State of California
California Regional Water Quality Control Board, Los Angeles Region

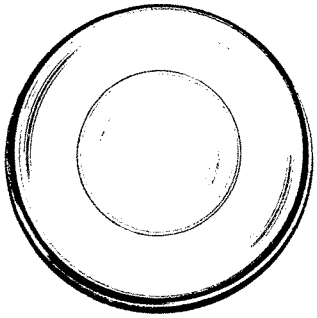
Amendment
to the
Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

adopted on November 5, 2009

Administrative Record
Volume 1 of 4

Malibu Prohibition Administration Record



Electronic Portion
February 2010
Regional Water Quality Control Board
Los Angeles Region

Wendy Phillips - R4 - BP Amendment - Malibu Prohibition

From: Wendy Phillips
To: Nicholas Martorano
Date: Wednesday, February 17, 2010 5:22 PM
Subject: R4 - BP Amendment - Malibu Prohibition
CC: David Koo; Deborah Smith; Dionisia Rodriguez; Elizabeth Erickson; Enrique Casas; Jeff Ogata; Orlando Gonzalez; Rebecca Chou; Rosie Villar; Toni Callaway; Tracy Egoscue
Attachments: 3. RESOLUTION.pdf; Malibu Resolution.doc; Title 23 Concise Summary 10-02.doc; Wendy Phillips.vcf

Hi Nick - We have two copies of the Admin Record going in the mail to you tomorrow. You already have an electronic version of our Powerpoint presentation. Attached, per your request, are the final resolution in both pdf and Word versions (the amendment language is attached to the resolution), and a draft concise summary (similar to the R8 example you sent). We still owe you the index and Excel file of our Lyris e-mail subscriptions -- we'll send these to you tomorrow. I understand that certification from the Chief Counsel is something that happens during the State Board review process. Re the Response to Comments, these are in the form of about 70 pages of matrices (in multiple files). You'll find a nice hard copy of it in Volume 2 of the Admin Record. If you still want an electronic version, please let Rebecca know, and she can consolidate it and send it to you.

Here's on overview of the Admin Record.

- **Hard Copy portion:** These include four volumes of draft and final documents, covering the period of July 31, 2009 (when we released our initial draft) to November 5, 2009 (when the Board adopted the amendment). A few special notes for you on our approach to organizing this admin record:
  - Volume 1: This includes all final documents, including the adopted resolution and final version of the technical staff report and environmental staff report. We also included the Nov 5, 2009 transcript in this volume.
  - Volume 2: This includes materials we used at the Board meeting on November 5, 2009, including the agenda item, staff reports, response to comments, presentations, sign-in sheets, etc.
  - Volume 3: This includes early drafts (July 31, 2009 and October 21, 2009) of the resolution and technical and environmental staff reports.
  - Volume 4: This includes our mandated public noticing and discretionary outreach efforts.
  - Peer Reviews: We completed an extensive review by external peers, and have included peer review materials as you specified. We had three peers review of two of our Tech Memos: Tech Memo #3 (nitrogen released from septics to Malibu Lagoon) and Tech Memo #4 (pathogens released from septics to the beaches):
    - Documents (reviews) received from peers: Because of keen stakeholder interest, all six peer reviews plus our staff responses are embedded as appendices to the appropriate Tech Memos, starting with the Oct 21, 2009 draft in Volume #3) and also in the final document (Nov 5, 2009) in Volume 1.
    - Tech Memos and transmittals submitted to peers: The documents that we submitted to the peers for review are separate from the peer reviews and staff responses (noted above), and included in Volume 3 (see the index).

- **Electronic portion:** Each hard copy of the Admin Record includes a DVD with about 4 GB of backup documents and references. An index for this electronic portion includes identification and files names.

The contact person in R4 is Dr. Rebecca Chou, Unit Chief for Groundwater Permitting. She may be reached at (213) 610-6156. (Or you may reach me tomorrow, or during the last two weeks of March.) Thanks for your efforts to facilitate this for us at State Board and OAL.

Wendy

Wendy Phillips wphillips@waterboards.ca.gov
Chief, Groundwater Cleanup and Permitting Section
CA Regional Water Quality Control Board, LA Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013
phone: (213) 576-6618 fax: (213) 576-5777

California Regional Water Quality Control Board Los Angeles Region
Resolution R4-2009-007: Amendment to the
Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties
to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area

	Volume #1 Final Documents Arising from Nov 5, 2009 Hearing	
1950 to 2009	Electronic portion of the Administration Record. See index, starting on page eight, for the electronic files	DVD in pocket, in front flap of Volume1
Nov 5, 2009	CA RWQCB-LA, Resolution No. R4-2009-007 – Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties,* to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area	1-1
Nov 5, 2009	CA RWQCB-LA, Final **Technical Staff Report**, presenting Evidence for an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties,* to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area	1-13
	▪ Overview	1-15
	▪ Technical Memorandum No. 1: *Dischargers Have Poor Records of Compliance with Regional Board Orders*	1-37
	▪ Technical Memorandum No. 2: *Pathogens and Nitrogen in Wastewater Impair Underlying Groundwater as a Potential Source of Drinking Water*	1-48
	▪ Technical Memorandum No. 3: *Pathogens in Wastewater that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation*	1-168
	▪ Technical Memorandum No. 4: *Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life*	1-260
	▪ Technical Memorandum. 5: *Dischargers with Unsuitable Hydrogeologic Conditions for High Flows of Wastewaters Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities*	1-333
Nov 5, 2009	CA RWQCB-LA, Final **Environmental Staff Report** containing substitute environmental documentation in accordance with the California Environmental Quality Act in support of an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties,* to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area	1-359
Nov 5, 2009	Kennedy Court Reporters, Inc, Transcript of CA RWQCB-LA Public Meeting	1-412

	Volume #2 Items from Public Hearing on Nov 5, 2009	
Nov 5, 2009	CA RWQCB-LA, Agenda for Public Meeting	2-1
	CA RWQCB-LA, Agenda Item No. 9 Note: for the technical and environmental staff reports attached to this item (drafts dated October 21, 2009), see Volume #3.	2-6
Oct 30, 2009	CA RWQCB- LA, Response to Comments	2-32
	– Comments from Government	2-107
	– Comments from NGOs	2-218
	– Comments from WDR Dischargers	2-267
	– Comments from Other Dischargers	2-385
	– Comments from Other	2-591
Nov 5, 2009	Presentations during CA RWQCB-LA Public Meeting: – CA RWQCB-LA staff	2-608
	– City of Malibu representatives	2-675
	– Heal the Bay staff	2-765
Nov 5, 2009	CA RWQCB-LA, Sign-In Sheet at Public Meeting	2-773
Nov 5, 2009	CA RWQCB-LA, Speaker Cards collected at Public Meeting	2-776

	Volume #3 **Submittals to Peer Reviewers and Staff Report Drafts** **(October 21, 2009 and July 31, 2009) circulated for Public Comment**	
Aug 20, 2009	CA RWQCB-LA, transmittal to Jorg E. Drewes (peer reviewer)	3-1
Aug 28, 2009	CA RWQCB-LA, transmittal to Robert Arnold (peer reviewer)	3-3
Sep 3, 2009	CA RWQCB-LA, transmittal to JoAnn Silverstein (peer reviewer)	3-5
Aug 6, 2009	CA RWQCB-LA, attachments to peer review transmittals of Aug 20, 2009, Aug 28, 2009, and Sep 3, 2009, including transmittal letter to Gerald W. Bowes, dated Aug 6, 2009, and attachments:	3-7
	– 'Plain English' summary of the *Basin Plan* amendment, and draft resolution and amendment language	3-11
	– Scientific Issues to be addressed by peer review for Technical Memoranda #3 and #4 of the proposed Prohibition on On-Site Wastewater Disposal Systems (OWDSs), drafts dated July 31, 2009 and August 5, 2009 respectively.	3-31
	– List of Participants in Tech Memos #3 and #4.	3-33
	– Technical Staff Report (Overview – draft dated July 31, 2009), in support of an Amendment to the *Water Quality Control Plan for Coastal Watersheds of Los Angeles and Ventura Counties* to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area, plus Tech Memos #3 and #4 – draft dated July 31, 2009.	3-35
	a. Technical Memorandum #3: **Pathogens in Wastewaters that are in Hydraulic Connection with Beaches are a Significant Source of Impairment to Water Contact Recreation,** by Elizabeth Erickson, P.G. – draft dated July 31, 2009.	3-35
	b. Technical Memorandum #4: **Nitrogen Loads in Wastewaters flowing to Malibu Lagoon Are a Significant Source of Impairment to Aquatic Life,** by Toni Calloway, P.G, Orlando Gonzalez, and Dr. C.P Lai, P.E. – draft dated August 5, 2009.	3-35
Aug 18, 2009	CA RWQCB-LA, Notice to delay peer review of Technical Memo #3	3-142
Sep 10, 2009	CA RWQCB-LA, transmittal to Jorge E. Drewes (peer reviewer)	3-143
Sep 10, 2009	CA RWQCB-LA, transmittal to Joann Silverstein (peer reviewer)	3-144
Sep 10, 2009	CA RWQCB-LA, transmittal to Robert Arnold (peer reviewer)	3-145
Sep 10, 2009	CA RWQCB-Attachments to peer review transmittals of Sept. 10, including: - Revised Attachment No. 2 (September 10, 2009) Description of Scientific Issues to be addressed by Peer Review.	3-146
	- Technical Memo #3 (draft dated September 10, 2009) in support of an Amendment to the *Water Quality Control Plan for Coastal Watersheds of Los Angeles and Ventura Counties* to Prohibit On-site Wastewater Disposal Systems (OWDSs) in the Malibu Civic Center Area.	3-147
	-Appendix T3-B Enterococcus Frequency Distributions for Civic Center Beaches and Selected Correlation Coefficients	3-183
	-Health Effects Criteria for Marine Recreational Waters, US EPA-600/1-80-031, August 1983.	3-185
	-An Epidemiological Study of Possible Adverse Health Effects of Swimming in Santa Monica Bay, Haile R.W. et al., May 7, 1996.	3-253
	-The Health Effect of Swimming in Ocean Water Contaminated by Storm Drain Runoff, Haile, R.W. et al., January 22, 1999, Epidemiology Resources.	3-545

	Volume #3 Submittals to Peer Reviewers and Staff Report Drafts (October 21, 2009 and July 31, 2009) circulated for Public Comment	
Sep 10, 2009	-What are the health risks of swimming in Santa Monica Bay?: An examination of issues surrounding the public health debate. Gold, Mark Andrew, 1994.	3-554
Oct 21, 2009	Draft Resolution	3-687
Oct 21, 2009	CA RWQCB-LA, **Draft Technical Staff Report,** presenting Evidence for an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties*, to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area	3-699
	▪ Overview	3-703
	▪ Technical Memorandum No. 1: *Dischargers Have Poor Records of Compliance with Regional Board Orders*	3-722
	▪ Technical Memorandum No. 2: *Pathogens and Nitrogen in Wastewater Impair Underlying Groundwater as a Potential Source of Drinking Water*	3-733
	▪ Technical Memorandum No. 3: *Pathogens in Wastewater that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation*	3-856
	▪ Technical Memorandum No. 4: *Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life*	3-948
	▪ Technical Memorandum. 5: *Dischargers with Unsuitable Hydrogeologic Conditions for High Flows of Wastewaters Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities*	3-1021
Oct 21, 2009	CA RWQCB-LA, **Draft Environmental Staff Report** containing substitute environmental documentation in accordance with the California Environmental Quality Act in support of an *Amendment to the Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties,* to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area	3-1047
Jul 31, 2009	Notice of Public Hearing	3-1098
Jul 31, 2009	Draft Resolution	3-1103
Jul 31, 2009	CA RWQCB-LA, **Draft Technical Staff Report,** presenting Evidence for an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties,* to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area	3-1112
	▪ Overview	3-1114
	▪ Technical Memorandum No. 1: *Dischargers Have Poor Records of Compliance with Regional Board Orders*	3-1126
	▪ Technical Memorandum No. 2: *Pathogens and Nitrogen in Wastewater Impair Underlying Groundwater as a Potential Source of Drinking Water*	3-1132
	▪ Technical Memorandum No. 3: *Pathogens in Wastewater that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation*	3-1228
	▪ Technical Memorandum No. 4: *Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life*	3-1276
	▪ Technical Memorandum. 5: *Dischargers with Unsuitable Hydrogeologic Conditions for High Flows of Wastewaters Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities*	3-1320

	Volume #3 **Submittals to Peer Reviewers and Staff Report Drafts** **(October 21, 2009 and July 31, 2009) circulated for Public Comment**	
Jul 31, 2009	CA RWQCB-LA, **Draft Environmental Staff Report** containing substitute environmental documentation in accordance with the California Environmental Quality Act in support of an *Amendment to the Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties*, to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area	3-1344

	Volume #4 **Public Noticing and Outreach**	
Sep 10, 2009	The Malibu Times, Declaration of Notice on Sep 3, 10, and 17, 2009	4-1
Aug 25, 2009	CA RWQCB-LA, transmittal to the County of Los Angeles re Notice of Public Hearing	4-2
Oct 23, 2009	CA RWQCB-LA, transmittal to the City of Malibu re Title 14 Notice (re CEQA) and revisions to the draft Environmental Staff Report	4-4
Oct 23, 2009	CA RWQCB-LA, transmittal to the County of Los Angeles re Title 14 Notice (re CEQA) and revisions to the draft Environmental Staff Report	4-5
Oct 27, 2009	CA RWQCB-LA, transmittal to the City of Malibu of draft (dated October 27, 2009) resolution, and reminder about postings of Response to Comments and revisions to the Environmental Staff Report	4-6
Oct 27, 2009	CA RWQCB-LA, transmittal to County of Los Angeles of draft (dated October 27, 2009) resolution, and reminder about postings of Response to Comments and revisions to the Environmental Staff Report	4-7
Oct 27, 2009	CA RWQCB-LA, transmittal to the Santa Monica Bay Restoration Project of draft (dated October 27, 2009) resolution, and reminder about postings of Response to Comments and revisions to the Environmental Staff Report	4-8
Oct 27, 2009	CA RWQCB-LA, transmittal to Latham & Watkins of draft (dated October 27, 2009) resolution, and reminder about postings of Response to Comments and revisions to the Environmental Staff Report	4-9
Oct 27, 2009	CA RWQCB-LA, transmittal to La Paz (via Schmitz and Associates and CoxCastle) of draft (dated October 27, 2009) resolution, and reminder about postings of Response to Comments and revisions to the Environmental Staff Report	4-10
Oct 27, 2009	CA RWQCB-LA, transmittal to the Santa Monica-Malibu Unified School District of draft (dated October 27, 2009) resolution, and reminder about postings of Response to Comments and revisions to the Environmental Staff Report	4-11
Oct 27, 2009	CA RWQCB-LA, transmittal of draft Environmental Staff Report to the Las Virgenes Municipal Water District of draft (dated October 27, 2009) resolution, and reminder about postings of Response to Comments and revisions to the Environmental Staff Report	4-12
Oct 1, 2009	CA RWQCB, Workshop Presentation and Handouts	4-13
Oct 1, 2009	CA RWQCB, Sign-In Sheet at Workshop	4-22
Sep 1, 2009	CA RWQCB, Workshop Presentation and Handouts	4-35
Sep 1, 2009	CA RWQCB, Sign-In Sheet at Workshop	4-55
Sep 1, 2009	CA RWQCB, Speaker Cards at Workshop	4-71
Jul to Nov 2009	CA RWQCB-LA, Lyris e-mail subscription list, and e-mails sent to subscribers. Note that this information was also posted on the Web site for the CA RWQCB, at www.waterboards.ca.gov/losangeles/	4-100
Jul 31, 2009	- Initial email - link provided to tentative resolution and staff reports (drafts dated Jul 31, 2009)	4-117
Aug 5, 2009	- Corrections to Tech Memo #4	4-118
Aug 11, 2009	- Corrections to Tech Memo #2	4-119
Aug 19, 2009	- Location and Parcel Map	4-121
Aug 19, 2009	- Change of date for Public Hearing	4-123
Aug 19, 2009	- Announce Community Meeting – Workshop Sep 1, 2009	4-129
Aug 20, 2009	- Clarity of Maps (Boundry Lines)	4-131

	Volume #4 Public Noticing and Outreach	
Aug 24, 2009	– Raw data to Tech Memo #3	4-133
Aug 25, 2009	– Further clarity to maps	4-134
Aug 26, 2009	– Further clarity to maps	4-136
Aug 26, 2009	– Reminder for workshop Sep 1, 2009	4-138
Aug 28, 2009	– Room change for workshop	4-140
Sep 10, 2009	– Announce community meeting Oct 1, 2009	4-141
Sep 10, 2009	– Tech Memo #3	4-143
Sep 16, 2009	– Parking instructions to community meeting	4-144
Sep 16, 2009	– Left out attachment to map from email #16	4-145
Sep 28, 2009	– Reminder for the community meeting Oct 1, 2009	4-146
Sep 30, 2009	– Last reminder for the community meeting Oct 1, 2009	4-148
Oct 6, 2009	– Reminder Deadline for Comments Oct 8, 2009 at 2 :00 pm	4-149
Oct 14, 2009	– Change of Venue to Board Meeting Nov 5, 2009	4-150
Oct 15, 2009	– Change of Venue for Public Meeting on Nov 5, 2009	4-151
Oct 22, 2009	– Revised Drafts for Tech Memo #3 and #4, Peer Reviews, and Responses to Peer Reviews	4-152
Oct 23, 2009	– Title 14 Notice (re CEQA), revisions to Resolution, Tech Staff Report…instructions re downloading posted comment letters	4-153
Oct 30, 2009	– Posting of matrices for responses to comments	4-155
Nov 2, 2009	– Public Hearing - re: speakers	4-156
Nov 18, 2009	– Final Resolution	4-157

Administrative Record Index - Electronic Portion (see DVD attached)
California Regional Water Quality Control Board Los Angeles Region
Resolution R04-2009-007
Amendment to the Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties to prohibit onsite wastewater disposal systems in the Malibu Civic Center Area

ITEM	FILE FOLDER NAME		FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER		
Environmental Staff Report	Basin Plan - TMDLs	Basin Plan	10 files by chapters	1994
		Santa Monica Bay Bacteria TMDL	dry bacteria resolution	2002
			Wet bacteria resolution	2002
			dry bacteria TMDL	2002
			Wet Weather bacteria TMDL	2002
			Dry Weather Only staff report	2002
			wet weather bacteria staff report	2002
		Malibu Creek Trash TMDL	Malibu Creek Trash TMDL	2008
			Malibu Creek Trach TMDL resolution	2008
			MCW Trash Staff Rpt 021408	2008
			MCW Trash SED 021408	2008
		Malibu Creek Bacteria TMDL	Malibu Creek Bacteria TMDL	2004
			Malibu Creek Bacteria TMDL Staff Report	2004
			Malibu Creek Bacteria TMDL resolution	2004
		Other Orders Resolutions	MOU termination resolution	2009
			Malibu Lumber WDR package	2008
			MOU termination board package	2009
	CEQA	CEQA Economic	CA RWQCB- LA, Cost Assumptions1 Malibu	7.30,2009
			CA RWQCB- LA, Cost Estimated1 Malibu	7.30.2009
			CA RWQCB- LA, Cost for Installation of OWDS	8.10.2009
			CA RWQCB- LA and Malibu emails cost info	8.10.2009
			CA RWQCB- LA staff notes on fees	Aug.2009
			SWRCB, Summary of Financial Assistance	Nov.2009
			Septic System Permit Fees	2009
			SWRCB,Wastewater User Charge Survey Report	2009
		Malibu General Plan	27 files by chapters	Nov. 1995, as amended
		Scoping Meeting-1.21.2009	Scoping Meeting - Transcript 1.21.2009	1.21.2009
			Scoping Meeting - Sign-In Sheet 1.21.2009	1.21.2009
			Scoping Meeting - presentation 1.21.2009	1.21.2009
			Scoping Meeting - Notice 12.19.2008	1.21.2009
			Public Notice - Malibu Times 12.25.2008	12.25.2008
			Public Notice - LA Times 12.25.2008	12.25.2008
			Mailing List 12.19.2008	12.19.2008
			Comment Letters 1.2009 to 2.2009	1.2009 to 2.2009
			CEQA Checklist 1.21.2009	1.21.2009

ITEM	FILE FOLDER NAME		FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER		
Maps			Alquist-Priolo Earthquake Fault Zones malibu	6.1.1995
			designation in zoning codes malibu	
			FEMA Issued Flood Maps JPEG	
			Index of Alquist-Priolo Earthquake Fault Zones	2000
Technical Memorandum No.1 and No.2	Monitoring Reports		Various dischargers-600 quarterly and annual reports from 19 WDR sites and Stone Report	7.22.1999-11.30.2009
	NOVs		CA RWQCB- LA 29 NOVs issued	4.4.2009-8.24.2009
	References		Basin Plan-coliform organisms	6.13.1994
			Basin Plan-potential beneficial use	
			California code of regulation,title 22,section64426.1-total coliform	10.11.2007
			Drinking Water Health Advisories-total coliform	Summer 2006
			Geology and Future Well Sites, Encinal - La Chusa Area	
			Ground Water Resources of Mrs. Rhoda Adamson's Property	
			Summary of Water Quality Problems, Interim and Permanent Solutions for Malibu Water Company	
			Supplemental Report on Ground Water Supply in Malibu Canyon and Vicinity	12.16.1957
			Water Reserves of Malibu Water Company	8.30.1951
	Stone Report		Stone Environment, Inc. -Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California:	8.30.2004
			Maps	
			Figures	
			Reports	
			Tables	
			Appendix 1-monitoring well construction logs	
			Appendix 2-hydraulic conductivity testing results	
			Appendix 3-hydrology model report	
			Appendix 4-materials from stakeholders presentation	
	WDR and TSO		CA RWQCB-LA 20 WDR and 6 TSO	12.3.1998-2.11.2009

ITEM	FILE FOLDER NAME			FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER			
Technical Memorandum No.3	Tech Memo #3 Bibliography and documents		1	Allen, L.A., Brooks, E. and Williams, I.L. "Effect of treatment at the Sewage Works on the Numbers and Types of Bacteria in Sewage." The Journal of Hygiene 47.3 (1949).	1949
			2	Azadpour-Keeley, A., Faulker, B.R., and Chen, J.S. "Movement and Longevity of Viruses in the Subsurface." U.S. Environmental Protection Agency: Ground Water Issue April 2003.	2003
			3	Bales, R.C., Gerba, C.P., Grondin, G.H., and Jensen, S.L. 1989. "Bacteriophage Transport in Sandy Soil and Fractured Tuff." Applied and Environmental Microbiology 55:8 (1989): 2061-2067.	1989
			4	Birosik, S.A. Los Angeles Public Works Public Meeting and Malibu Citizens Committee Public Meetings. "Re: Public Hearing in Malibu to Discuss Proposed Malibu Wastewater Facilities Plan." July 9, 1987.	1987
			5	Birosik, S.A. "Re: Malibu Sewer Meetings, September 7 and 12." September 13, 1988.	1988
			6	Birosik, S.A. "Re: Malibu Wastewater System Citizens' Committee/Public Forum, September 28, 1988." September 30, 1988.	1988
			7	Birosik, S.A. "Re: Malibu Sewer Issue – Board of Supervisors Hearing and Malibu Seminar." January 18, 1989.	1989
			8	Bloch, A.B., Stramer, S.L., Smith, D., Margolis, H.S., Fields, H.A., McKinley, T.W., Gerba, C.P., Maynard, J.E., and Sikes, R.K. "Recovery of Hepatitis A Virus from Water Supply Responsible for a Common Source Outbreak of Hepatitis A." American Journal of Public Health 80.4 (1990): 428-430.	1990
			9	Boehm, A.B., Shellenbarger, G.G., and Paytan, A. "Groundwater Discharge: Potential Association with Fecal Indicator Bacteria in the Surf Zone." Environmental Science and Technology 38.13 (2004): 3558-3566.	2004
			10	Borchardt, M.A., Bertz, P.D., Spencer, S.K. and Battigelli, D.A. "Incidence of Enteric Viruses in Groundwater from Household Wells in Wisconsin." Applied and Environmental Microbiology 69.2 (2003):1172-1180.	2003
			11	Borchardt, M.A., Chyou, P.H., DeVries, E.O. and Belongia, E.A. "Septic System Density and Infectious Diarrhea in a Defined Population of Children." Environmental Health Perspectives 111.5 (2003): 742-748.	2003
			12	Cabelli, V.J. "Health Effects Criteria for Marine Recreational Waters." U.S. Environmental Protection Agency Research and Development EPA-600/1-80-031 (1983).	1983
			13	California Department of Public Health. MacPherson, W. "Report on Investigation of Ocean and Stream Waters, Malibu Area." July 1970.	1970
			13a	California Department of Water Resources to California Regional Water Quality Control Board-Los Angeles Region: "Letter on Public Hearing on Waste Disposal Problems in the Malibu Area", February 11, 1970.	1970

ITEM	FILE FOLDER NAME			FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER			
Technical Memorandum No.3	Tech Memo #3 Bibliography and documents		14abc	California Regional Water Quality Control Board, Los Angeles Region. "Consideration of Action Relative to Sewage Disposal Problem in Malibu Area." April 8, 1970.	1970
			15	California Regional Water Quality Control Board, Los Angeles Region letter to LA County Supervisors. "Re: Sewerage System, Malibu Area." March 12, 1971.	1971
			16	California Regional Water Quality Control Board, Los Angeles Region. Resolution No. 72-4. "Policy Statement Relative to Sewage Disposal in the Malibu Area (File 70-19)." May 31, 1972.	1972
			17	California Regional Water Quality Control Board, Los Angeles Region. "Resolution No. 98-023: Malibu Creek Watershed." December 14, 1998.	1998
			18	California Regional Water Quality Control Board, Los Angeles Region. "Details from Selected Malibu Studies." September 26, 2001.	2001
			19	California Regional Water Quality Control Board, Los Angeles Region. "Total Maximum Daily Load to Reduce Bacterial Indicator Densities during Dry Weather at Santa Monica Bay Beaches." January 14, 2002.	2002
			20	California Regional Water Quality Control Board, Los Angeles Region. "Consideration of a Proposed Resolution Amending the Water Quality Control Plan (Basin Plan) to Incorporate a Wet-Weather Total Maximum Daily Load to Reduce Bacteria at Santa Monica Bay Beaches, staff report" December 12, 2002.	2002
			21	California Regional Water Quality Control Board, Los Angeles Region. "Total Maximum Daily Loads for Bacteria, Malibu Creek Watershed." January 29, 2004.	2004
			22	California Regional Water Quality Control Board, Los Angeles Region. Final Staff Report. "Proposed Amendments to the Water Quality Control Plan for the Los Angeles Region (Basin Plan) to Incorporate Changes to the Total Maximum Daily Load (TMDL) for Bacteria in the Malibu Creek Watershed, staff report" December 13, 2004.	2004
			23	California Regional Water Quality Control Board, Los Angeles Region. "Santa Monica Bay Beaches Wet-Weather Bacteria TMDL." February 3, 2009.	2009
			24	California Regional Water Quality Control Board Staff, Internal Document. Analysis: Hyperion, "Dispersion of the Plume from Hyperion Treatment Plant's 5-Mile Outfall." pre 2007.	2007
			25	Chu, A.K. and Sanders, B.F. "Data Requirements for Load Estimation in Well-Mixed Tidal Channels." Journal of Environmental Engineering (Aug. 2003): 765-773.	2003
			26	County of Los Angeles Health Department. "Waste Disposal Problems – Malibu Area." February 5, 1970.	1970
			27	County of Los Angeles Department of Health Services to LA Supervisors. Staff Report. "Malibu Sewers-County Improvement District." April 10, 1985.	1985

ITEM	FILE FOLDER NAME			FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER			
Technical Memorandum No.3	Tech Memo #3 Bibliography and documents		28	Cuyk, S.V., Siergrist, R.L. Lowe, K. and Harvey, R.W. "Vadose Zone Processes and Chemical Transport." Journal of Environmental Quality 33 (2004): 316-329.	2004
			29	Dalkey, A. and Shisko, J.F. "Observations of Oceanic Processes and Water Quality Following Seven Years of CTD Surveys in Santa Monica Bay, California." Southern California Academy of Science 95.1 (1996): 17-32	1996
			30	De Sieyes, N.R., Yamahara, K.M., Layton, B.A., Joyce, E.H. and Boehm, A.B. "Submarine Discharge of Nutrient-Enriched Fresh Groundwater at Stinson Beach, California is Enhanced during Neap Tides." Limnology and Oceanography 53.4 (2008): 1434-1445.	2008
			31	Gold, M.A. "What are the health risks of swimming in the Santa Monica Bay? An Examination of the Issues surrounding the public health debate." Dissertation University of California, Los Angeles, 2004.	2004
			32	Goyal, S.M., and Gerba, C.P. "Comparative Adsorption of Human Enteroviruses, Simian Rotavirus, and Select Bacteriophages to Soils." Applied and Environmental Microbiology 38.2 (1979): 241-247.	1979
			33	Gronewold, A.D. and Wolpert, R.L. April 7, 2008. "Modeling the Relationship Between Most Probable Number (MPN) and Colony-Forming Unit (CFU) Estimates of Fecal Coliform Concentration." Elsevier, April 7, 2008.	2008
			34	Ground Water Monitoring and Assessment Program: "Effects of Septic Systems on Ground Water Quality- Baxter, Minnesota." Minnesota Pollution Control Agency Ground Water and Toxics Monitoring Unit, May 1999.	1999
			34a	Haile, R. W., et. al. 1996, An Epidemiological Study of Possible Adverse Health Effects of Swimming in Santa Monica Bay, Heal the Bay, May 7, 1996.	1996
			34b	Haile, R.W. et. al. 1999, the Health Effects of Swimming in Ocean Water Contaminated by Storm Drain Runoff, Epidemiology Resources, Inc.	1999
			35	Los Angeles County Flood Control District. "Waste Disposal Problems, Malibu Area." February 5, 1970.	1970
			36	Marco Island, City of. "City of Marco Island Position Paper-Septic Tank Replacement Program." http://www.cityofmarcoislanf.com/Pulic_Documents/MarcoIslanfFL_dwp/position.	
			37	McCorquodale, J.A. and A.J. Engladde. "Final Report: Fate of Pathogens in Storm Water Runoff." U.S. Environmental Protection Agency National Center for Environmental Research, 2003.	2003
			38	McDonald Morrissey Associates, Inc. "Draft Malibu Model Report" May 5, 2004.	2004
			39	McDonald Morrissey Associates, Inc. "Ground-Water Flow and Solute Transport Modeling Malibu, California." Santa Monica Bay Restoration Project, July 28, 2004.	2004

ITEM	FILE FOLDER NAME			FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER			
Technical Memorandum No.3	Tech Memo #3 Bibliography and documents		40	Nicosia, L.A., Rose, J.B., Stark, L., and Stewart, M.T. "Ground Water Quality: A Field Study of Viruses Removal in Septic Tank Drainfields." Journal of Environmental Quality 30 (2001): 1933-1939.	2001
			41	Noble, R.T, and Fuhrman, J.A. "Virus Decay and Its Causes in Coastal Waters." Applied and Environmental Microbiology 63.1 (1997): 77-83.	1997
			42	This reference intentionally left blank.	
			43	Pradhan, S., Hoover, M.T., Clark, G.H., Gumpertz, M., Wolhum, A.G., Cobb, C. and Strock, J. "Septic Tank Additive Impacts on Microbial Populations." Journal of Environmental Health 70.6 (2008): 22-27.	2008
			43abc	Questa Engineering, July 7, 2003, Preliminary Conceptual Plan for Wastewater Reclamation in the Civic Center Area, Malibu, California.	2003
			44	Rong, Y. "Pitfalls in Statistics for Environmental Sampling Evaluation." Environmental Geosciences 4.3 (1997): 149-152.	1997
			45	L., J.M.. "Re: Malibu Regional Wastewater System Citizens Committee August 22, 1988." August 23, 1988.	1988
			46	L., J.M.. "Re: Malibu Regional Wastewater System Citizens Committee October 4, 1988." October 5, 1988.	1988
			47	Sanders, B., Grant, S.B., Horne, A., Keller and R., Sobsey, M.D. "Final Report: Identification and Control of Non-point Sources of Microbial Pollution in a Coastal Watershed." U.S. Environmental Protection Agency National Center for Environmental Research, 2001.	2001
			48	Sanders, B., Grant, S.B., Horne, A., Keller and R., Sobsey, M.D. "Progress Report: Identification and Control of Non-Point Sources of Microbial Pollution in a Coastal Watershed." U.S. Environmental Protection Agency National Center for Environmental Research, 2001.	2001
			48a	Santa Monica Bay Beaches Bacterial TMDLs Coordinated Shoreline Monitoring Plan, April 7, 2004.	2004
			49	Schaub, S.A. and Sorber, C.A. "Virus and Bacteria Removal from Wastewater by Rapid Infiltration through Soil." Applied and Environmental Microbiology 33.3 (1977): 609-619.	1977
			50	Schijven, J.F. and Hassanizadeh, S.M. "Virus Removal by Soil Passage at Field Scale and Groundwater Protection of Sandy Aquifers." Water Science and Technology 46.3 (2002): 123-129.	2002
			51	Stone Environmental, Inc. "Final Report-Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, CA." Santa Monica Bay Restoration Commission, August 30, 2004.	2004
			52	Stramer, S.L., and Cliver, D.O. "Septage Treatments to Reduce the Numbers of Bacteria and Polioviruses." Applied and Environmental Microbiology 48.3 (1984): 566-572.	1984

ITEM	FILE FOLDER NAME			FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER			
Technical Memorandum No.3	Tech Memo #3 Bibliography and documents		53	Tetra Tech, Inc. "Nutrient and Coliform Modeling for the Malibu Creek Watershed TMDL Studies." U.S. Environmental Protection Agency, Region 9 and LARWQCB, December 31, 2002.	2002
			54	United States Environmental Protection Agency, Office of Water. "Occurrence and Monitoring Document for the Final Ground Water Rule." October 2006.	2006
			55	United States Environmental Protection Agency, Office of Water. "Linkage between Water Quality Targets and Pollutant Sources." Protocol for Developing Nutrient TMDLs. (2001): 6.1-7.3.	2001
			56	United States Environmental Protection Agency. "Predicting Attenuation of Viruses during Percolation in Soils." August 2002.	2002
			57	University of California, Los Angeles. "Highlights from Lower Malibu Creek and Resource Enhancement and Management Report." California State Coastal Conservancy, February 1999.	1999
			58	URS Greiner Woodward Clyde. "Final Report, Study of Potential Water Quality Impacts on Malibu Creek and Lagoon from On-site Septic Systems." City of Malibu, June 1999.	1999
			59	United States Environmental Protection Agency, Region 9. "Total Maximum Daily Loads for Nutrients Malibu Creek Watershed, Public Review Draft." March 21, 2003.	2003
			60	Vaughn, J.M., Landry E.F., Baranosly, L.J., Beckwith, C.A., Dahl, M.C. and Delihas, N.C. "Survey of Human Virus Occurrence in Wastewater-Recharged Groundwater on Long Island." Applied and Environmental Microbiology 36.1 (1978):47-51.	1978
			60a	Warshall, Peter and Associates, and Philip Williams and Associates, Ltd. "Malibu Wastewater Management Study." 1992.	1992
			61	Yates, M.V., Gerba, C.P. and Kelley, L.M. "Virus Persistence in Groundwater." Applied and Environmental Microbiology 49.4 (1985): 778-781.	1985
			62	Yates, M.V., Yates, S.R., Warrick, A.W. and Gerba C.P. "Use of Geostatistics to Predict Virus Decay Rates for Determination of Septic Tank Setback Distances." Applied and Environmental Microbiology 52.3 (1986): 479-483.	1986
			63	Yamahara, K.M., Layton, B.A., Santoro, A.E., and Boehm, A.B. "Beach Sands along the California Coast are Diffuse Sources of Fecal Bacteria to Coastal Waters." Environmental Sciences & Technology 41 (2007): 4515-4521.	2007
			64	Yamahara, K.M., Walters, S.P., and Boehm, A.B. "Growth of Enterococci in Unaltered, Unseeded Beach Sands Subjected to Tidal Wetting." Applied and Environmental Microbiology. 75.6 (2009): 1517-1524.	2009
	Tech Memo #3 Indexed Additional References Consulted		1	Ambient Water Quality Criteria for Bacteria, 1986	1986
			2	Ballona Wetlands, 2006	2006
			3	Beach Population Data: Santa Monica Bay, 1999-2006	1999-2006
			4	Boehm, A.B., et. al., 2002, Decadal and Shorter Period Variability of Surf Zone Water Quality.	2002

ITEM	FILE FOLDER NAME			FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER			
Technical Memorandum No.3	Tech Memo #3 Indexed Additional References Consulted		5	Boehm, A.B., et.al., 2005,Composition and Flux of Groundwater from California Beach Aquifer	2005
			6	Boehm, A.B. 2005, Tidal Forcing of Enterococcus at Marine Recreational	2005
			7	Brinks, Dwight, 2008, Health Risks Bathing in Southern California	2008
			8	California Sea Grant College publication, 2009, Septic Tanks	2009
			9	Colford, J.M., 2006, Water Quality Indicators and the Risk	2006
			10	Colloid Transport Project, 2009	2009
			11	Dwight, R.H., et. al. 2004, Estimating the Economic Burden from Illness	2004
			12	Izbicki, J.A., et. al., 2009, Sources of Fecal Indicator Bacteria in Urban Streams and Ocean Beaches, Santa Barbara, California	2009
			13	transport	2003
			14	Minnesota Pollution Control Agency GWMAP, 2000, Groundwater Quality under 3 Unsewered Subdivisions	2000
			15	Turbow, D.J., et. al., 2003, Evaluation of Recreational Health Risks	2003
			16	County, Staff Report and Recommendation on Consistency	2001
			17	Vance, David, 1994, Particulate Transport in Groundwater, Part 1-Colloids	1994
	Tech Memo #3 Data Releases		1	Enterococcus in Groundwater Wells Data Released Aug 2009	August.2009
			2	FecalTotal Coliform Data Release Aug 2009	
			3	Station Sample Enterococcus. Data - Data Release Aug 2009	
Technical Memorandum No.4	Data and References			Crites & Tchobanoglous, Table 4-3 and Table 4-4	1998
				Crites and Tchobanoglous Tables 4-12, 4-13 and 4-14	1998
				Crites and Tchobanoglous page 4-19	1998
				5 Geologic Cross Sections for Malibu Water Company Geology Reports-Amarillo Cyn, Malibu Lake, Malibu Cyn, Marie Cyn and Malbu Knolls Highlands	May.1950
				HRL Industrial Wastewater Nitrogen Load	2003
				Malibu Water Company Geology Reports	1950-1960
				Malibu Civic Center area permitting summary on spreadsheet	9.212009
				CA RWQCB-LA, Staff notes in Malibu Geology & Hydrology	2009
				Metcalf & Eddy Fourth Edition Tables 3-1 to 3-4	2003
				Metcalf & Eddy Third Edition Table 2-9 and Table 3-26	1991
				Metcalf & Eddy Third Edition Table 14-7	1991
				Tapia WRF Nitrogen for 2009 Summer Season	Summer 2009
	Old Malibu Well Water Data			9 files for 9 areas	1949-1997

ITEM	FILE FOLDER NAME		FILE NAME	DATE
	MAIN FOLDER	SUB-FOLDER		
Technical Memorandum No.5	Monitoring Reports		See TM #1 and TM #2 Monitoring Reports folder	7.22.1999- 11.30.2009
	Data and References		Census - City of Malibu	2000
			City of Malibu - Malibu Yesterday Today and Tomorrow	.2006-2008
			EPA Source Water Protection Practices Bulletin	July.2001
			Southern Calif. Association of Gov-Profile of City of Malibu	May.2009
			CA RWQCB- LA Population and Water Consumption Analysis	10.1.2009
			City of ManhattanBeach-Emissions Inventory	August.2007
			LA County Lechuza Fire station 572 Rainfall Data	1979-2009
			USEPA- Emmission Facts	February.2005
			LA County Waterworks District 29- Water Consumption Data	1989-2004

Resolution

State of California
California Regional Water Quality Control Board, Los Angeles Region

Resolution No. R4-2009-007

Amendment to the
Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties
to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

WHEREAS, the California Regional Water Quality Control Board, Los Angeles Region (hereinafter Regional Board), finds that:

1. In the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (hereafter *Basin Plan*), the Regional Board designated beneficial uses and established water quality objectives for the following water resources in the Civic Center area of the City of Malibu:

   Groundwater: Municipal and Domestic Supply (Potential), Industrial Process and Service Supply, and Agricultural Supply.

   Malibu Lagoon: Navigation; Water Contact Recreation; Non-contact Water Recreation; Estuarine Habitat; Marine Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wetland Habitat.

   Malibu Creek: Water Contact Recreation; Non-contact Water Recreation; Warm Freshwater Habitat; Cold Freshwater Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wetland Habitat.

   Malibu Beach and Malibu Lagoon Beach (Surfrider Beach), Amarillo Beach, and Carbon Beach: Navigation; Water Contact Recreation; Non-contact Water Recreation; Commercial and Sport Fishing; Marine Habitat; Wildlife Habitat; Spawning, Reproduction, and/or Early Development; and Shellfish Harvesting.

2. In the 2006 Clean Water Act Section 303(d) list, approved by the United States Environmental Protection Agency (US EPA) on June 28, 2007, impairments to beneficial uses were formally identified for the following water resources:

   Malibu Lagoon: impaired by Coliform Bacteria, Eutrophication.
   Malibu Creek: impaired by Coliform Bacteria, Nutrients (Algae).
   Malibu Beach: impaired by Indicator Bacteria.
   Malibu Lagoon Beach (Surfrider Beach): impaired by Coliform Bacteria.
   Carbon Beach: impaired by Indicator Bacteria.

3. To restore water quality and impaired beneficial uses, the US EPA and/or Regional Board have adopted the following Total Maximum Daily Loads (TMDLs):

   i. **Malibu Creek Watershed Nutrient TMDL:** The US EPA, on March 21, 2003, specified a numeric target of 1.0 mg/l for total nitrogen during summer months (April 15 to November 15) and a numeric target of 8.0 mg/L for total nitrogen during winter months (November 16 to April 14). Significant sources of the nutrient pollutants include discharges of wastewaters from commercial, public, and residential land use activities. The TMDL specifies a load allocation for on-site wastewater disposal systems of 6 lbs/day during the summer months and 8 mg/L during winter months.

   ii. **Malibu Creek and Lagoon Bacteria TMDL**: The Regional Board specified numeric targets, effective January 24, 2006, based on single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. Sources of bacteria loading include storm water runoff, dry-weather runoff, on-site wastewater disposal systems, and animal wastes. The TMDL specifies load allocations for on-site wastewater disposal systems equal to the allowable number of exceedance days of the numeric targets. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 to October 31), there are no allowable exceedance days, in winter dry weather (November 1 to March 31), there are three allowable exceedances days, and in wet weather (defined as days with >=0.1 and the three days following the rain event), there are 17 allowable exceedance days.

   iii. **Santa Monica Bay Beaches Wet and Dry Bacteria TMDL:** For beaches along the Santa Monica Bay impaired by bacteria in dry and wet weather, the Regional Board specified numeric targets, effective July 15, 2003, based on the single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. The dry weather TMDL identified the sources of bacteria loading as dry-weather urban runoff, natural source runoff and groundwater. The wet weather TMDL identified stormwater runoff as a major source. The TMDLs did not provide load allocations for on-site wastewater disposal systems, meaning that no exceedances of the numeric targets are permissible as a result of discharges from non-point sources, including on-site wastewater disposal systems. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 to October 31), there are no allowable exceedance days, in winter dry weather (November 1 to March 31), there are three allowable exceedances days, and in wet weather (defined as days with >=0.1 and the three days following the rain event), there are 17 allowable exceedance days.

4. Pursuant to California Water Code section 13243, the Regional Board may, in its *Basin Plan*, specify certain conditions or areas where the discharge of waste, or certain types of

waste, will not be permitted. During a public meeting on December 14, 1998, the Regional Board directed the Executive Officer to prepare a prohibition of on-site wastewater disposal systems (OWDS) for consideration by the Regional Board. During a public meeting on November 13, 2008, the Regional Board discussed the need for a firm time schedule to address water quality problems in the Malibu Civic Center area and again directed staff to prepare a prohibition of on-site wastewater disposal systems for Board consideration.

5. For the purposes of this *Basin Plan* amendment, the "Malibu Civic Center area" is defined as the area within the lower Winter Canyon watershed, Malibu Valley watershed and adjacent coastal strips between and including Amarillo Beach and Surfrider Beach. A map depicting the boundaries of the Malibu Civic Center area is area is attached hereto as Exhibit 1.

6. In accordance with the California Water Code, sections 13280, 13281 and 13283, Regional Board staff presented technical evidence in a public hearing on November 5, 2009, demonstrating that discharges of wastewater from OWDSs in the Civic Center area fail to meet water quality objectives established in the *Basin Plan,* contribute to impairments of present or future beneficial uses of water resources, and cause pollution, nuisance or contamination. Section 13280 states that a determination that discharges from OWDSs should not be permitted shall be supported by substantial evidence. The evidence, as summarized in the Technical Staff Report, leads to the following conclusions:

   i. Dischargers in the Civic Center area subject to Orders from the Regional Board that specify waste discharge requirements (WDRs) for OWDSs have poor records of compliance.

   ii. Discharges of wastewaters released from OWDSs in the Civic Center area to groundwater contain elevated levels of pathogens and nitrogen that impair underlying groundwater as a potential source of drinking water.

   iii. Discharges of wastewaters released from OWDSs in the Civic Center area to groundwater that are in hydraulic connection with beaches along the mouths of unsewered watersheds transport pathogens that elevate risks of infectious disease for water contact recreation.

   iv. Discharges of wastewaters released from OWDSs in the Civic Center Area to groundwater that are in hydraulic connection with Malibu Lagoon transport a nitrogen load significantly in excess of the wasteload allocation in the nutrient TMDL established to restore water quality to a level sufficient to protect aquatic life and prevent nuisance resulting from eutrophication.

   v. Wastewater flows from OWDSs in the Civic Center area have been increasing. On many sites, hydrogeologic conditions are unsuitable for high flows of wastewater, and

many dischargers generate wastewater flows at rates that exceed their capacity to discharge on-site. These dischargers rely on pumping significant flows into tanker trucks that haul liquid sewage and sludge via public roadways to communities that have sewer and wastewater treatment facilities.

7. Peer reviews of the scientific portions of the technical staff report were conducted pursuant to California Health and Safety Code section 57004. The peer reviewers confirmed that the technical staff report was based upon sound scientific knowledge, methods and practices.

8. No authorized public agency has offered satisfactory assurance that discharge systems are appropriately designed, located, sized, spaced, constructed, and maintained, such that they are adequate to protect the quality of water for beneficial uses in the Malibu Civic Center area, pursuant to the California Water Code section 13282.

9. Pursuant to the California Water Code section 13283, the State Water Resources Control Board (State Board) is required to include a preliminary review of possible alternatives necessary to achieve protection of water quality and present and future beneficial uses of water, and prevention of nuisance, pollution, and contamination, including, but not limited to, community collection and waste disposal systems which utilize subsurface disposal, and possible combinations of individual disposal systems, community collection and disposal systems which utilize subsurface disposal, and convention treatment systems. The Regional Board has conducted a preliminary review of possible alternatives, as documented in the staff report.

10. The basin planning process has been certified as functionally equivalent to the California Environmental Quality Act (CEQA), including preparation of an initial study, negative declaration, and environmental impact report (California Code of Regulations, title 14, section 15251(g)). As this amendment is part of the basin planning process, staff has prepared an Environmental Staff Report, which is considered a substitute to an initial study, negative declaration, and/or environmental impact report. This Environmental Staff Report satisfies the substantive requirements of the California Code of Regulations, title 23, section 3777(a), and includes a project description, environmental checklist, reasonable alternatives, alternative methods of compliance with the Basin Plan amendment, and mitigation measures. The Environmental Staff Report, together with this resolution and the responses to comments constitute the Substitute Environmental Documents, as specified in California Code of Regulations, title 23, section 15252. The Regional Board hereby determines that depending upon the compliance project selected, there could be significant adverse impacts, as specified in the Substitute Environmental Documents. However, there are also impacts that can be mitigated and be less than significant. The potential mitigation measures are set forth in the Environmental Staff Report and checklist incorporated therein.

THEREFORE, be it resolved that:

1. Pursuant to sections 13240 and 13241 of the California Water Code, the Regional Board, after considering the entire record including oral testimony at the hearing, finds the evidentiary requirements specified in section 13280 et seq. have been satisfied and that discharges from septic systems in the Malibu Civic Center area fail to meet water quality objectives and impair both existing and potential beneficial uses of water, as documented in the Final Technical Staff Report, dated November 5, 2009. Pursuant to section 13240 of the California Water Code, the Regional Board hereby adopts and amends the *Basin Plan* to include a prohibition on discharges from on-site wastewater disposal systems in the Civic Center area. This amendment, as set forth in Exhibit 2, will:

   - Prohibit all new discharges, except certain specific projects which have already progressed through the entitlement process, and are identified on table 4-zz of the Basin Plan Amendment.

   - Prohibit discharges from existing systems within six years in commercial areas and within ten years in residential areas from the date of adoption by the Regional Board of this *Basin Plan* amendment as specified in figure 4-yy of the Basin Plan Amendment.

   This prohibition does not preclude a publicly owned, community-based, solution that includes specific wastewater disposal sites subject to waste discharge requirements to be prescribed by the Regional Board.

2. The Regional Board has reviewed and considered the information contained in the Substitute Environmental Documents, as described in Finding 10, above, and hereby adopts and certifies them.

3. Pursuant to California Code of Regulations, tit.14 section 15091(a)(2), the Regional Board hereby finds, as more fully set forth in the Substitute Environmental Documents, that there are potentially significant impacts from implementation projects to comply with the proposed prohibition on OWDSs, but notes that there are mitigation measures available (as more fully described in the Substitute Environmental Documents specified in paragraph 10 below) to reduce potentially significant environmental impacts to less than significant levels. However, implementation of these mitigation measures are not under the control or discretion of the Regional Board, but are within the responsibility and jurisdiction of other (responsible) agencies, which will be required to comply with or assist affected citizens in complying with the provisions of this prohibition (e.g., the City of Malibu). These agencies have the ability to implement these mitigation measures, can and should implement these mitigation measures, and are required under CEQA to consider whether to implement the mitigation measures when they undertake their own evaluation of impacts associated with compliance with the prohibition. (See Pub. Res. C. § 21159.2.) This finding is made pursuant to Title 14, California Code of Regulations, section 15091(a)(2).

4. Pursuant to California Code of Regulations, tit.14, section 15093, the Regional Board hereby finds that the project's benefits override and outweigh its potential unavoidable significant adverse impacts, for the reasons more fully set forth in the Substitute Environmental Documents. Specific economic, social, and environmental benefits justify the adoption of this project despite the project's potential significant adverse environmental impacts. These benefits, which include contributing to the present and future restoration of beneficial water uses, and reducing or eliminating pollution, nuisance and contamination, warrant approval of the project, despite each and every unavoidable impact. Upon review of the environmental information generated for this prohibition and in view of the entire record supporting the need for a prohibition, staff has determined that specific economic, legal, social, technological, environmental, and other benefits of this proposed prohibition outweigh the unavoidable adverse environmental effects, and that such adverse environmental effects are acceptable under the circumstances. This determination is based upon the fact that most of the identified significant adverse impacts from the reasonably foreseeable means of compliance are temporary nuisance impacts associated with abatement of the use of OWDSs, and/or the construction of compliance projects. The foreseeable means of compliance are generally accepted beneficial infrastructure amenities in most municipal jurisdictions, and typically installed for the benefit of the community irrespective of their potential growth inducing and other impacts associated with their construction and operation. Furthermore, the reasonably foreseeable means of compliance with the prohibition are expected to result, over the long term, in positive environmental improvements to the environment, including water quality and restoration of beneficial uses of water resources (including decreased instances of associated illness), and economic benefits associated with increased use from their restoration. This is particularly important at the Malibu beaches which are generally considered to be some of best beach environments in the State of California. Enhancement of recreational uses of beaches, aquatic habitat in Malibu Lagoon, and drinking water potential in groundwater will have positive social and economic effects.

5. In making the determination in paragraph 1 above, the Regional Board has considered all of the factors set forth in California Water Code section 13281, including but not limited to, the factors set forth in section 13241.

6. The Executive Officer is directed to forward this *Basin Plan* amendment to the State Board in accordance with the requirements of sections 13245 of the California Water Code.

7. If, during the approval process, the State Board or Office of Administrative Law determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Board of any such changes.

8. The Regional Board requests that the State Board approve the *Basin Plan* amendment in accordance with the requirements of sections 13245 and 13246 of the California Water Code and forward it to the Office of Administrative Law.

9. This prohibition is not intended to prevent repairs and maintenance to existing septic/disposal systems, provided that repairs and maintenance do not expand the capacity of the systems and increase flows of wastewaters.

10. Pursuant to Water Code section 13225 (or such other authority as may be appropriate), the Executive Officer is directed to require the City to submit quarterly written reports to the Executive Officer, summarizing the strategy and progress toward meeting the 2015 prohibition deadline. In the quarterly progress reports, the City shall document progress, to the satisfaction of the Executive Officer, toward the following interim and final deadlines:

May 1, 2010:	Completion of 25% of a master facilities plan for possible projects to comply with the prohibition, including initiation of a strong public participation program.
November 1, 2010:	Completion of 50% of a master facilities plan and initiation of environmental review, with strong, on-going public participation. Concurrently, initiation of preliminary engineering and a feasibility study for possible projects to comply with the prohibition.
May 1, 2011:	Substantial completion of a master facilities plan, preliminary engineering and a feasibility study, and engagement of the public in selection of a project to comply with the prohibition.
November 1, 2011:	Completion of a master facilities plan, preliminary engineering and a feasibility study, and selection of a project to comply with the prohibition.
November 1, 2012:	Completion of final design for selected project.
November 1, 2014:	Completion of 50% of construction of selected project.
November 5, 2015:	Completion of project to comply with prohibition, including successful startup of facilities, and commercial connections to the project facilities, and cease discharge from OWDSs.
November 5, 2019:	Completion of project to include residential connections to the project facilities, and cease discharge from OWDSs.

The first progress report is due March 31, 2010, and subsequent quarterly progress reports are due on March 31st, June 30th, September 30th, and December 31st until such time that the Regional Board determines that compliance with the prohibition has been achieved.

The City may, upon approval from the Executive Officer, transfer this responsibility to another public agency.

I, Tracy J. Egoscue, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Los Angeles Region, on November 5, 2009.

Tracy J. Egoscue
Executive Officer

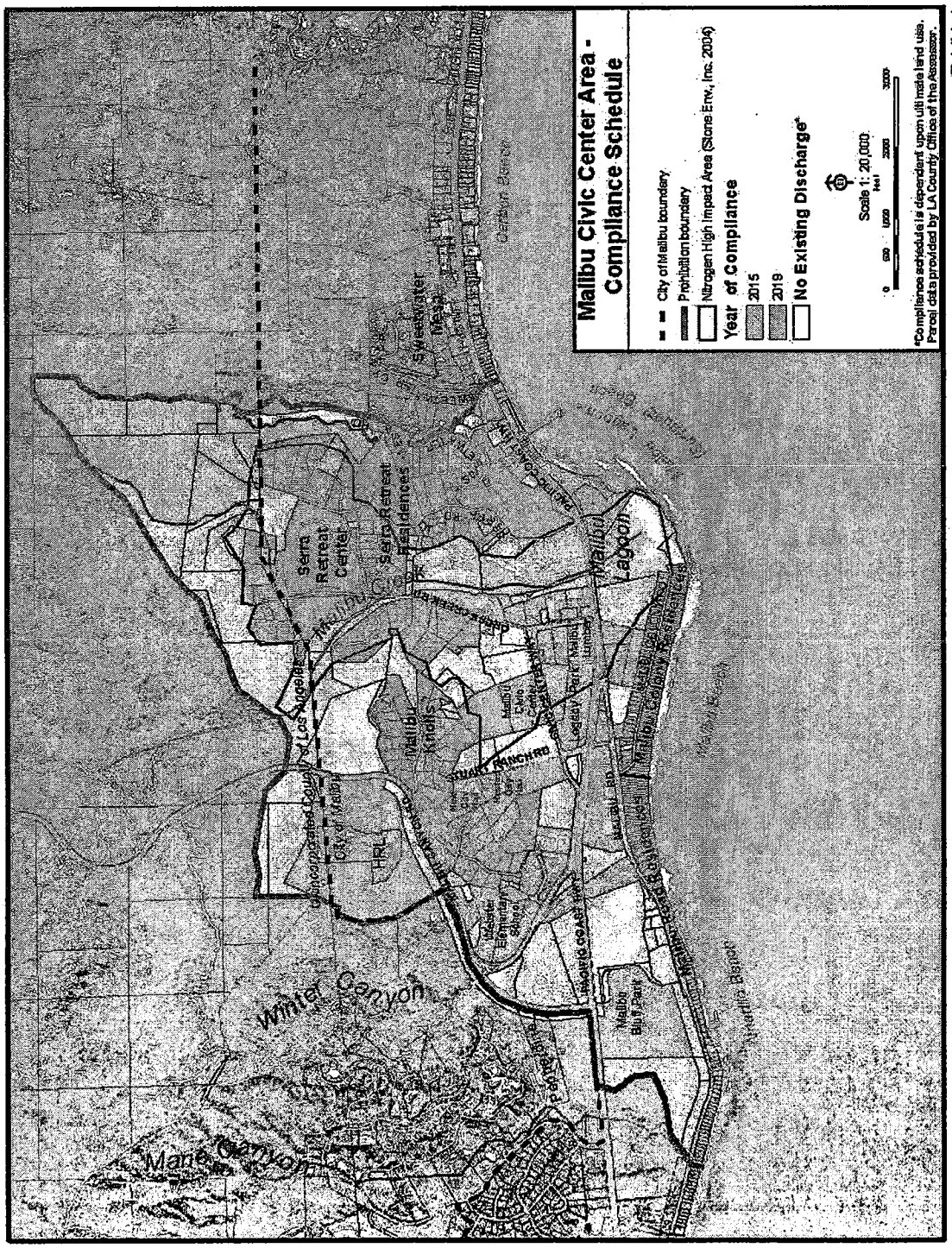


Exhibit 1

November 5, 2009

Malibu Civic Center Prohibition, Table 4-zz

Address	APN
24001 Malibu Road	4458018005
3469 Cross Creek Road	4458023003
3504 Coast View Drive	4458026014
23038 Pacific Coast Highway	4452005001
23060.5 Pacific Coast Highway	4452006902
3516 Sweetwater Mesa Road	4452017006
2930 Sweetwater Mesa Road	4452025021
2860 Sweetwater Mesa Road	4452025023
23460 Malibu Colony Drive	4458004031
23872 Malibu Road	4458007019
23812 Malibu Road	4458007028
24024 Malibu Road	4458009007
24380 Malibu Road	4458011021
22959 Pacific Coast Highway	4452019005
22941 Pacific Coast Highway	4452019009
24132 Malibu Road	4458010009
24266 Malibu Road	4458011010
23618 Malibu Colony Drive	4458005040
23401 Civic Center Way	4458022001
23800 Malibu Crest Drive	4458024038
3700 La Paz Lane	4458022025
23915 Malibu Road	4458018004
23410 Civic Center Way	4458020010
23816 Malibu Crest Drive	4458024023
3556 Sweetwater Mesa Road	4452017008
3314 Serra Road	4452026012
23917 Malibu Road	0000000067
23919 Malibu Road	0000000068
23921 Malibu Road	0000000069
23923 Malibu Road	0000000070
23652 Malibu Colony Drive	4458005030
23664 Malibu Road	4458001003
23720 Malibu Road	4458002900
3535 Coast View Drive	4458027030
23316 Malibu Colony Drive	4452008016
23684 Malibu Colony Drive	4458005022
23872 Malibu Road	4458007019
24052 Malibu Road	4458009002
23405 Malibu Colony Drive	4452010010
23681 Malibu Colony Drive	4458002008
23917 Malibu Road	4458018004
23919 Malibu Road	4458018004
23921 Malibu Road	4458018004
23923 Malibu Road	4458018004

(The Vesting Tract Map has not been recorded therefore APNs have not yet been assigned to the individual lots below.)

24108 Pacific Coast Highway	4458018002
24120 Pacific Coast Highway	4458018018
24134 Pacific Coast Highway	4458018019
24150 Pacific Coast Highway	
24174 Pacific Coast Highway	
3215 Serra Road	4457003023
3217 Serra Road	4457003021, 4457003022
3219 Serra Road	4457003019
3221 Serra Road	4457003020
3240 Cross Creek Road	4457002038

Resolution No. R4-2009-007

Amendment to the
Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties
to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

Exhibit 2: Language to be revised in the *Basin Plan*

The *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties* (*Basin Plan*) contains a section entitled "Septic Systems" in Chapter 4.[1] This amendment to the *Basin Plan* revises that section, as indicated by italicized, underlined text for additions, and text strikeouts for deletions.

Regulating Septic Systems

The California Water Code, Chapter 4, Article 5, sets forth criteria for prohibiting individual disposal systems (i.e., residential septic tanks). Alternatively, the Regional Board has authority to regulate discharges, including discharges from residential units, multiple-dwelling units, non-domestic septic tank systems, and large developments.

Oxnard Forebay Septic Prohibition

On August 12, 1999, the Regional Board amended the Basin Plan to include a prohibition on septic systems in the Oxnard Forebay (figure 4-xx), pursuant to Section 13280 of the California Water Code. The prohibition applies to both future and existing septic systems in the Oxnard Forebay. As of August 12, 1999, new septic systems in the Oxnard Forebay were prohibited. By January 1, 2008, discharges from existing septic systems must cease. This action was taken in view of:

- The conclusion that discharges of wastewaters from residential and commercial facilities to groundwater underlying the Oxnard Forebay do not meet water quality objectives specified in the Basin Plan, and are impairing the present and future beneficial uses of underlying resources of ground water.

- The need to ensure long-term protection of ground water underlying both the Oxnard Forebay and the Oxnard Plain. Alternatives to replace these supplies of local water, or to treat the water before beneficial use, would be costly and would violate the requirement to protect the water for beneficial uses.

[1] Language to be revised will go into the *Basin Plan*, starting on page 4-17 (in the 1994 version) with the section currently entitled 'Septic Systems.'

The prohibition is not intended to prevent repairs to existing septic systems in the Oxnard Forebay prior to January 1, 2008, provided that the purpose of such repairs is not to increase capacity.

An exemption to this prohibition or a time extension of the effective date of the prohibition may be granted in the event the Regional Board determines that such an exemption or extension is in the best interest of water quality, in accordance with Water Code Section 13241 and the correction of water quality problems associated with the wastewater discharges from septic systems in the Oxnard Forebay.

Individual disposal systems that dispose of domestic wastewater that are located on lot sizes equal to or greater than five acres are not subject to this prohibition.

Malibu Civic Center Area Prohibition

On November 5, 2009, the Regional Board amended this* Basin Plan *to prohibit on-site wastewater disposal systems (OWDSs) in the Malibu Civic Center area (figure 4-yy), pursuant to section 13280 of the California Water Code. Effective [insert effective date of Basin Plan amendment]:

- ***All new on-site wastewater disposal system discharges are prohibited with the exception of the projects identified in table 4-zz, which shall be deemed existing OWDSs.***
- ***All wastewater discharges in commercial areas from existing on-site wastewater disposal systems are prohibited on November 5, 2015, as specified in figure 4-yy.***
- ***All wastewater discharges in residential areas from existing on-site wastewater disposal systems are prohibited on November 5, 2019, as specified in figure 4-yy.***

This prohibition does not preclude a publicly owned, community-based, solution that includes specific waste water disposal sites subject to waste discharge requirements to be prescribed by the Regional Board.

The prohibition is not intended to prevent repairs, maintenance, and upgrades to existing on-site wastewater disposal systems prior to November 5, 2019, provided that repairs, maintenance, and upgrades do not expand the capacity of the systems or increase flows of wastewaters.

Other Areas

In other areas, where ground water constitutes an important source of drinking water, the Regional Board has adopted general WDRs (Order 91-94) for certain private residential subsurface sewage disposal systems. A lot with size less then 1 acre is not eligible for these general WDRs; for those lots between one and less than five acres in size, the General WDRs require either a hydrogeologic study or mitigation measures. WDRs are not required for lot sizes greater than five acres.

Final Technical Staff Report

State of California
California Regional Water Quality Control Board, Los Angeles Region

Final Technical Staff Report

Evidence in support of an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*

to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

November 5, 2009

Table of Contents

Page Numbers

Technical Staff Report Overview.....1-19
Wendy Phillips

Technical Memorandum #1: Permitted Dischargers Have Poor Records of Compliance with Regional Board Orders.....TM1-1 to TM1-10
Rebecca Chou

Technical Memorandum #2: Pathogens and Nitrogen in Wastewaters Impair Underlying Groundwater as a Potential Source of Drinking Water
David Koo.....TM2-1 to TM2-7

Attachment 2-1 Data Tables for 59 Individual Wells.....TM2-8 to TM2-63
Attachment 2-2 Graphs for 59 Individual Well.....TM2-64 to TM2-119

Technical Memorandum #3: Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment to Body Contact Recreation.....TM3-1 to TM3-39
Elizabeth Erickson

Staff Peer Review Memorandum.....TM3-40 to TM3-76
Robert Arnold Peer Review.....TM3-77 to TM3-81
Jörg E. Drewes Peer Review.....TM3-82 to TM3-86
Joann Silverstein Peer Review.....TM3-87 to TM3-91

Technical Memorandum #4: Nitrogen Loads in Wastewaters flowing to Malibu Lagoon Are a Significant Source of Impairment to Aquatic Life...TM4-1 to TM4-35
Toni Callaway and Orlando Gonzalez

Attachment 4-1 Nitrogen Mass Loading for Malibu Lagoon and Review Summary of Previous Studies on Mass Loading from OWDS to the Lagoon.....TM4-36 to TM4-45
C. P. Lai

Staff Peer Review Memorandum.....TM4-46 to TM4-52
Robert Arnold Peer Review.....TM4-53 to TM3-59
Jörg E. Drewes Peer Review.....TM4-60 to TM3-66
Joann Silverstein Peer Review.....TM4-67 to TM3-72

Technical Memorandum #5: Dischargers with Unsuitable Hydrogeologic Conditions for High Flows of Wastewaters Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities.....TM5-1 to TM5-11
Dionisia Rodriguez and Ryan Thacher

Appendix A: Septic Waste Flow and Hauling Data.....TM12-12 to TM5-15
Appendix B: Inspection Report, City of Malibu Haulers.....TM5-16 to TM5-20
Appendix D: Inspection Report, Surfrider Beach.....TM5-21 to TM5-22
Appendix E: Malibu Potable Water Consumption Trends / Population Analysis.....TM5-23 to TM5-25

State of California
California Regional Water Quality Control Board, Los Angeles Region

Final Technical Staff Report

Evidence in support of an
Amendment to the
Water Quality Control Plan for the Coastal Watersheds
of Los Angeles and Ventura Counties
to Prohibit On-site Wastewater Disposal Systems
in the Malibu Civic Center Area

Technical Staff Report

Overview

Technical Staff Report – Overview

Introduction

The purpose of this Technical Staff Report is to present evidence in support of an amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan),* to prohibit subsurface disposal systems (on-site wastewater disposal systems, or OWDSs), used in a developed and developing portion of the Malibu coast along the Santa Monica Bay. This area, referred to as the Malibu Civic Center area (Figure 1[1]), has a residential population estimated at almost 2,000. The area also serves as the core of the City of Malibu's business, cultural, and commercial activities, and the population estimate of 2,000 does not include significant daytime and evening workers and visitors who travel to the area – in particular, visitors to the renowned Surfrider Beach.[2]

Without community sewers and wastewater treatment infrastructure, residents, businesses, and public facilities in the City of Malibu use thousands of on-site disposal systems to discharge their sewage to the subsurface and underlying groundwater. In several areas of the City, high flows of wastewaters coupled with unfavorable hydrogeologic conditions have raised concerns about reliance on this wastewater disposal strategy. In one of those areas, namely the Malibu Civic Center area, relatively intensive land use activities by more than 400 dischargers result in the release of wastewaters to the subsurface at a rate that Regional Board staff estimates to be as high as 270,000 gallons per day (gpd).

Description of the Proposed Prohibition

Prohibition Boundary

The area that would be affected by the proposed prohibition is referred to as the Malibu Civic Center area, and is delineated by the red line shown in Figure 1[1]. The area is not defined according to municipal borders or parcel lines. Rather, the area subject to the prohibition is delineated according to hydrogeologic parameters and drainage patterns; as groundwater flow roughly mimics surface drainage, the prohibition boundary follows a topographic high surrounding both the Winter Canyon and lower Malibu Creek (also known as Malibu Valley) watersheds. All property extending seaward of this boundary to the ocean is subject to the prohibition, including the coastal strips along the Pacific Coast Highway stretching from Amarillo Beach to Surfrider Beach. This entire area, which is referred to as the "Malibu Civic

[1] Figure 1 and Figure 2 refer to the prohibition area as recommended by staff prior to a public meeting of the Board on November 5, 2009. During the public meeting, the Board directed staff to modify the western boundary so that upper Winter Canyon is not subject to the prohibition. Figure 1A and Figure 1B refer to the official prohibition boundary, as modified by the Board on November 5, 2009 in Resolution R4-2009-007.

[2] The population estimate of 2,000 does not include daytime and evening workers who are employed in the Malibu Civic Center area, and daytime and evening visitors who enjoy the beaches and patronize the businesses and public facilities in the area, and that the visitor population to Malibu area beaches (not limited to the area within the prohibition boundary) has substantially increased, from 233,500 per month in August of 1999 to 355,000 per month in August of 2006.

Center area,"[3] totals 2.2 square miles of which 1.5 square miles and 0.7 square miles are within the City of Malibu and the unincorporated area of County of Los Angeles, respectively. Figure 2[1] shows the civil boundaries and parcels.

To the west, the prohibition boundary encompasses Winter Canyon not only because this watershed is heavily developed and discharges almost 50,000 gallons per day of wastewater (about 20% of the wastewater in the prohibition area), but also because wastewater management

Figure 1

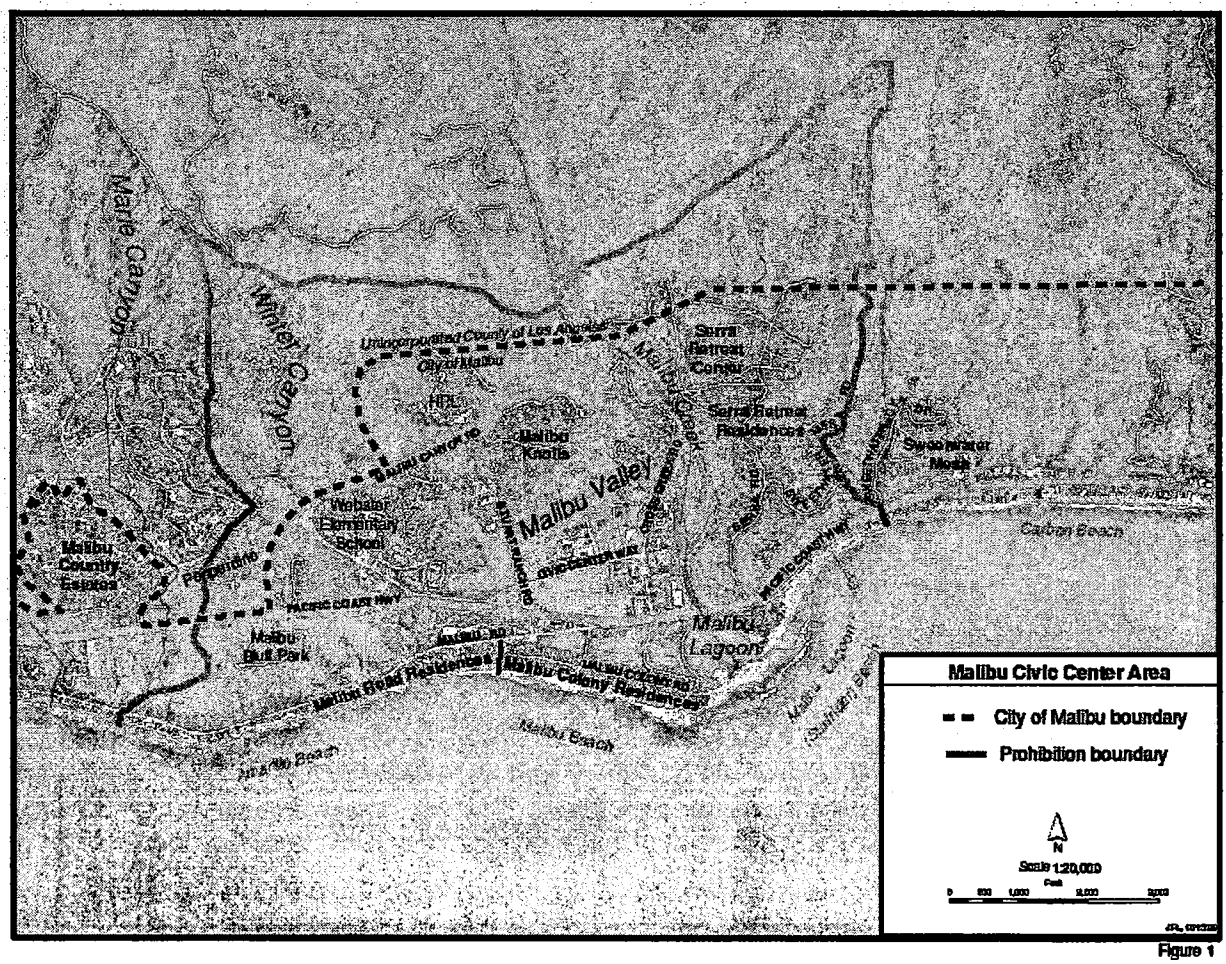


Figure 1

strategies for many commercial activities in the coastal strip adjacent to the Colony – as well as proposed strategies for managing future wastewaters from Malibu Valley – rely on disposal capacity in Winter Canyon, which is severely strained. Note that the prohibition area includes

[3] As the prohibition area covers a small portion of the City of Malibu and an even smaller portion of unincorporated County of Los Angeles, staff avoided designating this as a 'Malibu' prohibition. Nor did staff select hydrologic terms to designate the prohibition area, out of concern that such terminology may not be readily recognized by the affected community. Rather, the designation of 'Malibu Civic Center area' was selected for broad name recognition.

Malibu Civic Center Area
City of Malibu boundary
Prohibition boundary
Scale 1:20,000
Winter Canyon
Marie Canyon
Malibu Lagoon
Malibu Bluffs Park
Malibu Colony Residences
Malibu Knolls
Webster Elem.
Malibu County Estates
Serra Retreat
Serra Retreat Residences
Malibu Creek
Kanan Dume Rd.
Pacific Coast Hwy
Civic Center Way
Cross Creek Rd.
Las Flores Canyon Rd.
Malibu Canyon Rd.
Latrobe Rd.
Corral Canyon Rd.
Decker Canyon Rd.
Encinal Canyon Rd.
Unincorporated County of Los Angeles
Carbon Beach
Surfrider Beach
Malibu Point
Malibu Colony Beach
Sweetwater Mesa

Figure 1A

only a small sliver of the Pepperdine University campus, as this sliver is the only portion of Pepperdine that falls within the topographically-defined Winter Canyon watershed.

Figure 2

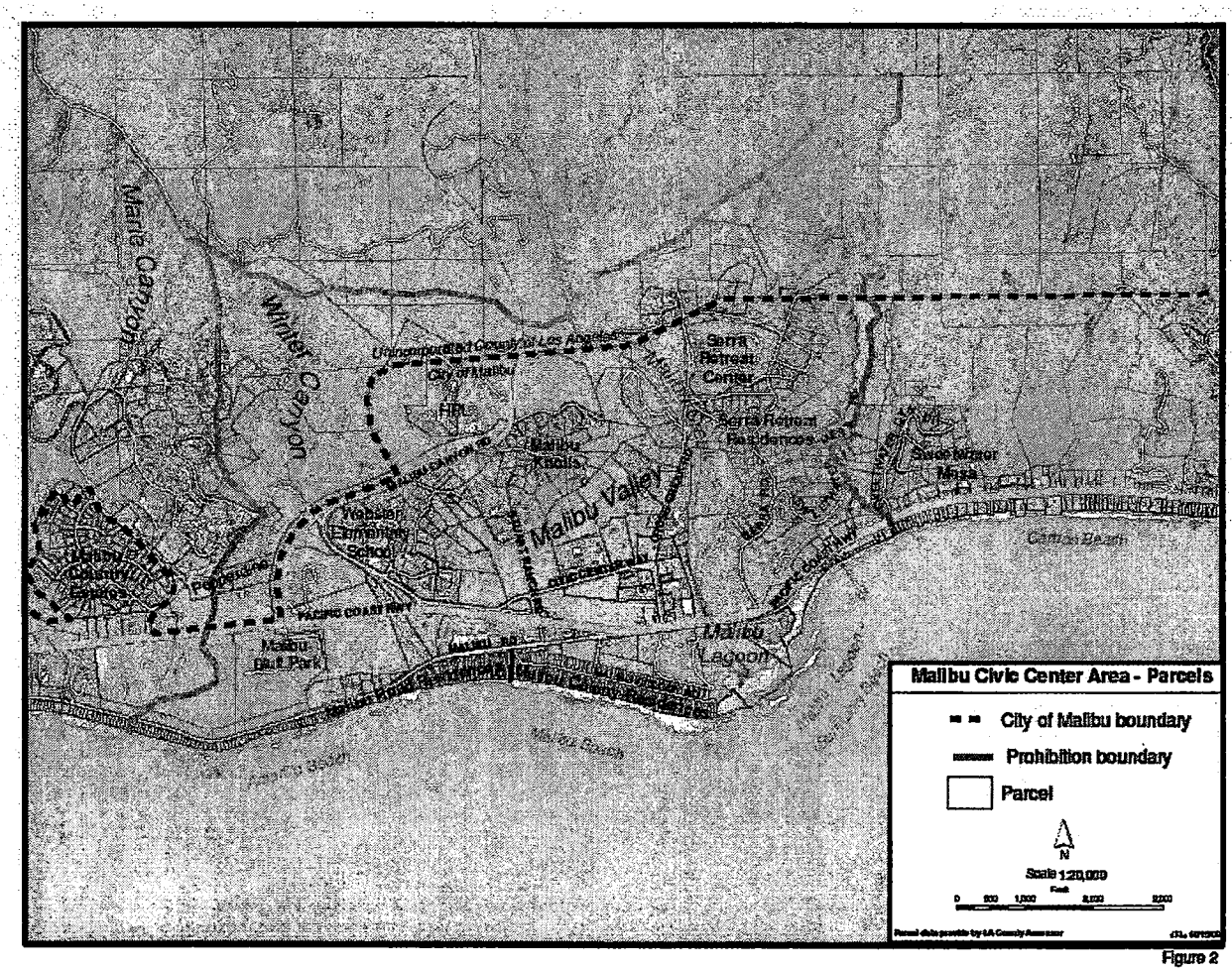


Figure 2

To the east, the prohibition boundary encompasses the Serra Retreat neighborhood, and follows Sweetwater Mesa Road along the eastern topographic high. The boundary was not extended eastward, as the Sweetwater Mesa neighborhood is a lower density residential development. Nor was the boundary extended eastward along the Pacific Coast Highway to capture a stretch of significant commercial development, as the intent of this proposed regulatory action is encompass priority areas that affect groundwater and are hydraulically connected to impaired surface water resources, including Surfrider, Malibu, and Amarillo Beaches and Malibu Lagoon. Additional areas, such as the stretch of the Pacific Coast Highway eastward of the boundary, may be subject to future regulatory actions.

Malibu Civic Center Area - Parcels
City of Malibu boundary
Prohibition boundary
Parcel
Scale 1:20,000
Winter Canyon
Marie Canyon
Malibu Canyon
Malibu Creek
Malibu Valley
Civic Center
Malibu Bluffs
Malibu Hills
Malibu Park
Santa Monica Mountains
Pacific Coast Highway

Figure 2A

Types of Dischargers Subject to Prohibition

All property owners, including existing residences, businesses, and public facilities that discharge wastes through an OWDS in the Malibu Civic Center area, would be affected by the proposed prohibition as well as future dischargers who may plan to discharge in this area. The regulatory action would immediately prohibit all new discharges from OWDS in the Malibu Civic Center area, and establish a schedule to cease discharges from existing systems by 2014.

Types of Discharges Subject to Prohibition

Collectively, the systems from which wastewaters discharge are referred to as OWDSs. Types of subsurface disposal systems, or OWDSs, that would be prohibited range from passive systems with conventional septic tanks to active systems with equipment that more aggressively remove pollutant loads from sewage before subsurface disposal. The prohibition would cover an OWDS that serves an individual property (residential, commercial, industrial, and public properties) as well as a group of properties. The prohibition would apply to all OWDSs and regulated discharges (whether they are regulated by the City of Malibu, County of Los Angeles, or State) as well as any unregulated discharges that may exist.

Water Resources

Surface Waters and Groundwater

Surface waters in the Malibu Civic Center area include Malibu Creek, Malibu Lagoon (a fresh/saltwater habitat used by numerous species, some endangered), and ocean beaches, which are heavily used by residents as well as visitors. Groundwater in the area was historically used as a source of drinking water, and is a potential source of drinking water for a portion of the community, or a reserve source of drinking water during times of emergency when deliveries of imported supplies of drinking water could be interrupted. In the *Basin Plan*,[5] the Regional Board has formally designated these plus other beneficial uses for the water resources in the area as follows:

> **Malibu Lagoon:** Navigation; Water Contact Recreation; Non-contact Water Recreation; Estuarine Habitat; Marine Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wetland Habitat.
>
> **Malibu Creek:** Water Contact Recreation; Non-contact Water Recreation; Warm Freshwater Habitat; Cold Freshwater Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wetland Habitat.
>
> **Malibu Beach and Malibu Lagoon Beach (Surfrider Beach), Amarillo Beach, and Carbon Beach:** Navigation; Water Contact Recreation; Non-contact Water Recreation;

[5] Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties, adopted by the Board on June 13, 1994, and as subsequently amended.

Commercial and Sport Fishing; Marine Habitat; Wildlife Habitat; Spawning, Reproduction, and/or Early Development; and Shellfish Harvesting.

Groundwater: Municipal and Domestic Supply (Potential), Industrial Process and Service Supply, and Agricultural Supply.

Also in the *Basin Plan,* the Regional Board has established water quality objectives to protect the beneficial uses identified above.

Impairments to Beneficial Uses of Water Resources

In the 2006 Clean Water Act Section 303(d) list, approved by the United States Environmental Protection Agency (US EPA) on June 28, 2007, impairments to beneficial uses are formally identified for the following water resources:

Malibu Lagoon: impaired by Coliform Bacteria, Eutrophication.
Malibu Creek: impaired by Coliform Bacteria, Nutrients (Algae).
Malibu Beach: impaired by Indicator Bacteria.
Malibu Lagoon Beach (Surfrider Beach): impaired by Coliform Bacteria.
Carbon Beach: impaired by Indicator Bacteria.

To restore water quality and impaired beneficial uses, the US EPA and/or Regional Board have adopted the following Total Maximum Daily Loads (TMDLs):

a. **Malibu Creek Watershed Nutrient TMDL:** The US EPA, on March 21, 2003, specified a numeric target of 1.0 mg/l for total nitrogen during summer months (April 15 to November 15) and a numeric target of 8.0 mg/L for total nitrogen during winter months (November 16 to April 14). Significant sources of the nutrient pollutants include discharges of wastewaters from commercial, public, and residential landuse activities. The TMDL specifies a load allocation for on-site wastewater disposal systems (OWDSs) of 6 lbs/day during the summer months and 8 mg/L during winter months.

b. **Malibu Creek and Lagoon Bacteria TMDL:** The Regional Board specified numeric targets, effective January 24, 2006, based on single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. Sources of bacteria loading include storm water runoff, dry-weather runoff, OWDSs, and animal wastes. The TMDL specifies load allocations for on-site wastewater disposal systems equal to the allowable number of exceedance days of the numeric targets. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 to October 31), there are no allowable exceedance days, in winter dry weather (November 1 to March 31), there are three allowable exceedances days, and in wet weather (defined as days with >=0.1 and the three days following the rain event), there are 17 allowable exceedance days.

c. **Santa Monica Bay Beaches Wet and Dry Bacteria TMDL:** For beaches along the Santa Monica Bay impaired by bacteria in dry and wet weather, the Regional Board specified numeric targets, effective July 15, 2003, based on the single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. The dry weather TMDL identified the sources of bacteria loading as dry-weather urban runoff, natural source runoff and groundwater. The wet weather TMDL identified stormwater runoff as a major source. The TMDLs did not provide load allocations for OWDSs, meaning that no exceedances of the numeric targets are permissible as a result of discharges from non-point sources, including on-site wastewater disposal systems. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 to October 31), there are no allowable exceedance days, in winter dry weather (November 1 to March 31), there are three allowable exceedances days, and in wet weather (defined as days with >=0.1 and the three days following the rain event), there are 17 allowable exceedance days.

Summary of Evidence

Staff investigations focused on five areas, the results of which are presented in five technical memoranda that comprise this staff report and that meet the requirements of the California Water Code, sections 13280 and 13281[6] for determination that discharges of OWDSs in the Malibu Civic Center area result in violation of water quality objectives, will impair present or future beneficial uses of water, will cause pollution, nuisance, or contamination, or will unreasonably degrade the quality of any water of the state.

Technical Memorandum #1: Permitted Dischargers Have Poor Records of Compliance with Regional Board Orders.

For the privilege of discharging wastewater to a water of the state (including both surface water and groundwater), dischargers must comply with waste discharge requirements (WDRs) that are specified in Orders issued by the Regional Board. The WDRs generally incorporate monitoring and reporting programs that rely on self-monitoring by dischargers. The reports of self-monitoring are used by the Regional Board to determine compliance and to ensure that the quality of the water into which wastes are discharged is not degraded and that beneficial uses, such as drinking water and swimming (body contact recreation) are protected.

In the Malibu Civic Center area, the Regional Board regulates 20 discharges, all of which are from commercial, industrial, or public facilities. In a review of the compliance records for the 20 discharges, each discharger had a record of violations from 2004 through 2008. Among the most serious violations are repeated failures to achieve effluent and flow limits specified in WDRs; in particular, limits for pathogens and nutrients (species of nitrogen and phosphorus) that are identified as pollutants in nearby waters that the Regional Board and EPA have designated as impaired under Clean Water Act section 303(d). Also, several dischargers 'failed to submit'

[6] See appendix for a summary of the findings in the technical staff report, organized by sections in regulatory codes.

monitoring reports, and thus compliance with technical requirements in their WDRs could not be determined.

Among the violations included in Table 1-4 in Tech Memo #1 are late submittal of reports of self-monitoring required by the WDRs and improper certifications of those monitoring reports – e.g. a perjury statement executed by a party not authorized to certify the accuracy of the results on behalf of the discharger, and/or modifications to the language of the perjury statement that is specified in a WDR.

Dischargers have poor records of compliance with Orders issued by Regional Board, and that discharges, in general, are not meeting requirements prescribed to protect water quality and beneficial uses.

Technical Memorandum #2: Pathogens and Nitrogen in Wastewaters Impair Underlying Groundwater as a Potential Source of Drinking Water.

Although groundwater in the Malibu Valley Groundwater Basin is not an existing source of drinking water to the community, groundwater was the community's source of drinking water until the 1960s. Groundwater production in the area gradually ceased as a newly formed special district – Los Angeles County Waterworks District No. 29, Malibu – started delivering imported water to the Malibu area and Topanga Canyon in the early 1960s. As a future resource – and also in the event of a disruption of deliveries of imported water, groundwater in the Malibu Valley Groundwater Basin is an important local resource, which the community may need to use to meet a portion of its demand for potable water or in the event that deliveries of imported water are interrupted during emergencies. The Regional Board recognized this beneficial use, in designating groundwater as a potential source of drinking water in the *Basin Plan.*

To evaluate impacts from OWDSs on groundwater as a potential source of drinking water, staff identified 56 groundwater wells, all of which were designed and constructed for monitoring the quality of groundwater, and compiled analytical data for pathogen indicators and nitrogen. To examine the extent of impairment of this groundwater for drinking water, staff compiled all available analytical results of sampling for pathogen indicators and nitrogen species during the period April 1999 to June 2009 and compared these results with drinking water standards for these pollutants. As summarized in graphs and tables for each well:

- ***Pathogens in Groundwater do not meet the Drinking Water Standard:*** Forty-seven wells, or 84% of the 56 wells, failed to meet the maximum contaminant level (MCL) for fecal coliform during at least one sampling event. Of the 1,016 fecal coliform samples collected from the 56 wells during the review period, 383 samples (38%) tested positive and failed to meet the MCL of 0 MPN/100ml (Most Probable Number per 100 milliliters).

- ***Nitrogen in Groundwater does not meet the Drinking Water Standard:*** Twenty-four wells, or 43% of the 56 wells, failed to meet the MCL of 10 mg/L for nitrate plus nitrite (as nitrogen) during at least one sampling event. Of the 1,012 samples collected from the 56 wells during the review period, 322 (32%) were above the MCL. Although there is no drinking water standard for ammonia, staff also reviewed analytical data for ammonia in

view of the likelihood that the ammonia species of nitrogen will nitrify. Assuming conversion of the ammonia to nitrite or nitrate, the results indicate that 400 samples (40%) were above the MCL, and that 34 wells (61%) of the 56 wells had levels above the MCL of 10 mg/L during at least one sampling event.

As indicated by coliform results, pathogens are present in groundwater at levels that elevate the risk of infectious disease should this groundwater be used for potable purposes. As indicated by the nitrogen results, species of nitrogen are present in groundwater at levels that can cause health problems in humans should this groundwater be used for potable purposes. Infants and fetuses are particularly sensitive and can develop methemoglobinemia (blue-baby syndrome) from ingestion of water with nitrate at levels that deplete oxygen in the blood stream.

Technical Memorandum #3: Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment to Water Contact Recreation.

Malibu Creek, Malibu Lagoon, and nearby beaches are popular not only within the local community but as a destination for visitors as well. In the *Basin Plan,* the Regional Board has designated these waters for both water contact recreation (e.g. swimming) and non-contact water recreation (e.g. sunbathing, aesthetic enjoyment), and set standards at levels that will protect human health.

As determined by the Regional Board and US Environmental Protection Agency, surface waters in the Malibu Creek Civic Center area are impaired for water contact recreation, consistently failing to meet standards set to protect swimmers and surfers from infectious disease resulting from direct exposure to or incidental ingestion of polluted waters during recreation. Repeated failures to meet standards have resulted in a 'beach bummer'[6] reputation for the renowned Surfrider Beach. Historic and recent documentation compiled by the Regional Board, US Environmental Protection Agency, other agencies, and environmental groups and presented in Technical Memo #3 demonstrates that indicators of pathogens in groundwater, surface waters and beaches in the Malibu Creek Civic Center exceed human health standards. Evidence from a 1995 epidemiology study at Surfrider Beach translates this failure to meet water quality criteria into a specific increase in human illness rates: 39 of every 1,000 swimmers at Surfrider Beach are expected to contract gastrointestinal illnesses. This illness rate is in excess of a standard[7] of 19 illnesses per 1,000 people.

The fecal indicator bacteria, enterococcus, which is shown to discharge from OWDSs into the groundwater, also appears along pathways from the Civic Center through the groundwater basin and beaches to the ocean waves. Well data show enterococcus densities exceed the ocean water quality standard in a majority of wells in the Civic Center area, a significant finding because the City of Malibu previously found that 42% of that groundwater comes from OWDSs and 92% of groundwater (78,000 to 126,000 ft ^{3} per day) enters the water at the beach.

---

[6] 'Beach Bummers' are designated in report cards issued annually by Heal the Bay.

[7] Environmental Protection Agency (1986), *Ambient Water Quality Criteria for Bacteria* stating "EPA's evaluation of the bacteriological data indicated that using the fecal coliform group at a maximum geometric mean of 200 per 100 ml, recommended in Quality Criteria for Water, would cause an estimated 8 illnesses per 1,000 swimmers at fresh water beaches and 19 illnesses per 1,000 swimmers at marine beaches.The E.Coli and enterococci criteria presented in Table 4 were developed using these currently acceptable illness rates (pg. 9)."

To evaluate possible other sources of pathogens, staff evaluated four years of summer beach data. These data show that enterococcus concentrations at Civic center beaches have consistent trends, suggesting source control through stormwater and OWDS management will be successful, and conflicting with claims that significant amounts of bacteria come from variable sources such as the homeless, birds, or trash.

Staff also reviewed 57 previous studies and found conclusions from these studies to be consistent with staff's determination that dry weather impairment to the beneficial use of water contact recreation can be attributable to subsurface migration from OWDSs to surface waters.

Technical Memorandum #4: Nitrogen Loads in Wastewaters flowing to Malibu Lagoon Are a Significant Source of Impairment to Aquatic Life.

Malibu Lagoon supports a valuable wetland ecosystem and nearby plant communities such as the coastal salt marsh and the coastal strand, and also serves as refuge for migrating birds (with over 200 observed species). These beneficial uses are impaired by excessive nutrients levels in the lagoon, stimulating aquatic growth (algae) and resulting in large daily fluctuations of dissolved oxygen and pH that may increase levels of the highly toxic un-ionized form of ammonia. As established in the nutrient TMDL[9] adopted by the US EPA on March 21, 2003 for Malibu Lagoon, nitrogen from OWDSs in hydraulic connection with the lagoon are subject to a load allocation of six pounds per day (lb/d).

To quantify current nitrogen loads from OWDSs in the Malibu Civic Center area to the lagoon, staff compiled an inventory of all 38 commercial dischargers and 392 residential dischargers. Using real data where available and reasonable assumptions (based on published literature and best professional judgment) for data gaps, staff calculated that the dischargers release about 270,000 gpd through OWDSs and estimated nitrogen loading factors. Applying these nitrogen loading factors to update an existing numerical model designed and calibrated by Questa 2005 for an earlier investigation, staff estimates that nitrogen loads released from OWDSs and transmitted via groundwaters to Malibu Lagoon total 30 lb/day. As a check, staff used the same flows and loading factors to a 'spreadsheet' model which characterized wastewater transport by hydrogeologic sector. Based on the 'spreadsheet' model, staff estimates that wastewaters transport 35 lb/day into Malibu Lagoon.

Staff's estimates of 30 lb/day to 35 lb/day from the numeric and 'spreadsheet' models are greater than two of the estimates (17 lb/day to 20 lb/day) prepared by the third parties in previous studies, and slightly overlap the estimate by the other third party (32 lb/day). Among the factors accounting for the range in estimates between staff's estimates and third-party estimates are:

[9] In the Malibu Creek Watershed Nutrient TMDL (March 21, 2003), the US EPA specifies a numeric target of 1.0 mg/l for total nitrogen during summer months (April 15 to November 15) and a numeric target of 8.0 mg/L for total nitrogen during winter months (November 16 to April 14). Significant sources of the nutrient pollutants include discharges of wastewaters from commercial, public, and residential land use activities. The TMDL specifies a load allocation for on-site wastewater treatment systems of 6 lbs/day during the summer months and 8 mg/L during winter months.

- Commercial Flows: The third-party models did not capture the entire OWDS inventory and used significantly lower assumptions for commercial wastewater flows.
- Nitrogen Concentrations – Residential: Two of the three third-party models assumed that residential wastewaters have nitrogen concentrations that are about one-half of what staff determined is a reasonable assumption.
- Nitrogen Concentration – Commercial: Staff determined that the average nitrogen concentration of commercial wastewater discharges has decreased since 2004, as OWTSs with greater treatment capabilities has been brought on-line. However, this declining trend in this subset of OWTSs is not great enough to meet the TMDL goal.

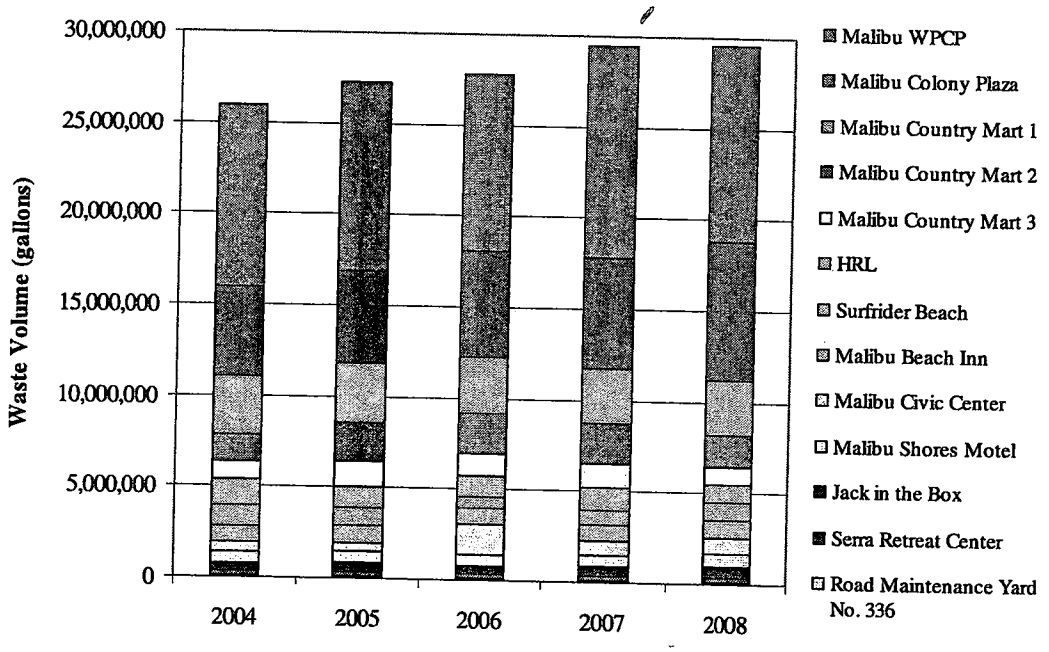
Regardless of differing assumptions and models used, all estimates – including those prepared by staff as well as past estimates prepared by third parties – indicate that nitrogen loads from OWDSs are significantly above the load allocation of 6 lb/day for OWDSs established in a TMDL for restoration of water quality and protection of beneficial uses in the Malibu Lagoon. Accordingly, staff concludes that OWDSs in the Malibu Civic Center area cumulatively release nitrogen at rates that contribute to eutrophication and impair aquatic life in Malibu Lagoon.

Technical Memorandum No. 5: Dischargers with Unsuitable Hydrogeologic Conditions for High Flows of Wastewaters Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities.

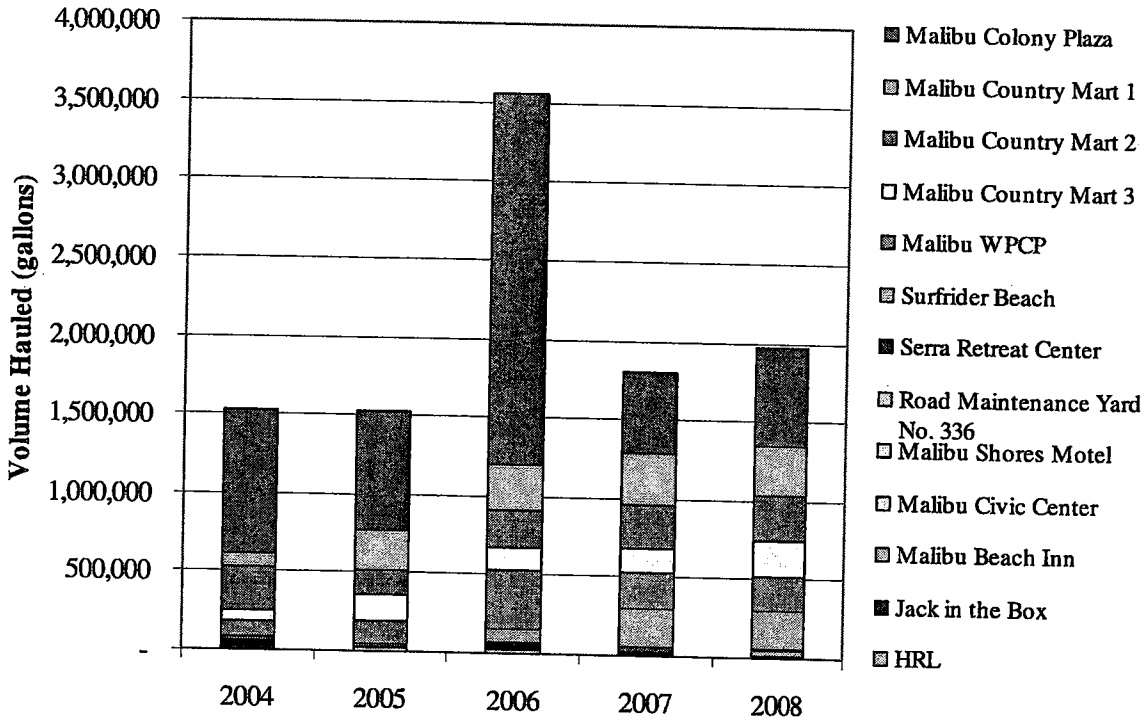
Intensive land use activities on many properties in the Malibu Civic Center area generate wastewater flows at rates that exceed the capacity of OWDSs to transmit the wastewaters into the subsurface. While some dischargers are limited by treatment equipment that has inadequate capacity and/or treatment capabilities, many dischargers do not have adequate disposal capacity on their properties to transmit the wastewaters into the subsurface. Their disposal rates can be constrained not only by lack of space, or area, for on-site disposal fields, but by hydrogeologic constraints as well, such as a high water table or tight soils. Consequently, in order to avoid failure of the OWDSs, a significant number of large dischargers resort to hauling liquid sewage and sludge to communities that have infrastructure to accept their liquid wastes.

To quantify reliance on the practice of hauling, staff reviewed reports of self-monitoring submitted by 20 commercial dischargers. Based on volumes of waste generated, staff identified a subset of 13 of the 20 dischargers for further analysis. In 2008, these thirteeen dischargers, whose activities generated a total of approximately 28 million gallons of wastewater (77,000 gpd), hauled almost 2 million gallons (5,500 gpd), or about 6%, of their raw sewage to off-site disposal facilities. Furthermore, staff quantified trends from 2004 through 2008, which indicate that these 13 dischargers cumulatively increased their rate of wastewater generation by 13% and their rate of hauling by 29%. (Staff was not able use existing data from dischargers to analyze seasonal hauling trends – e.g. hauling trends during the wet season, and also during warm summer holidays when populations have high peaks.)

Combined Annual Waste Flows for Select Dischargers



Combined Annual Septic Waste Hauling for Select Dischargers



Staff also considered the carbon footprint of hauling practices, which generally use large diesel-powered tanker trucks that have to travel between 60 and 180 miles round trip to transport sewage. Staff estimates that hauling by these vehicles releases over 250 tons of carbon dioxide each year. Eliminating the need for sewage waste hauling would contribute toward the goals of California's Global Warming Solution Act (AB 32, Pavley) by decreasing greenhouse gas emissions. Also, elimination of excessive hauling can help reduce public nuisances, such as traffic, noise, and odor resulting from these practices.

Conclusions

Discharges of wastewaters to the subsurface through OWDSs have degraded water resources and impaired existing and potential beneficial uses of these waters, as determined by the following conclusions from the technical memoranda.

i. Dischargers subject to Orders from the Regional Board that specify waste discharge requirements (WDRs) and Time Schedule Orders (TSOs) have poor records of compliance.

ii. Discharges of wastewaters contain elevated levels of pathogens and nitrogen that impair the underlying groundwater as a potential source of drinking water.

iii. Discharges of wastewaters to groundwater that is in hydraulic connection with beaches along the mouths of unsewered watersheds contain levels of pathogens that elevate risks of infectious disease for water contact recreation.

iv. Discharges of wastewaters that flow through groundwater and recharge Malibu Lagoon transport a nitrogen load significantly in excess of the allocation in the TMDL established to restore water quality to a level sufficient to protect aquatic life and prevent nuisance resulting from eutrophication.

v. Generation of wastewater flows in the Civic Center area has been increasing. On many sites, hydrogeologic conditions are unsuitable for high flows of wastewater, and many dischargers generate wastewater flows at rates that exceed their capacity to discharge on-site. These dischargers rely on pumping significant flows into tanker trucks that haul liquid sewage and sludge via public roadways to communities that have sewer and wastewater treatment facilities.

Recommendation

Staff recommends that the Regional Board adopt Resolution R4-2009-xx to immediately prohibit all future discharges of wastewaters and to prohibit existing discharges of wastewater by November 5, 2014.

Staff has prepared a draft resolution to amend the *Basin Plan* to prohibit OWDSs, in order to protect the quality of water resources and to restore beneficial uses of water resources in the Malibu Civic Center area. In order to adopt this prohibition, the Regional Board must make several determinations, in accordance with the California Water Code (CWC) 13280. Also, staff considered factors set forth in CWC 13281[1] and other regulatory codes. This information is summarized below, organized by sections in the codes.

1. **CWC 13280[2] – Discharges from OWDSs violate water quality objectives and impair present or future beneficial uses of water:** As detailed in the technical staff report, staff demonstrates that OWDSs impair water resources as follows:

   - Groundwater: In Tech Memo #2, staff evaluates nitrogen and pathogen levels in groundwater against drinking water standards, and concludes that OWDSs impair groundwater that the Board has designated as a potential source of drinking water.
   - Beaches: In Tech Memo #3, staff demonstrates that pathogens released from OWDSs in hydraulic connection with the ocean impair swimming, surfing, and other recreational activities (e.g. wading).
   - Lagoon: In Tech Memo #4, staff evaluates nitrogen levels from OWDSs in groundwater that is in hydraulic connection with Malibu Lagoon, and concludes that discharges from OWDSs fail to meet a load allocation of 6 pounds per day, specified in the nutrient TMDL in order to prevent accelerated eutrophication and restore aquatic and riparian habitat and wildlife.

   Furthermore, as described in Tech Memo #1, many dischargers under Orders specifying Waste Discharge Requirements (WDRs) and Time Schedule Orders (TSOs) from the Board have failed to meet effluent limits that the Board set at levels protective of beneficial uses.

2. **CWC 13280 – Discharges from OWDSs cause nuisance:** As detailed in the technical staff report, staff demonstrates that OWDSs cause nuisance:

   - Hauling: In Tech Memo #5, staff analyzes a subset of 13 dischargers who, due to relatively large flows coupled with unsuitable hydrogeologic conditions, hold their raw sewage for pumping into tanker trucks that haul the liquid wastes to other communities

[1] 13281. (a) In making a determination pursuant to Section 13280, except as specified in subdivision (b), the regional board shall consider all relevant evidence related to the discharge, including, but not limited to, those factors set forth in Section 13241, information provided pursuant to Section 117435 of the Health and Safety Code, possible adverse impacts if the discharge is permitted, failure rates of any existing individual disposal systems whether due to inadequate design, construction, maintenance, or unsuitable hydrogeologic conditions, evidence of any existing, prior, or potential contamination, existing and planned land use, dwelling density, historical population growth, and any other criteria as may be established pursuant to guidelines, regulations, or policies adopted by the state board.

[2] 13280. A determination that discharge of waste from existing or new individual disposal systems or from community collection and disposal systems which utilize subsurface disposal should not be permitted shall be supported by substantial evidence in the record that discharge of waste from such disposal systems will result in violation of water quality objectives, will impair present or future beneficial uses of water, will cause pollution, nuisance, or contamination, or will unreasonably degrade the quality of any waters of the state.

that have sewer and wastewater treatment facilities. This practices result in nuisance (odors and noise).[3]

- Additional Nuisances: At beaches, persistent failures to meet water contact standards result not only in elevated risks of human illness, but also in nuisance for beachgoers expecting to recreate in unpolluted waters. At Malibu Lagoon, odors and color problems from accelerated eutrophication can cause odor and color problems in and near the lagoon.

3. **CWC 13241(a) – Past, present, and probable future beneficial uses of water:** In analyzing evidence for a prohibition, staff relied upon designations of beneficial uses in the *Basin Plan*, as summarized below:

   - Groundwater, designated as a potential source of drinking water. Also, staff considered past uses of groundwater to meet historic demands for drinking water. Staff acknowledges that groundwater is not a current source of drinking water. Nevertheless, staff – in accordance with the Board's designation of groundwater as a 'potential' source of drinking water and the State Board's *Sources of Drinking Water Policy* – considered the potential for groundwater to be used as a future source of water to meet a portion of the community's demand, or to meet demand in times of emergency. (See Tech Memo #2.)
   - Malibu Lagoon, designated for providing habitat for aquatic life and wildlife. Also, staff considered recent regulatory actions that designated (in accordance with section 303(d) of the Clean Water Act) this waterbody as impaired, and that allocated loads from all significant point and nonpoint sources, including OWDSs. (See Tech Memo #4.)
   - Malibu Beach, Malibu Lagoon Beach (Surfrider), and Amarillo Beach, designated for water contact recreation. Also, staff considered recent regulatory actions that designated Malibu Beach and Surfrider Beach as impaired, and that specified dry and wet weather pathogen loads. (See Tech Memo #3.)

4. **CWC 13241(b) – Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto:** Staff considered environmental characteristics, including water quality and impairments to beneficial uses, throughout the technical and environmental staff reports and also in previous regulatory actions by the Board and US EPA to designate beneficial uses and establish water quality objectives, to designate impaired waters, and to issue TMDLs.

5. **CWC 13241(c) – Water quality conditions that could reasonably be achieved through coordinated control of all factors which affect water quality in the area:** In previous regulatory actions by the Board and US EPA, strategies to control pollutants from point and nonpoint sources were considered.

   - In the nutrient TMDL for Malibu Lagoon, numeric targets are established for all significant sources of nitrogen, including a numeric target of six pounds per day from OWDSs. (See nutrient TMDL for numeric targets for all significant sources of nitrogen; see Tech Memo #4 for an evaluation of nitrogen released from OWDSs.)

[3] Although staff also estimated the carbon footprint of hauling practices, staff did not quantify impacts to traffic from the tanker truck routes.

- The Santa Monica Bay Beaches Bacterial TMDLs require responsible agencies to achieve the numeric targets and waste load allocations for fecal indicator bacteria at the beaches through implementation of coordinated control strategies to address all bacterial sources. In the administrative records for the TMDLs, the Regional Board identifies myriad point and nonpoint sources of fecal indicator bacteria to the beaches, including sanitary sewer and sewage plant overflows and spills, septic systems, urban runoff, animal fecal matter, illegal discharges from boats, and illicit discharges from private drains among other sources. The Regional Board anticipated that responsible agencies would employ a variety of control strategies, including diverting storm drain flows to treatment plants, where possible; controlling sources of bacteria, including groundwater sources such as from malfunctioning or improperly placed septic systems; eliminating illicit discharges; or implementing "end-of-pipe" treatment to address these sources and, ultimately, achieve the TMDL targets.

6. **CWC 13241(d) – Economic considerations:** This section requires consideration of costs associated with establishment of water quality objectives. The proposed prohibition does not establish water quality objectives – rather, it is a proposed action to achieve existing objectives. Nevertheless, staff analyzed the costs of possible projects that the city, a utility, or a water authority could implement to comply with the prohibition. These projects, which were evaluated on a conceptual basis, have estimated costs ranging from $17 million to $80 million. (See Environmental Staff Report, section entitled Summary of Economics.)

7. **CWC 13241(e) – Need for developing housing within the region:** Although staff did not find that there is a need to develop additional housing in the City of Malibu, staff did consider impacts to housing that could arise from projects constructed to comply with the prohibition deadline. (See Environmental Staff Report, Environmental Checklist, Item 12.)

8. **CWC 13241(f) – Need to develop and reuse recycled water:** Although through this regulatory action the Regional Board is not determining method of compliance, staff assumed that the community would recycle as much treated wastewater as possible in planning and designing a project to achieve compliance with the prohibition. (See Environmental Staff Report, section entitled Options for Compliance Projects including Summary of Economics, and the Environmental Checklist, Item 3.)

9. **CWC 13281 – Health & Safety Code, section 117435, providing health officers with the authority to require reports from businesses that clean septic tanks, seepage pits, and cesspools:** Staff consulted with the health officer for the County of Los Angeles to get this information, and determined that the County does not require reports on the location of septic tanks/seepage pits/cesspools being cleaned, the locations of the disposal points, the frequencies of cleanouts, and any observed violations.[4] In the past, the County did require such reports. However, due to limited resources, the County has had trouble

[4] Staff is aware that the City provides contact information for five hauling firms, registered with the County; however, the City does not endorse any of these firms. Also, the City provides recommendations for pumping frequencies for properly functioning OWDSs. The City does not require 'section 117435' information (paragraph above), as this oversight would duplicate the County's oversight. Also, concerns have been raised by the City about the transporters' level of cooperation in providing such information to the City, as well as privacy issues.

reviewing all reports and, as a result, dropped the requirement for submittal for the past two years. The health officer still requires an annual inspection of all registered tanker trucks. (See Tech Memo #5, section entitled 'Septic Pumping and Hauling Regulations.')

Staff did have access, in Regional Board files, to pumping and hauling information for many of the dischargers who operate under WDRs specified in Orders issued by the Board. In Tech Memo #5 staff compiled and considered this information, and concluded that a high level of pumping and hauling occur due to limitations of treatment systems or hydrogeologic limitations, or both, that preclude on-site disposal.

10. **CWC 13281 – Possible adverse impacts if the discharge is permitted:** Swimmers are already exposed to elevated health risks at beaches in the Civic Center area. Habitat in Malibu Lagoon is already degraded by accelerated eutrophication. Much of the groundwater in the area fails to meet standards for drinking water. Continued and/or additional discharges will further pollute these water resources and be inconsistent with goals of the *Basin Plan* and other state plans and policies. In the Technical Staff Report as well as though previous regulatory actions by the Board, staff has demonstrated adverse impacts to the following water resources:

    - Groundwater: Pollution from OWDSs violates water quality objectives for drinking water use.[5] (See Tech Memo #2.)
    - Malibu Beach, Malibu Lagoon Beach (Surfrider), and Amarillo Beach: Pollution from OWDSs in hydraulic connection with these beaches is a significant source of impairment to water contact recreation.[6] (See Tech Memo #3.)
    - Malibu Lagoon: Pollution from OWDSs in hydraulic connection with the lagoon impairs aquatic and wildlife beneficial uses fails to meet a pollutant load for nitrogen is impaired by nitrogen from OWDSs as well as other sources.[7] (See Tech Memo #4.)

11. **CWC 13281 – Failure rates of any existing ....systems whether due to inadequate design, construction, maintenance, or unsuitable hydrogeologic conditions:** All 20 dischargers subject to Orders issued by the Board have violated those Orders at least once during the period from the fourth quarter of 2004 through the fourth quarter of 2008 (except Malibu Lumber, which didn't start discharge until April 2009[8]). While a few of the violations were for reporting problems (e.g. late submittal of a monitoring report), most were for serious violations, such as failure to meet pollutant concentration limits that the Board sets at levels protective of beneficial uses. Failure to meet limitations on flow is another example of serious violations, and indicates design limitations and/or siting and hydrogeologic limitations.

---

[5] See the *Basin Plan*, in which the Board designates groundwater as 'potential MUN;' the State Board 'Sources of Drinking Water Policy'[5]; and Tech Memo #2, in which staff presents evidence that groundwater fails to meet MCLs for nitrate, nitrite, and pathogens.

[6] See the *Basin Plan*, in which the Board has designates water contact recreation as a beneficial use for these beaches; the 303(d) list, in which the Board and US EPA designate these beaches as impaired; the beach pathogen TMDL, in which the Board specifies dry and wet weather targets for pathogens; and Tech Memo #3, in which staff presents evidence of impairment to water contact recreation activities from OWDSs.

[7] See the *Basin Plan*, in which the Board has designates aquatic and wildlife beneficial uses for the lagoon; the 303(d) list, in which the Board and US EPA designate Malibu Lagoon as impaired; and the nutrient TMDL for the lagoon, in which the Board allocates nitrogen loads for various sources of nitrogen, including OWDSs.

[8] Malibu Lumber, since beginning discharge in April 2008, also has a record of serious violations of its WDR.

Dischargers also experience start-up and maintenance problems, as indicated in reports of self-monitoring and the record of violations. (See Tech Memo #1.) A recent example is Malibu Lumber, which started treatment and discharge in April 2009. The discharger has experienced many unanticipated start-up problems. (See Tech Memo #1.) The discharger has yet to achieve full compliance with its WDR.

Many dischargers resort to a high level of pumping and hauling (almost 2 million gallons per year, from a subset of 13 dischargers) due to the limitations of treatment systems or hydrogeology, or both, which preclude on-site disposal. Such pumping and hauling practices have been needed to prevent further stress on sites and systems that already fail to properly function for the flow of wastewater generated from on-site activities, especially during periods of peak activity, such as summer weekends and holidays. (See Tech Memo #5.)

12. **CWC 13281 – Evidence of existing, prior, or potential contamination:** For Malibu Lagoon, the Board has already considered evidence of impairment, and designated that waterbody as impaired. (See 303(d) list.) Furthermore, targets for nitrogen loads have been allocated through a TMDL for nitrogen loads from various sources, including OWDSs. (See Malibu Lagoon nutrient TMDL.) In Tech Memo #4, staff demonstrates that nitrogen loads from OWDSs far exceed the TMDL target.

For Malibu Lagoon (Surfrider) Beach and Malibu Beach, the Board already considered evidence of impairment from pathogens, and designated these beaches as impaired. (See 303(d) list.) The Board already set dry weather targets for these beaches through a TMDL for pathogens TMDL. In Tech Memo #3, staff demonstrates that pathogen indicators released from OWDSs in hydraulic connection with beaches fail to meet water contact recreation standards and the dry weather target.

For groundwater, comments were received regarding seawater intrusion into groundwater resources, and staff acknowledges that seawater intrusion may have contributed to degradation of water quality (along with other sources of pollutants, such as OWDSs). Nevertheless, such problems do not preclude restoration of water quality. And in restoring water quality, staff is not suggesting that it is feasible for groundwater resources to completely replace the City's other supplies of drinking water. Rather, staff suggests that groundwater could meet a portion of drinking water demand, and could also serve as an emergency supply of water in the event that deliveries of imported water were interrupted. In restoring and managing potential future groundwater production, the storage and operational yield of the aquifer should be evaluated, and community leaders should ensure that pumping patterns and replenishment with high quality waters are properly designed and managed. Early studies of water resources were of limited scope, and past production of groundwater does not appear to have been managed in a manner to establish sustainable pumping patterns and sources of replenishment, in order to prevent over-pumping of the aquifer and degradation of water quality from seawater intrusion and discharges of wastewaters.

13. **CWC 13281 – Existing and planned land use and dwelling density:** The entire prohibition area covers 2.2 square miles, and includes approximately 400 dischargers who cumulatively generate wastewater at a rate of about 270,000 gallons per day (gpd).

Staff did not average the total existing flow over the entire 2.2 square miles. Most activity and the flows generated from these activities are concentrated along the beach and in the Civic Center area, which serves as the core of the City's business and civic activities. (See Tech Staff Report – Overview, sections entitled Introduction and Prohibition Boundary, and Tech Memo #4.) Many of the existing commercial dischargers already exceed flow limits established in WDRs. (See Tech Memo No. 1.) Many of these dischargers rely on hauling their wastewaters off-site. (See Tech Memo No. 5.) In lower Winter Canyon, high density development – namely four multi-family units – generate significant flows that rely on the Malibu Water Pollution Control Plant, a small, high-cost plant that has a problematic compliance history. (See Tech Memo #1.) Lower Winter Canyon also receives flows of wastewater from the coastal area, namely Malibu Colony Plaza, which lifts its wastewater over to four acres in Winter Canyon.

Significant properties in the City's core may be developed in the future, including La Paz and Malibu Towing; activities on these future developments may generate additional flows. Significant redevelopment also may occur in the future; intensified activities from redevelopment will likely generate additional flows. For example, Malibu Lumber is expected to generate up to 17,000 gpd – over a ten-fold increase in flows from the previous site activities.

14. **CWC 13281 – Historical population growth:** A census value is not available for the population within the prohibition boundary, and staff initially estimated the current residential population at about 1,000.[9] Staff revised this estimate to almost 2,000, using information on buildings, such as numbers of bedrooms and bathrooms (see Tech Memo #4, Table 2). Also, staff used information on wastewater flows (see Tech Memo #4, Table 1) as a rough cross-check of the population estimate. See also the Environmental Staff Report, section on Growth-Inducing Impacts. Staff also considered trend data (see Tech Memo #5, Appendix E), available for the City as a whole, and determined that, as with many areas in the County, Malibu has experienced growth; since 1990, prior to incorporation of the area that would become the City of Malibu, the population increased by 30%, from 10,500 to 13,700[10] in 2008 – an annual growth rate of 1.5%.

Furthermore, the population estimate of 2,000 does not include daytime and evening visitors who use the beaches and patronize the businesses and public facilities in the area. The visitor population appears to be substantially increasing, as indicated by beach activity statistics for beaches – e.g. beach activity (throughout the area – not just limited to the prohibition area) appears to be increasing at an annual rate of 6% based on an increase in monthly beach counts from 233,500 in August 1999 to 355,000 in August 2006. (See Tech Memo #3, Appendix E.) Although the monthly totals are for all Malibu

[9] Staff's population estimate of 1,000, presented in the July 31, 2009 drafts, was based on information in Stone, *Final Report – Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California*, 2004, funded by the Santa Monica Bay Restoration Commission and the California State Coastal Conservation.

[10] The 2008 population estimate is for the entire City of Malibu, not just the Malibu Civic Center area.

area beaches, staff believes that it is likely that beach activity for the beaches in the Civic Center area have shown a similar – and likely greater – increase, given the proximity of commercial and public facilities in the area.

Nor do the above population estimates include daytime and evening workers employed in the Malibu Civic Center area. As indicated by increasing wastewater flows from 13 commercial and public facilities (see Tech Memo #5, Figure 2), economic activity in the Civic Center area appears to be increasing with intensified development. Rates for discharges of wastewater will likely increase with intensified development – e.g. the redevelopment of the Malibu Lumber site which, when fully operational, is expected to discharge up to 17,000 gallons per day (over a ten-fold increase from the prior activity on the site).

Staff also considered growth inducing impacts. (See Environmental Staff Report, CEQA Analysis, section entitled Other Environmental Considerations.)

15. **CWC 13282 – Has an authorized public agency provided satisfactory assurance that systems will be appropriately designed, located, sized, spaced, constructed, and maintained?** No – The City has not given such assurance to the satisfaction of the Regional Board. However, the City has commented that it believes it can provide the assurances required by this section, as summarized below.

    - The City has started a wastewater management database.[11] However, staff has expressed concerns to the City of Malibu about the accuracy of information identifying each property listed in IWIMS, and also the extent to which entries for each property have been populated with data needed to regulate discharges to achieve protection of both public health as well as the quality of underlying groundwater and nearby surface waters. (See attachments to Tech Memo #1, letters dated May 28, 2009 and June 23, 2009.)

    - The City discussed, during the October 2008 public meeting of the Board, an Operating Permit Program initiated as of March 10, 2008 and other terms of the MOU. The Board directed staff to prepare a prohibition. Concurrent with staff efforts to prepare a prohibition, a meeting to discuss the MOU was held among three Regional Board members, including the Chair, and City officials. However, there was no progress towards re-negotiating the MOU.

[11] IWIMS – Integrated Wastewater Information System.

TM #1

State of California
California Regional Water Quality Control Board, Los Angeles Region

Final Technical Staff Report

Evidence in support of an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*

to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

Technical Memorandum #1: *Dischargers Have Poor Records of Compliance with Regional Board Orders*

by
Rebecca Chou,* Ph.D., P.E.
Chief, Groundwater Permitting Unit

** The author would like to thank Regional Board staff, Joe Luera and interns Albert Chu and Shannon Liou for their assistance in preparing map, tables and graphs.*

November 5, 2009

Technical Memorandum 1: *Dischargers Have Poor Records of Compliance with Regional Board Orders*

by
Rebecca Chou, Ph.D., P.E.
Chief, Groundwater Permitting Unit

Background

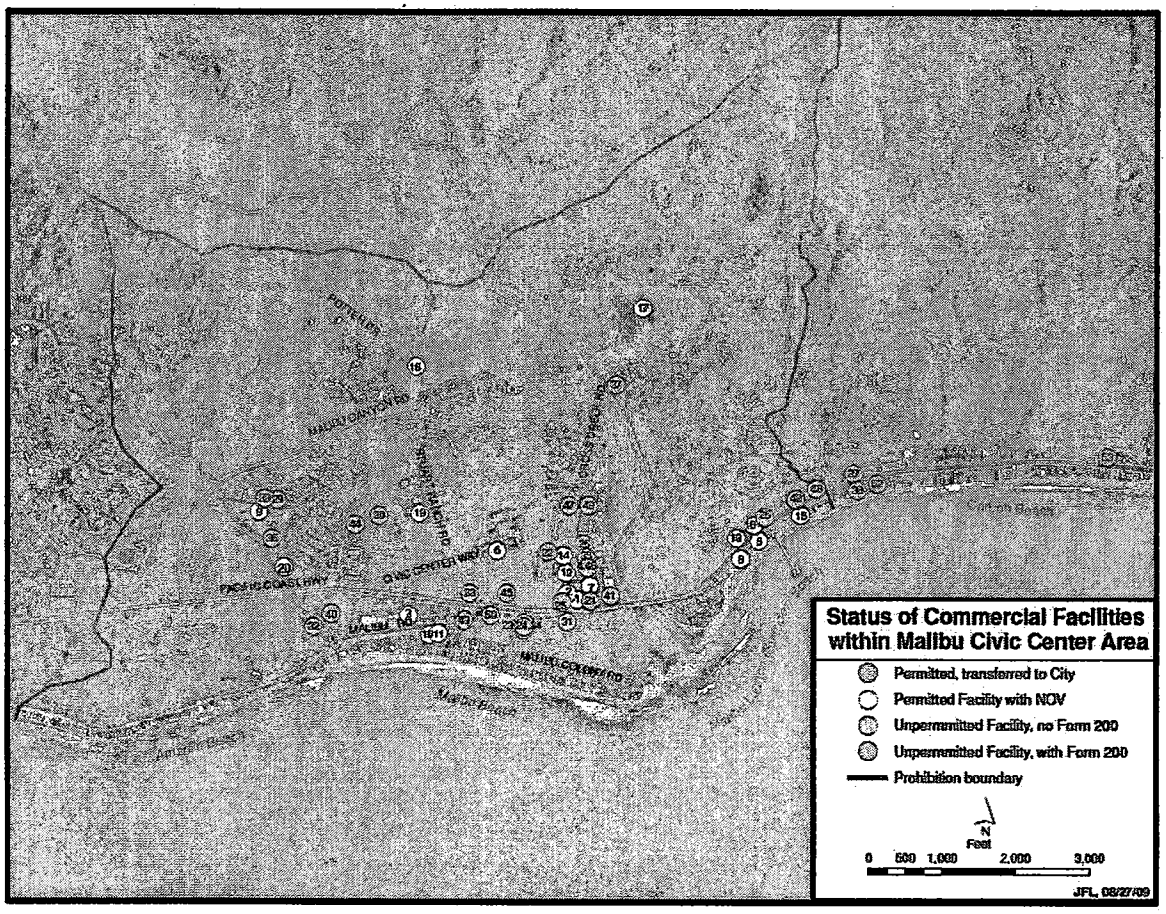
Without community sewers and wastewater treatment facilities and infrastructure, dischargers in the Malibu Civic Center area (Figure 1[1]) use on-site disposal systems for discharge of wastewaters from residential, commercial, and other facilities.

The Regional Water Quality Control Board for the Los Angeles Region (Regional Board) and City of Malibu share oversight for discharges of wastewater in the City of Malibu, including the Civic Center area.[2] Pursuant to a memorandum of understanding (MOU) dated August 12, 2004, the Regional Board regulates discharges from commercial land use activities (including discharges from industrial, research, and public facilities) that have wastewater flows that exceed 2,000 gallons per day (gpd), by issuing Orders that specify waste discharge requirements (WDRs) for the privilege of discharging waste to waters of the State. Also pursuant to this MOU, the City regulates discharges from small commercial facilities with wastewater flows equal to or less than 2,000 gpd and from residential land uses.

[1] The area subject to the proposed prohibition is referred to as the Malibu Civic Center area (Figure 1). The area was defined using topographic features and drainage patterns, and encompasses the hydrologic areas of Malibu Valley (also referred to as the lower Malibu Creek watershed), Winter Canyon, and adjacent coastal strips including Amarillo Beach, Malibu Beach, Malibu Lagoon, and Malibu Lagoon Beach (aka Surfrider Beach, including First, Second, and Third Points at Surfrider). For more discussion on the prohibition boundaries defining the Malibu Civic Center area, refer to the Technical Staff Report Overview and the Environmental Staff Report.

[2] In 1952, when the Regional Water Quality Control Board for the Los Angeles Region (Regional Board) delegated authority for permitting septic systems to local land use agencies, the County of Los Angeles assumed responsibility for oversight of septic systems incorporated areas, including the area that subsequently incorporated as the City of Malibu in 1991. In the early 2000s, during re-assessments by all nine Regional Boards of permitting authorities delegated to local agencies, the Regional Board chose not to renew delegation (i.e. waivers of requirements to submit a Report of Waste Discharge) of permitting authority to local agencies. Rather, the Regional Board adopted a strategy of entering into Memoranda of Understanding (MOUs) with each municipality in the Los Angeles Region.

Figure 1: Commercial Facilities within Malibu Civic Center Area



Purpose and Methodology

The purpose of this memorandum is to provide an analysis of compliance with Orders issued by the Regional Board. (With limited exceptions, compliance information for dischargers under oversight by the City of Malibu was not available.)

To conduct the analysis, staff, including a team of college-level and graduate-school–level interns, reviewed 224 reports of self-monitoring submitted during the period starting with the fourth quarter 2004 through the fourth quarter 2008 from 19 dischargers except Malibu Lumber based on April 2009 monthly report. Dischargers who submitted reports of self-monitoring include government organizations (state, county, and special districts) and privately-owned organizations (commercial and industrial organizations) listed in the following Tables 1 and 2.

Table 1 - Permitted Discharges from the Public Sector

Discharger	Facility	Start of Permitted Discharge	# Reports Analyzed	
			Quarterly	Annual
California Department of Parks and Recreations	Malibu Pier State Park	9/26/2002	15	3
Los Angeles County Department of Public Works (LA DPW)	Malibu Administrative Center	10/8/2002	17	5
LA DPW	Fire Station No. 88	8/19/2003	17	5
LA DPW	Surfrider Beach	2/25/2003	17	5
LA DPW	Road Maintenance Yard 336	10/25/2002	17	4
LA DPW	Malibu Water Pollution Control Plant (Winter Canyon)	11/2/1998	17	5

Table 2 - Permitted Discharges from the Private Sector

Discharger	Facility	Start of Permitted Discharge	# Reports Analyzed	
			Quarterly	Annual
HRL	Hughes Research Lab	1/26/1998	17	4
Malibu Beach Inn	Malibu Beach Inn	3/13/2003	16	3
Malibu Bay Company	Malibu Colony Plaza	12/7/2000	17	2
Malibu Country Mart Limited	Malibu Country Mart I	1/30/2003	17	0
Malibu Cross Creek, LTD	Malibu Country Mart II	1/30/2003	17	0
Malibu Country Mart Limited	Malibu Country Mart III	12/12/2002	17	0
Malibu Creek Preservation	Malibu Creek Plaza Shopping Center	1/11/2001	17	5
City of Malibu and Malibu Lumber LLC[3]	Malibu Lumber	April 2009[4]	1*	NA
Dave Whitehead	Malibu Shores Motel	12/19/2003	16	4
Morton Gerson	23730 Malibu Road	3/24/2003	16	1
Prudential Malibu Realty	Prudential Malibu Realty	8/28/2002	17	5

* April 2009 monthly report

[3] Although the City owns the land on which the Malibu Lumber development is sited, this discharger is grouped with private sector instead of public sector.
[4] A discharge from Malibu Lumber did not start until April 2009.

Three permitted dischargers, listed in Table 3, failed to submit any reports of self-monitoring as of April 2009. Although staff identified these cases of 'failure to submit' violations, staff was unable analyze compliance by these dischargers with technical requirements in their WDRs.

Table 3 – Permitted Dischargers from Private Sector-Failure to Submit Reports

Discharger	Start of Permitted Discharge	# Delinquent Reports	
		Quarterly	Annual
Jack in the Box # 160	1/23/2004	20	5
Miramar Building[5]	3/18/2004	19	5
Serra Retreat Center	4/28/2004	19	5

Results

Each one of the 20 dischargers under Orders issued by the Regional Board has a record of violations, summarized in Table 4, including 8 facilities with advanced treatment systems. Among the most serious violations are repeated failures to achieve effluent limits specified in WDRs; in particular, limits for pathogens and nutrients (species of nitrogen and phosphorus) that are identified as pollutants in nearby waters that the Regional Board and EPA have designated as impaired.

Among the other violations included in Table 4 is tardy submittal of reports of self-monitoring required by the WDRs, and improper certifications of those monitoring reports – e.g. a perjury statement executed by a party not authorized to certify the accuracy of the results on behalf of the discharger, and/or modifications to the perjury statement language specified in a WDR.

Conclusion

Permitted and unpermitted facilities are listed in Table 5 and shown in Figure 1. Permitted dischargers of wastewaters with wastewater flows of more than 2,000 gpd in the Malibu Civic Center area – including both public and private organizations – have poor records of compliance with Regional Board Orders.

The compliance status for dischargers under oversight by the City of Malibu[6], including small commercial dischargers and residential dischargers, has not been analyzed.

[5] Although the Miramar Investment Company is landlord to offices occupied by the City of Malibu, staff has included this discharger with the commercial group of dischargers.

[6] Although acknowledging that the City is compiling an Integrated Wastewater Management Information System (IWMIS), the Regional Board has expressed concern to the City of Malibu, in letters dated May 28, 2009 and June 23, 2009 (Appendix 1-1), about the accuracy of information identifying each property listed in IWMIS, and also the extent to which entries for each property have been populated with data needed to regulate discharges to achieve both protection of both public health as well as the quality of underlying groundwater and nearby surface waters.

Table 4 - Summary of Violations ***

Facility	TSO**	Non Submittal	Late Submittal	Non-reported Parameters	Discharge Violations	Perjury Statement	Material Change	Total Violation Counts
Fire Station No. 88*					**77**	**1**	**1**	**79**
HRL Laboratories		3	2			1		6
Jack In The Box		**25**						**25**
Malibu Administrative Center*					44	1	1	46
Malibu Colony Plaza	**2**	**3**	**9**		**39**	**1**	**1**	**55**
Malibu Beach Inn	**2**	**3**		**4**	**33**	**1**		**43**
Malibu Country Mart I	1	5	13	133		1		153
Malibu Country Mart II	1	5	14	133		1		154
Malibu Country Mart III	1	5	13	133		1		153
Malibu Lumber					**18**	**1**	**1**	**20**
Malibu Pier State Park*		**4**	**7**		**1**	**1**	**1**	**14**
Malibu Shores Motel		2	9		13	1	1	26
Malibu Creek Plaza Shopping Center (Malibu Village)	**1**		**3**		**38**			**42**
Malibu Water Pollution Control Plant*			**9**	**400**	**235**			**644**
Miramar Investment Co.		24						24
Morton Gerson Property		5	16		2			23
Prudential Malibu Realty			4					4
LA County Public Works Road Maintenance Yard*		1		3	120	1	1	126
Serra Retreat Center		24						24
Surfrider Beach*			4		3	1		8

*Public Sector

** Time Schedule Order

*** From quarterly reports during fourth quarter 2004 to fourth quarter 2008 for 19 dischargers, except Malibu Lumber from April 2009 monthly report. Bolded facilities have advanced treatment systems.

Table 5 Commercial Facilities within Malibu Civic Center Area as of April 2009

Map No	Facilities	Address	CI No.	Status
1	Prudential Malibu Realty	23405 W. Pacific Coast Highway (Hwy)	8447	Permitted Facility with NOV
2	Malibu Lumber & Hardware	23479 Pacific Coast Hwy	8695	Permitted Facility with NOV
3	Malibu Colony Plaza/ colony LLC	23705-23841 Malibu Road	8158	Permitted Facility with NOV
4	Cross Creek Plaza/Malibu Creek Preservation	3822 Cross Creek Road	8226	Permitted Facility with NOV
5	Malibu Pier State Park*	23000 Pacific Coast Hwy	8456	Permitted Facility with NOV
6	Malibu Admin. Center	23519 W. Civic Center Way	8469	Permitted Facility with NOV
7	Malibu Country Mart III	3900 Cross Creek Road	8512	Permitted Facility with NOV
8	Surfrider Beach	23060 W. Pacific Coast Hwy	8532	Permitted Facility with NOV
9	LACo. Dept. of Public Works - Road Maintenance Yard	3637 Winter Canyon Road	8471	Permitted Facility with NOV
10	Morton Gerson	23730 Malibu Road	8542	Permitted Facility with NOV
11	County of LA - Fire Station #88	23720 W. Malibu Road	8621	Permitted Facility with NOV
12	Malibu Country Mart I	3835 Cross Creek Road	8518	Permitted Facility with NOV
13	Malibu Shores Motel	23033 Pacific Coast Hwy	8693	Permitted Facility with NOV
14	Malibu Country Mart II	23410 Civic Center Way	6325	Permitted Facility with NOV
15	Malibu Beach Inn*	22878 Pacific Coast Hwy	8559	Permitted Facility with NOV
16	Hughes Research Lab Inc	3011 Malibu Canyon Road	6939C	Permitted Facility with NOV
17	Serra Retreat Center	3401 Serra Road	8743	Permitted Facility with NOV
18	Jack in the Box (Checker Board Properties Inc)	23017 Pacific Coast Hwy	8710	Permitted Facility with NOV
19	Mira Mar Properties-Office Bldg. W/ City Hall	23805 Stuart Ranch Road	8631	Permitted Facility with NOV
20	Malibu Water Pollution Control Plant	3260 Vista Pacifica Street	4673	Permitted Facility with NOV
21	Malibu Shell (Equilon)	23387 Pacific Coast Hwy	8513	Perm, transferred to City
22	Partners LLC	23440 Civic Center way	8587	Perm, transferred to City
23	Malibu Road, LLC	23700 Malibu road		Perm, transferred to City
24	23676-23712 Malibu rd	23700 Malibu road	8535	Perm, transferred to City
25	The Malibu Animal Hospital	23421 Pacific Coast Hwy	8711	Perm, transferred to City
26	Partnership	3806 Cross Creek Road	8361	Perm, transferred to City
27	Kentucky Fried Chicken*	22751 Pacific Coast Hwy		Unpermitted Facility, no Form 200
28	Malibu Inn Restaurant & nightclub*	22969 Pacific Coast Hwy		Unpermitted Facility, no Form 200
29	Webster Elementary School	3602 Winter Canyon		Unpermitted Facility, no Form 200
30	Rackett Club	23847 Stuart Ranch		Unpermitted Facility, no Form 200
31	Malibu Colony HOA	23554 Malibu Road		Unpermitted Facility, no Form 200
32	Mesa LLC	23915 Malibu Road		Unpermitted Facility, no Form 200
33	Lisa Krasnoff	23655 Malibu Road		Unpermitted Facility, no Form 200
34	Aqua Lion Unique	23700 Malibu Road		Unpermitted Facility, no Form 200
35	So. Cal. Edison	3808 Cross Creek Road		Unpermitted Facility, no Form 200
36	Malibu Canyon Village Owners Associates	23901 Civic Center		Unpermitted Facility, no Form 200
37	Mariposa Land Company LTD	3728 Cross Creek		Unpermitted Facility, no Form 200
38	Casa Malibu at the Beach (310)456-2219	22752 Pacific Coast Hwy		Unpermitted Facility, no Form 200
39	Our Lady of Malibu Catholic Church	3625 Winter Canyon Road		Unpermitted Facility, no Form 200
40	Land Corp.	23900 Pacific Coast Hwy		Unpermitted Facility, no Form 200
41	Malibu Retail Acquisition Co.	23359 Pacific Coast Hwy		Unpermitted Facility, no Form 200

Map No	Facilities	Address	CI No.	Status
42	American Commercial Equities LLC	22917 Pacific Coast Hwy		Unpermitted Facility, no Form 200
43		23755 Malibu Road		Unpermitted Facility, no Form 200
44	Wave Property Inc	3542 Coast View Drive		Unpermitted Facility, no Form 200
45	Land Corp.	23641 Pacific Coast Hwy		Unpermitted Facility, no Form 200
46	JP Morgan Chase Bank National Association	3854 Cross Creek Road		Unpermitted Facility, no Form 200
47	Verizon South Inc,.	3705 Cross Creek Road		Unpermitted Facility, no Form 200
48	Allegria Restaurant	22821 Pacific Coast Hwy		Unpermitted Facility, no Form 200
49	Mariposa Land Company LTD	3738 Cross Creek Road		Unpermitted Facility, no Form 200
50	Chevron USA Inc.	23614 Pacific Coast Hwy		Unpermitted Facility, no Form 200
51	Malibu Surfrider Hotel	22541 Pacific Coast Hwy	pending	Unpermited Facility, with Form 200
52	The Pier View	22718 Pacific Coast Hwy	pending	Unpermited Facility, with Form 200
53	Malibu Sand Shopping Center	22333 Pacific Coast Hwy	pending	Unpermited Facility, with Form 200

California Regional Water Quality Control Board
Los Angeles Region
Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Arnold Schwarzenegger
Governor

May 28, 2009

Mr. Jim Thorsen
Manager, City of Malibu
23815 Stuart Ranch Road
Malibu, CA 90265-0950

Dear Mr. Thorsen:

Integrated Wastewater Management Information System (IWIMS) Notebooks

Your staff submitted several notebooks containing IWIMS Exhibits on May 7, 2009 during a public meeting of the Regional Water Quality Control Board for the Los Angeles Region. With this letter, we are returning these notebooks to you.

Staff's review of the notebooks, as well as reliance on data generated from IWIMS to identify commercial properties with on-site wastewater disposal systems, raises concern. These concerns include the accuracy of the information identifying each property listed in the IWIMS, and also the extent to which entries for each property have been populated with the data needed to regulate discharges from on-site wastewater disposal systems to achieve both protection of public health as well as protection of the underlying groundwater and nearby surface waters. We look forward to discussing these concerns, as wells as other issues related to a Memorandum of Understanding, approved August 5, 2004, between the City of Malibu and the Regional Board. We have publicly noticed this meeting for June 17, 2009, and understand that you have issued similar public notice.

Also, we continue to wait for the modeling files for the City's risk assessment,[1] as requested several times by our staff. As most recently discussed with Craig George, we hope to have these data by May 29, 2009. Should you have questions about this request, please contact Ms. Elizabeth Erickson at (213) 610-2264.

Please do not hesitate to contact me, at (213) 576-6605, should you have questions about this letter.

Sincerely,

Tracy J. Egoscue
Executive Officer
Enclosures

[1] "Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu," prepared by Stone Environmental, August 2004.

California Regional Water Quality Control Board
Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Arnold Schwarzenegger
Governor

June 23, 2009

Mr. Jim Thorsen
Manager, City of Malibu
23815 Stuart Ranch Road
Malibu, CA 90265-0950

Dear Mr. Thorsen:

Integrated Wastewater Management Information System (IWIMS) Notebooks

Your staff submitted several notebooks containing IWIMS Exhibits on May 7, 2009 during a public meeting of the Regional Water Quality Control Board for the Los Angeles Region (Regional Board). As the Memorandum of Understanding with the City of Malibu, including the information you presented in the notebooks, had not been publicly noticed, we returned these notebooks to you on May 28, 2009. Subsequently, during a public meeting of the Regional Board on June 4, 2009, your staff re-submitted the notebooks. Per your request at the meeting and in your letter dated June 3, 2009, we have forwarded the notebooks to our board members.

We are pleased that the City of Malibu has taken significant steps toward design and compilation of a database system to track the use of thousands of on-site wastewater disposal systems. However, as mentioned in our letter dated May 28, 2009, staff's review of the notebooks plus reliance on data generated from IWIMS to identify commercial properties with on-site wastewater disposal systems, raises concern. These concerns include the accuracy of the information identifying each property listed in the IWIMS, and also the extent to which entries for each property have been populated with the data needed to regulate discharges from on-site wastewater disposal systems to achieve both protection of public health as well as protection of the underlying groundwater and nearby surface waters.

In your letter dated June 4, 2009, you expressed a concern about the City's constitutional right to express its viewpoint. Please be assured that staff at the Regional Board do not intent to limit your constitutional rights. However, we suggest that a more appropriate time to have submitted the notebooks would have been when we agendized the topic of the Memorandum of Understanding (MOU), approved August 5, 2004, between the City of Malibu and the Regional Board. In this regard, the public would have had notice of this issue and an ability to review information presented to the Board. We are sensitive to the legal requirement that all interested parties have access to the same information that is given to the Regional Board on matters that the Regional Board has discussed, is discussing, or will discuss at Board meetings.

As a legal matter, Government Code section 11125.1 deals with the fact that documents given to the Board members are considered disclosable pursuant to the Public Records Act and should be made available to the public who request copies of any such documents. This section does not address or support your concerns. Title 18, California Code of Regulations section 5572 refers to the Board of Equalization, so we assume you made that reference by mistake. However, even if that applied to the Regional Board, the substance of that section merely restates that documents submitted to government

agencies are public records. We agree that destruction of public records is a crime, but we returned the documents to you and did not steal, remove, secrete, destroy, mutilate, deface, alter or falsify the documents in any way.

We agree that your monthly presentations to the Board have been helpful and educational. Please be aware that we must all be careful that those presentations do not cross into matters that the Board will be considering and taking action upon in the near future.

Please do not hesitate to contact me, at (213) 576-6605, should you have questions.

Sincerely,

Tracy J. Egoscue
Executive Officer

State of California
California Regional Water Quality Control Board, Los Angeles Region

Final Technical Staff Report

Evidence in support of an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*

to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

Technical Memorandum #2: Pathogens and Nitrogen in Wastewaters Impair Underlying Groundwater as a Potential Source of Drinking Water

by
David Koo*

* *The author would like to thank Regional Board staff, Joe Luera and interns Yifei Tong, Ryan Thacher, Shentong Lu, and Justin Tang for their assistance in preparing map, tables and graphs.*

November 5, 2009

Staff revised Table 2, Figure 1, and Figure 2, For Attachment 2-1, three tables have been combined. For Attachment 2-2, three graphs have been combined. These tables and graphs, listed below, have been revised or replaced from the draft dated October 21, 2009:

Corrected Tables

	Page
Table 1: Summary of Groundwater Pollution	TM2-5
Table 2: Summary of Groundwater Wells in Malibu Civic Center Area	TM2-7
Malibu Administrative Center Well #7b	TM2-9
Malibu Administrative Center Well #8	TM2-10
Malibu Country Mart I Well MW-1	TM2-11
Malibu Country Mart I Well MW-2	TM2-12
Malibu Country Mart I Well MW-3	TM2-13
Malibu Country Mart II Well MW-1	TM2-14
Malibu Country Mart II Well MW-2	TM2-15
Malibu Country Mart II Well MW-3	TM2-16
Malibu Country Mart III Well MW-1	TM2-17
Malibu Country Mart III Well MW-2	TM2-18
Malibu Country Mart III Well MW-3	TM2-19
Malibu Creek Plaza Well #1	TM2-20
Malibu Creek Plaza Well #2	TM2-21
Malibu Creek Plaza Well #3	TM2-22
Malibu Creek Plaza Well #4	TM2-23
Malibu Creek Plaza Well #5	TM2-24
Malibu Creek Plaza Well #6	TM2-25
Malibu Lumber ML MW-1, ML MW-2, ML MW-3, ML MW-4, ML MW-5	TM2-26
Malibu Colony Plaza Well #1	TM2-27
Malibu Colony Plaza Well #2	TM2-28
Malibu Colony Plaza Well #3	TM2-29
Malibu Colony Plaza Well #4	TM2-30
Malibu Colony Plaza Well #5	TM2-31
Malibu Civic Center Area Well C-1	TM2-32
Malibu Civic Center Area Well C-2	TM2-33
Malibu Civic Center Area Well P-1	TM2-34
Malibu Civic Center Area Well P-7	TM2-35
Malibu Civic Center Area Well P-9	TM2-36
Malibu Civic Center Area Well SMBRP-1	TM2-37
Malibu Civic Center Area Well SMBRP-2	TM2-38
Malibu Civic Center Area Well SMBRP-3c	TM2-39
Malibu Civic Center Area Well SMBRP-6	TM2-40
Malibu Civic Center Area Well SMBRP-9	TM2-41
Malibu Civic Center Area Well SMBRP-10c	TM2-42
Malibu Civic Center Area Well SMBRP-11	TM2-43
Malibu Civic Center Area Well SMBRP-12	TM2-44
Malibu Civic Center Area Well SMBRP-13	TM2-45
Malibu Civic Center Area Well SMBRP-14	TM2-46
Malibu Civic Center Area Well SMBRP-15b	TM2-47
Malibu Civic Center Area Well SMBRP-16	TM2-48
Malibu Water Pollution Control Plant Well WPCP-1	TM2-49
Malibu Water Pollution Control Plant Well WPCP-2	TM2-50
Malibu Water Pollution Control Plant Well WPCP-3	TM2-51
Malibu Water Pollution Control Plant Well WPCP-4	TM2-52
Malibu Water Pollution Control Plant Well WPCP-5	TM2-53
Malibu Water Pollution Control Plant Well WPCP-6	TM2-54
Malibu Water Pollution Control Plant Well WPCP-7	TM2-55
Surfrider Beach Well SB-1	TM2-56
Surfrider Beach Well SB-2	TM2-57

Malibu Beach Inn Well MW-1 TM2-58
Malibu Beach Inn Well MW-2 TM2-59
Malibu Beach Inn Well MW-3 TM2-60

Corrected Graphs
Figure 1 – Groundwater wells in the Malibu Civic Center Area TM2-2
Figure 2 – Groundwater Quality Compliance Status TM2-6
Malibu Administrative Center Well #7b TM2-62
Malibu Administrative Center Well #8 TM2-63
Malibu Country Mart I Well MW-1 TM2-64
Malibu Country Mart I Well MW-2 TM2-65
Malibu Country Mart I Well MW-3 TM2-66
Malibu Country Mart II Well MW-1 TM2-67
Malibu Country Mart II Well MW-2 TM2-68
Malibu Country Mart II Well MW-3 TM2-69
Malibu Country Mart III Well MW-1 TM2-70
Malibu Country Mart III Well MW-2 TM2-71
Malibu Country Mart III Well MW-3 TM2-72
Malibu Creek Plaza Well #1 TM2-73
Malibu Creek Plaza Well #2 TM2-74
Malibu Creek Plaza Well #3 TM2-75
Malibu Creek Plaza Well #4 TM2-76
Malibu Creek Plaza Well #5 TM2-77
Malibu Creek Plaza Well #6 TM2-78
Malibu Lumber ML MW-1, ML MW-2, ML MW-3, ML MW-4, ML MW-5 TM2-79
Malibu Colony Plaza Well #1 TM2-80
Malibu Colony Plaza Well #2 TM2-81
Malibu Colony Plaza Well #3 TM2-82
Malibu Colony Plaza Well #4 TM2-83
Malibu Colony Plaza Well #5 TM2-84
Malibu Civic Center Area Well C-1 TM2-85
Malibu Civic Center Area Well C-2 TM2-86
Malibu Civic Center Area Well P-1 TM2-87
Malibu Civic Center Area Well P-7 TM2-88
Malibu Civic Center Area Well P-9 TM2-89
Malibu Civic Center Area Well SMBRP-1 TM2-90
Malibu Civic Center Area Well SMBRP-2 TM2-91
Malibu Civic Center Area Well SMBRP-3c TM2-92
Malibu Civic Center Area Well SMBRP-6 TM2-93
Malibu Civic Center Area Well SMBRP-9 TM2-94
Malibu Civic Center Area Well SMBRP-10c TM2-95
Malibu Civic Center Area Well SMBRP-11 TM2-96
Malibu Civic Center Area Well SMBRP-12 TM2-97
Malibu Civic Center Area Well SMBRP-13 TM2-98
Malibu Civic Center Area Well SMBRP-14 TM2-99
Malibu Civic Center Area Well SMBRP-15b TM2-100
Malibu Civic Center Area Well SMBRP-16 TM2-101
Malibu Beach Inn Well MW-1 TM2-102
Malibu Beach Inn Well MW-2 TM2-103
Malibu Beach Inn Well MW-3 TM2-104
Surfrider Beach Well SB-1 TM2-105
Surfrider Beach Well SB-2 TM2-106
Malibu Water Pollution Control Plant Well WPCP-1 TM2-107
Malibu Water Pollution Control Plant Well WPCP-2 TM2-108
Malibu Water Pollution Control Plant Well WPCP-3 TM2-109
Malibu Water Pollution Control Plant Well WPCP-4 TM2-110

Malibu Water Pollution Control Plant Well WPCP-5	TM2-111
Malibu Water Pollution Control Plant Well WPCP-6	TM2-112
Malibu Water Pollution Control Plant Well WPCP-7	TM2-113

Staff revised Table 2, Figure 1, and Figure 2, For Attachment 2-1, three tables have been combined. For Attachment 2-2, three graphs have been combined. These tables and graphs, listed below, have been revised or replaced from the draft dated October 21, 2009:

Corrected Tables	Page
Table 1: Summary of Groundwater Pollution	TM2-5
Table 2: Summary of Groundwater Wells in Malibu Civic Center Area	TM2-7
Malibu Administrative Center Well #7b	TM2-9
Malibu Administrative Center Well #8	TM2-10
Malibu Country Mart I Well MW-1	TM2-11
Malibu Country Mart I Well MW-2	TM2-12
Malibu Country Mart I Well MW-3	TM2-13
Malibu Country Mart II Well MW-1	TM2-14
Malibu Country Mart II Well MW-2	TM2-15
Malibu Country Mart II Well MW-3	TM2-16
Malibu Country Mart III Well MW-1	TM2-17
Malibu Country Mart III Well MW-2	TM2-18
Malibu Country Mart III Well MW-3	TM2-19
Malibu Creek Plaza Well #1	TM2-20
Malibu Creek Plaza Well #2	TM2-21
Malibu Creek Plaza Well #3	TM2-22
Malibu Creek Plaza Well #4	TM2-23
Malibu Creek Plaza Well #5	TM2-24
Malibu Creek Plaza Well #6	TM2-25
Malibu Lumber ML MW-1, ML MW-2, ML MW-3, ML MW-4, ML MW-5	TM2-26
Malibu Colony Plaza Well #1	TM2-27
Malibu Colony Plaza Well #2	TM2-28
Malibu Colony Plaza Well #3	TM2-29
Malibu Colony Plaza Well #4	TM2-30
Malibu Colony Plaza Well #5	TM2-31
Malibu Civic Center Area Well C-1	TM2-32
Malibu Civic Center Area Well C-2	TM2-33
Malibu Civic Center Area Well P-1	TM2-34
Malibu Civic Center Area Well P-7	TM2-35
Malibu Civic Center Area Well P-9	TM2-36
Malibu Civic Center Area Well SMBRP-1	TM2-37
Malibu Civic Center Area Well SMBRP-2	TM2-38
Malibu Civic Center Area Well SMBRP-3c	TM2-39
Malibu Civic Center Area Well SMBRP-6	TM2-40
Malibu Civic Center Area Well SMBRP-9	TM2-41
Malibu Civic Center Area Well SMBRP-10c	TM2-42
Malibu Civic Center Area Well SMBRP-11	TM2-43
Malibu Civic Center Area Well SMBRP-12	TM2-44
Malibu Civic Center Area Well SMBRP-13	TM2-45
Malibu Civic Center Area Well SMBRP-14	TM2-46
Malibu Civic Center Area Well SMBRP-15b	TM2-47
Malibu Civic Center Area Well SMBRP-16	TM2-48
Malibu Water Pollution Control Plant Well WPCP-1	TM2-49
Malibu Water Pollution Control Plant Well WPCP-2	TM2-50
Malibu Water Pollution Control Plant Well WPCP-3	TM2-51
Malibu Water Pollution Control Plant Well WPCP-4	TM2-52
Malibu Water Pollution Control Plant Well WPCP-5	TM2-53
Malibu Water Pollution Control Plant Well WPCP-6	TM2-54
Malibu Water Pollution Control Plant Well WPCP-7	TM2-55
Surfrider Beach Well SB-1	TM2-56
Surfrider Beach Well SB-2	TM2-57

Malibu Beach Inn Well MW-1 TM2-58
Malibu Beach Inn Well MW-2 TM2-59
Malibu Beach Inn Well MW-3 TM2-60

Corrected Graphs
Figure 1 – Groundwater wells in the Malibu Civic Center Area TM2-2
Figure 2 – Groundwater Quality Compliance Status TM2-6
Malibu Administrative Center Well #7b TM2-62
Malibu Administrative Center Well #8 TM2-63
Malibu Country Mart I Well MW-1 TM2-64
Malibu Country Mart I Well MW-2 TM2-65
Malibu Country Mart I Well MW-3 TM2-66
Malibu Country Mart II Well MW-1 TM2-67
Malibu Country Mart II Well MW-2 TM2-68
Malibu Country Mart II Well MW-3 TM2-69
Malibu Country Mart III Well MW-1 TM2-70
Malibu Country Mart III Well MW-2 TM2-71
Malibu Country Mart III Well MW-3 TM2-72
Malibu Creek Plaza Well #1 TM2-73
Malibu Creek Plaza Well #2 TM2-74
Malibu Creek Plaza Well #3 TM2-75
Malibu Creek Plaza Well #4 TM2-76
Malibu Creek Plaza Well #5 TM2-77
Malibu Creek Plaza Well #6 TM2-78
Malibu Lumber ML MW-1, ML MW-2, ML MW-3, ML MW-4, ML MW-5 TM2-79
Malibu Colony Plaza Well #1 TM2-80
Malibu Colony Plaza Well #2 TM2-81
Malibu Colony Plaza Well #3 TM2-82
Malibu Colony Plaza Well #4 TM2-83
Malibu Colony Plaza Well #5 TM2-84
Malibu Civic Center Area Well C-1 TM2-85
Malibu Civic Center Area Well C-2 TM2-86
Malibu Civic Center Area Well P-1 TM2-87
Malibu Civic Center Area Well P-7 TM2-88
Malibu Civic Center Area Well P-9 TM2-89
Malibu Civic Center Area Well SMBRP-1 TM2-90
Malibu Civic Center Area Well SMBRP-2 TM2-91
Malibu Civic Center Area Well SMBRP-3c TM2-92
Malibu Civic Center Area Well SMBRP-6 TM2-93
Malibu Civic Center Area Well SMBRP-9 TM2-94
Malibu Civic Center Area Well SMBRP-10c TM2-95
Malibu Civic Center Area Well SMBRP-11 TM2-96
Malibu Civic Center Area Well SMBRP-12 TM2-97
Malibu Civic Center Area Well SMBRP-13 TM2-98
Malibu Civic Center Area Well SMBRP-14 TM2-99
Malibu Civic Center Area Well SMBRP-15b TM2-100
Malibu Civic Center Area Well SMBRP-16 TM2-101
Malibu Beach Inn Well MW-1 TM2-102
Malibu Beach Inn Well MW-2 TM2-103
Malibu Beach Inn Well MW-3 TM2-104
Surfrider Beach Well SB-1 TM2-105
Surfrider Beach Well SB-2 TM2-106
Malibu Water Pollution Control Plant Well WPCP-1 TM2-107
Malibu Water Pollution Control Plant Well WPCP-2 TM2-108
Malibu Water Pollution Control Plant Well WPCP-3 TM2-109
Malibu Water Pollution Control Plant Well WPCP-4 TM2-110

Malibu Water Pollution Control Plant Well WPCP-5 TM2-111
Malibu Water Pollution Control Plant Well WPCP-6 TM2-112
Malibu Water Pollution Control Plant Well WPCP-7 TM2-113

Technical Memorandum #2: Pathogens and Nitrogen in Wastewaters Impair Underlying Groundwater as a Potential Source of Drinking Water

by
David Koo

INTRODUCTION

The City of Malibu (Malibu) is located in Los Angeles County on the north shore of the Santa Monica Bay, northwest of the City of Los Angeles, California. The boundaries of the Malibu Civic Center area are shown in Figure 1[1]. There are 392 residential properties and 38 commercial properties located in the study area. Surface water includes the lower portion of Malibu Creek, Malibu Lagoon, and Malibu Beach to Malibu Pier State Park.

Wastewater disposal in the City of Malibu falls within the jurisdiction of the Los Angeles Regional Water Quality Control Board (LARWQCB). The regional application of the Porter-Cologne Act is through the *Water Quality Control Plan – Los Angeles Region (Basin Plan)* for the Coastal Watersheds of Los Angeles and Ventura Counties.

According to the *Basin Plan*, the Malibu Civic Center area lies within the Malibu Valley Groundwater Basin. The *Basin Plan* designates this area as having a Potential Beneficial Use for Municipal and Domestic Supply (MUN) and Industrial Service Supply (IND).

PURPOSE

The purpose of this study is to determine the extent and severity of contamination of groundwater that is designated as a potential source of drinking water.

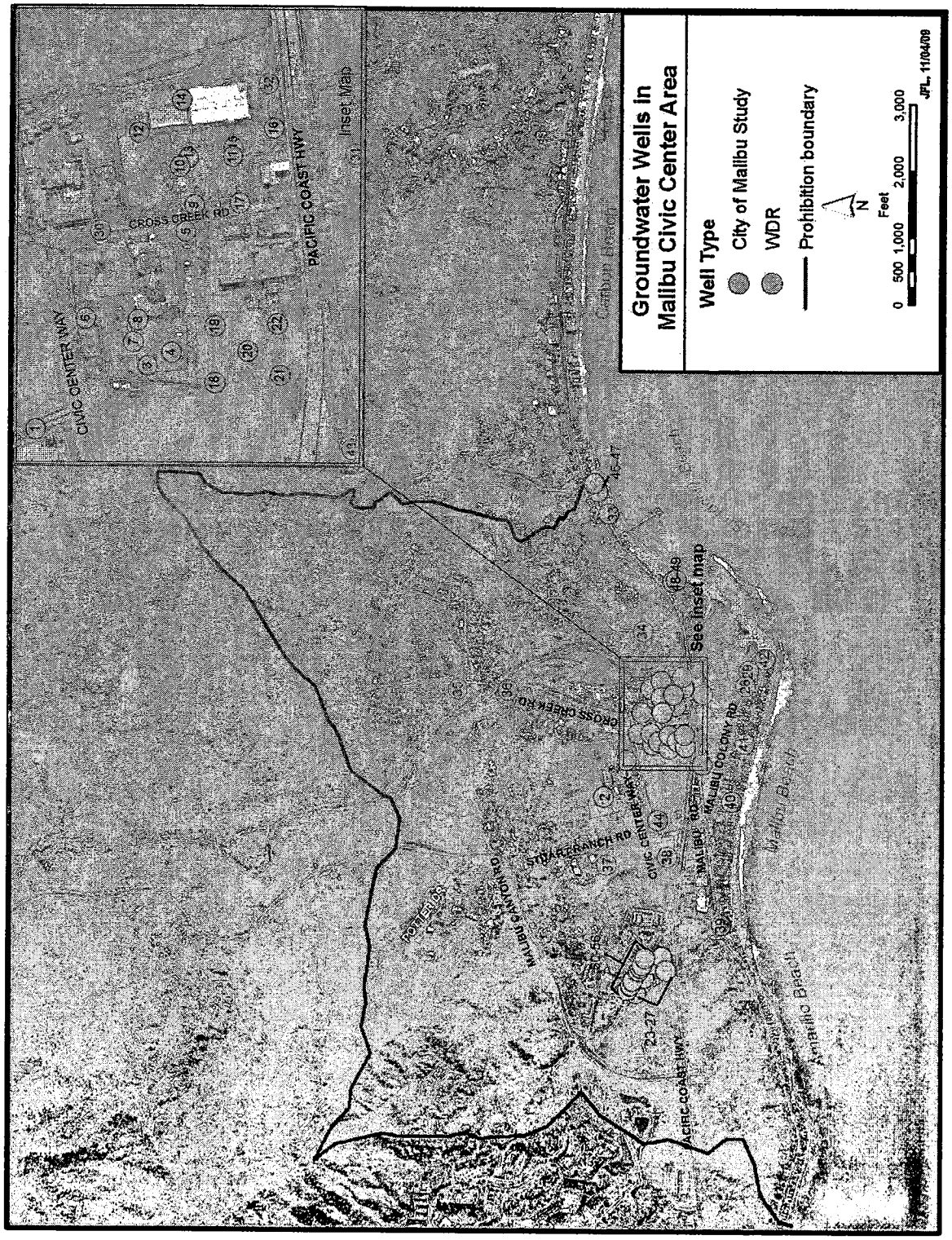
BACKGROUND

In addition to 27 miles of coastline which forms the northwest boundary of Santa Monica Bay and includes internationally famous Surfrider Beach, Malibu is home to two regionally significant aquatic resources, Malibu Creek, which drains the southern slope of the mountains, draining 109 square miles of watershed, and Malibu Lagoon, one of two significant remaining freshwater estuaries in southern California. Both the creek and lagoon have been identified as impaired for bacteria and nutrients under section 303(d) of the Clean Water Act.

---

[1] The area subject to the proposed prohibition is referred to as the Malibu Civic Center area (Figure 1). The area was defined using topographic features and drainage patterns, and encompasses the hydrologic areas of Malibu Valley (also referred to as the lower Malibu Creek watershed), Winter Canyon, and adjacent coastal strips including Amarillo Beach, Malibu Beach, Malibu Lagoon, and Malibu Lagoon Beach (aka Surfrider Beach, including First, Second, and Third Points at Surfrider). For more discussion on the prohibition boundaries defining the Malibu Civic Center area, refer to the Technical Staff Report Overview and the Environmental Staff Report.

Figure 1 – Groundwater wells in the Malibu Civic Center Area



TM2-2

Malibu Civic Center area consists of a low-lying plain along Santa Monica Bay, plus adjacent steep uplands that rise from sea level to 100 feet, with additional upland areas that rise 500 feet into the foothills to the Santa Monica Mountains. The area contains some undeveloped parcels but sustains the largest commercial development in Malibu along with multi-family and single-family residences that include Malibu Colony, a dense subdivision where houses are built close together directly on the beach. The Los Angeles County courthouse and library, the county fire department and county sheriff"s offices are also located in this area, which effectively functions as Malibu's town center. Contemporary development is built on what was naturally an estuary-lagoon and wetlands established within an alluvial plain at the mouth of Malibu Creek. Generally the water table is 3 to 36 feet below ground surface and depths fluctuate with tidal and seasonal hydrologic variations.

There are 429 on-site wastewater disposal systems (OWDSs) that serve Malibu Civic Center area. The LARWQCB, which is responsible for regulating waste discharge in the Los Angeles and Ventura County, has evidence that OWDSs in proximity to Malibu's water resources may be among the factors contributing to poor water quality. There are a total of 38 commercial and 392 residential OWDSs in the Malibu Civic Center area. Some of the systems are old; other systems are operated at a much greater wastewater flow capacity than what they were originally designed for.

METHODS AND PROCEDURES

The main steps of this study include the following:

- Collect and review existing information from a variety of sources on groundwater quality in proximity to the OWDSs from April 19, 1999 to June 12, 2009.
- Analyze the data, for pollutants that are indicators of wastewater – specifically for fecal coliform, total coliform, ammonia, and nitrogen (nitrate + nitrite).
- Determine the frequency that the groundwater failed to meet drinking water standards – i.e., Maximum Contaminant Levels (MCLs)[2] for fecal coliform, total coliform, ammonia, and nitrate + nitrite.

[2] The United States Environmental Protection Agency (USEPA) provides Drinking Water Health Advisories for organics, inorganics, radionuclides, and microbiology including total coliform. The MCL goal and MCL for total coliform is zero and 5%, respectively. In a well used for drinking water, no more than 5% samples analyzed each month can test positive for total coliform. Every sample that has total coliform must be analyzed for fecal coliform; no fecal coliform is allowed.
According to Title 22 of the California Code of Regulations, Section 64426.1 Total Coliform MCL " .....(b) A public water system is in violation of the total coliform MCL when any of the following occurs: ...(2) For a public water system which collects fewer than 40 samples per month, more than one sample collected during any month is total coliform-positive; or (3) Any repeat sample is fecal coliform-positive .....", the MCL for total coliform and fecal coliformis zero.
The Water Quality Control Plan – Los Angeles Region or Basin Plan provides that "In ground waters used for domestic or municipal supply (MUN), the concentration of coliform organisms over any seven day period shall be less than 1.1 MPN/100 ml.
Although the MCL for total coliform and fecal coliform is zero, the detection limit used by a majority of laboratories for total coliform and fecal coliform is 1.1 MPN/100 ml. Therefore, unless the sample has a zero concentration for total coliform and fecal coliform, any detection above 1.1 MPN/100 ml means that the sample is above the MCL.

Staff used two sources of groundwater quality data for this study. They are: (1) the compliance files under Waste Discharge Requirements (WDRs) issued by the LARWQCB; and (2) "Final Report - Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California" prepared by Stone Environmental, Inc. in August 2004 (2004 Stone Report).

In all, data from a total of 56 groundwater wells shown in Figure 2 are used for this study. Among the 56 wells, 39 of them are identified in the WDR compliance files and the other 17 are identified in the 2004 Stone Report. The two sources of data provided a total of 1,016 groundwater sampling results with 7,112 individual analyses.

Groundwater quality data for each well was then entered into spreadsheets. Results were compared to drinking water standards. Using these spreadsheets, two graphs – one for fecal and total coliform and the other for nitrogen species – were generated for each well to illustrate the exceedance from the MCL.

RESULTS

Staff reviewed data for 56 wells in the Malibu Civic Center area that were designed and constructed for monitoring the quality of groundwater. To examine impairment of groundwater as a source of drinking water, staff compiled analytical results of testing for pathogen indicators and nitrogen species, and summarized these results in Table 1. In addition, tables and graphs summarizing the analytical results of each well are provided in Attachments 2-1 and 2-2, respectively.

Fecal Coliform
For the 56 groundwater monitoring wells in the Malibu Civic Center area, from April 19, 1999 to June 12, 2009, a total of 1,016 samples were collected and analyzed for fecal coliform. Results indicated that out of the 1,016 samples, 383, or 38%, of the samples failed to meet the MCL. Forty-seven (47) out of 56, or 84%, of the wells detected fecal coliform that failed to meet the MCL of 0 MPN/100 ml (Most Probable Number per 100 milliliters).

Total Coliform
For the 56 groundwater monitoring wells in the Malibu Civic Center area, from April 19, 1999 to June 12, 2009, a total of 1,016 samples were collected and analyzed for total coliform. Results indicated that out of the 1,016 samples, 576, or 57%, of the samples failed to meet the MCL. All 56, or 100%, of the wells detected total coliform that failed to meet the MCL of 1.1 MPN/100 ml.

Nitrate and Nitrite
For the 56 groundwater monitoring wells in Malibu Civic Center area, from April 19, 1999 to June 12, 2009, a total of 1,012 samples were collected and analyzed for nitrate-nitrogen and nitrite-nitrogen. Results indicated that out of the 1,012 samples, 322, or 32%, of the samples failed to meet the MCL of 10 mg/L. Twenty-four (24) out of 56, or 43%, of the wells detected nitrogen (nitrate and nitrite) that failed to meet theMCL.

Ammonia plus Nitrate and Nitrite
For the 56 groundwater monitoring wells in the Malibu Civic Center area, from April 19, 1999 to June 12, 2009, a total of 1,012 samples were collected and analyzed for ammonia. Results indicated that out of the 1,012 samples, 400, or 40%, of the samples failed to meet the MCL of 10 mg/L. Thirty-four (34) out of 56, or 61%, of the wells detected total nitrogen (ammonia, nitrate and nitrite) that failed to meet the MCL.

In at least one point in time, all 56 wells demonstrated the presence of pathogens and nitrogen at levels that exceeded the MCL for drinking water as summarized in Table 2. Although not all wells were contaminated for each sampling event, of the 56 wells, 47 or 84% of them had fecal coliform that failed to meet the MCL and all 56 or 100% had total coliform that failed to meet the MCL. Twenty-four (24) or 43% of the wells had nitrate and nitrite that failed to meet the MCL. Staff also did an analysis including ammonia plus nitrite and nitrate; when using all three nitrogen species, 34 or 61% of the wells had nitrogen present that failed to meet the MCL.

Table 1: Summary of Groundwater Pollution

	Fecal Coliform	Total Coliform	Nitrate+Nitrite	Ammonia + Nitrate+Nitrite
	MPN/100mL	MPN/100mL	mg/L	mg/L
MCL	0	0	10	10
Concentration Range	0 - 140,000	0 - 16,000,000	0 - 120	0 - 120
Total Samples Analyzed	1,016	1,016	1,012	1,012
# Samples Failing to Meet MCL	383	576	322	400
% Samples Failing to Meet MCL	38%	57%	32%	40%

CONCLUSION

Pathogens and nitrogen in wastewaters released from OWDSs impair underlying groundwater as a potential source of drinking water.

Indicators of pathogen and nitrogen contaminants released by OWDSs substantially impair the potential use of groundwater as a source of drinking water.

Although groundwater in the Malibu Valley Groundwater Basin and Winter Canyon is not an existing source of drinking water to the community, groundwater was the community's drinking water source up until the early 1960s. In 1963, the County of Los Angeles started delivering imported water to the area. As a future resource, and also in the event of a disruption of deliveries of imported water, groundwater in Malibu Civic Center area is an important local source that the community may need to use. However, continued degradation jeopardizes use of this local resource for beneficial use of potential MUN (drinking water use).

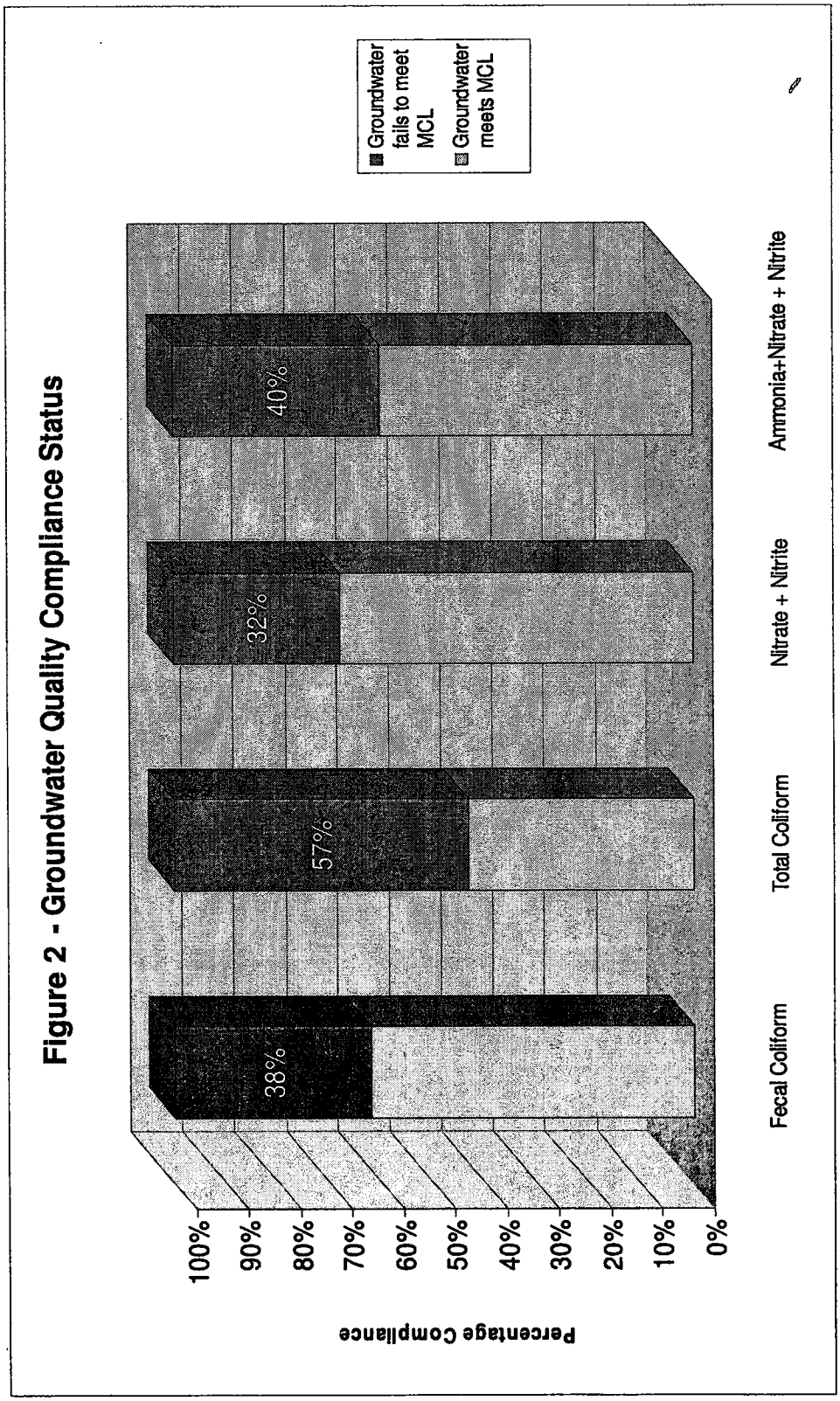

Figure 2 - Groundwater Quality Compliance Status
Groundwater fails to meet MCL
Groundwater meets MCL
Percentage Compliance
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
38%
57%
32%
40%
Fecal Coliform
Total Coliform
Nitrate + Nitrite
Ammonia+Nitrate + Nitrite

Table 2: Summary of Groundwater Wells in Malibu Study Area

Location	Well Numbers	Well Names	Fecal Coliform Fail to Meet MCL	Total Coliform Fail to Meet MCL	Nitrate+Nitrite Fail to Meet MCL	Ammonia+Nitrate +Nitrite Fail to Meet MCL
Malibu Administrative Center	1	Well #7b	Yes	Yes	Yes	Yes
	2	Well # 8	Yes	Yes	Yes	Yes
Malibu Country Mart I	3	Well MW-1	Yes	Yes	Yes	Yes
	4	Well MW-2	Yes	Yes	No	No
	5	Well MW-3	Yes	Yes	Yes	Yes
Malibu Country Mart II	6	Well MW-1	No	Yes	No	Yes
	7	Well MW-2	Yes	Yes	No	Yes
	8	Well MW-3	Yes	Yes	No	Yes
Malibu Country Mart III	9	Well MW-1	Yes	Yes	No	No
	10	Well MW-2	Yes	Yes	No	Yes
	11	Well MW-3	Yes	Yes	No	No
Malibu Creek Plaza	12	Well #1	Yes	Yes	No	No
	13	Well #2	Yes	Yes	Yes	Yes
	14	Well #3	Yes	Yes	No	No
	15	Well #4	Yes	Yes	Yes	Yes
	16	Well #5	Yes	Yes	No	Yes
	17	Well #6	Yes	Yes	Yes	Yes
Malibu Lumber	18	ML MW-1	Yes	Yes	No	No
	19	ML MW-2	Yes	Yes	No	No
	20	ML MW-3	Yes	Yes	No	Yes
	21	ML MW-4	Yes	Yes	No	No
	22	ML MW-5	Yes	Yes	No	No
Malibu Colony Plaza	23	Well #1	Yes	Yes	No	Yes
	24	Well #2	Yes	Yes	Yes	Yes
	25	Well #3	Yes	Yes	Yes	Yes
	26	Well #4	Yes	Yes	Yes	Yes
	27	Well #5	Yes	Yes	Yes	Yes
Malibu Study Area	28	C-1	Yes	Yes	No	No
	29	C-2	Yes	Yes	No	No
	30	Well P-1	No	Yes	No	No
	31	Well P-7	Yes	Yes	No	No
	32	Well P-9	Yes	Yes	No	No
	33	Well SMBRP-1	Yes	Yes	No	No
	34	Well SMBRP-2	Yes	Yes	No	No
	35	Well SMBRP-3c	Yes	Yes	No	No
	36	Well SMBRP-6	Yes	Yes	No	No
	37	Well SMBRP-9	Yes	Yes	Yes	Yes
	38	Well SMBRP-10c	Yes	Yes	No	No
	39	Well SMBRP-11	Yes	Yes	No	No
	40	Well SMBRP-12	Yes	Yes	No	Yes
	41	Well SMBRP-13	Yes	Yes	No	No
	42	Well SMBRP-14	Yes	Yes	No	Yes
	43	Well SMBRP-15b	Yes	Yes	No	No
	44	Well SMBRP-16	No	Yes	No	Yes
Malibu Beach Inn	45	MW1	Yes	Yes	Yes	Yes
	46	MW2	Yes	Yes	Yes	Yes
	47	MW3	Yes	Yes	Yes	Yes
Surfrider Beach	48	Well SB-1	No	Yes	Yes	Yes
	49	Well SB-2	Yes	Yes	Yes	Yes
Malibu Water Pollution Control Plant	50	MW-1	No	Yes	Yes	Yes
	51	MW-2	No	Yes	Yes	Yes
	52	MW-3	No	Yes	Yes	Yes
	53	MW-4	Yes	Yes	Yes	Yes
	54	MW-5	No	Yes	Yes	Yes
	55	MW-6	No	Yes	Yes	Yes
	56	MW-7	Yes	Yes	Yes	Yes
Total Number of Wells			56	56	56	56
Number of Wells Fail to Meet MCL			47	56	24	34
Percentage of Wells Fail to Meet MCL			84%	100%	43%	61%

Technical Memorandum #2: Pathogens and Nitrogen in Wastewaters Impair Underlying Groundwater as a Potential Source of Drinking Water

Attachment 2-1

Data Tables for 56 Individual Wells

Malibu Administrative Center
Well #7b

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate +
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
2/24/2003	2419.2	0	0	0.474	0.18	0	0.278	0.752	0.18	0.654
3/25/2003	2419.21	0	0	0.608	0.063	0	1.29	1.898	0.063	0.671
4/23/2003	0	0	0	0.69	0.16	0	0.71	1.4	0.16	0.85
5/29/2003	0	0	0	0.29	0.56	0	0.1	0.39	0.56	0.85
6/12/2003	0	0	0	0.43	0.368	0	0.29	0.72	0.368	0.798
6/30/2003	0	0	0	0.74	0	0	0.96	1.7	0	0.74
7/21/2003	29.3	0	0	0.53	0.06	0	0.47	1	0.06	0.59
7/30/2003	0	0	0	0.179	0.045	0	0.313	0.492	0.045	0.224
8/15/2003	0	0	230	0.243	0	0	0	0.243	0	0.243
8/18/2003	2419.2	0	300	0.33	0	0	0.58	0.91	0	0.33
9/30/2003	4.1	2	4	0.35	0.1	0	0.25	0.6	0.1	0.45
10/21/2003	0	0	0	0	0	0	0.43	0.43	0	0
10/28/2003	0	0	300	0.598	0.14	0.155	0.478	1.076	0.295	0.893
11/18/2003	19.6	4	4	0.18	0	0	0.61	0.79	0	0.18
11/19/2003	0	0	80	0	66.161	0.292	0.197	0.197	66.453	66.453
12/15/2003	0	0	0	0.17	0.03	0	0.42	0.59	0.03	0.2
12/19/2003	0	40	230	0.419	0	0.791	10.9	11.319	0.791	1.21
1/16/2004	0	140	140	0.292	0.79	2.06	0	0.292	2.85	3.142
1/19/2004	0	6	350	0.1	0.07	0	0.03	0.13	0.07	0.17
2/16/2004	0	0	0	0.42	0.03	0	0.07	0.49	0.03	0.45
2/20/2004	0	0	0	0	0.19	2.95	0.18	0.18	3.14	3.14
3/15/2004	691	0	20	0.03	0.02	0	0.64	0.67	0.7	0.05
3/24/2004	0	0	20	0.622	0	0	1.704	2.326	0	0.622
4/27/2004	0	0	3000	0.126	0.24	2.36	0.676	0.802	2.6	2.726
5/21/2004	0	0	2100	0.184	0	0	0	0.184	0	0.184
9/1/2004	0	0	0	0.139	0.126	0	0.483	0.622	0.126	0.265
12/6/2004	300	0	900	0	1.1	0	1.06	1.06	1.1	1.1
3/9/2005	40	0	340	0	0.359	0	0.407	0.407	0.359	0.359
6/10/2005	0	0	130	0	0.133	0	1.16	1.16	0.133	0.133
9/9/2005	3500	0	20	0.261	0.11	0	0.879	1.14	0.11	0.371
11/18/2005	10111	0	1700	0.286	0.176	0	0.274	0.56	0.176	0.462
3/3/2006	3990	20	24000	0.15	0.294	0	0.41	0.56	0.294	0.444
6/2/2006	763	0	20	0.24	0.183	0	0.94	1.18	0.183	0.423
9/8/2006	0	0	0	0.241	0	0	0.359	0.6	0	0.241
12/1/2006	0	0	0	0.4	0	0	0.24	0.64	0	0.4
3/9/2007	0	0	20	0	0.124	0	0.59	0.59	0.124	0.124
6/13/2008	0	0	0	0	0.37	0	1.22	1.22	0.37	0.37
9/12/2008	0	0	0	0.11	0.15	0	0.49	0.6	0.15	0.26

Malibu Administrative Center
Well # 8

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
5/29/2003	2419.2	2	6	0	55.6	0	0	0	55.6	55.6
6/12/2003	31	0	0	0	72.5	0	0	0	72.5	72.5
6/30/2003	1	0	0	0.26	11.1	0	0.02	0.28	11.1	11.36
7/21/2003	148.5	0	11	1.44	61.5	0	0.46	1.9	61.5	62.94
7/30/2003	30000	0	0	0	61.4	0	0	0	61.4	61.4
8/15/2003	0	0	130	0	65	0.873	0	0	65.873	65.873
8/20/2003	0	0	14	0	63.8	0	0.86	0.86	63.8	63.8
9/30/2003	3	2	300	0.04	43.1	0	0.41	0.45	43.1	43.14
10/21/2003	2419.2	0	0	0	31.6	0	0.53	0.53	31.6	31.6
10/28/2003	20	2300	2300	0	0.302	0.36	0.758	0.758	0.662	0.662
11/18/2003	8.4	22	23	0	48.1	0	0.9	0.9	48.1	48.1
11/19/2003	0	0	0	0.427	0	0	0.287	0.714	0	0.427
12/16/2003	2419.7	0	0	0	2.61	0	0.02	0.02	2.61	2.61
12/19/2003	0	80	800	0	54	0.633	13.8	13.8	54.633	54.633
1/16/2004	0	0	0	0	51	0.834	0.186	0.186	51.834	51.834
1/20/2004	2419.2	60	170	0	48.4	0.04	0	0	48.44	48.44
2/17/2004	5	0	2	0.09	48.6	0.02	0.09	0.18	48.62	48.71
2/20/2004	0	0	0	0	51.7	1.26	0.13	0.13	52.96	52.96
3/16/2004	10.5	0	0	0.02	60.2	0	0.16	0.18	0.7	60.22
3/24/2004	0	0	0	0.154	57.4	0.414	1.098	1.252	57.814	57.968
4/27/2004	0	0	2800	0	60.5	0.119	0	0	60.619	60.619
5/21/2004	20	0	70	0.121	60.7	0	0	0.121	60.7	60.821
9/1/2004	20	0	0	0.072	62.77	0	0.258	0.33	62.77	62.842
12/6/2004	300	0	0	0	68.3	0	0	0	68.3	68.3
3/9/2005	220	0	17000	0	5.85	0	0.343	0.343	5.85	5.85
6/10/2005	16000000	140000	3000000	18.2	0.142	0	7.4	25.6	0.142	18.342
9/9/2005	281	0	160000	0.303	19.7	0	2.97	3.273	19.7	20.003
11/18/2005	1553	0	30000	0	26.4	1.79	0.551	0.551	28.19	28.19
3/3/2006	155	0	1700	0	27.8	0.313	0.12	0.12	28.113	28.113
6/2/2006	0	0	500000	0	37	0	0.74	0.74	37	37
9/8/2006	1600000	5000	16000000	0.881	44.9	0	3.34	4.221	44.9	45.781
12/1/2006	300	1400	1300000	0.29	31.2	0.204	0.27	0.56	31.404	31.694
3/9/2007	40	0	3000	0	40.2	0	7.17	7.17	40.2	40.2
6/13/2008	1300	0	160000	0	31.6	0	0.19	0.19	31.6	31.6
9/12/2008	40	0	30000	0.2	30.9	0	10.44	10.64	30.9	31.1

Malibu Country Mart I
Well MW-1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
12/14/2004	0	0	1601	1.05	0.1	0	0.37	1.42	0.1	1.15
3/15/2005	0	0	0	0.39	1.6	0	0.85	1.24	1.6	1.99
6/15/2005	3880	0	0	0	0.3	0	0.37	0.37	0.3	0.3
9/15/2005	0	0	0	0	5.6	0	0.32	0.32	5.6	5.6
12/14/2005	0	0	0	0.1	11.6	0	0.25	0.35	11.6	11.7
3/20/2006	0	0	23	0.22	4.35	0	0.231	0.451	4.35	4.57
6/21/2006	10	23	2220	0.334	16	0	0.346	0.68	16	16.334
9/13/2006	0	0	0	0.221	9.1	0	0.503	0.724	9.1	9.321
12/27/2006	0	0	0	0.162	5.25	0	0.33	0.492	5.25	5.412
3/20/2007	0	0	0	7.48	0.1	0	8.36	15.84	0.1	7.58
6/13/2007	0	0	0	0.115	1.95	0	0.28	0.395	1.95	2.065
9/14/2007	0	0	0	0	5.5	0	0	0	5.5	5.5
12/21/2007	0	0	0	0	2.3	0	0.474	0.474	2.3	2.3
4/4/2008	0	0	0	0	3.45	0	0.335	0.335	3.45	3.45
7/2/2008	0	0	0	0.094	2.45	0	0.122	0.216	2.45	2.544

Malibu Country Mart I
Well MW-2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
12/14/2004	17	2	220	5.8	0	0	2.84	8.64	0	5.8
3/15/2005	0	0	2	5.2	0	0	6.22	11.42	0	5.2
6/15/2005	120	0	0	4.65	0	0	4.75	9.4	0	4.65
9/15/2005	0	0	4	7	0	0	8.5	15.5	0	7
12/14/2005	0	0	0	3.99	0	0	5.1	9.09	0	3.99
3/20/2006	0	0	22	3.64	0	0	3.64	7.28	0	3.64
6/21/2006	52	0	2600	0.56	1.6	0	0.589	1.149	1.6	2.16
9/13/2006	0	0	0	4.95	0	0	4.99	9.94	0	4.95
12/27/2006	0	0	0	4.23	0	0	4.33	8.56	0	4.23
3/20/2007	0	0	0	3.81	0	0	4.3	8.11	0	3.81
6/13/2007	0	0	4	6.34	0	0	6.9	13.24	0	6.34
9/14/2007	0	0	0	8.5	0	0	8.5	17	0	8.5
12/21/2007	0	0	0	7.7	0	0	7.99	15.69	0	7.7
4/4/2008	0	0	0	7.63	0	0	8.94	16.57	0	7.63
7/2/2008	0	0	0	6.5	0	0	6.95	13.45	0	6.5

Malibu Country Mart I
Well MW-3

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
12/14/2004	0	0	0	0.18	1.75	0	0	0.18	1.75	1.93
3/15/2005	0	0	4	0.1	3.5	0	0.272	0.372	3.5	3.6
6/15/2005	546	0	8	0	4.9	0	0.153	0.153	4.9	4.9
9/15/2005	0	0	13	0	0.6	0	0.242	0.242	0.6	0.6
12/14/2005	0	0	4	0.12	3.05	0	0.257	0.377	3.05	3.17
3/20/2006	0	0	0	0.175	2.35	0	0.19	0.365	2.35	2.525
6/21/2006	41	23	14000	0.7	12	0	0.797	1.497	12	12.7
9/13/2006	0	0	0	0	1.05	0	0	0	1.05	1.05
12/27/2006	0	0	0	0.102	2.05	0	0.166	0.268	2.05	2.152
3/20/2007	0	0	0	0	1.7	0	0.42	0.42	1.7	1.7
6/13/2007	0	0	0	0.149	1.7	0	0.354	0.503	1.7	1.849
9/14/2007	0	0	0	0.08	2	0	0.1	0.18	2	2.08
12/21/2007	0	0	0	0	1.65	0	0.178	0.178	1.65	1.65
4/4/2008	0	0	0	0	1.65	0	0.165	0.165	1.65	1.65
7/2/2008	0	0	0	0.088	2.1	0	0.309	0.397	2.1	2.188

Malibu Country Mart II
Well MW-1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
12/14/2004	11	0	0	0.17	1.75	0	0.15	0.32	1.75	1.92
3/15/2005	0	0	4	0.23	7.4	0	0.317	0.547	7.4	7.63
6/15/2005	2	0	0	0	7.65	0	0.3	0.3	7.65	7.65
12/14/2005	0	0	0	0.06	3.9	0	0.151	0.211	3.9	3.96
3/20/2006	0	0	2	0.36	2.75	0.05	0.36	0.72	2.8	3.16
6/21/2006	52	0	70	0.54	2.9	0	0.55	1.09	2.9	3.44
9/13/2006	0	0	0	0.128	3.4	0	0.128	0.256	3.4	3.528
12/27/2007	0	0	0	0.065	2.55	0	0.207	0.272	2.55	2.615
3/20/2007	0	0	0	11.2	0	0	11.7	22.9	0	11.2
6/13/2007	0	0	0	0.17	1.2	0.05	0.254	0.424	1.25	1.42
9/14/2007	0	0	0	0	1.2	0.05	0	0	1.25	1.25
12/21/2007	0	0	0	0	1.25	0.1	0.178	0.178	0.7	1.35
7/2/2008	0	0	0	0.054	1.75	0.05	0.169	0.223	0.7	1.854

Malibu Country Mart II
Well MW-2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
12/14/2004	0	0	0	18.8	0	0	15.5	34.3	0	18.8
3/15/2005	0	13	22	0.96	0	0	1.15	2.11	0	0.96
6/15/2005	30.5	0	500	13.7	0	0	15.7	29.4	0	13.7
12/14/2005	0	0	17	11.7	0	0	14.1	25.8	0	11.7
3/20/2006	0	0	2	9.1	0	0	9.2	18.3	0	9.1
6/21/2006	52	0	130	8.59	0	0	8.65	17.24	0	8.59
9/13/2006	0	0	0	1.92	0	0	4.37	6.29	0	1.92
12/27/2007	0	0	220	10.6	0	0	11.7	22.3	0	10.6
3/20/2007	0	0	0	9.2	0	0	11.9	21.1	0	9.2
6/13/2007	0	0	2	12	0	0	12.8	24.8	0	12
9/14/2007	0	0	0	3.61	0	0	3.81	7.42	0	3.61
12/21/2007	0	22000	90000	7.24	0	0	7.59	14.83	0	7.24
7/2/2008	0	16000	16001	14.1	0	0	15.9	30	0	14.1

Malibu Country Mart II
Well MW-3

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
12/14/2004	0	0	0	66	0.1	0	44.3	110.3	0.1	66.1
3/15/2005	0	30	30	55	0	0	58.6	113.6	0	55
6/15/2005	0	0	14	32	0	0	58.3	90.3	0	32
12/14/2005	0	0	7	49.3	0	0	52	101.3	0	49.3
3/20/2006	10	2	17	57	0	0	57.6	114.6	0	57
6/21/2006	52	0	240	8.6	0	0	8.7	17.3	0	8.6
9/13/2006	0	0	0	42.1	0	0	44.5	86.6	0	42.1
12/27/2006	0	0	0	47.3	0	0	49.2	96.5	0	47.3
3/20/2007	0	0	30	53.9	0	0	63	116.9	0	53.9
6/13/2007	0	0	0	55.4	0	0	56.4	111.8	0	55.4
9/13/2007	0	0	0	46.4	0	0	46.4	92.8	0	46.4
12/21/2007	0	0	0	35	0	0	35.3	70.3	0	35
7/2/2008	0	300	16001	28.3	0	0	29.8	58.1	0	28.3

Malibu Country Mart III
Well MW-1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
3/8/2004	3	17	1601	0.084	1.57	0	1.25	1.334	1.57	1.654
7/9/2004	0	0	0	0.12	1.6	0	1.33	1.45	1.6	1.72
9/23/2004	0	0	0	0.11	1.15	0	0.8	0.91	1.15	1.26
12/14/2004	0	0	0	0	1.6	0	0	0	1.6	1.6
3/15/2005	0	0	0	0.063	2.6	0	0.103	0.166	2.6	2.663
6/15/2005	31	0	0	0	3.15	0	0.169	0.169	3.15	3.15
9/15/2005	0	4	6	0	3.3	0	0.3	0.3	3.3	3.3
3/20/2006	0	0	0	0.17	2.5	0.1	0.181	0.351	2.6	2.77
6/21/2006	96	0	0	0.1	2.25	0	0.1	0.2	2.25	2.35
9/13/2006	0	0	0	0.079	2.2	0	0.08	0.159	2.2	2.279
12/27/2006	0	0	0	0.177	1.9	0	0.212	0.389	1.9	2.077
3/20/2007	0	0	4	0	1.55	0	0.285	0.285	1.55	1.55
6/13/2007	0	0	0	0.079	1.75	0	0.15	0.229	1.75	1.829
9/14/2007	0	2	2	0	1.4	0	0	0	1.4	1.4
12/21/2007	0	0	0	0	1.5	0	0.35	0.35	1.5	1.5
4/4/2008	0	0	0	0	1.9	0	0.235	0.235	1.9	1.9
7/2/2008	0	0	0	0	2.35	0	0.091	0.091	2.35	2.35

Malibu Country Mart III
Well MW-2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
3/8/2004	0	0	1601	0.8	2.32	0	1.07	1.87	2.32	3.12
7/9/2004	0	0	0	30.5	0.6	0	2.5	33	0.6	31.1
9/23/2004	4.1	1601	1601	34	0.55	0	12.4	46.4	0.55	34.55
12/14/2004	500	8	22	2.9	1.35	0	1.64	4.54	1.35	4.25
3/15/2005	0	4	22	0.72	3.1	0	0.826	1.546	3.1	3.82
6/15/2005	230	0	9	0.153	3.45	0	0.252	0.405	3.45	3.603
9/15/2005	63	2	2	0.9	2.75	0	1	1.9	2.75	3.65
3/20/2006	10	1100	1100	0.148	2.25	0	0.156	0.304	2.25	2.398
6/21/2006	84	1601	90000	0.291	2.2	0	0.294	0.585	2.2	2.491
9/13/2006	0	0	130	2.25	1.2	0	2.51	4.76	1.2	3.45
12/27/2006	23	0	9000	0.648	1.5	0	0.793	1.441	1.5	2.148
3/20/2007	0	0	0	0	1.2	0	0.231	0.231	1.2	1.2
6/13/2007	0	0	30	0.2	1.05	0	0.201	0.401	1.05	1.25
9/14/2007	0	23	23	0	3.3	0	0	0	3.3	3.3
12/21/2007	0	0	0	0	1.15	0	0.502	0.502	1.15	1.15
4/4/2008	0	0	0	0	1.8	0	0.276	0.276	1.8	1.8
7/2/2008	0	0	0	0.074	2.1	0	0.075	0.149	2.1	2.174

Malibu Country Mart III
Well MW-3

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
3/8/2004	0	0	1601	0.086	1.35	0	0.58	0.666	1.35	1.436
7/9/2004	0	0	4	0.12	1.35	0	1.74	1.86	1.35	1.47
9/23/2004	0.99	23	50	0.15	0.25	0	1	1.15	0.25	0.4
12/14/2004	13	1601	1601	0	1.8	0	0	0	1.8	1.8
3/15/2005	0	0	0	0.063	1.9	0	0.135	0.198	1.9	1.963
6/15/2005	1860	0	2	0	4.8	0	0.23	0.23	4.8	4.8
9/16/2005	0	0	0	0	3.2	0.05	0.16	0.16	3.25	3.25
3/20/2006	0	2	2	0.107	2.45	0.1	0.1	0.207	2.55	2.657
6/21/2006	97	1601	90000	0.302	2.25	0	0.305	0.607	2.25	2.552
9/13/2006	0	0	8	2.25	1.2	0	2.51	4.76	1.2	3.45
12/27/2006	23	0	8000	0.102	1.35	0	0.106	0.208	1.35	1.452
3/20/2007	0	0	0	0	1.2	0	0.345	0.345	1.2	1.2
6/13/2007	0	0	90	0.093	1.2	0	0.185	0.278	1.2	1.293
9/14/2007	0	0	0	0	1.7	0.05	0	0	1.75	1.75
12/21/2007	0	0	0	0	1.45	0	0.33	0.33	1.45	1.45
4/4/2008	0	0	0	0	1.95	0	0.32	0.32	1.95	1.95
7/2/2008	0	0	0	0	1.75	0	0	0	1.75	1.75

Malibu Creek Plaza
Well #1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
7/12/2002	7.4	0	1600	0.26	2.77	0.03	1.4	1.66	2.8	3.06
9/5/2002	8.4	0	6	0.08	2.47	0.11	1.62	1.7	2.58	2.66
11/6/2002	4.1	0	4	1.2	0.47	0.03	6.47	7.67	0.5	1.7
3/12/2004	20.2	0	22	0.03	3.3	0.03	0.21	0.24	3.33	3.36
5/28/2004	344.8	8	23	0.17	3.8	0	0.05	0.22	3.8	3.97
8/13/2004	15.3	0	8	0.23	3.9	0.03	0.28	0.51	3.93	4.16
11/12/2004	0	4	8	0.15	2.06	0.14	0.44	0.59	2.2	2.35
2/15/2005	231.8	0	13	0.08	4	0	1.18	1.26	4	4.08
5/1/2005	0	0	0	0	5.66	0.2	0.2	0.2	5.86	5.86
9/1/2005	4.1	0	0	0.08	2.21	0	0.19	0.27	2.21	2.29
11/22/2005	7.4	4	240	0	1.73	0	0.05	0.05	1.73	1.73
2/15/2006	0	0	0	0.26	2.32	0.13	0.05	0.31	2.45	2.71
5/3/2006	0	0	0	0	3.4	0	0.49	0.49	3.4	3.4
8/22/2006	0	0	0	0	1.99	0	0.05	0.05	1.99	1.99
11/15/2006	6.2	0	0	0.15	1.46	0	1.29	1.44	1.46	1.61
2/13/2007	11.6	7	50	0.1	1.52	0	0.81	0.91	1.52	1.62
5/11/2007	0	0	7	0.92	1.63	0	0.26	1.18	1.63	2.55
8/18/2007	42.4	0	8	0.02	1.72	0	0.64	0.66	1.72	1.74
11/7/2007	0	0	12	0.11	1.92	0	0.23	0.34	1.92	2.03
2/14/2008	84.5	13	50	0.02	2.29	0	0.44	0.46	2.29	2.31
5/13/2008	50.5	0	0	0.07	1.97	0	0.17	0.24	1.97	2.04
8/26/2008	9.8	0	0	0.05	1.68	0	1.02	1.07	1.68	1.73
11/18/2008	7.2	0	23	0.09	1.2	0	0.26	0.35	1.2	1.29

Malibu Creek Plaza
Well #2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
7/12/2002	2419.2	80	1600	0.5	0.7	0.03	0.86	1.36	0.73	1.23
9/5/2002	4.1	0	4	1.2	0.47	0.03	6.47	7.67	0.5	1.7
11/6/2002	51.9	0	4	0	2.39	0.04	1.07	1.07	2.43	2.43
3/12/2004	0	0	0	0.5	2.09	0	0.39	0.89	2.09	2.59
5/28/2004	10.8	0	0	0.05	1.39	0	0.11	0.16	1.39	1.44
8/13/2004	98.1	0	0	0.36	1.96	0.06	0.81	1.17	2.02	2.38
11/12/2004	31.8	0	0	0.47	1.67	0.14	0.43	0.9	1.81	2.28
2/15/2005	866.4	0	8	1.86	1.72	0	0.94	2.8	1.72	3.58
5/1/2005	64.5	0	0	0.6	0	0	0.28	0.88	0	0.6
9/1/2005	214.3	11	50	1.49	1.5	0	0.63	2.12	1.5	2.99
11/22/2005	0	2	80	0.25	2.84	0	0.1	0.35	2.84	3.09
3/2/2006	0	500	1600	0.28	0	0	0.05	0.33	0	0.28
5/3/2006	18.3	0	0	0.27	2.06	0	0.25	0.52	2.06	2.33
8/22/2006	0	0	0	0.08	1.35	0	0.05	0.13	1.35	1.43
11/15/2006	0	0	30	0.59	1.46	0	0.18	0.77	1.46	2.05
2/13/2007	32.9	0	4	0.74	1.81	0	0.78	1.52	1.81	2.55
5/11/2007	0	4	4	2.63	1.52	0	2.4	5.03	1.52	4.15
8/18/2007	10.8	0	0	2.71	1.9	0	1.56	4.27	1.9	4.61
11/7/2006	5.2	0	280	1.48	1.84	0	1.3	2.78	1.84	3.32
2/13/2008	3	0	7	0.98	1.69	0	1.31	2.29	1.69	2.67
5/13/2008	3	0	0	4.96	16	0.04	1.22	6.18	16.04	21
8/26/2008	9.7	0	23	0.55	2.28	0	0.56	1.11	2.28	2.83
11/18/2008	0	90	0	1.56	1.33	0	0.05	1.61	1.33	2.89

Malibu Creek Plaza
Well #3

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
7/12/2002	2	0	0	0.17	1.16	0.03	1.11	1.28	1.19	1.36
9/5/2002	4	0	4	0.5	0.93	0.08	1.12	1.62	1.01	1.51
11/6/2002	18.3	0	4	0.26	1.09	0.03	3.16	3.42	1.12	1.38
3/12/2004	0	0	0	0.62	2.02	0	0.35	0.97	2.02	2.64
5/28/2004	17.9	8	8	0.33	2.89	0	0.15	0.48	2.89	3.22
8/13/2004	0	0	0	0.69	2.24	0	0.53	1.22	2.24	2.93
11/12/2004	0	350	1600	0.76	1.19	0.14	0.48	1.24	1.33	2.09
2/15/2005	2	280	900	0.85	1.81	0	0.67	1.52	1.81	2.66
5/1/2005	0	0	13	0.81	4.64	0	0.28	1.09	4.64	5.45
9/1/2005	0	0	0	0.74	2.05	0	0.3	1.04	2.05	2.79
11/22/2005	2	0	300	0.82	1.36	0	0.36	1.18	1.36	2.18
3/2/2006	5.2	50	50	1.43	1.86	0.13	0.05	1.48	1.99	3.42
5/3/2006	8.4	0	4	0.9	1.86	0	0.32	1.22	1.86	2.76
8/22/2006	3	0	0	0	1.53	0.03	0.05	0.05	1.56	1.56
11/15/2006	5.1	0	240	0.73	0.72	0	0.85	1.58	0.72	1.45
2/13/2007	2419.2	1600	1600	0.03	1.07	0	2.73	2.76	1.07	1.1
5/11/2007	235.9	11	26	1.98	1.31	0	1.41	3.39	1.31	3.29
8/14/2007	165	8	1600	0.63	0.74	0	1.5	2.13	0.74	1.37
12/5/2007	16	0	23	0.6	0.87	0	1.04	1.64	0.87	1.47
2/13/2008	2419.2	9	1600	0.76	1.12	0.06	2.35	3.11	1.18	1.94
5/13/2008	11.9	0	0	0.76	1.09	0	0.48	1.24	1.09	1.85
8/26/2008	0	0	8	0.13	1.46	0	0.24	0.37	1.46	1.59
11/18/2008	16.6	1600	280	0.22	0.94	0.09	1.46	1.68	1.03	1.25

Malibu Creek Plaza
Well #4

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
7/12/2002	49.6	0	11	0.17	0.34	0.03	1.18	1.35	0.37	0.54
9/5/2002	22	0	240	0.4	0.03	0.09	2.91	3.31	0.12	0.52
11/6/2002	8.2	0	4	1.13	0.06	0.03	2.61	3.74	0.09	1.22
3/12/2004	48.7	0	0	0.06	1.63	0.04	0.24	0.3	1.67	1.73
5/28/2004	0	0	0	0.48	0.09	0	0.05	0.53	0.09	0.57
8/13/2004	3	0	0	0.25	3.47	0.12	0.38	0.63	3.59	3.84
11/12/2004	0	0	13	0.26	0.85	0.28	0.18	0.44	1.13	1.39
2/15/2005	2	13	13	0.12	2.54	0.05	0.2	0.32	2.59	2.71
5/1/2005	0	0	0	0	0.38	0.95	0.51	0.51	1.33	1.33
9/1/2005	0	50	50	0.06	0.27	0.02	0.16	0.22	0.29	0.35
11/22/2005	2	4	1600	0.08	1.25	0.11	0.07	0.15	1.36	1.44
3/2/2006	0	0	0	0.26	0.02	0	0.24	0.5	0.02	0.28
5/3/2006	2	0	0	0	1.51	0.06	0.4	0.4	1.57	1.57
8/22/2006	0	0	4	0	0.04	0	0.05	0.05	0.04	0.04
11/15/2006	15.6	0	0	0	0.04	0	0.25	0.25	0.04	0.04
2/15/2007	1046.2	0	300		0.03	0		0	0.03	0.03
5/11/2007	4.1	0	26	11.1	19.5	0	2.61	13.71	19.5	30.6
8/17/2007	0	0	22	25.8	1.04	0	4.56	30.36	1.04	26.84
12/6/2007	0	23	23	10.3	0.76	0	4.71	15.01	0.76	11.06
2/14/2008	2419.2	14	1600	6.44	0.03	0	7.76	14.2	0.03	6.47
5/13/2008	2419.2	500	1600	12.6	0.07	0	17	29.6	0.07	12.67
8/26/2008	25.4	2	30	6.46	1.57	0	3.64	10.1	1.57	8.03
11/18/2008	7.1	1600	240	7.75	0.04	0	3.7	11.45	0.04	7.79

Malibu Creek Plaza
Well #5

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
7/12/2002	2419.2	23	900	3.1	7.43	0.03	1.5	4.6	7.46	10.56
9/5/2002	104.6	0	1600	0.15	4.45	0.16	1.13	1.28	4.61	4.76
11/6/2002	184.2	240	1600	0	0.03	0.03	2.04	2.04	0.06	0.06
3/12/2004	0	0	4	7.23	0.04	0	3.22	10.45	0.04	7.27
5/28/2004	0	0	0	4.28	0	0	3.54	7.82	0	4.28
8/13/2004	2	0	0	3.61	0	0	4.3	7.91	0	3.61
11/12/2004	0	1600	1600	2.98	0	0.14	1.99	4.97	0.14	3.12
2/15/2005	0	240	240	4.58	0	0	3.42	8	0	4.58
5/1/2005	0	0	0	4.52	0.09	0	3.21	7.73	0.09	4.61
9/1/2005	0	14	22	2.73	0.25	0	1.2	3.93	0.25	2.98
11/22/2005	0	0	0	9.81	0	0	4.93	14.74	0	9.81
3/2/2006	0	0	17	6.58	0.03	0	1.06	7.64	0.03	6.61
5/3/2006	12.1	0	0	6.59	0	0	5.76	12.35	0	6.59
8/22/2006	0	0	0	1.17	0.92	0	0.12	1.29	0.92	2.09
11/15/2006	103.9	8	80	4.28	0.04	0.05	0.78	5.06	0.09	4.37
2/13/2007	488.4	0	23	4.05	0	0	0.06	4.11	0	4.05
5/11/2007	2	23	30	0.33	0	0	5.92	6.25	0	0.33
8/17/2007	49.7	1600	1600	1.23	0.28	0.03	1.76	2.99	0.31	1.54
12/5/2007	58	50	140	0.98	0	0	0.74	1.72	0	0.98
2/14/2008	2	17	110	1.18	0.11	0	0.6	1.78	0.11	1.29
5/13/2008	6.2	0	4	2.82	0.027	0	0.22	3.04	0.027	2.847
8/26/2008	5.2	500	1600	0.13	1.4	0	0.06	0.19	1.4	1.53
11/18/2008	0	130	14	0.08	1.47	0	0.36	0.44	1.47	1.55

Malibu Creek Plaza
Well #6

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
7/12/2002	2	0	0	0.19	0.06	0.03	1.12	1.31	0.09	0.28
9/5/2002	2419.2	0	1600	0.72	0.19	0.06	1.21	1.93	0.25	0.97
11/6/2002	29.1	0	300	0	4.22	0.09	2.18	2.18	4.31	4.31
3/12/2004	8.2	0	7	0.03	0.73	0.04	0.73	0.76	0.77	0.8
5/28/2004	79.7	13	23	0.13	3.46	0	0	0.13	3.46	3.59
8/13/2004	32.9	0	0	0.1	3.9	0.03	0.3	0.4	3.93	4.03
11/12/2004	0	0	4	0.23	1.45	0.19	0.17	0.4	1.64	1.87
2/15/2005	65.7	0	4	0.02	1.49	0	0.58	0.6	1.49	1.51
5/1/2005	0	0	0	0	13.3	10.4	0.43	0.43	23.7	23.7
9/1/2005	23.4	0	8	0	3.99	0	0	0	3.99	3.99
11/22/2005	6.2	4	1600	0.03	0.66	0	0.11	0.14	0.66	0.69
3/2/2006	0	0	0	0.16	0.98	0	0.05	0.21	0.98	1.14
5/3/2006	2	0	4	0.12	0.9	0	0.31	0.43	0.9	1.02
8/22/2006	0	0	0	3.74	0.04	0	0.81	4.55	0.04	3.78
11/15/2006	22.1	7	7	0	1.18	0	0	0	1.18	1.18
2/13/2007	13.5	0	0	0.11	1.23	0	0.31	0.42	1.23	1.34
5/10/2007	290.9	0	4	0.16	0.82	0	0.75	0.91	0.82	0.98
8/14/2007	58.5	0	30	0	7.96	0	1.19	1.19	7.96	7.96
11/15/2007	103	0	2	0	1.67	0	1.61	1.61	1.67	1.67
2/14/2008	5.1	0	11	0	1.35	0.03	0.35	0.35	1.38	1.38
5/13/2008	0	0	0	0.03	1.25	0	0.39	0.42	1.25	1.28
8/26/2008	9.3	0	0	0	10.7	0	0	0	10.7	10.7
11/18/2008	7	0	0	0	2.92	0	0	0	2.92	2.92

Malibu Lumber
ML MW-1, ML MW-2, ML MW-3, ML MW-4, ML MW-5

Parameter		Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit		(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL			0	0					10	10
Sample Number	Sample Date									
ML MW-1	5/20/2009	6	2	2	1.55	1.8	0	1.68	1.8	3.35
ML MW-2	5/20/2009	2	2	4	1.7	2.3	0	1.86	2.3	4
ML MW-3	5/20/2009	8	0	4	8.8	1.9	0	9	1.9	10.7
ML MW-4	5/20/2009	62	0	0	0.94	2.2	0	1.02	2.2	3.14
ML MW-5	5/20/2009	84	0	0	0.65	1.7	0	0.74	1.7	2.35

Malibu Colony Plaza
Well # 1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
2/28/2003	14.8	8	8	1.59	0.45	0.09	2.96	4.55	0.54	2.13
5/22/2003	0.99	0	4	0.22	0.16	0.09	0.84	1.06	0.25	0.47
8/21/2003	1986.3	0	0	0.4	0.05	0.09	0.41	0.81	0.14	0.54
11/5/2003	0	0	0	0.59	0.04	0	0.39	0.98	0.04	0.63
2/25/2004	0	0	0	0.38	0.06	0	0.02	0.4	0.06	0.44
4/30/2004	0	0	0	0.82	0.019	0	0.26	1.08	0.019	0.839
8/18/2004	0	0	0	0.31	0.03	0	0.08	0.39	0.03	0.34
11/12/2004	0	0	0	0.36	0.03	0.14	0.31	0.67	0.17	0.53
2/15/2005	14.1	4	23	0.11	0.07	0	0.74	0.85	0.07	0.18
5/12/2005	0.99	0	0	0.04	0.1	0	0.22	0.26	0.1	0.14
8/16/2005	2	0	0	0.29	0.06	0	0.14	0.43	0.06	0.35
11/9/2005	18.9	7	500	0.13	0.04	0	0.1	0.23	0.04	0.17
2/14/2006	114.5	2	2	0.17	0	0.1	0.05	0.22	0.1	0.27
6/7/2006	4.1	13	23	0	0.03	0.02	0.15	0.15	0	0.05
9/20/2006	3	2	16	0	0.03	0.02	0.05	0.05	0	0.05
12/26/2006	10	2	2	7.5	6.5	0	7.9	15.4	6.5	14
3/8/2007	0	0	0	0.93	1.7	0.028	0.99	1.92	1.728	2.658
6/7/2007	2	2	2	0.88	1.85	0.021	0.04	0.92	1.871	2.751
9/6/2007	2	2	10	0.79	2	0.023	0.06	0.85	2.023	2.813
11/15/2007	2	34	480	0.8	1.7	0.024	0.05	0.85	1.724	2.524
2/14/2008	2	2	16	0.82	1.5	0.022	0.04	0.86	1.522	2.342
5/14/2008	2	2	2	0.87	1.9	0.024	0.07	0.94	1.924	2.794

Malibu Colony Plaza
Well # 2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
2/28/2003	2	0	0	11.3	2.31	0.09	6.92	18.22	2.4	13.7
5/22/2003	2419.21	2	23	7.04	0.74	0.1	3.55	10.59	0.84	7.88
8/21/2003	2419.21	0	2	7.4	0.23	0.09	7.26	14.66	0.32	7.72
11/5/2003	0	0	8	12	0.65	0	37	49	0.65	12.65
2/25/2004	0	0	0	7.51	4.59	0	12.3	19.81	4.59	12.1
4/30/2004	0	0	0	11.3	5.69	0.03	4.15	15.45	5.72	17.02
8/18/2004	0	0	0	9.36	1.5	0.07	5.68	15.04	1.57	10.93
11/12/2004	0	7	900	8.06	0.22	0.25	5.18	13.24	0.47	8.53
2/15/2005	4.1	14	50	2.16	1.79	0.005	8.87	11.03	1.795	3.955
5/12/2005	0	0	0	2.3	3.83	0	11.3	13.6	3.83	6.13
8/16/2005	0	0	0	9.69	1.34	0.06	2.16	11.85	1.4	11.09
11/9/2005	0	2	2	9.65	1.76	0.07	0.43	10.08	1.83	11.48
2/14/2006	1	2	2	23.4	0.04	0.09	0.24	23.64	0.13	23.53
6/7/2006	10.1	17	80	12.2	0.05	0.04	10.6	22.8	0.09	12.29
9/20/2006	1	2	2	20.4	0.07	0.03	1.51	21.91	0.1	20.5
12/26/2006	10	2	2	28.7	11	0.021	29.4	58.1	11.021	39.721
3/8/2007	0	0	0	22	11.5	0.024	23	45	11.524	33.524
6/7/2007	8	2	2	19.8	10.6	0.023	0.2	20	10.623	30.423
9/6/2007	2	2	10	18.1	9.9	0.027	0.9	19	9.927	28.027
11/15/2007	10	50	110	16.7	9.4	0.02	0.7	17.4	9.42	26.12
2/14/2008	2	2	2	20.4	10.2	0.021	0.6	21	10.221	30.621
5/14/2008	11	2	2	18.5	10.6	0.027	1.2	19.7	10.627	29.127

Malibu Colony Plaza
Well # 3

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
2/28/2003	1	0	0	0.2	120	0	1.87	2.07	120	120.2
5/22/2003	101.4	0	4	0.09	21.1	0.1	0.08	0.17	21.2	21.29
8/21/2003	12	0	2	0.3	25.7	0	0.46	0.76	25.7	26
11/5/2003	2	0	0	0.38	23.4	0.012	1.25	1.63	23.412	23.792
2/25/2004	0	0	0	0.31	22	0.08	0.11	0.42	22.08	22.39
4/30/2004	16.1	0	0	0.41	30.4	0.08	0.33	0.74	30.48	30.89
8/18/2004	2	0	0	0	52.8	0.27	0.32	0.32	53.07	53.07
11/12/2004	0	0	0	0	21	1.82	0.049	0.049	22.82	22.82
2/15/2005	131.3	8	13	0	26.1	0.25	0.08	0.08	26.35	26.35
5/12/2005	0	0	0	0	24.7	0	0.16	0.16	24.7	24.7
8/16/2005	13.4	4	27	0.03	26.6	0	0.29	0.32	26.6	26.63
11/9/2005	0	7	30	0.09	22.3	0.2	0.049	0.139	22.5	22.59
2/14/2006	133.4	2	2	0.28	34.3	0.26	0.05	0.33	34.56	34.84
6/7/2006	1	23	23	0	23.3	0.26	0.05	0.05	23.56	23.56
9/20/2006	2	2	2	0	13.7	0.22	0.05	0.05	13.92	13.92
12/26/2006	10	2	2	1.05	30.5	0.251	1.2	2.25	30.751	31.801
3/8/2007	0	0	0	0.11	13.7	0	0.13	0.24	13.7	13.81
6/7/2007	2	2	2	0.1	12.5	0	0.02	0.12	12.5	12.6
9/6/2007	2	2	10	0	11.4	0	0	0	11.4	11.4
11/15/2007	2	14	170	0.1	11.6	0	0.02	0.12	11.6	11.7
2/14/2008	2	2	2	0.1	12.6	0	0	0.1	12.6	12.7
5/14/2008	9	2	2	0.1	14	0	0.02	0.12	14	14.1

Malibu Colony Plaza
Well # 4

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
2/28/2003	0	0	0	0.049	99.4	0	0.99	1.039	99.4	99.449
5/22/2003	2419.21	0	50	0.08	23.1	0	0.09	0.17	23.1	23.18
8/21/2003	2419.21	0	300	0.2	24.3	0	0.049	0.249	24.3	24.5
11/5/2003	109.5	0	2	0.83	23	0.03	0.87	1.7	23.03	23.86
2/25/2004	0	0	0	0.26	18.4	0.06	0.049	0.309	18.46	18.72
4/30/2004	3.1	0	0	0.34	26.8	0.03	0.049	0.389	26.83	27.17
8/18/2004	0	0	0	0.28	30.6	0.1	0.29	0.57	30.7	30.98
11/12/2004	0	0	0	0.08	22.7	1.3	0.049	0.129	24	24.08
2/15/2005	0	2	8	0	16.5	0	0.049	0.049	16.5	16.5
5/12/2005	0	2	2	0	14.9	0	0.049	0.049	14.9	14.9
8/16/2005	2	0	0	0.04	12.5	0	0.28	0.32	12.5	12.54
11/9/2005	1	17	1600	0.02	2.16	0	0.049	0.069	2.16	2.18
2/14/2006	133.4	2	2	0.28	34.3	0.26	0.05	0.33	34.56	34.84
6/7/2006	1	23	23	0	23.3	0.26	0.05	0.05	23.56	23.56
9/20/2006	1	2	2	0	13.7	0	0.05	0.05	13.7	13.7
12/26/2006	10	2	2	30	7.5	0.026	31	61	7.526	37.526
3/8/2007	0	0	0	0.64	10	0.031	0.7	1.34	10.031	10.671
6/7/2007	2	2	2	0.59	9.7	0.035	0.03	0.62	9.735	10.325
9/6/2007	2	2	10	0.52	9.5	0.03	0.06	0.58	9.53	10.05
11/15/2007	2	6	90	0.52	8.5	0.029	0.06	0.58	8.529	9.049
2/14/2008	2	2	2	12.8	0.52	9.4	0.027	12.83	9.92	22.72
5/14/2008	2	2	2	0.57	9.3	0.028	0.06	0.63	9.328	9.898

Malibu Colony Plaza
Well # 5

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
2/28/2003	4.1	0	0	11.5	4.64	0	3.98	15.48	4.64	16.14
5/22/2003	2419.21	0	2	9.71	0.16	0	4.83	14.54	0.16	9.87
8/21/2003	103.9	0	4	11.8	0.46	0	4.56	16.36	0.46	12.26
11/5/2003	6.2	0	0	18.1	0.34	0	15.1	33.2	0.34	18.44
2/25/2004	0	0	0	7.32	0.97	0	7.32	14.64	0.97	8.29
4/30/2004	0	0	17	18	1.44	0	18	36	1.44	19.44
8/18/2004	0	0	0	16.5	3	0.04	16.5	33	3.04	19.54
11/12/2004	0	0	23	1.65	0.09	0.15	1.65	3.3	0.24	1.89
2/15/2005	2419.21	50	50	2.08	2.08	0	2.08	4.16	2.08	4.16
5/12/2005	1.1	26	110	2.17	2.17	0	2.17	4.34	2.17	4.34
8/16/2005	0	1.9	4	10.6	10.6	0.02	10.6	21.2	10.62	21.22
11/9/2005	2	4	900	7.25	7.25	0	7.25	14.5	7.25	14.5
2/14/2006	1986.3	2	2	16	0	0.02	16	32	0.02	16.02
6/7/2006	1	2	2	19.6	0.06	0.02	19.6	39.2	0.08	19.68
9/20/2006	2419.2	2	1600	21.2	0	0.02	4.79	25.99	0.02	21.22
12/26/2006	10	2	2	1.75	16.5	0	1.9	3.65	16.5	18.25
3/8/2007	0	0	0	6	1.9	0.029	6.3	12.3	1.929	7.929
6/7/2007	2	4	2	5.7	1.8	0.03	0.01	5.71	1.83	7.53
9/6/2007	2	2	10	4.8	2.1	0.025	0.2	5	2.125	6.925
11/15/2007	68	8	80	4.8	1.9	0.026	0.12	4.92	1.926	6.726
2/14/2008	2	2	2	5.4	1.7	0.025	0.2	5.6	1.725	7.125
5/14/2008	2	2	2	5	1.7	0.031	0.5	5.5	1.731	6.731

Malibu Civic Center Area
Well C-1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/24/2003	0	0	0	3.27	0.6	0	4.1	0.6	3.87
5/30/2003	648.8	0	22	1.97	0.05	0	3.2	0.05	2.02
6/30/2003	61.3	0	20	2.88	0	0	3.5	0	2.88
7/24/2003	178.5	0	17	0.51	0	0	5.4	0	0.51
8/19/2003	63.7	4	17	3.02	0	0	6.9	0	3.02
9/30/2003	2	6	6	8.57	0	0	9.7	0	8.57
10/21/2003	0	2	2	7.22	0	0	10	0	7.22
11/18/2003	0	0	8	3.75	0.02	0	8.3	0.02	3.77
12/16/2003	0	0	0	3.42	0	0	6.3	0	3.42
1/20/2004	0	2	2	0	0.06	0.02	7.3	0.08	0.08
2/17/2004	1	0	0	3.78	0.08	0	6.3	0.08	3.86
3/16/2004	32.3	0	0	2.65	0.04	0	4.7	0.7	2.69

Malibu Civic Center Area
Well C-2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/24/2003	200	0	14	0.11	0.61	0	0.57	0.61	0.72
5/30/2003	2	0	4	0.44	0.07	0	0.85	0.07	0.51
6/30/2003	6.3	0	0	0.76	0	0	0.88	0	0.76
7/24/2003	2419.2	7	7	0.22	0	0	0.55	0	0.22
8/19/2003	1203.3	0	50	0.47	0	0	0.77	0	0.47
9/30/2003	15.5	0	0	0.44	0	0	0.87	0	0.44
10/21/2003	0	0	0	0.27	0	0	0.79	0	0.27
11/18/2003	4	8	30	0.21	0.03	0	0.78	0.03	0.24
12/16/2003	571.7	0	0	0.3	0	0	1	0	0.3
1/20/2004	4.1	0	0	0.48	0.02	0.02	0.94	0.04	0.52
2/17/2004	7.3	0	0	0.61	0.08	0	1.3	0.08	0.69
3/16/2004	4.1	0	0	0.23	0.03	0	0.84	0.7	0.26

Malibu Civic Center Area
Well P-1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/25/2003	0	0	0	0.08	6.58	0	0.15	6.58	6.66
5/29/2003	19.5	0	2	0.21	2.85	0	0	2.85	3.06
6/26/2003	0	0	4	0.08	5.49	0	0.85	5.49	5.57
7/21/2003	0	0	2	0.41	3.55	0	0.22	3.55	3.96
8/18/2003	0	0	4	0.13	7.16	0	0.18	7.16	7.29
9/29/2003	9.8	0	0	0	2.82	0	0.42	2.82	2.82
10/20/2003	1	0	2	0	4.07	0	0.1	4.07	4.07
11/18/2003	1	0	14	0.08	4.99	0	0.74	4.99	5.07
12/15/2003	1	0	0	0	2.89	0	0.18	2.89	2.89
1/19/2004	0	0	4	0	4.58	0	0	4.58	4.58
2/16/2004	0	0	2	0.25	3.53	0	0.61	3.53	3.78
3/15/2004	0	0	0	0.04	3.75	0	0.11	0.7	3.79

Malibu Civic Center Area
Well P-7

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/25/2003	3.1	0	23	0	0.68	0	0.26	0.68	0.68
5/28/2003	66.4	2	240	0.5	0.19	0	0.29	0.19	0.69
6/27/2003	0	0	0	0.2	0.11	0	0.37	0.11	0.31
7/24/2003	65.3	0	4	0.23	0	0	65.3	0	0.23
8/19/2003	547.5	0	0	0.08	0	0	0.27	0	0.08
9/30/2003	721.5	9	9	0	0	0	0.44	0	0
10/21/2003	125.4	23	1600	0	0.07	0	0.65	0.07	0.07
11/18/2003	55.9	50	900	0.04	0.09	0.02	0.35	0.11	0.15
12/16/2003	3	8	23	0	0.57	0.03	0.23	0.6	0.6
1/20/2004	12	12	80	0.04	0.5	0.04	0.52	0.54	0.58
2/17/2004	22.5	2	23	0.02	0.54	0.05	0.24	0.59	0.61
3/16/2004	7.4	0	30	0.02	0.57	0	0.18	0.7	0.59

Malibu Civic Center Area
Well P-9

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/23/2003	4.1	0	0	0.88	1.51	0	1.6	1.51	2.39
5/29/2003	21.3	0	0	0.31	1.83	0	1.3	1.83	2.14
6/26/2003	4.1	0	0	3.35	0.14	0	3.4	0.14	3.49
7/21/2003	2	0	2	3	0.71	0	3.2	0.71	3.71
8/18/2003	17.1	0	4	1.69	0.42	0	3.4	0.42	2.11
9/29/2003	44.1	0	4	1.56	0.42	0		0.42	1.98
10/20/2003	13.2	0	2	1.49	0.66	0	1.5	0.66	2.15
11/17/2003	1	0	6	2.11	0.12	0	5	0.12	2.23
12/16/2003	8.5	0	0	1.17	1.11	0	2	1.11	2.28
1/20/2004	13.4	4	8	0.51	2.13	0.1	1	2.23	2.74
2/17/2004	20.9	0	0	3.09	0.15	0	3.9	0.15	3.24
3/16/2004	45.7	0	110	0.03	5.12	0.05	3.6	0.7	5.2

Malibu Civic Center Area
Well SMBRP-1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/23/2003	0	7	50	0.78	0.15	0	2.7	0.15	0.93
5/30/2003	11	0	2	0.52	0.49	0	2	0.49	1.01
6/27/2003	0	0	0	2.52	0	0	4.9	0	2.52
7/24/2003	2419.2	0	50	1.72	0.14	0	2.5	0.14	1.86

Malibu Civic Center Area
Well SMBRP-2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/25/2003	7200	3000	3000	2.72	0	0	29	0	2.72
5/30/2003	2419.2	70	300	0.72	0.05	0	14	0.05	0.77
6/30/2003	2419.2	120	250	1.29	0.11	0	20	0.11	1.4
7/24/2003	2419.2	4	500	0.56	0	0	6	0	0.56
8/20/2003	0	0	4	0.57	0	0	10	0	0.57
9/30/2003	2419.2	0	9	0	0	0	1.1	0	0
10/21/2003	2419.2	0	0	0	0	0	1.3	0	0
11/18/2003	1119.8	0	23	0.07	0.14	0	0.9	0.14	0.21
12/16/2003	1413.6	0	2	0	0.18	0	0.93	0.18	0.18
1/20/2004	1413.6	0	0	0.25	0.06	0.02	0.81	0.08	0.33
2/17/2004	435.2	0	0	0.33	0.09	0	0.64	0.09	0.42
3/16/2004	25.7	0	30	0.17	0.07	0	0.58	0.7	0.24

Malibu Civic Center Area
Well SMBRP-3c

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/25/2003	30.8	0	0	0	2.82	0	0.1	2.82	2.82
5/30/2003	2419.2	0	0	0.2	2.78	0	0.37	2.78	2.98
6/27/2003	0	0	0	0.22	0.97	0	0.4	0.97	1.19
7/24/2003	4.1	0	0	0.24	0	0	0.41	0	0.24
8/19/2003	7.4	0	0	0.14	0.52	0.25	7.4	0.77	0.91
9/30/2003	1	0	0	0	0.37	0	0.44	0.37	0.37
10/21/2003	2	2	1600	0	0.37	0	1.4	0.37	0.37
11/18/2003	1	0	17	0	0.48	0	0.16	0.48	0.48
12/16/2003	1	0	0	0	1	0	0.2	1	1
1/20/2004	1	2	4	0.03	2.31	0.02	0	2.33	2.36
2/17/2004	1	0	0	0.16	3.79	0	0.38	3.79	3.95
3/16/2004	0	0	0	0.12	4.27	0	0.18	0.7	4.39

Malibu Civic Center Area
Well SMBRP-6

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/25/2003	0	0	13	0	2.02	0	0.36	2.02	2.02
5/30/2003	16.5	11	26	0.16	0.33	0	1.2	0.33	0.49
6/27/2003	0	2	2	0.16	0.21	0	1.1	0.21	0.37
7/24/2003	1	0	2	0.36	0	0	0.44	0	0.36
8/19/2003	0	0	0	0.05	0.22	0	0.14	0.22	0.27
9/30/2003	0	4	110	0	0.17	0	0.44	0.17	0.17
10/21/2003	0	0	900	0	0.27	0	1.3	0.27	0.27
11/18/2003	2	33	34	0	0.93	0	0.2	0.93	0.93
12/16/2003	0	0	0	0	1.55	0	0.35	1.55	1.55
1/20/2004	7.4	0	2	0	4.43	0.03	0	4.46	4.46
2/17/2004	5.2	0	0	0.05	6.88	0	0.27	6.88	6.93
3/16/2004	10.7	11	110	0.11	2.74	0	0.3	0.7	2.85

Malibu Civic Center Area
Well SMBRP-9

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/23/2003	0	0	0	0.01	3.03	0	1.1	3.03	3.04
5/28/2003	4.1	0	4	0.47	32.1	0	0	32.1	32.57
6/26/2003	0	0	11	0.4	25.8	0	0.52	25.8	26.2
7/21/2003	2419.2	240	1600	0.29	21.6	0	0.22	21.6	21.89
8/18/2003	2419.2	0	500	0.02	18.7	0	0.29	18.7	18.72
9/29/2003	6.3	0	7	0	13.2	0	0.16	13.2	13.2
10/20/2003	124.5	0	0	0	31.2	0	0.1	31.2	31.2
11/17/2003	1	17	500	0.15	22.3	0	0.48	22.3	22.45
12/15/2003	0	0	0	0	21.9	0	0.48	21.9	21.9
1/19/2004	14.2	0	0	0	30.8	0	0	30.8	30.8
2/16/2004	0	0	0	0.09	34.7	0.02	0.11	34.72	34.81
3/16/2004	10.7	0	0	0.02	38.5	0	0.24	0.7	38.52

Malibu Civic Center Area
Well SMBRP-10c

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/24/2003	0	0	0	0.09	3.41	0	0.35	3.41	3.5
5/29/2003	157.8	0	2	0.47	1.66	0	1.1	1.66	2.13
6/26/2003	0	2	4	0.04	1.27	0	1.3	1.27	1.31
7/21/2003	770.1	2	130	0.44	0.93	0	2.3	0.93	1.37
8/18/2003	1986.3	0	0	0.11	0.65	0	1	0.65	0.76
9/29/2003	33.7	0	4	0	0.32	0	2.7	0.32	0.32
10/20/2003	125.7	2	2	0	0.67	0	2.6	0.67	0.67
11/17/2003	43.5	0	0	0.06	0.7	0	1.4	0.7	0.76
12/15/2003	5.2	0	2	0	0.59	0	1.5	0.59	0.59
1/19/2004	2	0	0	0	1.43	0	0.24	1.43	1.43
2/16/2004	1	0	0	0.26	1.31	0	1.3	1.31	1.57
3/15/2004	5.1	0	0	0.05	1.79	0.02	1.3	1.81	1.86

Malibu Civic Center Area
Well SMBRP-11

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/25/2003	0	0	0	0.04	5.66	0	0.85	5.66	5.7
5/28/2003	2419.2	0	4	0.3	3.85	0	0.51	3.85	4.15
6/26/2003	0	0	2	0.03	2.48	0	0.49	2.48	2.51
7/21/2003	1203.3	2	110	0.37	1.48	0	0.52	1.48	1.85
8/18/2003	2419.2	2	240	0.17	1.35	0	0.98	1.35	1.52
9/29/2003	28.1	4	7	0	0.55	0	0.8	0.55	0.55
10/20/2003	3	0	0	0	0.45	0	0.16	0.45	0.45
11/18/2003	0	13	13	0.11	0.09	0	0.38	0.09	0.2
12/16/2003	7	0	0	0	0.26	0	0.29	0.26	0.26
1/20/2004	15.3	0	0	0	1.54	0.03	0.2	1.57	1.57
2/17/2004	5	0	0	0.11	0.25	0	0.28	0.25	0.36
3/15/2004	2	0	0	0.04	3.43	0	0.11	3.43	3.47

Malibu Civic Center Area
Well SMBRP-12

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/25/2003	2	2	50	5.14	0	0	13	0	5.14
5/28/2003	0	4	4	9.29	0	0	12	0	9.29
6/27/2003	0	0	0	10.2	0	0	12	0	10.2
7/21/2003	0	0	0	8.6	0.06	0	11	0.06	8.66
8/18/2003	1	0	0	6.45	0	0	12	0	6.45
9/29/2003	0	0	0	7.26	0	0	12	0	7.26
10/20/2003	0	0	0	6.29	0	0	6.5	0	6.29
11/17/2003	0	0	0	3.66	0.02	0	8.7	0.02	3.68
12/15/2003	1	2	4	7.19	0.02	0	9.6	0.02	7.21
1/19/2004	0	2	2	7.82	0.07	0	22	0.07	7.89
2/16/2004	1	0	0	0	0.03	0	12	0.03	0.03
3/15/2004	0	0	0	1.01	0	0	12	0	1.01

Malibu Civic Center Area
Well SMBRP-13

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/22/2003	34.1	0	0	0.16	1	0	0.59	1	1.16
5/28/2003	54.8	0	2	6.03	0.49	0	0.28	0.49	6.52
6/27/2003	5	0	0	0.15	0.3	0	0.35	0.3	0.45
7/21/2003	0	0	0	0.38	0.23	0	0.4	0.23	0.61
8/18/2003	2	0	8	0.09	0.09	0	0.34	0.09	0.18
9/29/2003	5.1	0	0	0.03	0.06	0	0.62	0.06	0.09
10/20/2003	2	0	0	0	0	0	0.15	0	0
11/17/2003	2	0	2	0.06	0.03	0	0.27	0.03	0.09
12/15/2003	19.9	0	0	0.14	0.02	0	1.2	0.02	0.16
1/19/2004	2	0	2	0	0.24	0	0	0.24	0.24
2/16/2004	26	2	2	0.05	0.42	0	0.4	0.42	0.47
3/15/2004	7.4	0	2	0.02	0.41	0	1.2	0.41	0.43

Malibu Civic Center Area
Well SMBRP-14

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/22/2003	21.1	17000	17000	17.4	0	0	25	0	17.4
5/28/2003	91.4	1600	1600	0.26	0	0	15	0	0.26
6/27/2003	0	1600	1600	13.1	0	0	16	0	13.1
7/21/2003	2419.2	900	1600	23.8	0.18	0	26	0.18	23.98
8/18/2003	16.6	220	1600	8.23	0	0	28	0	8.23
9/29/2003	8.4	1600	1600	21.1	0.07	0	26	0.07	21.17
10/20/2003	1	300	1600	20.4	0	0	100	0	20.4
11/17/2003	5.2	500	1600	15.5	0.03	0.02	33	0.05	15.55
12/15/2003	2	1600	1600	16.4	0.02	0	31	0.02	16.42
1/19/2004	22.8	1600	1600	16.2	0.05	0.02	36	0.07	16.27
3/15/2004	6.3	1600	1600	0.48	0.02	0	22	0.02	0.5

Malibu Civic Center Area
Well SMBRP-15b

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/25/2003	67.6	0	0	0.14	0.91	0	1	0.91	1.05
5/28/2003	2419.2	0	21	1.21	1.03	0	0.42	1.03	2.24
6/26/2003	3.1	0	0	0.05	0.94	0	0.28	0.94	0.99
7/21/2003	0	0	0	0.37	0.94	0	0.24	0.94	1.31
8/18/2003	2	0	2	0.05	1.31	0	0.18	1.31	1.36
9/29/2003	0	2	2	0	1.15	0	0.4	1.15	1.15
10/20/2003	0	0	0	0.18	1.64	0	0.48	1.64	1.82
11/18/2003	0	0	0	0	1.56	0.03	0.4	1.59	1.59
12/15/2003	0	0	0	0.02	1.7	0	0.66	1.7	1.72
1/20/2004	0	0	0	0	1.46	0.05	0	1.51	1.51
2/17/2004	9.1	0	0	0.09	1.24	0.06	0.2	1.3	1.39
3/16/2004	2	0	2	0.08	1.05	0.03	0.25	1.08	1.16

Malibu Civic Center Area
Well SMBRP-16

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
4/23/2003	33.3	0	0	0.2	2.88	0.49	0.64	3.37	3.57
5/28/2003	2419.2	0	4	6.08	4.02	0.31	1.2	4.33	10.41
6/26/2003	29.2	0	0	0.83	2.38	0.19	1.6	2.57	3.4
7/21/2003	5.2	0	0	0.52	4.5	0.24	0.56	4.74	5.26
8/18/2003	2419.2	0	0	0.04	4.58	0	1.1	4.58	4.62
9/29/2003	42.8	0	0	0	2.77	0.1	1.4	2.87	2.87
10/20/2003	0	0	0	0	3.66	0	0.73	3.66	3.66
11/17/2003	3.1	0	2	0.32	3	0.09	1.5	3.09	3.41
12/15/2003	1	0	0	0.04	4.11	0	1.1	4.11	4.15
1/19/2004	0	0	0	0.06	4.68	0.06	0.1	4.74	4.8
2/16/2004	0	0	2	0.04	5	0.03	0.99	5.03	5.07
3/15/2004	1	0	2	0.03	0	5.12	0.05	0.7	5.15

Malibu Water Pollution Control Plant
Well WPCP 1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
4/19/1999	/	0	0	0	10.3	0	0.108	0.108	10.3	10.3
1/24/2000	/	0	0	0	18.2	0	0	0	18.2	18.2
5/16/2000	/	0	0	0	18.7	0	0	0	18.7	18.7
8/8/2000	/	0	0	0.104	21	0	0.17	0.274	21	21.104
11/14/2000	/	0	0	0	15.3	0	0.168	0.168	15.3	15.3
3/13/2001	/	0	0	0	17.7	0	0	0	17.7	17.7
5/8/2001	/	0	0	0	21.4	0	0	0	21.4	21.4
8/7/2001	/	0	0	0	20.8	0	0.16	0.16	20.8	20.8
10/2/2001	/	0	0	0	16.6	0	0.12	0.12	16.6	16.6
1/22/2002	/	0	0	0.143	18.7	0	0	0.143	18.7	18.843
4/23/2002	/	0	0	0	21.9	0	0.234	0.234	21.9	21.9
7/16/2002	/	0	0	0.0809	25.7	0	0	0.081	25.7	25.7809
10/29/2002	/	0	0	1.09	23.9	0	4.89	5.98	23.9	24.99
2/25/2003	/	0	0	0	30.5	2.4	0.155	0.155	32.9	32.9
5/13/2003	/	0	0	0	22.4	0	0.15	0.15	22.4	22.4
8/26/2003	/	0	0	0	24.2	0.271	0.106	0.106	24.471	24.471
10/21/2003	/	0	0	0.11	31.4	0.353	0	0.11	31.753	31.863
1/13/2004	/	0	0	0	24.8	0.4	0.476	0.476	25.2	25.2
4/13/2004	/	0	0	0	37.9	0	0	0	37.9	37.9
7/13/2004	/	0	0	0.125	31.4	0.076	0	0.125	31.476	31.601
10/5/2004	/	0	0	0	23.26	0.18	0	0	23.44	23.44
1/18/2005	/	0	0	0	27	0	0.382	0.382	27	27
4/12/2005	/	0	0	0	21.6	0	0	0	21.6	21.6
7/19/2005	/	0	0	0	24.839	0.164	0	0	25.003	25.003
10/24/2005	/	0	0	0.108	18.5	0.849	0	0.108	19.349	19.457
1/30/2006	/	0	0	0	28.7	0	0.196	0.196	28.7	28.7
5/8/2006	/	0	0	0	23	0	0	0	23	23
7/31/2006	/	0	800	0	24.2	0.28	0	0	24.48	24.48
1/9/2007	/	0	0	0	24.2	0	0	0	24.2	24.2
4/3/2007	/	0	0	0	17.8	0.067	0.11	0.11	17.867	17.867
7/3/2007	/	0	0	0	7.43	0	0.71	0.71	7.43	7.43
10/9/2007	/	0	0	0	15.8	0	0	0	15.8	15.8
1/8/2008	/	0	0	0	16.6	0	0	0	16.6	16.6
4/22/2008	/	0	0	0	21.6	0	0	0	21.6	21.6
7/15/2008	/	0	0	0	22.5	0	0	0	22.5	22.5
10/20/2008	/	0	0	0.12	20.4	0	0.16	0.28	20.4	20.52

Malibu Water Pollution Control Plant
Well WPCP 2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
4/19/1999	/	0	0	0	26	0	0	0	26	26
1/24/2000	/	0	0	0	0.657	0	1.06	1.06	0.657	0.657
5/16/2000	/	0	0	0	1.71	0	0	0	1.71	1.71
8/8/2000	/	0	0	0.174	1.09	0	0.578	0.752	1.09	1.264
11/14/2000	/	0	0	0	1.79	0	0.12	0.12	1.79	1.79
3/13/2001	/	0	0	0	0.043	0	0.156	0.156	0.043	0.043
5/8/2001	/	0	0	0	4.4	0	0.4	0.4	4.4	4.4
8/7/2001	/	0	0	0	8.5	0	0	0	8.5	8.5
10/2/2001	/	0	0	0.152	7.9	0	0	0.152	7.9	8.052
1/22/2002	/	0	0	1.61	1.7	0	0.136	1.746	1.7	3.31
4/23/2002	/	0	0	3.3	0.4	0	0.28	3.58	0.4	3.7
7/16/2002	/	0	4	0.143	0	0	5.06	5.203	0	0.143
10/29/2002	/	0	0	2.89	0.535	5.05	1.07	3.96	5.585	8.475
2/25/2003	/	0	0	0.198	4.99	0	0.116	0.314	4.99	5.188
5/13/2003	/	0	0	2.94	0.409	0.344	0	2.94	0.753	3.693
8/26/2003	/	0	0	0.165	5.78	0.405	0.339	0.504	6.185	6.35
10/21/2003	/	0	0	2.22	0.429	0.438	0	2.22	0.867	3.087
1/13/2004	/	0	0	0.343	3.5	0.7	0.481	0.824	4.2	4.543
4/13/2004	/	0	0	3.323	0	0	0	3.323	0	3.323
7/13/2004	/	0	0	0	5.62	0	0	0	5.62	5.62
12/6/2004	/	0	0	0	6.842	0	0.15	0.15	6.842	6.842
1/18/2005	/	0	170	0	9.72	0	1.7	1.7	9.72	9.72
4/12/2005	/	0	34	0	6.95	0	0	0	6.95	6.95
7/19/2005	/	0	0	0	6.684	0	0	0	6.684	6.684
10/24/2005	/	0	0	0	6.98	0	0.415	0.415	6.98	6.98
1/30/2006	/	0	300	0	6.55	0	0.251	0.251	6.55	6.55
5/8/2006	/	0	0	0	6.48	0	0.24	0.24	6.48	6.48
7/31/2006	/	0	230	0	5.76	0	0.206	0.206	5.76	5.76
1/9/2007	/	0	0	0	5.2	0	0	0	5.2	5.2
4/3/2007	/	0	80	0	0.225	0	0.1	0.1	0.225	0.225
7/3/2007	/	0	0	0	4.6	0	0.56	0.56	4.6	4.6
10/9/2007	/	0	0	0	3.6	0	0.2	0.2	3.6	3.6
1/8/2008	/	0	0	0	3.39	0	0.24	0.24	3.39	3.39
4/22/2008	/	0	40	0	2.78	0	0.55	0.55	2.78	2.78
7/15/2008	/	0	0	0	3.77	0	0	0	3.77	3.77
10/20/2008	/	0	0	0	2.8	0	0.21	0.21	2.8	2.8

Malibu Water Pollution Control Plant
Well WPCP 3

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
4/19/1999	/	0	0	0	16.8	0	0	0	16.8	16.8
1/24/2000	/	0	0	0	13.2	0	0	0	13.2	13.2
5/16/2000	/	0	0	0	15.78	0.23	0	0	16.01	16.01
8/8/2000	/	0	0	0	16.1	0	0.238	0.238	16.1	16.1
11/14/2000	/	0	0	0	19.7	0.47	0	0	20.17	20.17
3/14/2001	/	0	20	0	14.8	0	0.229	0.229	14.8	14.8
5/8/2001	/	0	0	0	12.8	0	0	0	12.8	12.8
8/7/2001	/	0	0	0	12.1	0	0	0	12.1	12.1
10/2/2001	/	0	0	0	10.8	0	0.13	0.13	10.8	10.8
1/22/2002	/	0	0	0.084	16.5	0	0	0.084	16.5	16.584
4/23/2002	/	0	0	0.107	15	0	0.163	0.27	15	15.107
7/16/2002	/	0	0	0	14.5	0	0	0	14.5	14.5
10/29/2002	/	0	0	0.349	14.3	0	0	0.349	14.3	14.649
2/25/2003	/	0	0	0	80.7	0	0	0	80.7	80.7
5/13/2003	/	0	0	0	65.5	0	0	0	65.5	65.5
8/26/2003	/	0	0	0	22.5	0	0	0	22.5	22.5
10/21/2003	/	0	0	0	22.8	0.453	0.38	0.38	23.253	23.253
1/13/2004	/	0	300	0	24.8	1.1	0.31	0.31	25.9	25.9
4/13/2004	/	0	0	0	24.8	0	0.229	0.229	24.8	24.8
7/13/2004	/	0	0	0	19.1	0	0	0	19.1	19.1
12/6/2004	/	0	16,000	0	9.868	0.228	0.37	0.37	10.096	10.096
1/18/2005	/	0	50,000	0	18.6	0	1.03	1.03	18.6	18.6
4/12/2005	/	0	900	0	14.8	0	0	0	14.8	14.8
7/19/2005	/	0	300	0	32.52	0	0	0	32.52	32.52
10/24/2005	/	0	170	0	23.3	0	0.161	0.161	23.3	23.3
1/30/2006	/	0	0	0	37.9	0	0	0	37.9	37.9
5/8/2006	/	0	0	0	43.6	0	0	0	43.6	43.6
7/31/2006	/	0	0	0	47.4	0	0.129	0.129	47.4	47.4
1/9/2007	/	0	0	0	25.1	0	0	0	25.1	25.1
4/3/2007	/	0	0	0	31.6	0	0.1	0.1	31.6	31.6
7/3/2007	/	0	0	0	19.9	0	0.75	0.75	19.9	19.9
10/9/2007	/	0	0	0	13.2	0	0	0	13.2	13.2
1/8/2008	/	0	0	0	11.3	0	0	0	11.3	11.3
4/22/2008	/	0	0	0	11.2	0	0	0	11.2	11.2
7/15/2008	/	0	0	0	19	0	0	0	19	19
10/20/2008	/	0	0	0	11.9	0	0.11	0.11	11.9	11.9

Malibu Water Pollution Control Plant
Well WPCP 4

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
8/7/2001	/	0	2	0	23	0	0.18	0.18	23	23
10/2/2001	/	0	0	0	16.7	0	0.27	0.27	16.7	16.7
5/16/2000	/	0	0	0	18.7	0	0	0	18.7	18.7
8/8/2000	/	0	0	0.104	21	0	0.17	0.274	21	21.104
11/14/2000	/	0	0	0	15.3	0	0.168	0.168	15.3	15.3
3/13/2001	/	0	0	0	17.7	0	0	0	17.7	17.7
5/8/2001	/	0	0	0	21.4	0	0	0	21.4	21.4
8/7/2001	/	0	0	0	20.8	0	0.16	0.16	20.8	20.8
10/2/2001	/	0	0	0	16.6	0	0.12	0.12	16.6	16.6
1/22/2002	/	0	17	0.092	1.31	0.02	0	0.092	1.33	1.422
4/23/2002	/	0	700	0.12	1.46	0	0.28	0.4	1.46	1.58
7/16/2002	/	0	1,600	0.02	2.57	0	0.29	0.31	2.57	2.59
10/29/2002	/	0	140	0	20.2	0	0	0	20.2	20.2
2/25/2003	/	1,600	1,600	0	9.68	3.19	0	0	12.87	12.87
5/13/2003	/	1	55.2	0	1.75	0	0.907	0.907	1.75	1.75
8/26/2003	/	0	240	0	3.79	0	0	0	3.79	3.79
10/21/2003	/	170	1700	0.637	1.77	0.332	0	0.637	2.102	2.739
1/13/2004	/	0	24,000	0	0.8	0.4	0.367	0.367	1.2	1.2
4/13/2004	/	0	3,000	0	1.98	0	0.309	0.309	1.98	1.98
7/13/2004	/	0	0	0	1.77	0	0.13	0.13	1.77	1.77
10/5/2004	/	0	0	0	24.39	0	0	0	24.39	24.39
1/18/2005	/	0	160,000	0	21	0	0.778	0.778	21	21
4/12/2005	/	0	4	0.127	27.5	0.164	0.241	0.368	27.664	27.791
7/19/2005	/	0	220	0	25.97	0	0	0	25.97	25.97
10/24/2005	/	0	0	0.119	27.1	0.752	0	0.119	27.852	27.971
1/30/2006	/	0	500	0	35.7	0	0	0	35.7	35.7
5/8/2006	/	0	2,400	0	25.1	0	0	0	25.1	25.1
7/31/2006	/	0	9,000	0	26.8	0	0	0	26.8	26.8
1/9/2007	/	0	160,000	0	22.8	0	0	0	22.8	22.8
4/3/2007	/	0	90,000	0	18.1	0	0	0	18.1	18.1
7/3/2007	/	0	160,000	0	6.86	0.48	0.58	0.58	7.34	7.34
10/9/2007	/	0	1,300	0	11.2	0	0.1	0.1	11.2	11.2
1/8/2008	/	0	130	0	12.8	0	0	0	12.8	12.8
4/22/2008	/	0	13,000	0.14	19.4	0	0	0.14	19.4	19.54
7/15/2008	/	0	2,800	0	19.4	0	0	0	19.4	19.4
10/20/2008	/	0	230	0.1	18.2	0	0.16	0.26	18.2	18.3

Malibu Water Pollution Control Plant
Well WPCP 5

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
5/16/2000	/	0	0	0	18.7	0	0	0	18.7	18.7
8/8/2000	/	0	0	0.104	21	0	0.17	0.274	21	21.104
11/14/2000	/	0	0	0	15.3	0	0.168	0.168	15.3	15.3
3/13/2001	/	0	0	0	17.7	0	0	0	17.7	17.7
5/8/2001	/	0	0	0	21.4	0	0	0	21.4	21.4
8/7/2001	/	0	6	0	13	0	0.11	0.11	13	13
8/7/2001	/	0	0	0	20.8	0	0.16	0.16	20.8	20.8
10/2/2001	/	0	0	0	11.5	0	0.167	0.167	11.5	11.5
10/2/2001	/	0	0	0	16.6	0	0.12	0.12	16.6	16.6
1/22/2002	/	0	4	0.1	13.1	0	0.127	0.227	13.1	13.2
4/23/2002	/	0	50	0	7.79	0	0	0	7.79	7.79
7/16/2002	/	0	23	0	5.4	0	0	0	5.4	5.4
10/29/2002	/	0	20	0.124	10.6	0	0.268	0.392	10.6	10.724
2/25/2003	/	0	0	0	7.83	0	0.18	0.18	7.83	7.83
4/24/2003	0	0	0	0.1	3.52	0	2.9	3	3.52	3.62
5/13/2003	/	0	13.4	0	4.45	0	0.142	0.142	4.45	4.45
5/30/2003	6	0	4	0.07	15.3	0	0.06	0.13	15.3	15.37
6/30/2003	2	0	17	0.03	7.49	0	0.02	0.05	7.49	7.52
7/24/2003	0	0	4	0.39	14.9	0	0	0.39	14.9	15.29
8/19/2003	2	0	0	0.02	11.7	0	1.58	1.6	11.7	11.72
8/26/2003	/	0	0	0	8.96	0	0.166	0.166	8.96	8.96
9/30/2003	5.2	0	0	0	6.13	0	0.16	0.16	6.13	6.13
10/21/2003	/	0	0	0	3.41	0.545	0.242	0.242	3.955	3.955
10/21/2003	1553.1	0	0	0	6.46	0	2	2	6.46	6.46
11/18/2003	4.1	8	23	0	2.39	0	0.16	0.16	2.39	2.39
12/16/2003	0	0	2	0	28.5	0.39	0.19	0.19	28.89	28.89
1/13/2004	/	0	0	0	1.6	0.5	0.124	0.124	2.1	2.1
1/20/2004	0	0	0	0	1.31	0.02	0	0	1.33	1.33
2/17/2004	0	0	0	0.12	1.46	0	0.16	0.28	1.46	1.58
3/16/2004	0	0	0	0.02	2.57	0	0.27	0.29	0.7	2.59
4/13/2004	/	0	0	0.103	2.82	0	0	0.103	2.82	2.923
7/13/2004	/	0	0	0	17.2	0	0	0	17.2	17.2
10/5/2004	/	0	0	0	18.58	0	0.153	0.153	18.58	18.58
1/18/2005	/	0	40	0	22.8	0	0.568	0.568	22.8	22.8
4/12/2005	/	0	0	0.159	23.9	0	0.181	0.34	23.9	24.059
10/24/2005	/	0	0	0	30.3	0	0	0	30.3	30.3
1/30/2006	/	0	230	0	36.8	0	0	0	36.8	36.8
5/8/2006	/	0	0	0	27.8	0	0	0	27.8	27.8
7/31/2006	/	0	130	0	29.1	0	0	0	29.1	29.1
1/9/2007	/	0	0	0	26.4	0	0	0	26.4	26.4
4/3/2007	/	0	0	0	23.5	0	0	0	23.5	23.5
7/3/2007	/	0	0	0	14.7	0	0.56	0.56	14.7	14.7
10/9/2007	/	0	0	0	20.7	0	0	0	20.7	20.7
1/8/2008	/	0	0	0	18.8	0	0	0	18.8	18.8
4/22/2008	/	0	0	0	22.3	0	0	0	22.3	22.3
7/15/2008	/	0	0	0	20.8	0	0	0	20.8	20.8
10/20/2008	/	0	0	0	16.7	0	0.13	0.13	16.7	16.7

Malibu Water Pollution Control Plant
Well WPCP 6

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
8/7/2001	/	0	30	0	14.6	0	0	0	14.6	14.6
10/2/2001	/	0	0	0	11.5	0	0.17	0.17	11.5	11.5
5/16/2000	/	0	0	0	18.7	0	0	0	18.7	18.7
8/8/2000	/	0	0	0.104	21	0	0.17	0.274	21	21.104
11/14/2000	/	0	0	0	15.3	0	0.168	0.168	15.3	15.3
3/13/2001	/	0	0	0	17.7	0	0	0	17.7	17.7
5/8/2001	/	0	0	0	21.4	0	0	0	21.4	21.4
8/7/2001	/	0	0	0	20.8	0	0.16	0.16	20.8	20.8
10/2/2001	/	0	0	0	16.6	0	0.12	0.12	16.6	16.6
1/22/2002	/	0	0	0	18.3	0	0.128	0.128	18.3	18.3
4/23/2002	/	0	8	0	15.5	0.1	0	0	15.6	15.6
7/16/2002	/	0	0	0	20.3	0.116	0	0	20.416	20.416
10/29/2002	/	0	0	0.312	22.6	0.195	0	0.312	22.795	23.107
2/25/2003	/	0	0	0.114	20.9	0	0.174	0.288	20.9	21.014
5/13/2003	/	0	1	0	24.4	0	0	0	24.4	24.4
8/26/2003	/	0	0	0	25.5	0.317	0	0	25.817	25.817
10/21/2003	/	0	2	0.113	23.9	0.268	0	0.113	24.168	24.281
1/13/2004	/	0	0	0	30	0.6	0.159	0.159	30.6	30.6
4/13/2004	/	0	80	0	28.9	0	0.232	0.232	28.9	28.9
7/13/2004	/	0	0	0	29.8	0.204	10.5	10.5	30.004	30.004
10/5/2004	/	0	0	0	23.94	0.16	0.37	0.37	24.1	24.1
1/18/2005	/	0	20	0	20.8	0	0.475	0.475	20.8	20.8
4/12/2005	/	0	0	0	19.4	0	0	0	19.4	19.4
7/19/2005	/	0	0	0	22.4	0	0	0	22.4	22.4
10/24/2005	/	0	40	0	20.6	1.19	0	0	21.79	21.79
1/30/2006	/	0	20	0	28.9	0	0	0	28.9	28.9
5/8/2006	/	0	0	0	19.5	0	0	0	19.5	19.5
7/31/2006	/	0	40	0	22.2	0	0	0	22.2	22.2
1/9/2007	/	0	0	0	23.9	0	0	0	23.9	23.9
4/3/2007	/	0	0	0	27.5	0	0	0	27.5	27.5
7/3/2007	/	0	0	0	16.5	0	0.46	0.46	16.5	16.5
10/9/2007	/	0	0	0	14.2	0	0	0	14.2	14.2
1/8/2008	/	0	0	0	13.6	0	0	0	13.6	13.6
4/22/2008	/	0	0	0	19.1	0	0	0	19.1	19.1
7/15/2008	/	0	0	0	21.7	0	0	0	21.7	21.7
10/20/2008	/	0	220	0	21.8	0	0.12	0.12	21.8	21.8

Malibu Water Pollution Control Plant
Well WPCP 7

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
8/7/2001	/	0	4	0	22	0	0.15	0.15	22	22
10/2/2001	/	0	0	0	10.8	0	0.215	0.215	10.8	10.8
5/16/2000	/	0	0	0	18.7	0	0	0	18.7	18.7
8/8/2000	/	0	0	0.104	21	0	0.17	0.274	21	21.104
11/14/2000	/	0	0	0	15.3	0	0.168	0.168	15.3	15.3
3/13/2001	/	0	0	0	17.7	0	0	0	17.7	17.7
5/8/2001	/	0	0	0	21.4	0	0	0	21.4	21.4
8/7/2001	/	0	0	0	20.8	0	0.16	0.16	20.8	20.8
10/2/2001	/	0	0	0	16.6	0	0.12	0.12	16.6	16.6
1/22/2002	/	0	0	0	16.5	0.438	0.121	0.121	16.938	16.938
4/23/2002	/	0	0	0	19.7	0.207	0	0	19.907	19.907
7/16/2002	/	0	0	0	21.1	0.335	0	0	21.435	21.435
10/29/2002	/	0	40	0	23	1.02	0.46	0.46	24.02	24.02
2/25/2003	/	0	0	0	26.2	0.48	0	0	26.68	26.68
5/13/2003	/	2	47.1	0	26.9	0.225	0	0	27.125	27.125
8/26/2003	/	0	0	0	15.1	0.472	0.234	0.234	15.572	15.572
10/21/2003	/	0	0	1.04	18.2	0	0	1.04	18.2	19.24
1/13/2004	/	0	0	0	19.8	0	0.288	0.288	19.8	19.8
4/13/2004	/	0	0	0	16.4	0	0	0	16.4	16.4
7/13/2004	/	0	0	0	19.7	0	7.35	7.35	19.7	19.7
10/5/2004	/	0	0	0	15.2	0	0.944	0.944	15.2	15.2
1/18/2005	/	0	0	0	15.2	0	0.628	0.628	15.2	15.2
4/12/2005	/	0	0	0	11.5	0	0.166	0.166	11.5	11.5
7/19/2005	/	0	0	0	13.03	0	0	0	13.03	13.03
10/24/2005	/	0	0	0	19.3	0	0.327	0.327	19.3	19.3
1/30/2006	/	0	500,000	0	20.5	0	0	0	20.5	20.5
5/8/2006	/	0	300	0	18.4	0	0	0	18.4	18.4
7/31/2006	/	0	0	0	15.9	0	0	0	15.9	15.9
1/9/2007	/	0	0	0	13.5	0	0.26	0.26	13.5	13.5
4/3/2007	/	0	0	0	12.03	0	0	0	12.03	12.03
7/3/2007	/	0	20	0	10.7	0	0.4	0.4	10.7	10.7
10/9/2007	/	0	0	0	9.2	0	0.11	0.11	9.2	9.2
1/8/2008	/	0	0	0	8.9	0	0	0	8.9	8.9
4/22/2008	/	0	40	0	10.4	0	0.9	0.9	10.4	10.4
7/15/2008	/	0	0	0	10	0	0.137	0.137	10	10
10/20/2008	/	0	0	0	8.76	0	0.13	0.13	8.76	8.76

Surfrider Beach
Well SB-1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100 ml)	(MPN/100 ml)	(MPN/100 ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
3/24/2004	0	0	0	0.271	2.09	1.51	1.54	1.811	3.6	3.871
5/14/2004	0	0	0	0	2.17	0	0.55	0.55	2.17	2.17
9/1/2004	0	0	0	0	2.222	0	0.381	0.381	2.222	2.222
12/7/2004	0	0	0	0	5.53	0	1.63	1.63	5.53	5.53
3/9/2005	0	0	0	0	12	0.292	0	0	12.292	12.292
6/3/2005	0	0	0	1	1.33	0.615	2.38	3.38	1.945	2.945
9/9/2005	0	0	0	1.18	12.3	0	8.61	9.79	12.3	13.48
11/18/2005	549	0	800	0.396	11	1.4	1.6	1.996	12.4	12.796
3/3/2006	14,700	0	9,000	0.4	9.53	0.764	0.84	1.24	10.294	10.694
6/2/2006	0	0	0	0.466	39.3	0.928	0.154	0.62	40.228	40.694
9/8/2006	0	0	40	0.62	43.8	0.755	7.56	8.18	44.555	45.175
11/17/2006	0	0	0	0.64	42.9	0.396	3.1	3.74	43.296	43.936
3/2/2007	0	0	0	0.7	72.9	0.156	0.84	1.54	73.056	73.756
6/1/2007	0	0	0	1.5	31.1	0	2.28	3.78	31.1	32.6
9/7/2007	0	0	0	0	4.33	0	1.01	1.01	4.33	4.33
11/16/2007	0	0	0	0.92	3.61	0	1.38	2.3	3.61	4.53
5/30/2008	0	0	0	0.13	15.1	0	0.51	0.64	15.1	15.23
8/29/2008	0	0	0	0.19	16.7	0	0.39	0.58	16.7	16.89
12/5/2008	/	/	/	0	17.9	/	0	0	/	/
3/13/2009	0	0	0	0.37	14.4	/	0.12	0.49	/	/
6/12/2009	0	0	0	0.2	321	/	0.15	0.35	/	/

Surfrider Beach
Well SB-2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	Organic Nitrogen	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100 ml)	(MPN/100 ml)	(MPN/100 ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0						10	10
Sample Date										
3/24/2004	0	20	40	3.81	3.14	1.84	79.4	83.21	4.98	8.79
5/14/2004	0	0	0	1.63	63.7	0.13	36.6	38.23	63.83	65.46
9/1/2004	0	0	0	2.02	76.32	0.24	1.28	3.3	76.56	78.58
12/7/2004	0	0	0	0.34	15.8	0.158	0.58	0.92	15.958	16.298
3/9/2005	0	0	0	1.8	51.7	0	0.4	2.2	51.7	53.5
6/3/2005	0	0	0	0	10.2	0.231	1.67	1.67	10.431	10.431
9/9/2005	0	0	0	0.127	4.56	0	1.02	1.147	4.56	4.687
11/18/2005	3	0	230	0	0.869	0.724	0.541	0.541	1.593	1.593
3/3/2006	41	0	130	0.12	3.23	0	4.66	4.78	3.23	3.35
6/2/2006	0	0	40	0	0.045	0	1.11	1.11	0.045	0.045
9/8/2006	0	0	300	0	7.47	0	0.451	0.451	7.47	7.47
11/17/2006	0	0	0	0.17	9.03	0	0.91	1.08	9.03	9.2
3/2/2007	0	0	0	0.1	4.43	0	0.5	0.6	4.43	4.53
6/1/2007	0	0	0	0	0.9	0	0.17	0.17	0.9	0.9
9/7/2007	0	0	0	0	2.03	0	2.22	2.22	2.03	2.03
11/16/2007	0	0	0	0	2.08	0	0.13	0.13	2.08	2.08
5/30/2008	0	0	0	0.12	0.3	0	0.32	0.44	0.3	0.42
8/29/2008	70	0	0	0.11	3	0	0.25	0.36	3	3.11
12/5/2008	/	/	/	0	4.81	/	0.42	0.42	/	/
3/13/2009	0	0	0	0	1.88	/	0.42	0.42	/	/
6/12/2009	0	0	0	0.17	0.27	/	0.11	0.28	/	/

Malibu Beach Inn
MW1

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
2/11/2009	0	2	8	3	1.7	0	3.15	1.7	4.7
6/9/2009	2	0	10	2.05	3.9	0	2.2	3.9	5.95
2/11/2009	0	2	8	3	1.7	0	3.15	1.7	4.7
2/14/2008	0	0	0	1.5	15.1	0.09	1.63	15.19	16.69
5/15/2008	0	0	110	2.65	39	0.147	2.8	39.147	41.797
9/30/2008	/	2	24	2.3	18.1	0.201	2.47	18.301	20.601
12/3/2008	0	0	0	2.26	10.3	0.184	2.4	10.484	12.744
11/15/2007	/	0	0	16.5	8.5	0.635	17.5	9.135	25.635
2/15/2007	/	/	/	/	/	/	/	/	/
5/1/2007	/	/	/	/	/	/	/	/	/
2/15/2006	/	/	/	/	/	/	/	/	/
5/25/2006	/	/	/	/	/	/	/	/	/
8/18/2006	/	/	/	/	/	/	/	/	/
12/8/2006	/	/	/	/	/	/	/	/	/
2/23/2005	/	/	/	/	/	/	/	/	/
5/18/2005	/	/	/	/	/	/	/	/	/
9/27/2005	/	/	/	/	/	/	/	/	/
11/18/2005	/	/	/	/	/	/	/	/	/
6/25/2004	/	/	/	/	/	/	/	/	/
8/17/2004	/	/	/	/	/	/	/	/	/
11/8/2004	/	/	/	/	/	/	/	/	/

Malibu Beach Inn
MW2

Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
2/11/2009	/	/	/	/	/	/	/	/	/
6/9/2009	/	/	/	/	/	/	/	/	/
2/11/2009	/	/	/	/	/	/	/	/	/
2/14/2008	0	0	0	2.6	1.4	0.07	1.63	1.47	4.07
5/15/2008	0	0	48	1.85	9.5	0.029	2.83	9.529	11.379
9/30/2008	/	2	10	2.54	2.4	0	1.9	2.4	4.94
12/3/2008	0	0	0	2.15	3.2	0.028	2.68	3.228	5.378
11/15/2007	/	/	/	/	/	/	/	/	/
2/15/2007	2	2	0	0.01	0.18	0	0.06	0.18	0.19
5/1/2007	4.1	2	0	0	0.63	0	4.14	0.63	0.63
2/15/2006	33.6	0	0	0.01	0.15	0.04	1.47	0.19	0.2
5/25/2006	5.2	2	0	0.06	0.08	0	3.49	0.08	0.14
8/18/2006	0	2	0	0.12	5.14	0	0.56	5.14	5.26
12/8/2006	0	0	0	0.12	5.14	0	0.56	5.14	5.26
2/23/2005	2419.2	0	2	0.49	6.3	0.18	5.93	6.48	6.97
5/18/2005	63.2	2	4	0.7	28.9	0.28	2.44	29.18	29.88
9/27/2005	44.7	2	17	0.6	1.1	0	1.1	1.1	1.7
11/18/2005	13.2	0	0	0.34	0.32	0	0.42	0.32	0.66
6/25/2004	93.3	30	50	3.02	4.95	0.07	15.32	5.02	8.04
8/17/2004	128.7	2	2	1.82	3.83	0.13	6.71	3.96	5.78
11/8/2004	9.8	0	0	2.67	15.6	0.34	7.64	15.94	18.61

Malibu Beach Inn
MW3

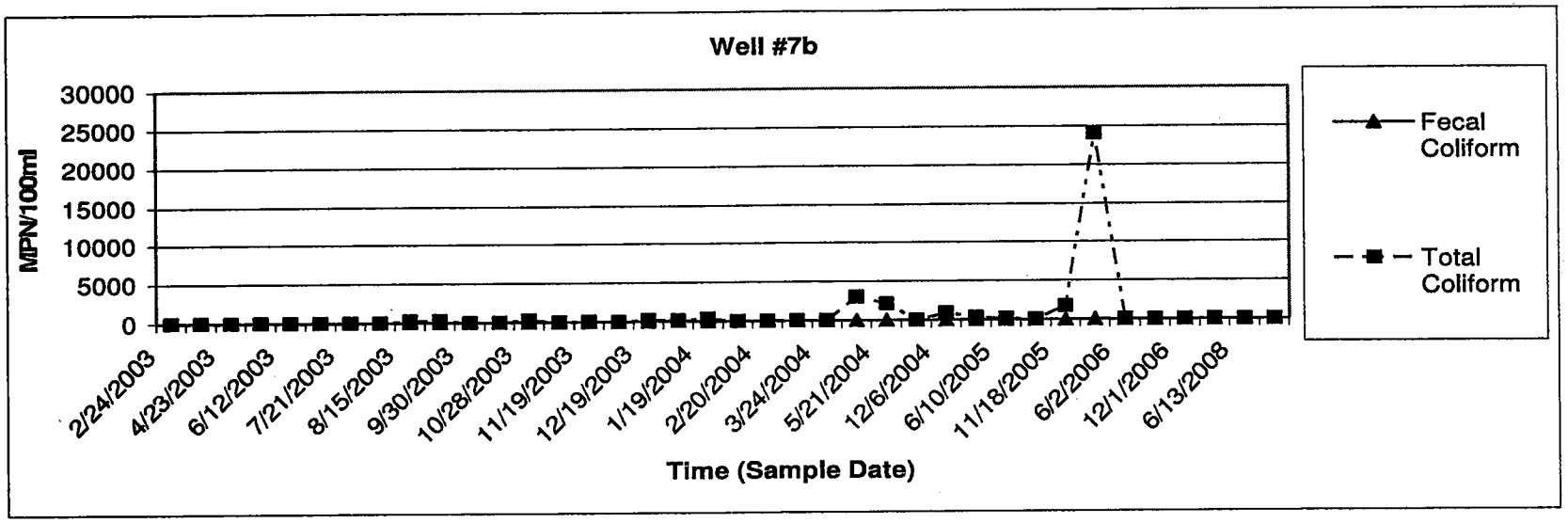
Parameter	Enterococcus	Fecal Coliform	Total Coliform	Ammonia	Nitrate	Nitrite	TKN	Nitrate + Nitrite	Ammonia + Nitrate + Nitrite
Unit	(MPN/100ml)	(MPN/100ml)	(MPN/100ml)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MCL		0	0					10	10
Sample Date									
2/11/2009	0	0	0	1.55	12.2	1.56	1.64	13.76	15.31
6/9/2009	0	0	0	0.68	16	0.119	0.73	16.119	16.799
2/11/2009	0	0	0	1.55	12.2	1.56	1.64	13.76	15.31
2/14/2008	/	/	/	/	/	/	/	/	/
5/15/2008	/	/	/	/	/	/	/	/	/
9/30/2008	/	/	/	/	/	/	/	/	/
12/3/2008	/	/	/	/	/	/	/	/	/
11/15/2007	/	/	/	/	/	/	/	/	/
2/15/2007	15.8	2	0	2.36	1.47	0.06	40.16	1.53	3.89
5/1/2007	18.7	2	11	16.3	0.88	0	19.48	0.88	17.18
2/15/2006	13.2	2	2	21	5.41	0.38	28.02	5.79	26.79
5/25/2006	5.2	17	17	10.9	15.4	0.06	13.05	15.46	26.36
8/18/2006	66.2	0	0	19.9	3.02	0	28.05	3.02	22.92
12/8/2006	0	0	0	65.1	0.9	0	88.7	0.9	66
2/23/2005	22.6	2	8	4.53	0.04	0.11	9.01	0.15	4.68
5/18/2005	5.1	4	4	6.19	1.34	0.06	19.59	1.4	7.59
9/27/2005	47.2	2	2	50.1	3.4	0.02	67.6	3.42	53.52
11/18/2005	7.4	0	0	26.8	1.22	0	31.73	1.22	28.02
6/25/2004	2419.2	7	30	22.4	0	1.29	40.1	1.29	23.69
8/17/2004	31.4	0	0	23.6	0	0.1	28.87	0.1	23.7
11/8/2004	9.7	0	0	12	0.07	0.14	13.44	0.21	12.21

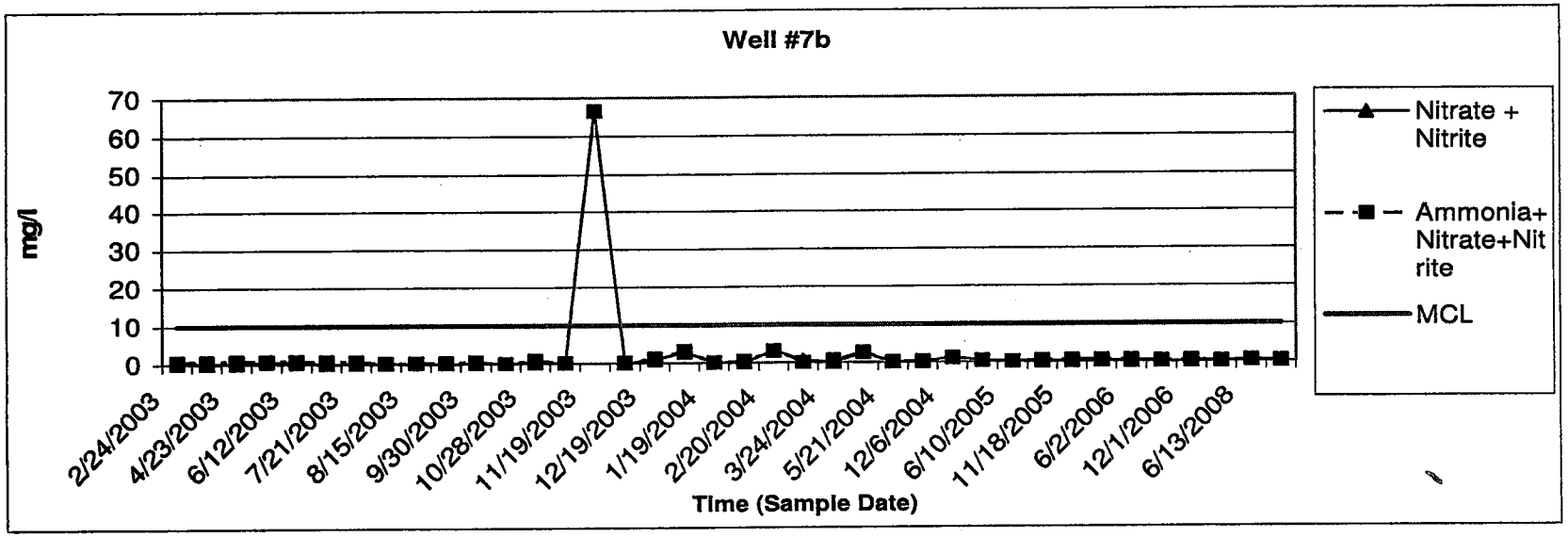
Technical Memorandum #2: Pathogens and Nitrogen in Wastewaters Impair Underlying Groundwater as a Potential Source of Drinking Water

Attachment 2-2

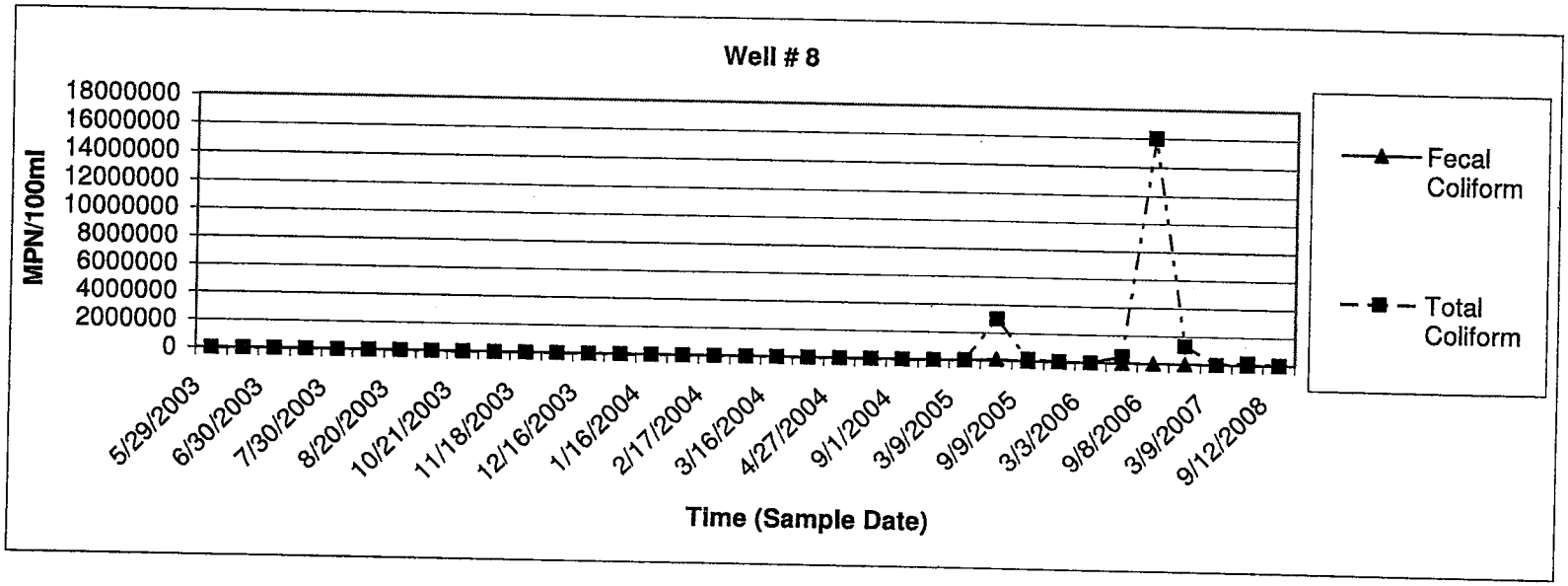
Graphs for 56 Individual Wells

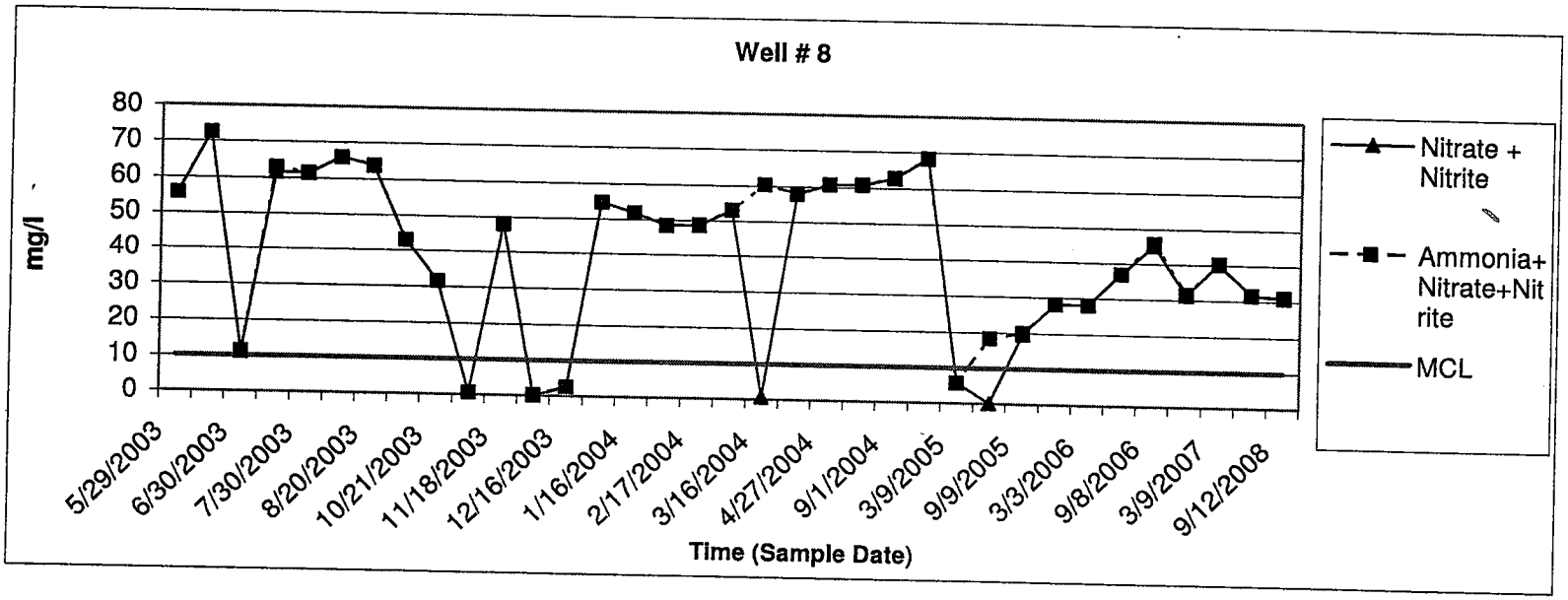
Malibu Administrative Center



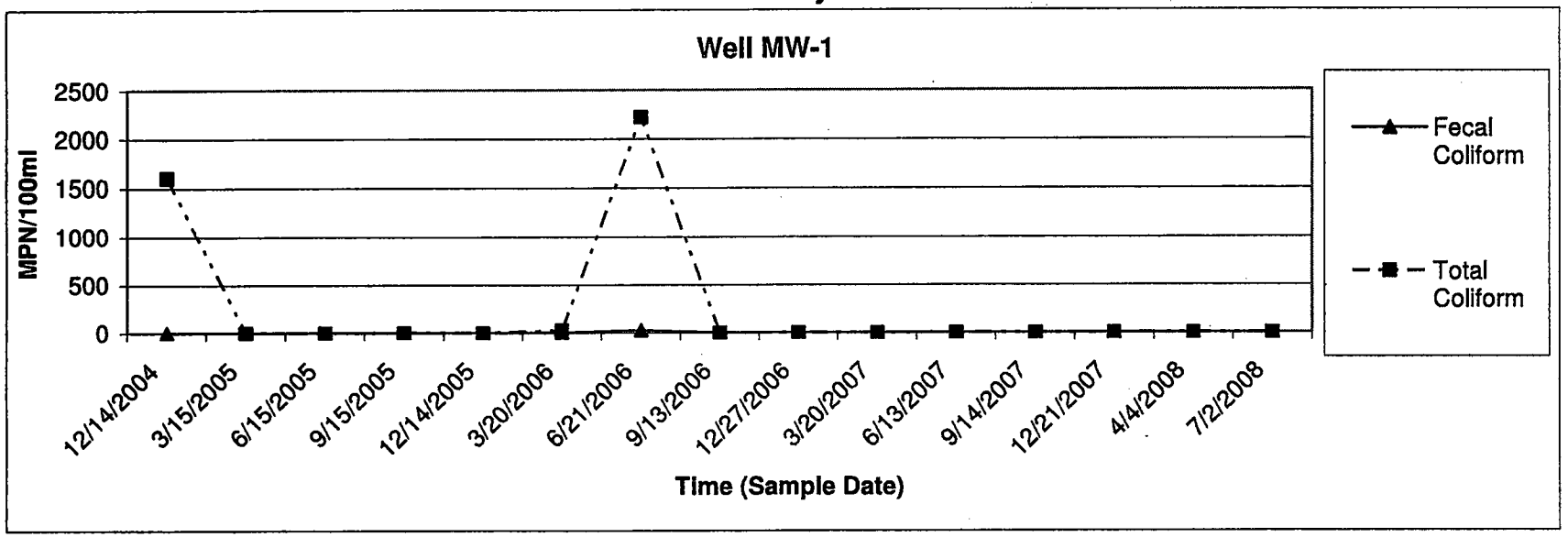


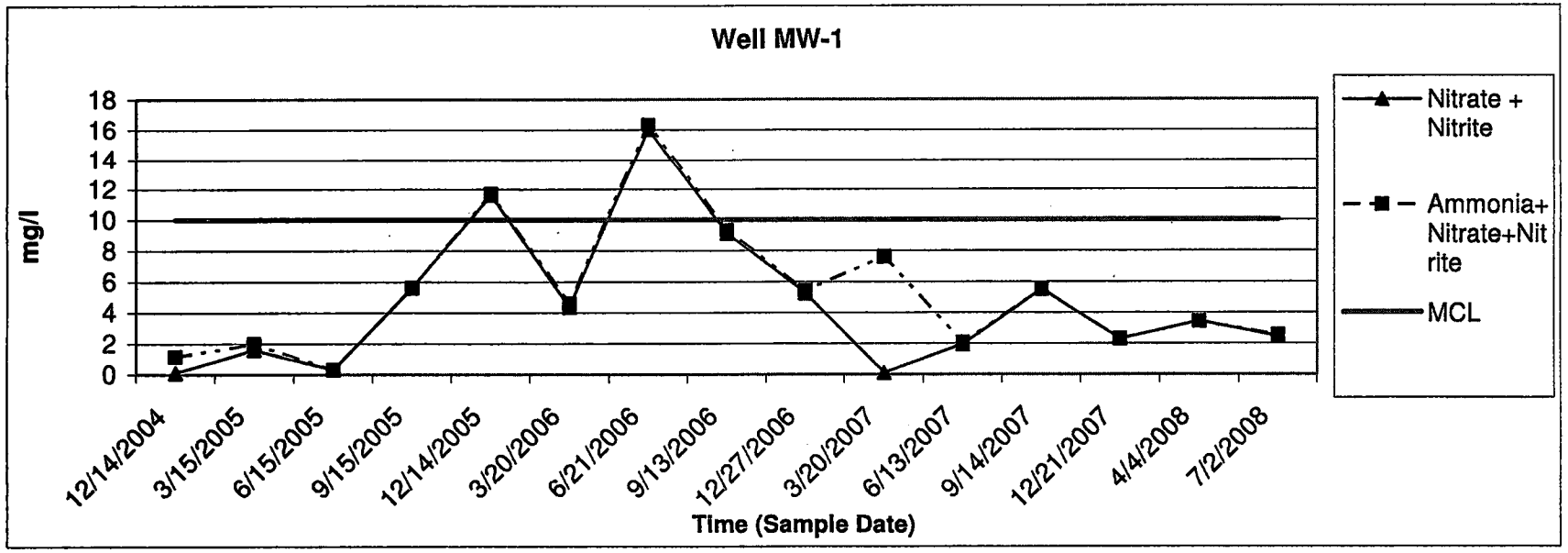
Malibu Administrative Center





Malibu Country Mart I

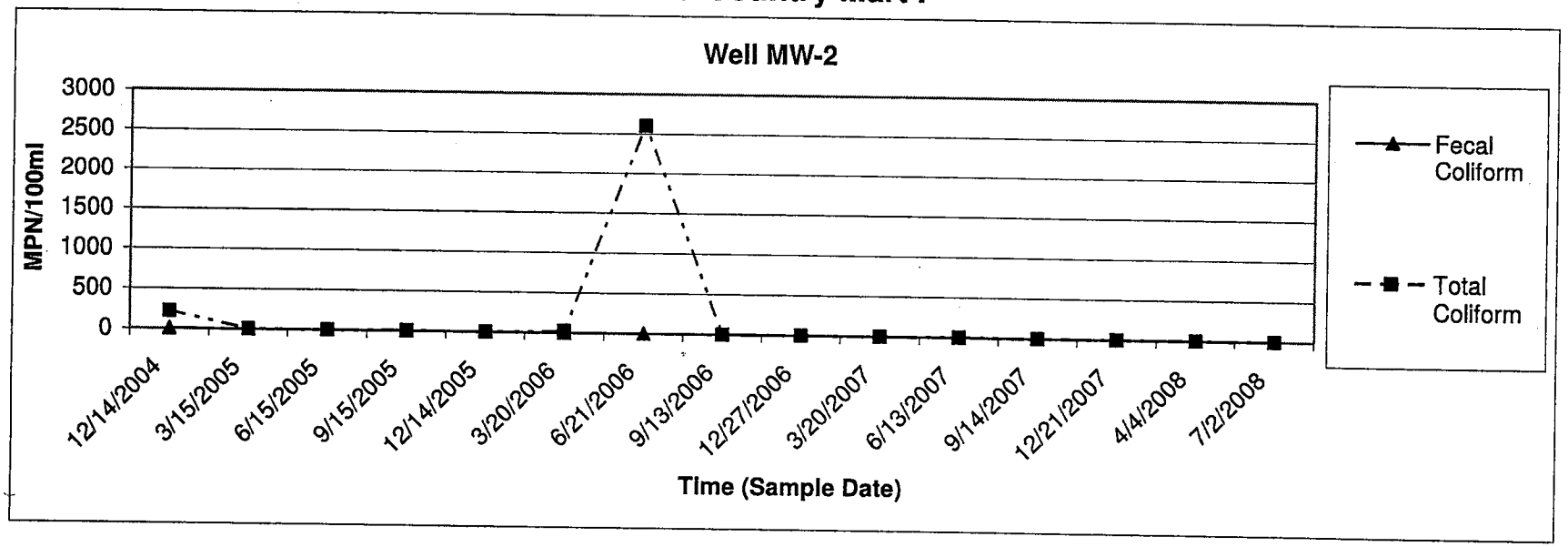


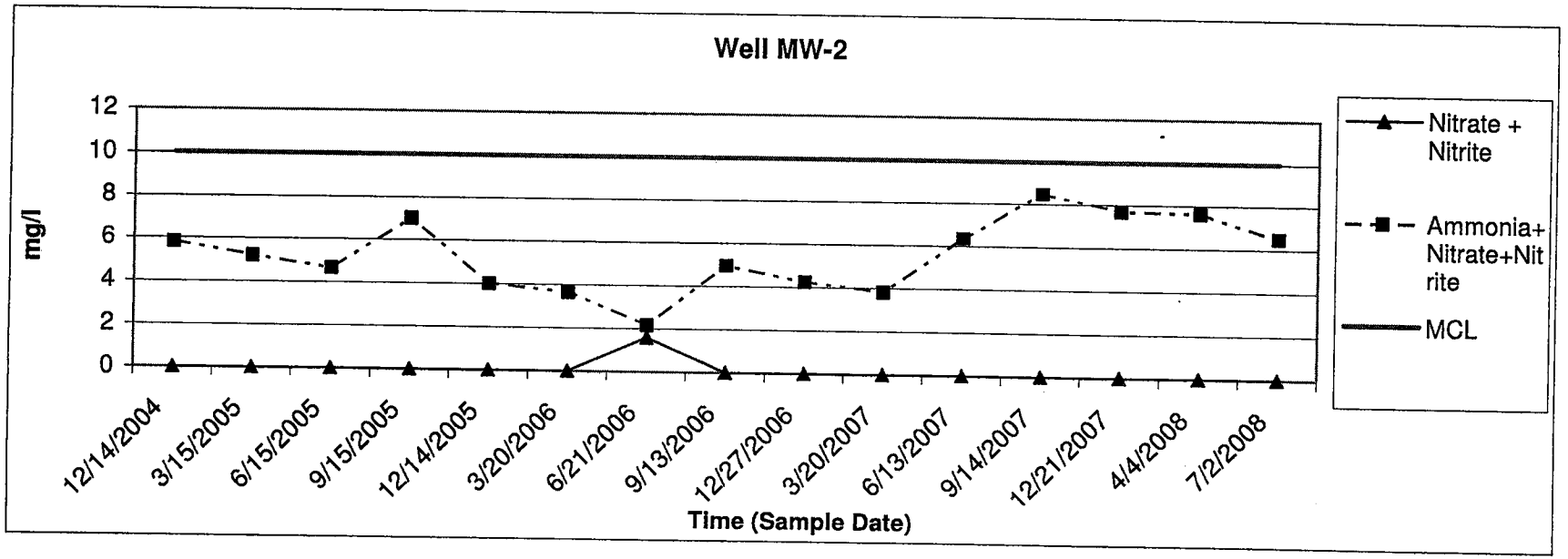


TM2-64

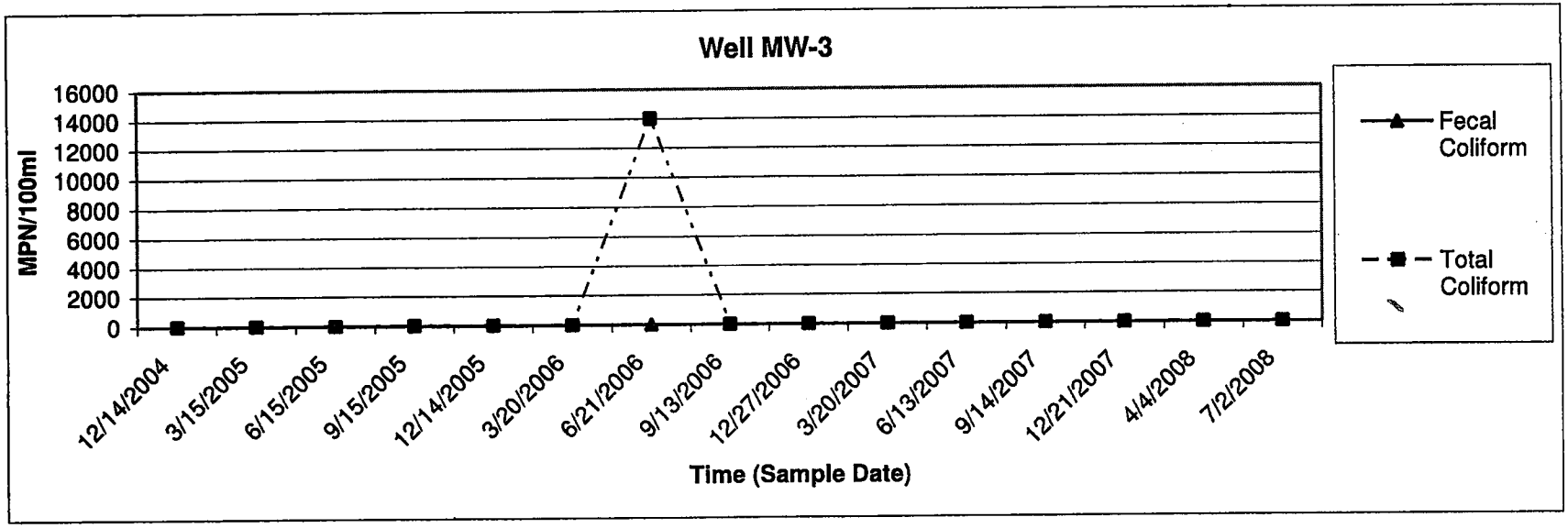
TM2-65

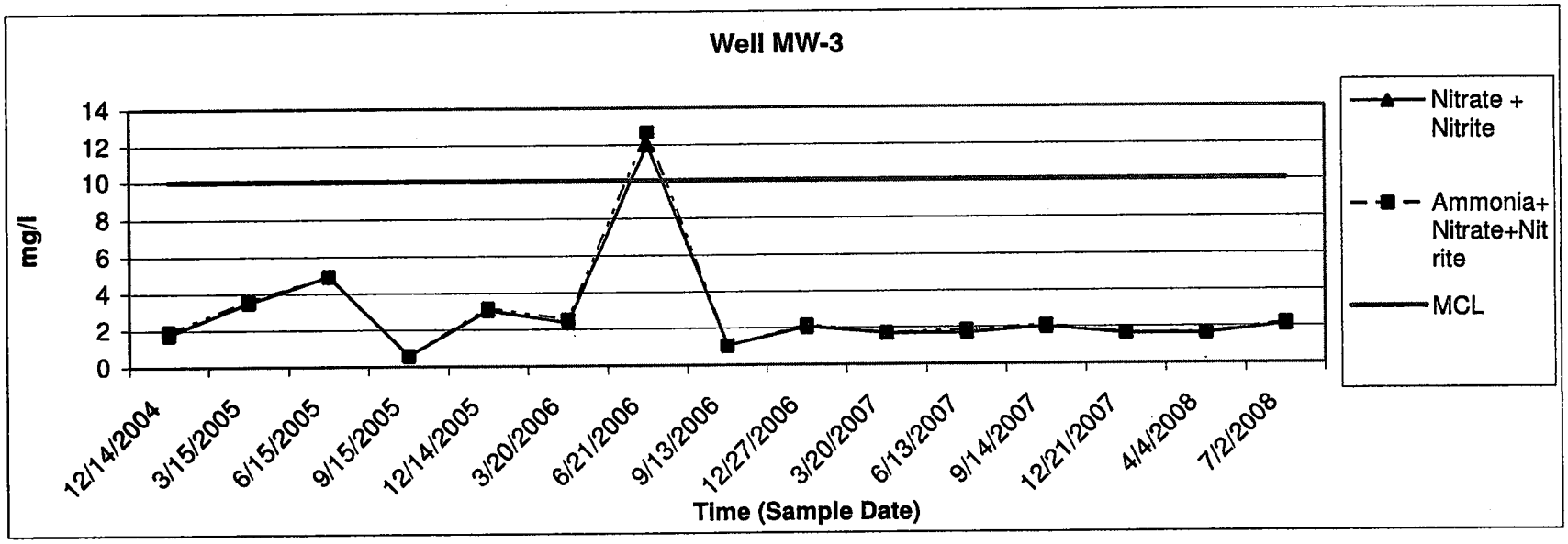
Malibu Country Mart I





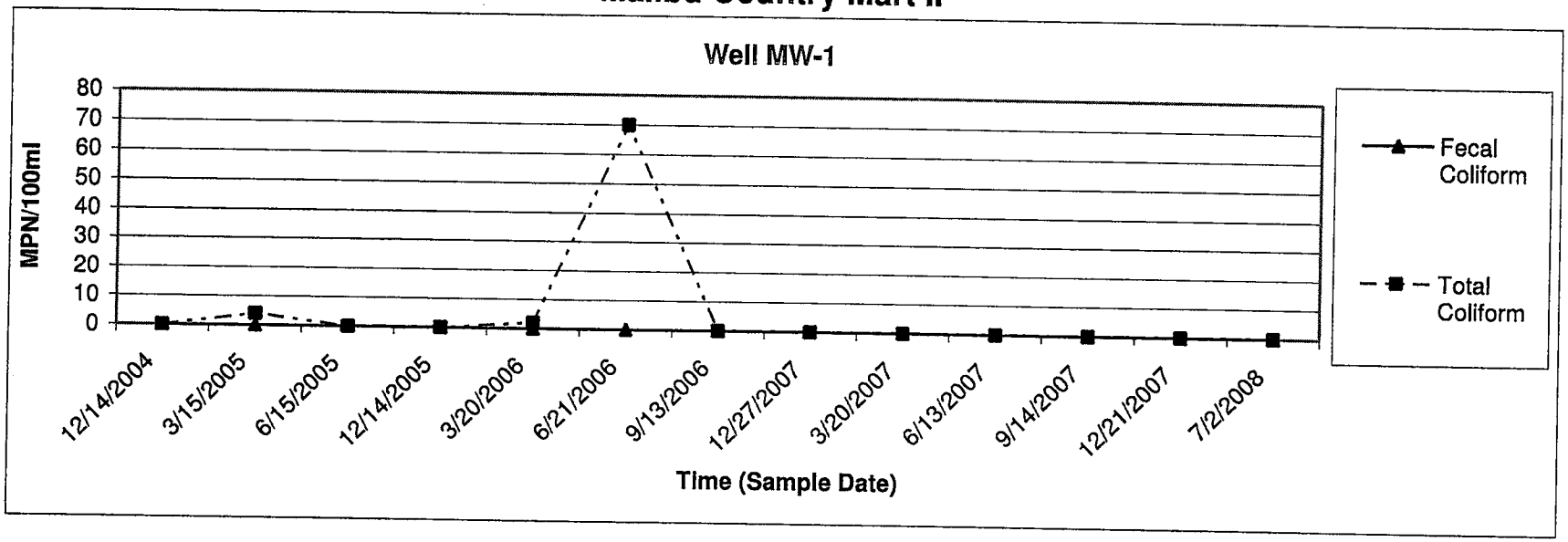
Malibu Country Mart I

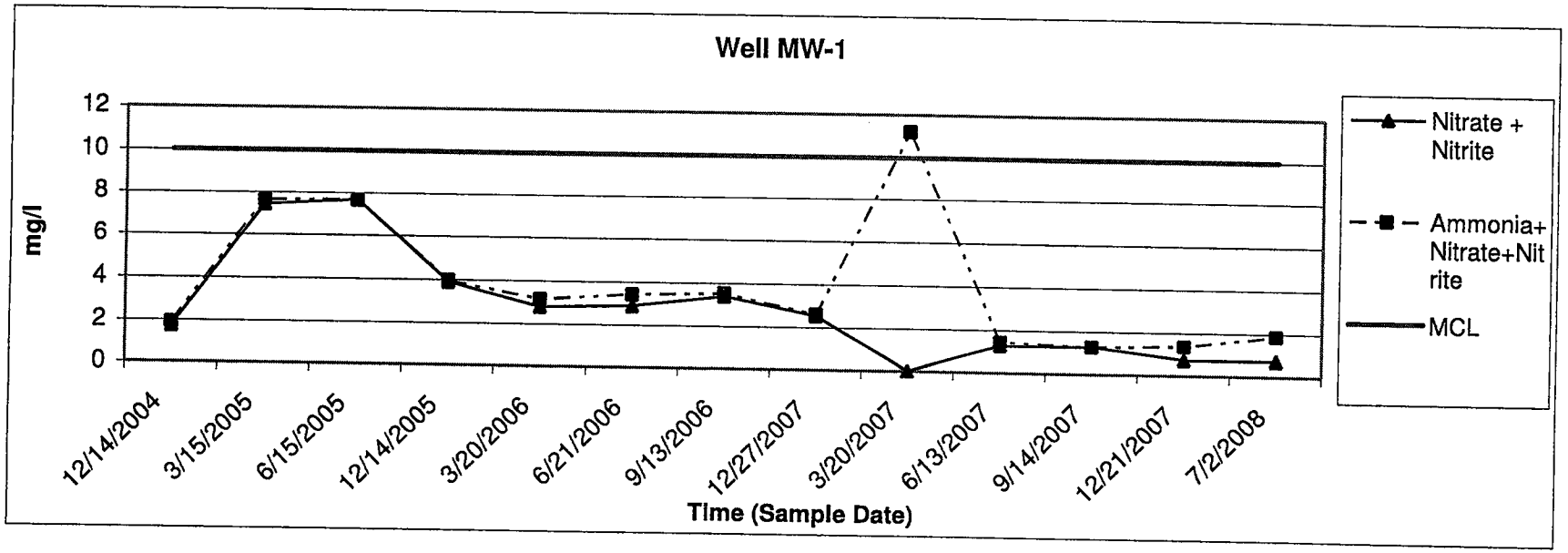




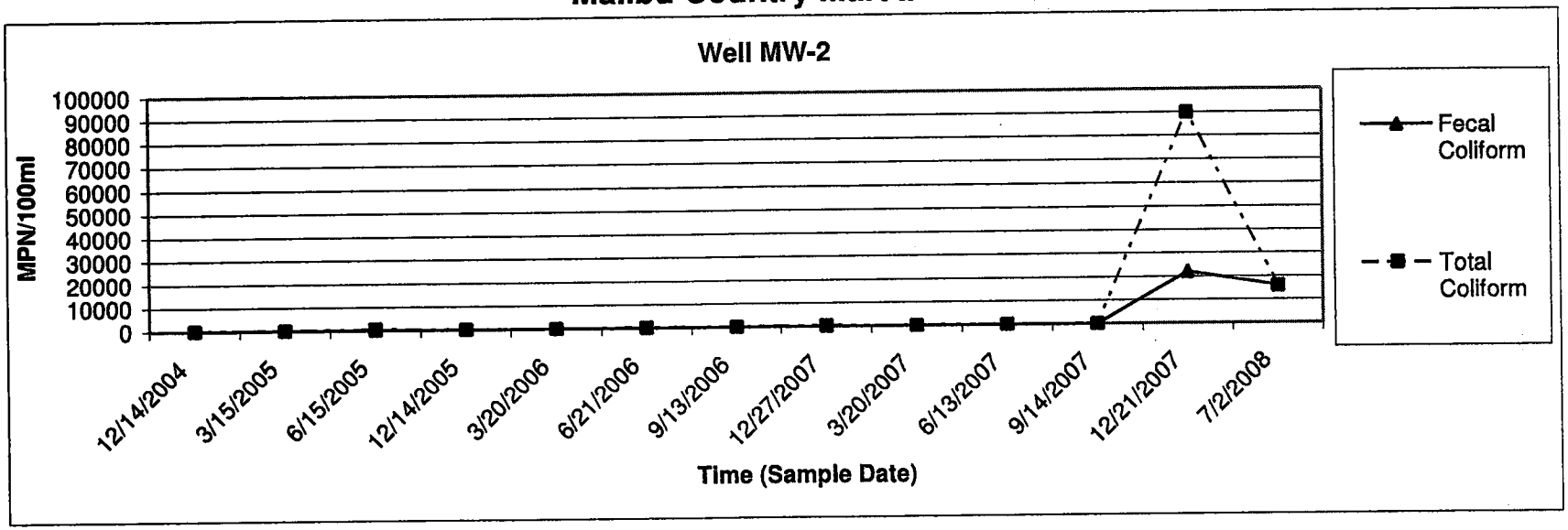
TM2-67

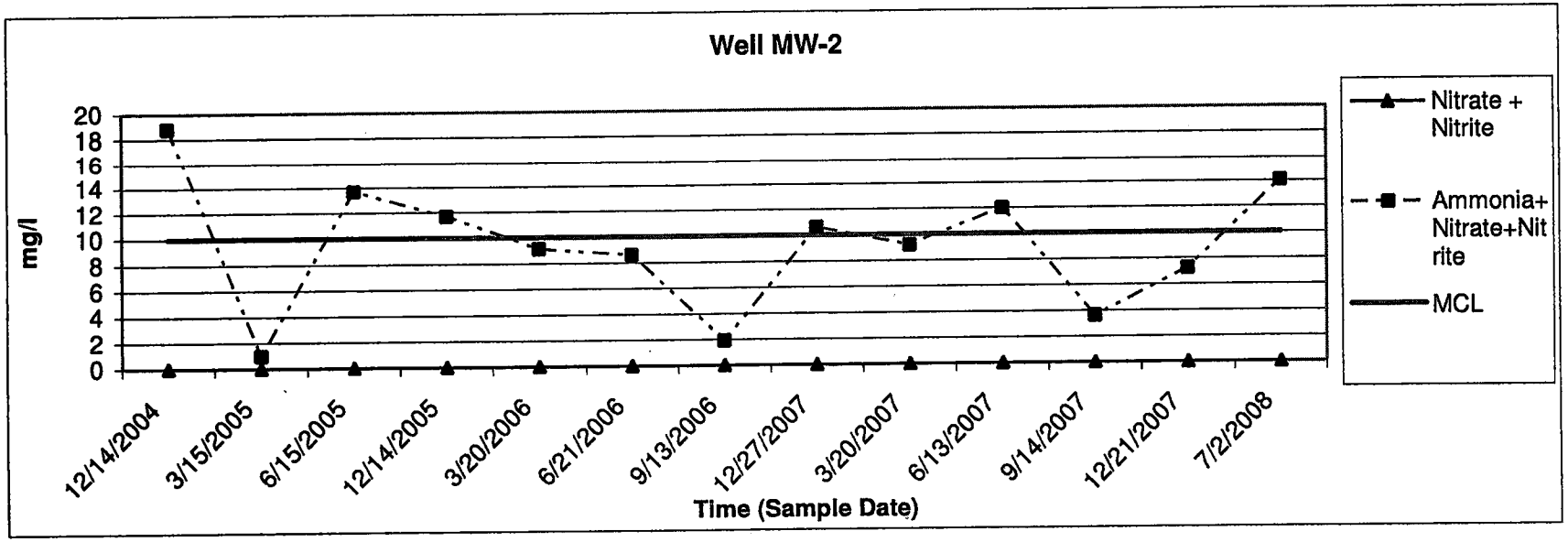
Malibu Country Mart II





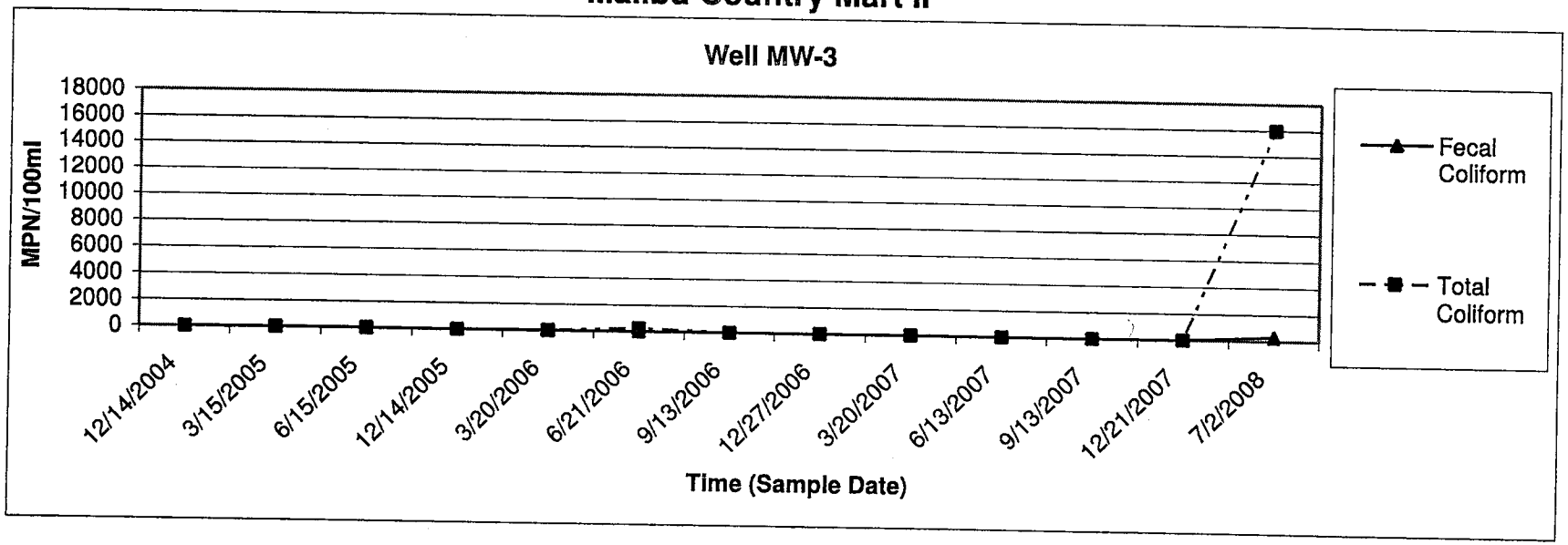
Malibu Country Mart II

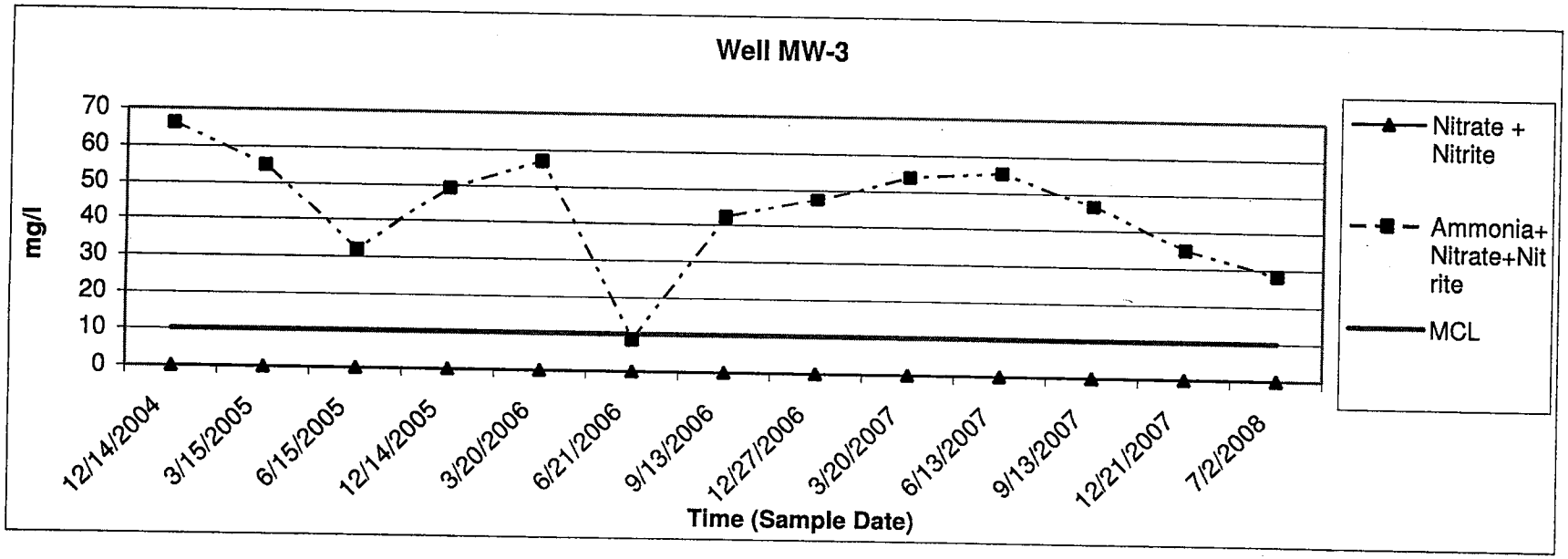




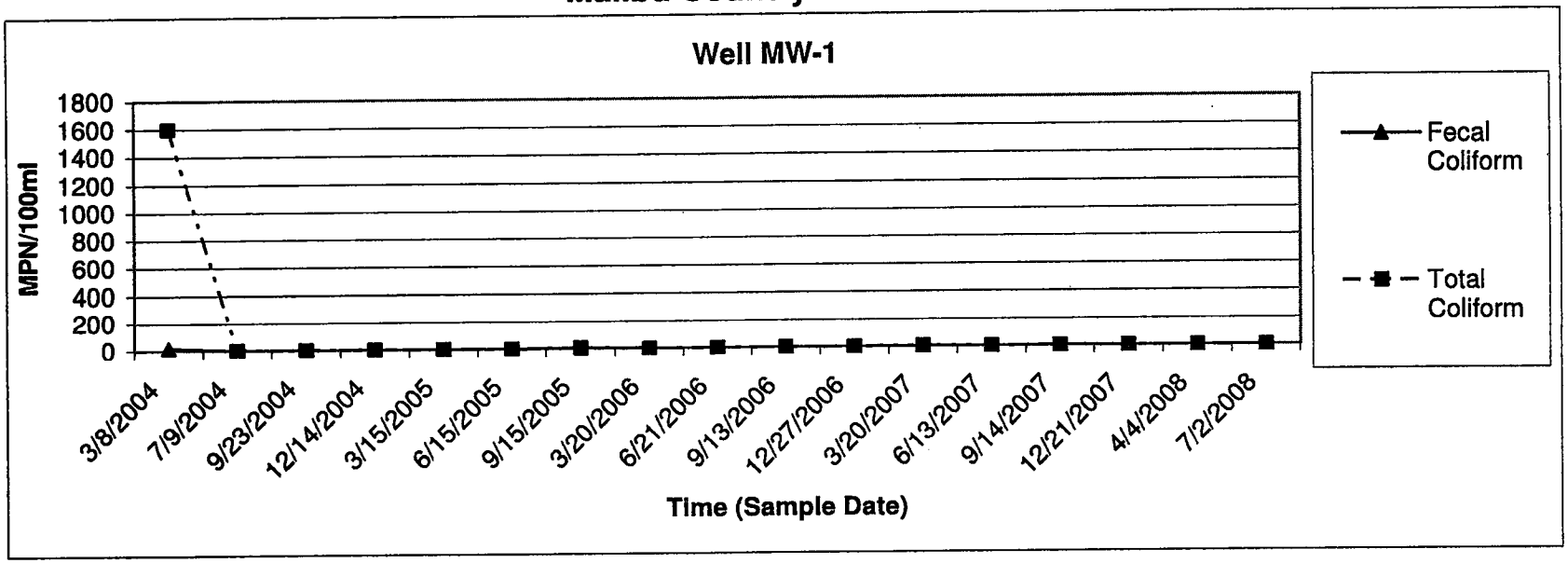
TM2-69

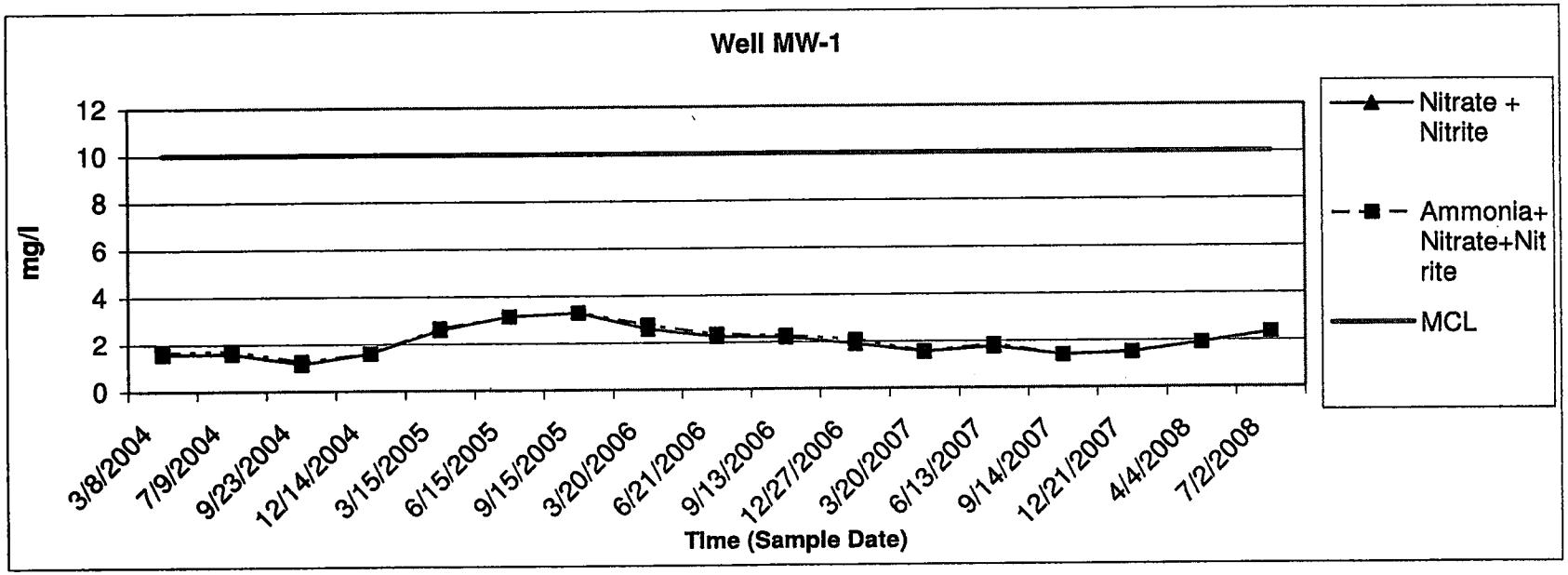
Malibu Country Mart II



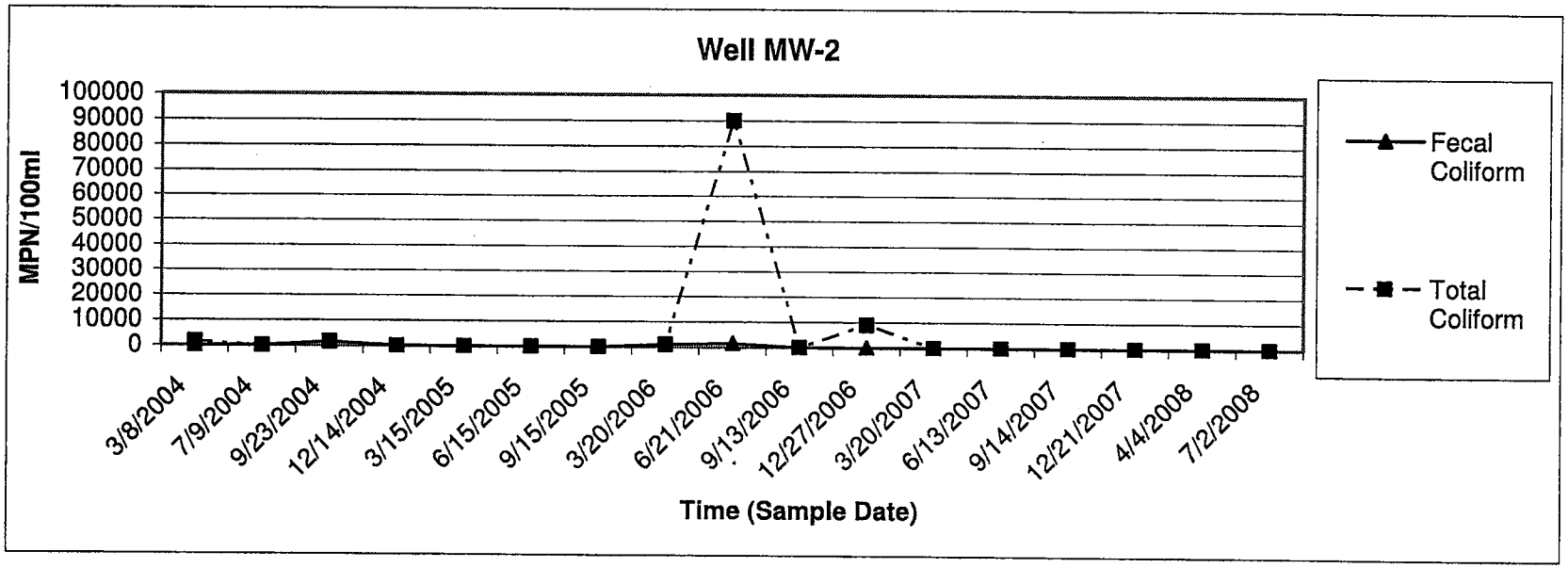


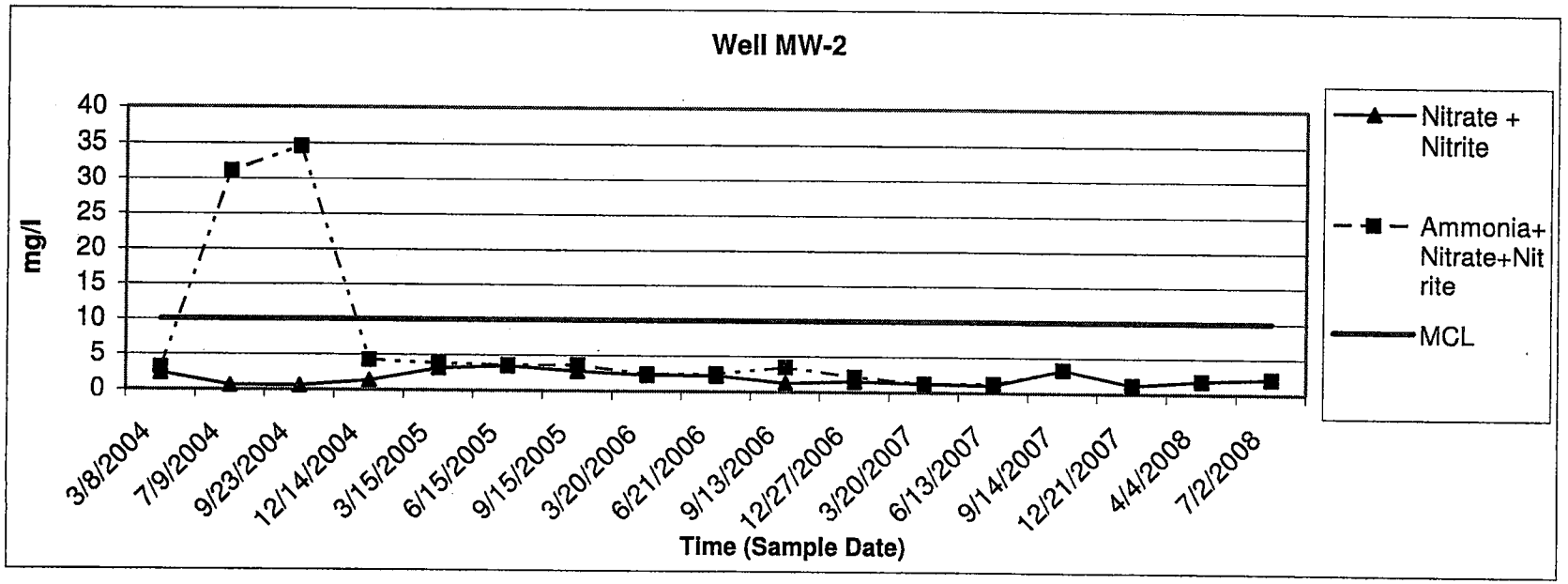
Malibu Country Mart III





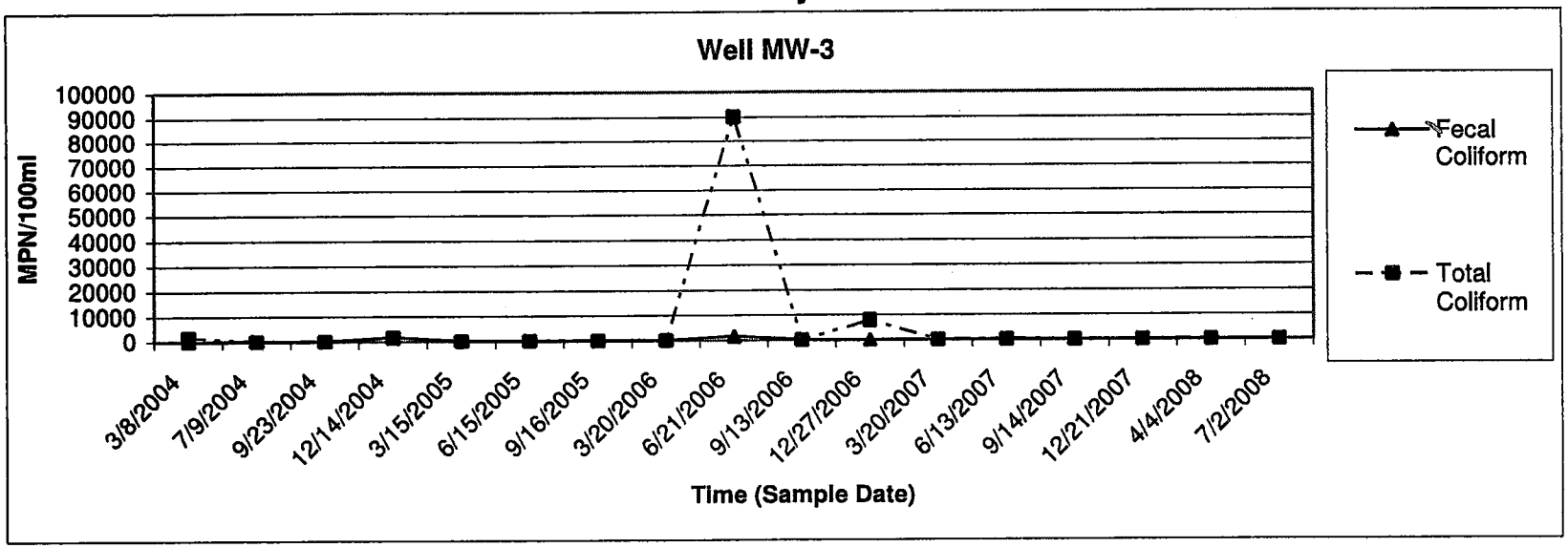
Malibu Country Mart III

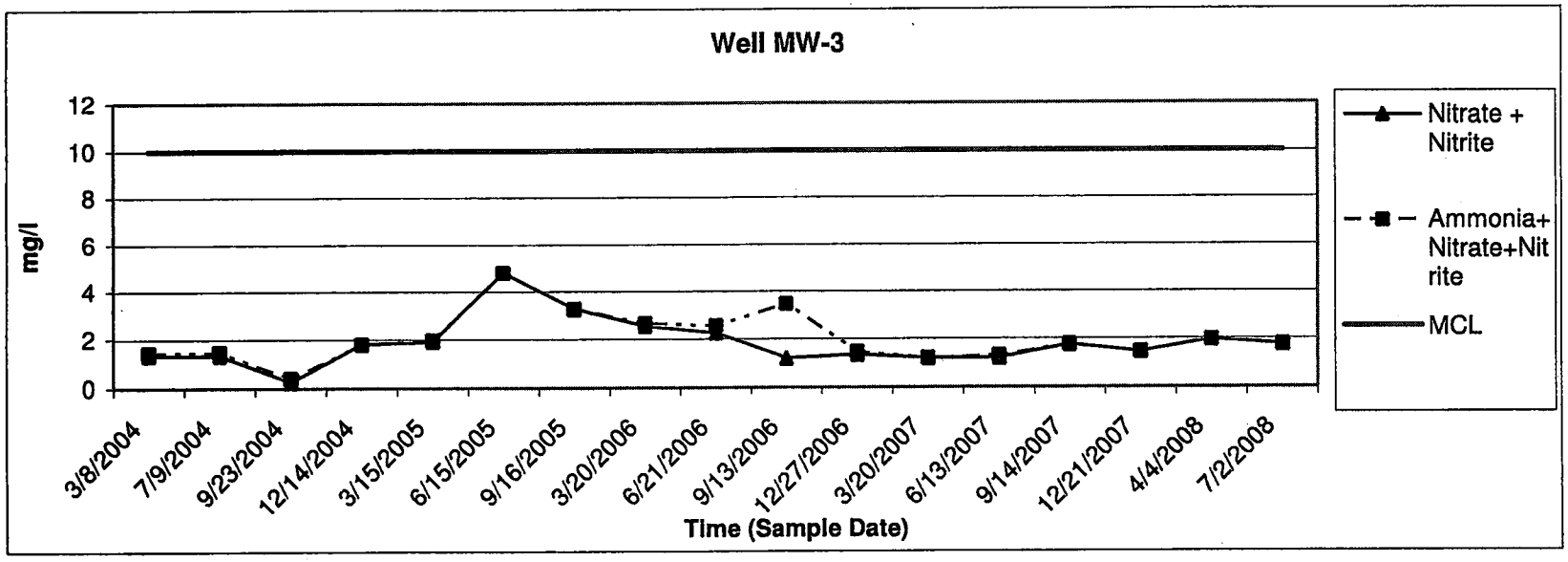


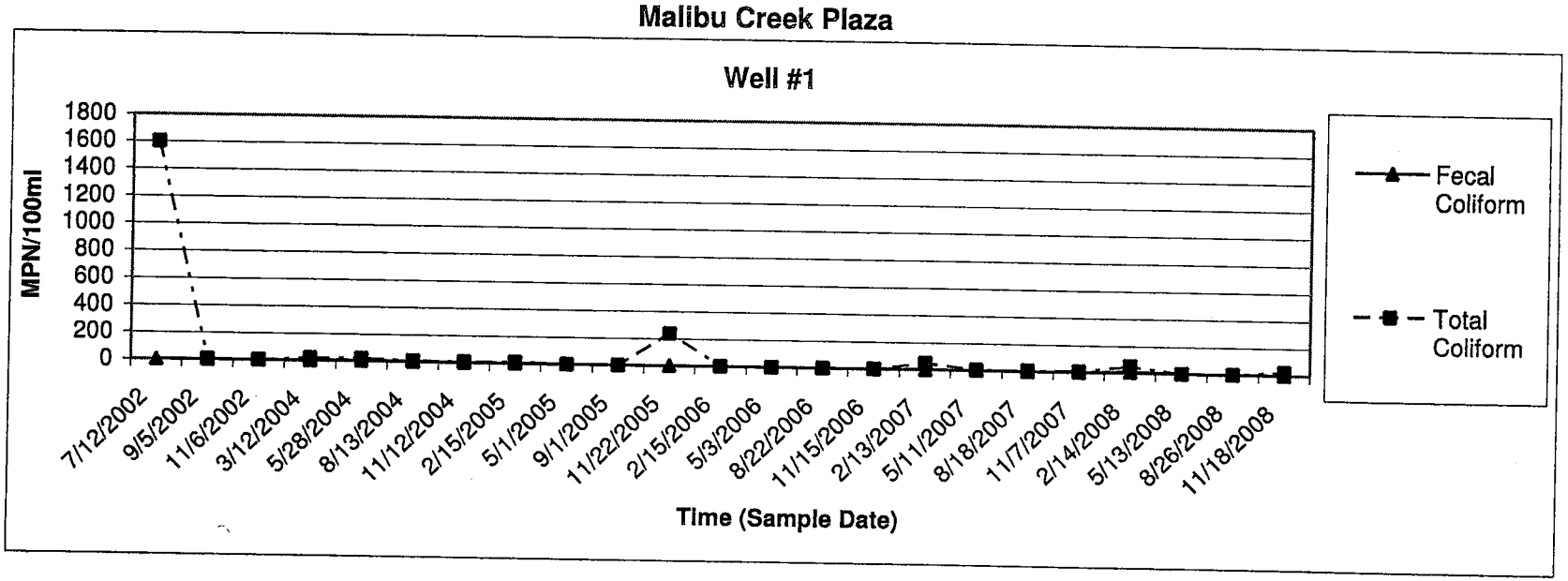


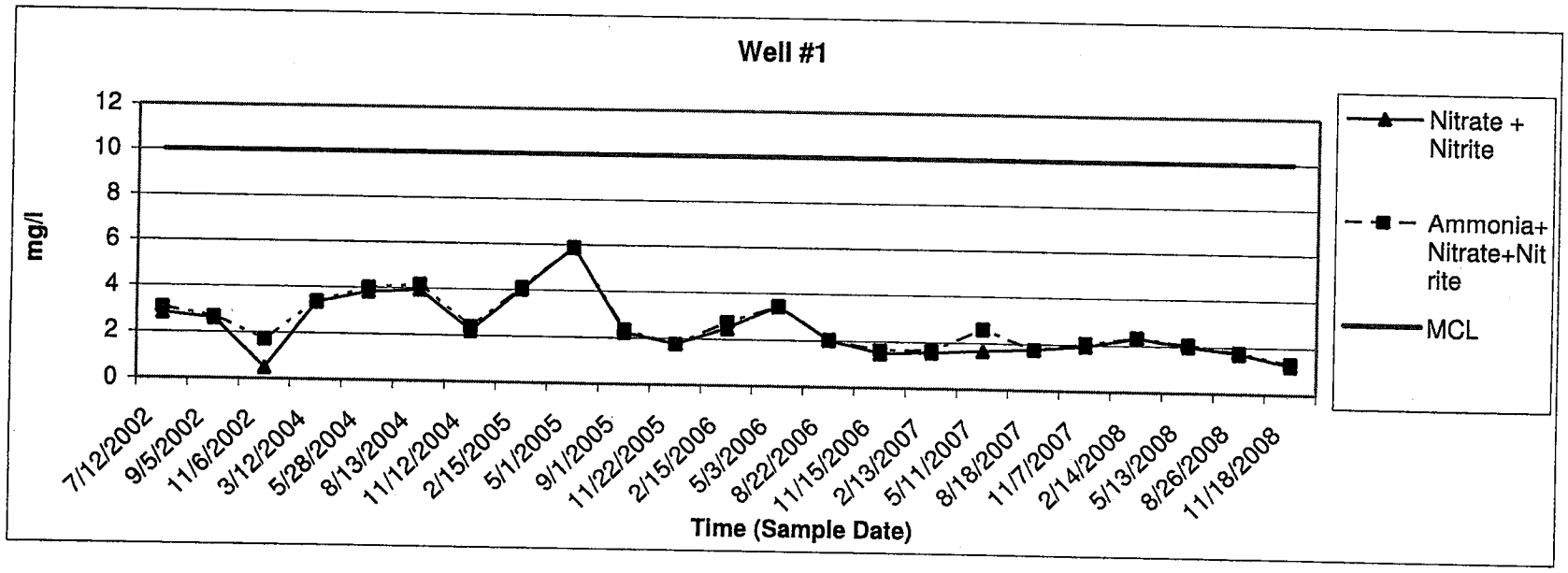
TM2-71

Malibu Country Mart III

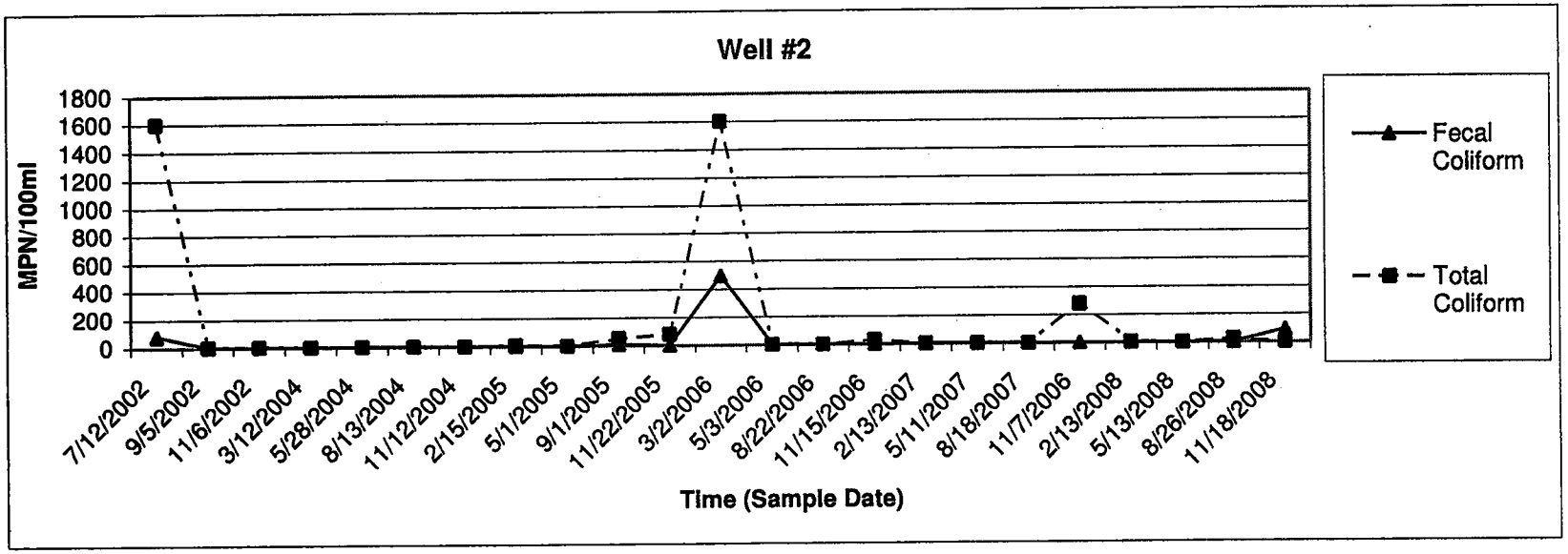


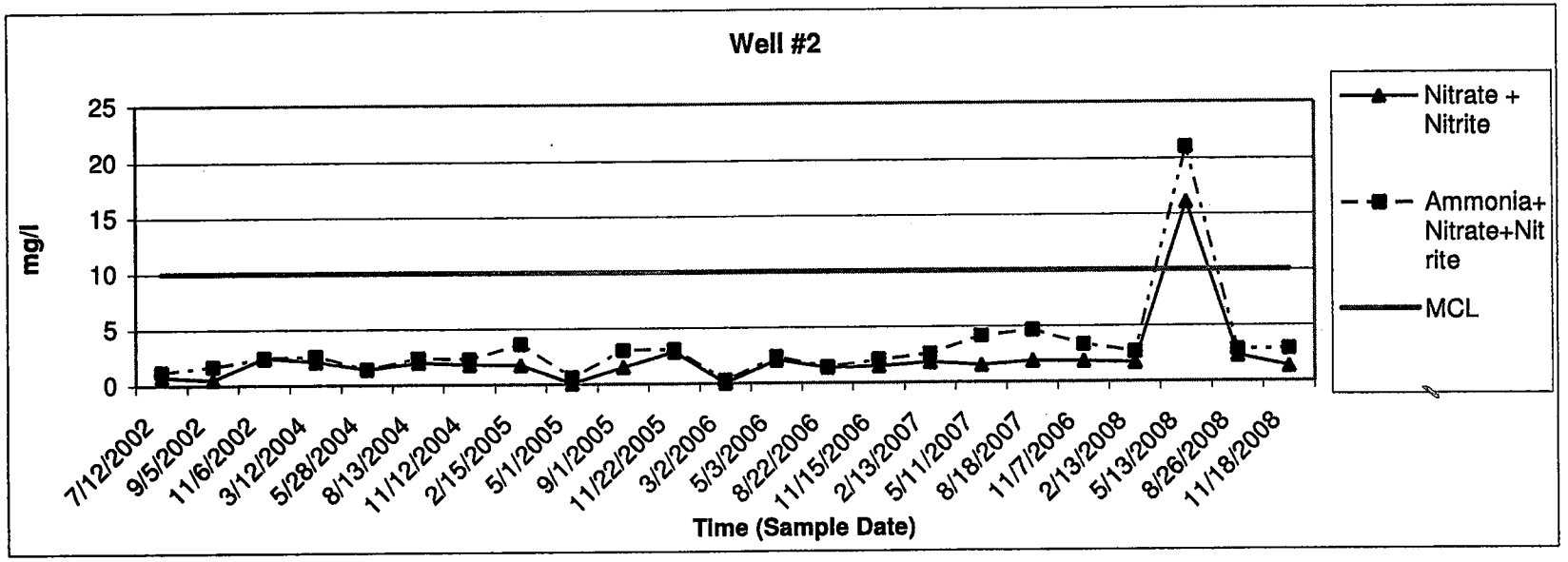


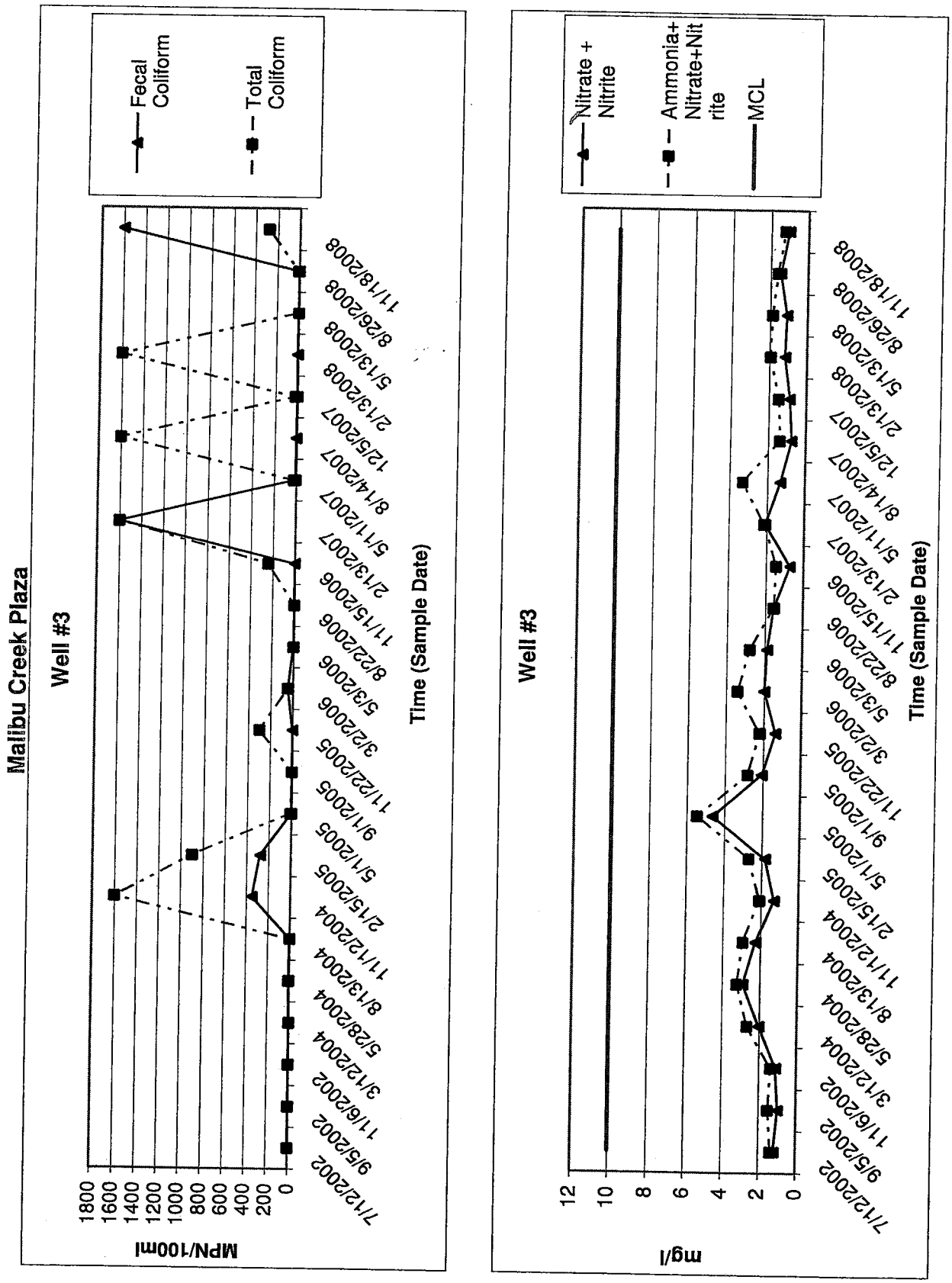

Malibu Creek Plaza
Well #1
MPN/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
7/12/2002
9/5/2002
11/6/2002
3/12/2004
5/28/2004
8/13/2004
11/12/2004
2/15/2005
5/1/2005
9/1/2005
11/22/2005
2/15/2006
5/3/2006
8/22/2006
11/15/2006
2/13/2007
5/11/2007
8/18/2007
11/7/2007
2/14/2008
5/13/2008
8/26/2008
11/18/2008
Time (Sample Date)
Fecal Coliform
Total Coliform


Well #1
mg/l
12
10
8
6
4
2
0
7/12/2002
9/5/2002
11/6/2002
3/12/2004
5/28/2004
8/13/2004
11/12/2004
2/15/2005
5/1/2005
9/1/2005
11/22/2005
2/15/2006
5/3/2006
8/22/2006
11/15/2006
2/13/2007
5/11/2007
8/18/2007
11/7/2007
2/14/2008
5/13/2008
8/26/2008
11/18/2008
Time (Sample Date)
Nitrate + Nitrite
Ammonia+ Nitrate+Nit rite
MCL

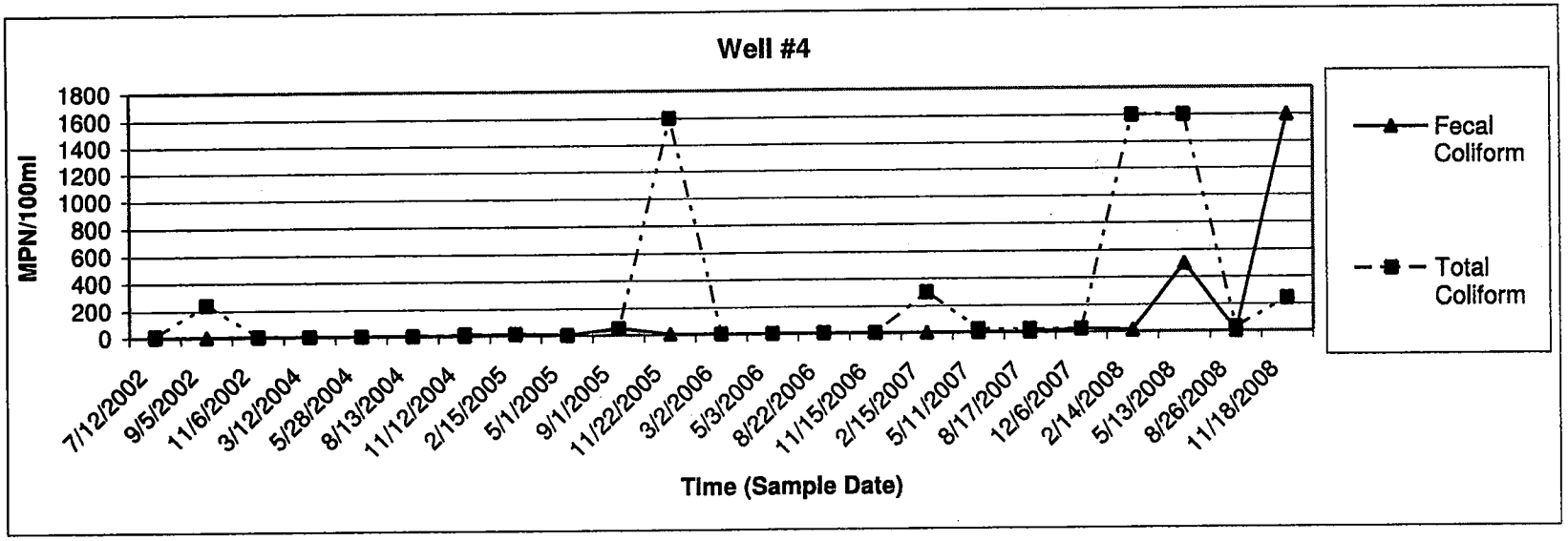
Malibu Creek Plaza

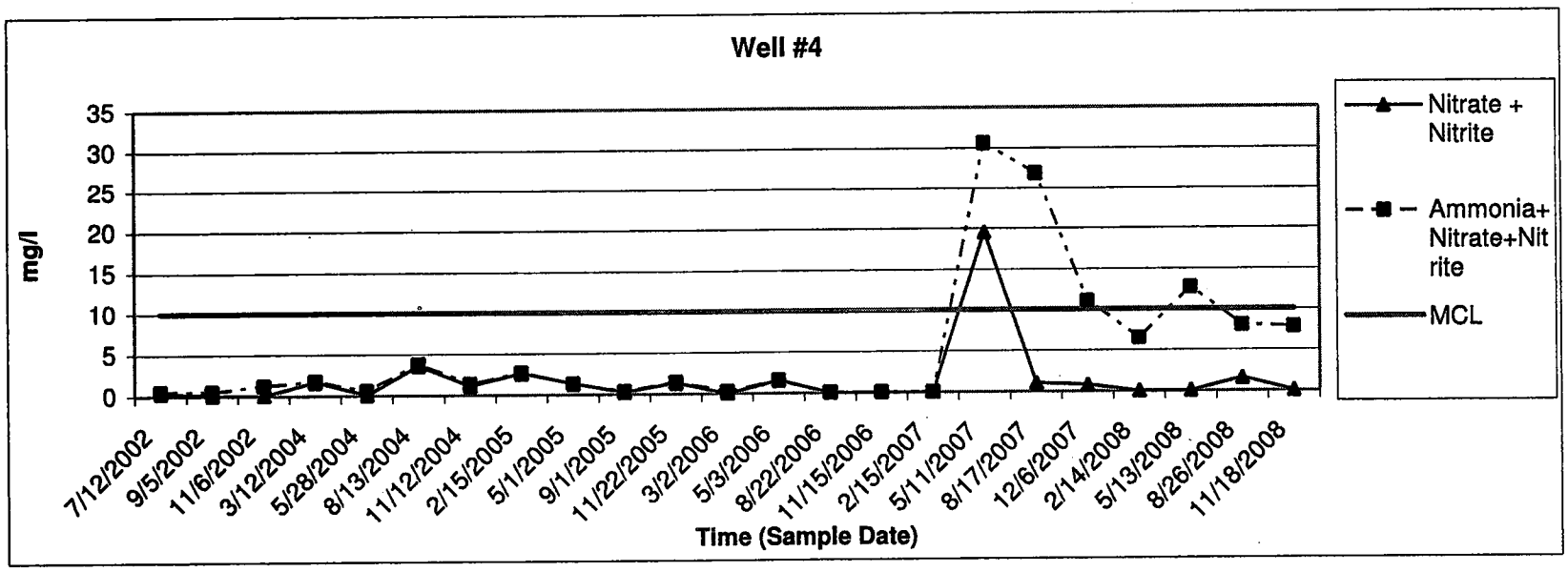


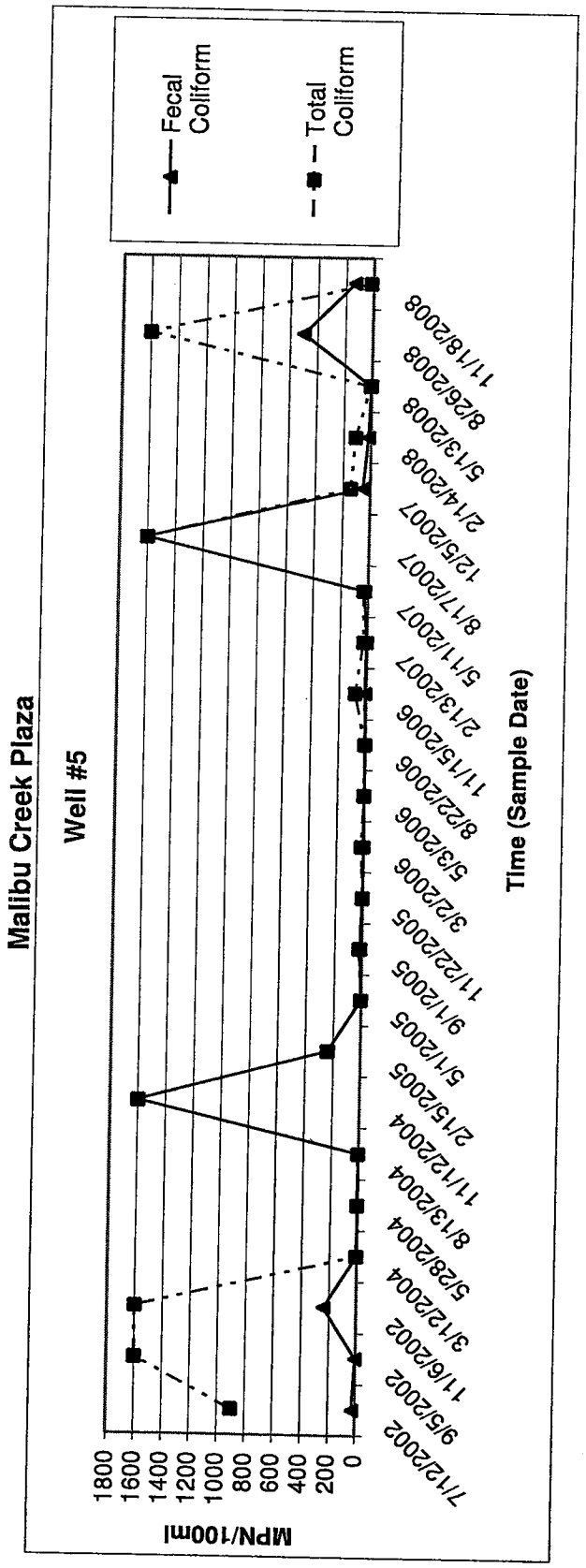


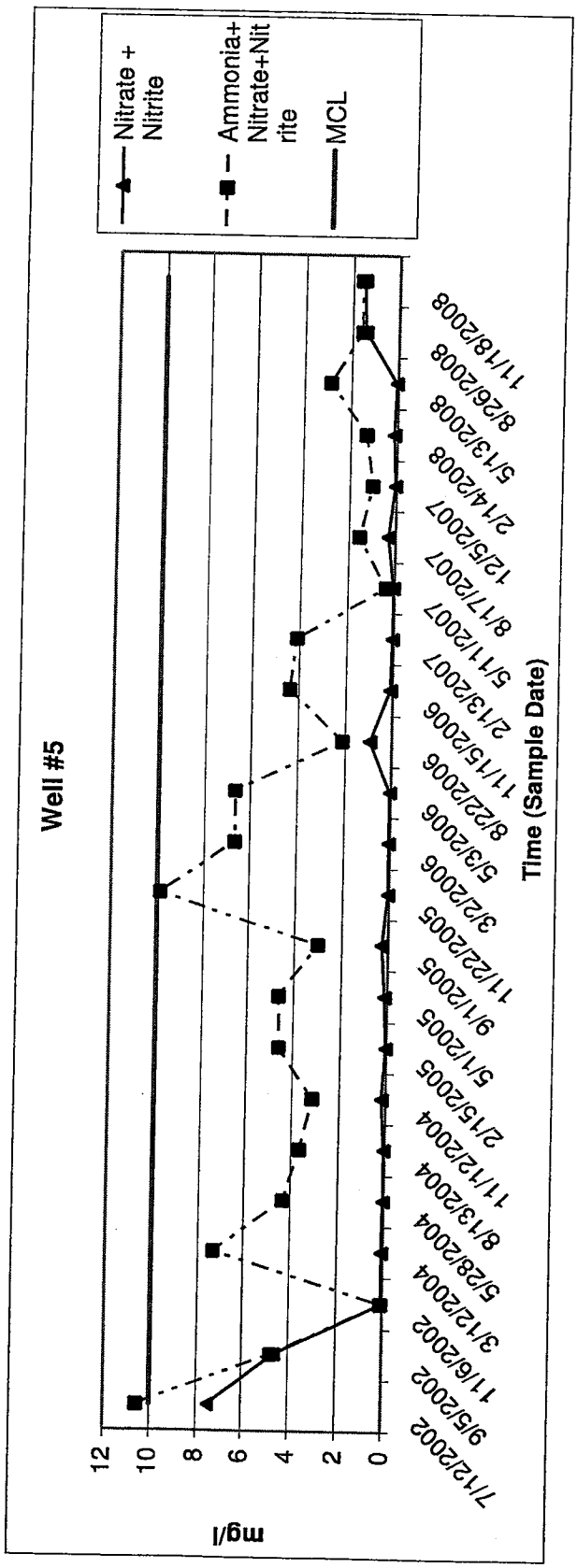

Malibu Creek Plaza
Well #3
Fecal Coliform
Total Coliform
MPN/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
7/12/2002
9/5/2002
11/6/2002
3/12/2004
5/28/2004
8/13/2004
11/12/2004
2/15/2005
5/1/2005
9/1/2005
11/22/2005
3/2/2006
5/3/2006
8/22/2006
11/15/2006
2/13/2007
5/11/2007
8/14/2007
12/5/2007
2/13/2008
5/13/2008
8/26/2008
11/18/2008
Time (Sample Date)
Well #3
Nitrate + Nitrite
Ammonia+ Nitrate+Nitrite
MCL
mg/l
12
10
8
6
4
2
0
7/12/2002
9/5/2002
11/6/2002
3/12/2004
5/28/2004
8/13/2004
11/12/2004
2/15/2005
5/1/2005
9/1/2005
11/22/2005
3/2/2006
5/3/2006
8/22/2006
11/15/2006
2/13/2007
5/11/2007
8/14/2007
12/5/2007
2/13/2008
5/13/2008
8/26/2008
11/18/2008
Time (Sample Date)

Malibu Creek Plaza



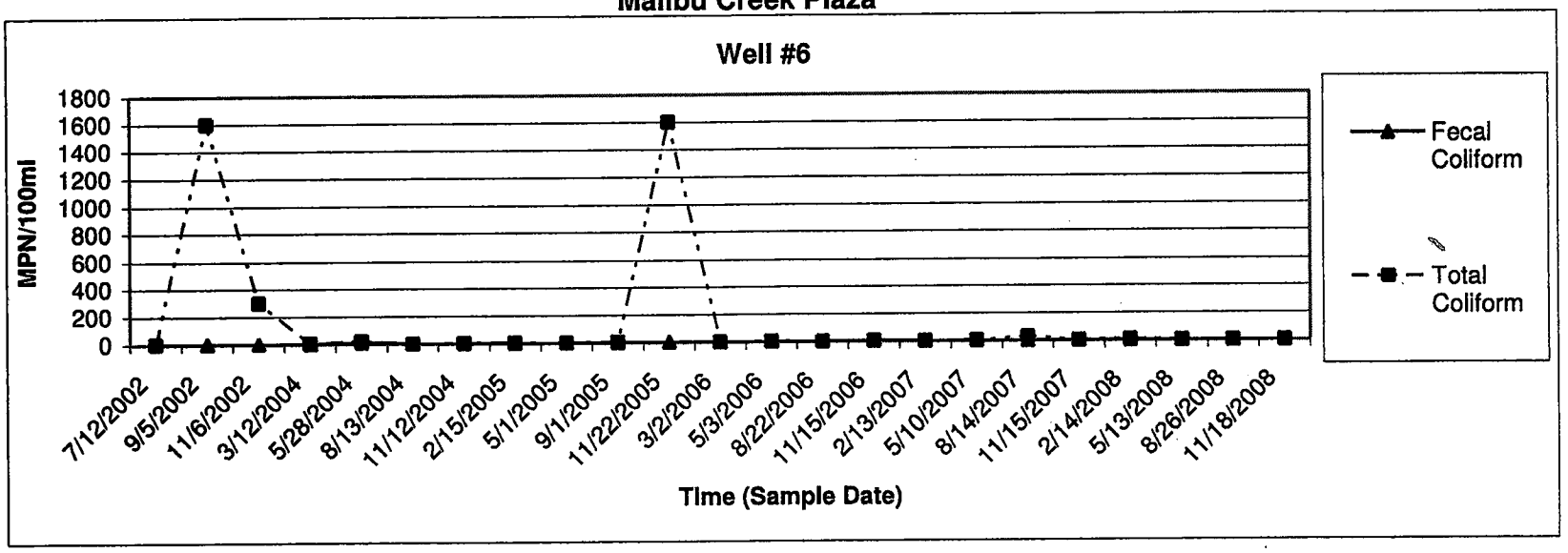


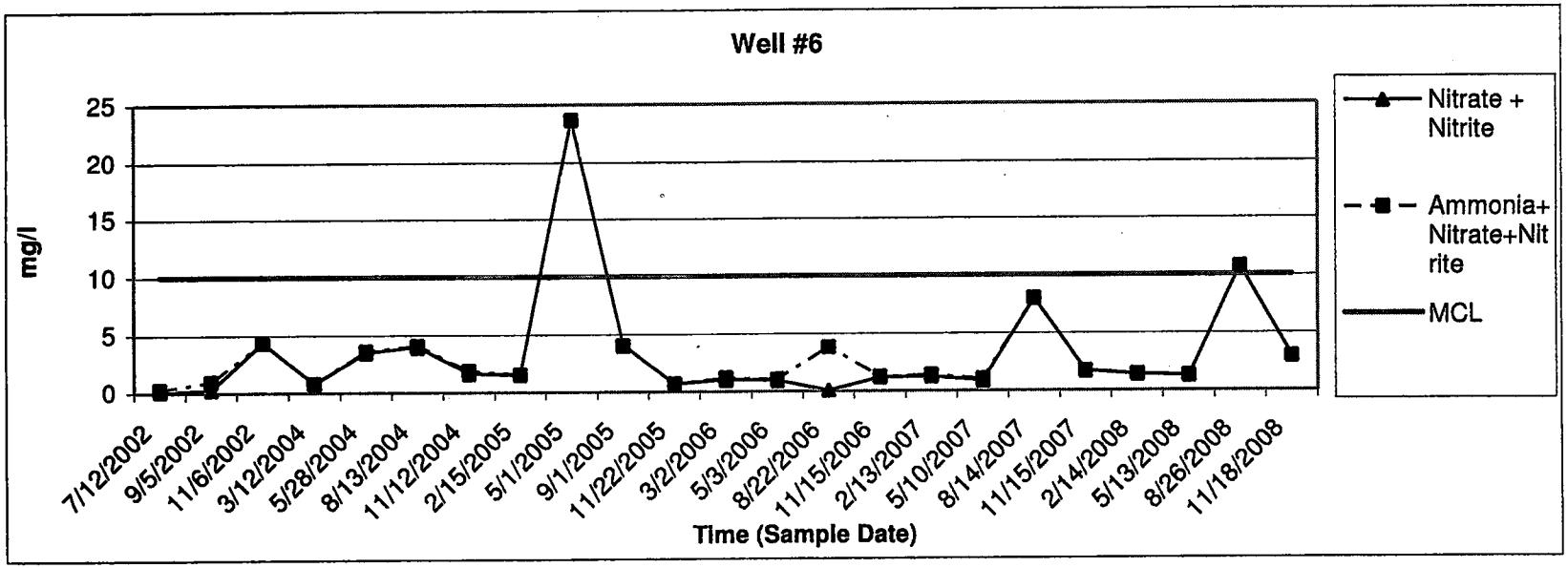

Malibu Creek Plaza
Well #5
Fecal Coliform
Total Coliform
MPN/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
7/12/2002
9/5/2002
11/6/2002
3/12/2004
5/28/2004
8/13/2004
11/12/2004
2/15/2005
5/1/2005
9/1/2005
11/22/2005
3/2/2006
5/3/2006
8/22/2006
11/15/2006
2/13/2007
5/11/2007
8/17/2007
12/5/2007
2/14/2008
5/13/2008
8/26/2008
11/18/2008
Time (Sample Date)


Well #5
Nitrate + Nitrite
Ammonia+ Nitrate+Nitrite
MCL
mg/l
12
10
8
6
4
2
0
7/12/2002
9/5/2002
11/6/2002
3/12/2004
5/28/2004
8/13/2004
11/12/2004
2/15/2005
5/1/2005
9/1/2005
11/22/2005
3/2/2006
5/3/2006
8/22/2006
11/15/2006
2/13/2007
5/11/2007
8/17/2007
12/5/2007
2/14/2008
5/13/2008
8/26/2008
11/18/2008
Time (Sample Date)

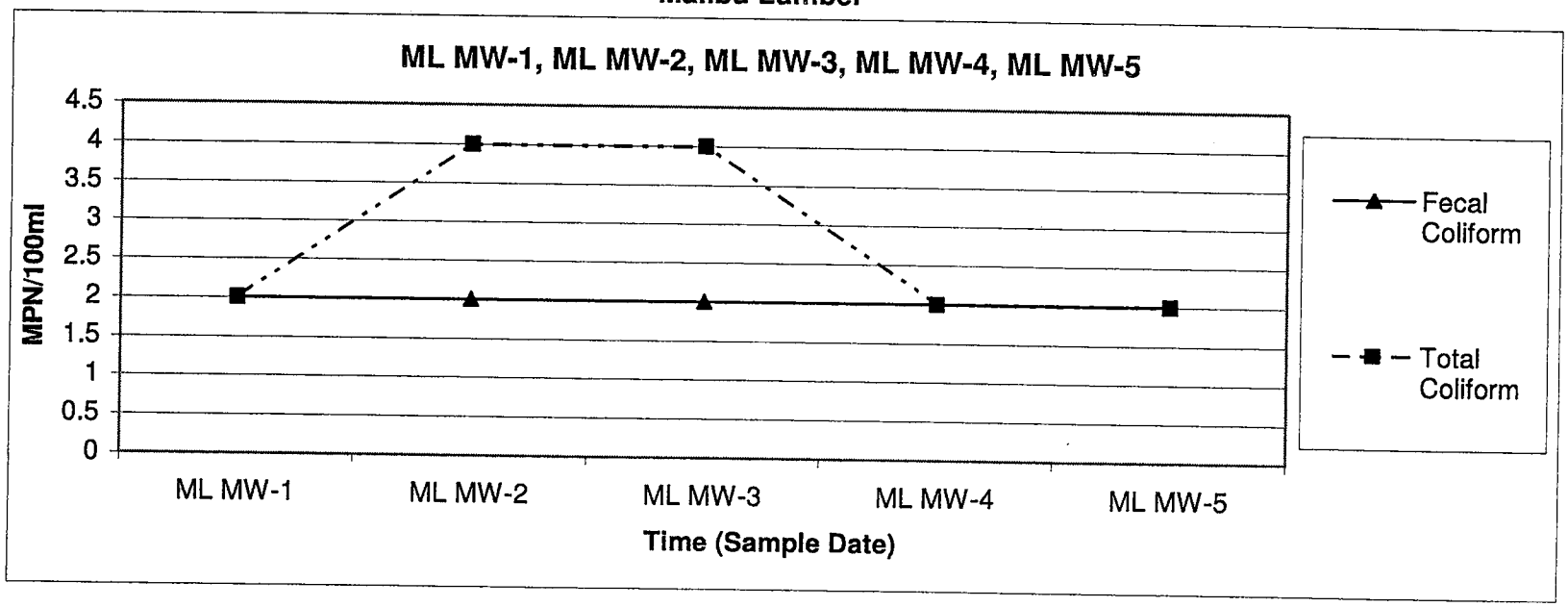
TM2-77

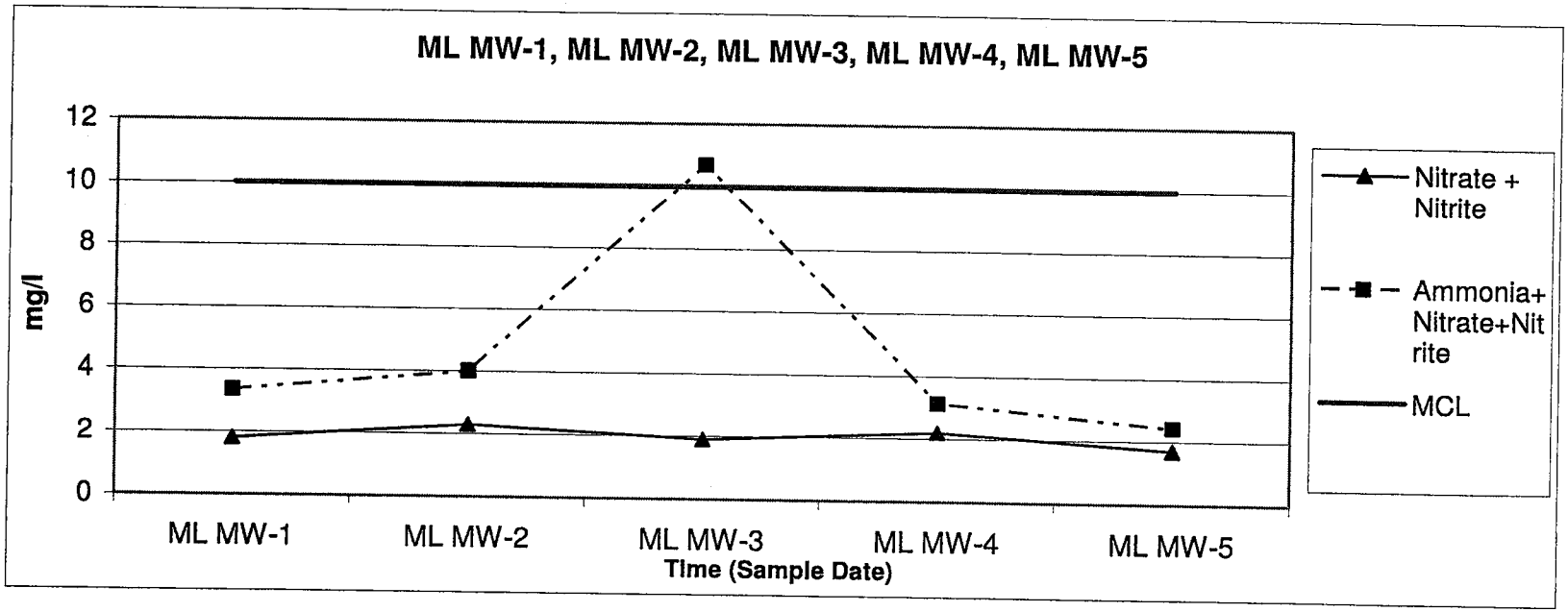
Malibu Creek Plaza



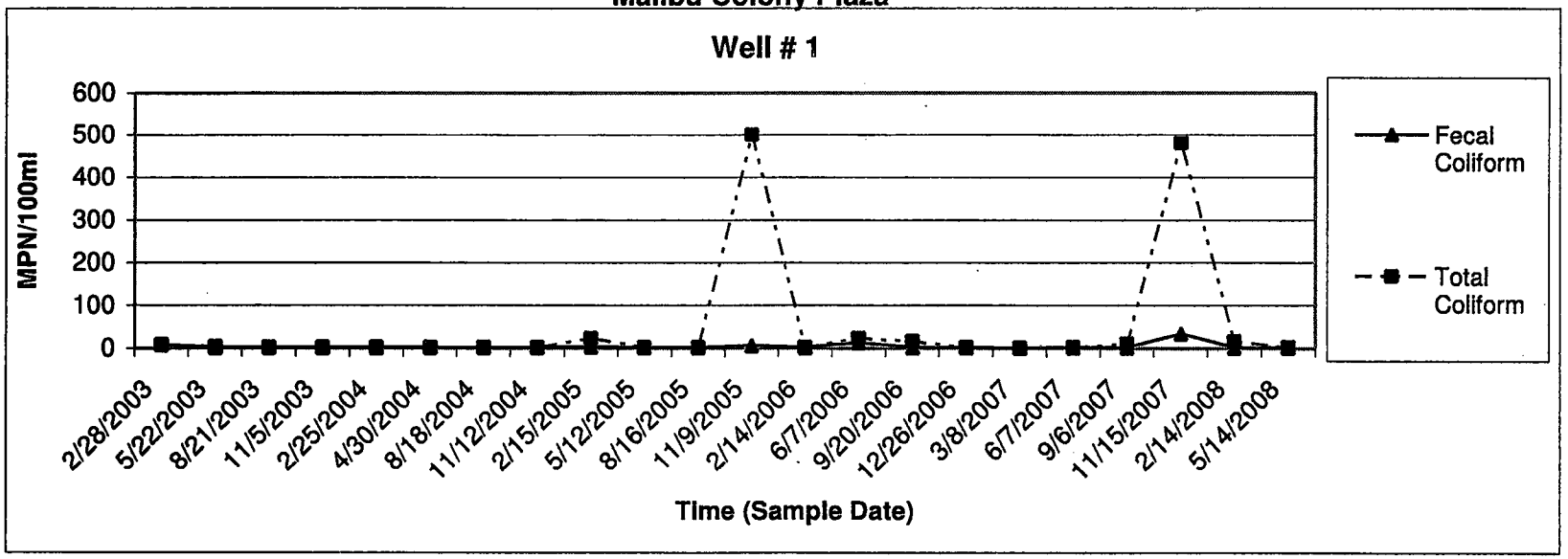


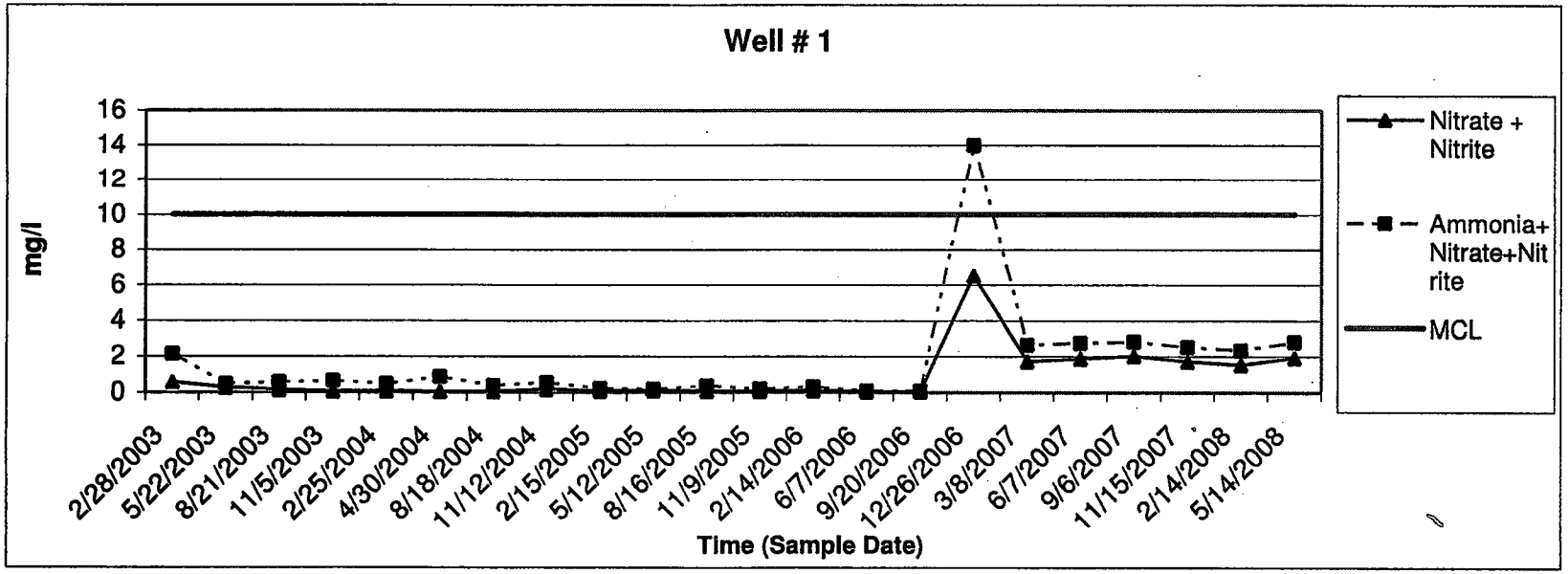
Malibu Lumber





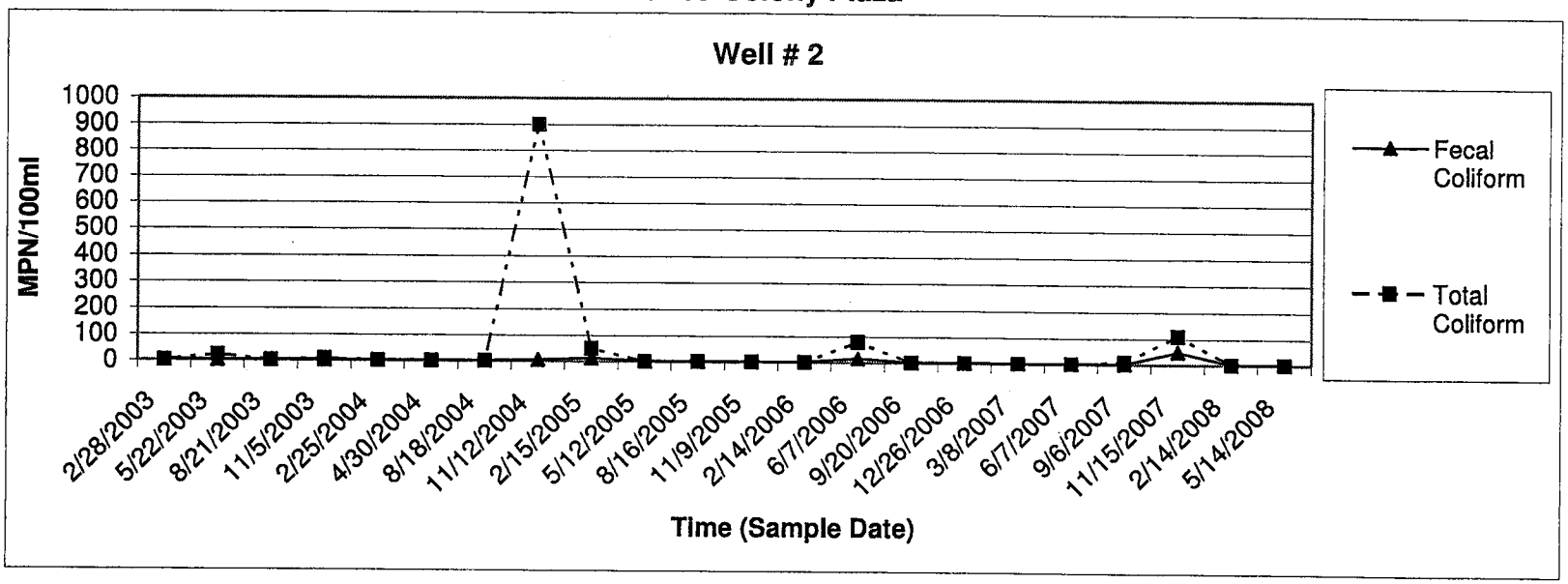
Malibu Colony Plaza

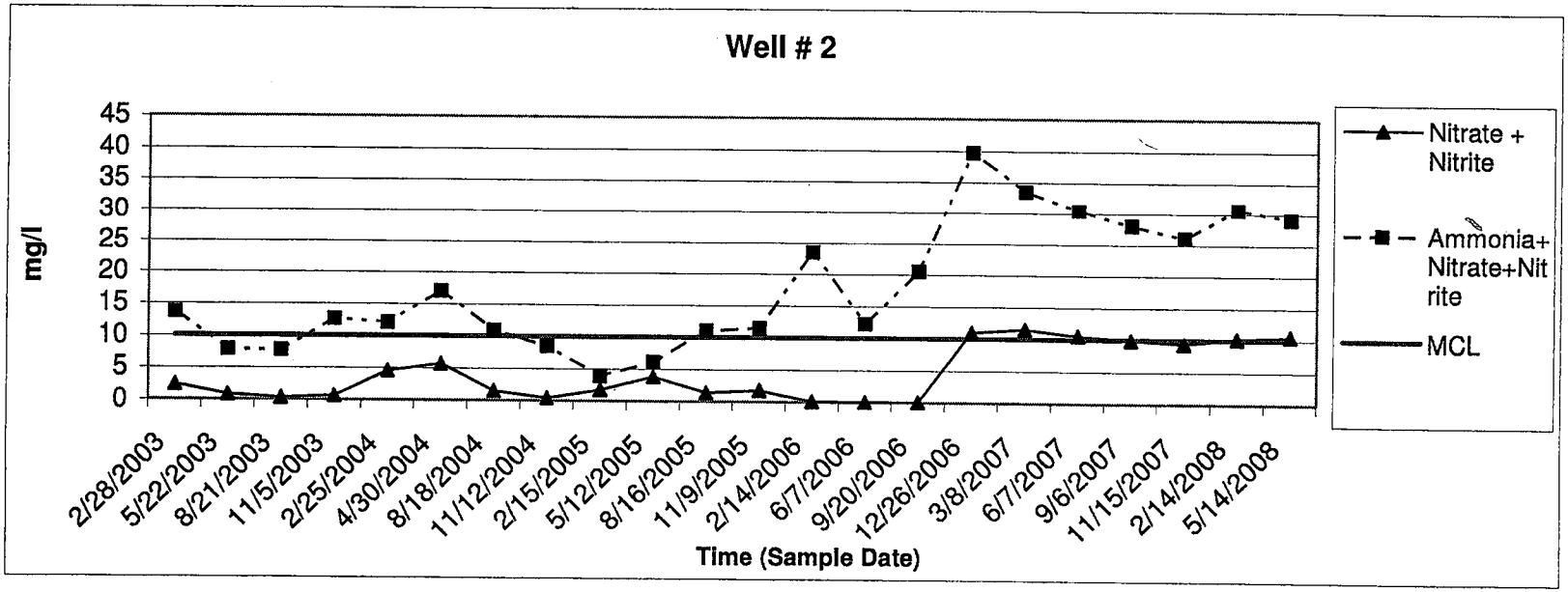




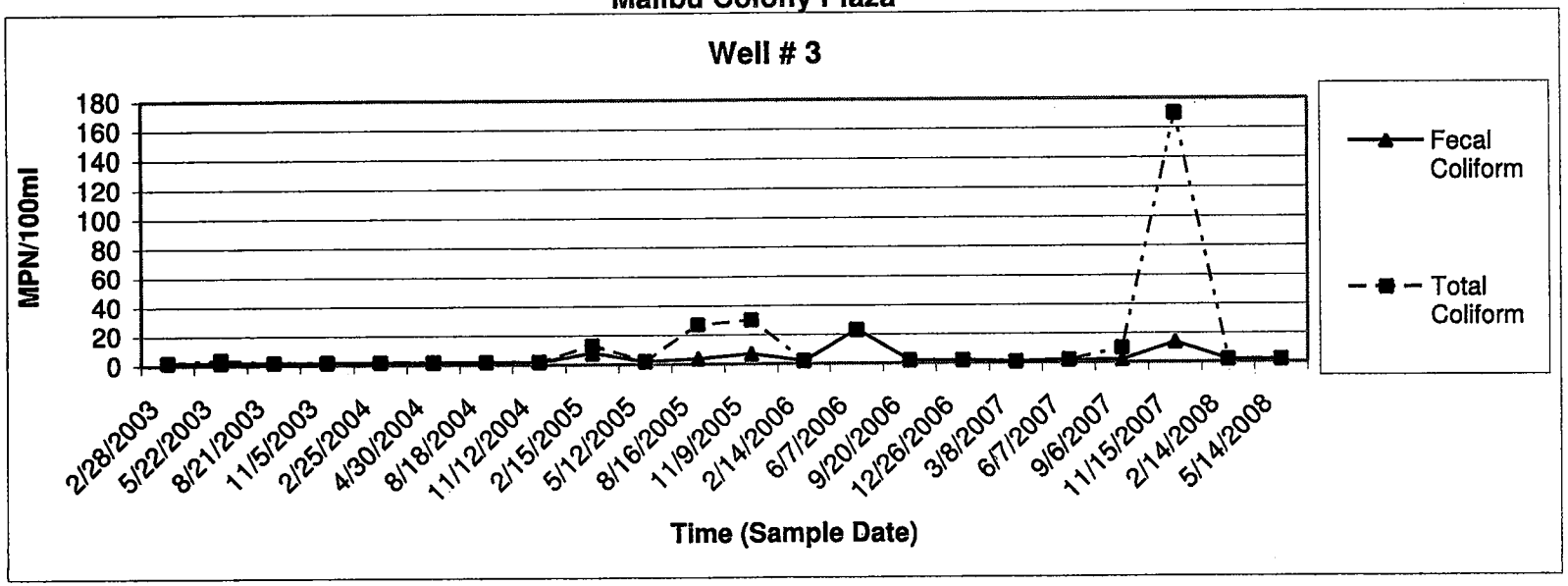
TM2-81

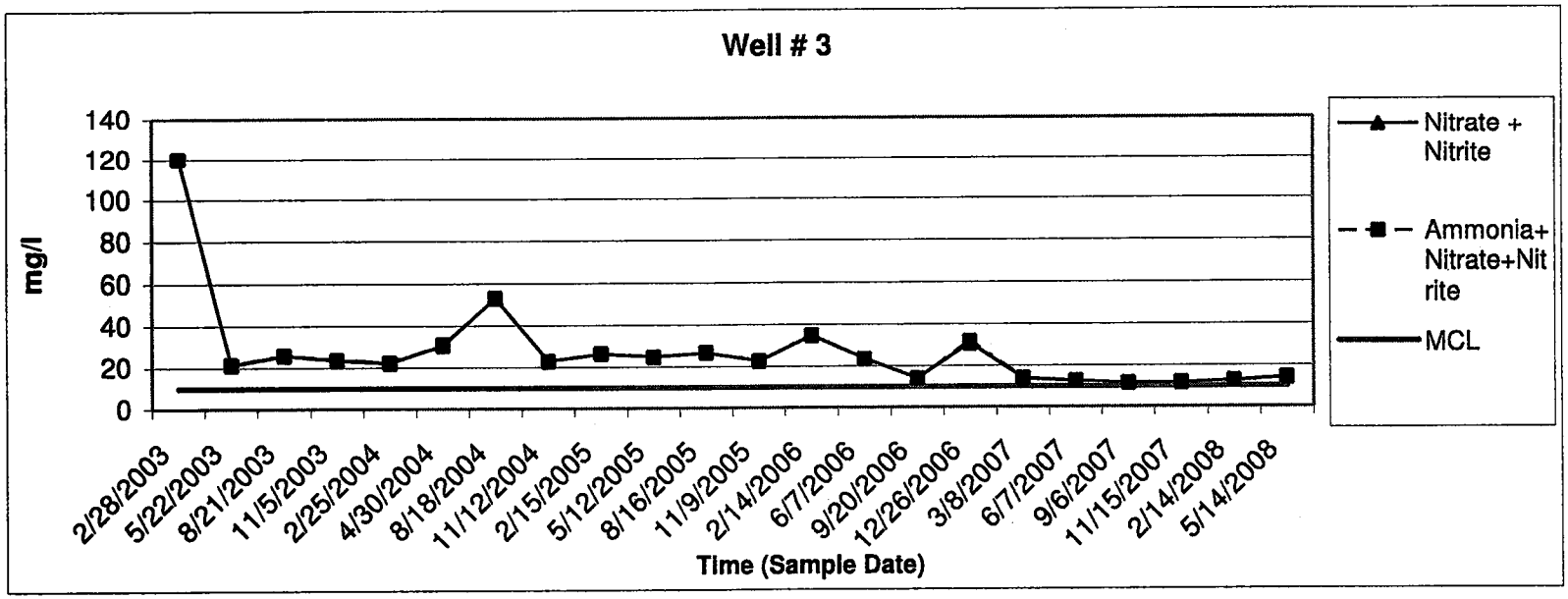
Malibu Colony Plaza



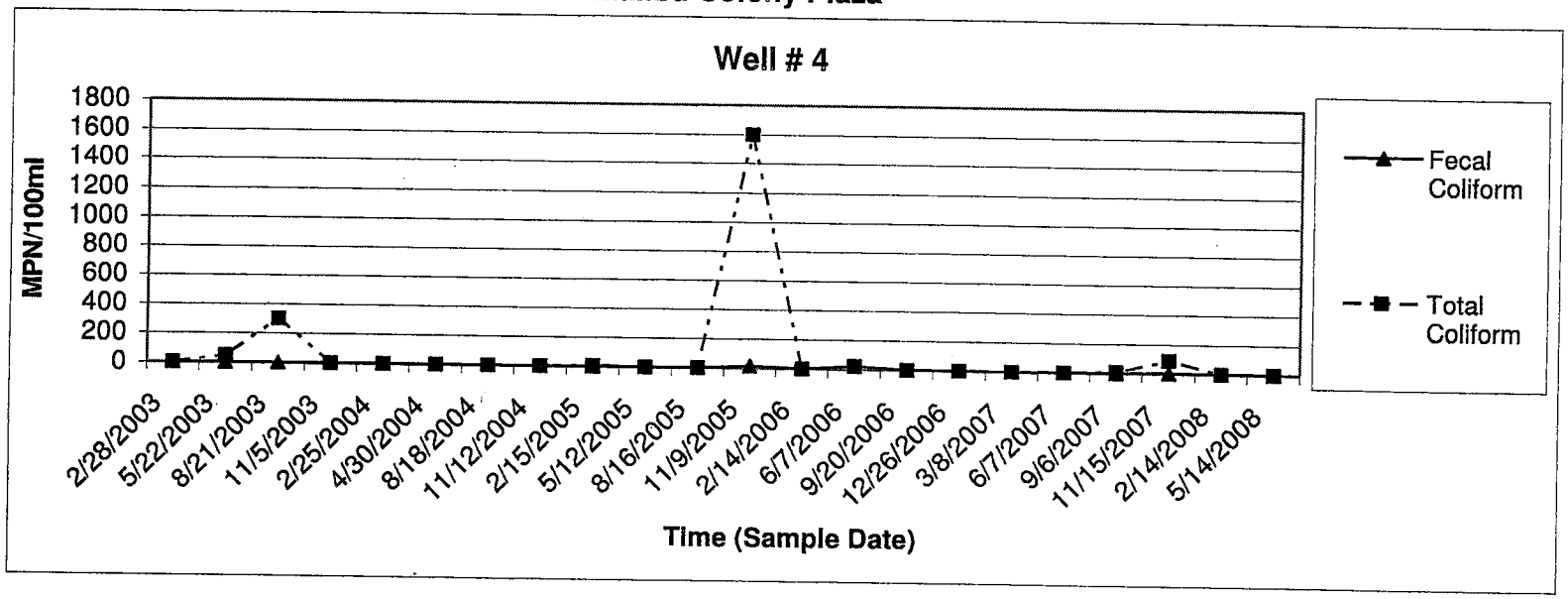


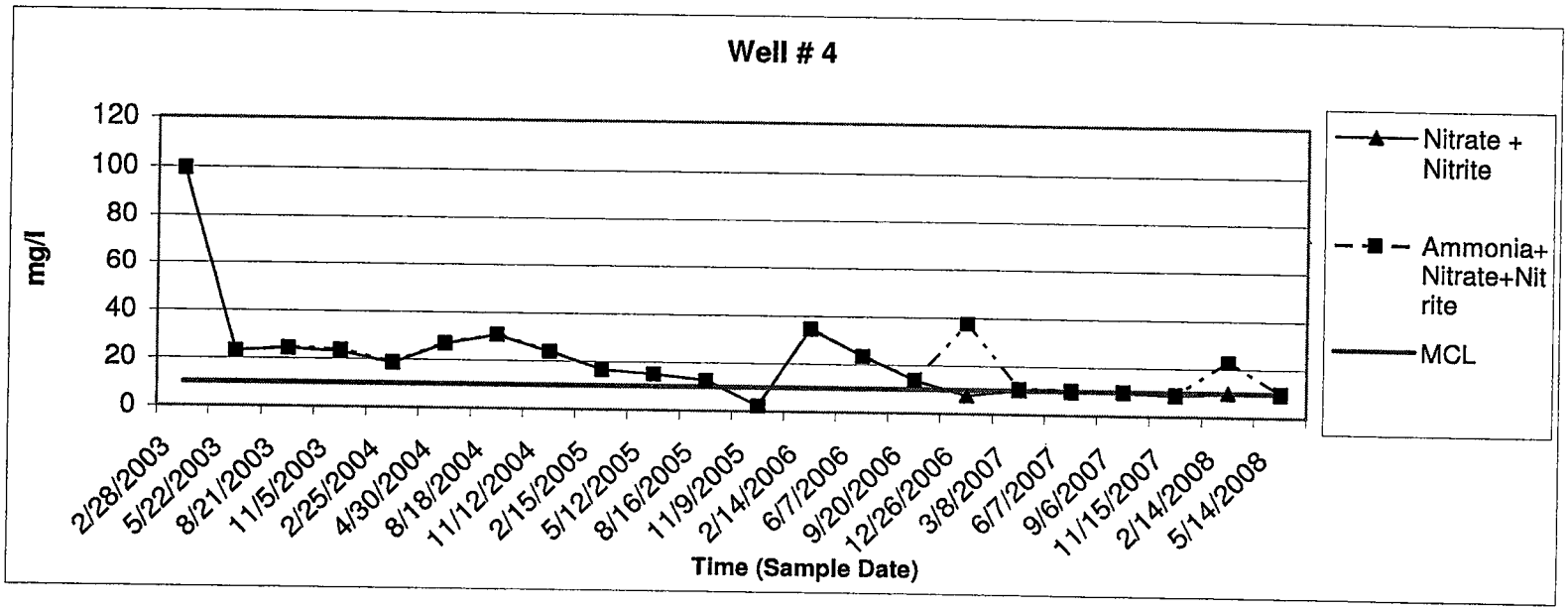
Malibu Colony Plaza



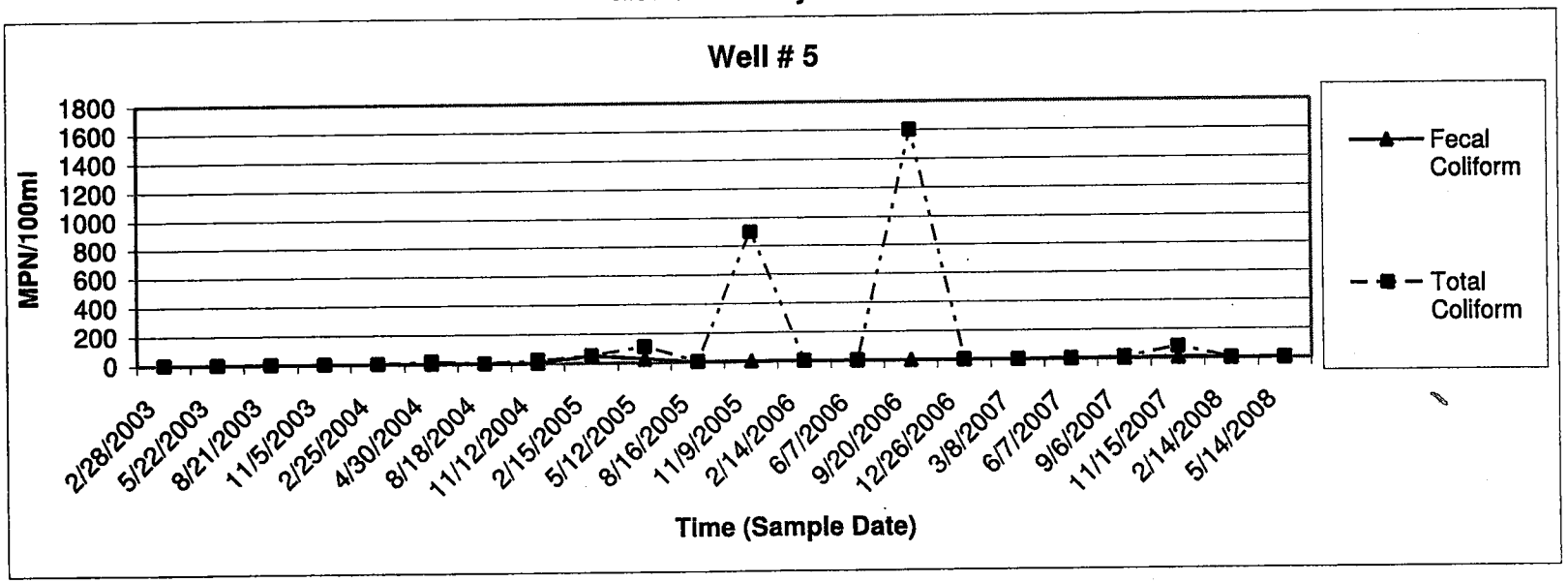


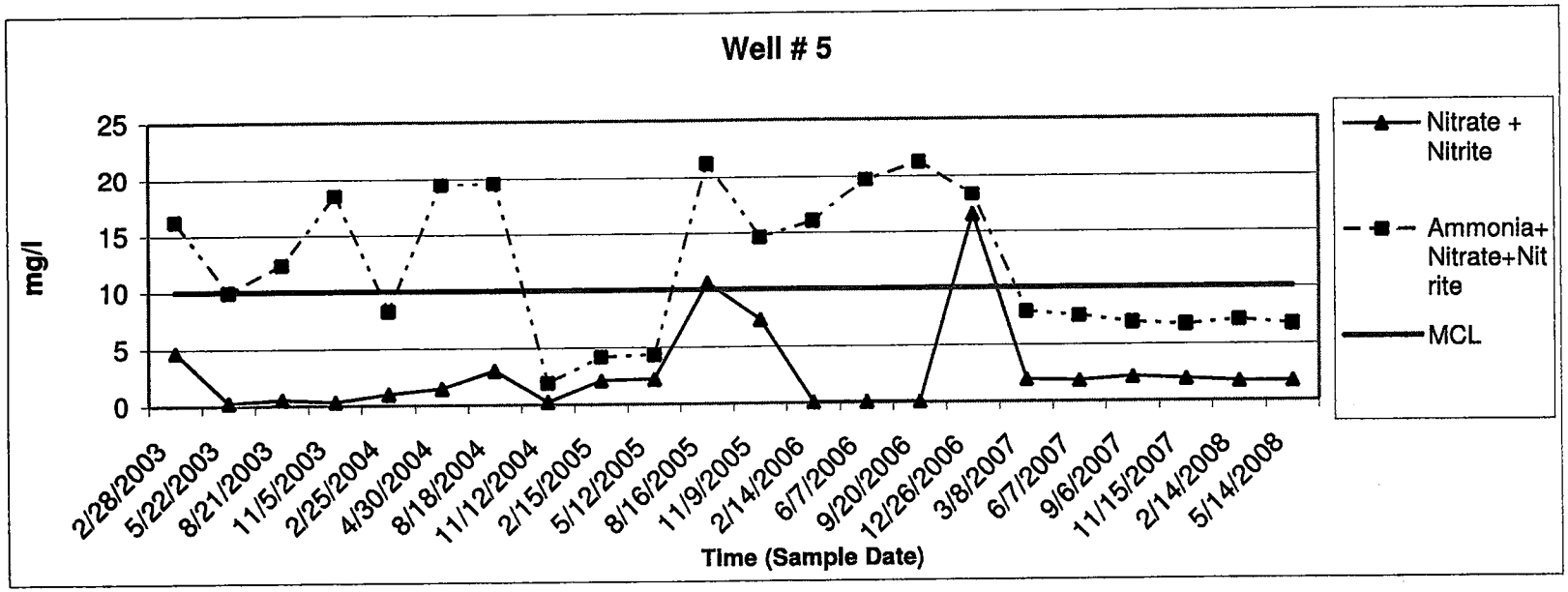
Malibu Colony Plaza



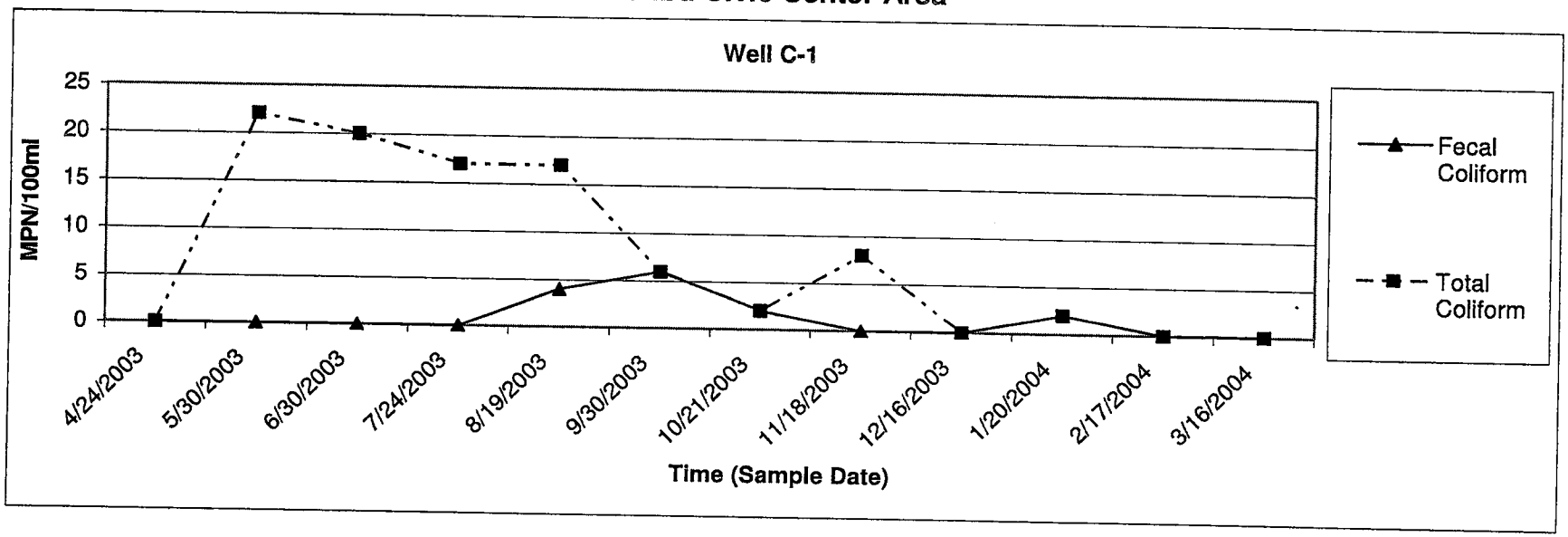


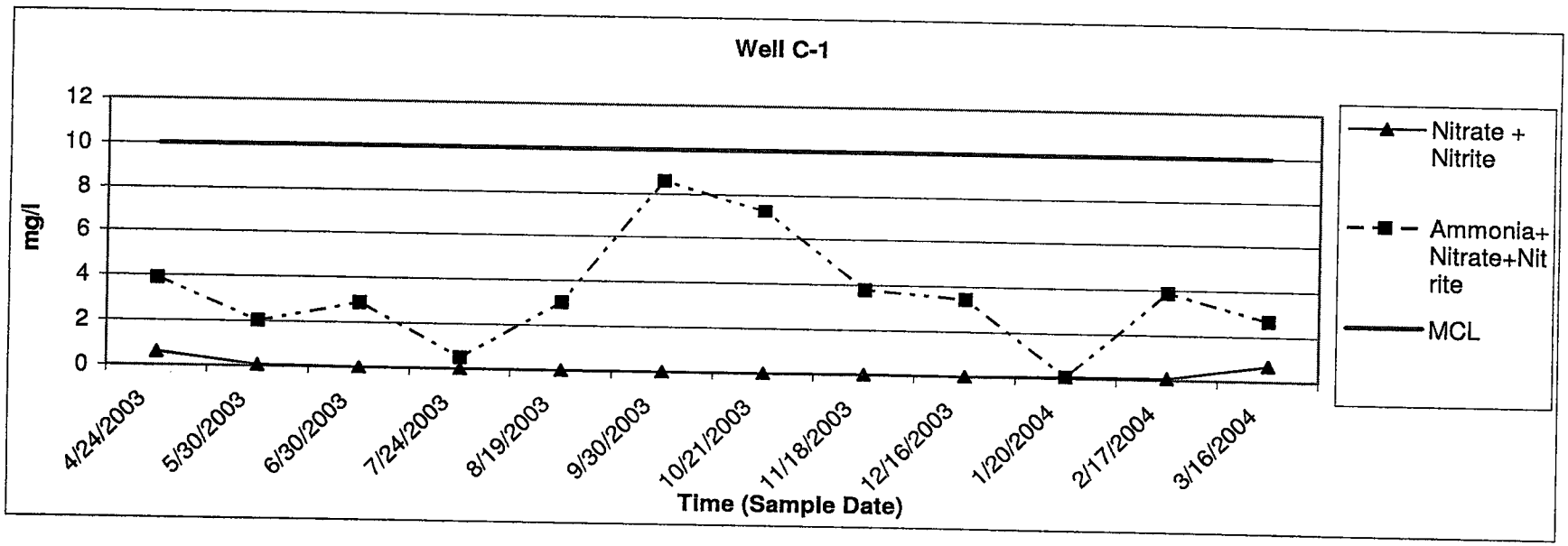
Malibu Colony Plaza



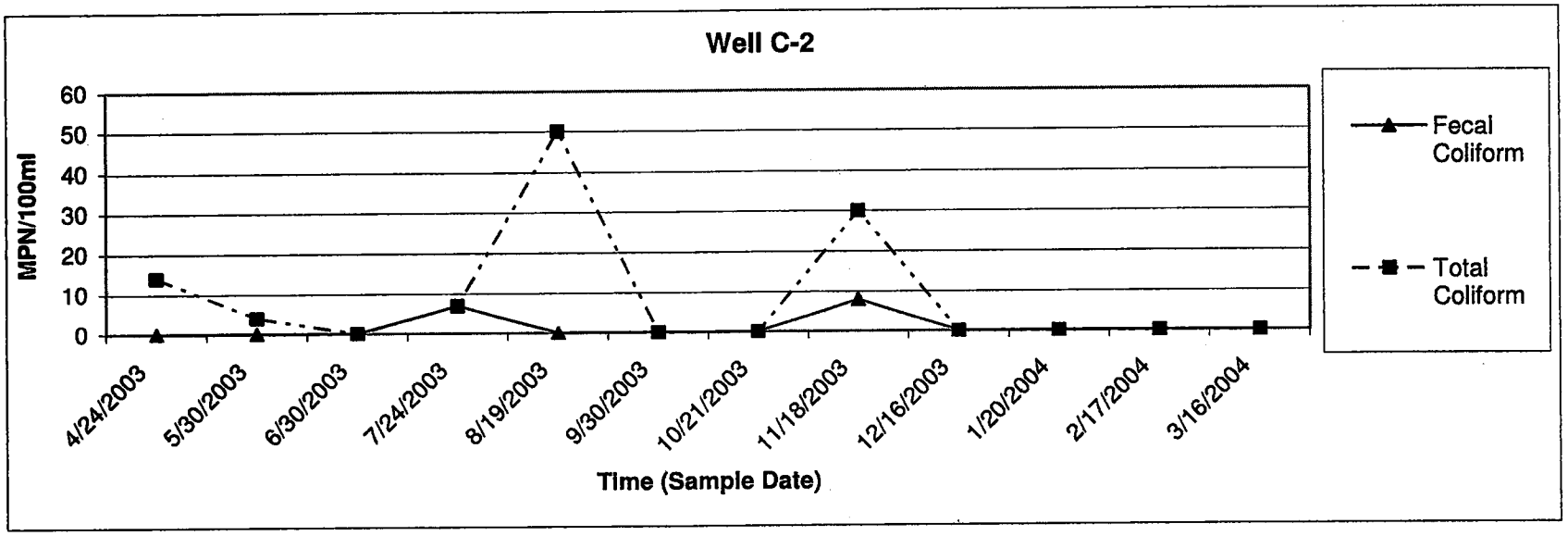


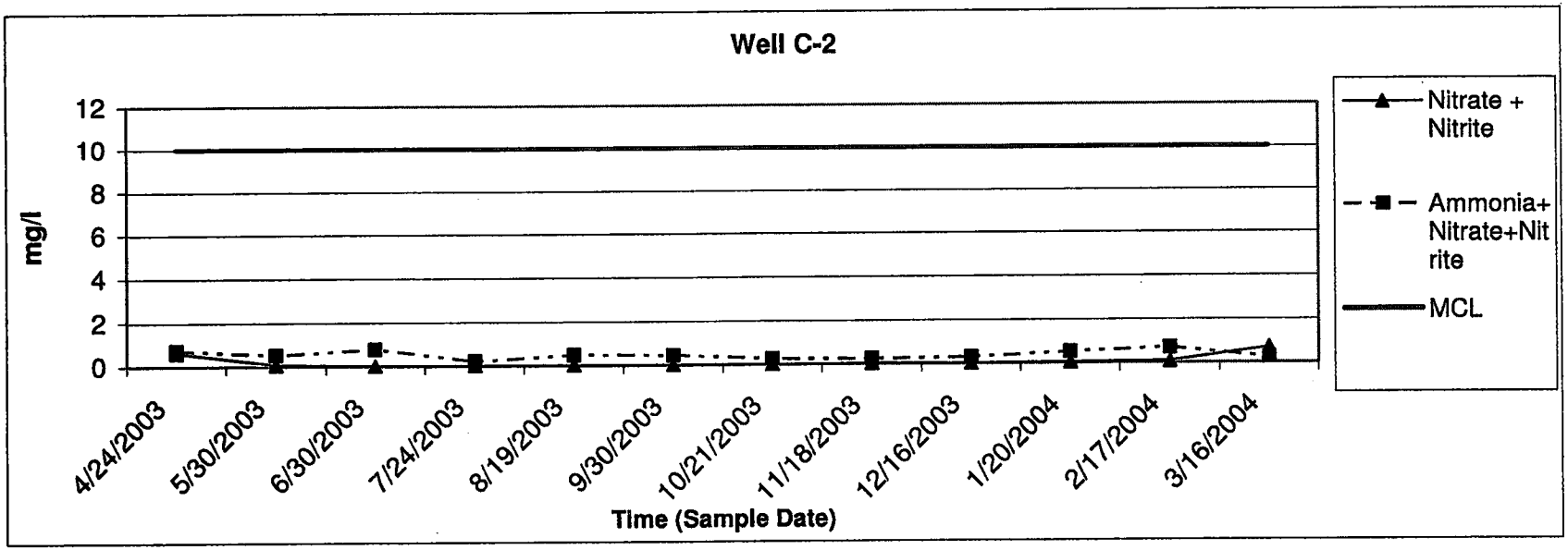
Malibu Civic Center Area





Malibu Civic Center Area

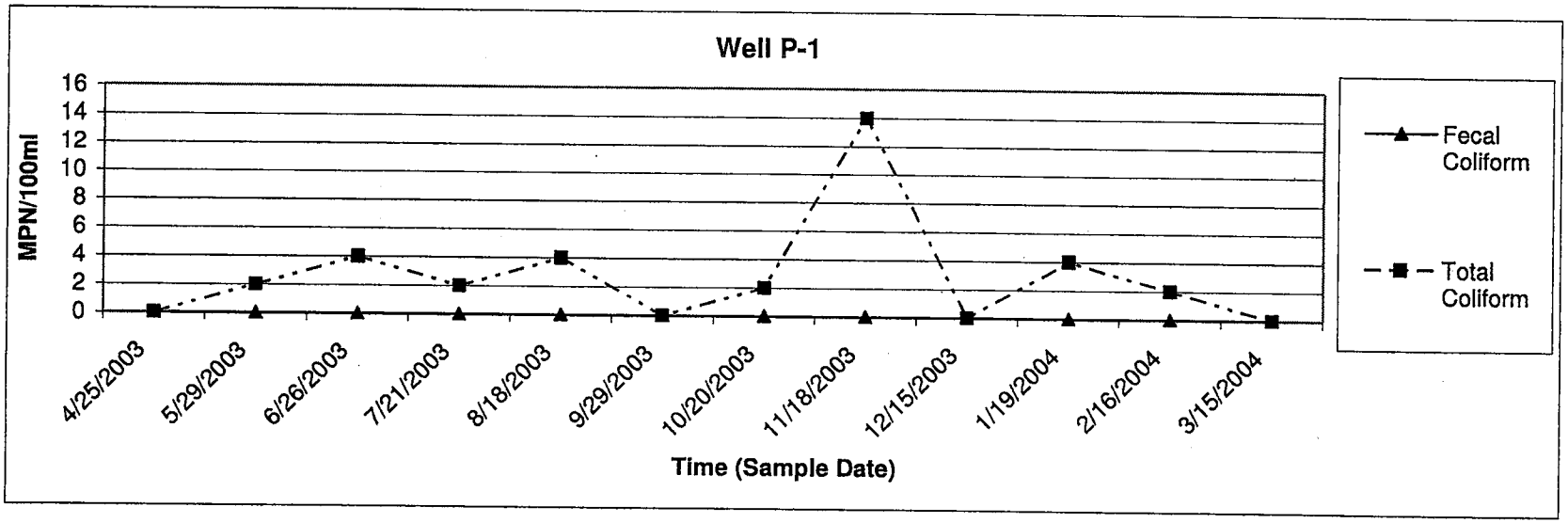


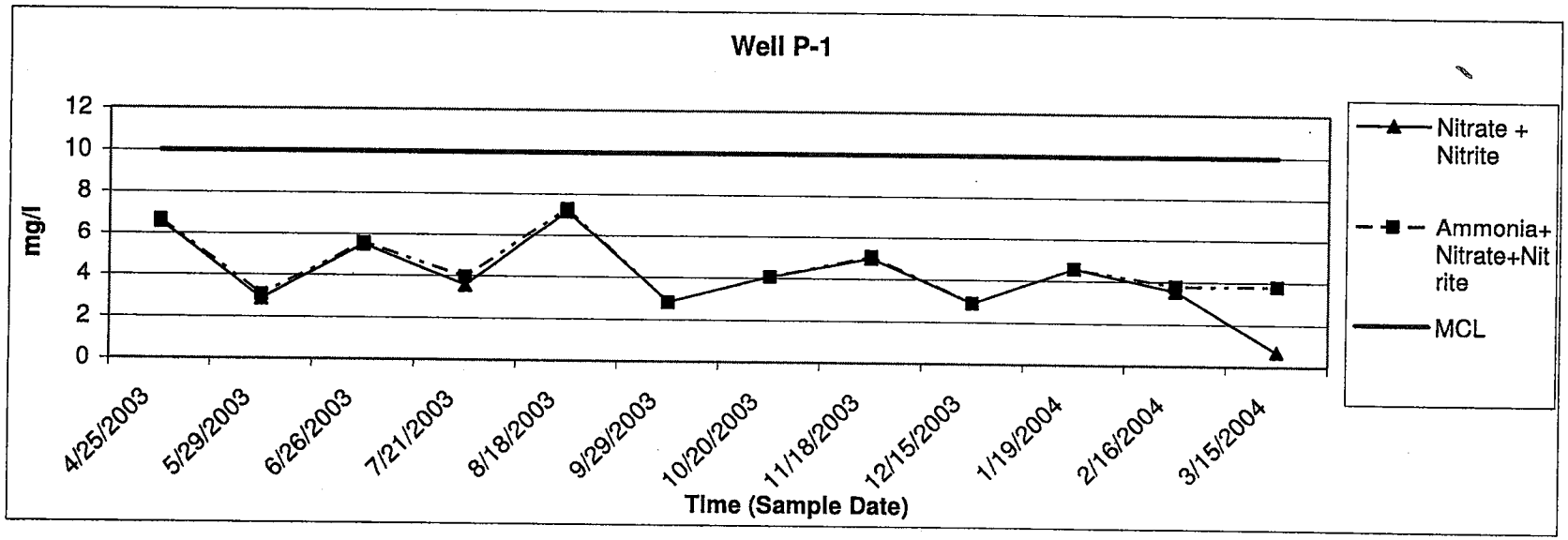


TM2-86

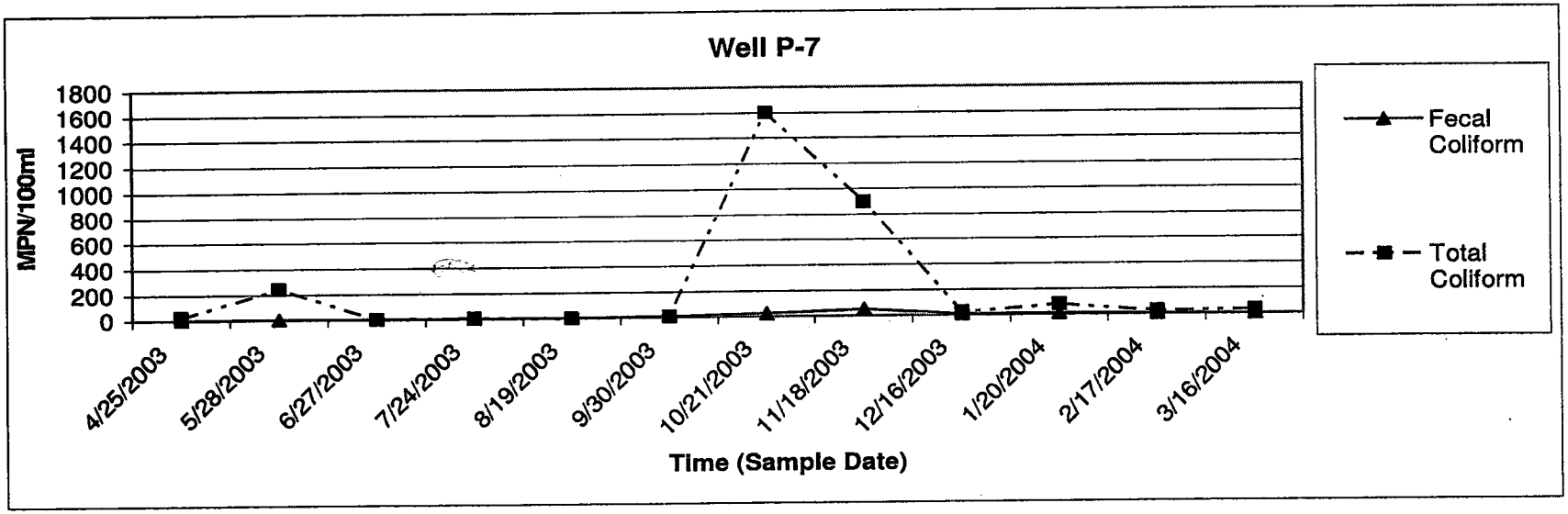
1 - 140

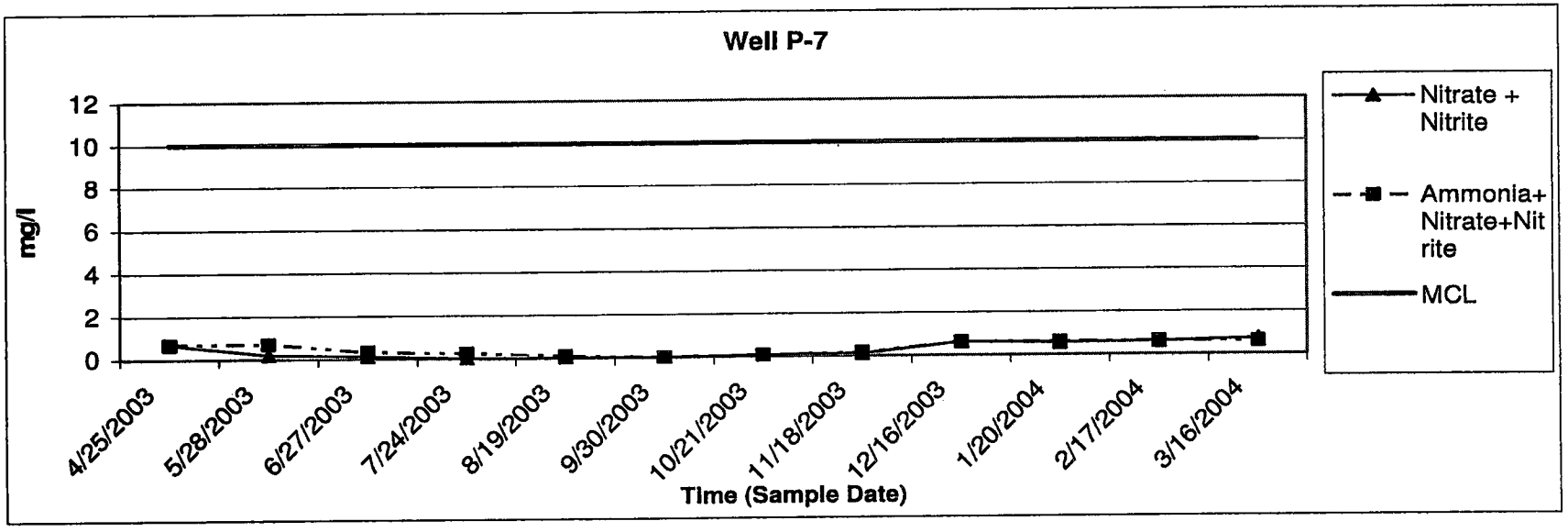
Malibu Civic Center Area



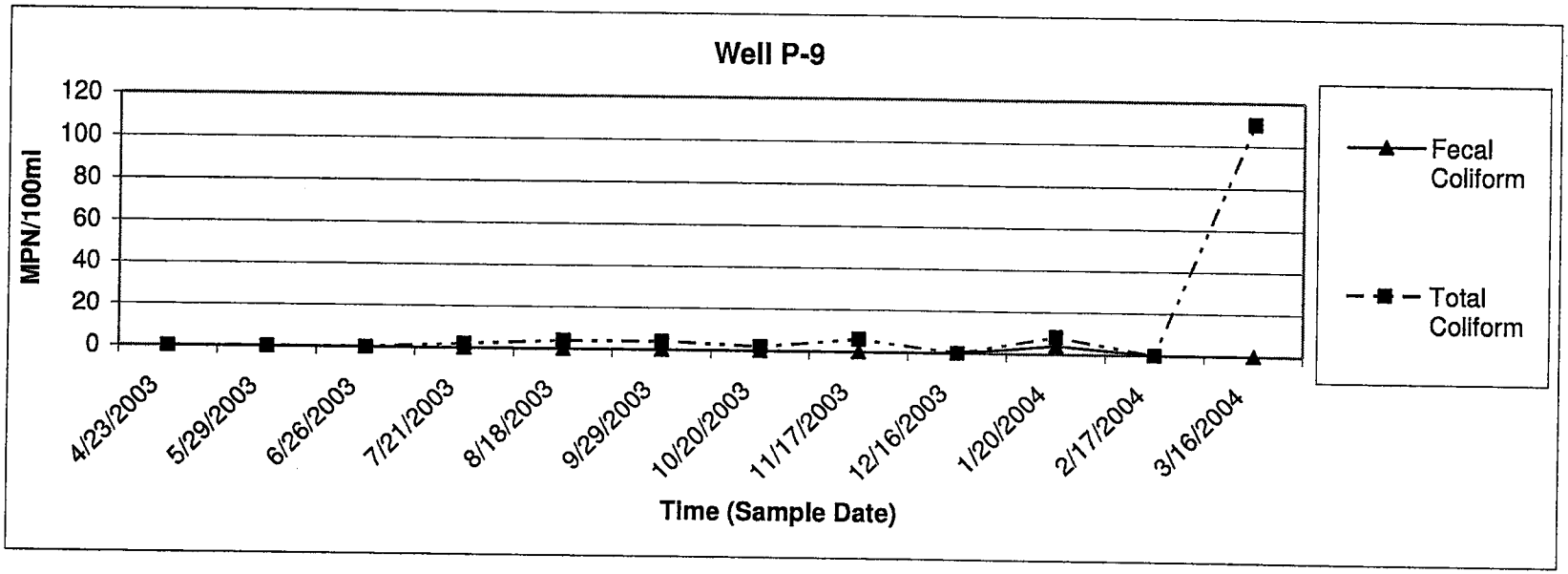


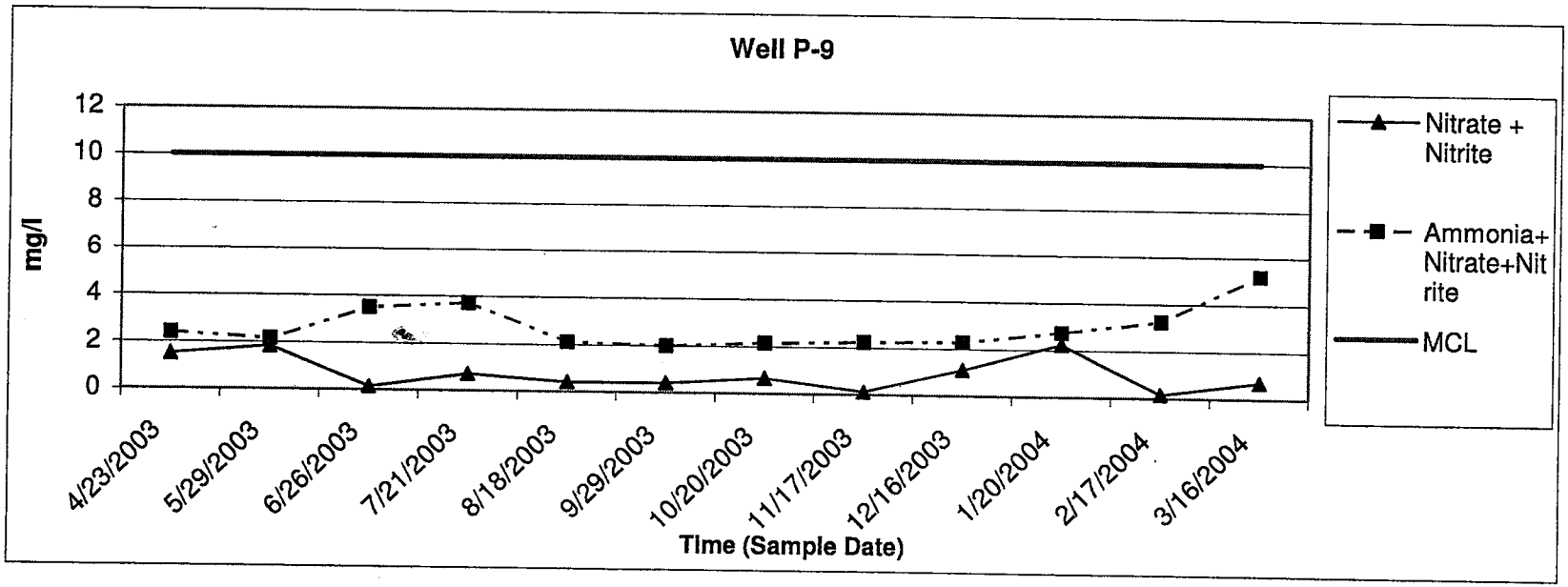
Malibu Civic Center Area



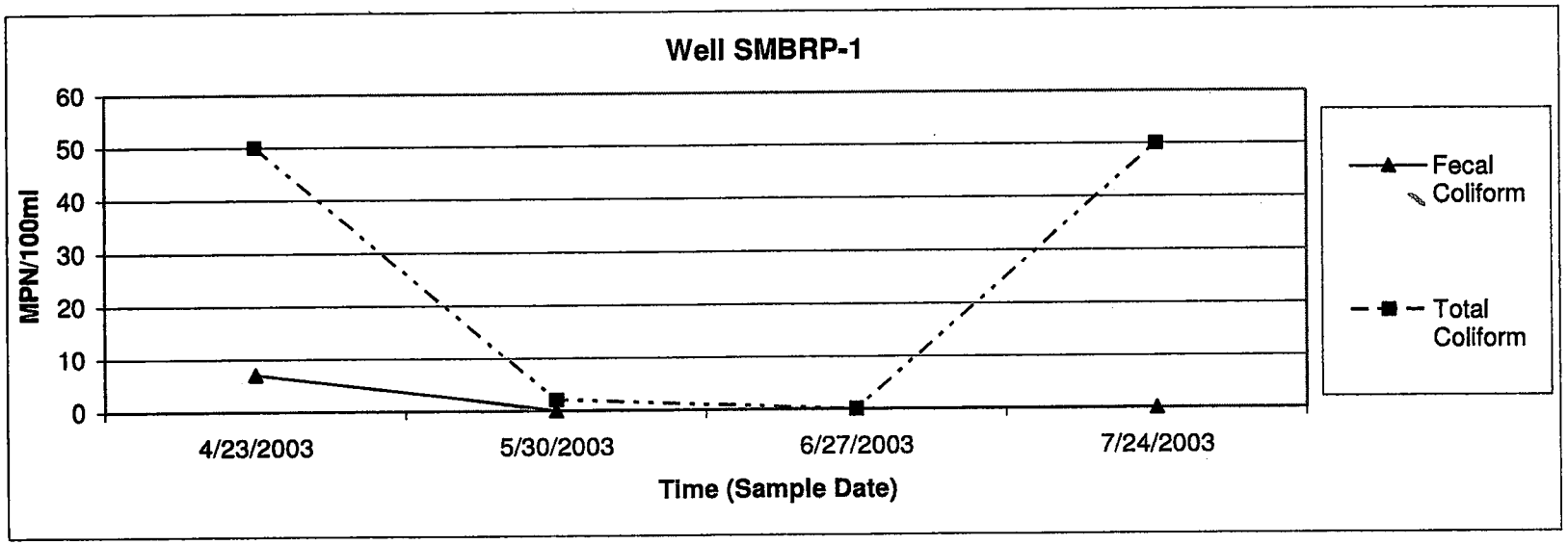


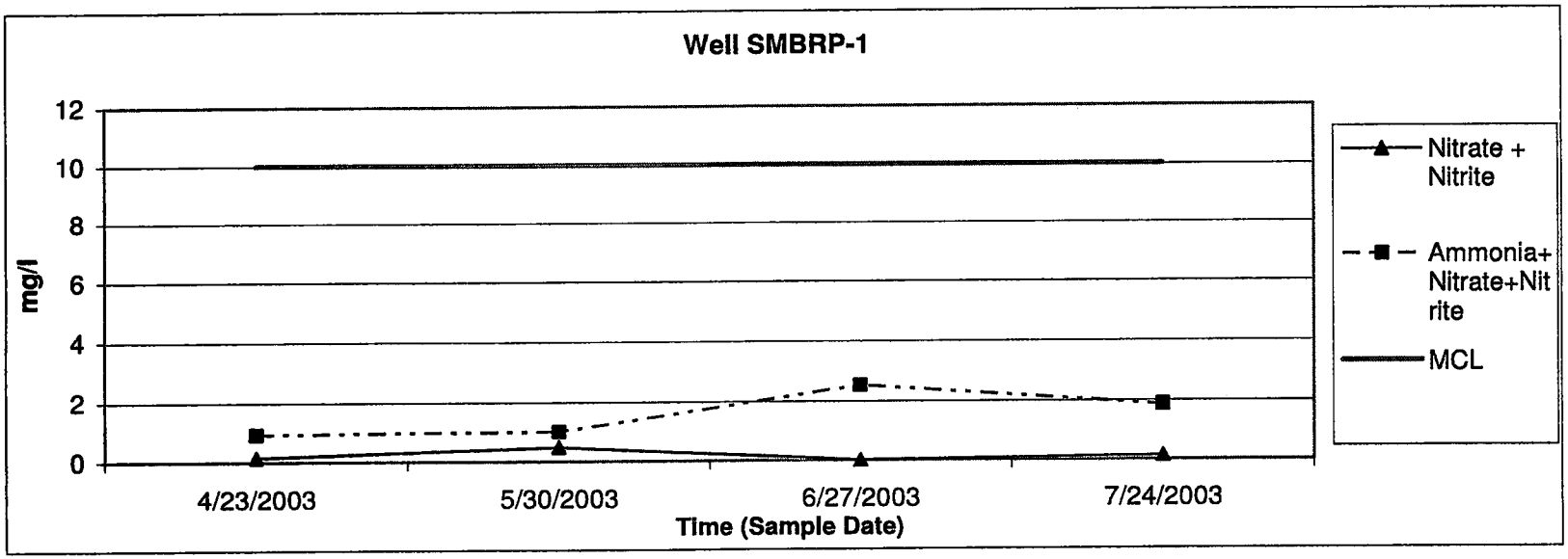
Malibu Civic Center Area





Malibu Civic Center Area

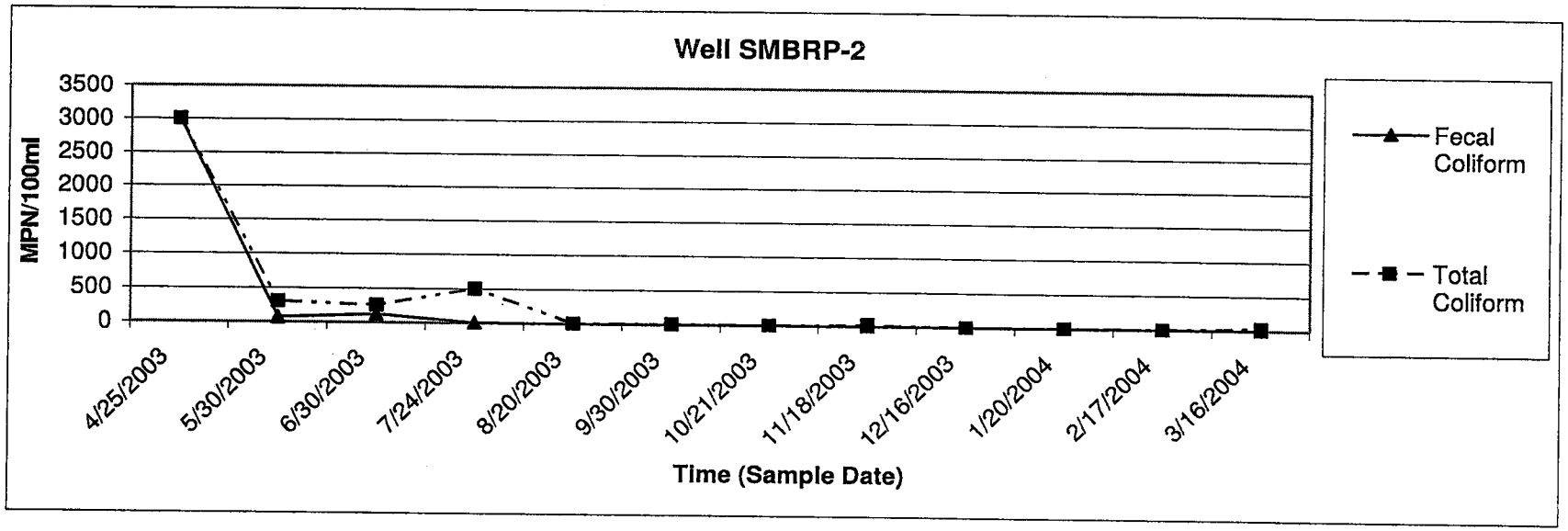


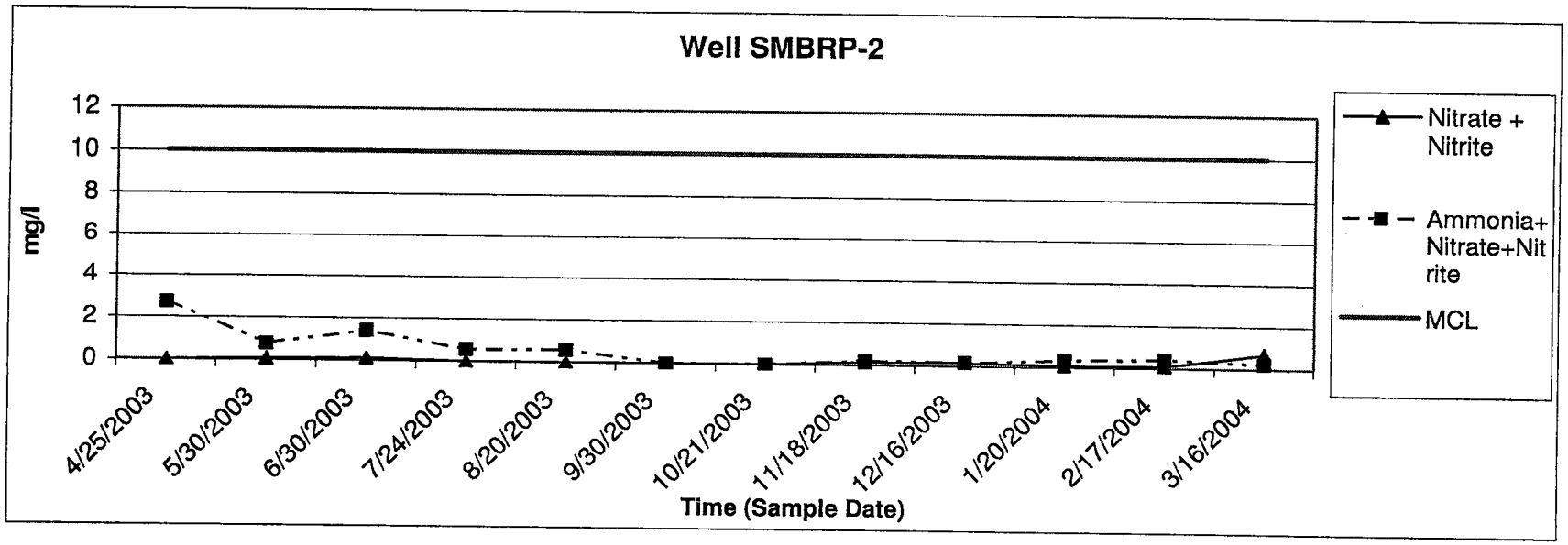


TM2-90

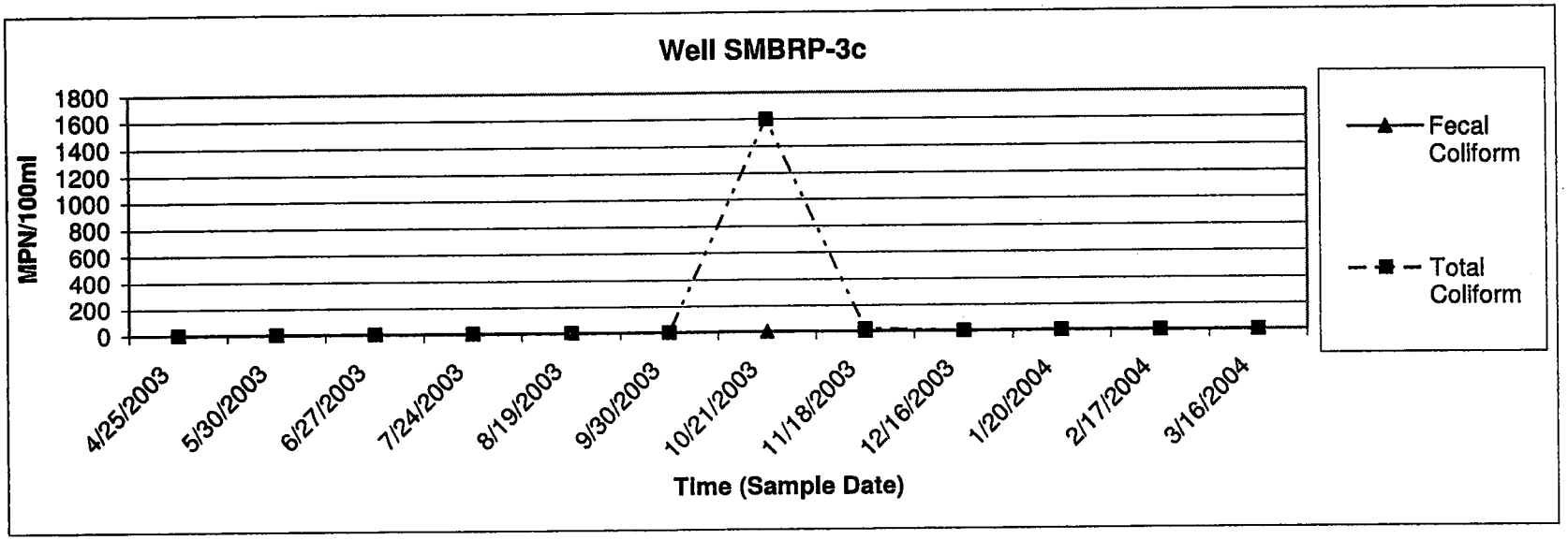
1 – 1 hh

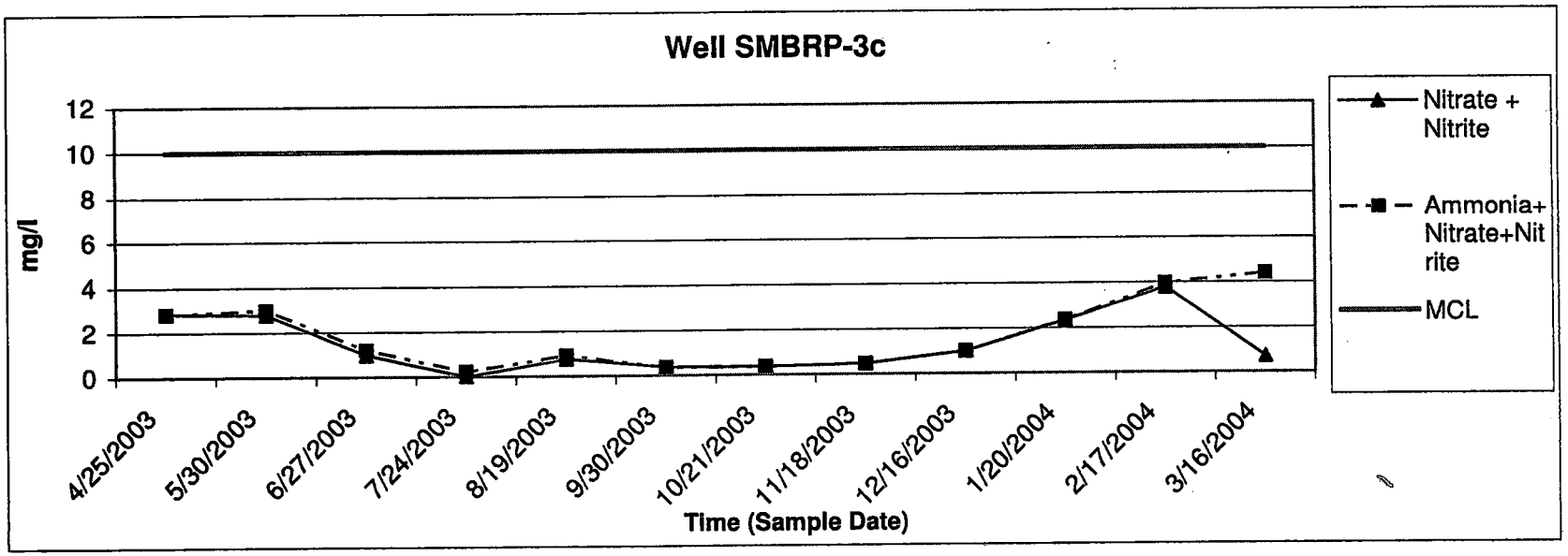
Malibu Civic Center Area





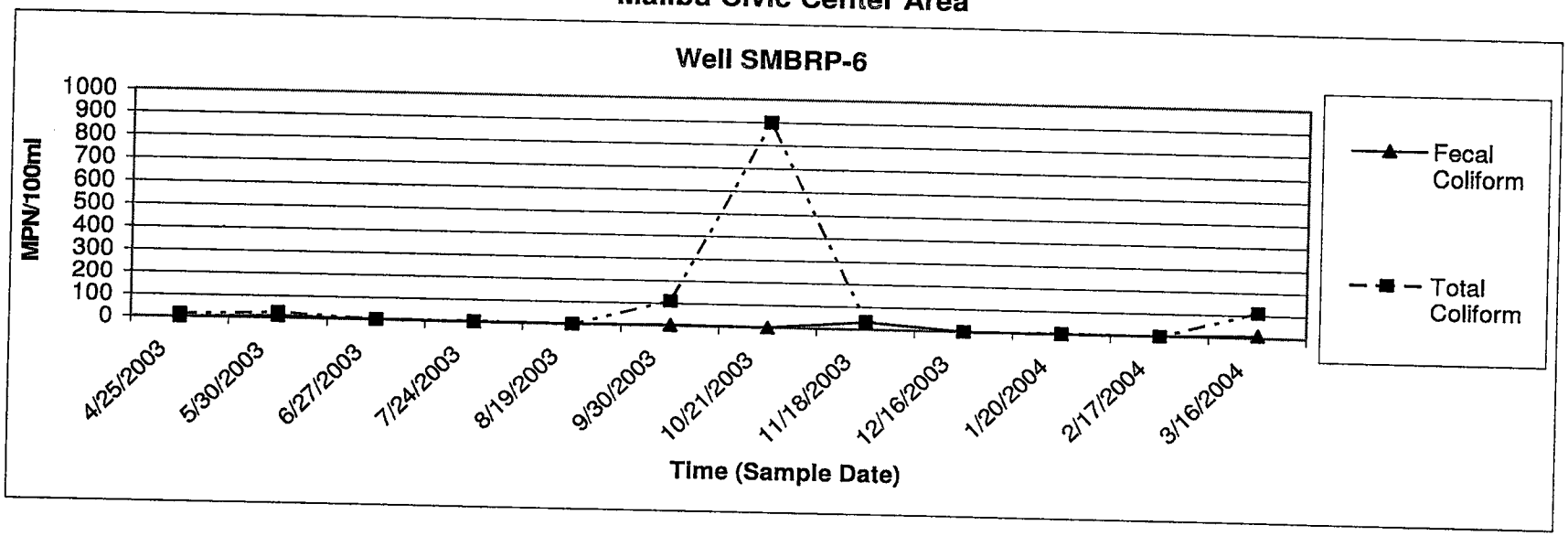
Malibu Civic Center Area

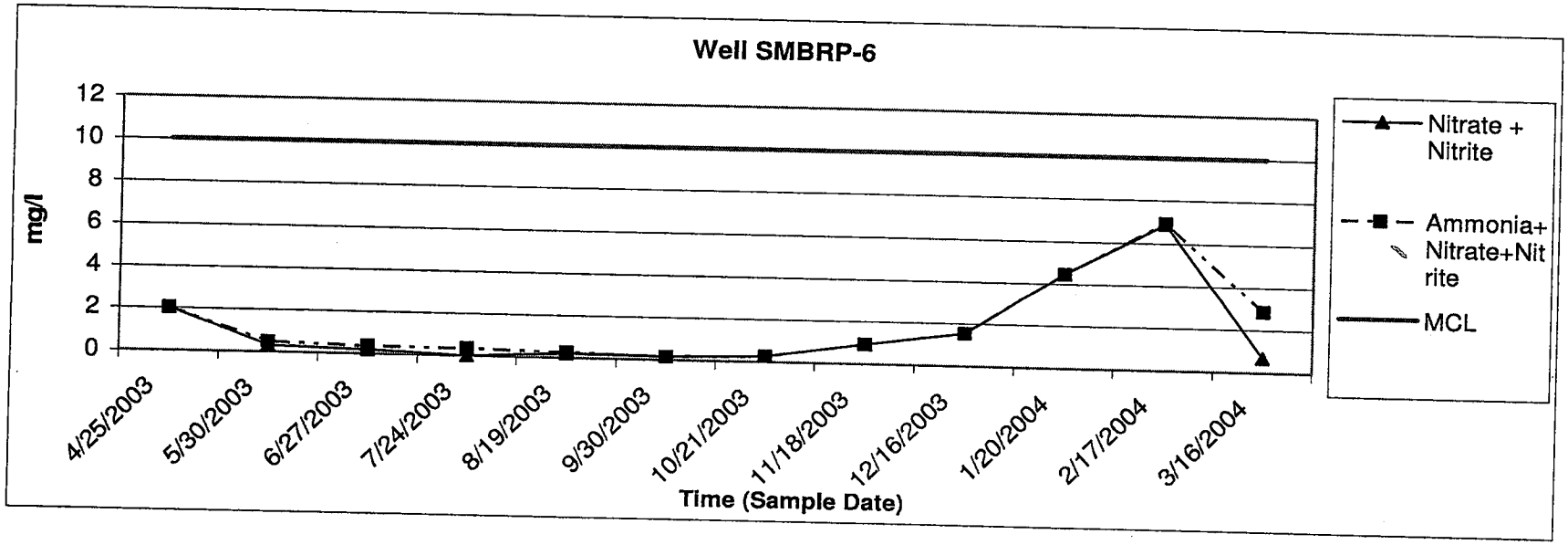




TM2-92

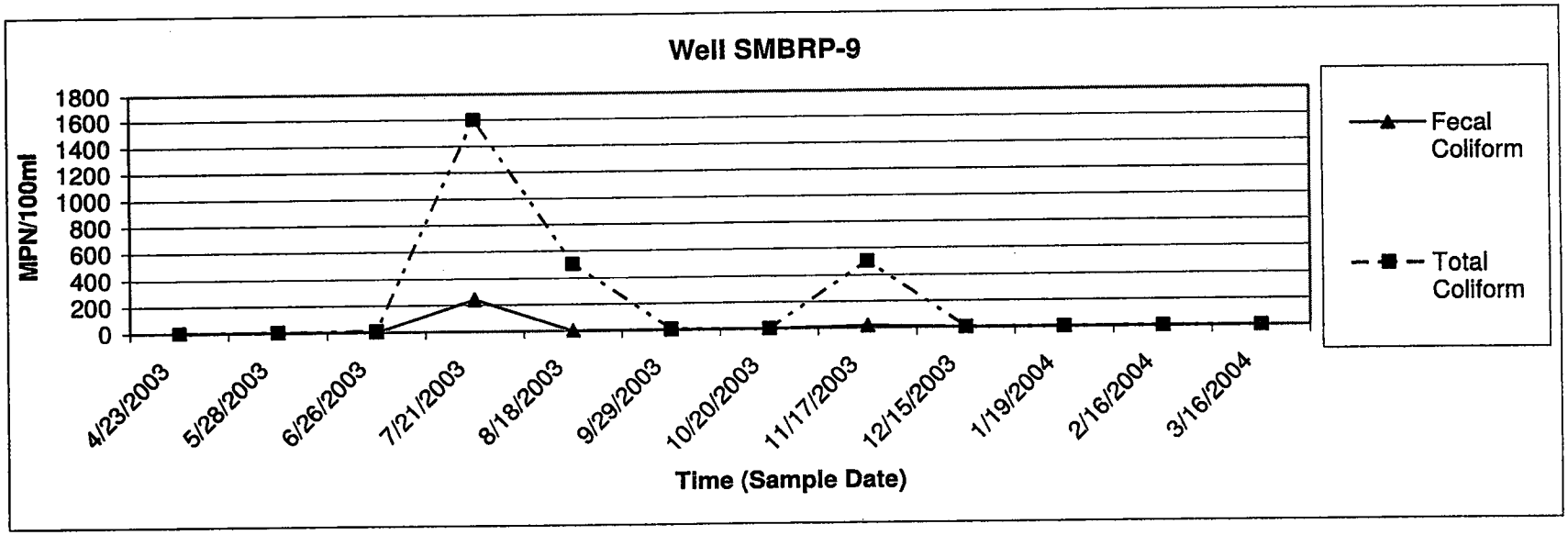
Malibu Civic Center Area

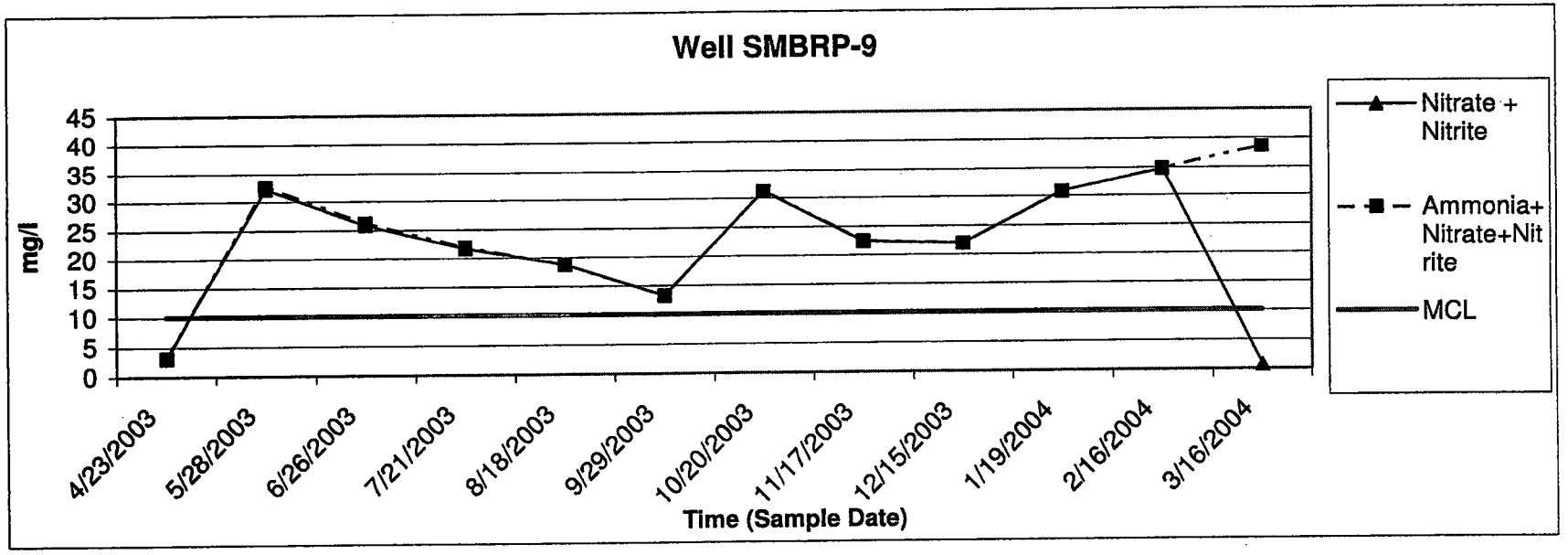




TM2-93

Malibu Civic Center Area

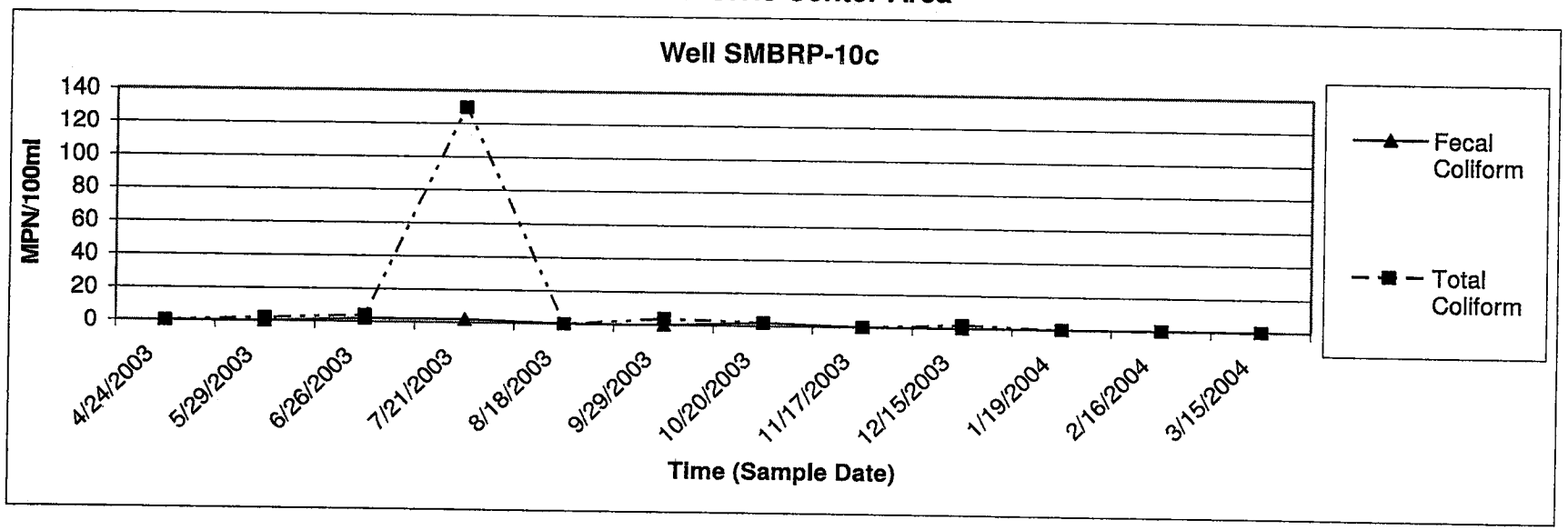


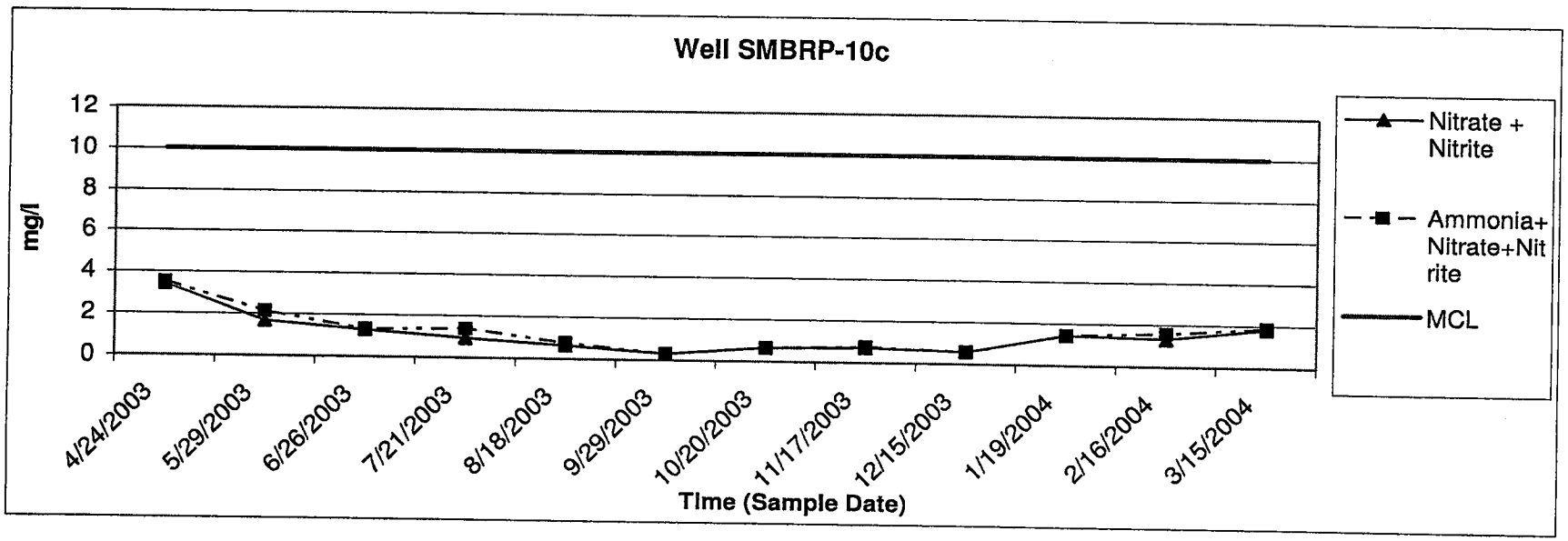


TM2-94

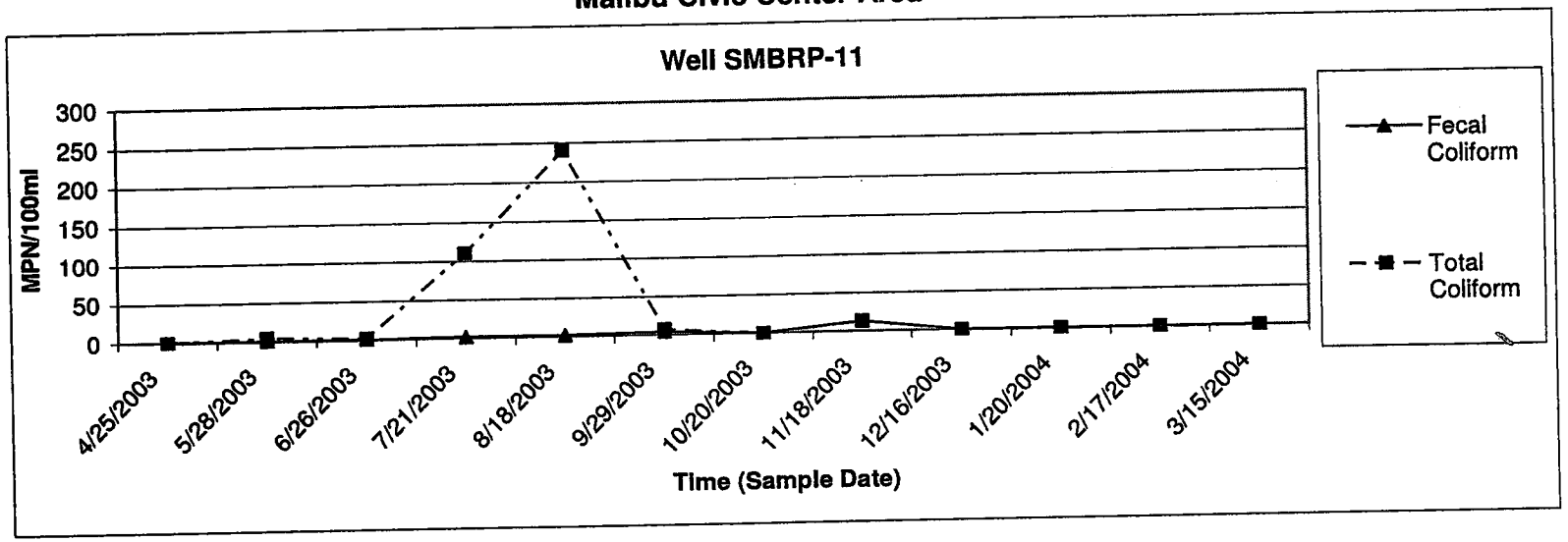
TM2-95

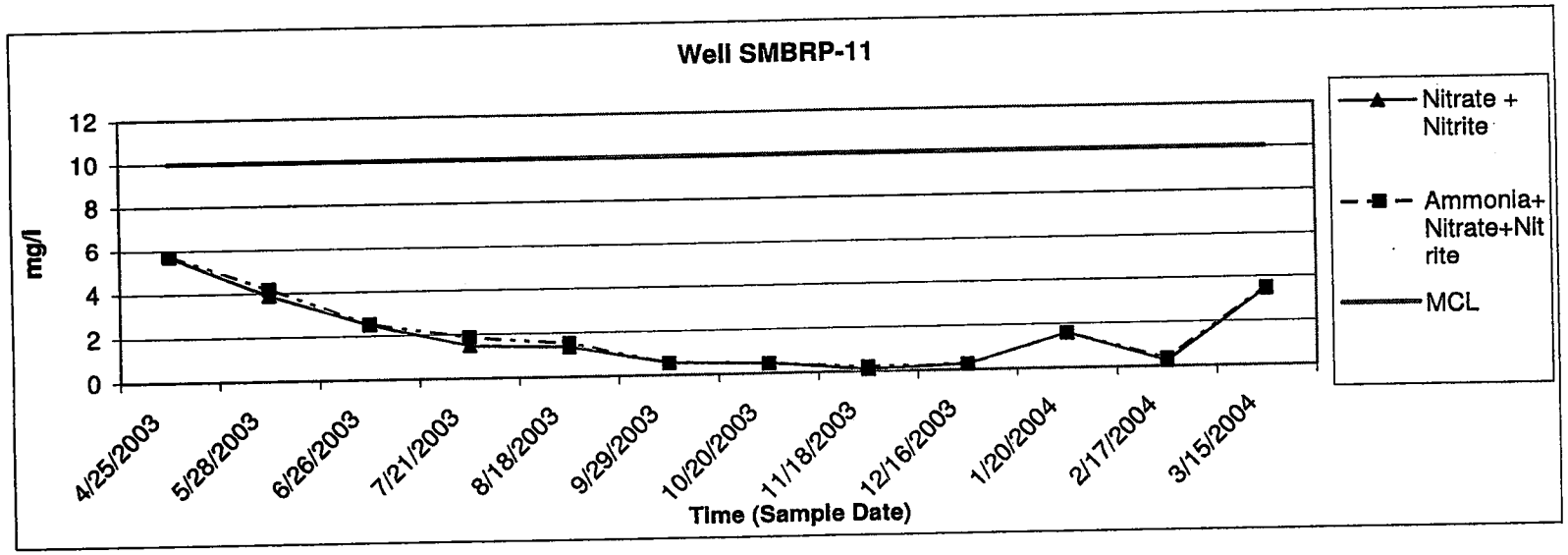
Malibu Civic Center Area





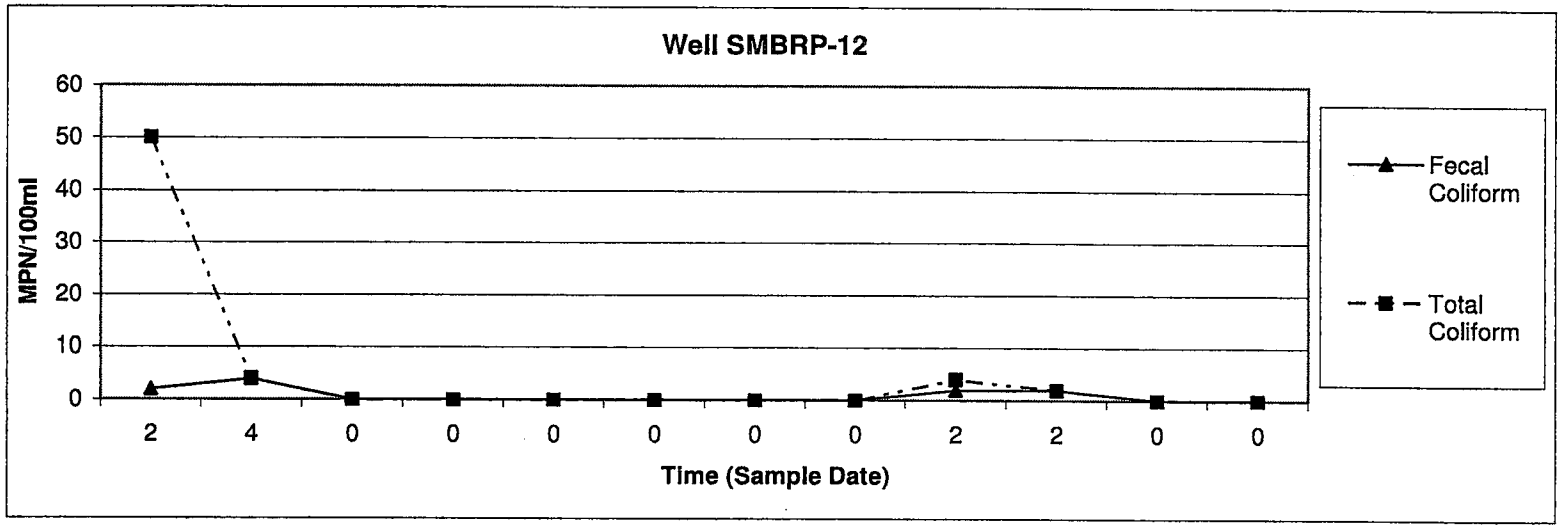
Malibu Civic Center Area

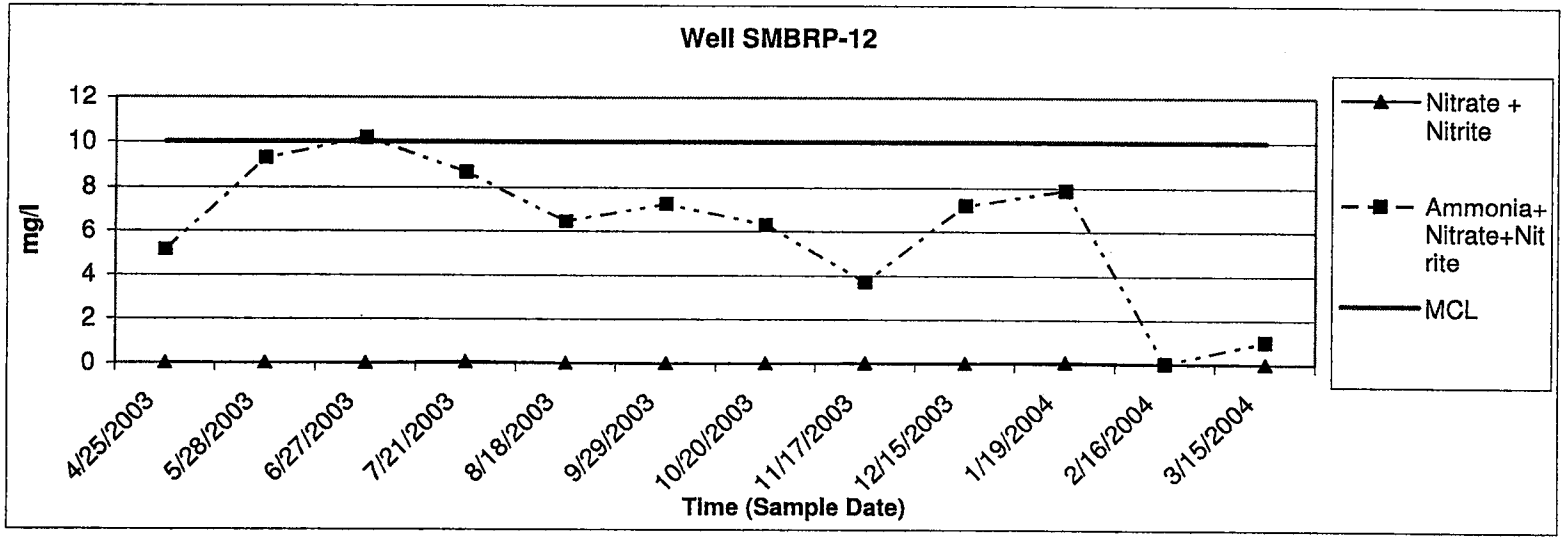




TM2-96

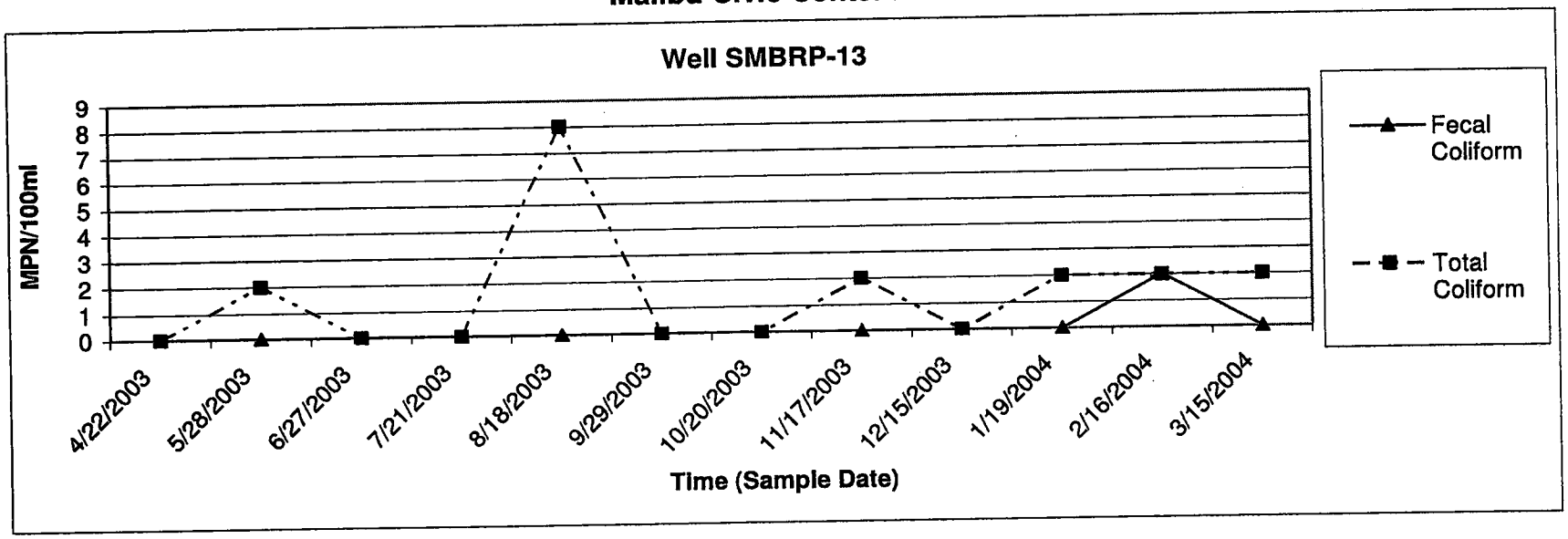
Malibu Civic Center Area

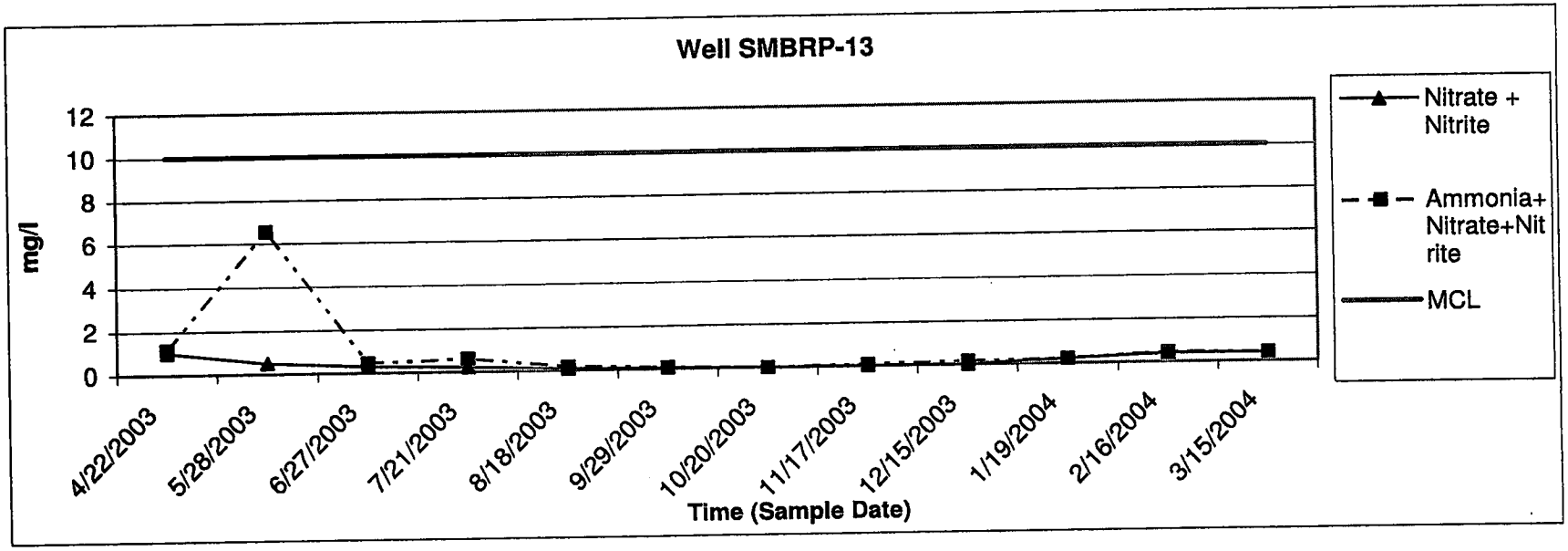


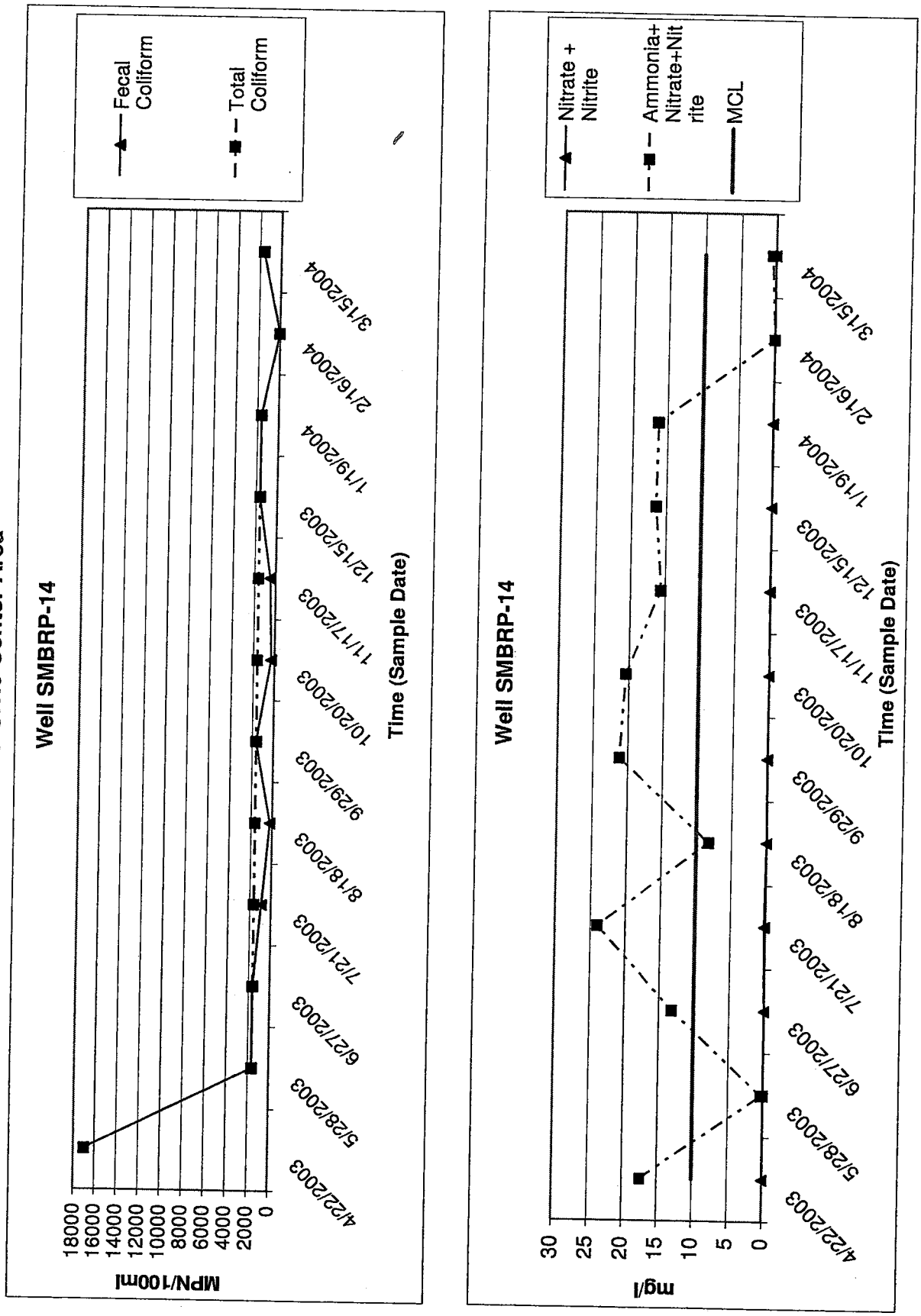


TM2-97

Malibu Civic Center Area

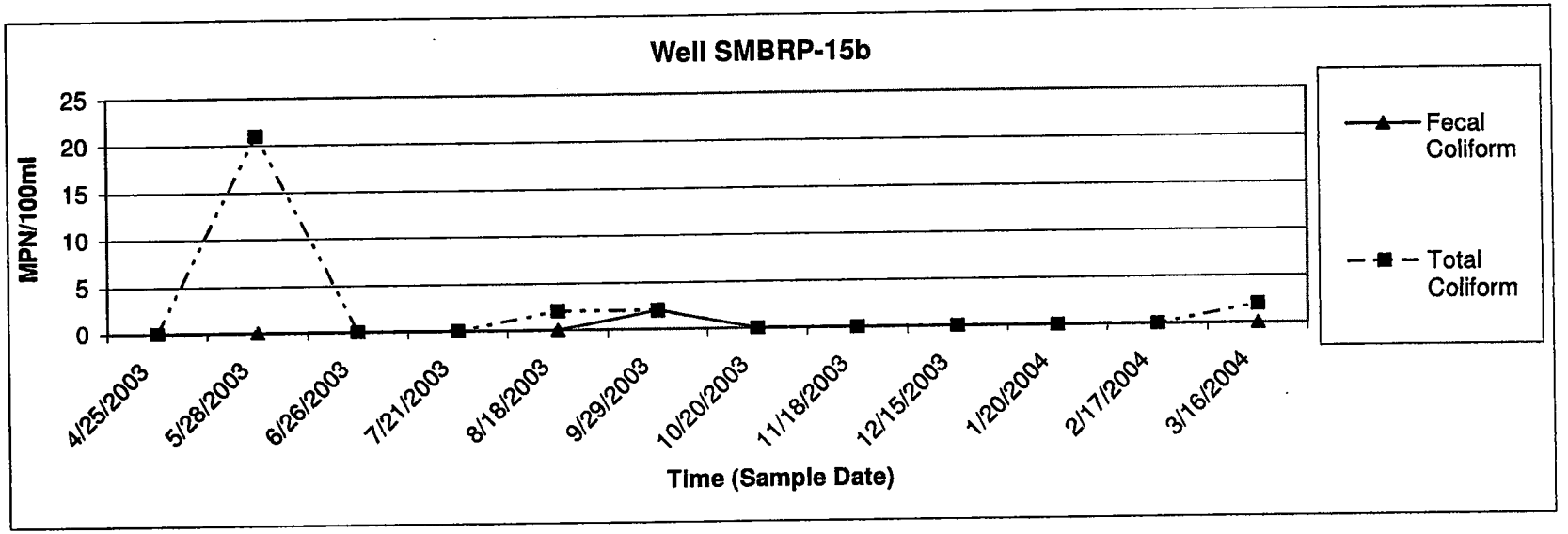


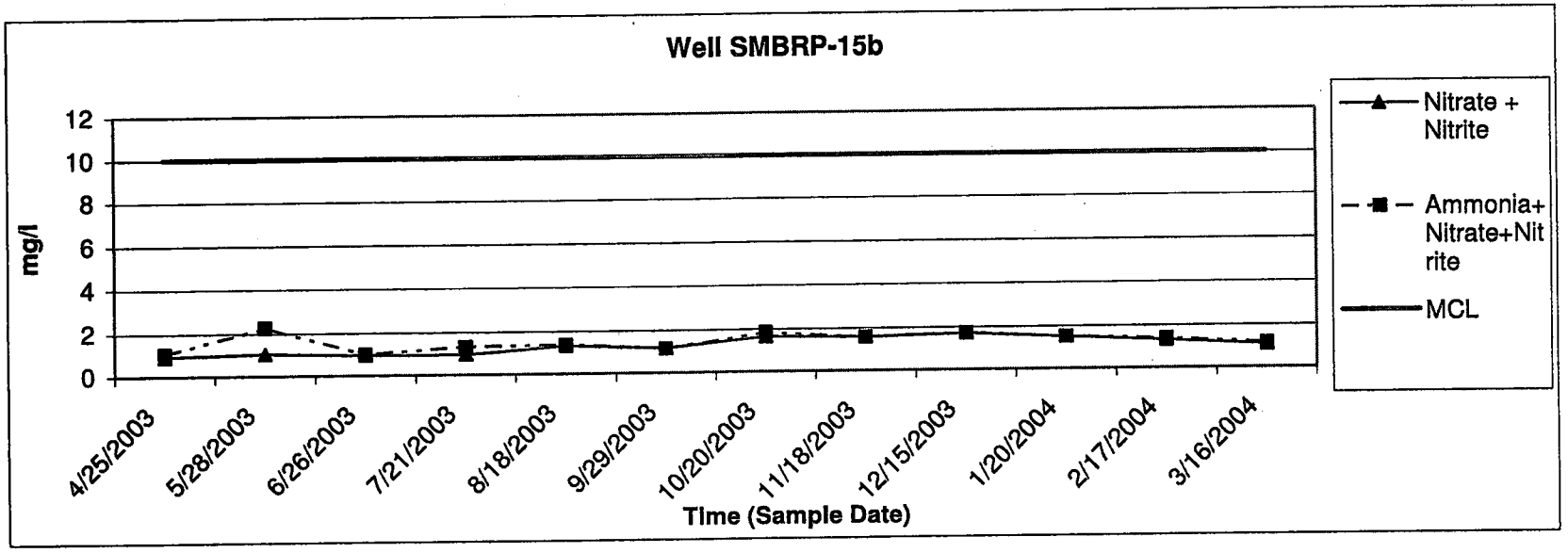



Malibu Civic Center Area
Well SMBRP-14
Fecal Coliform
Total Coliform
MPN/100ml
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
4/22/2003
5/28/2003
6/27/2003
7/21/2003
8/18/2003
9/29/2003
10/20/2003
11/17/2003
12/15/2003
1/19/2004
2/16/2004
3/15/2004
Time (Sample Date)
Well SMBRP-14
Nitrate + Nitrite
Ammonia+ Nitrate+Nitrite
MCL
mg/l
30
25
20
15
10
5
0
4/22/2003
5/28/2003
6/27/2003
7/21/2003
8/18/2003
9/29/2003
10/20/2003
11/17/2003
12/15/2003
1/19/2004
2/16/2004
3/15/2004
Time (Sample Date)

TM2-99

Malibu Civic Center Area



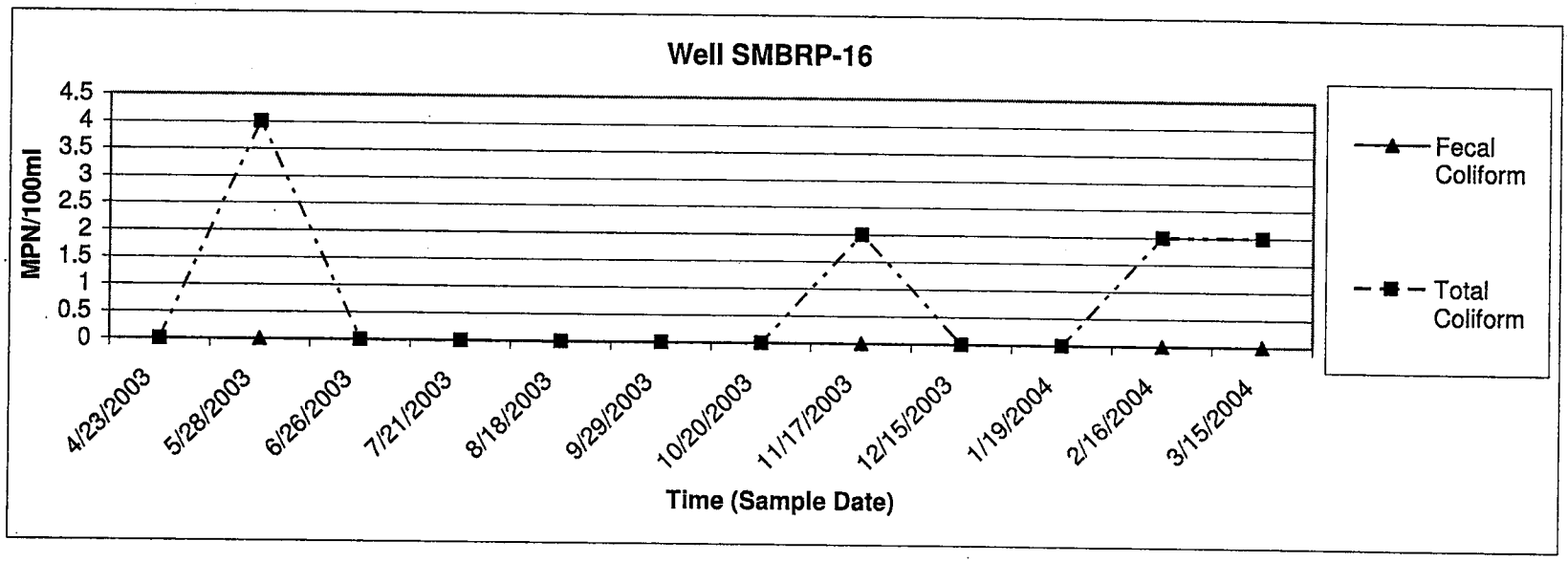


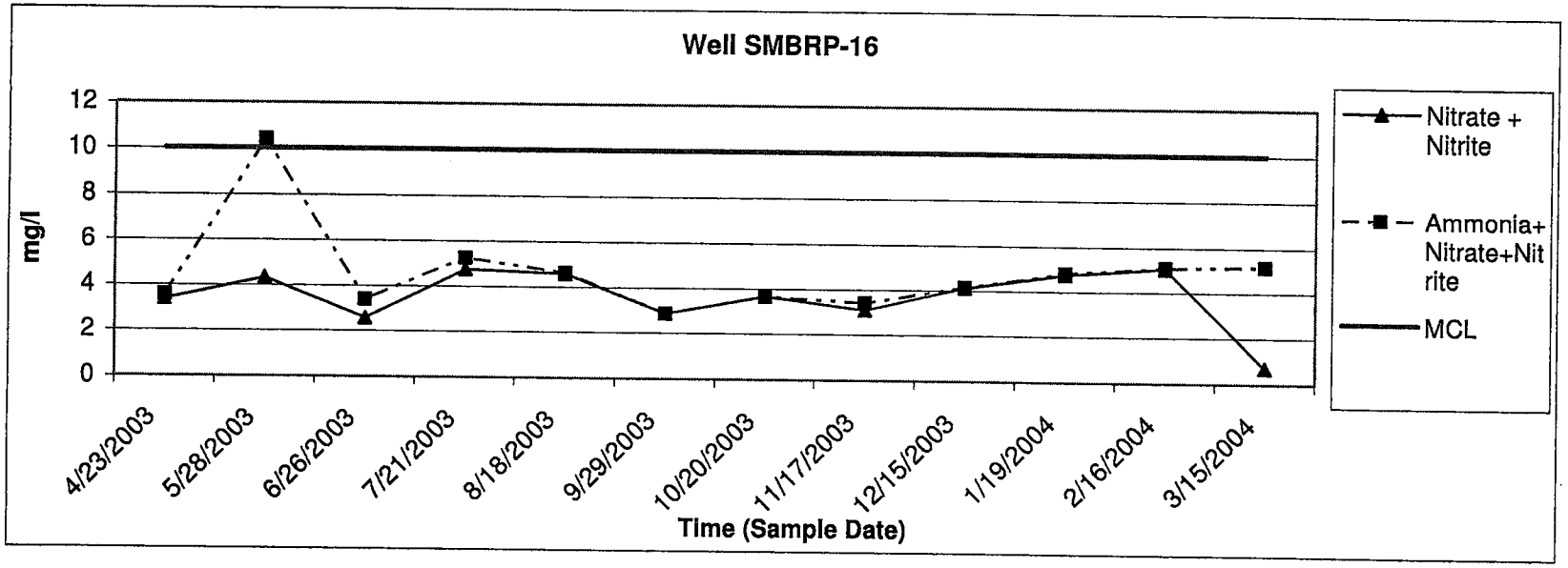
1 – 15h

TM2-100

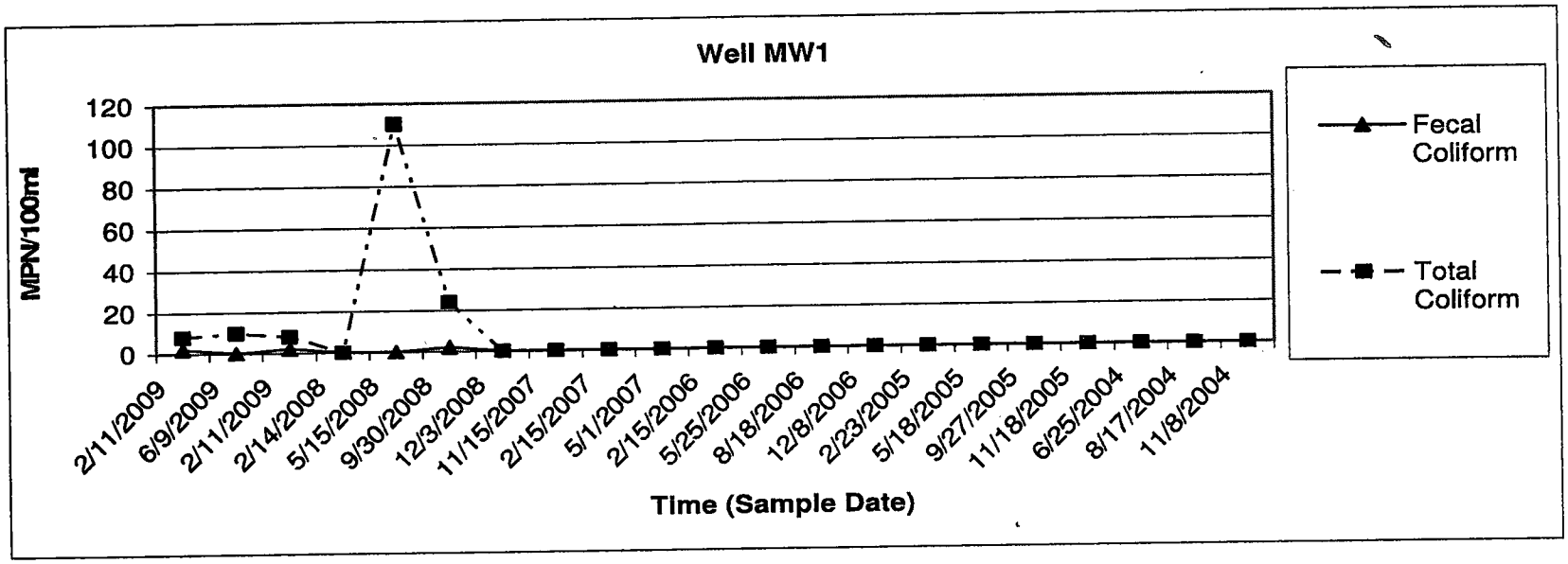
TM2-101

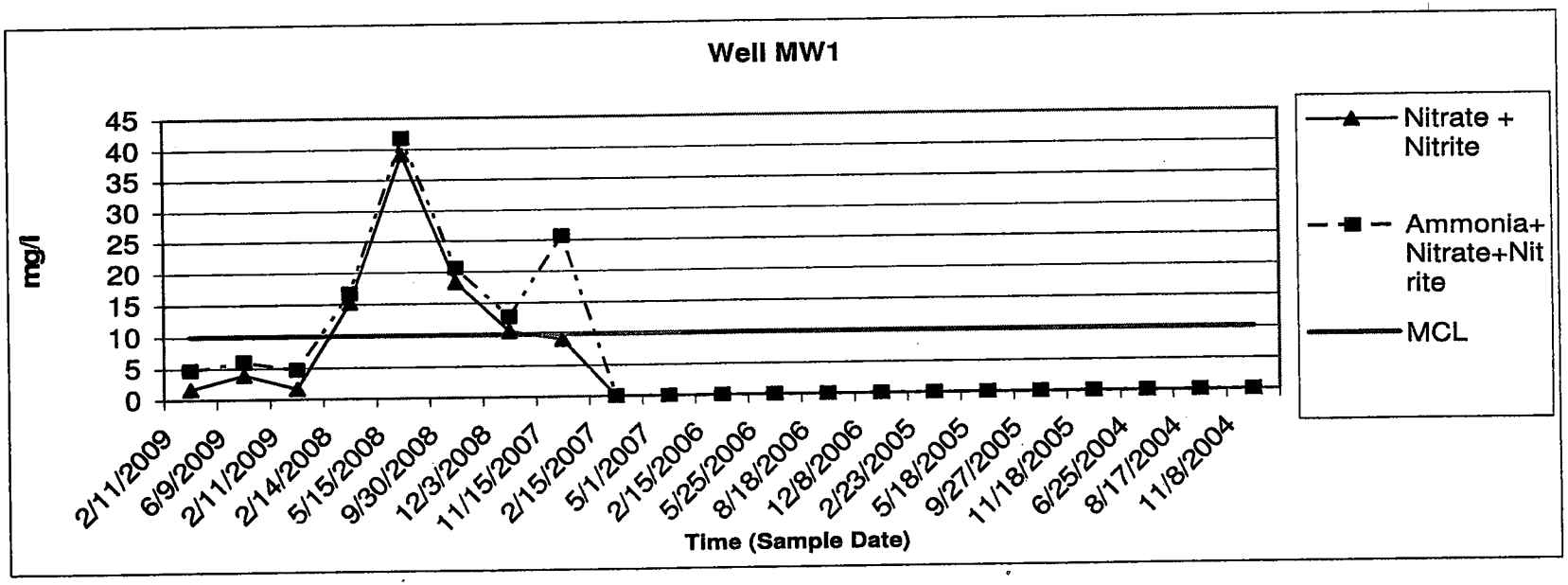
Malibu Civic Center Area





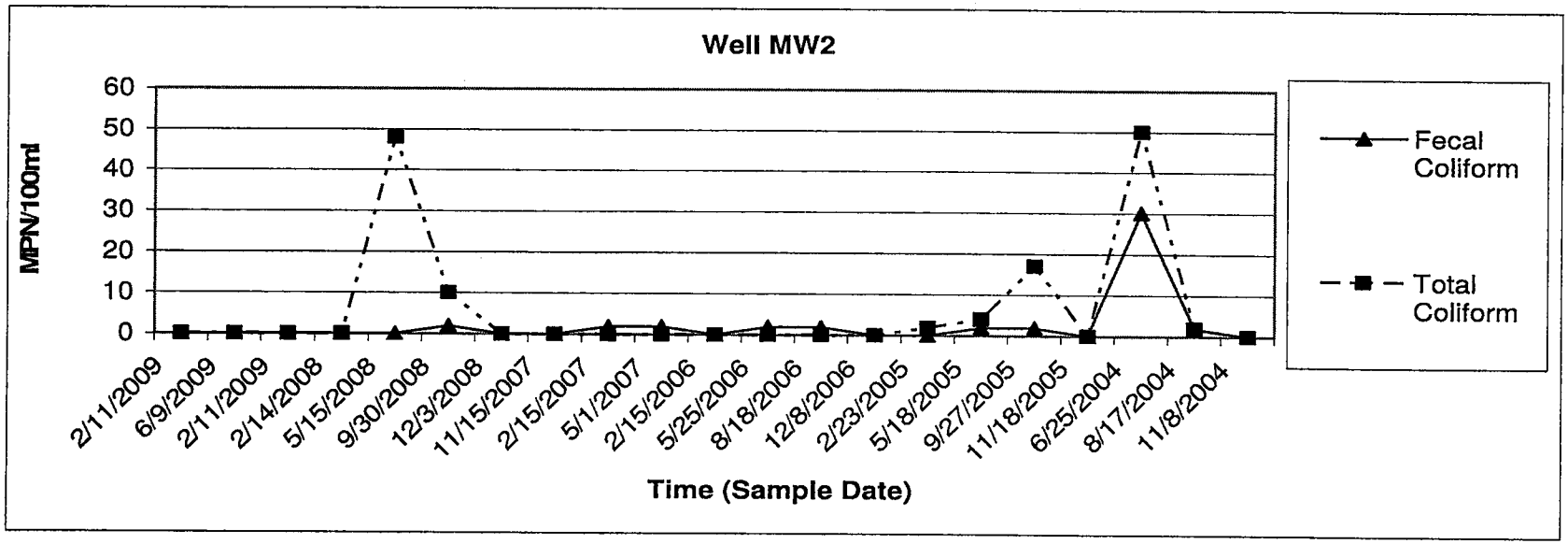
Malibu Beach Inn

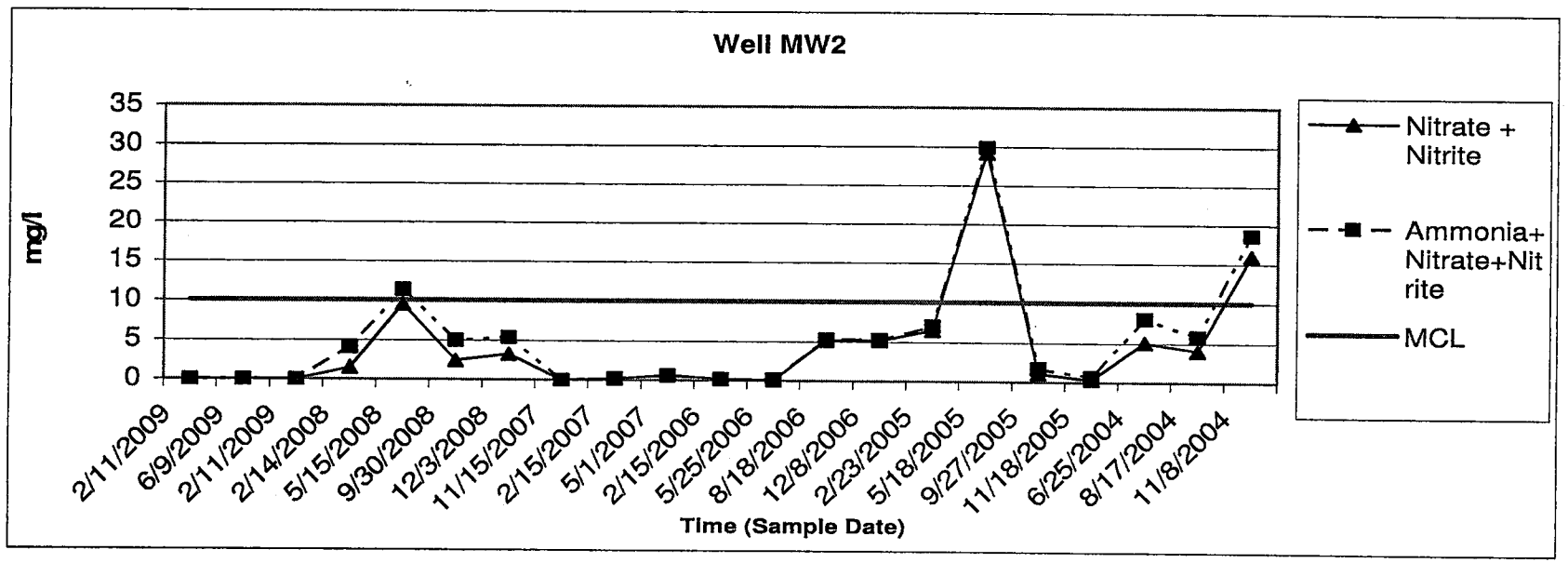




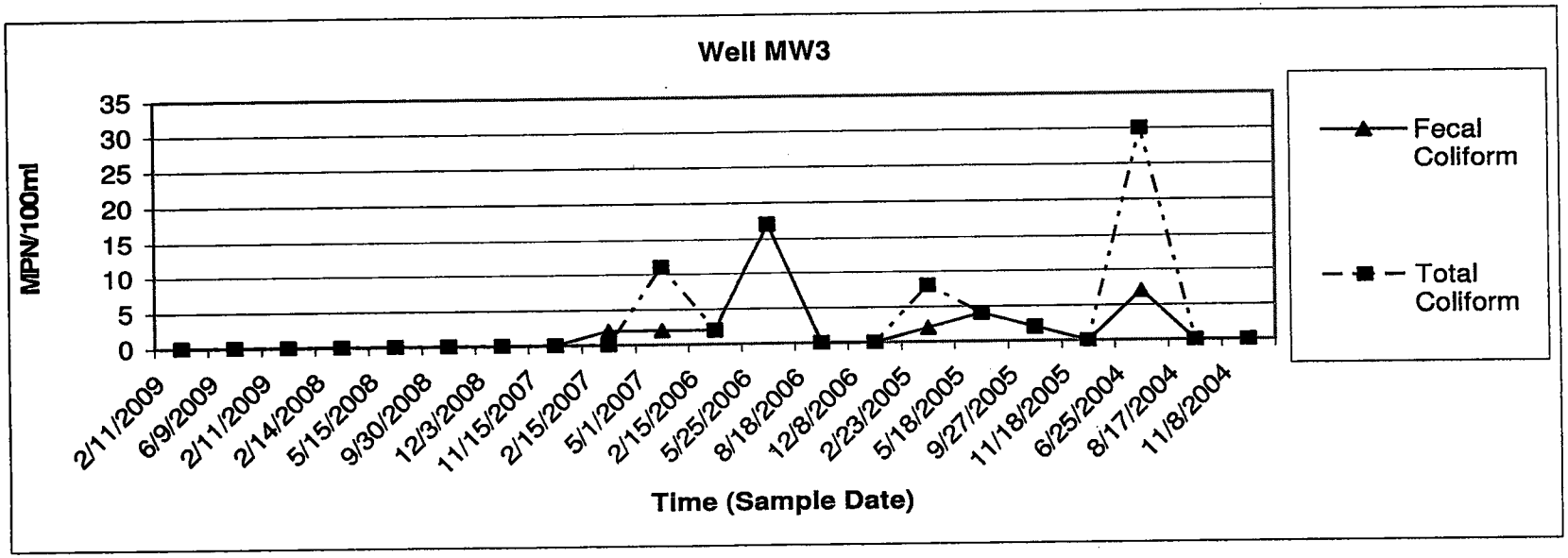
TM2-103

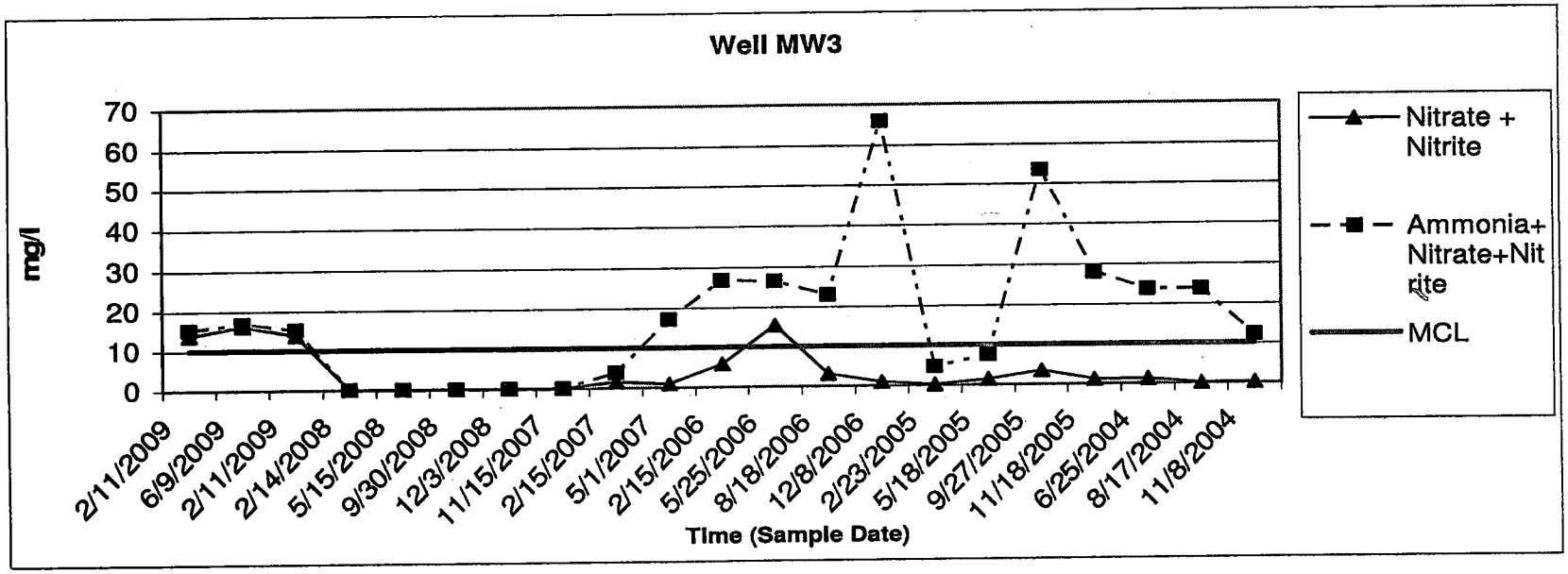
Malibu Beach Inn





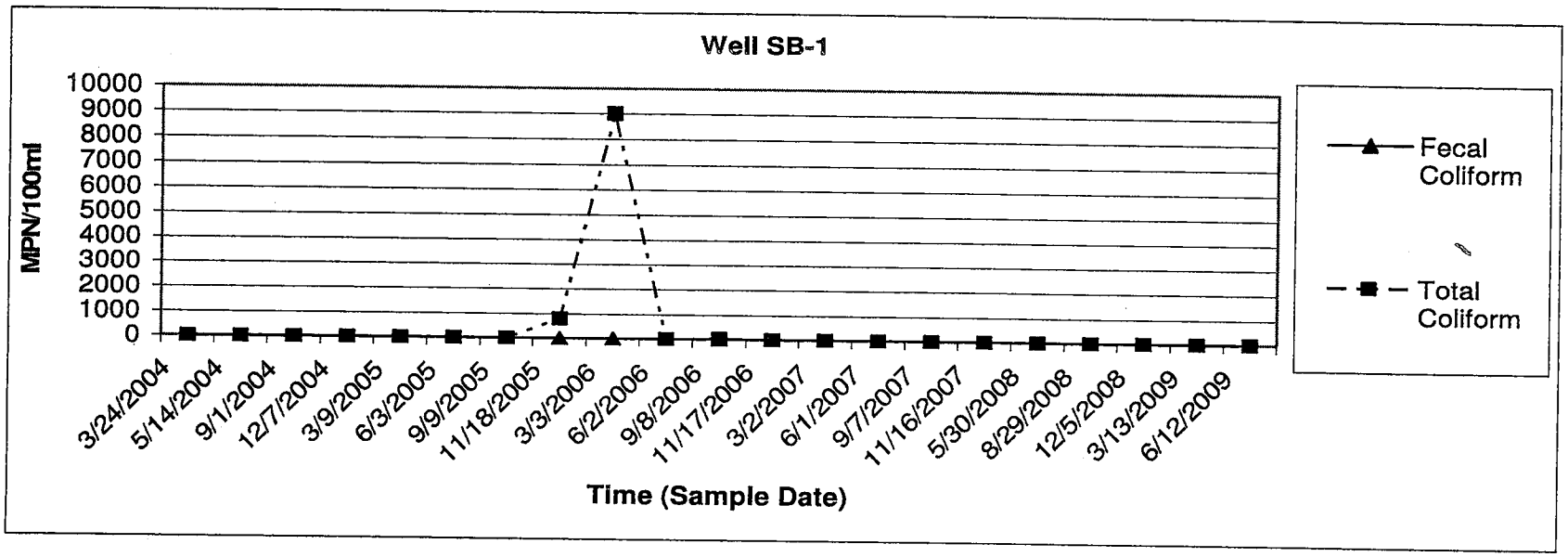
Malibu Beach Inn

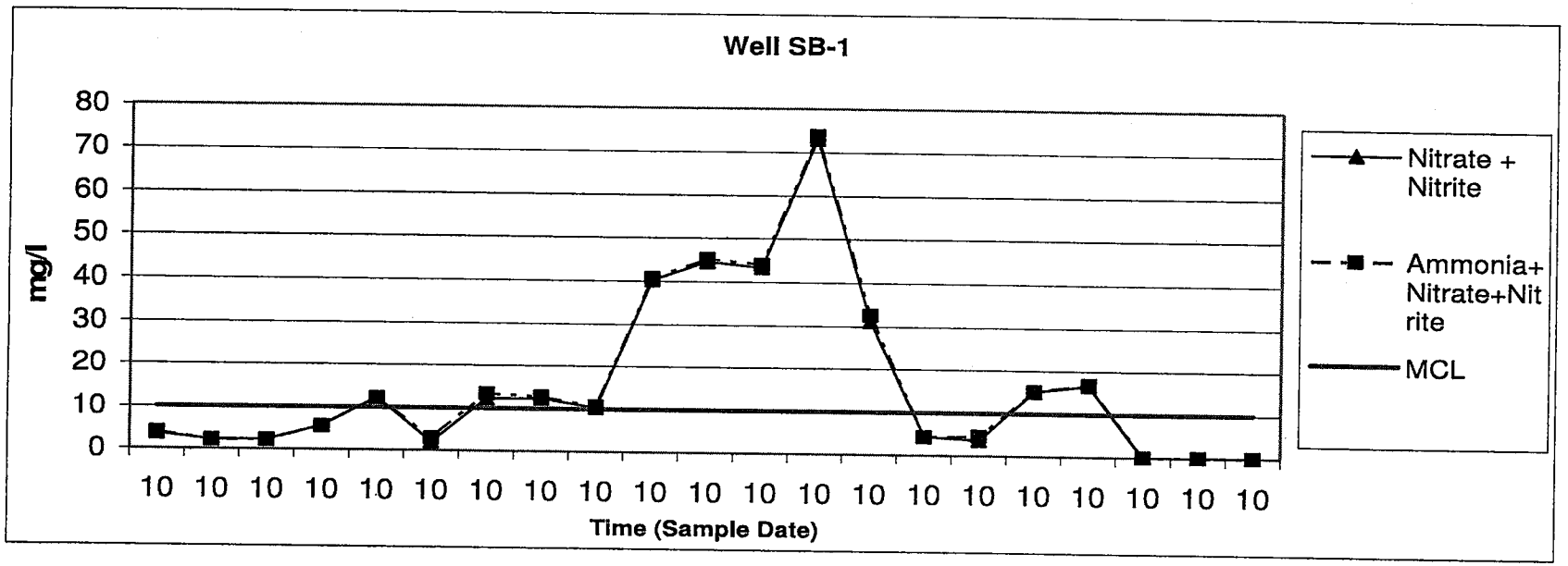




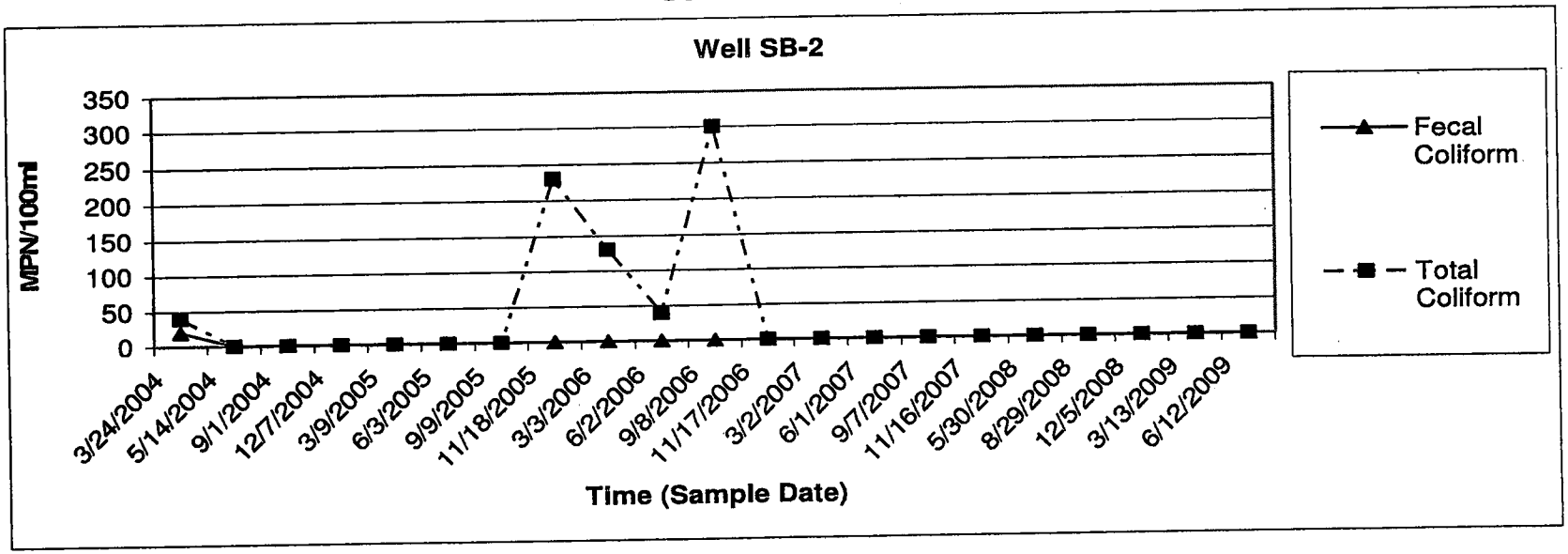
TM2-104

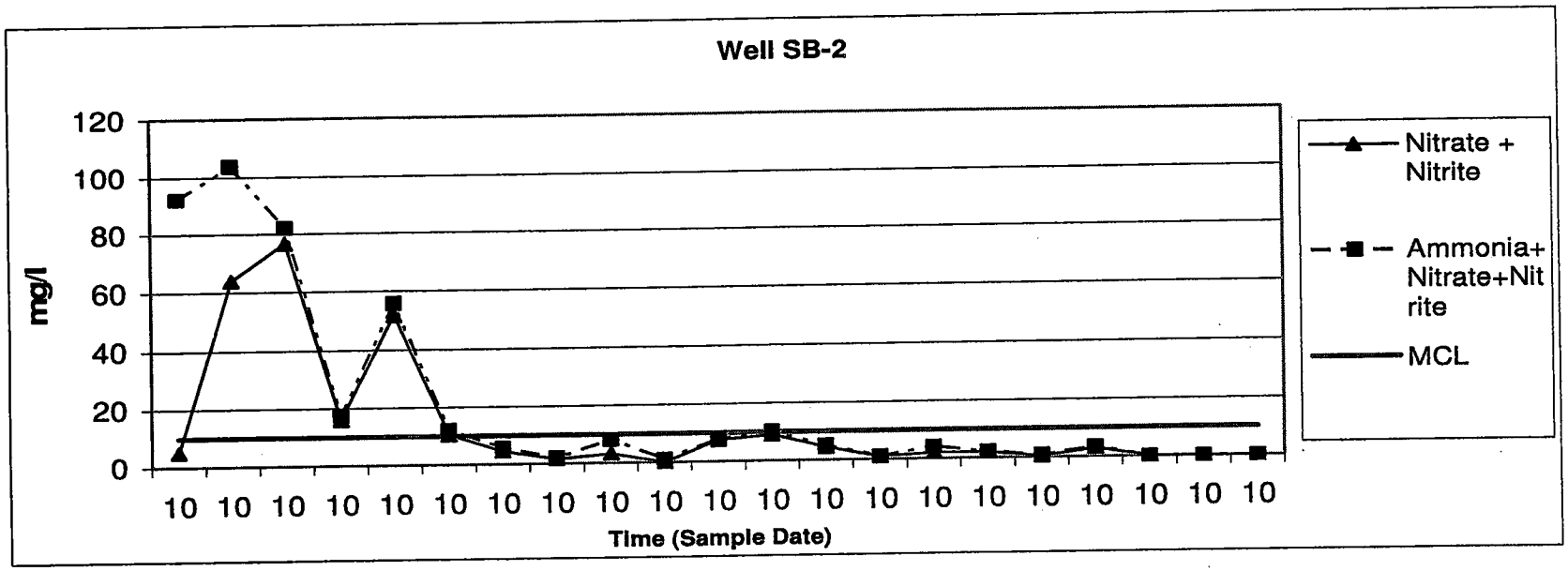
Surfrider Beach





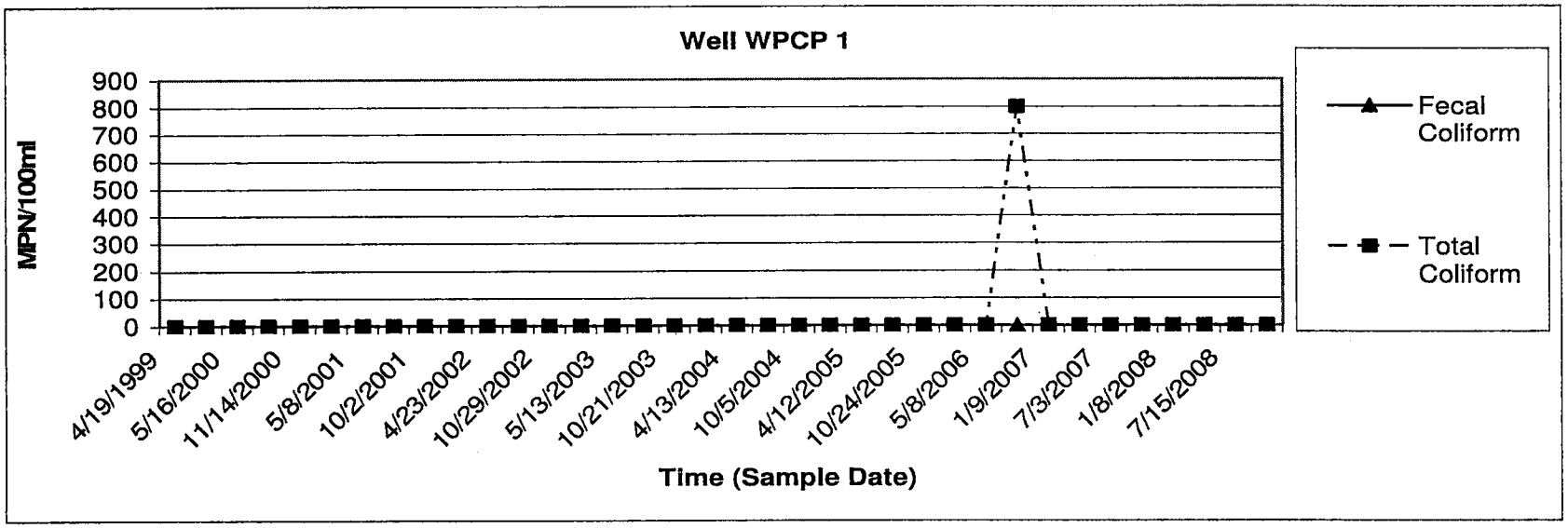
Surfrider Beach

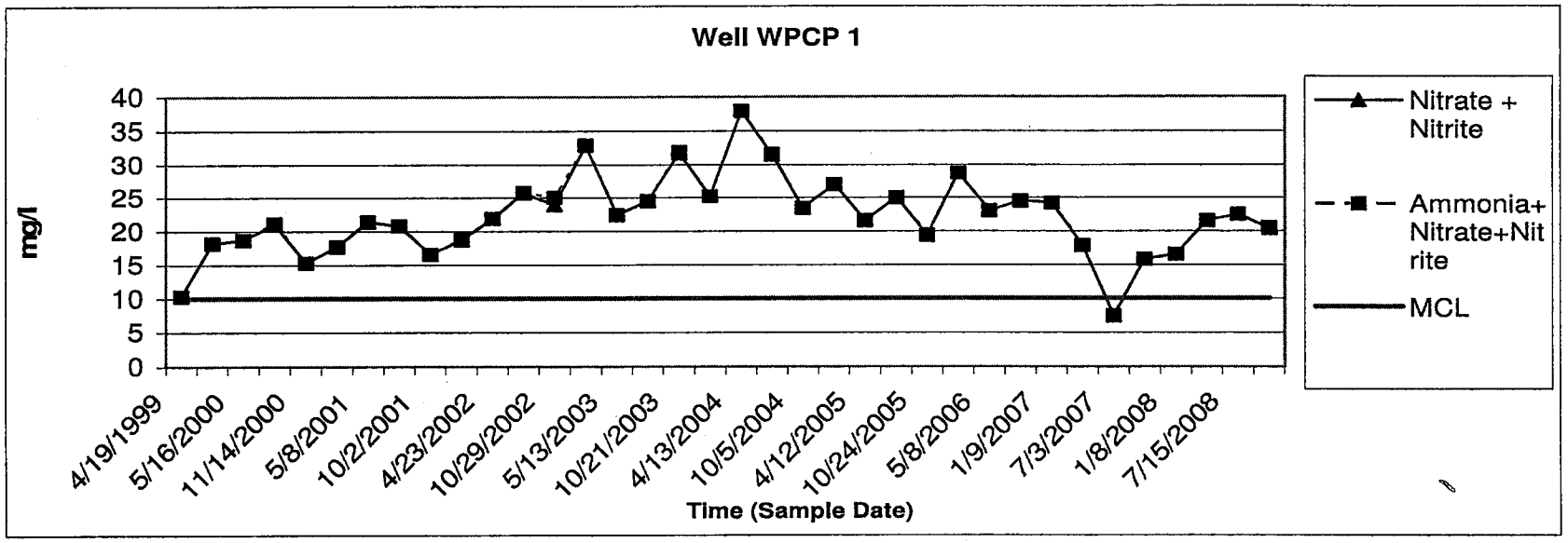




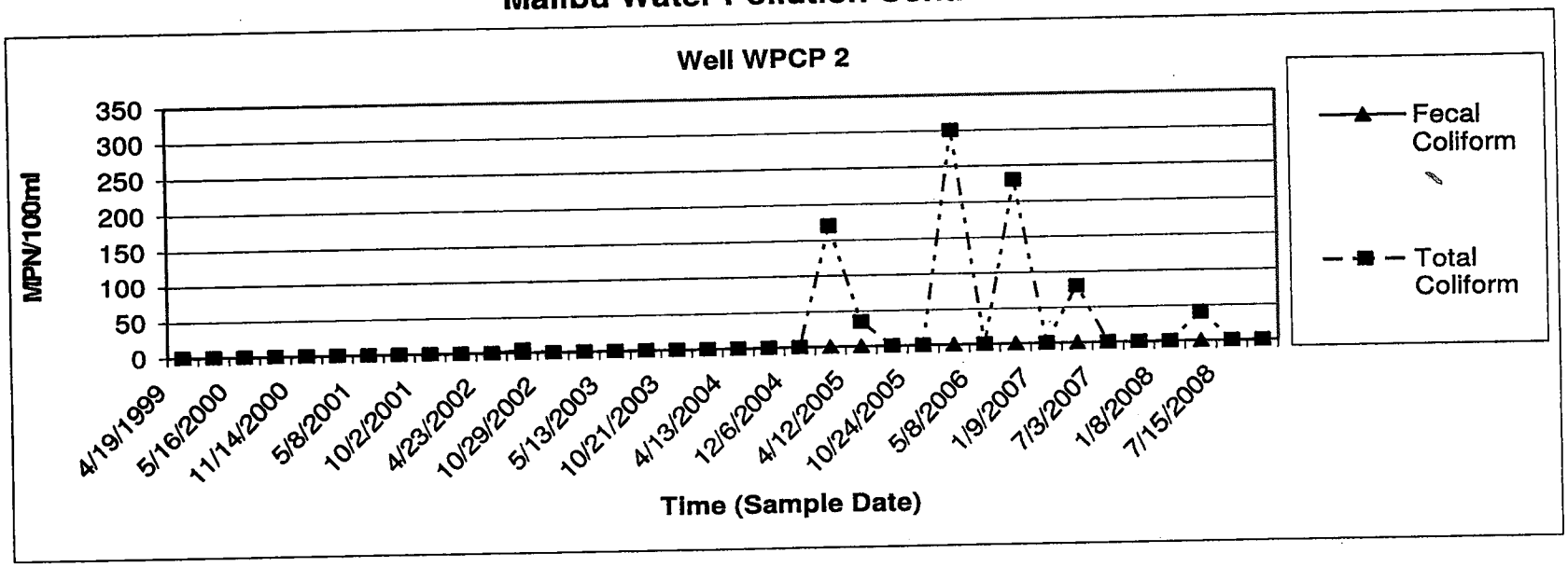
TM2-107

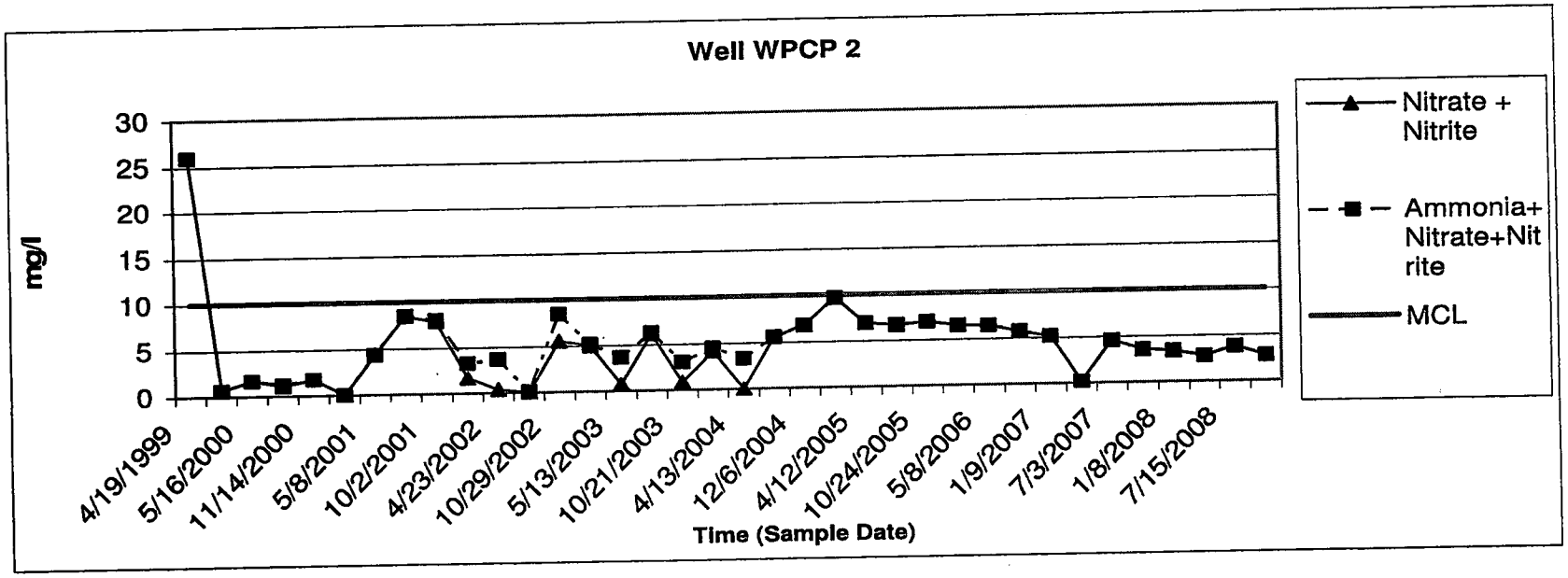
Malibu Water Pollution Control Plant





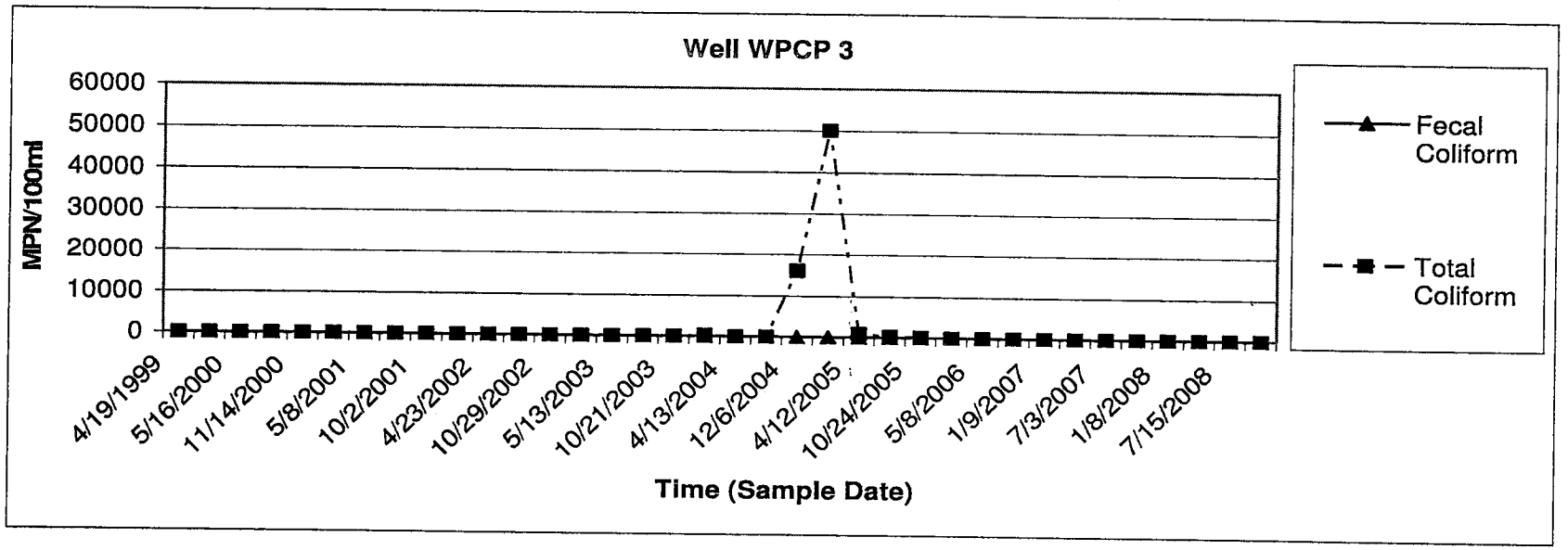
Malibu Water Pollution Control Plant

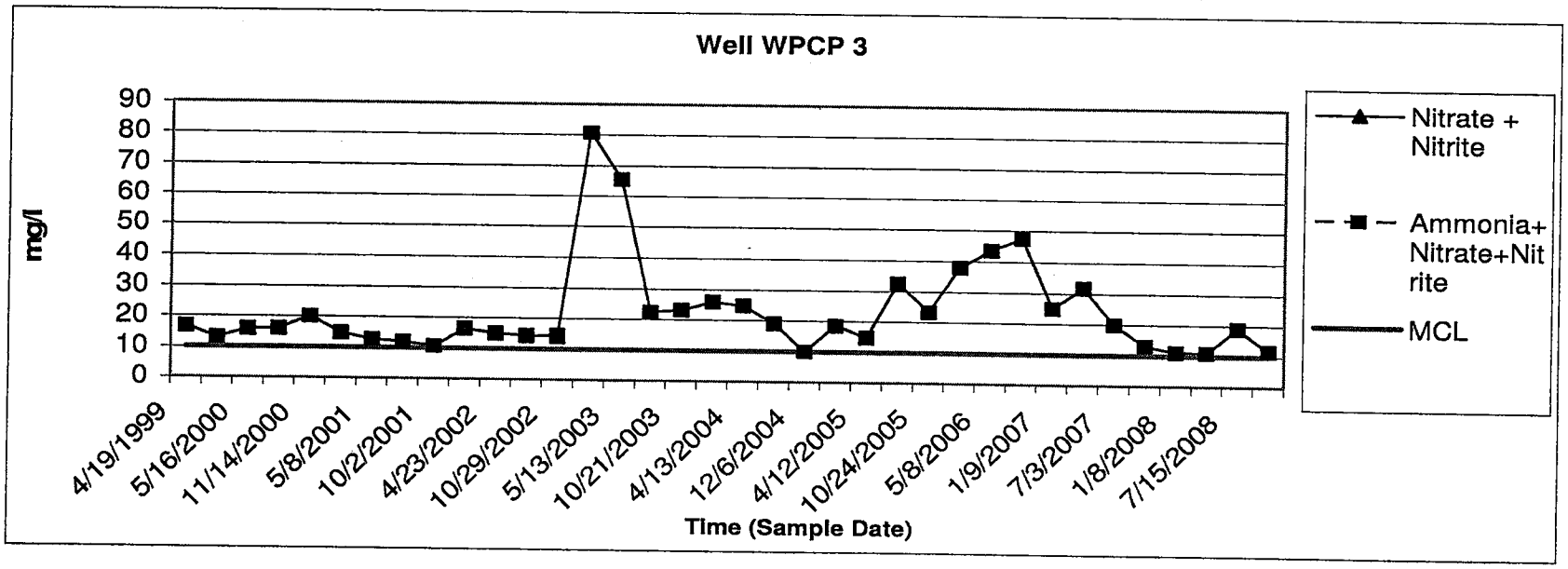




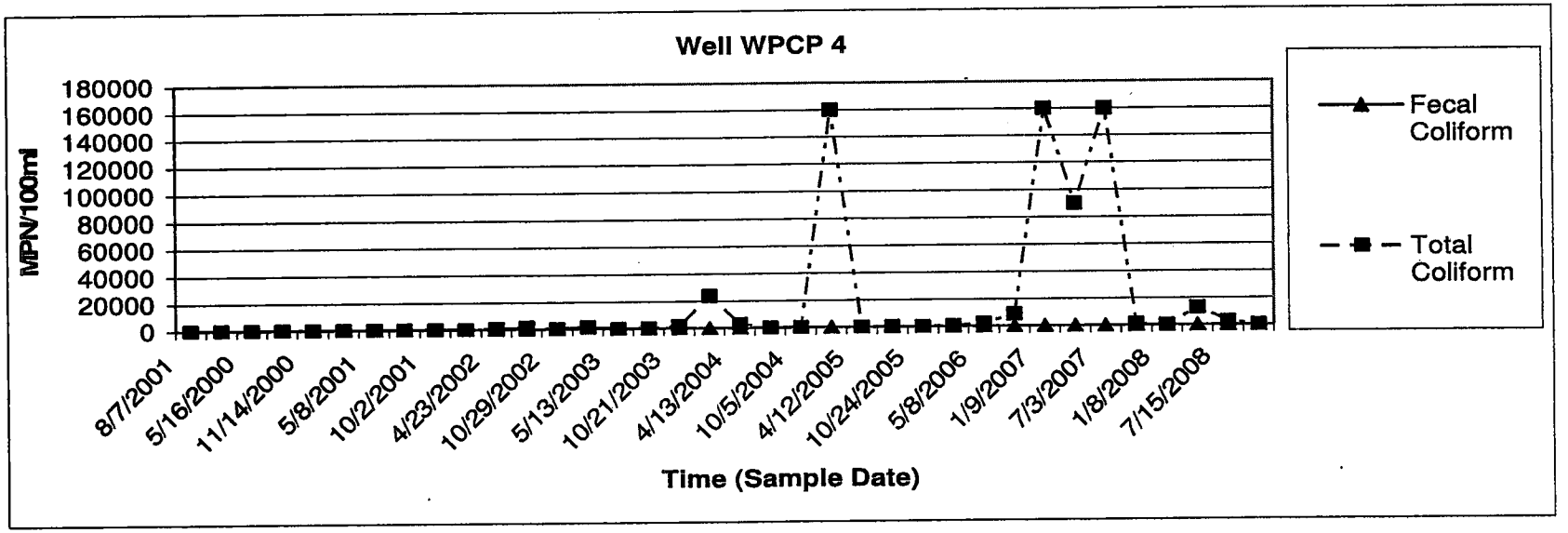
TM2-108

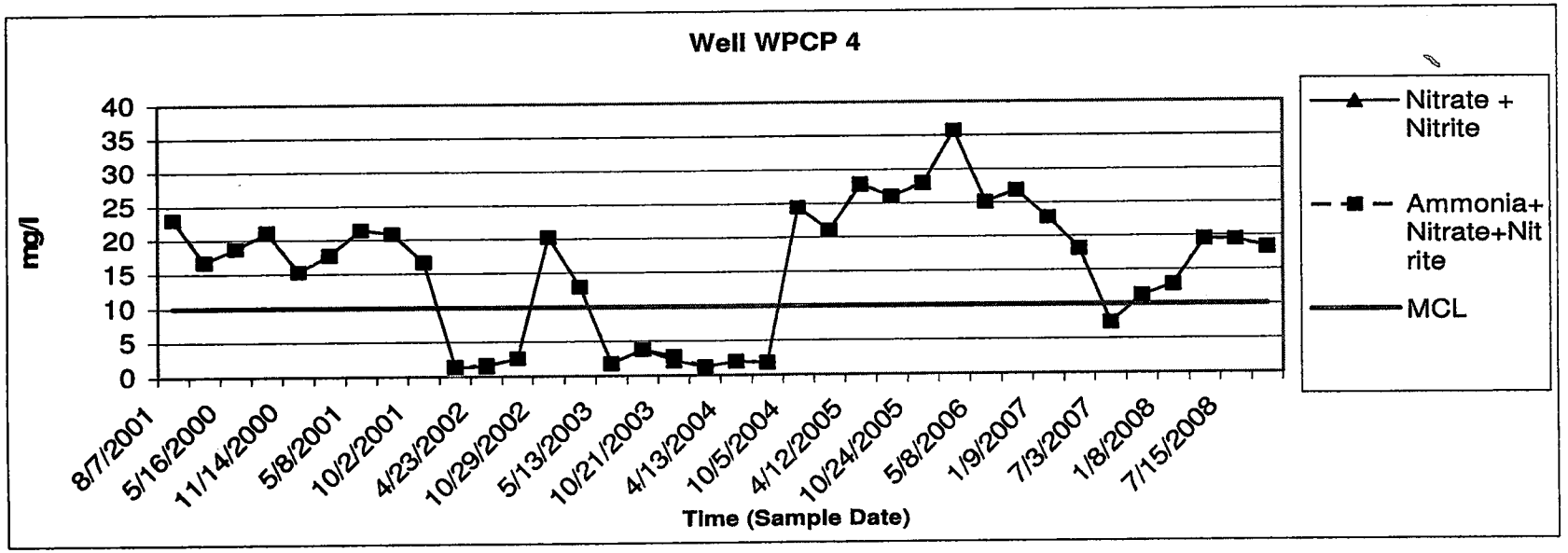
Malibu Water Pollution Control Plant

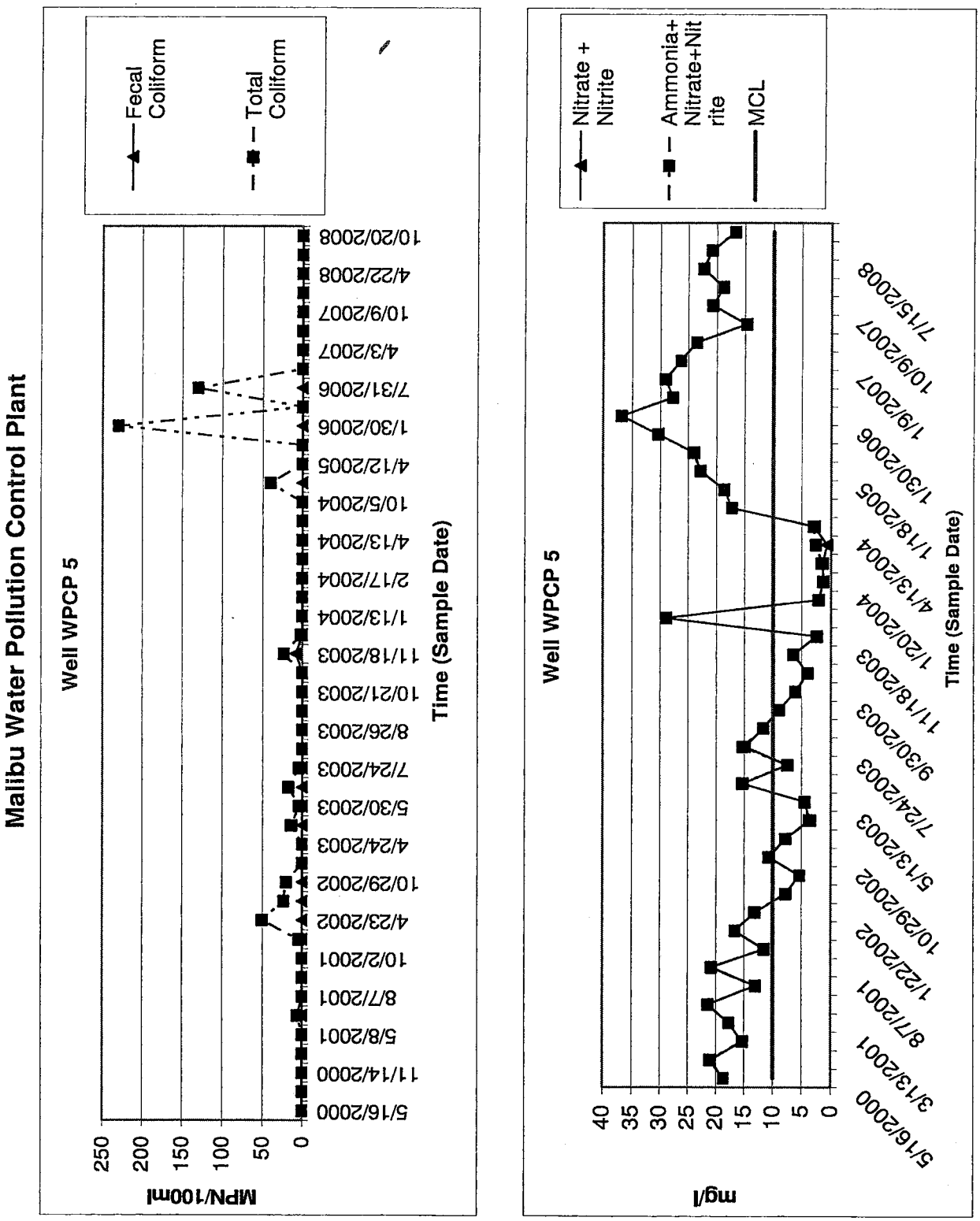




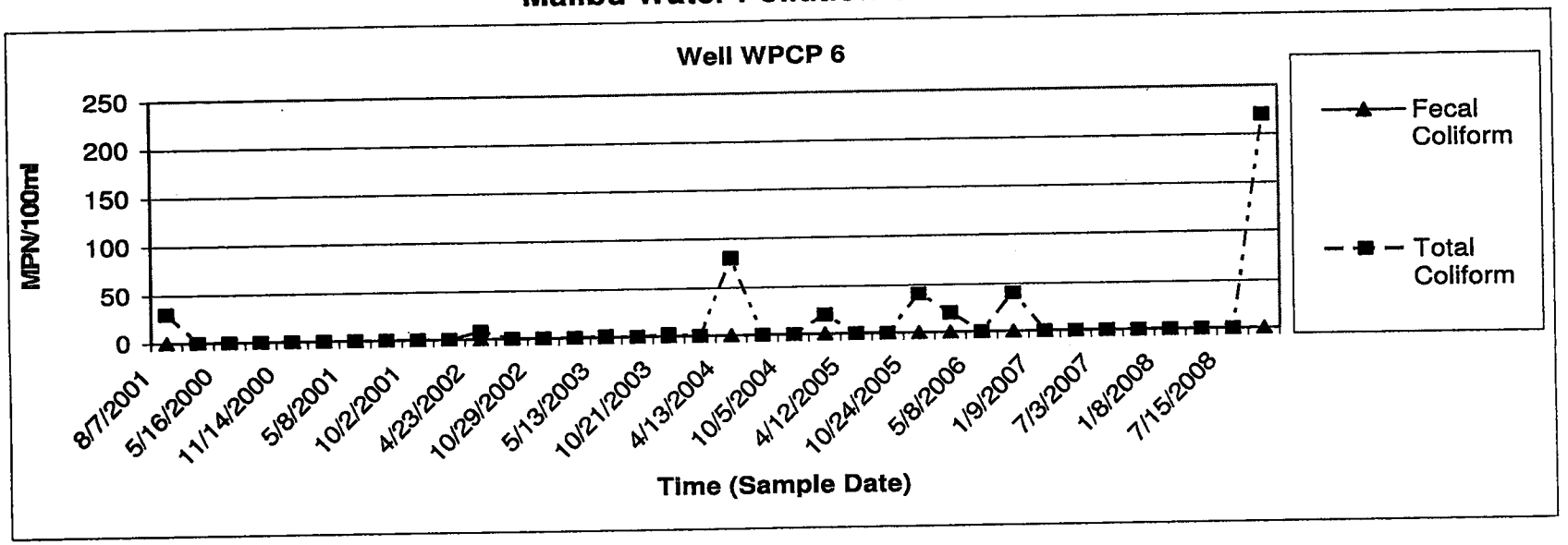
Malibu Water Pollution Control Plant

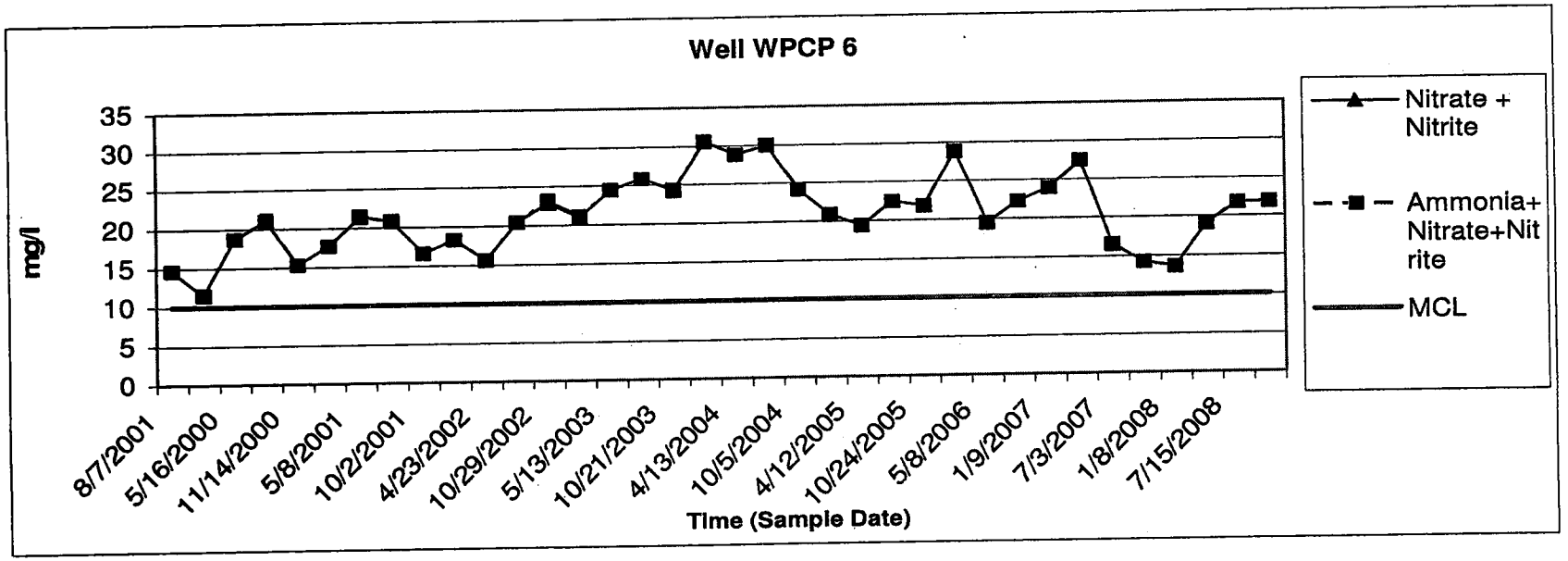




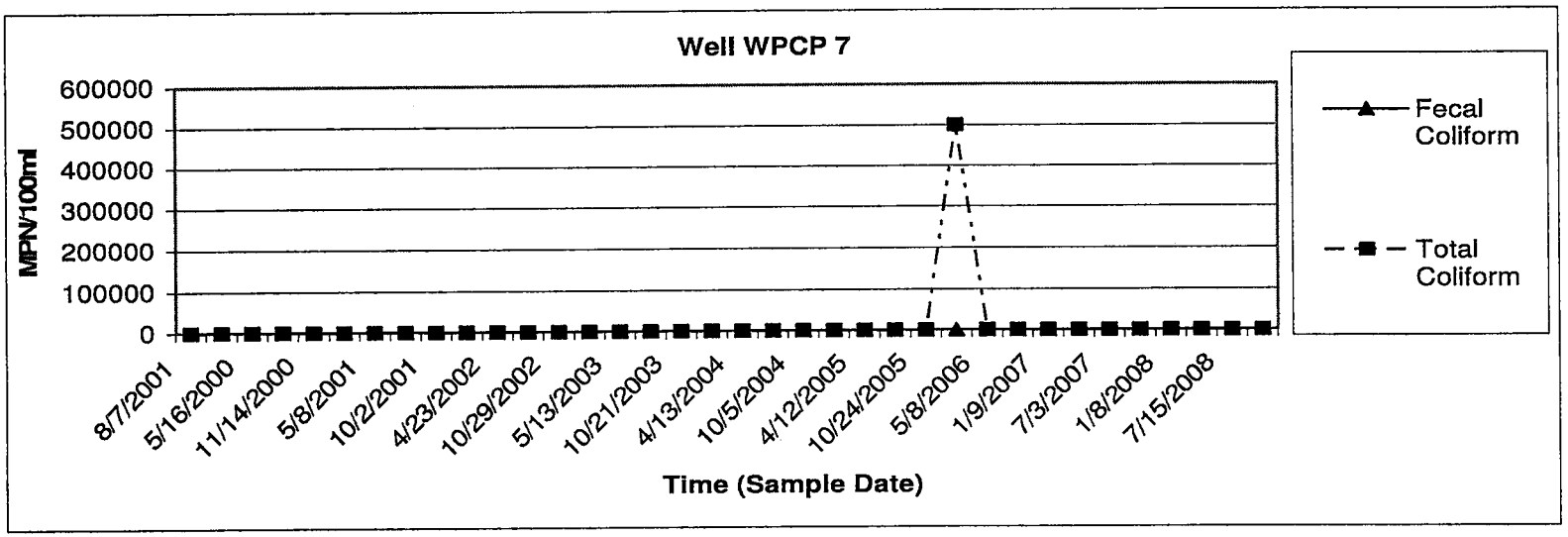

Malibu Water Pollution Control Plant
Well WPCP 5
Fecal Coliform
Total Coliform
MPN/100ml
Time (Sample Date)
Well WPCP 5
Nitrate + Nitrite
Ammonia+ Nitrate+Nitrite
MCL
mg/l
Time (Sample Date)

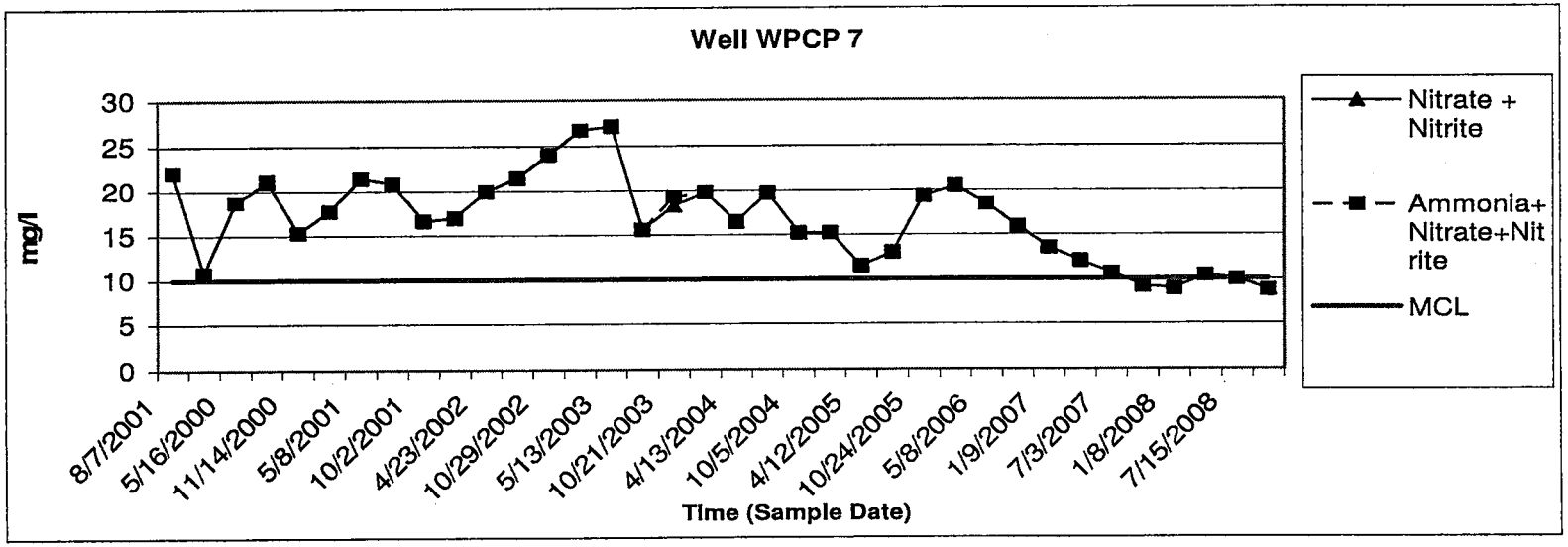
Malibu Water Pollution Control Plant





Malibu Water Pollution Control Plant





TM #3

State of California
California Regional Water Quality Control Board, Los Angeles Region

Final Technical Staff Report

Evidence in support of an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*

to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

Technical Memorandum #3:
Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation

By
Elizabeth Erickson,* Professional Geologist
Groundwater Permitting Unit

** The author would like to thank Regional Board staff, Joe Luera and interns Albert Chu, Shentong Lu, Shannon Liou, Justin Tang, Tessa Nielsen, Ben Leu, Holly MacGillivray, Thomas Palmieri, Ryan Thatcher and Yifei Tong for their assistance in preparing map, tables and graphs.*

November 5, 2009

Technical Memorandum #3: ***Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation***[1]

By
Elizabeth Erickson, Professional Geologist
Groundwater Permitting Unit

1. Purpose

The purpose of the memorandum is (a) to document the discharge of enterococcus, total coliform and fecal coliform, bacteria used to indicate risk of recreational waterborne illness, from on-site wastewater disposal systems (OWDS) in the Malibu Civic Center onto adjacent surface waters and beaches, and (b) to determine human health impacts on beach users from exposure to pathogens given observed levels of enterococcus in beach water.

2. Study Design and Data

The study sought to examine the distribution of bacteria in groundwater beneath the Malibu Civic Center area and surface water around Malibu Civic Center area. Fecal-indicator-bacteria are quantified in OWDS discharge, in leachfields/seepage pits, in groundwater, and in streams and beaches. OWDS performance data from permitted commercial facilities, groundwater monitoring data and beach monitoring data at the Malibu Civic Center are studied for the presence of enterococcus bacteria, which can originate in the human gut, have been used as indicators of pathogens, and are the basis of marine recreational criteria for the protection of human health.

Of the twenty permitted commercial facilities in the Malibu Civic Center under the Regional Water Quality Control Board's (Regional Board) oversight, four provided end-of-pipe measures and ten submitted groundwater monitoring results. End-of-pipe discharge reports from permitted systems document effluent quality as it enters the leachfield/seepage pit. Enterococcus densities were also examined in groundwater monitoring wells surrounding the leachfields.

The City of Malibu measures groundwater quality periodically throughout the Malibu Valley Basin which receives the effluent from the OWDS in the Malibu Civic Center area The groundwater monitoring of 20 such wells in the Malibu Civic Center area completed by the City of Malibu in 2004 and summarized by Stone Environmental, Inc. (Stone, 2004) are used for this study.

---

[1] The area subject to the proposed prohibition is referred to as the Malibu Civic Center area (Figure 1). The area was defined using topographic features and drainage patterns, and encompasses the hydrologic areas of Malibu Valley (also referred to as the lower Malibu Creek watershed), Winter Canyon, and adjacent coastal strips including Amarillo Beach, Malibu Beach, Malibu Lagoon, and Malibu Lagoon Beach (aka Surfrider Beach, including First, Second, and Third Points at Surfrider). For more discussion on the prohibition boundaries defining the Malibu Civic Center area, refer to the Technical Staff Report Overview and the Environmental Staff Report.

Beach data collected as part of the Coordinated Shoreline Monitoring Plan for Santa Monica Bay beaches were used for this study. The "Santa Monica Bay Beaches Bacteria Total Maximum Daily Load Coordinated Shoreline Monitoring Plan, April 7, 2004" (CSMP) went into effect on April 28, 2004. The sites cover 44 beaches that were identified as impaired due to high fecal-indicator-bacteria and/or beach closures and therefore placed on the California Clean Water Act 2002 section 303(d) list. Detailed descriptions of standardized sampling and testing procedures can be found at http://ladpw.org/wmd/npdes/beachplan.cfm. Attachment 3-A contains a complete list of the beaches in the CSMP.

The study sought to determine if enterococcus bacteria were present continuously along likely hydrological transport paths, such as those documented for the Civic Center area or at other beaches described in the literature, from the OWDSs in the Civic Center area to the adjacent beaches. Beach enterococcus densities, and their frequency distributions, were compared to variables such as watershed size, urban acreage, beach visitor population, wave strength, setting such as lagoon or estuary, number of roofs seen on air photo (where indicative of a septic system), preceding winter weather as rainfall, and annual variation, to identify correlations with the highest Pearson's Correlation coefficients. Although the study design does not eliminate all possible alternative bacteria sources, it focused on bacteria delivered to the beach via groundwater by examining the beaches during the summer months (May to the end of October) when other bacteria sources, such stormwater and overland urban runoff, are known to be at a minimum. Further, examining bacteria during storm-free dry conditions minimizes other transport mechanisms, such as rainfall or heavy wave action, which could move bacteria onto the beach face.

Compilations of the data reviewed have been provided for public review. Over 8000 records collected for CSMP were compiled and released with a summary of the beach characteristics on August 24, 2009 on the Regional Water Quality Control Board Website www.waterboards.swrcb/los angeles. Among these records, the Civic Center beaches sampled by CSMP are Malibu Colony Beach labeled as MC-1, Malibu Surfrider Beach labeled as MC-2, and the beach near Malibu Pier Beach labeled as MC-3. Sweetwater Canyon at Carbon Beach, labeled as SMB 1-13, is the Civic Center beach which lies furthest to the southeast. Marie Canyon, labeled as SMB 1-12, is the beach which lies furthest to the northwest and just outside the Malibu Civic Center Prohibition area. Attachment 3-B contains an expanded reference list including those documents cited here. Attachment 3-C contains a list of selected correlation coefficients between the Civic Center Beaches.

Early Technical Review

An Early Technical Review (ETR) of this work was conducted between June 8, 2009, and the public release of this document. The ETR resulted in recommendations from the reviewers (a) to enhance the confidence of the conclusions using statistics, (b) to recommend additional studies to confirm and extend the results shown here, (c) to emphasize the complexity of the subsurface hydraulic and microbiological environment between OWDS discharge and the ocean, and (d) to verify the relationship between human illness from marine recreational activities and coastal OWDS use. In response to these comments, additional statistical results were generated and human health risks estimates were based on a site-specific study. The Early Technical Reviewers were Dr. Mark Gold (Heal the Bay), Mr. Steve Weisberg and Dr. John Griffith (Southern California Coastal Water Research Project or SCCWRP), Dr. Alexandria Boehm

(Stanford University) and Dr. John Izbicki (US Geological Survey), all of whom have completed research on microbial water quality at beaches.

Peer Review

Independent Peer Review was also conducted through a contract with the University of California at Berkeley and the State Water Resources Control Board, with the comments and response to comments released to the public and considered with this document by the Regional Board.

Integration with Ongoing Studies

An epidemiology study of Surfrider Beach by SCCWRP is ongoing with fieldwork conducted during the summer of 2009. Groundwater assessment was conducted during a ten-day period in July 2009 by Dr. John Izbicki of the USGS. The City of Malibu reports that Richard Ambrose and Jenny Jay of UCLA conducted a study of *Bacteroides* in Malibu Lagoon in 2009. General descriptions of the ongoing studies are available from the Regional Board.

3. Results

Hydrological Connection

The existence of a hydrological connection between the beaches and the groundwater underlying the Malibu Civic Center area has been well established in existing literature, by groundwater models (Stone, 2005; Questa, 2003), by surface water models (Malibu Creek and Lagoon nutrient TMDL 2003; Malibu Creek and Lagoon bacteria TMDL, 2004), and as described in the 2004 Memorandum of Understanding between the City of Malibu and the Regional Board. The City of Malibu's ongoing hydrology study, as expressed in the planning documents provided to Board staff in September, 2008, seeks to quantify and model the groundwaters of the Civic Center and their hydrological connection with the ocean.

Enterococcus is found all along hydrological transport paths from the Onsite Wastewater Disposal Systems in the Civic Center Area to the beaches.

Bacteria in Groundwater

End-of-pipe bacteria measurements are reported for four permitted commercial sites in the Malibu Civic Center. Disinfection has failed in each example except Malibu Beach Inn. The enterococcus values are considered to be typical for non-disinfection systems like most residential OWDSs. A more complete description of the extent of enterococcus in the groundwater basin is included as part of Technical Memo #2.

Table 1: End-of-Pipe Effluent Bacteria Densities (MPN/100mL) reported for permitted Malibu Civic Center Commercial Facilities where Disinfection has failed.

Site	Total	Fecal	Enterococcus
Malibu Creek Preservation	1,600	350	46
	1,600	140	110
Malibu Beach Inn[2]	Not measured	2	2
	Not measured	2	2
Malibu Colony Plaza	105	2	2
	4,000	2	2
	1,600	1,600	2,419
	1,600	1,600	2,419
Fire Station 88	1,600	1,600	2,419
	9,000	Not available	90,000
	24,000	24,000	24,000
	30,000	2,400	50,000
	240,000	Not available	240,000
	300,000	50,000	1,600,000

Shaded measures on the chart show where fecal-indicator-bacteria values are above the water quality objectives for protection of body contact recreation (REC-1)). The end-of-pipe data were provided to document that enterococcus is discharged from OWDSs into groundwater. Staff notes the values are higher than 'average' enterococcus ranges reported in raw sewage or natural waters. Enterococcus values in wells and at end-of-pipe have been reported ranging to 1 X 10^8, suggesting that high values are not computational, sampling or reporting errors.

Elevated bacteria levels were found throughout the Malibu Valley groundwater basin, which underlies the Malibu Civic Center area, and are also reported in 2004 by Stone Environmental's "Final Report-Risk Assessment of Decentralized Wastewater Disposal Systems in High Priority Areas in the City of Malibu, CA". Figure 1 shows the locations of monitoring wells in Stone's study. Elevated subsurface enterococcus densities are seen adjacent to the receiving waters. Fifteen out of 20 City wells, and 16 out of 27 permit monitoring wells, located at the edge of leachfields, contained a maximum enterococcus density exceeding the single sample maximum water quality objective of 104 MPN/100ml for protection of the beneficial use of REC-1, i.e., 31 out of the total 47 wells (76%) have an exceedance (Figure 2 and 3). Importantly, the occurrence of enterococcus in groundwater at these wells illustrates that enterococcus is present in the groundwater at the study site.

[2] Disinfection had not failed at Malibu Beach Inn, but end-of-pipe data were submitted.

Figure 1. The maximum enterococcus measures in wells in the Civic Center area after Stone 2004.

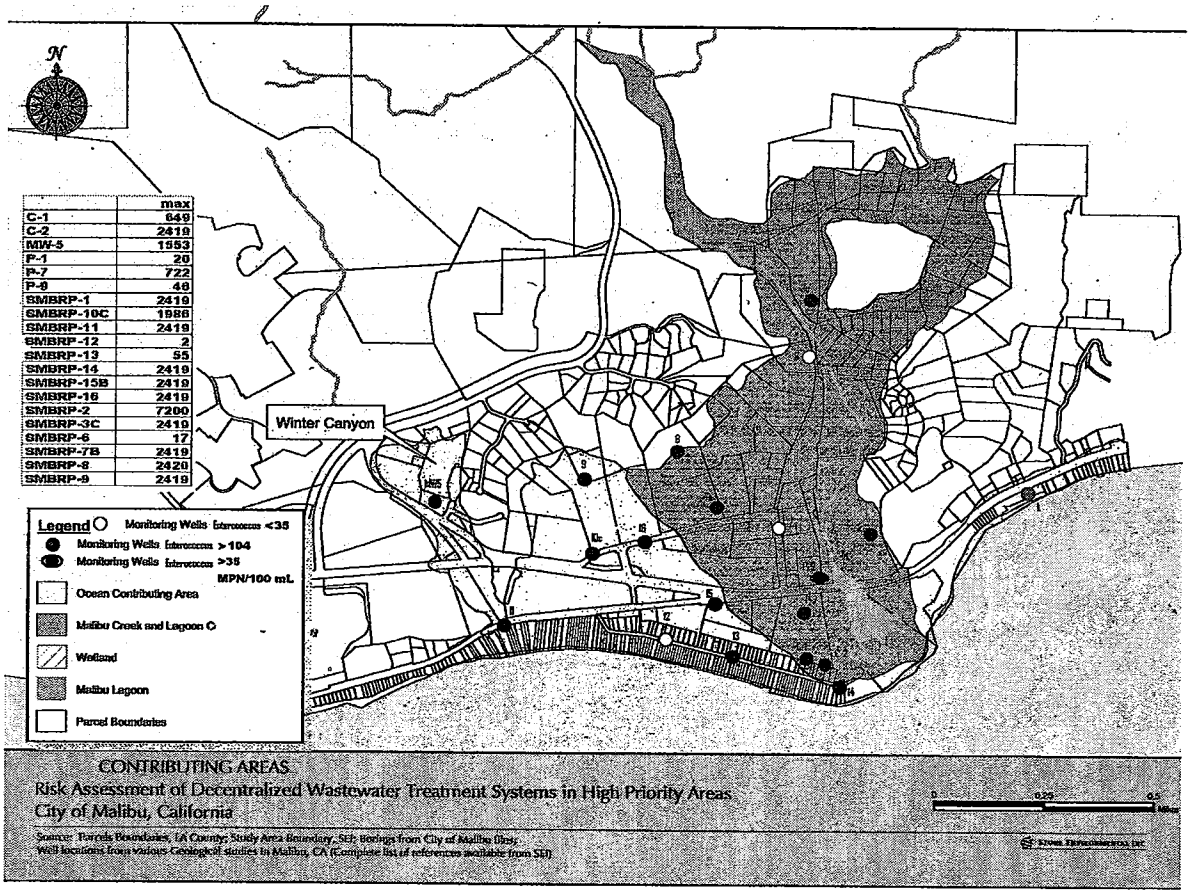


Figure 2: Chart of Maximum Enterococcus Density (MPN/100 mL) for 20 groundwater wells in the Civic Center area from Stone 2004 Study (well locations are shown in Figure 1).

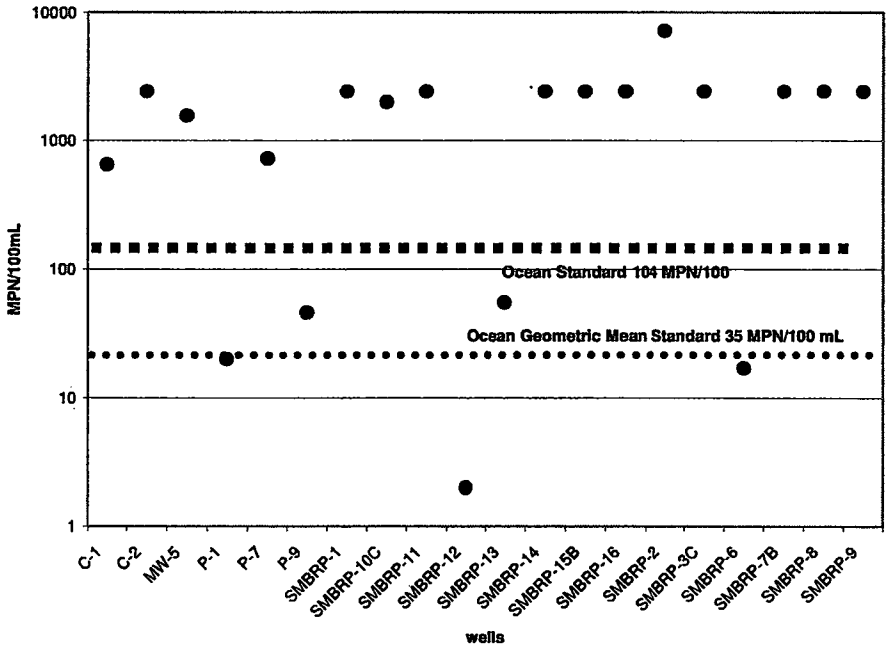
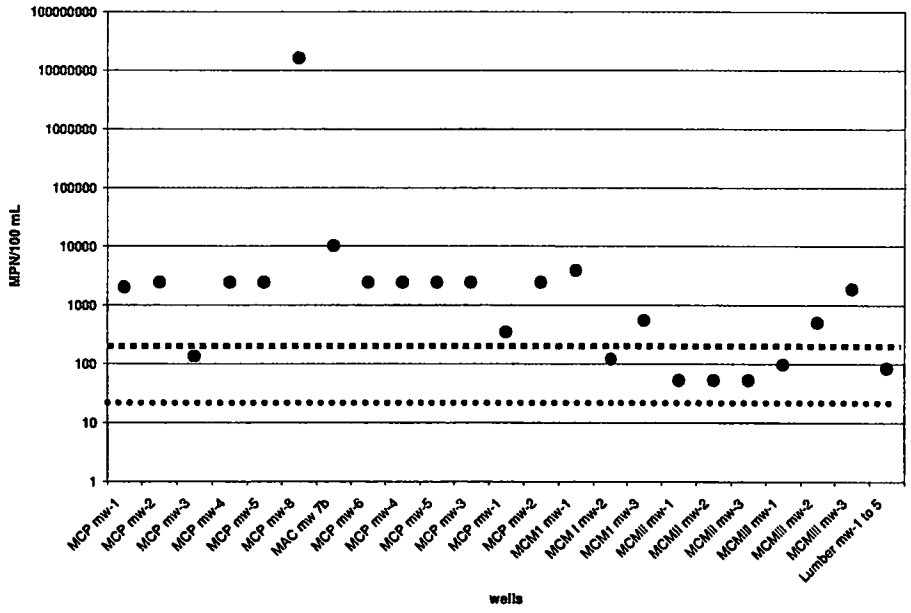


Figure 3: Chart of Maximum Enterococcus Density (MPN/100 mL) for 27 permit monitoring wells in the Civic Center area (well locations are shown in Technical Memorandum #2).

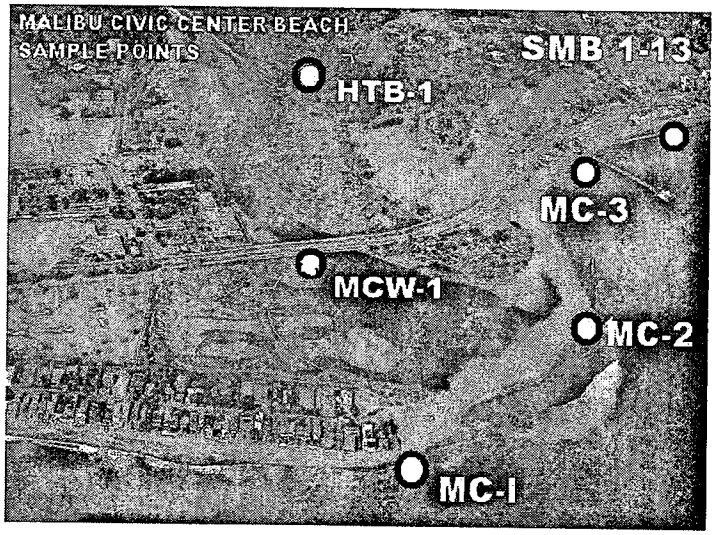


Bacteria in Surface Water: Malibu Creek and Lagoon

Several public and not-for-profit agencies measure water quality on Malibu beaches, in Malibu Creek, in the lagoon and in the ocean. This data were not collected simultaneously, may not be sampled, transported or tested with consistent protocols, and is often not compiled. Recent data from 2 of many sample sites show that last summer's levels of enterococcus are lower in the water entering Malibu Lagoon from the Malibu Creek watershed (see HTB-1 in Figure 4), than downstream of the Malibu Civic Center area (MCW-1). The contrast can be seen at Lower Malibu Creek sampling station HTB-1 and Lagoon sampling station MCW-1.

Researchers have recently released data, but not interpretations, of water quality in the lagoon and creek that may ultimately lead to a better understanding of the temporal relationship between bacteria sources and transport mechanisms such as tides, creek flow volumes, groundwater discharge volumes, and rainfall. The recent data provided in Figure 5 demonstrate that periods have been observed when Malibu Creek is not the only source of bacteria in the lagoon. Given the elevated concentrations of enterococcus observed in the groundwater beneath the civic center, and Stone's (2004) conclusion that about half of groundwater is supplied by OWDSs and most of the groundwater makes it way to the ocean, the existence of Malibu Civic Center groundwater discharge is considered a possible source of increased levels of enterococcus in the Lagoon. Typically during the summer, bacteria from any source must travel via groundwater beneath the Surfrider Beach berm before discharging into the wave zone at MC-2, as seen in Figure 4, because the beach is not broken by overland flow.

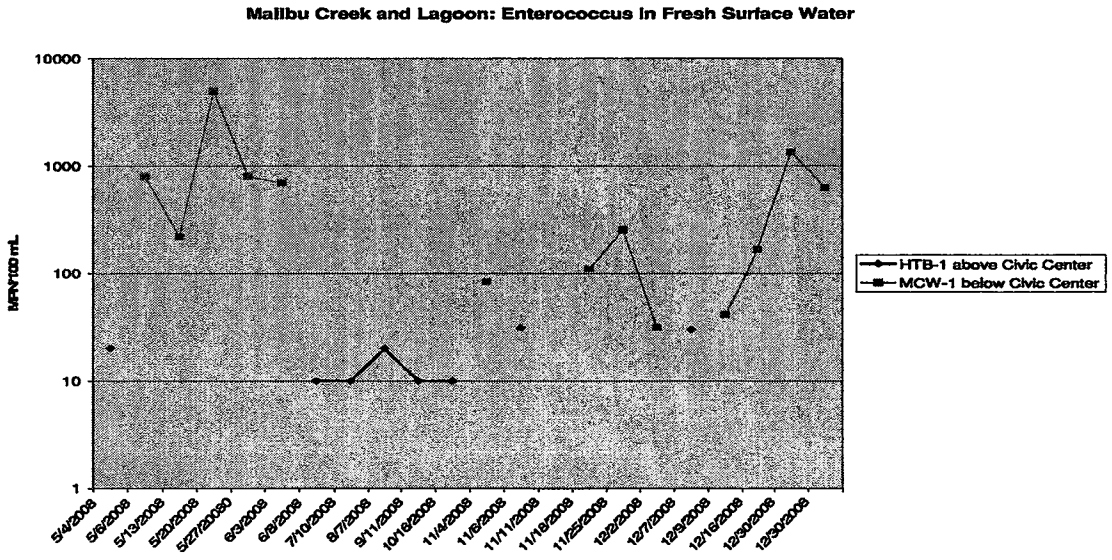
Figure 4: Malibu Civic Center Surface Water and Beach Sampling Points.



Sampling Point HTB-1 can be seen in Figure 4 where surface water from Malibu Creek watershed enters the Lagoon, MCW-1 where Malibu Creek enters Malibu Lagoon after receiving groundwater discharge from the Malibu Civic Center. The groundwater contains enterococcus which increases in concentration in the Lagoon, as shown in Figure 5. Also seen are beach sampling points MC-1 at the beach adjacent to

Malibu Colony, MC-2 at the breach point of Malibu Lagoon on Surfrider Beach, MC-3 at the beach adjacent to Malibu Pier and SMB-1-13 at Carbon Canyon Beach where Sweetwater Canyon discharges.

Figure 5: Summer 2008 Enterococcus above and below Malibu Civic Center in the Lagoon[3]



Bacteria in Surface Water: Beaches

The frequencies with which bacteria at Surfrider Beach, Malibu Colony Beach, adjacent to Malibu Pier and Sweetwater Canyon, and Marie Canyon Beach exceed the water quality objectives for enterococcus in the summers of 2005, 2006 and 2008 are listed here. A figure comparing these violations of the water quality standards for the protection of contact recreation beneficial use (REC-1) are displayed in Figure 6.

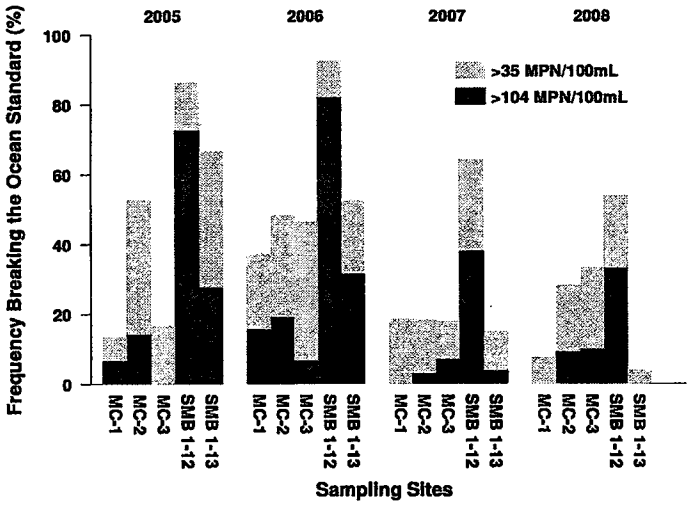
[3] Data have been collected at these locations for additional dates, but these data are the most recent and documents simultaneous measurements at upstream and downstream locations in the lagoon.

Table 2: Exceedences of single sample Enterococcus water quality standard[4].

Days/Frequencies with Enterococcus >104 MPN/100mL	2005	2006	2007	2008
Adjacent to Malibu Pier (MC 3)	0 (0)	2 (6.7%)	2 (7.1%)	0 (0)
Surfrider Beach (MC-2)	10 (14.3%)	25 (19.2%)	4 (3.1%)	12 (9.2%)
Malibu Colony (MC-1)	1 (6.7%)	5 (15.6%)	0 (0)	0 (0)
SMB 1-13 Sweetwater Canyon at Carbon Beach (southeast)	5 (27.8%)	12 (31.6%)	1 (3.7%)	0 (0)
SMB 1-12 Marie Canyon(northwest)	16 (72.7%)	55 (82.1%)	16 (38.1%)	13 (33.3%)

[4] The data summarized here were collected at each site four times a month from April through October

Figure 6: Cumulative frequencies of enterococcus concentrations that failed to meet the ocean discharge standards in Malibu Civic Center beaches



On the beaches, bacteria are typically present at levels above water quality objectives at Malibu Colony (MC-1), Surfrider Beach (MC-2), and adjacent to Malibu Pier (MC-3). The pollution on beaches has been quantified in the 2002 303(d) list, Heal the Bay's beach report cards, and the Regional Board's Santa Monica Bay Beaches Bacteria TMDLs. Further, the Regional Board issued a Notice of Violation (NOV) for bacteria adjacent to the Malibu Civic Center beaches in March 2008. It identified violations of the waste discharge requirements established in Board Order No. 01-182, as amended by Order No. R4-2006-0074 and Order No. R4-2007-0042, pertaining to the Los Angeles MS-4 Permit controlling urban runoff and stormwater discharges. Tables 3, 4 and 5 show the water quality measures upon which the NOV was based for Malibu Civic Center Beaches.

Table 3: Surfrider beach: Fecal-Indicator Bacteria Violations[5]

Surfrider Beach MC-2 Date of Violation(s)	Single Sample Result (MPN/100 ml)			
	Total Coliform	Fecal Coliform	Enterococcus	Total Coliform (Fecal:Total Coliform Ratio > 0.1)
Basin Plan Limit	10,000	400	104	1,000
9/14/2006		1,100		6,800
9/15/2006		1,100		7,900
9/16/2006				
9/17/2006				
9/18/2006				
9/19/2006				
9/20/2006				
9/21/2006				
9/22/2006				
9/23/2006				
9/24/2006				
9/25/2006				
9/26/2006				
9/27/2006				
9/28/2006		500		
9/29/2006		430		2,200
9/30/2006				1,400
10/1/2006				
10/2/2006				
10/3/2006	>13,000	6,300		>13,000
10/4/2006				
10/5/2006	13,000	7,300	1,400	13,000
10/6/2006				
10/7/2006		740		
10/8/2006				
10/9/2006				
10/10/2006		1,000	530	5,500
10/11/2006				
10/12/2006				
10/13/2006				
10/14/2006				
10/15/2006				
10/16/2006				

[5] Data listed here were gathered for enforcement purposes and does not represent all the information gathered in a particular year. The geometric mean calculations were incompletely documented in an 9/9/09 draft and have been deleted.

10/17/2006		1,300		6,300
10/18/2006			110	1,100
10/19/2006				
10/20/2006		500		
10/21/2006				
10/22/2006				
10/23/2006				
10/24/2006				
10/25/2006		3,200	160	3,200
10/26/2006				
10/27/2006		430	110	3,400
10/28/2006				
10/29/2006				
10/30/2006				
10/31/2006				
4/6/2007		580		3,400
4/7/2007	>13,000	1,600		>13,000
4/24/2007	11,000	740		
4/25/2007	11,000	7,300		11,000
4/27/2007		430		1,600
5/18/2007		430	190	
5/19/2007		430		
6/2/2007			270	
6/16/2007		8,700	310	9,600
10/19/2007		500		1,300
10/20/2007	>13,000	830		
10/24/2007	11,000	500		
10/30/2007		580	120	
10/31/2007		910		5,900
Total Violations	**7**	**25**	**9**	**18**

Table 4: Malibu Colony: Fecal-Indicator Bacteria Violations

MC-1 Malibu Colony Date of Violation(s)	Single Sample Result (MPN/100 ml)			
	Total Coliform	Fecal Coliform	Enterococcus	Total Coliform (Fecal:Total Coliform > 0.1)
Basin Plan Limit	10,000	400	104	1,000
9/14/2006				
9/15/2006				
9/16/2006				
9/17/2006				
9/18/2006				
9/19/2006				
9/20/2006				
9/21/2006				
9/22/2006				
9/23/2006				
9/24/2006				
9/25/2006				
9/26/2006				
6/4/2007		419		
Total Violations	**0**	**1**	**0**	**0**

Table 5: Adjacent to Malibu Pier: Fecal-Indicator Bacteria Violations

Malibu Pier MC-3 Date of Violation(s)	Single Sample Result (MPN/100 ml)			
	Total Coliform	Fecal Coliform	Enterococcus	Total Coliform (Fecal:Total Coliform > 0.1)
Basin Plan Limit	10,000	400	104	1,000
10/10/2006			422	
10/11/2006				
10/12/2006				
10/13/2006				
10/14/2006				
10/15/2006				
10/16/2006				
10/17/2006				
10/23/2006				
10/24/2006				
10/25/2006				

10/26/2006				
10/27/2006				
10/28/2006				
10/29/2006				
10/30/2006				
10/31/2006				
6/4/2007			131	
10/29/2007			109	2,046
Total Violations	**0**	**0**	**3**	**1**

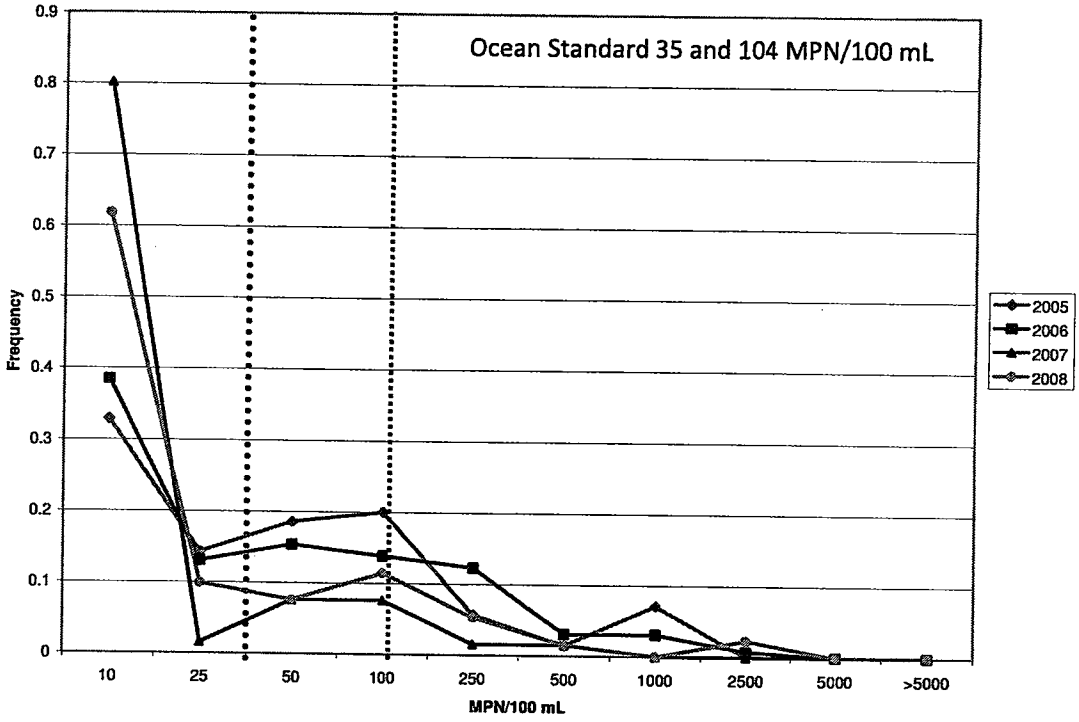
Correlations of Enterococcus with Beach Variables.

Staff did not include the results comparing beach enterococcus densities, and their frequency distributions, with other beach variables when no correlation was found. The variables examined include watershed size, urban acreage, beach visitor population, wave strength, setting such as lagoon or estuary, and number of roofs seen on air photo (where indicative of a septic system). The Pearson's Correlation Coefficient between enterococcus frequency distributions during four summers at a single beach defined statistically valid correlations (Appendix T3-C). More sophisticated statistical studies were applied, and Staff did find a statistically valid contrast between enterococcus frequency distributions from beaches adjacent to septic and sewered beaches and a statistically valid correlation between septic beaches and rainfall. These results are not included here, but included in the response to peer review.

Enterococcus on Malibu Civic Center Beaches

The enterococcus measures recorded on beaches adjacent to the Malibu Civic Center area over the summers 2005 to 2008 were sorted by interval frequency, plotted against the concentrations of enterococcus (MPN/100mL) and shown in Figures 7-9. The method was chosen to minimize the impact of varying sample sizes, to large variations in the measures and is a commonly used technique to analyze data.

Figure 7: Surfrider Beach (site MC-2) Enterococcus Interval Frequency for May-October Summer Single Measures



The enterococcus interval frequencies calculated for the beaches for the four summers were compared using the Pearson's correlation coefficient. The number of measures were counted in each of 8 intervals: values less than or equal to ten; more than ten but less than or equal to 25; more than 25 but less than or equal to 50; more than 50 but less than or equal to 100; more than 100 but less than or equal to 250; more than 250 but less than or equal to 500; more than 500 but less than or equal to 1000; and more than 1000. The intervals approximate a logarithmic distribution, but include more intervals between 25 and 100 and between 250 and 1000, ranges in which the beaches contrasted most sharply. Pearson's correlation coefficient was applied following the method used in EPA's *Ambient Water Quality Criteria for Bacteria, 1986* as described in the following quote:

> "The examination of a number of potential indicators, including the ones most commonly used in the United States (total coliforms and fecal coliforms), was included in the study. Furthermore, the selection of the best indicator [enterococcus] was based on the strength of the relationship between the rate of gastroenteritis and the indicator density, *as measured with the Pearson's Correlation Coefficient. This coefficient varies between minus one and plus one. A value of one indicates a perfect relationship, that is, all of the paired points lie directly on the line which defines the relationship. A value of zero means that there is not linear relationship. A positive value indicates that the relationship is direct, one variable increases as the other increases. A negative value indicates the relationship is inverse, one variable decreases as the other increases.* The correlation coefficients for gastroenteritis rates are related to the various indicators of water quality from both marine and fresh bathing water as shown.... (page 5)"

Correlation coefficients between annual enterococcus frequency distributions for Surfrider Beach (MC-2) ranged from 0.78 to 0.98 suggesting little change in frequency distribution from year-to-year. Calculations of correlation coefficients for the Civic Center beaches with the best correlation, Surfrider, and the beach with the poorest correlation, next to Malibu Pier, are shown by year in Appendix T3-B:

Since enterococcus frequency distributions each year correlate well, this suggests that the distribution of bacteria frequencies is generally consistent at a beach, and not a function of random events such as swimmer shedding, the inappropriate disposal of a diaper or beach use by a homeless person.

Figure 8: Malibu Colony (site MC-1) Enterococcus Interval Frequency for May-October Summer Single Measures

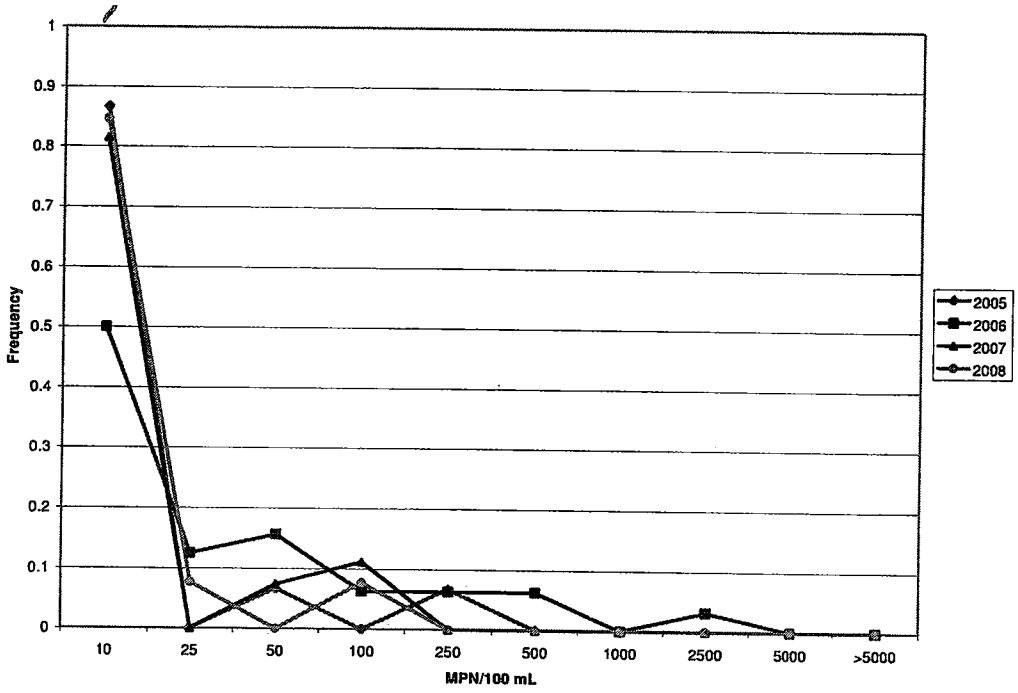
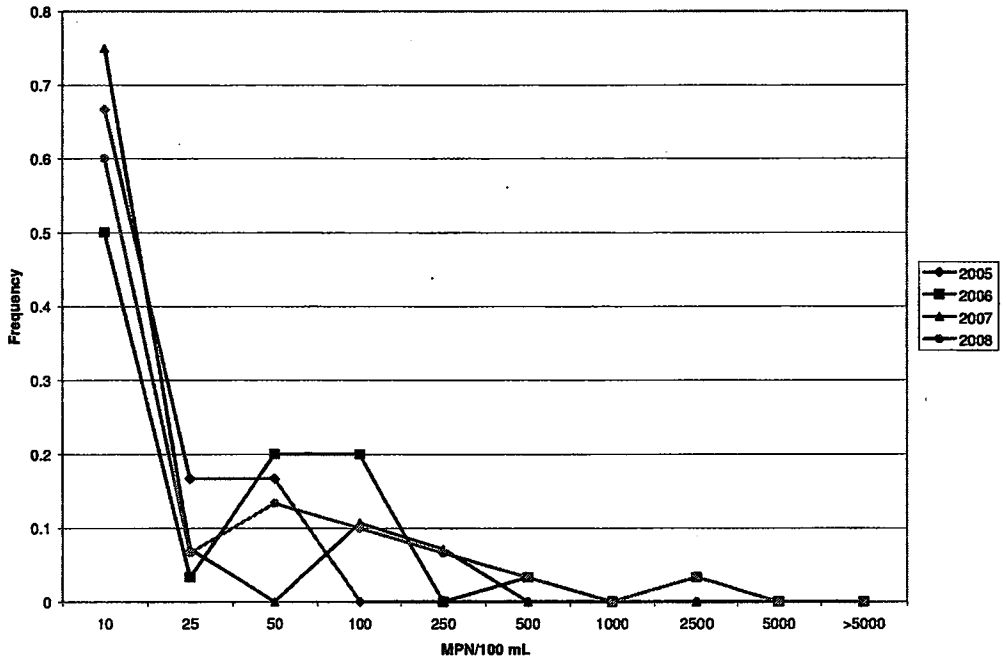


Figure 9: Adjacent to Malibu Pier (site MC-3) Enterococcus Interval Frequency for May-October Single Measures



4. Epidemiology Evidence of Human Health Impacts in the Malibu Civic Center.

Robert W. Haile and 13 co-authors (1996) completed an epidemiology study contrasting illness among immersed-head swimmers at Malibu's Surfrider Beach, Will Rogers Beach and Ashland Storm Drain. The results are summarized in Table 6. The first of its kind study on the health impacts of swimming at urban runoff contaminated ocean beaches was completed under the auspices of the USEPA's National Estuary Program's Santa Monica Bay Restoration Project (now a state commission). The study linked increased illness rates to fecal indicator bacteria densities at these beaches between June and September 1995.

Table 6: Epidemiology evidence of human impacts in Malibu

June 22 to September 17, 1995	Enterococcus Number > 104 MPN/100 mL	Percentage of days when exceeded 104 MPN/100 mL
Surfrider Beach	26	34.6
100 yards upcoast	4	5.1
100 yards downcoast	14	17.9

Will Rogers Beach	32	45.2
100 yards upcoast	5	6.8
100 yards downcoast	7	9.6
Ashland Beach	5	6.3
100 yards upcoast	0	0
100 yards downcoast	1	1.3

Illness rates are given below for each of the days when enterococcus was above 104 MPN/100 mL at any beach. As a point of comparison, the EPA bathing water criteria for enterococcus (geometric mean of 35 MPN/100 ml and 104 MPN/ 100 ml for single samples) was determined by EPA to lead to a Highly Credible Gastrointestinal Illness (HCGI) rate of an additional 19 people with HCGI out of 1,000. The HCGI illness identified by EPA included a fever and correlates with Haile's HCGI 2 category.

Significant respiratory Disease (runny nose, coughing and fever) (SRD)	One of: vomiting, diarrhea and fever or stomach pain and fever. (HCGI 2)
45 per 1,000 swimmers	39 per 1,000 swimmers

The Santa Monica Bay bacteria and Malibu Creek and Lagoon TMDL used the term 'urban runoff' to identify surface dry weather flows not otherwise quantified and did not preclude surface flow originating as groundwater. The 1999 Haile study attributed decreasing illness in swimmers with increasing distance from the stormwater outlet point to the dilution of bacteria delivered at the stormwater outlet via 'urban runoff." However, Haile also measured illnesses at Surfrider Beach even when no surface flow crossed the 'storm drain' sampling point. Because Stone (2004) found that under average conditions the majority of the water in the Lagoon and entering the ocean comes from groundwater, the bacteria Haile measured could be associated with groundwater flows moving through the beach face at Surfrider as well as surface flows crossing the beach.

The Malibu beaches had more exceedances of the Ocean standard than the other two study areas in 2005, 2007 and 2008, after a low-flow diversion was installed on Will Rogers Beach to limit overland flow during the summer.

5. Discussion of Historic and Recent Studies

Historic Studies relating Malibu Civic Center Septic Systems to Human Health Risk and Beach Pathogens

Existing technical studies (summarized in Table 7) link OWDS at the Malibu Civic Center area to beach bacteria and are discussed below:

On February 5, 1970, Los Angeles County Health provided a letter to the Regional Board stating that serious potential hazards to human health were expected to result from OWDS. LACH has repeatedly closed Surfrider Beach at the Malibu Civic Center due to high bacteria concentrations.

On July 8, 1987, Los Angles County Public Works held a public meeting to discuss a Draft Environmental Impact Report for a centralized waste water treatment plant and sewer for Malibu to address human health risk caused by OWDS system pathogens. The City of Malibu subsequently incorporated and a group of citizens brought a lawsuit to block the formation of assessment districts. The legal settlement required the new City of Malibu to provide sufficient oversight of on-site waste water treatment facilities such that they would meet Regional Board requirements.

The 1994 Ph.D. dissertation of Dr. Mark Gold "What are the health risks of swimming in the Santa Monica Bay?" identified human viruses in Malibu Lagoon and identified a potential source of the contamination as adjacent OWDS.

On January 24, 2002, the Regional Board adopted a Resolution amending the Santa Monica Beach Bacteria TMDL to the Basin Plan. The staff report found that bacteria loads from OWDS contribute to beach pathogens.

On August 30, 2004, the Stone report found that bacteria in the groundwater may enter receiving water where OWDS are found within 6-month groundwater travel time of the Ocean or Malibu Creek.

The September 17, 2004, Memorandum of Understanding between the City of Malibu and the Regional Board stated that "ordinances shall be drafted by staff, and recommended for adoption within the six-month-time-of-travel zone, as identified in the Risk Assessment Report (Stone), to provide advanced treatment and disinfection. The six-month time-of-travel zone shall include all areas contributing to Malibu Creek and Lagoon, and beaches between Sweetwater Canyon outfall and Winter Canyon outfall. OWTS located outside of the six-month-travel-time zone that cannot demonstrate compliance through inspection or that are identified as impacting groundwater by any other means shall provide adequate vertical separation and/or advanced treatment with disinfection." As of the date of this document, the City of Malibu has not provided documentation that systems within the six-month-time-of-travel zone have been upgraded to prevent bacteria discharge to the subsurface or include disinfection, nor has an ordinance to this effect been passed by the City of Malibu.

On Dec. 13, 2004, the Regional Board adopted a Resolution incorporating the Malibu Creek and Lagoon Bacteria TMDL into the Basin Plan. The staff report references a surface water model prepared by Tetra Tech which quantifies bacteria loads contributed by OWDS in the Malibu Civic Center.

Numerous studies have been completed to describe the ecosystem, hydrology, land use, possible mechanisms of waste water treatment, and costs to support policy decisions about bacteria and human health risk in the Malibu Civic Center (Ambrose et al. 2008; Bing Yen and Associates, 2001; Crawford Multari and Clark Associates, 1997, 2006, 2007; Ensitu Engineering, 2008; Gold, 1994; Jones and Stokes, 2008; Regional Board 1972, 1998, 1990, 2002, 2004b, 2008, 2008b; Lucero, 2008; Warshall,

1992; Questa, 2003; RMC, 2008; SMBRP, 1999, 2001; UCLA, 2000; URS Greiner, 1999; EPA, 2003; Stone, 2004a, 2004b, 2004c; Trim, 1994; Thorsen, 2008; and Van Beveren, 2008a, 2008b, 2008c).

Table 7: Historic Findings of Human Health Risk related to Malibu OWDS.

Date	Source	Summary
Feb 5, 1970	LA County Flood letter to Regional Board	Future OWDS will pollute groundwater in Malibu Creek with nutrients
Feb 5, 1970	LA County Health to Regional Board	Serious potential hazard to health from OWDS
Feb 11, 1970	CA DWR to Regional Board	Malibu Valley needs an area wide Water Quality plan
Apr. 8, 1970	Public Hearing SWRCB	Discontinue OWDSs, continue Regional Board surveillance
Jan. 21, 1971	CA DPH Status Ocean and streams in Malibu	Local ocean and freshwater bacteria exceed standards to protect shell fish collection in areas of development
Mar. 12, 1971	Regional Board EO to LA County Supervisors	Sewer for Malibu must be provided
May 31, 1972	Regional Board Resolution 72-4	Waste Discharge Requirements only allowed if a timetable is established to provide future connections to LA County sewer
Apr. 10, 1985	CA DPH to LA County Supervisors	Staff report and recommendation to authorize Sewer districts
July 8, 1987-Nov. 30 1988	LA Public Works Public Meeting and Malibu Citizens Committee public meetings	Draft Environmental Impact Report for Sewer, discussion of Malibu incorporating, discuss alternatives for centralized system with wetland treatment
Jan. 18, 1989	LA County Supervisors hearing	STEP WWTP system construction approved
1992	Warshall et al. report finalized	OWDS in Malibu described. Pathogen removal quantified. Author states that systems require extensive management and recommends centralized system in some areas like Civic center
1994	Mark Gold Dissertation	Three studies between 1990 and 1992 show high fecal-indicator-bacteria densities at ankle-depth wave wash and human viruses in runoff from three storm drains in Santa Monica Bay including Malibu Creek and Lagoon
May 7, 1996	Haile, et.al. 1996 epidemiology study	22,085 subjects in epidemiology study at Surfrider, Will Rogers and Santa Monica, with detailed study results for Malibu.
Dec. 14, 1998	Regional Board Resolution 98-023	Directs Report of Waste Discharge for all OWDSs and ACL to City of Malibu
Aug 12, 1999	Regional Board Resolution 99-13	El Rio septic staff report: Poorly maintained septic linked to nitrogen contamination in groundwater

January 22, 1999	Haile, et al, 1999 epidemiology study	In Epidemiology July 1999, vol. 10, n. 4 22,085 subjects in epidemiology study at Surfrider, Will Rogers and Santa Monica showing increased risk to immersed-head swimmers for illness where fecal indicator bacteria are present.
1999	Dames and Moore study	Salt tracer, no pathogens found in wells within 200 feet, but tidal reversal confounds results
1999	URS Greiner study	Salt Tracer found at 20 feet in wells, but indicator bacteria not seen in short period test.
Dec. 12, 2002	Regional Board Resolution	Santa Monica Bay Bacteria Total Maximum Daily Load: beach pathogens attributed to loads from septic systems
March 21, 2003	EPA Malibu Creek Nutrient TMDL	Total Maximum Daily Load sets loads and numeric targets for total Nitrogen
2003	Questa study	Groundwater discharge to receiving water, quantified including volume from septic system discharge.
Aug 30, 2004	Stone study	Bacteria may enter receiving water where septic systems are found within 6-month travel time
Jan. 24, 2004	Regional Board Resolution	Malibu Creek and Lagoon bacteria TMDL: Tetra Tech surface water model sets loads for bacteria from septic systems
March 2006	Richard Viergutz, M.S. Thesis	Discharge of sewage-polluted groundwater into Malibu Creek and Lagoon resulting from groundwater surface interactions

Enterococcus as a Study Focus

Enterococcus is a bacteria indicative of the possible presence of etiological agents of human illness and a study focus for this analysis. Enterococcus was emphasized over fecal, total or Escherichia coli bacteria for the following reasons: (1) it is part of the flora of the human gut; (2) it is prevalent in discharge from septic systems into the leachfields in the Malibu Civic Center; (3) Annette Pruss' 1998 survey of epidemiology studies linking beach pathogens to human illness identified enterococcus as one of two bacteria correlating most strongly with highly credible gastrointestinal illness among swimmers; (4) The 58 sites sampled during the summers in Santa Monica Bay include data from the wet year of 2005 and the dry year of 2007; (5) it was correlated with increased human illness at Surfrider Beach, adjacent to the Civic Center, in the 1999 epidemiology study by Robert Haile and others; (6) the protocol for the sampling, transportation, and analysis of the most probable number of enterococcus colonies in 100 milli-Liters of water is well established in the refereed literature; and (7), the 1983 EPA marine recreational standard and its interpretation in the 2005 California Ocean Plan relate enterococcus density to both an acceptable illness threshold of 19 per 1000 swimmers and both a single sample and a geometric mean sample water quality objective.

Alternative indicators of human pathogens have been proposed, but the supporting research for candidates such as bacteroides or genetically defined species of enterococcus is insufficiently developed to support a new EPA criteria. In fact the 2005 study by Southern California Coastal Water Research Project or SCCWRP found bacteriodes in Ballona Creek, but not in Malibu Creek and Lagoon. Additional work is

underway to determine if the density of bacteriodes retained after transport is sufficient for the species to serve as an indicator of human risk.

Species of enterococcus have also been identified in the feces of domestic animals, wild animals, birds, and in some plants. The genetic typing of enterococcus species in water along with the identification of other human-characteristic chemicals such as optical brighteners has been used to distinguish human from non-human enterococcus with some success in areas outside Malibu. The 1999 Haile epidemiology study results do not support dilution of enterococcus bacteria so as to preclude its value as an indicator of human illness. Specifically, the study found that for the same enterococcus densities, Surfrider Beach had a highly credible gastrointestinal illness with fever rate of 39 per 1,000 swimmers, which is higher than the 19 per 1,000 illnesses rate reported by EPA. The enterococcus concentration on the Malibu Civic Center beaches can be considered a conservative measure of the contribution of human fecal matter.

OWDS and Transport of Pathogens

Many studies have been completed within the last twenty years to characterize the transportation mechanisms of pathogens through the groundwater from the leachfield of septic systems or other OWDSs: Schaub and Sorber (1977) reported that viruses move by rapid infiltration and concluded that removal can be limited by low absorption rate of virus particles to soil. The authors used a mixed compound consisting of the tracer virus f2 and indicator bacteria in the tested septic tank and monitored the mitigation of indicators in well samples. It was found that enteric bacteria were quickly filtered by soil and concentrated on the soil surface; but the tracer viruses was not observed on the upper soil layers but was found in the down-gradient groundwater layers. Vaughn et al. (1983) also observed a preferential entrainment of bacteria, as opposed to viruses from septic discharge, in a shallow, sandy soil aquifer. These results illustrate that even when indicator bacteria are not present, viruses may still be present.

Goyal et al. (1979) further investigated the adsorption rates for different types or strains of viruses/bacteria to various types of soils. No specific viruses or bacteria were found to represent the general adsorptive behaviors of all viruses to soils, and no specific soil type can serve as a general model for all the soil types. Similarly, Chu et al. (2003) investigated the transportation rates of viruses passing through saturated and unsaturated soil columns. Strong correlations were found between virus adsorption and various factors, i.e. existence of metal oxides, water content, organic matter, pH, etc.

Bloch et al. (1990) presented a case study of a human virus infection (hepatitis A virus, HAV) due to groundwater contamination from on-site discharge system. The leachfield of the septic system in the studied site (a trailer park) was approximately 30 to 60 meters away from the drinking water well, and the author confirmed the direct association between septic discharge and virus infection. Fecal coliform was not significantly higher during the outbreaks period of hepatitis A.

These studies indicate the significant differences between viral and bacterial contaminants: viruses have the potential to penetrate the soil layers to a greater extent than bacteria. This highlights a limitation of using bacterial water quality indicators to predict viral groundwater contamination. However, it can be also implied that when higher densities of indicator bacteria occur, there is a higher risk that the soil layer can be contaminated by viruses. For example, Cuyk et al. (2004) reported a high correlation between virus concentrations and bacteria indicators in well-operated soil columns and field septic systems.

Recent work also shows that the beach is a more complex hydrologic environment than the steady state condition previously modeled (Stone 2005 Malibu Risk Assessment). Episodic freshwater transport has recently been documented (Izbicki, 2009 in process). Bacteria densities have been tentatively linked to tidal and seasonal changes (Boehm et al., 2004; De Sieyes et al. , 2008, Izbicki, 2009 in press). Other researchers used sand column studies to show bacteria and virus retention and remobilization was related to the movement of organic material and bacteria and viruses have recently been shown to adhere and remain viable in beach material until remobilized (Yamahara et al., 2007; Azadpour-Keeley et al., 2003; Noble et al., 1996; Schaub et al., 1997, Schijven et al., 2002; Stramer et al., 1984).

In 2007, Nathalie Tifenkni provided a survey of particulate transport in the groundwater and noted that the existing models are deficient in successfully predicting the movement of organic particles. The survey specifically notes that work predicting the subsurface slowing of bacteria movement has not been paralleled by equally vigorous exploration of the subsurface enhancement of bacteria movement.

> "A substantial research effort has been aimed at elucidating the role of various physical, chemical and biological factors on microbial transport and removal in natural subsurface environments. The major motivation of such studies is an enhanced mechanistic understanding of the these processes for development of improved mathematical models of microbial transport and fate. In this review, traditional modeling approaches are systematically evaluated. A number of these methods have inherent weaknesses or inconsistencies (page 1455)....For instance, calculations based on Tufenkji and Elimelech (TE) equation indicate that particles in the size range of [about] 2μm (e.g. many bacteria) are nearly twice as mobile in porous media than previously believed (page 1461)....The release (detachment) of microorganisms from sediment grain surfaces can be of considerable importance in natural subsurface environments and engineered water treatment systems...an improved understanding of.. factors controlling microbial release are required before practical incorporation of this process into mathematic transport models (page 1646)... Future areas for fundamental research in this area have been identified and include (i) inactivation kinetics of microorganisms in soils, (ii) role of protozoan grazing in removal of bacteria, (iii) mechanisms of microbial detachment from sediment grain surfaces,)iv) interactions between cell/cyst surface biomolecules and mineral surfaces, and (v) the influence of physical and geochemical aquifer heterogeneity on microbial transport (page 1468)."

Other possible mechanisms that may result in the preservation of enterococcus include elevated nitrogen and/or oxygen levels (Azadpour-Keeley et al., 2003; Yates, 1985, 1986) in the subsurface or on the beach face. In addition, septic plumes are now known to stay intact during subsurface movement (Groundwater Monitoring and Assessment Program: Baxter, Minnesota, 1999) limiting the impact of subsurface dilution of discharged enterococcus densities.

Studies relating OWDS to Beach Pathogens[6]

Research completed over the last ten years has expanded the understanding of beach bacteria sources . For example, it has been demonstrated that the fecal-indicator-bacteria enterococcus are present at many California beaches. In 2003(b), Borchardt et al. reported that the density of septic systems correlated with increased rates of infectious diarrhea in children in central Wisconsin. The authors found that viral diarrhea increased by 8% for every additional holding tank in 640 acres and bacterial diarrhea increase by 22% for every additional holding tank in 40 acres. While household wells were sampled for bacterial, risks were attributed to surface contact with pathogens near septic systems.

In 2004, Boehm et al. reported that groundwater discharge of microbial pollution moved from a shallow beach aquifer on to the beach face at Huntington Beach. While fecal indicator bacteria were found in only one groundwater sample, column studies show that the transport of enterococcus is not inhibited by sand collected in the field. In addition, radium isotopes characteristic of groundwater linked 38% of the enterococcus variation to groundwater discharge.

In 2007, Yamahara et al. reported in Environmental Science and Technology, Vol. 41, No. 12, that 91% of sampled California coastal beaches had enterococcus present in sand. The presence of a putative pollution source such as a river, wave shelter and surrounding anthropogenic land use correlated with higher enterococcus concentrations in the sands.

In 2008, De Sieyes et al. reported that fresh nutrient-rich groundwater discharges in fortnightly pulses into the ocean across a beach from adjacent septic systems and leachfields. While fecal indicator bacteria and human enterococcus genes were found in monitoring wells and attributed to pollution from adjacent septic systems, the concentrations of these pathogens did not increase with nutrients in the surf zone.

In 2009, the American Association for the Advancement of Science summarized studies identifying Methicillin Resistant Staphylococcus Aureus Bacteria (MSRA) in ocean water and on beaches in Florida.. Citizens have claimed an MSRA infection was contracted at Malibu beaches. The infections, which are resistant to antibiotics and are more commonly found in hospitals, are now known to be transmitted to beach water through contact with infected individuals and, according to one report, through municipal effluent. The ability of the bacteria to travel via sewage has not been quantified.

Enterococcus has been grown in the laboratory setting in unseeded beach sand (Yamahara et al., 2009) and found in a freshwater environment free from human impact (Tiefenthaler et al., 2008 Enterococcus has also been shown to persist in the beach sand and occur in higher concentrations in organic beach

---

[6] Early Technical Reviewers recommended enhancements of staff's summary of studies on beach pathogens completed since 2004. While it is beyond the scope of this document to present a complete literature study on the topic, the summary emphasizes the scope of ongoing technical investigations in the field. The authors of the papers cited, some of whom were Early Technical Reviewers, wished staff to emphasize that additional study is necessary to characterize the physical, chemical and biological processes which allow bacteria and viruses to move through the groundwater for surface discharge. The authors should be contacted for the most up-to-date information on their research and the interpretation of the work already completed.

debris where it may later be transported to near shore waters (Pednekar et.al, 2007; Yamahara et al., 2007).

These studies and others show that the beach is a more complex microbiological environment than was previously understood.

Potential Scenarios for Sources and Transport Mechanisms for Bacteria in the Malibu Civic Center.

Figure 10 shows the Malibu Civic Center with planned development (Questa, 2003), and the line of the cross section shown in Figure 11. The cross section shows possible paths of transport for the bacteria discharged into OWDS leachfields/seepage pits to Malibu Creek, Malibu Lagoon and the ocean. Note in the cross section that bacteria leaving OWDS in Malibu Colony or adjacent to Legacy Park have the shortest travel times and fewest opportunities for subsurface physical detention, chemical attack or biological predation.

The movement of septic system bacteria from the Civic Center area north of Pacific Coast Highway via subsurface transport to Surfrider Beach under summer conditions would require movement through the beach barrier into marine water (see Figure 11 [cross section]). Enterococcus from septics must survive physical, chemical and biological destruction in the subsurface before ocean discharge. Enterococcus from higher elevations within the watershed must travel further on the surface and both light and distance are known to cause de-activation of both viruses and bacteria (Azadpour-Keeley, 2003;Yates, 1985, 1986).

Figure 10. Planned development in the Malibu Civic Center from Questa 2003 and cross section line

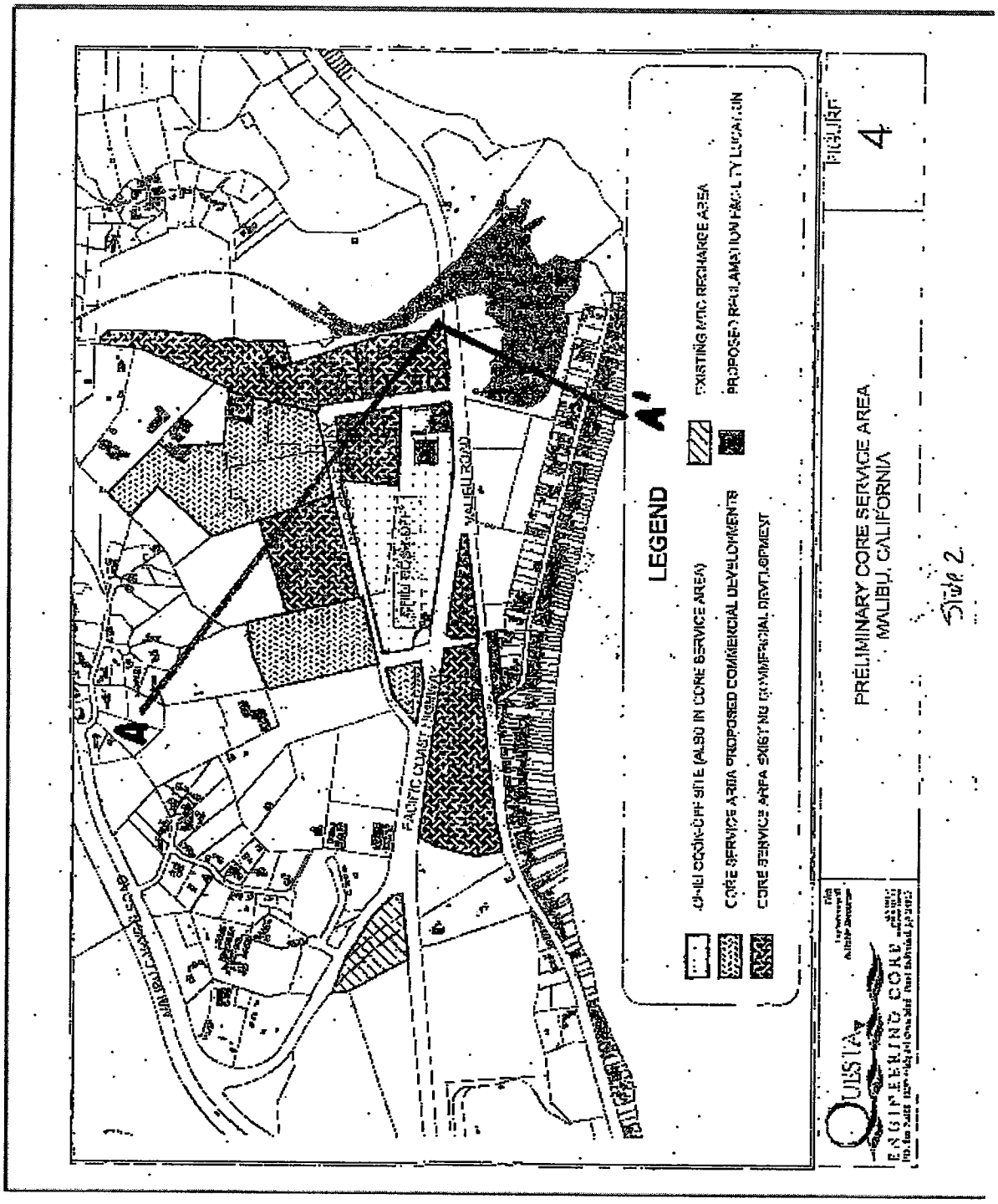
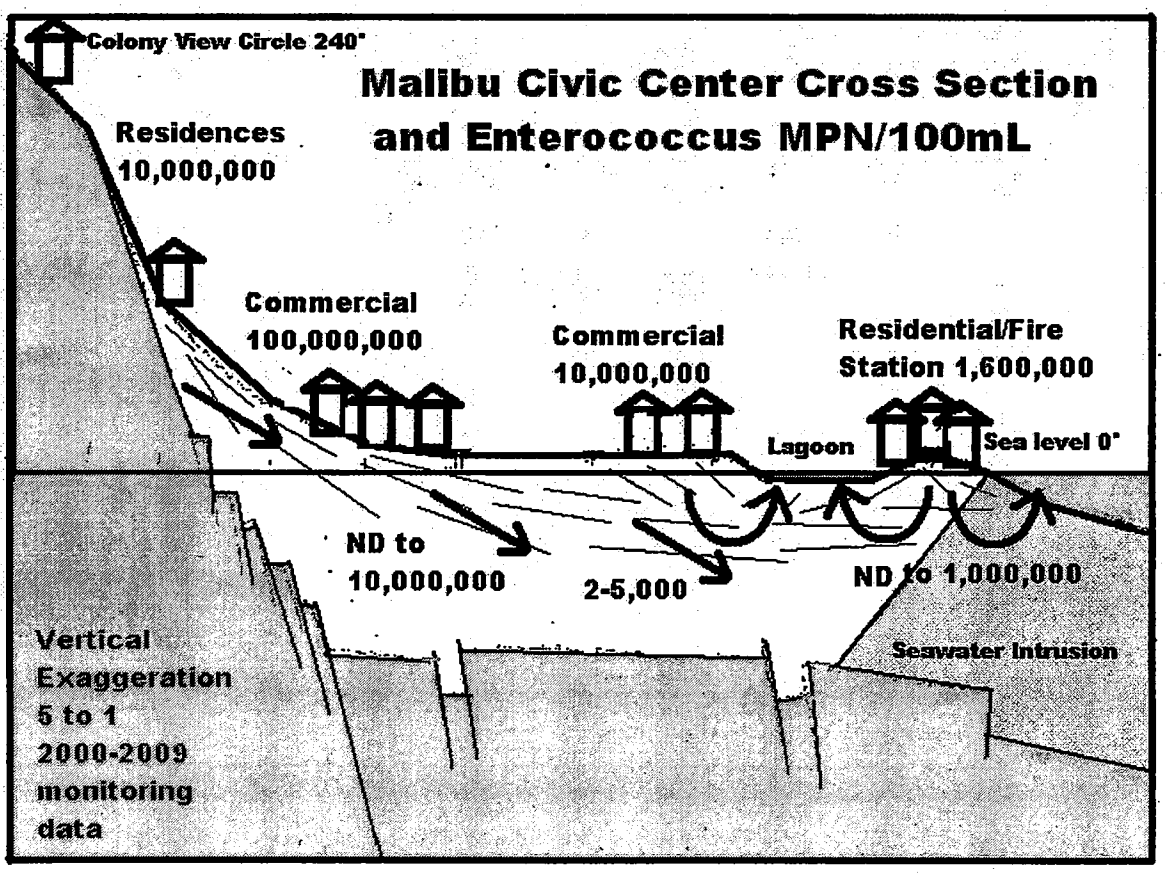


Figure 11. Cross Section A to A' showing facility and groundwater bacteria and flow paths



6. Conclusion

Malibu Creek, Lagoon, and nearby beaches are popular within the local community and as a destination for well over 1 million visitors per year. In the Basin Plan, the Regional Board has designated these waters for both water contact recreation (e.g. swimming) and non-contact water recreation (e.g. sunbathing, aesthetic enjoyment), and set standards, using the best available science, at levels that will protect human health.

As determined by the Regional Board and US Environmental Protection Agency, surface waters in the Malibu Creek Civic Center area are impaired for water contact recreation, and consistently have failed to meet State health and water quality standards set to protect swimmers and surfers in contact with the water. Repeated failures to meet standards set to protect public health have resulted in a poor water quality reputation for Surfrider Beach.

To examine the hydraulic connection of discharges from Onsite Wastewater Disposal Systems (OWDSs) through groundwater to nearby surface waters, staff evaluated more than 8,000 samples of wastewater

effluent, underlying or nearby groundwater, and surface waters. Staff determined that pathogens from wastewaters are likely migrate to surface waters and that, consistent with data supporting the designations of impairments, threaten human health. This conclusion is based on our analysis of the indicator bacteria enterococcus. The levels of this bacteria do not meet standards protective of human health. Staff also determined that risks of infectious disease from water contact recreation were elevated at beaches in the Malibu Civic Center based on work by Haile et. al. 1999.

Staff also reviewed numerous previous studies, and found conclusions from these other studies to be consistent with staff's determination of impairment to the beneficial use of water contact recreation.

ATTACHMENT 3-A: Monitored Santa Monica Bay Beaches[7]

No	CSMP	Location	Linked Watershed	Treat-ment Type	Strom drain/ Freshwater	Total Acres
1	SMB 1-01	Arroyo Sequit Creek, Leo Carrillo State Beach	Arroyo Sequit	Septic	Y	7,549
2	SMB 1-02	El Pescador State Beach	Los Alisos	Septic	N	2,396
3	SMB 1-03	El Matador State Beach	Encinal	Septic	N	1,794
4	SMB 1-04	Trancas Creek	Trancas	Septic	Y	6,514
5	SMB 1-05	Zuma Break at Zuma Beach	Zuma	Septic	Y	6,339
6	SMB 1-06	Walnut Creek	Ramirez	Septic	Y	3,334
7	SMB 1-07	Ramirez Canyon at Paradise Cove Pier	Ramirez	Septic	Y	3,334
8	SMB 1-08	Escondido Creek	Escondido	Septic	Y	2,295
9	SMB 1-09	Latigo Canyon	Latigo	Septic	Y	813
10	SMB 1-10	Solstice Creek at Dan Blocker County Beach	Solstice	Septic	Y	2,841
11	SMB 1-11		Corral	Septic	Y	4,280
12	SMB 1-12	Marie Canyon Strom Drain on Puerco Beach	Corral	Septic	Y	4,280
13	SMB 1-13[8]	Sweetwater Canyon on Carbon Beach	Carbon	Septic	Y	2,320
14	SMB 1-14	Las Flores Creek on Las Flores State Beach	Las Flores	Septic	Y	2,897

[7] Data as reported in Santa Monica Bay beaches Bacteria TMDLs and SMB beaches Bacteria TMDL Coordinated Shoreline Monitoring Plan

15	SMB 1-15	Big Rock Beach	Piedra Gorda	Septic	Y	664
16	SMB 1-16	Pena Creek on Las Tunas County Beach	Pena	Septic	Y	608
17	SMB 1-17	Tuna Canyon	Tuna	Septic	N	1,013
18	SMB 1-18	Topanga Canyon on Topanga State Beach	Topanga	Septic	Y	12,575
19	SMB 2-01	Castlerock storm drain aka Parker Mesa Storm Drain	Castlerock	Sewer	Y	4,976
20	SMB 2-02	Santa Ynez Storm Drain	Santa Ynez	Sewer	Y	1,203
21	SMB 2-03	Will Rodgers State Beach 1/4 mile east of Gladstones	Santa Ynez	Sewer	N	1,203
23	SMB 2-04	Pulga Storm Drain on Will Rodgers State Beach	Santa Ynez	Sewer	N	1,203
24	SMB 2-05	Bay Club Storm Drain on Will Rodgers State Beach	Santa Ynez	Sewer	N	1,203
25	SMB 2-07	Santa Monica Canyon	Santa Monica Canyon	Sewer	Y	10,088
26	SMB 2-08	Venice Beach Pier	Venice Beach	Sewer	N	5,241
27	SMB 2-09	Topsail Street, Venice Beach	Venice Beach	Sewer	N	5,241
28	SMB 2-10	Culver Storm Drain	Dockweiler	Sewer	Y	6,573
29	SMB 2-11	North Westchester Storm Drain	Dockweiler	Sewer	Y	6,573
30	SMB 2-12	Dockweiler Beach	Dockweiler	Sewer	N	6,573
31	SMB 2-13	Imperial Highway Storm Drain	Dockweiler	Sewer	Y	6,573
32	SMB 2-14	Hyperion Plant, Dockweiler Beach	Dockweiler	Sewer	N	6,573
33	SMB 2-15	Grand Ave, Dockweiler Beach	Dockweiler	Sewer	Y	6,573
34	SMB 3-01	Montana Ave, Santa Monica Storm Drain, Santa Monica State Beach	Santa Monica	Sewer	Y	8,850

35	SMB 3-02	Wilshire Storm Drain, Santa Monica State Beach	Santa Monica	Sewer	Y	8,850
36	SMB 3-03	Santa Monica Pier Storm Drain, Santa Monica State Beach	Santa Monica	Sewer	Y	8,850
37	SMB 3-04	Pico-Kenter Storm Drain	Santa Monica	Sewer	Y	8,850
38	SMB 3-05	Ashland Storm Drain	Santa Monica	Sewer	Y	8,850
39	SMB 3-06	Rose Ave Storm Drain, Venice Beach	Santa Monica	Sewer	Y	8,850
40	SMB 3-07	Brooks Ave Storm Drain, Venice Beach	Santa Monica	Sewer	Y	8,850
41	SMB 3-08	Venice Pavillion	Santa Monica	Sewer	Y	8,850
42	SMB 3-09	Strand Street, Santa Monica State Beach	Santa Monica	Sewer	N	8,850
43	SMB 4-01	San Nicholas Canyon	Nicholas	Septic	Y	1,235
44	SMB 5-01	40th Street, Manhattan Beach	Hermosa	Sewer	N	2,624
45	SMB 5-02	28th Street Drain, Manhattan Beach	Hermosa	Sewer	Y	2,624
46	SMB 5-03	Manhattan Beach Pier	Hermosa	Sewer	Y	2,624
47	SMB 5-04	26th Street, Hermosa Beach	Hermosa	Sewer	N	2,624
48	SMB 5-05	Hermosa Beach Pier	Hermosa	Sewer	N	2,624
49	SMB 6-01	Herondo Storm Drain	Redondo	Sewer	Y	3,544
50	SMB 6-02	Redondo Beach Pier	Redondo	Sewer	Y	3,544
51	SMB 6-03	Sapphire Street	Redondo	Sewer	N	3,544
52	SMB 6-04	Topaz Groin	Redondo	Sewer	N	3,544
53	SMB 6-05	Avenue I	Redondo	Sewer	Y	3,544
54	SMB 6-06	Malaga Cove	Redondo	Sewer	N	3,544
55	SMB BC-01	Ballona Creek	Ballona Creek	Sewer	Y	81,980

56	SMB 01	MC- Malibu Point on Malibu State beach	Malibu Creek	Septic	Y	70,410
57	SMB 02	MC- Breach Point of Malibu Lagoon on Malibu State Beach	Malibu Creek	Septic	Y	70,410
58	SMB 03	MC- Malibu Pier on Carbon Beach near Malibu Creek	Malibu Creek	Septic	Y	70,410
59	SMB 7-01	300 Paseo Del Mar, Palos Verdes Estates	Palos Verdes Peninsula	Sewer		10,023
60	SMB 7-02	Bluff Cove, Palos Verdes Estates	Palos Verdes Peninsula	Sewer		10,023
61	SMB 7-03	Long Point, 7200 Palos Verdes Drive South, Rancho Palos Verdes	Palos Verdes Peninsula	Sewer		10,023
62	SMB 7-04	6000 Palos Verdes Drive South, Rancho Palos Verdes	Palos Verdes Peninsula	Sewer		10,023
63	SMB 7-05	Portuguese Bend Club, Rancho Palos Verdes	Palos Verdes Peninsula	Sewer		10,023
64	SMB 7-06	White's Point/Royal Palms County Beach, San Pedro	Palos Verdes Peninsula	Sewer		10,023
65	SMB 7-07	Midway between White Point County Beach and Wilder Annex	Palos Verdes Peninsula	Sewer		10,023
66	SMB 7-08	Point Fermin/Wilder Annex, San Pedro	Palos Verdes Peninsula	Sewer		10,023
67	SMB 7-09	Cabrillo Beach, San Pedro	Palos Verdes Peninsula	Sewer		10,023

ATTACHEMENT 3-B: REFERENCES

Ambrose, Richard. May 14, 2008. Ecological Goals. Malibu Legacy Park Project prepared in association with RMC Water and Environment.

Allen, L.A., Brooks, E., Williams, & I.L., 1949. Effect of Treatment at the Sewage Works on the Numbers and Types of Bacteria in Sewage. *The Journal of Hygiene*, **47**(3):303-319.

Azadpour-Keeley, A., Faulkner, B.R., & Chen, J.S. April 2003. Movement and Longevity of Viruses in the Subsurface. United States Environment Protection Agency.

Bales, R.C., Gerba, C.P., Grondin, G.H., & Jensen, S.L. 1989. Bacteriophage Transport in Sandy Soil and Fractured Tuff. *Applied and Environmental Microbiology*, **55**(8): 2061–2067.

Bing Yen & Associates, Inc. January 5, 2001. Report of Malibu Civic Center Groundwater Evaluation. City of Malibu, Camarillo CA.

Bloch, A.B., Stramer, S.L., Smith, D., Margolis, H.S., Fields, H.A., McKinley, T.W. Gerba, C.P., Maynard, J.E., & Sikes, R.K. April 1990. Recovery of Hepatitis A Virus from Water Supply Responsible for a Common Source Outbreak of Hepatitis A. *American Journal of Public Health.*, **80**(4): 428-430.

Boehm, A.B., Shellenbarger, G.G., & Paytan, A. 2004. Groundwater Discharge: Potential Association with Fecal Indicator Bacteria in the Surf Zone. *Environmental Science & Technology*, **38**(13):3558-66.

Borchardt, M.A., Bertz, P.D., Spencer, S.K.,& Battigelli, D.A. 2003a. Incidence of Enteric Viruses in Groundwater from Household Wells in Wisconsin. *Applied and Environmental Microbiology*, **69**(2):1172-1180.

Borchardt, M.A., Chyou, P.H., DeVries, E.O., & Belongia, E.A. 2003b. Septic System Density and Infectious Diarrhea in a Defined Population of Children. *Environmental Health Perspectives*, 111(5):742-748.

Cabelli, V.J. August 1983. Health Effects Criteria for Marine Recreational Waters. Health Effect Research Laboratory Office of Research and Development.

CDM. August 10, 2006. Technical Memorandum Task 10, TMDL Implementation Analysis.

CDM., Irvine CA, February 27, 2007. Integrated Total Maximum Daily Load Implementation Plan for the Malibu Creek Watershed. Los Angeles County Department of Public Works.

City of Malibu. November 5, 2002. Ordinance No. 242. City Council of the City of Malibu.

City of Marco Island. City of Marco Island Position Paper Septic Tank Replacement Program. City of Malibu.

Crawford, Multari & Clark Associates. July 1997. Draft, City of Malibu, Civic Center Specific Plan. Prepared for City of Malibu by Crawford, Multari & Clark Associates, San Luis Obispo CA.

Cuyk, S.V., Siergrist, R.L., Lowe, K., & Harvey, R.W. 2004. Evaluating Microbial Purification during Soil Treatment of Wastewater with Multicomponent Tracer and Surrogate Tests, Vadose Zone Processes and Chemical Transport. *Journal of Environmental Quality*, **33**: 316-329.

De Sieyes, N.R., Yamahara, K.M., Layton, B.A., Joyce, E.H., & Boehm, A.B. 2008. Submarine Discharge of Nutrient-Enriched Fresh Groundwater at Stinson Beach, California is enhanced during Neap Tides. *Limnol Oceanography*, **53**: 1434-1455.

Ensitu Engineering Inc. June 30, 2008. Advanced On-site Wastewater Treatment System Design, California Department of Health Services Engineering Report. Malibu Lumber, Morro Bay CA.

Ensitu Engineering Inc. August 13, 2008. Malibu Lumber Wastewater Flow Calculations Commercial Development without Restaurant Use. Letter addressed to Brett Thornton, prepared by Ensitu Engineering, Morro Bay CA.

Ensitu Engineering Inc. 2008. Advanced On-site Wastewater Treatment System Design, City of Malibu Engineering Report. Prepared for Malibu Lumber by Ensitu Engineering Inc., Morro Bay CA.

Gold, M.A. 1994. What are the health risks of swimming in the Santa Monica Bay?: An examination of the issues surrounding the public health debate. Prepared for University of California, Los Angeles.

Gronewold, A.D.,& Wolpert, R.L. April 7, 2008. Modeling the Relationship between Most Probable Number (MPN) and Colony – Forming Unit (CFU) Estimates of Fecal Coliform Concentration. Elsevier.

Ground Water Monitoring and Assessment Program. May 1999. Effect of Septic Systems on Ground Water Quality – Baxter, Minnesota.

Haile, Robert W., Witte, John S., Gold, Mark, et. al. July 1999. "The Health Effect of Swimming in Oceaen Water Contaminated by Storm Drain Runoff" in Epidemiology, vol. 10, n. 4, page 355-363.

Haile, Robert W., et. al. 1996"An epidemiological study of possible adverse health effects of swimming in Santa Monica Bay", unpublished but peer reviewed, Heal the Bay document, May 7, 1996.

James, Kirsten. November 19, 2008. Comments on Tentative Waste Discharge Requirements, Water Reclamation Requirements and Monitoring and Reporting Program for Malibu Lumber. Heal The Bay, Santa Monica CA.

Jones & Stokes. 2008. Malibu Legacy Park Project, Draft Environmental Impact Report. Prepared for City of Malibu by Jones & Stokes, Los Angeles CA.

Regional Board. 1972. Resolution No. 72-4, Policy Statement Relative to Sewage Disposal in the Malibu Area. California Regional Water Quality Control Board, Los Angeles Region.

LARWCB. December 14, 1998. Resolution No. 98-023 Malibu Creek Watershed. California Regional Water Quality Control Board, Los Angeles Region.

Regional Board. 1990. Regional Water Quality Control Board's Interim Policy on the Use of Septic Tanks. California Regional Water Quality Control Board, Los Angeles Region.

Regional Board. 2002. Santa Monica Bay Beaches Wet Weather Bacteria TMDL, Item #5 Regional Board Workshop, June 27, 2002. California Regional Water Quality Control Board, Los Angeles Region.

Regional Board. 2004b. Total Maximum Daily Loads for Bacteria, Malibu Creek Watershed. California Regional Water Quality Control Board, Los Angeles Region.

Regional Board. 2008. 520th Regular Board Meeting, Item 16, Consideration of Termination of Memorandum of Understanding for On-site Wastewater Treatment Systems for the City of Malibu. California Water Quality Control Board, Los Angeles Region.

Regional Board. 2008b. 521st Regular Board Meeting, Item 18, Revised Order, Waste Discharge Requirements/Water Reclamation Requirements and Monitoring and Reporting Program for City of Malibu's Malibu Lumber at City of Santa Monica's Legacy Park. California Regional Water Quality Control Board, Los Angeles Region.

Lucero, Gene. 2008. Submittal of Comments to Tentative Waste Discharge Requirements and Water Reclamation Requirements for Malibu Lumber LLC. Latham & Watkins, LLP.

National Center for Environment Research. 2003. Final Report: Fate for Pathogens in Storm Water Runoff; prepared for National Center for Environment.

Office of Water. October 2006. Occurrence and Monitoring Document for the Final Ground Water Rule. Prepared for Office of Water by the Office of Water.

Peter Warshall & Associates and Philip Williams & Associates. 1992. Malibu Wastewater Management Study, A Human Ecology of the New City. Prepared for City of Malibu by Philip Williams and Associates, San Francisco CA and Peter Warshall & Associates, Tucson AZ.

Pednekar, A.M., Grant, S.B., Candelaria, L, 2007. Assessing the Seasonal Impact of Storm Drains on Water Quality in Western Newport Bat, Southern California, report to the SWRCB.

Pradhan, S., Hoover, M.T., Clark, G.H., Gumpertz, M., Wollum, A.G., Cobb, C., & Strock, J. February 2008. Septic Tank Additive Impacts on Microbial Populations. *Journal of Environmental Health.*

Pruss, A, 1998, *Review of Epidemiological Studies on Health Effects from Exposure to Recreational Water.* International Epidemiological Association Vol. 17 pages 1-9.

Questa Engineering Corporation. July 7, 2003. Preliminary Conceptual Plan for Wastewater Reclamation in the Civic Center Area, Malibu, California. Prepared for City of Malibu by Questa Engineering, Santa Barbara CA.

RMC Water and Environment. August 15, 2008. Irrigation of Legacy Park with Treated Effluent from Lumber Yard Development. Technical Memorandum prepared by RMC Water and Environment.

RMC Water and Environment. May 14, 2008. Summary of Stormwater Management and Water Quality Improvements for Lower Malibu Creek and Lagoon. Prepared by RMC Water and Environment for City of Malibu, Legacy Park.

Rong, Y. November 3, 1997. Pitfalls in Statistics for Environmental Sampling Evaluation. *Environmental Geosciences.*

Santa Monica Bay Restoration Project. 1999. Malibu Creek Watershed Restoration Activities Draft. Malibu Creek Watershed Executive Advisory Council.

Santa Monica Bay Restoration Project. January 2001. Improving Septic System Management in the Santa Monica Bay Watershed. Santa Monica Bay Restoration Project, Septic System Task Force.

Schaub, S.A., & Sorber, C.A. May 1977. Virus and Bacteria Removal from Wastewater by Rapid Infiltration Through Soil. *Applied and Environmental Microbiology*, **33**(3):609-619.

Stone Environmental, Inc. 2004. Final Report- Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu CA. Prepared for Santa Monica Bay Restoration Commission by Stone Environmental, Montpelier VT.

Stone Environmental, Inc. April 9, 2004. IWIMS Design Document, City of Malibu Clean Beaches Initiative. Prepared for S. Groner Associates, Inc by Stone Environmental, Montpelier VT.

Stone Environmental, Inc. May 6, 2004. IWIMS Design Document, City of Malibu Clean Beaches Initiative. Prepared for S. Groner Associates, Inc by Stone Environmental, Montpelier VT.

Stramer, S.L., & Cliver, D.O. 1984. Septage Treatments to Reduce the Numbers of Bacteria and Polioviruses. *Applied and Environmental Microbiology*, **48**(3): 566-572.

Tiefenthaler, L.L, Stein, E.D., & Lyon, G.S. January 2008. Fecal Indicator Bacteria Levels During Dry Weather form Southern California Reference Streams. Prepared for Southern California Coastal Water Research Project.

Tifenkji, N. 2007, *Modeling Microbial transport in porous media: Traditional approaches and recent developments.* Advances in Water Resources, Vol. 30, pages 1455-1469.

Tim, Heather. November 1994. Review of Monitoring and Response Protocol for the Malibu Creek Watershed. Santa Monica Bay Restoration Project.

Thorsen, Jim. 2008. Letter in Response to the Los Angeles Regional Water Quality Control Board's Letter Regarding Notification of Incomplete Application for Waste Discharge Requirements for Malibu Lumber. City of Malibu, CA.

United States Environmental Protection Agency. January 2001. Linkage between Water Quality Targets and Pollutant Sources.

United States Environmental Protection Agency. August 2002. Predicting Attenuation of Viruses During Percolation in Soils.

University of California, Los Angeles. May 200. Lower Malibu Creek and Lagoon Resource Enhancement and Management. Final Report to the California State Coastal Conservancy by UCLA.

URS Greiner Woodward Clyde. 1999. Final Report, Study of Potential Water Quality Impacts on Malibu Creek and Lagoon from On-site Septic Systems. Prepared for City of Malibu by URS Greiner Woodward Clyde, Santa Ana CA.

US Environmental Protection Agency. January 10, 2003. Total Maximum Daily Loads for Nutrient, Malibu Creek Watershed, Public Review Draft. US Environmental Protection Agency, Region 9.

Van Beveren & Butelo Inc. 2008. Supporting Geology/Soils Report Proposed Legacy Park Discharge Area. Prepared for Malibu Lumber, LLC by Van Beveren & Butelo Inc.

Van Beveren & Butelo Inc. February 20, 2008. Supporting Geology/Soils Report Proposed Legacy Park Discharge Area. Prepared by Van Beveren & Butelo Inc for Malibu Lumber LLC.

Van Beveren & Butelo Inc. June 27, 2008. Response to Comments by the City of Malibu Proposed Legacy Park Discharge Area. Prepared by Van Beveren & Butelo Inc for Malibu Lumber LLC.

Van Beveren & Butelo Inc. August 11, 2008. Response to Comments by the City of Malibu Proposed Legacy Park Discharge Area. Prepared by Van Beveren & Butelo Inc for Malibu Lumber LLC.

Van Beveren & Butelo Inc. October 13, 2008. Response to Comments by the City of Malibu Proposed Legacy Park Discharge Area. Prepared by Van Beveren & Butelo Inc for Malibu Lumber LLC.

Vaughn, J.M., Landry, E.F., & Thomas, M.Z., 1983. Entrainment of Viruses from Septic Tank Leach Fields Through a Shallow, Sandy Soil Aquifer. *Applied and Environmental Microbiology*, **45**(5): 1474–1480.

Viergutz, Richard, 2006, Discharge of Sewage-Polluted Groundwater into Malibu Creek and Lagoon Resulting from Groundwater Surface Interactions: MS Thesis, California State University, Los Angeles.

Yates, M.V., Gerba, C.P., & Kelley, L.M. April 1985. Virus Persistence in Groundwater. *Applied and Environmental Microbiology*, **49**(4): 778–781.

Yates, M.V., Yates, S.R., Warrick, A.W., & Gerba C.P. September 1986. Use of Geostatistics to Predict Virus Decay Rates for Determination of Septic Tank Setback Distances. *Applied and Environmental Microbiology*, **52**(3): 479–483.

Yamahara, K.M., Layton, B.A., Santoro, A.E., & Boehm, A.B. 2007. Beach Sands along the California Coast are Diffuse Sources of Fecal Bacteria to Coastal Waters. *Environmental Sciences & Technology*, **41**(13):4515-4521.

Yamahara, K.M., Walters, S.P., & Boehm, A.B., 2009. Growth of Enterococci in Unaltered, Unseeded Beach Sands Subjected to Tidal Wetting. *Applied and Environmental Microbiology*, **75**(6): 1517-1524

Appendix T3-C[9]										
Enterococcus Frequency distributions for Civic Center Beaches and Selected Correlation Coefficients										
Malibu Pier						**Surfrider Beach**				
MPN/100mL	2005	2006	2007	2008		MPN/100mL	2005	2006	2007	2008
<10	0.417	0.067	0.464	0.233		<10	0.21	0.262	0.58	0.435
10	0.25	0.433	0.286	0.367		10	0.11	0.123	0.221	0.183
25	0.167	0.033	0.071	0.067		25	0.14	0.131	0.015	0.099
50	0.167	0.2	0	0.133		50	0.19	0.154	0.076	0.076
100	0	0.2	0.107	0.1		100	0.2	0.138	0.076	0.115
250	0	0	0.071	0.067		250	0.06	0.123	0.015	0.053
500	0	0.033	0	0.033		500	0.01	0.031	0.015	0.015
1000	0	0	0	0		1000	0.07	0.031	0	0
2500	0	0.033	0	0.033		2500	0	0.008	0	0.023
5000	0	0	0	0		5000	0	0	0	0
>5000	0	0	0	0		>5000	0	0	0	0
sum of frequencies	1	1	1	1.033			1	1	1	1
Correlation Coefficients			**2005-2006**	**2006-2008**		**Correlation Coefficients**			**2005-2006**	**2006-2008**
2007-2008	**2006-2007**		0.437	0.847		**2007-2008**	**2006-2007**		0.904	0.871
0.8075	0.427					0.98	0.78			

[7] Shaded boxes indicate corrections of clerical errors since 9/09/2009 Draft

State of California
California Regional Water Quality Control Board, Los Angeles Region

Peer Review – Staff Memorandum

Technical Memorandum #3:
Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation

By

Elizabeth Erickson, Professional Geologist
Groundwater Permitting Unit

TM-40

November 5, 2009

California Regional Water Quality Control Board
Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Linda S. Adams
Cal/EPA Secretary

Arnold Schwarzenegger
Governor

To: Wendy Phillips, C.E.G., C.H.G.,
Chief of Groundwater Permitting and Landfills Section
Rebecca Chou, Ph.D. P.E., Chief of Groundwater Permitting Unit

From Elizabeth Erickson, P.G. Groundwater Permitting Unit

Date: October 21, 2009

Subject: Peer Review Response to Comments - Technical Memo #3: Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation

Attachments:

1. Comments dated October 5, 2009 from Dr. Robert Arnold, Arizona State University
2. Comments dated October 7, 2009 from Dr. Jörg Drewes, Colorado School of Mines
3. Comments dated September 10, 2009 from Dr. JoAnn Silverstein, University of Colorado at Boulder

To ensure that the proposed amendment to the *Basin Plan*[1] is based on sound science and engineering principles, the scientific elements of Technical Memorandum #3: "Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation" dated September 9, 2009, was peer reviewed. This peer review was conducted in accordance with requirements and guidelines from the Cal/EPA Scientific Peer Review Program, Office of Research, Planning and Performance.

Summary

Dr. Robert Arnold of Arizona State University, Dr. Jörge Drewes of Colorado School of Mines, and Dr. JoAnn Silverstein of the University of Colorado at Boulder agreed that the approach and methods used in Tech Memo #3 incorporate sound scientific and engineering principles. Although some suggestions were made to improve staff's discussion, none of the comments materially altered the conclusion of Tech Memo #3. That is: OWDSs in the Malibu Civic Center area cumulatively release bacteria to Malibu Beaches, where the enterococcus densities exceed the water quality criteria for the protection of human health.

[1] Proposed amendment to the *Water Quality Control Plan for Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan)* to prohibit on-site subsurface disposal systems (OWDSs) in the Malibu Civic Center area.

New Material Added

Dr. Bob Arnold asked for additional material to be added. Statistical support for the findings were added on page T3-17 and summarized in Appendix 1.

Dr. Arnold: "The contention here is that the correlations among annual frequency distribution provides evidence of annual similarities at each beach for which data were provided and thus an indication that fluctuation in enterococcus numbers is probably the result of some regular pattern of events as opposed to random odd events like direct communication with bathers, etc. I am unable to provide a convincing statistical analysis as part of this review..." (page 3).

Response: The enterococcus interval frequencies calculated for the beaches for four summers were compared using the Pearson's correlation coefficient. The number of measures were counted in each of eight intervals: (1) values less than or equal to ten; (2) more than ten but less than or equal to 25; (3) more than 25 but less than or equal to 50; (4) more than 50 but less than or equal to 100; (5) more than 100 but less than or equal to 250; (6) more than 250 but less than or equal to 500; (7) more than 500 but less than or equal to 1,000; and (8) more than 1,000. The intervals approximate a logarithmic distribution, but include more intervals between 25 and 100 and between 250 and 1,000, ranges in which the beaches contrasted most sharply. Pearson's correlation coefficient was applied following EPA's "Ambient Water Quality Criteria for Bacteria, 1986" as described in the following quote:

> "The examination of a number of potential indicators, including the ones most commonly used in the United States (total coliforms and fecal coliforms), was included in the study. Furthermore, the selection of the best indicator [enterococcus] was based on the strength of the relationship between the rate of gastroenteritis and the indicator density, *as measured with the Pearson's Correlation Coefficient. This coefficient varies between minus one and plus one. A value of one indicates a perfect relationship, that is, all of the paired points lie directly on the line which defines the relationship. A value of zero means that there is not linear relationship. A positive value indicates that the relationship is direct, one variable increases as the other increases. A negative value indicates the relationship is inverse, one variable decreases as the other increases.* The correlation coefficients for gastroenteritis rates are related to the various indicators of water quality from both marine and fresh bathing water as shown in Table 2" (page 5).

Staff also conducted an additional study to determine if evidence for groundwater contributions to beach bacteria could be statistically linked to existing water quality and hydrology data. Early technical reviewers commented that the approach had not been used before and asked for additional time to evaluate the study. The analysis is provided in Attachment #1.

Requests for Clarification

Dr. Arnold, Dr. Jorge Drewes and Dr. JoAnn Silverstein asked for clarification on three topics. Dr. Arnold requested clarification on how the scientific process was used. Dr. Drewes' inquiry on non-

human sources for enterococcus and Dr. Silverstein's query about bacteria transport in groundwater have been resolved with clarifying language in the memo.

Dr. Arnold: "I feel that this is a weak argument, primarily because the statement does not seem to rest on statistically valid hypothesis testing. That is, do the calculated correlation coefficients in fact justify the conclusion that the distribution of values observed is derived from the same population of actual values each year - that the distribution of MPNs does not change from year to year. Even if that distribution of concentrations is time invariant (as suggested) it seems that the population of enterococcus concentrations in the waters tested may take on a distribution of this sort for any number of reasons, including a somewhat randomly generated source of contamination due to bathing and so forth. It seems difficult to justify the elimination of such an explanation based on the data provided."

Response: Material has been added on pages T3-2 and T3-25 to clarify the hypothesis testing process which led to the results.

Dr. Drewes: "The author neglects to state that there are also non-human sources for enterococcus, which could potentially contribute to the concentrations observed in beach samples, although the likelihood for non-human contributions is small in the given settings (page 1)."

Response: Enterococcus has been attributed by some researchers to feces from warm-blooded animals such as raccoons, a source which may be present at the Malibu beaches. See the additional clarifying material included on page T3-23 and in Attachment 2.

Dr. Silverstein: "..the Haile et. al. epidemiology study was based on illness resulting from swimming at or near storm drain outfalls. The 1983 EPA document, Health Effects Criteria for Marine Recreational Waters, was based on studies of illness linked with treated wastewater outfalls. These are both point sources at beaches. The mechanism for transport of septic tanks and subsurface infiltration such as those in Malibu is thorough porous media, which may lessen the risk of these discharges. One source of difference resulting from subsurface discharge is the removal of particulate matter and attached bacteria. The 1983 EPA Health Effects document noted that removal of suspended solids during wastewater treatment reduced the density of Salmonella."

Response: Both the Haile and EPA epidemiology studies measured illnesses associated with enterococcus from point and non-point sources. Additional clarifying discussion was added at T3-24 and in Attachment 3.

Recommendations Not Incorporated

Staff appreciated comments from Dr. Drewes and Dr. Silverstein and provides further explanation, but did not incorporate two recommendations. Dr. Drewes requested that more surface water information should be provided in the memo. Staff chose to rely on existing surface water documents. Dr. Silverstein commented that the end-of-pipe enterococcus measures were not consistent with average raw sewage densities. Staff agrees, but inserted additional discussion describing why a change was not made.

Dr. Ørewes: "Data presented in this Technical Memorandum provide support that beach water quality in the vicinity of the Malibu Creek watershed repeatedly fails to meet water quality objectives. The data presented would not support that the water quality "persistently" fails to meet the water quality objectives since only a limited data set is presented. For some tables, information is missing regarding the size of the data set considered. For example, regarding Table 2, what is the total number of samples collected? Exceedances reported for the Surfrider Beach (2006 and 2007) in Table 2 seems to be based on data collected during six weeks in 2006 only, whereas the 2007 data set represents data collected over a four-month period. Are results presented in Tables 3-5 all data that is available for these sampling locations? At a minimum, a clarification should be provided in the Memorandum" (page 3).

Response: Sufficient evidence of a persistent problem has already been made available to the public in EPA's 2002 303(d) list, Santa Monica Bay Bacteria, Malibu Creek and Lagoon bacteria and Malibu Creek and Lagoon nutrient TMDLs and the 2008 NOV on stormwater exceedances in Malibu, but additional discussion was provided on page T3-7.

Dr. Silverstein: "Some of the data in Table 1 (page T3-3) seem questionable. For the Malibu Colony Plaza, the numbers of total and fecal coliform are identical, and typically fecal coliform are a log unit less than total. Also the number of Enterococci is higher than either total or fecal coliform, which is atypical in general, and not consistent with the other samples. For Fire Station 8, the data are more puzzling. In all samples, the MPN for enterococcus is equal to or greater than either total or fecal MPNs. .....these data should be questioned by anyone familiar with typical trends for these three indicators reported in the literature and therefore some explanation of the differences should be offered."

Response: The end-of-pipe data were provided to document that enterococcus can be discharged from OWDSs into groundwater. The bacteria densities and proportions are not consistent with sewage or non-sewage related waters. Inconsistencies within these samples is attributed to the wide range of data reported for OWDS effluent where disinfection has failed and different detection methods are used on serial grab samples of samples of partially treated sewage. See discussion added on page T3-4.

Dr. Silverstein: "The scientific basis for Figure 11 is weak..."

Response: The end-of-pipe values included in this figure show the wide variation in enterococcus densities entering the groundwater at the location indicated and discussed above. Staff questions if 'average' range of enterococcus in raw sewage concentrations from homogenized municipal waste is an appropriate criteria for well testing or septic tank outlet to a seepage pit. Numerous reported enterococcus values in the Malibu Civic Center wells and at end-of-pipe range up to 1 X 10^8 MPN/100 mL, suggesting that any one high value is not a computational, sampling or reporting error.

Comments in Support

Dr. Arnold: "Considering the entire argument presented and supporting information provided, the staff has made an adequate case for improving the microbial quality (indicators of fecal contamination) in Malibu ground water in order to improve the water quality in the near shore marine area off the Malibu coastline in order to reduce associated threats to human health (page 4)."

Dr. Arnold: "There are somewhat speculative, but increasingly accepted, mechanisms for the transport of bacteria and viruses from proximate ground waters, through the near-surface beach sand and into the surf zone. Observations regarding transport through the beach front were derived from studies outside the Malibu area, but in southern California, from multiple lines of experimentation. These have been described in peer-reviewed archival journals, adding to their credibility (page 4)."

Dr. Drewes: "The reviewer concurs with the interpretation of the key literature considering in this Technical Memorandum indentifying factors that increase the levels of pathogen indicators and risk to human health. The reviewer also concurs with the selection of enterococcus bacteria, since it is more persistent in water and sediments as compared to coliforms, as a recreational water quality indicator illustrating the presence of human waste at the sites studied "(page 1).

Dr. Drewes: "The reviewer agrees with staff's determination of impairment through pathogenic organisms and the conclusion that groundwater in this area is a source of impairment to lagoon and beaches (page 3)."

Dr. Drewes: "Plotting enterococcus occurrence data as frequency graphs is appropriate to illustrate distribution changes over several years for May-October summer time periods. (page 3)"

Dr. Drewes: "Correlation coefficients between annual enterococcus frequency distributions are reported for the Surfrider Beach (MC-2) data set only and they demonstrate that the variability of the distribution is small from year to year (page 3)."

Dr. Silverstein: "Overall, the movement of groundwater from the area served by OWDSs is well documented in other reports (Tech Memo 4). Literature cited confirms that pathogens, especially viruses, are transported in the subsurface from OWDSs, and would therefore reach the ocean water, especially in a sandy aquifer with short travel time. The presence of enterococcus in septic tank effluent, nearby groundwater, and the beaches is credible support for the contribution of OWDSs to contamination of the Malibu beaches by bacteria."

Dr. Silverstein: "a particular source of pathogen risk is associated with the fact that OWDSs serve a small number of people. This was discussed in the EPA Health Effects Criteria for Marin Recreational Waters (1983, page 49). That document notes that when the number of individuals who are sources of fecal waste becomes smaller, the ratio of pathogen-to-indicator density will vary highly from numbers based on aggregate wastes from a large population. If one or a small number of individuals in these small systems have an infectious disease, the ratio could approach 1, making the risk a significantly higher than that addressed by the water quality standard. The EPA document advises in that case, which may include OWDSs : " The solution is administrative action prohibiting such discharges into recreational waters."

Dr. Silverstein: "Taken as a whole, the conclusions of Technical Memos #3 and #4 are based on sound scientific principles and reasoning. Epidemiologic studies cited provide a strong basis for increased health risks to swimmers and the presence of indicator bacteria measured at the beaches, especially enterococcus, at concentrations higher than marine recreational water quality standards. There are some relatively minor concerns about interpretations of literature and some of the reported data as discussed above and in previous comments on Tech Memo #4. Addressing these will acknowledge real uncertainties that always exist with environmental studies, but will not weaken the conclusions."

Other Revisions

Dr. Arnold: "I feel that the case is well made for construction of sewerage in the Malibu area, but I was convinced in part by information from the supporting documents that might be included directly in the technical memorandum. The epidemiological case in particular requires supporting information. In my opinion, further studies are not required to justify Board action, so that recommendations specific to such studies are unnecessary. The complexity of the hydrology conditions, microbiological transport mechanisms and so forth are sufficiently plain (page 4)."

Response: The supporting documents have been included as part of the administrative record and posted on the website for the use of the public in considering Technical Memo #3. Specifically, we included Haile et. al, "An epidemiological study of possible adverse health effects of swimming in Santa Monica Bay", 1996; Haile et. al. "The health effects of swimming in ocean water contaminated by storm drain runoff", 1999; Gold, M.A. "What are the health risks of swimming in Santa Monica bay", 1994; and EPA "Health Effects Criteria for Marine recreational waters", 1983.

Dr. Silverstein: "Caution should be used in associated the bacteria indicator with human waste."

Response: Corrections in the text are made as per your recommendations emphasizing that enterococcus can also be associated with non-human waste.

Editorial and grammatical suggestions have been followed as appropriate, but are not specifically listed here. Staff wishes to express appreciation for the contributions of the peer reviewers.

Attachment #1

Comparison of Santa Monica Bay Beaches Adjacent to OWDS and to Sewers with Winter Rainfall using Gehan Statistical Test.

Dr. Arnold asked for additional statistical support for staff's findings.

Data

Beach data were collected as part of the "Santa Monica Bay Beaches Bacteria Total Maximum Daily Load Coordinated Site Monitoring Plan, April 7, 2004" (CSMP) and can be found at http://ladpw.org/wmd/npdes/beachplan.cfm.

Sampling procedures are standardized, including morning sampling in ankle-deep water at fixed points with testing in State certified laboratories. The study focused on records for June through August in 2005, May through October in 2006, April through October in 2007, and May through October in 2008, on a total of 58 beaches, 36 of which receive freshwater drainage (with MS-4 stormwater permits) and 22 of which do not. The beaches stretch from El Pescador Beach in the northwest to Redondo Beach in the southeast.

The sample sites were sorted according to characteristics, such as watershed size, land-use, fecal-indicator-bacteria concentrations, septic system presence, wave strength and beach visitor population. A full array of site characteristics were found to be represented: sewage or septic system waste treatments, adjacent groundwater levels of enterococcus levels above 1 MPN/100mL, watershed sizes ranging from 813 acres to 81,980 acres, urban acres ranging from 128 acres to 68,700 acres, and wave action identified from surf web-sites ranging from none to persistent. Some beaches had adjacent lagoons, tidally influenced pools, stormwater containments and low flow diversions.

Results

Enterococcus on Malibu Civic Center Beaches and all Santa Monica Bay Beaches

The enterococcus measures recorded on CSMP beaches over the summers 2005 to 2008 were sorted by interval frequency and plotted against the concentrations of Enterococcus (MPN/100mL). The method was chosen to minimize the impact of varying sample sizes and simplify large variations in the measures.

The beaches were found to have the most measures at 10 MPN/100 mL and some additional measures above 1,000 MPN/100 mL Figures A to D and Tables A to D of all Santa Monica Bay beaches for 2005 through 2008 show that these general characteristics are present for all the studied beaches.

Figure A. 40 Santa Monica Bay Beaches 2005 (All MS-4 beaches) Enterococcus Interval Frequency for June-August Single Measures[2]

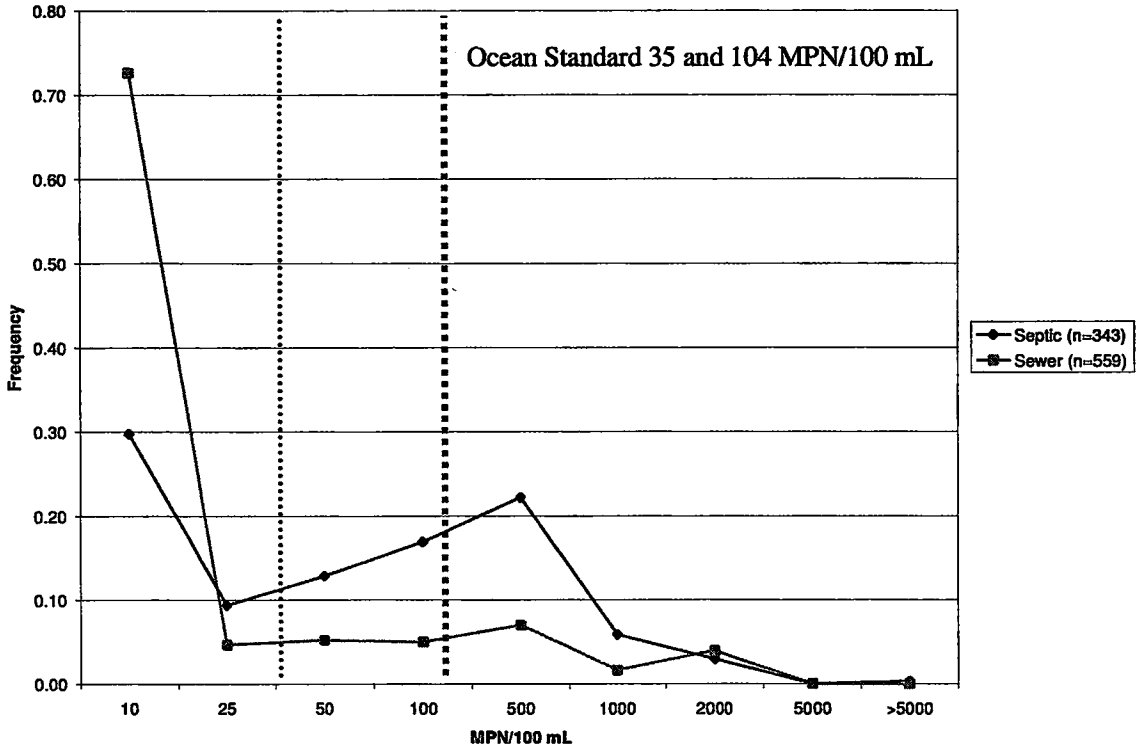


Table A: Relative Number of Exceedances for 57 Septic and Sewered Beaches in 2005.

In MPN/100mL	all beaches in 2005			
Enterococcus	Septic (n=466)	% total days reported at septic sites	Sewer (n=859)	% total days reported at sewer sites
Days above 35	206	44%	207	24%
Days above 104	108	23%	126	15%

[2] For the purposes of this study, the following site definitions were made: MS-4 Septic (19) 1-01, 1-03, 1-04, 1-05, 1-06, 1-07, 1-08, 1-09, 1-10, 1-11, 1-12, 1-13, 1-14,1-16,1-18, 4-01, MC-01, MC-02, MC-03; MS-4 Sewer (21) 2-01, 2-02, 2-06, 2-07, 2-10, 2-11, 2-13, 2-15, 3-01, 3-02, 3-03,3-04, 3-05, 3-06, 3-07, 3-08, 5-02, 5-03,6-01,6-05, BC-01; Non MS-4 Septic (3)1-02,1-15,1-17;
Non MS-4 Sewer (15) 2-03,2-04,2-05,2-08,2-09,2-12,2-14,3-09,5-01,5-04,5-05,6-02,6-03,6-04,6-06

Figure B. 40 Santa Monica Bay Beaches 2006 (All MS-4 beaches) 1nterococcus Interval Frequency for May-October Single Measures

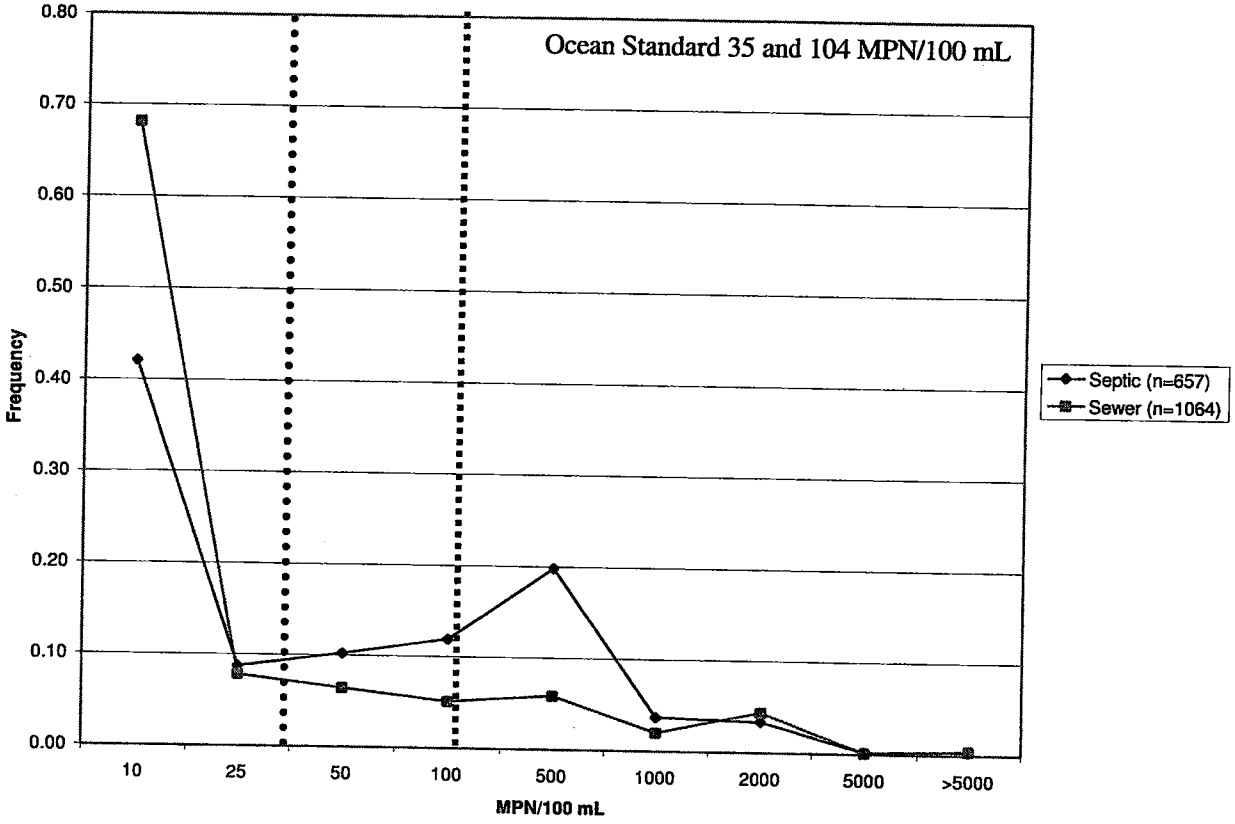


Table B: Relative Number of Exceedances for 57 Septic and Sewered Beaches in 2006. Sewered beaches were tested about one and a half times as often, in this year, as septic beaches, yet more days were recorded when enterococcus densities on septic beaches were higher than the Ocean single sample and geometric mean objectives.

In MPN/100mL	all beaches in 2006			
Enterococcus	Septic (n=903)	% total days reported at septic sites	Sewer (n=1669)	% total days reported at sewer sites
Days above 35	326	36%	295	18%
Days above 104	183	20%	156	9%

Figure C. 40 Santa Monica Bay Beaches 2007 (All MS-4 beaches) Enterococcus Interval Frequency for May-October Single Measures

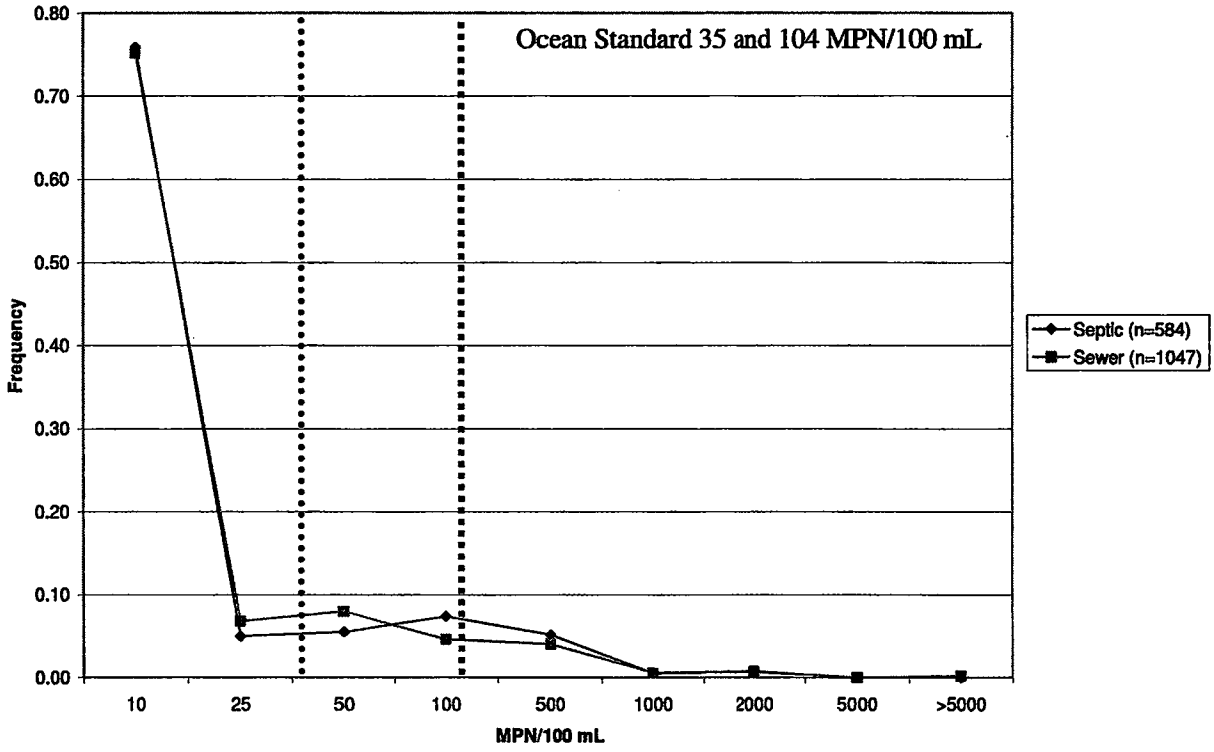


Table C: Relative Number of Exceedances for 57 Septic and Sewered Beaches in 2007. Sewered beaches were tested about twice as often, in this year, as septic beaches, and both had the same frequency of exceedances.

In MPN/100mL	all beaches in 2007			
Enterococcus	Septic (n=816)	% total days reported at septic sites	Sewer (n=1705)	% total days reported at sewer sites
Days above 35	106	13%	215	13%
Days above 104	38	5%	79	5%

Figure D. 40 Santa Monica Bay Beaches 2008 (All MS-4 beaches) Enterococcus Interval Frequency for May-October Single Measures

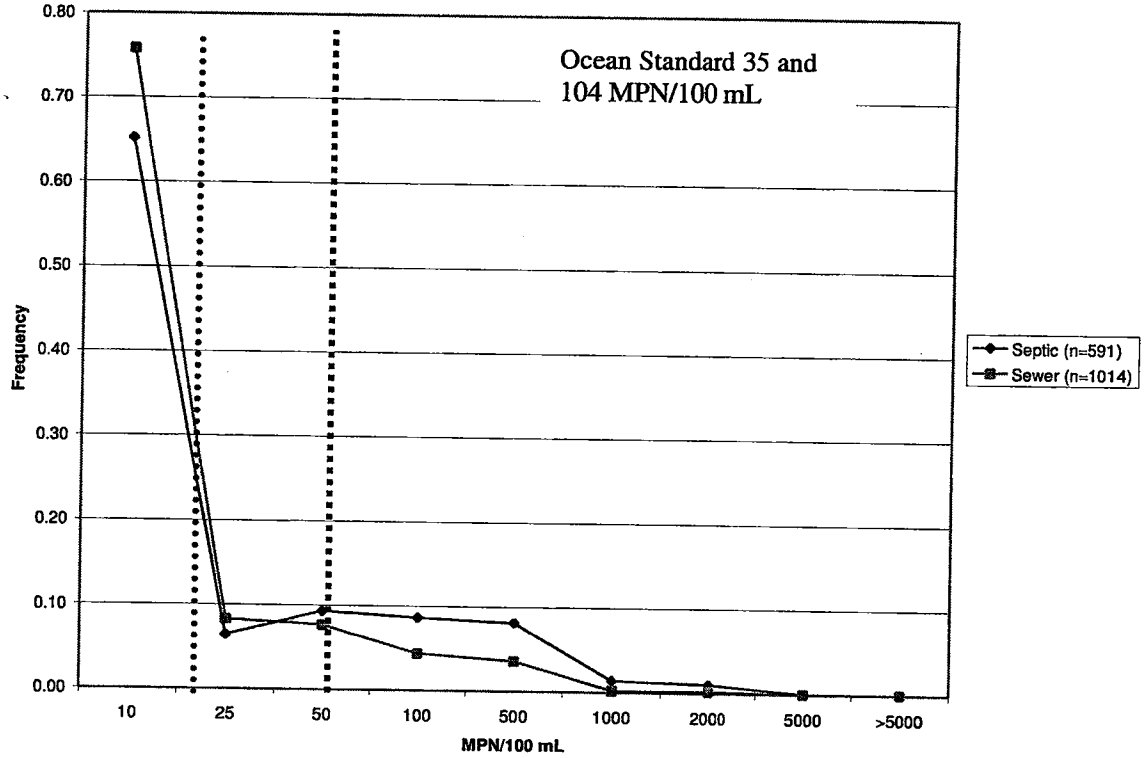


Table D: Relative Number of Exceedances for 57 Septic and Sewered Beaches in 2008.

In MPN/100mL	all beaches in 2008			
Enterococcus	Septic (n=813)	% total days reported at septic sites	Sewer (n=1644)	% total days reported at sewer sites
Days above 35	145	18%	176	11%
Days above 104	59	7%	54	3%

This annual comparison of all Santa Monica Bay beaches is consistent with the hypothesis that the mechanism(s) supplying enterococcus bacteria to beaches during the summer months does not operate uniformly every year. Further, the mechanism which supplies enterococcus bacteria to the beaches at levels of 10 MPN/100 mL, and to a lesser extent at levels above 1,000 MPN, must operate on all beaches regardless of the year or the method of waste treatment in the adjacent area.

The difference between the septic and sewered data sets for 2005, 2006 and 2008 is statistically significant.

Statistic analysis was performed for the same data sets of 2005-2008 using a t-test, and a Chi-square test. The use of these tools to measure the significance of enterococcus distributions was found to produce variable results depending on the size of the population and any truncation of the population. This observation is attributed to the non-normal and non-Chi-square shape of the distributions with a predominance of very low values and wide variations in the number and size of the largest values.

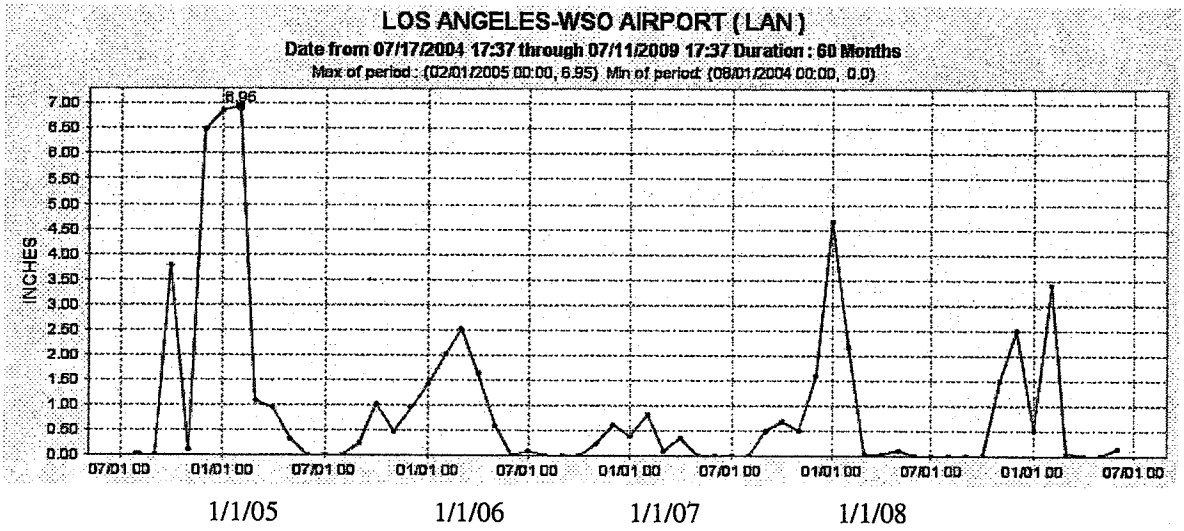
Consistent statistical results were obtained for the entire population of over 8,000 measures using the Gehan Test (a non-parametric Statistical Program) from USEPA ProUCL Statistical Program in conjunction with the Wilcoxsin and Quartile tests. All results confirmed hypothesis that enterococcus concentrations at septic beaches are greater than sewered beaches with 95% confidence level except for 2007 data. Gehan Test results and a discussion of the discarded methods are provided below.

This examination of all Santa Monica Bay beaches over four years provides evidence that bacteria may be transported by groundwater to the beach face as other mechanisms such as stormwater flow, overland urban flow, storm surge are minimal in the summer and the only other major source present only at septic beaches in groundwater discharge. Because bacteria must be transported by the groundwater between the septic systems and surface receiving waters and groundwater gradients increase after rain, a correlation between the number of enterococcus measures per site and the rainfall is expected at beaches where groundwater movement of the bacteria takes place.

Rainfall and Enterococcus

The highest monthly volume of rain fell in 2005 (wet year), among the years evaluated here, when 6.95 inches were recorded. The lowest was reported in 2007 (dry year) when less than one inch was recorded. However, the average annual rain fall in this area is 12 inches per year, significantly larger than the rain received in this study's "wet" year of 2005. Rain gauge reports from Los Angeles International Airport reported by the Department of Water Resources confirm annual variations in precipitation by year and are shown in Figure E.

Figure E. Rain gauge information for Los Angeles International Airport



Septic beaches are more distinct from sewered beaches in summers preceeded by rainy winters. The relative frequency of bacteria densities above 35 MPN/100mL on the beaches during the summer are seen to decrease between 2005 and 2007 in Tables A through D. The rainfall also decreases during this period as shown in Figure E.

Non parametric statistical tools were applied to the enterococcus beach data sets using Gehan Test from EPA's ProUCL statistical program. Using Form 1 Test, the Null Hypothesis is "Septic Beach Mean/Median Less Than or Equal to Sewer Beach Mean/Median;" and the Alternative Hypothesis is "Septic Beach Mean/Median Greater Than Sewer Beach Mean/Median". The result of the Gehan Test for 2005, 2006 and 2008 shows that the Null Hypothesis is rejected by a low P-value with an alpha value of 0.05 (a confidence level of 95%) , which rejects the Null Hypothesis and supports the Alternative Hypothesis "Septic Beach Mean/Median Greater Than Sewer Beach Mean/Median".

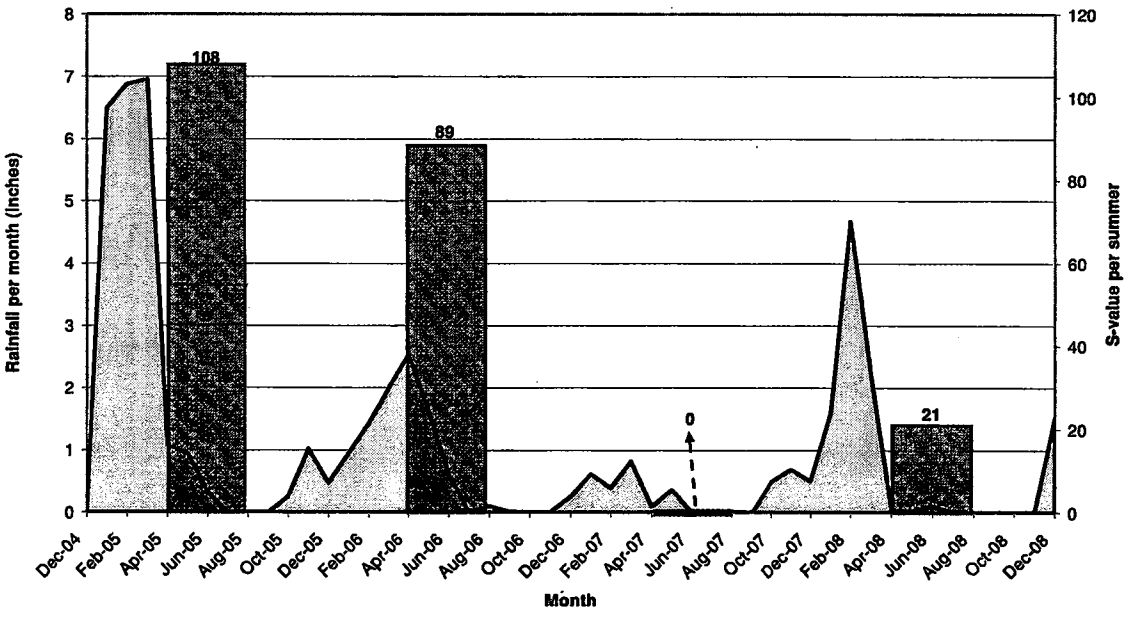
The statistical assessments of the 2007 enterococcus data are not consistent with the statistical results for 2005, 2006, and 2008. The same results were also obtained with an alpha value of 0.01 (a confidence level of 99%); enterococcus concentrations at septic beaches are higher than concentrations at sewered beaches statistically. Form 2 Test is also performed using the Gehan Test to verify the above conclusions.

The "Substantial Difference" (S) is used to estimate the difference in enterococcus concentration between septic and sewered beaches and is shown in Figure F. The rainfall was low in 2007, as is the S value. The S increases as the winter rains increase in 2008.

Because septic or sewered beach have little stormwater discharge for June to September, these observations document a supply and transport mechansim. Ground water discharge with elevated enterococcocus densities after wet winters is affecting septic beaches to a greater extent than is occuring on sewered beaches. In the summer of 2008, the frequency of enterococcus densities above 35 MPN/100mL does not increase to the 2006 summer levels, despite increasing rainfall in the winter of 2007-2008, nor does the S value increase to 2006 levels. This observation is attributed to short term rain events in February 2008 when discharge was via stormwater and not groundwater recharge.

Figure F.

Santa Monica Bay: Los Angeles International Airport Monthly Rainfall and Dimensionless Measure of Significance for the Contrast between Summer-Month Septic and Sewered Beach Enterococcus-Interval-Frequency-Distributions vs. Months



Septic Density

Septic Density did not show a strong correlation with enterococcus measures or interval frequencies.

The number of septic systems at a beach within 1000 feet of the CSMP monitoring location was estimated by counting roofs on air photos dating after 2004 and available for coastal areas on Google for the area northwest of Castlerock Mesa, where no sewer hook up is available. The counts are as follows:

Table E.

Beach with Lower Septic System Density	Sampling Point	Number of roofs within 1000 feet
Zuma Beach	1-05	3
Malibu Pier	MC-3	4
Leo Carrilo	1-01	5
San Nicholas Canyon	4-01	10
Solstice Creek an Dan Blocker Beach	1-10	10

Table F.

Beach with Higher Septic System Density	Sampling Point	Number of roofs within 1000 feet
Latigo Canyon	1-09	20
Surfrider Beach	MC-2	21
Trancas Creek	1-04	22
Walnut Creek	1-06	29
Sweetwater Canyon on Carbon Beach	1-13	32
Corral Canyon	1-11	34
Escondido Creek	1-08	34
Pena Creek on Las Tunas County Beach	1-16	36
Topanga Beach	1-18	41
Marie Canyon	1-12	43
Malibu Colony	MC-1	45
Las Flores Creek	1-14	58
Tuna Canyon	1-17	93
Ramirez Creek	1-07	120

Six beaches with no sewer connections and less than 20 roofs within 1000 feet of the CSMP monitoring point were compared with 14 beaches with no sewer connections and more than 20 roofs, as shown in Tables E and F and Figures G, H, J, and K. The plots below demonstrate that significant differences, as measured by the less reliable student t-test, were found on beaches in 2005 and 2006, when some rain fell. The following two years, a significant difference was not found. A weather related summer month difference, when direct discharge across the beaches is limited, is most likely attributed to groundwater flows.

Figure G.

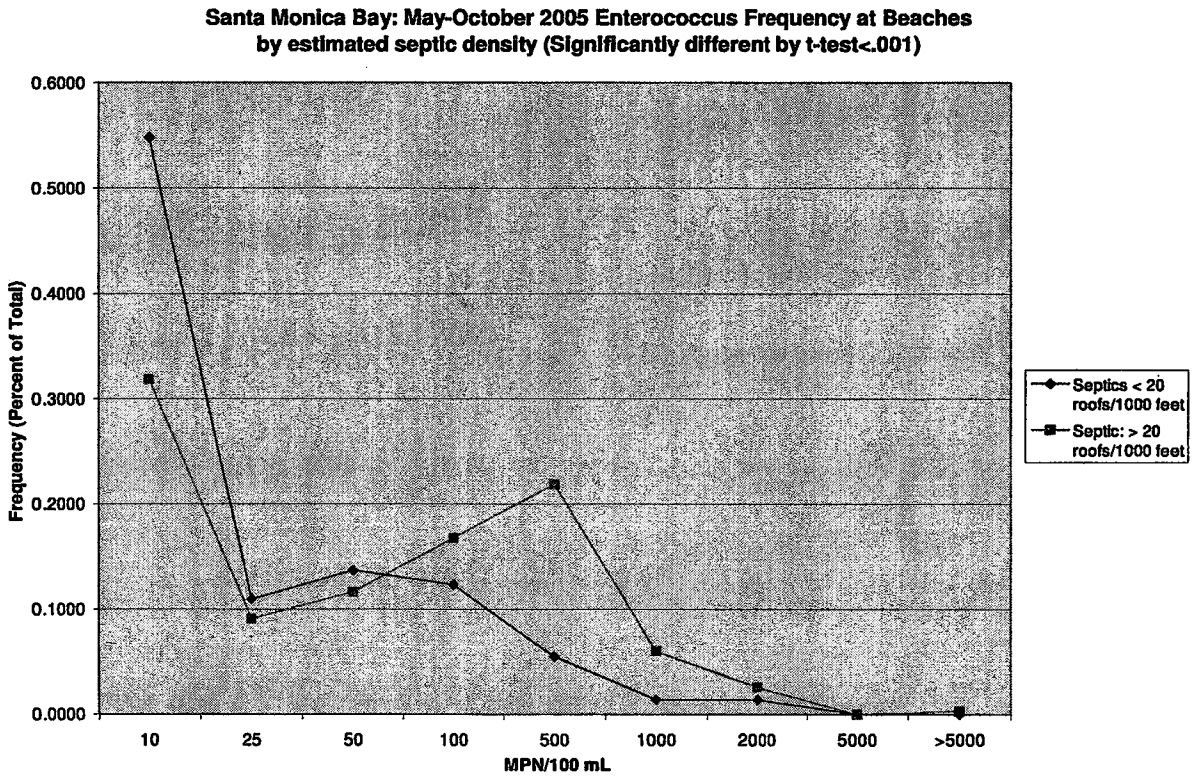

Santa Monica Bay: May-October 2005 Enterococcus Frequency at Beaches
by estimated septic density (Significantly different by t-test<.001)
Frequency (Percent of Total)
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000
10
25
50
100
500
1000
2000
5000
>5000
MPN/100 mL
Septics < 20 roofs/1000 feet
Septic: > 20 roofs/1000 feet

Figure H.

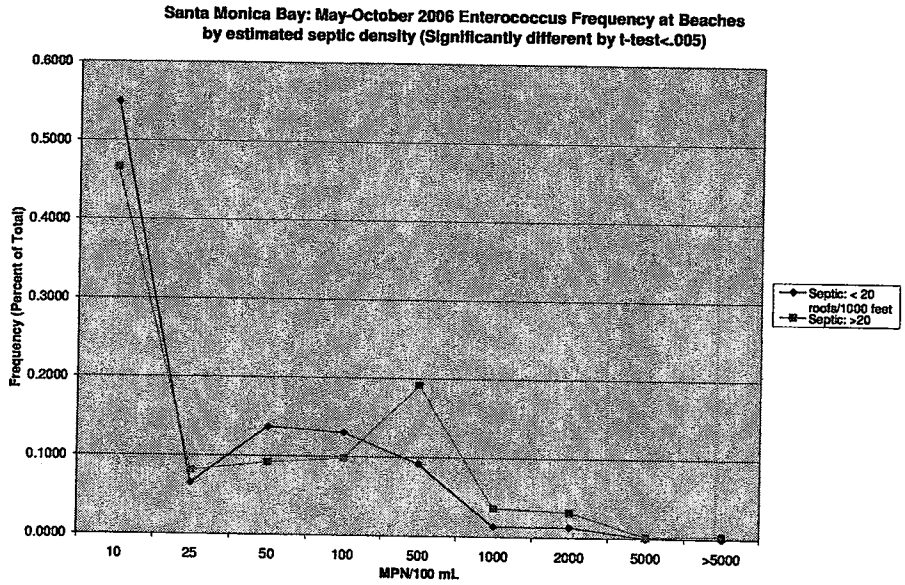


Figure J.

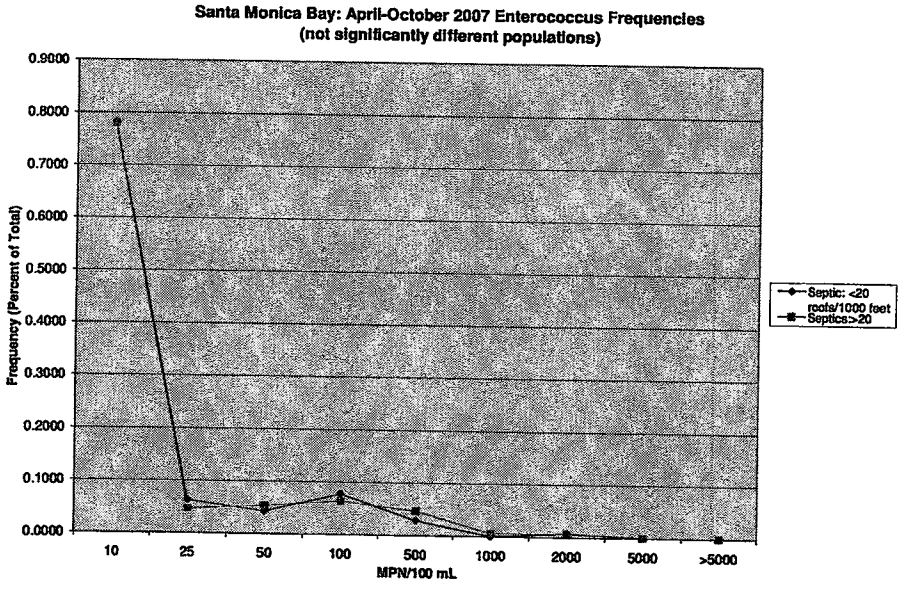
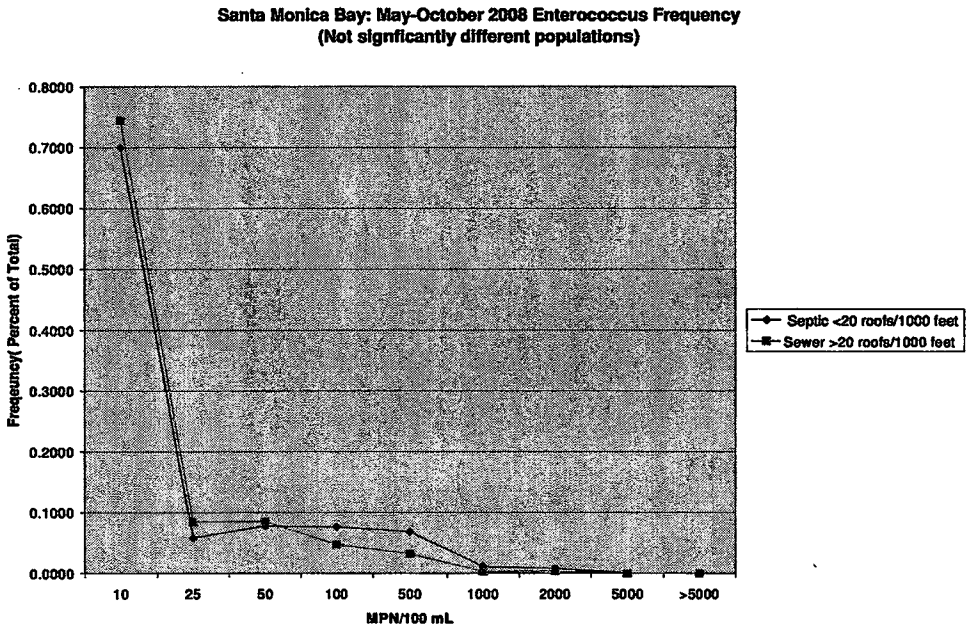


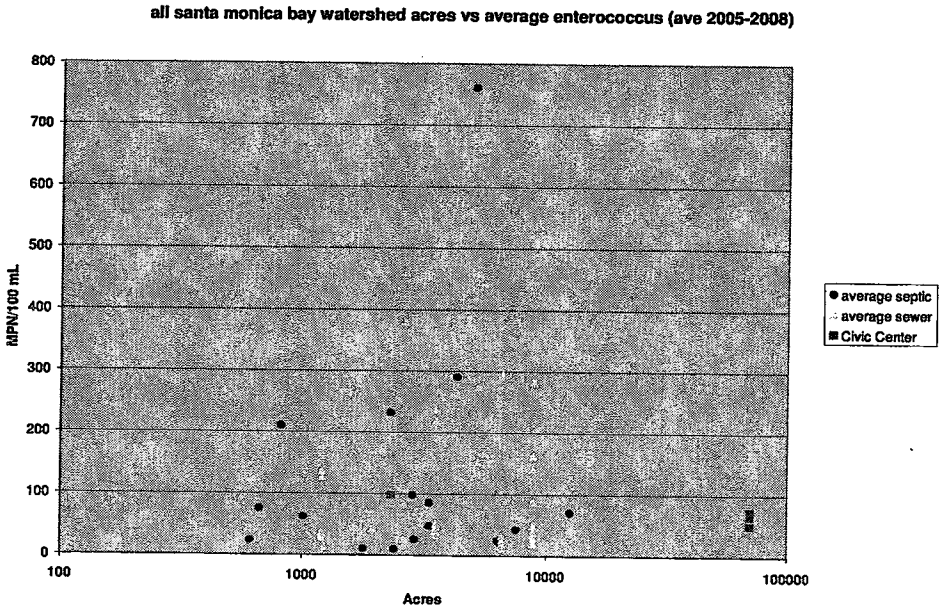
Figure K.



Watershed Area, Urban development and Beach populations

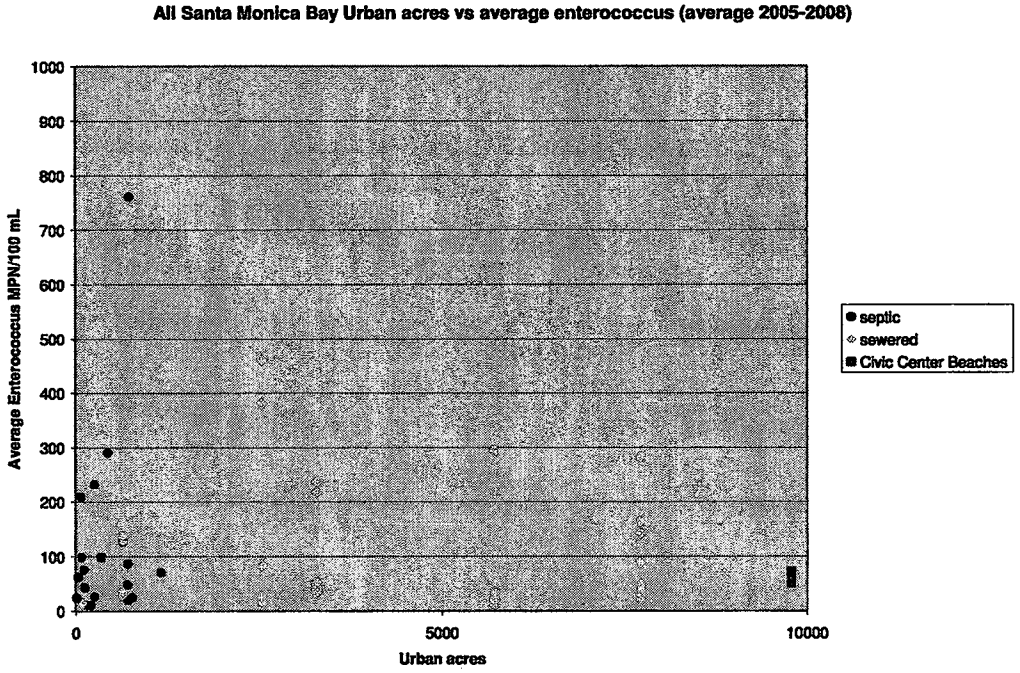
Watershed area, urban acreage and beach populations were not found to correlate with variations in enterococcus density distributions in Figure K. The following charts were prepared to show that the average enterococcus density on beaches with or without adjacent sewers is not seen to vary with these potentially confounding factors.

Figure L.



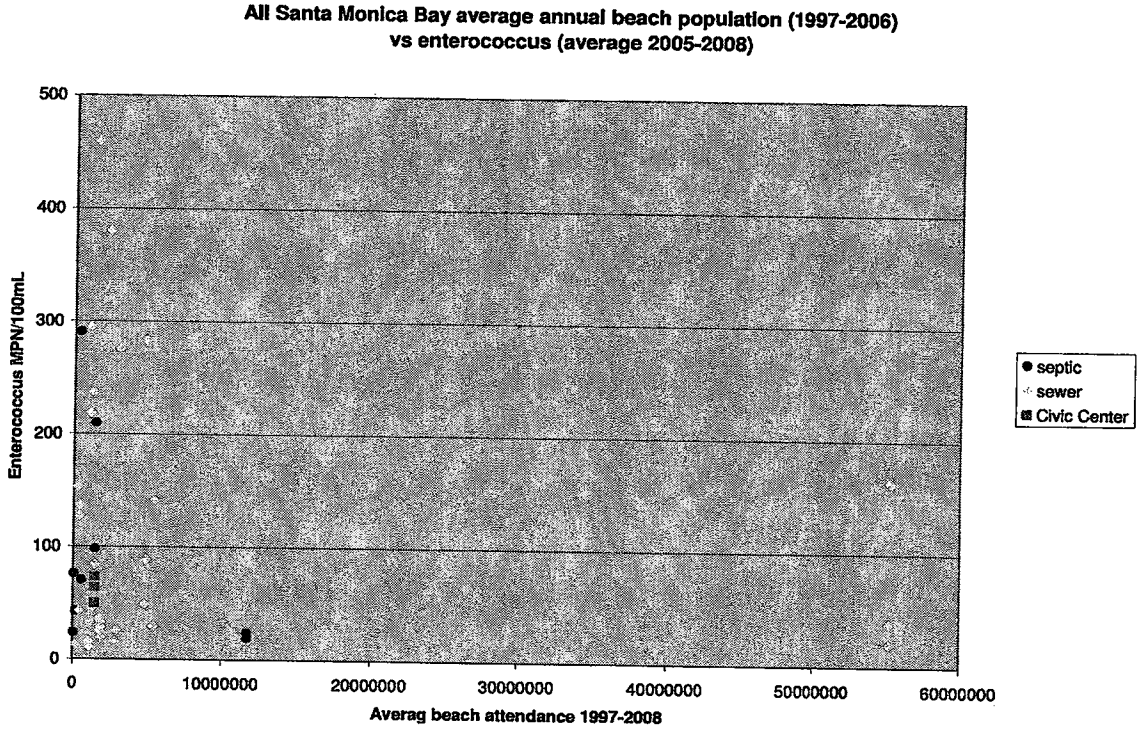
The Surfrider, Malibu Colony and Malibu Pier septic beaches appear on the right side of Figure L (greater than 10,000 acres) and a nearby beach, Sweetwater Canyon at Carbon beach, appears in the center (less than 5,000 acres). The acreage values come from the Santa Monica Bay bacteria Total Maximum Daily Load documents, and staff notes that three Civic Center beaches share the same high value for acreage. This may incorrectly suggest that the watershed size for is much greater than other beaches. Further evidence that watershed size does not correlate with enterococcus average comes from the two largest watersheds: Santa Monica Canyon with an average of 117.42 MPN/100 mL and acreage of 10,088; and, Ballona Creek with an average of 47.42b MPN/100 mL and acreage of 81,980.

Figure M.



No strong correlation is seen in Figure M above between urban acreage and average enterococcus densities for beaches with or without sewers. The Surfrider, Malibu Colony and Malibu Pier septic beaches appear on the right side of the chart (at 10,000 acres) and Sweetwater Canyon at Carbon beach appears on the left (at less than 1,000 acres). The acreage values come from the Santa Monica Bay bacteria Total Maximum Daily Load documents.

Figure N.



No strong correlation is seen in Figure N between acreage beach attendance and average enterococcus densities for beaches with or without sewers. The Surfrider, Malibu Colony, and Malibu Pier beaches appear on the left (at less than 1,000,000 people).

Statistical Significance

The application of statistical tools to the beach bacteria data sets revealed that standard tests have a high potential to produce misleading results. Additional statistical tests were used to confirm a significant difference between enterococcus interval frequency distributions for septic and sewered beaches in 2005, 2006 and 2007 for non-MS-4 beaches not including beaches with direct discharge to beach wave wash. The examination of enterococcus on beaches requires the manipulation of very large data sets. As an example, 7,081 measures were collected from beaches receiving MS-4 discharge in the summers of 2005 through 2008. The measures were not all normally distributed and were dominated by densities at or below 10 Most Probable Number (MPN)/100 mL (considered to be non-detect), with the presence of occasional measures above 24,000 MPN/100mL. The majority of the bacteria measures in the beach data sets had low and high enterococcus densities which together constitute a log normal distribution, but with interval frequencies between 50 and 1,000 MPN/100 mL which were not consistent with a log normal distribution.

Statistics which rely on normal distributions may produce false positive measures of significance for the beach bacteria populations. Many single beach samples assembled through weekly sampling over 4

summers did not have sufficiently large populations to allow statistical assessment with such tests. For example, an attempt to compare Surfrider and Manhattan (40th Street) beaches during the summer of 2007 was not successful because of the distribution of the measures for Manhattan Beach (9 measures below 10 MPN/100 mL, one of 24,000 MPN/100mL and 5 of 10 MPN/100mL). The resulting sample distribution was not normally distributed nor was the natural log of the sample distribution normally distributed. A comparison of the data with the larger sample at Surfrider Beach varied with the interval to which the statistical test was applied.

Where data sets are large, normal distributions can be created through repeated sampling. However, the largest data sets also had a few very large measurements and many small measurements, suggesting that population distribution is not improved with sampling. As an example, annual populations for all sewered and septic beaches had high correlation coefficients for large and small intervals, but not for the interval between 50 and 1,000 MPN/100 mL.

If normality was assumed and Student's t-tests and Correlation Coefficient were applied to the entire population, the results were repeatedly inconsistent. T-tests and t-tests of normal log values would show sewer and septic populations were distinct in a given year, but fail to provide this result if the data were truncated to remove high values or low values. The statistic package Minitab was used to apply the Chi-square test. When the chi square correlation was made on truncated populations of all beaches with some values below 10 MPN/100 ML removed, the results ($p<.05$) indicated that septic and sewered beaches did not belong to the same population. However, the removal of about half of the population was of concern.

Non parametric statistical tools were applied to the same data sets. When all septic and sewered beaches for the year 2005 - 2008 were contrasted using the non-parametric Quartile Hypothesis Test, the Wilcoxon-Mann-Whitney (WMW) Test and Gehan Test from EPA's ProUCL statistical program, the Quartile Test results recommend using the WMW Test. However, the WMW Test is only applicable for data set with less than 40% non-detect level of 10 MPN/100mL. Therefore, the Gehan Test is the most appropriate Test for this study. The Gehan test looks at all intervals and emphasizes the mean/median interval. The results are summarized in Tables 1 through 4.

The Null Hypothesis is termed "Septic Beach Mean/Median Less Than or Equal to Sewer Beach Mean/Median;" and the Alternative Hypothesis is "Septic Beach Mean/Median Greater Than Sewer Beach Mean/Median" using Gehan Form 1 Test.

The result of the Gehan Test for 2005, 2006 and 2008 shows that the Null Hypothesis is rejected by a low P-value with an alpha value of 0.05 (a confidence level of 95%) , which rejects the Null Hypothesis and supports the Alternative Hypothesis "Septic Beach Mean/Median Greater Than Sewer Beach Mean/Median". The 2007 data are not consistent with the results of 2005, 2006, and 2008 due to low groundwater discharge to beaches after dry winter. The same results were also obtained with an alpha value of 0.01 (a confidence level of 99%) that enterococcus concentration at septic beaches is higher than concentration at sewered beaches statistically.

Table 1 - 2005 Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: septic
Background Data: sewered

Raw Statistics

	Site	Background
Number of Valid Data	358	754
Number of Non-Detect Data	113	482
Number of Detect Data	245	272
Minimum Non-Detect	10	10
Maximum Non-Detect	10	10
Percent Non detects	31.56%	63.93%
Minimum Detected	20	20
Maximum Detected	9208	4200
Mean of Detected Data	261.7	368.9
Median of Detected Data	87	99
SD of Detected Data	661.3	591.3

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test	
Value	9.461
Critical z (0.95)	1.645
P-Value	1.52E-21

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Table 2 - 2006 Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: septic
Background Data: sewered

Raw Statistics

	Site	Background
Number of Valid Data	685	1377
Number of Non-Detect Data	293	921
Number of Detect Data	392	456
Minimum Non-Detect	10	10
Maximum Non-Detect	10	10
Percent Non detects	42.77%	66.88%
Minimum Detected	20	20
Maximum Detected	24192	48010
Mean of Detected Data	324.9	532.3
Median of Detected Data	86.5	42
SD of Detected Data	1320	2701

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test	
Value	11.74
Critical z (0.95)	1.645
P-Value	4.17E-32

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Table 3 - 2007 Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: septic

Background Data: sewered

Raw Statistics

	Site	Background
Number of Valid Data	731	1364
Number of Non-Detect Data	574	1023
Number of Detect Data	157	341
Minimum Non-Detect	10	10
Maximum Non-Detect	10	10
Percent Non detects	78.52%	75.00%
Minimum Detected	10	20
Maximum Detected	2000	24192
Mean of Detected Data	127.5	260
Median of Detected Data	52	41
SD of Detected Data	281	1713

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test	
Value	-1.226
Critical z (0.95)	1.645
P-Value	0.89

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table 4 - 2008 Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: septic
Background Data: sewered

Raw Statistics

	Site	Background
Number of Valid Data	734	1315
Number of Non-Detect Data	514	979
Number of Detect Data	220	336
Minimum Non-Detect	10	10
Maximum Non-Detect	10	10
Percent Non detects	70.03%	74.45%
Minimum Detected	20	20
Maximum Detected	2000	2000
Mean of Detected Data	146.8	90.55
Median of Detected Data	53	31
SD of Detected Data	290.3	226.3

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test	
Value	3.45
Critical z (0.95)	1.645
P-Value	2.81E-04

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

An additional measurement of significance using the Gehan test can be achieved by adding an investigation value (i.e. enterococcus concentration) to the mean/median before assessing the Null hypothesis to demonstrate the magnitude of difference using Gehan Form 2 Test. The larger this value, called substantial difference, S, the greater the difference between the populations, i.e., the greater an S, the greater an enterococcus concentration for septic beaches versus sewered beaches. Definitions from EPA's ProUCl program are detailed follow.

> Δ (delta): The true difference between the mean concentration of X in one sample and the mean of X in a second sample. Delta is an unknown parameter which describes the true state of nature. Hypotheses about its value are evaluated using statistical hypothesis tests. In principle, we can select any specific value for Δ and then test if the observed difference is as large as Δ or not with a given confidence and power.

> S (substantial difference): A difference in mean concentrations that is sufficiently large to warrant additional interest based on health or ecological information. S is the investigation level. If Δ exceeds S, the difference in concentrations is judged to be sufficiently large to be of concern, for the purpose of the analysis. A hypothesis test uses measurements from the site and from background to determine if Δ exceeds S.

In the study cases, the S value was calculated to determine the significance of the contrast between sewered and septic beaches for the summers of 2005, 2006, 2007 and 2008. The resulting S values show that septic beaches were most distinct from sewered beaches in 2005 after wet winter and not distinct in 2007 after dry winter. A substantial difference exists between septic and sewered beaches for every year except 2007.

Year	2005	2006	2007	2008
S value MPN/100 mL	108	89	0	21

The Gehan calculation with S factor calculation for the 2005 - 2008 are shown in Tables 5 - 9.

Table 5 – 2005 Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	108
Selected Null Hypothesis	Site or AOC Mean/Median Greater Than or Equal to Background Mean/Median plus a Substantial Difference, S (Form 2)
Alternative Hypothesis	Site or AOC Mean/Median Less Than Background Mean/Median plus a Substantial Difference, S

Area of Concern Data: septic beaches
Background Data: sewered beaches

Raw Statistics

	Site	Background
Number of Valid Data	358	754
Number of Non-Detect Data	113	482
Number of Detect Data	245	272
Minimum Non-Detect	10	10
Maximum Non-Detect	10	10
Percent Non detects	31.56%	63.93%
Minimum Detected	20	20
Maximum Detected	9208	4200
Mean of Detected Data	261.7	368.9
Median of Detected Data	87	99
SD of Detected Data	661.3	591.3

Site vs Background Gehan Test

H0: Mu of Site or AOC >= Mu of background 108

Gehan z Test Value	-1.631
Critical z (0.95)	-1.645
P-Value	0.0514

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site >= Background + 108.00
P-Value >= alpha (0.05)

Table 6 – 2006 Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	89
Selected Null Hypothesis	Site or AOC Mean/Median Greater Than or Equal to Background Mean/Median plus a Substantial Difference, S (Form 2)
Alternative Hypothesis	Site or AOC Mean/Median Less Than Background Mean/Median plus a Substantial Difference, S

Area of Concern Data: septic beaches
Background Data: sewered beaches

Raw Statistics

	Site	Background
Number of Valid Data	685	1377
Number of Non-Detect Data	293	921
Number of Detect Data	392	456
Minimum Non-Detect	10	10
Maximum Non-Detect	10	10
Percent Non detects	42.77%	66.88%
Minimum Detected	20	20
Maximum Detected	24192	48010
Mean of Detected Data	324.9	532.3
Median of Detected Data	86.5	42
SD of Detected Data	1320	2701

Site vs Background Gehan Test

H0: Mu of Site or AOC >= Mu of background 89

Gehan z Test Value	-1.353
Critical z (0.95)	-1.645
P-Value	0.088

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site >= Background + 89.00

P-Value >= alpha (0.05)

Table 7 – 2007 Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Greater Than or Equal to Background Mean/Median plus a Substantial Difference, S (Form 2)
Alternative Hypothesis	Site or AOC Mean/Median Less Than Background Mean/Median plus a Substantial Difference, S

Area of Concern Data: septic beaches
Background Data: sewered beaches

Raw Statistics

	Site	Background
Number of Valid Data	731	1364
Number of Non-Detect Data	574	1023
Number of Detect Data	157	341
Minimum Non-Detect	10	10
Maximum Non-Detect	10	10
Percent Non detects	78.52%	75.00%
Minimum Detected	10	20
Maximum Detected	2000	24192
Mean of Detected Data	127.5	260
Median of Detected Data	52	41
SD of Detected Data	281	1713

Site vs Background Gehan Test

H0: Mu of Site or AOC >= Mu of background 0

Gehan z Test Value	-1.226
Critical z (0.95)	-1.645
P-Value	0.11

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site >= Background + 0.00
P-Value >= alpha (0.05)

Table 8 – 2008 Gehan Site vs Background Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	21
Selected Null Hypothesis	Site or AOC Mean/Median Greater Than or Equal to Background Mean/Median plus a Substantial Difference, S (Form 2)
Alternative Hypothesis	Site or AOC Mean/Median Less Than Background Mean/Median plus a Substantial Difference, S

Area of Concern Data: septic beaches
Background Data: sewered beaches

Raw Statistics

	Site	Background
Number of Valid Data	734	1315
Number of Non-Detect Data	514	979
Number of Detect Data	220	336
Minimum Non-Detect	10	10
Maximum Non-Detect	10	10
Percent Non detects	70.03%	74.45%
Minimum Detected	20	20
Maximum Detected	2000	2000
Mean of Detected Data	146.8	90.55
Median of Detected Data	53	31
SD of Detected Data	290.3	226.3

Site vs Background Gehan Test

H0: Mu of Site or AOC >= Mu of background 21

Gehan z Test Value	-0.305
Critical z (0.95)	-1.645
P-Value	0.38

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site >= Background + 21.00
P-Value >= alpha (0.05)

Attachment #2

Non-Human Sources for Enterococcus

Dr. Drewes asked Staff to include additional discussion on non-human sources for enterococcus

Staff finds that enterococcus densities exceeding the water quality objective are a sufficiently reliable indicator of human health risk despite research documenting non-human sources for the bacteria.

Enterococcus, a genus of bacterium, has been found in feces from humans and warm-blooded animals including marine birds. State and federal standards establish a water quality objective of 35 MPN/1000 mL enterococcus for any marine human-contact recreation, yet genetic typing of the enterococcus has been used to preferentially close beaches when human enterococcus was identified. The Vermont case, described below, resulted in fewer beach closures using this more sophisticated method when combined with a reduction of the human-sourced bacteria identified, a process which has not proved successful in Malibu.

> "The Vermont staff deployed Microbial Source Tracking (MST) to classify isolates of enterococcus as being from humans, birds, dogs, or wildlife sources, and flurometery (detection of optical brighteners in detergents from sewers and septic drain fields) was added as a chemical method to differentiate between human and non-human sources of pollution. Based on 2004 results that human sources of pollution were present at several beaches, investigations by officials from Hampton, Newport News and Hampton Road Sanitation Districts identified probable sources of the pollution and took steps to eliminate the problems. Sampling in 2005 and 2006 confirmed the success of these efforts (reduction in the level of pollution from human sources) and demonstrated improved water quality conditions at beaches....Hilton, King-Lincoln and Anderson Beaches all had advisories in 2004 and 2005, but none in 2006. This demonstrated the success of using MST to identify sources of fecal pollution in 2004, performing remediation to remove the origins of the pollution in 2005, and then follow-up with MST in 2006 to prove that the sources found in 2004 and 2005 were no longer present in 2006. This is the first report where MST results indicated pollution from a particular source was present (human-origin sewage), the origin of the pollution was then located, steps taken to eliminate the pollution, and subsequent MST results indicated the success of those remediation efforts. (Hagedorn, C., 2006, *Final Project Report: Microbial Source Tracking and Virginia Beach Monitoring Program.* Virginia Polytechnic Institutes and State University and Virginia Department of Health)"

Anti-biotic resistant enterococcus has been identified in bird waste and the proportion of antibiotic resistant species used to conclude that non-human sources generated entercoccus in densities exceeding water quality standards. In the Huntington Beach studies, garbage and an offshore sewage outfall were also identified the sources for anti-biotic resistant enterococcus to enter the food chain. The United States Fish and Wildlife provided the alternative explanation that the bird population, alone, was insufficient to explain the bacteria densities.

> "The Huntington Beach studies showed that the levels of bacteria generated within the marsh contributed to the bacteria population, but were not sufficient, in and of themselves, to account for the problem itself. Specifically, the studies showed that bacteria generated by birds in the Talbert Marsh could cause bacteria concentrations in the surf line near the marsh to briefly exceed criteria on outgoing nighttime or early morning tides. The study further concluded that fecal material deposited by western gulls is a significant source of indicator bacteria in the water flowing out of Talbert Marsh and that indicator bacteria growing on vegetation in the marsh and in marsh sediment may also contribute to the near shore loading of these microorganisms. The study additionally concluded that the levels of bacteria recorded along the beach were higher than could possibly have been generated by Talbert Marsh alone and that there has to be another source (page 47).....data show that beaches near tidal wetlands do not have chronic beach postings. Postings on beaches near tidal wetlands had an average of about 2 postings for 12 days in 1999 while beaches not near wetlands had an average of about 3 posting for 32 days(page 49)." (US Fish and Wildlife Service, 2001 Staff Report and Recommendation on Consistency Determination: Bolsa Chica Lowlands, Orange County, California Coastal Commission Determination CD-061-01.)

Further, literature on non-human enterococcus sources does not include an epidemiology study linking decreased illness rates among swimmers exposed only to enterococcus species generated outside the human body. In fact, the 1983 Cabelli epidemiology study, upon which the 1983 EPA enterococcus criteria is based, states that the beaches studied did not all have an identifiable point source of human sewage. In addition, the 1999 Haile study looked at fecal, total, e. coli, and enterococcus and related human illness to the densities of each of these bacteria on the beach, even though both fecal and total bacteria are known to include bacteria species not related to human feces.

The literature on non-human sources of enterococcus reviewed by staff also fails to interpret a change to the enterococcus water quality objective, except to say in the most general way that the criteria may 'require revision.' Instead, Pruse's review in 1998 found that enterococcus was among the most reliable indicators of illness.

> "The indicator organism which correlate best with health outcome were enterococcus/fecal streptococci for both marine and freshwater (pg 3)." (Pruse, A, 1998, *Review of Epidemiological Studies on Health Effects from Exposure to Recreational Water*. International Epidemiological Association vol. 17, pages 1-9)

Future research is desirable to resolve these apparent contradictions in the application of the enterococcus standard. Staff offers the possible explanation that bacteria densities correlate with human illness because bacteria and virus densities are highest in microbiological and hydrological environments where bacteria are successfully transported and protected. The proximity and volume of a human fecal source would be the secondary variable controlling the infectious natural of the enterococcus observed. The 1998 Pruse summary confirms a correlation between illness and indicator bacteria in 19 of 22 studies.

Staff's explanation allows agreement with research showing enterococcus can exceed the water quality objective where no human fecal sources are present, without negating its use in protecting beaches where

proximal human fecal source is present. In the Malibu Civic Center, the three sources of human feces are stormwater, urban runoff and groundwater containing septic discharge. Further, concerns about an over-stringent application of the enterococcus standard are settled by the site specific epidemiology study linking illness rates at the Civic Center beach called Surfrider to bacteria density at approximately the published criteria rate for gastrointestinal symptoms which include a fever (HCGI 2). Staff notes that the enterococcus water quality standard is implemented nation-wide, has not been revised since 1983, and is the criteria upon which the Board must evaluate the exceedances shown.

Attachment #3

Bacteria Transport in Groundwater

Dr Silverstein comments that a reduction in pathogen density is expected between the OWDSs and the ocean. In fact, the rate and manner of bacteria and virus transport is not fully understood. The hydraulic and microbiological setting of the Civic Center beaches contains characteristics which may prevent bacteria and viruses destruction in the subsurface and enhance transport through the beach sand to the ocean on occasion in some locations.

In 2007, Nathalie Tufenkji provided a survey of particulate transport in the groundwater and noted that the existing models are deficient in successfully predicting the movement of organic particles. The survey specifically notes that work predicting the subsurface slowing of bacteria movement has not been paralleled by equally vigorous exploration of the subsurface enhancement of bacteria movement.

> "A substantial research effort has been aimed at elucidating the role of various physical, chemical and biological factors on microbial transport and removal in natural subsurface environments. The major motivation of such studies is an enhanced mechanistic understanding of the processes for development of improved mathematical models of microbial transport and fate. In this review, traditional modeling approaches are systematically evaluated. A number of these methods have inherent weaknesses or inconsistencies (pg 1455)....For instance, calculations based on Tufenkji and Elimelech (TE) equation indicate that particles in the size range of [about] 2 um (e.g. many bacteria) are nearly twice as mobile in porous media than previously believed (pg 1461)....The release (detachment) of microorganisms from sediment grain surfaces can be of considerable importance in natural subsurface environments and engineered water treatment systems...an improved understanding of....factors controlling microbial release is required before practical incorporation of this process into mathematical transport models (pg 1646)... Future areas for fundamental research in this area have been identified and include (i) inactivation kinetics of microorganisms in soils, (ii) role of protozoan grazing in removal of bacteria, (iii) mechanisms of microbial detachment from sediment grain surfaces, (iv) interactions between cell/cyst surface biomolecules and mineral surfaces, and (v) the influence of physical and geochemical aquifer heterogeneity on microbial transport (page 1468) (Tufenkji, N. 2007, *Modeling Microbial Transport in Porous Media: Traditional Approaches and Recent Developments.* Advances in Water Resources vol. 30, pages 1455-1469)

Referred literature shows that colloids travel at elevated rates in discrete macro-pores instead of through uniform concentration fronts like dissolved species. Further, changes in colloidal movement have been attributed to chemistry, such as the difference between freshwater and saltwater, with more rapid colloid movement freshwater. As another example, a 2001 study showed that bacteria move more rapidly in 'dirty' packed sand than in clean sand.

> "We characterize the filtration and deposition profiles of a recombinant analog of Norwalk virus, an important waterborne pathogen, in packed beds of saturated quartz sand under both 'clean-bed' and 'dirty-bed' conditions. Under clean-bed conditions with

NaCl as the electrolyte, the retained Norwalk virus particles decline like a power-law with depth. The power-law decay in retained particle concentration is consistent with the predictions of a recently proposed filtration model which assumes that microscale heterogeneity leads to particle filtration length scales of all sizes, i.e. the filtration is fractual in nature. However, under dirty-bed conditions with either groundwater or wastewater as the pore fluid, the deposited Norwalk virus particles profiles are considerably more complex. Analysis of these data using both the traditional filtration model and the fractal filtration model suggest that, under dirty-bed conditions, macroscale heterogeneity dominates virus removal rates. (Redman, J. A., Estes, M.K., and Grant, S.B, 2001, *Resolving macroscale and microscale heterogeneity in virus filtration*, Colloids and Surfaces A: Physicochemical and Engineering Aspects. Vol. 191, Issues 1-2, pg 57- 70)

Staff found literature both supporting and refuting the conclusion that the method and rate of groundwater well pumping may affect the reliability of bacteria samples collected. Higher pressure extraction rates are discussed as a possible mechanism for the destruction of bacteria. Staff proposes that well testing may not successfully sample the zones of preferential transport described above. Heterogeneity in aquifer properties and bacteria transport may not be represented by the homogeneous conditions assumed in traditional groundwater modeling.

Future research is desirable to resolve these challenges to existing groundwater modeling methods and introduce a measure of caution in predicting microbiological transport based solely on water movement. The prediction that variations in subsurface flow conditions can affect bacteria transport is consistent with Izbicki's recent studies at Santa Barbara, his ongoing hydrology at Surfrider Beach, as well as De Sieyes work which links episodic nutrients pulses correlated with tides, to septic systems, and Boehms work which links groundwater to bacteria.

Staff offers the comment that rapid change in the subsurface hydrology, such as with breaching of the lagoon, may create variations in the proportion of septic bacteria which are present at the beaches. Just as swimming next to a flowing storm drain is currently discouraged, additional study may identify an elevated risk with summer swimming during periods of increased septic discharge, such as during neap tides or during low ebb of a spring tide.

State of California
California Regional Water Quality Control Board, Los Angeles Region

Peer Review

Technical Memorandum #3:
Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation

By

Dr. Robert Arnold
Chemical & Environmental Engineering
The University of Arizona
P.O. Box 210011
Tuscon, AZ 85721-0011

520-621-2591
520-621-6048 FAX

TM3-77

November 5, 2009

College of Engineering and Mines
Department of Chemical
and Environmental Engineering

THE UNIVERSITY OF
ARIZONA
TUCSON ARIZONA

P.O. Box 210011
Tucson, AZ 85721-0011
(520) 621-6044
FAX: (520) 621-6048

Memorandum

5 October 2009

To: Ms. Wendy Phillips; Chief, Groundwater Cleanup and Permitting Section, CA Regional Water Quality Control Board

From: Bob Arnold

Subject: Review of Regional Board Staff Technical Memorandum #3: *Pathogens in wastewaters that are in hydraulic connection with beaches represent a source of impairment for water contact recreation.*

I will first cover the technical issues delineated for review in an attachment to your email dated 10 September.

1. The interpretation of four technical documents selected to support Technical Memorandum #3—emphasis on the Haile documents (1996, 1999) and the 1983 EPA criteria for recreational risk in marine water.

- **An Epidemiological Study of Possible Adverse Health Effects of Swimming in Santa Monica Bay**—Haile et al., 1996. This is a detailed and convincing piece of research that illustrates the type of health effects and relative risk associated with bathing on Santa Monica beach sites that are proximate to discharge points for overland runoff. Although the document does not bear directly on situations in which the presumed source of contamination is the proximate groundwater, the study shows very clearly that runoff containing contaminants of fecal origin produces both elevated concentrations of fecal indicators and higher incidence of waterborne disease among those bathing in impacted waters. The study also establishes the relevance of enterococcus concentration as a useful indicator and the usefulness of the disease parameters (symptoms such as gastrointestinal and respiratory problems, rash and so forth) eventually selected for use in Technical Memorandum #3.
- **Haile, R.W., Witte, J.S., Gold, M. *et al.* 1999. The health effects of swimming in ocean water contaminated by storm drain runoff. *Epidemiology 10*: 355-363.** This is apparently the peer reviewed form of the same study in Santa Monica Bay. The fact that the work withstood peer review for archival publication is noteworthy and adds to the credibility of the study and interpretation of findings. The authors note that their findings may have widespread relevance since the indicators of fecal contamination are similar to those at a great number of other

beaches. They also indicate that incremental risk upon exposure to waters containing those levels of the indicator organisms is probably significant based on the results of their work (incremental risk on the order of >1 per 100 exposed). Finally, they make the point that the standards for fecal indicators in marine recreational areas appear to be relevant since exposure at lower levels had no statistically significant health outcome. The article did not stress use of enterococcus results in predicting incidence of disease, but relied on coliform measurements and direct measurement of virus.

- **Gold, M. 1994. What are the health risks of swimming in Santa Monica Bay: an examination of the issues surrounding the public health debate. Ph.D. dissertation, UCLA.** The dissertation largely set the stage for the subsequent epidemiological study (above). The major finding related to high concentrations of fecal indicators including enteric viruses across the bay. There was comment about higher than acceptable levels of indicator organisms in Malibu Bay, but that was not the primary focus of the work. The importance of the work was that it was done competently and that it provoked the subsequent study.
- **Cabelli, V.J. 1983. Health effects criterin for marine recreational waters. EPA-600/1-80-031.** This is an exceptional piece of work, as evidenced in part by the fact that we are still reading it. The document uses data from a variety of studies in the United States and Egypt to establish the methodologies for epidemiological work of this kind, selection of disease indicators, and justification for use of specific indicator organisms. The fact that findings are appropriate to several locations attests to their utility. Interestingly, the response of Egyptians to enterococci-indicated exposure was reduced, but that of visitors was not, in the Alexandria study. The current standards for enterococci in seawater can be justified on the basis of the study results, since significant swimming-related disease incidence was provided by exposure to waters containing 10-100 enterococci per 100 mL. In fact, the swimming related incidence of HCGI illness was about double that of the endemic rate among non swimmers when waters contained ~50 enterococci per 100 mL. The author concluded that enterococci have a survival behavior more similar to the infectious agents that do other indicator organisms tested. The linear relationship suggested between swimming related incidence and log transformed enterococci data seems justified based on the studies reviewed.

2. Discussion of correlation coefficients among annual frequency distributions for enterococcus MPN data at Malibu beaches.

The contention here is that the correlations among annual frequency distributions provides evidence of annual similarities at each beach for which data are provided and thus an indication that fluctuation in enterococcus numbers is probably the

result of some regular pattern of events as opposed to random odd events like direct contamination by bathers, etc.

I am unable to provide a convincing statistical analysis as part of this review. Nevertheless, I feel that this is a weak argument, primarily because the statement does not seem to rest on statistically valid hypothesis testing. That is, do the calculated correlation coefficients in fact justify the conclusion that the distribution of values observed is derived from the same population of actual values each year—that the distribution of enterococcus MPNs does not change from year to year. Even if that distribution of concentrations is time invariant (as suggested) it seems that the population of enterococcus concentrations in the waters tested may take on a distribution of this sort for any number of reasons, including a somewhat randomly generated source of contamination due to bathing and so forth. It seems difficult to justify the elimination of such an explanation based on the data provided.

As a minor point, the text on p. T3-15 indicates that correlation coefficients for MPN-dependent frequencies at the Surfrider Beach ranged from 0.82-0.98. The values provided in the Appendix T3-B table indicate that the correlation coefficient varies from 0.72-0.98. For those not statistically well informed (including me), the method of calculation of the correlation coefficient might be provided.

3. **Validity of conclusion that water quality during dry weather at Surfrider Beach, Malibu Colony Beach, Malibu Pier Beach, Carbon Beach and Marie Canyon persistently fails to meet water quality objectives.** This statement is well supported by the enterococcus data provided.

4. **Conclusions regarding the groundwater origin of microbial contamination at Malibu Lagoon and beaches.** Since this is the crux of the technical paper, it is well to consider the evidence presented in total. The staff report and references therein establish the validity of enterococcus measurements as an indicator of fecal contamination that provides a potential source of health risk. There is no reason to question the validity of the enterococcus standards for protection of public health. That is, consistent violations of the marine standard for recreational use will likely produce a significant disease increase among bathers. Consequently, the waters off Malibu, which do not meet standards, probably present a health-related problem. There are high concentrations of bacterial indicators of fecal contamination in the ground waters of heavily populated and commercial sections of the Malibu community. Furthermore, groundwater contaminants appear to add contamination to the enterococcus levels in the Malibu Lagoon at the MCW-1 sampling station, downstream from the Malibu Civic Center area. Finally, there are somewhat speculative, but increasingly accepted, mechanisms for the transport of bacteria and viruses from proximate ground waters, through near-surface beach sands and into the surf zone. Observations regarding transport through the beach front were derived from

studies outside the Malibu area, but in southern California, from multiple lines of experimentation. These have been described in peer-reviewed archival journals, adding to their credibility.

No other credible sources of near-shore marine pollution are described in the technical report. If land surface runoff is a possibility, it seems unlikely that the effects would be so general or unmanageable during summer months, particularly since the period 2005-2008—the period of record for the measurements provided—was apparently an unusually dry period for the region. In any case, rainfall would likely increase the efflux of groundwater bacteria into the surf zone as well as increasing the rate of surface runoff.

Considering the entire argument presented and supporting information provided, the staff has made an adequate case for improving the microbial quality (indicators of fecal contamination) in Malibu ground water in order to improve the water quality in the nearshore marine area off the Malibu coastline in order to reduce associated threats to human health.

Additional comments. On page T3-2, it is indicated that several changes were made to the technical memorandum based on an Early Technical Review. These changes include generation of statistical support for conclusions, recommendations regarding additional supporting studies, emphasis on the hydrological and microbiological complexity of the subsurface intertidal region and verification of the relationship between human illness due to marine recreational activities and coastal OWDSs. In my opinion, statistically based inference remains largely missing from the document. The treatment of incremental risk at Surfrider Beach (Table 6) is apparently based on results reported in the 1983 EPA report and published information regarding bathing near stormwater discharge point in Santa Monica Bay. However, the connection here is not well developed and results of those studies that contribute to the staff position should be clearly laid out.

At this point, I feel that the case is well made for construction of sewerage in the Malibu area, but I was convinced in part by information from the supporting documents that might be included directly in the technical memorandum. The epidemiological case in particular requires supporting information. In my opinion, further studies are not required to justify Board action, so that recommendations specific to such studies are unnecessary. The complexity of the hydrological conditions, microbiological transport mechanism and so forth are sufficiently plain.

The technical memorandum (#3) is clearly written and easy to understand. The staff has done its work very well.

State of California
California Regional Water Quality Control Board, Los Angeles Region

Peer Review

Technical Memorandum #3:
Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation

By

Dr. Jörg E. Drewes
DREWES ENVIRONMENTAL
798 Cressman Court
Golden, CO 80403
Phone 303-884-9746
E-mail: jdrewes@mines.edu

TM-82

November 5, 2009

DREWES ENVIRONMENTAL
Professor Dr. Jörg E. Drewes

798 Cressman Court
Golden, CO 80403
Phone 303-884-9746
E-mail: jdrewes@mines.edu

October 7, 2009

California Regional Water Quality Control Board
Attn.: Wendy Phillips
Chief, Groundwater Permitting and Landfills Section
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Re: Peer Review of Technical Memorandum #3 in support of an amendment to the Water Quality Control Plan for Coastal Watersheds of Los Angeles and Ventura Counties to Prohibit On-Site Subsurface Disposal Systems – Malibu Civic Center Area

Dear Mrs. Phillips,

Please find enclosed my review of the Technical Memorandum #3 *"Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation"* prepared by Elizabeth Erickson.

The review is providing responses to questions formulated in Attachment 2.

Please feel free to contact me if you have any further questions.

Thank you very much.

Sincerely,

Professor Jörg Drewes

Scientific Review Report of Technical Memorandum #3
Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation
by Elizabeth Erickson

a. The interpretation of key literature identifying factors that increase the levels of pathogen indicators and risks to human health at the beach

General:
The reviewer concurs with the interpretation of key literature considering in this Technical Memorandum identifying factors that increase the levels of pathogen indicators and risk to human health. The reviewer also concurs with the selection of entercoccus bacteria, since it is more persistent in water and sediments as compared to coliforms, as a recreational water quality indicator illustrating the presence of human waste at the sites studied. However, the author neglects to state that there are also non-human sources for enterococcus, which could potentially contribute to the concentrations observed in beach samples, although the likelihood for non-human contributions is small in the given settings.

Specifics:
- Table 1: Please clarify what the numbers reported for each site represent? – Are these replicates or discrete measurements at different days? What is the time period of data collection?

b. In particular, the interpretation of Haile et al. (1996 and 1999) epidemiology study and the 1983 EPA marine health criteria for health risk
Haile et al. (1996 and 1999) are representing the same experimental dataset published as a final research report (1996) and a subsequent peer-reviewed journal article (1999). Both Haile et al. studies (1996 and 1999) are reporting findings of epidemiological studies conducted in areas that are highly representative and directly linked to surface water and beaches targeted in this Technical Memorandum, - the Santa Monica Bay, Will Rogers Beach, and the Surfrider Beach. It is noteworthy that Haile et al. (1999) represents a journal article that was subject to a peer review process. The reviewer agrees with the key findings of this study that exposure to water impacted by storm run-off exhibits a higher risk of a broad range of human health symptoms, including both upper respiratory and gastrointestinal effects. The strength of the Haile et al. (1996, 1999) study is the size of the study population, the diversity of the population studied, and the assessment of adverse health outcomes through exposure to coliforms, enterococci, and viruses.

Staff's interpretation of the 1983 EPA marine health criteria for health risk agrees with the general published literature in this field (see review article by Pruess, 1998).

Pruess, A. (1998). Review of epidemiological studies on health effects from exposure to recreational water.

c. The application of correlation coefficients in Figures 7, 8, and 9

Plotting enterococcus occurrence data as frequency graphs is appropriate to illustrate distribution changes over several years for May-October Summer time periods. These graphs illustrate that exceedance of the ocean standard of enterococcus is occurring consistently across the three study sites (MC-2, MC-1, and MC-3). The data also illustrate the gradient of severity in impact and as a consequence health effect outcomes. The classification scheme of either "safe" or "unsafe" based on meeting or failing ocean water standards does not seem to reflect this dynamic.

Correlation coefficients between annual enterococcus frequency distributions are reported for the Surfrider Beach (MC-2) data set only and they demonstrate that the variability of the distribution is small from year-to-year.

d. The conclusion, on pages T3-7 through T3-9, that water quality persistently fails to meet water quality objectives during dry weather at Surfrider Beach, Malibu Colony Beach, Malibu Pier Beach, Carbon Beach, and Marie Canyon

Data presented in this Technical Memorandum provide support that beach water quality in the vicinity of the Malibu Creek watershed repeatedly fails to meet water quality objectives. The data presented would not support that the water quality "persistently" fails to meet the water quality objectives since only a limited data set is presented. For some tables, information is missing regarding the size of the data set considered. For example regarding Table 2, what is the total number of samples collected? Exceedance reported for the Surfrider Beach (2006 and 2007) in Table 2 seems to be based on data collected during six weeks in 2006 only, whereas the 2007 data set represents data collected over a four-month period. Are results presented in Tables 3-5 all data that is available for these sampling locations? At a minimum, a clarification should be provided in the Memorandum.

e. The conclusion that groundwater, contaminated with indicators of pathogens, is a source of impairment to lagoon and beaches

The reviewer agrees with staff's determination of impairment through pathogenic organisms and the conclusion that groundwater in this area is a source of impairment to lagoon and beaches.

Overarching questions:

(a) In reading Tech Memos #3 and #4, are there any additional scientific issues, not described above, that are part of the scientific basis of the proposed rule? If so, please comment with respect to the statute language given above.

Regarding Tech Memo #3, there are not additional scientific issues that need to be addressed.

(b) Taking each of Tech Memo #3 and #4 as a whole, is the conclusion of each tech memo based on sound scientific knowledge, methods, and practices?

Regarding Tech Memo #3, with the exception of comments provided above, the conclusions presented in this Tech Memo are based on sound scientific knowledge, methods, and practices.

State of California
California Regional Water Quality Control Board, Los Angeles Region

Peer Review

Technical Memorandum #3:
Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation

By

Dr. Joann Silverstein
Dept. Civil, Environmental & Architectural Engineering
University of Colorado
Boulder, CO 80309-0428 USA
tel: (303) 492-7211
fax: (303) 492-7317

TM3-87

November 5, 2009

Peer Review of Technical Memorandum #3:

Pathogens in Wastewaters that are in Hydraulic Connection with Beaches Represent a Source of Impairment for Water Contact Recreation

Revised Draft dated September 10, 2009

a. Interpretation of key literature, identifying factors that increase the levels of pathogen indicators and risks to human health at the beach.

Caution should be used in association of indicator bacteria with human waste, as is suggested on page T3-3, in two places. In the first sentence, referring to Table 1: "Highlighted measures on the chart are fecal-indicator-bacteria values in human waste which [sic, grammar incorrect] the water quality objectives for protection of body contract [sic, typo, should be "contact"] recreation." [emphasis added] The data in Table 1 are not per se values in human waste. The table caption is more accurate: "End-of-pipe Effluent Bacteria Densities," and should be used in the text. Also on page T3-3, paragraph 2, the last sentence mischaracterizes the link between Enterococcus and human waste: "Importantly, the occurrence of Enterococcus in groundwater at these wells illustrates that human waste is present in the groundwater at the study site." [emphasis added] The EPA document provided: Health Effects Criteria for Marine Recreational Waters, reported the results of a study at Lake Ponchartrain which stated that although Enterococcus may have been the most reliable indicator of recreational water quality, it was "not specific for human wastes." Other studies, including the epidemiologic studies of Haile et al (1999; 1996) found Enterococcus in storm water. In the glossary of Haile et al (1996), Enterococcus is described as: "A bacteria that is part of the normal flora found in human and animal waste." [emphasis added] Therefore, the sentences in the report overstate the association of Enterococcus with human waste compared with scientific literature.

Although not directly related to literature, some of the data in Table 1 (page T3-3) seem questionable. For the Malibu Colony Plaza, the numbers of total and fecal coliform are identical, and typically fecal coliform are a log unit less than total. Also the number for Enterococci is higher than either total or fecal coliform, which is atypical in general, and not consistent with other samples. For Fire Station 88, the data are more puzzling. In all samples, the MPN for Enterococcus is equal to or greater than either total or fecal coliform MPNs. Other sources (Metcalf and Eddy, 2003, citing Crook, 1998) suggest Enterococci density is two to three logs less than fecal coliform and three to four logs less than total coliform bacteria density in raw sewage. In one sample from the Fire Station the Enterococcus MPN is one log higher than the total coliform. MPN in one sample; total and fecal coliform and Enterococcus are identical in another sample. These data would be questioned by anyone familiar with the typical trends for these three indicators reported in the literature and therefore some explanation of the differences should be offered.

There is a small inconsistency in the 1996 study by Haile et al and Technical Memo #3 in the use of the high cutoff for Enterococcus. Haile et al report the exceedences of a high cutoff of 106 MPN/100 ml (Tables 12 and 13); while the Memo uses 104 MPN/100 ml, the actual standard.

b. Interpretation of the Haile et al epidemiology study and the 1983 EPA marine health criteria for health risk

The Haile et al epidemiology study was based on illness resulting from swimming at or near storm drain outfalls. The 1983 EPA document, Health Effects Criteria for Marine Recreational Waters was based on studies of illness linked with treated wastewater outfalls. These are both point sources at beaches. The mechanism for transport of septic tank and subsurface infiltration systems such as those in Malibu is through porous media, which may alter the risk of these discharges. One source of difference resulting from subsurface discharge is the removal of particulate matter and attached bacteria. The 1983 EPA Health Effects document noted that removal of suspended solids during wastewater treatment reduced the density of Salmonella.

c. Application of correlation coefficients (Figures 7, 8, and 9) referring to attached table sent 9/10/09

Use of correlation coefficients to show consistency of Enterococcus density frequency distributions from 2005-2008 at the three beach sites is acceptable, if unusual. Typically, bacteria counts, in this case for any year at any location, can be fitted to a Poisson Distribution by regression, and then comparing the mean, μ (which also equals the variance for the Poisson Distribution). Also, showing the frequency distributions as histograms rather than line graphs is more typical.

d. The conclusion, on pages T3-7 through T3-9, that water quality persistently fails to meet water quality objectives during dry weather at Surfrider Beach, Malibu Colony Beach, Malibu Pier Beach, Carbon Beach, and Marie Canyon

The conclusion that water quality is impaired at the five beaches as measured by Enterococcus counts exceeding the single count maximum (104 MPN/100 ml) is justified, although the degree of bacterial impairment varies among the five sites. It is interesting that there were no exceedences of the 104 MPN/100 ml standard at three of the beaches (Surfrider, Malibu Pier, and Carbon) in 2008. Haile et al. (1999) reported large increases in relative risk of a number of adverse health effects (skin rash, highly credible gastrointestinal illness, diarrhea with blood) when swimmers were exposed to these levels of Enterococcus.

e. The conclusion that groundwater, contaminated with indicators of pathogens, is a source of impairment to lagoon and beaches.

This conclusion is addressed on pages T3-20 – T3-23. There are two issues in this section. First is that septic tank discharge causes bacterial (and other pathogen) contamination of groundwater,

and the second, implied, is that the discharge of groundwater contaminated with pathogens is a source of ocean/beach water quality impairment, presumably a significant source if removal of OWDS's from the Malibu Civic Center area is to result in improvement of beach water quality. The section *OWDS Systems and Transportation* [sic, "Transport" is probably the more appropriate term] *of Pathogens*, needs some editing for grammatical errors, e.g., "filtrated" instead of filtered in paragraph 1, line 6 on page T3-20 and "septic bacteria" in the same paragraph, line 9 which probably should be indicator bacteria. Paragraph 3, which cites the results of Stramer and Cliver which concern septage, not septic tank effluent, is irrelevant and should be deleted unless its relevance is explained. Most of the literature cited on pathogen indicator transport from OWDS's concerns viruses, and the last paragraph of this section, in paragraph 1 on page T3-21, provides a good explanation of the limitation of using bacterial indicators, which have different transport characteristics than viruses, to predict viral pathogens. In addition, as the paragraph points out, bacterial indicators are conservative, and also have been correlated with viruses from OWDS's.

The next section cites literature related to beach pathogens. The first paragraph summarizing the papers of Yamahara et al and DeSieyes et al does not provide strong support for the importance of septic systems with beach Enterococcus, especially as compared with other sources and transport mechanisms. A later citation of Yamahara et al (paragraph 5, page T3-21) is similarly weak support for the importance of OWDS's as a source of Enterococcus. The work of Borchardt et al was done in central Wisconsin and is not relevant to beaches. Paragraph 1 on page T3-22, citing DeSieyes, is almost impossible to understand. The AAAS review of MRSB has no mention of OWDS's and should be deleted unless a better connection besides ocean water and beaches is made.

The scientific basis for Figure 11 is weak, both as support for transport and Enterococcus density. The MPN values for Enterococcus shown in Figure 11 are very difficult to justify compared with other reports (see comments above). Metcalf and Eddy report a range of $10^4 - 10^5$ MPN/100 ml for Enterococcus in raw sewage. Figure 11 has residential septic tank effluent Enterococcus at 10^7/100 ml, and one commercial system as high as 10^8/100 ml. Also the ranges of non-detect (ND) to 10^7/100 ml and ND to 10^6/100 ml are so large as to be meaningless. The one very high MPN value in Table 1 which provides only minimal evidence is suspect (as discussed above).

Overall, the movement of groundwater from the area served by OWDS's is well documented in other reports (Tech Memo 4). Literature cited confirms that pathogens, especially viruses, are transported in the subsurface from OWDS's, and would therefore reach the ocean water, especially in a sandy aquifer with short travel time. The presence of Enterococcus in septic tank effluent, nearby groundwater, and the beaches is credible support for the contribution of OWDS's to contamination of the Malibu beaches by bacteria.

Overarching questions:

a. Are there additional scientific issues, not described above, that are part of the scientific basis of the proposed rule? If so, please comment with respect to the statute language given above.

A particular source of pathogen risk is associated with the fact that OWDS's serve a small number of people. This was discussed in the EPA Health Effects Criteria for Marine Recreational Waters (1983, page 49). That document notes that when the number of individuals who are sources of fecal waste becomes smaller, the ratio of pathogen-to-indicator density will vary highly from numbers based on aggregate wastes from a large population. If one or a small number of individuals in these small systems have an infectious disease, the ratio could approach 1, making the risk significantly higher than that addressed by the water quality standard. The EPA document advises in that case, which may include OWDS's: "The solution is administrative action prohibiting such discharges into recreational waters."

b. Taking each of Tech Memo #3 and #4 as a whole, is the conclusion of each tech memo based on sound scientific knowledge, methods, and practices.

Taken as a whole, the conclusions of Technical Memos #3 and #4 are based on sound scientific principles and reasoning. Epidemiologic studies cited provide a strong basis for increased health risks to swimmers and the presence of indicator bacteria measured at the beaches, especially Enterococcus, at concentrations higher than marine recreational water quality standards. There are some relatively minor concerns about interpretations of literature and some of the reported data as discussed above and in the previous comments on Tech. Memo #4. Addressing these will acknowledge real uncertainties that always exist with environmental studies, but will not weaken the conclusions.

TM #4

State of California
California Regional Water Quality Control Board, Los Angeles Region

Final Technical Staff Report

Evidence in support of an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*

to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

Technical Memorandum #4:
Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life

by

Toni Callaway,* P.G., Engineering Geologist
Orlando Gonzalez, Water Resources Control Engineer
Groundwater Permitting Unit
and
C.P. Lai, Ph.D., P.E., Water Resources Control Engineer
TMDL Unit

* *The authors would like to thank Regional Board staff, Joe Luera and intern Gina Ho, Justin Tang, and Ben Leu for their assistance in preparing map and tables.*

November 5, 2009

Technical Memorandum #4:
Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life

by
Toni Callaway, P.G., Engineering Geologist
Orlando Gonzalez, Water Resources Control Engineer
Groundwater Permitting Unit
and
C.P. Lai, Ph.D., P.E., Water Resources Control Engineer
TMDL Unit

1. Purpose

Aquatic life in Malibu Lagoon is impaired by eutrophication resulting from excessive nitrogen loads. One of the sources of nitrogen loading is from discharges of wastewaters through on-site wastewater disposal systems (OWDSs) in the Malibu Civic Center area.

The purpose of this evaluation was to quantify cumulative nitrogen loads from OWDSs to Malibu Lagoon and compare the result with targets established through the TMDL for restoration of Malibu Lagoon.

2. Method

a. Malibu Civic Center Area Description and Data Collection

The City of Malibu does not provide regional sewage collection or treatment. Most wastewater generated in Malibu is treated by on-site wastewater disposal systems (OWDS) is the terminology used to describe wastewater discharged from both septic and advanced treatment systems (defined as more advanced than primary treatment, i.e. secondary and tertiary treatment with disinfection). The Malibu Civic Center area for this evaluation corresponds to the lower two miles of the Malibu Creek watershed, which discharges to the Malibu Lagoon and the ocean, and was divided into 5 sectors as shown in Map 1. The Malibu Civic Center area includes the Malibu Valley, Winter Canyon, and the surrounding hills and the beaches located immediately north and south of the Lagoon[1].

The main commercial area in the Malibu Valley has historically been referred to as the Malibu Civic Center area. Both Los Angeles County and the City of Malibu have administrative

[1] The area subject to the proposed prohibition is referred to as the Malibu Civic Center area (Figure 1). The area was defined using topographic features and drainage patterns, and encompasses the hydrologic areas of Malibu Valley (also referred to as the lower Malibu Creek watershed), Winter Canyon, and adjacent coastal strips including Amarillo Beach, Malibu Beach, Malibu Lagoon, and Malibu Lagoon Beach (aka Surfrider Beach, including First, Second, and Third Points at Surfrider). For more discussion on the prohibition boundaries defining the Malibu Civic Center area, refer to the Technical Staff Report Overview and the Environmental Staff Report.

offices there. Commercial development is concentrated along Pacific Coast Highway, Malibu Road, Civic Center Way, and Cross Creek Road located adjacent to Malibu Creek just above the Malibu Lagoon.

Malibu Civic Center area has high groundwater and is also subject to flooding and tidal fluctuations. Shallow groundwater located in the Cross Creek area closest to Malibu Lagoon rises and drops in response to daily tides (Figure 1) and provides direct evidence of communication with Malibu Lagoon and the ocean. Each Waste Discharge Requirements (WDR) includes a monitoring and reporting program that requires quarterly submission of self-monitoring data. These data include mass loading from wastewater discharged at commercial properties located in the Malibu Civic Center area. The subsequent evaluation of such data incorporates information from monitoring reports submitted to the Regional Board from the 4th quarter 2004 to the 2nd quarter 2009. The time interval for data inclusion is post release of the Stone Environmental, Inc. "Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California", in 2004 (2004 Stone Report).

This evaluation of nitrogen loading from the subsurface discharge of sewage incorporates information from Regional Board records. WDRs have been issued to most of the larger commercial dischargers in the area; and for these sites, a Monitoring and Reporting Program (MRP) is issued with every permit. For smaller businesses and private residents, staff have used inventory listed in 2004 Stone Report.

Staff identified all of the commercial and residential properties located in the Malibu Civic Center area. The inventory consists of 392 residential properties and 38 commercial properties. When it was available, real data on wastewater volumes and total nitrogen (TN) concentrations from self-monitoring reports were used for this evaluation. When actual data were not available, conservative assumptions, based on information from published literature, were used to calculate nitrogen mass loading from all wastewater discharged in the Malibu Civic Center area. Results from the summation of the wastewater TN load are used to model attenuation of the nitrogen load as it moves from the point of discharge to groundwater and from groundwater as it flows to the Lagoon.

Commercial Sites - Several sources were used for the inventory of commercial properties located in the Malibu Civic Center area. The Regional Board's databases for permitted and un-permitted commercial facilities were the primary sources of information (Table 1). Other sources of information were the 2004 Stone Report, the City of Malibu, and the (2002) Malibu Survey by S. Groner & Associates. Wastewater discharge volumes from commercial properties located in the Malibu Civic Center area were extracted from the self- monitoring reports submitted for those facilities which are permitted. For the un-permitted commercial properties, additional information regarding business activities, population served, and the OWTS was utilized to estimate discharge volumes and wastewater strength.

Residential Sites – An inventory of residential properties located in the Malibu Civic Center area was listed in the 2004 Stone Report and used for its assessment of nitrogen loads

contributed by residential properties in the Malibu Civic Center area[2]. This inventory was originally extracted from Los Angeles County's Assessor's data of 2002. Information is posted in the Assessor's web-page by Assessor Identification Number (AIN). The number of bedrooms and bathrooms at each residence was used to estimate the wastewater discharge volume for each home. Calculations for the total nitrogen load discharged at residential property in the Malibu Civic Center area used the estimated wastewater discharge volumes. The residential property inventory sorted by sector location is listed in Table 2.

Geographic Sectors – Earlier evaluations approached the assessment of nitrogen loading by estimating the percentage of the groundwater flow from the entire lower Malibu Creek watershed, which discharges to the Lagoon versus the Pacific Ocean. Staff evaluation of nitrogen loading to the Lagoon used a different approach. All sectors of the entire watershed do not have an equal flow contribution to impairment of the Lagoon. Therefore, staff divided the Malibu Civic Center area into geographic sectors to evaluate groundwater flow and nitrogen load contribution to evaluate impairment of the Lagoon from OWDS discharges. Initially, the area surrounding Malibu Lagoon was divided into five geographic sectors on the basis of surface topography (Map 1). Surface geographic features marking boundaries for the sectors are the gently sloping Valley floor, Malibu Creek, Pacific Coast Highway (PCH), and the Pacific Ocean. After considering flow gradients, subsurface hydrologic, and geologic conditions, two of the sectors were further divided on the basis of estimated flow contribution to the Lagoon. Each sector has a unique flow contribution to the Lagoon.

b. Total Nitrogen Loading from On-site Wastewater Treatment Systems

Slightly different approaches had to be taken to calculate total nitrogen loads from wastewater discharged at commercial and residential sites. Because the Regional Board issues permits or WDRs for wastewater discharges from commercial sites, there has been much more information on file for commercial properties. Historically, permitting of residential wastewater discharges has been delegated to local agencies.

i. Commercial Wastewater

Staff calculated the nitrogen loading from the commercial facilities dividing the commercial facilities into three groups. One group includes permitted facilities with advanced wastewater treatment, effluent volume limits, and discharge volume limits. At these permitted facilities, a Discharger is required to measure wastewater volumes, total nitrogen concentrations at "end of pipe," and submit this information to the Regional Board per the MRP issued with the WDR. Staff was able to use actual data from these sites to calculate the nitrogen loads. The second group includes smaller permitted commercial facilities where monitoring of wastewater discharge volume is required, but not effluent monitoring, because these facilities discharge domestic-type wastewater. In these cases, staff estimated nitrogen loading by using the provided flow information and published information on total nitrogen concentrations for domestic wastewater from similar types of businesses. The third group includes all un-permitted commercial facilities. In these cases, staff conducted drive-by inspections and

[2] Stone Environmental, Inc., "Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California," 2004.

collected information from several other sources regarding the OWTS, the business activity, and the population served in order to estimate wastewater flow, nitrogen concentration, and nitrogen loading from these commercial sites. A list of commercial facilities is provided (See Table 1).

General Characterization of Wastewater Strength

Biochemical oxygen demand (BOD) - BOD is the measurement of the rate of oxygen uptake used by microorganisms to oxidize or consume organic matter over a specified period. The 5-day BOD (BOD_5, 5-day, 20°C) value is a widely used single strength measure of wastewater and/or polluted surface water containing degradable wastes. Thereafter, in this technical memorandum the term BOD refers to BOD_5, 5-day, 20°C; although BOD_5 does not measure nitrification, staff found there was a consistant TN/BOD ratio in the wastewater from the mixed-use shopping centers in Malibu (see Table 4 which summarizes 106 septic tank samples). The strength of wastewater is commonly expressed in terms of BOD, suspended solids, and chemical oxygen demand (COD). COD is commonly used to measure the amount of oxygen consumed under specific conditions in the oxidation of organic and inorganic material in both sewage and industrial waste. Both BOD and COD greatly impact the amount of dissolved oxygen in receiving water and determine the waste assimilative capacity of that surface water, an example being the Malibu Lagoon.

There are several chemical, physical, and biological parameters which provide information on water quality and organic pollution. These parameters are total and fecal coliform density, pH, nitrite, nitrate, Kjeldahl nitrogen which includes, ammonia nitrogen, and organic nitrogen, phosphates, chlorides, turbidity, suspended solids, temperature, grease fats and oils. BOD is commonly used for the characterization of domestic wastewater and the sizing and design of wastewater treatment systems. In this study, BOD is used to estimate total nitrogen when total nitrogen data is unavailable.

Total Nitrogen Concentration Milligrams per Liter (mg/L) - Total nitrogen concentration in milligrams per liter (mg/L) measured at "end of pipe" (e.o.p.) was used for load calculations when this information was available. Staff also used previous analyses of samples taken directly from the septic tanks. There is considerable information in Regional Board files on the septic tank composition for commercial sites in the Malibu Civic Center area.

Where neither e.o.p nor septic tank effluent analyses was available, staff based the estimation of total nitrogen on typical total nitrogen (TN) concentrations seen in the published literature on domestic wastewater composition. BOD values for commercial wastewater are more widely available than total nitrogen values and total nitrogen can be estimated as a proportion of BOD. Most wastewater engineering textbooks have tables showing the concentration of various elements in typical untreated domestic wastewater. Review of this information yields a percentage proportion or TN/BOD ratio[3] of 21%

[3] Table 4-14. on page 181 in Crites and Tchobanoglous, "Small and Decentralized Wastewater Management Systems," 1998.

between total nitrogen (TN) and BOD. Another widely used textbook on wastewater engineering shows TN/BOD ratios ranging from 18% to 21%.[4] An average TN/BOD ratio of 20% was used to estimate the total nitrogen load at selected commercial sites.
In the nitrogen load spreadsheet, either a total nitrogen value from "end of pipe" or an estimated total nitrogen value derived from the TN/BOD ratio in the above tables was used for the nitrogen load spreadsheet, where no "end of pipe" total nitrogen value was available.

Assumptions Made for Commercial Nitrogen Loading Calculations

Most of the larger commercial wastewater discharges have been permitted. There are 38 commercial sites located in the Malibu Civic Center area, 25 of which have been permitted. Total nitrogen concentrations measured at "end of pipe" and wastewater discharges volumes are available and were used for nitrogen loading calculations for these sites. When wastewater effluent analysis was not available, estimation of the total nitrogen load (TN) was based on published information for similar businesses or typical nitrogen concentrations for domestic wastewater. The total nitrogen load spreadsheet developed as Table 1 has two key assumptions: 1) BOD value based on the type of business, and 2) a total nitrogen load based on the average TN/BOD ratio found in the above wideky used college textbooks on wastewater treatment such as Metcalf and Eddy (1991 and 2003). The volume of wastewater discharged is known for most commercial properties in the Malibu Civic Center area, but an estimate of wastewater volume had to be made for 10 of the smaller unpermitted commercial sites. Basic assumptions are listed below:

TN/BOD Ratio - Most of the larger commercial discharges in the Malibu Civic Center area, such as Malibu Colony Plaza, Malibu Creek Plaza, and the three Malibu Country Mart shopping centers, were permitted by the Regional Water Quality Control Board, and as a result staff have analysis of septic tank samples, or "end of pipe" effluent where advanced OWTS have been installed.

For commercial dischargers such as small offices where staff have no data, staff choose a low BOD of 220 mg/L, and estimated the TN to be 40 mg/L.

For wastewater generated by commercial facilities, such as schools, mid-range to high-range effluent strength and nitrogen concentrations were assumed. Performance of the OWDS depends primarily on the soil profile and groundwater separation. Footnotes were added to Table 3 to indicate additional critical factors such as failed leachfields or the use of seepage pits for disposal which impact estimated total nitrogen reducing TN values ranging from 75 mg/L to 45 mg/L for these sites.

Flow Rate - For the purpose of calculating nutrient load due to wastewater discharges from OWDS, staff have used actual flow data from monitoring reports for commercial facilities permitted by the Regional Water Quality Control Board. As stated previously, the septic discharge volume or flows for residential and smaller un-permitted commercial properties

[4] Table 3-16, page 109, Metcalf & Eddy, Inc. "Wastewater Engineering Treatment, Disposal and Reuse," 3rd Edition, 1991.

were estimated. For the residential properties, the flow estimate was based on the number of bedrooms.

Some of the smaller commercial properties remain unpermitted because the City of Malibu agreed to assume responsibility for any non-food preparation commercial properties discharging less than 2,000 gpd. For most of the smaller unpermitted commercial properties under the jurisdiction of the City of Malibu, Regional Board staff assumed a flow of 400 gpd. Many of the smaller commercial properties were not included in previous Malibu inventories and surveys.

2001 Tetra Tech[5] and 2003 U.S. Environmental Protection Agency [6] studies on Total Mass Daily Loads generated in the Malibu Civic Center area used total commercial wastewater flow of 75,000 gallons per day (gpd). Since 2001, the inventory of commercial properties located in the City of Malibu has increased. Current total wastewater volume generated by the commercial properties located in the Malibu Civic Center area is 127,241 gpd. This reflects a greater than 100% increase in the wastewater discharge volume estimated for commercial properties in the Malibu Civic Center area made by in earlier nitrogen loading studies, e.g. 2004 Stone Report, 2005 Questa Report, and 2001 Tetra Tech Report.

The Regional Board staff estimate of the wastewater discharge volume associated with residential OWDS located in the Malibu Civic Center area is 139,300 gpd. This volume was, virtually identical to the residential volume in the 2004 Stone Report. Staff estimation of the commercial wastewater discharge volume is greater than commercial discharge volume estimate of 62,166 gpd in the 2004 Stone Report. This Regional Board staff assessment of total nitrogen load does not include non-septic or OWDS nitrogen load contributions.[7]

Formula Used for Calculation of Commercial Nitrogen Loading

Calculations of nitrogen loading from commercial properties were made with the equation (4-4, page 193) shown below.[8]

Mass Load, lb/d = (concentration, mg/L)(flow rate Mgal/d) [(8.345* lb/Mgal x mg/L)]

The above formula has two variables, including: 1) concentration of total nitrogen (TN) in milligrams per liter (mg/L), and 2) flow rate in million gallons per day (Mgal/d). (8.345* is a unit conversion factor)

---

[5] Tetra Tech, Inc., 2001, "Nutrient and Coliform Modeling for the Malibu Creek Watershed TMDL Studies", prepared for U.S. Environmental Protection Agency, Region 9 and the Los Angels Regional Water Quality Control Board. dated May 22, 2001.
[6] U.S. Environmental Protection Agency, "Total Maximum Daily Loads for Nutrients Malibu Creek Watershed", 2003.
[7] HRL industrial wastewater nitrogen load of .31 lbs/d; TN load from use of treated wastewater for landscape irrigation on Pepperdine University Campus; TN load carried by Malibu Creek from upper watershed; and the TN load from the Malibu Colony private golf course.
[8] Page 196. Crites and Tchobanoglous, "Small and Decentralized Wastewater Management Systems," 1998.

For the permitted commercial properties, staff used reported average wastewater discharge volumes and total nitrogen values compiled from quarterly monitoring reports for the loading calculations. This evaluation includes more "end of pipe" nitrogen concentrations for our total nitrogen load calculations. Using reported or estimated wastewater discharge volumes and total nitrogen concentrations, wastewater flow was multiplied by the nitrogen concentration to obtain the nitrogen loading rate.

For unpermitted commercial facilities, flow and nitrogen concentration in the wastewater discharge for each business was estimated based on the information searched about the business activities and number of people working or type of business.

ii. Residential Wastewater

A different approach was needed to determine nitrogen mass loading from residential areas. Both discharge volume and nitrogen concentration of the residential domestic wastewater had to be estimated. Wastewater flow was based on the total number of houses and the bedrooms and bathrooms in each house. Residential property located in the Malibu Civic Center area was listed by Los Angeles County's Assessor Identification Number (AIN) from 2004 Stone Report. With AIN numbers, staff found the address and the number of rooms and baths for each residence posted on the County Assessor's web-page.

Staff assigned houses per their address into the five sectors. Addresses were viewed with aerial photo location guides to insure their section location. Once houses were grouped by sector, the total flow from each sector was calculated by multiplying the total number of homes by 100 gpd produced per bedroom. The next step was to estimate the nitrogen concentration in the domestic wastewater. Staff consulted published literature on wastewater to estimate the nitrogen load. The research indicated that typical untreated domestic wastewater has a range of total nitrogen concentrations. Review of standard engineering literature found nitrogen concentrations of 20 mg/L, 40 mg/L and 85 mg/L, defining domestic wastewater strength[9] as weak, medium or strong. Staff chose a nitrogen concentration of 45 mg/L for calculating the nitrogen load from residential sites. The residential property inventory was sorted by sector location is listed in Table 2.

Assumptions for Residential Flow and Total Nitrogen Concentration

Assumptions made to determine the flow and nitrogen loading from each residence in the absence of wastewater meter and sampling and analytic data of each discharge are listed below.

100 Gallons per Day per Bedroom - Regional Board staff estimated the flow by making the assumption that at least there is one user per bedroom (personal private bedroom/bathroom combination) at home with a total water use per person of 100 gallons per day. The 100

[9]Table 3-16, page 109, Metcalf & Eddy, Inc., "Wastewater Engineering Treatment, Disposal and Reuse", revised by Tchobanoglous, G. and Burton, F., McGraw-Hill, 3rd Edition , 1991

gallons per person is widely used number for design and estimation purpose of wastewater flow[10].

45 mg/L for Domestic Wastewater - The nitrogen level in the domestic wastewater depends on the wastewater strength or organic load type discharged to OWDS. Waste strength is determined by considering food preparation practices, type of food prepared and consumed (e.g. high protein foods have higher nitrogen content), the use of garbage disposal units, left-over food handling and disposal practices, etc. The sewage generated by affluent neighborhoods has higher strength, measured by BOD and higher total nitrogen concentrations. Domestic wastewater with levels of TN as high as 80 mg/L, are associated with residential affluence.[11] Considering affluence and other factors, Regional Board staff selected a septic tank influent value of 60 mg/L of nitrogen, a concentration exactly mid-range of nitrogen concentration values assigned to untreated domestic wastewater, which ranges between low (20 mg/L) medium (40 mg/L) and high (85 mg/L) strength.

Another source of nitrogen reduction occurs within a septic tank, especially when the septic tank is oversized for the wastewater volume and the retention time is several days. This nitrogen load reduction is called "in-tank denitrification" and it can reduce a large percentage of total nitrogen from the effluent. Also, ammonia nitrogen can be incorporated into microbial or plant biomass in the septic tank systems as well as in the subsurface effluent disposal zone given certain environmental conditions. In general, this is not considered a major mechanism for nitrogen removal from septic tanks, but the total nitrogen concentration in residential effluent in the Malibu Civic Center area was further reduced from 60 mg/L to 45 mg/L before calculating the total nitrogen load from residential OWTS. The value of 45 mg/L TN concentration reflects an in-tank reduction of TN with equivalent to the soil reduction values given in Table 3-19, USEPA (2002) Onsite Wastewater Treatment System Manual treatment and removal. Table 14-7,[12] indicates that the total nitrogen concentration in the septic tank effluent ranges from 25 mg/L to 60 mg/L. A nitrogen concentration of 45 mg/L for OWDS treated wastewater is mid-range of typical domestic wastewater strengths.

Formula Used for Calculation of Residential Nitrogen Loading

The same basic formula is used to calculate mass load of nitrogen from residential wastewater, but with no data or metering of the discharge volume, residential flow volume was estimated using, the number of bathrooms is multiplied by 100 gpd. Flow volume is converted to million gallons per day by multiplying (10^{-6}). Nitrogen load is calculated by multiplying flow volume by the effluent nitrogen concentration of 45 mg/L and unit conversion values. The formula shown below shows the complete calculations described:

---

[10]Table 2-9, page 27, Metcalf & Eddy, Inc., "Wastewater Engineering Treatment, Disposal and Reuse", revised by Tchobanoglous, G. and Burton, F., McGraw-Hill, 3rd Edition , 1991

[11] Rich Stowell, personal communication, Notes from State Board Training Academy training course "Wastewater Engineering 2, Volume 1, The Advanced Class," 2009.

[12] Table 14-7, page 1040, Metcalf & Eddy, Inc., "Wastewater Engineering Treatment, Disposal and Reuse", revised by Tchobanoglous, G. and Burton, F., McGraw-Hill, 3rd Edition, 1991.

$$\text{Mass Load, lb/day} = \frac{\text{No. of}}{\text{bathrooms}} \times 100\text{gpd} \times 3.785 \frac{\text{L}}{\text{gal}} \times \frac{\text{Total}}{\text{Nitrogen}} \frac{\text{mg}}{\text{L}} \times 2.205 \times 10^{-6} \frac{\text{lb}}{\text{mg}}$$

iii. Summary of Total Nitrogen Loading from Commercial and Residential Sites

Staff's inventory of commercial wastewater flows in the Malibu Civic Center area consists of 25 permitted sites and 13 unpermitted sites. The total wastewater discharge volume released from these commercial properties is 127,241 gallons per day (gpd). The total nitrogen load carried to groundwater by these wastewater discharges is 42.1 lbs/day or 15,368 lbs/year.

Total residential flow is 139,300 gpd and the total nitrogen load from residential sites is 52.3 lbs/day or 19,093 lbs/year.

Total nitrogen loading from commercial and residential wastewater is summarized in Table 1. Total flow of 266,541 gpd and total nitrogen loading of 94.4 lbs/day are used for both spreadsheet and numerical models to estimate the mass loading to Malibu Lagoon.

c. Modeling to Estimate Nitrogen Load to Malibu Lagoon

i. Numerical Model

Using an updated total nitrogen release of 94.4 lbs/d in the numerical fate and transport model, the estimation of wastewater derived nitrogen load transported by groundwater flow to the Lagoon is 30.2 lbs/day. When the estimated total nitrogen load is greater, the numerical model indicates load to the Lagoon is greater. Details of the numerical modeling approach to estimate mass loading to the Lagoon, using updated total nitrogen load, and older load assessments were prepared by Dr. C.P. Lai, and are appended to this Technical Memorandum #4 as Attachment 4-1.

ii. Spreadsheet Model by Flow Reduction via Geographic Sectors and Soil Reduction

Flow Reduction Factor

Flow portioning reduces the TN load reaching the Lagoon. Factors governing flow contribution include: wastewater discharge locations, surface topography, and groundwater contours, which control the direction of groundwater flow. Different proportions of the total wastewater discharged in each reach the Lagoon.

Sector I - consists of the Winter Canyon drainage and the bedrock highlands that extend above the western side of the Malibu Valley. Sector 1 corresponds to the Winter Canyon and West Alluvium areas described in the 2004 Stone Report. Exclusive of Pepperdine University, there are nine commercial wastewater discharges located in this sector. The wastewater discharged from the commercial facilities in Sector 1 is a mixture of treated and only primary treated wastewater and the total discharge volume is 52,397 gpd. There are 61 homes in Sector 1, discharging an estimated 19,800 gpd of wastewater.

The highland area is bisected by Malibu Canyon Road and includes 61 homes and a portion of the Pepperdine University campus. Winter Canyon is not eroded to the depth of the Malibu Valley and thickness of the alluvium is less. Sector I is subdivided into two sub-sectors with significant differences in contribution to the Lagoon. The greatest volume of wastewater from Sector I is discharged in the Winter Canyon drainage, but the Winter Canyon load is assumed to have a small contribution to Malibu Lagoon via tidal inflow (USEPA, 2003, p34, estimated as much as 5 percent of nitrogen is from tidal inflow). Most of the wastewater discharged in Winter Canyon is assumed to discharge between Amarillo Beach and Malibu Beach.

Sector I is divided into the Winter Canyon drainage and drainage from highland area southeast toward Malibu Valley. The division is based on topography. Wastewater in this sub-sector is discharged from mostly single family homes, private schools, nurseries, and the HRL facility. Flow is directed by topography southeast to the western edge of Malibu Valley and east toward Malibu Creek Canyon.

Regional Board staff assumed that the maximum contribution to the Lagoon from this sub-sector is 45% of the total flow. The fractured bedrock highlands outside of the Winter Canyon drainage have a thin veneer of soil. It has been assumed in some previous studies that all wastewater from septic discharges to this highland area flows into the alluvial sediments on the west-side of Malibu Valley. Where flow through the relatively impermeable alluvium is slow and travel times to the Lagoon of 30 years to 50 years. A portion of the wastewater flow from this highland sub-sector does enter the alluvium, as evidenced by the relatively high nitrogen concentrations and high bacteria found in the monitoring wells located near the Valley walls (e.g. monitoring wells located at the Mira Mar Properties on Stuart Ranch Road and behind the County Administration Center on Civic Center Way). Monitoring wells used for the Stone risk assessment study were all located in the alluvium of the Malibu Valley and none of the groundwater table contours extend to the bedrock highlands, which represent over 50% of the Malibu Civic Center area.

Groundwater takes the path of least resistance. It can be logically assumed that some portion of the septic wastewater will percolate down into the fractured bedrock, until it reaches the water table. Low permeability sediments are not recharged at high rates; flow is restricted. There should be sufficient hydrostatic head for groundwater flow through the highly fractured bedrock underlying the Valley. Unconfined, this groundwater will rise to potentiometric surface.

Malibu Water Company records and geologic reports[13] indicate that the deep and shallow alluvial aquifers in the Malibu Valley are recharged by groundwater in the fractured bedrock exposed in the surrounding highlands. All unconfined groundwater in the Malibu Civic Center area rises to the same potentiometric surface, a surface that slopes from the bedrock highlands to sea level. Groundwater in the bedrock highlands derived from

[13] Old records for the Malibu Water Company, owned and operated by the Adamson Family, are kept in storage at Mariposa Land Company, LLC, offices on Cross Creek Rd.

rainfall, infiltration from septic discharges, and irrigation preferentially would not flow into relatively impermeable alluvial layers of silt and clay when high permeability sands, gravels, and fractured bedrock underlying the Malibu Valley provide a relative super highway for groundwater flow. Wells and borings adjacent to Malibu Creek have found very high permeability sands and gravels. Wells and borings adjacent to Malibu Creek have found very high permeability sands and gravels. There are no confining layers in this relatively coarse alluvium. These sediments have high conductivities and travel times of 400 feet a day (ft/d).

Sector II – Sector II consists of area along the east side of Malibu Creek including the residential area surrounding Serra Retreat and the surrounding highlands, which drain to this area. In the Stone Environmental report, Sector II corresponds to the Malibu Tributary, Serra Retreat, North Alluvium, and East Alluvium areas. There is only one commercial facility located in Sector II; that is Serra Retreat with a relatively low wastewater discharge of 428 gpd. There are 83 homes located in this sector with an estimated wastewater discharge volume of 30,900 gpd.

Percolate from septic systems following topography flows toward Malibu Creek. Most of Malibu Water Company's water supply wells were located in this area. It was implied in previous nitrogen load studies that flow from the wastewater discharged into the thin alluvium draped over the bedrock highlands in this sector was confined to this thin soil layer until it reaches the alluvial sediments in the Valley. Alluvium adjacent to Malibu Creek on the east-side of Malibu Valley has very high conductivities, 400 ft/d, and travel times of less than one year for the alluvium in this area of the Malibu Valley were estimated in the (2004) Stone report[11]. Regional Board staff estimated that as much as 95% of the total wastewater flow from this sector reaches the Lagoon.

Sector III – Sector III consists of the relatively flat, gently sloping floor of Malibu Valley located north of Pacific Coast Highway. Sector III is generally described as the Malibu Civic Center area and most of the commercial development is located here. Many of these commercial facilities are located close to Malibu Creek and the Lagoon where the alluvial sediments have high conductivity. Travel time to Malibu Creek and the Lagoon for wastewater discharged in this area can be less than one day. Staff estimates 95% of the wastewater flow from this area reaches Malibu Creek and Lagoon. An exception to this high percentage of total flow is the wastewater discharged from two commercial properties located near the western edge of Malibu Valley. The (2004) Stone report found travel times to the Lagoon from this area can be as much as 50 years[14]. The Racquet Club and Miramar Properties are located in this area. It is estimated that only 20% of the wastewater discharged at these two sites reaches the Lagoon.

Only two homes with an estimated wastewater of 800 gpd are located in Sector III. There are 16 commercial facilities located in Sector III. An estimated 51,598 gpd, consisting of wastewater from both septic and advanced wastewater treatment systems, is discharged in Sector III.

[14] Stone Environmental. Inc. "Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California", 2004.

Sector IV – Sector IV consists of commercial facilities located south of Pacific Coast Highway along Malibu Road and 223 homes located in Malibu Colony and Amarillo Beach. All of the wastewater generated at Malibu Colony Plaza, which encompasses all of the commercial facilities located between Malibu Road and Pacific Coast Highway, is pumped under Pacific Coast Highway to Winter Canyon for treatment and disposal and assigned to Sector 1. Most of the wastewater from commercial development in this sector is collected and treated in Winter Canyon. Only five commercial properties located in Sector IV are not connected to the Malibu Colony Plaza wastewater collection system. The collective, wastewater discharge from these commercial properties is only 2,490 gpd.

There are 223 homes located in Sector IV. Wastewater, from the five commercial properties and most of the homes (150), discharges directly to the ocean and beaches north of Malibu Lagoon. A portion of the nutrient and bacteria load discharged to the beach can be transported with sediments toward the Lagoon by the prevailing long-shore movement of northwest to southeast. Once transported toward the Lagoon, it can enter the Lagoon through tidal inflow. The U.S. Environmental Protection Agency estimated that tidal inflow contributed only 1% of the nutrient load in Malibu Lagoon. Staff estimates that 1% of the 52,300 gpd of wastewater discharged in the main area of Sector IV could reach the Lagoon, but acknowledges the proportion could be much smaller.

There are alluvial sediments, estuary sediments, and beach sand beneath Sector IV. Both high and low permeability are found in this mixture of sand, silt and clay. Generally, nutrient removal by soil bacterial action would be high, but it is not because there is little separation between septic discharges and groundwater. Much of this coastal area has little elevation above sea level.

Sector IV has a sub-sector located near the Lagoon and subject to Lagoon tidal fluctuations. A collective wastewater flow of 25,900 gpd from 73 homes is assigned to the near Lagoon sub-sector. It is estimated that nearly 45% of the 25,900 gpd of the wastewater discharged in this sub-sector reaches the Lagoon.

Sector V – Sector V consists of a narrow coastal corridor located east of Malibu Lagoon and adjacent to Pacific Coast Highway and the Pacific Ocean. Sector V is smallest section and contributes little groundwater flow to the Malibu Lagoon. The topography of the area directs groundwater flow to the ocean. This area is described as the East Shore in the 2004 Stone Report. Bacteria and nitrogen from wastewater discharged directly to the ocean pollute the public beaches in this sector. Nitrogen and bacteria discharged to the beaches south of the Lagoon can be transported toward the Lagoon during short intervals when there is a southern swell, usually in the summer and early fall months when storm center highs are located to the south off the coast of Baja California. At such times, coastal long shore transport can reverse direction.

There are nine commercial facilities and 23 homes located in Sector V. The commercial wastewater discharge volume is estimated at 20,328 gpd. Three of the commercial facilities have advanced OWTS and thus, this volume is a mixture of septic and more treated

wastewater. The estimated residential wastewater discharge volume from the 23 homes located in Sector V is 9,600 gpd.

Staff estimates a very small proportion of the wastewater discharged in Sector V, approximately 1% of the total flow, has a chance of being transported northward toward the Lagoon where it could be carried by tidal inflow.

Soil Treatment Reduction Factor

Soil Nitrogen Load Reduction Factor for Commercial Sites - Given sufficient separation between the point of wastewater effluent discharge and groundwater, soil bacteria can remove significant amounts of nitrogen. This soil bacteria activity is called "soil treatment". Another factor that influences the removal of nitrogen in the wastewater disposal zone is the soil composition and permeability. This characteristic of the soil is the reason that most permitting agencies require soil percolation testing. If the percolation is too fast (e.g. clean, coarse grained, uniform sand), wastewater flow through the near surface oxygenated zone does not allow time for nitrogen removal by soil bacteria. If the percolation rate is too slow (e.g. very fine soils with high clay content), subsurface disposal of wastewater may not be possible. Table 3 contains information on the depth to groundwater and soil type was utilized to estimate total nitrogen load reduction factors by "soil treatment" ranged from 0% to 20% (modified from Table 3-19 on page 3-29, USEPA, 2002, to account for leachfield failure or seepage pit disposal).

No Soil Treatment Factor for Residential Sites - Permitting of OWDS for residential property is delegated to local agencies, and staff do not have information on site-specific conditions needed to make an estimate of "soil treatment" or load reduction factor. Therefore, a nitrogen load reduction factor could not be applied to the nitrogen load estimated for residences located in the Malibu Civic Center area. It is known that many of the Malibu Colony residences lack adequate separation from groundwater. In addition, many residences in the highland sectors of the Malibu Civic Center area use seepage pits rather than leachfields for wastewater disposal. Nitrogen load reduction factors for soil bacteria activity are not applicable where seepage pits are used for wastewater disposal. Filtration of wastewater discharged into seepage pits located in soil or permeable bedrock will remove some bacteria load, but the nitrogen load carried in solution, is not removed by filtration.

Detail calculations for flow reduction and soil treatment reduction are summarized in Table 3.

3. Results

Using staff's loading factors for the numerical fate and transport model, staff estimates that wastewaters transport 30 lb/day of total nitrogen into Malibu Lagoon. This model also indicates that loads are increasing. Details of this numerical modeling approach are in the Mass Loading Estimate prepared by Dr. C.P. Lai that is appended to Technical Memorandum #4 as Attachment 4-1.

Also, using the same load factors applied to the 'spreadsheet' model, which characterized the wastewater transport into five hydrogeologic sectors, staff estimates that wastewaters transport 35 lb/day into Malibu Lagoon.

Staff's estimates of 30 lb/day to 35 lb/day fr om the numerical and 'spreadsheet' models are above two of the estimates (17 lb/day to 20 lb/day) prepared by the third parties in previous studies and slightly overlap the estimate by the other third party (32 lb/day). Among the factors accounting for the range in estimates between staff's estimates and third-party estimates are:

- Commercial Flows: The third-party models used significantly lower assumptions of commercial wastewater flows.
- Residential Concentrations: Two of the three third-party models assumed that residential wastewaters have nitrogen concentrations that are less than one-half of what staff assumed.
- Nitrogen concentration of commercial wastewater: The average nitrogen concentration of commercial wastewater discharges has decreased. Since 2004, eight additional OWTS have been installed at commercial properties in the Malibu Civic Center area.

The ranges in estimates of nitrogen loads to the Lagoon and key factors are shown in the following Table 5:

	Third-Party Estimates			**Staff Estimates**	
	Stone (2004) Model	**Questa (2005) Model**	**Tetra Tech (2002)**	**Staff Spreadsheet Model**	**Staff Numeric Model**
Commercial Flow Rate (gal/day)	62,166	100,000	75,000	127, 241	127, 241
Commercial Concentration (mg/L)	50.0	50.0	59.2	3-110	3-110
Commercial Load (lb/day)	26	42	35	42.1	42.1
Residential Flow Rate (gal/day)	126,121	126,121	54,800	139,300	139,300
Residential Concentration (mg/L)	20.0	20.0	59.2	45	45
Residential Load (lb/day)	21	21	27	52.3	52.3
Ratio of Mass loading	36%	32%	50%	37%	32%
Gross Load released from OWDSs	47	63	64	94.4	94.4
Net Load to Malibu Lagoon	17	20	32	34.9	30.2

Regardless of differing assumptions and models used in the estimates, all estimates – including those prepared by staff as well as past estimates prepared by third parties – indicate that nitrogen loads from OWDSs are significantly above the waste load allocation of 6 lb/day established in a TMDL[15] adopted by the US EPA on March 21, 2003.

4. Conclusion

Staff has determined that OWDSs in the Malibu Civic Center area cumulatively release nitrogen at rates that contribute to eutrophication and impair aquatic life in Malibu Lagoon. This conclusion is supported by staff's estimates ranging from 30 lb/day to 35 lb/day as well as third-party estimates that range from 17 lb/day to 32 lb/day. All estimates are well above targets needed to restore water quality and protect beneficial uses in Malibu Lagoon.

[15] In the Malibu Creek Watershed Nutrient TMDL (March 21, 2003), the US EPA specifies a numeric target of 1.0 mg/l for total nitrogen during summer months (April 15 to November 15) and a numeric target of 8.0 mg/L for total nitrogen during winter months (November 16 to April 14). Significant sources of the nutrient pollutants include discharges of wastewaters from commercial, public, and residential landuse activities. The TMDL specifies load allocations for on-site wastewater treatment systems of 6 lbs/day during the summer months and 8 mg/L during winter months.

References:

American Water Works Association (AWWA). 1999. Residential End Users of Water. AWWA Research Foundation.

California Division of Mines and Geology, 2001, "Seismic Hazard Zone Report for the Malibu Beach 7.5- Minute Quadrangle, Los Angeles, California", Seismic Hazard Zone Report 050, dated 2001.

California Department of Water Resources, Bulletin 63-5, "Seawater Intrusion in California", October 1965.

Crites, R. and Tchobanoglous. G., "Small and Decentralized Wastewater Management Systems" McGraw-Hill, 1998.

Dibblee, T. W., 1982, "Geology of Santa Monica Mountains and Simi Hills, Southern California" , pages 94-130, in Geology and Mineral Wealth of the California Transverse Ranges", 1982.

Dibblee, T. W., "Geologic Map of the Malibu Beach Quadrangle, Los Angeles, California", published by Dibblee Geological Foundation, 1993.

Fife, D. and Minch, J., eds., "Geology and Mineral Wealth of the California Transverse Ranges", South Coast Geological Society, Inc., 1982.

Fugro West, Inc., 2005, "A Steady-State Groundwater Flow Model for the Proposed Malibu-La Paz Ranch Development, Project No. 3354.001.06, dated March 7, 2005.

Geosyntec Consultants, Inc., 2007, "Geotechnical Site Exploration and Intrepretation of Subsurface Conditions, Malibu Legacy Park Site", Project No. LA0142-02, dated July 30, 2007.

Leighton and Associates, Inc. 1994, "Report of Geotechnical Studies for Planning Purposes in the Civic Center Area, City of Malibu, California", Project No. 2920647-01, dated July 30, 2007.

Malibu Water Company, personal communication between Grant Adamson and Toni Callaway. The Adamson Family owned the Malibu Water Company. Records on water supply wells located in the lower Malibu Creek watershed, are stored at Mariposa Land Company, LLC, offices on Cross Creek Road (2009).

Metcalf & Eddy, Inc., " Wastewater Engineering Treatment, Disposal and Reuse", revised by Tchobanoglous, G. and Burton, F., McGraw-Hill, 3rd Edition, 1991.

Metcalf & Eddy, Inc., "Wastewater Engineering. Treatment and Reuse" McGraw-Hill, 4th Edition, 2003.

Peter Warshall and Association (PWA). 1992. Malibu Wastewater Management Study.

Salvato, J. A., 1982, "Environmental Engineering and Sanitation", John Wiley & Sons. 1982.

Stone Environmental, Inc., 2004, "Final Report, Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California", Project No. 011269-W, dated August 30, 2004.

Stowell, R., personal communication, Notes from State Board Training Academy training course "Wastewater Engineering 2, Volume 1, The Advanced Class,"2009.

Tetra Tech, Inc., 2001, "Nutrient and Coliform Modeling for the Malibu Creek Watershed TMDL Studies", prepared for U.S. Environmental Protection Agency, Region 9 and the Los Angels Regional Water Quality Control Board, dated May 22, 2001.

U.S. Environmental Protection Agency, 2003, "Total Maximum Daily Loads for Nutrients Malibu Creek Watershed", 2003.

U.S. Environmental Protection Agency, 2002, "On-site Wasterwater Treatment Systems Manual", 2002.

URS Greiner Woodward Clyde, 1999, "Study of Potential Water Quality Impacts on Malibu Creek and Lagoon From On-Site Septic Systems". Project No. 964P170, dated June 7, 1999.

Van Beveren & Butelo, Inc., 2007, "Report of Geotechnical Investigation, Proposed Remodeling of Malibu Lumber Facility", Project No. 07-020, dated July 26, 2007.

Van Beveren & Butelo, Inc., 2007, "Report of Hydrologic Study, Proposed Legacy Park Discharge Area", Project No. 07-020.2, dated September 26, 2007.

Map 1 – Malibu Civic Center Area

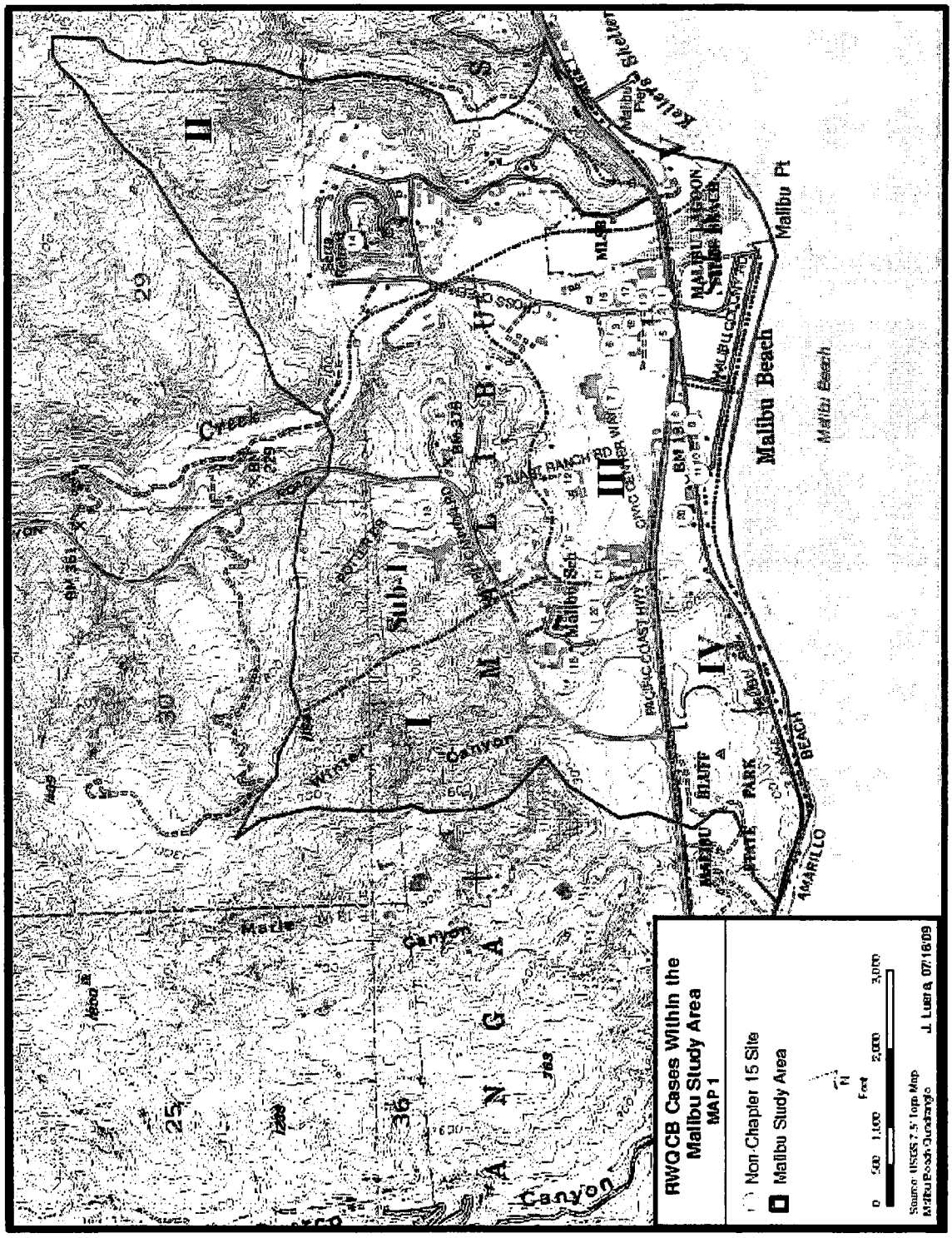


Figure – 1
Correlation of Groundwater and Tidal Levels

Figure -1 Adapted from Figure 4-7 in "Study of Potential Water Quality Impacts on Malibu Creek and Lagoon From On-site Septic Systems", 1990, URS Greiner Woodward Clyde

Table 1 –Commercial and residential nitrogen loading (continue to next page)

Sector 1	Flow Rate (Gallon/day)[A]	Category	Effluent TN (mg-N/L)	TN Load (lbs/day)	TN Load (lbs/year)
HRL -3011 Malibu Cyn Rd	3,428	[B]3	45.0	1.29	469.9
L.A. Co. Main. Yard -3637 Winter Cyn Rd	252	[B]4	40.0	0.08	30.7
Malibu Colony Plaza -Disposal in Winter Cyn[D]	16,617	2	18.1	2.51	916.1
Malibu WPCP -3260 Vista Pacifica[D]	22,500	2	20.4	3.83	1,398.1
Webster Elementary -3602 Winter Cyn Rd	5,000	[B]3	75.0	3.13	1,142.2
Our Lady of Malibu -3625 Winter Cyn Rd	3,100	[B]3	75.0	1.94	708.2
Malibu Presbyterian Nursery School - 3324 Malibu Cyn Rd	1,500	[B]3	75.0	0.94	342.7
Commercial - 7 Business Facilities	52,397			13.72	5,007.8
Residential 61 homes	19,800	[B]1	45.0	7.44	2,713.9
Total				21.16	7,721.7

Sector 2	Flow Rate (Gallon/day)[A]	Category	Effluent TN (mg-N/L)	TN Load (lbs/day)	TN Load (lbs/year)
Serra Retreat -3401 Serra Rd	428	[B]3	60.0	0.21	78.2
Commercial - 1 Business Facility	428			0.21	78.2
Residential 83 homes	30,900	[B]1	45.0	11.60	4,235.4
Total				11.82	4,313.6

Sector 3	Flow Rate (Gallon/day)[A]	Category	Effluent TN (mg-N/L)	TN Load (lbs/day)	TN Load (lbs/year)
Malibu Animal Hospital -23431 PCH	1,260	[B]4	40.0	0.42	153.5
Malibu Adm. Center -23519 Civic Ctr Wy	4,038	[B]7	40.0	1.35	492.0
Raquet Club -23847 Stuart Ranch Rd	1,500	[B]4	75.0	0.94	342.7
Prudential Realty -23405 PCH	450	[B]7	40.0	0.15	54.8
Malibu Country Mart I -3835 Cross Creek Rd	8,400	[B]4	80.0	5.61	2,046.9
Malibu Country Mart II 23410 Civic Ctr Wy	6,300	[B]4	80.0	4.21	1,535.1
Malibu Country Mart III -3900 Cross Creek Rd	3,400	[B]4	80.0	2.27	828.5
Malibu Shell -23387 PCH[D]	300	2	4.2	0.01	3.8
Malibu Prof. Arts Bldg -23440 Civic Ctr Wy	450	[B]7	40.0	0.15	54.8
Malibu Lumber -23479 PCH[D]	8,500	2	5.7	0.40	147.6
Mira Mar Properties -23805-23815 Stuart Ranch Rd	3,200	[B]7	40.0	1.07	389.9
J & P Limited -3806 Cross Creek Rd	500	[B]7	40.0	0.17	60.9
So. Calif. Edison	400	[B]7	40.0	0.13	48.7
Verizon South, Inc. -3705 Cross Creek Rd	400	[B]7	40.0	0.13	48.7
Mariposa Land Company, LLC -3728 Cross Creek Rd	1,500	[B]7	40.0	0.50	182.8
Malibu Creek Plaza/Malibu Village[D]	11,000	2	3.0	0.28	100.5
Commercial - 16 Business Facilities	51,598			17.78	6,491.3
Residential 2 homes	800	[B]1	45.0	0.30	109.7
Total				18.08	6,600.9

Sector 4	Flow Rate (Gallon/day)[A]	Category	Effluent TN (mg-N/L)	TN Load (lbs/day)	TN Load (lbs/year)
Malibu Rd., LLC -23676-23712 Malibu Rd	1,000	[B]7	40.0	0.33	121.8
Morton-Gerson -23730 Malibu Rd	150	[B]7	40.0	0.05	18.3
L.A. Co. Fire Station #88 -23720 Malibu Rd	540	6	30.0	0.14	49.3
Lisa Krasnoff -23655 Malibu Colony Rd	400	[B]7	40.0	0.13	48.7
Mesa, LLC 23915 PCH	400	[B]7	40.0	0.13	48.7
Commercial - 5 Business Facilities	2,490			0.79	286.9
Residential 223 homes	78,200	[B]1	45.0	29.37	10,718.6
Total				30.15	11,005.5

Sector 5	Flow Rate (Gallon/day)[A]	Category	Effluent TN (mg-N/L)	TN Load (lbs/day)	TN Load (lbs/year)
Surfrider Co. Beach -23060 PCH	3,188	[B]4	40.0	1.06	388.4
Malibu Pier State Park -23000 PCH[D]	3,000	2	11.7	0.29	106.9
Malibu Shores Motel -23033 PCH	1,797	[B]4	60.0	0.90	328.4
Malibu Beach Inn -22878 PCH[D]	2,843	2	31.9	0.76	276.2
Jack-in-the-Box -23017 PCH[D]	1,800	6	26.3	0.39	144.0
Malibu Plaza 22917 PCH[B]	1,500	[B]7	40.0	0.50	182.8
Malibu Inn & Restaurant 22969 PCH[C]	6,200	6	110.0	5.69	2,077.3
Surfshack/Fish Grill -22935 PCH	400	[B]4	80.0	0.27	97.5
Spic & Span Cleaners/Chabad -22941 PCH[B]	1,000	[B]4	40.0	0.33	121.8
Commercial - 9 Business Facilities	20,328			9.60	3,504.0
Residential 23 homes	9,600	[B]1	45.0	3.61	1,315.8
Total				13.21	4,819.9

Malibu Civic Center Area	Flow Rate (Gallon/day)[A]	Category	Effluent TN (mg-N/L)	TN Load (lbs/day)	TN Load (lbs/year)
Commercial	127,241			42.10	15,368.3
Residential	139,300			52.31	19,093.4
Total	**266,541**			**94.42**	**34,461.6**

Note:

[A] Measured or discharger reported flow underlined

[B] Estimated flow and TN concentration

[C] Discharger reported TN concentration

[D] Advanced OWDS treatment

Category

1-Residential discharge after "in-tank treatment" reduction

2-Multi-Use commercial with advanced wastewater treatment

3-Facilities such as schools with food service and high restroom usage

4-Multi-Use commercial with septic system

5-Stand alone restaurant with septic system

6- Assigned TN concentration from another site with the same advanced treatment system

7- Office building with low domestic strength wastewater

Table 2 –List of Residential Septic Systems

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
I	4458027034	3547 Malibu Colony Rd	Multi Family	6	3	On-site
I	4458026007	3400 Coast View Dr	Residential	4		On-site
I	4458027002	3401 Coast View Dr	Residential	4	4	On-site
I	4458026006	3436 Coast View Dr	Residential	2	2	On-site
I	4558026015	3502 Coast View Dr	Residential	4	3	On-site
I	4458026014	3504 Coast View Dr	Residential	3	4	On-site
I	4458026004	3524 Coast View Dr	Residential	3	3	On-site
I	4458026003	3536 Coast View Dr	Residential	2	2	On-site
I	4458027030	Coast View Dr	Residential			On-site
I	4458025020	3207 Colony View Cir	Residential	3	3	On-site
I	4458025016	3213 Colony View Cir	Residential	4	4	On-site
I	4458025015	3215 Colony View Cir	Residential	3	4	On-site
I	4458025012	3216 Colony View Cir	Residential	3	4	On-site
I	4458025010	3217 Colony View Cir	Residential	3	2	On-site
I	4458025011	3220 Colony View Cir	Residential	3	3	On-site
I	4458025025	3211 Colony View Cir	Residential	5	5	On-site
I	4458024004	32701 Harbor Vista Dr	Residential	3	3	On-site
I	4458024043	23702 Harbor Vista Dr	Residential	3	2	On-site
I	4458024025	23704 Harbor Vista Dr	Residential	4	3	On-site
I	4458024031	23706 Harbor Vista Dr	Residential	3	2	On-site
I	4458024001	23708 Harbor Vista Dr	Residential	3	2	On-site
I	4458024029	23721 Harbor Vista Dr	Residential	3	3	On-site
I	4458025014	23722 Harbor Vista Dr	Residential	3	4	On-site
I	4458024034	23741 Harbor Vista Dr	Residential	3	2	On-site
I	4458025013	23748 Harbor Vista Dr	Residential	3	3	On-site
I	4458024009	23803 Harbor Vista Dr	Residential	6	7	On-site
I	4458025019	23812 Harbor Vista Dr	Residential	3	2	On-site
I	4458024010	23813 Harbor Vista Dr	Residential	3	2	On-site
I	4458024011	23831 Harbor Vista Dr	Residential	5	4	On-site
I	4458024012	23837 Harbor Vista Dr	Residential	3	1	On-site
I	4458025024	23838 Harbor Vista Dr	Residential	5	6	On-site
I	4458025006	23850 Harbor Vista Dr	Residential	3	3	On-site
I	4458025018	23858 Harbor Vista Dr	Residential	3	3	On-site
I	4458024013	23843 Harbor Vista Dr	Residential	3	2	On-site
I	4458025017	3224 Malibu Canyon Rd	Residential	2	2	On-site
I	4458025004	3338 Malibu Canyon Rd	Residential			On-site
I	4458024038	23800 Malibu Crest Dr	Residential	4	3	On-site
I	4458024042	23805 Malibu Crest Dr	Residential	4	4	On-site
I	4458024041	23806 Malibu Crest Dr	Residential	5	6	On-site
I	4458024039	23808 Malibu Crest Dr	Residential	3	2	On-site
I	4458024040	23812 Malibu Crest Dr	Residential	3	4	On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
I	4458024022	23814 Malibu Crest Dr	Residential	4	5	On-site
I	4458024023	23816 Malibu Crest Dr	Residential	3	2	On-site
I	4458024021	23854 Malibu Crest Dr	Residential	2	3	On-site
I	4458024015	23870 Malibu Crest Dr	Residential	3	4	On-site
I	4458024014	23880 Malibu Crest Dr	Residential	4	4	On-site
I	4458026010	23901 Malibu Knolls Rd	Residential	4	1	On-site
I	4458026011	23903 Malibu Knolls Rd	Residential	4	3	On-site
I	4458026012	23905 Malibu Knolls Rd	Residential	3	2	On-site
I	4458026013	23907 Malibu Knolls Rd	Residential	3	3	On-site
I	4458026009	23908 Malibu Knolls Rd	Residential	3	3	On-site
I	4458025001	23915 Malibu Knolls Rd	Residential	3	2	On-site
I	4458026008	23916 Malibu Knolls Rd	Residential	4	4	On-site
I	4458025022	23933 Malibu Knolls Rd	Residential	2	2	On-site
I	4458027904	Winter Canyon Rd	Multi-Family			
I	4458027025	3625 Winter Canyon Rd	Residential	6	6	On-site
I	4458027003	3431 Coast View Dr	Residential	3	2	On-site
I	4458027004	3453 Coast View Dr	Residential	5	5	On-site
I	4458027005	3505 Coast View Dr	Multi-Family	4	3	On-site
I	4458027029	3525 Coast View Dr	Residential	3	3	On-site
subtotal			61	198	178	
II	4452015035	3501 Cross Creek LN	Residential	4	4	On-site
II	4452015034	3509 Cross Creek LN	Residential	3	4	On-site
II	4452015023	3510 Cross Creek LN	Residential	4	4	On-site
II	4452015033	3511 Cross Creek LN	Residential	5	6	On-site
II	4452015025	3512 Cross Creek LN	Residential	3	4	On-site
II	4452015026	3520 Cross Creek LN	Residential			On-site
II	4452015031	3535 Cross Creek LN	Residential	4	4	On-site
II	4452015027	3538 Cross Creek LN	Residential	4	3	On-site
II	4452015030	3539 Cross Creek LN	Residential	4	4	On-site
II	4452015042	3550 Cross Creek LN	Residential	5	4	On-site
II	4452014006	3415 Cross Creek Rd	Residential	3	3	On-site
II	4452015024	Cross Creek LN	Residential	5	5	On-site
II	4458023003	3469 Cross Creek Rd	Residential	4	9	On-site
II	4458023009	3515 Cross Creek Rd	Residential	4	4	On-site
II	4452015029	3551 Cross Creek LN	Residential			On-site
II	4458022021	3565 Cross Creek Rd	Residential	4	3	On-site
II	4458022004	Cross Creek Rd	Residential			On-site
II	4458022003	3661 Cross Creek Rd	Residential	2	2	On-site
II	4452015003	23110 Mariposa De Oro St	Residential	5	5	On-site
II	4452015014	2311 Mariposa De Oro St	Residential	3	3	On-site
II	4452015007	23122 Mariposa De Oro St	Residential	4	4	On-site
II	4452015010	23140 Mariposa De Oro St	Residential	5	4	On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
II	4452015040	23146 Mariposa De Oro St	Residential	6	5	On-site
II	4452015006	23155 Mariposa De Oro St	Residential	4	5	On-site
II	4452015036	23160 Mariposa De Oro St	Residential	2	1	On-site
II	4452015021	23210 Mariposa De Oro St	Residential	5	5	On-site
II	4452015020	23215 Mariposa De Oro St	Residential	3	2	On-site
II	4452015022	23222 Mariposa De Oro St	Residential	5	5	On-site
II	4452015019	23233 Mariposa De Oro St	Residential	3	3	On-site
II	4452015018	23255 Mariposa De Oro St	Residential	5	5	On-site
II	4452027018	23247 Palm Canyon Ln	Residential	5	6	On-site
II	4452027016	23267 Palm Canyon Ln	Residential	2	2	On-site
II	4452027013	23301 Palm Canyon Ln	Residential	4	7	On-site
II	4452027012	23333 Palm Canyon Ln	Residential	3	4	On-site
II	4452027011	23333 Palm Canyon Ln	Residential	6	5	On-site
II	4452014004	23344 Palm Canyon Ln	Residential	4	3	On-site
II	4452012028	23500 Palm Canyon Ln	Residential	5	5	On-site
II	4452027021	3200 Retreat Ct	Residential	8	8	On-site
II	4452027022	3201 Retreat Ct	Residential	6	7	On-site
II	4452027019	3210 Retreat Ct	Residential	5	6	On-site
II	4452027023	3211 Retreat Ct	Residential	5	6	On-site
II	4452026008	3216 Serra Rd	Residential	5	5	On-site
II	4452026009	3220 Serra Rd	Residential	4	3	On-site
II	4452026007	3226 Serra Rd	Residential	5	5	On-site
II	4452026006	3226 Serra Rd	Residential			On-site
II	4452026010	3250 Serra Rd	Residential	4	6	On-site
II	4452026011	3264 Serra Rd	Residential	5	5	On-site
II	4452026019	3268 Serra Rd	Residential	4	4	On-site
II	4452026018	3270 Serra Rd	Residential			On-site
II	4452026012	3314 Serra Rd	Residential	4	3	On-site
II	4452026013	3350 Serra Rd	Residential	5	4	On-site
II	4452026016	3410 Serra Rd	Residential	5	4	On-site
II	4452026014	3426 Serra Rd	Residential	4	3	On-site
II	4452026015	3434 Serra Rd	Residential	4	4	On-site
II	4452018006	3611 Serra Rd	Residential	4	3	On-site
II	4452026003	Serra Rd	Residential			On-site
II	4452018011	3549 Serra Rd	Residential	3	3	On-site
II	4452013001	3556 Serra Rd	Residential	4	3	On-site
II	4452018012	3557 Serra Rd	Residential	3	3	On-site
II	4452013002	3560 Serra Rd	Residential	3	2	On-site
II	4452018013	3567 Serra Rd	Residential	4	4	On-site
II	4452013003	3574 Serra Rd	Residential	6	7	On-site
II	4452018015	3609 Serra Rd	Residential	2	3	On-site
II	4452013009	3610 Serra Rd	Residential	4	4	On-site
II	4452018008	3615 Serra Rd	Residential			On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
II	4452018016	3621 Serra Rd	Residential	4	4	On-site
II	4452018009	3623 Serra Rd	Residential	4	2	On-site
II	4452018017	3625 Serra Rd	Residential	4	2	On-site
II	4452018018	3627 Serra Rd	Residential	5	4	On-site
II	4452018019	3629 Serra Rd	Residential	4	3	On-site
II	4452018020	3631 Serra Rd	Residential	5	4	On-site
II	4452012014	3633 Serra Rd	Residential	4	4	On-site
II	4452012012	3635 Serra Rd	Residential	3	3	On-site
II	4452012015	3637 Serra Rd	Residential	1	1	On-site
II	4452013005	3644 Serra Rd	Residential	4	7	On-site
II	4452017001	3700 Serra Rd	Residential	4	3	On-site
II	4452012007	3701 Serra Rd	Residential	3	3	On-site
II	4452012016	3705 Serra Rd	Residential	4	3	On-site
II	4452012013	3707 Serra Rd	Residential	2	3	On-site
II	4452012022	3227 Serra Rd	Residential	4	4	On-site
II	4452012009	3737 Serra Rd	Residential	4	4	On-site
II	4452012011	3751 Serra Rd	Residential	3	4	On-site
II	4452012020	3811 Serra Rd	Residential	4	6	On-site
subtotal			83	309	311	
III	4452027010	3200 Cross Creek RD	Residential	3	3	On-site
III	4452027009	3232 Cross Creek RD	Residential	5	5	On-site
subtotal			2	8	8	
IV	4458004044	70 Malibu Colony Rd	Residential	4	3	On-site
IV	4452008025	112 Malibu Colony Rd	Residential	5	5	On-site
IV	4452008017	23314 Malibu Colony Rd	Residential	3	3	On-site
IV	4452008016	23316 Malibu Colony Rd	Residential	4	4	On-site
IV	4452008014	23318 Malibu Colony Rd	Residential	3	5	On-site
IV	4452008030	23324 Malibu Colony Rd	Residential	5	7	On-site
IV	4452010017	23325 Malibu Colony Rd	Residential	2	2	On-site
IV	4452008028	23330 Malibu Colony Rd	Residential	2	4	On-site
IV	4452010024	23331 Malibu Colony Rd	Residential	2	3	On-site
IV	4452008027	23334 Malibu Colony Rd	Residential	3	4	On-site
IV	4452010023	23337 Malibu Colony Rd	Residential			On-site
IV	4452008026	23338 Malibu Colony Rd	Residential	3	4	On-site
IV	4452008024	23346 Malibu Colony Rd	Residential	3	2	On-site
IV	4452010032	23349 Malibu Colony Rd	Residential	4	4	On-site
IV	4452008023	23350 Malibu Colony Rd	Residential	4	4	On-site
IV	4452010031	23351 Malibu Colony Rd	Residential	3	3	On-site
IV	4452008022	23354 Malibu Colony Rd	Residential	2	3	On-site
IV	4452008021	23356 Malibu Colony Rd	Residential	3	3	On-site
IV	4452008020	23360 Malibu Colony Rd	Residential	3	4	On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
IV	4452010012	23401 Malibu Colony Rd	Residential	4	6	On-site
IV	4452008019	23402 Malibu Colony Rd	Residential	6	4	On-site
IV	4452009027	23410 Malibu Colony Rd	Residential	3	3	On-site
IV	4452009017	23416 Malibu Colony Rd	Residential	4	3	On-site
IV	4452009016	23418 Malibu Colony Rd	Residential	3	4	On-site
IV	4452010008	23425 Malibu Colony Rd	Residential	3	4	On-site
IV	4452009024	23426 Malibu Colony Rd	Residential	4	4	On-site
IV	4452010028	23431 Malibu Colony Rd	Residential	4	4	On-site
IV	4452010009	23435 Malibu Colony Rd	Residential			On-site
IV	4452009018	23438 Malibu Colony Rd	Residential	4	6	On-site
IV	4452009019	23440 Malibu Colony Rd	Residential	5	6	On-site
IV	4452010029	23441 Malibu Colony Rd	Residential	4	3	On-site
IV	4452009022	23444 Malibu Colony Rd	Residential	4	3	On-site
IV	4452010027	23445 Malibu Colony Rd	Residential	5	3	On-site
IV	4452009021	23446 Malibu Colony Rd	Residential	5	4	On-site
IV	4452010005	23449 Malibu colony Rd	Residential	3	5	On-site
IV	4452009020	23450 Malibu Colony Rd	Residential	4	6	On-site
IV	4452009015	23456 Malibu Colony Rd	Residential	3	4	On-site
IV	4452010003	23457 Malibu Colony Rd	Residential	3	4	On-site
IV	4458004031	23460 Malibu Colony Rd	Residential	3	2	On-site
IV	4458004032	23500 Malibu Colony Rd	Residential	3	5	On-site
IV	4452010002	23501 Malibu Colony Rd	Residential	2	1	On-site
IV	4452010019	23505 Malibu Colony Rd	Residential	4	4	On-site
IV	4458004033	23506 Malibu Colony Rd	Residential	2	4	On-site
IV	4458004034	23510 Malibu Colony Rd	Residential	3	3	On-site
IV	4458003023	23511 Malibu Colony Rd	Residential	3	2	On-site
IV	4458004035	23512 Malibu Colony Rd	Residential	4	4	On-site
IV	4458003022	23515 Malibu Colony Rd	Residential	5	5	On-site
IV	4458004036	23516 Malibu Colony Rd	Residential	3	2	On-site
IV	4458003021	23517 Malibu Colony Rd	Residential	3	2	On-site
IV	4458004037	23520 Malibu Colony Rd	Residential	4	5	On-site
IV	4458004038	23524 Malibu Colony Rd	Residential	4	5	On-site
IV	4458004039	23526 Malibu Colony Rd	Residential	5	7	On-site
IV	4458004040	23530 Malibu Colony Rd	Residential	4	4	On-site
IV	4458003019	23531 Malibu Colonr Rd	Residential	4	5	On-site
IV	4458003018	23533 Malibu colony rd	Residential	4	3	On-site
IV	4458004041	23536 Malibu colony rd	Residential	4	3	On-site
IV	4458004042	23538 Malibu Colony Rd	Residential	5	4	On-site
IV	4458003017	23543 Malibu Colony Rd	Residential	5	3	On-site
IV	4458004043	23544 Malibu Colony Rd	Residential	5	4	On-site
IV	4458003015	23555 Malibu Colony Rd	Residential	1	1	On-site
IV	4458004046	23556 Malibu Colony Rd	Residential	2	2	On-site
IV	4458004047	23560 Malibu Colony Rd	Residential	4	4	On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
IV	4458003014	23561 Malibu Colony Rd	Residential	5	4	On-site
IV	4458004048	23562 Malibu Colony Rd	Residential	4	5	On-site
IV	4458004049	23566 Malibu Colony Rd	Residential	3	1	On-site
IV	4458003013	23567 Malibu Colony Rd	Residential	3	2	On-site
IV	4458004050	23570 Malibu Colony Rd	Residential	5	3	On-site
IV	4458004051	23600 Malibu Colony Rd	Residential	2	3	On-site
IV	4458003012	23601 Malibu Colony Rd	Residential			On-site
IV	4458004052	23604 Malibu Colony Rd	Residential	2	3	On-site
IV	4458004053	23608 Malibu Colony Rd	Residential	4	5	On-site
IV	4458004054	23610 Malibu Colony Rd	Residential	5	6	On-site
IV	4458003027	23611 Malibu Colony Rd	Residential	4	6	On-site
IV	4458004055	23614 Malibu Colony Rd	Residential	4	5	On-site
IV	4458003026	23615 Malibu Colony Rd	Residential	4	5	On-site
IV	4458005040	23618 Malibu Colony Rd	Residential	4	5	On-site
IV	4458005039	23620 Malibu Colony Rd	Residential	3	7	On-site
IV	4458005038	23622 Malibu Colony Rd	Residential	7	4	On-site
IV	4458003009	23623 Malibu Colony Rd	Residential	3	3	On-site
IV	4458005037	23626 Malibu Colony Rd	Residential	4	5	On-site
IV	4458003008	23629 Malibu Colony Rd	Residential			On-site
IV	4458005036	23630 Malibu Colony Rd	Residential	4	3	On-site
IV	4458005035	23632 Malibu Colony Rd	Residential	5	3	On-site
IV	4458005034	23634 Malibu Colony Rd	Residential	4	5	On-site
IV	4458003030	23639 Malibu Colony Rd	Residential	2	2	On-site
IV	4458005033	23640 Malibu Colony Rd	Residential	3	4	On-site
IV	4458003004	23641 Malibu Colony Rd	Residential			On-site
IV	4458005032	23644 Malibu Colony Rd	Residential	5	6	On-site
IV	4458005031	23648 Malibu Colony Rd	Residential	3	4	On-site
IV	4458003029	23649 Malibu Colony Rd	Residential	4	4	On-site
IV	4458005030	23652 Malibu Colony Rd	Residential	3	2	On-site
IV	4458005029	23654 Malibu Colony Rd	Residential	4	4	On-site
IV	4458003028	23655 Malibu Colony Rd	Residential	3	3	On-site
IV	4458005028	23660 Malibu Colony Rd	Residential	4	5	On-site
IV	4458002014	23661 Malibu Colony Rd	Residential	5	5	On-site
IV	4458005027	23664 Malibu Colony Rd	Residential	3	2	On-site
IV	4458002011	23667 Malibu Colony Rd	Residential	3	3	On-site
IV	4458005026	23668 Malibu Colony Rd	Residential	3	2	On-site
IV	4458005025	23672 Malibu Colony Rd	Residential	4	5	On-site
IV	4458002010	23673 Malibu Colony Rd	Residential	4	2	On-site
IV	4458005024	23674 Malibu Colony Rd	Residential	3	4	On-site
IV	4458005023	23678 Malibu Colony Rd	Residential	6	6	On-site
IV	4458005022	23684 Malibu Colony Rd	Residential	4	3	On-site
IV	4458002006	23687 Malibu Colony Rd	Residential	5	4	On-site
IV	4458005021	23700 Malibu Colony Rd	Residential	8	8	On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
IV	4458006041	23704 Malibu Colony Rd	Residential	6	3	On-site
IV	4458002004	23705 Malibu Colony Rd	Residential	4	5	On-site
IV	4458006040	23708 Malibu Colony Rd	Residential	5	5	On-site
IV	4458002003	23709 Malibu Colony Rd	Residential	4	3	On-site
IV	4458006038	23712 Malibu Colony Rd	Residential	6	7	On-site
IV	4458002017	23713 Malibu Colony Rd	Residential	2	1	On-site
IV	4458006037	23716 Malibu Colony Rd	Residential	5	4	On-site
IV	4458006036	23720 Malibu Colony Rd	Residential	2	3	On-site
IV	4458006035	23730 Malibu Colony Rd	Residential	5	5	On-site
IV	4458006034	23736 Malibu Colony Rd	Residential	4	4	On-site
IV	4452005025	23006 Malibu Rd	Residential	3	3	On-site
IV	4458004045	23554 Malibu Rd	Residential	3	2	
IV	4458006033	23740 Malibu Rd	Residential	5	4	On-site
IV	4458006032	23746 Malibu Rd	Residential	4	3	On-site
IV	4458006031	23750 Malibu Rd	Residential	4	5	On-site
IV	4458006030	23752 Malibu Rd	Residential	4	4	On-site
IV	4458006029	23754 Malibu Rd	Residential	4	4	On-site
IV	4458006028	23758 Malibu Rd	Residential	3	4	On-site
IV	4458006027	237562 Malibu Rd	Residential	3	4	On-site
IV	4458006026	23764 Malibu Rd	Residential	3	5	On-site
IV	4458006025	23768 Malibu Rd	Residential	3	4	On-site
IV	4458006023	23800 Malibu Rd	Residential	9	10	On-site
IV	4458006022	23808 Malibu Rd	Residential	4	4	On-site
IV	4458007028	23812 Malibu Rd	Residential	4	1	On-site
IV	4458007027	23816 Malibu Rd	Residential	2	3	On-site
IV	4458007026	23822 Malibu Rd	Residential	4	7	On-site
IV	4458007025	23826 Malibu Rd	Residential	4	3	On-site
IV	4458007024	23832 Malibu Rd	Residential	5	3	On-site
IV	4458007023	23834 Malibu Rd	Residential	2	3	On-site
IV	4458007022	23844 Malibu Rd	Residential	3	2	On-site
IV	4458007021	23850 Malibu Rd	Residential	7	5	On-site
IV	4458007016	23858 Malibu Rd	Residential	5	6	On-site
IV	4458007015	23864 Malibu Rd	Residential			On-site
iV	4458007020	23868 Malibu Rd	Residential	5	6	On-site
IV	4458007019	23872 Malibu Rd	Residential	3	2	On-site
IV	4458007018	23900 Malibu Rd	Residential	3	2	On-site
IV	4458007017	23910 Malibu Rd	Residential	3	6	On-site
IV	4458008017	23917 Malibu Rd	Residential	5	4	On-site
IV	4458008016	23920 Malibu Rd	Residential	5	7	On-site
IV	4458008015	23926 Malibu Rd	Residential	6	5	On-site
IV	4458008014	23930 Malibu Rd	Residential	4	5	On-site
IV	4458008013	23936 Malibu Rd	Residential	4	4	On-site
IV	4458008018	23940 Malibu Rd	Residential	6	7	On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
IV	4458008003	23950 Malibu Rd	Residential	4	5	On-site
IV	4458008002	23952 Malibu Rd	Residential	2	3	On-site
IV	4458008001	23956 Malibu Rd	Residential	5	3	On-site
IV	4458009013	23962 Malibu Rd	Residential	3	2	On-site
IV	4458009012	24000 Malibu Rd	Residential	4	3	On-site
IV	4458009009	24016 Malibu Rd	Residential	3	3	On-site
IV	4458009001	24056 Malibu Rd	Residential	2	1	On-site
IV	4458010015	24058 Malibu Rd	Residential	4	2	On-site
IV	4458010016	24102 Malibu Rd	Residential	4	4	On-site
IV	4458010017	24108 Malibu Rd	Residential	3	4	On-site
IV	4458010019	24116 Malibu Rd	Residential	3	3	On-site
IV	4458010018	24116 Malibu Rd	Residential	3	3	On-site
IV	4458010012	24120 Malibu Rd	Residential	3	3	On-site
IV	4458010011	24124 Malibu Rd	Residential	2	2	On-site
IV	4458010010	24128 Malibu Rd	Residential	3	4	On-site
IV	4458010008	24134 Malibu Rd	Residential	2	3	On-site
IV	4458010007	24138 Malibu Rd	Residential	3	3	On-site
IV	4458010006	24142 Malibu Rd	Residential	2	2	On-site
IV	4458010005	24146 Malibu Rd	Residential	4	4	On-site
IV	4458010004	24150 Malibu Rd	Residential	4	3	On-site
IV	4458010003	24154 Malibu Rd	Residential	2	2	On-site
IV	4458010001	24172 Malibu Rd	Residential	3	2	On-site
IV	4458011002	24212 Malibu Rd	Residential	2	2	On-site
IV	4458011003	24216 Malibu Rd	Residential	3	2	On-site
IV	4458018005	24001 Malibu Rd	Residential	3	3	On-site
IV	4458018020	24031 Malibu Rd	Residential	3	2	On-site
IV	4458018011	24109 Malibu Rd	Residential	3	2	On-site
IV	4458018012	24111 Malibu Rd	Residential	3	2	On-site
IV	4458010019	24112 Malibu Rd	Residential	4	4	On-site
IV	4458011004	24222 Malibu Rd	Residential	2	2	On-site
IV	4458011005	24228 Malibu Rd	Residential	2	2	On-site
IV	4458011007	24236 Malibu Rd	Residential	3	3	On-site
IV	4458011008	24246 Malibu Rd	Residential	2	2	On-site
IV	4458011009	24254 Malibu Rd	Residential	3	4	On-site
IV	4458011010	24266 Malibu Rd	Residential	2	2	On-site
IV	4458011012	24314 Malibu Rd	Residential	3	3	On-site
IV	4458011013	24320 Malibu Rd	Residential	1	4	On-site
IV	4458011032	24330 Malibu Rd	Residential	4	4	On-site
IV	4458011018	24348 Malibu Rd	Residential	2	1	On-site
IV	4458011019	24352 Malibu Rd	Residential	3	2	On-site
IV	4458011021	24380 Malibu Rd	Residential	4	5	On-site
IV	4458011022	24402 Malibu Rd	Residential	2	3	On-site
IV	4458011023	24408 Malibu Rd	Residential	3	3	On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
IV	4458011024	24414 Malibu Rd	Residential	3	3	On-site
IV	4458011027	24434 Malibu Rd	Residential	7	6	On-site
IV	4458011028	24436 Malibu Rd	Residential	5	4	On-site
IV	4458011029	24444 Malibu Rd	Residential	3	3	On-site
IV	4458011030	24450 Malibu Rd	Residential	3	3	On-site
IV	4458011031	24456 Malibu Rd	Residential	2	3	On-site
IV	4458012001	24460 Malibu Rd	Residential	3	5	On-site
IV	4458012002	24466 Malibu Rd	Residential	5	4	On-site
IV	4458012003	24470 Malibu Rd	Residential	3	3	On-site
IV	4458012004	24476 Malibu Rd	Residential	3	3	On-site
IV	4458012005	24508 Malibu Rd	Residential	6	5	On-site
IV	4458012006	24514 Malibu Rd	Residential	2	2	On-site
IV	4458012007	24518 Malibu Rd	Residential	3	2	On-site
IV	4458012008	24524 Malibu Rd	Residential	2	2	On-site
IV	4458012009	24528 Malibu Rd	Residential	3	2	On-site
IV	4458012010	24534 Malibu Rd	Residential	2	1	On-site
IV	4458012011	24538 Malibu Rd	Residential	2	1	On-site
IV	4458012012	24542 Malibu Rd	Residential	3	3	On-site
IV	4458012013	24548 Malibu Rd	Residential	3	3	On-site
IV	4458012014	24554 Malibu Rd	Residential	3	2	On-site
IV	4458012035	24560 Malibu Rd	Residential	3	4	On-site
IV	4458012036	24572 Malibu Rd	Residential	3	4	On-site
IV	4458012017	24604 Malibu Rd	Residential	3	4	On-site
IV	4458012018	24608 Malibu Rd	Residential	3	4	On-site
IV	4458012019	24612 Malibu Rd	Residential	3	4	On-site
IV	4458012020	24616 Malibu Rd	Residential	4	5	On-site
IV	4458012021	24620 Malibu Rd	Residential	3	3	On-site
IV	4458012021	24626 Malibu Rd	Residential	3	3	On-site
IV	4452008018	23406 Malibu Colony Rd	Residential	4	3	On-site
IV	4452009026	23414 Malibu Colony Rd	Residential	4	3	On-site
IV	4452009025	23422 Malibu Colony Rd	Residential	4	4	On-site
IV	4452009023	23430 Malibu Colony Rd	Residential	6	6	On-site
subtotal			223	782	793	On-site
V	4452025006	3395 Sweetwater Mesa Rd	Residential	2	2	On-site
V	4452016004	3401 Sweetwater Mesa Rd	Residential	5	10	On-site
V	4452016019	3415 Sweetwater Mesa Rd	Residential	6	7	On-site
V	4452016020	3431 Sweetwater Mesa Rd	Residential	5	7	On-site
V	4452016007	3451 Sweetwater Mesa Rd	Residential	4	4	On-site
V	4452017004	3509 Sweetwater Mesa Rd	Residential	5	8	On-site
V	4452017005	3535 Sweetwater Mesa Rd	Residential	6	7	On-site
V	4452017009	3620 Sweetwater Mesa Rd	Residential	6	8	On-site
V	4452013008	3655 Sweetwater Mesa Rd	Residential	4	4	On-site

Section	AIN	Property Location	Property Use	Bed	Bath	System Type
V	4452013007	3669 Sweetwater Mesa Rd	Residential	2	2	On-site
V	4452016008	3330 Sweetwater Mesa Rd	Residential	4	3	On-site
V	4452016018	3362 Sweetwater Mesa Rd	Residential	4	3	On-site
V	4452016017	3380 Sweetwater Mesa Rd	Residential	4	3	On-site
V	4452016016	3416 Sweetwater Mesa Rd	Residential	3	3	On-site
V	4452016015	3464 Sweetwater Mesa Rd	Residential	4	4	On-site
V	4452017008	3556 Sweetwater Mesa Rd	Residential	6	6	On-site
V	4452005004	23018 Pacific Coast Hwy	Residential	3	3	On-site
V	4452005022	23022 Pacific Coast Hwy	Residential	2	2	On-site
V	4452005018	23030 Pacific Coast Hwy	Residential	2	2	On-site
V	4452005002	23034 Pacific Coast Hwy	Residential	2	2	On-site
V	4452005001	23038 Pacific Coast Hwy	Residential	3	2	On-site
V	4452019008	22931 Pacific Coast Hwy	Residential	2	3	On-site
V	4452005020	22860 Pacific Coast Hwy	Multi Family	12	13	On-site
subtotal			23	96	108	
TOTAL			392	1,393	1,398	

Table 3 - Total Nitrogen Load to the Lagoon After Adjustment of Flow and Leach Field Reduction

Table 3 Total Nitrogen Loading to the Lagoon After Adjustment of Flow and Leach Field Reduction

Sector 1	Discharge (gpd)	Estimated Percent Flow to Lagoon	Estimated Flow to Lagoon (gpd)	Effluent TN (mg-N/L)	Depth to GW	Soil Type	Leach Field Reduction	Eff. TN to Lagoon (mg/L)	TN Load to Lagoon (lb/day)
HRL -3011 Malibu Cyn Rd*	3,428	45%	1,543	45.0	>10	soil & bedrock	0%	45.0	0.58
L.A. Co. Main. Yard -3637 Winter Cyn Rd	252	1%	3	40.0	10	sand, silt & clay	20%	32.0	0.00
Malibu Colony Plaza -Disposal in Winter Cyn*	16,617	1%	166	18.1	varies	sand & silt	0%	18.1	0.03
Malibu WPCP -3260 Vista Pacifica*	22,500	1%	225	20.4	varies	sand & silt	0%	20.4	0.04
Webster Elementary^ -3602 Winter Cyn Rd	5,000	1%	50	75.0	15	sand & silt	20%	60.0	0.03
Our Lady of Malibu^ -3625 Winter Cyn Rd	3,100	1%	31	75.0		sand & silt	0%	75.0	0.02
Malibu Presbyterian Nursery School - 3324 Malibu Cyn Rd	1,500	45%	675	75.0		sand & silt	0%	75.0	0.42
Commercial - 7 Business Facilities	52,397		2,692						1.11
Residential 61 homes	19,800	45%	8,910	45.0				45.0	3.35
Total									4.46

*Seepage Pit Disposal or Failed Leachfield = 0% soil treatment

Sector 2	Discharge (gpd)	Estimated Percent Flow to Lagoon	Estimated Flow to Lagoon (gpd)	Effluent TN (mg-N/L)	Depth to GW	Soil Type	Leach Field Reduction	Eff. TN to Lagoon (mg/L)	TN Load to Lagoon (lb/day)
Serra Retreat -3401 Serra Rd	428	95%	407	60.0	>10	sand & silt	20%	48.0	0.16
Commercial - 1 Business Facility	428		407						0.16
Residential 83 homes	30,900	95%	29,355	45.0				45.0	11.02
Total									11.19

Sector 3	Discharge (gpd)	Estimated Percent Flow to Lagoon	Estimated Flow to Lagoon (gpd)	Effluent TN (mg-N/L)	Depth to GW	Soil Type	Leach Field Reduction	Eff. TN to Lagoon (mg/L)	TN Load to Lagoon (lb/day)
Malibu Animal Hospital -23431 PCH	1,260	95%	1,197	40.0	10	sand, silt & clay	20%	32.0	0.32
Malibu Adm. Center -23519 Civic Ctr Wy	4,038	60%	2,423	40.0	>10	sand, silt & clay	20%	32.0	0.65
Raquet Club -23847 Stuart Ranch Rd	1,500	20%	300	75.0	ukn.	sand, silt & clay	0%	75.0	0.19
Prudential Realty -23405 PCH	450	95%	428	40.0	10	mostly sand	20%	32.0	0.11
Malibu Country Mart I -3835 Cross Creek Rd*	8,400	95%	7,980	80.0	<5	sand & silt	0%	80.0	5.33
Malibu Country Mart II 23410 Civic Ctr Wy*	6,300	95%	5,985	80.0	<5	sand & silt	0%	80.0	4.00
Malibu Country Mart III -3900 Cross Creek Rd*	3,400	95%	3,230	80.0	<5	mostly sand & silt	0%	80.0	2.16
Malibu Shell^^ -23387 PCH	300	95%	285	4.2	5 to 10	mostly sand	20%	3.4	0.01
Malibu Prof. Arts Bldg -23440 Civic Ctr Wy	450	60%	270	40.0	10	sand, silt & clay	10%	36.0	0.08
Malibu Lumber -23479 PCH	8,500	60%	5,100	5.7	5 to 10	fill, sand, silt & clay	20%	4.6	0.19
Mira Mar Properties -23805-23815 Stuart Ranch Rd*	3,200	20%	640	40.0	>10	sand, silt & clay	0%	40.0	0.21
J & P Limited -3806 Cross Creek Rd	500	95%	475	40.0	10	mostly sand	20%	32.0	0.13
So. Calif. Edison	400	95%	380	40.0		mostly sand	20%	32.0	0.10
Verizon South, Inc. -3705 Cross Creek Rd	400	95%	380	40.0		sand & silt	20%	32.0	0.10
Mariposa Land Company, LLC -3726 Cross Creek Rd	1,500	95%	1,425	40.0		mostly sand	20%	32.0	0.38
Malibu Creek Plaza/Malibu Village -PCH &Cross Creek	11,000	95%	10,450	3.0	<5	mostly sand	10%	2.7	0.24
Commercial - 16 Business Facilities	51,598		40,947						14.19
Residential 2 homes	800	95%	760	45.0				45.0	0.29
Total									14.5

Sector 4	Discharge (gpd)	Estimated Percent Flow to Lagoon	Estimated Flow to Lagoon (gpd)	Effluent TN (mg-N/L)	Depth to GW	Soil Type	Leach Field Reduction	Eff. TN to Lagoon (mg/L)	TN Load to Lagoon (lb/day)
Malibu Rd., LLC -23676-23712 Malibu Rd	1,000	1%	10	40.0	<10	sand, silt & clay	20%	32.0	0.00
Morton-Gerson -23730 Malibu Rd	150	1%	2	40.0	<10	sand, silt & clay	20%	32.0	0.00
L.A. Co. Fire Station #88 -23720 Malibu Rd	540	1%	5	30.0	<10	sand, silt & clay	20%	24.0	0.00
Lisa Krasnoff -23655 Malibu Colony Rd	400	1%	4	40.0	<10	sand & silt	0%	40.0	0.00
Mesa, LLC 23915 PCH	400	1%	4	40.0	ukn.	ukn.	0%	40.0	0.00
Commercial - 5 Business Facilities	2,490		25						0.01
73 of 223 Res.@50% Flow to Lagoon	25,900	45%	11,655	45.0				45.0	4.38
150 of 223 Res.@20%Flow toLagoon	52,300	1%	523	45.0				45.0	0.20
Total									4.58

Sector 5	Discharge (gpd)	Estimated Percent Flow to Lagoon	Estimated Flow to Lagoon (gpd)	Effluent TN (mg-N/L)	Depth to GW	Soil Type	Leach Field Reduction	Eff. TN to Lagoon (mg/L)	TN Load to Lagoon (lb/day)
Surfrider Co. Beach -23080 PCH	3,188	10%	319	40.0	>10	mostly beach sand	0%	40.0	0.11
Malibu Pier State Park -23000 PCH	3,000	1%	30	11.7	<10	mostly sand	10%	10.5	0.00
Malibu Shores Motel -23033 PCH	1,797	1%	18	60.0	10	sand & silt	10%	54.0	0.01
Malibu Beach Inn -22878 PCH	2,843	1%	28	31.9	<10	mostly sand	0%	31.9	0.01
Jack-in-the-Box -23017 PCH	1,600	1%	16	26.3	>10	fill, sand & silt	20%	21.0	0.00
Malibu Plaza 22917 PCH	1,500	1%	15	40.0	~ 10	fill, sand & silt	0%	40.0	0.01
Malibu Inn & Restaurant^ 22969 PCH	6,200	1%	62	110.0	~10	sand, silt & clay	0%	110.0	0.06
Surfshack/Fish Grill -22935 PCH	400	1%	4	80.0	~10	fill, sand & silt	0%	80.0	0.00
Spic & Span Cleaners/Chabad -22941 PCH	1,000	1%	10	40.0	~10	fill, sand & silt	0%	40.0	0.00
Commercial - 9 Business Facilities	20,328		504						0.20
Residential 23 homes	9,600	1%	96	45.0				45.0	0.04
Total									0.23

Study Area	Discharge (gpd)	Estimated Percent Flow to Lagoon	Estimated Flow to Lagoon (gpd)	Effluent TN (mg-N/L)	Depth to GW	Soil Type	Leach Field Reduction	Eff. TN to Lagoon (mg/L)	TN Load to Lagoon (lb/day)
Commercial	127,241		44,575						15.67
Residential	139,300		51,299						19.26
Total	266,541		95,874						34.93

Table 4 Monitoring results of TN/BOD ratio of mixed usage commercial sources

#	Location	Date	Parameter	TN	BOD	TN/BOD
1	Malibu Colony Plaza	03/30/01	Composite	54.2	420	12.9%
2	Malibu Colony Plaza	04/30/01	Composite	49.6	332	14.9%
3	Malibu Colony Plaza	05/23/01	Composite	56.0	772	7.3%
4	Malibu Colony Plaza	07/27/01	Composite	70.5	552	12.8%
5	Malibu Colony Plaza	08/22/01	Composite	72.8	551	13.2%
6	Malibu Colony Plaza	09/07/01	Composite	65.3	705	9.3%
7	Malibu Colony Plaza	09/21/01	Composite	55.1	385	14.3%
8	Malibu Colony Plaza	09/28/01	Composite	72.8	635	11.4%
9	Malibu Colony Plaza	10/05/01	Composite	67.2	477	14.1%
10	Malibu Colony Plaza	10/12/01	Composite	60.7	491	12.4%
11	Malibu Colony Plaza	10/19/01	Composite	65.3	34	192.1%
12	Malibu Colony Plaza	10/26/01	Composite	56.0	542	10.3%
13	Malibu Colony Plaza	11/02/01	Composite	56.0	383	14.6%
14	Malibu Colony Plaza	11/09/01	Composite	53.7	441	12.2%
15	Malibu Colony Plaza	11/17/01	Composite	44.7	359	12.5%
16	Malibu Colony Plaza	12/29/01	Composite	62.3	279	22.3%
	Malibu Colony Plaza	**2001 Yearly**	**Composite**	**60.1**	**460.0**	**24.2%**
17	Malibu Colony Plaza	01/11/02	Composite	18.1	386	4.7%
18	Malibu Colony Plaza	02/15/02	Composite	38.4	539	7.1%
19	Malibu Colony Plaza	03/14/02	Composite	69.4	424	16.4%
20	Malibu Colony Plaza	04/16/02	Composite	25.3	201	12.6%
21	Malibu Colony Plaza	05/17/02	Composite	18.7	592	3.2%
22	Malibu Colony Plaza	06/21/02	Composite	60.7	461	13.2%
23	Malibu Colony Plaza	07/19/02	Composite	45.5	210	21.7%
24	Malibu Colony Plaza	08/15/02	Composite	68.4	566	12.1%
25	Malibu Colony Plaza	09/26/02	Composite	41.0	359	10.8%
26	Malibu Colony Plaza	10/17/02	Composite	43.9	344	12.8%
27	Malibu Colony Plaza	11/12/02	Composite	60.4	384	15.7%
28	Malibu Colony Plaza	12/19/02	Composite	60.5	394	15.4%
	Malibu Colony Plaza	**2002 Yearly**	**Composite**	**45.9**	**406.7**	**12.1%**
29	Malibu Colony Plaza	01/22/03	Composite	48.4	515	9.4%
30	Malibu Colony Plaza	02/21/03	Composite	45.6	291	15.7%
31	Malibu Colony Plaza	03/27/03	Composite	35.8	318	11.3%
32	Malibu Colony Plaza	04/24/03	Composite	61.2	346	17.7%
33	Malibu Colony Plaza	05/27/03	Composite	62.1	641	9.7%
34	Malibu Colony Plaza	06/10/03	Composite	40.3	334	12.1%
35	Malibu Colony Plaza	07/17/03	Composite	54.7	286	19.1%
36	Malibu Colony Plaza	08/14/03	Composite	64.9	308	21.1%
35	Malibu Colony Plaza	09/18/03	Composite	55.8	469	11.9%
38	Malibu Colony Plaza	10/16/03	Composite	51.3	431	11.9%
39	Malibu Colony Plaza	11/19/03	Composite	81.3	441	18.4%
40	Malibu Colony Plaza	12/17/03	Composite	68.1	402	16.9%

	Malibu Colony Plaza	**2003 Yearly**	**Composite**	**55.8**	**398.5**	**14.6%**
41	Malibu Colony Plaza	01/15/04	Composite	35.8	250	14.3%
42	Malibu Colony Plaza	02/19/04	Composite	35.4	288	13.0%
43	Malibu Colony Plaza	03/11/04	Composite	47.6	403	11.8%
44	Malibu Colony Plaza	04/08/04	Composite	43.2	410	10.5%
45	Malibu Colony Plaza	08/12/04	Composite	70.2	344	20.4%
46	Malibu Colony Plaza	11/18/04	Composite	45.5	466	9.8%
	Malibu Colony Plaza	**2004 Yearly**	**Composite**	**46.6**	**360.2**	**13.3%**
47	Malibu Colony Plaza	02/24/05	Composite	19.0	91	20.8%
48	Malibu Colony Plaza	05/13/05	Composite	58.0	617	9.4%
49	Malibu Colony Plaza	08/12/05	Composite	82.1	483	17.0%
50	Malibu Colony Plaza	11/10/05	Composite	101.7	287	35.4%
	Malibu Colony Plaza	**2005 Yearly**	**Composite**	**65.2**	**369.5**	**20.7%**
51	Malibu Creek Plaza	01/30/02	Single Sample	53.5	352	15.2%
52	Malibu Creek Plaza	02/28/02	Single Sample	33.9	122	27.8%
53	Malibu Creek Plaza	03/14/02	Single Sample	25.6	177	14.5%
54	Malibu Creek Plaza	04/16/02	Single Sample	15.5	62	25.0%
55	Malibu Creek Plaza	05/17/02	Single Sample	12.7	141	9.0%
56	Malibu Creek Plaza	06/21/02	Single Sample	30.5	64	47.7%
57	Malibu Creek Plaza	07/19/02	Single Sample	25.3	181	14.0%
58	Malibu Creek Plaza	08/15/02	Single Sample	49.6	147	33.7%
59	Malibu Creek Plaza	09/26/02	Single Sample	20.8	136	15.3%
60	Malibu Creek Plaza	10/17/02	Single Sample	30.8	148	20.8%
61	Malibu Creek Plaza	11/12/02	Single Sample	47.5	191	24.9%
62	Malibu Creek Plaza	12/19/02	Single Sample	42.2	127	33.2%
	Malibu Creek Plaza	**2002 Yearly**	**Single Sample**	**32.3**	**154.0**	**23.4%**
63	Malibu Creek Plaza	01/22/03	Single Sample	41.5	214	19.4%
64	Malibu Creek Plaza	02/21/03	Single Sample	43.4	133	32.6%
65	Malibu Creek Plaza	03/27/03	Single Sample	35.0	152	24.3%
66	Malibu Creek Plaza	04/24/03	Single Sample	39.2	142	27.6%
67	Malibu Creek Plaza	05/27/03	Single Sample	45.9	207	22.2%
68	Malibu Creek Plaza	06/10/03	Single Sample	32.8	171	19.2%
69	Malibu Creek Plaza	07/17/03	Single Sample	7.6	22	34.7%
70	Malibu Creek Plaza	08/14/03	Single Sample	44.1	133	33.2%
71	Malibu Creek Plaza	09/18/03	Single Sample	51.7	161	32.1%
72	Malibu Creek Plaza	10/15/03	Single Sample	38.0	129	29.4%
73	Malibu Creek Plaza	11/19/03	Single Sample	45.9	113	40.6%
74	Malibu Creek Plaza	12/17/03	Single Sample	35.3	82	43.0%
	Malibu Creek Plaza	**2003 Yearly**	**Single Sample**	**38.5**	**138.3**	**29.8%**
75	Malibu Creek Plaza	01/15/04	Single Sample	33.2	117	28.4%
76	Malibu Creek Plaza	02/19/04	Single Sample	28.9	147	19.6%
77	Malibu Creek Plaza	03/11/04	Single Sample	42.3	148	28.6%
78	Malibu Creek Plaza	04/08/04	Single Sample	33.7	142	23.7%
79	Malibu Creek Plaza	05/27/04	Single Sample	42.3	151	28.0%
80	Malibu Creek Plaza	06/17/04	Single Sample	64.9	145	44.8%

81	Malibu Creek Plaza	07/22/04	Single Sample	42.7	205	20.8%
82	Malibu Creek Plaza	08/12/04	Single Sample	56.1	131	42.8%
83	Malibu Creek Plaza	09/09/04	Single Sample	41.7	143	29.2%
84	Malibu Creek Plaza	10/14/04	Single Sample	55.6	116	47.9%
85	Malibu Creek Plaza	11/18/04	Single Sample	45.1	145	31.1%
86	Malibu Creek Plaza	12/16/04	Single Sample	53.9	92	58.6%
	Malibu Creek Plaza	**2004 Yearly**	**Single Sample**	**45.0**	**140.2**	**33.6%**
87	Malibu Creek Plaza	01/13/05	Single Sample	35.39	164	21.6%
88	Malibu Creek Plaza	02/24/05	Single Sample	9.3	56	16.6%
89	Malibu Creek Plaza	03/04/05	Single Sample	23.81	79	30.1%
90	Malibu Creek Plaza	04/14/05	Single Sample	44.8	162	27.7%
91	Malibu Creek Plaza	May	Single Sample	31.97	140	22.8%
92	Malibu Creek Plaza	June	Single Sample	19.91	82	24.3%
93	Malibu Creek Plaza	07/21/05	Single Sample	22.64	132	17.2%
94	Malibu Creek Plaza	Aug	Single Sample	39.55	149	26.5%
95	Malibu Creek Plaza	Sept	Single Sample	35.82	160	22.4%
96	Malibu Creek Plaza	10/20/05	Single Sample	40.2	125	32.2%
97	Malibu Creek Plaza	11/10/05	Single Sample	27.94	188	14.9%
98	Malibu Creek Plaza	12/22/05	Single Sample	83.11	156	53.3%
	Malibu Creek Plaza	**2005 Yearly**	**Single Sample**	**34.5**	**132.8**	**25.8%**
99	Malibu Country Mart I	06/15/00	Single Sample	29.4	355	8.3%
100	Malibu Country Mart I	06/15/00	Single Sample	101.0	207	48.8%
101	Malibu Country Mart I	06/15/00	Single Sample	66.2	2853	2.3%
102	Malibu Country Mart I	06/15/00	Single Sample	75	897	8.3%
103	Malibu Country Mart I	06/15/00	Single Sample	70.5	882	8.0%
104	Malibu Country Mart I	06/15/00	Single Sample	70.9	935	7.6%
	Malibu Country Mart I	**2000 Yearly**	**Single Sample**	**68.8**	**1021.5**	**13.9%**
105	Malibu Country Mart II	06/15/00	Single Sample	77.0	1098	7.0%
106	Malibu Country Mart II	06/15/00	Single Sample	77.9	403	19.3%
	Malibu Country Mart II	**2000 Yearly**	**Single Sample**	**77.5**	**750.5**	**13.2%**
				Average		**20.4%**

Technical Memorandum #4:
Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life

Attachment 4-1

Nitrogen Mass Loading for Malibu Lagoon and Review Summary of Previous Studies on Mass Loadings from OWDS to the Lagoon

C.P. Lai, Ph.D., P.E.

This memorandum summarizes the findings of previous studies on the mass loadings of nitrogen to Malibu Lagoon from on-site wastewater disposal systems (OWDS). Using recent data, staff then estimated the nitrogen loading into Malibu Lagoon based on previous numerical modeling results and a spread sheet model. Finally, staff estimated the nitrogen concentration in Lagoon water resulting from this mass loading by using a continuous stirred tank reactor (CSTR) mass balance model.

1.0 Briefing of Previous Studies

Three previous studies about the subject topics have been reviewed and their estimates of mass loadings of nitrogen at the edge of the Lagoon are summarized as follows:

1.1 Stone Report
(Groundwater-Flow and Solute Transport Modeling as Appendix 3 of the Final Report "Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California", August 2004)

A numerical model was used to simulate groundwater flow and solute transport in the alluvium deposited along Malibu Creek and Lagoon near the Malibu Civic Center area. The groundwater flow model used in this study is the USGS MODFLOW model and the solute transport model is the USEPA MT3D groundwater transport model. The model is limited by the amount of data that was used to build, calibrate, and verify the model.

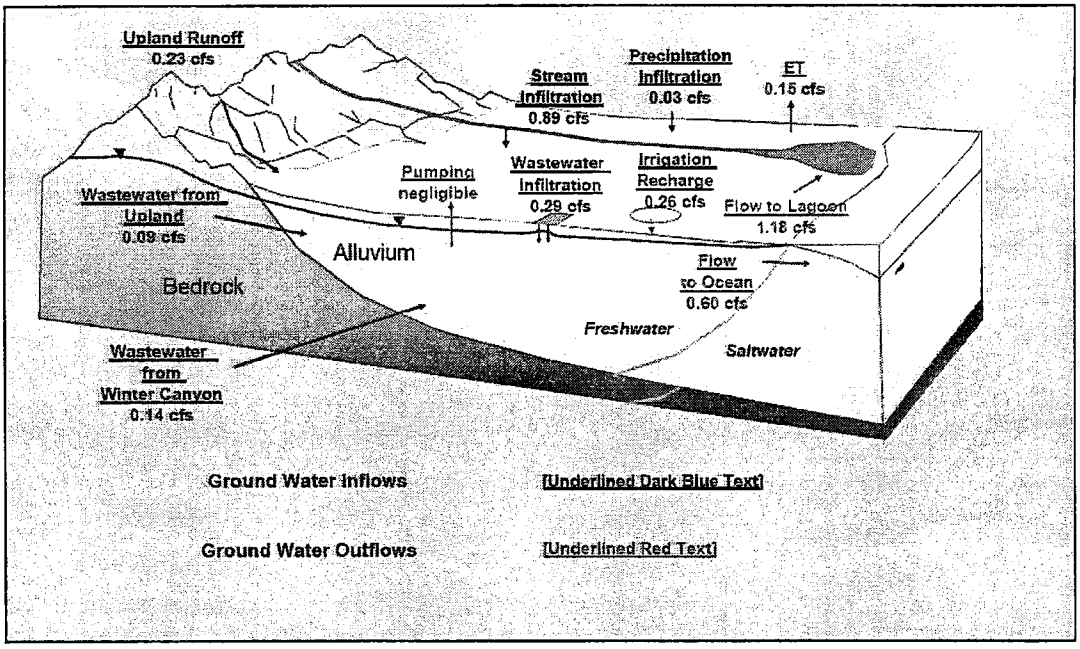
The purposes for constructing a model for the Malibu Civic Center area were to develop a water budget, to determine directions of groundwater flow, to identify which parts of the study area contribute groundwater flow to the beaches and to Malibu Lagoon, to estimate how long it takes groundwater from various parts of the study area to reach the beaches and Malibu Lagoon, and to estimate how much nitrogen is transported by the groundwater from OWDS to the Lagoon and to the ocean. No attempt was made in this model to estimate the mass loading for bacteria.

Results from the flow modeling were used to evaluate directions of groundwater flow, groundwater travel times in the flow system, and the contributing area for the Lagoon and ocean. The transport simulation was run for the period from 1930 through 2090, for a total of 160 years.

The total amount of wastewater disposal assumed as input for the model is approximately 0.52 cubic feet per second (cfs). Commercial wastewater disposal is estimated to be about 0.115 cfs. Source concentrations of nitrogen from OWDS were assumed to be 20 mg/l from domestic wastewater disposal systems and 50 mg/l from commercial systems.

The total average annual inflow to the alluvial groundwater flow system was estimated and is presented in Figure 1 below. The estimated total annual inflow to the alluvial groundwater flow system is approximately 1.93 cfs. The estimated total annual outflow is also 1.93 cfs, which includes 1.18 cfs to Malibu Lagoon, 0.60 cfs to the Pacific Ocean and 0.15 cfs for evapotranspiration.

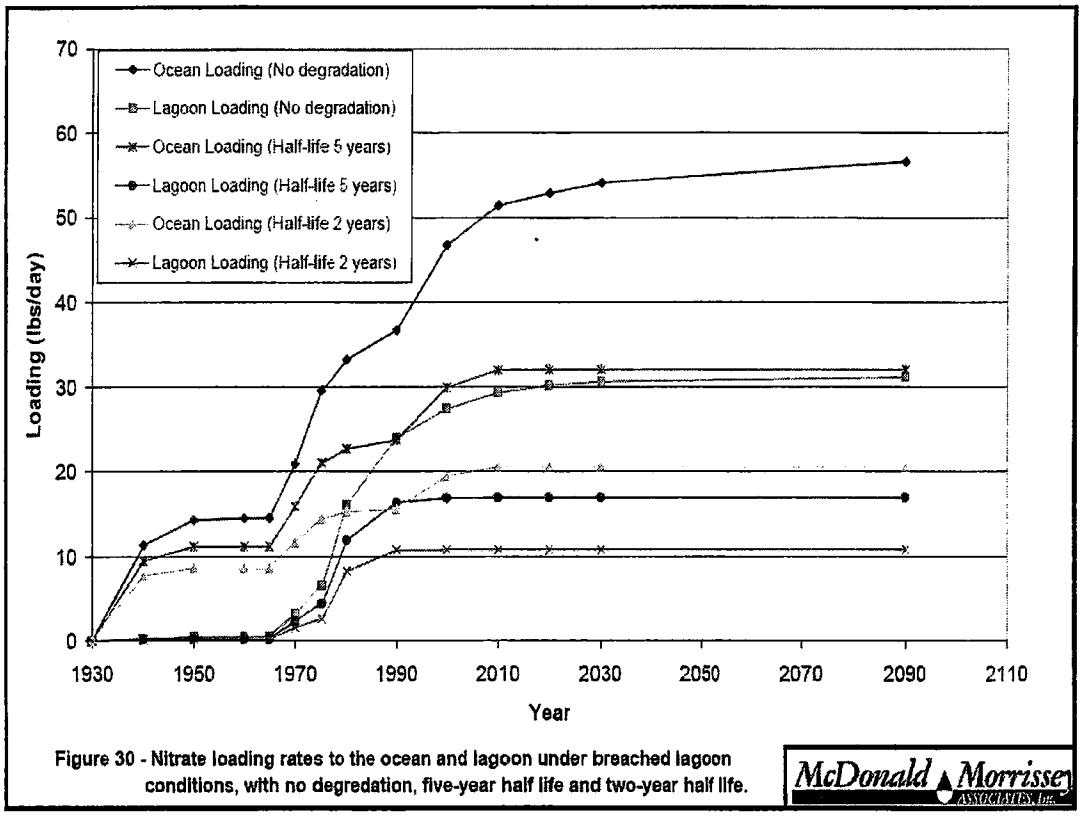
Figure 1 Average Annual Groundwater Budget for the Malibu Alluvium



Transport model simulations were run with four steady-state hydraulic stresses, which represent changing source loadings over different time periods, for un-breached and breached Lagoon conditions in order to estimate nitrogen loadings to the ocean and Lagoon from OWDS. Depending upon the assumptions of nitrate degradation, the calculated maximum nitrogen loading to the Lagoon resulting from OWDS ranges from 31 lbs/day (un-breached Lagoon with no degradation) to 11 lbs/day (breached Lagoon with a 2-year half life). The calculated nitrogen mass loading rates to the Malibu Lagoon and the ocean under the breached Lagoon condition are shown in Figure 2. Figure 2 shows that the model predicted the nitrate loading, which is an approximation of the total nitrogen loading.

Additionally, the study modeled groundwater movement to determine the time of travel to Malibu Creek, Malibu Lagoon, the surf zone, and the ocean. Some areas had times of travel as short as six months and others as long as 50 years.

Figure 2 Calculated Nitrogen Loading Rates to the Malibu Lagoon and the Ocean under the Breached Condition



1.2. Questa Report

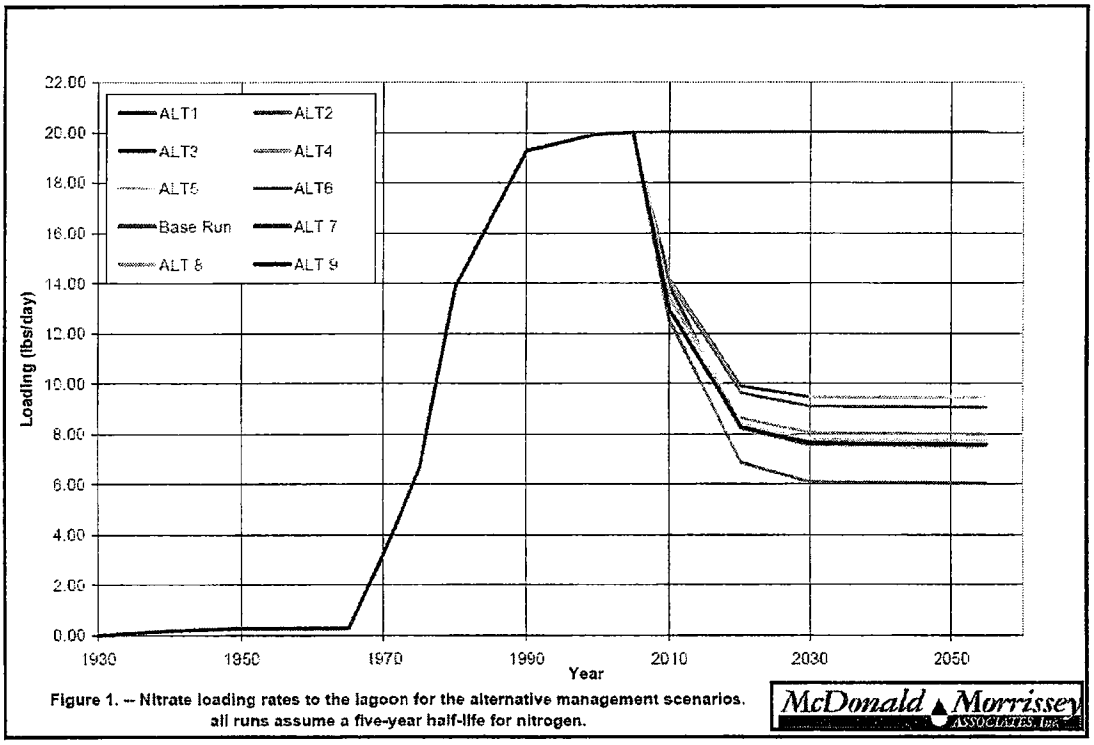
(Groundwater Modeling Report as Appendix D of the Final Report "Civic Center Integrated Water Quality Management Feasibility Study for City of Malibu", April 2005)

The three-dimensional groundwater flow and solute transport model developed for the Risk Assessment study (the Stone Report) was refined by McDonald Morrissey Associates to assess the potential water quality implications of various combinations of wastewater collection, treatment and dispersal options. Nine options were evaluated along with a baseline condition. Estimated wastewater flows from future development, as well as existing wastewater flows, were considered in the analysis. The model results of nitrogen mass loadings into the Malibu Lagoon for each wastewater management alternative, including the existing condition, are shown in Figure 3.

The nitrogen load at the present condition was estimated to be approximately 20 lbs/day. This result is slightly greater than the result obtained in the Stone Report (17 lbs/day) because

additional loading from commercial OWDS was included. Figure 3 shows that the model predicted the nitrate loading, which is an approximation of the total nitrogen loading.

Figure 3 Calculated Nitrogen Loading Rates to the Malibu Lagoon for the Alternative



Management Scenarios

1.3 Tetra Tech Report (Nutrient and Coliform Modeling for the Malibu Creek Watershed TMDL Studies, December 2002)

The TMDL modeling report estimated that nitrogen loading from residential OWDS is 59.2 milligram/liter (mg/l) with 274 gallons per day (gpd) average effluent flow rate. It also assumed that there are two billion coliform counts per person per day discharged into OWDS, and an average population of 3.4 persons per household.

For "normal" OWDS, the TMDL report assumed 100% of the bacteria load is removed prior to reaching surface water bodies, and that 50% of the nitrogen loading reaches the surface water (TetraTech, 2002). For the "failed" OWDS, it was assumed that 40% of the bacteria reaches the Lagoon and 50% of the nitrogen reaches the Lagoon. For "short circuited" systems, 87% of the nitrogen loads and 20% of the bacteria loads were assumed to enter the Lagoon.

Based on the above assumptions, TetraTech (2002) estimated the current total annual bacteria load that OWDS contribute to surface water in the Malibu Lagoon subwatershed to be 1,176,760 x 10^9 counts per year (3,224 x10^9 counts per day) for fecal coliform.

Similarly, the report estimated the current total annual nitrogen load that OWDS contribute to surface water in the Malibu Lagoon subwatershed to be 23,434 pounds per year, or 64.2 lb/day (TetraTech, 2002).

2.0 Staff Estimate of Mass Loading Rates into the Malibu Lagoon

2.1 Estimate using Questa Numerical Model Results

The Questa groundwater flow and transport modeling assumed that the unsaturated zone had a negligible effect on nitrogen species and that the tidal actions and influences had a negligible effect on the water table and solute transport. Based on local soil properties, the soil is mostly sand and less clay. As such, the assumption that infiltration flows directly into the saturated zone is reasonable. As far as tidal influences are concerned, the varied tidal level will slightly affect the local water table and will not have much of an effect on the up-gradient groundwater water elevation. Therefore, staff concludes that the model results obtained from the Questa Report can be used to estimate the nitrogen mass loading to the Malibu Lagoon using recent OWDS loading data.

From Figure 2, it can be seen that the maximum loading rate to the Malibu Lagoon for the breached Lagoon condition varies from 31 lbs/day (no degradation) to 17 lbs/day (5-year half life) depending on different nitrate degradation coefficients. To be conservative, staff assumed the breached condition and a 5-year half life for the nitrate degradation rate to estimate nitrogen mass loading to the Malibu Lagoon. The relationship of nitrogen mass loading from OWDS and mass loading entering the Lagoon from the Questa Report is presented in Figure 4. There are four loading periods shown in Figure 4 to represent general changes in rates of mass loading into the Lagoon based on changes in source loading to the groundwater system. The loading period A is the period during 1930 to 1964 in which the simulated sources were from Malibu Colony only. During loading period B from 1965 to 1974, the simulated source loading includes the additional loading from residential areas in uplands adjacent to the alluvium. The loading period C from 1975 to 1989 includes all sources in loading period B plus commercial systems in the main body of alluvium. For the loading period D from 1990 to 2009, the source loading includes all sources in the loading period C plus loading from increased commercial and wastewater disposal at the Malibu Bay Colony plant.

To estimate the current loading to the Malibu Lagoon, the flow rate and concentration of wastewater from OWDS for commercial and residential areas from 2008-2009 were used to calculate the mass loading from OWDS to groundwater in the study area and then, based on the relationship for the loading period D as shown in Figure 4, to estimate the mass loading of nitrogen to the Malibu Lagoon. The resulting estimate of nitrogen mass loading into the Lagoon is 30.2 lbs/day based on mass loading from OWDS of 94.4 lbs/day as shown in Table 1.

2.2 Estimate using Spread Sheet Model

Since there are no numerical model input data available, the estimate of mass loading into the Lagoon assumes that the relationship between mass loading from OWDS and mass loading to the Lagoon is linear and the ratio of mass loading of 0.32 obtained from the Questa Report was used. However, the relationship between mass loading from OWDS and mass loading into the Lagoon may not be linear because the increased mass loading from OWDS could contribute more mass loading into the Lagoon due to the limited nitrogen capacity of groundwater during long term discharge and the effect of local groundwater flow net patterns. As such, Regional Board staff in the Groundwater Permitting Unit used a spread sheet model to estimate the mass loading entering the Lagoon based on local geotechnical data, hydraulic conductivity and groundwater flow net patterns. The estimate of mass loading into the Lagoon based on this spread sheet model is **34.9** lbs/day resulting from a mass loading from OWDS of 94.4 lbs/day.

The comparisons of the three previous modeling results and staff estimates of nitrogen mass loading to the Malibu Lagoon using a numerical model and a spreadsheet model are presented in Table 1.

2.3 Evaluation of Nitrogen Mass Loadings into the Lagoon using a Mass Balance Model

To evaluate which estimate of mass loading to the Lagoon presented in Table 1 is the best fit with actual conditions and to understand the effect of mass loading from OWDS to the Malibu Lagoon on nitrogen concentrations in Lagoon water, staff used a continuous stirred tank reactor (CSTR) mass balance model to estimate the resulting concentration due to the mass loading. The CSTR model results for different mass loadings are presented in Figure 5. The results are compared with actual Lagoon nitrogen concentration data. It can be seen from Figure 5 that the predicted nitrogen concentration in the Lagoon due to a mass loading entering the Lagoon of 20 lbs/day (as predicted by the Questa Report) is a good comparison with the average nitrogen concentration of 1.4 mg/L for receiving water data collected by the Tapia wastewater treatment plant from 1995-1999. In addition, the predicted nitrogen concentration due to the load allocations for OWDS developed in the TMDL of 6 lbs/day is less than the nitrogen numeric target of 1.0 mg/L. The maximum of nitrogen mass loading into the Lagoon to maintain the nitrogen numeric target of 1.0 mg/L is about 13 lbs/day.

Staff estimates that the current mass loading into the Lagoon from OWDS may vary from 30 lbs/day to 35 lbs/day based on the predicted nitrogen concentrations in the Lagoon water and measured Lagoon nitrogen concentrations for 2002-2003 data (SCCWRP Technical Report 441) as shown in Figure 5. The current estimate of mass loading into the Lagoon of 34.9 lb/day using the spread sheet method would produce a nitrogen concentration in the Lagoon water of 2.9 mg/L and the current estimate of mass loading of 30.2 lb/day using the Questa numerical model results would cause the nitrogen concentration in the Lagoon water to be 2.5 mg/L. According to the measured data during 1995-1999 and 2002-2003, the nitrogen concentration in the Lagoon water is increasing. As such, the resulting nitrogen concentration of 2.9 mg/L for 2008-2009 falls within the trend of measured data from 1995 to 2003. Thus, the mass loading into the Lagoon of 34.9 lb/day is considered to be an appropriate and reasonable estimate.

In summary, staff finds that the previous model developed by McDonald Morrissey Associates as presented in the Questa Report was calibrated with measured nitrate data and its modeling results can be used and have been used in this memo to estimate current nitrogen mass loading into the Lagoon. The spreadsheet model also provides a reasonable estimate of current mass loading to the Lagoon. By comparing the results of these two models with measured nitrogen concentration data in the Lagoon, staff estimates that **29-35** lbs/day of nitrogen are loaded to the lagoon, which exceeds the TMDL load allocation and results in exceedances of the TMDL numeric target.

3.0 References

1. "Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California", Final Report, prepared for Santa Monica Bay Restoration Commission, prepared by Stone Environmental, Inc., August 30, 2004.
2. "Ground-Water Flow and Solute Transport Modeling, Malibu, California", prepared for Santa Monica Bay Restoration Project, prepared by McDonald Morrissey Associates Inc., July 28, 2004.
3. "Malibu Civic Center Integrated Water Quality Management Feasibility Study", prepared for City of Malibu, prepared by Questa Engineering Corporation, April 28, 2005.
4. "Groundwater Modeling Report in the Appendix D of Malibu Civic Integrated Water Quality Management Feasibility Study", prepared by McDonald Morrissey Associates, Inc., April 26, 2005.
5. "Total Maximum Daily Loads for Nutrients Malibu Creek Watershed", United States Environmental Protection Agency, Region 9, 2003.
6. "A Steady-State Groundwater Flow Model for the Proposed Malibu-La Paz Ranch Development", prepared for Sterling Capitol, prepared by Furgo West, Inc., March 2005.
7. "Final Malibu Lagoon Restoration and Enhancement Plan", prepared for the California State Coastal Conservancy & California State Department of Parks and Recreation, prepared by Moffatt & Nichol, June 17, 2005.
8. "Summary of Stormwater Management and Water Quality Improvements for Lower Malibu Creek and Lagoon", prepared for City of Malibu, prepared by RMC, March 26, 2008.
9. "Lower Malibu Creek and Lagoon Resource Enhancement and Management ", Final Report to the California State Coastal Conservancy, prepared by Richard F. Ambrose and Antony R. Orme, University of California, Los Angeles, May 2000.
10. "Malibu Wetland Feasibility Study", prepared for Malibu Coastal Land Conservation, prepared by Huffman and Carpenter, Inc., August 2000.
11. "Sediments as a Non-Point Source of Nutrients to Malibu Lagoon, California, USA", Southern California Coastal Water Resources Project (SCCWRP) Technical Report 441, October 2004.
12. Las Virgenes Municipal Water District (LVMWD),Tapia Water Reclamation Facilities, Malibu Creek Monitoring Program, 1995-1999 Annual Report, NPDES Permit No. CA0056014.

Figure 4 Relationship of nitrogen mass loading from OWDS and mass loading into the Lagoon

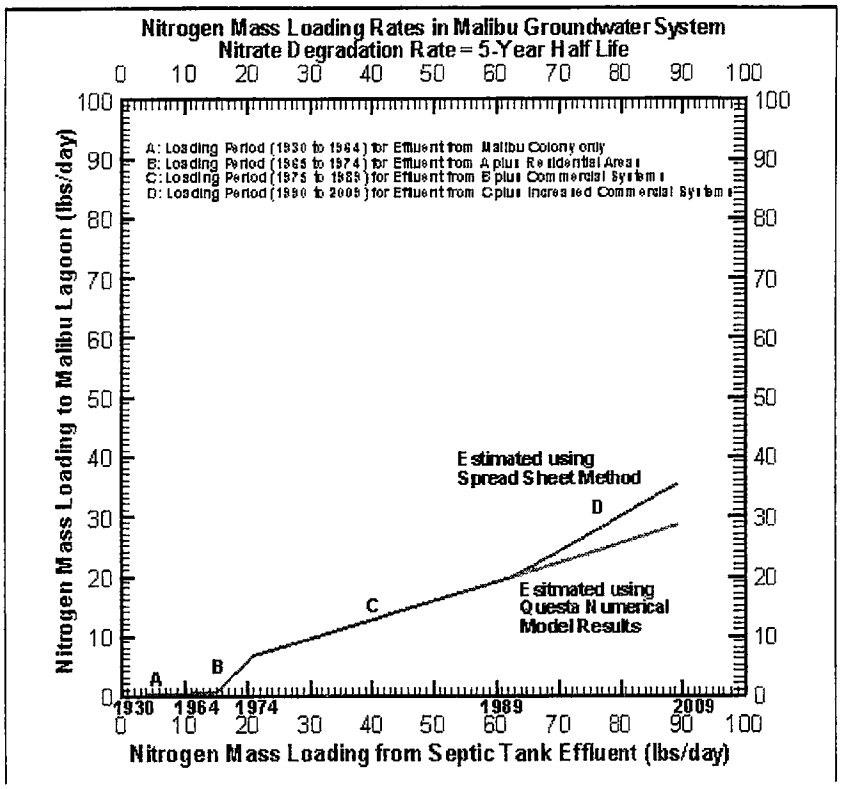


Table 1 Comparisons of nitrogen mass loading to the Malibu Lagoon for three previous studies and staff estimates

	Stone Report (2004)[b]	Questa Report (2005)[b]	Tetra Tech Report (2003)[c]	Staff Estimate Using Spread Sheet Method[d]	Staff Estimate Using Numerical Model Method[e]
1.Wastewater Flow Rate from Commercial OWDS (gal/day)	62166	100000	75000	127241	127241
2.Concentration in Commercial Wastewater (mg/L)	50	50	59.2	3 - 110	3 – 110
3.Mass Loading from Commercial OWDS (lbs/day)	25.94	41.73	37.05	42.1	42.1
4.Wastewater Flow Rate from Residential OWDS (gal/day)	126121	126121	54800	139300	139300
5.Concentration in Residential Wastewater (mg/L)	20	20	59.2	45	45
6.Mass Loading from Residential OWDS (lbs/day)	21.05	21.05	27.07	52.3	52.3
7.Mass Loading from OWDS (lbs/day)	46.99	62.78	64.12	94.4	94.4
8.Ratio of Mass Loading[a]	0.36	0.32	0.50	0.38	0.32
9.Mass Loading to Malibu Lagoon(lbs/day)	17	20	32	34.9	30.2

Note: [a] the ratio of mass loading entering Malibu Lagoon versus mass loading from OWDS, i.e., value of row 9 divided by value of row 7.

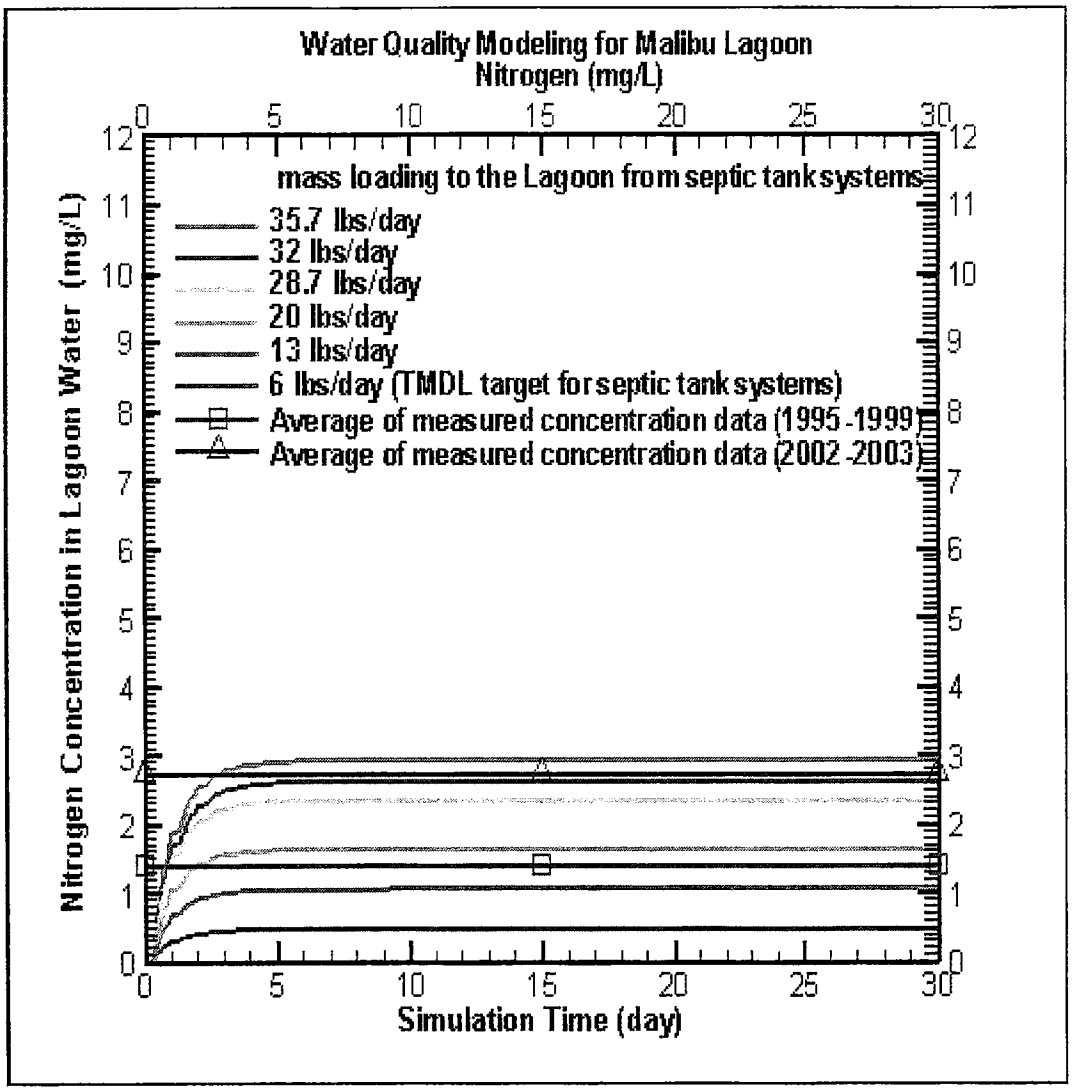
[b] the nitrogen loads were assumed to be mostly nitrate in the OWDS and the model only simulated the nitrate in the Stone and Questa Modeling Reports.

[c] 50 percent of nitrogen loads from the OWDS were assumed to enter the Malibu Lagoon.

[d] the nitrogen mass loading from OWDS was estimated based on the commercial load from each OWDS and the residential load with an average concentration of 45 mg/L for OWDS. Staff estimated the nitrogen mass loading to Malibu Lagoon by using the spread sheet method.

[e] the nitrogen mass loading based on the commercial load from each OWDS and the residential load with an average concentration of 45 mg/L from OWDS were used in the model. Staff estimated the nitrogen mass loading to Malibu Lagoon by using Questa numerical model results.

Figure 5 Nitrogen concentrations in Lagoon water resulting from different mass loadings entering the Lagoon



State of California
California Regional Water Quality Control Board, Los Angeles Region

Peer Review – Staff Memorandum

Technical Memorandum #4:
Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life

By

Toni Callaway, P.G., Engineering Geologist

TM4-46

November 5, 2009

California Regional Water Quality Control Board
Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Linda S. Adams
Cal/EPA Secretary

Arnold Schwarzenegger
Governor

Date: October 21, 2009

To: Rebecca Chou, Ph.D., P.E., Chief of Groundwater Permitting Unit
Wendy Phillips, PG, CHG, CEG, Chief of Groundwater Permitting and Landfill Section

From: Toni Callaway, P.G., Engineering Geologist, Groundwater Permitting Unit

Subject: **Peer Review Response to Comments - Technical Memorandum #4: Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life**

Attachments:

1. Comment dated September 5, 2009 from Dr. Robert Arnold of Arizona State University
2. Comments dated September 10, 2009 from Dr. Jörg Drewes of Colorado School of Mines
3. Comments dated September 12, 2009 from Dr. JoAnn Silverstein of the University of Colorado at Boulder

---

To ensure that the proposed amendment to the *Basin Plan*[1] is based on sound science and engineering principles, the scientific elements of Technical Memorandum (Tech Memo) #4: *Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life,* draft dated August 5, 2009 (Tech Memo #4), were peer reviewed. This peer review was conducted in accordance with requirements and guidelines from the Cal/EPA Scientific Peer Review Program, Office of Research, Planning and Performance.

All three peer reviewers responded promptly and provided valuable comments. In summary, all three peer reviewers found that the basic approaches and methods used to calculate the nitrogen loading to Malibu Lagoon in Tech Memo #4 incorporated sound scientific and engineering principles.

Suggestions were made to clarify the assumptions made by staff. Staff responded to these suggestions and revised Tech Memo #4 as appropriate and noted that none of the changes materially altered the conclusion of Tech Memo #4. That is: On-site subsurface disposal systems (OWDSs) in the Malibu Civic Center area cumulatively release nitrogen to Malibu Lagoon at

---

[1] Proposed amendment to the *Water Quality Control Plan for Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan)* to prohibit on-site subsurface disposal systems (OWDSs) in the Malibu Civic Center area.

rates that violated the total maximum daily limit (TMDL) adopted by the US Environmental Protection Agency in 2003 for the Malibu Lagoon (USEPA, 2003).

Comments have been summarized into three main issues and presented in *italics*, followed by staff's response. The main issues raised in the comments are: 1) Residential Loading - Is the 100 gallons per day per person (gpd/person) wastewater flow rate assumed in the Tech Memo for single-family homes realistic? 2) Commercial Loading - Are the flow rates estimated for un-permitted commercial properties in the Tech Memo accurate? and 3) TN/BOD Ratio - Is the TN/BOD Ratio of 0.20 in wastewater used in the Tech Memo an appropriate estimation for total nitrogen (TN) when biochemical oxygen demand (BOD_5) data is available while TN data is not available? Comments related to these issues are addressed in paragraphs 1 through 3 below:

1. ***Residential Loadings**: Comparing to the typical rate of wastewater generation per capital in the literature (40 to 90 gpd/person), the 100 gpd/person rate used in Tech Memo #4 for the Malibu Civic Center area may be too high.*

   Staff considers the residences in the Malibu Civic Center area luxury homes, because almost all the 392 residences in the area are large single family homes with more than 3.5 bath/bedrooms per house. Many studies have shown that luxury homes use more water than ordinary homes and therefore generate more wastewater. For example, Metcalf and Eddy (1991, Table 2-9, page 27) reported that the average water usage for luxury homes in residential areas was 75-150 gpd/person, while the water usage for the average home nationwide was 70 gpd/person. The higher than typical wastewater flow rate used in Tech Memo #4 is also supported by historical water use data of Malibu City. In 2008, the population of the Malibu City was 13,009 and the water consumption of the City was 2,200 million gallons for both commercial and residential usage. It has been estimated that approximately 54% of urban water usage is residential (Department of Water Resource in California) and that 50% of residential water usage is for irrigation (American Water Works Association). Assuming these percentages are applicable to the Malibu Civic Center area, the net per capita water consumption (excluding irrigation use) would be 125 gpd/person. Because the bulk of residential water consumption becomes wastewater at the end, the 100 gpd/person of wastewater flow rate used for the Malibu Civic Center area is a reasonable estimate. Tech Memo #4 has therefore not been modified in response to this comment.

2. ***Commercial Loading**: In Tech Memo #4, wastewater flow rates from small businesses were estimated using on-site population and business activity information. A few details or examples of the process by which wastewater flows were assigned might provide a feel for this work.*

A new column (category) has been added to Table 1 in Tech Memo #4 to characterize each commercial facility, including whether flow rate of the facility was estimated. New footnotes have also been added to Table 1 to better explain the data source for each facility. Of the 38 commercial facilities in the Malibu Civic Center area that discharge wastewater with OWDSs, the flow rates of 7 facilities were not available and had to be estimated. This constitutes 5.4% of the total commercial flow.

3. ***TN/BOD Ratio**: Staff assumed a constant fraction (0.20) of total nitrogen concentration to five-day biochemical oxygen demand (TN/BOD_5) to estimate nitrogen load of commercial sources where only BOD_5 measurements were available. More appropriate references should be used to provide the accurate representation of single source waste streams. TN/BOD ratios from single sources should be site-specific and highly depending on the types of dischargers (i.e. lower in restaurant effluents). If local data exist with which to make this distinction, they should be cited in the text. It is advisable that samples be taken to verify the TN:BOD ratio from specific dischargers with higher flow.*

BOD_5 is a measurement of the amount organic substances in wastewater. Because nitrogen in wastewater is mostly derived from organic substances (proteins), the concentration of total nitrogen generally increases with the increase of BOD_5. The 0.20 TN/BOD_5 ratio used in Tech Memo #4 is consistent with tables characterizing residential wastewater found in college textbooks, such as Metcalf and Eddy (1991) and Crites and Tchobanoglous (1998). Staff has added Table 4 which summarizes TN and BOD analytical data from 106 septic tank wastewater samples from large mixed usage commercial facilities located in the Malibu Civic Center area. The average TN/BOD_5 ratio for these samples was 20.4%, which is essentially the same as what was used in Tech Memo #4. The mixed use commercial properties include restaurants, but there are few stand-alone restaurant in the Malibu Civic Center area.

Staff responses to comments requiring minor clarification summarized in paragraphs A through H below:

A. Staff should provide more information regarding the OWDSs being used in the Malibu Civic Center area, such as a definition of "advanced" OWTS treatment. In the interest of defining the most significant sources of nitrogen load, the facilities that provide advanced treatment, the nature of the treatment provided, and typical BOD_5 and total nitrogen removal efficiencies might be added to the report. The credits between OWDSs and soil profile to the removal of nitrogen/BOD should be clarified.

"Advance OWTS treatment" is defined as more advanced than primary treatment, i.e. secondary and tertiary treatment with disinfection. The advanced systems in the Malibu

Civic Center area vary greatly, no two are alike, but a footnote (Footnote D) has been added to Table 1 to identify advanced OWTSs. As stated in Tech Memo #4, the Regional Board lacks site specific information for the hundreds of residential septic systems in the Malibu Civic Center area. When available, the effluent loads (nitrogen concentration) in Table 1 listed real "end-of-pipe" data.

In Table 3 of Tech Memo #4, credits for TN reduction in the soil profile are based on soil type (e.g. sandy loam), sufficient groundwater separation (e.g. 5 feet to 10 feet from bottom of leachfield to groundwater), and demonstrated unsaturated soil assimilative capacity. The high density of wastewater discharges in many of the commercial and residential areas of Malibu preclude adequate subsurface assimilative capacity. Available data indicates that site conditions in the coastal strips (high groundwater) and the highland residential area (fractured bedrock with the prevalent usage of seepage pits for disposal) do not warrant further reduction of nitrogen loads by soil treatment.

B. Because many calculations in the spreadsheet model were based on assumptions, a sensitivity analysis of the eventual nitrogen load estimates in response to the variation of key input parameters, such as flow rate, TN, and soil attenuation factor, is recommended.

Staff has conducted a sensitivity analysis to the spreadsheet model, but little impact was observed to the eventual nitrogen load estimates. Sensitivity analysis was made by changing the estimated flow rate and TN concentration in the spreadsheet model. All of the variations tried resulted in values much higher than the assigned TMDL load for septic systems in the lower Malibu Creek watershed).

C. Is it possible that seasonal effects are of importance to the average nitrogen load estimation in the Malibu Civic Center area?

Since most homes in the Malibu Civic Center area are owner occupied, little seasonal variation is expected on the wastewater flows from the single homes. Monitoring data large multi-family residences located in the area do not display seasonal significant variation. Wastewater flows from commercial sources do change by season as a function of the number of visitors. Staff observed slightly higher TN loads in the prime summer tourist season. Because the flow rate data in Tables 1 and 3 of Tech Memo #4 are annual averages over several years, seasonal variations were minimized.

D. Staff's judgment regarding the fate of nitrogen during on-site treatment and subsequent transport seems arbitrary. The discussion makes no distinction between ammonium ion absorption, which is both efficient and fast on soil particles, and

nitrification/de-nitrification reactions, which can lower the concentrations of available nitrogen forms and dramatically affect nitrogen transport in the subsurface.

Because of variations of local site conditions, it is impractical to distinguish the form of nitrogen transport for all wastewater sources in the area. However, as detailed in Tech Memo #2, there are indications showing that natural attenuation (treatment of pollutants in soil) is not occurring in many areas of the Malibu Valley and the nearby Winter Canyon. There are numerous indications that the high density of subsurface wastewater discharges in the Malibu Civic Center Area has exceeded the natural assimilation capacity of the soil profiles. Because the goal of Tech Memo #4 is to determine the long term total nitrogen load of the Malibu Civic Center area to the Malibu Lagoon, the form of nitrogen transport should have little effect to the conclusion of the study. Both the numeric and spreadsheet models assume that total nitrogen is converted to nitrate after reaching surface waters.

E. Staff might comment on the form in which nitrogen is present in the Malibu Lagoon since this bears on the forms in which nitrogen is transferred from on-site disposal locations.

Malibu Lagoon is a unique aquatic system which opens to ocean during raining season and close during dry season. During dry seasons that nitrogen can be accumulated, significant breakthrough of nitrate or ammonia was not observed in the lagoon, but serious eutrophication has been observed. Staff assumes that total nitrogen in groundwater converts in the Lagoon to nitrate.

F. There are some inconsistencies between Tables 1 and 3. Since all the designed parameters are the same for all models, the calculated total nitrogen loads should be the same.

The inconsistencies between Tables 1 and 3 in Tech Memo #4 have been verified and corrected.

G. The non-point source nitrogen contributions to the Lagoon did not appear to have been considered. If these are available from the TMDL calculation, they should be considered as part of the total load.

The total load allocation of nitrogen in the Lagoon is 27 lbs/day. Because non-point sources have already been considered in the TMDL for Malibu Lagoon, they are not included in Tech Memo #4, which is to determine whether the total nitrogen load from OWDSs in the Malibu Civic Center area exceeds the 6 lbs/day allocation required in the TMDL for OWDSs sources. Details of total nitrogen load allocations from non-point sources in the

larger Malibu Creek watershed are detailed in the TMDL (USEPA, 2003) and available on the Regional Board website at http:www.waterboards.ca.gov/losangeles.

H. How much a 6 lbs/day of nitrogen addition to the lagoon is likely to increase the available nitrogen levels in Malibu Lagoon?

An evaluation of nitrogen mass loading in Malibu Lagoon is given in Attachment 4-1 (by Dr. Lai) of Tech Memo #4. Figure 5 of Attachment 4-1 indicates that, assuming no other sources exist, a 6 lbs/day of total nitrogen load into the lagoon would bring the nitrogen concentration in the water from 0 to approximately 0.5 mg/L.

Editorial and grammatical suggestions have been followed as appropriate, but are not addressed here. A revised Tech Memo #4 that incorporates changes made in response to peer review comments is posted on the Regional Board website at http:www.waterboards.ca.gov/losangeles.

Staff would like to thank all three peer reviewers for their thoughtful review of Tech Memo #4 and providing their comments in a very timely, professional manner.

State of California
California Regional Water Quality Control Board, Los Angeles Region

Peer Review

Technical Memorandum #4:
Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life

By

Dr. Robert Arnold
Chemical & Environmental Engineering
The University of Arizona
P.O. Box 210011
Tuscon, AZ 85721-0011

520-621-2591
520-621-6048 FAX

TM4-53

November 5, 2009

Memorandum

5 September 2009

To: Ms. Wendy Phillips; Chief, Groundwater Cleanup and Permitting Section, CA Regional Water Quality Control Board

From: Bob Arnold

Subject: Review of Regional Board Staff Technical Memorandum #4. Nitrogen loads from wastewater flowing into Malibu Lagoon.

I will first address the technical issues that were identified for peer review in attachments to your email note dated 28 August. Issues are taken in the order that you suggested.

1. The approach used to inventory wastewater discharges in the Malibu Civic Area (255,000 gallons per day). The flows inventoried fell into the following four classes:

(i) Large, permitted commercial enterprises with Waste Discharge Requirements (WDRs). A subset of these sources provide advanced wastewater treatment (undefined in the report) prior to effluent discharge. The other subset provides only septic treatment prior to discharge. For these sources there is a record of both wastewater volume generated and total nitrogen concentration (Kjeldahl, nitrate, nitrite) discharged to the environment.

(ii) Smaller permitted commercial sources, which also produced a record of wastewater volumes, but were not required to analyze for nitrogen forms in treated effluent. These sources seldom if ever provided advanced treatment prior to discharge.

(iii) Small businesses that were not regulated by the state and for which there was no official record of wastewater volume generated or probable total nitrogen concentration in treated waste.

(iv) Private residences, for which there was no record of wastewater flow or effluent quality.

Thus a complete inventory of the required wastewater volume generated required the authors to find or otherwise estimate the following information, generally from the tertiary sanitary engineering literature and/or the assumptions noted below:

- For dischargers in class (i) the volume flows and nitrogen levels provided all information necessary to calculate flows and respective nitrogen loads at points of discharge.
- For smaller, permitted commercial sources (class (ii), above) flow data were available, but nitrogen levels would depend on an assumption (see below) regarding total nitrogen level.
- Small business flows were estimated using information derived by staff regarding on-site population and business activity. Detailed information/methods for these steps are not described in Technical Memorandum No. 4.

- Flows from residences were estimated based on 100 gallons per day per residence bathroom.

There is very little to criticize in this approach to volume estimation. A few details or perhaps examples of the process by which flows were assigned to small, unpermitted businesses might provide a feel for this work. However, the magnitude of flow generated by this class of dischargers must have been fairly small and probably insignificant –– making the quality of assumptions used or accuracy of related estimates almost irrelevant within the context of the overall exercise. To make this plain, it would be useful to organize the eventual flow information by class of discharger within each of the geographical sectors within the study area. It also seems possible that water use data, if uniformly available for small businesses could have been used to generate estimates of wastewater flows. It seems very unlikely that such an alternative approach, however, would have led to materially different results at the conclusion of the nitrogen analysis. In a sense, assumptions regarding domestic flows are the most critical, inasmuch as treated domestic wastewater is a major contributor to the eventual calculation of the nitrogen load to Malibu Lagoon. Again, water demand data might have been used to generate wastewater flow estimates.

In general, I am satisfied that no set of alternative (rational) assumptions would have materially improved the quality of the analysis to this point.

2. **Methods for calculating nitrogen load** contributions from individual OWDSs. Again relying on the four classes of dischargers within the Malibu Civic Area:

(i) Total nitrogen data were available for large, permitted commercial sources with WDRs. Again, there is no clear indication of which specific sources fell within this category in any of the summary tables, so that the efficiency of advanced wastewater treatment processes (unspecified) for nitrogen management cannot be determined from the Table 3 data.

(ii) It was assumed that the smaller, permitted, commercial sources produced an effluent that was similar to domestic effluent quality following septic treatment. The report indicates that some effort was undertaken to express effluent strength, including total nitrogen concentration as a function of the type of business practiced on site. Details and intermediate results from that work are not provided, however.

(iii) Site-specific information was used to anticipate total nitrogen concentration at unpermitted commercial facilities. Again, essentially no information is provided with which to illustrate the type of information collected, methodology for its conversion to nitrogen concentration or nitrogen load, and so forth.

(iv) The total nitrogen concentration in residential wastewater was estimated by assuming that the concentration of total nitrogen (as N) was a constant fraction (0.21) of the five-day biochemical oxygen demand. The correlation was taken from an exceptionally important sanitary engineering text and should be at least approximately correct.

I have the following reservations regarding the approach taken to estimation of nitrogen concentrations for the purpose of nitrogen load allocation at respective discharge points:

- Although the correlation between total nitrogen concentration and BOD_5 (0.21 mg/L as N per mg/L BOD_5 as O_2) may be accurate for domestic wastes, the justification for its use in this context is misleading. The authors contend that nitrogenous oxygen demand is a consistent contributor to BOD_5 (p. T4-4). In fact, the kinetics of biochemical oxygen demand may be dominated by carbonaceous oxygen demand over the first five days of the BOD measurement. This does not invalidate the approach taken, inasmuch as both total nitrogen and BOD_5 are useful indicators of the strength of a waste and are likely correlates in domestic wastewater. Since BOD_5 data were more broadly available than total nitrogen data, the method of estimation probably has merit. For those cases in which both BOD_5 and total nitrogen data are available, however, the authors should provide them — to demonstrate the strength of the correlation.

- No attempt is made in the report to define "advanced" OWTS treatments. In the interest of defining the most significant sources of nitrogen load, the facilities that provide advanced treatment, the nature of the treatment provided and typical BOD_5 and total nitrogen removal efficiencies might be added to the report.

- The choice of BOD concentrations , absent data, and thus total nitrogen concentrations (21% of BOD_5) seems arbitrary:

Facility Type	BOD_5 (mg/L)	TN (mg/L as N)
Shopping centers with restaurants	800	160*
Small Offices	220	40
Schools		45-75**

* reduced to 80 mg/L to reflect frequent pumping of septic tanks at Malibu Country Mart.

** dependent on soil type and groundwater separation.

Nevertheless, any other assignment of values would be equally arbitrary and probably no more reasonable than the values chosen for the nitrogen loading models. At the end of the exercise, however, it isn't possible to determine which facilities were included in each class (large commercial, small commercial without water quality data, etc.) so it is not possible to reproduce the spreadsheet calculations from the data provided. Given that reviewers will be incapable of performing independent calculations, the authors might carry out their own sensitivity analysis——to determine which parameters are the primary determinants of the eventual nitrogen load estimates. A good candidate for sensitivity analysis, for example, is the 80 mg/L (as N) total nitrogen concentration that is assumed for some of the commercial sources. Were this value actually 40 mg/L, would the outcome of the analysis change dramatically? The spreadsheet approach is well suited to make such repetitive calculations, and the results could be illuminating. This comment applies to several of the assumed parametric values.

- Various data elements are missing from table 1, page T4-20. Is there a reason for this?

- The apparent importance of residential contributions to regional nitrogen loading suggests that it may be important to distinguish between reported literature values (20, 45, 85 mg/L as N)—to make a selection that is appropriate for Malibu. If local data exist with which to make this distinction, they should be cited in the text. I failed to find data related to nitrogen levels in septic tank effluents, although staff suggested that measurements in septic tank effluent had been made. Absent data, the sensitivity of spreadsheet results to the assumed value should be determined.

- Finally, is it possible that seasonal effects are of importance to average nitrogen load estimation in the study area? No mention was made of variation in population or commercial activity in the Malibu study area. However, since estimated groundwater travel times to Malibu were sometimes on the order of decades, it is conceivable that winter occupancy rates and seasonal commerce might lower annual average nitrogen loading rates in a way that also lowers the average nitrogen load at the Malibu Lagoon. Since neither this study nor previous studies seem to have considered seasonal effects, it seems likely that they are unimportant in this context.

3. Division of the Malibu Civic Center area in hydrologic zones. There is clear justification for division of the study area into hydrologic zones. This seems like a very good way to account for substantial differences in fractional contributions of wastewaters to the Malibu Lagoon that arise from consideration of topography, water table contours and groundwater travel times to the lagoon. The breadth of both fractional contributions and estimates of groundwater travel times is a little unnerving. That is, travel times are held to vary from up to 50 years, for at least a portion of the wastewater discharged in sector I to less than one year for a portion of the flow that originates in sector II. The estimated fractions of discharged wastewater that reach the Malibu Lagoon range from 1% (Winter Canyon, main area sector IV, Sector V) to 95% (sector II much of sector III). The approach is sound, in my opinion, and potentially allows planners and engineers to discriminate geographically in making decisions regarding the importance of new sewerage to the quality of water in the Malibu Lagoon. That is, based on nitrogen considerations alone, it seems probable that new construction would be best deployed in sectors II, III and part of IV. The effects of that construction on lagoon water quality should be relatively rapid due to the short, estimated travel times. The staff's own spreadsheet model can be used to estimate fractional reductions in annual nitrogen load to Malibu Lagoon as consequence of several possible sewerage configurations. Staged construction and water quality response in the lagoon could then be used to avoid unnecessary extension of the sewage system.

I offer just a few comments in this area— use of hydrological sectors, etc:

- Since water table contours are not provided in the report, readers are obliged to accept staff's opinion on gradients and groundwater flow directions. A contour map would undoubtedly lead those reviewing the document to the same conclusion that was reached by staff and would better ground the very significant assumptions about flow routing and

contribution to Malibu Lagoon that are presented in the document. Such a contour map should be developed and included in the report if it is practical to do so.

- Where the selection of flow contribution by sector or sub-sector has an element of uncertainty, staff should examine the sensitivity of their general findings to the fraction adopted. The spreadsheet solution should make such an exercise accessible, and the results would likely show that staff findings are robust with respect to selection of sector-dependent factors governing respective fractions of on-site discharges that reach the lagoon.

- Judgment regarding the fate of nitrogen during on-site treatment and subsequent transport seems arbitrary. While estimated nitrogen losses may have been conservatively high, contributing to the strength of the staff's eventual findings and recommendations, it would be preferable to cite local data for the loss of total nitrogen during on-site treatment, and the discussion of nitrogen fate and transport following discharge is inadequate. That discussion makes no distinction between ammonium ion absorption, which is both efficient and fast on soil particles, and nitrification/de-nitrification reactions, which can lower the concentrations of available nitrogen forms and dramatically affect nitrogen transport in the subsurface. Furthermore, the availability of molecular oxygen in groundwaters affected by on-site discharges deserves attention since oxygen is required for nitrification. Finally, staff might comment on the form in which nitrogen is present in the Malibu Lagoon since this bears on the forms in which nitrogen is transferred from on-site disposal locations.

4. Model adjustment using new nitrogen load factors. I have nothing to say about the use of updated nitrogen load factors to adjust model results. This activity seems well justified and takes advantage of previous modeling work.

5. Other comments. I could make about a dozen grammatical suggestions but have not since this lies outside the scope of my review. I can send a marked up electronic version of the draft technical memorandum if you like.

In the end, I think that none of the comments offered here will materially alter the results of staff's analysis. Sensitivity analysis can be better used to show that analytical results are in fact robust with respect to tributary assumptions. Staff is well positioned to use their spreadsheet model for that purpose.

Although it goes beyond the limits of my review, I would like to know how much 6 lbs/day of nitrogen addition to the lagoon is likely to increase available nitrogen levels in Malibu Lagoon. To that end, what would be the incremental change in total nitrogen concentration in effluent from the Malibu Creek due to 6 lbs/day (as N) of supplemental nitrogen under some sort of critical flow condition?

Staff's analysis suggests that parts of the study area might be excluded from a sewer construction program since their collective on-site discharge contributes little or nothing to nitrogen levels in Malibu Lagoon. Staged construction would allow regulators to determine the effects of

sewerage in areas that are the likeliest source of anthropogenic nitrogen in the lagoon, before extending sewer construction into the other geographic sectors of the study area.

In summary, staff's work is very well done. No set of alternative assumptions is likely to affect the general findings of the report. Sensitivity analysis could be used to demonstrate that point.

State of California
California Regional Water Quality Control Board, Los Angeles Region

Peer Review

Technical Memorandum #4:
Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life

By

Dr. Jörg E. Drewes
DREWES ENVIRONMENTAL
798 Cressman Court
Golden, CO 80403
Phone 303-884-9746
E-mail: jdrewes@mines.edu

TM4-60

November 5, 2009

DREWES ENVIRONMENTAL
Professor Dr. Jörg E. Drewes

798 Cressman Court
Golden, CO 80403
Phone 303-884-9746
E-mail: jdrewes@mines.edu

September 10, 2009

California Regional Water Quality Control Board
Attn.: Wendy Phillips
Chief, Groundwater Permitting and Landfills Section
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Re: Peer Review of Technical Memorandum #4 in support of an amendment to the Water Quality Control Plan for Coastal Watersheds of Los Angeles and Ventura Counties to Prohibit On-Site Subsurface Disposal Systems – Malibu Civic Center Area

Dear Mrs. Phillips,

Please find enclosed my review of the Technical Memorandum #4 "Nitrogen Loads in Wastewaters flowing to Malibu Lagoon Are a Significant Source of Impairment to Aquatic Life" prepared by Toni Calloway, Orlando Gonzalez, and Dr. C.P Lai.

The review is providing responses to questions formulated in Attachment 2.

Please feel free to contact me if you have any further questions.

Thank you very much.

Sincerely,

Professor Jörg Drewes

Scientific Review Report of Technical Memorandum #4
Nitrogen Loads in Wastewaters flowing to Malibu Lagoon Are a Significant Source of Impairment to Aquatic Life
by Toni Calloway, P.G, Orlando Gonzalez, and Dr. C.P Lai, P.E.

a. The approach used to compile an inventory of wastewater discharges from OWDSs in the Malibu Civic Center area, which staff estimates to total 255,000 gallons per day.

Wastewater discharges in the Malibu Civic Center area originate from commercial and residential sources. Flow data for commercial sources were available from monitoring reports for facilities permitted by the Regional Water Quality Control Board. Therefore, the flow estimate for commercial sources can be considered to be fairly accurate.
For residential sources, the number of individual residencies was determined using public records and aerial photographs that were used to confirm the number of residencies. This number can be considered as very accurate. Flow data for residential sources was based on the number of bedrooms and bathrooms at each residence, which served as a surrogate for the number of persons living at a given residence. A per capita water consumption of 100 gal/day was assumed referencing Table 2-9 (Metcalf and Eddy 1991). This table provides a range of "typical" water consumptions for individual residencies ranging from 40 to 90 gal/day and person (Metcalf & Eddy 1991). The latest edition of Metcalf and Eddy (2003) suggests a typical per capita water consumption of 74 gal/capita day without water conservation and 51.9 gal/capita day with water conservation. A study conducted by the Awwa Research Foundation on 1,100 households determined a per capita water consumption of 60.5 gpcd (Mayer et al. 1999). These more recent numbers would suggest that the assumption of 100 gal/capita day is too high and considering the national average should be corrected to 60-70 gal/capita day. Assuming 70 gal/capita day would reduce the total residential flow to 88,410 gpd and the total flow to 216,879 gpd.

Mayer, P.W., W.B. DeOreo, E.M. Optiz, J.C. Kiefer, W.Y. Davis, B. Dziegielewski, and J.O. Nelson (1999). *Residential End Uses of Water*, American Water Works Association Research Foundation, Denver, CO, 310 p.

b. The methodology used to calculate loads of nitrogen from wastewaters discharged from OWDSs in the Malibu Civic Center area; specifically, staff's interpretation of published literature and assumptions used to calculate nitrogen loads released from OWDSs for those discharges where real data were not available.

General:
- Using BOD concentrations to estimate total nitrogen concentrations when total nitrogen data is unavailable is in principal a reasonable approach. Where neither end-of-pipe nor septic tank effluent analyses were available, staff based the estimation of total nitrogen on typical total nitrogen concentrations reported in the published literature on domestic wastewater composition. In section i) (Commercial Wastewater), the authors refer to two key sources

(Crites and Tchobanoglous 1998 and Metcalf and Eddy 1991) that have been considered regarding ranges of concentrations in typical untreated domestic wastewater. The authors proposed a TN/BOD ratio of 0.2.

The reviewer notes that these particular sources did not distinguish between water characteristics of single sources and raw sewage collected in a centralized sewer system. The wastewater discharged in the Malibu Civic Center area originates from single sources, which have a different make-up regarding organic matter and nitrogen than raw sewage collected in a centralized system. Thus, more appropriate references should be considered to provide a more accurate representation of single source waste streams. A very useful reference that the authors might want to consider is a recent research report published by the Water Environment Research Foundation (*Lowe, K., et al. 2007, Influent Constituent Characteristics of the Modern Waste Stream from Single Sources: Literature Review. Water Environment Research Foundation (WERF), Alexandria, VA*). Based on a comprehensive literature review of waste streams from single sources, findings of this report suggest the following median concentration for septic tank effluents:

Source	BOD (mg/L)	TN (mg/L N)	TN/BOD ratio
Single source	156	55.4	0.36
Multiple sources	184	46	0.25
Food	561	86.5	0.15
Non-medical	244	84	0.344

These results would suggest that a TN/BOD ratio of 0.3 might be more appropriate for single domestic as well as commercial sources (non-medical) than the ratio of 0.2 considered by the authors.
In addition, the authors considered "typical untreated domestic wastewater". Since in this case, septic tank effluents contribute to groundwater contamination, a water quality leaving the tank rather entering a tank should be considered. While septic tanks achieve little to none nitrogen removal, the EPA Onsite Wastewater Treatment Manual (2002) reports 30 to 50 percent of BOD is removed whereas Lowe et al. (2007) reported 55 percent removal during septic tank treatment. In both cases, BOD changes occurring during septic tank treatment will result in shifting the TN/BOD ratio to higher numbers.
Since this ratio was used in the nitrogen load spreadsheet, that was not available to the reviewer, in cases where no "end-of-pipe" total nitrogen concentrations were available, which percentage was also not available, the reviewer cannot assess whether changing the TN/BOD ratio from 0.2 to 0.3 would have a significant effect.

- p. T4-5, third paragraph. "For commercial dischargers such as small offices where we have no data, we choose a low BOD of 220 mg/L, and estimated the TN to be 40 mg/L."
What is the basis for this estimation? As mentioned above, the authors might want to consider findings reported in Lowe et al. (2007). Findings reported in this study would suggest that the BOD concentration for "small offices" is matching the median concentration of 244 mg/L for non-medical sources, but the total nitrogen concentration is only 50 percent of what was

determined for non-medical sources (i.e., 84 mg/L N). Thus, the release of nitrogen from these sources is potentially significantly underestimated.

- p. T4-5, fourth paragraph, last sentence. What is the basis (reference?) for reducing estimated total nitrogen concentrations depending on soil profile and groundwater separation? Why is credit given to subsurface treatment where no credit is given to BOD during septic tank treatment?

- The estimation of the total commercial flow seems reasonable and supported by actual flow data.

- in section ii) (Residential Wastewater), the underlying assumption to estimate the residential flow is 100 gal/capita day. Please see discussion under a.), but the water consumption based on more recent studies would suggest 60-70 gal/capita day.
The estimation of nitrogen concentrations in domestic wastewater is referencing Metcalf and Eddy (1991) with three values (20, 40 and 85 mg/L) for weak, medium and strong wastewater. In the most recent edition of Metcalf and Eddy (2003) these values were revised to 20, 40 and 70 mg/L N.
The recent study by Lowe et al. (2007) reported a median total nitrogen concentration for residential single sources of 63 mg/L N for raw sewage and 55.4 mg/L N for septic effluent, respectively. These values provide support for the total nitrogen concentration of 60 mg/L for septic tank influent proposed by the Regional Board staff in this memorandum.
Although the staff acknowledged that septic tank systems are limited in their ability to remove nitrogen, which is supported by multiple studies (EPA 2002, Lowe et al. 2007), credit was given to OWDS treatment and the estimated total nitrogen concentration of septic tank effluents in the Malibu Civic Center area was reduced from 60 to 45 mg/L N. The basis for this reduction is weak at best.

- Summary of Total Nitrogen Loading from Commercial and Residential Sites
The estimation of total nitrogen releases from commercial sources could be affected by the used TN/BOD ratio of 0.2, which was suggested to be closer to 0.3. For the residential sources, considering a 70 gal/capita day water consumption and nitrogen concentration of 45 mg/L N, the nitrogen load would have been reduced to 12,118 lbs/year or 33.2 lbs/day. Considering the lower water consumption (70 gpcd) and 60 mg/L N, would reduce the total nitrogen loading from 17,311 lbs/year as stated in the report to 16,157 lbs/year or 44.3 lbs/day. This number is close to the estimate of 47.4 lbs/day provided by the Regional Board staff.

<u>Specifics:</u>
- p. T4-4, first subheading. BOD is defined as "biochemical oxygen demand", not "biological oxygen demand" as stated. Please revise.

- p. T4-5, first paragraph. "...TN/BOD ratio found in the above popular wastewater textbooks." The term "popular" doesn't buy credibility and I'd suggest "peer-reviewed", which represents a

better term. Regardless, the author might want to consider other references (see discussion above) that might be more suitable.
- p. T4-6, last paragraph, third sentence. "Using reported or estimated using wastewater...". Typo, deleted "using".

U.S. EPA (2002). *Onsite Wastewater Treatment Systems Manual*. Report No. 625/R-00/008. U.S. Environmental Protection Agency, Cincinnati, OH.

c. Staff's characterization of groundwater flow regimes in the Malibu Civic Center area into five hydrogeologic sectors, and staff's application of the nitrogen loads (calculated from #2 above) into a 'spreadsheet' model that estimates attenuation of nitrogen loads released from OWDSs and transported to Malibu Lagoon (i.e. to the point of groundwater recharge into the lagoon) for each hydrogeologic sector.

The proposed characterization of groundwater flow regimes into five hydrogeologic sectors seems reasonable and is well supported. The number of residencies/sources in these sectors is well known. The estimated flow of wastewater in each section could potentially be revised considering a lower per capita water consumption (60-70 gpcd) as discussed above. The same holds true for the considered total nitrogen concentrations for individual sources, which could be adjusted from 45 mg/L to 60 mg/L N.
The assumed total nitrogen load reduction factors by "soil treatment" for commercial sites is reasonable. Given that little is known about site specific conditions of residential sites, the assumption that no soil treatment is occurring is appropriate.

d. Staff's use of the updated nitrogen loads released from OWDSs (calculated from #2 above) to adjust (update) estimates of nitrogen transported to Malibu Lagoon (i.e. to the point of groundwater recharge into the lagoon), using a relationship already established by a groundwater flow and transport model (which is already accepted by stakeholders in the community).

Besides the comments provided above regarding flow estimation and nitrogen loading from both commercial and residential sites, the use of updated nitrogen loads released from OWDSs to adjust estimates of nitrogen transported to Malibu Lagoon seems reasonable. The adjustments made in these calculations are appropriate (concentrations might change and discharge volumes, see comments above). The only aspect that is somewhat inconsistent is the assignment of a "Leach Field Reduction". What constitutes a reduction of 10 percent vs. 20 percent? In Sector 3, sites with a soil type "sand, silt & clay" and depth to groundwater of 10 or >10 were assigned reduction credits between 0 and 20 percent!?

Overarching questions:

(a) In reading Tech Memos #3 and #4, are there any additional scientific issues, not described above, that are part of the scientific basis of the proposed rule? If so, please comment with respect to the statute language given above.

Regarding Tech Memo #4, there are not additional scientific issues that need to be addressed.

(b) Taking each of Tech Memo #3 and #4 as a whole, is the conclusion of each tech memo based on sound scientific knowledge, methods, and practices?

Regarding Tech Memo #4, with the exception of comments provided above regarding flow estimation and nitrogen loads, the conclusions presented in this Tech Memo are based on sound scientific knowledge, methods, and practices.

State of California
California Regional Water Quality Control Board, Los Angeles Region

Peer Review

Technical Memorandum #4:
Nitrogen Loads from Wastewater Flowing to Malibu Lagoon are a Significant Source of Impairment to Aquatic Life

By

Dr. Joann Silverstein
Dept. Civil, Environmental & Architectural Engineering
University of Colorado
Boulder, CO 80309-0428 USA
tel: (303) 492-7211
fax: (303) 492-7317

TM4-67

November 5, 2009

Peer Review of Technical Memorandum #4: Nitrogen Loads in Wastewaters flowing to Malibu Lagoon Are a Significant Source of Impairment to Aquatic Life, by Tony Calloway, P.G., Orlando Gonzalez, and Dr. C.P. Lai, P.E.

JoAnn Silverstein, Ph.D., P.E.
September 12, 2009

Determination for issues requested in Attachment 2: Description of Scientific Issues to be addressed by Peer Review.

a. *Approach used to compile an inventory of wastewater discharges from OWDSs in the Malibu Civic Center area, which staff estimates to total 255,000 gallons per day.*

Residential wastewater flow was estimated to be 100 gal/toilet/day, which is assumed to represent the wastewater generated by one person. The 349 residences had 1,263 bathrooms producing the estimate in Table 1 of 126,300 gal/day of residential wastewater. The rationale for the one person per toilet equivalent is not given. However, accepting that equivalent, 100 gallons per capita per day (gpcd) is high for households of more than two persons. A more recent text estimate for domestic wastewater flow rates for households of 3 – 4 persons is 41-71 gpcd (Metcalf and Eddy, 2003). The Onsite Wastewater Treatment Systems Manual (USEPA, 2002) reports estimates of residential wastewater ranged between 50 and 70 gpcd for homes built before 1994. For newer homes with water-saving fixtures, the reported range of wastewater flow rates was 40 – 60 gpcd. The US Census Bureau estimated that the average household size (1998) was 2.7 people per residence. With 349 residences with on-site systems, the population equivalent based on Census data would be 942, and the corresponding wastewater flow rate using the more conservative EPA flow rate range (pre-1994 homes) would be 47,000 to 66,000 gal/day, approximately half or less than the flow rate estimated in Table 1: 126,300 gal/day. Another method to estimate wastewater flow is to use the number of bedrooms, and assume 1 – 1.5 people/bed. Since the number of bathrooms and bedrooms are nearly identical in Malibu, this would produce a population range of 1,263 to 1,894, and a flow rate range, using the EPA per capita flow rate range of 63,000 to 133,000 gpcd. Only the most conservative assumptions of 1.5 persons per bedroom (or bathroom) and 70 gpcd wastewater flow produce flow rate close to the value in Table 1. For one person per bathroom (and bedroom), at the high per capita flow rate, the estimated residential flow is 88,400, 30% lower than the Table 1 value. The high residential wastewater flow rate estimated in Table 1 is not well justified given estimation methods reported in the literature. Consideration should be given to characterizing the uncertainty in the residential wastewater flow estimates, including reporting values with fewer significant figures than 4 – 6 significant figures in Table 1 entries.

For commercial properties, flow data were available for permitted sites that were assumed to be representative of average flow rates. Flow data for unpermitted sites was estimated but the method used was not reported. For example, the basis for 400 gal/day for small commercial facilities should be given. Also, it would be useful to indicate in Table 1 which commercial facilities were unpermitted. In addition, the percent of the commercial flow estimate of 128,469 gal/day that was estimated would provide a better indication of the uncertainty in the commercial flow rate estimates.

b. *The methodology use to calculate loads of nitrogen from wastewaters discharged from OWDS's in the Malibu Civic Center area; specifically staff's interpretation of published literature and assumptions use to calculate nitrogen loads released from OWSDS's for those discharges where real data were not available.*

Residential nitrogen loads were estimated assuming that wastewater discharged from septic tanks contained 45 mg/L total nitrogen. Estimates of residential septic tank effluent (STE) nitrogen concentration range from 40 to 100 mg/L, depending on influent water quality, tank hydraulic and solids residence times (USEPA, 2002). The total nitrogen mass loading from residential on-site systems was estimated to be 47.429 lb/day (too many significant figures!), based on the estimated residential flow rate of 126,300 gal/day and average STE total nitrogen of 45 mg/L. As a check, the estimate of 0.03 lb-TKN/cap/day (Metcalf and Eddy, 2003) and the population estimate based on bathroom number were used to calculate a total nitrogen loading from residences in the study area: to be 38 lb/day. Assuming no attenuation of nitrogen in a septic tank, this is ~19% lower than the estimated daily loading rate from residences of 47 lb/day in Table 1. Most literature reports indicate that almost 90% of the nitrogen in STE is in the form of ammonium. Removal of nitrogen in a subsurface wastewater infiltration system (SWIS) or leach field occurs by a combination of sorption, biomass uptake, and nitrification-denitrification and was estimated in the groundwater loading section of Technical Memorandum #4, as summarized in Table 3.

Eight businesses served by package plants appeared to be the only commercial discharges where effluent total nitrogen data were available. These plants constituted 46% of the estimated commercial flow (59,000 gal/day) but had consistently lower effluent nitrogen than other commercial discharges, constituting 8 lb-TN/day, which was only 19% of the daily total nitrogen load in the study areas (42 lb/day).

Commercial septic tank effluent not reported was estimated, typically as a fraction of BOD, the second of two key assumptions (page T4-5, paragraph 1). (By the way, the callout for Table 2 in this paragraph appears to be wrong. The nitrogen loading spreadsheet is Table 1.) It is widely recognized that some commercial facilities, particularly restaurants, have very high BOD concentrations compared with residential wastewater. However, the 0.18 – 0.21 TN:BOD ratio from the literature which was used to estimate the total nitrogen concentration in commercial wastewater effluent was based on residential wastewater characterization, where as much as 78% of the nitrogen comes from toilet waste (urea) (USEPA, 2003, Table 3.8). In restaurants, the excess BOD probably comes from food waste, oil, and grease, which should have a generally lower TN:BOD ratio. One study (Converse et al, 1984) found restaurant that septic tank effluent total nitrogen ranged from 30 to 82, with a flow-weighted mean of 57 mg/L and an average TN:BOD ratio of 15.6 g-N/g-BOD_5. This is a concern in the reliability of the commercial wastewater nitrogen loading estimate. Nine commercial discharges had estimated nitrogen concentrations ≥ 75 mg/L and were 27% of the commercial wastewater flow. Together the nitrogen discharged from them was 9,000 lb-TN/year, which was 58% of the total commercial nitrogen loading estimate. The effluent nitrogen concentration in just one of these, (Malibu Inn and Restaurant) was estimated to be 110 mg/L at a flow rate of 6,200 gal/day, which means that the discharge from this one facility constituted over 13% of the total commercial nitrogen load. Given the impact of the commercial discharges with high nitrogen on the total loading estimate,

it is advisable that samples be taken verify the high nitrogen discharge numbers, particularly if the nitrogen concentration estimates were based on the TN:BOD ratio characteristic of residential wastewater. Moreover, characterization of the uncertainty in these estimates, incorporating better values of restaurant wastewater from the literature, and perhaps analysis of the sensitivity of the total nitrogen loading rate to estimated high nitrogen loading rates should be done.

c. *Staff's characterization of groundwater flow regimes in the Malibu Civic Center area into five hydrogeologic sectors, and staff's application of the nitrogen loads (calculated from #2 above [should be b?]) into a spreadsheet model that estimates attenuation of nitrogen loads released from OWDS's and transported to Malibu Lagoon (i.e. to the point of groundwater recharge into the lagoon) for each hydrogeologic sector.*

Division of the region into topographic and hydrogeologic sectors to calculate groundwater flow and associated nitrogen loading rates to the Malibu Lagoon, summarized in Table 3, is a good approach. Estimates of attenuation of nitrogen in SWIS's were very conservative, from 0 to 20%; whereas typical estimates in the literature ranged from 10 – 40% based on soil type. Given that most of the soil in the region was high permeability sand and silt, this may be reasonable. It appeared that the 0% removal was applied when the depth to the ground water table was < 5 ft, regardless of soil characteristics. The other assumption was that nitrate could be used as a surrogate for total nitrogen discharged to the groundwater. This assumes significant nitrification (bacterial oxidation of ammonia to nitrate) in the unsaturated zone, which is supported by the literature. In one case study, the average nitrate concentration in a fine sand SWIS peaked at 21.6 mg/L NO_3-N at a depth of 0.6 m (2 ft), but was still high, 13 mg/L NO_3-N, after percolating to a depth of 1.2 m (4 ft), although there was clearly some attenuation, probably by denitrification, even in the sandy soil (USEPA, 2002). Particularly in wastewater SWIS systems, there will be residual organic matter in the soil that can be used by denitrifying bacteria to reduce nitrate to N_2 gas, so the zero attenuation factor for shallow groundwater table may be too conservative. As with the nitrogen loading estimates, it would be useful to perform a sensitivity analysis for SWIS (leach field) attenuation estimates. Also, if there are monitoring wells near leach fields, nitrate concentrations could be measured to verify these estimates.

d. *Staff's use of the updated nitrogen loads released from OWDS's (calculated from #2 [b?] above) to adjust (update) estimates of nitrogen transported to Malibu Lagoon (i.e. to the point of groundwater recharge into the lagoon), using a relationship already established by a groundwater flow and transport model (which is already accepted by stakeholders in the community).*

The staff's estimate of total nitrogen loading to Malibu Lagoon using the spreadsheet model (Table 4) was 36 lb/day with 38% of the TN mass loading from OWDS reaching the Lagoon, compared with 32% in the numeric model. There is an inconsistency between the spreadsheet column estimate in Table 4 and Table 1 in Attachment 4-1 (page T4-41). In the attachment Table 1, the ratio is given as 40%, with an associated mass loading of 35.7 lb/day. This is a small discrepancy, and may just be rounding difference. However since all the input data are the same, the two tables should be consistent for the spreadsheet estimate. An overall concern is that the rationale for increased commercial loading was not clear, either in section 2.2 of Attachment 4-1

or in Section 3 of the Report (page 4-13-14). Commercial flows increased, but this was captured in the nitrogen loading estimates. The possibility of exceeding soil uptake capacity for nitrogen removal was mentioned in section 2.2 of Attachment 4-1, but there was no indication of how this resulted in an increase in the fraction of the nitrogen reaching Malibu Lagoon from 32 to 38% (or 40% in Attachment Table 1).

The CSTR model used to compare the estimate mass loading to measured nitrogen concentrations was interesting and appears to support the higher estimates of nitrogen loading to the Lagoon. However, the non-point source nitrogen contributions to the Lagoon did not appear to have been factored in. If these are available from the TMDL calculation, they should be considered as part of the total load.

General comments.

Check document for typos, grammatical errors and erroneous callouts. Examples:
p. T4-2, para. 4, line 5: "conservation" should be conservative.
p. T4-3, last line: "facility" should be facilities.
p. T4-5, para 4, line 1 should read: For wastewater generated by commercial facilities…
p T4-6, para 1, line 3 should read: Since 2001, the inventory of commercial properties (delete "on")
p. T4-6, para 5, line 4 should read: Using reported or estimated wastewater (delete second "using")
page T4-7, section Assumptions for Residential Flow and Total Nitrogen Concentration. The estimate of 100 gallons per day per bathroom is for water use, not wastewater generation. You appear to have made the assumption that wastewater generation = water use. This is generally not the case, and Metcalf and Eddy is not correctly cited. (See comments in part a). Also, instead of using the unit 100 gallons per person, the usual unit is gallons per capita per day (gpcd).

Use appropriate significant figures, especially in Tables. Calculated values with 4-6 significant figures do not reflect the input information.

Overarching questions

(a) The scientific basis for the proposed rule, regarding nitrogen discharges from OWDS's to Malibu Lagoon includes estimates not based on site data but literature values, some of which can be questioned (see specific comments in parts a, b, and c above). Overall, a higher scientific standard would be achieved by better characterization of the uncertainty in the estimates, careful use the most recent literature, and analysis of the sensitivity of the results to variation of key input parameters such as flow rates, effluent nitrogen concentrations from OWDS's, and soil attenuation factors.
(b) Even with the concerns above, the general approach and methods used in Technical Memorandum #4 incorporate sound scientific and engineering principles. Adjustments based on less conservative assumptions could lower the OWDS nitrogen loading rate, even by as much as one-third. However, even the lowered loading rate would still far exceed the TMDL, and the conclusion in the Memorandum that the 6 lb/day maximum loading rate for wastewater nitrogen will not being achieved using OWDS's is reasonable and justified.

References

Converse, J.C., R.L. Siegrist, and D.L. Anderson, Onsite Treatment and Disposal of Restaurant Wastewater, Report 10.13, Small Scale Waste Management Project, Univ. Wisconsin, 1984.

Metcalf and Eddy, Wastewater Engineering Treatment and Reuse, 4th Ed., McGraw-Hill, NY. 2003.

USEPA, National Risk Management Research Laboratory, Onsite Wastewater Treatment Systems Manual, EPA/625/R-00/008, Washington, DC. 2002.

TM #5

State of California
California Regional Water Quality Control Board, Los Angeles Region

Final Technical Staff Report

Evidence in support of an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*

to Prohibit On-site Wastewater Disposal System in the Malibu Civic Center Area

Technical Memorandum #5:

Dischargers with Unsuitable Hydrogeologic Conditions for High Flows of Wastewaters Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities

by
Dionisia Rodriguez, Environmental Scientist
Ryan Thacher, Student Intern
Groundwater Permitting Unit

November 5, 2009

Technical Memorandum 5: *Dischargers with Unsuitable Hydrogeologic Conditions for High Flows of Wastewaters Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities*

by
Dionisia Rodriguez, Environmental Scientist
Ryan Thacher, Student Intern
Groundwater Permitting Unit

Introduction

Relatively intensive land use on commercial facilities in the Malibu Civic Center area[1] (Figure 1) generate wastewater flows at rates that exceed the capacity of the on-site wastewater disposal systems (OWDSs) to discharge wastewaters into the subsurface. Lack of treatment equipment capabilities and capacities and lack of adequate space on their properties limit the dischargers' ability to dispose the treated wastewater into the subsurface. In addition to these limitations, there are hydrogeological constraints in the Malibu Civic Center area, such as a high water table, that further limit the dischargers' ability to transmit flow into the subsurface. Therefore, to avoid OWDS failure, and spills, many dischargers resort to hauling liquid sewage and sludge to communities that have wastewater treatment facilities.

In order to quantify the reliance of dischargers on the practice of hauling, Regional Board staff reviewed the self-monitoring reports submitted by twenty permitted facilities, shown in Figure 1, in the Malibu Civic Center area.

[1] The area subject to the proposed prohibition is referred to as the Malibu Civic Center area (Figure 1). The area was defined using topographic features and drainage patterns, and encompasses the hydrologic areas of Malibu Valley (also referred to as the lower Malibu Creek watershed), Winter Canyon, and adjacent coastal strips including Amarillo Beach, Malibu Beach, Malibu Lagoon, and Malibu Lagoon Beach (aka Surfrider Beach, including First, Second, and Third Points at Surfrider). For more discussion on the prohibition boundaries defining the Malibu Civic Center area, refer to the Technical Staff Report Overview and the Environmental Staff Report.

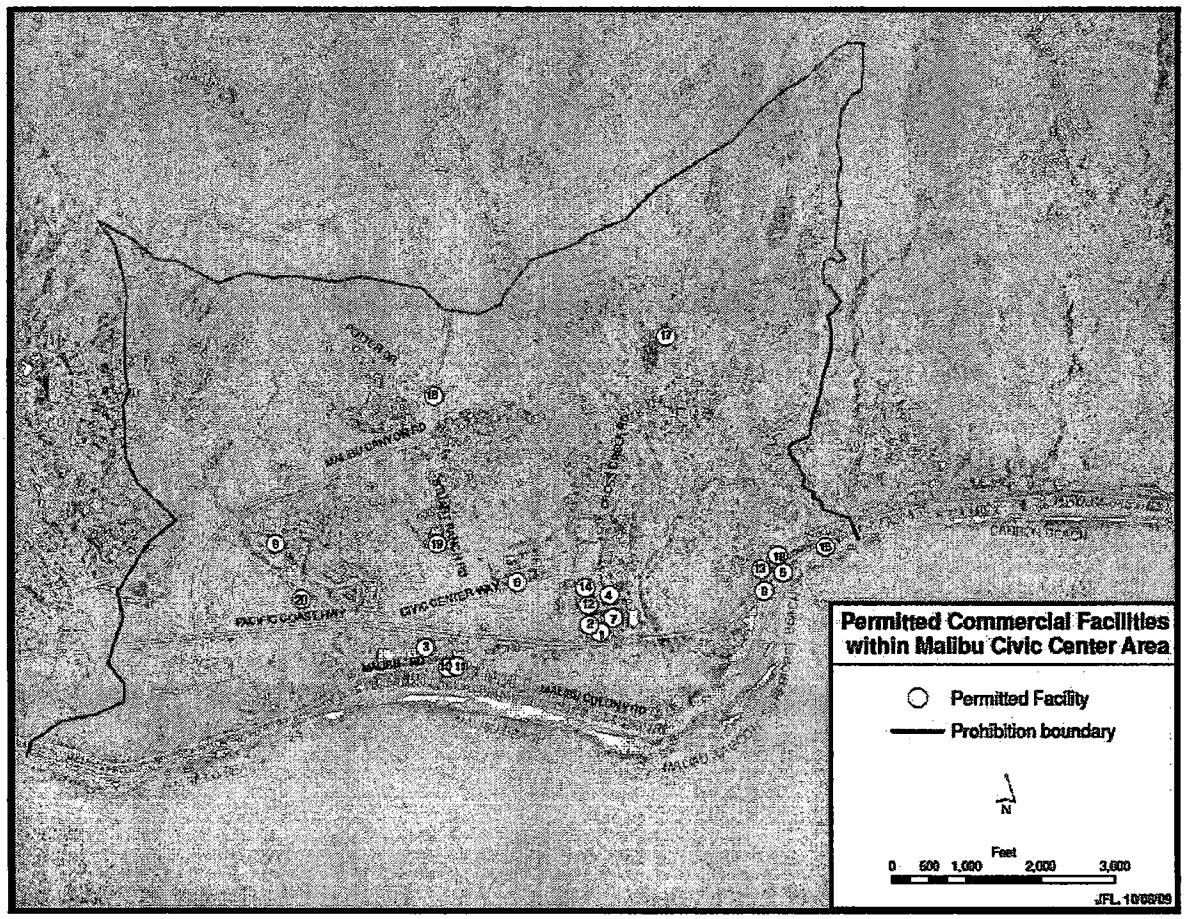


Figure 1. The Malibu Civic Center area includes Malibu Valley, Winter Canyon, and the adjacent coastal strips of land and beaches. Locations of twenty commercial facilities with a Waste Discharge Requirement (WDR) through the Regional Board are shown.

1. Prudnetial Malibu Realty	11. Los Angeles County Fire Station #88
2. Malibu Lumber	12. Malibu Country Mart I
3. Malibu Colony Plaza/Colony Plaza LLC	13. Malibu Shores Motel
4. Cross Creek Plaza/Malibu Creek Preservation	14. Malibu Country Mart II
5. Malibu Pier State Park	15. Malibu Beach Inn
6. Malibu Admin. Center (Malibu Civic Center)	16. Hughes Research Lab, Inc. (HRL)
7. Malibu Country Mart III	17. Serra Retreat Center
8. Surfrider Beach	18. Jack in the Box (Checker Board Properties)
9. Los Angeles County Road Maintenance Yard	19. Miramar Properties
10. Morton Gerson Colony Plaza	20. Malibu Water Pollution Control Plant (MWPCP)

Background

Septic systems, also known as on-site wastewater disposal systems (OWDSs), are used to reduce or eliminate the pathogenic organisms that are found in wastewater. Pathogenic organisms in wastewater pose a relatively minor threat to water resources when OWDSs are properly sited, designed, constructed, and operated. On the other hand, improperly, designed or operated OWDS can be a significant source of surface water and groundwater contamination that can lead to waterborne disease outbreaks and other adverse health effects. The bacteria and viruses found in the wastewater can cause numerous diseases including gastrointestinal illness, cholera, hepatitis A, and typhoid. Nitrogen, which is also found in the wastewater, primarily from urine, feces, and food waste, can cause methemoglobinemia (blue-baby syndrome) in infants.[2]

Malfunctioning OWDSs can lead to illicit discharges of septic waste, which is the subsurface or surface release, for any reason or cause, of sewage, wastewater effluent, or any material or substance from an improperly functioning OWDS. An illicit discharge includes dumping, leaking, overflowing, pumping and spilling. This technical memo will quantify reliance on pumping and hauling off-site of septic waste to control wastewater generated by relatively intensive land use activity in the Malibu Civic Center area.

Proper operation and maintenance of the OWDSs is a crucial preventive measure to avoid septic system failures. Inadequate septic system operation and maintenance can lead to failure even when systems are designed and constructed according to regulations; therefore, dischargers pump their OWDSs at regular intervals to avoid potential problems or complete failure of the system. Local health officers recommend that residential septic systems be pumped at least once every three years and commercial systems be pumped twice a year. They also recommend that restaurants, as part of their Best Management Practices, pump out their grease interceptors once a month. The presence of grease in the septic system causes scum formation that can lead to septic failure. However, it has come to the attention of Regional Board staff that some of the large commercial establishments in the Malibu Civic Center area are pumping their septic systems multiple times per week, for large volumes of waste. Regional Board staff believes that the septic systems may be adequately treating a portion of the wastewater generated by the relatively intensive land use activities, but lack sufficient on-site capacity to dispose of the effluent. Many of the seepage pits and leach fields in the area have been in use for decades and can no longer serve their purpose. Also there are hydrogeologic constraints, such as the lack of suitable surface area for new leach fields, as well as the extremely limited vertical separation between leach field disposal sites and the groundwater table, that further limit wastewater disposal on-site. These factors cause a trend of increasing reliance on septic pumping and hauling off-site.

Sources of Data

Within the Malibu Civic Center area, there are twenty commercial dischargers (listed in Table 1) with Waste Discharge Requirements (WDRs) from the Los Angeles Regional Water Quality Control Board (Regional Board). A WDR requires each discharger to submit quarterly monitoring reports, which must include septic waste flow data, and details of any septic system

[2] U.S. EPA Source Water Protection Practices Bulletin, *"Managing Septic Systems to Prevent Contamination of Drinking Water."*

hauling and pumping. If pumping and hauling occurred, dates, quantities, and pumping company information must be provided. If no pumping occurred, this must also be stated. Regional Board staff used information supplied in monitoring reports to conduct their analyses.[3]

There are five additional commercial facilities (Equilon Enterprises, J & P Limited, Malibu Animal Hospital, Malibu Professional Arts Building, and Malibu Road, LLC) with discharges of less than 2,000 gallons per day (gpd) that were permitted by the Regional Board, but oversight was transferred to the City of Malibu in February 2005. The City of Malibu does not collect hauling data for the commercial dischargers under their oversight; therefore, no data are available for these five dischargers. Additionally, there are thirteen unpermitted dischargers within the Civic Center area, and no hauling information is available for these dischargers.

Table 1. Dischargers permitted by the Regional Board in the Malibu Civic Center area.

Discharger Name
Checker Board Properties (Jack in the Box)
Cross Creek Plaza/Malibu Creek Preservation
Hughes Research Labs (HRL)
Los Angeles County Fire Station #88
Los Angeles County Road Maintenance Yard 336
Malibu Admin. Center (Malibu Civic Center)
Malibu Beach Inn
Malibu Colony Plaza/ Colony Plaza LLC
Malibu Country Mart I (MCM 1)
Malibu Country Mart II (MCM II)
Malibu Country Mart III (MCM III)
Malibu Lumber
Malibu Pier State Park
Malibu Shores Motel
Malibu Water Pollution Control Plant (MWPCP)
Miramar Properties (MiraMar Investments Co.)
Morton Gerson Colony Plaza
Prudential Malibu Realty
Serra Retreat Center
Surfrider Beach

Seven dischargers included in Table 1 and located within the Civic Center area are left out of this analysis:

[3] Many monitoring reports are incomplete, missing data such as waste flow rates or lacking information about waste hauling (if no hauling was done during a quarter, dischargers are required to report that as well). For a more complete analysis, Regional Board staff made assumptions to fill these gaps in the data based on data that was available. For example, if no fourth quarter data was available for a certain year and the first three quarters contained complete data sets, an average value based on the first three quarters would be used for the fourth quarter data. All assumptions made for this analysis are outlined at the end of Appendix A.

- Miramar Properties is omitted because it did not submit monitoring reports. Subsequently the Regional Board issued a Notice of Violation (NOV) to MiraMar Investments Co. for non-submittal of monitoring reports.
- Prudential Malibu Realty, Morton Gerson Colony Plaza, and Los Angeles County Fire Station #88 are not included in the study due to relatively insignificant annual waste flows and volumes of septic waste hauled off-site.
- Malibu Pier State Park data is omitted due to infrequent and relatively low volume septic waste hauling. In 2008, Malibu Pier State Park disconnected its treatment system from the existing leach field and began transporting the effluent to an upgraded system at the Malibu Pier Wastewater Treatment Plant. During its start-up period, Malibu Pier State Park hauled septic waste off-site frequently, but hauling was minimal before and after this time.
- Cross Creek Plaza (Malibu Creek Preservation) is omitted based on the recent facility upgrades. From 2004 through 2007 Cross Creek Plaza was responsible for more combined hauling than any other discharger (combined total of 6.56 million gallons of septic waste hauled off-site), but in late 2007 they completed an upgrade of their treatment and disposal systems. Very little hauling has been done at this location since October of 2007.
- Malibu Lumber was permitted in late 2008 by the Regional Board, and the plant did not start operating until April of 2009.

Commercial dischargers are the main focus of this analysis, but it is also important to consider the impacts from the large number of residential septic systems within the Malibu Civic Center area. Using the list of residential properties in "Risk Assessment of Decentralized Waste Water Treatment System, City of Malibu" prepared by the Stone Environmental, Inc. in August 2004 and records from the Los Angeles County assessor's database, Regional Board staff determined that there are 391 residential homes in the Malibu Civic Center area. Regional Board staff determined the number of bedrooms in each residence using information gathered from the Los Angeles County assessor's database. The waste flows generated from each residence was estimated by multiplying the number of bedrooms in each house by 100 gallons per day, which is an accepted assumption of waste discharge from homes. It was estimated that 139,000 gallons of wastewater per day are discharged from the residences in the Malibu Civic Center area. These residences are regulated by the City of Malibu, which currently does not maintain septic hauling records for residences. However, local health officials recommend pumping residential septic systems once every three to five years depending on tank size, wastewater volume, and types of solids entering the system.[4]

Wastewater Generation Analysis

Waste flow volumes have been steadily increasing in the City of Malibu as shown in Figure 2.[5] Most dischargers do not use continuous flow meters to measure waste flows, but instead assume that 95% of the water used within the facility goes to the OWDSs. The remaining 5% accounts for water use outdoors (i.e. hosing down paved areas, irrigation). As a result, the waste flow values presented are estimates based on dischargers' assumptions.

[4] City of Malibu Clean Water Team. "The City of Malibu's Environmental Programs Office Presents: A Homeowner's Guide to Healthy Habits for Clean Water.".

[5] To further examine factors affecting wastewater discharge and hauling trends, an analysis of potable water consumption with regards to population trends and annual rainfall was performed. The results from these analyses can be seen in Appendix E.

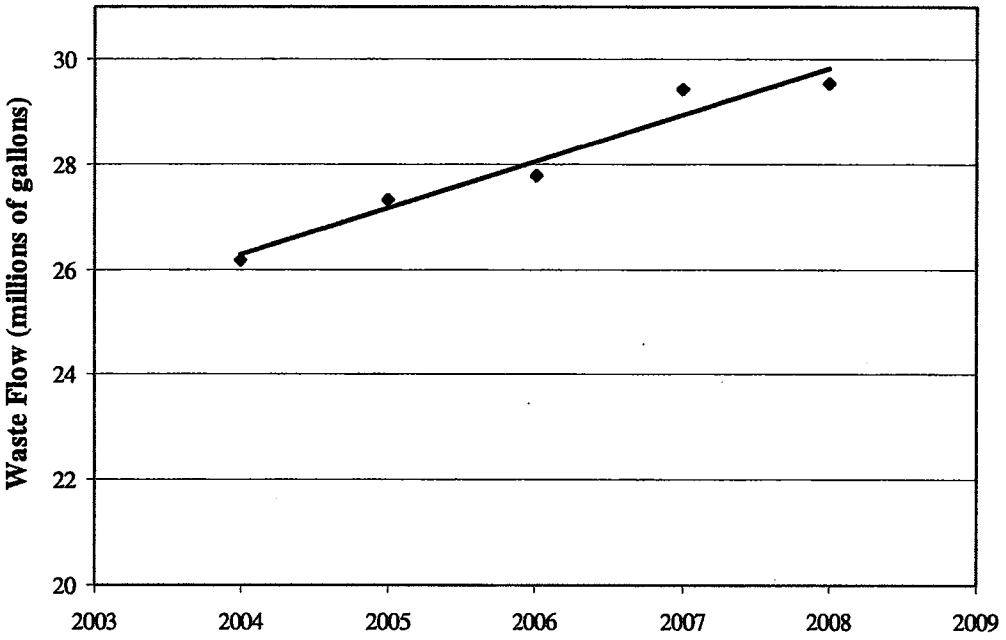


Figure 2. Combined annual waste flow trend for select dischargers in Malibu.

The dischargers included in Figure 2 are MCM I, MCM II, MCM III, Surfrider Beach, HRL, Malibu Shores Motel, Malibu Colony Plaza, Serra Retreat Center, Malibu WPCP, Malibu Civic Center, Road Maintenance Yard No. 336, Jack in the Box, and Malibu Beach Inn. The combined annual waste flows for the dischargers listed above have increased 13% from 26.2 million gallons in 2004 to 29.5 million gallons in 2008.

A breakdown of the total annual waste flows within the Civic Center area by discharger is shown in Figure 3. Among the 13 dischargers, two Winter Canyon dischargers predominate – namely, the Malibu WPCP (which servers several multi-family developments), and Malibu Colony Plaza (which lifts wastewater from multiple commercial activities for disposal in Winter Canyon).

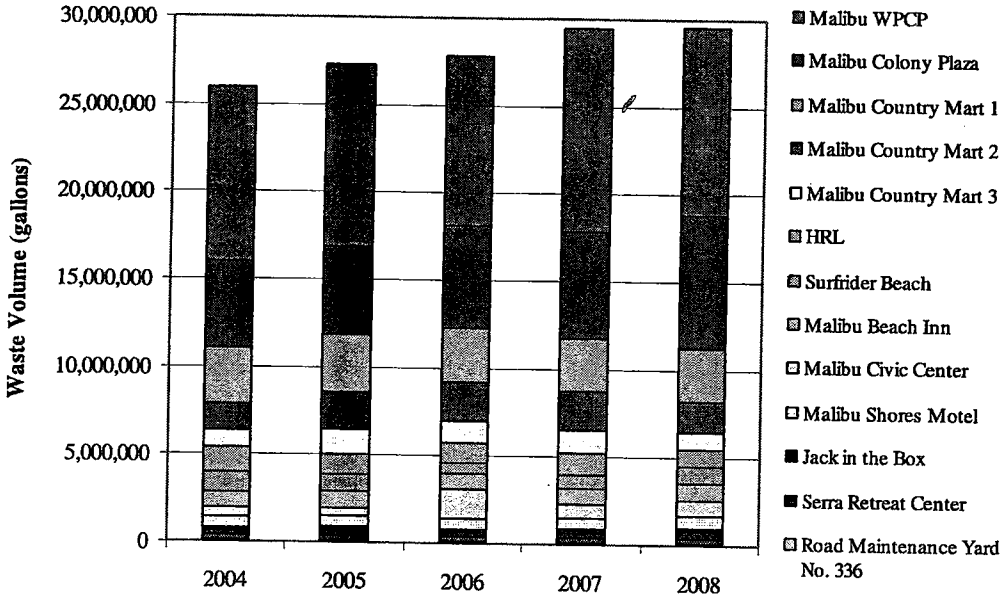


Figure 3. Combined annual waste flows for select dischargers.

Wastewater Hauling Analysis

Septic waste hauling has been steadily increasing in Malibu as shown in Figure 4.

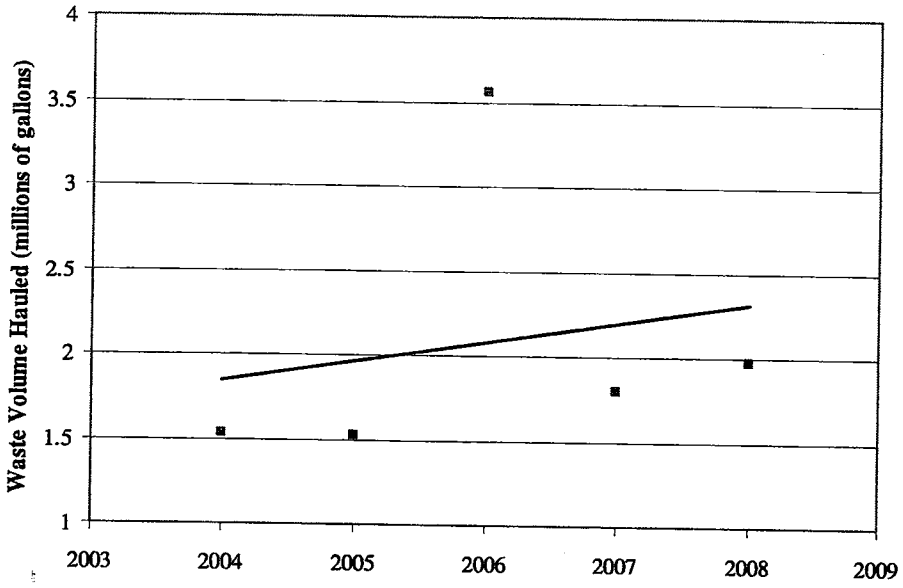


Figure 4. Septic waste hauling trend for select dischargers. The anomaly in 2006 is explained in Figure 5.

The dischargers included in Figure 4 are identical to those in Figure 2. Septic waste hauling increased 29% from 1.5 million gallons in 2004 to about 2 million gallons in 2008. Septic waste hauling data and the waste flow data are attached in Appendix A.

A breakdown of annual hauled quantities by discharger is shown in Figure 5. Most septic waste hauled off-site came from Malibu Colony Plaza, Malibu WPCP, MCM I, MCM II, and MCM III. Septic waste hauling records for all three Malibu Country Marts show increasing hauling trends since 2004.

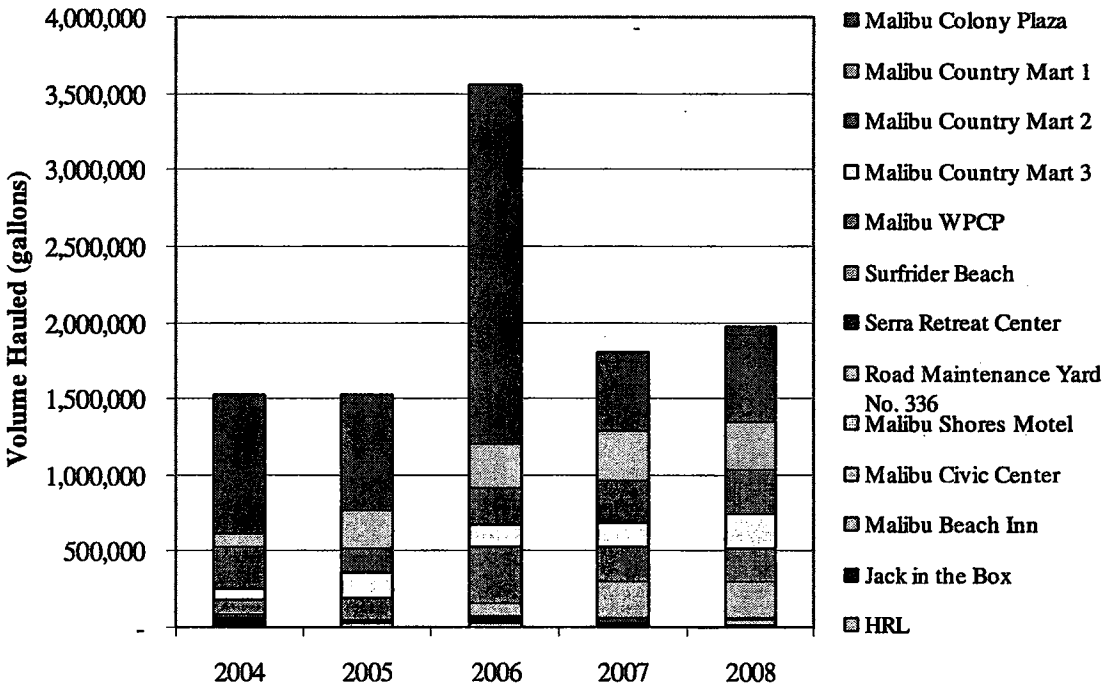


Figure 5. Septic waste hauling for select dischargers. The large spike in hauled waste in 2006 from Malibu Colony Plaza was due to the completion and start-up of its treatment plant. The plant was unable to meet the effluent limitations during its start-up period and the waste had to be hauled off-site for treatment.

In 2004, 5.8% of the total waste generated by the dischargers in Figure 5 was hauled off-site for treatment, and this increased to 6.1% in 2008. Certain dischargers contribute much more to the percent of annual hauled septic waste to total waste flows than others. For example in 2008, Malibu Colony Plaza hauled 41% of its total generated waste flow off-site, MCM III hauled 23.2% of its total waste flow off-site, and MCM II hauled 16% of its total waste flow off-site. Data regarding annual percentages of septic waste hauled are included in Appendix A.

Septic Pumping and Hauling Regulations

Regional Board staff also reviewed regulations related to the pumping and hauling of septic waste. The firms that engage in the business of cleaning of septic tanks, chemical toilets, cesspools, sewage seepage pits, or disposing of the cleanings are regulated under California Health and Safety Code Section 117400-1177450. These firms must register with the local health officer before they can engage in these activities. In Los Angeles and Ventura counties, the

county health officers regulate these firms.[6] A public information bulletin from the City of Malibu lists five firms that are engaged in hauling septic waste in the area. They are A & B Malibu Pumping, County Sanitation Company, Ely Jr's. Pumping, McDermott Pumping and W.A.S.T.E.C.[7] All these firms have valid registrations from Los Angeles County Environmental Health. The registrations are good for one year and their vehicles are scheduled for annual inspection each June. The County inspects the vehicles on an annual basis to make sure that they are not leaking, that their openings can be tightly closed and that the pumps are functioning properly. The inspectors also make sure that the drivers of the trucks are trained to handle septic waste properly, and have the necessary safety equipment to handle spills. In the case of a spill, the drivers must make sure that the discharge is contained and the spill area properly sanitized.

There is one recorded complaint against septic waste haulers in the Civic Center area. Residents complained about an odor caused by septic wastes being transferred from a "milk run" truck to a bigger truck for disposal. There are no regulations related to the transfer of waste from one truck to another. However, City of Malibu local health officers directed the truck drivers to transfer waste at locations away from residences to mitigate the odor nuisance.

To further gather information regarding the transportation of septic waste, two Regional Board staff conducted a drive-through type of inspection on June 16, 2009. They observed waste being pumped from one of the dischargers in the Malibu Civic Center area. The observations of that inspection are documented in the inspection report included as Appendix B.

Carbon Footprint Analysis

Sources of Data

Three pumping companies do the majority of septic pumping and hauling in the City of Malibu: Ely Jr's Pumping, A & B Malibu Pumping, and McDermott Pumping. Regional Board staff interviewed representatives from the pumping companies to gather information on the types of trucks used to haul waste and the frequency of waste pick-up done in the City of Malibu. Regional Board staff used this information to calculate the carbon footprint. A carbon footprint analysis was done to determine the impact of septic waste hauling trucks on climate change. A reasonable estimate of carbon dioxide emissions from a truck is based on the miles traveled per trip, the miles driven per gallon of fuel burned, and the amount of carbon dioxide generated per gallon of fuel burned. Miles per gallon estimates were based on truck information provided by each pumping company, and miles per trip estimates were based on the distance from the company's headquarters to the pumping sites, pumping sites to the disposal location (the Joint Water Pollution Control facility in Carson), and disposal location back to headquarters.

Data Analysis

Regional Board Staff used the data obtained from septic waste hauling contractors and septic waste hauling information from monitoring reports to develop Table 2.

---

[6] Staff determined that the health officer for the County of Los Angeles does not require reports on the location of septic tanks/seepage pits/cesspools being cleaned, the locations of the disposal points, the frequencies of cleanouts, and any observed violations. In the past, the County did require such reports, but no longer has resources to review such reports.

[7] The City of Malibu does not endorse any of these firms. Also, the City provides recommendations for pumping frequencies for properly functioning OWDSs.

Table 2. Tons of carbon dioxide emitted each year by tanker trucks from the three main septic waste pumping companies in Malibu.[8]

Pumping Contractors	Round Trip Distance (miles)	Miles per Gallon (MPG)	Frequency[9] (days/week)	Number of Trucks	Tons CO2 per Year
A&B Malibu Pumping	67	6	3	1	19
Ely Jr's. Pumping	178	6	5	2	171
McDermott Pumping	64	6	5	2	62
				Sum	**252**

Diesel engines produce approximately 22.2 pounds of carbon dioxide per gallon of fuel burned according to *Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel*[10]. The diesel trucks used for hauling are estimated to get anywhere from four to ten miles per gallon, but more often on the lower end of that scale. Due to constant stop and go driving on the Pacific Coast Highway, six miles per gallon is used for the calculation. The result of 252 tons of carbon dioxide produced per year from septic waste hauling within the Malibu Civic Center area is an estimate based on available data.

Another possible method of calculation would take the total volume of waste hauled per year, and divide that by the capacity per pumping truck (3,500 gallons to 8,000 gallons), which would yield the number of trips necessary to haul that amount of sewage. The same calculation as above proceeds from here to determine the amount of CO2 produced each year. This leads to a significant underestimate for a two main reasons: One is that this assumes each trip, the tanker truck fills to capacity, which according to hauling records is not the case. Two, our calculated amount of hauled sewage each year is only based on the larger permitted commercial dischargers within the Malibu Civic Center area, as there are no hauling records available for the unpermitted dischargers, meaning there is a large amount of undocumented hauling occurring.

Manhattan Beach, California, is a coastal city with almost three times the population of Malibu, and the city inventories its emissions. Manhattan Beach officials calculated that in 2005, 6,245 tons of carbon dioxide were released into the atmosphere. The inventory includes emissions associated with city operated facilities and parks, vehicle fleet fuel usage, employee commute emissions, water and sewage pump stations, street lights, and traffic signals.[11] If the City of Manhattan Beach reduced its emissions by 252 tons per year (estimated amount of CO_2 produced from hauling in Malibu per year), this would equate to a 4% decrease in carbon dioxide emissions from municipal activities.

[8]Information gathered from interviews with Ely Simental of Ely Jr's' Pumping and Amy McDermott of McDermott Pumping Company.

[9] Both trip frequency and the number of trucks in service at once were determined from conversations with representatives from pumping contractors. The representatives could only provide educated guesses regarding trip frequency and average number of trucks out at once.

[10] http://www.epa.gov/oms/climate/420f05001.html

[11] http://www.ci.manhattan-beach.ca.us/Index.aspx?page=1510

Implications

The California Air Resource Board, Local Government Action for Climate Change, does not have standards for Greenhouse Gas Emissions for each municipality at present. Most actions taken by the municipalities are voluntary. Some cities such as Manhattan Beach have conducted an inventory of Greenhouse Gas Emissions from their municipal activities for the purpose of studying how to reduce such emissions, and help meet Kyoto Protocol type goals.

Although currently the State of California does not have a mandate base for carbon dioxide emissions, eliminating septic waste hauling in the City of Malibu has the potential to lower greenhouse gases emitted from Civic Center activities.

Discussion of Spills in the Study Area

In response to comments about the spill data that included many spills on problematic sites outside of the prohibition area, staff deleted these data (Appendix C) and the explanatory text from the July 31, 2009 draft.

Dischargers are taking some extreme actions to prevent spills within much of the prohibition area, through the practice of frequently pumping large quantities of raw sewage and hauling this waste off-site, as analyzed in the tech memo. On some sites where systems have completely failed - e.g. the comfort station at First Point on Surfrider Beach (see Appendix D), large volumes of raw sewage are hauled on a frequent basis to prevent sewage from surfacing on the beach sand, as it has in the past.

Conclusion

Our analyses show that the volume of waste generated by dischargers in the Malibu Civic Center area has increased since 2004 by 13%. Septic waste hauling has increased at an even greater rate, with 2008 values 29% higher than 2004. Because of the pumping frequency and volume of waste that is hauled off-site, Regional Board staff concludes that waste is being hauled off-site for disposal to prevent OWDS failure, and not as part of regular septic system maintenance.

Our study also shows that the ongoing practice of frequently hauling septic waste off-site emits an estimated 252 tons of carbon dioxide per year. All vehicles on the road contribute to greenhouse gas emissions, but tanker trucks contribute much more due to their inefficient miles per gallon rating, and because they run on diesel fuel.

Wastewater flows in the Civic Center area have been increasing consistently each year. Many of the discharge sites are constrained by hydrogeologic conditions mentioned earlier, making them unsuitable for disposal of high flows of wastewater. Many commercial facilities produce wastewater flows at rates that exceed their capacity to discharge on-site. These dischargers rely on pumping significant volumes into tanker trucks that haul liquid sewage and sludge via public roadways to communities that have sewer and wastewater treatment facilities.

Appendix A: Septic Waste Flow and Hauling Data

See last page of Appendix A for assumptions used in data sets marked with an asterisk

Site	Year	Annual Total Hauled (gal)	Monthly Average (gal)	Annual Waste Flow (gal)	Daily Capacity (gal)	Monthly Capacity (gal)	Percent Annual Flow Hauled
Malibu Country Mart 1							
*	2004	85,000	7,083	3,116,916	18,000	540,000	2.73
	2005	255,000	21,250	3,331,380	18,000	540,000	7.65
	2006	290,000	24,167	3,126,045	18,000	540,000	9.28
	2007	320,000	26,667	3,002,800	18,000	540,000	10.66
	2008	320,000	26,667	3,022,084	18,000	540,000	10.59
Malibu Country Mart 2							
	2004	280,000	23,333	1,537,140	14,000	420,000	18.22
	2005	160,000	13,333	2,094,399	14,000	420,000	7.64
	2006	230,000	19,167	2,182,840	14,000	420,000	10.54
	2007	280,000	23,333	2,265,040	14,000	420,000	12.36
	2008	280,000	23,333	1,753,612	14,000	420,000	15.97
Malibu Country Mart 3							
*	2004	70,000	5,833	991,976	5,000	150,000	7.06
*	2005	163,000	9,417	1,388,200	5,000	150,000	11.74
	2006	150,000	12,500	1,249,280	5,000	150,000	12.01
	2007	160,000	13,333	1,292,000	5,000	150,000	12.38
	2008	230,000	19,167	991,576	5,000	150,000	23.20
Malibu Beach Inn							
*	2004	17,000		900,000	12,000		
*	2005	17,000		900,000	12,000		
*	2006	15,000		900,000	12,000		
*	2007	1,400		900,000	12,000		
	2008	26,700	2,225	964,600	12,000	360,000	2.77
Surfrider Beach							
	2004	2,500		1,105,817	2,250	67,500	0.23
	2005	2,500	208	968,801	2,250	67,500	0.26
	2006	86,853	7,238	652,985	2,250	67,500	13.30
	2007	245,430	20,453	764,006	2,250	67,500	32.12
*	2008	238,267	19,856	971,022	2,250	67,500	24.54

Site	Year	Annual Total Hauled (gal)	Monthly Average (gal)	Annual Waste Flow (gal)	Daily Capacity (gal)	Monthly Capacity (gal)	Percent Annual Flow Hauled
Malibu Civic Center							
	2004	8,000		502,514	16,000		
	2005	-		449,254	16,000		
	2006	-		1,602,989	16,000		
	2007	-		745,999	16,000		
	2008	4,800		899,056	16,000		
Malibu Shores Motel							
*	2004	5,000		647,928	2,500		
*	2005	5,000		647,928	2,500		
	2006	6,500		631,629	2,500		
*	2007	5,000		625,494	2,500		
*	2008	3,000		706,767	2,500		
Malibu Colony Plaza							
	2004	918,500	76,542	5,000,000	45,000	1,350,000	18.37
	2005	752,450	62,704	5,000,000	45,000	1,350,000	15.05
*	2006	2,359,700	196,642	5,753,176	45,000	1,350,000	41.02
	2007	515,600	42,967	6,099,999	45,000	1,350,000	8.45
*	2008	625,500	104,250	7,616,840	45,000	1,350,000	8.21
Public Works Road Maintenance Yard No. 336							
	2004	0		123,218			
	2005	0		126,929			
	2006	0		81,943			
	2007	1,500		96,573			
*	2008	0		91,919			
Jack in the Box							
	2004	24,550	2,046	41,2085	1,200		5.96
	2005	2,500	208	48,8005	1,200		0.51
	2006	15,000	1,250	47,0941	1,200		3.19
	2007	200	17	54,8139	1,200		0.04
	2008	10,000	833	60,7299	1,200		1.65

Site	Year	Annual Total Hauled (gal)	Monthly Average (gal)	Annual Waste Flow (gal)	Daily Capacity (gal)	Monthly Capacity (gal)	Percent Annual Flow Hauled
Malibu WPCP	2004	90,000	7,500	9,935,987	45,000		0.91
	2005	140,000	11,667	10,413,640	45,000		1.34
	2006	369,280	30,773	9,750,365	45,000		3.79
*	2007	222,720	18,560	11,584,832	45,000		1.92
	2008	215,540	17,962	10,707,434	45,000		2.01

HRL							
	2004			1,389,829			
	2005			1,192,739			
*	2006	22,000		1,141,598			
*	2007	11,000		1,251,311			
	2008	8,000		923,572			

Serra Retreat				262,800	21,600		
	2004						
	Q1	6,700	2,233				10.3
	Q2	3,750	1,250				5.8
	Q3	9,850	3,283				15.2
	Q4	9,000	3,000				13.9
	Sum	**29,300**	9,767				
	2005						
	Q1	2,200	733				3.4
	Q2	8,000	2,667				12.3
	Q3	8,300	2,767				12.8
	Q4	8,050	2,683				12.4
	Sum	**26,550**	8,850				
	2006						
	Q1	2,700	900				4.2
	Q2	0	0				0.0
	Q3	0	0				0.0
	Q4	10,000	3,333				15.4
	Sum	**12,700**	4,233				
	2007						
	Q1	19,400	6,467				29.9
	Q2	10,200	3,400				15.7
	Q3	3,000	1,000				4.6
	Q4	3,900	1,300				6.0
	Sum	**36,500**	12,167				
	2008						
	Q1	4,200	1,400				6.5
	Q2	3,200	1,067				4.9
	Q3	3,000	1,000				4.6
	Q4	3,000	1,000				4.6
		13,400	4,467				

Assumptions for Sewage Hauling Data

Malibu Country Mart I:

2004, Q1: Assume 10,000 gallons hauled based on hauling data from Q2.
2004, Q4: Waste flow estimated based on Q3 waste flows.

Malibu Country Mart III:

2004, Q4: Hauled volume estimated from trends seen from Q1-Q3
2004, Q4: Waste flow estimated based on trends seen from Q1-Q3.
2005, Q1: Hauled volume estimated to be the same as Q2.
2005, Q1: Waste flow estimated based on trends from Q1-Q3.

Surfrider Beach:

2008, Q4: Q4 data estimated as the average value of data from the first three quarters.

Malibu Colony Plaza

2004: No waste flow data was available until the Q3 of 2006, therefore based on available data from 2006, 2007, and 2008, annual waste flow is estimated to be 5 million gallons.
2005: No waste flow data was available until the Q3 of 2006, therefore based on available data from 2006, 2007, and 2008, annual waste flow is estimated to be 5 million gallons.
2006, Q4: Hauled volume estimated to be the same as Q3
2006: Annual waste flow estimated as four times the value reported in Q4 (the only quarter with data provided)
2008: Annual waste flow estimated as two times the sum of Q1 and Q2 (Q3 and Q4 waste flow data missing)

Malibu WPCP

2006, Q4: Q4 data estimated as the average value of data from the first three quarters.

Public Works Road Maintenance Yard No. 336

2008, Q3 and Q4: Q3 and Q4 monitoring reports missing, therefore estimates were made from Q1 and Q2 data.

HRL

2005: Q4 data estimated as the average value of data from the first three quarters.
2006: Only Q3 data available; this was used as data for the other three quarters.
2008: Q3 data estimated as the average value of data from the first three quarters.

Appendix B:
INSPECTION REPORT
CITY OF MALIBU HAULERS

Name of Inspectors: Dionisia Rodriguez
Ryan Thacher

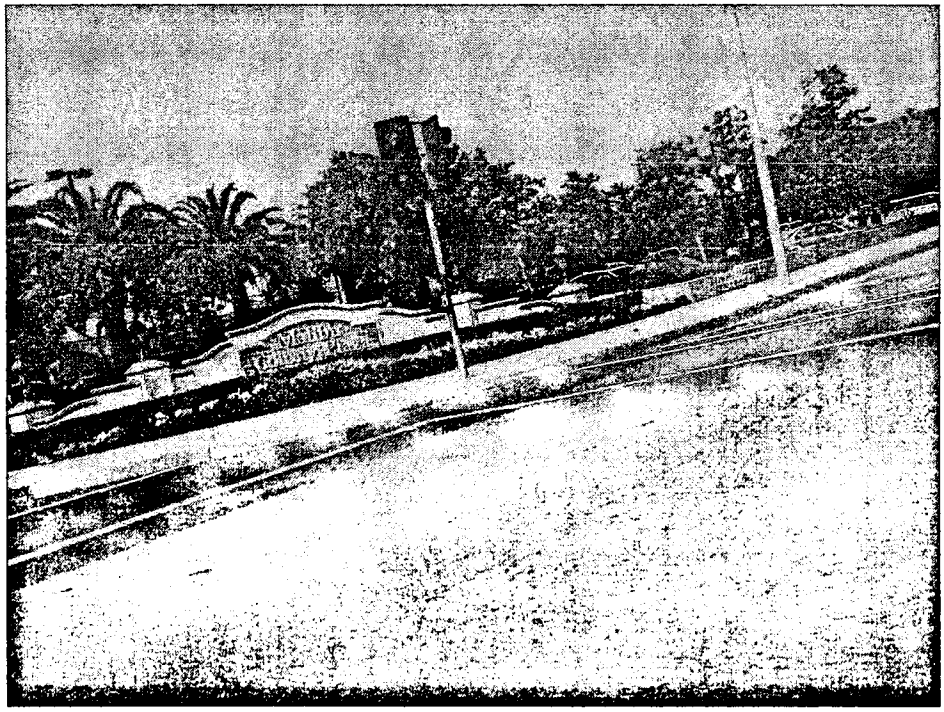
Date of Inspection: June 16, 2009

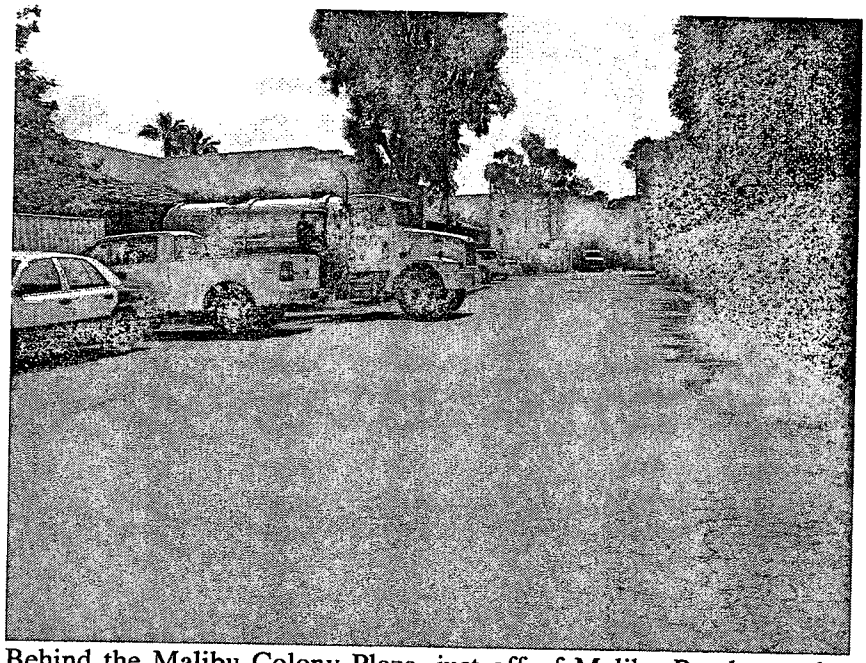
PURPOSE

In order to gather some information about septic waste hauling in the City of Malibu, we decided to conduct a drive-through the city. The following pictures were taken during that drive-through conducted on Tuesday, June 16, 2009 between 10:00 a.m. and 11:30 a.m.

OBSERVATIONS

We chose Malibu Colony Plaza as our primary destination due to the frequent pumping of large volumes of waste from its septic system as reported by quarterly Monitoring Reports. We believed this site would provide us the best probability of seeing a pumping truck. This photo is the entrance of Malibu Colony Plaza, at the intersection of the Pacific Coast Highway and Webb Way.





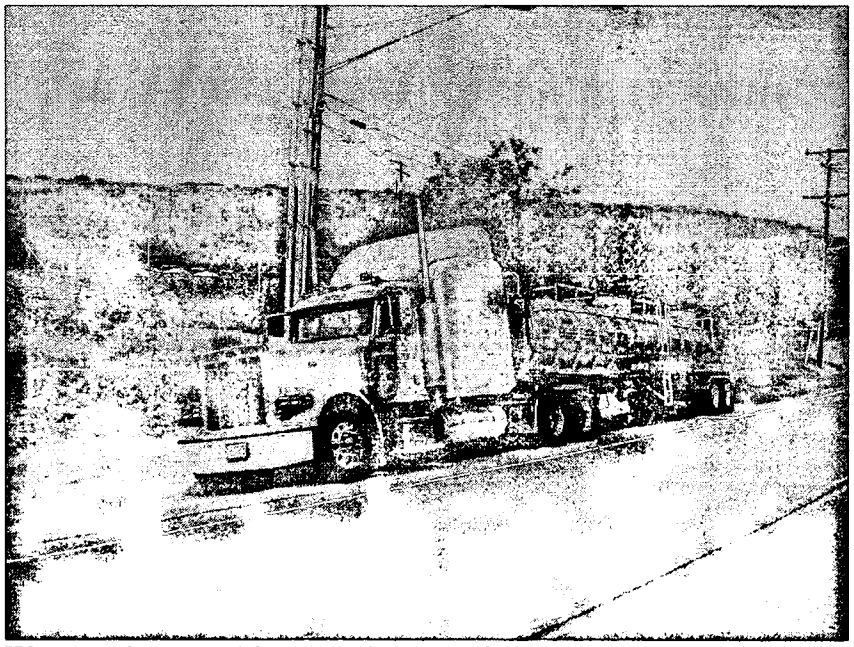
Behind the Malibu Colony Plaza, just off of Malibu Road, we observed an Ely Jr's Pumping truck.



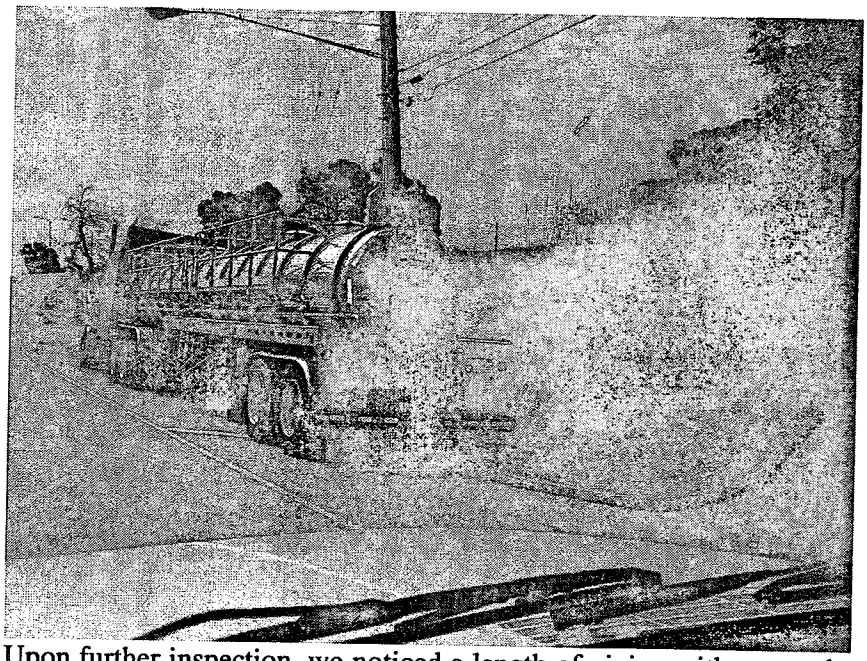
The operator was preparing to pump, so we waited and watched to observe any notable information about this process.



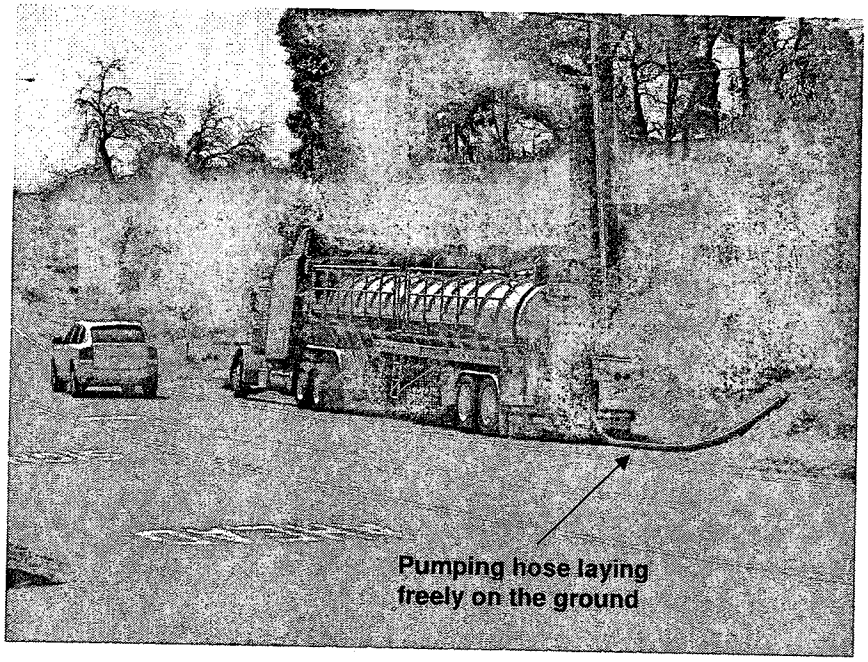
While pumping, there was a very strong stench of raw sewage, and noise levels required raising your voice significantly for conversation. No spills or leaks were observed during the pumping process.



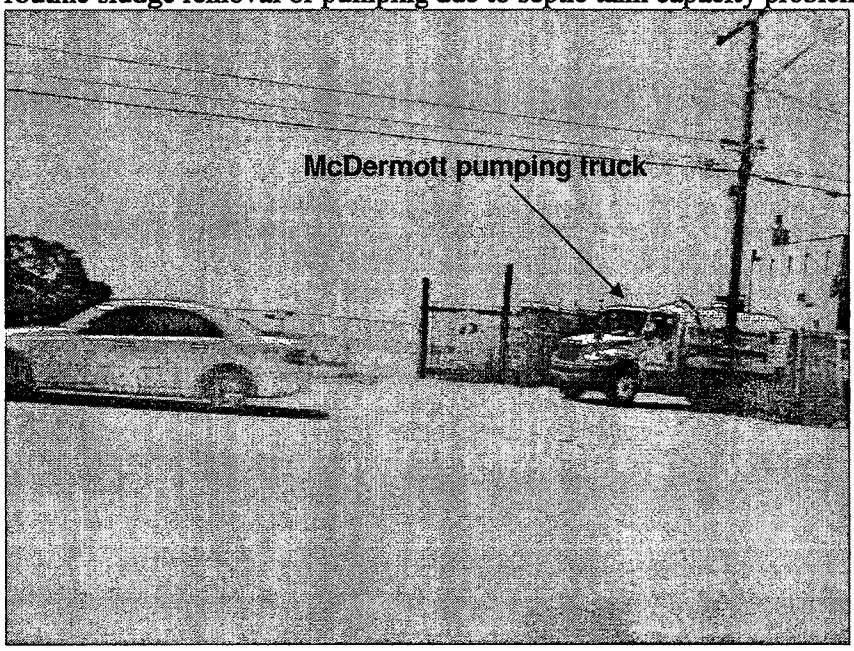
We were interested in observing pumping in a residential area, so we arbitrarily chose to drive north on Winter Canyon Road. At this location at 11:00 a.m. we encountered a large, unmanned sewage hauling truck belonging to Ely Jr's Pumping. We believe it was parked next to the leach field at Winter Canyon Road.



Upon further inspection, we noticed a length of piping with one end attached to the truck's tank, and the other laying freely on the side of the road.



Driving on the Pacific Coast Highway we saw three separate pumping vehicles belonging to McDermott Plumbing, apparently pumping residential septic tanks. We were only able to photograph one shown below at 11:20 a.m. It was unclear whether these trucks were performing routine sludge removal or pumping due to septic tank capacity problems.



CONCLUSION

We will use this inspection report for our technical memo regarding septic hauling in Malibu for the Malibu Prohibition case.

Report Prepared by: Dionisia Rodriguez

Ryan Thacher

Report Approved by: Dr. Rebecca Chou

Appendix D:
INSPECTION REPORT
SURFRIDER BEACH

FACILITIES INSPECTION REPORT

OFFICE NO: 4 (CA RWQCB – LA) 1870125

INSPECTOR: Wendy Phillips and Rebecca Chou

PCA System Task No: 12501

	Co of Los Angeles, Dept of Public Works	Surfrider Beach Comfort Station (First Point)
WDID NUMBER	AGENCY NAME OR PARTY RESPONSIBLE FOR DISCHARGE	FACILITY NAME
CI 8532	900 South Fremont Avenue	23068 W Pacific Coast Highway
CI NUMBER	AGENCY STREET	FACILITY STREET
	Alhambra, CA 91803	Malibu, CA 90625
NPDES NUMBER	AGENCY CITY AND STATE	FACILITY CITY AND STATE
	Alexander Villarama	Alexander Villarama
(YY/MM/DAY) SCHED INSPECT DATE	AGENCY CONTACT PERSON	FACILITY CONTACT PERSON
2009/09/23	(626) 458-6102 office; (626) 543-3385 cell	none
ACTUAL INSPECTION DATE	AGENCY PHONE NO.	FACILITY PHONE NO.

INSPECTION TYPE (Check One)

(A1) ____ "A" type compliance -- Comprehensive inspection in which samples are taken. (EPA Type S)

(B1) ____ "B" type compliance -- A routine nonsampling inspection. (EPA Type C)

(02) ____ Noncompliance follow-up -- Inspection made to verify correction of a previously identified violation.

(03) ____ Enforcement follow-up -- Inspection made to verify that conditions of an enforcement action are being met.

(04) ____ Complaint -- Inspection made in response to a complaint.

(05) ____ Pre-requirement -- Inspection made to gather info. relative to preparing, modifying, or rescinding requirements.

(06) X Miscellaneous -- Any inspection type not mentioned above. If this is an EPA inspection not mentioned above, please note type.

To check on conditions of backup sanitation facilities.
(Type)

(e.g. - biomonitoring, performance audit, diagnostic, etc.)

N* Were VIOLATIONS noted during this inspection? (Yes/No/Pending Sample Results)

____ Was this a Quality Assurance-Based Inspection? (Y/N)

____ Were bioassay samples taken? (N = No, If YES, then S = Static or F = Flowthrough)

INSPECTION SUMMARY (REQUIRED) (100 character limit)

This inspection focused on presence, in the Surfrider Parking lot, of nine portable toilets that serve as a backup sanitation facility to a comfort station.* See attached photos for details. Conclusion: The portable toilets at the First Point of Surfrider Beach function not only as a backup sanitation system for the Surfrider comfort station, but as additional toilet capacity during periods of heavy demand by visitors at the beach.

*No discharge from the comfort station. Discharge ceased after sewage daylighted onto beach in 2007. (Following this incident, the Discharger disconnected the leachfield and has been holding sewage from the comfort station in a septic tank for periodic pumping and off-site hauling to legal point of disposal.)

INITIALS WP/RC SIGNATURE [signature] DATE 10-7-09

For Internal Use: Reviewed By: (1) [signature] (2) _____ (3) _____ Reg. CIWQS Coordinator

CIWQS Data Entry Date: _____ Regional Board File Number: _____

Malibu – Surfrider Beach – First Point (CI 8532)

Comfort Station and Backup Sanitation Facility

September 23, 2009, at approximately 1 p.m. (Phillips/Chou)
page 2 of 3



Photo 1 (right): Surfrider Beach – View of beach near First Point, on a warm, weekday afternoon.

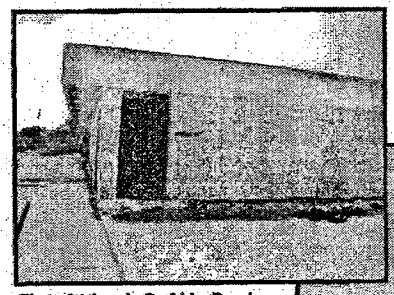


Photo 2 (above): Surfrider Beach – View of comfort station (which was open to the public during the inspection).

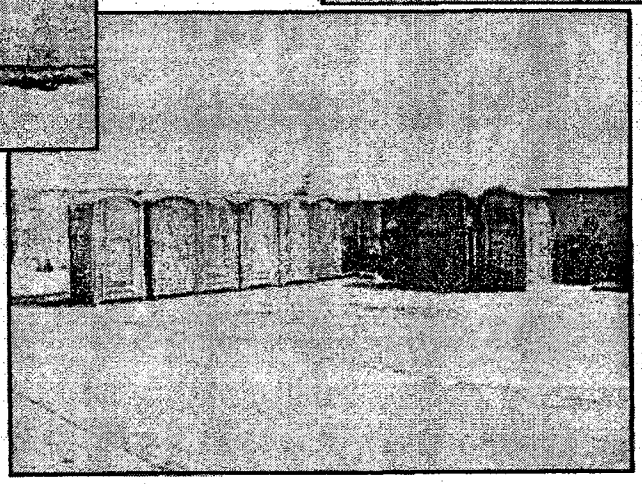
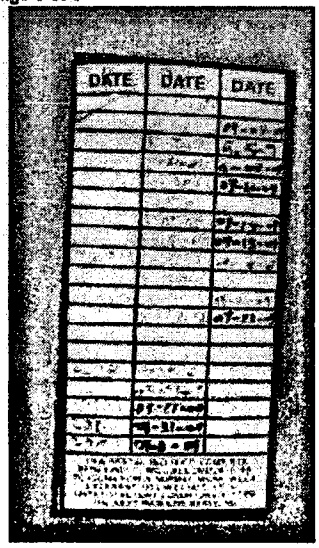


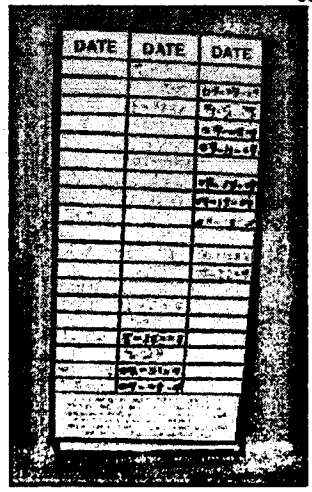
Photo 3 (right): Surfrider Beach – View of nine, free-standing portable toilets, made of molded plastic, in parking lot near First Point. These toilets not only serve as backup sanitation for periods when the comfort station has been shut down, but also to handle a portion of visitors' sanitation needs while the comfort station is open.

Malibu – Surfrider Beach – First Point (CI 8532)

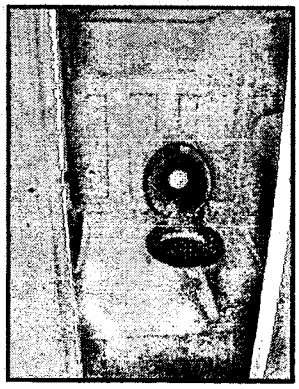
Comfort Station and Backup Sanitation Facility

September 23, 2009, at approximately 1 p.m. (Phillips/Chou)
page 3 of 3





Photos 4 and 5 (above and right): Surfrider Beach – Labels on two of the portable toilets showing maintenance schedule (with a frequency of several cleanouts per week).





Photos 6 and 7 (right): Surfrider Beach – Despite almost daily maintenance, portable toilets, such as the ones in the photos on the right, needed cleaning and emitted a strong odor of raw sewage.

Appendix E:
Malibu Potable Water Consumption Trends and Population Analysis

Ryan Thacher, Student Intern, September 30, 2009

Potable Water Consumption and Population Analysis

Figure 1 below illustrates the relationship between potable water use in the City of Malibu and population increase from the late 1980s to the present. The linearization of the data reveals a trend of increasing water demand. Analysis of endpoints from the best fit line of this data shows that between 1989 and 2008 there has been a 49 percent increase in potable water consumption. Due to the yearly fluctuations in potable water consumption, using the best fit line for this calculation provides a more accurate perspective of the increasing water demand in the City of Malibu. The population of the City of Malibu has increased 31 percent from 10,479 people in 1990 to 13,700 people in 2008. Potable water consumption is increasing at a much greater rate than the population (49 percent versus 31 percent), indicating the per capita potable water consumption rate is not a static value, but is increasing as well.

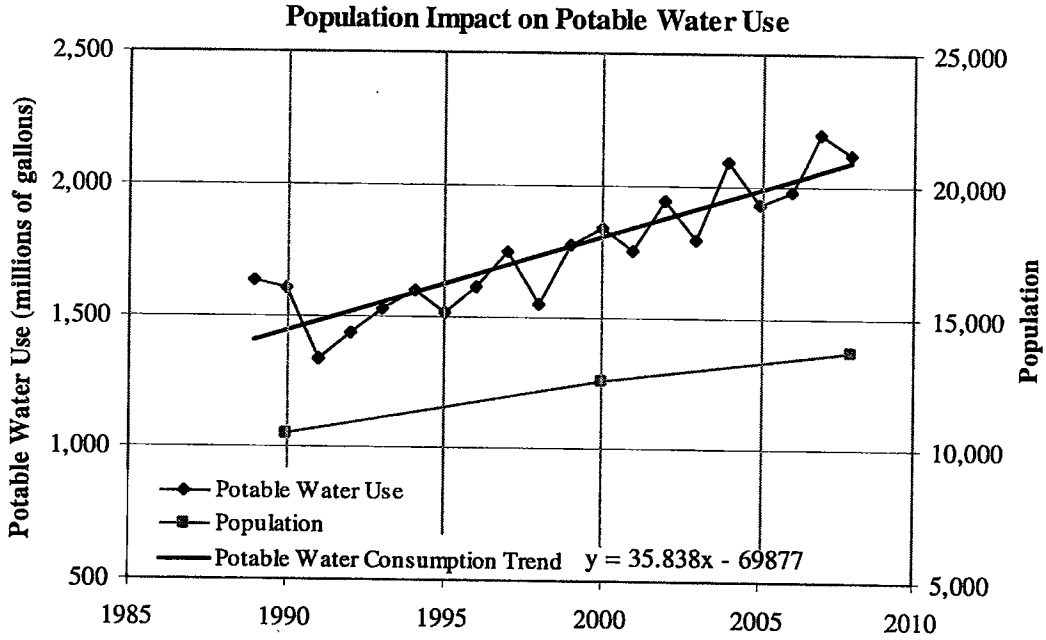


Figure 1. Potable water consumption in the City of Malibu plotted with population increases over the past two decades. Annual potable water consumption is increasing at a greater rate than population.

Potable Water Consumption and Annual Rainfall Analysis

To analyze the large yearly fluctuations in potable water consumption, this data was compared with annual rainfall data gathered from the Lechuza Point/Fire Station 72 rain gauge located in Malibu. Historical rainfall data by month from the early 1980s up to present day was provided to the Regional Board by the Los Angeles County Department of Public Works. This is shown in Figure 2.

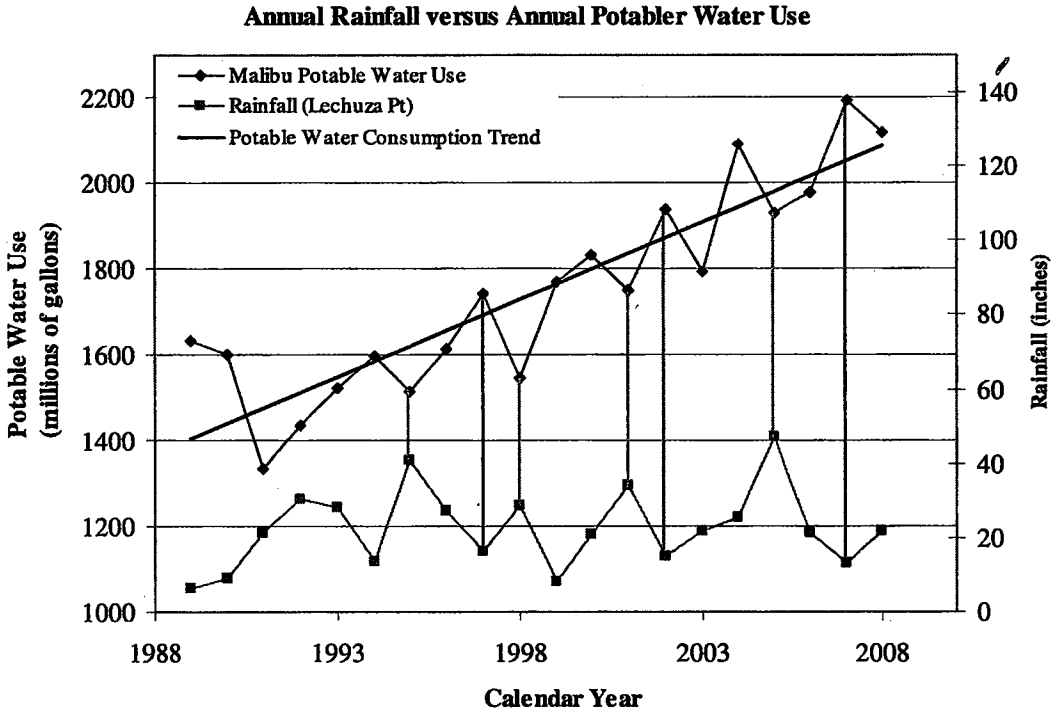
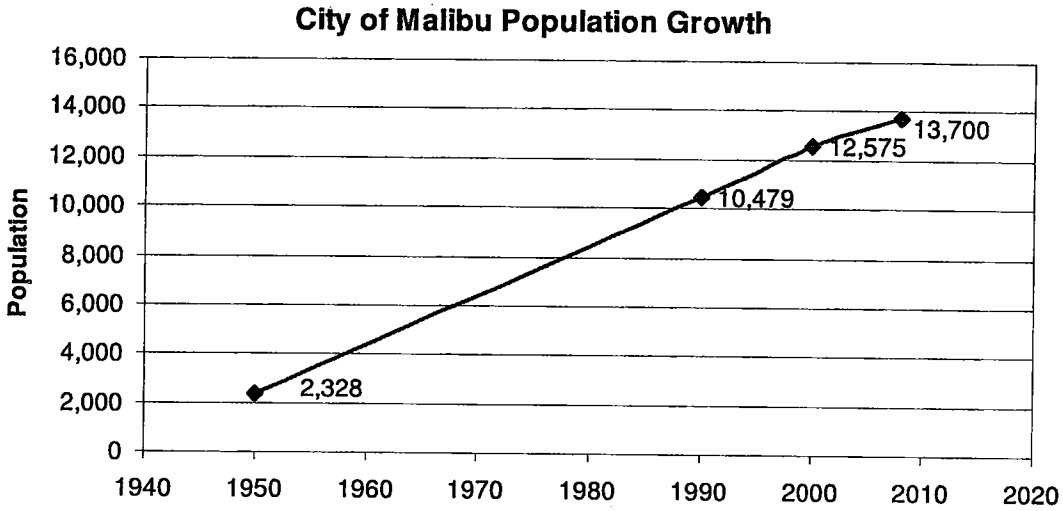


Figure 2. Annual rainfall data (by calendar year) compared with annual potable water use in the City of Malibu.

Looking at the relationship between potable water use in the City of Malibu and the amount of rainfall recorded during the corresponding year shows a strong inverse relationship. The red and green vertical lines emphasize years that clearly exhibit this behavior. Assuming water consumption per capita increases at a fairly constant rate despite weather patterns, the large seasonal fluctuations in annual water consumption seen in the City of Malibu can be attributed to potable water use for irrigation purposes.

City of Malibu Population Growth Analysis

Orlando Gonzalez, Staff Water Resource Engineer, September 30, 2009



The population trend of the City of Malibu has increased as shown in the above figure. According to the Malibu Coastal Vision Report titled "Malibu Yesterday, Today, and Tomorrow" (page 9), the population of Malibu was 2,328 in 1950. The 2000 Census indicates that the population in 1990 and 2000 was 10,479 and 12,275, respectively. Updated information presented in the report titled "Profile of City of Malibu" funded by the Southern California Association of Governments and dated May 2009, indicated in page one that the population in 2008 was 13,700. Based in the above information, the population grew at an average rate of 3.83% per year from 1950 to 1990, 1.84% per year from 1990 to 2000, and 1.08% per year from 2000 to 2008.

Regional Board staff estimates the population in 2009 at 1,842 for the proposed prohibition area. Based on the County of Los Angeles Assessor's data, there are 391 single family houses. The average number of bedrooms per house is four and assuming one person per bedroom, the population is 1,564 people for the houses. In addition, there are four multifamily complexes that have a total of 191 units with an estimated of 278 bedrooms. Again, assuming one person per bedroom, this indicates 278 additional people.

The estimated population does not include daytime and evening workers who are employed in the Malibu Civic Center area. Nor does it include daytime and evening visitors, who enjoy the beaches and patronize the businesses and public facilities. Based on Beach Activity Report prepared by Los Angeles County Fire Department, Lifeguard Division, Malibu Beach visitors have increased from 233,500 in August 1999 to 355,000 in August 2006, which is about an average annual increase of 6%.

Final Environmental Staff Report

State of California
California Regional Water Quality Control Board, Los Angeles Region

Final Environmental Staff Report

Containing substitute environmental documentation in accordance with the California Environmental Quality Act in support of an Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*

to Prohibit Onsite Wastewater Disposal Systems in the Malibu Civic Center Area

November 5, 2009

Table of Contents

Page Number

Introduction..... 1

Proposed Action.....1
Lead Agency.....4
Scope of Environmental Staff Report.....4
California Environmental Quality Act.....5
Public Resources and Water Code Requirements..... 5

Proposed Action.....7

Description of Proposed Action.....7
Goal of Proposed Action.....7
Environmental Setting.....7
Background.....7
Water Resources..... 8
Impairments to Beneficial Uses of Water Resources.....8
Technical Evidence in Support of the Proposed Prohibition.....9
Schedule for Compliance with the Proposed Prohibition.....10

Program Alternatives.....12

Program Alternative 1 – Local Government Initiative.....12
Program Alternative 2 – No Action.....13
Recommendation.....14

Options for Compliance Projects.....15

Introduction.....15
Summary of Economics.....16
Compliance Project A – Integrated Water Resources Management Facility.....17
Compliance Project B – Interceptor Sewer.....17
Compliance Project C – Decentralized Wastewater Management.....19

CEQA Analysis.....21

Environmental Checklist and Discussion.....21
Other Environmental Considerations.....43
Cumulative Impacts.....43
Growth-Inducing Impacts.....44
Unavoidable Significant Adverse Impacts.....46
Statement of Overriding Considerations and Determination.....47

Environmental Staff Report

in support of an Amendment to the
Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

to Prohibit Onsite Wastewater Disposal Systems in the Malibu Civic Center Area

Introduction

Proposed Action

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board) proposes to amend the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties (Basin Plan)* to prohibit discharges from on-site wastewater disposal systems (OWDSs) in the Civic Center area of the City of Malibu. This proposed regulatory action is referred to as the prohibition, or project, throughout this report.

Prohibition Boundary

The area that would be affected by the proposed prohibition is referred to as the Malibu Civic Center area, and is delineated by the red line shown in Figure 1[1]. The area is not defined according to municipal borders or parcel lines. Rather, the area subject to the prohibition is delineated according to hydrogeologic parameters and drainage patterns; as groundwater flow roughly mimics surface drainage, the prohibition boundary follows a topographic high surrounding both the Winter Canyon and lower Malibu Creek (also known as Malibu Valley) watersheds. All property extending seaward of this boundary to the ocean is subject to the prohibition, including the coastal strips along the Pacific Coast Highway stretching from Amarillo Beach to First Point at Surfrider Beach. This entire area, which is referred to as the "Malibu Civic Center area,"[2] totals 2.2 square miles of which 1.5 square miles and 0.7 square miles are within the City of Malibu and the unincorporated area of County of Los Angeles, respectively. Figure 2[1] shows the civil boundaries and parcels.

To the west, the prohibition boundary encompasses Winter Canyon not only because this watershed is heavily developed and discharges almost 50,000 gallons per day of wastewater (about 20% of the wastewater in the prohibition area), but also because wastewater management strategies for many commercial activities in the coastal strip adjacent to the Colony – as well as

[1] Figure 1 and Figure 2 refer to the prohibition area as recommended by staff prior to a public meeting of the Board on November 5, 2009. During the public meeting, the Board directed staff to modify the western boundary so that upper Winter Canyon is not subject to the prohibition. Figure 1A and Figure 1B refer to the official prohibition boundary, as modified by the Board on November 5, 2009 in Resolution R4-2009-007.

[2] As the prohibition area covers a small portion of the City of Malibu and an even smaller portion of unincorporated County of Los Angeles, staff avoided designating this as a 'Malibu' prohibition. Nor did staff select hydrologic terms to designate the prohibition area, out of concern that such terminology may not be readily recognized by the affected community. Rather, the designation of 'Malibu Civic Center area' was selected for broad name recognition.

proposed strategies for managing future wastewaters from Malibu Valley – rely on disposal capacity in Winter Canyon, which is severely strained. Note that the prohibition area includes only a small sliver of the Pepperdine University campus, as this sliver is the only portion of Pepperdine that falls within the topographically-defined Winter Canyon watershed.

Figure 1

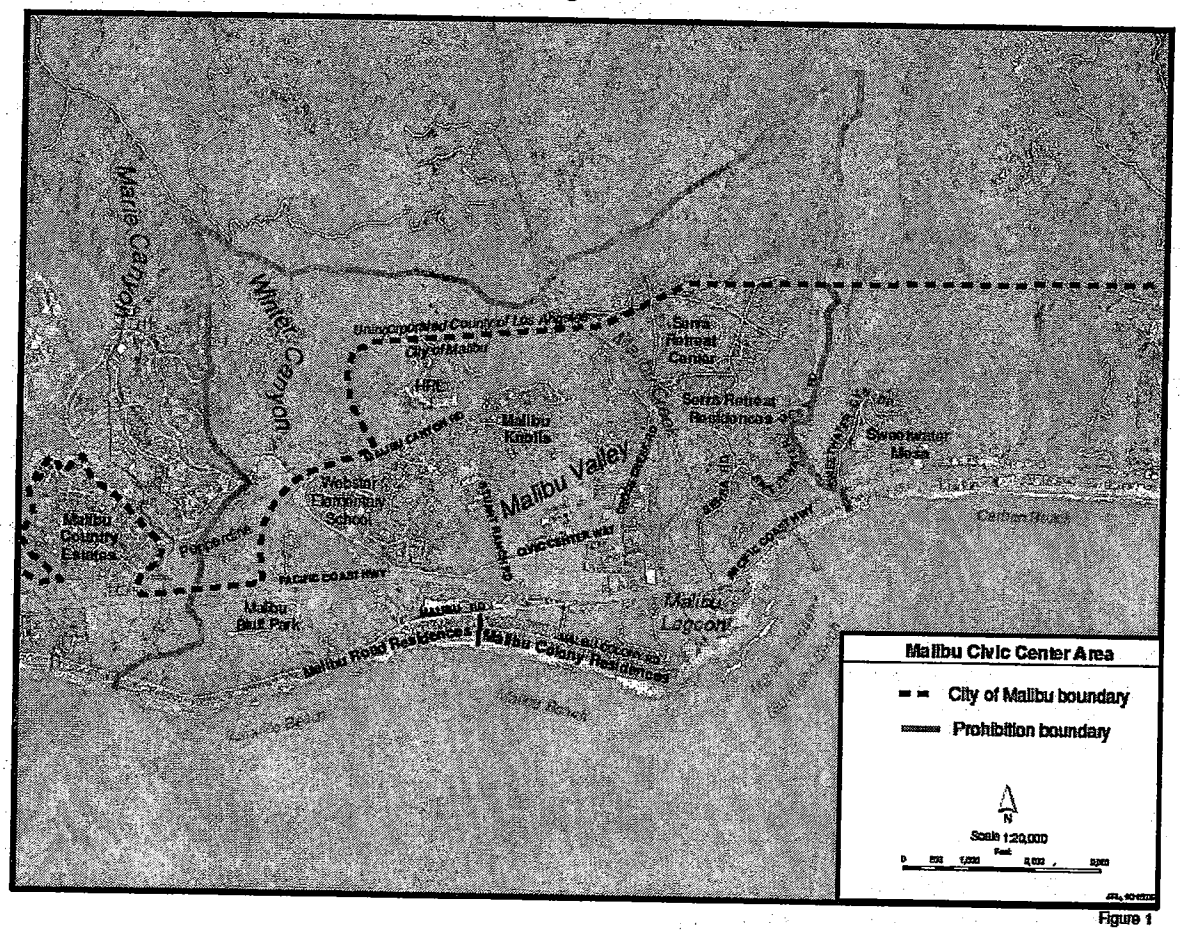


Figure 1

To the east, the prohibition boundary encompasses the Serra Retreat neighborhood, and follows Sweetwater Mesa Road along the eastern topographic high. The boundary was not extended eastward, as the Sweetwater Mesa neighborhood is a lower density residential development. Nor was the boundary extended eastward along the Pacific Coast Highway to capture a stretch of significant commercial development, as the intent of this proposed regulatory action is to encompass priority areas that affect groundwater and are hydraulically connected to impaired surface water resources, including Surfrider, Malibu, and Amarillo Beaches and Malibu Lagoon. Additional areas, such as the stretch of the Pacific Coast Highway eastward of the boundary, may be subject to future regulatory actions.

Malibu Civic Center Area
City of Malibu boundary
Prohibition boundary
Scale 1:20,000
Figure 1A
Winter Canyon
Malibu Canyon
Malibu Lagoon
Malibu Valley
Malibu Beach
Malibu Bluffs Park
Malibu Colony Residences
Malibu Knolls
Serra Retreat
Serra Retreat Residences
Shea Water Mesa
Corbin Beach
Unincorporated County of Los Angeles
City of Malibu

Figure 2

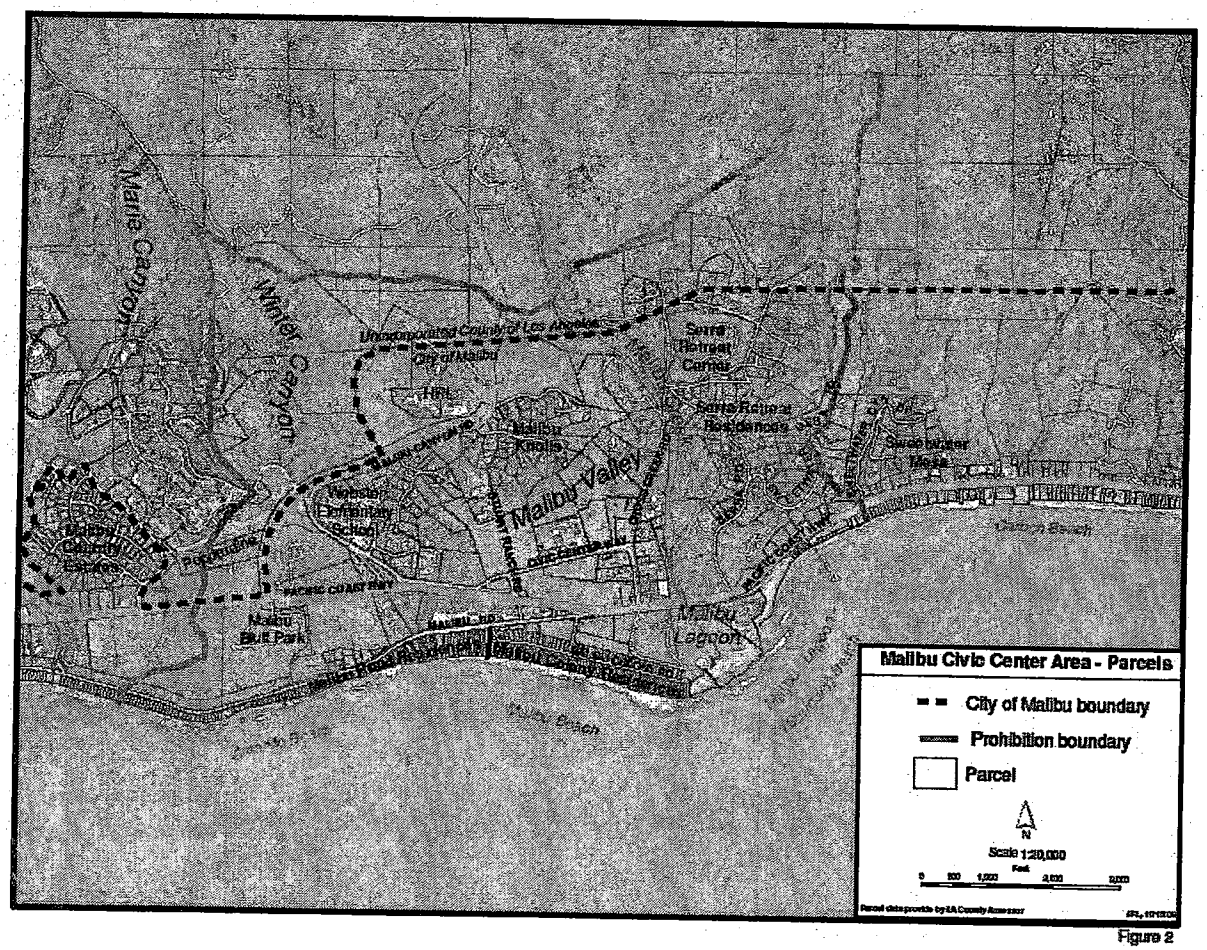


Figure 2

Types of Dischargers Subject to Prohibition

All property owners, including existing residences, businesses, and public facilities that discharge wastes through an OWDS in the Malibu Civic Center area, would be affected by theproposed prohibition as well as future dischargers who may plan to discharge in this area. The regulatory action would immediately prohibit all new discharges from OWDS in the Malibu Civic Center area, and establish a schedule to cease discharges from existing systems by 2014.

Types of Discharges Subject to Prohibition

Collectively, the systems from which wastewaters discharge are referred to as OWDSs. Types of subsurface disposal systems, or OWDSs, that would be prohibited range from passive systems with conventional septic tanks to active systems with equipment that more aggressively remove pollutant loads from sewage before subsurface disposal. The prohibition would cover an OWDS that serves an individual property (residential, commercial, industrial, and public properties) as well as a group of properties. The prohibition would apply to all OWDSs and regulated

Malibu Civic Center Area - Parcels
City of Malibu boundary
Prohibition boundary
Parcel
Scale 1:20,000
Winter Canyon
Marie Canyon
Malibu Lagoon
Malibu Bluffs Park
Zuma Beach
Carbon Beach

Figure 2A

discharges (whether they are regulated by the City of Malibu, County of Los Angeles, or State) as well as any unregulated discharges that may exist.

Lead Agency

The Regional Board is the lead agency for evaluating environmental impacts from the proposed prohibition on OWDSs in the Malibu Civic Center area.

Scope of Environmental Staff Report

The Regional Board's basin planning process is exempt from certain requirements of CEQA, including preparation of an initial study, negative declaration, and environmental impact report (California Code of Regulations, title 14, section 15251(g)). As the proposed amendment to the *Basin Plan* is part of the basin planning process, the Regional Board prepares environmental information and analyses that are the functional equivalent of an environmental impact report. The Regional Board describes it as "substitute environmental documentation," which complies with Public Resources Code section 21080.5. In this substitute environmental documentation, alternatives to the proposed project, reasonably foreseeable environmental impacts arising from those alternatives and from methods of complying with the proposed prohibition are disclosed in accordance with the California Environmental Quality Act (CEQA) and CEQA regulations.

This information is also presented to meet a requirement of section 13283 of the California Water Code (CWC), which requires a preliminary review of possible alternatives to achieve protection of water quality and present and future beneficial uses of water, and prevention of nuisance, pollution, and contamination.

Consideration of the factors in section 13241 of the CWC is required by section 13281. Staff has presented preliminary cost information for conceptual options, or projects, that the community and stakeholders could select and implement to comply with the prohibition. These projects are analyzed on a conceptual basis only, as a local government body will need to select and implement a specific wastewater management strategy and project. As this occurs, it will be the responsibility of a local government body to perform a specific project-level analysis and disclose environmental impacts.

The Regional Board has analyzed environmental impacts. This substitute environmental documentation is based on the proposed prohibition that will be considered by the Regional Board and, if adopted, implemented through an amendment to the *Basin Plan*. Evidence in support of the proposed prohibition is presented in a technical staff report that, together with this environmental staff report and a tentative resolution, are part of the substitute environmental documentation which will be considered on November 5, 2009. Approval of the substitute environmental documentation is separate from approval of a specific project alternative or a component of an alternative. Approval of the substitute environmental documentation refers to the process of: (1) addressing comments, (2) confirming that the Regional Board considered the information in the substitute environmental documentation, and (3) affirming that the documentation reflects independent judgment and analysis by the Regional Board (Cal. Code Regs., tit. 14, section 15090).

California Environmental Quality Act

This prohibition is evaluated at a program level of detail under a Certified Regulatory Program and the information and analyses are presented in this substitute environmental documentation as discussed in this section.

CEQA's basic purposes are to: 1) inform the decision makers and public about the potential significant environmental effects of a proposed project, 2) identify ways that environmental damage may be mitigated, 3) prevent significant, avoidable damage to the environment by requiring changes in projects, through the use of alternative or mitigation measures when feasible, and 4) disclose to the public why an agency approved a project if significant effects are involved. (Cal. Code Regs., tit. 14, section 15002(a).)

To fulfill these functions, a CEQA review need not be exhaustive, and CEQA documents need not be perfect. They need only be adequate, complete, and good faith efforts at full disclosure. (Cal. Code Regs., tit.14, section 15151.) The Court stated in *River Valley Preservation Project v. Metropolitan Transit Development Board* (1995) 37 Cal.App.4th 154, 178:

> As we have stated previously, "[o]ur limited function is consistent with the principle that ""[t]he purpose of CEQA is not to generate paper, but to compel government at all levels to make decisions with environmental consequences in mind. . . ."" (*City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1438, 1448 [263 Cal.Rptr. 340]; quoting *Laurel Heights I*, supra, 47 Cal.3d at p. 393.) "We look 'not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.' (Guidelines, section 15151.)" (*City of Fremont v. San Francisco Bay Area Rapid Transit Dist.*, supra, 34 Cal.App.4th at p. 1786.)

Nor does CEQA require unanimity of opinion among experts. The analysis is satisfactory as long as those opinions are considered. (Cal.Code Regs.,tit. 14, section 15151.)

In this document, the Regional Board staff has strived to perform a good faith effort at full disclosure of the reasonably foreseeable environmental impacts that could be attendant with the prohibition. Our analysis and conclusions follow.

Public Resources and Water Code Requirements

While the "certified regulatory program" of the Regional Board is exempt from certain CEQA requirements, it is subject to the substantive requirements of California Code of Regulations, title 23, section 3777(a), which requires a written report that includes a description of the proposed activity, an analysis of reasonable alternatives, and an identification of mitigation measures to minimize any significant adverse environmental impacts. Section 3777(a) also requires the Regional Board to complete an environmental checklist as part of its substitute environmental documents. This checklist is provided within this document.

In addition, pursuant to the California Water Code, section 13281(a), the Regional Board must consider all relevant evidence related to the discharge, including, but not limited to, those factors

set forth in section 13241 information provided pursuant to section 117435 of the Health and Safety Code, possible adverse impacts if the discharge is permitted, failure rates of any existing individual disposal systems, whether due to inadequate design, construction, maintenance, or unsuitable hydrogeologic conditions, evidence of any existing, prior or potential contamination, existing and planned land use, dwelling density, historical population growth, and any other criteria as may be established pursuant to guidelines, regulations, or policies adopted by the state board. This evidence is presented in the technical and environmental staff reports.

Pursuant to the California Water Code, section 13241, the Regional Board may establish water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance; however, it is recognized that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses. In so doing, the Regional Board is to consider factors, including but not necessarily limited to, all of the following:

(a) Past, present, and probable future beneficial uses of water.
(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
(d) Economic considerations.
(e) The need for developing housing within the region.
(f) The need to develop and use recycled water.

Although the proposed regulatory action does not establish a new water quality objective, staff has nonetheless presented such information in the technical and environmental staff reports.

Public Resources Code section 21159(d) specifically states that the public agency is not required to conduct a "project level analysis." Rather, a project level analysis must be performed by the local agencies that are required to implement the requirements of the prohibition. Notably, ***the Regional Board is prohibited from specifying the manner of compliance with its regulations*** (Water Code § 13360), and accordingly, the ***actual*** environmental impacts will necessarily depend upon the compliance strategy selected by the local agencies.

This substitute environmental documentation identifies the reasonably foreseeable environmental impacts of the ***reasonably foreseeable*** methods of compliance (Pub. Res. Code, section 21159(a)(1)), based on information developed before, during, and after the CEQA scoping process that is specified in California Public Resources Code section 21083.9. This analysis is a program-level (i.e., macroscopic) analysis. CEQA requires the Regional Board to conduct a program-level analysis of environmental impacts. (Pub. Res. Code, section 21159(d).) Similarly, the CEQA substitute documents do not engage in speculation or conjecture (Pub. Res. Code, section 21159(a).) When the CEQA analysis identifies a potentially significant environmental impact, the accompanying analysis identifies reasonably foreseeable feasible mitigation measures. (Pub. Res. Code, section 21159(a)(2).) The substitute environmental documentation has identified the reasonably foreseeable alternative means of compliance. (Pub. Res. Code, section 21159(a)(3).)

documentation has identified the reasonably foreseeable alternative means of compliance. (Pub. Res. Code, section 21159(a)(3).)

Proposed Action

Description of Proposed Action

The proposed regulatory action by the Regional Board would prohibit discharge of wastewater through an OWDS in the Civic Center area of the City of Malibu. The prohibition would be effected through an amendment, set forth in the tentative resolution, to the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties (Basin Plan).*

The area that would be affected by the proposed prohibition is referred to as the Malibu Civic Center area (Figure 1[1]), which includes Malibu Valley, Winter Canyon, and the adjacent coastal strips of land and beaches. Existing residents, businesses, and public facilities that discharge wastes through an OWDS in the Malibu Civic Center area, would be affected by the proposed prohibition as well as future dischargers who may plan to discharge in this area. The regulatory action would immediately prohibit all new discharges from OWDS in the Malibu Civic Center area, and establish a schedule to cease discharges from existing systems by 2014.

Types of subsurface disposal systems, or OWDSs, that would be prohibited range from passive systems with conventional septic tanks to active systems with equipment that more aggressively removes pollutant loads from sewage before subsurface disposal. The prohibition would cover an OWDSs that serves an individual property (residential, commercial, industrial, and public properties) as well as a group of properties.

Goal of the Proposed Action

The goal of the proposed prohibition on OWDSs is to remedy pollution of water resources, including beaches, Malibu Lagoon and Creek, and groundwater, that are affected by discharges from OWDSs. The prohibition, together with other efforts, is expected to restore beneficial uses of these water resources.

Environmental Setting

Background

The Malibu Civic Center area supports a population of approximately 2,000 residents and is the core of the City's business, cultural, and commercial activities. The area, which includes the renowned Surfrider Beach, attracts a high volume of visitors.

Residents, businesses, and public facilities in the area discharge wastewaters totaling about 270,000 gallons per day (gpd) through OWDSs to the subsurface and underlying groundwater. These high flows of wastewater, coupled with unfavorable hydrogeologic conditions, have raised concerns about reliance on this wastewater disposal strategy.

Water Resources

Surface waters in the Malibu Civic Center area include Malibu Creek, Malibu Lagoon, a critical fresh/saltwater habitat for rare, threatened, and endangered species, and the ocean beaches that are heavily used by the resident population as well as visitors. Also, groundwater in the area is a historic and potential source of drinking water. In the *Basin Plan,* the Regional Board has formally designated these plus other beneficial uses for water resources as follows:

> **Malibu Lagoon:** Navigation; Water Contact Recreation; Non-contact Water Recreation; Estuarine Habitat; Marine Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wetland Habitat.
>
> **Malibu Creek:** Water Contact Recreation; Non-contact Water Recreation; Warm Freshwater Habitat; Cold Freshwater Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wetland Habitat.
>
> **Malibu Beach and Malibu Lagoon Beach (Surfrider Beach), Amarillo Beach, and Carbon Beach:** Navigation; Water Contact Recreation; Non-contact Water Recreation; Commercial and Sport Fishing; Marine Habitat; Wildlife Habitat; Spawning, Reproduction, and/or Early Development; and Shellfish Harvesting.
>
> **Groundwater:** Municipal and Domestic Supply (Potential), Industrial Process and Service Supply, and Agricultural Supply.

Also in the *Basin Plan,* the Regional Board has established water quality objectives to protect the beneficial uses identified above.

Impairments to Beneficial Uses of Water Resources

In a 2006 Clean Water Act Section 303(d) list, approved by the United States Environmental Protection Agency (US EPA) on June 28, 2007, impairments to beneficial uses are formally identified for the following water resources:

> Malibu Lagoon: impaired by Coliform Bacteria, Eutrophication.
> Malibu Creek: impaired by Coliform Bacteria, Nutrients (Algae).
> Malibu Beach: impaired by Indicator Bacteria.
> Malibu Lagoon Beach (Surfrider Beach): impaired by Coliform Bacteria.
> Carbon Beach: impaired by Indicator Bacteria.

To restore water quality and impaired beneficial uses, the US EPA and/or Regional Board have adopted the following Total Maximum Daily Loads (TMDLs):

a. **Malibu Creek Watershed Nutrient TMDL:** The US EPA, on March 21, 2003, specified a numeric target of 1.0 mg/l for total nitrogen during summer months (April

15 to November 15) and a numeric target of 8.0 mg/L for total nitrogen during winter months (November 16 to April 14). Significant sources of the nutrient pollutants include discharges of wastewaters from commercial, public, and residential land use activities. The TMDL specifies a load allocation for onsite wastewater disposal systems of 6 lbs/day during the summer months and 8 mg/L during winter months.

b. **Malibu Creek and Lagoon Bacteria TMDL:** The Regional Board specified numeric targets, effective January 24, 2006, based on single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. Sources of bacteria loading include storm water runoff, dry-weather runoff, onsite wastewater disposal systems, and animal wastes. The TMDL specifies load allocations for onsite wastewater disposal systems equal to the allowable number of exceedance days of the numeric targets. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 to October 31), there are no allowable exceedance days, in winter dry weather (November 1 to March 31), there are three allowable exceedances days, and in wet weather (defined as days with >=0.1 and the three days following the rain event), there are 17 allowable exceedance days.

c. **Santa Monica Bay Beaches Wet and Dry Bacteria TMDL:** For beaches along the Santa Monica Bay impaired by bacteria in dry and wet weather, the Regional Board specified numeric targets, effective July 15, 2003, based on the single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. The dry weather TMDL identified the sources of bacteria loading as dry-weather urban runoff, natural source runoff and groundwater. The wet weather TMDL identified stormwater runoff as a major source. The TMDLs did not provide load allocations for onsite wastewater disposal systems, meaning that no exceedances of the numeric targets are permissible as a result of discharges from non-point sources, including onsite wastewater disposal systems. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 to October 31), there are no allowable exceedance days, in winter dry weather (November 1 to March 31), there are three allowable exceedances days, and in wet weather (defined as days with >=0.1 and the three days following the rain event), there are 17 allowable exceedance days.

Technical Evidence in Support of the Proposed Prohibition

In the technical staff report, staff presents evidence in support of the proposed prohibition, in accordance with the requirements of the California Water Code, sections 13280 and 13281, for a determination that discharges of OWDSs in the Malibu Civic Center area result in violation of water quality objectives, impairment of present or future beneficial uses of water, pollution, nuisance, or contamination, or unreasonable degradation of the quality of waters of the State. The conclusions, based on the evidence in the technical staff report, are as follows:

i. Dischargers subject to Orders from the Regional Board that specify waste discharge requirements (WDRs) for OWDSs have poor records of compliance. (See Technical Memorandum #1 appended to the technical staff report.)

ii. Discharges of wastewaters released from OWDSs to groundwater contain elevated levels of pathogens and nitrogen that impair underlying groundwater as a potential source of drinking water. (See Technical Memorandum #2 appended to the technical staff report.)

iii. Discharges of wastewaters released from OWDSs to groundwater that is in hydraulic connection with beaches represent a source of impairment for water contact recreation. (See Technical Memorandum #3 appended to the technical staff report.)

iv. Discharges of wastewaters released from OWDSs to groundwater that is in hydraulic connection with Malibu Lagoon transport a nitrogen load significantly in excess of the wasteload allocation in the TMDL established to restore water quality to a level sufficient to protect aquatic life and prevent nuisance resulting from eutrophication. (See Technical Memorandum #4 appended to the technical staff report.)

v. Wastewater flows in the Civic Center area have been increasing. On many sites, hydrogeologic conditions are unsuitable for high flows of wastewater, and many dischargers generate wastewater flows at rates that exceed their capacity to discharge on-site. These dischargers rely on pumping significant flows into tanker trucks that haul liquid sewage and sludge via public roadways to communities that have sewer and wastewater treatment facilities. (See Technical Memorandum #5 appended to the technical staff report.)

Based on these conclusions, the technical staff report presents a recommendation for Regional Board action to prohibit discharges from OWDSs in order to protect the quality of water resources and to restore beneficial uses of water resources in the Malibu Civic Center area. This recommendation is set forth in a tentative resolution for the proposed amendment to the *Basin Plan*, which the Regional Board will consider for adoption on November 5, 2009.

Schedule for Compliance with the Proposed Prohibition

Although the Regional Board is not specifying the *manner* of compliance with the prohibition, staff has reviewed options for conceptual projects that could provide the community with wastewater services in compliance with federal and state regulations, water quality objectives, and the proposed prohibition. These compliance projects include construction, operation, and maintenance of:

A. Integrated water resources management facilities that would collect and treat wastewaters in, and distribute recycled water from, a centralized plant within the community.

B. A community sewer collection system and interceptor sewer to export sewage for treatment at a facility in another community.

C. Decentralized wastewater management facilities that would collect and treat and wastewaters in, and distribute recycled water from, small plants within the community.

The proposed prohibition anticipates that the community would select, design, and construct one of the above projects, or a similar project, and cease discharges from OWDSs by 2014, in accordance with the following schedule:

May 1, 2010:	Completion of 25% of a master facilities plan for possible projects to comply with the prohibition, including initiation of a strong public participation program.
November 1, 2010:	Completion of 50% of a master facilities plan and initiation of environmental review, with strong, on-going public participation. Concurrently, initiation of preliminary engineering and a feasibility study for possible projects to comply with the prohibition.
May 1, 2011:	Substantial completion of a master facilities plan, preliminary engineering and a feasibility study, and engagement of the public in selection of a project to comply with the prohibition.
November 1, 2011:	Completion of a master facilities plan, preliminary engineering and a feasibility study, and selection of a project to comply with the prohibition.
November 1, 2012:	Completion of a final design for selected project.
November 1, 2013:	Completion of 50% of construction of selected project.
November 1, 2014:	Completion of project selected to comply with prohibition, including successful startup of the project and termination of discharge from all OWDSs.

Program Alternatives

In this section, staff analyzed two alternatives, or actions, to the proposed project within the jurisdiction of the Regional Board, municipalities, and other local agencies. These alternatives include:

1. An initiative by a municipality, utility, or other local authority (local government) to cease discharge through OWDSs by providing community services to collect and dispose/reuse wastewater in a manner that will restore water quality and beneficial uses of impaired waters.

2. A 'no action' alternative, in which dischargers continue to rely on existing OWDSs.

Staff did not analyze an alternative that assumes that dischargers would elect to haul large quantities of sewage off-site, by tanker truck, to other communities with wastewater disposal facilities and capacity to accept liquid wastes from dischargers in the Malibu Civic Center area. As discussed in the technical staff report (Technical Memorandum #5), a subset of ten commercial dischargers haul about 7% of their sewage (almost 2 million gallons) from the Malibu Civic Center area to communities that have wastewater treatment facilities. This need results from on-site hydrogeologic limitations and/or facility limitations. The hauling practice already has impacts to traffic, odor, and aesthetics, and staff did not deem this to be a practical alternative on a larger scale (capable of handling flows of about 250,000 gpd to 300,000 gpd) and on a long-term basis, for reasons among which include:

- Tanker truck capacities are small, ranging from 2,500 gallons to 7,000 gallons.
- Public nuisances, including noise and odor, have been observed during the pumping of raw sewage at various commercial facilities for transfer into the tanker trucks.
- Round trips for the tanker trucks are between 60 miles and 180 miles (including routes through other communities), and are expected to have adverse impacts on roads and transportation flows.
- Air quality impacts from diesel emissions would be significant.
- Staff estimates that this practice of managing raw sewage contributes to climate change, at a rate of 250 tons of carbon dioxide per year.

Program Alternative 1– Local Government Initiative

Under program alternative 1, a municipality, utility or other local authority would provide community services to collect and dispose/reuse wastewater in the Malibu Civic Center area in a manner that will restore water quality and beneficial uses of impaired waters.

While a local government may be an existing entity, such as the City of Malibu or and existing utility or other government authority, it also may be a newly formed utility or government authority. California law provides for a number of institutional options for providing community services. For example, the City can contract for services from a nearby government entity that already has wastewater management capabilities and capacity. Alternatively, an existing utility,

such as the Los Angeles County Waterworks District No. 29, Malibu, or a regional water authority, such as the West Basin Municipal Water District, could expand their scope of services and provide wastewater management services, integrated with potable water services already offered to the Malibu Civic Center area. Such an option also offers the potential to manage wastewater as a resource for recycling. Finally, a private organization – while not a government entity – could nevertheless be formed by community members and stakeholders to provide wastewater management services.

Program alternative 1 – for a local government initiative – anticipates achieving water quality objectives and TMDL targets through compliance projects that would provide the community with wastewater services in compliance with federal and state regulations, water quality objectives, and the proposed prohibition. These compliance projects could include construction, operation, and maintenance of:

A. Integrated water resources management facilities that would collect and treat wastewaters in, and distribute recycled water from, a centralized plant within the community.

B. A community sewer collection system and interceptor sewer line to export sewage for treatment at a facility in another community.

C. Decentralized wastewater management facilities that would collect and treat and wastewaters in, and distribute recycled water from, small plants within the community.

An overview and analysis of conceptual projects, or options, that the community and stakeholders could implement to comply with these program alternatives is provided in the next section (Options for Compliance Projects). These compliance projects are expected to have positive environmental impacts, in that they are expected to reduce water quality impairments and help restore beneficial uses. However, these projects also have potential significant adverse impacts to the environment that would occur from the construction, operation, and maintenance these community facilities. These impacts, which are of relatively short duration, can either be mitigated or alternative projects to achieve water quality objectives may be available.

Program Alternative 2 – No Action

This "no action" program alternative assumes that neither the Regional Board nor a local government takes action to prohibit discharges from OWDSs. Although dischargers could voluntarily implement projects to achieve water quality objectives and TMDL targets, staff believes that this is unlikely. Staff's technical memos provide evidence that water quality objectives are not being met and there is no evidence that those objectives will be met in the future absent any additional action. Accordingly, under this program alternative, it is assumed that the cumulative rate of pollutant loading does not decline. As a result, this program alternative would result in continuing or worsening impairments to beneficial uses of the water resources in and around the Malibu Civic Center area, including:

- Malibu Valley groundwater, as a potential source of drinking water.
- beaches, for body contact recreation, and
- Malibu Creek and Lagoon, as support for aquatic and wildlife habitat, including rare, threatened, and endangered species.

Recommendation

Staff concludes that the proposed project (Regional Board prohibition) is the most environmentally advantageous program. Program alternative 2 (no action) is not a preferred alternative because, while it avoids impacts due to construction and operation of wastewater management projects, it allows continued impairment of beaches, Malibu Lagoon and Creek, and underlying groundwater.

Both the proposed project (Regional Board prohibition) and program alternative 1 (local government initiative) have potential to achieve water quality objectives and to restore beneficial uses. However, program alternative 1 relies on an existing or newly formed government entity to voluntarily plan, design, construct, and operate a project that would provide dischargers in the Malibu Civic Center area with community wastewater collection, treatment, and disposal services. Such a voluntary, or discretionary, effort is not currently available. Or, if such an initiative does form, it may not be able to act in a timely manner to complete projects to achieve water quality goals and restore beneficial uses. Therefore, program alternative 1 is not a preferred alternative.

Options for Compliance Projects

Introduction

The program alternatives in the previous section do not specify a particular project to achieve compliance,[4] and it will be the responsibility of the community and stakeholders to select a strategy for compliance. Project-level impacts to the environment will depend on the selected strategy and it will be the responsibility of a local government (local agency) to perform a specific project-level analysis and disclose those environmental impacts.

Nevertheless, the Regional Board can analyze and disclose, on a conceptual basis, foreseeable environmental impacts from possible projects that may be selected for compliance. Accordingly, in this section, staff provides an overview and analysis of three conceptual options, or projects, that the community and stakeholders could implement to comply with the proposed prohibition and program alternative 1 – the local government initiative. These possible compliance projects include:

A. "Integrated Facilities," including the construction and operation of a central wastewater treatment plant in the community, a local sewer collection system, and recycled water distribution system. The community may also elect to broaden the scope of such a project, in order to integrate these services with delivery of potable water supplies; however, for purposes of this analysis, a more limited scope was assumed.

B. "Interceptor Sewer," including construction and operation of a local sewer collection system and an interceptor sewer to export sewage for treatment at a facility in another community.

C. "Decentralized Facilities," including the construction and operation of small plants in the community, small sewer collection systems, and limited recycled water distribution systems.

These projects are expected to have positive environmental impacts, in that they are expected to reduce water quality impairments to:

- Groundwater – which has pollutants from OWDSs at levels that would impact human health should the community need groundwater as part of its potable water supply in the future.

- Malibu Lagoon – which has a nitrogen load from OWDSs at levels that contribute to eutrophication and impair habitat for aquatic life and wildlife.

- Nearby beaches – which consistently fail to meet standards set to protect swimmers and surfers from infectious disease resulting from incidental ingestion of or direct exposure to polluted water.

[4] The Regional Board is prohibited from specifying the manner of compliance with its regulations (Water Code § 13360).

However, these projects also have potential significant adverse impacts to the environment, which would occur from the construction, operation, and maintenance these facilities. These impacts, which are generally of relatively short duration, can either be mitigated or alternative means of compliance with the Regional Board prohibition may be available.

Summary of Economics

Wastewater costs for systems currently operating in the Malibu Civic Center area vary widely. Many residents had passive septic systems installed decades ago which, if replaced today, would roughly cost between $8,000 to $21,000. Maintenance costs for such systems are not significant; assuming a homeowner pumped sludge on a three-year schedule, operating and maintenance costs would be $600 (or $200 annually spread over three years). At the other extreme are capital costs for the wastewater management systems for larger commercial properties that generate high flows of wastewater relative to land available for plant and equipment and for subsurface disposal. For example, capital costs for the treatment system at Malibu Lumber – the most recent system to come on-line (in April 2009) – totaled millions of dollars.

To estimate costs for the three compliance projects considered in this analysis, staff assumed that the projects would be sized to replace the total existing OWDS capacity in the community, and that the projects would not be designed to accommodate increases in wastewater flows. Accordingly, all three compliance projects were sized to handle a flow of approximately 300,000 gpd.

Based on preliminary estimates for the three compliance projects considered in this analysis, capital costs, in today's dollars, would range from $17 million to $80 million, as follows:

Summary of Capital Costs for Compliance Projects

Components	Integrated Facilities	Interceptor Sewer to a:		Decentralized Facilities
		Hyperion Connection	Tapia Connection	
Local Sewer System	$7,800,000	$7,800,000	$7,800,000	$7,800,000
Interceptor Sewer	--	$49,000,000	$72,500,000	--
Treatment Plant(s)	$5,900,000	--	--	$5,800,000
Recycled Distribution System	$3,000,000	0	0	$3,000,000
Total	***$16,700,000***	***$56,800,000***	***$80,300,000***	***$16,600,000***

Also, in switching from OWDSs to one of the above projects, all dischargers would incur costs for abandonment of their systems. For a residential property, these costs are estimated to range from $1,700 to $2,700.

Compliance Project A – Integrated Water Resources Management Facilities

Under the "Integrated Facilities" method of compliance, the City of Malibu, an existing utility or local authority, or a newly formed utility or local authority would construct and operate a centrally located wastewater treatment plant, with a local sewer collection system and a local recycled water distribution system. Capital cost estimates for this compliance project total $16,700,000 and include the following major components and key assumptions:

Integrated Water Resources Management Facilities

Component	Capital Cost	Key Assumptions
Local Sewer System	$7,800,000	22,000 ft of 8-inch diameter pipe, to collect 300,000 gpd by gravity flow to 3 wet wells.
		Construction Technique: Open Cut Trenching
Treatment Plant	$5,900,000	300,000 gpd capacity using activated sludge, filtration, and disinfection to produce a Title 22 recycled water for direct reuse.
		Cost of land not included.
Recycled Water Distribution System	$3,000,000	15,000 ft of 8-inch diameter pipe, to distribute 150,000 gallons of recycled water
		Construction Technique: Open Cut Trenching
		50% of flow recycled; 50% disposed to subsurface.
Total	***$16,700,000***	

For purposes of this preliminary analysis, staff assumed that there would be demand to directly reuse only half of the treated effluent (and a market analysis would need to be conducted to determine the community's capacity for recycling). Community planners may consider the promotion of additional uses for recycled water by requiring dual plumbing for any new development or retrofits.

Staff also assumed that the portion of treated effluent not recycled is discharged through subsurface methods, which will require a larger project footprint, unless the discharge can be integrated into management with other water projects such as stormwater treatment. As an alternative to subsurface disposal, the community may elect to consider an ocean outfall. Costs for construction of this outfall, additional treatment capabilities such as temperature controls for the treated effluent, and diffusers at the outfall, have not been included in this analysis.

Compliance Project B – Interceptor Sewer

Under the "Interceptor Sewer" method of compliance with the proposed prohibition, the community would design and construct a wastewater collection system in the Malibu Civic Center area that would feed into an interceptor sewer that exports the sewage out of the area to another community with wastewater treatment facilities. The nearest connections are sewers that are part of the Hyperion Wastewater Treatment Plant in El Segundo and the Tapia Water Reclamation Facility in Calabasas.

Hyperion Interceptor Sewer: An interceptor sewer designed to export sewage to the Hyperion system is expected to require tunneling under the Pacific Coast Highway to the nearest connection point in Castellammare, which is 7-1/2 miles from the Civic Center area. Cost estimates for this compliance project total $56,800,000 and include the following major components and key assumptions:

Hyperion Interceptor Sewer

Component	Capital Cost	Key Assumptions
Local Sewer System	$7,800,000	22,000 ft of 8-inch diameter pipe, to collect 300,000 gpd by gravity flow to 3 wet wells.
		Construction Technique: Open Cut Trenching
Interceptor Sewer Line	$49,000,000	40,000 ft of 24-inch diameter pipe, to export 300,000 gpd by gravity flow to a connection point in Castellammare.
		Connection fee of $1,700,000 included
		Construction Technique: Trenchless Tunneling
		California Department of Transportation permitting fees not included.
total	***$56,800,000***	

The interceptor sewer line costs include the capital costs of a local collection system, the interceptor line, and four wet well lift stations that would be needed for gravity flow transport of sewage with a vertical lift of 300 feet over 7-1/2 miles to a connection in Castellamarre.

Tapia Interceptor Sewer: An interceptor sewer designed to export sewage to the Tapia Water Reclamation Facility is expected to require tunneling under Las Virgenes Road and installation of pumps to lift the sewage to a connection point with the Tapia plant in Calabasas. Cost estimates for this compliance project total $80,300,000 and include the following major components and key assumptions:

Tapia Interceptor Sewer

Component	Capital Cost	Key Assumptions
Local Sewer System	$7,800,000	22,000 ft of 8-inch diameter pipe, to collect 300,000 gpd by gravity flow to 3 wet wells.
		Construction Technique: Open Cut Trenching
Interceptor Sewer Line	$72,500,000	58,000 ft of 24-inch diameter pipe, to export and lift 300,000 gpd by pressurized flow Tapia.
		Connection fee of $1,700,000 included
		Construction Technique: Trenchless Tunneling
		Permitting fees not included.
total	***$80,300,000***	

The interceptor sewer scenario includes capital costs for the local collection system, the interceptor line, and ten wet well lift stations needed to lift and transport the sewage 800 vertical feet over a distance of 11 miles to the Tapia connection.

Compliance Project C – Decentralized Wastewater Management Facilities

Under the "Decentralized Facilities" method of compliance, the City of Malibu, an existing utility or local authority, or a newly formed utility or local authority would construct and operate small plants in the community, small sewer collection systems, and limited recycled water distribution systems. Or, alternatively, such projects could be led by private sector developers. Cost estimates for this compliance project total $16,600,000 and include the following major components and key assumptions:

Decentralized Wastewater Management Facilities

Component	Cost	Key Assumptions
Local Sewer System	$7,800,000	22,000 ft of 8-inch diameter pipe, to collect 300,000 gpd by gravity flow to 3 wet wells.
		Construction Technique: Open Cut Trenching
Treatment Plant 1	$1,200,000	67,000 gpd capacity using activated sludge, filtration, and disinfection to produce a Title 22 recycled water for direct reuse.
		Cost of land not included.
Recycled Water Distribution System Treatment Plant 1	$600,000	3,000 ft of 8-inch diameter pipe, to distribute Construction Technique: Open Cut Trenching
		50% of flow recycled; 50% disposed to subsurface.
Treatment Plant 2	$4,600,000	233,000 gpd capacity using activated sludge, filtration, and disinfection to produce a Title 22 recycled water for direct reuse.
		Cost of land not included.
Recycled Water Distribution System Treatment Plant 2	$2,400,000	12,000 ft of 8-inch diameter pipe, to distribute Construction Technique: Open Cut Trenching
		50% of flow recycled; 50% disposed to subsurface.
Total	***$16,600,000***	

For purposes of this preliminary analysis, staff assumed that there would be demand to directly reuse only half of the treated effluent, and a market analysis would need to be conducted to determine the capacity for recycling within each sector served by the treatment plants. Community planners may consider the promotion of additional uses for recycled water by requiring dual plumbing for any new development or retrofits. Staff assumed that effluent that could not be recycled is discharged via subsurface mechanisms, which would require more land. Staff did not expect that an ocean outfall for the non-recycled portion of the treated effluent would be practical for these smaller scale plants.

CEQA Analysis

Environmental Checklist and Discussion

The Regional Board has endeavored to analyze and disclose impacts to the environment that are expected to result from possible projects that would achieve compliance with the proposed Regional Board prohibition. These compliance projects, described in the previous section, include construction, operation, and maintenance of:

A. "Integrated Facilities," including the construction and operation of a central wastewater treatment plant in the community, a local sewer collection system, and recycled water distribution system. The community may also elect to broaden the scope of such a project, in order to integrate these services with delivery of potable water supplies; however, for purposes of this analysis, a more limited scope was assumed.

B. "Interceptor Sewer," including construction and operation of a local sewer collection system and an interceptor sewer to export sewage for treatment at a facility in another community.

C. "Decentralized Facilities," including the construction and operation of small plants in the community, small sewer collection systems, and limited recycled water distribution systems.

These compliance projects are expected to have positive environmental impacts, in that discharges through OWDSs should cease, resulting in improvement to water quality and restoration of beneficial uses. However, these projects also have some potential significant adverse impacts to the environment that would occur from the construction, operation, and maintenance of these community facilities, and from abandonment of OWDSs currently in use. These impacts, which are generally of relatively short duration, can either be mitigated or alternative means of compliance with the Regional Board prohibition may be available.

The impacts from the possible compliance projects are analyzed below on a conceptual basis. A review of possible projects[1] and a more detailed, project specific analysis should be led by community leaders with robust participation among stakeholders. It will be the responsibility of the community and stakeholders to select a strategy for compliance. And as a strategy and compliance project are selected, it will be the responsibility of a local government (local agency) to perform a specific project-level analysis and disclose environmental impacts in accordance with CEQA.

[1] The Regional Board is prohibited from specifying the manner of compliance with its regulations (Water Code § 13360).

ENVIRONMENTAL CHECKLIST		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
1.	**Earth. Will the proposal result in:**				
	a. Unstable earth conditions or in changes in geologic substructures?		X		
	b. Disruptions, displacements, compaction or overcoming of the soil?		X		
	c. Change in topography or ground surface relief features?				X
	d. The destruction, covering or modification of any unique geologic or physical features?				X
	e. Any increase in wind or water erosion of soils, either on or off the site?		X		
	f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?			X	
	g. Exposure of people or property to geologic hazards, such as earthquakes, landslides, mudslides, ground failure, or similar hazards?		X		

Discussion:

a. Many of the areas where the compliance projects would be located are already developed and significantly altered, and the projects would not subject people or structures to seismic risk or unstable soils identified on seismic/soil hazard maps. However, portions of the Interceptor Sewer and portions of the collection system for all compliance projects might be constructed through zones of slope instability. During this construction period, compliance with standard design and construction specifications and implementation of recommendations to mitigate geologic hazards, prepared at a project level, would reduce the risk of geologic hazards Such mitigation measures could include among others: shoring sufficient for each excavation, proper location of excavated stockpiled soils, adequate setback from slopes and structures, appropriate compaction of backfilled soils, dewatering excavations as necessary of ground water, and controlling surface run on from stormwater or irrigation.

b. Implementation of any of the compliance projects would disturb soils during excavations and trenching for sewers, pump stations, and/or recycled water distribution lines, and also during foundation work for treatment plant facilities for the Integrated Facilities and Decentralized Facilities. To the extent that any soil is disturbed during construction, standard construction techniques, including but not limited to, shoring, piling and soil stabilization would mitigate any potential impacts. Prior to earthwork, geotechnical studies would be conducted to evaluate geology and soil conditions.

Upon completion of any of the compliance projects, trenching for lateral sewer lines and proper abandonment of existing OWDSs may disturb soils. Standard and accepted engineering practices and techniques for stabilizing soils and minimizing erosion and sedimentation during trenching and installation activities should mitigate these impacts, and would be further evaluated on a project basis.

c. No impact, as infrastructure for the compliance projects could be of a size or scale that minimizes impact to topography and relief.

d. No impact as pre-construction studies and mapping should identify any unique structures or features and geologic mapping during excavations would identify potential problems missed during earlier investigations.

e. For all compliance projects, construction activities would require soil displacement and could result in the loss of topsoil. Trenching equipment would be required to install sewer lines, interceptor line, and recycled water delivery lines. Construction activities would include the use of machinery for rough and final grading. To mitigate these impacts, topsoil could be stockpiled and standard best management practices (BMPs), such as minimizing the size and duration of exposed stockpiles, managing stormwater, and revegetating replaced soils as soon as practicable, could be identified and implemented to prevent/control erosion from water and wind.

f. Portions of all compliance projects would occur in loosely consolidated beach sands due to the location near former shorelines. As documented in 1(e) above, construction activities would require soil displacement. Trenching equipment would be required to install sewer lines, an interceptor line, and recycled water delivery lines. Construction activities would include the use of machinery for rough and final grading. To mitigate these impacts, standard BMPs, such as covering and minimizing the amount of disturbed/stockpiled soil and controlling runon/runoff, would be identified and implemented to prevent/control erosion from water and wind.

g. Portions of the Interceptor Sewer and portions of the the collection system for all compliance projects might be sited and constructed in zones of slope instability identified in published seismic/soil hazard maps. As documented in 1(a) above, compliance with accepted standard engineering design and construction specifications and implementation of measures (such as sufficient shoring for each excavation, proper location of excavated stockpiled soils, adequate setback from slopes and structures, appropriate compaction of backfilled soils, dewatering excavations as necessary of ground water, and controlling surface run on from stormwater or irrigation) to mitigate geologic hazards, prepared at a project level, would reduce the risk of geologic hazards.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
2.	**Air. Will the proposal result in:**				
	a. Substantial air emissions or deterioration of ambient air quality?		X		
	b. The creation of objectionable odors?		X		
	c. Alteration of air movement, moisture or temperature, or any change in climate, either locally or regionally?			X	

Discussion:

a. All compliance projects would be located in the South Coast Air Basin, which is classified as an extreme non-attainment area for ozone and serious non-attainment area for PM_{10} and CO. Due to a coastal influence in the area, air quality is generally considered better than much of the South Coast Air Basin.

During construction of all compliance projects, short-term increases in traffic (from construction equipment as well as idling cars) and short-term use of construction equipment would increase air emissions and generate minor amounts of NOx, CO, SO_2, ROG, and PM_{10}; these emissions would be quantified during planning and design at the project level. With mitigation measures, these emissions should be within the South Coast Air Quality Management District's construction significance thresholds. Measures to mitigate these impacts might include use of construction and maintenance vehicles with lower-emission engines, use of soot reduction traps or diesel particulate filters, and use of emulsified diesel fuel.

During operation of treatment facilities associated with the Integrated Facilities, Decentralized Facilities, and pump stations for local sewers associated with all compliance projects, maintenance activities and solid waste removal are not expected to significantly increase air emissions. Furthermore, solid waste removal schedules could be synchronized with general trash removal schedules.

b. All compliance projects have the potential to eliminate existing odors from problematic OWDSs and from pumping excess sewage into tanker trucks for off-site hauling. However, the projects may also create odors during construction (which would be of a short-term nature) and during operation of facilities such as the Integrated Facilities and Decentralized Facilities. The potential for such odors would be evaluated during planning and design at the project level. Mitigation measures, such as siting, design, and buffer zones, would be identified and considered at a project level.

c. No significant impact as construction activities would not increase air emissions to an extent that affects air movement, moisture or temperature, or change in climate.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
3.	**Water. Will the proposal result in:**				
	a. Changes in currents, or the course of direction or water movements, in either marine or fresh waters?				X
	b. Changes in absorption rates, drainage patterns, or the rate and amount of surface water runoff?			X	
	c. Alterations to the course of flow of flood waters?		X		
	d. Change in the amount of surface water in any water body?			X	
	e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen, or turbidity?		X		
	f. Alteration of the direction or rate of flow of ground waters?	X			
	g. Change in the quantity or quality of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	X			
	h. Substantial reduction in the amount of water otherwise available for public water supplies?				X
	i. Exposure of people or property to water related hazards such as flooding or tidal waves?			X	

Discussion:

a. No changes in currents or surface water flow are expected because the proposed project and the potential compliance projects are not expected to discharge to any surface waters and create this impact.

b. Decreases in absorption rates, drainage patterns, or the rate and amount of surface water runoff from hardscape at the plant(s) for the Integrated Facilities and Decentralized Facilities are expected to be minimal because the design and construction of these facilities would have to consider and address these factors. These impacts would be evaluated at the project level, and minimized through siting and design of the facilities during the planning stages.

c. Alterations to the course of flow of flood waters may be expected but the compliance projects will have be designed, constructed and operated to take into account the flow of flood waters when the site of the facilities are determined. The City is aware of the flood hazards, as described in the Malibu General Plan, section 7.3.3.1, and will be expected to ensure through its oversight

of the design and construction of compliance projects that the sites will account for such hazards. The City will determine the appropriate mitigation measures.

d. No change in the amount of flow of surface water is expected because neither the proposed project nor the compliance projects are expected to discharge flows into surface waters. To the extent that groundwater is dewatering during construction and discharged into surface waters, it is not expected that such discharges will change the amount of flow of surface waters significantly.

e. Water quality problems, including eutrophication in Malibu Lagoon and pathogen levels at beaches that necessitate beach advisories, are well known in the area. Implementation of compliance projects is expected to improve, over the long-term, the quality of surface waters in the area and to restore beneficial uses.

However, during construction of all of the compliance projects, possible short-term impacts may result. The potential for such impacts, such as increased turbidity and sediment in runoff from construction sites and groundwater dewatering, would be evaluated during planning and design at the project level. Mitigation measures, such as treatment of dewatered groundwater prior to discharge during construction and construction BMPs (such as berms, fiber blankets, soil cover, temporary vegetation) to control pollution in stormwater, would be identified and considered at a project level.

Furthermore, for compliance projects such as the Integrated Facilities, there may not be sufficient demand for recycling of all of the wastewaters, and a portion of the 300,000 gpd flow may need to be discharged. Should areas with favorable hydrogeologic conditions for subsurface disposal not be identified, such projects may require export of the treated wastewater through an outfall. With proper design and operation of treatment facilities and outfall equipment such as diffusers and temperature controls, an outfall discharge should meet water quality objectives, including temperature and turbidity. These impacts, together with mitigation measures, would be considered at a project level.

f. Upon operation of all compliance projects, termination of discharges from OWDSs would alter, on a local scale, groundwater flow patterns because the discharges from the OWDSs will cease. Should subsurface disposal mechanisms be used for all or a portion of the discharge from the Integrated Facilities and Decentralized Facilities, groundwater flow patterns could be altered on a larger scale. Proper design and siting of the subsurface disposal mechanisms will be necessary to mitigate this impact to the extent possible.

In anticipation of restoration of groundwater quality, integrated planning and design for disposal field sites should consider potential sites for future production wells to meet a portion of the community's potable water needs or as a short-term water supply in the event of disrupted delivery from the Los Angeles County Waterworks District No. 29 – Malibu. Future groundwater production would significantly alter the direction and rate of flow of groundwater. These and other impacts would be evaluated during planning and design at the project level, and monitored during operation of disposal mechanisms. Possible mitigation measures could include planning efforts to determine the safe yield of the basin and the minimum discharge required for Malibu Creek and Lagoon for aquatic life protection.

g. One of the goals of the Regional Board's proposed prohibition is to improve the quality of groundwater and restore this resource as a potential source of drinking water. This would be a potentially significant beneficial impact. See also 3(f) above.

h. No reduction to public water supplies is expected. One of the goals of the Regional Board's proposed prohibition is to improve the quality of groundwater and restore this resource as a potential source of drinking water. See also 3(f) above.

i. The Malibu General Plan, section 7.3.3.1 states that tsunamis can be expected rarely from distant sources but may be generated offshore by surface ground rupture or submarine landslides. Damage to the Malibu Civic Center area due to flooding from such events can be expected. The Malibu Building Code, specifically Chapter 15.20, contains mitigation measures for flood impacts. Such mitigation includes: requiring bulkheads or other protective barriers be installed at time of construction, control the creation of hazards that contribute to flood, control the location of facilities, and prevent the construction of flood barriers that may increase flood hazards in other areas.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
4.	**Plant Life. Will the proposal result in:**				
	a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, microflora and aquatic plants)?		X		
	b. Reduction of the numbers of any unique, rare or endangered species of plants?		X		
	c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?				X
	d. Reduction in acreage of any agricultural crop?				X

Discussion:

a. As much of the Malibu Civic Center area is urbanized, construction and operation of facilities associated with all compliance projects would not disturb or change plant diversity or change or reduce the number of unique, rare, or endangered species of plants. However, portions of the area are environmentally sensitive and, depending on the location selected for the facilities, impacts could potentially occur to biological resources including special-status species and habitats, wetlands, and trees protected under local ordinances or policies. Important plant communities include the coastal salt marsh and coastal stand. The diversity of species, or number of any species of plants, could be maintained by siting and/or by preserving plants prior, during, and after the construction of facilities by re-establishing and maintaining the plant communities after construction. The City of Malibu's Technical Advisory Committee has completed studies on the ecosystem of Malibu Valley and generated documents recommending the enhancement of the plant and animal life to replicate historic conditions. These plans can provide specific options for the mitigation of removal of plant and animal life through project construction and result in an enhanced ecosystem upon completion.

b. As documented in 4(a) above, portions of the area are environmentally sensitive and, depending on the location selected for the facilities, impacts could potentially occur to biological resources including unique, rare or endangered species of plants. When the specific projects are developed and sites identified, a search of the California Natural Diversity Database could be employed to confirm that any potentially sensitive plant species or biological habitats in the site area are

properly identified and protected as necessary. Focused protocol plant surveys for special-status-plant species could be conducted. Responsible agencies should endeavor to avoid compliance measures that could result in reduction of the numbers of any unique, rare or endangered species of plants. If sensitive plant species occur on a project site, a local agency should require mitigation in accordance with the Endangered Species Act. These mitigation measures would be developed in consultation with the California Department of Fish and Game (CDFG) and the United States Fish and Wildlife Service (USFWS). Also, see 4(a) above.

c. No impact because the use of an existing ecosystem study to choose landscaping, as described in 4(a), should minimize the invasion of foreign species.

d. No impact because, according to the Malibu General Plan, page 1-13, traditional ranching and farming is only practiced in a minute fraction of land within the City. Horticulture and horse ranches are more prevalent, usually as a transitional use or adjunct to residential use.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
5.	**Animal Life. Will the proposal result in:**				
	a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, insects or microfauna)?		X		
	b. Reduction of the numbers of any unique, rare or endangered species of animals?		X		
	c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?				X
	d. Deterioration to existing fish or wildlife habitat?		X		

Discussion:

a. As much of the Malibu Civic Center area is urbanized, construction and operation of facilities associated with all compliance projects would not disturb or change the diversity of animal species or change or reduce the numbers of any of species. However, portions of the area are environmentally sensitive and, depending on the location selected for the facilities, impacts could potentially occur to biological resources including the wetlands and riparian habitat. Malibu Lagoon is a refuge for migrating birds. When specific projects are developed and sites identified, measures should also be identified to avoid and mitigate impacts to habitat and direct impacts to animals and wildlife during construction and operation. The City of Malibu's Technical Advisory Committee has completed studies on the ecosystem of Malibu Valley and generated documents recommending the enhancement of the plant and animal life to replicate historic conditions. These plans can provide specific options for the mitigation of removal of plant and animal life through project construction and result in an enhanced ecosystem upon completion.

b. As documented in 5(a) above, portions of the area are environmentally sensitive and, depending on the location selected for the facilities, impacts could potentially occur to biological resources including unique, rare or endangered species of animals. Construction activities may be proposed within and/or adjacent to areas potentially supporting these species and may result in the temporary and/or permanent modification of their habitat. When the specific projects are developed and sites identified, a search of the California Natural Diversity Database could be employed to confirm that any potentially special-status animal species in the site area be properly identified and protected as necessary. When specific projects are developed and sites identified, measures should be identified that will avoid or mitigate impacts to the habitats and also direct impacts to animals during construction and operation. If a project site is located in a habitat for a sensitive animal species, a local agency should require mitigation in accordance with the Endangered Species Act. These mitigation measures would be developed in consultation with the California Department of Fish and Game (CDFG) and the United States Fish and Wildlife Service (USFWS). See 5(a) above.

c. No impact because the projects will not introduce new species nor will the compliance projects be sited to be barriers to the movement of animals. Proper design and siting analysis will prevent this factor from being a concern .

d. As documented in 5(a) above, portions of the area are environmentally sensitive and, should facilities be located in a habitat supporting fish or wildlife habitat, some short-term deterioration to this habitat might occur during construction. When specific projects are developed and sites identified, standard BMP measures such as soil coverings, fiberglass barriers, and fencing, should be identified that will avoid or mitigate impacts to habitat and to animals during construction and operation.

However, it is expected that all the compliance projects will, over the long-term, considerably improve habitat for aquatic life and wildlife.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
6.	**Noise. Will the proposal result in:**				
	a. Increases in existing noise levels?		X		
	b. Exposure of people to severe noise levels?		X		

Discussion:

a. During construction, all compliance projects would be expected to result in noise and/or vibration. When specific projects are developed, measures should be identified to ensure that noise is kept to levels that comply with any noise standard or ordinance. Mitigation could include requirements for mufflers on noise emitting equipment, or construction during certain times of the day.

During operation, no significant increase in noise is anticipated from any of the possible compliance projects. Design of buildings to capture and muffle noise could be required. There

may be a reduction in noise on commercial sites that on tanker trucks to regularly pump raw sewage for off-site hauling once these sites are connected to one of the compliance projects.

b. As noted in 6(a) above, all compliance projects would be expected to result in noise and/or vibration during construction. Machinery used for construction would likely include standard equipment such as graders, dozers, backhoes, and other similar equipment. It is unknown at this time if pile driving equipment would be required to construct any facilities. Noise impacts from vehicles, machines, and equipment, would be short-term and of a temporary duration. When specific projects are developed, measures, such as requiring mufflers on equipment or construction during certain times of the day, should be identified to ensure that noise is kept to levels that comply with any noise standard or ordinance.

During operation, no significant increase in noise is anticipated from any of the possible compliance projects.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
7.	**Light and Glare. Will the proposal:**				
	a. Produce new light or glare?		X		

Discussion:

a. Construction of the compliance projects is not likely to produce new light or glare, unless construction is done at night. For the Interceptor Sewer, however, should construction night-time schedules be used to mitigate traffic impacts during construction, additional lighting will be needed. Such impacts, which would be short-term, should be evaluated at the project level. Mitigation measures could include hoods or shields to direct lighting down onto the work areas.

During operation of all compliance projects, no need for significant lighting is expected. For lighting that may needed, light and glare to passing vehicles, neighborhood homes, and businesses during operation, can be minimized by a lighting plan specifying hoods or shields on all light fixtures and limiting light trespass and glare through the use of shielding and directional lighting methods.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
8.	**Land Use. Will the proposal result in:**				
	a. Substantial alteration of the present or planned land use of an area?	X			

Discussion:

a. The proposed prohibition is intended to be growth neutral, and not have a direct impact on population and housing. Under California law, each county and city must prepare a comprehensive, long term general plan to guide its future. In general plans, counties and cities must address a minimum of seven elements, including housing. The City of Malibu and County of Los Angeles have adopted general plans and amended these plans. Through the general planning process as well as zoning and other land use authorities, the City and the County have authority to meet community goals, including land use goals.

Sewer lines for all three compliance projects should not have impacts on land use, zoning, or the physical arrangement of the community. After installation of the sewer lines, pre-project conditions would be restored.

Land for treatment plant facilities for the Integrated Facilities and Decentralized Facilities might require changes in land use. The Integrated Facilities' wastewater/recycled water plant would require land for construction and operation of this facility. Should disposal of treated wastewater that cannot be recycled be discharged to the subsurface, additional land for infiltration would be required. The Decentralized Facilities also would require land for plant(s) and subsurface disposal, although such land requirements may be on a smaller scale and require a smaller footprint. Impacts would be considered at a project level since the location selected will likely determine if there is a "substantial alteration of the land use of the area. Possible mitigation would involve careful consideration of the siting of the facilities to meet community goals, in accordance with local plans and zoning codes.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
9.	**Natural Resources. Will the proposal result in:**				
	a. Increase in the rate of use of any natural resources?				X
	b. Substantial depletion of any nonrenewable natural resource?				X

Discussion:

a. No impact. The compliance projects would not use or deplete any mineral resources in the area. The use of electrical power and fuel is discussed in the Energy portion of the checklist.

During operations, no impact to natural resources is anticipated, other than land. See the discussion under Land – 8(a).

b. No Impact. See Natural Resources – 9(a) above.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
10.	**Risk of Upset. Will the proposal involve:**				
	a. A risk of an explosion or the release of hazardous substances (including, but not limited to: oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?		X		

Discussion:

a. For all compliance projects, it is reasonably foreseeable that hazards or hazardous materials would be used during construction, operation, and maintenance of the facilities. However, the use of these materials is not expected to create a significant hazard to the public or environment through the routine transport, use, or disposal of hazardous materials. The hazardous materials that might be used are controlled substances regulated at the state and local levels. Materials would be delivered by contractors licensed to handle and transport these materials in accordance with applicable laws and regulations. The storage and use of materials would be strictly regulated and a hazardous materials management program would be developed for use by construction contractors and plant operators. This information would also be filed with the fire department. See also the discussion under 14(a). Mitigation could be a requirement that all handlers/transporters receive education about the federal, state and local laws, ordinances, regulations and statutes that govern safe handling/transport of hazardous materials.

Proper design of sewer and plant facilities for all compliance projects, with appropriate redundancy, backup systems, and alarms would lower risk of upset during operation of the plant and sewer facilities for all compliance projects. Backup electrical generators to ensure uninterrupted power supply (redundancy requirement) could be installed to monitor release of hazardous substances in the event of an accident, upset condition, or natural disaster. A warning system could be designed and operated to ensure that responsible personnel provide quick and effective response. During operation, early detection of potential failures can be improved through frequent inspections and wastewater testing. Operators should be trained and certified, and have a safety plan in place for upset conditions. Periodic video surveys of sewer lines could detect rooting or corrosion, allowing for appropriate maintenance and repair to prevent sewer line rupture.

Due to the nature (wastewater management) of all compliance projects, the risk of exposure to raw sewage and partially treated wastewater should be lowered, as the projects are intended to better control and manage wastewaters generated within the community. During abandonment of existing OWDSs, the risk of accidental release of hazardous material can be lowered by complying with local codes for proper decommissioning such systems. See section 16(d).

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
11.	**Population. Will the proposal:**				
	a. Alter the location, distribution, density, or growth rate of the human population of an area?			X	

Discussion:

a. All compliance projects would replace existing on-site wastewater disposal systems, and should not affect population and growth. However, during construction of all compliance projects, there may be brief, temporary periods during which construction workers are employed in the area. These workers are not expected to substantially add to new employment and population density.

The compliance projects are expected to be sized to replace existing OWDS flows only, and no population increases are expected. However, depending upon the location of the compliance projects, some of these factors may be impacted. Without a specific compliance project to analyze, any discussion would be speculative. See the discussion under Housing – 12(a).

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
12.	**Housing. Will the proposal:**				
	a. Affect existing housing, or create a demand for additional housing?		X		

Discussion:

a. The proposed prohibition is intended to be growth neutral, and should not have a direct impact on population and housing. However, the project could have an effect on existing housing. The City of Malibu, in its General Plan section 3.3.3, has a strategy of using individual septic systems as a means of reducing the rate and intensity of growth. The building of any of the compliance projects could undermine that strategy. As mitigation, the City of Malibu could update its General Plan to develop a new strategy for reducing the rate and intensity of growth. If none of the compliance projects are developed, the impact could be that all housing is affected adversely. However, that is not a reasonably foreseeable outcome.

The proposed prohibition will not create a demand for additional housing, nor will the development of any compliance project. By itself, the building of some type of community treatment system should not create a demand for additional housing. Further, the Malibu General Plan section 7.3.3.1 states that the opportunity for development of housing is constrained by geologic hazards, flood hazards, and wildland and urban fire hazards. Also, slope instability,

expansive soils, and high groundwater are additional constraints on development. Therefore, it seems unlikely that this project will create a demand for additional housing.

Through the general planning process as well as zoning and other land use authorities, the City and the County have the tools to meet community goals, including housing goals.

During construction of all compliance projects, there may be brief, temporary periods during which construction workers are employed in the area. These temporary workers are expected to be present for one shift per work day, and should not add to housing demands.

The compliance projects will presumably be sized to provide capacity for existing wastewater flow rates or for whatever level of growth that the City decides. During operation of all compliance projects, no increased demand for housing stemming from job creation at the compliance projects is anticipated.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
13.	**Transportation/Circulation. Will the proposal result in:**				
	a. Generation of substantial additional vehicular movement?	X			
	b. Effects on existing parking facilities, or demand for new parking?		X		
	c. Substantial impact upon existing transportation systems?	X			
	d. Alterations to present patterns of circulation or movement of people and/or goods?			X	
	e. Alterations to waterborne, rail or air traffic?				X
	f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?	X			

Discussion:

a. Construction of all three compliance projects would require construction crews and earthmoving equipment, and may require soil transport, resulting in some traffic congestion of a short-term, temporary duration. Measures to mitigate these impacts, which would be examined more closely on a project level, could include development of a traffic mitigation plan. For the Interceptor Sewer, a project level analysis should consider night-time schedules for construction along the Pacific Coast Highway, which is the most heavily traveled highway in the area and which is an important regional link. This may be a significant adverse impact for a short duration.

During operation of the compliance projects, no impacts are expected to traffic. Traffic conditions may improve upon completion of the compliance projects, as the need for frequent pumping from many commercial facilities will be eliminated.

b. During construction, all compliance projects may cause some loss of parking capacity. However, this impact is temporary. Measures to mitigate such impacts would be examined more closely on a project level, and could include development of a traffic mitigation plan which addresses parking issues, such as park-and-ride lots or temporary increased public transportation.

During operation, no significant impacts are expected.

c. During construction, all compliance projects may impact existing roadways and parking capacity. The Treatment Plants and Interceptor Sewer project would have significant impacts on vehicle traffic on the Pacific Coast Highway; however, this impact will be temporary and limited to the construction phase and for intermittent maintenance activity. Impacts would be examined more closely on a project level, and measures to facilitate traffic movement, such as minimizing construction traffic in peak traffic times and providing temporary traffic signals/flagging could be developed in a traffic mitigation plan.

During operation, no significant impacts are expected

d. During construction of the compliance projects, there may be temporary less than significant impacts to present patterns of circulation due to temporary road closures or detours. No impacts from operation of the compliance projects is expected.

e. No impact. No waterborne, air, or rail traffic is expected to be generated from any of the compliance projects during construction or operation.

f. No permanent road or design hazards are associated with operation of any of the possible compliance projects. However, during construction, all three compliance projects would require construction crews, earthmoving equipment, and – for Interceptor Sewer – possible night-time construction activity. These activities would result in some traffic congestion of a short-term, temporary duration. Hazards arising from such conditions would be considered at a project level, and measures to lower risk to vehicles, bicyclists, and pedestrians might include signage and markings, barricades, and traffic flow controls (signals or traffic control personnel), and coordination with local police and the California Highway Patrol. These methods would be selected and implemented by responsible local agencies considering project level concerns.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
14.	**Public Service. Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:**				
	a. Fire protection?		X		
	b. Police protection?			X	
	c. Schools?				X
	d. Parks or other recreational facilities?	X			
	e. Maintenance of public facilities, including roads?				X
	f. Other governmental services?				X

Discussion:

a. Construction of all three compliance projects, and operation of the treatment facilities for the Integrated Facilities and Decentralized Facilities would use hazardous materials, and incidents of upset, such as spills, could result in the need for emergency and/or fire suppression response. Traffic impacts during construction of all compliance projects could result in delays in emergency responses; however, most jurisdictions have in place established procedures to ensure safe passage of emergency vehicles during periods of road maintenance, construction, or other attention to physical infrastructure. Impacts to fire protection and response capabilities, and measures to mitigate these impacts, would be considered at a project level.

b. Mitigation of traffic impacts during construction of all compliance projects would require coordination with local police and the California Highway Patrol. See the discussion under 13(f). These impacts could result in delays in police emergency responses; however, most jurisdictions have in place established procedures to ensure safe passage of emergency vehicles during periods of road maintenance, construction, or other attention to physical infrastructure. Impacts to police protection and response capabilities, and measures to mitigate these impacts, would be considered at a project level.

No impact during operation of any of the compliance projects.

c. No impact is expected to schools, as none of the compliance projects is expected to add new students to elementary, middle, or high schools or to Pepperdine University.

d. See the discussion of land use impacts under 8(a) above and recreational impacts under 14(a) below. The Integrated Facilities – a centralized integrated wastewater/recycled water plant – would require land for construction and operation of this facility. Impacts to parks and measures to mitigate these impacts would be considered at a project level.

Compliance with the proposed prohibition is a remedy to restore beneficial uses, including avoiding beach closures that currently impair swimming along beaches in the Malibu Civic Center area.

e. No impact to maintenance of public roads is expected. During sewer installation of all three compliance projects, the City of Malibu and other entities with utilities along the public roads will coordinate maintenance and repair activities.

Positive impacts (lower road maintenance) might result from a reduction in tanker truck traffic that will no longer be needed to haul a portion of the community's sewage to facilities in other areas (e.g. Carson).

f. No impact, because it is likely that the City would re-direct its efforts to oversee its existing strategy of OWDS management in the Malibu Civic Center area to an area-wide wastewater collection and treatment strategy, to achieve compliance with the proposed prohibition. Should the City decide to pursue an integrated strategy of managing stormwater, wastewater, and recycled water, it may be better positioned to accomplish conservation and environmental goals.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
15.	**Energy. Will the proposal result in:**				
	a. Use of substantial amounts of fuel or energy?			X	
	b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?			X	

Discussion:

a. During the construction phase of all compliance projects, construction vehicles, equipment, and machinery would require fossil fuel and/or power. These energy demands are not expected to significantly affect the power grid or deplete resources of fossil fuels; nor are the energy demands expected to conflict with energy conservation plans or use non-renewable resources in a wasteful manner. Such impacts, and measures to promote energy efficiency, would be evaluated on a project basis.

As design of treatment plant facilities for Integrated Facilities, Decentralized Facilities and pumping stations to lift wastewater in sewers for all compliance projects is expected to be subject to building codes with energy conservation requirements, operation is expected to result in an incremental amounts of energy, and demand on the power grid is expected to be minimal. Such impacts, and measures to promote energy efficiency, would be evaluated on a project basis.

b. Energy needed for existing OWDSs ranges from zero (for passive septic systems) to low power consumption (for advanced OWDSs). During operation of a compliance project, the demand for energy will increase, as energy would be needed to power lift pumps for the collection system and interceptor sewer, and/or treatment plant. This increase is

estimated to range from 300 kilo-watt hours per day to 1,500 kilo-watt hours per day, and is not expected to be a significant impact. Nor are any of the compliance projects expected to result in the need for a new source of energy. Impacts would be evaluated on a project basis.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
16.	**Utilities and Service Systems. Will the proposal result in a need for new systems, or substantial alterations to the following utilities:**				
	a. Power or natural gas?			X	
	b. Communications systems?				X
	c. Water?			X	
	d. Sewer or septic tanks?	X			
	e. Storm water drainage?		X		
	f. Solid waste and disposal?			X	

Discussion:

a. Refer to discussion under Energy, 15(a) and 15(b) above.

b. No impact as none of the compliance projects will place significant demands on existing communication systems.

c. Operation of the Integrated Facilities, if undertaken in conjunction with capital improvements to the community's water supply system, could improve the reliability of water service.

Furthermore, and by their nature, operation of all the possible projects to comply with the prohibition is expected to result in substantial improvements to water quality, including the quality of groundwater (which is a potential source of drinking water for the community, especially in the event of a disruption to deliveries of imported water supplies).

See also the discussion under Water, 3(g) above.

d. The purpose of the prohibition and possible compliance projects is to eliminate reliance on OWDSs, which have severe constraints, including hydrogeological, siting, capacity, and operational constraints. By the nature of the prohibition, elimination of the on-site systems will result in a need for sewers and treatment facilities. The elimination of these on-site systems will require septic tanks, leach fields or seepage pits to be properly abandoned or decommissioned in compliance with the Malibu Plumbing Code (which is Title 28, Plumbing Code, of the Los Angeles County Code, as amended and in effect on January 1, 2008, adopting the California

Plumbing Code, 2007 Edition (Part 5 of Title 24 of the California Code of Regulations)) and/or any other appropriate ordinance, regulations or statutes.

e Refer to discussion under Water, 3(b), 3(c), 3(d), 3(e) above. All three proposed compliance projects would result in earth disturbances during construction activities which may impact storm water drainage. The disturbances would result from site grading and trenching for the construction of the wastewater treatment plant and lift stations, sewer collection systems, and pumped sewer lines. The impacts produced by the storm water run-on and run-off at construction sites could be mitigated by applying good engineering and management practices. Good practices could include construction during the dry season, appropriate soil compaction, slope stabilization, soil stock pile minimization, rapid re-vegetation of affected areas before the rainy season, reduced exposure time of disturbed areas, and appropriate management of storm water to avoid contact with unstable areas

f. During construction of all compliance projects, excavated soils should be re-used as fill material to the extent feasible. However, a minimal amount of soils and other construction materials may be wasted. For example, soils and aggregate wastes could be transported to aggregate recycling centers and prepared for reuse, and/or applied as daily cover at landfills. Wastes generated from the abandonment of existing OWDSs would be handled in compliance with Los Angeles County or City Plumbing Codes and Chapter 7 of the California Plumbing Code. These impacts, which are expected to be less than significant, would be evaluated on a project level.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
17.	**Human Health. Will the proposal result in:**				
	a. Creation of any health hazard or potential health hazard (excluding mental health)?		X		
	b. Exposure of people to potential health hazards?		X		

Discussion:

a. During construction of all three possible compliance projects, there may be an increased risk to the health of construction workers who may be handling hazardous materials. This would be evaluated on a project basis, and appropriate measures – such as Health and Safety Plans and compliance with Cal OSHA regulations – to mitigate these risks should be identified. For a discussion on the risk of Upset, refer to discussion under 10(a).

During operation of the wastewater treatment plants for the Integrated Facilities and Decentralized Facilities and during maintenance of sewers and pump stations for all compliance projects, operating personnel may be exposed to raw sewage and partially treated wastewaters. These possible impacts would be evaluated on a project basis and appropriate measures – such as Health and Safety Plans and compliance with Cal OSHA regulations to provide safety equipment and training – to mitigate these risks should be identified.

Due to the nature of the proposed prohibition and possible projects to comply with the prohibition, wastewaters from domestic, commercial, and industrial activities will be better controlled, treated, and discharged (or recycled).

b. See discussion under 17(a) above.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
18.	**Aesthetics. Will the proposal result in:**				
	a. The obstruction of any scenic vista or view open to the public?		X		
	b. The creation of an aesthetically offensive site open to public view?		X		

Discussion:

a. During construction of all three possible compliance projects, the aesthetics of residents and visitors may be offended by construction equipment and activities. These impacts, which would be temporary, together with appropriate mitigation measures such as temporary screens or landscaping, would be considered at a project level.

After installation of sewers for all three compliance projects, pre-project conditions would be restored, and the sewers would not permanently impact aesthetics.

After construction, facilities such as a treatment plant and reservoir for storing recycled water could impact scenic vistas or views open to the public. These impacts would be evaluated on a project level, and designs could be required in locations that are acceptable to the community. Mitigation could include ensuring that the design of the facilities considers appropriate and acceptable shapes, sizes, and colors of the facilities, re-establishment of vegetative cover in disturbed areas, landscaping of graded slopes, and installation of screens or fences. Irrigation with recycled water could result in more rapid growth of the new landscaping.

b. See discussion under 18(a) above.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
19.	**Recreation. Will the proposal result in:**				
	a. Impact upon the quality or quantity of existing recreational opportunities?	X			

Discussion:

a. The Integrated Facilities – a centralized integrated wastewater/recycled water plant – would require land for construction and operation of this facility. During construction of the Integrated Facilities, the park may be temporarily unavailable for recreation. Such impacts, together with mitigation measures, would be considered at a project level. If the facilities are built on lands used for recreational activities, there could be significant impacts. Appropriate mitigation could include improving other recreational sites or creating other locations for recreational use.

Implementation of one of the possible projects to comply with the proposed prohibition is a remedy to restore beneficial uses, including avoiding beach closures that currently impair swimming along beaches in the Malibu Civic Center area. This long-term impact and restoration of water quality in Malibu Lagoon and along beaches will enhance recreational opportunities.

See also the discussions for Land use under 8(a) above and for Public Services—Parks under 14(d) above.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
20.	**Archeological/Historical. Will the proposal:**				
	a. Result in the alteration of a significant archeological or historical site structure, object or building?		X		

Discussion:

a. It is not expected that any of the compliance projects would affect historic structures. Also, it is expected that the compliance projects would not affect archeological resources, as sewers for all the possible compliance projects would generally be located in public streets and on public property that has already undergone significant disturbance.

Should a relatively undisturbed site be selected for a treatment plant for the Integrated Facilities or Decentralized Facilities, impacts and mitigation measures recommended by appropriate agencies and organizations for possible archeological resources would be evaluated on a project level. These measures could include a records search, using resources such as the South Central Coastal Archaeological Information Center at the University of California, Los Angeles. Other

measures could include a field survey, to examine the surface of the areas proposed for grading or disturbance and a requirement that an archaeologist be on site during grading, trenching, and excavations.

	ENVIRONMENTAL CHECKLIST	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant	No Impact
21.	**Mandatory Findings of Significance**				
	Potential to degrade: Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		
	Short-term: Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time, while long-term impacts will endure well into the future.)			X	
	Cumulative: Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)			X	
	Substantial adverse: Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

Discussion:

The prohibition does not have the potential to degrade the quality of the environment in the long-term. The possible compliance projects also do not have reasonably foreseeable long-term impacts that will degrade the quality of the environment with significant adverse impacts. As discussed in the checklist herein, there are many standard mitigation measures well known to responsible local agencies that will have jurisdiction over the compliance projects. The short-term construction impacts, however, may be significant in some ways. Those impacts are also described in the checklist and discussion herein.

The prohibition probably will not have the potential to achieve short-term benefits. The prohibition, in conjunction with the TMDLs and other regulatory actions, will provide long-term beneficial impacts to water resources.

As discussed below, the cumulative beneficial impacts are considerable, while the cumulative adverse impacts are not. The cumulative impacts from implementation of the TMDLs, this prohibition, and the City's efforts will have an immense benefit to the water resources, resulting in more environmental and economic benefits to the City of Malibu.

The project and potential compliance projects do not have the potential to create substantial adverse effects to human beings, directly or indirectly. Assuming the compliance projects are appropriately designed, constructed and operated in conformance with all laws, ordinances, regulations and statutes, it is not foreseeable that there will be substantial effects to human beings. In fact, there should be substantial beneficial effects on human beings as the water resources of the Civic Center area will no longer be impaired.

Other Environmental Considerations

Analyses of other environmental impacts resulting from reasonably foreseeable options of complying with the proposed prohibition include:

- Cumulative Impacts of the Program Alternatives (as required by CEQA Guidelines Section 15130): Cumulative impacts, defined in Section 15355 of the CEQA Guidelines, refer to two or more individual effects, that when considered together, are considerable or that increase other environmental impacts. A cumulative impact assessment must consider not only impacts of the proposed prohibition, but also impacts from other municipal and private projects that would occur in the area during the period of implementation.
- Potential Growth-Inducing Effects of the Program Alternatives (as required by CEQA Guidelines Section 15126).
- Unavoidable Significant Impacts (as required by CEQA Guidelines Section 15126.2).

Cumulative Impacts

On a programmatic level, the Regional Board expects a net environmental benefit to water quality and beneficial uses from the proposed prohibition, TMDLs, and other future regulatory actions. The Regional Board's proposed prohibition is a regulatory action that is related to TMDLs that have been developed by the Regional Board and US Environmental Protection Agency, including:

a. The Malibu Creek Watershed Nutrient TMDL: The US EPA, on March 21, 2003, specified a numeric target of 1.0 mg/l for total nitrogen during summer months (April 15 to November 15) and a numeric target of 8.0 mg/L for total nitrogen during winter months (November 16 to April 14). Significant sources of the nutrient pollutants include discharges of wastewaters from commercial, public, and residential land use activities. The TMDL specifies a load allocation for onsite wastewater disposal systems of 6 lbs/day during the summer months and 8 mg/L during winter months.
b. The Malibu Creek and Lagoon Bacteria TMDL: The Regional Board specified numeric targets, effective January 24, 2006, based on single sample and geometric mean bacteria water quality objectives in the *Basin Plan,* to protect the water contact recreation use. Sources of bacteria loading include storm water runoff, dry-weather runoff, onsite

wastewater treatment systems, and animal wastes. The TMDL specifies load allocations for onsite wastewater treatment systems equal to the allowable number of exceedance days of the numeric targets. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 – October 31), there are no allowable exceedance days, in winter dry weather (November 1 - March 31), there are three allowable exceedances days, and in wet weather (November 1 - October 31), there are 17 allowable exceedance days.

c. The Santa Monica Bay Beaches Wet and Dry Bacteria TMDL: For beaches along the Santa Monica Bay impaired by bacteria in dry and wet weather, the Regional Board specified numeric targets, effective July 15, 2003, based on the single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. The dry weather TMDL identified the sources of bacteria loading as dry-weather urban runoff, natural source runoff and groundwater. The wet weather TMDL identified stormwater runoff as the major source. The TMDLs did not specify load allocations for onsite wastewater treatment systems. This effectively means that no loading is permissible from discharges from on-site wastewater disposal systems.

The proposed prohibition, in that it is a remedy to water quality impairments, is closely related to the Malibu Creek Watershed Nutrient TMDL, Malibu Creek and Lagoon Bacteria TMDL, and Santa Monica Bay Beaches Wet and Dry Bacteria TMDL. Additionally, the Regional Board has issued other TMDLs that affect the area, such as a trash TMDL in the Malibu Creek watershed. The Regional Board and other agencies may issue future regulations that affect the area.

The cumulative impacts of the proposed project and the TMDLs identified above should not be significant since the implementation time frames for each of the Regional Board actions are staggered and lengthy, allowing the City and other parties to undertake a iterative implementation process towards achieving the ultimate requirements. The Santa Monica Bay Beaches TMDL allows implementation over three phases, with deadlines in 2006, 2009 and then as late as 2021. The Nutrient TMDL, because it was developed by US EPA, does not have set deadlines for implementation. The proposed project sets a feasible and reasonable deadline, of 2014, for compliance.

On a project level, the Regional Board expects a net environmental benefit over the long term from projects undertaken to comply with the prohibition, TMDLs, and other regulatory actions, in that water quality will be improved and beneficial uses will be restored. Specific projects proposed to comply with the prohibition must be environmentally evaluated and cumulative impacts considered as the implementing municipality or agency considers such projects.

Growth-Inducing Impacts

Staff's analyses of other environmental impacts resulting from reasonably foreseeable options of complying with the proposed prohibition also includes growth-inducing impacts, including:

- an overview of the CEQA Guidelines relevant to evaluating growth inducement,
- a discussion of the types of growth that can occur in the Malibu Civic Center area,
- a discussion of obstacles to growth in the area, and

- an evaluation of the potential for the Program Alternatives to induce growth.

Growth-inducing impacts are defined by the State CEQA Guidelines as:

> The ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are impacts which would remove obstacles to population growth. Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects... [In addition,] the characteristics of some projects.. .may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It is not assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.
>
> (CEQA Guidelines, Section 15126.2(d)).

Growth inducement indirectly could result in adverse environmental effects if the induced growth is not consistent with or accommodated by the land use plans and growth management plans and policies. Local land use plans provide for land use development patterns and growth policies that encourage orderly urban development supported by adequate public services, such as water supply, roadway infrastructure, sewer services, and solid waste disposal services.

Public works projects that are developed to address future unplanned needs (i.e., that would not accommodate planned growth) could result in removing obstacles to population growth. Direct growth inducement would result if, for example, a project involved the construction of new wastewater treatment facilities to accommodate populations in excess of those projected by local or regional planning agencies. Indirect growth inducement would result if a project accommodated unplanned growth and indirectly established substantial new permanent employment opportunities (for example, new commercial, industrial, or governmental enterprises) or if a project involved a construction effort with substantial short-term employment opportunities that indirectly would stimulate the need for additional housing and services. Growth inducement also could occur if the project would affect the timing or location of either population or land use growth, or create a surplus in infrastructure capacity.

Types of Growth: The primary types of growth that occur within the area affected by the proposed prohibition are:

- development of land, and
- population growth. (Economic growth, such as the creation of additional job opportunities, also could occur; however, such growth generally would lead to population growth and, therefore, is included indirectly in population growth.)

Growth in land development is the physical development of residential, commercial, and industrial structures in the Malibu Civic Center area. The Malibu General Plan, section 7.3.3.1, describes several constraints on development. The Plan states that hillsides and steep slopes make housing construction expensive or impossible. More than eighty-three percent of Malibu is hillside area; the remaining relatively flat land is either subject to ocean and/or canyon (creek) flooding, or other significant environmental constraints. Other constraints mentioned in the

General Plan include seismic characteristics (citing numerous faults in the area), flood plains, land slides, soil erosion, fire hazards and liquefaction potential. Land use growth is subject to general plans, community plans, parcel zoning, and applicable entitlements and is dependent on adequate infrastructure to support development. The portion of the prohibition area in unincorporated Los Angeles County would be subject to similar plans promulgated by the County.

Population growth is growth in the number of persons that live and work in the Malibu Civic Center area and other jurisdictions within the boundaries of the area. Population growth occurs from natural causes (births minus deaths) and net emigration to or immigration from other geographical areas. Emigration or immigration can occur in response to economic opportunities, life style choices, or for personal reasons.

Although land use growth and population growth are interrelated, land use and population growth could occur independently from each other. This has occurred in the past where the housing growth is minimal, but population within the area continues to increase. Such a situation results in increasing population densities with a corresponding demand for services, despite minimal land use growth. The Malibu Civic Center area that would be affected by the proposed prohibition is within the City of Malibu, which has plans that guide land use development The portion of the prohibition area in unincorporated Los Angeles County would be subject to similar plans promulgated by the County.

Existing Obstacles to Growth: Obstacles to growth could include inadequate infrastructure (e.g. an inadequate water supply that results in rationing or inadequate wastewater treatment capacity that results in restrictions in land use development). Policies that discourage either natural population growth or immigration also are considered to be obstacles to growth. In Malibu, there are several environmental constraints that constitute obstacles to growth, as described above.

Potential for Compliance with the Proposed Prohibition to Induce Growth

The prohibition on OWDSs in the Malibu Civic Center area is not expected to directly induce growth, in that it would not result in the construction of new housing.

Furthermore, the prohibition on OWDSs in the Malibu Civic Center area is not expected to indirectly induce growth, in that it would not generate long-term economic opportunities that could lead to additional immigration, and would not remove an obstacle to land use or population growth. Although the City has cited the use of septic systems as a strategy for reducing the rate and intensity of growth, there are other strategies that the City could employ to maintain that goal. Although construction activities associated with compliance projects for the prohibition would increase the economic opportunities in the area and region, this construction activity is not expected to result in or induce substantial or significant population or land use development growth because the majority of the new jobs that would be created by this construction are expected to be filled by persons already residing in the area or region, based on the existing surplus of unemployed persons in the area and region.

Unavoidable Significant Adverse Impacts

Section 15126.2(c) of the CEQA Guidelines requires a discussion of potential significant, irreversible environmental changes that could result from a proposed project. Examples of such changes include commitment of future generations to similar uses, irreversible damage that may result from accidents associated with a project, or irretrievable commitments of resources. Although the proposed prohibition in conjunction with theTMDLs would require resources (materials, labor, and energy), the proposed project does not represent a substantial irreversible commitment of resources.

In addition, compliance with the prohibition and TMDLs will have substantial benefits to water quality and will enhance beneficial uses. Enhancement of the recreational beneficial uses (both water contact recreation and non-contact water recreation) will have positive social and economic effects by decreasing potential trash hazards, reducing bacteria and nutrient loading in the water, and increasing the aesthetic experience at beaches, parks around the lake, and other recreation areas. In addition, pristine habitat carries a significant non-market economic value. Enhancement of the beneficial uses will also have positive indirect economic and social benefits. The environmental checklist identifies the anticipated environmental effects from possible compliance projects, identifies mitigation measures for potentially significant impacts, and determines that most of the impacts after implementation of mitigation are insignificant.

To the extent that there are unavoidable significant adverse impacts, those impacts are temporary in nature, predominantly arising from construction of possible compliance projects, and temporary nuisance impacts associated with abatement of the use of OWDSs.

DISCUSSION OF ENVIRONMENTAL EVALUATION (Based on information in the technical staff report and environmental staff report for the proposed prohibition on OWDSs in the Malibu Civic Center area)

Findings Related to Mitigation for Significant Adverse Impacts (Title 14, California Code of Regulations, section 15091(a)(2).)

This environmental analysis concludes that there are some potentially significant impacts from implementation projects to comply with the proposed prohibition on OWDSs, but notes that there are mitigation measures available to reduce potentially significant environmental impacts to less than significant levels. However, implementation of these mitigation measures is not under the control or discretion of the Regional Board, but is within the responsibility and jurisdiction of other (responsible) agencies, which will be required to comply with or assist affected citizens in complying with the provisions of this prohibition (e.g., the City of Malibu). These agencies have the ability to implement these mitigation measures, can and should implement these mitigation measures, and are required under CEQA to consider whether to implement the mitigation measures when they undertake their own evaluation of impacts associated with compliance with the prohibition. This finding is made pursuant to Title 14, California Code of Regulations, section 15091(a)(2).

Statement of Overriding Considerations and Determination (Title 14, California Code of Regulations, section 15093.)

The Regional Board staff has balanced the economic, legal, social, technological, and other benefits of this proposed prohibition on OWDSs against the unavoidable environmental risks in determining whether to recommend that the Regional Board approve the prohibition. Upon review of the environmental information generated for this prohibition and in view of the entire record supporting the need for a prohibition, staff has determined that specific economic, legal, social, technological, environmental, and other benefits of this proposed prohibition outweigh the unavoidable adverse environmental effects, and that such adverse environmental effects are acceptable under the circumstances. This determination is based upon the fact that most of the identified significant adverse impacts from the reasonably foreseeable means of compliance are temporary nuisance impacts associated with abatement of the use of OWDSs, and/or the construction of compliance projects. The foreseeable means of compliance are generally accepted beneficial infrastructure amenities in most municipal jurisdictions, and typically installed for the benefit of the community irrespective of their potential growth inducing and other impacts associated with their construction and operation. Furthermore, the reasonably foreseeable means of compliance with the prohibition are expected to result, over the long term, in positive environmental improvements to the environment, including water quality and restoration of beneficial uses of water resources (including decreased instances of associated illness), and economic benefits associated with increased use from their restoration. This is particularly important at the Malibu beaches which are generally considered to be some of best beach environments in the State of California. Enhancement of recreational uses of beaches, aquatic habitat in Malibu Lagoon, and drinking water potential in groundwater will have positive social and economic effects.

This environmental staff report, together with the technical staff report and tentative resolution provide the necessary information pursuant to Public Resources Code section 21159 to conclude that properly designed and implemented compliance projects generally should not foreseeably have significant permanent adverse effects on the environment. Any potential impacts can be mitigated at the subsequent project level when specific sites and methods have been identified, and responsible local governments can and should implement the recommended mitigation measures.

Specific projects to comply with this prohibition that may have a significant impact will be implemented by local agencies and jurisdictions and would therefore be subject to a separate environmental review. A lead agency for the compliance projects would have the ability to mitigate project impacts, can and should mitigate project impacts, and are required under CEQA to mitigate any environmental impacts it identifies, unless it has reason not to do so. Notably, in almost all circumstances, where unavoidable or unmitigable impacts would present unacceptable hardship upon nearby receptors or venues, a local agency has a variety of alternative implementation measures available instead.

All of the potential impacts must be mitigated at the subsequent project level because they involve specific sites and designs not specified or specifically required by the *Basin Plan* amendment to implement the prohibition. At this stage, any more particularized conclusions

would be speculative. The Regional Board does not have legal authority to specify the manner of compliance with its orders or regulations (CWC, section 13360), and thus cannot dictate that an appropriate location be selected for any particular project, that it be designed consistent with standard industry practices, or that routine and ordinary mitigation measures be employed. These measures are all within the jurisdiction and authority of an agency, or local government, that would be responsible for implementing this prohibition, and that agency can and should employ those alternatives and mitigation measures to reduce any impacts as much as feasible. (14 Cal. Code Regs., section 15091(a)(2).)

Implementation of the proposed prohibition is both necessary and beneficial. To the extent that the alternatives, mitigation measures, or both, that are examined in this analysis are not deemed feasible by those local agencies, the necessity of implementing the prohibition and restoring beneficial uses (an action required to achieve the express, national policy of the Clean Water Act) remains.

PRELIMINARY STAFF DETERMINATION

☐ The proposed project COULD NOT have a significant effect on the environment, and, therefore, no alternatives or mitigation measures are proposed.

☑ The proposed project MAY have a significant or potentially significant effect on the environment, and therefore alternatives and mitigation measures have been evaluated.

Chief Deputy E.O. for — 11-5-09

signature — date

Tracy J. Egoscue — November 5, 2009

printed name — Date

Note: Authority cited: Sections 21083 and 21087, Public Resources Code. Reference: Sections 21080(c), 21080.1, 21080.3, 21082.1, 21083, 21083.3, 21093, 21094, 21151, Public Resources Code; Sundstrom v. County of Mendocino, 202 Cal.App.3d 296 (1988); Leonoff v. Monterey Board of Supervisors, 222 Cal.App.3d 1337 (1990).

Transcript

0001

BEFORE THE LOS ANGELES REGIONAL WATER QUALITY BOARD
MARY ANN LUTZ, CHAIRPERSON

In the Matter of the)
PUBLIC HEARING RE:)
)
ALL ITEMS ON THE AGENDA)
)

TRANSCRIPT OF PROCEEDINGS
Los Angeles, California
Thursday, November 5, 2009

Reported by:
KAREN ALIGO,
CSR No. 13418

Job No.:
B3230WQLA

0002

BEFORE THE LOS ANGELES REGIONAL WATER QUALITY BOARD
MARY ANN LUTZ, CHAIRPERSON

In the Matter of the)
PUBLIC HEARING RE:)
)
ALL ITEMS ON THE AGENDA)
)

TRANSCRIPT OF PROCEEDINGS, taken at 700 North Alameda Street, Board Room, Los Angeles, California, commencing at 9:00 a.m. on Thursday, November 5, 2009, heard before MARY ANN LUTZ, Chairperson, reported by KAREN ALIGO, CSR No. 13418, a Certified Shorthand Reporter in and for the State of California.

0003

APPEARANCES:

CHAIR: MARY ANN LUTZ
VICE CHAIR: MADELYN GLICKFELD

BOARD MEMBERS: STEVE BLOIS
F.W. "DICK" RICHARDSON
FRANCINE DIAMOND
MARIA MEHRANIAN
MARIBEL MARIN

EXECUTIVE OFFICER: TRACEY EGOSCUE

ALSO PRESENT: MICHAEL LEVY
Senior Staff Counsel
JEFF OGATA
Staff Counsel

0004

I N D E X

SPEAKERS:	PAGE
FRAN SPIVEY-WEBER	14
DESI ALVAREZ	19
WENDY PHILLIPS	24
REBECCA CHOU	39
LESLIE LAUDON	65
JIM THORSEN	67
JIM SIBERT	68
SHARON BAROVSKY	71
PAMELA CONLEY ULICH	72
RICHARD LATON	83
BRUCE DOUGLAS	87
JOHN IZBICKI	92
VANESSA THULSIRAJ	98
MARK GOLD	115
P. LOMBARDO	129
SALLY McCRAVEN	136
DEAN ISACCSON	138
GRANT ADAMSON	141
MARK PESTRELLA	145
GENE LUCERO	147
MICHAEL BLUM	154
JOE MELCIONI	156
KEN SANO	158

0005

I N D E X (Continued)

SPEAKERS:	PAGE
MARY SWEENEY	162
CHAD NELSON	166
ANGELA HOWE	168
LUCILE KELLER	170
SALLY BENJAMIN	172
MIKE BALDY	174
SONYA DIAZ	176
SIRA GHANDI	177
CARL URDICK	178

JACK TOPELLE	180
STEVE RYAN	183
JOEL WALKER	184
NATALIE BURDICK	189
TOM FORD	190
TATIANA GAUR	191
RICHARD SCOTT	192
TAMARA STEIN	193
WALTER KELLER	195
BILL RHODES	196
BRIANNA BAYLORD	197
MIKE BARSAKINI	198
RICHARD SHERMAN	199
PAUL GRISANTI	200

I N D E X (Continued)

SPEAKERS:	PAGE
PAT SHONE	201
STEVE BRABAND	202
REBECCA EVANS	203
JEFF HARRIS	204
NORMAN HANEY	205
RICK VARDEL	206
AMANDA GRUSEBACH	207
LLOYD AHERN	208
DAVID RESNICK	209
MARILYN DOVE	209
ROBERT GOLD	211
ROBERT RICHNER	212
SARA SICHICH	213
RYAN EMORY	214
DON SCHMIDTS	224
CHRIS DELEAU	224

Los Angeles, California, Thursday, November 5, 2009
9:00 a.m.

CHAIR LUTZ: This is the L.A. Regional Water Quality Control Board meeting for November 5, 2009. We will start this morning with our Pledge of Allegiance, and that will be led by Mr. Richardson.

(Pledge of Allegiance is recited)

MS. LUTZ: May we have roll call, please.

MS. HARRIS: Mr. Blois?

MR. BLOIS: Here.

MS. HARRIS: Ms. Diamond?

MS. DIAMOND: Here.

MS. HARRIS: Ms. Glickfeld?

MS. GLICKFELD: Here.

MS. HARRIS: Ms. Lutz?

CHAIR LUTZ: Present.

MS. HARRIS: Ms. Marin?

MS. MARIN: Here.

MS. HARRIS: Ms. Mehranian?

MS. MEHRANIAN: Here.

MS. HARRIS: Mr. Richardson?

MR. RICHARDSON: Here.
CHAIR LUTZ: Before we get into the actual agenda this morning, I have a couple of things I would like to say. First thing is that in order to speak for the items before us today, you need to fill out a blue speaker's card. If you have not done so, they are to -- by the door, there's a table, and you can turn them in to Ms. Ronji Harris. So in order to be able to speak, you need a card from me.
Also, this is a bitter-sweet meeting for us today. One of our colleagues is leaving us after this meeting, but we're sure to have you go out with a bang. Dick Richardson has been a board member for the past four years with us, and we would like to give you something for appreciation. Could you come over here?
This is on behalf of all of your colleagues. We would like to give you this plaque. It says, "In appreciation of your leadership in protecting water quality and commitment to representing the interests of irrigated agriculture throughout the Los Angeles and Ventura Counties, 2005 to 2009. We will miss you, Dick.
MR. RICHARDSON: Thank you.
CHAIR LUTZ: Okay. We will now start with the order of agenda. Ms. Egoscue, do we have changes to the agenda?
MS. EGOSCUE: Yes, I do, Madam Chair. Good morning. Item No. 11 is postponed, and we ask that the Chair poll her fellow board members to see if Item 10 can be moved to the consent calendar at this time.
CHAIR LUTZ: Is there anybody who objects to Item 10 being sent to the consent calendar?
Therefore we will move it to the consent calendar.
MS. EGOSCUE: Thank you.
CHAIR LUTZ: And Item No. 12 has been pulled, then.
MS. EGOSCUE: Item No. 11.
CHAIR LUTZ: Item 11. I'm sorry. Okay. We will move on to the approval of the minutes. We have minutes for two board meetings in front of you, September 3rd and October 1st. Are there any changes or concerns with the minutes?
MR. BLOIS: I second.
CHAIR LUTZ: Discussion? All in favor?
(All in favor from the board members)
CHAIR LUTZ: Motion carried. Now, we'll move on to Board member communications. First ex-parte communication. If anybody has had any ex-parte communications regarding this item, any item on the agenda, I'm going to start with Dick. Anything?
MR. RICHARDSON: No.
CHAIR LUTZ: Steve?
MR. BLOIS: Yes. I have two to report. First of all, I had a meeting with Mr. Richard Sherman. I told him that we could not talk about the item on our agenda today. So we talked in very general terms about available technology for treating wastewater in our area, and we had

discussions about various contractors in our area, and finally he recommended a book to me, which I am pleased to report that I have actually gone out and bought, and I'm about halfway through reading. I recommend it highly to each one of you. It's called the "Big Necessity" by Rose George. It's a little bit of humorous and serious take on wastewater and its history over the years.

Second thing I have to report is Mr. Grant Adamson called me several weeks ago, wanted to talk to me about the issue on our agenda. I told him we really couldn't, but that I would have to report this. We talked in generalities, and that was the end of our discussion.

MS. GLICKFELD: Madam Chair, can I go ahead?

CHAIR LUTZ: Yes.

MS. GLICKFELD: Thank you, Madam Chair. I live in Malibu, so everywhere I go people have been

0011

trying to talk to me about this. I can't disclose all of the people -- my pharmacist, the book seller, my hair dresser. So you get the idea. But basically, other than the phone call I got from Mr. Adamson as well where I referred him to Steven King and Tracey, the only other ex-parte communication from people in Malibu was from Rusty Areyes who represented the City and asked me to come and negotiate out an alternative, and I told him I couldn't do that.

I have a couple of other ex-parte communications I wanted to disclose, and I wanted to hand in the written records that I have of those. I received e-mails from -- (coughing interruption) -- Resnick in the week of October 19th. He noted to me that ex-parte communications are not barred in this amendment and asked for a time to talk with me. I did talk briefly with him on the phone on Tuesday, October 27th. He asked me to consider alternative proposals that have been brought to the Board by Heal the Bay and the City, and I told him that I knew meetings were occurring between both of those parties and our Staff, and I would be listening to all proposals made.

He wanted me to talk with him about these proposals but I declined stating that he would be able to give testimony to us about his thoughts on these

0012

proposals, and he noted that he ran out of time before being able to complete his comments and Board members had a right to ask questions of anyone testifying. I also made one last ex-parte communication. I'll pass this in. I want to share this with the rest of the Board as well.

In the record that we received, a letter one of the -- one of the commenters talked about the difficulties that the community -- that the Board in the Central Valley had with the septic prohibition there and that after 10 years things were not solved. So I called Roger Briggs, who is the executive officer of the Water Board, just to inquire about the status of the Los Osos case. He told me that they had done six prohibitions; that in five cases all of them had been accepted and implemented, including the City of Nipomo, which is a very poor community in San Luis Obispo County.

I also have some information I wanted to disclose. He basically said that after 10 years, the Community Services District was bankrupt, the County had taken over the implementation of the sewer plant and it was moving forward. So I want to share this information with other Board members to make sure we all have -- (interruption of door slamming)

Thank you.

CHAIR LUTZ: Ms. Diamond.

MS. DIAMOND: I didn't request under ex-parte communications -- (interruption of coughing) -- because I asked our executive officer if it was Ex-parte to have a conversation, and because this is a quasi-legislative amendment to the basin plan it's not. But I do have a communication to disclose. After finding that out, I agreed to have a meeting with Mr. Steve Soboroff -- (coughing) -- who is a person in -- that I've known and has been involved as a business person in Malibu, and we did have a meeting, and I listened to concerns after the items before us after understanding that it was not an issue of ex-parte. That's all I have to disclose.

CHAIR LUTZ: Any other ex-parte? I do wish to give just a couple of brief ones. I received a letter after one of the public hearings on this item from a citizen just requesting that we adhere to the time limits equally, and that I, as the Chair, make sure that everybody who wanted to speak had an opportunity to speak.

So just to get that out of the way right now, we have some members on the item today, on the Malibu septic tank item that have requested additional time. They have been preapproved. Everybody else will be given three minutes, and as of right now, this is my stack of cards. So I will try to keep everybody to three minutes and try to keep it as equal as possible. Please, you can help me do that so that we are being equal and fair to all of the people who wish to speak.

I did also receive an e-mail from Mr. Resnick, as Madelyn had, and I responded to him that, yes, while this was an item, as Ms. Diamond said, that could be discussed, that I felt that what he would have to say is of importance that all the Board members should hear it, not just me. So I asked him to please bring those concerns before the entire Board today.

Are there any Board member communications outside of the asylum today? Okay. What we would like to do is eliminate the Executive Officer's report, move to Board checklist. Are there any concerns, questions regarding the checklist? Okay. And then we have our update from the State Board, our vice chair from the State Board, Fran Spivey-Weber.

MS. SPIVEY-WEBER: Thank you. I'll be brief. As all of you have read in the paper today, there is a water policy bill that has passed through the legislature. It's on the Governor's desk and evaluations are coming into the Governor today, so I expect that he will act on this soon.

For the Water Board, the biggest thing in the

bill was 25 people, and these are not to be paid out of the general fund, which is a mainstay that these might actually be real people who can actually do things on the water rights. Next on the agenda with the legislature and the Governor will be the budget. It's still not a pretty sight, so that we expect that there may be, probably will be a special session on budget soon.

Tomorrow I'm going to -- the first of three water re-use sponsored meetings on the salt nutrient management plans that would have an effect on our basin plans, and there will be Board -- I will be there tomorrow. Staff will be at the other three. The Water Board itself will be sponsoring some meetings on this planning process that came out of the recycled water policy from last year. So we'll be working with your Staff and letting them know what is going on, and certainly it will be up to you as to how you want to work in this process. But stakeholders are being asked to step up and provide a lot of the leadership and funding and expert information.

The next meeting will be the 17th. The next

0016

meeting of the State Board will be the 17th. We will be focusing on the enforcement policy. We'll probably vote on it on that day, and this will set a uniform method for establishing penalties statewide. We will also be spending a fair amount of time on the underground storage tank program and the funding for that. And then in December we will be addressing Wanser Cooley. So those are some of the big things that are coming up. We will have a workshop on Wanser Cooley, and then a vote on Wanser Cooley, probably separated by a couple of weeks. Hopefully it will be the 1st and the 15th of December, possibly the 15th, and early in January. So that's what's happening there.

CHAIR LUTZ: Thank you. I think you and I should jointly report on the WQCC, which was last week, correct, Monday and Tuesday, and it's our Fall WQCC, where all of the Board members from the Water Board all over the state get together and we talk about Water Board issues. I think it was a very productive meeting. I will be putting together a synopsis or summary and handing that to all of our Board members, so you can learn as much. But we had a lot of discussion about the legislation, the issues that had passed legislature, law discussion about the

0017

upcoming bills that the legislature is looking for now with regard to water. So I would be happy to represent our Board there.

MS. SPIVEY-WEBER: Thank you for coming. In addition -- as soon as the Governor signs the bill, we'll have an announcement for what it means for the Water Board, and we'll get that out to Tracey, and Tracey can distribute it to all of you.

CHAIR LUTZ: Perfect.

MS. GLICKFELD: I have a question. That last issue that you talked about. This legislation seems like it's pretty mementos, and there are questions that lots of us have about what it means, and it might be a very good idea in our spring WQCC, we actually

invited some of the legislature authors and their Staff to come and brief us on the intent. I have lots of questions about it as to, for instance, whether or not the 20 percent conservation goal includes the reduction of the use of recycled water substituted by that? It doesn't. So basically cities that are recycling water will be able to implement their conservation goals on fresh water, imported water by recycling the use.

MS. DIAMOND: I have one question, also. If the bonds pass, this will be put on in November, I believe?

MS. SPIVEY-WEBER: Yes. November --

MS. DIAMOND: And if they pass, there will be money throughout the state for groundwater cleanup available --

MS. SPIVEY-WEBER: To the Department of Public Health. So that really translates into well and treatment. That's what they are responsible for. If it had been assigned to the Water Board and to the Department of Public Health, their surround water water cleanup would have been a topic, but it's my understanding from those who put that into the bill that well and treatment is what they are interested in.

So it went all to Department of Public Health. In fact, we got very little out of the bond. There is some unstated -- we don't know where the recycled water money is going right now. It's out there, but it's not allocated to any particular agency, and that will be a follow-up bill in the spring as to where those monies would go assuming the voters pass the bond.

MS. MEHRANIAN: Off hand, if you remembered the definition of the small cities, because there's like $75 million to go to the small cities on the wastewater treatment --

MS. SPIVEY-WEBER: I don't think that got changed. I think it is now small cities. It's not small disadvantaged cities. I know that some of the folks who were working for disadvantaged communities were trying to get it more targeted to disadvantaged communities, but at this point I think it's small cities.

CHAIR LUTZ: Thank you very much. That will bring us to public forum. I do have a speaker card for public forum, and that is Desi Alvarez from LA Gateway -- from the IRWM planning, I believe.

MR. ALVAREZ: Good morning, Madam Chair and members of the Board. I'm Desi Alvarez representing the Gateway Region Integrated Regional Water Management Joint Powers Authority. I'm here today to thank you and give you a report on what it makes for a very successful effort to help us meet one of the TMDL's in Southeast L.A. County.

The Gateway Region represents South East Los Angeles County, which is 26 cities. Recently with your support and the effort of your Executive Officer and your Staff, we were able to successfully get a significant grant under the ARRA Program to retrofit catch basins for those cities -- (Interruption: Door

0020
closing) -- Los Angeles River, to bring them into full compliance within the TMDL, and because of the bidding environment that we're in today and so on, it looks like we're going to be able to install full-captured devices on a hundred percent of all of the catch basins in 16 cities that drain to the Los Angeles River. In addition to the installation of the full-captured devices, and it's about 11,000 catch basins that are going to be retrofitted, it also looks like we will be able to install the retractable screens on the catch basin inlets in about 60 percent of those catch basins.

So this is a very successful effort. We wanted to thank you. Of these 16 cities, 11 of them are disadvantaged communities, where their median household income is significantly below the state median household income -- actually, of the 16 cities, only two have median household incomes that equal to or exceed the state average median household income.

So without the effort that you guys have participated in and helped in, these communities would have had a very difficult time coming into compliance with the trash TMDL for the Los Angeles River, and given this, we hope right now, and it looks like we will be complete with the project by the end of next

0021
year, and at that point everybody will be in compliance.

So I would like to thank you very much. We're very appreciative, and if you have any questions, I would be pleased to answer them.

CHAIR LUTZ: Thank you. Any questions?

MS. DIAMOND: I guess it's more of a statement. I want to thank you, and I think this is a wonderful -- this is the second month that we've had really good reports from cities. Last month we heard from Fillmore, and we were thrilled. I can tell you that personally I'm thrilled, and I'm sure that all of us are thrilled to hear your report.

It's a wonderful thing to hear that the partnership that we've had with these cities, and this trash TMDL that has been a big part of the work that we've been doing over the years is resulting in such excellence. So I want to thank you and acknowledge that we've had a great partnership, and thank our Staff for all that you've done to make this happen.

MR. ALVAREZ: Thank you.

CHAIR LUTZ: Thank you very much. All right. That will move us into our uncontested items list, which are Items 7, 8 and 10. Do I have a motion?

MR. RICHARDSON: So moved.

0022
MS. GLICKFELD: Seconded.

CHAIR LUTZ: Any objections? The motion carries. We will without further ado move into the main feature of today.

The item that we're going to is our basin plan amendment regarding the Malibu Civic Center area. A couple of things I do want to say before we actually begin. As I said earlier, we do have people who have requested to speak for an extended amount of time. We have granted them specific amounts of time. They will

speak after our Staff report. We'll have a Staff report, and then we will have comments from the City of Malibu, and then we will go into those speakers.

At that point, depends on where we are with time, I think we'll probably be breaking for lunch, and then when we come back after lunch, about 1:00 o'clock, then we will continue with the public comments on this item. So, Ms. Harris, could you please read the items?

MS. HARRIS: This is a pubic hearing for consideration of a proposed amendment to the basin plan to prohibit discharge from on-site wastewater disposal systems in the Malibu Civic Center area, including Malibu Valley and surrounding hillsides, Winter Canyon and surrounding hillsides, and the

0023

coastal strips along the Pacific Coast Highway between and including Surfrider Beach and Amarillo Beach.

Copies of the amendment were sent to all known interested persons, agencies and organizations. The order of presentation of testimony at this hearing will be Board Staff, Leslie Laudon of the State Board Division of Finance, City of Malibu representatives, Heal the Bay, Lombardo, Dean Isaccson, Grant Adamson and Mark Pestrella and the interested public. Anyone wishing to speak before the Board should fill out a speaker card and turn it into the clerk. The setting of time limits is at the discretion of the Board. Please leave written copies of your testimony if available.

Madam Chair, will you now please open the hearing and administer the oath.

CHAIR LUTZ: Yes. Everybody who is going to speak, please rise. The whole room is going to rise.

Please raise your right hand. Do you swear the testimony you're about to give today in the matter before us is the truth, the whole truth and nothing but the truth under penalty of perjury.

THE SPEAKERS: I do.

CHAIR LUTZ: Ms. Harris, when she read the speakers that have been allotted the time, there was

0024

one remaining that did not get listed, and that was Gene Lucero from Malibu Realty and that is a five-minute, so we will make sure we're together on that. We will start with our Staff report from Wendy Phillips.

MS. PHILLIPS: Good morning, I'm Wendy Phillips. I am the chief of the section for groundwater permitting and landfills. Staff's goals this morning are to describe the structure of the prohibition, review the technical evidence we've compiled to justify the prohibition and to summarize comments and our responses and the key legal issues. The goal of this proposed regulatory action is to remedy water pollution caused by septics to help restore water quality in beneficial uses at the beaches, in Malibu Lagoon, and in groundwater, which is the pathway from the septics to the lagoon and the beaches.

I want to start by carefully defining our proposed regulatory action. It's actually an amendment to the Basin Plan to prohibit on-site

wastewater disposal systems, commonly called septic systems or septics. I do want to clarify that I will be using these words interchangeably during this presentation.

The prohibition area covers 2.2 square miles, and it's delineated by this red line, and we refer to it as the Malibu Civic Center area. It includes this flat valley, Malibu Valley, it includes Winter Canyon and the surrounding hills, and it includes the adjacent coastal strips along the beach here.

Jack, I don't know if I should be using a different pointer here.

We estimate that there's about 270,000 gallons per day of sewage generated in this area. The area is home to about 2,000 residents, including four high density multi-family complexes in Winter Canyon. This area is the core of the City's business and civic activities. It supports the work force, and it's a destination for visitors -- local, regional, even international, who use the shops, restaurants, and also the famous Surfrider Beach.

As a result, the population fluctuates more than in most communities, with peaks on hot summer days, on weekends and during holidays. I want to review who is going to be affected by this prohibition. All existing and future dischargers would be subject to the prohibition, including residents, commercial businesses, industrial facilities, such as Hughes, and public facilities --

the schools, fire station and the beach comfort station.

I want to review what types of systems the prohibition applies to. The systems would range from conventional septic systems, such as those in the upper left-hand corner, that passively treat raw sewage through a septic tank combined with a leach field in the lower left. These are very low cost systems.

It would also include advanced systems, such as the small treatment plant recently installed at Malibu Lumber with costs reported to have ranged between 3 million and 4 1/2 million.

Here is the timing: For existing dischargers we propose that they be allowed to continue using their septics until 2014, at which time they must cease discharge. The expectation is that by 2014, the City will have completed a wastewater management project for this solution.

However, an existing discharger would not be able to expand or increases flow as of today, given the way we've structured the prohibition. New discharges would be immediately prohibited. This is also the case with projects in the permitting pipeline. If you haven't completed your permitting by

today, you would not be allowed to discharge. We've had many comments, including strong support, as well as strong objections, to the proposed structure.

I'll review these objections toward the end of our presentation. I'll go into more details about the boundaries, the timing, and the exemptions.

The Water Code sets hurdles that we need to meet to demonstrate the need for prohibition. We've summarized our technical evidence by code section in your item on pages 3 to 10, and also in the Technical Staff Report Overview, at the end of that on pages 13 to 19. Our Technical Staff Report Overview is organized by impairment. One of the notable impairments, that has been the subject of much advocacy, is presence of pathogens at Surfrider Beach, where water quality consistently fails to meet well-established standards protective of swimmers. This is the subject of one of five technical memos. My colleague, Elizabeth Erickson, will present evidence of this impairment shortly.

Other tech memos cover impairments to Malibu Lagoon and also pollution of groundwater, again, through which the wastewater flows toward the lagoon or the beaches. In addition to these impairments, we've characterized the long-term history of

0028

violations and compliance problems with the Regional Board's permittees.

Finally, we evaluated hauling practices at about a dozen sites, where there's so much sewage being generated that it can't be transmitted into the ground. As a result, there's an increasing trend of trucking or hauling raw sewage down PCH to other communities.

I'm going to start with Malibu lagoon. This is a wetland that's much reduced from its original size, and it has an impaired ecosystem. Today we're limiting our focus to the impairment caused by excessive nutrients from septics. When I say "nutrients," I'm talking about fertilizer-type chemicals, nitrogen, phosphorus, and detergents and human waste, for example, food waste that you put down the kitchen sink, ammonia and urine that's discharged from septics that flows through groundwater to the lagoon.

While a small level of nutrients in the lagoon is natural, nutrients from septics and other sources have accelerated eutrophication, that is, the nutrients have stimulated aquatic growth, such as algae, and you can so the algae mats in this photo. During darkness, the algae deplete oxygen dissolved in

0029

the water, and when the dissolved oxygen level becomes so low, a fish kill can result.

The Regional Board and EPA evaluated all the nutrient sources flowing to the lagoon and set a nitrogen target for restoration. To meet this target, nitrogen from septics entering the lagoon via groundwater flow is limited to 6 pounds per day.

In Tech Memo No. 4, Tony Callaway, Orlando Gonzalez, and Dr. C.P. Lai answered the questions: "How much nitrogen is coming from the septics, and does it meet that load allocation of 6 pounds per day?" To do this, they compiled an inventory of all discharges we know about, and it's about 270,000 gallons per day from commercial, multi-family, single-family residential, and we've then calculated the loading rate for each discharger, using real numbers where available; conservative

assumptions were not.

We plugged this nitrogen loading data into a groundwater model and determined that septics release about 30 pounds per day. That's almost five times the target allocated for septics. We also used an alternative check, a spreadsheet model, where we divided the septics into five hydrogeologic sectors. This resulted in an even greater estimate of nitrogen loads. It's 35 pounds per day, and we compared our estimates with those done by third parties, and the results from our estimates overlaps slightly with others. Our estimates tend to be slightly greater because our inventory is more complete. This is the evidence supporting our conclusion that nitrogen from septics pollutes the lagoon.

We have had several objections to this analysis, mostly from the City, and their key objections to Tech Memo No. 4 -- first, the City disagrees with the restoration target for the lagoon and the waste load allocation of 6 pounds per day for septics. Our response is that the nitrogen target for the lagoon did include -- did consider all sources, including atmospheric deposition. Regardless of that, though, the Board has already ruled on this TMDL, Total Maximum Daily Load. It is a final regulatory action, and this is not subject to further public comment.

A second objection from the City was on Staff's assumption of 100 gallons per day per capita for residential flow rates, and our response is that we did address this concern in our response to the peer reviews. For condos, we used real numbers. We didn't have to make any assumptions. For single-family units, we are confident that our residential flow assumptions, and we're talking 100 gallons, are reasonable, given the number of bedrooms and bathrooms per home, given information in published literature from sources such as Metcalf and Eddy, and also looking at the approach taken in other studies; for example, the City's 1992 Warshall report, where they used 142 gallons.

Finally, I do want to point out this work was peer reviewed. Peer reviewers of this tech memo said that it incorporated sound scientific and engineering principles. And I want to commend the Staff for their work on this. I'm now going to turn over the microphone to Elizabeth Erickson, who will cover impairment to beaches.

MS. ERICKSON: Good morning. I'm Elizabeth Erickson. I'm a geologist with the Groundwater Permitting Unit, and I'm here to talk about the technical evidence linking human pathogens in the environment to on-site wastewater disposal systems or septic systems. We agree with EPA that passive septic systems can operate successfully when maintained and cited correctly, but only if sufficient soil is present to physically, chemically or biologically deactivate human pathogens.

Unfortunately, as shown in the cartoon, human viruses and the bacteria, which are even larger, may

escape to be discharged to the surface through groundwater or well withdrawal.

Our Technical Memo No. 3 describes evidence that pathogens identified by the presence of enterococcus bacteria have been released from septic systems. They have traveled to the beaches, and they were of sufficiently high concentrations to cause human illness.

We did find evidence that enterococcus bacteria had been released from the septic tanks. We found enterococcus in monitoring wells around the leach fields, and in fact, 76 percent of Malibu Valley groundwater wells shown here in red dots had levels above 35 MPNs per 100 milliliters. We also know that 42 percent of the groundwater in the Malibu Valley basin comes from septic systems, according to Stone's 2004 work. They estimated that 92 percent of that flow eventually makes it to the beach.

This flow path from septic systems to the beach is described by other authors as well: Questa, EPA's TetraTech, four associated TMDLs and other geologist's studies by Vergets and Izbicki.

My next slide is going to talk about bacteria

0033

at the beach, and if you look on the photo here, you can see point MC2, that's Surfrider Beach, and that's what I'm going to talk about in the next slide, because we did find evidence of enterococcus bacteria at the Civic Center beaches at levels that EPA and the State had determined is not protective of human health. This is a graph summarizing four summers of bacteria data, 2005 to 2008, when the beach berm was closed the majority of the time at Surfrider Beach.

Along the bottom of the graph, are the bacteria concentrations increasing from 10 at the left to over 5,000 MPN per 100 milliliter on the right. The vertical dotted lines show the two contact recreation criteria, the geometric mean at 35 and the maximum at 104. The vertical scale here is frequency, and every point to the right of the dotted lines indicates elevated human health risk. I would also like to note that the curves correlate pretty well, correlation coefficients at the top. What this means is that the process of delivering these pathogens to the beach during dry summer days takes place steadily during all four summers and was not a function of random events but of persistent sources and persistent transport processes.

We also found evidence that pathogens have

0034

caused human illness at the Civic Center beaches. In 1995 an epidemiology study was completed at local beaches. They interviewed over 22,000 people concerning their health following swimming between June and September, and in that year when enterococcus concentrations were above 35 MPN per 100 milliliter, 45 swimmers in every thousand had fever, nasal discharge, sore throat or coughing with phlegm.

In addition, 30 swimmers in a thousand had fever with vomiting, diarrhea or stomach pain. These levels of illness are higher than the 1983 EPA and the 2001 California OSHA plan criteria allowing 19 additional illnesses per thousand swimmers.

So those are our findings. The most prominent question or comment we received was that we needed more evidence to relate OWDSs to beach pathogens. Now, we remind you that three peer reviewers found -- presented evidence was sufficient; however, we're going to go on and provide a brief review of even more evidence relating enterococcus bacteria concentrations to human illness at Malibu Beaches and septic system use.

Let's begin with the 1985 letter from the Los Angeles County Department to the L.A. County supervisors -- it's quoted on the right. The three

0035

quotes I brought to your attention is that they said, "Of the ones they studied, 40 percent of the septic systems were discharging to the surface, not to the groundwater, to the surface."

Further, in the wet years of 1983, 1980, 1974 and 1971, between 165 and 239 individual septic systems were destroyed by storm with raw sewage released to 12 miles of the beaches for periods extending into the summer. LA County Department Of Health's overall summary was that 58.8 percent of Malibu properties were beachfront and that 45.5 percent of those had failed or were failing.

Now, the City of Malibu incorporated with the commitment to clean these problems up, and we recognize that progress has been made since 1985, but the City has not complied with their 2004 agreement to inventory: How many of these original redwood boxes remain below the concrete floors of Malibu Colony homes, or how often they fail with direct discharge of sewage into the sands.

There's a second and third reference relating septic systems to beach pathogens. Between 1983 and 2001, EPA and the State completed and/or interpreted epidemiology studies on international beaches with and without identifiable sources of human sewage, as it

0036

says there.

Further, EPA and the State of California found that enterococcus concentrations and human illnesses correlated so well that they could set the number of acceptable human illnesses at 19 per 1000 swimmers, as I already mentioned. The quotes are on the right.

The next reference: 1992, Wendy's already suggested Peter Warshall and others did a study for the City of Malibu. They completed a separate investigation of 118 septic systems, and the group concluded that a smaller number of the systems had failed as stated by LA County, but that all needed immediate and frequent upgrades and additional management was necessary. The Warshall group emphasized that the system should work because they were underlain by a bottomless sand filter. That's the quote there.

Again, Stone in 2004, the City study, showed that effluent does not sink out of sight into the soil but spreads laterally for discharge to the ocean and other receiving waters. The second quote there is that Warshall, again, the City's consultant, also concluded that a sewage treatment design was necessary

for the Civic Center area, and that land-use planning should be considered with sewage treatment, not after it.

So here's three more lines of evidence. In 1996 the Malibu Civic Center Beaches were Federally designated as impaired for contact recreation and shellfish harvesting because of bacteria concentrations. We already cited the 1999 epidemiology study, but I would like to remind you that the illnesses were reported among swimmers at the Malibu Civic Center beaches when no overland flow was present.

Further, the illness rate was highest at the locations where freshwater was most likely to leak through the beach berm and were not as high at locations further up and down the beach. After 2002, only four TMDLs were completed, but each attributed various loads to the OWDSs. The surface water impairments were documented again in each TMDL, and all except the nutrient TMDLs set time lines for load and waste load reductions. The City's schedule presented to me for construction of a wastewater treatment plant did not demonstrate likely completion in time to meet the TMDL deadlines from the Santa Monica Bay bacteria TMDLs. All the beaches were supposed to comply as of Monday of this week.

During 2008, other things happened. We received many WDR applications for additional discharge totaling more that 50,000 gallons per day from new projects in the absence of reasonable municipal steps towards the construction of a regional wastewater plan to treat the existing discharges, what was already going into the groundwater.

2008 was also the year that we reviewed the City's progress on our Memorandum of Understanding. The MOU described in specific steps the City's obligations to meet the water quality and wastewater treatment requirements of the Regional Board.

Now, these same obligations have been established in a more general way by the 1991 resolution of the City's lawsuit against the County of Los Angeles to prevent the construction of a centralized sewer system.

So in summary, we find that these documents demonstrate a pretty solid relation between OWDSs and beach water quality and human illness. They also provide a glimpse of the multiple policy alternatives that have been considered to improve the water quality conditions. Thanks for your attention. I'm going to turn you over to Rebecca. She'll talk about compliance and nutrients.

CHAIR LUTZ: Rebecca, before you start, I have been made aware that we are exceeding the number of people who can be in this room. If you are standing, there are a few seats periodically throughout -- if you've got an open seat next to you, raise your hand, please, so we can -- right, or move in so we can have everybody seated.

We also have added an overflow room, just kind of behind us. It's either Room 102 or 101, I'm

not sure which one, but there is an overflow room with a video feed. So thank you. I appreciate that. The last thing we want to do is get shut down by the marshals. Go ahead. Thank you.

MS. CHOU: Good morning, I'm Dr. Rebecca Chou, chief of groundwater permitting unit. Water resources control engineer, David Koo, conducted this study, to determine the extent and severity of groundwater contamination from septics.

The first step of this study is to collect and review existing information from a variety of sources on groundwater quality from 2002 to 2009. 56 groundwater monitoring wells are used as shown in this map. Next step is to compare groundwater data with drinking water standards. For pollutants that are indicators of wastewater, specifically for

0040

pathogens and nitrates due to public health concerns. There is zero tolerance for pathogens in drinking water, including fecal coliform and total coliform. Nitrates can cause Blue Baby syndrome and result in death.

The first step is to determine the frequency that the groundwater quality failed to meet drinking water standards that is maximum contaminant levels or MCL in terms of number of samples and number of wells.

Here is the result of more than 1,000 samples. 38 percent of the samples failed to meet the fecal MCL and fecal coliform MCL, and 57 percent failed to meet the total coliform MCL with nitrate and nitrite combined. 32 percent of samples failed to meet the MCL. Although ammonia has no MCL, it can be easily nitrified to nitrate and nitrite; therefore when we added ammonia to nitrate and nitrite, we find that 40 percent of the samples failed to meet the MCL. Here is the results based on the number of wells: 84 percent of wells failed to meet fecal coliform MCL. All 56 wells failed to meet the total coliform MCL at some point in the past.

43 percent of the wells failed to meet the nitrate and nitrite MCL. It is even worse when we add ammonia to the equation. More than half or 61 percent

0041

of the wells failed to meet the MCL. Based on the indicators of pathogens and nitrogens contaminants released by septics substantially impaired the potential use of groundwater as a source of drinking water. Although groundwater in the Malibu Valley groundwater basin is not an existing source of drinking water. Groundwater was the community's drinking water source prior to 1963.

In 1963 Water Works District 29 started importing drinking water. As a potential source of drinking water, groundwater is an important local source that the community may need to use. Therefore, continue degradation would jeopardize the use of this local resource for future generation.

We received several comments for Tech Memo No. 2. The first key comment is groundwater not suitable as a potential source of drinking water. In response, Wendy will cover MUM beneficial use later. Groundwater resources are not sufficient to meet demands of the entire community; nonetheless, meet

partial demand or meet emergency demand.
The second key comment is other sources of nitrogen impacting groundwater are not considered. Staff agrees that other sources can contribute to the groundwater pollution; however, these other sources do

0042

not have direct pathway to the groundwater.
Impact from historical agriculture use in this area should be dissipated by now. Livestock and horses are located east of Malibu Creek and infiltration should be minimal. Stormwater does not contain pathogens like domestic wastewater and should have limited infiltration; therefore, septic discharge is the primary nitrogen source.
The third key comment is regarding methodology. Staff added ammonia to cumulative impact analysis because ammonia can easily be nitrified to nitrate and nitrite and should be evaluated. In addition, there are three sets duplicate wells in October 21st draft Tech Memo No. 2. After consolidating these three data sets, total number of wells changed from 59 wells to 56 wells. The percent of the wells failed to meet MCL remain the same, except for fecal coliform decreased from 85 percent to 84 percent. Nitrate and nitrite decreased from 44 percent to 43 percent as reflected in earliest slide.
Wendy, Elizabeth and I have laid out the pollution of the lagoon, beaches and groundwater. Now I'm going to talk about compliance record. The map identifies over 50 commercial facilities, including

0043

retail stores, restaurants, offices and schools. Among these facilities, 20 of them are under the Regional Board's oversight as shown in the white dots. The rest are either under City's oversight or are not permitted at this time.
All permitted facilities are in violation. This includes dischargers with simple septic systems. This also includes dischargers with advanced treatment systems highlighted in yellow. All of these facilities have violated their permitting conditions and received notices of violation. Not only do all permittees have violations, but all permittees have multiple violations as shown in the last column. Dischargers violated time schedule order deadline, report submittal deadlines, tardy submittal of reports, improper certifications of monitoring reports and technical requirements, such as effluent and groundwater discharge limits.
In conclusion, all facilities have poor compliance with multiple violations of permit.
We received several comments regarding Tech Memo No. 1. The first key comment is an objection to the prohibition and suggests improvement in the regulatory process. In response, Staff find the existing permitted dischargers routinely violate

0044

effluent limits for nutrients and pathogens. WDR are insufficient to ensure that water quality objectives will be met. Most of the advanced treatment systems have start-up problems, such as Malibu Lumber, or maintenance problems, such as the two plants in

Winter Canyon.

The City's operating permit program initiated in March 2008 will take many years to cover a substantial portion of residents and small commercial dischargers since the City only requires upgrades at point of sale and remodeling. Second key comment is request for revisions to violations summary table. In response, Staff revised Table 4 to distinguish discharge violations and non-reported parameters. Table 4 also revised the violation counts for Hughes Research Lab and Malibu Colony Plaza after reviewing supporting documents submitted by the dischargers. This concludes my presentation, and I'll turn the floor over to Wendy.

MS. PHILLIPS: One remaining line of evidence supporting our prohibition is the practice of hauling, where the raw sewage is pumped into a tanker truck and transported to another community that will accept the waste. This is occurring on sites that generate a lot of raw sewage in relation to their size. I'm looking

0045

at the size in three dimensions here, the horizontal size of the site -- and understand that many sites don't have enough land for a proper leach field to spread out the wastewater from a septic tank, and the septics on many sites are in close proximity.

Then there's also a vertical limitation. On many sites the water table is so high that there's little vertical separation between the bottom of the leach field and the water table, and this tends to short-circuit the natural treatment that you might normally expect from soils.

We evaluated data for 13 of our larger dischargers, and for this subset we started by looking at the trend in the amount of wastewater that they generate. Over this four-year period, you can see that there's more than a 13 percent increase in wastewater generation. In this bar chart we've broken out the waste flow by discharger, and I'll just point out our three largest: In the pink you have Malibu Water Pollution Control Plant, and this is a small plant that serves four multi-family complexes in Lower Winter Canyon.

In the blue you have Malibu Colony Plaza, and that's because there's not enough on-site capacity for the flow from the shopping center, so the discharger

0046

lifts the sewage, transports it over to Lower Winter Canyon for treatment and discharge into a seepage pit in a 4-acre area.

And then I also want to draw your attention to Country Marts 1, 2 and 3. Even though we've broken these three Country Marts into separate stripes, the reddish to orange-ish ones, we want to point out that these three Country Marts are closely related in terms of location and also ownership and that they are managed by affiliated partners.

In addition to looking at how much wastewater is generated by these dischargers, we evaluated hauling data and these are the results. Cumulatively over 6 percent of the raw sewage on the graphs that I just displayed has to be hauled off site, and this hauling trend is increasing. Over this four-year

period, it increased by 21 percent, and that compares to the 13 percent increase in wastewater generation I just displayed.

Again, we've broken out the hauling activity by discharger. Three largest: Malibu Colony Plaza, one of the Winter Canyon dischargers; Country Marts 1, 2 and 3 together, and they are near the creek; and then Malibu Water Pollution Control Plant, the plant that I mentioned that serves the multi-family

0047

complexes in Winter Canyon.

The haulers who transport the sewage usually discharge it to Carson. In querying one of the haulers, Staff determined that although Hyperion would also accept this waste, the haulers preferred the L.A. County Sanitation District Carson Plant because it's cheaper. For those haulers who head for Carson, you're looking at a 64-mile roundtrip, and of course, I do want to acknowledge that the tankers may make other stops on this trip to pick up liquid waste at other locations.

We had comments from the City which indicated that in our analysis of water consumption we should use data from L.A. County Waterworks District No. 29, and this is indeed the data that we used for our water consumption analysis. So we didn't need to make any changes here. The City also commented that most of the spill data that we had in the July 31st draft was for spills outside of the area, and we do acknowledge that point, and we've removed that data; however, within the prohibition area we point out that hauling is critical to preventing spills.

Most of the comments on Tech Memo No. 5 came from Malibu Colony Plaza, the second largest discharger of wastewater and the largest hauler.

0048

The Bay Company, the owner of Malibu Colony Plaza, disputed our numbers of assumptions. We spent a lot of time re-evaluating the numbers, and for our 2004 hauling data, we believe that Malibu Bay Company now concurs with our analysis. For the 2004 and 2005 wastewater generation data, we still have differences.

We believe that we made reasonable assumptions and note that the discharger has not been able to document the discrepancies; nevertheless, to set aside those discrepancies and to evaluate the trend with the Colony Plaza data stripped out, we produced this graph. For the remaining 12 dischargers in this stripped out graph, we still have an increasing trend of wastewater generation.

I'm going to acknowledge the work on Tech Memo No. 5 by environmental scientist, Dionesa Rodrigues, and engineer, Ryan Satcher. I'm going to end our discussion with Tech Memo No. 5 with these portable toilets, which is a fixture in the parking lot at Surfrider Beach. Back in 2006 the county's leach field for the toilets at the comfort station failed. Ever since 2006 the county has had to use a septic tank at the comfort station as a holding tank to collect and hold the raw sewage which is then emptied and hauled at least every three days by tanker

0049

truck. These portable toilets here not only provide

additional toilet capacity at the beach, but also serve as the back-up sanitation system for periods when the holding tank at the comfort station is full of raw sewage. Without hauling, the county would have to discontinue providing sanitation at this beach in order to prevent spills.

This concludes our presentation of the technical justification for the prohibition.

MR. OGATA: Good morning, Chair Lutz, members of the Board. My name is Jeff Ogata, and I'm the Regional Board attorney working with Staff on this project. I'm going to summarize Staff's environmental assessment pursuant to the California Environmental Quality Act, or CEQA. As Wendy pointed out, this project is a basin plan amendment. The Regional Board's basin planning program is a certified regulatory program with exempt and certain requirements.

State Board's regulations in Title 23 of the California Code of Regulations require a brief description of the proposed activity, reasonable alternatives to the proposed activity and mitigation measures to minimize any significant adverse environmental impacts of proposed activity.

0050

CEQA also requires in Public Resources Code Section 21559 that for the adoption of a performance standard the environmental review must contain an analysis of reasonably foreseeable environmental impacts of the methods of compliance, a reasonably foreseeable mitigation measure relating to those impacts, and a reasonably foreseeable alternative means of compliance with the regulation that would avoid or eliminate the impacts.

But our analysis -- (door slamming) -- taken in context of Water Code Section 13360 which prohibits the Regional Board from specifying the design, location, type of construction or particular manner in which compliance -- with prohibition.

In the Environmental Staff Report that described the project, which is the prohibition, and its objectives, that has performed a first-tier level environmental analysis. This is appropriate because this review of environmental effects of the prohibition will be followed by a detailed site-specific analysis of the compliance project by a lead agency. Staff has done what is reasonably feasible given that this project is a basin plan amendment. Staff discussed alternatives to the project and determined that none would meet the

0051

project's basic purpose of eliminating impairment of beneficial uses from OWDS discharges and result in substantially less significant impacts than the prohibition.

Staff also analyzed three potential methods of compliance through the checklist and narrative contained in the Environmental Staff Report. That discussed a potential environmental impacts and set forth measures and mitigation that could be used to avoid and reduce significant impacts. It's important to note again that compliance projects will be reviewed and analyzed by a lead agency with their own

in-depth project level CEQA analysis. At that time the lead agency will require mitigation that will avoid specific foreseeable impacts from construction and operation activities.

We are first required by CEQA to consider alternatives to the prohibition. We must include a reasonable range of alternatives that can feasibly accomplish most of the basic objectives of the project while avoiding or substantially lessening one or more of the significant impacts.

Staff looked at the alternative of continued and increased hauling of sewage by tanker trucks. This analysis was informed by the information and

0052

evaluation of hauling contained in Technical Memo No. 5, as Wendy just described. After reviewing the evidence, Staff did not believe that this was a practical alternative. Besides having unacceptable impacts to air quality, traffic and aesthetics, this alternative did not meet the basic objectives of the prohibition.

Staff considered an alternative that relies on a local initiative to develop a solution to the water quality problems. Because of the lack of progress made to date by any local agency to develop a solution and a concern that plans would not proceed in a timely manner, that concluded that this alternative also did not meet the basic objectives of the prohibition.

We are not recommending the no project alternative, which envisions the scenario in which discharges from OWDSs continue, and no agency or entity takes action to abate the pollution. This is inconsistent with the Regional Board's water quality policy, and in particular our goals of restoring the lagoon, making the beaches safe for swimming and protecting and restoring groundwater as a potential source of drinking water.

Staff considered several different methods of

0053

compliance with the prohibition -- (coughing in audience). These projects are only suggestions for possible means of compliance, since, as we stated, we are not allowed to dictate the matter of compliance, and none of those projects have detailed designs that would allow for specific analysis of environmental impacts; therefore, Staff evaluated the reasonably foreseeable impacts from three projects and noted in the checklist and the narrative in the environmental Staff report the most severe potential impacts of the three projects for each technical area.

We considered the public comments that we received and revised the Environmental Staff Report and checklist accordingly to clarify the impacts and possible mitigation measures. The three potential methods of compliance we analyzed are first centralized integrated water resources facility, which looks at the wastewater as a resource and would collect, treat and recycle as much treated wastewater as possible, and even a more progressive approach might be to integrate wastewater and potable water operations for our cost estimates don't include the space.

Second project was interceptor sewers that export the sewage from the community via the edge of Hyperion sewer system or up Malibu Canyon to Tapia. The third project was decentralize facilities which would collect and treat wastewater to small plants.

I'm going to have Wendy talk about the capital costs of the three --

MS. PHILLIPS: For a prohibition, the Water Code Section 13241 does not mandate that we analyze the economics; nevertheless, Staff is well aware of the Board's sensitivity on economic impacts of regulatory actions, and accordingly, we did project capital costs for the three compliance projects, which ranged from 17 million to 80 million.

The key assumption that I really want to emphasize is that all projects were sized for existing wastewater flows from the community; that is, we designed for capacity of 300,000 gallons per day for each of these projects, and that approximates the 270,000 gallons per day that we estimated the current flow. The projects that Jeff just mentioned are laid out in the columns that centralized integrated facilities and then you've got your two interceptor scenarios and on the right the decentralized scenario. In the rows you have the major components for each project: a local sewer collection system, the plant or interceptor sewer, and for the centralized integrated facility a recycled distribution system. Again, we've limited our cost analysis to conceptual projects, and we have not undertaken feasibility studies and detailed design work, nor have we identified specific sites and land for each of these projects.

The impact at this level would be disclosed in an EIR for the specific project by the lead agency, and that could be by the City, could be by an existing utility or some water authority or a utility or water authority to be formed.

MR. OGATA: In the Environmental Staff Report checklist that has identified a few technical areas where there is potential significant adverse effects. The section number behind the technical area up on the slide refer to the checklist section number in our Environmental Staff Report. Most of the effects identified, however, will be temporary in nature related to the construction of a compliance project.

A prime example is potential for impacts on traffic on Pacific Coast Highway during trenching for pipelines. Standard traffic mitigation measures should help, but the impacts might still be significant during the construction activities. Although there may be potential significant adverse effects, Staff believes those effects are outweighed by the substantial benefits of enhanced water quality resulting in improvement of beach conditions and the restoration of beneficial uses of water. Therefore, the prohibition should be adopted in spite of potential significant effects.

The statement of overriding considerations is set forth in the Environmental Staff Report on page 48

and in the resolution on pages 5-6 in paragraph 4.

MS. PHILLIPS: In this final section of our presentation, we want to highlight the support and opposition we have to the structural features of our prohibition, including the timing, that is, the 2014 deadline, the boundaries and exemptions. I'm going to start with exemptions.

The proposed structure does allow for repair and maintenance of a septic system during this five-year period, but it does not allow for increased flows; for example, if a homeowner desired to add a bathroom, he would not be able to get a building permit from the City or County to do this. City Staff has suggested that increased flows from an existing residence be allowed if the homeowner upgraded the wastewater management system so that the pollutant mass did not increase. Malibu has also informally

0057

proposed language for development projects for a commercial or residential property has entered but not completed permitting. Instead of crafting language for this, Staff has asked the City and the County to provide a list of projects that the Board could consider for this exemption, and just before the hearing started, I did get a list of those projects, and I believe there were 22 of them.

Several parties opposed such an exemption, among them are the Surfing Association, Surfing Coalition and Bay Keeper.

Another exemption: Staff in the July 31st draft had included a zero discharge exemption for commercial projects that could demonstrate 100 percent recycling, that is, achieve zero discharge to groundwater, primarily through irrigation.

Staff eliminated this proposed exemption in the October draft in response to comments from the Santa Monica Bay Restoration Commission and also the environmental community, including Heal the Bay, Bay Keeper, the Surfing Association and the Surfing Coalition.

Concerns here focused on the ability of small size properties to irrigate in the manner that does not allow water, nutrients, and other salts to pass

0058

through the root zone and into groundwater, and also to provide for emergency discharge.

On boundaries. We did have a couple of comments recommending that we expand the boundary to the east. One comment that we expand it to the west; however, by far and away, most of the comments advocated that the boundaries be contracted. In particular these parties that I listed on this slide advocated that Winter Canyon be excluded from the discharge area.

Before going into these comments in detail, I do want to review how we came up with the boundary. We used hydrology to draw this red line, since the flow of groundwater roughly mimics surface drainage patterns. And that's why the red line is drawn along the ridges. It follows the topographic highs that define Winter Canyon and Malibu valley.

Here is a plan view. Showing the prohibition area, again, the red line, in relation to city limits,

the black dash line. You can see that our prohibition boundary does not follow specific boundary, nor was it intended to. Again, it's based on hydrology. Nor does the boundary track parcel lines. These are the thin, gray lines on this map. Parcel lines were not one of our criteria for the boundary. We stuck to the technical topographic criteria.

Back to Winter Canyon. There were several objections to including Winter Canyon in the prohibition area. We had comments that Winter Canyon groundwater does not flow to the lagoon, and we concur in general with that, but we point out that there are other factors that drive our recommendation to include this area, including the dense development, that is, the four multi-family complexes. Concern about the sustainability of current treatment systems, pollution of groundwater and concern about pollution on Amarillo and Malibu Beaches.

In another objection to Winter Canyon several parties state that Amarillo Beach is not polluted. We acknowledge that there is not a beach monitoring station at Amarillo Beach. The lower Winter Canyon stream is not apparent to a viewer nowadays. It was hydro-modified when PCH was improved years ago, but even though segments of the stream are subsurface, the stream still discharges to the ocean.

Additionally, we have impaired beaches on either side of Amarillo -- to the west and Malibu Beach to the east. In our best professional judgment, looking at the groundwater pollution and the pathway for pathogens in groundwater to discharge onto the Amarillo Beach and also looking at the surrounding beach pathogen data, we believe that Winter Canyon should be included within the boundary for protection of swimmers at Amarillo and Malibu.

Several parties object to the boundary, including Winter Canyon, because they believe groundwater is not suitable for drinking water and that Winter Canyon is not part of the Malibu Valley Groundwater Basin. However, in the basin plan, the Board identified the Malibu Valley Groundwater Basin as a water resource. This is a blowup of the basin in that gold area from Figure 2-12 in the basin plan, and you can see how the gold area does include lower Winter Canyon.

There are three important details here. To draw the basin boundaries back in 1994, we referred to our sister agency, Department of Water Resources, specifically their Bulletin 118, the edition that was available at that time. That is what is documented in our current basin plan.

Second: Groundwater in upper Winter Canyon, that is, up gradient uphill of the gold area is also subject to the basin plan. Third: Groundwater has been used in the past for drinking water, and it is a future source that could meet a portion of the community's demand or emergency demand. So these are the legal or basin plan reasons that we've included Winter Canyon in the prohibition area.

So I've covered the link between polluted

groundwater and Amarillo Beach, and I've just reviewed our consistency with the basin plan, but here are other reasons that we believe Winter Canyon needs to be on the table here. Winter Canyon accounts for 50,000 gallons per day, and that's probably conservatively estimated for 20 percent of the flow of the prohibition area. It's densely developed with the four multi-family complexes and schools; plus, it's linked to the coastal area, in that the shopping center, Malibu Colony Plaza, along the coastal strip needs to lift its sewage over to Winter Canyon for treatment and disposal onto a four-acre site.

And you don't have that slide on your handout. We added that after we photocopied this, but I do have hard copies if you need that.

We have concerns about the sustainability of the two plants, that is, the Malibu Water Pollution Control Plant and the Winter Canyon Plant, neither of which have strong compliance records. This is the activated sludge tank at the Malibu Water Pollution Control Plant taken back in the mid to late 1990s

0062

showing a hazardous level of corrosion. The plant had badly deteriorated, as you can see from that rusted metal component, and it wasn't even meeting secondary wastewater treatment standards. Repairs were delayed and an upgrade was delayed as residents objected to the cost.

Finally, by 1998, the Board had to issue a time schedule order to get this fixed, and it wasn't until 2001 the plant was fixed. Since then, it has had a number of significant violations. You can refer back to Dr. Rebecca Chou's report. This plant has a life expectancy to about 2021. To do this repair in today's dollars would cost about 2.6 million, and this doesn't include 40,000 to 50,000 for capital expenditures that will be needed within the next five to ten years for blowers, pumps, replacing electrical, and the 191 homeowners served by this plant do not have a reserve fund established to cover these future expenses.

Also, monthly service fees for these homeowners, they are already at $192 a month per homeowner, and this is just for O&M. These homeowners, again, have not reserved for significant repairs and future capital expenditures. Next door to this plant is the Winter Canyon Plant serving Malibu

0063

Colony Plaza, which recently incurred incremental capital expenditures of 2.1 million. This plant which had a lot of start-up problems and several violations since start-up has a life expectancy to about 2031.

We've had concerns about timing, and Staff prepared a time line of five years. We believe this is feasible. This time line is supported by the environmental groups that I've listed up there. It is, however, opposed by the City, the Santa Monica Malibu School District, most of our WDR dischargers, most other dischargers and many of the other stakeholders.

There are other concerns ranging from recommendations that the Regional Board instead of a prohibition take a more collaborative approach.

There's been concerns about Tapia's contribution to the problem, the Berm, Serra Retreat Compliance. We believe that we have responded to those appropriately in our Response to Comments document that went out last Friday. We will be glad to go into detail on that, but for the sake of time, I will conclude.

We put before you in this presentation and in the two volumes of your Board agenda extensive evidence in accordance with state requirements showing that septics impair beaches, Malibu Lagoon and groundwater. We've also set forth evidence showing that dischargers have poor compliance records with Regional Board orders, and also that there is an increasing trend of wastewater generation among larger commercial dischargers and an increasing reliance on hauling sewage off site given site limitations, which illustrates an inability to discharge into the ground.

We recommend that the Board adopt the resolution. The resolution does two things: It certifies the environmental disclosures in our substitute environmental documentation in the Environmental Staff Report; and it also prohibits discharge from on-site wastewater disposal systems. It covers all dischargers. No exemptions, except for repairs and replacements with a 2014 timing for existing dischargers and immediate deadline for new dischargers. Thank you.

CHAIR LUTZ: Thank you. I think it is 10:30, so I think we will take a 15-minute break until 10:45 for our reporter, and we'll be back at 10:45 and start with the City of Malibu.

(Recess)

CHAIR LUTZ: Please take your seats so we can proceed. I do need to make one more announcement. Excuse me, everybody that's in the room, I do need to please make an announcement so we may proceed. Thank you. This is going to be a very, very long day, so I would appreciate it if we could move along as quickly as possible.

We've been asked a few things: That everybody in this room please be seated. Please do not put things in the aisles, brief cases and things, because we are so full for the fire code, if something happens, everybody needs to be able to get out. So we need you to clear the aisles, please be seated, and they have also asked please do not bring food or drink into the auditorium. Thank you so much for your patience. We do want to adhere to the request of our host.

Now we will recontinue and our first speaker will be Leslie Laudon from the State Board, and you are in the finance department.

MS. LAUDON: Thank you. I'm Leslie Laudon with the State Water Resources Control Board, Division of Financial Assistance --

CHAIR LUTZ: Leslie, I'm sorry, can you move the microphone a little closer so everyone can hear.

MS. LAUDON: I'm Leslie Laudon with the State Water Resources Control Board, Division of Financial Assistance. I manage our bonds section, and my Staff

managed the water quality improvement projects we have with the City of Malibu. We administer a number of financial assistance programs to assist our dischargers in complying with water control laws, and the City of Malibu has initiated an application for clean water state revolving fund loan for wastewater treatment plan. The project is on our project priority list. My Staff held a kick-off meeting with the City for the wastewater project in 2005 to explain the process and the requirements for obtaining a clean water state revolving fund loan.

Our loan terms are typically 20 years with the interest rates that at one half of the last general obligation and bond rate. Right now that is about 2 1/2 percent for a 20-year loan. We are in the very preliminary stages with the City on this project, so there really aren't any details regarding the project. There's quite a bit of planning and environmental documentation that had to be done before obtaining a loan, but if you have any questions about any of our financial assistance programs, I would be happy to answer them.

CHAIR LUTZ: Thank you. We'll leave that when we ask -- questions of Staff, we'll include that as part of it. Thank you.

0067

Now we have a presentation by the City of Malibu, and they've been allotted 60 minutes, and I believe -- I'm not sure -- well, you're going to tell us who is speaking.

MR. THORSEN: Yes, I will.

CHAIR LUTZ: Thank you.

MR. THORSEN: Thank you. Good morning, Chair, and members of the Board. My name is Jim Thorsen. I'm the city manager for the City of Malibu. Today with me I have a contingent city personnel and expert witnesses. What I would like to do is introduce as part of our team here is Mayor Andy Stern is here, Mayor Pro Tem, Sharon Barovsky, council members, John Sibert and Pamela Conley Ulich. In addition to that from our Staff, I have Craig George, our environmental and building safety manager as well as Andrew Sheldon, our environmental health specialist. We have Steve Clary, our consultant who has been helping us with the wastewater program and our stormwater projects.

We have several other consultants and expert scientists here today that I'll introduce a little bit later. The last time I was here before the Board, I believe we had a very brief discussion about whether you should be called the Regional Water Quality Board

0068

of Malibu or whether we should be called the City of the Regional Water Quality board. I think either way it shows that we're joined at the hip, and the underlying fact is we need to work together. We need to come together on these issues. With that, I would like to, first of all, just introduce John Sibert and then followed by Sharon Barovsky for a few quick comments.

MR. SIBERT: Thank you, Jim. My name is John Sibert, I'm a city council member, but before I was a city council member -- after I'm a city council

member and during I'm a scientist with an extensive experience in the water area. I was a professor at Yale Cal Tech and worked in water issues. My first job doing that, first consulting job was with the Air and Water Pollution Committee on phosphates and detergents and how we dealt with it.

I have an extensive background at Noah, was chair at the National Coastal Research Institute, was a founding board member of the Coastal Services Center in Charleston, South Carolina, and I'm on the Santa Monica Bay Restoration Commission Governing Board on the State Water Task Force, one of the two voting members from L.A. County, and I think it is important that you guys get a copy of what we just

0069

approved on Tuesday, which is the recommendations from the -- California cities on water issues, and it includes a lot on discharge. All right. Enough of the sort of background.

CHAIR LUTZ: Sorry to interrupt, our reporter has asked that you speak a little more slowly, and I think this is good time for me to ask that all speakers please speak slowly and succinctly so that our reporter can get everything that we need.

MR. SIBERT: Sorry, I missed your signal.

I will try. I've spent too many years as a professor, I guess, trying to cram too much in. This is a complex problem, and let's not -- this is not a simple problem. You know, we admit that there are issues that we need to deal with with water. One of the things I ran on was cleaning up the water. I lived there. I spent time on that beach and in that water.

As I said, it's a complex problem, and it is a problem. -- Lincoln said, "For every complex problem there's a simple solution, neat, plausible and wrong, and I happen to think this is the wrong solution. It is a piece of it. A complex problem like this takes a whole bunch of different tools, a tool box full of tools, not just a hammer, and I think

0070

it's important that we recognize that this is a tool box full of tools and we have been working on it hard. This is not the same city that I was in in the '80s and '90s. This is a different city council and it's a different city, and we'll be addressing a number of those and you'll hear about those in a few minutes.

What's really important, and the point I've been trying to make for a long time is the critical element when it comes to discharge bodies, the ocean, or the lagoon. We need to know really what all the sources are. It doesn't do us any good to fix what we assume is the problem, and then discover it wasn't. So science needs to inform decisions, not rationalization of data to support a preconceived conclusion. That's dogma; that's not good science.

Science has to relate cause and effect, and there has to be a trail from one to the other, and good scientists will be their own worst critic on analyzing the data, not just pick with what works best.

As we said earlier, collaboration is important, not combativeness, not punitive actions,

but trying to get a solution to this. We've already done a lot of that, you're going to hear about it, and you're going to hear a lot of facts that have not been presented yet, new facts.

Just to finish up, I was in a meeting after dinner back at Yale in the '70s, and two people who were fellow colleagues were sitting there, William F. Buckley and John Kenneth Galbraith, two ends from the spectrum, but good friends, and Buckley was skewering Galbraith on a policy change he had made or a statement, and Galbraith looked at him and said, "When I get new facts, I re-assess my position. What do you do with new facts, Bill?" And I thought that was the perfect question: What do you do with new facts? So let's take a hard look at those and make sure that we're doing the right thing. Thanks.

CHAIR LUTZ: Thank you.

MR. THORSEN: I would like to introduce Sharon Barovsky, Mayor Pro Tem.

MS. BAROVSKY: I'm going to stay away from the science. I have no scientific credentials. But I would like to make a statement, which I think on its face can't be disputed. We all are on the same page; we're all in it for the same goal. I think everybody on this council, top priority since they've served has been water quality. I'm sorry we're here today in kind of this confrontational mode, because it shouldn't happen. Seven, eight years ago, I started out with Fran Diamond and the then Mayor, met with John Bishop, the then director. In 19 -- I think it was '97, Fran came to the dedication of Legacy Park, and it's as much Fran's legacy and Susan Kloak, a prior board member, as anybody in Malibu, because we worked together, and that project is going to clean up the stormwater pollution that we found we were going to take care of and we're taking care of it. With that kind of collaborative effort, we can do that again. The way we're headed right now is off to court, and that's not where we should be. We should be spending every resource we have on water quality, not fighting each other but working together.

So I invite you to listen, and maybe by the time we leave today, we can be on at least the same page because we do have the same goals.

MR. THORSEN: In addition, I would like to introduce Pamela Conley Ulich, council member.

MS. ULICH: Good morning, I would like to thank you. My name is Pamela Conley Ulich. First I'm a mother before I was ever elected, and now I'm a council person, too. But for my children and for your children and all the children of all the people out here, like Sharon said, we're all here to do what we can, when we can to clean up the water issues that we're all facing.

My message today is what Jim said earlier and Sharon and council member, Sibert, we have facts and let's do what we can to make it better for everyone. Here's some facts: You are the Regional Water Quality Board. You're focusing with a laser beam into Malibu, and at Surfrider Beach in the last year, according to

the Heal the Bay report card, we had 21 weeks where we had F's, and that's a problem. But guess what? In Santa Monica Pier, they had more. They had 29 weeks of F's in dry weather and they have sewers.

Okay. So let's look at what else is going on in Santa Monica Pier, according to Heal the Bay Beach report card, they had one day, one week where they had an A grade or better, and they have sewers. In Malibu at Surfrider Beach for the same period, we had 21 weeks, that's about 147 days where we did have A's.

So I'm going to submit this into the record. I'm going to remind you that we're all here to work together, but besides Malibu, there are other issues that are facing you as a Board, and you need to help us help you with all of these issues. I hope when you act today, you act so we can work together. And don't use the hammer. Be a collaborative approach. Let's work together. Let's solve the problems. But if you

0074

use that hammer too hard, what you make it is a reaction, and we will end up in court, and nobody wants to go there. The only ones that get rich and succeed there are the lawyers. So let's stop it. Let's be responsible. Let's work together. I look forward to working with you to resolving this issue, and I'm going to submit this report card into the record through Tracey. Thank you.

MR. THORSEN: Thank you. We do have a lot of information to cover in a very short time, so we'll jump right to it. Today we're going to talk about five major issues, first of all, Malibu's vision and our accomplishments as well --

CHAIR LUTZ: I apologize. I need to stop you for just one moment. I'm getting flagged by our --

MR. OGATA: I apologize. With respect to the Heal the Bay report card that was submitted, we can't put it into the record because it would be a late submission of documents.

CHAIR LUTZ: So based on our history, and if it is read into the record, that it can be put in but we can't put it in as a document.

MR. OGATA: Her comments are in the record, but I believe the point that she wanted to make, she made orally.

0075

MS. GLICKFELD: Just for the audience, Madam Chair, I just want to make sure that the audience understands that this proposal that our Staff has before us has been available to the public since July. There have been workshops. We had a deadline for comments so that our Staff could respond to them, and it is our policy to not take any more comments so that this Board can make sure that all the information that we get is available to us so that we can prepare for these hearings and we can listen to what you have to say.

CHAIR LUTZ: In other words, this is our oral comments. What I will suggest is if there is another fine point that you would like to bring up with regard to the report cards from Heal the Bay, I would be more than happy to give you a couple of minutes more to do that, but we need to move on with oral.

MR. THORSEN: Thank you. Quick topics:

There's five new studies coming out, and I know you've heard about them, but it's very important -- I think the information is very pertinent to what we're talking about today. Additionally, we will talk in brief discussion about what we feel are fatal flaws with the Regional Board's proposed prohibition, and finally and most importantly, we want to emphasize an

0076

alternate plan, and we hope that you're open and willing to receive that type of information.

Let's talk about our vision and our accomplishments. First of all, the Board's vision and our vision are exactly the same. You want clean water; we want clean water. We have 15 million visitors that come to our beaches every year. We want the water clean as much as you do. We're aggressively moving forward to improve water quality and protect the public health and our aquatic habitat.

The City has achieved significant progress in implementing our new stormwater programs as well as our wastewater programs. In fact, the City spends more dollars per capita on water quality projects than any city in California that I'm aware of.

The City commits to working closely with the Board, the Staff and stakeholders to implement a responsible course of action. We've done outreach prior to this meeting and we're willing to continue that outreach.

Malibu is an environmental steward. We've banned smoking on beaches. We've banned expanded polystyrene. We've banned the use of plastic bags. We do implement water conservation programs. We require native vegetation for new projects. We

0077

followed the SUSWMP programs as well as we continue to educate our public and do outreach programs. We fund water quality testing as well as radio and TV ads. We create water educational quarterly newsletters. We even held a water quality symposium.

What about projects; what has the City done for projects? Here is a list of over $52 million projects in the last three years that the City's implemented. First of all, in order to begin some of these projects, we had to purchase Legacy Park. As a $25 million purchase, the City went into debt for $20 million in order to purchase that property. Thankfully we had also some grants and many thousand donors who helped purchase that property on our behalf.

In addition, Malibu Creek City Civic Center Stormwater Treatment Facility was constructed. It went into operation in 2007. That stormwater treatment facility can handle 1400 gallons per minute, and during the last two years, there have been no storms that have exceeded its capacity; therefore, it's treated every single rainstorm during this last two years, granted the rainfalls have been less in the last two years.

In addition to that, during dry weather,

0078

there has been no discharge of dry weather flows out to Malibu Creek. We capture it in our storm drain systems and run it through our treatment facility, and

we store it and irrigate vacant land with that. When we're complete with Legacy Park, we'll use that water to help irrigate Legacy Park with that water. In addition, we've done low-impact development projects. Cross Creek Road was a $5 million utilizing pervious sidewalks. We did low water-tolerant landscaping. We piped it so we can tap in and use recycled water as part of that project.

In addition, we did the Forest Creek bank stabilization and restoration program. The Marie Canyon stormwater treatment facility, another important stormwater treatment facility. L.A. County was the lead on that project, but we did partner with them on it.

Finally, this year we broke ground on two vital projects. Legacy Park, it's our $10 million construction project to build a state-of-the art stormwater project. Paradise Cove, another stormwater treatment facility that's out at Ramirez Creek. These are significant milestones and shows the progress the City's been making. Our annual budget is $20 million. Those costs are almost three times our annual budget.

0079

Very significant and shows the dedication of the community and the council.

Real quickly. Legacy park, it's the centerpiece of more than a $50 million commitment to water. The stormwater treatment system acts as our environmental cleaning machine. It captures, cleans, disinfects and recycles more than 2.5 million gallons during a rainstorm. More importantly, it insures that the bacteria TMDL from Malibu Creek is met 100 percent of the time. It's doubled the size of the basin that we need it, but it insures that 330-acre watershed is completely taken care of. This will be all completed in October 2010.

Paradise Cove, this is the City's third stormwater treatment facility. I don't know of any city that has more than one. In fact, there's very few that even have one. This city is constructing on our third project. It's again another major step moving forward. It's a $1.1 million project that cleans, disinfects stormwater over at Paradise Cove, and that will be completed in March of 2010.

Wastewater, what are we doing on wastewater? Well, it's hard to fit them all on the slide, but we did our best. We've implemented as part of our MOU with the Regional Board a point of sale ordinance. It

0080

mandates inspection of all our septic systems and requires that they be certified. We run an operating permit program. When anybody has to obtain permits, they are in our permit system forever. There's annual renewal dates, and they have to have those systems inspected on a regular basis. We keep track of all of this through our IWIMS program.

In addition, we do an inspection program where we certify inspectors on how to inspect these type of septic systems before they can go out and actually do any of the work within our city. In addition, we've done water resource management programs as well as mailed out on-site wastewater treatment manuals to all of our residents, and a

couple of other facts that may get washed away, but they are very important. Residential properties along the beach: Any of those properties that increase fixture counts are required to upgrade to secondary treatment and disinfection. That's in our codes right now.

Commercial properties: Any building upgrades are required to install secondary treatment as part of their wastewater system. That's in our codes today. What are we doing about a centralized wastewater treatment facility? We've been working very hard at

0081

it. We've completed all the background analysis and preliminary design. We have a task group that's comprised of a member from the Regional Board, the State Board, the scientific communities. So we're moving forward with that program.

In January of this year, $2.6 million was allocated to fund the design in the EIR for that project. We've authorized -- as part of this, we're looking for a site to build that plant. The La Paz project is a development project that allows for 2.3 acres to be dedicated to the City, if it gets approved. It's currently under litigation with the Santa Monica Baykeepers, but we're hopeful that will be resolved, and we'll have a site to put our wastewater treatment plant.

Let's talk real quickly about our alternate plan. First of all, the City opposes a blanket septic prohibition. We believe there are many technical, legal, scientific flaws, the boundaries are too broad, and without any justification, it requires a significant plant size up to 600,000 gallons without regard to where are we going to send the dispersal. Very major issues that would have to be addressed. We don't feel the time line is achievable; it's just not realistic.

0082

In addition to that, we've submitted detailed letters based on all the changes that have been happening with the technical memorandums. What we have before you today, and we'll get into that in a few minutes, is we have an alternate plan that we would like for you to really consider.

We feel the plant complies with the mandate to clean local waters. It targets a smaller boundary but it's higher impacts. It addresses a lot of our key stakeholders' concerns as well as it achieves a time line with enforceable provisions. This is our opportunity to work collaboratively with the stakeholders, with the Regional Board to craft a solution that will be acceptable for everyone.

Let's talk about some of the emerging data. There are five studies out there currently that are providing very, very interesting results. There's a groundwater mounding study which you'll hear from both Bruce Douglas and Dr. Laton today. There's a water resources study being completed by the U.S.G.S. And Dr. Izbicki will be here today to speak on that.

In addition to that, UCLA is conducting a human specific bacteroidales study, and you'll hear from Vanessa. Finally, there are two other studies that are being conducted by SCCWRP, a new

0083
epidemiology. The last one was done over 15 years ago for Surfrider Beach, and also they've been conducting a source ID at Ramirez and Escondido Creeks, and that's been a three-year effort, and so far they haven't been able to determine the cause of the exceedances of bacteria at those two creeks.

So with that, I would like to invite up Dr. Richard Laton. Dr. Laton received his B.S. in oceanography, his master's -- and I'll try to say these words correctly -- in coastal geomorphology and his Ph.D. in geology with an emphasis in hydrogeology. Dr. Laton is currently an associate professor of hydrogeology in the Department of Geological Sciences at Cal State Fullerton. He possesses extensive knowledge in the area of hydrogeology, field hydrology, wetlands coastal monitoring geomorphology, field and sampling techniques in environmental remote sensing. With that, here is Dr. Laton.

MR. LATON: Thank you. My name is Dr. Richard Laton. I'm an associate professor of hydrogeology at California State University Fullerton, and I'm here to present some background information on the City of Malibu, an area of concern today.

First thing I do want to remind everyone is the hydrological cycle. Point out a few things:

0084
Ocean is an -- groundwater certainly is associated with this particular project all go into the ocean, and that's certainly an area of concern. Something we're all very cognitive of. To put everything into perspective, what we're seeing here, and you see over here the Malibu Creek and the lagoon. We have the coastal area down here. We do have an alluvium basin that's filled with both alluvium and some flood basin sediments which is surrounded by a bedrock area which there again drains into an alluvium basin and down towards the ocean.

Not all water within the Civic Center area flows directly into the creek or the lagoon, but it all ultimately ends up in the ocean. So between both flow into the lagoons, which ultimately ends in the ocean, they also have groundwater flow that directly goes into the ocean and the beaches nearby.

From previous work in 2004 by McDonald Morrissey and Stone Environmental, they put together a water budget for the area trying to depict where everything was coming from, and this was leading to a groundwater flow model, which we will talk about here in a second.

But really what we see up here is certainly water in those area of concern comes from upland areas

0085
to the bedrock into the alluvium basin, mixes with stuff that's being infiltrated there. Part of that water gets into the stream, which ultimately ends up in the lagoon and ultimately out into the ocean where it meets its evaporation and repeats the cycle again.

Here is a quick geology map of the area. If you notice the gray areas are depicted as bedrock areas or upland areas where we do have homes and recharge going on as well as natural recharge from rainstorms precipitation. The gray area or orange

there is the alluvial basins. The floodplain aquifer follows the creek there; it's the light tan area. Then we also have coastal beaches and beach sediments associated with the beach areas.

Here is a groundwater flow map from 2004. Things have not changed greatly. This is in a particular time frame. What makes it very dynamic in Malibu is that the lagoon controls a lot of the groundwater flow gradients near the creek area, which is not unexpected. In this particular contour map of groundwater, the lagoon itself is -- in other words, there's a berm there holding back water at a higher elevation than that of the ocean.

So you see the water is flowing down the creek as well as in Winter Canyon, it's flowing

0086

towards the ocean, and there's kind of a dividing line there towards the middle; however, when the lagoon breaches, groundwater flows change a little bit, and here's where you can see the lagoon -- to give you an idea is if you take a water monitoring well near the lagoon, and this is SMP1P4 and ML-1, as you see in the picture, you can see as a rainstorm happens, water levels increase in the monitoring wells, which would be expected from recharge and upgradings and whatnot, but as soon as the lagoon breaches, all of a sudden water levels in that area drop, lagoon drops and all that water then floods out into the ocean. That's what this hydrograph is basically illustrating: that there is a change in the gradient of groundwater flow throughout the Civic Center area dictated by the conditions of the lagoon.

Here we have a long-term hydrograph plot of all the data through time, and certainly, there's a lot more newer data in 2009. But this kind of gives you an idea that water levels throughout the area do not have any discernable trends going up, down, or whatnot. They are kind of basically hanging in the middle there. Some go down; some go up.

Overall, we do have quite a bit of data. There's some significant shortfalls to the data.

0087

There are a couple of years that I would have loved to have data, but we don't, and we can't go back in time, but we're trying to correct that with some of the work we're doing with the City. So with that, I will turn it over to the next speaker.

MR. THORSEN: Thank you, Dr. Laton. I would like to introduce Bruce Douglas. He's a registered engineer with a B.S. in hydrology and a master's of science in plant and soil science. Mr. Douglas specializes in decentralized wastewater management and biotechnical creek restoration. Bruce co-authored many of the studies in Malibu, including the integrated water quality management feasibility study as well as the risk assessment of a decentralized wastewater treatment system which a lot of your Staff has used as well. With that, I would like to let Bruce run his PowerPoint.

MR. DOUGLAS: Thanks, Jim. Good morning. It's great to be able to address you here. What I would like to do -- advance the slide -- and recognize as was discussed by John Sibert, the concept of a

toolbox. What this project is developing another very significant, important tool for the toolbox understanding the hydrology of the Civic Center area.

What happened historically is that individual property owners would have to come to the Regional Board for a waste discharge WDR permit and do a hydrogeologic analysis of their individual project, and what the Regional Board Staff recommended is the City look at multiple projects simultaneously, essentially look at the whole basin and look at the large picture cumulative effect of individual on-site wastewater treatment systems and develop a tool that can also be used for the municipal -- the analysis, municipal options of wastewater management in the Civic Center area.

There's a history here that the background actually goes back to 2001, when there was a similar to, if you will, lack of information, lack of real field data in the Civic Center area. Stone Metal worked for the City and with the Regional Board in a project funded by Santa Monica Bay Restoration project to really collect data, collect water levels, collect water quality data, collect existing data and develop a groundwater model that could be used to understand where groundwater is flowing.

And as Richard Laton just showed us, groundwater it's -- it doesn't flow according to topography. It's a complex system. It flows relative to the water levels in the lagoon and it varies across the site. So the models also used in 2005 by Questa Engineering to look at alternatives as part of the integrated water quality management studies, essentially to look at municipal wastewater management alternatives and proved very useful in assessing which alternatives are likely to get compliance with water quality standards in the lagoon.

But just to give you a little background on how the models are developed. On the left is a black diagram. It's a schematic, similar to what Richard Laton presented that we developed for the Malibu Lagoon Watershed. In that model we're looking at precipitation. We're looking at water levels. We're looking at recharge of individual on-site systems characterizing that as the highest level of detail as possible, and then to describe that -- or to develop a tool, we put that into a grid, a three-dimensional grid. Essentially, it's blocked as you see on the right. Different layers with different values of hydrogeologic properties in each block. When it's all assembled, you can literally run different scenarios of hydrologic conditions and of recharge conditions in the specific watershed, and also calibrate it to real field date to insure that the model is represented throughout the conditions.

What goes into the model? This shows a study area that we're using for our project, the red line, and quickly you'll see the residential on-site wastewater treatment systems that are served, the lots in blue. The lots in green are served by commercial outside wastewater treatment systems, and the pink

shows systems that are off-site systems, such as the Malibu Colony Plaza or the county facility of Civic Center Way. It has off-site systems that are shown in red.

You see all the little, yellow spots in here, that's the outside wastewater treatment system. They get a better feel for the level of detail we have. There is a blowup of Malibu Colony and lower lagoon and PCH crossing the middle of that property from left to right, and what you see is the fact we have digitized the individual permit data to really understand however the data is available where the outside wastewater treatment systems are and where that sort of recharge is so we can come up with a very accurate model that can be a useful tool to assessing alternatives.

Also, the monitoring the amount of data we put into it, it shows 3000 points of subsurface hydrogeologic and geologic data. We have launching

0091

wells. We have borings. We have test pits. We have geologic trenches. This information can be put into -- is being put into the model to better understand -- better characterize the conditions and have it be a very useful tool. This data is fantastic. It slowed us down a bit, but the Regional Board, your Staff, was so cooperative and gave us plenty of data, and it's taken some time to organize that information, as I'll talk about in a minute.

The closeup we saw before, looking at a photographic image of the ground surface in the study area, but we're also fortunate to have -- the brown lines here is topography, and the level of data that's now available and it was acquired by the City for this project is digital elevation model with a 2-foot elevation contour accuracy, which gives essentially the top surface of our hydraulic model.

The model is being developed. We've organized the available geologic and hydrologic information. We've created databases and identified additional data needs. What we're doing right now is we're finding the conceptual model. We're essentially improving on the previous evaluation in modeling approach, and we're also refining the numerical model. The numerical model we're using, it's called Modulus,

0092

developed by the U.S. Geological Survey. It's probably the most widely used groundwater models in the world in using thousand of applications. It's all been sourced. It's very transparent strategy. What we're moving towards is having this tool available to the City to simulate existing on-site wastewater treatment system conditions. Thank you.

MR. THORSEN: Thank you. Now I would like to introduce Dr. John Izbicki. He has a Ph.D. from U.C. Riverside. He's worked for the U.S.G.S. Service for more than 25 years. Dr. Izbicki's recent work includes studies of submarine groundwater discharge and bacterial source identification in urban streams and near ocean shore water. Dr. Izbicki.

MR. IZBICKI: John Izbicki. I'm here to talk about some work that we did this July with the City of

Malibu and the Civic Center area. I don't want to extend the results of our work beyond that period of time. It was a dry hydrologic period. The lagoon berm mount had not breached at the time. But we collected a lot of data; some of it is relatively unique and unusual, a host of groundwater level data, some are continuous. Continuous radon-222 data and direct-current resistivity data to assess the

connection to the groundwater system, the lagoon and the near-shore ocean. We have about 200 samples of fecal -- bacteria in groundwater, in the lagoon and the near-shore ocean and some bacterial source-tracking data, which are not available for this presentation, but it ultimately includes genetic data, including human-specific bacteroides, molecular data, which would be fatty acid data, and chemical wastewater indicator data.

Along with that we have some nutrient data that were collected at the same time, including nitrogen isotopes, nitrate and ammonia and hydrogen to track the source of movement of water in the system. As I said, we collected more than 200 samples during the period that we worked. We went around the clock. The period that we worked was carefully selected. It was done concurrently with work done by SCCWRP as part of their epidemiological study, and we furnished samples to SCCWRP for analysis using their techniques for viral indicators and human-specific pathogens.

The work was done on a falling tidal cycle to insure that we had the maximum component of groundwater discharge to near-shore ocean at the time the data was collected. What you can see there is the well location samples, the Pieziometers on the

near-shore, the surface water samples in Malibu Lagoon and on the near-shore ocean, and as part of its work we also sampled some septic systems and did some very specialized extractions from the line on the beach and some sand at the line of the beach.

Let me back up a second. The next four slides I'm going to show you are really relating various compartments of the hydrologic system to each other in terms of the mass and transfer of water and -- transfer of FIB associated with that water.

First slide I'm going to show, we'll talk about the transfer of water from the alluvial groundwater system in the Malibu Lagoon. The second slide will be movement of water and associated bacteria through the berm and the mouth of the lagoon into the near-shore ocean. The third and fourth slides will illustrate data we collected in the Malibu Colony and other recreational beaches and near the sea wall of Malibu Colony to look at the exchange of water and bacteria between the ocean and the groundwater system.

This is showing our radon-222 data, and radon is an indicator of groundwater movement from the subsurface and the surface water -- because radon is naturally occurring, part of the uranium series. It

has a half life of about 3.8 days, so it has a -- clock associated with it -- with that we can evaluate

the movement of groundwater in the surface water. It works because radon is high in groundwater and low in surface water. What you see on the lower panel is a calculated groundwater discharge to the lagoon and it's represented as a six-hour moving average in the purple line.

That 2.8 centimeters per day is the average during the period of time that we worked. You will notice that's in a flux its length per time. If you were really quick and looked at the Stone Engineering plots of the water budget in the area, you would see that they had in volume per time. The numbers are essentially identical. No reason why they should have been, but they are.

Regardless of the number that you used, the point that I want to make is that 10 of 11 samples of groundwater from wells that we collected had FIB concentrations less than the detection limit.

So effectively at the time that we worked, there was no FIB in the groundwater, no fecal indicator bacteria, and that includes enterococcus. So regardless of the discharge rate of groundwater Malibu Lagoon, if you multiply that number by zero,

0096

the discharge or the mass transfer of indicator bacteria, including enterococcus to the lagoon, it was effectively zero at that point in time.

This is an image showing Malibu Lagoon on the left-hand side, the ocean on the right-hand side at low tide. That is about 180 feet long. It's right across the berm. The lagoon elevation at the time was about 8 feet above the low tide line.

What you're looking at is data that were collected using direct-current resistivity at low tide. The intensive blue color you see near the top is actually seawater that was in place and infiltrated through the berm during the previous night during high tide. The yellow and green colors that you see there tracing back to Malibu Lagoon is actually moderately saline water from the lagoon discharging through that berm to low tide. Again, we have a grading of about 8 feet or so at this point in time.

The graph that you see on the bottom there is specific conductance and enterococcus concentrations, specific conductance in red. What you see is at low tide the near-shore ocean, the salinity decreases. It's decreasing because of discharge of water from the lagoon, through the berm into the near-ocean. The enterococcus concentrations increase at that point in

0097

time shortly after the maximum discharge of water from the lagoon. What this is showing is that the lagoon itself and the berm transport water through the berm is a source of bacteria to near-shore ocean. That red line that you see there is the standard for single sample and enterococcus.

One of the important points that we got is that bacteria in the near-shore ocean were associated with tidal fluxes, and what you see there is the highest concentrations were occurring at high tide and relating to washing from the rack line by the ocean. Groundwater bacteria concentrations at low tide were low.

Here you can actually see the image of discharge of groundwater to the ocean -- freshwater lens that you see there in the yellow colors in that section, it's isolated from the groundwater system by a seawall at Malibu Colony, which is forming a barrier, the discharge of groundwater at the ocean. The groundwater does discharge, but by the time it breaches, other bacteria had been removed -- at least for the period of time that we did the sample collection.

So there's the summary of our data. The most important point that I want to make is at the time

that we did our work, FIB concentrations of groundwater were rather low. The discharge to the lagoon was effectively negligible and most of the bacteria transport that we saw in the near-shore ocean was weighted tidal fluctuations at high tide with groundwater discharge at low tide. Thank you very much.

MR. THORSEN: Thank you, John. That was a very informative presentation. I would like to provide our last speaker who is Vanessa Thulsiraj. She's a Ph.D. candidate speaking on behalf of Dr. Ambrose from U.C.L.A. Vanessa is a Ph.D. student conducting her doctoral research in Dr. Jay's laboratory at U.C.L.A.

MS. THULSIRAJ: Madam Chairman, and honorable board. Thank you so much for letting me be here today and speak to you again. I am here on behalf of Dr. Jennifer Jay and Dr. Richard Ambrose. This was a collaborative study done by these two by the University of Los Angeles.

CHAIR LUTZ: Can I ask you to pull the mic just a little closer to you.

MS. THULSIRAJ: So we did an investigation of FIB and human-specific bacteroidales within Malibu Creek and Lagoon. The objective of the study was

first to compare FIB concentrations for the following environmental conditions. This was during wet weather when the lagoon was open as well as during dry weather when the lagoon was open and closed. Finally, wanted to compare traditional FIB concentrations with human-specific bacteroidales marker. These are the sites that we analyzed. There are a total of 20. We looked upstream as well as within the lagoon and then we took five coastal water samples, and that's all the alphabetical letters: So A, B, C, X and Y.

This is just a little bit of a summary of the FIB data that we got. This is for E.coli. We found that during wet weather we had the highest concentrations, and that the concentrations began to drop during the dry weather open lagoon condition. Then once the lagoon closed up again, we started to see few more exceedances for this indicator, particularly in the lagoon.

We found similar results for enterococcus. The highest number of exceedances were observed during wet weather again. There were lower number of exceedances for this indicator. Some conclusions on the FIB data. It was high throughout the stream, lagoon and ocean specifically after rainfall, and this

was the only time that we were able to observe high FIB upstream and as well as in ocean water samples.

The FIB concentrations were generally low when the lagoon was open, and this was during the wet season, so when we sampled in March. Specific hot spot areas tended to be in the marsh region. Finally, when the lagoon was closed, FIB concentrations started to become high again. The second indicator that we looked at was human-specific bacteroidales, and Griffith, et al., in 2003 found that this was the most effective method to detect human fecal pollution in a mixture of samples and he found no false positives.

The great thing about using bacteroidales is that it is exclusively from fecal sources. It originates from feces and the digestive tract and other body cavities, and since members of the bacteroidales exhibit distinct genetic sequences, this has enabled the development of host specific assays. So we measured human-specific bacteroidales, and we followed the rigorous protocol as developed by Seurinck, et al., in 2005.

We have some internal controls that we do when we run this assay. One includes determining that we had correct purity of our product, and we do that by melting the sample at the end of our -- and then we check the melting temperature, and if it's 76.4, then this identifies a positive correct amplification of this marker.

Furthermore, we look for environmental interference samples and we spike it with a known concentration of 2 times 10 five copies. So this is just a setup of what the plate would look like. We run reactions, and then 96 well plates. Each unknown sample is run in duplicate; alongside that we spike the sample. If we get a concentration less than 8 times 10 a the four, we set the sample aside, dilute it by half and rerun again, and this is to address environmental interference.

Then we run two negative controls. So there should be no contamination. If there is no count in our negative control wells, that shows that this was -- if we get a true positive, in fact, it was a signal.

So this is a little bit of the human-specific bacteroidales data, and this is just a visual representation of it. We actually found five hits, so this was located in -- okay, the pointer isn't working very well.

We have a hit here, that's Site 3, as well as here, Site 7, and then Sites 5 and 6. In addition, we did a two-week study with the City of Malibu. We analyzed seven more samples, and again, we found no detection HBM.

I want to summarize our results. We sampled 39 samples during the dry weather open lagoon condition and did not detect HBM. We did detect it in five samples, so 7 percent of the time, and this was at Sites 3 and 5 during wet weather open lagoon condition. And during dry weather, we found three hits in closed lagoon condition, and that was Sites 3,

6 and 7. Finally, of the 74 samples, 69 did not contain HBM; that means we weren't able to detect this within the lagoon 93 percent of the time; moreover, we did not detect HBM in any ocean water samples or upstream. Finally, we did observe exceedances of FIB concentrations even when there was no HBM detected, and there was no correlation found between the two indicators that we examined. With that, thank you so much.

MR. THORSEN: Thank you, Vanessa. I think that's a very telling slide at the very end of this. For 93 percent of the time there was no human markers, and I guess I can't emphasize that enough. Here was some of the data, and we'll just pass through that.

Real quickly, I'm not going to dwell on what we call the fatal flaws of the Regional Board. We've

0103

submitted all of our written comments. There's just a couple points I would like to emphasize right up front, and then we'll move on. We believe that the fatal flaws include a faulty finding upon which the entire proposal is based, and that is that the groundwater in our region, Malibu Valley, is listed by the State as a potential drinking source. In the court case of the City of Arcadia versus the State Water Resources Control Board who has found that it is improper to base standards on the potential benefit water uses and only probable watering sources can be considered.

I would also like to state as currently written, we could not even construct a centralized wastewater treatment facility based on the prohibition, as the prohibition would prohibit a new discharge of this magnitude. With that, I had a lot of other slides, and I'm not going to go through them. I apologize for that, because I do want to get on to our alternate plan. I know we're running out of time, and I would like to just really focus back on to this.

Here again is an overview of the basin. You can see the proposed Regional Water Quality Prohibition boundaries in Malibu Canyon Road, the City's boundary, pier and other landmarks. 30 percent of this prohibition is outside of our city. 70

0104

percent is inside the City. What we have planned is a phased approach that will target specific issues. In this particular case we've got a Phase 1, which we are looking to connect our commercial Civic Center area into a centralized wastewater treatment plant. That's what we're designing. That's what we're moving full speed ahead on.

Phase 2 includes capturing the wastewater from the residential community that drains towards Malibu Creek. The black outline that you see is the drainage basin of groundwater that contributes to Malibu Creek. We already capture all the stormwater and we're now capturing groundwater via the centralized wastewater treatment plant. In addition to that we've identified where we would, as a City, put together an ordinance that would require disinfection units to be installed on the residential units as well as some of the commercial restaurants to the east of the creek. I'll go into these in varied detail here.

As I mentioned, the black area, this is the contributing groundwater basin for Malibu Creek. Malibu Creek, as you know, is impaired for bacteria and nutrients. These are the areas that impact that basin. What we've developed is a plan that targets the high commercial users. As you can see, the area in red is our commercial sector within that groundwater basin.

Here's a quick blowup, and you can see that much of the land is still undeveloped. In fact, Legacy Park will never be developed. It's 15 acres right in the heart of that. There's about 120,000 gallons per day that is generated in that area and ultimately a total of about 190 that could be generated. We are planning to use a state-of-the-art reclamation plant. It's an MBR plant. It's designed to maximize the use of recycled water. It's a treatment facility that could be located on the La Paz site, the wave site, as we call it, but we need a minimum of 2 acres in order to construct that facility.

We would be looking at dispersal fields in our Winter Canyon area. We believe that the entire site, as we've mentioned, has a capacity to generate up to 190,000 gallons per day, and we would build a treatment plant to accommodate that. As I mentioned, it targets the commercial properties with high effluent levels that are in close proximity to Malibu Creek, and ultimately, we're looking at eliminating bacteria and reducing nitrogen.

Phase 2: We're implementing this immediately during and after Phase 1 gets constructed, and this would be constructed by 2018. It's the residential area. Again, here's a blowup of that site. It would be connected into the Phase 1 reclamation facility. It would again have dispersal areas outside of the Malibu Creek watershed. We would be adding about 50,000 gallons per day for those residential units. It's designed to maximize the re-use of that recycled water, to the maximum extent possible. Again, it reduces the bacteria and nitrogen that would contribute to the creek.

We have the disinfection unit for the residential systems. Here's a blowup of that area. It would be an ordinance that we would require. It would be adopted within one year, and all systems must be installed by 2018. Currently the technology allows for ultraviolet light use. The ordinance currently exists mandating homeowners to install disinfection only when they are adding additional showers, toilets, those types of things; this ordinance would add on to that and require that by a date certain all of those units would require disinfection for those units.

We also have our proposal as part of this plant, and again, it goes outside of the boundary limits because we're trying to target specific areas. Here's what we're looking at, is a disinfection for PCH restaurant properties along the north or south side of PCH, from our eastern boundary all the way over to Malibu Creek.

The disinfection system again would be the same, and we would adopt an ordinance within a year. Require all of those properties that have restaurants to have a system installed by 2018. Currently there's five properties that already have systems installed, and there's about 14 more that would need those type of disinfection.

What are the benefits? We in a very efficient and effective way achieve water quality objectives. We base our decisions on the best available science we have. You heard a lot of other science today as well. We implement a risk-based targeted approach for wastewater treatment. It focuses on high impact areas, it deploys appropriate technology, allows for construction of a wastewater system in a modular fashion. It doesn't all have to be built at once, and it's capable of collecting and treating up to 240,000 gallons a day.

Time frame for Phase 1: Without going into great detail, we've outlined and we had discussions

0108

with the Regional Board Staff and stakeholders about our time frame. We believe getting through an EIR process, the final design and working with all the stakeholders, we can have this system up and running by April of 2015.

Phase 2: We believe we can have this system up and running by December 2018. Here's some preliminary estimates that we received from our engineers. Based on the proposed Board prohibition, you're looking at $52 million project, operating and maintenance cost of $1.6 million a year. The cost of businesses and residential as you can see are very high. The City of Malibu's alternate plan is a less costly system with a less on -- but it's still because we have fewer residences it's still about the same either way from a residential or a business perspective.

Again, the disinfection systems are not inexpensive. Those are going to run homeowners anywhere from 30,000 to 60,000, and restaurants even more. How are we going to pay for this? That's always a question. As mentioned earlier by the State, we have our application in for a low-interest loan from the State Water Resources Control Board. Option is we can also do a local bond measure. All of this

0109

is pending that an assessment district has to be formed for those parcels that benefit from a wastewater system, and it requires two-thirds of those voters to approve of an assessment district.

Our bottom line is we believe we need to work cooperatively. We have a plan in place. We don't believe prohibition is the appropriate method. We believe we've got a targeted approach and a very specific time line. We're committed to moving forward and protect the public's health. We've developed this base and this plan based on quite a bit of input from not only our scientists, but from community experts, from commercial property owners as well as the Board Staff. We feel we need to move forward with our plan instead of a prohibition. With that, I would like to open it up for questions, and we finished two minutes

early. Thank you.

CHAIR LUTZ: We appreciate two minutes there. We will have question and answer period after we have all of the speakers. But this brings me to our speaker list. There's seven plus hours of speakers in here. There's one more. I have a proposition so that we can make sure that everybody is heard or their opinion is heard or their support, opposed option is heard.

At this time what I would like to do is invite all of those who are here to -- first I'll take the opposed, and all you want to do is say "opposed" and you don't have anything else to say, I'm going to ask that you stand and one by one very quickly come through the microphone, say your names succinctly so that our reporter can get that, and we're also going to try to write it down so we can pull you out of this list and just say "opposed," and your name. And then we will do the same with the support people, and that way we will hopefully get this to a manageable number of people, because I don't think we want to be here for seven hours.

So what I would like to ask right now is all those who have -- if you just want to say "opposed," please stand and line up in the aisle right there and just come forward and we will be taking your name and your status.

Also, I've been reminded that some of the people that are in the remote room, you may have filled out a card and would like to do that, please come and join us now, and we will go through that.

After we do that, we will be adjourning for our lunch break, and then we will take all of the other speakers. So if you also cannot stay until after the lunch but you want to get a support/opposed comment and you filled out one of these cards, please come up at this time and do that now so that we have -- what we want is name, opposed, and then that's it.

MR. LAWRENCE: Richard Lawrence, opposed.

CHAIR LUTZ: Thank you. Anybody else with opposition?

MR. WAGONSELLER: Scott Wagonseller, opposed.

MR. KELLY: William Kelly, opposed.

CHAIR LUTZ: And you can start coming down so we can maybe move a little more quickly if possible.

MR. WOODMAN: Paul woodman, opposed.

MS. BERNARD: Heidi Bernard, Malibu Chamber of Commerce, opposed.

CHAIR LUTZ: Anybody else in opposition who wants to just say that?

MS. FIVA: Jane Fiva, Malibu Canyon Village Board of Directors, opposed.

CHAIR LUTZ: Anybody else, and then I will close? Anybody else? If you're coming down, please raise your hand so I know.

Now let's have the people who just want to come up to the microphone, your name and "support," and we will then pick you out of our list here. I'm going to ask that you line up so we can go through

this fairly quickly.
There is nobody who just wants to voice support? I was just handed about 10 more cards. We're going backwards. So at this point we're going to take the lunch period and have everybody speak about this more a minute, but we have, I would guess, close to eight hours worth of testimony here if everybody takes the three minutes. I do have a --
MS. EGOSCUE: I thought it would be useful to note at this point that if people have to speak, it's going to be shortened from three to probably one. Right now we have scheduled to come back at 1:00 o'clock. We have approximately nine hours of planned testimony, including those cards, which means that we would be here until well passed a reasonable time. So the Chair would have no choice but to cut down to three minutes.
CHAIR LUTZ: It is a logistics issue. I apologize that this is the logistic issue we're in. We would love to give everybody the maximum amount of time that they would need to say. I'm going to ask you, I will leave these with our Staff. If you can re-think your just giving us support/oppose, we can pull your card, you can write that on, and I will read

0113

those names when we come back from lunch, but we really need some help on this. I'm serious. This is at least seven plus hours, plus we have the people that we've already allowed extra --
MS. GLICKFELD: If I could make another suggestion, if people are willing to speed their time and have someone else speak for them, is that a possibility? We've done that in other hearings --
CHAIR LUTZ: That's possible, but what we won't be able to do is speed their time and add that time to that other speaker. Or if there are groups of you -- here's another option: If there's a group of you who are here from one specific group and if you can assign one speaker to say everything you need to say, you can all stand up there, get all your names out and have one person say the three minutes, that would help us tremendously.
At this point we will be here until midnight tonight. I have -- then at this point we will take our lunch break and go into our close session and we'll be back at 1:00 o'clock.
MR. LEVY: Madam Chair and members of the Board, we're in close session. We will be discussing Items 12.13 and 12.15 on the agenda. Thank you.

0114

(Hearing recessed at 12:40 p.m. to be reconvened at 1:00 p.m.)

AFTERNOON SESSION
1:05 p.m.
--ooo--

CHAIR LUTZ: Welcome back. Thank you for waiting while we try to organize a little bit. I do have some information about our speaker cards that I would like to share with you. We've gone through all of the speaker cards, and there is a portion on the

card that says, "I do not wish to speak, but would like to express the following position," and then it's checked.

So we have gone through the cards that have that and that have checked it, and we pulled those, and that is quite substantial. We have a couple in opposition, and approximately 135 in support. These will be made part of our record. So the names will be part of the record and will be submitted at this time.

So if you have checked that, I won't be calling your name because we have your comments here as you checked on your blue card. So that reduces what we have to speak to a usable number, and we will be able to give everybody the three minutes. Yeah.

Also, when we do get to the speakers -- right now we will have the people who have given us -- who have asked for additional time that we have allowed them. We will go through those. After that, we will start with the public comment from the card. I have to thank Joseph Melcioni for getting together a group of people that were here with him to reduce their speakers to one, and I appreciate that. All of you who are on that, please know -- or three, I'm sorry, three, but the record will reflect all of those names with that as well. So our record will be very accurate.

This will be the flow for the speakers: Heal the Bay will have 20 minutes; Lombardo, 8 minutes; Dean Isaccson, 8 minutes, and I understand, Dean, you're going to split that with Sally McCraven; Grant Adamson, 5 minutes; Mark Pestrella, 5 minutes; and Gene Lucero, 5 minutes. We will go ahead and start with Heal the Bay.

MR. GOLD: Good afternoon. My name is Mark Gold. I'm the president of the environmental group, Heal the Bay. Thank you for the opportunity to speak. Make sure that works. I do not see it. So much for that.

Just for background purposes, Heal the Bay has been involved on this issue pretty much forever. It goes back really from the very beginning when Malibu became a city and was fighting against the county proposal to put in a giant 2 million gallon a day treatment plan in Coral Canyon. Heal the Bay was with the local Malibu residents because that was the wrong wastewater solution for Malibu.

And then we've worked on that epidemiology study for Santa Monica Bay. I'm working with the Santa Monica Bay Restoration Commission. We were co-authors of that study. You've heard a little bit about that from your Staff earlier back in 1995. We're currently working with SCCWRP and U.C. Berkeley and the Orange County Sanitation Districts on the current study, and so anything you've heard on the results of the epidemiology study to date. There are no results, and there won't be for probably another year that can be shared. So just so you understand that in regard to that.

My dissertation for my doctorate at UCLA included water quality issues in Malibu Lagoon and Surfrider Beach, and there's been some work that was

done there that I was lucky enough to be part of that found human enterococcus -- viruses getting into Malibu Lagoon, so that's obviously a big concern because the source of that, of course, is human sewage.

We've been involved in the clean beach initiative technical advisory committee. I think that's really important because a lot of money has been steered toward solving water quality problems in Malibu through state funding. I think that big list of projects of some of the great things that have been occurring in Malibu. My bet is about 75 percent of that funding probably came from the state, and I know our organization played a big role, especially the run-off treatment facility in the Civic Center and trying to make that happen. And involved in the Legacy Park issue as well. We sat on the technical advisory committee for Legacy Park on that particular issue.

I've personally sat on Malibu's Environmental Review Board for a decade, so I'm very, very familiar with the politics and the water quality issues within the area. We took part in another study that I think is critical to this, which is a dissolved oxygen study with SCCWRP. It was looked at the predawn hours in Malibu Creek and Lagoon and found dissolved oxygen within the lagoon literally at zero at 4:00 in the morning. So to show you how putrefied the lagoon is and the nutrient problems within the lagoon we had during these predawn studies during late summer finding that the dissolved oxygen levels were at zero.

So I bring that all up for background from a standpoint of clearly it's been a major issue for us for quite some time. What's the problems? I think your Staff did a superb job in going through these problems and talking about them and characterizing them, not only in the tech memos, but in their presentation this morning.

On the public L side, you heard a little bit about the epidemiology study. I can go in that in detail if you have any questions about that. The beach report card, this is just an example of just this year on these sorts of things that we've been seeing during the AB4 11 time frame.

We're still seeing relatively high percentages of poor grades, Cs, Ds and Fs on the report card during the summer months, and this is just recent. If you look at annually over the last decade, as you can tell, Surfrider really is one of the most polluted beaches in the entire State of California, and it has been right up there along with the pier at Santa Monica, which I know was brought up earlier, and I know the Regional Water Quality Control Board is moving forward on enforcement against the City of Santa Monica because of the water quality problems at the pier.

I also know that the City of Santa Monica is spending about -- has already spent $2 million trying to upgrade and solve that problem, so it's not, as you know, a matter of people only picking on Malibu and

Surfrider Beach. Clearly all the beach water quality problems are high priority to the environmental community as well as to the Regional Water Quality Control Board.

On TMDLs: Obviously there's a lot of TMDLs that are of concern here: Malibu Creek and Lagoon bacteria. These are some of the deadlines that are there for that in Malibu Creek and Lagoon nutrients and Santa Monica Bay beaches bacteria TMDL. There's been major water quality compliance issues on each and every one of these, and clearly, we think Heal the Bay thinks that the moratorium proposal by Staff will go a long way towards -- moving towards compliance on these TMDLs, and as you can see, some of the TMDLs have been in place now for six or seven years, and so it's high time that something is moving forward on these particular issues.

0120

So you see the number of TMDL violations just for Surfrider Beach. In '06, remember that was only half a year, because July 15th was the initiation of the compliance deadline; and then '07, very dry year; and then '08 and then '09 on -- at least from our calculations, it might be different from your Staff, on the number of beach bacteria TMDL violations that we see at Surfrider.

So clearly this action today is critical from the standpoint of protecting public health and aquatic life. You've issued your notices of violations to the City of Malibu before on water quality objectives being exceeded on a regular basis. 16 percent of those violations were indeed at Surfrider Beach.

This slide here -- if I had a decent pointer -- it's probably where I would spend nearly all of my time. I'll do the best I can with that.

So in general, Heal the Bay supports the Staff recommendation for the moratorium with some modifications. I want a little more background to talk about some equity issues that again -- the Board picking on Malibu, I think, is important to bring up.

When you look at the City of Los Angeles and what they've done with their sewer system, the upgrades at Hyperion sewage treatment plant was a

0121

$1.6 billion project. The sewer upgrades over the last 20 years in the City of L.A. have been about another $4 billion. So, yes, clean water is not cheap, and so you've heard a little bit about the cost issues on water quality within the Civic Center area.

I think the overall cost is probably going to be a little closer to the cost of Legacy Park which is about a $45 million project, and it's probably going to be more like 25, 30 million, depending on what the proposal is, maybe then perhaps what you guys have come up with, but to put it in the context of the billions of dollars that have spent on water quality I think it's important.

Beach water quality, you heard what Malibu is doing. The City of L.A. is another example. $40 million with their Prop O money is going to be used for dry weather runoff diversions, and there's going to be another $100 million in beach water quality projects to meet the beach bacteria TMDLs that

the City of L.A. is going to implement within the Santa Monica Bay Watershed.

I just bring that up for context, in that clearly there's a lot going on to clean up water in Santa Monica Bay, and this is something that's one of the most important things that you guys are going to do, hopefully, by the end of the day.

Also, stepping up to the plate, their Regional Board about a decade ago on the Tapia prohibition; getting Tapia to stop discharging from April through October made a big difference on water quality during the summer months. Obviously, it was quite costly for -- Municipal Water District.

One other thing that hasn't been talked about to date, which I think is really important here, is the potential for whatever the Civic Center solution is, is that it also can be a water supply solution, the water recycling potential of actually having a centralized water recycling facility and using that as a resource for irrigation and other uses, I think is very, very important and really needs to be considered.

You guys as a Regional Board are charged with maximizing the use of recycled water, and as we've seen with the water plan, not one that Heal the Bay supported, but the water plan that was approved by the legislature yesterday. Clearly there's not a more important issue within the state right now than water supply, and that needs to be factored into the equation as well.

So to look at this map in particular and where Heal the Bay is I think is really important. So you look at the red outline -- and I'm going to try again, but nobody can really see that. So I'll do the best I can here.

So you look at the outline there and try to think of the Malibu proposal that you saw earlier as well for context. We think that a prohibition is absolutely critical here and a moratorium is absolutely critical, and the reason why is because the politics in Malibu change dramatically.

Every time there's an election, there's a new council, and you need to have a legally binding commitment. This is the number one thing that has to happen today, is that no more voluntary commitments like, "We're going to deal with the wastewater problem in Malibu. We're going to clean up Surfrider Beach. We're going to clean up Malibu Lagoon," because the voluntary commitments have not ended up in compliance with the water quality objectives and water quality standards and TMDLs. And so that to me and to Heal the Bay is the most critical point, is that whatever you do today has to be mandatory.

So the proposal you saw from the City of Malibu was not something that would come with a prohibition or a moratorium, and that's something that I think is very important in that regard. Now, looking at the boundary in the areas itself. Now, you know where Winter Canyon is, and one of the things that we were concerned about in this boundary is where

you would do wastewater disposal with this large of prohibition and moratorium area.

We think that the best potential for wastewater disposal is probably within the upper Winter Canyon area, and by drawing this the way that it is drawn, that option is pretty much eliminated as a wastewater disposal option, and I think that's something that you need to look at. From the standpoint --

MS. GLICKFELD: Excuse me, this apparently is backwards, and that's why none of the lasers are working with it, but if you could go back. I don't know, are you calling everything above Malibu Canyon Road upper Winter Canyon? Can you give us some reference point as to what upper Winter Canyon is?

MR. GOLD: Well, I don't want to say where the disposal site is because -- the point being is that Winter Canyon is a likely disposal area. It doesn't drain into Malibu Creek. It doesn't drain into the lagoon. It doesn't drain into Surfrider Beach. So it drains more to the Amarillo Beach area

0125

and the Colony, and that area on the sorts of concerns that you might have would be different because it would be disinfection would be the number one thing that you would want to do, rather than disinfection and -- you don't have nutrient impairment on the beach at Amarillo. So right now you can't use that as a wastewater disposal option. I don't know what to do on the lack of lighting, but the gist of it is -- let's see if that one is any better. No.

So in looking at these lines -- so if you look at the area on the beach itself, one of the things that we're saying for the Colony, if you remember our letter, what we're saying in the Colony and the Malibu Road area and the Amarillo Beach area is that another potential option besides sewering would be disinfection systems.

So sort of allow that option as well for the individual residents as opposed to just mandating a sewer, seems to be a potential, viable alternative. The same thing for PCH, where you look at PCH east of Malibu Creek and Lagoon in that whole area there with all the commercial, where -- there's another possibility where again, the impairment is for fecal bacteria.

So to potentially, rather than forcing a

0126

sewer option there, to actually have the disinfection option available I think is very, very important. So to use on-site wastewater treatment technologies, some of the best that's available, seems to be an important thing as an alternative as well. I would also expand in that direction further east, including the whole commercial corridor, to at least include all the restaurants and hotels on PCH within Malibu from the standpoint of requiring advanced disinfection. So the areas itself that would absolutely, positively have to be sewered is the Malibu Creek watershed and the groundwater basin that actually drains to Malibu Creek and Lagoon. That's where you have your TMDLs, that's where you have your water quality violations that are the most severe, and that seems to make the most

sense.

Now, there are parts of Winter Canyon where some of your most egregious violations are occurring. So another thing for you to potentially think about is should that area be required to be sewered or should they at least be required to use the best available advanced treatment to make sure that they are complying with their WDRs, because there's been a long history of WDR exceedances in that area. But the bottom line is that the only way this is going to work

0127

is if there's a moratorium and prohibition in place, and that to me is the most important take-home at this point.

So in looking at the TMDL, we've seen routine violations. We have a public health risk that has been demonstrated at Surfrider Beach. I want to remind people from the standpoint -- one of the things that I think the City of Malibu was really trying to focus on was, Do you have proven cause and effect? Are people getting sick because of the septic systems? That's a very, very difficult burden to meet, but what is an easy burden that has been met time and time again, is that the reasonable potential to cause or contribute to water quality exceedances has absolutely been demonstrated.

There's been numerous studies that have shown that there's human viruses or human bacteroidales that are getting into the lagoon from various different locations from the lagoon. I can tell you from the studies that I participated myself on, on the back channels in Malibu Lagoon that are next to the Colony, we found human viruses.

Also, if you know where that gas station is just inland on PCH at the PCH Bridge, we also found human viruses there a number of times during the '90s.

0128

So there's a little drainage that goes in right at the creek at that location. It's demonstrated that there's a problem, whether it's due to one person's septic system or another, that's a different issue altogether, but the preponderance of evidence shows that the reasonable potential is absolutely positively there.

You've also heard about the other issues in regard to the violation that your Staff pointed out so well on the number of violations of the individual WDRs, so clearly a huge problem. The Malibu smell issue. There's a big one. Waste hauling is a regular occurrence within there and clearly having the solution recommended by Staff. We'll deal with those issues as well.

Another thing that is a very important topic right now is when you have noncompliance, nonattainment of TMDLs. It really calls into question whether or not you can add new sources of impairing pollutants, so that's another reason to justify the moratorium, is because you are in nonattainment for bacteria and nutrients within the lagoon, within the receiving waters, and so that's another thing: Don't put in new sources of pollution when you're already have an impairment.

0129

I think at that point -- I know you will have questions at the end, but I'm a little bit concerned about my description of the map and a potential solution here that would make sense. I think another way for you to think about it, since I can't draw it up there, is that if you look at the Malibu proposal and make that mandatory, including with a prohibition and moratorium and something to deal with the chronic discharge problems and violations in Winter Canyon, that's a potential viable solution that we at Heal the Bay would be willing to support. But the key thing is it has to be a moratorium, and it has to be a prohibition; otherwise, Heal the Bay would absolutely oppose that moving forward. Thank you for the opportunity to speak.

CHAIR LUTZ: Thank you. Mr. Lombardo and followed by Dean Isaccson.

MR. LOMBARDO: Good afternoon. Thank you for this opportunity to speak in front of the Board. My name P.O. Lombardo. I'm president of Lombardo Associates. We're a nationally recognized wastewater engineering firm serving municipal and private clients. I'm a professional engineer registered in the State of California and a nationally recognized expert on decentralized innovative wastewater systems

0130

and water quality issues.

Give you more background on ourselves: We've been the engineer of record for over $200 million of innovative wastewater projects throughout the United States. We've co-authored half a dozen U.S.E.P.A. manuals on alternative wastewater systems, decentralized systems and we've worked in Chesapeake Bay, Cape Cod and a number of coastal areas that are dealing with the similar issues that Malibu is as well. We have been the wastewater engineers for a number of developed and undeveloped properties in the Malibu Civic Center area, and those include the Malibu Creek Plaza system that we engineered, and that system has been producing excellent water quality results for the last two years since its initiation.

I would contest the picture that was presented on the performance of those systems. We've had three minor violations that are due to simple equipment issues that are common during start-up. We're currently now achieving, averaging total nitrogen less than 3, and we're now routinely achieving total nitrogen less than 1, but with a system that requires two hours per week of operation and maintenance.

We consider it the best in class system. I

0131

want to emphasize that these systems are operating today in Malibu Center -- or the Civic Center, and I would urge you not to cut the flowers with the weeds, that these decentralized systems can indeed do the job.

Additionally, I'm the author of the U.S.E.P.A. Water Quality model that has been used for TMDL determinations, so I understand the purpose of the science and the analogy associated with that. So I wanted to speak today regarding five critical issues, technical issues that I respectfully ask for

your consideration on. But prior to that, I would just like to quickly go through to read into the record the administrative due process issues. We're the author, if you will, of the "no discharge systems" that have been proposed in Malibu Civic Center for a number of our clients, in addition to the engineering of the Cross Creek Plaza wastewater system that again is achieving excellent performance.

It's essentially achieving Title 22, unrestricted water use standards, even though it's not required to. There's an administrative due process issue of really focusing on the elimination of the no discharge option and requesting that the board reconsider that and respectfully request that it be

0132

reinserted.

The exemption option for clients being eliminated has a significant option as it was -- or excuse me, significant impact as it was an option upon which they were or may rely upon. The removal was made only 10 days ago and has provided insufficient process time for us to respond and comment on this, what we would call significant material change.

The response to the comment that was a basis for its removal states that of all comments taken together, and I quote, "It demonstrates the difficulty of proposing an exemption for zero discharge projects that will make progress towards the objective of restoring beneficial uses of water quality due to design and operational constraints."

In our professional opinion, this is a misrepresentation and not entirely true. We will submit that there are no discharge systems existing today in Malibu Civic Center and have been for over 20 years. I brought along the copy of the annual report that Pepperdine University submits to the Water Quality Control Board that demonstrates that their system that they operate is a no-discharge system. Okay? So Pepperdine has been doing that for a lot of time.

0133

In terms of the rationale for the removal, it appears that it is because it's difficult to manage. In our, you know, respectful opinion, what's difficult for some is not really difficult for others. I'm not going to be a good medical person as my wife is. At the end of the day, these no-discharge systems is just a simply water balance, that the demand for water is far -- for nonpotable water, it's far greater than the amount of wastewater that's being produced at the site.

So to have a no-discharge system in the area of Malibu environment is really no surprise to a practicing professional as myself because of the climate and situation here. No discharges are really achieved by 50 percent internal water re-use within the buildings, where it's used for restroom, nonpotable purposes, and the other 50 percent is being used for landscaping purposes, and it's being stored during the winter period when there's some rain.

The rain in Malibu is very episodic and really is not a significant contributor to irrigation needs. Pepperdine here, for instance, irrigates all

year-round, and they need to satisfy the irrigation requirements.

So consequently, we would submit to you that the zero discharge exemption removal is arbitrary, and again, we respectively request it's insertion in the process. We would also suggest to you that the no-discharge option is in your interest to expedite water quality achievement, because it will engage the private sector and to implement systems, and they can be done concurrently, along with any public sector work. So all of the commercial facilities can achieve that.

Now, in the interest of time, I'm going to just hit the highlights of the five technical points. Again, the no-discharge systems really should not be removed because they are really in compliance with the State Board's requirements for water recycling. We have integrated all of the State requirements for landscape irrigation into these designs, which is doing it precisely as the State Water Resources Control Board says it should be done and as Pepperdine has done for a number of years.

The second item is that, in my professional opinion, there are a small number of serious violators in the Civic Center area that are the elephants in the room, if you will, that need to be addressed. One property there represents -- and it's a major source of violation -- represents 72 percent of the nitrogen contribution to the Malibu Creek, and 33 percent of the total nitrogen load to the entire Malibu Lagoon. So that one violator if it was corrected would solve a huge significant portion of the problem, and we just question why isn't that just being done, why is everybody getting in the net.

The third item is in looking at the groundwater data, one needs to be sensitive if there's a lag time. As the hydrogeologic studies have shown, it takes years for the water to move down. So when you look at the data, you need to remember that that data may be a representative of what happened five or ten years ago.

The data that we collect on the groundwater in the Civic Center at the Cross Street Plaza shows that 95 percent of the time it was within compliance with the bacterial standards, and when it wasn't, it was obvious that there was upgradient septic system that was failing. Very obvious from the data.

The other item that we would submit to you is that the wastewater solutions were known and were agreed to a number of years ago. Nitrification systems were needed within six months of travel time, and there was a number of components of the MOU that really described what everybody thought would do the job.

My professional opinion in looking at it, I agree with that, and I would say rather than this blanket prohibition and sewering, that perhaps going to the original plan may be the wiser approach to take. So thank you for the opportunity to submit this.

CHAIR LUTZ: Thank you. The next speaker is -- it's a dual, Sally McCraven along with Dean Isaccson, and you have eight minutes.

MS. McCRAVEN: My name is Sally McCraven. I'm a senior hydrogeologist with Todd Engineers. Todd Engineers is a consulting firm specializing in protection and management of water resources. We've worked for a number of years in the West Malibu area west of the Civic Center looking at development and redevelopment projects to assess whether the hydrogeologic conditions were suitable for discharge of wastewater and looking at water quality issues.

Our analysis of one proposed project in West Malibu, which has been favorably reviewed by the Regional Water Quality Control Board provides a perspective on issues raised in the Civic Center area. We've collected quite of bit of water quality and water level data. It's no surprise the water quality

0137

data shows that individual septic systems in the area impact groundwater and occasionally ocean water and that the water level data indicates that there's really a minimal separation between septic systems and leach fields and the groundwater as you get closer to the ocean.

The project I would like to talk about would include a package plant, an individual package plant that would provide tertiary treatment, disinfection. The water would meet standards so that it could be recycled for irrigation, and these type of projects offer a lot of benefits. You can improve effluent water quality in the area. The developer has proposed that in addition to treating the water for his proposed houses, he would also take water from up to maybe about 160 existing homes that currently rely on primarily primary on-site septic systems.

This type of approach has a lot of benefits: You can improve water quality, groundwater quality, ocean water quality, and even though you're adding more homes to the area, you can actually reduce the overall volume of effluent going to groundwater because you can re-use it for irrigation.

Finally, perhaps, one of the most important things, is if you can take some irrigated areas that

0138

are currently irrigated with potable water, replace it with recycled water, you have the added benefit of reducing reliance on potable water.

As a hydrogeologist, I support the need for regional wastewater management strategy in Malibu and decentralize packaged plants with advanced treatment in the proper hydrogeologic setting and available land for irrigation could be a beneficial component of such an overall strategy. Thank you.

MR. ISACCSON: Honorable Chair, Board members, thank you for your time. I'm not going to repeat what Sally McCraven has said --

CHAIR LUTZ: Could you please just state your name for the record for our reporter.

MR. ISACCSON: Dean Isaccson. I've been a resident of Malibu for over 15 years, a multi-family home builder in the City of Malibu since approximately 1990. I have intimate knowledge about rebuilding

wastewater systems. In the last project that we built, which was 22 units, we actually were the last party to put up most of the money to rebuild the Winter Canyon project. If I had to go back from the beginning, 20-20 hindsight, which I can't, I can only move forward, I'm sure it would have been better to not have our L.L.C. pay up to a million dollars, but

to pool this money with other commercial property owners, markets in the area that did individual systems and get an area-wide solution for the Civic Center. Unfortunately, we can only move forward.

The reason I'm here before you, not only as a resident, but as a developer, is that we can do better in the City of Malibu. We have the sophistication. We have the information. As residents, we have to work with the City. We have to be more involved so that we don't come down to these very confrontational situations with the Board working on opposing sides.

Unfortunately, this is where this has been led, and we have to move from here. The most important thing that I can tell you is that if we look at these area wide systems, we will eliminate the need if we act now in other parts of Malibu, not to have the same discussion, not to put the valuable City resources to work defending themselves, the State resources, the State Staff defending themselves will put in to solving the problem.

We need to start solving the problem in Malibu, and I'm going to work with the City as much as I can to implement ideas and my experience. I'm very inexpensive. I also want to say that I also rebuilt a 68-unit facility for apartments in Malibu, as well,

and that's working successfully.

Sally McCraven told you about the scientific data that we've gathered over 10 years. We met with homeowners in West Malibu. Why did they like the idea? Because we could have them tie into this treatment plant, pay approximately half of what it would take to have an individual mini treatment plant, instead of 168 mini treatment plants, they can go on to our property, the water would be tertiary cleaned, most of it would be evaporated, and it would cost them half. Half.

So we have facts. We want to share these facts. These are not rumors. This is facts: that we can do this for half of what they can do it on an individual basis. Plus, we're not recharging groundwater through evapotranspiration. Most of the water, water is in the landscaping and evaporates.

In closing, I just want to say that my idea is for the private sector to work with the City to reduce costs. On my particular area in West Malibu, we will be adding one house for every five houses that are removed from discharging primary treated water to the groundwater, one for five. We're wanting responsible growth. We're wanting caps on growth so that in the future new construction can't come in and

tie into this treatment plant and magnify it even more, and we have CC&Rs that have been developed by homeowners. Seventy homeowners actually like this

concept, and they have interest in proceeding with this concept, so there must be merit to it.

The reason that there is merit is because there's scientific data, it's going to cost less, and this is not news to the City of Malibu. They know about evapotranspiration. They know about these area of package plants. All I want to do is say is that it works, I've done it, and I want to do it again. I'm here for any questions.

CHAIR LUTZ: Thank you. Grant Adamson, and you are scheduled for five minutes.

MR. ADAMSON: I have a photo for the Board members.

CHAIR LUTZ: You can take it.

MR. ADAMSON: Madam Chair, and Board members, my name is Grant Adamson. I'm here today representing my family and our MHAB trust. Sixteen years ago my youngest daughter was born. That same year, we started the permit approval process to build homes on a piece of land, which is now in the northeast corner of the proposed on-site wastewater ban area.

During the last 16 years, we have learned

0142

that getting a partial map recorded can actually take longer than getting it approved. We have learned not to get too excited about getting a conditional use permit, because quite possibly, you will need to go through the process again as we have done.

We have learned that the cumulative impact of Federal, State and Local regulation on building homes in this area is staggering. In Homer's classic tale of the Odyssey, Trojan war hero, Odysseus, spent 10 years on a perilous journey to reach home. We are now 16 years into our own odyssey. The Regional Water Quality Control Board's decision today could have a more formidable impact on us than the combined impact, the Sirens, the Cyclops, and the Medusa had on Odysseus.

We finished grading several homesites on large 8-plus acre parcels in the northeast portion of the proposed on-site discharge ban area. Please see the photo that I have handed out. These properties are about a mile from Malibu Lagoon. We have over $2 million invested in the permit approval process and grading, plus the cost of the land. We've received most but not all of our approvals to build homes on these sites. Our approval from Los Angeles County Environmental Health includes installation of advanced

0143

wastewater treatment systems.

These advanced systems would treat wastewater to roughly the same level as a centralized municipal treatment system, and we're willing to agree to more frequent monitoring than usual for residential homes. My family has been around Malibu for a long time. Most of what is now state-owned land. In and along Malibu Creek and Lagoon was transferred from my family by sale and gift to the public. Much of the rest of state-owned land in the subject area, including our former family home on Surfrider Beach, which still bears our name, was taken from us by the State with its power of eminent domain.

Over the years my family has consistently

supported the installation of a centralized wastewater collection system for Malibu. We continue to support the installation of a centralized wastewater system; however, we believe that the Regional Board should consider projects like ours that have been in the regulatory approval pipeline for many years which are proposing advanced treatment systems. Our land is far from Malibu Lagoon.

Most significantly, we are willing to commit to hook up and to pay our share for centralized wastewater system when available. Our project is --

0144

located among 20 large privately owned parcels in L.A. County. The L.A. County area of the proposed on-site wastewater ban. It isn't likely that L.A. County will build the centralized wastewater system for so few homes in this remote area of the county. If the City of Malibu does not want to serve this county area and the county does not build a centralized system, we will be unable to build homes on these graded parcels indefinitely.

In the October 1st presentation by Board Staff, it appeared that there would be a chance for projects which have been in the permitting pipeline for a long time. There was talk of working with the City of Malibu and the county to proceed with permitting these exceptions. In January, my daughter will have her 17th birthday. How many more birthdays will she have before we can build these homes. We have finished significant grading. We have approvals for advanced treatment systems, and we continue to be committed to hooking up to a centralized collection system as soon as it is available.

Our project is roughly a mile from Malibu Lagoon. We ask you to please allow us to continue by allowing exception for certain long-term pipeline projects. We ask that you please help us finish our

0145

Odyssey. Thank you.

MS. EGOSCUE: Chair Lutz?

CHAIR LUTZ: Yes.

MS. EGOSCUE: Sorry for the interruption. Mr. Adamson, before you leave, would the Chair please ask Mr. Adamson to read into the record the official parcel number of his parcels? It's on this photo that has been handed to me, and if you don't have it, I'll hand it back to you for that.

MR. ADAMSON: Parcel map 23897 and APN 4457-002-038. Thank you.

CHAIR LUTZ: Thank you. Next speaker, Mark Pestrella, and that is five minutes.

MR. PESTRELLA: Good afternoon, Madam Chair and Board members. Thank you for allowing the County to speak today. I'm here representing the County of Los Angeles in this matter. Today I'm representing the County's interest in the Malibu area.

Here today with me representing Supervisor Yaroslavsky is his chief deputy, Lisa Katz, and Susan Nisman. We also have in the audience today our County health officer represented by Mr. Almadena.

The area bounded here that's bounded by the prohibition area includes county -- areas as been

0146
noted. In that area there are approximately 20 private homes, as Mr. Adamson just referred to. Also, within this area and facilities that we're very concerned about, the county owns four public facilities.

First of those is the County Fire Department, Fire Station 88, which is an essential public safety facility. They have a road maintenance yard that maintains roads within the unincorporated area and Winter Canyon area. We operate a known public restroom facility located at Surfrider Beach, well known, which currently has a pending -- or has an approval to place an advanced treatment system within it from your Board. And then the County also owns the Malibu Civic Center area, which houses important facilities, such as the county library, the Superior Court, and also houses our Waterworks District 29, which serves water to the residents of Malibu.

The proposed prohibition could potentially lead to the interruption of these public services, and it would for sure. The U.S.E.P.A. and both State and Local Health Departments have confirmed that on-site wastewater treatment systems, such as those that are being used on these facilities, are safe and effective means of private sewage disposal, and you've heard a

0147
number of professionals get up here this afternoon and give testimony to that fact, that advanced treatment is appropriate and can be used in the conditions that exist here in this area.

I would reference Mr. Gold's reference to advanced treatment as well to -- disinfection is also a septic system with advanced treatment. The OWDS serving the County facilities in the prohibition area have been approved, as I said, by the local building official, by the health officer, who is here today, and also by your Regional Board, and they continue to offer, I believe, in an appropriate manner.

The County believes that it can produce evidence that these systems do not cause or contribute to exceedances of groundwater or service water standards, and we would like the opportunity to do that by requesting -- it's your Board -- including provision within this prohibition to allow individual property owners to provide evidence to your Staff that these systems do not, in fact, cause or contribute to exceedances of water quality standards in those areas that you have stated your concern with. I thank you for your time today.

CHAIR LUTZ: Thank you. And our final speaker with a predetermined time is Gene Lucero, and

0148
this is five minutes as well.

MR. LUCERO: Madam Chair and Board Members, good afternoon. I'm here to make a presentation on behalf of Malibu Realty, L.L.C. Before I start, I would like you to note an important fact. I'm a lawyer. I'm a member of the class of people who stand to benefit if you guys can't work out the details of this proposal. I would observe, first of all, that the City and Heal the Bay are essentially talking about the same area that needs to be subject to the

prohibition.

They don't agree on the issue of whether a prohibition should apply, but they are talking roughly about the same area. The reason I'm here today is I need to talk about what happens if you go forward with a prohibition. We are extremely concerned, and we need you to fix one discrete part of the resolution, whichever resolution you decide to go with.

Let me tell you just a moment about Malibu Realty. It owns a property, a significant residential property in the Malibu Civic Center area. It's adjacent to Malibu Creek. It is a property that has been under a comprehensive remodel since 2007. It will have a new advanced and expanded wastewater treatment system. And this is important: It has

0149

completed or the City of Malibu has completed its conformance review, and I'm going to talk about that in a minute.

My request is that you need to add to this amendment a provision, and I have a specific proposal which I'll present at the end, to allow future discharge from on-site wastewater disposal systems that are in the permitting pipeline right now when this amendment goes into effect.

When I talk about what's in the permitting pipeline, what we're really talking about are one of two classes of on-site wastewater disposal systems. We're talking about either one that is subject to regulation by the Regional Board and has received the determination from the Regional Board that they have a complete WDR permit application, a complete ROWD, and I think we all agree at that point the processing begins.

The comparable point in the City of Malibu's system is they have received and approved the initial application for conformance review. This is not a simple point to get to. In discussing it with the City of Malibu, it cost roughly $70,000 to $80,000 in preparation to get that application to the point that the City will determine it to be completed.

0150

In my client's case, it is several hundred thousand dollars. If this resolution, the one that was posted on October 27th is drafted, none of those facilities, including Malibu Realty property, will be allowed to complete the project and to discharge into their advanced -- using their advanced on-site wastewater treatment plant.

Essentially this amendment, as it's drafted, is it prohibits the discharges from permitting from OWDSs in the permitting pipeline. It penalizes parties who have made substantial investments in developing these properties. It penalizes them if they've gone too advanced on on-site wastewater treatment systems, and as I'm going to comment in a minute, there's no evidence, I see, that warrants this approach.

I might note, the City has apparently submitted a list of 24 properties that they consider in the permitting pipeline. Ten of those properties are fire replacements, okay? It's not my place here today to make another observations, but if a fire

occurs in Malibu, the way this resolution is drafted, they will not be able to replace that house and begin reinjecting in the on-site wastewater treatment system. It's easy to fix, but as drafted currently, it won't happen.

The problem is this presents a very unfair situation with respect to the choices that face property owners. They either have to abandon their redevelopment plans. They lose their significant investments. In some cases, development won't occur, and in some cases their only alternative will be to -- I think this is really an unfair and unjust reaction, because if you think about what the City said earlier today, for any upgraded system that requires a Malibu permit, they require -- if there's an additional fixture, that there's that additional bathroom that Wendy Phillips referred to, then they will have to go to secondary and tertiary treatment, which reduces nutrient loads and the pathogens, which is the objective, indeed letting these proceed with -- what we need is an amendment that would capture and allow these systems to proceed. (Bell ringing) I think that was only for three minutes, but let me show you the proposed language --

CHAIR LUTZ: Let me double-check. How much time was that?

MS. HARRIS: He has one minute left. It was four minutes.

MR. LUCERO: This is the language from the actual basin plan amendment. This is not the language or the resolution. I have modified it with the text in red -- provision which says -- and it is the first bullet. "All discharges from existing OWDs in the Malibu Civic Center area shall be prohibited on -- date -- for purposes of this amendment" -- this is the important sentence -- "of existing system is defined to include a permitted but not yet operating system" -- which is not captured under the current graph -- "as well as any OWDSs for which the City of Malibu's environmental health reviewed vision has received and approved initial application for conformance review or a complete wastewater discharge permit application has been submitted to the Regional Water Quality Control Board as appropriate before the effective date, and all these new discharges are prohibited."

I show you this last bullet because what's missing from the language in the current resolution is there's no allotment for replacements. Upgrades, repairs, there's no allotment for replacements, which I think you need. That's my proposal. That's what I ask you consider adding to, whatever resolution you -- (Bell ringing)

CHAIR LUTZ: Thank you. We'll go to the speaker cards. Let me see what time it is. Are we okay? The first speaker cards I would like to call up are those that Mr. Melcioni put together. I apologize I do not know the name of who is going to speak, and from here on in, speakers are three minutes.

MR. MELCIONI: Yes. Before the time starts,

Madam Chair, I want to be sure we're clear on this. We have gotten Malibu Surfing Association, the Surfrider Foundation, Santa Monica Bay Keeper and Heal the Bay to agree to limit their comments to three speakers for Malibu Surfing Association, three speakers for Surfrider, two speakers for Bay Keeper, and then Heal the Bay would like an additional five minutes. It has five speakers who are residents -- I've talked to the council about all of this beforehand.

CHAIR LUTZ: Give me a minute if we can confer for just one moment.

(Discussion off the record)

CHAIR LUTZ: I apologize. We had a little misunderstanding of what we were doing. So if I'm understanding correctly here, you have three organizations, you have a couple of speakers for each organization. This is what I'm prepared to offer 30 minutes for the whole thing.

0154

MR. MELCIONI: We only need 18, I believe.

CHAIR LUTZ: If that's all you need, then let's go with 18. Please be sure and give your names and who you are representing so it's on the record for us.

MR. BLUM: Good afternoon, Board members. My name is Michael Blum. I'm the president of the Malibu Surfing Association. By reference in this morning's Staff report we were recognized as Surfing Association and our work with other surfing clubs listed as Surfing Coalition. We're one of the oldest Surfing clubs in California and a primary user group of Malibu Surfrider Beach, our home surfing break since the MSA was founded in 1961.

Our oldest member who surfed at Surfrider in the 1950s can still surf there daily. We are here today because in the discussion of repairing public beneficial uses of water bodies, such as Surfrider Beach, we are of that public. We are the people in the water now, and we hope to be the people you see in -- we hope to be the people you see using this recreational resource with cleaner water in the future.

In addition to representing the members of MSA here today, I have provided in our comment letters

0155

signatures of 15 sister surfing clubs from California, Hawaii, and the East Coast, representing more than 1,000 members who believe in clean water at Malibu and Surfrider Beach.

We recognize and accept as fact the iconic stature of Surfrider Beach, the birth place of modern surfing, the template for the casual Southern California beach lifestyle, which was sold to the rest of the world, and a public resource for 1.5 million annual visitors, local visitors, regional visitors and international visitors.

It's a vital resource, a recreational, cultural and economic resource at that. The MSA supports Staff's proposed prohibition and moratorium as the best alternative to protect public health with over 150 violations at Surfrider Beach over the last three years. We concur with Staff that other

alternatives continued hauling, no action or local initiatives are unlikely to produce the desired outcomes.

In particular, we believe that a lack of progress and timely progress on wastewater has been made. Lastly, we believe that there are enough scientific alternatives -- or enough scientific studies, rather, to support the prohibition of

0156

moratorium, and the preliminary nonpeer reviewed data presented earlier this morning represents nothing more than cramming the night before a test.

At last November's Board hearing at which the renegotiated MOU and potential prohibition was first discussed, members of the city council invoked the words of our then newly elected-president, yes, we can. Yes, we can have clean water at Malibu. Yes, we can successfully partner with the City and the Water Board. Yes, we can protect these resources for all citizens.

I believe this and accept this as the basis of my conclusion. Through your action, the adoption of the proposed resolution which includes all relevant parcels together with an enforceable time line, including a prohibition and a moratorium, we believe we can meet these water quality objectives. Yes, we can, and it's time do so.

Let me return the favor enclosed by invoking another president. This time the 16th. Let us have faith that right makes might, and in that faith, let us to the end dare to do our duty as we understand it. Thank you for your time and the opportunity to speak today.

MR. MELCIONI: Thank you, Madam Chair, and

0157

members of the Board. I appreciate the opportunity to speak here today. My name is Joe Melcioni. I'm the environmental committee chair of the Malibu Surfing Association. I want to support the Staff's recommendation to impose a moratorium on on-site wastewater treatment systems in the Malibu Civic Center area.

I support heartedly their balanced job of demonstrating the need for this prohibition. This is not a new issue. As Mark Gold said, we have been dealing with this issue forever, and the City is recalcitrant still to make good on the obligations that it made in 1991 in connection with its incorporation to deal with wastewater treatment.

Their record of compliance is abysmal. We are not talking about speculation here. We're talking about on-site wastewater systems that do not work, that are not properly monitored, that have failed repeatedly. They have not today demonstrated any contrition or any admission of culpability. They include statements of -- implied threats of litigation if they don't get their way, and they have made no significant progress in coming up with a waste treatment solution for the Malibu Civic Center area. In particular, they keep talking about funding,

0158

funding, funding.

This is the 54th richest community on the

planet, okay? Cities much poorer than this have dealt with their wastewater treatment problems. This city must come to grips with its problems and deal with it. The toilet is full. There isn't any more room to flush anything anywhere. They need to build a waste treatment facility. They need to do it now. And the only way that that's going to get done is to stop with the consensual agreements, because, believe me, if it's consensual, if it's permissive, they will begin to undermine it the day after you make a decision. They must be subject to a moratorium. They must have their feet put to the fire. They must come up with a time table. They must come up with a solution to this problem.

So I would hope that the Board would be tired by now of hearing promises of performance and would impose a moratorium. This city has no excuse for not dealing with these wastewater treatment problems. It has the money. It can get the job done, and we all be better for it. Thank you very much.

MR. SANO: Thank you, Board members, for this opportunity. I'm representing the Malibu Surfing Association, and my name is Ken Sano. Forgive me for

0159

reading this, but I'm trying to keep it down to three minutes.

My name is Ken Sano, and I am a nobody. Many have identified themselves with what they feel are qualifications to comment on this issue. I have only a bachelor's degree in biology. I am a surfer. I have no attorneys to represent me because I can't afford one. I'm just a surfer. But this surfer in August of 1997 was surfing at Surfrider Beach and found himself paddling around in raw sewage.

This isn't the first time I paddled around in it. I've gotten ear infections, nose infections, respiratory infections, gastrointestinal infections, diarrhea, conjunctivitis of my eyes that wouldn't go away. This is a regular thing for any surfer. Ask all these guys right here and these ladies right here. This is what happens to us and we deal with it. But sewage so foul to my senses that I regurgitated before I could paddle to the sand.

I showered off as thoroughly as I could. I drove home to Santa Monica and showered again. The next morning I woke up with a temperature of 103 degrees. I stayed that way for three weeks. I didn't get well until three weeks later. This was due to a Coxsackie B4 infection. Coxsackie B4 is a human fecal

0160

virus that's transported by water, and I know where I got it from because I smelt it. It was foul. I tasted it. It was ugly. I don't want to talk about that to make you sick, but there's no doubt in my mind because it's happened before.

I've surfed Malibu since 1971. I got a lot of waves there, and I no longer surf there because of what happened. Can I read something about the Coxsackie B4 virus? Viruses in Coxsackie B family can progress to myocarditis or pericarditis, which can result in permanent heart damage or death.

What you see right here is a pacemaker, an artificial pacemaker. It's under my skin. It's been

there for 12 years now. It's right there. You want to look at it? There's a lot of people who have had this -- not just myself. I have four friends, four personal friends that surf Malibu that have the same thing in their chest, and what kind of probability is there of this of your closest friends who surf Malibu having to have a pacemaker.

There have got to be other people who I'm not friends with. Myocarditis is the inflammation of heart muscles. It resembles a heart attack but coronary arteries are not blocked. Myocarditis is most often is due to infection by common viruses. It

0161

may cause chest pain, heart failure or sudden death. Ventricular arrhythmias and high degree heart block, have poor prognosis. That's me.

Loss of right ventricular function is a strong predictor of death. I will die. I will die before my time because of this infection I received. There are others that have died. There's a man named Eric Venueva, he was only 21 years old. In 1992 he wrote this letter to Longboarder Magazine.

"My name is Eric Venueva. In the last summer of '92 I lived in the surfer's ultimate nightmare. I almost lost my life to the polluted waters of Malibu. I caught the Coxsackie B4 virus which destroyed my heart. Only by a miracle of modern technology, the heart transplant, was my life saved. My life was a living testimony to the cause that every surfer should take up. The elimination of contamination on our beautiful coast. If we are going to allow the corporate community to glorify the ocean for profit, then they should be held responsible for the enjoyment of the ocean and its cleanliness.

In Malibu, the richest city in Los Angeles, the rich people are so selfish that they formed their own city, only to avoid building a long needed treatment system. Unregulated and barely taxed, many

0162

residents of Malibu have obscene septic tanks that leak raw sewage not only into the ocean, but into the rivers and streams that feed into the ocean."

There have been a lot of people that have made cases for businesses and economic concerns. My plead to you Board members is for life itself. If you feel this is an important enough issue, I ask that you move forward with this prohibition. Thank you.

MS. SWEENEY: My name is Mary Sweeney, speaking on behalf of Surfrider Foundation's Local Chapter. In West L.A. Malibu Chapter we have about 3,000 local members. Surfrider Foundation was founded to protect -- wave at Surfrider beach.

We would like to express our support and thanks to you as Board members for your efforts to alleviate our health risks surfing at Malibu. Your time and to the time of the people in this room, we have collected many of the signature cards that you have showing support from around 135 people.

Many of these people have taken time off work to come and be here physically present today because this issue is vitally important to us and to our chapter. Surfrider Beach is a world famous wave, a meca to the surf community. Your decisive actions to

end pollution there come as a great relief to us. We have been fighting for our right to clean water for generations of volunteers. We need a smart, comprehensive solution for wastewater around our beach. We want enforcement of the Clean Water Act.

Your expertise and resources are the strength that can get us there. We know that commercial and residential septic tanks in the Malibu Civic Center are a significant source of pollutants in the lower Malibu Creek, Malibu Lagoon, and ultimately Surfrider Beach. As a result, these areas are all included on the EPA's list as impaired for recreation.

Unbelievable that this world famous beach is considered unsafe for beach-goers. Yet it's something we all know, Surfrider is one of the state's most polluted beaches receiving poor water quality grades every year for almost two decades.

Surfrider Foundation believes that eliminating septics in the area surrounding this beach is necessary to meet Clean Water Act regulations. We support your proposed prohibitions on septics in the Civic Center area and look forward to a comprehensive wastewater plan in the future.

We know that Surfrider Beach failed to meet California clean water standards 74 times during the dry summer season of 2008. We believe that a comprehensive modern plan for wastewater in Malibu Colony, Serra Retreat and the Civic Center will benefit the City, the residents, the retailers, the surfers, and the 1.5 million recreational visitors to Surfrider Beach yearly.

When visiting L.A. many years ago for the first time I fell in love with this area of the Malibu Coastline. As a new L.A. surfer, I was shocked to learn how dirty this beach is and that it's one of the dirtiest beaches in California. In the past two years I have devoted the majority of my personal time to this issue turning volunteers and researching this issue.

Improvement in water quality at Surfrider Beach seems vitally important above all other concerns for me and for the community that I have come to know at this beach. With our fellow clean water coalition members, we thank you for stepping in to solve this serious public health issue.

I also represent here today hundreds of members who cannot be here, physically. We have 1150 signatories on a petition, which I will read briefly, as it relates directly to your considerations here today. "We the undersigned are concerned about the number of times Surfrider Beach fails to meet clean water standards. In the dry season of 2008, Surfrider Beach exceeded safe levels of bacteria 74 times. We believe that in -- septic systems in the Malibu Civic Center area Serra Retreat and the Malibu Colony caused these failures.

"We support efforts by the Los Angeles Regional Water Quality Board to provide wastewater solutions for the area affecting water quality at Surfrider Beach. We want to emphasize that including

the implementation of an integrated wastewater and stormwater treatment plan is fundamental to sound city planning.

"We ask for the following: One: The Los Angeles Regional Water Quality Board create an integrated wastewater and stormwater treatment plan for the Lower Malibu Creek watershed. Focus this system on alleviating chronic pollution problems at Surfrider Beach.

"Two: A moratorium on all future developments in the area until the integrated system above is complete. Three: The City of Malibu and the Regional Water Quality Board begin these plans by 2011 and move to better protect the help of 1.5 million recreational users at Surfrider Beach."

Thank you so much for the opportunity to comment.

CHAIR LUTZ: Ms. Harris, can I just get an update on the time?

MS. HARRIS: Two more.

CHAIR LUTZ: You have two more speakers? I'm going to allow two minutes for each of you so that we can continue with the other speakers.

MR. NELSON: All right. Thank you. Good afternoon, my name is Chad Nelson. I'm the environmental director at the Surfrider Foundation. I'm also a doctoral candidate at UCLA School for public health where I'm studying the economics of coastal recreation, and I'm here to make two important points about the economics of water quality impairment in Malibu.

First, I would like to discuss the economic costs of the health burden of the dirty water, and then second, talk about some of the benefits that could be achieved, economic benefits by improving water quality. We heard about some of the illnesses that you can get from surfing in the polluted water here in Malibu, and all of these illnesses have a variety of costs, people that are affected by them, ranging from medical costs, time loss from work, and also nonmarket impacts.

There was a study done in 2006 that estimated the regional public health costs for contaminated coastal waters. That study was based on official water quality results and two standard epidemiological models, and they actually did an estimate for Malibu Beach, and they found excess GI illnesses, meaning above that 19 per thousand standard in Malibu to be 25,000 to 100,000 excess illnesses per year resulting in a cost of a million to $4 million annually public cost due to illness.

This represents a significant public health burden, both in terms of number of cases and the cost, and as you heard earlier, it can be even worse than that. The good news is that the water quality improvements in Malibu will have a positive economic and societal benefit.

Another study done in 2004 also looked at Surfrider Beach as part of the Southern California beach evaluation study, and they used robust economic model to estimate the benefits of moving the grade at

Surfrider Beach from a B to a C, and we can see a lot more improvement than that. But just in that one grade, they see an increased number of trips to Malibu Beach of 1,538 visits per year, increase in the consumer surplus are willing us to pay the societal

benefit in economic terms by $140,000 a year.

Those additional visitors will bring economic impact spending to the area in excess of $45,000 per year. Remember, this is for one letter grade -- (Bell ringing) That was only one minute.

CHAIR LUTZ: No, I'm sorry.

MR. NELSON: Okay. These costs are felt every single year that there's --

CHAIR LUTZ: If you wish to continue, you will take the time of your partner here.

MS. HOWE: I'm Angela Howe. I'm an attorney and legal manager of Surfrider Foundation. I'm here today on behalf of the Local Chapter, but also our National Headquarters representing over 55,000 members across the U.S. and throughout the world.

I really want to make three quick points. Thank you for your time. Thank you for addressing this greatly important issue.

Number one, people don't want to swim and surf in sewage. That's at the heart and soul of our very mission. That's what our members came here to say. That's what 1100 people signed that petition to tell the Board today. Number two, there's a legal mandate to clean these water resources, provide for beneficial uses. You all know that the State's --

Water Quality Act provides that you must clean these waters. You must act to make these waters clean. The local coastal program, the basin plan, all provide for beneficial uses of water. This means clean and healthy water to surf and swim in.

Finally, the time is now to change. We cannot delay this any longer. In December of 1998 your Board gave an executive order to change this policy to prohibit septics. It's been over a decade later. Now is the time. We must act now. Thank you.

CHAIR LUTZ: Thank you.

MR. MELCIONI: I just wanted to make it clear, this is Surfrider and Malibu Surfing Association. So there are people in this audience that I don't speak for that may support the moratorium, and there's also --

CHAIR LUTZ: I have speaker cards. So we'll -- I'm sure we'll be hearing a lot more. Thank you.

What I'm going to do is call three speakers at a time, because I think that we possibly have some more speakers over in the overflow room. I want to give them time to get over here. I have a couple that want to share the three minutes: Lucille -- (door slamming) -- and Sally Benjamin.

MS. KELLER: I need to correct that. We offered that at a point when you were talking about reducing it to one minute each, so I would like to go back to the three minutes each that we were originally scheduled to do.

CHAIR LUTZ: Okay. So each of you will have three --

MS. KELLER: We were trying to accommodate you and --

CHAIR LUTZ: I understand, and we appreciate that.

MS. KELLER: Okay. Thank you. I'm Lucille Keller. I represent Malibu Township Council. MDC does not support the Board's proposal prohibiting septic systems in the Civic Center. Current studies need to be completed and verifiable results obtain to -- nexus between system uses, especially residential and water pollution.

Water Code 13820 requires that a determination that system should not be permitted shall be supported by substantial evidence in the record. This has not been met, especially for residential use. Determinations in your technical memos for residential systems are estimates based on assumptions, conclusions and extrapolations of data

0171

from other uses. There is no direct verifiable data that residential systems pollute the ocean or groundwater.

Counting roofs, assuming a person occupies each bedroom, assuming water use amounts and percent of water entering septic systems fails to meet Code 13820. Many homes house two people. There are secondary homes that are unoccupied much of the year. Discharge amounts and flow directions are estimates. Prohibition of residential septic systems is not warranted unless data directly attributable to those systems is provided.

Using drinking water standards is inappropriate. Malibu's water table has not been a source of potable water for 50 years, and there's no distribution or processing system to enable use of that water for emergencies. I was here then. When it was used, it was unreliable because of saltwater intrusion and because of excess fluoride content. We were told our kids couldn't drink it.

The first step is to document with actual test results. Weather systems are actually malfunctioning and polluting the ocean or groundwaters. That's kind of been missed. Prohibiting on-site systems unnecessarily limits new

0172

technology options for resolving the pollution problem forcing reliance on a sewer. Limiting options to 100-plus-year old technology of sewers in an area of fault lines, high groundwater table, near the ocean with limited space for effluent disposal could be more of a liability than a cure.

There are septic system solutions with technology available. One creates an aerobic environment in the septic tank which reduces sludge and cleans the water. Without using actual data to identify the cause of pollution, throwing millions at building an area-wide collector sewer that may not solve the problem would be a terrible waste of taxpayer funds. Please determine the cause of this before you try to fix it. Thank you.

CHAIR LUTZ: Thank you. Sally Benjamin

followed by Mike Baldy and Sonya Diaz.
MS. BENJAMIN: Sally Benjamin, 3216 Colony View Circle, the vice president of Malibu Township Council. The Malibu Township Council does not support the Regional Water Quality Control Board's proposal to prohibit septic systems in the Civic Center area. The technical memos have failed to highlight the success stories of the bacterial reductions from the implemented systems. Causes of

0173

high nitrogen nutrients in our waterways was inadequately analyzed.
The report would have you conclude that on water disposal systems are the only source of this pollution. Nitrogen can occur naturally in the air, soil, fertilizers, animal waste and plant material, which was not analyzed in the papers. For Malibu Watershed, fertilizers would play a major role contributing to the nitrogen content in Malibu Creek.
From the Chesapeake Bay study atmospheric nitrogen is a more important contributor to nitrogen pollution to our waterways than was originally thought. Malibu carries a large amount of Z traffic on PCH and Malibu Canyon contributing to the nitrogen level in the waterways.
These various sources were not identified and broken down into their percentage of contribution. In 2007, Malibu Country Mart installed an updated septic system which caused the bacterial count to decline. The technical memo states that bacterial count declined in 2007 was due to a dry season only.
Also, the Malibu city installed a dry weather run-off system in 2007. This also reduced the counts and was not mentioned in the technical reports. This is an example of another system put into place which

0174

is reducing those counts. Septic systems do not need to be banned, rather updated to new technology. Thank you.
CHAIR LUTZ: Thank you. Mike Baldy followed by Sonya Diaz and Meredith McCartney.
MR. BALDY: Hello, my name is Mike Baldy. I'm a registered civil engineer with Witz Engineers located in El Segundo. I'm reading this letter on behalf of the Mesa Canyon, L.L.C., Francisco Heights, L.L.C., Gray Rock Canyon, L.L.C., Rancho Mesa, L.L.C., Rancho -- Properties, also known as APN 4457-002-050-051-053-054-039, which is shown as five of the properties included in a Staff's proposed on-site wastewater disposal systems prohibited area.
The vacant properties are located on the slopes north of Malibu Canyon Road above Laboratories. Including the subject properties and the on-site wastewater disposal systems prohibition area places undue burden and -- usability of the property and is not appropriate because of the following: The property is located outside the incorporated City of Malibu in the County of Los Angeles, which is in another jurisdiction with its own laws and ordinances.
This makes it difficult if not impossible for the owners to follow and comply with the laws and

0175

ordinances of another jurisdiction. California

Regional Water Quality Board's concerns are with the City of Malibu and not the county. The Staff report is using a watershed as determining factors to arrive at a prohibited boundary. Just ignores the fact that the watershed area deals with surface water, and on-site wastewater disposal systems deal with underground water, each traveling different -- and having different considerations.

As shown on the geologic site location map, which I have here, the strata underline the site is better off dipping northeast away from the Civic Center causing any other groundwater to flow northeast away from the Malibu Civic Center, not into the Civic Center as the on-site wastewater disposal system prohibition map suggests.

With this statement may we request the Board modify the proposed boundaries to exempt the subject properties from the -- and the on-site wastewater disposal system prohibition area. I also have letters from the owners. I would like to give you -- you see these are the boundaries. You probably can't see the dipped plains going northeast, so I don't know if you guys would like to see this or not.

CHAIR LUTZ: Thank you. Sonya Diaz followed

0176

by Meredith McCartney and Allison Lipman.

MS. DIAZ: Good afternoon, my name is Sonya Diaz, I'm a beach-goer, and I regularly enjoy riding my bike along the beach and surfing at Surfrider, and I just wanted to express my support for the Staff recommendation today.

As we have seen here today, there is overwhelming evidence that pollution has been going on here, and the alternatives and solutions have been presented here today, but we cannot move forward until we have this prohibition in place. I want to be able to take my children to enjoy Surfrider just like I have in the past but without all of the smell and dirty water. Thank you.

CHAIR LUTZ: Thank you. Meredith McCartney -- McCarther, rather, Allison Lipman followed by Natalie Burdick. No Meredith. Allison Lipman?

MS. EGOSCUE: Chair Lutz, is "support" or "oppose" indicated on the absent speakers card?

CHAIR LUTZ: No, not on either of them. When there is, I will note that for the record. Natalie Burdick? I'm going to put Natalie Burdick aside just in case she is in the other room, and I'll call her again. Sira Ghandi? Jessica Bereski and Carl Urdick. Are any of those people present? Okay.

0177

You're coming down.

MS. GHANDI: Hi, my name is Sira Ghandi. I think I was the third or fourth name you called. I grew up going to the beach up and down the PCH from Camarillo, California. The water quality in Malibu Lagoon and Surfrider Beach is important to me. I don't want my fellow beach-goers to be threatened by contaminated beach water. Surfrider Beach has been continuously getting Ds and Fs on Heal the Bay beach report card as wastewater faulty septic systems continue to leak into Malibu Lagoon and Creek and finally into the ocean. Therefore, I am in favor of

the Malibu septic system ban. Thank you very much for your time.

CHAIR LUTZ: Thank you.

MS. SANTALINA: Hi, my name is Susie Santalina. Meredith McCarthy and Allison Lipman can't be here right now, but they were here to speak in support of the prohibition. I just wanted to say that. Natalie Burdick is on her way. She's on the freeway, though.

CHAIR LUTZ: Well, if she gets here in the next ten or fifteen minutes, we'll be good, but otherwise I can't hold --

MS. SANTALINA: Okay. I apologize for that. Thank you.

CHAIR LUTZ: Jessica Belski?

MS. SANTALINA: Her, too. Sorry.

CHAIR LUTZ: So that we will note as support. Carl Urdick.

MR. URDICK: Before my clock starts, I would like to leave off a copy of my prepared remarks?

Good afternoon, I appreciate the opportunity to discuss with the Board our concerns about the prohibition. I'm representing Our Lady of Malibu Church and School, and we're located in the Winter Canyon area, and I would like to take a little bit narrower point of view of the whole prohibition. I would like to just settle for pertinent points, namely our request to exclude the Winter Canyon area from the prohibition area, and note some of the discrepancies in the technical memoranda and comment on the extreme hardship which has been placed on charitable institutions.

Winter Canyon is the watershed that does not drain into Malibu Creek and Lagoon. This has been all duly noted, of course, during the hearings in the past and to date and in the technical memoranda also. Any resultant discharge percolating into the ocean near Amarillo Beach, if any, would simply add to the effluent already been brought down the coast from the upcoast area that are not included in the prohibition area.

I would like to draw your attention to the map over here. Offshore ocean flow goes from west to east along this whole coastline here, so whether there's pollution or effluent from the Winter Canyon area or not, the Surfrider Beach area is still subject to all of the effluence coming from the areas upcoast that are not included in the prohibition area. So it wouldn't solve the problem entirely.

Now, in the technical memoranda, there's several discrepancies; for instance, the Malibu Presbyterian Church and portions of the Pepperdine College and Malibu Glass Company are not included in Table 5 of Technical Memorandum No. 1, and I've already discussed this with Wendy and Rebecca this morning.

Now, the map in Tech Memo No. 2, noted as Malibu Colony Plaza, are between PCH and Civic Center Way and get the conclusion to the casual looker that it's all that pollution of the test wells is not part of the -- is coming from the Winter Canyon area.

Reality says that they are coming from the Malibu Plaza area.

Now, our Lady of Malibu has completed a significant upgrade of our septic system in November 2008. Now passes all the established and state-of-the-art operating requirements, fully permitted and operates sufficiently. This cost us $48,000 last year which we could ill-afford. To be forced into another system a few years from now would cause all that money to be thrown away and ask for another $40,000. So we request that you exclude the Winter Canyon area, and in that respect we support the City of Malibu, and I think the Healing the Bay organization recommendation.

CHAIR LUTZ: Thank you. Okay. Next three: Jack Topelle, Steve Ryan and Joe Walker.

MR. TOPELLE: Good afternoon, my name is Jack Topelle, and I'm an environmental scientist with the Santa Monica Bay Restoration Commission. I'm here representing the commission Staff and our director, Dr. Shelly Luse.

We are pleased to add the Bay Restoration Commission Staff support for the amendment to the basin plan that would prohibit on-site wastewater discharge systems in the Civic Center of Malibu. The commission has been involved with septic issues in Malibu since its formation in 1988.

More than 20 years ago the Bay Restoration project, as it was known then, was urging the Board to make investigating relationships between groundwater and the role of septic systems in contributing pollutants to the creek, lagoon and -- priority. In 2000, we convened a task force that included the City of Malibu and Regional Board Staff. The task force developed recommendations to improve the management of septic systems in the Northern Santa Monica Bay and many of those recommendations have been implemented.

Additionally, we have invested millions of taxpayer dollars and thousands of Staff hours to help address water quality issues in the City of Malibu. Our Staff participates in multiple committees that deal with water quality issues in Malibu. One of our highest priorities in our Bay Restoration plan is the elimination of septic systems in the Malibu Creek area.

Clearly our organization has invested interest in solving water quality problems in Malibu. Unfortunately, despite our best efforts on behalf of the City, Surfrider Beach continues to suffer from poor water quality, and the creek and the lagoon remain impaired. Our Staff has reviewed the evidence presented in the Board's Staff reports, technical memoranda, peer reviews along with other reports, including the City's responses.

We agree that the evidence provided by the Regional Board Staff clearly indicates that discharges from on-site wastewater discharge systems in the Civic Center area are responsible for frequent exceedances of water quality standards in

groundwater. There's a demonstrated hydraulic link between groundwater in the Creek, Lagoon and Surfrider Beach, despite the implementation and multiple management actions and projects to control pollutants, so Lagoon, Creek and Beach remain polluted. And continued discharges from on-site wastewater discharge systems from the Civic Center area represent a threat to public health and the ecological health of Malibu Creek and Lagoon.

Finally, although this prohibition is long overdue, the Board is being asked to delay action, but yet more studies. While these ongoing studies may add valuable knowledge, there's no reason to believe that additional studies will disprove the results of research conducted over many years.

Those studies clearly indicate that on-site wastewater discharge systems in the Malibu Creek,

0183

Civic Center area are significant contributors to the impairment of beneficial uses of Malibu Lagoon and Creek and Surfrider Beach.

We respectfully urge the Board to act today to adopt the basin plan amendment and we look forward to working with the Regional Board Staff and the City of Malibu Staff to achieve a long-term solution to the issues that have plagued Malibu surface and groundwater. Thank you for the opportunity to speak.

CHAIR LUTZ: Thank you. Steven Ryan followed by Joel Walker, and it is my intention to take a short break after these two speakers.

MR. RYAN: Yes. My name is Steve Ryan. I live in Malibu, but I don't live in the area that will be affected by the ban. Basically, I represent -- I'm not a rich SOB Malibu-lite. I'm just a normal person, like most of us, and the problem is that we cannot afford to have another $500 to $1000 added to our bill every month. I mean, could any of you afford that -- (door slamming)

We're all looking at a home that is worth much less than when we bought it and we owe much more than we can possibly sell it for. So if we get this kind of a fine prohibition on us, we're probably going to have to abandon our homes or we're going to have to

0184

have Malibu Port-a-Potties and close off our toilets or some stupid thing like that.

The other thing that I wanted to say is that -- basically what you're doing, you can't possibly say that every septic system in that area of Malibu doesn't work. You can't possibly say that. You don't have any proof of that. What you're basically doing is you are taking everyone who lives in that area of Malibu, lining them up against the wall, shooting them without a trial. Okay. And then that's just not fair. It's not moral. It's not ethical. People have a right to prove that they are not polluting, and you're not giving us that right. That's all I have to say. Thank you.

CHAIR LUTZ: Joel Walker.

MS. BURDICK: Hi, my name is Natalie Burdick, and my name was called earlier, but I was in the overflow room.

CHAIR LUTZ: If you would like to take a

seat, afterwards I'll call you --
MS. BURDICK: Great. Thanks.
MR. WALKER: Good afternoon, my name is Joel Walker. I appreciate the opportunity to speak with you all. I've got a couple of quick things with respect to my qualifications. I'm a registered

0185

professional engineer in the state of California. I'm a fellow of my engineering society. I'm also a fellow for the United States Government Military Society. I also served as president of the past and present of the Malibu Property Owners Association. I'm on the Board of the Malibu Road Properties Owners Association, and I was on with John Sibert as a member of the planning commission for the City of Malibu. So I've been around for a while. What's that?
(Cell phone interruption)
Okay. Given that, I will say that sitting on the planning commission reminds me of what you're doing right now. I sat behind this big table. A project came before us. A group would come up and say, "This is why our project is great. We have this scientific information. We have this legal information. We have this. People in the neighborhood think we're great. Everything is wonderful." I said, "Boy, that's a strong argument."
Then the next people would come up and say, "You know, we've looked into this, and we think this is a bunch of poo-poo, and this is the reason. We have these specific things against it. We find these specific things that make this a bad idea, and we are definitely against it."

0186

Now, I'm sitting there behind the table just like we are, you are kind of are in the same place. You've got people with good intentions on both sides that are both wanting to do something, but you've got to kind of say at this point, "Gee, what makes the most sense of all this data?"
Well, I listened to the data, and I'll give you my take on it. I think that our Staff has done -- first off, I definitely agree that we have to do something about our water situation. No questions asked. Got to get on it. Got to do it. I think the Malibu city needs to be on top of this thing ASAP, in fact, they haven't done it yet, gives you reason to push them to make it happen, but I think that has to happen.
With respect to the technical information as to the real sources, I've heard that bouncing all over the place. Well, I saw this back in 1993 and such and such and therefore, it means this. The best scientific data that I heard was actually from our professor back -- I'm sorry. The professors who spoke this morning had very, very structured, very, very carefully prepared, and very, very accurate -- what appeared to be the most accurate information I've heard.

0187

That's from my point of view. You have to make your own decisions. I'm not sitting behind the table now. You are. That's your choice. But I basically felt that was the best information. That

information differs from some of the other information. The reason I bring that up is because the second problem you're faced with is whatever information you believe, you have to decide, "How am I going to execute this thing to get the job done and get that damn water cleaned up?" That is important.

CHAIR LUTZ: Can you wrap it up --

MR. WALKER: We've got 42 seconds.

CHAIR LUTZ: I thought a heard a bell. I'm sorry. That was the telephone. Now, I've interrupted you again.

MR. WALKER: Let me continue on. What I'm really saying is now you have to make the choices to the best way to proceed. Clearly the best way to proceed is to not do it with by dropping something in on the City of Malibu, but what I'm hearing from a number of people here is that there are concerns that the City of Malibu is really going to execute this plan, which I thought was extremely well presented. So if we can find a way to be sure that the City of Malibu would execute on its promises this time and

0188

maybe you can do something in your documentation of your plan to do that, it seems to me like that's the most efficient way to get the job done. That's my recommendation to you. I wish you well. As I say, I'm glad I'm not sitting behind your table. Thank you.

CHAIR LUTZ: Thank you. Okay. Let's take a break. I show about 10 after 3:00, so we'll come back at 3:25.

(Recess)

CHAIR LUTZ: Let's start. And, please, we're going to go one minute. I'm sorry. The room is not available to us. If you have heard somebody say something and you would like to reiterate it, please just say that you concur with the person ahead of you, and we will do our best. It's my anticipation that about a quarter after four, we will have to discontinue the public comments. We do have, for the record, everybody's name, so even if you don't get to speak, we know that you were here to comment, and that will be placed in the record. So we'll start with -- first I have a person who did want his name in his record and his comment, Don Yaroslavsky, and he has wanted us to say that he's in opposition.

So we'll start with Natalie Burdick, go to

0189

Tom Ford and Tatiana Gaur. Please, we're going to go one minute.

MS. BURDICK: First of all, thank you for allowing public comment for this very important issue. My comment will be very short, to match the one minute allocation. What I would like to say is that a photograph is worth a thousand words. I don't have a photograph, but I do have a simple graphic. For those behind me, this is the simple graphic. As a very simple layperson, a member of the public at large, when I go to a restaurant and I see that sign, I know it's not safe for me to consume the food there. In fact, I don't think those restaurants are even allowed to be open when they have that sign.

What I do know is that Surfrider Beach has

repeatedly received the F grade, and last summer over 64 times, and in fact over 51 percent of the time, it has not met water quality standards. I'm just here to vehemently and passionately support the proposal to ban septics in Malibu. It's an important issue to keep water quality safe for our children, families, surfers, swimmers, everyone who partakes. It's a public resource, and I appreciate your time.

CHAIR LUTZ: Thank you. Tom Ford, Tatiana Gaur and then Richard Scott. Before you start, Tom, if we could get everybody who is -- the three people close, we will move faster and everybody will get a chance to speak. I would like to hear from everybody.

MR. FORD: My apologies. I arrived late, so I was not here for administration of the oath this morning.

CHAIR LUTZ: And anybody else who was not, please rise. Raise your right hand. Do you swear the testimony you're about to give in the matter now before us is the truth, the whole truth, and nothing but the truth under penalty of perjury?

THE SPEAKERS: I do.

CHAIR LUTZ: Thank you.

MR. FORD: Good afternoon, I'm Tom Ford, Santa Monica BayKeeper, and I wanted to commend the Regional Board Staff for their absolutely exemplary work preparing the various documents and memoranda supporting the prohibition of the on-site wastewater disposal system prohibition for the Civic Center area.

The Santa Monica BayKeeper supports the prohibition as proposed by the Regional Board with one exception, and that the ban should be extended eastward along Carbon Canyon Beach and incorporate the multi-family and commercial properties that extend along PCH. Today we've been requested to consider many new facts. We need to consider all the facts, many of which were very well captured in the technical memorandum provided by the Regional Board Staff.

I was going down a list for you when I had time, but that's been altered. Let me just say that 20 years of studies should encourage you folks to take the action that you have a chance before you. In short, Malibu unfortunately, very unfortunately is the U.S. Calvary of wastewater promises. These folks have lived up to their word, and it is time that they have the opportunity to live up to their commitments through prohibition adoption today. Thank you.

CHAIR LUTZ: Thank you. Tatiana Gaur. Again, I would like to thank all of you for being so brief. Ms. Gaur followed by Walter Keller.

MS. GAUR: Good afternoon, Chair, members of the Board, Tatiana Gaur, on behalf of Santa Monica BayKeeper. The facts are real simple. Now the Creek, Lagoon and Surfrider Beach are on the list of impaired waters. Septics have been identified as a source, solution and impairment. In those waters, according to City of Malibu, 42 percent of groundwater is essentially sewage. This impairs the use of groundwater, as the beneficial use of groundwater

source of drinking water. This is in a state of what we all very well know has serious issues with water supply. So it's not something to be overlooked.

So far Regional Board has tried to regulate this problem through WDRs and septic MOU with the City. Obviously, as you all know, through the NOVs to the various dischargers, and the City's failure to deliver in its commitment under the septic MOU, those regulatory tools have failed. Adopt the septic prohibition. Thank you.

CHAIR LUTZ: Thank you. Richard Scott followed by Tamara Stein, Walter Keller and Bill Rhodes.

MR. SCOTT: I'm going to read this really fast. My name is Richard Scott. "I'm president of the Malibu Knolls Property Owners Association. Our community consists of 70 homes above the Civic Center. I appreciate the opportunity to speak on behalf of the hard working families which live in Malibu Knolls. We are in favor of improving water quality as is everyone else here today. We are not in favor of the government imposing high cost rules and regulations on hard working families without evidence that they are contributing to a problem.

The wide net cast by the current boundary

0193

ensnares properties like those in Malibu Knolls even though there is no scientific or technical basis to include our properties within the boundary. How have you determined that we are part of the problem? Where are your studies and expert reports which demonstrate that wastewater from Malibu Knolls is, in fact, contributing to the impairment of beneficial uses of water resources?"

The scientific data presented by the Board does not support the proposed prohibition discharges in general, and in particular, with Malibu Knolls. The prohibition due to the elevation and geology of Malibu Knolls does not warrant us being included in the boundary area, and we ask that you eliminate Malibu Knolls from the boundary area --

CHAIR LUTZ: Thank you, Mr. Scott. If you could give us that in writing, it certainly will assist our reporter.

Tamara Stein, followed by Walter Keller, Bill Rhodes, and Rhianna --

MS. STEIN: I'm Tamara Stein of Cox, Castle and Nicholson representing Malibu La Paz Ranch, L.L.C. I'm going to move along here. The substituting environmental documentation needs to be recirculated because it contains significant new information. I

0194

won't go into the definition. The categories that disclose new information: Transportation and circulation, ACF, water C, archeo and historical, aesthetics A&B, human health A&B, housing -- analysis isn't adequate because of addresses, only the combined impact of proposed prohibition, and the three TMDLs identified in the document, that's inadequate.

The findings are inadequate because you need to make one or more written findings for each significant effect and have a brief explanation of the rationale for each finding. No findings as to

feasibility. It's not clear which impacts are actually being overridden. Comments, responses are inadequate. If that's my one minute, I respectfully ask to submit a writing that I have that contains the entirety of what I had to say, which I could have done in three minutes.

CHAIR LUTZ: The part that you read in will be part of the record.

MS. STEIN: Excuse me?

CHAIR LUTZ: The portion that you've read in will be part of the record.

MS. STEIN: Then I just want to make for the record a statement that if I had had three minutes, I would have been able to get everything that I had to say in, and I ask that this hearing to be continued and the documentation be recirculated for further public comment. Thank you.

CHAIR LUTZ: Walter Keller, followed by Bill Rhodes, Brianna Baylord and Mike Barsakini.

MR. KELLER: Cutting to the chase, last time I spoke to you folks I urged you and your Staff to get on the Internet, punch in septic systems and learn about modern septic systems. I hope you did, but I can tell from what I heard today, your Staff did not. I think it's unjustifiable for them to recommend that you ban something they don't know anything about. That's very unfortunate.

The other thing -- I was going to read you the whole thing, but I'll just give you a short. In the October 26th L.A. Times, the heading is, "Sewage spill shuts coastline. Two and half mile stretch of coastline" -- et cetera, et cetera, and it's going to be a couple of weeks before -- (door slamming) -- this is in Long Beach, and how many times will that happen -- where we have a lot of movement in the soil and so on. Anyway, I think one minute is ridiculous.

CHAIR LUTZ: Thank you. Bill Rhodes, Brianna Baylord -- I'm sorry, I just received information that the valet service of this building will stop at 5:00 o'clock. If you have a car in the valet, you will need to have it picked up and paid for prior to 5:00 or I guess it's spending the night. The Board Staff will -- we'll have our Staff members help with that. I apologize. There's nothing much we can do here. Mr. Rhodes.

MR. RHODES: Yes. My name is Bill Rhodes, I'm the president of the Malibu Association, and I'll hurry. Most conclusions by Staff are based on old '80s research not applicable to our coastal environment. Staff ignored abundant research that would lead to contrary conclusions about the impact of wastewater treatment systems in Malibu.

There's a new advanced molecular methods of research that are required to make any conclusions by the Staff and findings by the Regional Board that have been completely ignored. Emergent science verifies what's been known due to research in the 21st Century. The Board needs to wait for this critical emergent science during which time Staff can increase their knowledge about the best available current peer reviewed science.

A couple of other things, too. The blanket prohibition, I believe, is ridiculous because if somebody wants to upgrade the septic system to add a bathroom at this time and it's a benefit to the environment, why not allow it immediately. Another thing, too, is have you seen how many birds are around the lagoon. There are thousands of them that contribute to the nitrogen in tremendous amounts. Bird waste is used as fertilizer, and it is an enormous quantity around there. Thousands of birds utilize that area.

CHAIR LUTZ: Thank you. Brianna Baylord, Mike Barsakini and then Dick Sherman.

MS. BAYLORD: My name is Brianna Baylord, and I represent Pepperdine University. I'm here today because portions of our campus have been erroneously included within the prohibition boundary. To be clear, we agree with the City and the Board that the water quality issues discussed here today need to be addressed. However, the Pepperdine property included in the boundary does not contribute to the water quality concerns in the Civic Center area and should not be included.

The resolution is aimed at on-site wastewater disposal and septic systems, and so by its very terms should not include the campus. We do not use septic systems. We never have, and we never will. Pepperdine constructed the Malibu Mesa treatment facility as well as connections to Tapia. All of our wastewater is treated to Title 22 standards and the resulting recycled water accounts for 97 percent of our overall irrigation. Beyond not needing any proposed system, we don't impact groundwater in the subject area and don't contribute to the violations in Winter Canyon.

The fact is, is that Pepperdine has spent millions on a nonseptic wastewater system and reclaimed irrigation infrastructure much like the one that would be proposed in the Civic Center, and so we feel that our inclusion is both unsubstantiated and inequitable. Thank you.

CHAIR LUTZ: Thank you. Mike Barsakini. After, I'm going to add on the end Paul Grisanti.

MR. BARSAKINI: Madam Chair, Board, I'm Mike Barsakini. I live and work in Malibu. I've lived here since the '60s. I'm an architect. I live in Malibu Knolls. That is right above Winter Canyon. Our earlier studies -- I'm opposed to the moratorium. I am in favor of the Malibu plan.

The Malibu plan had a very scaled and timed approach to this, which I think was appropriate for a city of our size. I think there's five studies out there you need to evaluate, your Staff does, and I think to proceed without the studies is a rush to judgment, and I think that you should exclude our Malibu Knolls. We are on bedrock. We're not contributing to the groundwater. You saw the groundwater slide. It was put up by the city. We're nowhere near it. I've been dealing with septic systems for over 40 years, and I know how far the

effluent works. I think you have two choices: deal with this with the iron fist or the velvet glove. Thank you.

CHAIR LUTZ: Thank you. Dick Sherman, followed Todd Rotiana and Tom Sawyer.

MR. SHERMAN: Good afternoon, my name is Richard Sherman. I'm the bottom of the food chain. I'm one of the few contractors in town that's had his hands in somebody's septic system for probably 40 years. The one thing that hasn't been brought up, and I have two or three things to talk about, was water, the re-use of water. Water coming out of the water meters in Malibu is now -- the base rate is $4 for 750 gallons.

If you use over your allocation, it's $8 for 750 gallons. That's over a penny a gallon coming out of the water meter. I think the days in which you can take the water that is capable of being adequately

0200

treated with advanced treatment systems and either dump it in a leach field, dump it in an outfall of the ocean or do something else with it, isn't going to stop. The cheapest way to do this is to take the water that comes onto the site, treat it on the site, use it on the site. Don't try to collect it. Put it in a plant, store it, pump it and redistribute it to the same place it came from. Thank you.

CHAIR LUTZ: Thank you. Paul Grisanti, Tom Sawyer, and Chris Reed.

MR. GRISANTI: Hi, my name is Paul Grisanti. I've lived in Malibu for 32 years now, and I remember the days when we went into the shopping centers, and there were puddles that smelled bad. It's not like that anymore. The City of Malibu has been very aggressive, and thanks to your efforts as well.

Most of these shopping centers have had their systems replaced with these high-tech systems, and everything is disinfected. They are doing a great job. The City of Malibu has also got a -- inspection on sale program, and they are requiring residential systems to be upgraded to tertiary treatment basically as well.

I think the studies that are coming out now are telling us that the great majority of the problem,

0201

especially in the lagoon area and Malibu Creek, is not from human sources. There is a real possibility that if you take this action and create the prohibition and we go through the process of building a huge sewer treatment plant, we're still going to have exactly as many F days at Surfrider Beach as we've had in any prior year. Thank you.

CHAIR LUTZ: Thank you. Tom Sawyer, Chris Reed, followed by Patricia Shone.

MR. REED: Tom Sawyer has left. I'm Chris Reed. I'm a Malibu resident. The coalition of all the environmental surfer groups have stated that there's a million and a half visitors to Surfrider Beach each year. These groups have tens of thousands of members worldwide. I would just like to ask the rhetorical question: Are they willing to subsidize any of the costs since they are the primary beneficiaries?

CHAIR LUTZ: Thank you. Patricia Shone. Steve Braband. Ken --

MS. SHONE: I'm Pat Shone, a Malibu resident and a member of the Malibu Road Owners Association. I would urge you to not make a decision today because the technical reports have serious errors. Written report corrections weren't accepted after October 8th, although huge report changes were made after that date. Two years of monitored results improved water quality have been ignored. Report calculations used 394 residences, not the actual 582. It overstated -- it counted toilets versus population to establish that there was 3.4 versus the actual 2.4 residents per household. That resulted in overstating effluent by 82,000 gallons per day.

The Board shouldn't make a decision with inaccurate facts, and not accepting written corrections after October 8th prevented the City and property owners from correcting the record. Please, give the City time to manage their problem. Thank you.

CHAIR LUTZ: Thank you. Steve Braband, Ken Glenn and Rebecca Evans.

MR. BRABAND: Hi, my name is Steve Braband. I'm a wastewater consultant. I have a letter from one of my mentors who served as a visiting scientist from the U.S.E.P.A.. His name is Dr. Bob Ribbon. In 2003, the United States Environmental Protection Agency published a set of voluntary national guidelines for management of on-site wastewater systems. I participated in the development of this document and assisted the U.S.E.P.A. in the decentralized efforts as visiting scientist on detail from North California State University where I was professor. I'm going to paraphrase this a little bit because of time.

The on-site wastewater management program implemented by the City of Malibu -- (coughing) -- comprehensive, sustainable on-site wastewater program.

Early in my tenure with U.S.E.P.A. I did provide educational information to the city and that educational information was incorporated into their management effort. The City of Malibu on-site wastewater's system effort -- (bell ringing) is grounded management specific waste water technologies. Thank you.

CHAIR LUTZ: Thank you. Ken Glenn, Rebecca Evans and Dr. Harris --

MS. EVANS: I'm Rebecca Evans, C.E.O. at the Malibu Chamber of Commerce. On behalf of the Board of Directors and 650 business members in Malibu as well as the 13,000 residents, we are here to provide leadership. At the present time the chamber and many of its members have seen increase in wastewater enforcement actions by the Board.

While many larger businesses have the knowledge and resources to take appropriate steps to make necessary corrections, our smaller businesses and property owners simply do not have the ability to comply. One thing that Malibu businesses do understand is the importance of visitor destination.

That is why people in Malibu have been working with the City in all types of areas. We feel that the California Regional Quality Water Board has proposed a prohibition for the Civic Center without giving quality time to businesses and residents to completely understand how to implement and meet the list that they are providing. We want to be part of the solution. I know for a fact -- (bell ringing) -- that I'm done. Thank you.

CHAIR LUTZ: Jeff Harris, followed by Norman Haney and Rick Vardel.

MR. HARRIS: Good afternoon, I'm Dr. Jeff Harris, 23712 Malibu Road. I was originally some 15 years ago one of the people who vocalized the need for pollution cleanup at Malibu Beach and at Malibu Creek and the Lagoon. My impression lately is that a lot of the effort that has gone in from the BayKeeper, from the Santa Monica Restoration projects, et cetera, have really worked, and that we're in a situation now where there's very little illness occurring in Malibu compared to 10, 15 years ago.

I attribute this to cessation of the Tapia

0205

wastewater discharges which were opening up the berm and creating unseasonal flows, and also, probably to the upgrade in adjacent commercial systems, and also to enforcement of other systems.

There's one other point I would like to make: In Chicago on Lake Michigan they had a similar problem with a lot of F grades. What they found is when they hired dogs to drive the birds off the beach that the F grades disappeared.

So I'm arguing in the material I've given for you to take the lead and adopting the graphic pathogen specific indicators and abandon the approach of coliform indicators which are misleading in this watershed.

CHAIR LUTZ: Thank you. Norman Haney, Rick Vardel, followed by John Butte.

MR. HANEY: Good afternoon, my name is Norm Haney. My background is civil engineering. I chair the wastewater advisory committee for the City of Malibu. I am actually in support of Dr. Mark Gold's comment that the Winter Canyon area should not be part of the prohibition with regard to new updated state-of-the-art wastewater treatment systems, which eliminate 100 percent of the bacteria.

They can't really be considered part of the

0206

problem if they eliminate all the bacteria and the water ends up in the ocean where nitrates and phosphates don't seem to be a problem at this point. One last comment: When it comes to zero discharge, this organization should be encouraging it. If we can find technologies which will reduce the amount of potable water that we bring into an area -- and we know we can. We've done all kinds of things. We came up with the heart bypass and added 20 years onto people's lives.

If you give us an incentive to do that, we will find a way to do that, and there's no nexus. If there's zero discharge, it can't possibly have anything to do with groundwater or pollution. We

should encourage that. Make that an incentive. Thank you.

CHAIR LUTZ: Thank you. Rick Vardel, followed by John Butte, followed by Amanda Grusebach?

MR. VARDEL: Hello, my name is Rick Vardel. I've been running wastewater treatment plants in the L.A. area for about 30 years, including 20 years at Hyperion, four years at Tapia, three years for L.A. County Sanitation. I know what plants can do, and I've also been running plants in on-site systems at Malibu. I was the operations manager at Hyperion. When I was the operations manager, we won numerous awards for plant of the year, EPA gold award. Many things like that I'm very proud of. Working in Malibu on the individual systems. The advanced systems work. I have the knowledge to be able to say that.

I think they should be given a chance. People who have spent money building those systems should be given the benefit of the doubt, and people who haven't should be punished. But I don't think the punishment should include the people who have done it right. That's it.

CHAIR LUTZ: Thank you. John Butte, followed by Amanda Grusebach. Is Amanda here as well? Yes. Go ahead.

MS. GRUSEBACH: Hi. Thank you. Good afternoon. My name is Amanda Grusebach, and I'm a fellow beach-goer and lover of the ocean. Malibu Creek and Lagoon and Surfrider Beach are listed on the state's list of impaired water bodies as being affected by a number of pollutants. Pollution limit regulations were adopted five years ago for bacteria and nutrients with no significant improvement in the amount of bacteria found in beach water to date. Something needs to be done. Something needs to be done now. We need to reach bacterial health standards to ensure that people don't get sick from swimming at Surfrider. So I am supporting the Regional Board Staff recommendation for the prohibition of septic systems in Malibu. Time is long overdue for improvement of water quality along one of California's most beautiful stretches of coast. Thank you.

CHAIR LUTZ: Thank you. John Tapp followed by Lloyd Ahern and David Resnick. Is John Tapp here? Okay. Lloyd Ahern.

MR. AHERN: Good afternoon. My name is Lloyd Ahern, and I do not live in the prohibition area. We're at the end of the day right now, and I think I heard Dr. Gold somewhat say that he liked the deal that Jim Thorsen, our city manager, said, and if we could come to a conclusion and make a deal where we can move forward -- because the first thing that's going to happen is we're going to have to have an assessment district, and we're going to have to get two-thirds vote. At two-thirds vote it's going to be hard to get.

So I think we should find a way to make this work, and if it takes putting people in a room together, maybe Jim and Dr. Gold and one of your Staff or you, that's what we should do and just wrap this

0209
thing up and find a way to clean the water and not feed the lawyers. Thank you.
CHAIR LUTZ: David Resnick followed by Deborah Stark, I believe, and Michael Hedlow.
MR. RESNICK: Hi, I'm David Resnick, representing Malibu Bay Company. I appreciate the opportunity to speak, although I must say that I am very disappointed that we need to take ex-parte and limit public comment to only one minute.
In the brief time that I have, I want to say that it's refreshing to see the City of Malibu and Heal the Bay are very close together on a solution to the situation, and I suggest that you give that serious consideration.
Second thing: I want to say that whatever ordinance or prohibition that you adopt, that you do exclude Winter Canyon and that you do provide an exemption for fully recycled waterwaste systems. Thank you.
CHAIR LUTZ: Thank you. Deborah Stark? Okay. Michael Hedlow, followed by Marilyn Dove and Steve Sebra. Okay. So Michael Hedlow isn't here and Marilyn is here. We'll take Marilyn first.
MS. DOVE: Okay. Marilyn Dove. I urge the Board to carefully review and consider the testimony

0210
and data presented here by the Stone Community --
CHAIR LUTZ: Could you please put the microphone in front of you?
MS. DOVE: I'm sorry. The U.S.G.S. findings and the UCLA findings presented by Vanessa for Dr. Ambrose. These findings indicate that your Staff data is obsolete; that it's biased; that there are findings that are in direct contradiction by these studies, and I wanted to point out that if we don't know where we're going, all directions are wrong.
Sewers won't work in Malibu for a number of reasons. We have chronic power failures, the pumping won't work, and especially during fires and floods and high winds. We have those routinely. High soil erosions -- (bell ringing) -- unstable ground, frequent road closures all would hamper sewers.
CHAIR LUTZ: Thank you.
MS. DOVE: And I want to point out that the only closure in Malibu was caused by Thousand Oaks' sewer spill of 50 million gallons into Ventura River in February '98.
CHAIR LUTZ: Thank you. Thank you very much. Then we'll have Robert Gold and Robert Richner.
MR. SOBOROFF: I'm going to ask the Staff listen up, also, before I start my time, because what

0211
I'm going to offer you is a prius: Gas doesn't work; electric is too expensive. What I'm going to offer you is a proposal, a specific proposal that I believe would be responsible for one of you to propose, and that is the Mark Gold, the City of Malibu proposal. If you want to use it as a moratorium or a specific, go ahead, because you said -- everybody told me, "You got to act today," but do that proposal. But hold it until somebody makes a mistake.
You don't have to take it up to the state to

start all the lawyers. Hold it until they miss one little thing, and if you do that, we -- I'm trying to work with Whole Foods, to put a little Whole Foods market in there. We'll put the first $2 million in towards that, towards the prius. Nothing else is going to work. Why not do something that's practical, why overreact, why not listen. Mark Gold has agreed. The City has agreed. Go ahead and enact your prohibition or whatever it's called because you need to do that, I guess, but hold it. Don't take it to the state until they miss one deadline, one meeting. The first $2 million.

CHAIR LUTZ: Thank you. Robert Gold, Robert Richner and Nicole McGinny?

MR. GOLD: Good afternoon, Robert Gold. We

0212

own two properties in Winter canyon. We agree with Heal the Bay that Winter Canyon should be removed from the prohibition area because groundwater -- does not have impact on impaired waters, and we urge the Board to consider Heal the Bay's and the City's proposal. We also -- pipeline projects so that the family and businesses with immense projects based on existing rules be treated equitably and recognize that much of the regulatory process is (coughing) -- thank you.

CHAIR LUTZ: Thank you. Robert Richner, Nicole McGinny, followed by Matthew Horns.

MR. RICHNER: My name is Robert Richner, and I did a little peer review of the memorandum which I present to you as in support of the amendment. I would like to recommend to you that you have another peer review and real peer review before you go ahead. When you look at the data which is presented, for instance, in Memorandum 2, they are just presented and misrepresented in their conclusion.

Therefore, you cannot by any circumstances base your next decision on those memoranda. They are very biased and they are misrepresented. So, please, be careful before you make -- before you come to any conclusions. Thank you very much.

CHAIR LUTZ: Thank you. Is Nicole here?

0213

UNKNOWN SPEAKER: I'm speaking on her behalf.

CHAIR LUTZ: I'm sorry. We need to have her. She filled out the card. Then your card I'm assuming --

UNKNOWN SPEAKER: Can you pull my card then?

CHAIR LUTZ: When we get there. Matthew Horns, followed by Sara Sichich and Bob Ferby. Is Matthew Horns here? Okay. Go ahead, Sara.

MS. SICHICH: Good afternoon, my name is Sara Sichich. I'm a resident of Malibu and live on PCH within a mile of Surfrider Beach. My husband and I moved there to be close to the surf at Surfrider. I support the prohibition. It's tragic that in this day and age, in the era of I-phones and online video conferencing, Surfrider Beach regularly exceeds standards for bacteria pollution and causes health risks to those of us who surf and swim there.

In the surfing world, people often have a list of places that they like to surf in their lifetime. Surfrider is on the top of many people's

lists. I've met people from all over the world in the waves at Surfrider, and they have come to California to specifically surf at this beach.

What kind of message are we giving them by welcoming them with a polluted beach and the high chance that they'll go home with an ear infection, stomach flu or other poor water quality caused illness. I live in an older apartment, just east of the proposed prohibition zone and we're on septic. It's not uncommon to be sitting in our back patio and experiencing the putrid odor of waste when someone is taking a shower or doing laundry. I support this prohibition and hope you move forward today. Thank you.

CHAIR LUTZ: Thank you. Bob Ferby, followed by John Kay and Joan Levine.

MS. SMITH: Madam Chair, Mr. Ferby asked me to tell you guys that he had to leave, but I asked him if he wanted to support and he said support.

CHAIR LUTZ: Okay. John Kay? John Kay is not here. Joan Levine and Ryan Emory. You must be Ryan?

MR. EMORY: Yes. I'm Ryan Emory. I'm on Civic Center Way, which although we have an address on Civic Center Way. It is the Civic Center area. It's not in the Civic Center. We are connected to the common Los Angeles County operated and recently rebuilt sewage treatment plant in Winter Canyon, which is working fine. It's not failed. It's not a single Septic system. It's not really a problem. It continues to function fine. I agree with Mark Gold and the others that Winter Canyon is an acceptable discharge area. It does not connect to Malibu Lagoon. It is not a source of the pollutants in the Lagoon or at Surfrider Beach.

So the request is that the prohibition area be changed to exclude Winter Canyon and specifically maybe even by reference the existing County-run treatment facility. A lot of the data, by the way, that the Staff's been using or picking and choosing to use is from the '90s. There are so many changed conditions since then, including major rebuilds of the Civic Center and Cross Creek Road area, that that data is no longer pertinent.

CHAIR LUTZ: Thank you. Andrea Bochaletti. Susan Sherod and Barbara Bradley. Are any of those people here? Okay. We'll move on to Rick Margolis and Richard Scott.

UNKNOWN SPEAKER: Good evening. I'll try to speed talk. I'm here to support a no-net discharge system. If there's no-net discharge, I don't see how it can affect anybody to say that it might fail. Doesn't seem to be an appropriate reason not to do it because everything fails. I'm here to also support the pipeline exemption, which allows people who have gone through the system and have done it properly, spent a lot of money, a lot of time to be afforded the opportunity to continue with their system.

I'm also supportive -- I want to talk about fairness for a minute. I haven't seen any signs

whatsoever that distinguishes between fowl fecal matter and human fecal matter, and just because you get rid of -- sewer systems in Malibu or get rid of these systems, doesn't mean that the fowl is still not going to cause contamination sickness of people.

We're dealing with fairness as well. We have updated systems in Malibu, which are very expensive, and the Regional Water Quality Control Board has told us to spend when we upgrade our homes $150,000 or $200,000 in fixing this process, and now you're telling us that the $150,000 or $200,000 that we spend is wasted throwing away money because we're going to be treated exactly the same as the guy next door who has been living in his house since the '40s and does absolutely nothing to his home, because both have to have hook-ups the same system -- (bell ringing) -- in that regard, I do appreciate the comments of Mark Gold. Thank you.

CHAIR LUTZ: Thank you. Richard Scott -- who

0217

is not here.

Well, that does conclude our cards. Several people were not here. I'm sorry.

UNKNOWN SPEAKER: We turned in two speaker --

CHAIR LUTZ: What I'm going to do, then, is if you would like to come up and see Ms. Harris, I'll have her go through here. If your speaker card has said that you didn't wish to speak but were supporting, that's probably why you weren't called, but I will turn these over to Ms. Harris. We will continue, and if time permits, we will have you speak.

What I would like to do at this time is -- so please come up and see Ms. Harris and she will try to find your card. Thank you.

What I would like to do is have our Staff at this time give us an overview of their points based on the comments to expedite us at this point. So Ms. Egoscue?

MS. EGOSCUE: Thank you, Madam Chair. Chair Lutz has kindly offered me this time to address the Board in preparation for your deliberations. In November of last year this Board directed Staff to bring you a prohibition for the Malibu Civic Center area. Staff has followed Board direction, and with

0218

substantial evidence as seen in the record has justified a prohibition from red line to red line. Nevertheless, after indeed listening extremely carefully to each speaker and in view of the many issues presented, along with Staff, I'm going to offer an alternative to our original proposal.

Can someone help me with the copies for the Board, please? I apologize we don't have it to pull up, but we have a hundred copies, and I will give a couple of minutes to have those passed out to the full audience.

While we're doing that, I would also like to offer into the record a list of the so-called pipeline projects that we've heard testimony about today in the case of the Adamson parcels. I also have received a list from the City of Malibu for their pipeline projects, projects that they have through their

process. I'm going to actually read the addresses into the record, and I apologize for taking the time to do that. I'm going to read the parcel number for the county address while we pass out the alternative.

The County Parcel No. is 23897 and APN 44, 57, 002, 038. These are the parcels that were testified by Mr. Adamson. I have followed up with Ms. Nizman of the supervisor's office. These are

0219

indeed the only five parcels that the county considers in their pipeline.

Now, for the City of Malibu, this list comes from the City, and I appreciate them offering this to us today. There are approximately 40 properties, including six fire rebuilds, which you heard testimony about earlier. Again, I beg your patience: 24001 Malibu Road. 3469 Cross Creek Road. 3504 Coast View Road. 23038 Pacific Coast Highway. 23060.5 Pacific Coast Highway. 3516 Sweet Water Mesa Road. 2930 Sweet Water Mesa Road. 2860 Sweet Water Mesa Road. 23460 Malibu Colony Drive. 23872 Malibu Road. 23812 Malibu Road. 24024 Malibu Road. 24380 Malibu Road. 22959 Pacific Coast Highway. Are you doing all right?

THE COURT REPORTER: Yes.

MS. EGOSCUE: 22941 Pacific Coast Highway. 24132 Malibu Road. 24266 Malibu Road. 23618 Malibu Colony Drive. 23800 Malibu Crest Drive. 23915 Malibu Road. 23816 Malibu Crest Drive. 3556 Sweet Water Mesa Road. 3314 Sara Road. 23917 Malibu Road. 23919 Malibu Road. 23921 Malibu Road. 23923 Malibu Road. 23652 Malibu Colony Drive. 23664 Malibu Road. 23720 Malibu Road. I'm almost done.

0220

3535 Coast View Drive. 23316 Malibu Colony Drive. 23684 Malibu Colony Drive. 23872 Malibu Road. 24052 Malibu Road. 23405 Malibu Colony Drive. 23681 Malibu Colony Drive, and 23681 Malibu Colony Drive.

Again, these are the projects that the City of Malibu has presented to me as those through their pipeline process as of today. As we heard testimony, it means substantial investment on behalf of these property owners, and I offer these parcels for the county and these exact addresses to be entered into this prohibition as specific exemptions for the immediate prohibition.

It doesn't mean they don't ultimately get hooked in to the system. It means that the immediate November 5th prohibition does not apply to these specific projects. I offer that to you at the outset.

Now that I think we've got the alternative passed out, the difference here is substantial and significant, and it reflects the spirit that the Staff is attempting to hold while also creating some maneuverability. Again, it's an alternative.

At the outset you will note that there are two stages. The first stage, which we have as a year of compliance for 2014 would be the commercial

0221

properties. They currently appear as almost a cornflower yellow. The second stage would be all

residential areas within the red lines, which currently are a year of compliance of 2019. The other difference, as you'll note, and it's a little bit hard to see, but follow with me, the edge of the boundary, the original boundary that runs along the Winter Canyon parcel that cuts through Pepperdine, under this Staff proposal would be edged in to relatively hug the City of Malibu's property line.

So you would go from the beach up to PCH and then start in towards the Malibu city line, and that would excise Pepperdine's parcel and would allow the disposal option of Winter Canyon that we've heard a lot about today, including the idea that if there was a centralized system, that that would be the ideal place to disperse it in the city.

My last comment, and then I've got to have our counsel up here, unfortunately, and I'll explain that. In view of the fact that the City of Malibu and their presentation made two statements regarding the facts that they will be in litigation with this Board. It is important and critical to preserve the rights of this agency at this time. I'm going to hand this over to Staff counsel, Jeff Ogata, for a few remarks in

0222

that regard.

MR. OGATA: Thank you, Board members. This morning Malibu councilmember Pamela Conley Ulich first presented a document that she purported was a Heal the Bay report card. Looking at it, it consists of only two pages of data, which purports to compare the results of Surfrider Beach and the Santa Monica Pier side-by-side, but no actual part of the report was presented today.

So we haven't had an opportunity to actually determine whether or not that information is true and correct. Further, the deadline for submission of written comments in evidence was October 8, 2009. So all this information was clearly given to us after that. As I said, Staff and other stakeholders haven't had the opportunity to review it for accuracy in the context of the arguments that Malibu is trying to make today. We believe that it's an inappropriate contrary to our hearing procedures to allow those particular documents into administrative record; likewise, the City of Malibu and its comments to us that were prepared timely on October 8th referred to the five studies that they presented this morning.

We had asked for further information about those studies, as we understood that they were ongoing

0223

and the results weren't yet available. We asked them in an e-mail to provide clarifying information about those studies, additional information about those studies on approximately October 13th. We did not receive any of that. Today was the first time that our Staff has had any information about the results of those studies.

So again, based upon the lack of our ability to review that information, to see if it's complete, whether or not it says what the people are purporting it to say, the other stakeholders haven't had the opportunity to review those comments as well. Again, we believe that that purported evidence is late, and

we didn't have the opportunity to review it, and so we ask that it not be considered evidence, not be placed into the record. Unless the Board directs us otherwise, these documents will not be accepted by Staff into the administered record.

CHAIR LUTZ: Okay. Since we have our Staff up at the podium now, why don't we start with questions of Staff, and then once we conclude -- oh, I'm sorry, we do have -- we found the speaker cards? I apologize for that. We'll give you each a minute for your speaking, and then we will continue with questions for Staff. Okay. I have Don Schmidts.

MR. SCHMIDTS: Board members, Don Schmidts on behalf of Malibu La Paz. It's about clean water, right? That's your charter. Now, your idea is to throw everybody into one big net, collect up all the wastewater, clean up the Title 22 standards and discharge it within the Civic Center.

Our idea that we've been working on for 10 years is that we'll take our own wastewater, we'll clean it to Title 22 standards and we'll discharge it on our property, except we're not going to discharge it at all. We're going to re-use it. We're going to flush our toilets with it and clean it again, and we're going to use every drop in our landscaping, and that's why when we came forward to your Staff several years ago, we believe that no-net discharge exemption was in there, and then after you closed the public comment period, you removed that exemption.

Your Staff testified earlier today that you cannot mandate how we achieve these clean water goals. We can meet the goals. We'll have Title 22 water. You really do need to put that exemption back into this proposed prohibition moratorium.

CHAIR LUTZ: Thank you. Chris -- I'm not going to say your last right.

MR. DELEAU: Deleau.

CHAIR LUTZ: Deleau. Please.

MR. DELEAU: Thank you, Chair, Board members. My name is Christopher Deleau. I represent Malibu La Paz as well, special projects manager on La Paz project. The response to public comments from the Board grouped together several responses to several different people commenters inappropriately in accordance with CEQA Guidelines, and the response to comments were also conclusionary in nature many of them and didn't comply with the CEQA Guidelines.

I would also like to note for the record that specifically, importantly that Staff did not analyze any potential significant impacts that may arise if the prohibition didn't reach its goal of getting a centralized treatment plant in place within five years.

I think it's a very foreseeable -- especially in light of other prohibitions in other areas of the state that five years is -- it's not going to happen in five years. You're not going to get an assessment district passed. You're not going to have people hooked up to a system in five years. What happens, if that doesn't happen? Well, that wasn't addressed at all in the environmental document, and I support the

exemption for no-net discharge systems. Thank you very much.

CHAIR LUTZ: Okay. Thank you. I'm going to start with Ms. Marin and we will start questions for the Staff.

MS. MARIN: There's so much to begin with here. First of all, with regard to the modified plan that you submitted. I wanted to make sure that I understand how it compares with the Heal the Bay, City proposal. It looks like -- for the most part, incorporates a lot of the Phase 1, Phase 2 areas in your yellow and green -- there is some differences, but primarily I think I'm understanding that you -- this not a disinfection solution. This all connects to the sewer, correct?

MS. EGOSCUE: That's correct.

MS. MARIN: And you have not expanded it to include the commercial areas that were referenced -- that were outside the original boundary?

MS. EGOSCUE: No, we have not.

MS. MARIN: Can you explain why we couldn't do that? Is it because of noticing --

MS. EGOSCUE: Well, I can let the counsel answer the noticing issue. I feel that Staff has made a very good record for the red boundaries and feel that it's very safe from an administrative agency perspective to contract, if you would like, but not to go outside those boundaries. One more issue is that if the City has a willingness to do those properties to their city line, they are free to do so with or without this Board's action.

MS. MARIN: And, you know, we heard a lot about the removal of the exemption for the zero discharge systems. Can you talk a little bit about your thinking behind that, and especially any experience that we have with zero discharge systems that have already been implemented?

MS. PHILLIPS: Sure. My name is Wendy Phillips, for the record. We eliminated this option after receiving comments on our July 31st draft, and the thinking behind this is that it was better to take a more comprehensive approach to the prohibition. We had concern about eliminating big chunks of commercial dischargers and shifting more burden to the remaining community.

Second, you heard a comparison to Pepperdine, and I do want to make some distinctions between what Pepperdine currently does and what is being proposed. Pepperdine, first of all, has a relatively small flow in relation to the amount of irrigatable area. We can give you some examples of that, if you would like, and we can go into more detail. But there's another important difference here, and that is that Pepperdine has a couple of emergency back-up provisions.

One, it can pump waste, partially treated effluent up to Tapia. Second, it does have an NPDES permit. So during a raining period, Pepperdine does have provisions to discharge subject to NPDES requirements.

And then there's a third reason, and that is

oversight. Pepperdine's a fairly large facility, but these other ones, when we start talking about a lot of new, small, zero discharge facilities, the success for those are going to require a lot of land use controls, irrigation practices, practices for measuring the soil moisture in the unsaturated zone. You're going to need network of piezometers to make sure that the discharge is taken up in the root zone and doesn't elevate the water table. You need plumbing design features built into these projects. These are really local land use agency issues. And I'll stop there.

MS. MARIN: I'm familiar with why we're here. I was here last year when we took action to move in this direction because at the time when there was an opportunity to develop a collaborative approach, the collaborative spirit didn't seem to be present. So

0229

now we are really seeing some activity because of the threat of a prohibition, and it just seems like without that prohibition we wouldn't be getting all of the activity that we're getting now.

So my question is: What are we expecting the City to provide in terms of substantial compliance towards achieving what needs to be achieved in the city? Is it plans, designs? I know they've mentioned that they just embarked off their design activity and their environmental documents that they have to prepare. What else do we need to see in terms of compliance? What are the specs towards the 2014 and then 2019?

MS. PHILLIPS: First of all, I would like to recognize that the City has done some substantial preliminary planning. Questa 2003 and 2005. Stone, in 2004. In fact, much of that was funded with State grants. So they got a head start on this. If you look at your resolution page 7 of 12, you'll see that we have laid out some interim goals.

Early in this five-year time line you will have some overlapping between the environmental studies, the planning, the feasibility, and then you'll see we've laid out critical time lines; for example, May 1, 2011, that's a year and a half from

0230

now.

We're looking at substantial completion of a master's facilities plan, and the City of Malibu may call that an alternative's analysis, you know, just depends on how you label this. But we do have our proposed key interim deadlines outlined on page 7 of 12. Also, the City will be required to submit quarterly progress reports to the Executive Officer.

MS. MARIN: One of the proposals was that we not approve the prohibition today but instead hold it in a ban until such a time that they don't meet certain criteria, but it sounds to me like we're at completely opposite ends of thinking here, because what the proposal that the City is putting forward excludes a large segment of the red area from sewers at all, because my understanding is that the disinfection approach is still a septic approach; is that correct?

MS. EGOSCUE: The disinfection, to the best of my knowledge, is in the current systems. They

install secondary treatment. That's correct.
MS. MARIN: So it's still septic?
MS. EGOSCUE: That's correct.
MS. MARIN: Right. And what we're proposing is a complete sewer system?

MS. EGOSCUE: We're proposing a centralized system, centralized plant.
MS. MARIN: So in terms of that proposal it doesn't seem to me to be compatible with the recommendation that we're making here today, even if we were to that say that the prohibition wouldn't take place until a year from now until they could -- or we could, say, you know, that it would happen automatically after they completed Phase 1, but the problem that I see with that is that we're still eliminating a whole group of pieces from the prohibition altogether and from the sewering altogether, right?
MS. EGOSCUE: It's questionable that we can legally offer that kind of a basin plan amendment and hold anyway, and maybe Jeff can speak to that, the idea that we can hold off on a basin plan amendment being effective until some future date. But the other point in response to your questions is that the idea of an agreement is what has led us and the failure of that agreement has what led the Board to direct us to come to today.
MS. MARIN: Right. It's clear -- I mean, my concern is that we haven't been able to get them to act until we propose the prohibition and their track

record is not a good one, and it just seems like the prohibition is what's going to ensure that proper action take place. But the prohibition also means that they have to abandon the septic approach, including all the investments that have already been made and move towards the integrated centralized approach.
MS. EGOSCUE: That is correct.
MS. MARIN: Those are the questions I have. I'm interested to hear what my colleagues have to say -- (noise interruption) -- different options that have been proposed. I'm particularly interested in what you guys have to say about the exemptions.
MS. MEHRANIAN: My question is from the best of what I'm understanding that we're proposing certain dates in a certain area, but we cannot propose how to do it. Am I right? Like by saying that we want a central unit are we proposing -- is that in -- I understand the area is and the time line is, but can we in our jurisdiction say how to get there?
MS. EGOSCUE: No, we cannot, and that was made clear by Mr. Ogata.
MS. MEHRANIAN: If we can't say that, saying a central treatment unit or plant, isn't that defining how? I'm trying to clarify it for myself.

MS. EGOSCUE: I think that you're asking me if in recommending a prohibition where we are in essence recommending a centralized approach?
MS. MEHRANIAN: Yes.
MS. EGOSCUE: Perhaps it's semantics, but

legally we are proposing a prohibition of the discharges.

MS. MEHRANIAN: Okay. Second part of my question is -- yeah, the exemptions are important. The people who have spent -- I mean, I'm just hoping that I can understand if there is, how do we deal separately with people who did actually try to mitigate and did spend money on putting --

MS. EGOSCUE: Are you referring to the property owners that are in line to do a new system --

MS. MEHRANIAN: No. The one that meets certain kind of requirements.

MS. EGOSCUE: I think that in terms of the single family residents, the best way that the Staff is proposing to deal with that is to give them 10 years under the alternative we are proposing, and I believe that that is our best bet at handling that situation.

MS. MEHRANIAN: Would you know what the

0234

average life of this system? Is the 10 years attached to that or is the 10 years -- no?

MS. EGOSCUE: No, it is not.

MS. MEHRANIAN: And then my other question is, and you probably have talked about it before, on the unincorporated county areas, how do we deal with that?

MS. EGOSCUE: The unincorporated county? We've dealt with that by having the county and the land owner that is through their pipeline, quote, unquote, certified to us that they are through the pipeline and that is entered into the record, today those five parcels. Other than that, there is no one else pending in the unincorporated county, to the best of our knowledge today.

MS. MEHRANIAN: And it's subject to whatever we decide?

MS. EGOSCUE: That's correct.

MS. MEHRANIAN: And then my last question, again, which is probably something that we haven't discussed which concerns me in whatever measure we take, I would really like to know a little bit of the future development goal, land use goals of the City, and therefore, whatever system, in whatever capacity, either centralized or phased or is put in would meet

0235

the requirement of not now but also certain -- in certain time line in the future, so we don't face the same issues again knowing of chronic problems of the land and the topography and water table and all that. I'm wondering if anybody -- so many people talked about so many things today, but that was not discussed, and it's a concern of mine, which is not right now, but in the future.

MS. EGOSCUE: Perhaps when the City is up in front of you for questions you can ask them that question.

MS. MARIN: I have one question about the state government funding. I don't know if we ask it of our Staff?

MS. LUTZ: You know, they were part of our Staff's presentation so we can --

MS. EGOSCUE: Leslie is still here.
CHAIR LUTZ: Well, no, go ahead and ask that and then --
MS. MARIN: My question was in terms of the loans that are being identified for the potential use in Malibu, is that for the public projects only or does that also allow the residents to access funds for connections?
MS. LAUDON: We do have mechanisms to

0236

allow the residents to access those funds. There are different ways that we can set it up with the city where the city essentially would be the bank then to loan the money to the residents, and we do have mechanisms for that.
MS. MARIN: Thank you.
MS. MEHRANIAN: One last question I have, and probably you have answered this question, but I'm not still clear on it. In the different proposals that we heard, and some of them have this very targeted measures for solutions for different areas, and we can't as a Board or can in terms of the jurisdiction to entertain that because there's specific information of how -- for example, this disinfection, I mean, let's say that I start thinking that maybe in certain areas disinfection might resolve the problem, but that's not what is in front of us --
MS. EGOSCUE: The way that -- if the Board wanted to go that direction, the way that the Board would do it is they would exempt those areas from the prohibition boundaries.
MS. MEHRANIAN: So that's how you would do it? Okay, which is problematic in my mind, but I understand.
CHAIR LUTZ: Ms. Glickfeld:

0237

MS. GLICKFELD: Thank you.
CHAIR LUTZ: Thank you, Madam Chairman. I think we have very little time, so I feel the way that the people in the audience feel, that there isn't enough time, so I'm going to try to ask my questions quickly.
On the issue of the -- many people said things in general that there was something wrong with our Staff analysis; that there was something with the peer review; that our Staff had used -- particularly that our Staff had used obsolete indicators in tracking the impacts over time. Could you comment on that in and respond to that in a way? Were the peer reviewers chosen by you or were they chosen through a process that is independent?
MS. EGOSCUE: The peer reviewers were not cherry-picked by Staff. That is part of a process that happens. It's required by law. The indicators that were used by Staff are the indicators that EPA uses. It's how we regulate our beach water quality, and the fact that we have used years of data actually improves the science behind the conclusions. It doesn't disprove the science.
So I'm trying to kind of shorten that answer, but if you want to bring up our scientists, then --

0238

MS. GLICKFELD: That's adequate.

MS. EGOSCUE: Mr. Levy is waving his hand at me.

MR. LEVY: For the Board's information and the public's information, the way the peer review process works is that all of the scientific assumptions from all of the Regional Board's regulations get sent up to Gerald Bose, I think, is still the point person in the Division of Water Quality of the State Board, and the State Water Resources Control Board in conformance with the Health and Safety Code has a master contract with the University of California, and Gerald Bose works with the point person at the University of California to locate qualified experts to do the peer review. Staff doesn't participate in that decision.

MS. GLICKFELD: And it's not necessarily University of California faculty. They are from all over the place?

MR. LEVY: Well, the master contract as -- when I was last working up in there, there was a master contract with the University of California, that the law requires it to be from California State University of the University of California. I think we're still using --

0239

MS. GLICKFELD: I think you -- I have noted that the peer reviewers were not in the UC system, that they were outside the UC system -- actually, they are from outside California.

MR. LEVY: That may be so, but that would be, as I understand it, a result of the University of California determining who should be the peer reviewers.

MS. EGOSCUE: And for the Vice Chair's further clarification, Staff is not allowed or permitted to have any contact with the peer reviewers with the exception of transmitting the actual study to them in the first instant.

MS. GLICKFELD: This is the most rigorous process of Staff's scientific review that I've had in all my years of working as an oversight person on the commission or from an agency.

I want to review one more factor, which is the Staff's argument basically says, There are these on-site systems that are a variety of different kinds. Some are run by the county. Some are run by individual shopping center owners. Some are run by individual businesses. Some of them are very basic septic systems. What the Staff has done, in my understanding, is that you have taken the water

0240

monitoring systems that are there to monitor how the water goes into the ground and what the quality is and whether or not the treatment that goes on between the septic system and the groundwater is adequate to meet the water standards; is that correct?

MS. EGOSCUE: The Vice Chair displays a keen understanding of what happened.

MS. GLICKFELD: So then the next thing that Staff has done is try to use hydrological models to understand where the groundwater is moving and at what a speed it's moving and how the pollutant load is flowing with that; is that correct?

MS. EGOSCUE: That is correct.
MS. GLICKFELD: And they also had studies, maybe 57 studies, that they used other peer reviewed published opinions that indicate things that these groundwaters are connected to Malibu Lagoon and they are connected to the ocean; is that correct?
MS. EGOSCUE: That is correct.
MS. GLICKFELD: So while I really appreciate the statements of some of the people -- you know, I live in Malibu. I've lived there for 35 years, and the rule is if your system doesn't smell bad, if your toilet flushes, if the water goes down your sink and you don't have those kinds of problems that you can

0241

see or smell and you don't have to pump your system every day, it's working. No one has any idea of what the water quality is when it goes down to the bottom, unless they actually have a monitoring well that they are regularly sampling.
So we had Mr. Emory come in and say his system is working really well, and I feel bad because he has paid a fortune for it, but there are 400 water quality violations, in the groundwater, in the well that's connected to his system, and then that ground water is moving -- and that's another question: The groundwater that's in Winter Canyon, is it all just going straight out to Amarillo Beach or is it actually contributing in any way to the lagoon through the Civic Center?
MS. PHILLIPS: The groundwater in Amarillo Beach does flow to the ocean. It follows the --
MS. GLICKFELD: I meant, Winter Canyon.
MS. PHILLIPS: I'm sorry. Groundwater in Winter Canyon does flow to Amarillo Beach. It follows the surface drainage pattern.
Now, once it hits the beach, there is that long -- (coughing) -- current which takes it down toward the Colony and to the lagoon, but so as far as the groundwater flow component of it is, almost all of

0242

it flows --
MS. GLICKFELD: But nothing is actually being contributed into the groundwater basin in the Civic Center?
MS. PHILLIPS: The groundwater basin where?
MS. GLICKFELD: In the Civic Center area. What you call the Malibu Valley Civic Center area.
MS. PHILLIPS: It's one designated basin, but you have two separate aquifers, if you will. You've got the Winter Canyon aquifer, and then you've got the shallow and the deep aquifer over in the Malibu Valley, the Civic Center area, but it is all one designated basin.
MS. GLICKFELD: So basically it's very hard to tell where all of the water is going and be sure that not some of the water being generated in Winter Canyon is also reaching Malibu Lagoon in another way?
MS. PHILLIPS: Well, I do want to clarify that while both Winter Canyon, Lower Winter Canyon and Malibu Valley are called the Malibu Valley groundwater basin. The flow in Winter canyon, the groundwater flow does go toward Amarillo Beach. We don't expect

that much of any of it goes over toward the lagoon through groundwater flow. Once the groundwater

discharges onto Amarillo Beach, there is that longshore current which could --

MS. GLICKFELD: So you're saying that this longshore current takes it down to the mouth of the lagoon and the tides take it in --

MS. PHILLIPS: Right.

MS. GLICKFELD: And the peer reviewers have agreed with that--

MS. PHILLIPS: The peer reviewers did take a look at Tech No. 4 where we divided this into five hydrogeologic sectors. But understand we did not -- in our Tech No. 4 we did not assign much of any nitrogen loading from Winter Canyon over to the lagoon. When I say that the nitrogen going into the lagoon exceeds the target of 6 pounds per day, I'm talking about the nitrogen from the Civic Center area, near the creek in the surrounding hills.

MS. GLICKFELD: Thank you. I have a couple of more questions, and then I'll go on to let my colleagues ask some. There are what, around 40 pipeline projects that you read into the record, Ms. Egoscue?

MS. EGOSCUE: There's 40 approximately --

MS. GLICKFELD: So that's 10 percent of the 400 parcels in the prohibition area?

MS. EGOSCUE: I believe you're about right.

MS. GLICKFELD: So are we guaranteeing -- these are properties that have gone through the preliminary review but haven't been before this Board yet, are we guaranteeing that the Board will issue WDRs for --

MS. EGOSCUE: These are single-family homes.

MS. GLICKFELD: So they are not under our jurisdiction?

MS. EGOSCUE: Currently these are handled by the City, and I asked the City to give me a good faith list and they have done so, and I'm going to take them at their word.

MS. GLICKFELD: So there are no commercial facilities in this list?

MS. EGOSCUE: The City had a couple of commercial facilities on the list, and I did not read them into the record. If you would like me to clarify those for you, I can, but I felt that the single-family residents in listening to today's testimony were the most compelling, and I would like to offer the alternative to the Board to solve that issue. The commercial properties would come to the Board and therefore would be dealt with in a different way.

MS. GLICKFELD: Do you endorse the idea of the City to provide only disinfection in septic systems to all the beach front areas that are within the prohibition area?

MS. EGOSCUE: I'm going to not answer your question at the risk of making you upset by answering it in the following way.

MS. GLICKFELD: You're going to answer it

then.

MS. EGOSCUE: I support the Staff's proposal, and I support the alternative that we are presenting to you.

MS. GLICKFELD: All right. And last question, which is people are very troubled. I'm somewhat troubled. I wish this Board would have acted years ago when it became clear in 2006, 2007 that the City had stopped making any effort to move forward with their 2004 agreement. During that time, people have made -- the City shifted into allowing these new advanced treatment systems, and they cost a fortune.

Their own system on their own property on Malibu Lumber cost between $3 and 4 million, according to what their representatives have told us. We know that Paradise Coast spent $5 million on their system for 60,000 gallons. So these are very, very expensive

0246

systems. People are not happy to be spending that money on them. Is it possible that the City could consider doing what the Questa engineers suggested in their 2005 report, which is allow the septic systems and allow the advanced treatment systems to stay on the properties and provide treatment before they go into a community system? Would that be an alternative that would constitute the kind of community system that they could opt into, without having to go ahead and abandon everything that's been done to date?

MS. EGOSCUE: The way that the prohibition is currently drafted, it would not be possible; however, should the Board wish to go in that direction, we can come up with some language that would achieve that, but that is not currently how it's drafted.

MS. GLICKFELD: Thank you very much.

MR. BLOIS: I'm going to have to cut it short. Do you know how much water Water Works District 29 provides to the prohibition area?

MS. PHILLIPS: We estimated that. We estimated it from the Water Works No. 29 data for their district, which includes the City of Malibu and also Topanga Canyon and a little chunk of -- I think it's Marina Del Rey. And then we talked to the Staff over there, and they advised us as to what percentage

0247

goes to the City of Malibu, and then what percentage goes to the Civic Center area. So, yes, we did, and that data is in Tech Memo No. 5.

MR. BLOIS: That's why I asked, because it wasn't in Tech No. 5. What you had was an estimate and you used that estimate to size possible alternative treatment plants.

MS PHILLIPS: Oh. If you would look at page -- Appendix E, we do have a trend line for the City.

CHAIR LUTZ: What's the page on that, please.

MS. PHILLIPS: Yes, TM5-23. This is for the City -- okay. The trend line, Director Blois, is for the City, as a whole, and we did talk to the Staff at Water Works No. 29 and determined that a certain percentage was in the Civic Center area. If you need to know that, I can check with Staff.

MR. BLOIS: Where I'm going with it, I've been trying to figure out some correlation between the

sizing of alternative or potential sewage treatment plan or plants and comparing that roughly with the water usage. Dick Sherman kind of struck a note with me, water in, water out. There's got to be a correlation. So if you don't have it, I don't want to waste any more time belaboring the point, so I'll move on.

Was there any consideration given to natural sources in any of the technical reports or studies or conclusions you've reached?

MS. PHILLIPS: Yes, we did consider natural sources. In fact, that was one of the comments that we got from more than one party, and we did respond to that in our response to comments.

MR. BLOIS: Ms. Egoscue, the list of exemption properties that you got from the City and read into the record, was the Presbyterian church that burnt down one of those?

MS. EGOSCUE: Do you happen to know the address?

MR. BLOIS: I do not. I know it is on Malibu Canyon Road somewhere up near the Knolls.

MS. EGOSCUE: Maybe we can have the City respond to that when they come up.

MR. BLOIS: As a good Presbyterian, I had to ask that. There's one thing that is actually my last comment, but there's one thing that's missing from not only your report but everybody's report the entire day, and it really is concerning me, and that is the importance of maintaining all of these systems. There's absolutely no requirement in any of your things or no mention of management or the importance of the maintenance of these systems. Is there some way you can address that?

MS. EGOSCUE: When this basin plan amendment was contemplated, we tried to be as clear and concise as possible, and we tried to avoid land use decisions and operation decisions such as maintenance. I could probably work with Staff to try and come up with some sort of general finding that expresses the Board's view that that's important; however, in some sense the maintenance and operation of systems on-site becomes irrelevant when the ultimate objective of the basin plan amendment is the prohibition of the use of such systems.

MR. BLOIS: I'll ask that question of the City, then.

CHAIR LUTZ: Ms. Diamond.

MS. DIAMOND: I just have a couple of questions to add. On the issue of Winter Canyon, I understand that there are schools there, the fire station -- the county brought up the issue of the fire stations, and maybe I'm going to go back to the L.A. County comments about Fire Station 88 and public restrooms. Also, if you can comment about what happens with the Malibu Bay Company, because, as I remember, don't they discharge over to Winter Canyon? What happens to the Malibu Bay Company in this new plan? I just wanted to understand where that is in that and where the county's concerns over the fire

stations and the public restrooms. If you could comment about those.

MS. PHILLIPS: The Bay Company, Malibu Colony Plaza, that would be -- as you see, that's the golden rod color on the map, that would be subject to the 2014 deadline.

Now, your other questions about the fire station and the Civic Center, those would also be subject to the 2014 deadline, as well as Surfrider Beach.

MS. DIAMOND: Okay. I wanted to just clarify where that was. Another quick question, because I want to be conscious of our time. In terms of the TMDL compliance dates that the City has, without doing a prohibition or taking the actions that we're contemplating today, would the City be able to meet the compliance dates of their TMDLs for bacteria, pathogens, and nitrogen?

MS. EGOSCUE: That's somewhat of a loaded question in terms of bacteria on the beach; however, the nitrogen TMDLs do have load allocations for the

0251

systems in the Malibu Creek area. I find it difficult to opine as to whether a City can meet a requirement in the future that we haven't even initiated any kind of enforcement on. I'm going to not talk about the bacteria on the beach that we've issued to so far.

MS. DIAMOND: One other question I have and it has to go back to the issue of funding. As I recall, and I think it was 1999, we had an action to prohibit septics in El Rio, a very poor, disadvantaged community. I believe the Regional Board, and I think you were involved with that, if I remember, did we not help El Rio with their funding and will we be able to do that as well?

MS. PHILLIPS: Yes. In 1998 or 1999 the Board did prohibit septics in the Oxnard -- that covered several communities: El Rio, Strickland Acres, a small sliver of the City of Oxnard. The total cost to sewer that area is $35 million. The State ended up contributing in terms of grant funding almost $20 million. I think there was another million that came from EPA. So the residents were left with the remaining 15 million. There was a large developer nearby, the Riverside project, I believe, and some of the cost was able to be allocated over to that developer to ease the burden on the residents.

0252

MS. DIAMOND: So we would -- as already mentioned earlier, but we would be helpful for the City of Malibu as well in this --

MS. PHILLIPS: Absolutely, I think that -- you know, in fact we do have some numbers just toward wastewater management. The State has already given the City $4 million in grants. When you throw in the Lagoon, when you throw in Ramirez Canyon stormwater drainage, I mean, it is millions -- how many millions is it, Leslie? We have this compiled.

MS. LAUDON: Just from the State Water Board, we've given them about $14 million in grants since 2001 for some of the septic work that they did, the septic management plan, and then the stormwater systems and the Paradise Cove system. The State Board

does have some other grant programs, too. I think with El Rio they've got a small disadvantaged community wastewater because of the low MHI.

We do have different grant programs that are happening, you know, the Integrated Regional Water Management is the big money out there right now, through the Department of Water Resources. So that's probably where the best opportunity is as far as grant funds. The low cost loans, the low interest loans, we consider that when you look at it compared to

conventional financing, it's about a 25 percent grant. So that's what it would equate to versus going out and getting conventional financial.

MS. DIAMOND: Thank you very much.

CHAIR LUTZ: Mr. Richardson.

MR. RICHARDSON: Just a couple real quick comments or questions. Do you consider that the prohibition is supposed to coincide with successful completion of the wastewater treatment system and an appropriate time to hook up is the four years -- basically four years, is that appropriate time?

MS. EGOSCUE: The four years for commercial we believe is feasible. The City has proposed today to add another year to that, to 2015. So to be safe, 2015 is indeed feasible under the City's own testimony for commercial. For the residents, we are proposing 10 years.

MR. RICHARDSON: Okay. The other comment, I know it came out in the Staff report, because I've been told this many times since I've sat on the Board, is that we're not allowed to dictate what method to use to come into compliance, and so I guess my question is: Disinfection at zero discharge doesn't come into compliance?

MS. EGOSCUE: The basic premise of this

prohibition and the science that the Staff has brought to you as evidence is that septic systems do not work in this high risk area. That is not to say that they don't work when properly cited and maintained and operated in other areas, but in this chronically polluted area of Malibu that has not been able to meet water quality standards or objectives for a very long time, they are not working.

Now, would disinfection in certain areas work? Bacteria, that would attack that one. How about the nitrogen loading? How about the water issues and the science behind the water movement? The zero discharge, I think Wendy did answer that, to the extent of the Staff's discomfort with, "How do you determine whether or not it is truly discharging? Do establish perimeter monitoring wells, who reviews those reports?" Those are the kind of issues that we have been struggling with as a Staff.

With the view of, quite frankly, taking care of this issue and moving on to other issues in our vast region, the way that we have crafted this prohibition, it's a very hands-off approach once it's done by this Board. It's up to the City and the residents to comply and to figure out, quite frankly, how they want to run their city and solve this

problem.

MR. RICHARDSON: I was concerned because Dr. Gold came up with basically the same thing as the City of Malibu, as far as -- and this just blew me away -- as far as the disinfection portion, which I've never have considered that he would comply with, but he actually proposed that wasn't a bad alternative. So I'm wondering if he didn't figure it was a bad alternative with Heal the Bay, why are we not considering disinfection in those particular areas that he was comfortable with? Why should we not consider that?

MS. EGOSCUE: The best answer to that, and with all due respect to Dr. Gold, is that the Staff has a separate opinion of whether or not that's something that should be done in those areas. I would never speak for Dr. Gold, and I hope that he is here and can answer for himself why he is proposing that alternative.

MR. RICHARDSON: The last comment or question I have is that some of the individuals who got up and spoke, spoke -- and some of them were developers and some of them were realtors -- that there were systems in place that actually would take in additional homes -- and the one individual stated that of 20 or

0256

30 homes that were being built, a system was being put in place that would handle an adjacent 100 homes, and it seems to me that 100 homes taken off of individual septic systems and put into a small centralized system may be more economically feasible than trying to do one large system and pipe everything from all over the place into one location. I mean, that's just my mentality.

MS. EGOSCUE: The gentlemen, Mr. Isaccson, who testified regarding that system was testifying regarding a situation outside the prohibition boundary, and we are not precluding an approach by the City that would entail small pocket plants, if that was more economically feasible for whatever reason.

MR. RICHARDSON: So you're leaving that up to the City?

MS. EGOSCUE: That's correct.

MR. RICHARDSON: That's all I need. Thank you.

CHAIR LUTZ: I have just a couple of follow-up questions, and then our reporter has indicated she needs a break. So we will take a couple minutes, and we're going to try and wrap this up by 5:30, I'm hoping.

My first question has to do with the maps.

0257

If we look at the map that you provided us with the alternative from Staff, with the new recommendation from Staff, there is a brown outline, and it is indicated as a nitrogen high impact area from the Stone Environmental report of 2004. My question is this: When I go back into the Technical Memo No. 3 where there is discussed, I was getting confused as to what was the Stone report and what wasn't, because it seems to me that there are two different terminologies, and I want to make sure that I'm right that they are the same thing.

In some portions of it, for example, on page 20 it says the Stone report found groundwater entered receiving were -- OWDSs were found with six months groundwater travel time, and then the very next paragraph says, "September 17, 2004, Memorandum of Understanding between the City of Malibu and the Regional Board states ordinances shall be drafted by Staff and recommended for adoption for the six-month time of travel zone as identified in the risk assessment report (Stone) to provide advanced treatment and disinfection."

So my question is, is that the same thing? Is Stone as in reported the six-month travel time zone, and is that in fact what is on the brown?

0258

MS. ERICKSON: The brown shows the high risk -- I'm Elizabeth Erickson. The brown shows the high risk for nitrogen. The six-month travel time looks more like a bathtub ring, and it was based on the bacteria, so they are not the same.

CHAIR LUTZ: Can you help me where that area is?

MS. ERICKSON: Where the six-month travel time is?

CHAIR LUTZ: Is it where the brown --

MS. ERICKSON: It's smaller than the brown.

CHAIR LUTZ: It's smaller than the brown.

MS. ERICKSON: This is based on their assumptions that the bacteria moves in the same way as the water does, which we don't know to be true. So they looked at that time, that six-month time of travel for the water, which we don't know that that corresponds to how the bacteria actually move, and if you just look at what you've got there -- you imagine a bathtub ring along the ocean, and you imagine a little bathtub ring that goes up Malibu Creek, that's pretty much the area that they agreed they were going to remove the systems in 2004, because that was the area of the six-month travel time. So it's different than the brown.

0259

CHAIR LUTZ: Okay. And through everything I've read and through what I think I heard earlier today, that Stone report with the six-month travel time is a report that is agreed upon by everybody at this point? Staff agrees with the conclusion --

MS. ERICKSON: It was used as the basis of TMDLs for --

CHAIR LUTZ: -- and the City also -- I'll probably need to ask them directly, too.

MS. ERICKSON: I wouldn't say it's in 100 percent agreement, but it's certainly -- substantially used in the record.

CHAIR LUTZ: But to your knowledge, this is a report and figures that everybody at this point seems to be relying on?

MS. ERICKSON: They are relying on, yes. I don't think we necessarily agree that this is six-month bacterial travel time, but that is what we had at the time -- in 2004 when the TMDLs went forward and that's what we used at the time. Now, we know more. I'm not sure that would be the appropriate outline anymore. Is that helpful?

CHAIR LUTZ: I think so. When you say, "we don't agree," are you saying that Staff thinks it might have changed or do you think there's

disagreement with the City at this point?

MS. ERICKSON: I can't speak for the City. I know that they went ahead with exactly the same procedure very similar what they had done with Stone again, and what that does, as I said, is it assumes that the water and the bacteria moves the same. Water is a little, tiny molecule. Bacteria is big hunks. and colloids, which is how bacteria and viruses travel, are even in bigger hunks, and what we know is that colloid transport isn't necessarily in the same direction as water, and it's based on the rate of the water movement.

So what I'm saying is that their studies have shown that there are varying paths for bacteria transport, and they did not do a microbiological study to determine how the bacteria actually moved. There's obviously bacteria logical work that's being done. So I would say that science has moved on since 2004.

CHAIR LUTZ: So you're saying that Staff doesn't necessarily agree with the six months any longer?

MS. ERICKSON: Right, that's it.

CHAIR LUTZ: And do you have other studies that show that that I've missed in here?

MS. ERICKSON: Actually, we did try and look, as has been suggested, beyond what was known before, and we said, Okay, well, maybe we can determine exactly where the bacteria are in the Malibu Valley. So why don't we look at 4 years of data for all of Santa Monica Bay. We did a very simple study. We looked only at summer data. We divided up the beaches into which were septic and which were sewered, and lo and behold we found that there were more enterococcus on the septic beaches, two years out of four, and that the dry weather time, everybody had no enterococcus.

So in other words, we went way beyond this little, tiny Malibu focus to try and say, Well, how do septic beaches perform, and what we found is that where there's a septic system, there's more enterococcus when the weather is wet, which is not right now.

CHAIR LUTZ: Thank you. Wendy, in your presentation, one of your PowerPoints is entitled "Potential Methods For Compliance." If I had a number, I would tell you, but I have no numbers on mine, and it is towards the end. Counting on the papers you gave us, it's eight from the back.

MS. PHILLIPS: Okay.

CHAIR LUTZ: So there's been a lot of discussion from my Board members about the -- that we can't necessarily say you must achieve these things using this item, but, yet, you've given us a list here, and I would like to see if you could clarify that for me.

MS. PHILLIPS: Sure, and actually I think our legal counsel wants to handle this question.

CHAIR LUTZ: Okay.

MS. PHILLIPS: Oh, can you repeat the question? You're asking about the difference between our list of alternatives and then our list of projects that we identified -- conceptual projects to comply with --

CHAIR LUTZ: Pretty much, because this one is entitled, "Potential Methods of Compliances," and you've got a list of different ways that I'm -- that to me reads that they can be complied. So I'm just trying to understand, whether we are saying to comply you need a very narrow or there are a multitude of things you can do.

MR. OGATA: We are tasked with trying to develop and analyze different methods of compliance. So basically we can brainstorm all sorts of possible methods of compliance, but we're trying to pick some that we believe are reasonably foreseeable that could be done and analyze those impacts. So the three that

0263

seem very reasonable and came to us quickly was centralized plant, regional plants and exporting the sewage to another place.

There certainly are other potential methods of compliance, but we picked three that we felt seemed reasonable and seemed like were projects that people had been talking to us about. The City had mentioned it. We heard it from other developers who said regional plants were possible, and so that's why I selected those. Certainly we could do any number of things, and the list could include a number of things that would not be feasible.

So we're trying to come up with something that is useful so that we can analyze those impacts, even though we have no specific projects in front of us, which then means we can't do any specific kind of analyze of the impact. So this is kind of a brainstorm, if you will, about things that we thought were possible and we did our best to analyze the impacts from these three.

MS. MEHRANIAN: When you said we're tasked by looking at different alternatives and analyze them, tasked by what, tasked by who?

MR. OGATA: If you recall when I first stepped up here, I described a different CEQA and

0264

Water Code Guidelines --

MS. MEHRANIAN: But CEQA?

MR. OGATA: CEQA.

MS. MEHRANIAN: That's what I thought, and that's what I wanted to make sure: That it's CEQA, that requires like three or four alternatives?

MR. OGATA: It doesn't have a reasonable number of alternates.

CHAIR LUTZ: So am I understanding, then, that these are methods that you believe will bring the city into compliance if they decide they want to do the interceptor sewers, for example, but they also are being asked to bring a plan forward of how they will actually achieve this, and so when it comes in the plan, there will be decision-making as to whether this will actually make them achieve the plan?

MS. PHILLIPS: No, it's a community-based decision on how they want to solve this problem. What

we're asking for is progress, and we're not dictating to them which project to pick. We're saying pick a project, make a decision Community, and come back and periodically show us your progress.

CHAIR LUTZ: But are we limiting them to the ones that are on this PowerPoint?

MS. EGOSCUE: No.

0265

CHAIR LUTZ: So that's where I'm getting confused. If we're not limiting them to a list of that we have, we in a sense are limiting them by saying we don't want disinfection. Am I right?

MS. EGOSCUE: We are not going one way or the other. What I said in the answer was that if you wanted to go disinfection, we would change the boundary lines, because disinfection no longer is a prohibition on discharge, the way that the Staff has currently written it. This is exactly what we normally do with the TMDL, which is a basin plan amendment. We have a companion CEQA document that lists potential alternatives. So what we've tried to do today is give the Board that review, and if it has confused, I apologize, but literally the potential alternatives are just us in an abundance of caution trying to comply with the CEQA requirement, which is that you consider alternatives.

CHAIR LUTZ: So if this Board in the discussion says, "You know, I think that this area over here might be suitable for disinfection," that is something that we could work around?

MS. EGOSCUE: Absolutely. We would just add an exemption to the prohibition for those areas that you would like to have disinfection.

0266

CHAIR LUTZ: I want to be real clear about the exemptions that you talked about earlier and the addresses that you gave us. These are developments or homes that are currently under construction or have already been permitted to start construction?

MS. EGOSCUE: These are the single-family residences that have been through the approval process as told to me by both the county and the city representatives.

CHAIR LUTZ: So in Malibu, say, for example, they have their - through the MOU currently, they will give the approval of the septic or the on-site system that is going in so I'm assuming that we would assume that that is part of the permitting. I think what -- my question is, is -- okay. So we exempt them from the immediate need to hook up to a system or to meet these other requirements, but when, according to the proposal that Staff has brought, the amended proposal, when the 10 years in 2018 hit, they will then have to make a decision to do one -- to do something; am I correct?

MS. EGOSCUE: That is correct. The current projects that happen to be in the pipeline will not be subject -- those that I read into the record will not be subject to the immediate November 5th prohibition,

0267

but they will be subject to the ultimate 10 year, under the alternative proposal I've given to you.

CHAIR LUTZ: Should the Board feel that

disinfection is something that we would like to open the door to, would we need to identify where in the map we would want that, or would that be something that is discussed later?

MS. EGOSCUE: No. If you would like to exempt those areas that -- for example, that the City has proposed for disinfection, we would do that right now. We would actually exempt them from the prohibition.

CHAIR LUTZ: Okay. Let me make sure, but I think that's -- that's all I have.

The final question I have is with regard to the five studies that the City of Malibu brought us and gave us the update of, which I understand our counsel is saying we haven't been able to verify it, so we're not accepting that for the truth of the matter? Do I have that correct? Okay, I do.

The question I want to know about these five studies is and what I think is going to happen is when these studies do give their final report, however, in the process the City is within meeting the objectives of 2014, 2018, for example, those studies will then be

0268

incorporated and reviewed and we'll see how they pan out with the process; am I correct?

MS. EGOSCUE: The way that the prohibition is currently fashioned in my mind is that, first of all, they don't reference the five studies. So the way that the Staff has conceptualized this is that those studies would educate and influence how the community does their solution.

CHAIR LUTZ: So, in other words, if -- I'm trying to think. Time line flies. The community has some major decisions to make, depending upon what we do today, and they need to decide how they are going to do it and whether they are going to go after more grants or whether they may have to do a bond issue or a 218 vote or whatever they are going to have to do, yet somewhere in there these five studies will fall, and I guess I'm just thinking that it would be -- the City would be not as interested in making those decisions until they have some of these studies.

MS. EGOSCUE: I will not speak for the City.

CHAIR LUTZ: Okay. So making a scenario that the City has decided that they are going to do a certain procedure and they know what the plan is and the progress and they know that two of the studies will be finalized in 2013, if they decide to wait

0269

until 2013, where are we as the Water Board, if they decide to wait until those studies are completed?

MS. EGOSCUE: The Chair at this point is offering me a hypothetical that doesn't -- I don't know if 2013 is the date that these studies will be completed. If the Board expresses to the Staff that they have some concern, I have already offered that the City itself has testified and offered you a proposal for their first phase to be done in 2015.

So perhaps the best way to solve that conundrum is to merely give another year on the first phase of the Staff alternative. Instead of 2014 going to 2015. That keeps Staff out of that problem, which quite frankly is that these are preliminary studies

with no final data. We have no idea when they will be done. We have no way of tracking that. As I already said, we would like to just pull off. We would like to make a decision and just -- similar to a TMDL and let the regulated entities figure out how they are going to comply with that TMDL.

CHAIR LUTZ: Okay. And I understand your reasoning that the City had proposed 2015, and so that seems like a viable number to make an alternative.

MS. EGOSCUE: It's feasible, according to their own --

MS. LUTZ: Their own reports. Okay. Ms. Diamond has one final question, and then we will go to a recess.

MS. DIAMOND: I just wanted follow up on something that -- if the Board wanted to go towards the disinfection, it seems to me that that would be a very different time line to consider, rather than a sewer. You have 2019 for all residences in 10 years, which is what happened in the Oxnard Bay, but disinfection is a very -- I can't imagine that it would be a 10-year time line. I guess that's my question. If that's where the Board was going rather than 10 years for sewering, as you're recommending, what would the time line look like?

MS. EGOSCUE: Well, I don't recall what the City said in terms of the time line for the -- and maybe we can have them come back up, but it wouldn't -- and I would like to clarify that -- would the proposal be that the disinfection would be all of the green shaded areas or the green shaded areas which are referenced by the Malibu Colony, which is the City's proposal?

MS. MARIN: I don't think we're there yet. Are we there yet?

MS. EGOSCUE: I'm sorry that I'm going down that road, but I don't know any other way to answer that question. You're asking me if we would hold the same time line for the residences to disinfection. I've already suggested to you that if you want to go the disinfection, you would exempt that area, which means that a time line no longer matters, you would not have any kind of regulatory authority over that --

MS. MARIN: I got it. That answers the question.

CHAIR LUTZ: We're going to take a 10-minute break. I'm going to encourage everybody to please stay in the room so that we can come back at 10 minutes and continue on. We are already about 5:30, and I fear they will come through the doors and kick us all out at any moment. So we'll take 10 minutes starting now. Thank you.

(Recess)

CHAIR LUTZ: Please take your seats so that we can continue. Thank you for sticking around so we can do this quickly. I appreciate it. These are going to be questions -- virtually, I did a little poll, and everybody wants to ask questions of the City and possibly Dr. Gold, I believe. So I will start with Mr. Richardson, and -- you're the only one who specifically -- there's only a couple who have

0272
questions for Dr. Gold, so why don't you start with him, and then we'll go -- and I know he's here because he raised his hand when they asked if he was still here.

MR. RICHARDSON: In complying with the spirit of the time element, was I incorrect in any of my statements that I said that you indicated that you were -- you were in favor of the majority of the City of Malibu's alternate plan?

DR. GOLD: I think I spent a lot of time clarifying that. So the geographic delineation of it, the answer to that question is largely yes. There was a significant disagreement in the Winter Canyon developed area that I would be glad to explain.

MR. RICHARDSON: I don't need the Winter Canyon explained. What I need explained is you were also, I believe, in favor of one of the solutions is disinfection.

DR. GOLD: Right, so let's word that again. You spent a lot of time in the last -- excuse me, pardon the cough. You spent a lot of time in the last hour or so talking about you didn't want to determine how Malibu complies, right? And so the areas that we were suggesting were to give the option -- so this is the key thing -- to give the option of doing advanced

0273
treatment with disinfection in areas that don't drain to the Malibu Creek watershed, and so they could either sewer or they could go to advanced treatment and disinfection --

MR. RICHARDSON: Okay. My --

DR. GOLD: -- to allow that alternative to still be in play.

MR. RICHARDSON: My short question to you, then, is with the City's map, the three locations of disinfection, are those appropriately indicated as not draining too?

DR. GOLD: So there's so many different maps going. Is it this one in particular you're looking at?

MR. RICHARDSON: I'm looking at the one where they've delineated disinfection at three different locations.

DR. GOLD: Okay. So City of Malibu alternate plan. So the only fundamental disagreement with this map, which is what the City of Malibu has, there's two different things: One is they did it as sort of -- in a nonenforceable way. So it needs to be a prohibition, which is No. 1, for our organization.

The second thing is, this area here is the developed part of Winter Canyon, and that we're

0274
suggesting that that should be similar to what they -- they wrote disinfection. We would say disinfection or sewer, but adding that developed part of Winter Canyon as disinfection or sewer. It doesn't need to go to full -- because it doesn't drain into the impaired waters that are nutrient impaired, but it does need to go to disinfection because there's, as you know, been many, many compliance problems --

MR. RICHARDSON: That still isn't -- my question. We've already taken care of Winter Canyon.

We want to consider -- we're considering the alternative as presented by Staff, okay? My question is specifically the areas of disinfection that are marked by the City's plan along the coast, not Winter Canyon.

DR. GOLD: So just along the coast what they have done is extended eastward, and we're very supportive of that.

MR. RICHARDSON: Okay. That's what I needed to know.

DR. GOLD: And it's a shorter part of Malibu Colony and Amarillo Beach. I'm not sure about the precise line, but it probably -- we've taken the position that we have not seen adequate data to say why it go goes all the way to Marie Canyon.

MR. RICHARDSON: Okay.

CHAIR LUTZ: While we have Dr. Gold up, any other quick questions for him?

MS. GLICKFELD: So in her testimony, Ms. Egoscue said that if we wanted to take the disinfection option on Malibu Road and Malibu Colony, since that would be involved retaining the on-site septic system that she would recommend us take them out of the prohibition area which then would take our ability to enforce the disinfection requirement away, as far as I'm concerned. Do you have that view or what other view do you have? Are you in favor of taking the Malibu Colony beach front out of the septic prohibition area?

DR. GOLD: No. I actually at break had that conversation with your senior Staff engineer, Elizabeth Erickson, because I wanted to make sure I understood it. I didn't understand whether there was some sort of legal constraint in having a tier prohibition, where one you might have a prohibition of septic systems altogether, and another one you would have a prohibition of septic systems that don't have advanced treatment and disinfection.

So I think the suggestion that Heal the Bay was making was that all of the facilities in question, all the properties in question would still be under a prohibition. It's just the language of how the prohibition would apply would be different for those areas that just have a disinfection requirement as opposed to hooking into the sewer mandatory. Right? So I just don't know whether that's something legally you guys have the ability to do, but that was my interpretation based on what Heal the Bay was recommending --

MS. GLICKFELD: Summarize. If our legal counsel and our Staff are telling us that the only way to do this is to take the Colony out, would you still be supporting this alternative?

DR. GOLD: That's a big "if." I would need someone to demonstrate why that indeed is the case. I'm sorry.

MS. MEHRANIAN: My question to you is it's kind of like Part 2 of the same question. When we talk about alternatives that the City is going to take, why can't -- I want to know your opinion of could this -- just simply be one of them and not be

treated separately so we have to change the boundaries and all that?

DR. GOLD: Well, the reason -- if you look at the City of Malibu's alternate plan map that I think you guys all received, they are saying that this whole area, Serra and the Civic Center, should be sewered, right? We're in total concurrence on that. We think that that's -- that's a great area, and we don't think that, you know, new alternative treatment should be allowed in those areas, that basically it should be sewerage, sewered as soon as possible.

It's these other areas that are green here in this map that impact the beach or impact -- that's not in here that impact Winter Canyon, that we believe because -- the big thing for them is bacteria issues and impacts on the beach, that some sort of disinfection needs to be required.

Now, allowing the City the alternative of how they are going to get there, is really all we're trying to say, is that narrow those alternatives for the Malibu Creek watershed, because the water quality problems are so severe and so intractable, but for those other areas allow more -- so if people want to spend, you know, $30,000, $50,000 to do individual on-site treatment systems in those other areas that are going to be tertiary disinfection or secondary disinfection and they are able to demonstrate to you that they are going to be able to manage that properly, then that should be another possibility.

Or if they want to commingle sewage from various different septic tanks into one and then pump it into one disinfection system and then only have one leach field rather than a whole bunch of different leach fields and have that further away from shore, that's -- you know, to give that sort of flexibility to self-determine, that's really the whole point here.

CHAIR LUTZ: Thank you. The questions for the City of Malibu are next, and we'll start with Ms. Marin.

MS. MARIN: I don't have any questions.

MS. MEHRANIAN: I have one. I just would like you to summarize, to the extent you can, the land use goals of your, you know, plans of development goals in the next five years, ten years, if there's anything that the City has, which I --

MR. THORSEN: Well, the City of Malibu has the most restrictive development standards you'll find in any city. We have what they call a floor aerial ratio of 0.15. Most cities if you go into their Civic Center areas they have for commercial systems typically in the 0.5, 0.6, which is four times the amount of development that they are allowed to build in our city.

So we have a few vacant partials that are left commercial. It's up to the proposed developer and the owner of those properties if they are going to have development on those. There's a couple of proposals that have been in. The City approved one. In 18 years that the City has been incorporated, there has been no new commercial development in our Civic

Center. There's been remodels, but no brand new facility in the 18 years that we've been incorporated.

MS. MEHRANIAN: Did you want to comment on your residential? Anything?

MR. THORSEN: Well, the residential, again, we have very few homes that are left to be built out there. There's hardly any -- I won't say hardly any. There's definitely some homes that could be built out there. There's a lot of vacant space. If you've seen the aerial photos, probably 60, 65, 70 percent of that property out there is vacant or undeveloped in open space. So very few pieces are really available. There's a couple of pieces in the pipeline that have some proposed development, a four lot here and a five lot there, and then generally a single-family after that.

CHAIR LUTZ: Ms. Glickfeld.

MS. GLICKFELD: Yes. Thank you. In your presentation you said that your preferred site for --

0280

community system would be the La Paz site; is that correct?

MR. THORSEN: The preferred --

MS. GLICKFELD: The preferred site that you're considering is the La Paz site --

MR. THORSEN: That's absolutely correct, yes.

MS. GLICKFELD: So one of the confusing points for me is that the representatives from the La Paz site are actually focused very much on their own alternative treatment system, and in fact, have applied to this Board for their own alternative treatment system. So is this the site that you're doing your EIR on and do you have any kind of an arrangement with them or are they simply going to do their own, and then, Gee, we don't have a site?

MR. THORSEN: Well, we're in a catch-22 with any potential developer, where they want to develop, and obviously a centralized system would be coming down perhaps later than what they would like to develop. In this particular case, La Paz was conditioned to give us 2.3 acres on their site, and they've agreed to that condition, and they are willing to give us that land for a centralized wastewater facility.

MS. GLICKFELD: If they get an increase in

0281

density --

MR. THORSEN: If they --

MS. GLICKFELD: -- they have the option to opt out, right?

MR. THORSEN: They were approved for a 0.15 FAR, and if they do a governmental or a benefit to the public, they are allowed to go to an entire 0.20 development. But, yes, we're also proposing a no-net discharge.

MS. GLICKFELD: So basically it's either or: They can do their own thing for less density or they can do the more density and then they give you the site, and you actually have a site and you can start working on something. My concern is when are we going to talk about a real site that you actually have an interest in? That would be my concern.

MR. THORSEN: Well, we've been talking about

real sites. The case is that you have to buy those real sites, or the only other way you can acquire those sites is through some generous donation, which is unlikely in the commercial sector, or you try to -- as they propose a development that you're able to negotiate a deal where you can obtain that site.

MS. GLICKFELD: One thing you could have done, of course, and I'm not going to argue with this, you could have actually said to them, "You can only build, and you can build more, but you can only build if you are in the location for the site that we've committed to the Regional Water Board to build." That would have been an option for you to do. That's certainly would have been an option for us to not -- actually, not have to do a prohibition because -- that's it. That's all.

CHAIR LUTZ: Mr. Blois.

MR. BLOIS: Hi, Mr. Thorsen, I thought that the Staff's presentation was okay when it came to the technical parts. I thought that your presentation was very good, and I appreciate that. You mentioned that you're doing five studies and you mentioned you're spending a lot of money. Do you have a breakdown of rough numbers of the percentage of monies that are being -- have been spent or will be spent on those things concerning storm drains, stormwater versus wastewater?

MR. THORSEN: Well, first all to clarify, the City is not doing the five studies. Two of the studies were being done by SCCWRP independent of the City. So those two studies were not done by the City.

Secondly, there is a study being done by UCLA that was, again, not funded by the City. It was an independent study taken on by the UCLA group. Thirdly, the USC study was joint-funded. It was partially funded by the City and USC -- excuse me, U.S.G.S., and then the lastly, which is the Stone Environment, is a groundwater mounding and modeling study which was requested by the Regional Board in an effort to try to get a comprehensive look.

We spent approximately $350,000 on that study. It's not complete yet. Probably will be completed within the next six months or so. In addition to that, the Staff here highly counted the Stone report, which is very nice, because the author of that report is here today, and actually the testimony, I guess, was stricken from the record, I'm not sure, but the report that was relied on upon by the Staff and the author that's here today unfortunately he was told -- or we were told that his information is not viable because they couldn't verify that.

It's unfortunate because a lot of that information is still in the mix, and we're still working on that, and a lot of that is through cooperation with your Board Staff.

MR. BLOIS: Time line that you proposed in your presentation, does that take into consideration all of the data that you will need from these reports to make your conceptual plans into reality?

MR. THORSEN: We feel very comfortable with the proposal I made for the 2015. We are doing the studies. The mounding study helps, the U.S.G.S. study helps, the U.C.L.A. study -- all these things help us get to the conclusions that need to be reached in an EIR document. What I'm really concerned about is the proposal that's presented by the Board Staff goes way outside the boundaries that we've anticipated.

My first reaction is that there's no way we will even be done with that report and be able to construct by 2015. Our proposal to get this was a very concentrated effort within the Malibu Creek regime, and it's very targeted to those properties that are draining towards the Malibu Creek regime, which is a bacteria and nutrient impaired, and that's why we focus on that, plus that's where all the studies have been.

If go outside of that regime, then we're going to end up having to do additional EIR focus work, and I'm very uncomfortable with that time frame. The final part of that is, is that the more area we continue to take in outside of the focused areas, that means we have to find dispersal areas.

0285

What we were proposing was to take Malibu Creek regime out of the picture and put it into Winter Canyon and have a dispersal area in Winter Canyon. Winter Canyon does have limits, as does Malibu Creek. If we take all of the flow that comes from Malibu Creek, put it into Winter Canyon, and we include all the other areas within the prohibition boundary, I'm pretty certain we're going to have to reach outside of that.

So that means we're either hauling it off or we're sending it via pipeline to Hyperion, we're doing deep well injections or even ocean outfalls, which I think all of those are very, very skeptical.

MR. BLOIS: One thing that concerns me is the time and effort and money, quite frankly, that has been spent and will be spent or could be spent making some pretty fancy treatment plants. We've heard a lot of testimony today about all the good things that are happening with some of these systems. It makes no sense to me to take all of those things in five years or whatever time frame we establish and throw them all away.

Is there a way that you see in your conceptual planning to date to incorporate some or all

0286

or most of those plans into some global strategy to solve wastewater problems?

MR. THORSEN: Well, I think there's two issues here: One is right now we have heard about all of the poor grades at Surfrider. Surfrider the drainage tributary is Malibu Creek. We, as a City, are taking care of all the surface runoff, first and foremost. So that's going to have a huge impact on that beach.

Second our proposal addresses exactly what the Board is looking to do, which is improve the water quality in Malibu Creek, which will then improve the water quality at Surfrider. Our proposal is targeted

specifically to make sure of those improvements. We're looking to hook up those systems to those properties to a commercial wastewater treatment plant, there will be a reclamation. We're trying to recycle as much as we can, and we're targeted on those areas.

Once we start getting outside of those boundaries, then you're talking the Winter Canyon regime, and then we're talking all of that drains towards the ocean, and the ocean is impaired for bacteria. It's not impaired for nutrients. So then we're talking a whole different issue of what we're trying to resolve.

So our proposal with the disinfection was try to reach a compromise. We've read Heal the Bay's letter. We based our phasing and our plans based on what we read in that Heal the Bay. We've had discussions. We think it it's a fairly aggressive plan, and we think it's very sound science-based plan, and that's why we were pushing for that, and that's why we would like that to be adopted.

MR. BLOIS: Well, I'm trying to figure out if there's a way to put some teeth in the time line, and I'm cutting to the chase because of time. But one thing strikes me the similarity of the City of Malibu's plan with Dr. Gold's Heal the Bay's plan is strikingly similar. You both agree, most agree to that. That says you ought to go that way. But there's a lot of hesitation amongst my colleagues and a lot of others today about the City's past performance in the meeting deadlines, time lines and agreements. So where I'm headed is if you can suggest a time line that you absolutely can commit to, maybe that's the way that we ought to go here.

MR. THORSEN: Well, I'm telling you today we're committing to the time line that was put into that proposal. I think the time line is feasible. I think we're on the right track. We've already authorized the funding. As far as a track record, I'm glad you brought that up. I think we have a very good track record. You have to look at the last three years we've accomplished quite a bit. There's a lot of construction, yes, and I would like to thank the State because they did back us on many of those State funding projects.

Wastewater isn't that type of project. Wastewater, there's very little funding for grants. It was mentioned that disadvantaged communities are eligible for some grants, but generally Malibu is not a disadvantaged community, and we don't qualify for those type of grants.

Typically a wastewater is a utility you have to form an assessment. All the state revolving fund loans are based on a set repayment. We would have gone further in the application progress, but we're stalled because until you have an assessment district approved you can't -- they need to see that assessment district approved and that there's a committed funding stream to meet that requirement. So that's where we are.

MR. BLOIS: Two more questions, and then I'll let Fran talk. The first one is are you okay with

Dr. Gold's modification of your plan to do disinfection in Lower Winter Canyon but not nitrification?

MR. THORSEN: Well, it's kind of a loaded question. It certainly -- maybe we would accept that as a condition, that we would do the disinfection in the Lower Winter Canyon, if that was really the desire of the Board. I believe one of the things we would like to do is come back and say if we do an abundance of testing to determine whether bacteria during the time that this prohibition goes forward -- not the prohibition, the disinfection issue goes forward, that if we come back and we say, "We've done testing, an extreme amount of testing and there's no exceedances of bacteria within that Winter Canyon area" -- which a lot of the data we're getting back right now says there's not, then I would like to be able to review whether that would be a mandatory at that point in time.

MR. BLOIS: One last question. I apologize. I'm trying to keep things simple. My last issue is enabling ordinances. Does your time line -- is it going to slip or can you commit to making whatever enabling ordinances need to happen, happen, forming assessment districts, whatever legal issues the City has to come up with?

MR. THORSEN: Let me state this: The city is totally committed to that time line. We feel we can meet that time line. As with all voter issues, when you go to a voter issue on an assessment district, whether we have a prohibition or we don't have a prohibition, the property owners have to vote for that assessment district, and that's really one of the key pin in this whole process, is will the voters vote for an assessment district, especially when we know the magnitude in general numbers and what that may mean.

We feel the commercial area probably will. I think everybody is looking for that, and I think they will too. The residential area, I think we can work on trying to reduce costs so that we can get them into a residential and tie them in in an economic fashion. That is something that has to be designed. It's going to take quite a bit of effort. And, again, that's why we put that off until 2018, and when I say, "we put it off," it's not that we put it off, but it's going to be a much bigger nut to solve on that residential issue.

MR. BLOIS: I've got dozens of other questions, but I'm going to shut up and let Fran talk.

MS. DIAMOND: I guess what I'm going to ask you is just one question, and then I'm going to signal sort of where I am, because I'm not exactly aware of where Board member Blois is.

When your studies are complete, as often is the case with our permits and with our basin plan amendments, we are always open to re-opening, listening to new information, and I'm assuming, and I'm seeing a nod from our counsel, that that is something that you can bring forward to us. Once you have studies that are complete and you have new

information to bring us, I would welcome it. I think we would all welcome that, the studies, and I appreciate your report to us today as well.

What I would like to say is also that I was very impressed with our Staff report, and I neglected to say earlier that this was quite an amazing Staff report, both the written materials and the oral presentation, and I guess it's the --

CHAIR LUTZ: Can you hear Ms. Diamond?

MS. DIAMOND: I would like to say that I think that our Staff report was excellent and the studies were excellent, and I also want to state that while all of us respect Heal the Bay and Dr. Gold, though some people may not believe it, he is not and Heal the Bay is not a member of the Regional Water Board. So -- (audience laughing) -- we listen to the

0292

reports very seriously, but we also listen to all the other people who are before us.

I know that the Santa Monica Bay Restoration Commission supported the Staff report as did BayKeeper and other NGOs and people here as well and the surfers and the beach-goers. So my inclination is to support the Staff prohibition, what was brought to us today, but I would add a year to the commercial property, and I agree with the idea of 2019 for the residences. So that's what I'm going to be supporting today. I'm saying this now because there is a time issue, and I think it's time for us, as Board Member Blois did, is to set the stage for where we are and what we're thinking. So that's --

MS. MEHRANIAN: Can you tell us --

CHAIR LUTZ: Hold on one moment. Before we go --

MS. DIAMOND: I wasn't actually making a motion, because I'm sure Mr. Richardson wants to speak, but that's what I would be supporting.

CHAIR LUTZ: Let us first ask have Mr. Richardson ask his question, and then we'll go to Board deliberations. I want to make sure he has time to ask his question.

MR. RICHARDSON: I'm not really sure I have

0293

much more to say. I'm a little confused now. I do like the alternative that our Executive Officer proposed. I'm not sure how you incorporate disinfection and the zero discharge systems into that, and if I could ask maybe -- that's where I would be heading. I don't know how you incorporate that so --

CHAIR LUTZ: Mr. Richardson, could I just ask you, do you still have questions for the City?

MR. RICHARDSON: No, I think Mr. Blois pretty much asked all the questions.

CHAIR LUTZ: Thank you. Now, I will let you continue.

MR. RICHARDSON: Okay. I'm just wondering. I don't know how the rest of you feel. I liked the proposal that our Executive Officer gave us, but I'm a little hesitant to make a motion in that respect, because I'm not comfortable with us dictating that there will be no disinfection or no zero discharge --

MS. MEHRANIAN: Because we're not. We're just prohibiting the area and the City will decide how

they want to do it --
MR. RICHARDSON: If that is the case then --
MS. DIAMOND: I was just going to move it along by saying that I move that we accept the Staff report adding the years 2015 for the commercial property and 2019 for all residences in the ten years, and I know that there was something --
CHAIR LUTZ: It's --
MS. MEHRANIAN: Amended --
MS. DIAMOND: Yes, amended boundaries, the amended Staff report that we got from our Executive Officer after everybody else was heard.
CHAIR LUTZ: Did you all hear that? Our mics are turned off. Speak very loud.
MS. DIAMOND: I move that we accept the amended Staff recommendation that we heard today from our executive officer at the end of the day, at the end of all of the reports.
MS. MEHRANIAN: With the amendment of the --
MS. DIAMOND: With the amendment that we change the year of compliance to 2015 for commercial properties and have 2019 for all residential in ten years.
MS. MEHRANIAN: I'll second.
CHAIR LUTZ: Is there any further discussion?
MR. BLOIS: Are you including the exemptions that Ms. Egoscue read into the record?
MS. MEHRANIAN: Yes.
MR. BLOIS: The exemptions being the properties and the parcel numbers?
MS. DIAMOND: Yes. Everything that she read into the record, all of the exemptions, and with the addition of the change of the year from 2014 to 2015.
MR. RICHARDSON: And that is with the understanding that the City has the rights to determine whether or not zero discharge or disinfection are the proposed plans of operation in certain areas?
MS. MARIN: No, the motion is for the septic prohibition. That means no septic systems. That's all we're agreeing to.
MS. MEHRANIAN: One thing, in the discussion for Pepperdine to come back and show that there is no discharge in the exempt, would that be --
MS. DIAMOND: They are already out. Pepperdine is already out.
MS. MEHRANIAN: Yes, I second the motion.
CHAIR LUTZ: Yes, Ms. Glickfeld.
MS. GLICKFELD: I assume that what you've said and what I heard before is that we gave some suggestions -- we gave suggestions for ways of compliance, but we're not limiting their way of compliance. So I specifically encourage the City to try and find a way to use the existing advanced treatment systems as a way of pretreating and then moving water into a community system and not having to abandon those -- find that as a way of saving money. That would be a suggestion that I would like to make clear that the City could consider, that those systems are not -- is that something you could incorporate in

part of your --
MS. DIAMOND: I think we should vote on the motion and we have that as a suggestion --
MS. GLICKFELD: It is not allowed --
CHAIR LUTZ: I can hear now. The mics are on.
MR. BLOIS: I'm going to make a couple of comments. I cannot support the categorical prohibition without exemptions. I think one of the exemptions that has to be in place is a zero discharge exception. I am really, really troubled that Staff removed that option after the deadline for comments, and that we only allowed one minute worth of comments from the public today. I think that's patently unfair, in addition to the fact that I think it ought to be in there anyway. I don't understand why it was exempted. I think that that has to be an exemption. We have to allow zero discharge systems. We want to encourage people to re-use water, and that's one of the major ways to do it.

0297

The problem that I have with that, though, is that we're sending a mixed signal to the community. We're encouraging them to spend a lot of money that's going to be thrown away five years down the road. There's got to be a better way to do it. The other thing that I think we're doing is we're approaching the subject with a meat clever, and I don't like that.
I think that we need to figure out some other way to provide some flexibility. What I was going to propose, and at this point it's just a matter of discussion, because there's a motion on the floor, but my thought was to accept the City's plan as modified with our discussion here, but accept it in concept. Get them nailed down to their time line, which is what I was trying to do with Mr. Thorsen, and then go ahead with the prohibition, but hold it in advance until such time and when and if they don't meet their time lines. I don't know if that's something we can do or not. That's the direction I would like to --
MS. MEHRANIAN: But this has been done in the past. We started this, and we said, you know -- and then the minute -- and because of prohibition was not on the table, nothing happened -- or significant things didn't happen. I'm sure there was a lot happened, and we heard it this morning. There was

0298

stormwater facility, this, that, but nothing significant. I like what you're saying because, yes -- I live in a community that's on septic tanks, and I understand all this, but I'm just thinking that the history of this doesn't help me to not take the categorical action, otherwise I like what you're saying. Exemption, don't be very targeted -- I mean, I follow your thought process, and I like the concept. I'm just not sure if it is working in this context right now.
MR. BLOIS: I didn't invent this. I'm just a poor, dumb contractor retired or whatever, but our colleagues on the central coast in a little community called Los Osos, actually, did the same or similar thing, and here's what happened: They came up with a prohibition, the locals up there formed a community

services district and then started construction on a treatment plant in a distribution system and some activists in the community decided they didn't like that direction, so they recalled a majority of the Board and they stopped all construction.

So the Regional Board up there says, "Uh-huh, you guys are not in compliance with your agreed on time line anymore, so we're going to institute or reinstitute millions of dollars worth of fines." The result of that was, and it's ironic to think about what it might do in this situation, is that the community services district went bankrupt, and the whole thing was taken over by the county, who to this day is now building their system.

So if that's the end run, and that's the - it would be more than a hammer, it would be more than a sledge hammer, it would be a bulldozer.

MS. MEHRANIAN: What kind of regulatory measures are you suggesting in this? Or is it just trust, we'll trust you, go do it?

MR. BLOIS: No, I'm not saying that we depend upon trust. I am thinking that we have a pretty good size sledge hammer hanging over all of our heads, which is that if they don't meet their time lines, if they don't make progress towards solving the wastewater problems in the Malibu area, in the specific area that we're talking about, but I'm sure that the City could be encouraged to expand that, then we come in and say, "You've got" --

MS. MEHRANIAN: You're suggesting --

MR. BLOIS: What would happen then is that the prohibition would in fact go into effect.

MS. MEHRANIAN: No, but even before the five or six years, do you have deadlines of monitoring?

MR. BLOIS: Yes, the City put in their presentation --

MS. MEHRANIAN: Which you agree with? Those are the deadlines you're suggesting?

MR. BLOIS: Well, the point is, is that -- I don't agree -- I agree, but it's their suggestion. So they've got skin in the game.

MS. MEHRANIAN: I'm just trying to understand --

UNKNOWN SPEAKER: Madam Chair?

CHAIR LUTZ: Yes.

UNKNOWN SPEAKER: Vote.

CHAIR LUTZ: We have a call for the vote. Can you please repeat what the motion is and -- before we vote?

MS. DIAMOND: Okay. I'm going to move, and this is after many years, I have to say, of being on the Board and trying to -- (coughing) -- to work with Malibu and coming away from a conference that was not on the time line, and yet another thing that happened in this long calendar of promises and promises not kept -- and that was in 2003, I believe, when we had a water quality conference. I was chair at the time in Malibu where everybody came together, and I remembered thinking, "Boy, this is like so historical. We have the County and the City and the Regional Board, and we

had Terry Taminin as a speaker," and I really felt that the glass was half full and that progress was being made.

Well, I don't feel that way anymore, and as much as I enjoyed my meetings and worked with Sharon and Barbara Cameron and others, I feel very disappointed and feel that the glass is half empty, and without having a -- using our regulatory system, which we haven't really tried in the past, in terms of this. This is a hammer I think that we need, and I think I want to look forward to having Malibu come before us just like Fillmore came before us last month, and just like Desi Alvarez came before us today to talk about the progress that was made. So I'll repeat my motion, which is --

CHAIR LUTZ: Ms. Diamond, I just wanted to say, after you repeat your motion, I failed to -- when Ms. Glickfeld's microphone did not work, she was in the processes of asking for an amendment. So repeat your motion, please, then we want Ms. Glickfeld to continue with her amendment and we'll move forward from there, as long as Ms. Mehranian --

MS. GLICKFELD: Okay. My motion is to accept the amended Staff report as was given today by

0302

Executive Officer Tracy Egoscue, including all of the exemptions that she read, and changing the year to 2015 for commercial property and allowing the 2019 for all residences in 10 years. That's the motion that I made.

MS. MEHRANIAN: And then did --

UNKNOWN SPEAKER: And you seconded --

CHAIR LUTZ: It was --

MS. GLICKFELD: I actually got two. The first one is to indicate that one method of compliance could include using the existing advanced system as pretreatment for that -- you wanted collected and treated and re-used through a community system. That would be my first amendment.

CHAIR LUTZ: Are you asking the chair to accept your friendly amendment or -- I'm sorry, the motion maker --

MS. GLICKFELD: I would love to have the -- be a motion maker. I simply want to make that option available to them. The Staff has told us it isn't in their current recommendation that I would have to make amendments --

CHAIR LUTZ: So Ms. Diamond, do you accept that friendly amendment?

MS. DIAMOND: As long as I see no problems.

0303

Staff, is there a --

MS. GLICKFELD: I would be happy to hear it from Staff.

MR. LEVY: It's problematic because the prohibition says what they can't do. Everything else other than the prohibition they can do, and so what you're trying to do is specify one of perhaps many different things --

MS. GLICKFELD: So you're saying they can do it, unless we say they can't --

MR. LEVY: Exactly.

MS. GLICKFELD: What Ms. Egoscue said is that

we couldn't do it. So would you --
MR. LEVY: I'll let Ms. Egoscue speak for herself.
MS. EGOSCUE: If you would like to amend the motion, essentially what that would mean is those systems would be exempted from the prohibition.
MS. GLICKFELD: I don't want to do that.
MS. EGOSCUE: That's what we would do. The counsel just said that's not what you said. So --
MS. GLICKFELD: What I said was that they would become a pretreatment before the treated wastewater entered a further treatment system or recycling, that they wouldn't have to abandon them.

0304

MR. LEVY: If there's A way to make beneficial use of those systems in complying with the prohibition, nothing stops them from --
MS. GLICKFELD: That's all I needed, then. I don't need -- it was just simply a misunderstanding.
The other issue is that I buy -- one of the things that I'm concerned about is the idea that within the prohibition area that there couldn't be any discharged groundwater, and I would like to see the maker of the motion consider an amendment which would allow the City to come back, they found an appropriate place to do discharge within the prohibition area as part of their solution to this problem, that we would consider that.
MS. EGOSCUE: I can offer that we would craft an exemption for a city-operated discharge or of the like. We have language we can suggest. It would be exempt from the prohibition.
MS. GLICKFELD: Okay. So there's no amendments required on either of those cases, then?
CHAIR LUTZ: Is that correct, or do you need --
MS. EGOSCUE: We would need an amendment for the discharge by the City system. So we would exempt a discharge by a city system which would -- and we

0305

should define that: Does that include Malibu Lumber or is that a city --
MS. GLICKFELD: Part of the City's system that city submits to us to comply with this to replace.
MS. EGOSCUE: So an exempt -- that the prohibition would exempt a publicly-owned city discharge? Publicly-owned, how about that?
MS. GLICKFELD: Now, am I offering that as an amendment --
MS. EGOSCUE: That's an amendment --
UNKNOWN SPEAKER: I accept.
CHAIR LUTZ: Will a second accept that as well?
MS. MARIN: Yes.
CHAIR LUTZ: Were there any other amendments that --
MS. EGOSCUE: Before the vote, Madam Chair, we need to read into the record the resolution changes that reflect your motion. Can we do that at this time?
CHAIR LUTZ: Yes, I don't see anything else.
MR. OGATA: This is what we propose as

changes to the resolution. First of all, on page 5 of the resolution under the first paragraph, "Therefore be resolved," we will add to the first bullet, it will read, "Prohibit all new discharges except certain specific projects, which I've already progressed through the time and process and are identified on Figure 4YY of the basin plan amendment, and prepare that figure."

The second bullet will read, "Prohibit discharges from existing systems within six years in commercial areas, and within ten years residential areas from the date of adoption by the Regional Board of this basin plan amendment as specified in Figure 4XX of the basin plan amendment," Figure 4XX being the new figure that Ms. Egoscue passed out. This will replace the figure that was in Staff's original resolution.

Also, then we will also change the language of the basin plan. So basin plan amendment under the Malibu Civic Center prohibition, which is page 11 of a resolution again, under the first bullet under Malibu Civic Center area prohibition, first bullet will read, "All new on-site wastewater disposal system discharges are prohibited with the exception of the projects identified in Figure 4-YY, which shall be deemed existing OWDSs."

The second bullet will read, "All wastewater discharges in commercial areas from existing on-site wastewater disposal systems are prohibited on November 5, 2015 as specified in Figure 4-XX."

We'll add a third bullet that will read, "All wastewater discharges in residential areas from existing on-site wastewater disposal systems are prohibited on November 5, 2019 as specified in Figure 4-XX." We're working on an addition with respect to the last amendment.

MR. RICHARDSON: I'm still not clear. How about an exemption on the zero discharge facilities? Is that not --

MR. OGATA: That was not part of the motion.

MR. RICHARDSON: Okay. I'm asking, though. I'm asking how that's being handled, because I'm not clear on this.

MR. OGATA: So we're adding a fourth bullet on page 11 of the prohibition. "This prohibition does not preclude a publicly-owned, community base, solution that includes specific wastewater disposal sites subject to waste discharge requirements to be described by the Regional Board," and then that will also become the third bullet on page 5 of the resolution under paragraph 1.

CHAIR LUTZ: Mr. Richardson, did you have a --

MR. BLOIS: I do. Just so I'm clear, are we allowing somebody within this prohibition area to construct a zero discharge system?

CHAIR LUTZ: That recycles? Is that the key thing that you're talking about, is the ability for them to recycle or to treat and recycle available to --

MR. BLOIS: Right.
CHAIR LUTZ: I think that's the question.
MS. GLICKFELD: What we are not precluding is for the City to organize a system, a zero discharge system. We're not --
MR. RICHARDSON: Is that an exemption?
MS. GLICKFELD: It's not an exemption. We're not precluding it.
CHAIR LUTZ: So the City's public option could be a recycling program; is that correct?
MS. EGOSCUE: The City's option is exempted currently within the prohibition.
CHAIR LUTZ: But that exemption includes their ability to utilize and recycle?
MS. EGOSCUE: That exemption is whatever they want --
MS. GLICKFELD: Whatever they want --

MS. EGOSCUE: -- publicly owned, and obviously as per the language just read, it's going to be subject to a joint discharge requirement by the Board.
CHAIR LUTZ: Is everybody clear on the motion and where we are? Okay. We have a motion before us with amendments, and we're not done. Yes, Jeff.
MR. OGATA: On the resolution on page 7, we have -- paragraph 10 we have compliance schedule here, and we're just going to change the dates to make it consistent with the dates that you just changed.
CHAIR LUTZ: Okay. Then one more comment, and we will have the vote.
MR. BLOIS: Madam Chair, if I may, I would like -- I'm with you all the way up to where we're at, complicated as it is, but I'm going to offer an amendment, that we do all of the above, but that we allow the City -- or that we hold it in bans until such time if the City does not meet their agreed upon deadlines. I offer that up, and we'll see if there's a second.
CHAIR LUTZ: Are you offering it as an amendment or --
MR. BLOIS: As an amendment.
CHAIR LUTZ: -- amendment for --

MR. BLOIS: Friendly amendment, if she agrees; otherwise, it's not.
MS. DIAMOND: I won't agree. Sorry.
CHAIR LUTZ: So this is an amendment. Do we have a second on the amendment?
MS. MARIN: No, she didn't agree.
CHAIR LUTZ: She can make it a stand-alone amendment.
MS. MARIN: No, we have to take a vote on this one --
MR. BLOIS: Mr. Blois, if we vote on the motion, then that's a done deal, then I have no opportunity to make an amendment to it.
CHAIR LUTZ: You could make a substitute motion, but she didn't call for the vote.
MR. RICHARDSON: That doesn't mean we have to vote. If the rest of us are not ready to vote, we don't have to vote. And the correct procedure is that an amendment to the motion can be made prior to the

motion being voted on. Once the motion is voted on, it's a done deal. You can't amend it after the fact. So Mr. Blois is correct.

MS. GLICKFELD: So we need a second.

CHAIR LUTZ: So we need to see if there's a second for his amendment. Is there a second? I'm not hearing a second. Therefore we will vote, and I would like a roll call vote, please.

MS. HARRIS: Mr. Blois?

MR. BLOIS: No.

MS. HARRIS: Ms. Diamond?

MS. DIAMOND: Yes.

MS. HARRIS: Ms. Glickfeld?

MS. GLICKFELD: Yes.

MS. HARRIS: Ms. Lutz?

CHAIR LUTZ: Yes.

MS. HARRIS: Ms. Marin?

MS. MARIN: Yes.

MS. HARRIS: Ms. Mehranian?

MS. MEHRANIAN: Yes.

MS. HARRIS: Mr. Richardson?

MR. RICHARDSON: No.

MS. HARRIS: We have two nays and five yeas.

CHAIR LUTZ: Okay. The motion does carry. I think we're ready to adjourn, if I'm not mistaken.

I would like to before we adjourn just wish the very best to our Board member, Mr. Richardson, and thank him for all of the work he's done, and he will be missed. So we will adjourn in Mr. Richardson's name.

(Hearing concluded at 6:45 p.m.)