



ITEM. X. C.
08/01/07

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

5 HARRIS COURT, BLDG. G
POST OFFICE BOX 85
MONTEREY, CA 93942-0085 • (831) 658-5600
FAX (831) 644-9560 • <http://www.mpwmd.dst.ca.us>

SEASIDE BASIN WATERMASTER MEMORANDUM 2007-03

Date: July 5, 2007
To: Seaside Basin Watermaster
From: Joe Oliver, PG, CHg, Senior Hydrogeologist
Tom Lindberg, Associate Hydrologist
Subject: Results of Quarterly Ground Water Quality Samples Collected in Spring 2007 from MPWMD Seaside Ground Water Basin Coastal Monitor Wells

Summary

This memorandum transmits and summarizes quarterly ground water quality data collected in Spring 2007 by the Monterey Peninsula Water Management District (MPWMD or District) from its network of Seaside Ground Water Basin coastal monitor wells. This information is being provided to the Seaside Basin Watermaster Board for information purposes, and is in compliance with the monitoring protocols described in the Watermaster's *Seaside Basin Monitoring and Management Program* (revised September 5, 2006), which was prepared in response to the March 27, 2006 court decision in the Seaside Basin adjudication case. The chemical data from the Spring 2007 sampling of the District's existing coastal "sentinel" monitor wells do not indicate evidence of seawater intrusion at these locations and depths monitored in the Seaside Basin.

MPWMD Seaside Basin Coastal Monitor Well Network

The District initiated a ground water quality monitoring program in the coastal area of the Seaside Basin in 1990, and the network has been expanded since that time. The water chemistry data collected from the monitor wells are utilized for the purposes of: (1) characterizing the chemical nature of the ground water, (2) establishing long-term ground water quality trends, and (3) monitoring of seawater intrusion potential into the Seaside Basin. The chemical data reported herein provide information about present ground water quality conditions in the coastal portion of the basin, and serve as background ground water quality data for comparison with future analyses. The District collects ground water quality data *annually* in the Fall from its network of 12 monitor wells at 6 separate sites in and near the coastal area of the Seaside Basin.

In addition to this annual sampling, the District is currently collecting *quarterly* samples from six of these wells (at three locations) that are closest to the coastline. These sites, described herein as the “MPWMD coastal sentinel wells”, are shown on **Figure 1**. At each of these three sites, a “shallow” and “deep” monitor well have been installed (either in separate boreholes or as multiple completions in a single borehole), generally corresponding to well completions within the two principal aquifer units in the Seaside Basin, known as the Paso Robles Formation (QTp) and Santa Margarita Sandstone (Tsm), respectively. The Pliocene/Pleistocene-Age QTp is a continental formation generally comprised of a fluvial mix of clay, silt, sand and gravel, deposited as ancestral valley fill sediments. The Miocene-Age Tsm is generally described as a marine and brackish-marine, fine- to coarse-grained arkosic sandstone, which overlies the shales of the Monterey Formation. The monitor wells are constructed of 2-inch PVC casing, with screens isolated in sand “packages” within each aquifer unit. The aquifer units are separated from each other in the wells by cement strata isolation seals.

Water Sample Collection

Water sample collection is accomplished by “air-lift” pumping. The method utilizes a 3/4-inch PVC dedicated airline in the well, which is coupled to an air compressor. The wellhead configuration is fashioned after that shown in **Figure 2**. Due to the small diameter of the monitor wells, the well casing is used as the “eductor” pipe, rather than a separate eductor pipe inside the well. Through experience, it has been determined that acceptable pumping results can be achieved if the bottom of the airline is placed at a depth that gives approximately 50 percent pumping submergence (i.e., the ratio of the length of the airline below the pumping water level to the total length of the airline). The air-lift method can be inappropriate for certain ground water quality constituents due to chemical changes brought about by air entrainment in the purged water; however, it is considered appropriate for the suite of inorganic constituents that are currently analyzed from the collected samples.

The volume of water removed from each well prior to sampling is generally three casing volumes, consistent with standard sampling protocol. Sampling is supplemented by field measurement of several indicator parameters that are collected during pumping, which ensures that the ground water quality has stabilized prior to sample collection. Upon collection of the samples, they are taken to a State-certified laboratory for analysis.

Spring 2007 Quarter Water Quality Results

Water chemistry analytical results for the quarterly ground water samples collected from the District’s six existing coastal “sentinel” monitor wells on April 30, 2007, are provided in **Table 1**. For comparison, the analytical results from the previous sampling of these same wells in Winter 2007 (i.e., January 30, 2007) are provided in **Table 2**.

The chemical data from the depth intervals sampled at these monitor wells do not indicate evidence of water quality changes indicative of seawater intrusion at these locations in the coastal area of the Seaside Basin. Additional descriptions of the ground water quality results from the District’s Seaside Basin coastal monitor wells can be found in *MPWMD Seaside Basin*

MPWMD Seaside Basin Watermaster Memorandum 2007-03

July 5, 2007

Page 3

Watermaster Memoranda 2007-01 and -02, as well as *MPWMD Technical Memorandum 97-02*. These documents are available at the District office for review.

U:\Joe\wp\SBWatermaster\2007\WQ\Spring2007WQresults_memo_5jul07.doc

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
SEASIDE BASIN COASTAL GROUND WATER QUALITY
SENTINEL WELL LOCATIONS

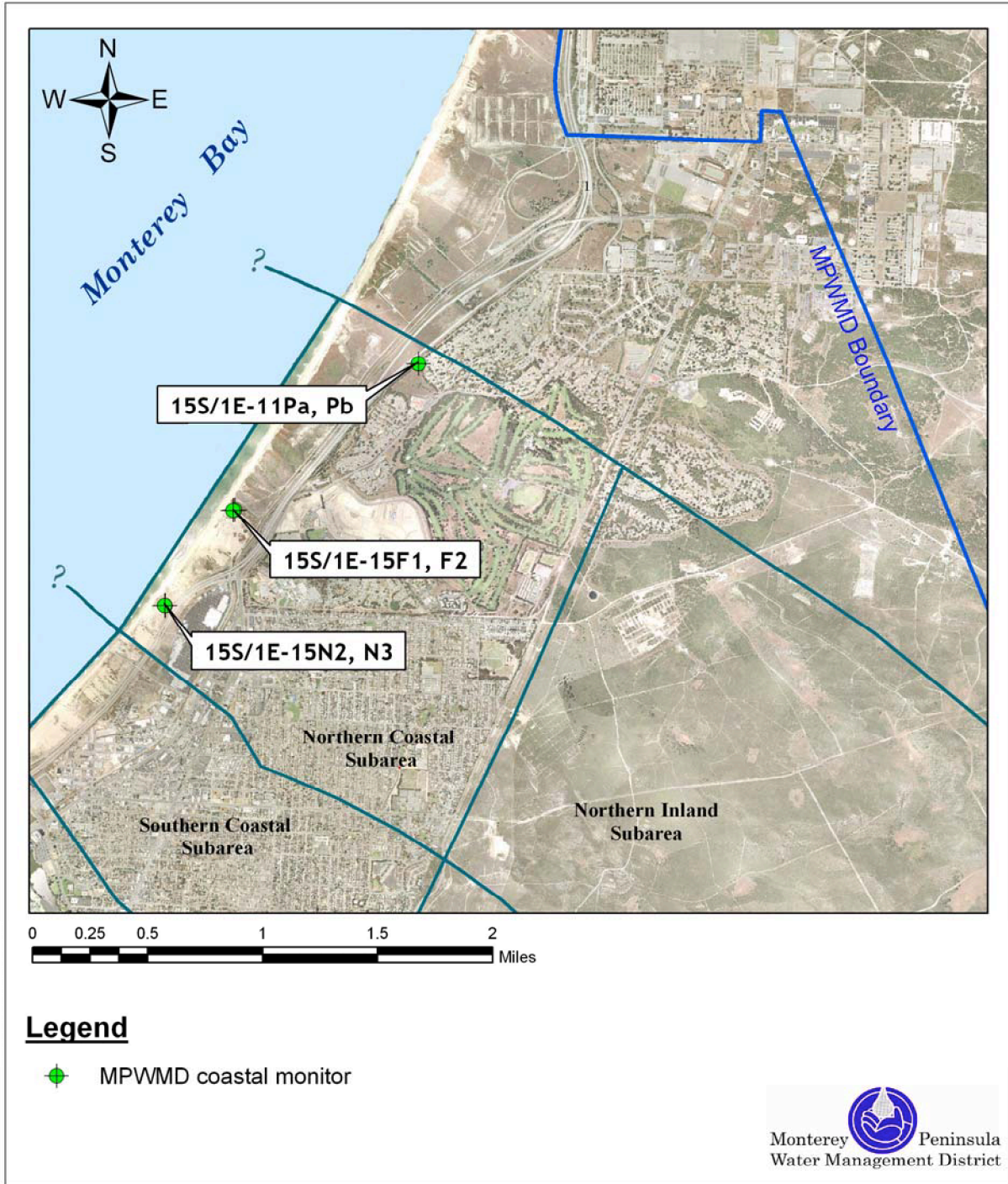


Figure 1. MPWMD Seaside Basin Coastal “Sentinel” Monitor Well Locations.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

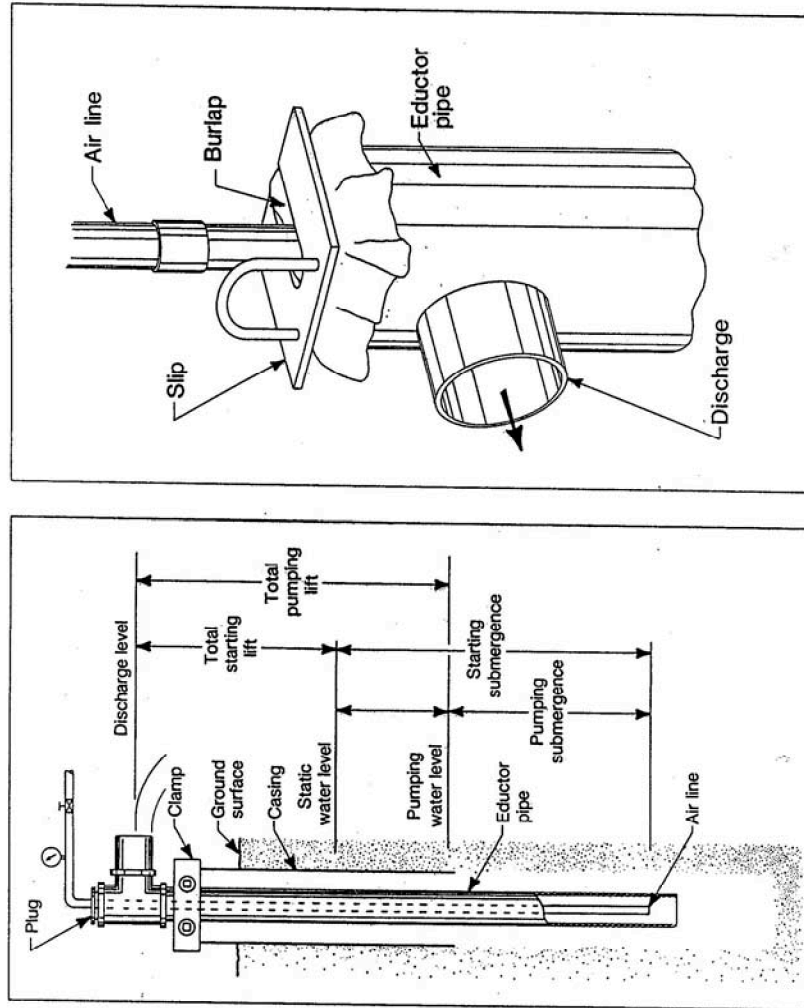


Figure 2. Diagrams illustrating the airlift-pumping method for water sample collection (from Driscoll, 1986, Figure 15.10)

Ground Water Quality Monitoring Results

Tables

Table 1

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

Seaside Basin Sample Collection Date: April 30, 2007

Units are milligrams per liter unless otherwise noted.

Water Quality Constituent	Specific Conductance (micromhos/cm)	Total Alkalinity (as CaCO3)	pH	Chloride	Sulfate	Ammonia Nitrogen (as NH3)	Nitrate Nitrogen (as NO3)	Nitrate (as NO3-N)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophosphate	Total Dissolved Solids	Hardness (as CaCO3)	Boron	Bromide	Fluoride
Drinking Water Standard (1)	900 1600 2200 (2)	NA	NA	250 500 600 (2)	250 500 600 (2)	NA	45	NA	NA	NA	NA	NA	NA	0.3	0.05	NA	NA	NA	NA	NA	NA
Sampling Location																					
15S/1E-15N3 (shal)	326	73	8.1	43	18	<0.05	<1	<0.05	<0.20	18	38	5	3.3	<0.10	<0.02	<0.05	215	66	0.12	<0.10	0.14
15S/1E-15N2 (deep)	960	209	8.2	153	46	0.06	<1	<0.05	0.44	76	106	15	4.5	<0.10	0.064	<0.05	537	252	0.16	0.46	0.23
15S/1E-15F1 (shal)	300	66	8.1	42	11	<0.05	4	0.97	<0.20	19	33	5	2.1	<0.10	<0.02	<0.05	201	68	0.08	0.13	<0.10
15S/1E-15F2 (deep)	928	223	7.8	155	44	0.05	<1	<0.05	0.32	78	101	16	4.8	0.141	0.098	<0.05	509	261	0.18	0.44	0.27
15S/1E-11Pa (shal)	320	61	8.1	50	16	<0.05	1	0.15	<0.20	22	33	4	3.6	<0.10	<0.02	<0.05	226	71	0.32	<0.10	<0.10
15S/1E-11Pb (deep)	421	89	8.2	65	15	<0.05	1	0.14	<0.20	27	51	4	3.3	<0.10	<0.02	<0.05	245	84	0.14	0.20	<0.10

NOTES:

(1) Maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

(2) The three values listed for certain constituents refer to the "recommended" level, the "upper" level, and "short-term use" level, respectively.

Table 2

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

Seaside Basin Sample Collection Date: January 30, 2007

Units are milligrams per liter unless otherwise noted.

Water Quality Constituent	Specific Conductance (micromhos/cm)	Total Alkalinity (as CaCO3)	pH	Chloride	Sulfate	Ammonia Nitrogen (as NH3)	Nitrate Nitrogen (as NO3)	Nitrate (as NO3-N)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophosphate	Total Dissolved Solids	Hardness (as CaCO3)	Boron	Bromide	Flouride
Drinking Water Standard (1)	900 1800 2200 (2)	NA	NA	250 500 600 (2)	250 500 600 (2)	NA	45	NA	NA	NA	NA	NA	NA	0.3	0.05	NA	NA	NA	NA	NA	NA
Sampling Location																					
15S/1E-15N3 (shal)	325	69	8.1	47	18	0.07	<1	<0.05	0.26	19	38	5	3.5	<0.10	0.031	<0.05	234	68	0.24	0.15	0.15
15S/1E-15N2 (deep)	1005	238	8.2	150	45	0.09	<1	<0.05	0.45	80	102	15	4.6	<0.10	0.072	<0.05	581	262	0.26	0.44	0.25
15S/1E-15F1 (shal)	311	69	8.1	47	11	<0.05	4	0.97	0.41	20	33	5	2.2	<0.10	<0.02	<0.05	198	71	0.12	0.15	<0.10
15S/1E-15F2 (deep)	993	224	7.9	152	43	0.10	<1	<0.05	0.65	83	105	16	4.9	0.199	0.101	<0.05	576	273	0.20	0.43	0.28
15S/1E-11Pa (shal)	323	62	8.1	56	13	<0.05	1	0.14	0.35	23	33	4	3.6	<0.10	<0.02	<0.05	232	74	0.18	0.18	<0.10
15S/1E-11Pb (deep)	433	82	8.2	71	15	<0.05	1	0.14	0.29	28	50	3	3.4	<0.10	<0.02	<0.05	262	82	0.18	0.22	0.12

NOTES:

(1) Maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

(2) The three values listed for certain constituents refer to the "recommended" level, the "upper" level, and "short-term use" level, respectively.