REGIONAL GROUNDWATER MONITORING REPORT
CENTRAL AND WEST COAST BASINS
LOS ANGELES COUNTY, CALIFORNIA
WATER YEAR 1998-1999

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EXECUTIVE SUMMARY

Based on the results of Water Year (WY) 1998-1999 groundwater monitoring in the Water Replenishment District (WRD), the overall quality of groundwater and the replenishment waters used to recharge the Central and West Coast Basins (CWCB) remains excellent. Groundwater level monitoring data also indicate that while water levels in the CWCB dropped slightly during the 1998-1999 WY, groundwater levels remain sufficient to meet current and near-term production demands. The following sections summarize the results of the WRD 1998-1999 Regional Groundwater Monitoring Program.

GROUNDWATER REPLENISHMENT

During WY 1998-1999, WRD purchased 42,201 AF of recycled water for spreading in the Montebello Forebay. No imported water was purchased for spreading at the Montebello Forebay during the 1998-1999 WY. At the seawater barriers, 18,620 AF of treated imported water was purchased for injection at the West Coast, Dominguez Gap and Alamitos seawater barrier projects. An additional 6,973 AF of recycled water was purchased for injection into the West Coast Barrier Project. In-lieu replenishment totaled 23,516 AF during the 1998-1999 WY.

The water quality associated with key constituents in untreated imported water used at the Montebello Forebay spreading grounds remains excellent and has improved slightly over the past water year. Average total dissolved solids (TDS), hardness, iron and manganese concentrations in both Colorado River and/or State Water Project water have decreased and remain below their respective maximum contaminant levels (MCLs). Meanwhile, trichloroethylene (TCE) and tetrachloroethylene (PCE) were not reported in either water source.

The water quality associated with key constituents in recycled water used at the Montebello Forebay spreading grounds also remains excellent and is carefully monitored and controlled to show little variation over time.

Stormwater samples are occasionally collected from the Montebello Forebay area and analyzed for a few water quality parameters. Samples collected between 1995 and early 1998 show that average stormwater TDS concentrations and hardness are lower than most other sources of replenishment water.

GROUNDWATER PRODUCTION AND WATER LEVELS

Groundwater production in the CWCB was 255,750 AF for WY 1998-1999. This amount is less than the adjudicated amount, partly due to the success of WRD's In-Lieu Replenishment Program, which provides incentives to pumpers for not producing groundwater in areas that are difficult to recharge by other means.

The WRD nested monitoring wells show clear, significant differences in groundwater elevations between the various aquifers screened. The head differences in the WRD nested monitoring wells reflect both hydrogeologic and pumping influences on the CWCB. Vertical head differences between 1 and 60 feet occur between zones above and below the producing zones. The greatest head differences tend to occur in the pumping holes of the CWCB Pressure Areas, while the smallest differences occur in the Montebello Forebay recharge area, and in the Torrance area which has thick, merged aquifers.

Basinwide hydrographs and groundwater elevations measured in nested monitoring wells and key production wells indicate a general decline in water levels in the CWCB during the 1998-1999 WY.

GROUNDWATER QUALITY

During WY 1998-1999, WRD sampled 18 of its 24 nested monitoring wells. A total of 177 groundwater samples were analyzed for over 77 chemical constituents. These data, along with production well water quality data provided by the California Department of Health Services (DHS), demonstrate that groundwater quality differs both vertically and horizontally (areally) in aquifers across the CWCB. These differences can be summarized by reviewing the results of the following key constituents.

TDS concentrations for WRD wells located in the Central Basin are relatively low, while TDS concentrations for WRD wells located in the West Coast Basin are elevated in portions of the basin, primarily the Torrance and Dominguez Gap areas. The elevated TDS concentrations may be caused by seawater intrusion and/or oil field brines. During this reporting period, concentrations in the Central Basin ranged from 160 milligrams per liter (mg/L) to 790 mg/L, and in the West Coast Basin 200 mg/L to 9840 mg/L. The District is conducting further studies with the U.S.G.S. to identify the sources of high TDS.

Iron concentrations in many production wells and nested monitoring wells in the CWCB exceed MCLs. During this reporting period, concentrations in the Central Basin ranged from not detected (ND) to 0.5 mg/L, and in the West Coast Basin, ND to 0.46 mg/L. In the Central Basin, it appears that the spreading of replenishment water at the Montebello Forebay tends to decrease dissolved iron concentrations in groundwater.

Similar to the iron concentrations, manganese concentrations in the WRD wells exceed MCLs in a large number of nested monitoring wells and production wells across the CWCB. During this reporting period, concentrations in the Central Basin ranged from ND to 1,000 micrograms per liter (μg/L), and in the West Coast Basin ND to 1,400 μg/L. As with iron, it appears that the spreading of replenishment water at the Montebello Forebay tends to decrease dissolved manganese concentrations in groundwater, probably because the two constituents have similar geochemical behavior.

Nitrate concentrations in the Central Basin ranged from ND to 6.5 mg/L, and in the West Coast Basin ND to 28.8 mg/L in WRD nested monitoring wells. Concentrations approaching or exceeding the 10 mg/L MCL tend to be limited to the uppermost zone at a particular nested well. No concentrations above the MCL were observed in the Silverado aquifer. DHS data indicated no CWCB production wells tested above the MCL for nitrate during WY 1998-1999.

TCE was not detected in the Silverado Aquifer in the WRD wells sampled, with the exception of Huntington Park #1. During this reporting period, concentrations in the Central Basin ranged from ND to 29 μg/L, and in the West Coast Basin ND to 14 μg/L. PCE was detected in three WRD wells in the Central Basin and one well in the West Coast Basin. During this reporting period, concentrations in the Central Basin ranged from ND to 12 μg/L, and in the West Coast Basin ND to 6.8 μg/L.

WRD also sampled for constituents that are of recent interest to the pumpers and regulators because of proposed changes to MCLs, or other emerging issues in water quality. Special studies constituents include aresenic, hexavalent chromium, MTBE, perchlorate, and radon. Although results from the initial sampling events of the special studies are preliminary, WRD will continue to test for these constituents to understand their occurrence in the CWCB.

As represented by these data, groundwater in the CWCB is of generally good quality and is suitable for continued use by the pumpers in the District, the stakeholders, and the public.

FUTURE ACTIVITIES

WRD will continue to update and augment its Regional Groundwater Monitoring Program to best serve the needs of the District, the pumpers and the public. Activities planned under this program for the WY 1999-2000 are listed below.

Based on the success of the In-Lieu Replenishment Program at reducing pumping in the CWCB, WRD intends to continue this program as a management tool for replenishment. Because recycled water is a relatively low-cost, replenishment water source, WRD will continue to maximize recycled water use at the Montebello Forebay spreading grounds without exceeding regulatory limits. WRD will continue to maximize recycled water use at the West Coast Basin barrier, and intends to use recycled water at the Dominguez Gap and Alamitos barriers in the near future. WRD will continue to monitor the quality of all replenishment water sources to ensure the CWCB are being recharged with high-quality water.

Total injection quantities at all three seawater intrusion barriers is expected to increase over the next several years as additional barrier wells are constructed to further combat seawater intrusion. WRD will work with the pumpers over the next year to find solutions to reduce the injection water demands. Basin management alternatives will be explored.

WRD will install additional nested monitoring wells in key areas throughout the CWCB in upcoming years to continue refining the regional understanding of groundwater occurrence, movement, and quality. Water levels will be recorded using automatic dataloggers to monitor groundwater elevation differences throughout the year.

WRD will continue to sample groundwater from nested monitoring wells twice per year, and analyze the samples for general water quality constituents. In addition we will continue to focus on constituents of interest to WRD and the pumpers such as NDMA, arsenic and radon. WRD will continue to use the data generated by this Regional Groundwater Monitoring Program to address current and upcoming challenges related to water quality and groundwater replenishment in the Central and West Coast Basins.

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SECTION 1
INTRODUCTION

The Water Replenishment District of Southern California (WRD or the District) manages groundwater replenishment and water quality activities of the Central and West Coast Basins (CWCB) (**Figure 1.1**). Our mission is to maintain a sufficient supply of high quality groundwater in the basins through progressive, cost effective, and environmentally sensitive management. This mission is being accomplished by meeting WRD goals relating to water quality, water supply, basin management, stakeholder communications, and efficient operations of the organization.

A major aspect to meeting these goals is to have a thorough and current understanding of groundwater conditions in the CWCB, and to predict and prepare for future conditions. This is achieved through groundwater monitoring, modeling, and planning, which provides the necessary information to determine the "health" of the basins. This information in turn provides WRD, the pumpers in the District, other interested stakeholders, and the public with the knowledge necessary for responsible water resources planning and management.

1.1 BACKGROUND OF REGIONAL GROUNDWATER MONITORING PROGRAM

Since its formation in 1959, WRD has been actively involved in groundwater replenishment, water quality monitoring, contaminant prevention, data management, and data publication. Historical overpumping of the CWCB caused overdraft, seawater intrusion and other groundwater management problems related to supply and quality. Adjudication of the basins in the early 1960s set a limit on allowable production to control the overpumping. Along with adjudication, WRD was formed to address issues of groundwater recharge and groundwater quality. The Regional Groundwater Monitoring Program is one of the programs WRD funds from the pumper's replenishment assessment in order to meet the challenges of managing the replenishment and water quality of the CWCB.

Prior to 1995, WRD relied upon groundwater monitoring data collected, interpreted, and presented by other entities such as the Los Angeles County Department of Public Works (LACDPW), the California Department of Water Resources (DWR), and the private sector for current basin conditions. This includes WRD's former basinwide monitoring program, and the ongoing but separate Montebello Forebay recycled water monitoring for regulatory compliance. However, these data have been collected primarily from production wells, which are typically screened across multiple aquifers to maximize water inflow. This results in a mixing of the waters from the perforated aquifers inside of the well casing, causing an averaging of the water qualities and water levels.

In order to obtain more accurate data for specific aquifers from which to infer localized water quality and level conditions, depth-specific (nested) monitoring wells that tap discrete aquifer zones are necessary. **Figure 1.2** illustrates the capabilities of nested monitoring wells to assess individual aquifers compared to typical production wells. During Water Year 1994-1995, WRD and the United States Geological Survey (USGS) began a cooperative study to improve the understanding of the geohydrology and geochemistry of the CWCB. This study was the nucleus of the Regional Groundwater Monitoring Program. In addition to compiling existing available data, this study recognized that sampling of production wells did not adequately characterize the layered multiple aquifer systems of the CWCB. The study focused on new data collection through drilling and construction of nested groundwater monitoring wells and conducting depth-specific water quality sampling. **Figure 1.3** shows the locations of completed WRD nested monitoring wells and planned future well locations. Construction information for the completed wells is presented in **Table 1.1.**

An *Annual Report on the Results of Water Quality Monitoring* (*Annual Report*) was published by WRD from Water Years 1972-1973 through 1994-1995, and was based on a basinwide monitoring program outlined in the *Report on Program of Water Quality Monitoring* (Bookman-Edmonston Engineering, Inc., January 1973). The latter report recommended a substantial expansion of the then-existing program, particularly the development of a detailed and intensive program of monitoring the quality of groundwaters in the Montebello Forebay. The Regional Groundwater Monitoring Program is designed to serve as an expanded, more representative basinwide monitoring program for the CWCB. This Groundwater Monitoring Report is published in lieu of the old *Annual Reports*.

1.2 CONCEPTUAL HYDROGEOLOGIC MODEL

The Regional Groundwater Monitoring Program changes the focus of groundwater monitoring efforts in the CWCB from production zones with averaged groundwater level and groundwater quality information, to a layered multiple aquifer system with individual zones of groundwater quality and groundwater levels. WRD views each aquifer as a significant component of the groundwater system and understands the importance of the interrelationships between water-bearing zones. The most accepted hydrogeologic description of the basin and the names of water-bearing aquifers were provided in *Bulletin No. 104: Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix A – Ground Water Geology* (DWR, 1961). WRD generally follows the naming conventions of this report, redefining certain aspects when new data become available.

The locations of idealized geologic cross-sections AA' and BB' through the CWCB are shown on **Figure 1.3**. Cross-sections AA' and BB' are presented on **Figures 1.4 and 1.5**. These cross-sections illustrate the aquifer system of the CWCB. The main potable production aquifers are shown including the deeper Lynwood, Silverado, and Sunnyside aquifers of the lower Pleistocene San Pedro Formation. Other main shallower aquifers, which locally produce potable water, include the Gage and Gardena aquifers of the Upper Pleistocene Lakewood Formation. Also shown on the geologic sections are the aquitards separating the aquifers. Throughout this report the aquifers shown on the geologic sections are referred to as discrete groundwater zones.

1.3 GIS DEVELOPMENT AND IMPLEMENTATION

WRD developed a sophisticated geographic information system (GIS), which is being utilized as a tool for CWCB groundwater management. Much of the GIS was compiled through the WRD/USGS cooperative study. The GIS links spatially-related information (e.g., well locations, geologic features, cultural features, contaminated sites) to data on well production, water quality, water levels, and replenishment amounts. WRD uses the industry standard ArcInfo®/ArcView® GIS software for data analysis and preparation of graphics. WRD utilized a highly accurate global positioning system (GPS) to refine the locations of basinwide production wells and nested monitoring wells in the GIS database.

WRD is constantly updating the GIS with new data and newly acquired archives of data provided by pumpers. The GIS is a primary tool for WRD and other water-related agencies to more accurately track current and past use of groundwater, track groundwater quality, and project future water demands, thus allowing improved conjunctive use of the basins.

1.4 SCOPE OF REPORT

The purpose of this report is to update information on groundwater conditions in the CWCB for Water Year (October-September) 1998-1999, and to discuss the status of the Regional Groundwater Monitoring Program. Section 1 provides an overview of WRD and the WRD Regional Groundwater Monitoring Program. Section 2 discusses the types, quantities, and water quality of different source waters used by WRD for replenishment at the Montebello Forebay spreading grounds and the seawater intrusion barriers. Section 3 summarizes groundwater production in the CWCB, and evaluates water level and groundwater elevation data for Water Year 1998-1999. Section 4 evaluates water quality data for the WRD nested monitoring wells and basin-wide production wells. Section 5 summarizes the findings of this report. Section 6 describes future regional groundwater monitoring activities. Section 7 lists references used in this report.

SECTION 2
GROUNDWATER REPLENISHMENT

Both natural and artificial groundwater replenishment occur in the CWCB. Natural replenishment occurs through percolation of precipitation and applied waters (i.e., irrigation), conservation of stormwater in spreading grounds, and underflow from adjacent basins. Artificial replenishment occurs through the efforts of WRD by purchasing imported and recycled water for recharge at the spreading grounds and for injection at the seawater intrusion barrier wells. Artificial replenishment also occurs through the District's In-Lieu Replenishment Program. This section focuses on the sources of surface water used for artificial replenishment and the quantities used during Water Year 1998-1999.

Groundwater replenishment is accomplished through percolation of surface waters at the Rio Hondo and San Gabriel River spreading grounds, located in the Montebello Forebay (Montebello Forebay spreading grounds) shown on **Figure 1.1**. Replenishment is also realized through injection of water into the three seawater intrusion barriers (West Coast Basin, Dominguez Gap, and Alamitos barriers) in WRD's service area. Artificial recharge, along with the natural replenishment and controlled pumping, have ensured a sustainable, reliable supply of local groundwater.

2.1 SOURCES OF REPLENISHMENT WATER

The available supply of surface water for direct replenishment may be classified among the following categories:

- Imported water: This source originates from the Colorado River or the State Water Project, and is used in the Montebello Forebay spreading grounds. This supply is under full upstream control, and its availability is limited and variable, especially during drought years ("interruptible source").
- Treated imported water: This source also originates from the Colorado River or the State Water Project, but has been treated for direct consumption and meets all

drinking water standards. It is used at the seawater intrusion barrier wells. This supply is under full upstream control, but is classified as a "noninterruptible source", meaning the supply will continue even through a drought.

- Recycled water: This resource's relatively low unit cost, coupled with its year-round availability, makes it highly desirable as a replenishment source. However, its use is restricted by regulatory agencies. Recycled water is used primarily at the spreading grounds, but it is also injected into the West Coast Basin barrier after advanced treatment (reverse osmosis).
- Make-Up Water: "Make-Up Water" is occasionally delivered to the Montebello Forebay spreading grounds from the San Gabriel Valley Basin. This water, termed the "Lower Area Annual Entitlement", was established in accordance with the judgment in Case No. 722647 of Los Angeles County, City of Long Beach, et al vs. San Gabriel Valley Water Co., et al (Long Beach Judgment). Under the provisions of the Long Beach Judgment, either the San Gabriel Valley Basin (Upper Area) or the Central Basin (Lower Area) may owe water to the other basin each year, based on the average annual rainfall over the last 10 years and the usable water that actually flowed from the Upper Area to the Lower Area. Historically, the Upper Area has not received a water "credit", but has occasionally been required to deliver "Make-Up Water" to the Lower Area. During Water Year 1998-1999, Make-Up Water was not delivered to the Lower Area. Therefore, Make-Up Water quantities will not be discussed in this report.
- Local water: Local water consists of channel flow from local sources (e.g., stormflow, rising water, incidental surface flows) conserved in the Montebello Forebay spreading grounds by the LACDPW. It also includes infiltration of precipitation and applied water throughout the District, especially within the Montebello Forebay.
- Subsurface water: Groundwater flows into and out of the CWCB from adjacent groundwater basins (Santa Monica, Hollywood, San Gabriel, Orange County) and the Pacific Ocean. The amounts depend on the hydrogeologic properties of the aquifers and the groundwater gradients at the basin boundaries.

2.2 QUANTITIES OF REPLENISHMENT WATER

Historical quantities of water used for replenishment of the Montebello Forebay are presented in **Table 2.1**. Historical seawater barrier well injection amounts are shown on **Table 2.2**. The calculations required to determine the total quantity of artificial replenishment water necessary for the CWCB prior to each water year are outlined in the District's annual *Engineering Survey and Reports* (ESRs).

At the Montebello Forebay spreading grounds (**Table 2.1**), the following trends are noted for the quantities of replenishment water for Water Year 1998-1999:

- The quantity of artificial replenishment water used during Water Year 1998-1999 was 41,201 acre-feet (AF). This is a far smaller quantity than the long-term average quantity over Water Years 1961-1962 through 1997-1998 (82,736 AF).
- The quantity of artificial replenishment water was much smaller because imported water was not purchased during Water Year 1998-1999, due to construction activities in the Montebello Forebay spreading grounds.
- The recycled water contribution during Water Year 1998-1999 was the entire artificial replenishment quantity (41,201 AF). This compares to a long-term average quantity over Water Years 1961-1962 through 1997-1998 of 30,496 AF. Over the last three water years, the average percentage of recycled water used compared to the total inflow to the Montebello Forebay equaled 31 percent. This compares to a long-term average percentage over Water Years 1961-1962 through 1997-1998 of 19 percent. WRD maximizes recycled water use without exceeding regulatory limits (50 percent or 60,000 AF maximum in any one year, and 35 percent or 150,000 AF total over three consecutive years).
- Make-Up Water was not delivered during Water Year 1998-1999.

At the seawater intrusion barriers (**Table 2.2**), the following trends are noted for the quantities of artificial replenishment water for Water Year 1998-1999:

- At the West Coast Basin barrier, the injection volume during Water Year 1998-1999 was 17,098 AF, which included 6,973 AF of recycled water. The long-term average injection over Water Years 1961-1962 through 1997-1998 is 20,833 AF. The recycled water contribution has generally increased since recycled water injection began (Water Year 1994-1995), but the total injection water quantity (imported plus recycled) for Water Year 1998-1999 remained relatively stable compared to closely preceding water years.

- At the Dominguez Gap barrier, the injection volume during Water Year 1998-1999 was 4,483 AF. The long-term average injection over Water Years 1970-1971 (the commencement date of injection at the barrier) through 1997-1998 is somewhat greater, at 5,998 AF. To date, only imported water has been injected at the Dominguez Gap barrier; however, WRD plans to augment this volume with recycled water in the near future. The Regional Groundwater Monitoring Program is providing critical baseline water quality and water level data from the Dominguez Gap barrier region, in order to evaluate the use of recycled water contribution to the barrier in the future.
- At the Alamitos barrier, the injection volume during Water Year 1998-1999 was 4,012 AF. This amount refers only to the water injected on the Los Angeles County side of the barrier, not the Orange County injection. The long-term average injection over Water Years 1964-1965 (the commencement date of injection at the barrier) through 1997-1998 is slightly lower, at 3,846 AF. As with the Dominguez Gap barrier, WRD plans to augment imported water injection volumes at the Alamitos barrier with recycled water. The Regional Groundwater Monitoring Program is also collecting data in the Alamitos barrier region to evaluate the future use of recycled water at the barrier.

Injection amounts at the barrier systems are expected to increase over the next several years to further combat seawater intrusion.

2.3 QUALITY OF REPLENISHMENT WATER

This section discusses water quality data for key parameters in WRD replenishment water and local surface water during Water Year 1998-1999. Although numerous other constituents are monitored, these are the ones found to be most prevalent and at elevated levels in wells in the CWCB. The data are classified according to their source. The key water quality parameters of this discussion are: TDS, hardness, nitrogen, iron, manganese, trichloroethylene (TCE), and tetrachloroethylene (PCE). Monitoring the concentrations of these constituents is necessary for an understanding of the general chemical nature of the recharge source, and its suitability for replenishing the groundwater basins. A brief description of each parameter follows.

- TDS: TDS is a measure of the total mineralization of water, and is indicative of general water quality. In general, the higher the TDS, the less desirable a given water supply is for beneficial uses although this depends also on the particular constituents making up the TDS. The California Department of Health Services (DHS) drinking water maximum contaminant level (MCL) for TDS ranges from 500 milligrams per liter (mg/L), which is the recommended level, to 1,000 mg/L, which is the upper limit allowed.
- Hardness: For most municipal type uses, hardness (a measure of calcium and magnesium) is an important mineral characteristic in water. Excessive hardness is undesirable because it results in increased consumption of cleaning products, scale formation and other undesirable effects. There is no MCL for hardness, but generally waters are considered soft at less than 50 mg/L, and very hard at greater than 200 mg/L.
- Nitrogen: DHS standards limit nitrate concentrations to 45 mg/L (measured as nitrate), corresponding to 10 mg/L nitrogen. In recycled water most of the nitrogenous material exists in the form of ammonia (with a small portion existing in the form of organic nitrogen). Theoretically, it would be possible for all of the nitrogenous materials in water to be oxidized to the nitrate form. Therefore, the total nitrogen in water recharging the groundwater supply should not exceed 10 mg/L (as nitrogen). This is conservative in that it neglects any nitrogen which may be adsorbed, converted into nitrogen gas, or otherwise removed from the water.
- Iron: The iron content of water is important because small concentrations of iron in water can seriously affect the water's suitability for domestic or industrial purposes. The DHS limits the amount of iron in drinking water to 0.3 mg/L because iron in water stains plumbing fixtures, incrusts well screens, and clogs pipes. Some industrial processes cannot tolerate more than 0.1 mg/L iron.
- Manganese: Manganese is objectionable in water in the same general way as iron.

Stains caused by manganese are more unsightly and harder to remove than those caused by iron. The DHS MCL for manganese is 50 micrograms per liter (μg/L).

- TCE: Trichloroethylene is a manmade solvent used primarily to remove grease from metal parts. Because of its potential health effects (central nervous system depression, carcinogen), the MCL for TCE is 5 μg/L.
- PCE: Tetrachloroethylene (also known as perchloroethylene, perc, perclene, and perchlor) is a manmade solvent used heavily in the dry cleaning industry. Like TCE, PCE can depress the central nervous system and is a possible carcinogen. The MCL for PCE in drinking water is also 5 μg/L.

Quality of Imported Water

As stated previously, treated imported water is used at the seawater intrusion barriers. This water is processed to meet all drinking water standards, so its water quality is excellent and suitable for direct injection. Average water quality data for treated imported water during Water Year 1998-1999 are presented on **Table 2.3**. Average water quality data for the previous three water years are presented in the 1995-1998 Regional Groundwater Monitoring Report.

Untreated imported water ("raw water") is used at the Montebello Forebay spreading grounds. The average TDS concentration of Colorado River water has decreased over the past four water years, from 682 mg/L to 582 mg/L. The average TDS concentration of State Water Project water has also shown a decreasing trend, from 320 mg/L to 252 mg/L.

The average hardness of Colorado River water has decreased over the last four water years, from 322 mg/L to 287 mg/L. The average hardness of State Water Project water has also shown a decreasing trend, from 173 mg/L to 139 mg/L.

The average nitrogen concentration of Colorado River water has increased compared to the previous water year, from 0.17 mg/L to 0.90 mg/L. The average nitrogen concentration of State Water Project water has also increased compared to the previous water year, from 0.31 mg/L to 0.96 mg/L. Both Colorado River and State Water Project water nitrogen concentrations have been far below the MCL.

The average iron concentration of Colorado River water has increased compared to the previous water year, from 0.021 mg/L to 0.044 mg/L. The average iron concentration of State Water Project water has decreased over the last four water years, from 0.154 mg/L to 0.023 mg/L. Both Colorado River and State Water Project water iron concentrations have been below the MCL.

The average manganese concentration of Colorado River water has decreased over the past four water years, from 9 μg/L to non-detect. The average manganese concentration of State Water Project water has also decreased over the past four water years, from 13 μg/L to non-detect. Both Colorado River and State Water Project water manganese concentrations have been below the MCL.

Neither TCE nor PCE have been detected in Colorado River Water or State Project Water over the last four water years.

Quality of Recycled Water

As outlined previously, recycled water from the West Basin Municipal Water District (West Basin MWD) wastewater reclamation plant (WRP) undergoes advanced treatment using reverse osmosis, then is used at the West Coast Basin barrier. This water is processed to meet or exceed drinking water standards, so it is of excellent quality and suitable for direct injection. The DHS limits injection however, to 50 percent of the total injected amount. Average water quality data for this water are presented on **Table 2.3**.

Recycled water from the Whittier Narrows WRP, San Jose Creek East WRP, San Jose Creek West WRP, and Pomona WRP are used at the Montebello Forebay spreading grounds. The water quality from these WRPs is carefully controlled and typically shows little variation over time. **Table 2.3** presents average water quality data from these WRPs. All constituents shown have either decreased slightly or remain stable over the past four water years. Furthermore, neither TCE nor PCE have been detected above MCLs in recycled water from these four WRPs over the last four water years.

Quality of Stormwater

As discussed in Section 3, stormwater infiltrates to some degree throughout the District, but especially in the Montebello Forebay, where it is conserved along with imported and recycled water in the spreading grounds. Occasional stormwater quality analyses have been performed by LACDPW throughout the history of the Montebello Forebay spreading grounds. Stormwater samples were not analyzed during Water Year 1998-1999; however, stormwater quality data for two of the parameters described above (TDS, hardness) are available for several dozen samples collected between 1995 and early 1998. Average stormwater quality data for TDS and hardness are presented on **Table 2.3.** The average TDS concentration and hardness of stormwater in the Montebello Forebay are lower than that of most other sources of replenishment water.

SECTION 3

GROUNDWATER PRODUCTION AND WATER LEVELS

3.1 GROUNDWATER PRODUCTION IN THE CENTRAL AND WEST COAST BASINS

In the early 1960s, the State courts limited the amount of pumping that could occur in the CWCB to stop the declining water levels that were causing the basins to lose valuable groundwater storage and causing seawater to intrude into the coastal aquifers. The West Coast Basin pumping limit (adjudication) was set at 64,468.25 acre-feet/year (AFY). The Central Basin adjudication was set at 271,650 AFY, although this was reduced to the allowed pumping allocation (APA) of 217,367 AFY. The current total amount that can be pumped from both basins is 281,835 AFY.

The adjudicated amounts were intentionally set higher than the natural replenishment of the extracted groundwater. WRD was created as a special district charged with making up this deficiency through the purchase and artificial recharge of imported and recycled water. A replenishment assessment is placed on pumping to collect the funds necessary to purchase the supplemental water.

During Water Year 1998-1999, groundwater production was 255,750 AF. This volume is slightly higher than the average production volume for the previous five water years of 238,346 AF. However, this volume is less than the adjudicated amount, partly due to WRD's In-Lieu Replenishment Program, which provides incentives to pumpers for suspending pumping in areas that are difficult to recharge by other methods. **Table 3.1** presents historical groundwater production quantities for the CWCB. **Figure 3.1** illustrates the levels of production throughout the CWCB during the 1998-1999 Water Year.

Under the terms of the Water Replenishment Districts Act, each groundwater producer in the CWCB must submit a report to the District summarizing their production activities (monthly reports for larger producers, quarterly reports for smaller producers). The information in these reports is the basis from which each producer pays the replenishment assessment. WRD then forwards these production data to the DWR, which acts as the court-appointed Watermaster in connection with the adjudication of the CWCB.

With few exceptions, meters installed and maintained by the individual producers measure the groundwater production throughout the basins. Through periodic testing, both WRD and Watermaster verify the accuracy of individual meters and order corrective measures when necessary. The production of the few wells that are not metered is estimated on the basis of electrical energy consumed by individual pump motors, duty of water, or other reasonable means.

Participation in WRD's In-Lieu Replenishment Program, which replaces groundwater pumping with the use of surplus imported water, has become a major factor affecting annual groundwater production: as participation in the program increases, total production decreases accordingly. During the past five years, in-lieu replenishment has averaged 39,094 AFY. In-lieu replenishment peaked during 1993-94, with total groundwater extractions of less than 172,000 AF, and in-lieu replenishment of about 110,000 AF. However, recent trends show In-Lieu participation decreasing, with a 2000-2001 participation estimate of 25,000 AF.

During emergency or drought conditions, WRD can also allow an additional 27,000 AF (17,000 AF for Central Basin and 10,000 AF for West Coast Basin) of extractions for a four-month period. This provision has yet to be exercised but offers the potential use of an additional 7.8 percent groundwater for Central Basin and 15 percent groundwater for West Coast Basin pumpers.

The District's annual *Engineering Survey and Report (ESR)* provides additional information on previous, current, and ensuing year pumping and In-Lieu.

3.2 GROUNDWATER LEVELS

This section describes the groundwater level aspect of the Regional Groundwater Monitoring Program. Typical products of monitoring water levels include water level hydrographs and groundwater elevation contour maps. Water level hydrographs illustrate changes in water levels at a well over time. Groundwater elevation contour maps show the elevation of the potentiometric surface of the aquifer, which is used to determine groundwater flow directions and gradients, identify areas of recharge, identify potential pathways for seawater intrusion, and identify areas of heavy discharge (commonly known as "pumping holes").

Groundwater Levels

Over the past 40 years, groundwater elevation contour maps have been prepared by the LACDPW using depth-to-water measurements collected from production wells and certain monitoring wells throughout the basins. The maps have been named "Deep Aquifer Contour Maps" to indicate that the contoured water surface is representative of the deeper San Pedro Formation aquifers (Lynwood, Silverado, Sunnyside) tapped by the pumpers, and not the shallow aquifer, water table aquifer, or perched groundwater.

WRD has modified and used the "Deep Aquifer Contour Maps" every year in the WRD annual ESR since 1960. Starting with the 1999 ESR, WRD began creating its own groundwater elevation contour map of the San Pedro Formation ("Deep") aquifers using data primarily from our nested monitoring wells and other supplemental data. **Figure 3.2** is the groundwater elevation contour map for Fall 1999 prepared for the 2000 ESR. As shown on the figure, groundwater elevations range from a high of about 130 feet above mean sea level (MSL) in the Whittier Narrows area to a low of about 90 feet below MSL in the Gardena and Carson areas, and 100 feet below MSL in the Long Beach area. Another significant water level low can be seen in the Huntington Park area, where groundwater elevations are over 50 feet below MSL. Much of the groundwater in the CWCB is still below sea level. By comparing water levels between years, changes in groundwater storage can be calculated. The storage change is also calculated using the USGS regional computer model. The annual change in storage for the CWCB is reported in the 2000 ESR. During the 1998-1999 water year, the change in storage for the CWCB was determined to be -80,196 AF (i.e., a loss of 80,196 AF). The loss from storage can be attributed to a dry year, increased pumping, and reduced replenishment in the spreading grounds due to construction activities. This is a significant change from the average **increase** over the previous three water years. **Figure 3.3** presents general changes in groundwater levels for San Pedro Formation aquifers across the CWCB between Fall 1998 and Fall 1999. This figure is based on WRD's groundwater elevation contour maps for Fall 1998 and Fall 1999.

Historical Water Levels at Key Wells

Water level hydrographs are useful for evaluating general water level trends in the CWCB and tracking the effects of adjudication and replenishment efforts on groundwater supply. The LACDPW has historically tracked water levels in "key wells" across the CWCB. It should be noted that many of these wells are production wells screened across multiple aquifers, while the remainder are monitoring wells screened in a single aquifer. **Figures 3.4 through 3.7** show typical hydrographs for wells in the Central Basin Pressure Area, the West Coast Basin, the Montebello Forebay, and the Los Angeles Forebay that have been tracked in the ESR for many years (locations of these key wells are shown on **Figure 3.2**).

Well 4S/13W-12K1 and Well 4S/12W-28H9 (**Figure 3.4**) have been used historically to represent the condition of groundwater levels in the Central Basin Pressure Area. Between Fall 1998 and Fall 1999, both wells displayed the typically large seasonal fluctuations resulting from summer pumping, but an overall decrease of approximately 10 feet. **Figure 3.3** shows that water levels both rose and fell between 1998 and 1999 in various portions of the Central Basin Pressure Area. Rises are probably related to reductions in pumping, whereas falls are related to increased pumping and reduced recharge. The decreases in water levels are of some concern; they are of greater magnitude than the increases in water levels in other portions of the region, and they reflect an overall decrease in groundwater storage.

Well 3S/14W-22L1 and Well 4S/13W-22P1 (**Figure 3.5**) have been used historically to represent the condition of groundwater levels in the West Coast Basin. Water levels in these wells experienced net decreases of less than 5 feet between Fall 1998 and Fall 1999. In contrast, in the Carson "pumping hole" area, water levels declined up to 60 feet (**Figure 3.3**). In other areas of the basin, some water level increases were observed. As with the Central Basin Pressure Area, rises in water levels are probably related to reductions in pumping, while falls are related to increased pumping and reduced recharge.

Well 2S/11W-18K2, Well 2S/12W-24M8, and Well 3S/12W-1A6 (**Figure 3.6**) have been used historically to represent the condition of groundwater levels in the Montebello Forebay. During Water Year 1998-1999, rainfall was nearly half of the long-term average. This dry year, along with suspension of imported water spreading due to construction activities, caused water levels to drop up to 20 feet in these wells, and up to 60 feet in other portions of the forebay between Fall 1998 and Fall 1999 (**Figure 3.3**).

Well 2S/13W-10A1 (**Figure 3.7**) has been used historically to represent the condition of groundwater levels in the Los Angeles Forebay. The water level in this well declined about 15 feet between 1998 and 1999, and water levels dropped up to 60 feet in other parts of the Los Angeles Forebay (**Figure 3.3**). These declines are related to the dry year, increased pumping, and reduced artificial recharge.

Aquifer-Specific Water Levels

The accurate measurement of water levels in wells, and knowledge of which aquifer is represented by a particular water level measurement, is critical to construct reliable groundwater elevation contour maps and hydrographs from which important conclusions and decisions are made as to the state of the basin. It has been stated previously that production wells often provide average water quality results because they are tapped into multiple aquifers. This is also true of water levels. Specific aquifers usually have different elevation heads because of pressure differences within the aquifers.

Table 1.1 presented the construction information for WRD monitoring wells. **Table 3.2** presents groundwater elevation (head) measurements from WRD nested monitoring wells. These data demonstrate the head differences between individual aquifers at each WRD nested monitoring well location. The differences in head are caused primarily by the amount of local pumping, the proximity to recharge sources, and the degree of separation between aquifers caused by aquitards.

Nested wells show meaningful differences between zones, reflecting both hydrogeologic and pumping conditions. Head differences from about 1 to 60 feet occur between zones above and below the producing zones. The greatest head differences tend to occur in the pumping holes of the Central and West Coast Basin Pressure Areas, while the smallest differences occur in the Montebello Forebay recharge area and the Torrance area (which have thick, merged aquifers). Nested well locations showing largest differences in heads between aquifers typically exhibit the lower head in the Silverado and adjacent producing zones, because these are the most heavily pumped.

At this time, WRD has completed 24 nested monitoring wells. This network of wells provides outstanding vertical and areal coverage of water level (and water quality) trends across the CWCB. The following discussion focuses on vertical water level differences observed in WY 98-99 at several WRD nested well sites and how those differences infer the connectivity of aquifers.

Downey #1 (Figure 3.8): This well is located in the Central Basin Pressure Area near the boundary with the Montebello forebay. During WY 1998-1999, water levels in zones 1 through 4 (Sunnyside, Silverado, Hollydale, and Jefferson Aquifers) generally tracked well, suggesting similar responses to pumping and recharge. Water level highs occurred in December 1998 and January 1999, with lows occurring in August 1999. Zones 5 (Exposition Aquifer) and 6 (Gaspur Aquifer), however, have heads 15 to 30 feet higher than the deeper aquifers, and their elevations fluctuate only several feet per year versus tens of feet for the deeper aquifers. This suggests the shallower two aquifers are not immediately connected to the deeper ones, and do not respond to pumping and recharge as strongly as the deeper aquifers.

Carson #1(Figure 3.9): This well, located in the center of the Carson pumping hole, shows a 50-foot difference in head between the Silverado aquifer (elevation approximately 75 feet below MSL) and the overlying Lynwood aquifer (elevation approximately 25 fee below MSL). The Silverado and underlying Sunnyside aquifers exhibit similar heads and trends through the year, as do the Lynwood and Gage aquifers.

Rio Hondo #1(Figure 3.10): This well is located in the Central Basin Non-Pressure Area (at the Montebello Forebay spreading grounds). With the exception of Zones 2 and 3 (both in the Sunnyside aquifer) which have nearly identical heads throughout the year, there are several feet of vertical head differences between aquifers. The most significant finding is that Zone 4 (Silverado aquifer) has the lowest head of all measured aquifers, suggesting that this aquifer is the most heavily pumped in the area. Because it has the lowest head, it should be expected to receive recharge waters from above and below the Silverado. Water level highs in all zones were generally observed in April 1999 and lows in September 1999.

Huntington Park #1(Figure 3.11): This well, located in the Los Angeles Forebay, shows only slight differences in head between the Silverado aquifer (average elevation approximately 25 feet below MSL) and the overlying Jefferson and Gage aquifers. There is over 30 feet head difference between Zones 3 and 4. Heads remained relatively level except for Zone 2 which dropped 9 feet.

SECTION 4
GROUNDWATER QUALITY

This section discusses the vertical and horizontal distribution of several key water quality parameters based on data from WRD monitoring wells and production wells in the CWCB, for Water Year 1998-1999. WRD collects biannual groundwater samples from completed WRD nested monitoring wells in the fall and spring of each WY. Groundwater samples are submitted to a DHS certified laboratory for analytical testing for general water quality parameters and known or suspected contaminants. Data for production wells were provided by the DHS. **Figures 4.1 through 4.22** are maps which present water quality data for key parameters and special interest constituents in the WRD nested monitoring wells and production wells in the CWCB. The figures present the maximum values for data where more than one result is available for the water year. **Table 1.1** presents well construction information for WRD wells. **Table 4.1** categorizes groundwater at the WRD wells into major mineral water quality groups. **Table 4.2** lists the water quality analytical results for the wells during Water Year 1998-1999.

4.1 MAJOR MINERAL CHARACTERISTICS OF GROUNDWATER IN THE CENTRAL AND WEST COAST BASINS

Major minerals data from general mineral analyses were used to characterize groundwater from each zone of each WRD well with respect to source of recharge water (**Table 4.1**). Research by the USGS has provided three distinct groupings of groundwater compositions. Group A groundwater is typically calcium bicarbonate or calcium bicarbonate/sulfate dominant. Group B groundwater has a typically calcium-sodium-bicarbonate or sodium bicarbonate character. Group C has a sodium chloride character. A few of the WRD wells yield groundwater samples which do not fall into one of the three major groups and are grouped separately.

Groundwater from Group A likely represents recently recharged water with a significant percentage of imported water. Groundwater from Group B represents older native groundwater replenished by natural local recharge. Groundwater from Group C represents groundwater impacted by seawater intrusion or connate saline brines. **Table 4.1** lists the groundwater group for each WRD nested monitoring well sampled during Water Year 1998-1999. Comparison of groundwater groups with well locations indicates that, in general, Group A groundwater is found at and immediately down-gradient from the Montebello Forebay spreading grounds in all but the deepest zones. Group B groundwater is found farther down the flowpath of the Central Basin and inland of the salt water wedge and injected water in the West Coast Basin. Group C water is generally found near the coastlines. Several wells, grouped as "Other" on **Table 4.1**, plot outside the Group A, B, and C ranges and represent unique waters not characteristic of the dominant flow systems in the basins. The USGS is currently conducting trace element isotope analyses of water from these wells to identify their hydrogeologic source(s).

The major mineral compositions of water from the WRD nested monitoring wells sampled this water year have not changed substantially from previous years where older data are available. It is expected that continued analysis will show gradual changes in major mineral compositions over time, as older native water is extracted from the basins and replaced by younger replenishment water.

4.2 TOTAL DISSOLVED SOLIDS (TDS)

As described in Section 5, TDS is a measure of the total mineralization of water. WRD well data for Water Year 1998-1999 indicate relatively low TDS concentrations for groundwater in the Central Basin (**Figure 4.1**). All but one of the aquifers screened by the WRD wells sampled in the Central Basin (including the major producing zone, the Silverado Aquifer) exhibit TDS concentrations less than the DHS upper limit of 1,000 mg/L. In fact two-thirds of the wells had concentrations below the Primary MCL of 500 mg/L and most of the rest fell between 500 and 750 mg/L. Only the shallowest zones at Downey #1 and Lakewood #1 had TDS concentrations above 750 mg/L and only the deepest zone of Santa Fe Springs #1 exceeded 1,000 mg/L. Generally, TDS concentrations exceeding 500 mg/L seem to be associated with the San Gabriel spreading grounds side of the Montebello Forebay or localized surface sources of recharge to the shallowest zones of nested monitoring wells.

In contrast, the nested monitoring well data show generally higher TDS concentrations for groundwater in the West Coast Basin. Only the most inland nested monitoring wells, Carson #1 and Gardena #1 indicate TDS values below 500 mg/L consistently for all zones below the shallowest. Wilmington #1 and Wilmington #2, located near the Dominguez Gap Seawater Intrusion Barriers have significantly high TDS values. The Mariner well, inland from the West Coast Basin Barrier Project indicates high TDS due to seawater intrusion. All zones of the Inglewood #1 and Lomita #1 nested monitoring wells exceed 750 mg/L with the shallowest and deepest zones greater than 1,000 mg/L.

Figure 4.2 presents 1998-1999 TDS water quality data for production wells across the CWCB. In the Central basin, TDS is generally below 500mg/L except a grouping of TDS data between 500 and 750 mg/L located around and partially down the flowpath of the San Gabriel Spreading grounds. The limited data indicate four wells near the coast have elevated TDS while two wells inland show TDS below 500mg/L.

4.3 IRON

Dissolved iron in groundwater has historically been a water quality problem in the CWCB. An abundant source of iron is present in the minerals which make up the aquifers of the basins. The presence of dissolved iron, that is the iron dissolving from the minerals into the groundwater is controlled by a variety of geochemical factors discussed at the end of this section. In the Central Basin, nested monitoring wells (**Figure 4.3**) indicated only a few local zones where iron exceeds the detection limit or the MCL.

In the West Coast Basin elevated iron concentrations in nested monitoring wells appears more widespread than in the Central Basin. The highest iron concentrations occur primarily along the western portion of the basin. At the Inglewood #1, Gardena #1, Madrid, Lomita #1 and Chandler #3 wells, the vertical distribution of iron concentrations varies; the highest iron concentrations tend to be exhibited in either the Lynwood or

Silverado aquifer. Conversely, at the Wilmington #1 well, the highest iron concentration is exhibited in the shallowest zone.

Figure 4.4 presents 1998-1999 water quality data for iron in production wells across the CWCB. The data show elevated iron concentrations in many production wells throughout the CWCB, however some distinct patterns are observed. In the Central Basin, iron concentrations exceeding the MCL tend to occur in the distal portions of the basin, away from the Montebello Forebay spreading grounds. No production wells exceeded the MCL in production wells in the vicinity of the Montebello Forebay spreading grounds, most were less than the detection limit.

Less iron data were available from DHS for the West Coast Basin. For those production wells where data were available, iron concentrations were above the limit of detection in six of eight wells sampled and four of those six wells exceeded the MCL.

Although a definitive source cannot be identified for the various elevated iron concentrations described above, some general geochemical relationships for dissolved iron in groundwater may apply to the iron distribution patterns. First, dissolved iron tends to form under reducing groundwater conditions. Groundwater having a pH value between 6 and 8 (as is the case for all the WRD wells) can be sufficiently reducing to retain as much as 50 mg/L of dissolved ferrous iron at equilibrium, when bicarbonate activity does not exceed 61 mg/L (Hem, 1992). Second, iron is a common component of many igneous rocks and is found in trace amounts in virtually all sediments and sedimentary rocks—therefore, abundant natural sources of dissolved iron are present throughout the CWCB. Third, water may dissolve any subsurface iron casing, piping, etc. upon contact—thus, historical subsurface piping may contribute a minor amount of dissolved iron to shallow groundwater in heavily urbanized areas.

4.4 MANGANESE

Manganese concentrations in the WRD nested monitoring wells exhibit widespread vertical and horizontal variations across the CWCB (**Figure 4.5**). Like iron, manganese is a naturally occurring element in groundwater and aquifer materials. In the Central Basin, manganese is present in detectable concentrations in nearly all zones of all nested monitoring wells and exceeds the MCL of 50 micrograms per liter (ug/L) in one or more zones of all nested wells. Manganese is present in shallow zones, the Silverado aquifer producing zones and deeper zones.

In the West Coast Basin, manganese concentrations tend to be even higher than the Central Basin. The MCL is exceeded in over 60% of the zones monitored in the nested wells.

Figure 4.6 presents 1998-1999 manganese water quality data for production wells across the CWCB. The data show a greater number of wells having elevated manganese concentrations compared to those exhibiting elevated iron concentrations. Similar to iron, the general pattern of predominantly low concentrations in the vicinity of the Montebello Forebay spreading grounds is contrasted by the pattern of concentrations exceeding the MCL farther away from the spreading grounds and throughout the West Coast Basin.

Although a definitive source cannot be identified for the various manganese concentrations described above, some general geochemical principles for dissolved manganese in groundwater may apply to the manganese distribution patterns. Like iron, dissolved manganese tends to form under reducing groundwater conditions (Hem, 1992). The reason for most wells in the Montebello Forebay not having problematic manganese is likely the effect of oxygen rich recharge water moving through the aquifers. Second, although manganese is one of the more abundant metallic elements and behaves similarly in geochemical processes as iron, there is only about 1/50 as much manganese in the Earth's crust as there is iron. Manganese is not an essential component of any of the more common silicate rock minerals. Therefore, it is found less commonly in water and the concentration is generally much lower than iron (Driscoll, 1989).

4.5 NITRATE

Nitrate concentrations in groundwater are a concern due to a relatively low MCL of 10 mg/L and the widespread introduction of nitrate into groundwater systems by human activities. These activities include nitrate associated with historic agricultural practices such as fertilizing crops and leaching of animal wastes, as well as presence of nitrate in recycled water used for recharge.

Figure 4.7 presents 1998-1999 nitrate water quality data for nested monitoring wells in the CWCB. Nested monitoring wells in the vicinity of the Montebello Forebay spreading grounds indicate concentrations of nitrate slightly above detection but well below the MCL. Rio Hondo #1 and Pico #2 show detectable concentrations of nitrate from the shallowest down to Zones 4 and 6 respectively. These two wells are near the down gradient end of the Rio Hondo and San Gabriel spreading ground. South Gate #1 and Downey #1 show detectable concentrations in the middle (producing) zones, down the flow path from the spreading grounds, however nested wells more distant from the spreading grounds yield non-detectable concentrations of nitrate. The detectable but relatively low concentrations of nitrate at and near the spreading grounds are likely due to the recycled water component of recharge at the spreading grounds.

Concentrations exceeding the nitrate MCL were limited to the shallowest zones of the Gardena #1, Lomita #1, and Chandler #3 nested monitoring wells in the West Coast Basin. These shallow occurrences and other shallow zone occurrences of nitrate where deeper zones are below detection levels are likely attributable to contamination by local surface recharge from former agricultural activities prior to the extensive land development beginning in the 1950s.

Figure 4.8 presents 1998-1999 nitrate water quality data for production wells across the CWCB. The data show no production wells exceeded the nitrate MCL in the CWCB during Water Year 1998-1999. Detectable concentrations below the MCL were generally concentrated around and down the groundwater flow path of the San Gabriel spreading grounds side of the Montebello Forebay. One isolated production well located in the northwestern corner of the Central Basin had detectable concentrations of nitrate. Several production wells in the West Coat Basin also show detectable nitrate below the MCL.

4.6 TRICHLOROETHYLENE (TCE)

TCE was not detected in the Silverado aquifer in any of the WRD wells for the majority of samples collected (**Figure 4.9**). However, in the Central Basin, the Huntington Park #1 well. (Los Angeles Forebay area) shows elevated TCE concentrations ranging from less than the MCL to more than 4 times the MCL in Zones 2, 3, and 4. Levels of TCE below the MCL were detected at Downey #1, Zones 5 and 6, and South Gate #1, Zone 5.

Figure 4.10 presents 1998-1999 TCE water quality data for production wells across the CWCB. Less data were available for the West Coast Basin. The data show many TCE detections above the MCL along the San Gabriel River in and several miles south of the Montebello Forebay. An additional detection was found in the Los Angeles Forebay. DHS data for the West Coast Basin included only six production wells sampled during WY 1998-1999 with three wells exceeding the MCL, one detection below the MCL, and two wells with non-detectable concentrations of TCE.

4.7 TETRACHLOROETHYLENE (PCE)

The PCE distribution pattern is slightly different than the TCE pattern for the WRD nested wells. Overall, PCE was detected in only three nested wells in the Central Basin and one well in the West Coast Basin (**Figure 4.11**). In the Central Basin, well Pico #2 shows PCE detected at 2-4 times the MCL immediately below the Silverado aquifer, in the Sunnyside aquifer. Well South Gate #1 shows PCE detected at 1-2 times the MCL in the Silverado aquifer. At Huntington Park #1, PCE was detected below the detection limit in Zone 3. In the West Coast Basin, the Inglewood #1 well shows PCE exceeding the MCL in the shallowest screened zone, the Gage aquifer, and detected below the MCL in the deepest zone.

Figure 4.12 presents 1998-1999 PCE water quality data for production wells across the

CWCB. No data were available for the West Coast Basin. In the Central Basin there were seven production wells exceeding the MCL. These wells were located in the Montebello and Los Angeles Forebay areas of the Central Basin. There were 32 additional production wells with detected concentrations below the MCL. The relatively large number of production wells with PCE are primarily located in the Los Angeles and Montebello Forebays and extend out into the middle of the Central Basin. It should be noted that the detections of PCE above the MCL have increased compared to the previous three water years.

Similar to TCE, PCE is a common manmade solvent and has been used since the 1940s. Furthermore, TCE is often a breakdown product of PCE. In both the Central and West Coast Basins, there are numerous possible historical sources of TCE, PCE, or other contaminants of concern. **Figure 4.13** shows a partial listing of sites which have been identified on one or more federal, state, or local regulatory databases as sites of potential environmental concern, having known or potentially hazardous materials, petroleum products or hazardous wastes.

4.8 SPECIAL STUDIES CONSTITUENTS

At the recommendation of the WRD Pumpers' Task Force, several additional water quality constituents were considered during Water Year 1998-1999, to address emerging water quality issues related to hazardous waste contamination, recycled water use in the CWCB, and proposed revisions to water quality regulations. Current special studies constituents include arsenic, hexavalent chromium, MTBE, perchlorate, and radon. The following subsections describe each constituent studied.

Arsenic

Arsenic is an element that occurs naturally in the earth's crust. Accordingly, there are natural sources of exposure. These include weathering of rocks and erosion depositing arsenic in water bodies and uptake of the metal by animals and plants. Consumption of food and water are the major sources of arsenic exposure for the majority of U.S. citizens. People may also be exposed from industrial sources, as arsenic is used in semiconductor manufacturing, petroleum refining, wood preservatives, animal feed additives and herbicides. The National Research Council (NRC) of the National Academy of Sciences released its *Report on Arsenic in Drinking Water* in March 1999 and recommended lowering the current drinking water standard of 50 μg/L, which has been in effect since 1943. This recommendation is based on NRC assessments of the risks of skin, lung, and bladder cancer from drinking water containing inorganic arsenic. The report quantified the risks from bladder cancer and describes potential risks of cardiovascular effects.

The Safe Drinking Water Act, as amended in 1996, requires the United States Environmental Protection Agency (EPA) to revise the existing drinking water standard for arsenic. The new standard will protect against possible adverse health effects from exposure to this contaminant and will reflect the statutory evaluation of whether the costs are justified by the benefits. The process for revising the standard has been complex, and EPA must consider a range of scientific, economic, and programmatic factors.

EPA is expected to release a proposed rule in Summer 2000. The new rule would become effective in January 2001 with compliance likely required by 2004. It appears that the proposed new standard will be 5 μg/L, but the EPA will also ask for comments on a standard of 3 μg/L and 10 μg/L.

Figure 4.14 presents 1998-1999 arsenic water quality data for WRD nested monitoring wells. Arsenic concentrations greater than the proposed MCL in the Central Basin appear to be significant and widespread especially in the southern and eastern portions of the basin. This distribution of arsenic appears similar to the distribution of iron and manganese in the Central Basin.

Several nested monitoring wells in the West Coast Basin had zones with concentrations of arsenic above the proposed MCL of 5 ug/L. These included the deepest zones in Inglewood #1, Gardena #1, Carson #1, and Chandler #3, and the shallowest zones in Mariner, Madrid, and Chandler #3. Except for the Chandler #3 well at the margin of the basin, Arsenic was not detected in the Silverado aquifer in the West Coast Basin.

Figure 4.15 presents 1998-1999 arsenic water quality data for production wells across the CWCB. Production well results support the findings from nested monitoring wells. Production Wells in the southern and eastern portions of the Central Basin indicate arsenic concentrations well above the proposed MCL. The Los Angeles and Montebello Forebay areas of the Central Basin are generally below the detection limit and the proposed MCL. Arsenic was not detected in any West Coast Basin production wells during the 1998-1999 WY.

Hexavalent Chromium

Chromium is a metal used in the manufacture of stainless steel, metal plating operations, and other applications. It has the potential to contaminate groundwater from spills and leaking tanks. It comes in two basic forms: chromium III (trivalent) and chromium VI (hexavalent). Currently there is an MCL for total (all forms of) chromium set at 50 μg/L. The California Public Health Goal (PHG) for total chromium is 2.5 μg/L. The DHS will review the current MCL and consider reducing it in light of the PHG, which was issued in February 1999. The Office of Environmental Health Hazard Assessment determined that the health protective level for hexavalent chromium is 0.2 μg/L.

Figure 4.16 presents 1998-1999 hexavalent chromium water quality data for WRD nested monitoring wells. Hexavalent chromium was not detected in the WRD wells sampled in the West Coast Basin. No WRD nested monitoring wells in the Central Basin were sampled for hexavalent chromium during the 1998-1999 WY, but will be sampled in the upcoming WY. As new wells are added to the WRD nested monitoring well network, samples will be collected for hexavalent chromium analysis to update these special study results. WRD will report these updates in subsequent regional groundwater monitoring reports. Hexavalent chromium is not typically sampled for in production wells across the CWCB, and was not sampled for during Water Year 1998-1999. If DHS begins requiring hexavalent chromium testing active drinking water production wells, this data will also be reported in future regional groundwater monitoring reports.

Methyl Tert-Butyl Ether (MTBE)

Methyl tertiary butyl ether (MTBE) is a synthetic chemical added to gasoline to improve air quality as part of the federal Clean Air Act. Limited quantities have been used in gasoline in California since the 1970s. In 1992, oil companies began using it extensively in California to meet reformulated gas requirements of the State Air Resources Board. MTBE has been detected in groundwater and surface water sources throughout California. Animal tests have shown it to be carcinogenic. Effective May 17, 2000, a primary MCL of 13 μg/L was established by DHS. Previously, a secondary standard of 5 μg/L was established in response to objectionable taste and odor characteristics. An executive order by Governor Davis bans the use of MTBE by 2003, which should significantly reduce, if not virtually eliminate new discharges.

Figure 4.17 presents 1998-1999 MTBE water quality data for WRD nested monitoring wells. MTBE was not detected above the MCL in any of the WRD nested monitoring wells sampled. **Figure 4.18** presents 1998-1999 MTBE water quality data for production wells across the CWCB. MTBE was not detected above the MCL in any of the production wells sampled.

Perchlorate

Perchlorate (as ammonium perchlorate) is an inorganic chemical used in the production of solid rocket fuel, fireworks, explosive devices, and munitions. It dissolves easily in water, does not biodegrade readily, and adsorbs poorly to the soil. Water supply wells have been contaminated by perchlorate in areas in which such production, or rocket testing, occurred. Perchlorate primarily affects the human thyroid gland's ability to utilize iodine to produce thyroid hormones, which are required for normal body metabolism, as well as growth and development. DHS has established an action level for perchlorate at 18 μg/L. Below 18 μg/L, perchlorate is not thought to pose a health risk to humans. If a public utility detects perchlorate above 18 μg/L, DHS will recommend that the utility remove the contaminated source from service.

Figure 4.19 presents 1998-1999 perchlorate water quality data for WRD nested monitoring wells. In the Central Basin, perchlorate was detected at low levels in three nested monitoring wells including Downey #1 Zones 2 and 3, South Gate #1 Zone 3, and Huntington Park #1 Zones 3 and 4. These perchlorate concentrations occur in relatively deep aquifers (Silverado in Downey #1 and below the Silverado in South Gate #1) in the Central Basin Pressure Area. At Huntington Park #1, detections of perchlorate were found somewhat shallower in the Gage and Exposition Aquifers. The source of the perchlorate in the aquifers is unknown at this time. None of the detected concentrations were above the State Action Level (SAL) in any of the WRD wells sampled.

In the West Coast Basin, perchlorate was detected at low levels in the shallowest zone of Lomita #1 and Chandler #3. The source of the perchlorate in the aquifers is unknown at this time. None of the detected concentrations were above the SAL in any of the WRD wells sampled.

Figure 4.20 presents 1998-1999 perchlorate water quality data for production wells across the CWCB. Perchlorate was not detected above the SAL in any of the production wells sampled. A group of four production wells in the Norwalk and Bellflower areas had detected concentrations of perchlorate below the SAL. The source of the detected perchlorate is unknown at this time.

Radon

Radon is a naturally-occurring radioactive gas that may be found in drinking water and indoor air. Some people who are exposed to radon may have an increased cancer risk during their lifetime. Currently, there is no drinking water standard for radon. As required by the Safe Drinking Water Act, the EPA released a proposed regulation in November 1999 to reduce radon in drinking water that has a multimedia mitigation option to reduce radon in indoor air.

The proposed standards would apply to community water systems that use ground water or mixed ground and surface water (e.g., systems serving homes, apartments, and trailer parks). The proposal will provide states flexibility in how to limit exposure to radon by allowing them to focus their efforts on the greatest radon risks, those in indoor air, while also reducing the risks from radon in drinking water. The proposed regulation provides two options to states and water systems to reduce exposure to radon.

- First Option: States can choose to develop enhanced state programs to address the health risks from radon in indoor air, known as Multimedia Mitigation (MMM) programs, while individual water systems reduce radon levels in drinking water to 4,000 picoCuries/liter (pCi/L) or lower. EPA is encouraging states to adopt this option because it is the most cost-effective way to achieve the greatest radon risk reduction.
- Second Option: If a state chooses not to develop an MMM program, individual water systems in that state would be required to either reduce radon in their system's drinking water to 300 pCi/L or develop individual local MMM programs and reduce levels in drinking water to 4000 pCi/L. Water systems already at or below 300 pCi/L standard would not be required to treat their water for radon.

The final rule is due to be set in August 2000.

Figure 4.21 presents limited 1998-1999 radon water quality data for WRD nested monitoring wells in the West Coast Basin. Radon was not detected above 300 pCi/L in the WRD wells sampled. Radon sampling for the Central Basin will be performed in the upcoming WY and as new wells are added to the WRD nested monitoring well network, samples will be collected for radon analysis to update these special study results. WRD will report these updates in subsequent regional groundwater monitoring reports.

Figure 4.22 presents 1998-1999 radon water quality data for production wells across the CWCB. Less data were available for the West Coast Basin. Elevated concentrations of radon above 300 pCi/L were detected in clusters in the Los Angeles and Montebello Forebays, and in two clusters in the southern portion of the Central Basin. In the West Coast basin, only two production wells exceeded 300 pCi/L. WRD will continue to study the occurrence and distribution of radon in the basins in an effort to understand the behavior of this emerging water quality constituent of interest.

SECTION 5
SUMMARY OF FINDINGS

This Annual Groundwater Monitoring Report was prepared by WRD to report on the groundwater conditions in the CWCB during the WY 1998-99. A summary of findings is bulleted below.

- Artificial replenishment activities combined with natural replenishment and controlled pumping have ensured a sustainable, reliable supply of groundwater in the CWCB. Artificial replenishment water sources used by WRD include imported water from the Metropolitan Water District of Southern California, recycled water from the County Sanitation Districts of Los Angeles County, recycled water with advanced treatment from West Basin MWD, and In-lieu replenishment water.
- At the Montebello Forebay, imported water was not purchased for replenishment during Water Year 1998-1999 due to construction activities in the spreading grounds. This, along with a below-normal precipitation year, resulted in a water level drop in the Montebello Forebay. A total of 41,201 AF of recycled water was purchased for spreading in the Montebello Forebay. A total of 18,620 AF of imported water was purchased for injection to the seawater barriers. A total of 6,973 AF of recycled water was purchased for injection into the West Coast Basin Barrier Project. In-lieu replenishment water totaled 23,516 AF.
- Groundwater production in the CWCB was 255,750 AF for Water Year 1998-1999. This amount is less than the adjudicated amount, partly due to the success of WRD's In-Lieu Replenishment Program, which provides incentives to pumpers for not pumping in areas that are difficult to recharge by other means.
- The WRD nested monitoring wells show clear, significant differences in groundwater elevations between the various aquifers screened. The head differences in the WRD nested monitoring wells reflect both hydrogeologic and pumping conditions in the CWCB. Vertical head differences between 1 and 60 feet occur between zones above and below the producing zones. The greatest head differences tend to occur in the

pumping holes of the Central and West Coast Basin Pressure Areas, while the smallest differences occur in the Montebello Forebay recharge area, and the Torrance area which has thick, merged aquifers.

- Basinwide hydrographs and groundwater elevations measured in nested monitoring wells and key production wells indicate a general decline in water levels in the CWCB during Water Year 1998-1999.
- The water quality associated with key constituents in untreated imported water used at the Montebello Forebay spreading grounds remains excellent and has improved slightly over the past water year. Average TDS, hardness, iron and manganese concentrations in both Colorado River and/or State Water Project water have decreased and remain below their respective MCLs. Meanwhile, TCE and PCE have not been detected in either water source.
- The water quality associated with key constituents in recycled water used at the Montebello Forebay spreading grounds also remains excellent and is carefully monitored and controlled to show little variation over time.
- Stormwater samples are occasionally collected from the Montebello Forebay area and analyzed for a few water quality parameters. Samples collected between 1995 and early 1998 show that average stormwater TDS concentrations and hardness are lower than most other sources of replenishment water.
- Based on the data obtained from the WRD nested monitoring wells during Water Year 1998-1999, the water quality associated with key constituents in groundwater differs both vertically between aquifers and horizontally (areally) across the CWCB.
- TDS concentrations for WRD wells located in the Central Basin are relatively low, while TDS concentrations for WRD wells located in the West Coast Basin are elevated in portions of the basin, primarily the Torrance and Dominguez Gap areas. The elevated TDS concentrations may be caused by seawater intrusion or oil field brines. During this reporting period, concentrations in the Central Basin ranged from 160 mg/L to 790 mg/L, and in the West Coast Basin 200 mg/L to 9840 mg/L. The District is conducting further studies with the U.S.G.S. to identify the sources of high TDS.
- Iron concentrations in production wells in the CWCB continue to be problem. During

this reporting period, concentrations in the Central Basin ranged from ND to 0.5 mg/L, and in the West Coast Basin ND to 0.46 mg/L. In the Central Basin, it appears that the spreading of replenishment water at the Montebello Forebay tends to decrease dissolved iron concentrations in groundwater.

- Similar to the iron concentrations, manganese concentrations in the WRD wells exceed MCLs in a large number of nested monitoring wells and production wells across the CWCB. During this reporting period, concentrations in the Central Basin ranged from ND to 1,000 μg/L, and in the West Coast Basin ND to 1,400 μg/L. As with iron, it appears that the spreading of replenishment water at the Montebello Forebay tends to decrease dissolved manganese concentrations in groundwater, probably because the two constituents have similar geochemical behavior.
- Nitrate concentrations in the Central Basin ranged from ND to 6.5 mg/L, and in the West Coast Basin ND to 28.8 mg/L in WRD nested monitoring wells. Concentrations approaching or exceeding the 10 mg/L MCL tend to be limited to the uppermost zone at a particular nested well. No concentrations above the MCL were observed in the Silverado aquifer. DHS data indicated no CWCB production wells tested for nitrate above the MCL during WY 1998-1999.
- TCE was not detected in the Silverado Aquifer in the WRD wells sampled, with the exception of Huntington Park #1. During this reporting period, concentrations in the Central Basin ranged from ND to 29 μg/L, and in the West Coast Basin ND to 14 μg/L.
- PCE was detected in three WRD wells in the Central Basin and one well in the West Coast Basin. During this reporting period, concentrations in the Central Basin ranged from ND to 12 μg/L, and in the West Coast Basin ND to 6.8 μg/L.
- As represented by these data, groundwater in the CWCB is of generally good quality and is suitable for continued use by the pumpers in the District, the stakeholders, and the public.

SECTION 6
FUTURE ACTIVITIES

WRD will continue to update and augment its Regional Groundwater Monitoring Program to best serve the needs of the District, the pumpers and the public. Some of the activities planned under this program for the WY 1999-2000 are listed below.

- Based on the success of the In-Lieu Replenishment Program at reducing pumping in the CWCB, WRD intends to continue this program as a management tool for replenishment.
- Because recycled water is a relatively low-cost, replenishment water source, WRD will continue to maximize recycled water use at the Montebello Forebay spreading grounds without exceeding regulatory limits.
- WRD will continue to maximize recycled water use at the West Coast Basin barrier, and intends to use recycled water at the Dominguez Gap and Alamitos barriers in the near future.
- WRD will continue to monitor the quality of all replenishment water sources to ensure the CWCB are being recharged with high-quality water.
- Total injection quantities at all three seawater intrusion barriers is expected to increase over the next several years as additional barrier wells are constructed to further combat seawater intrusion. WRD will work with the pumpers over the next year to find solutions to reduce the injection water demands and/or high costs. Basin management alternatives will be explored to help find these solutions.
- WRD will install additional nested monitoring wells in key areas throughout the CWCB in upcoming years to continue refining the regional understanding of groundwater occurrence, movement, and quality. Water levels will be recorded using automatic dataloggers to monitor groundwater elevation differences throughout the year.
- WRD will continue to sample groundwater from nested monitoring wells twice per year, and analyze the samples for general water quality constituents. In addition we

will continue to focus on constituents of interest to WRD and the pumpers such as N-Nitrosodimethylamine (NDMA), arsenic and radon.

- WRD will continue to use the data generated by this Regional Groundwater Monitoring Program to address current and upcoming issues related to water quality and groundwater replenishment in the Central and West Coast Basins.

SECTION 7
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TABLE 1.1
CONSTRUCTION INFORMATION
WRD NESTED MONITORING WELLS

Well Name	Zone	WRD ID Number	Depth of Well (feet)	Top of Perforation (feet)	Bottom of Perforation (feet)	Aquifer Designation
Carson #1	1	100030	1010	990	1010	Sunnyside
	2	100031	760	740	760	Silverado
	3	100032	480	460	480	Lynwood
	4	100033	270	250	270	Gage
Cerritos #1	1	100870	1215	1155	1175	Sunnyside
	2	100871	1020	1000	1020	Sunnyside
	3	100872	630	610	630	Silverado
	4	100873	290	270	290	Hollydale
	5	100874	200	180	200	Gage
	6	100875	135	125	135	Artesia
Chandler #3b	1	100082	363	341	363	Gage/Lynwood/Silverado
Chandler #3a	2	100083	192	165	192	Gage/Lynwood/Silverado
Columbia	1	100042	600	555	595	Lower San Pedro
	2	100043	505	460	500	Silverado
	3	100044	285	240	280	Lynwood
	4	100045	205	160	200	Gage
Commerce #1	1	100881	1390	1330	1390	Pico Formation
	2	100882	960	940	960	Sunnyside
	3	100883	780	760	780	Sunnyside
	4	100884	590	570	590	Silverado
	5	100885	345	325	345	Hollydale
	6	100886	225	205	225	Exposition/Gage
Downey #1	1	100010	1190	1170	1190	Sunnyside
	2	100011	960	940	960	Silverado
	3	100012	600	580	600	Silverado
	4	100013	390	370	390	Hollydale/Jefferson
	5	100014	270	250	270	Exposition
	6	100015	110	90	110	Gaspur
Gardena #1	1	100020	990	970	990	Sunnyside
	2	100021	465	445	465	Silverado
	3	100022	365	345	365	Lynwood
	4	100023	140	120	140	Gage
Hawthorne #1	1	100887	990	910	950	Pico Formation
	2	100888	730	710	730	Lower San Pedro/Sunnyside
	3	100889	540	520	540	Lower San Pedro/Sunnyside
	4	100890	420	400	420	Silverado
	5	100891	260	240	260	Lynwood
	6	100892	130	110	130	Gage
Huntington Park #1	1	100005	910	890	910	Silverado
	2	100006	710	690	710	Jefferson
	3	100007	440	420	440	Gage
	4	100008	295	275	295	Exposition
	5	100009	134	114	134	Gaspur
Inglewood #1	1	100091	1400	1380	1400	Pico Formation
	2	XXXXXXXXXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
	3	100093	450	430	450	Silverado
	4	100094	300	280	300	Lynwood
	5	100095	170	150	170	Gage
Inglewood #2	1	100824	860	800	840	Pico Formation
	2	100825	470	450	470	Pico Formation
	3	100826	350	330	350	Silverado
	4	100827	245	225	245	Lynwood
Lakewood #1	1	100024	1009	989	1009	Sunnyside
	2	100025	660	640	660	Silverado
	3	100026	470	450	470	Lynwood
	4	100027	300	280	300	Hollydale
	5	100028	160	140	160	Artesia
	6	100029	90	70	90	semi-perched
La Mirada #1	1	100876	1150	1130	1150	Sunnyside
	2	100877	985	965	985	Silverado
	3	100878	710	690	710	Lynwood
	4	100879	490	470	490	Jefferson
	5	100880	245	225	245	Gage
Lomita #1	1	100818	1340	1240	1260	Lower San Pedro
	2	100819	720	700	720	Silverado
	3	100820	570	550	570	Silverado
	4	100821	420	400	420	Silverado
	5	100822	240	220	240	Gage
	6	100823	120	100	120	Gage
Long Beach #1	1	100920	1470	1430	1450	Sunnyside
	2	100921	1250	1230	1250	Sunnyside
	3	100922	990	970	990	Silverado
	4	100923	619	599	619	Lynwood
	5	100924	420	400	420	Gage
	6	100925	175	155	175	Artesia
Long Beach #2	1	101740	1090	970	990	Pico Formation
	2	101741	740	720	740	Sunnyside
	3	101742	470	450	470	Silverado
	4	101743	300	280	300	Lynwood
	5	101744	180	160	180	Gage
	6	101745	115	95	115	Gaspur
Los Angeles #1	1	100926	1370	1350	1370	Pico Formation
	2	100927	1100	1080	1100	Sunnyside
	3	100928	940	920	940	Silverado
	4	100929	660	640	660	Lynwood
	5	100930	370	350	370	Gage

TABLE 1.1
CONSTRUCTION INFORMATION
WRD NESTED MONITORING WELLS

Well Name	Zone	WRD ID Number	Depth of Well (feet)	Top of Perforation (feet)	Bottom of Perforation (feet)	Aquifer Designation
Madrid	1	100034	685	640	680	Lower San Pedro
	2	100035	525	480	520	Silverado
	3	100036	285	240	280	Lynwood
	4	100037	190	145	185	Gage
Mariner	1	100038	715	670	710	Lower San Pedro
	2	100039	545	500	540	Silverado
	3	100040	385	340	380	Lynwood
	4	100041	245	200	240	Gage
Pico #1	1	100001	900	860	900	Pico Formation
	2	100002	480	460	480	Silverado
	3	100003	400	380	400	Silverado
	4	100004	190	170	190	Jefferson
Pico #2	1	100085	1200	1180	1200	Sunnyside
	2	100086	850	830	850	Sunnyside
	3	100087	580	560	580	Sunnyside
	4	100088	340	320	340	Silverado
	5	100089	255	235	255	Lynwood
	6	100090	120	100	120	Gaspur
Rio Hondo #1	1	100064	1150	1110	1130	Sunnyside
	2	100065	930	910	930	Sunnyside
	3	100066	730	710	730	Sunnyside
	4	100067	450	430	450	Silverado
	5	100068	300	280	300	Lynwood
	6	100069	160	140	160	Gardena
Santa Fe Springs #1	1	100096	1410	1290	1310	Pico Formation
	2	100097	845	825	845	Sunnyside
	3	100098	560	540	560	Sunnyside
	4	100099	285	265	285	Silverado
	5	XXXXXXXXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXX
South Gate #1	1	100893	1460	1440	1460	Sunnyside
	2	100894	1340	1320	1340	Sunnyside
	3	100895	930	910	930	Sunnyside
	4	100896	585	565	585	Lynwood/Silverado
	5	100897	250	220	240	Exposition
Whittier #1	1	101735	1298	1180	1200	Pico Formation
	2	101736	940	920	940	Sunnyside
	3	101737	620	600	620	Silverado
	4	101738	470	450	470	Jefferson
	5	101739	220	200	220	Gage
Willowbrook #1	1	100016	905	885	905	Pico Formation
	2	100017	520	500	520	Silverado
	3	100018	380	360	380	Lynwood
	4	100019	220	200	220	Gage
Wilmington #1	1	100070	1040	915	935	Lower San Pedro
	2	100071	800	780	800	Silverado
	3	100072	570	550	570	Silverado
	4	100073	245	225	245	Lynwood
	5	100074	140	120	140	Gage
Wilmington #2	1	100075	1030	950	970	Lower San Pedro
	2	100076	775	755	775	Silverado
	3	100077	560	540	560	Silverado
	4	100078	410	390	410	Lynwood
	5	100079	140	120	140	Gage

TABLE 2.1
Summary of Spreading Operations at Montebello Forebay

Water Year	Central Basin Recharge											
	Rio Hondo Spreading Grounds				San Gabriel River Spreading Grounds				Total Central Basin Recharge			
	Imported	Reclaimed	Local	Total	Imported	Reclaimed	Local	Total	Imported	Reclaimed	Local	Total
1973-1974	40,593	9,574	18,421	68,588	34,271	10,516	8,544	53,331	74,864	20,090	26,965	121,919
1974-1975	29,173	11,359	16,542	57,075	32,974	8,084	10,360	51,418	62,147	19,443	26,902	108,493
1974-1975	14,783	8,371	10,503	33,657	19,611	10,297	7,763	37,671	34,394	18,668	18,266	71,328
1976-1977	11,349	3,195	7,753	22,297	2,548	15,707	5,165	23,420	13,897	18,902	12,918	45,717
1977-1978	19,112	7,424	53,086	79,622	11,249	9,938	74,967	96,154	30,361	17,362	128,053	175,776
1978-1979	27,486	6,233	36,659	70,377	15,143	14,367	17,250	46,760	42,629	20,600	53,909	117,137
1979-1980	11,229	8,082	54,416	73,726	6,602	14,549	39,753	60,904	17,831	22,631	94,169	134,630
1980-1981	43,040	9,177	38,363	90,581	13,823	16,283	8,860	38,966	56,863	25,460	47,223	129,547
1981-1982	19,299	9,667	37,730	66,696	11,239	19,143	8,283	38,665	30,538	28,810	46,013	105,361
1982-1983	3,203	7,512	89,153	99,868	5,975	9,419	36,893	52,287	9,178	16,931	126,046	152,155
1983-1984	18,815	9,647	38,395	66,857	912	17,371	18,667	36,950	19,727	27,018	57,062	103,807
1984-1985	33,364	7,848	23,614	64,826	3,879	12,930	10,620	27,429	37,243	20,778	34,234	92,255
1985-1986	8,128	9,234	51,913	69,275	10,927	16,806	13,045	40,778	19,055	26,040	64,958	110,053
1986-1987	0	12,234			64,575	87,921			64,575	100,155	16,700	181,431
1987-1988	16,105	12,560	22,508	51,173	6,529	24,678	22,125	53,332	22,634	37,238	44,633	104,505
1988-1989	0	26,568			63,216	25,981			63,216	52,548	24,200	139,964
1989-1990	7,079	25,629			72,196	24,560			79,275	50,188	26,400	155,864
1990-1991	33,320	20,927			34,215	33,045			67,536	53,972	18,300	139,808
1991-1992	28,695	19,156			58,381	28,679			87,077	47,835	71,000	205,911
1992-1993	4,306	18,526			26,596	32,041			30,902	50,567	107,700	189,169
1993-1994	7,599	26,654			25,893	27,361			33,492	54,015	36,800	124,307
1994-1995	3,827	16,397			25,227	22,861			29,054	39,258	92,100	160,411
1995-1996	12,304	24,154	41,514	77,972	3,899	26,502	13,709	44,110	16,203	50,656	55,223	122,082
1996-1997	12,652	17,899	33,658	64,209	4,732	28,085	17,715	50,532	17,384	45,984	51,373	114,741
1997-1998	889	14,984	52,958	68,831	0	19,594	32,580	52,174	889	34,578	85,538	121,005
1998-1999	0	23,102	14,840	37,942	0	18,099	11,990	30,089	0	41,201	26,830	68,031

Notes:

1) These amounts may differ from those shown in WRD's Annual Survey and Engineering Reports. The ESR reflects only water that WRD purchased for replenishment. However, some of this water may percolate and be "lost" in San Gabriel Valley before it reaches the spreading grounds. Also, other entities, such as LACDPW, or the Main San Gabriel Basin Watermaster may also purchase replenishment water. This table reflects water which was actually conserved in the spreading grounds, as reported by LACDPW.

2) Data from shaded areas was not available from LACDPW detailing the relative amounts local water spread in the Rio Hondo and San Gabriel Reiver Spreading Grounds, only total central basin recharge volumes could be reported (Source: Annual Reports on Results of Water Quality Monitoring). Corresponding local water rechage volumes were calculated by subtracting corresponding imported and reclaimed water from the total volume.

TABLE 2.2

HISTORICAL QUANTITIES OF ARTIFICIAL REPLENISHMENT WATER AT SEAWATER INTRUSION BARRIERS

(Acre-feet)[(a)]

WATER YEAR	WEST COAST BASIN BARRIER[(b)]		DOMINGUEZ GAP BARRIER[(c)]	ALAMITOS BARRIER[(d)]	TOTAL
	Imported	Recycled			
1952-53	1,140				1,140
1953-54	3,290				3,290
1954-55	2,740				2,740
1955-56	2,840				2,840
1956-57	3,590				3,590
1957-58	4,330				4,330
1958-59	3,700				3,700
1959-60	3,800				3,800
1960-61	4,480				4,480
1961-62	4,510				4,510
1962-63	4,200				4,200
1963-64	10,450				10,450
1964-65	33,020			2,760	35,780
1965-66	44,390			3,370	47,760
1966-67	43,060			3,390	46,450
1967-68	39,580			4,210	43,790
1968-69	36,420			4,310	40,730
1969-70	29,460			3,760	33,220
1970-71	29,870		2,200	3,310	35,380
1971-72	26,490		9,550	4,060	40,100
1972-73	28,150		8,470	4,300	40,920
1973-74	27,540		7,830	6,140	41,510
1974-75	26,430		5,160	4,440	36,030
1975-76	35,220		4,940	4,090	44,250
1976-77	34,260		9,280	4,890	48,430
1977-78	29,640		5,740	4,020	39,400
1978-79	23,720		5,660	4,220	33,600
1979-80	28,630		4,470	3,560	36,660
1980-81	26,350		3,550	3,940	33,840
1981-82	24,640		4,720	4,540	33,900
1982-83	33,950		6,020	3,270	43,240
1983-84	28,000		7,640	2,440	38,080
1984-85	25,210		7,470	3,400	36,080
1985-86	20,260		6,160	3,410	29,830
1986-87	26,030		6,230	4,170	36,430
1987-88	24,270		7,050	3,990	35,310
1988-89	22,740		5,220	3,900	31,860
1989-90	20,279		5,736	4,110	30,125
1990-91	16,039		7,756	4,096	27,891
1991-92	22,180		6,894	4,172	33,246
1992-93	21,516		4,910	3,350	29,776
1993-94	15,482		5,524	2,794	23,800
1994-95	14,237	1,480	4,989	2,883	23,589
1995-96	12,426	4,170	5,107	3,760	25,463
1996-97	11,372	6,241	5,886	3,854	27,353
1997-98	8,173	8,306	3,771	3,677	23,927
1998-99	10,125	6,973	4,483	4,012	25,591

(a) Source: Engineering Survey and Report, WRD 1999

(b) Prior to 10/1/71, water was purchased by the State, West Basin Water Association, local water interests, Zone II of the LA County Flood Control District and WRD. After 10/1/71, all purchases have been by WRD

(c) In 1970-71, purchases were shared by WRD and Zone II. After 10/1/71, all purchases have been by WRD

(d) Excludes water purchases by Orange County Water District.

TABLE 2.3
WATER QUALITY OF REPLENISHMENT WATER, WATER YEAR 1998-1999

Constituent	Units	Treated Colorado River/State Project Water[a] 1998-1999[d]	Untreated Colorado River Water[b] 1998-1999[d]	Untreated State Project Water[b] 1998-1999[d]	West Basin MWD WRP[c] 1999[e]	Whittier Narrows WRP[b] 1998-1999[f]	San Jose Creek East WRP[b] 1998-1999[f]	San Jose Creek West WRP[b] 1998-1999[f]	Pomona WRP[b] 1998-1999[f]	Stormwater[g] 1995-1998[g]
Total Dissolved Solids (TDS)	mg/L	451	582	252	113	538	583	560	506	407
Hardness	mg/L	223	287	139	44	194	218.71	218.83	206.75	184
Nitrogen (Nitrate as N)	mg/L	<0.1	0.90	0.96	1.0	6.56	2.38	4.42	1.84	NA
Iron	mg/L	<0.02	0.044	0.023	<0.1	0-<0.05	0.08	0.07	0-<0.05	NA
Manganese	ug/L	<5	<5	<5	<30	9	30	6	8	NA
Trichloroethylene (TCE)	ug/L	<0.5	<0.5	<0.5	<0.3	0-<0.5	0-<0.6	0-<0.5	0-<0.5	NA
Tetrachloroethylene (PCE)	ug/L	<0.5	<0.5	<0.5	<0.3	0-<0.5	0.4-<0.8	0.4-<0.7	0.7-<1.1	NA

Notes:

a = Used at the seawater intrusion barriers

b = Used at the Montebello Forebay spreading grounds

c = Used at the West Coast Basin Barrier

d = Average concentration data from Metropolitan Water District of Southern California (MWD), for fiscal year July 1 through June 30

e = Average concentration data from West Basin Municipal Water District (West Basin MWD), for calendar year

f = Average concentration data from County Sanitation Districts of Los Angeles County (CSDLAC), for water year October through September (except for Hardness data: calendar year 1999)

g = Average concentration data from LACDPW, for samples collected from Rio Hondo and San Gabriel Rivers between 1995-early 1998

Sources of data:
MWD draft data for 1998-1999
Montebello Forebay Groundwater Recharge annual report (CSDLAC, 1999)
West Basin Water Recycling Facility annual report (West Basin MWD, 1999)

TABLE 3.1
HISTORICAL AMOUNTS OF GROUNDWATER PRODUCTION

WATER YEAR	CENTRAL BASIN	WEST COAST BASIN	TOTAL
1960-61	292,500	61,900	354,400
1961-62	275,800	59,100	334,900
1962-63	225,400	59,100	284,500
1963-64	219,100	61,300	280,400
1964-65	211,600	59,800	271,400
1965-66	222,800	60,800	283,600
1966-67	206,700	62,300	269,000
1967-68	220,100	61,600	281,700
1968-69	213,800	61,600	275,400
1969-70	222,200	62,600	284,800
1970-71	211,600	60,900	272,500
1971-72	216,100	64,800	280,900
1972-73	205,600	60,300	265,900
1973-74	211,300	55,000	266,300
1974-75	213,100	56,700	269,800
1975-76	215,300	59,400	274,700
1976-77	211,500	59,800	271,300
1977-78	196,600	58,300	254,900
1978-79	207,000	58,000	265,000
1979-80	209,500	57,100	266,600
1980-81	211,915	57,711	269,626
1981-82	202,587	61,874	264,461
1982-83	194,548	57,542	252,090
1983-84	196,660	51,930	248,590
1984-85	193,085	52,746	245,831
1985-86	195,889	52,762	248,650
1986-87	196,587	48,026	244,613
1987-88	194,561	43,833	238,394
1988-89	200,105	44,162	244,267
1989-90	197,811	47,904	245,715
1990-91	186,977	53,075	240,052
1991-92	196,382	55,964	252,346
1992-93	150,386	40,058	190,444
1993-94	156,930	41,768	198,697
1994-95	181,164	41,396	222,560
1995-96	182,067	52,759	234,826
1996-97	187,452	52,581	240,033
1997-98	188,988	51,841	240,829
1998-99	204,418	51,331	255,749

TABLE 3.2
GROUNDWATER ELEVATIONS, WATER YEAR 1998 - 1999
WRD NESTED MONITORING WELLS

ZONE	1	2	3	4	5	6
CARSON #1						Reference Point Elevation: 24.16
Depth of Well	1010	760	480	270		
Aquifer Name	Sunnyside	Silverado	Lynwood	Gage		
10/2/98	-77.52	-75.49	-27.67	-24.83		
11/19/98	-76.31	-74.22	-27.52	-24.76		
2/4/99	-73.85	-72.01	-27.42	-24.73		
5/11/99	-74.1	-72.12	-27.04	-24.31		
7/9/99	-75.58	-73.74	-26.97	-24.3		
7/30/99	-74.72	-73	-27.1	-24.43		
9/22/99	-76.17	-74.42	-27.28	-24.58		
CERRITOS #1						Reference Point Elevation: 40.72
Depth of Well	1215	1020	630	290	200	135
Aquifer Name	Sunnyside	Sunnyside	Silverado	Hollydale	Gage	Artesia
4/2/99	-22.52	-18.74	-25.44	16.5	20.74	21.63
6/21/99	-	-38.07	-42.35	-44.43	13.61	19.24
7/29/99	-51.24	-54.89	-55.53	8.26	14.57	14.53
CHANDLER #3						Reference Point Elevation: 153.2
Depth of Well	363	192				
Aquifer Name	Gage/Lyn/Silv	Gage/Lyn/Silv				
10/5/98	-28.72	-28.5				
3/5/99	-27.62	-				
8/4/99	-27.46	-27.19				
COLUMBIA						Reference Point Elevation: 78.42
Depth of Well	600	505	285	205		
Aquifer Name	Lower San Pedro	Silverado	Lynwood	Gage		
10/7/98	-12.29	-12.28	-9.71	-8.91		
2/18/99	-11.74	-10.88	-8.43	-8.77		
COMMERCE #1						Reference Point Elevation: 170.09
Depth of Well	1390	960	780	590	345	225
Aquifer Name	Pico Formation	Sunnyside	Sunnyside	Silverado	Hollydale	Exposition/Gage
6/24/99	67.91	68.29	63.24	27.47	52.41	59.6
8/5/99		62.4	58.77	25.39	18.05	58.94
DOWNEY #1						Reference Point Elevation: 97.21
Depth of Well	1190	960	600	390	270	110
Aquifer Name	Sunnyside	Silverado	Silverado	Hollydale/Jefferson	Exposition	Gasper
10/6/98	16.97	21.47	25.47	23.96	51.02	53.98
10/21/98	18.53	23.06	29.73	29.81	51.31	53.89
12/7/98	23.39	27.04	34.39	33.1	51.53	53.44
2/10/99	27.55	28.9	32.7	32.76	51.31	53.42
6/30/99	17.86	19.12	19.16	16.72	47.92	51.87

TABLE 3.2
GROUNDWATER ELEVATIONS, WATER YEAR 1998 - 1999
WRD NESTED MONITORING WELLS

ZONE	1	2	3	4	5	6
GARDENA #1					Reference Point Elevation: 79.9	
Depth of Well	990	465	365	140		
Aquifer Name	Sunnyside	Silverado	Lynwood	Gage		
10/5/98	-47.55	-71.13	-58.94	-12.41		
11/25/98	-47.07	-70.21	-56.76	-12.48		
HAWTHORNE #1					Reference Point Elevation: 86.35	
Depth of Well	990	730	540	420	260	130
Aquifer Name	Pico Formation	LSP/Sunnyside	LSP/Sunnyside	Silverado	Lynwood	Gage
7/13/99	-80.43	-26.15	-24.55	-24.24	-17.91	-4.68
8/4/99	-83.05	-26.9	-25.22	-24.98	-18.65	-2.94
8/29/99	-84.21	-26.53	-25.02	-24.69	-18.59	-5.67
HUNTINGTON PARK #1					Reference Point Elevation: 177.08	
Depth of Well	910	710	440	295	134	
Aquifer Name	Silverado	Jefferson	Gage	Exposition	Gasper	
10/6/98	-29.34	-31.59	-20.2	15.84	46.8	
12/1/98	-30.92	-32.91	-17.52	16.75	-	
2/19/99	-	-	-	17.9	45.34	
2/24/99	-28.62	-30.6	-17.54	17.59	45.29	
7/8/99	-32.66	-39.87	-21.88	16.66	-	
INGLEWOOD #1					Reference Point Elevation: 110.56	
Depth of Well	1400	885	450	300	170	
Aquifer Name	Pico Formation	Pico Formation	Silverado	Lynwood	Gage	
10/5/98	-32.02	2.53	-34.67	-3.17	2.67	
12/8/98	-34.04	2.58	-32.08	-3.01	2.61	
2/17/99	-34.06	3.25	-32.86	-2.22	3.25	
5/19/99	-35.06	-	-36.78	-6.3	-0.96	
5/22/99	-32.04	3.15	-32.46	-1.97	3.43	
8/4/99	-30.83	3.33	-34.95	-2.27	3.61	
9/10/99	-30.83	3.48	-35.93	-2.28	3.64	
INGLEWOOD #2					Reference Point Elevation: 217.33	
Depth of Well	860	470	350	245		
Aquifer Name	Pico Formation	Pico Formation	Silverado	Lynwood		
2/24/99	-24.43	-	-12.2	-6.2		
3/19/99	-24.28	-23.68	-12.13	-6.17		
7/7/99	-23.57	-22.75	-11.72	-5.8		
9/5/99	-23.65	-22.95	-12.01	-6.07		

TABLE 3.2
GROUNDWATER ELEVATIONS, WATER YEAR 1998 - 1999
WRD NESTED MONITORING WELLS

ZONE	1	2	3	4	5	6
LA MIRADA #1						Reference Point Elevation: 75.85
Depth of Well	1150	985	710	490	245	
Aquifer Name	Sunnyside	Silverado	Lynwood	Jefferson	Gage	
3/8/99	9.87	6.65	-13.06	-37.36	-9.65	
4/2/99	10.67	7.02	-12.64	4.58	-8.21	
6/2/99	-6.26	-7.28	-13.29	-37.89	-17.6	
6/21/99	19.16	-	-	-	-	
8/3/99	-17.02	-16.88	-30.03	-51.92	-23.72	
8/9/99	-18.45	-18.3	-31.78	-53.01	-23.73	
8/27/99	-22.04	-21.61	-34.74	-56.45	-25.26	
LAKEWOOD #1			Reference Point Elevations: 37.91 (Zones 1, 2, 3, 4) and 37.93 (Zones 5 and 6)			
Depth of Well	1009	660	470	300	160	90
Aquifer Name	Sunnyside	Silverado	Lynwood	Hollydale	Artesia	semi-perched
10/5/98	-36.98	-28.84	-27.81	-11.12	3.22	26.52
11/23/98	-21.47	-20.22	-17.64	-2.49	9.52	26.74
2/18/99	-31.75	-25.43	-23.22	1.8	12.88	28.17
7/1/99	-66.84	-54.02	-51.85	-26.18	-13.3	13.08
9/9/99	-79.94	-62.87	-61.74	-30.99	-16.72	11.42
LOMITA #1						Reference Point Elevation: 76.91
Depth of Well	1340	720	570	420	240	120
Aquifer Name	Lower San Pedro	Silverado	Silverado	Silverado	Gage	Gage
12/2/98	-45.57	-	-29.82	-31.75	-27.78	-
2/4/99	-42.06	-33.92	-30.54	-33.3	-27.63	-30.44
3/19/99	-41.96	-32.99	-29.84	-32.6	-27.35	-30.31
5/28/99	-41.07	-31.68	-30.37	-30.65	-25.54	-30.53
6/16/99	-43.11	-33.94	-32.26	-32.58	-27.22	-31.07
7/10/99	-41.05	-32.02	-30.31	-30.81	-25.2	-29.19
7/30/99	-41.58	-34.5	-32.58	-33.23	-27.16	-31.22
9/28/99	-39.23	-31.99	-31.24	-33.1	-25.63	-30.26
MADRID						Reference Point Elevation: 70.68
Depth of Well	685	525	285	190		
Aquifer Name	Lower San Pedro	Silverado	Lynwood	Gage		
10/7/98	-25.81	-21.14	-20.87	-20.87		
11/24/98	-24.56	20.68	-20.37	-20.3		
2/18/99	-24.55	-20.62	-20.45	-20.44		
6/18/99	-19.11	-14.94	-14.78	-14.74		
9/28/99	-19.38	-14.9	-14.75	-14.71		

TABLE 3.2
GROUNDWATER ELEVATIONS, WATER YEAR 1998 - 1999
WRD NESTED MONITORING WELLS

ZONE	1	2	3	4	5	6
MARINER						Reference Point Elevation: 97.7
Depth of Well	715	545	385	245		
Aquifer Name	Lower San Pedro	Silverado	Lynwood	Gage		
10/7/98	-7.95	-2.24	-0.37	-0.32		
2/5/99	-7.49	-1.75	0.1	0.15		
9/26/99	-12.06	-6.1	-	-3.74		
PICO #1						Reference Point Elevation: 181.06
Depth of Well	900	480	400	190		
Aquifer Name	Pico Formation	Silverado	Silverado	Jefferson		
10/6/98	152.25	133.26	131.8	141.09		
10/21/98	151.38	136.02	133.74	140.15		
12/9/98	151.68	141.88	141.64	141.06		
2/11/99	149.4	143.23	142.95	142.34		
4/5/99	148.6	-	-	-		
5/21/99	150.2	-	-	-		
6/8/99	149.09	-	-	-		
6/29/99	147.38	136.3	136.41	136.77		
7/23/99	145.26	136.51	135.97	134.21		
8/2/99	144.53	135.71	135.13	133.15		
PICO #2						Reference Point Elevation: 149.6
Depth of Well	1200	850	580	340	255	120
Aquifer Name	Sunnyside	Sunnyside	Sunnyside	Silverado	Lynwood	Gasper
10/6/98	90.98	90.47	100.02	113.85	112.6	123.25
10/21/98	90.31	90.63	100.11	112.33	111.29	118.97
12/11/98	92.1	95.47	102.58	114.26	113.37	120.94
2/11/99	95.34	97.4	103.37	110.9	111.41	119.47
6/23/99	85.46	87.6	97.07	115.19	114.64	123.98
RIO HONDO #1						Reference Point Elevation: 144.36
Depth of Well	1150	930	730	450	300	160
Aquifer Name	Sunnyside	Sunnyside	Sunnyside	Silverado	Lynwood	Gardena
10/6/98	87.72	85.71	84.84	71.27	89.38	93.64
10/21/98	87.62	84.99	84.1	71.94	90.42	94.43
12/3/98	87.14	86.99	86.19	78.07	91.34	94.62
2/8/99	89.76	88.75	88.91	80.01	91.3	94.03
6/28/99	83.05	78.64	77.73	69.83	85.02	87.71

TABLE 3.2
GROUNDWATER ELEVATIONS, WATER YEAR 1998 - 1999
WRD NESTED MONITORING WELLS

ZONE	1	2	3	4	5	6
SANTA FE SPRINGS #1					Reference Point Elevation: 168.83	
Depth of Well	1410	845	560	285	190	
Aquifer Name	Pico Formation	Sunnyside	Sunnyside	Silverado	Lynwood	
5/20/99	-	83.81	66.37	67.56	-	
6/22/99	76.72	84.1	67.65	63.82	-	
SOUTH GATE #1					Reference Point Elevation: 90.96	
Depth of Well	1460	1340	930	585	250	
Aquifer Name	Sunnyside	Sunnyside	Sunnyside	Lynwood/Silverado	Exposition	
7/6/99	-1.38	-2.63	-1.28	-0.98	40.81	
7/7/99	-1.49	-2.97	-1.28	-0.98	40.81	
8/4/99	-4.3	-5.34	-3.43	-5.8	40.36	
9/2/99	-6.16	-7.24	-5.53	-7.55	39.82	
9/10/99	-6.14	-6.26	-3.77	-4.03	39.91	
WILLOWBROOK #1					Reference Point Elevation: 96.21	
Depth of Well	885	500	360	200		
Aquifer Name	Pico Formation	Silverado	Lynwood	Gage		
10/8/98	-41.69	-41.69	-21.73	-21.31		
1/26/99	-31.13	-26.52	-18.28	-17.92		
6/3/99	-25.65	-25.99	-19.63	-19.13		
WILMINGTON #1					Reference Point Elevation: 37.96	
Depth of Well	915	780	550	225	120	
Aquifer Name	Lower San Pedro	Silverado	Silverado	Lynwood	Gage	
10/5/98	-74.36	-74.29	-74.63	-34.35	-30.13	
11/18/98	-72.5	-72.4	-72.74	-34.17	-30.15	
2/5/99	-70.17	-70.13	-70.51	-32.89	-29	
4/23/99	-70.67	-70.62	-71.03	-32.5	-28.56	
5/12/99	-70.75	-70.83	-71.07	-32	-27.99	
9/23/99	-72.47	-72.59	-72.78	-31.69	-31.63	
WILMINGTON #2					Reference Point Elevation: 29.78	
Depth of Well	950	755	540	390	120	
Aquifer Name	Lower San Pedro	Silverado	Silverado	Lynwood	Gage	
10/5/98	-54.51	-47.9	-42.91	-42.06	-12.1	
11/17/98	-53.44	-47.08	-42.17	-41.46	-12.33	
2/4/99	-51.87	-46.05	-40.52	-39.54	-12.32	
5/26/99	-52.19	-46.07	-40.68	-39.76	-12.21	

TABLE 4.1
MAJOR MINERAL WATER QUALITY GROUPS

GROUP A Generally Calcium Bicarbonate or Calcium Bicarbonate/Sulfate Dominant	GROUP B Generally Calcium-Sodium-Bicarbonate or Sodium-Bicarbonate Dominant	GROUP C Generally Sodium-Chloride Dominant	OTHER Generally Different Than Groups A, B, and C
CENTRAL BASIN			
Cerritos #1 Zones 1, 2, 3, 4, 5, 6 Downey #1 Zones 2, 3, 4, 5, 6 Huntington Park #1 Zones 1, 2, 3, 4 Lakewood #1 Zone 6 Rio Hondo #1 Zones 1, 2, 3, 4, 5, 6, Pico #1 Zones 2, 3, 4 Pico #2 Zones 1, 2, 3, 4, 5, 6 South Gate #1 Zones 1, 2, 3, 4, 5 Willowbrook #1 Zones 2, 3, 4	Downey #1 Zone 1 Lakewood #1 Zones 1,2, 3, 4, 5 La Mirada #1 Zones 1, 2, 3, 4 Willowbrook #1 Zone 1		La Mirada #1 Zone 5 Pico #1 Zone 1
WEST COAST BASIN			
Carson #1 Zones 3, 4 Gardena #1 Zones 2, 3, 4 Inglewood #1 Zones 3, 4, 5 PM-3 Madrid Zones 3,4	Carson #1 Zones 1, 2 PM-Madrid Zone 2 Wilmington #2 Zone 3	PM-4 Mariner Zones 2,3,4 Wilmington #1 Zones 1, 2, 3, 4, 5 Wilmington #2 Zones 4,5	Gardena #1 Zone 1 Inglewood #1 Zone 1 Lomita #1 Zones 1, 2, 3, 4, 5, 6 PM-3 Madrid Zone 1 PM-4 Mariner Zone 1 Wilmington #2 Zone 1,2

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Carson #1 Zone 1 11/19/98	Carson #1 Zone 1 5/12/99	Carson #1 Zone 1 9/22/99	Carson #1 Zone 2 11/19/98	Carson #1 Zone 2 5/12/99	Carson #1 Zone 2 9/22/99	Carson #1 Zone 3 11/19/98	Carson #1 Zone 3 5/12/99	Carson #1 Zone 3 9/22/99	Carson #1 Zone 4 11/19/98	Carson #1 Zone 4 5/12/99	Carson #1 Zone 4 9/22/99
General Mineral:																
Total Dissolved Solid (TDS)	500	1000		mg/l	220	210	200	240	250	220	340	310	310	630	540	570
Cation Sum				meq/l	3.60	3.41	3.52	4.03	3.85	4.06	5.23	5.24	5.35	9.71	9.6	9.57
Anion Sum				meq/l	3.46	3.5	3.51	3.90	4.08	4.05	5.28	5.43	5.44	9.86	10.2	9.77
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Manganese, Total, ICAP/MS		50		ug/l	35	30	29	25	24	24	42	39	37		**145**	**140**
Turbidity		5		NTU	0.20	0.4	2.7	0.20	ND	0.45	0.10	ND	ND	0.70	1.8	4.7
Alkalinity				mg/l	144	145	146	166	173	172	166	167	169	205	211	209
Bicarbonate as HCO3,calculated				mg/l	175	176	177	202	210	209	202	203	205	250	257	254
Calcium, Total, ICAP				mg/l	19.5	22.8	19.5	30.9	30.7	31.6	43.1	45.1	44.5	91.0	91.5	90.3
Carbonate as CO3, Calculated				mg/l	0.903	2.28	2.3	1.04	2.16	2.71	1.65	2.09	2.11	1.03	1.33	1.31
Chloride	250	500		mg/l	20	20.8	20.4	20	21.5	21.1	22.5	24.1	23.5	120	123	114
Fluoride	2			mg/l	0.27	0.26	0.26	0.21	0.21	0.21	0.28	0.28	0.29	0.39	0.38	0.39
Free CO2 (25C)				mg/l	4.41	1.76	1.77	5.09	2.65	2.09	3.21	2.56	2.59	7.92	6.47	6.4
Hydroxide as OH, Calculated				mg/l	0.014	0.034	0.034	0.014	0.027	0.034	0.021	0.027	0.027	0.011	0.014	0.014
Langelier Index - 25 degree				None	0.0	0.5	0.4	0.3	0.6	0.7	0.6	0.7	0.7	0.7	0.8	0.8
Magnesium, Total, ICAP				mg/l	4.54	4.4	4.3	6.72	5.7	7	12.0	11.3	12.6	22.0	21.1	22.2
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	3.04	2.5	2.9	2.50	ND	2.4	3.06	1.5	3	4.78	3.2	4.6
Sodium, Total, ICAP				mg/l	50.0	42.4	48.6	42.9	42.5	42.3	46.1	46.3	46.2	74.2	73.8	71.5
Sulfate	250	500		mg/l	ND	ND	ND	ND	ND	ND	62.7	66.9	66.4	113	118	113
Surfactants		0.5		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	67	75	66	105	100	108	157	159	163	318	315	317
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Organic Carbon				mg/l	0.7	0.8	0.7	ND	0.5	ND	ND	ND	ND	0.5	0.6	ND
General Physical:																
Apparent Color		15		ACU	5	5	3	3	3	3	ND	3	ND	5	5	3
Lab pH				Units	7.9	8.3	8.3	7.9	8.2	8.3	8.1	8.2	8.2	7.8	7.9	7.9
Odor		3		TON	4	1	**8**	4	1	3	4	1	3	4	1	3
pH of CaCO3 saturation(25C)				Units	7.9	7.8	7.907	7.6	7.6	7.625	7.5	7.5	7.485	7.1	7.1	7.084
pH of CaCO3 saturation(60C)				Units	7.5	7.4	7.5	7.2	7.2	7.2	7.1	7	7	6.6	6.6	6.6
Specific Conductance		1600		umho/cm	345	340	340	395	385	380	525	520	505	990	960	925
Radon				pCi/l			80			90			110			120
Metals:																
Hexavalent Chromium (CrVI low)				mg/l			ND			ND			ND			ND
Chromium, Total, ICAP/MS	50			ug/l	4.3	8	8.1	4.6	10	11	4.6	9.2	10	6.0	14	14
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	44	ND	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	ND	1.8	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium, Total, ICAP/MS	1000			ug/l	22	18	18	42	38	39	64	61	66	220	215	230
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.3	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Volatile Organics:																
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l												
2,4-D	70			ug/l												
Bentazon	18			ug/l												
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l												
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l												
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l												
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l												
Perchlorate			18	ug/l		ND	ND		ND	ND		ND	ND		ND	ND
Phenanthrene				ug/l												
Picloram	500			ug/l												
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l												
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Cerritos #1 Zone1 6/22/99	Cerritos #1 Zone 2 6/22/99	Cerritos #1 Zone 3 6/22/99	Cerritos #1 Zone 4 6/22/99	Cerritos #1 Zone 5 6/22/99	Cerritos #1 Zone 6 6/22/99	Chandler #3 Zone 1 6/14/99	Chandler #3 Zone 2 6/14/99	Downey #1 Zone 1 12/7/98	Downey #1 Zone 1 6/30/99	Downey #1 Zone 2 12/7/98
General Mineral:															
Total Dissolved Solid (TDS)	500	1000		mg/l	280	250	300	260	270	250	630	740	210	200	350
Cation Sum				meq/l	4.78	4.35	5.14	4.8	4.64	4.65	11.2	14.7	3.63	3.58	5.73
Anion Sum				meq/l	4.84	4.45	5.25	4.86	4.58	4.61	11.2	15	3.61	3.61	5.81
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND
Manganese, Total, ICAP/MS		50		ug/l	27	36	45	80	105	ND		24	3.9	2.6	ND
Turbidity		5		NTU	ND	0.7	0.05	0.8	3.7	0.2	1.5	52	5.8	0.05	0.40
Alkalinity				mg/l	164	156	168	179	181	188	300	227	156	155	171
Bicarbonate as HCO3,calculated				mg/l	199	190	204	218	220	229	366	276	190	188	208
Calcium, Total, ICAP				mg/l	32.6	34.5	39.6	43.6	36.8	45.1	75.1	110	40.8	39.2	74.1
Carbonate as CO3, Calculated				mg/l	2.58	1.96	2.1	1.42	1.8	1.49	0.947	1.42	1.23	1.54	0.853
Chloride	250	500		mg/l	15.5	13.3	19.8	13.4	10.6	10.2	168	205	5.0	5.13	26
Fluoride	2			mg/l	0.32	0.37	0.38	0.57	0.52	0.35	0.26	0.24	0.31	0.38	0.29
Free CO2 (25C)				mg/l	1.99	2.4	2.57	4.36	3.5	4.58	18.4	6.95	3.80	2.99	6.59
Hydroxide as OH, Calculated				mg/l	0.034	0.027	0.027	0.017	0.021	0.017	0.007	0.014	0.017	0.021	0.011
Langelier Index - 25 degree				None	0.7	0.6	0.7	0.5	0.6	0.6	0.6	0.9	0.4	0.5	0.5
Magnesium, Total, ICAP				mg/l	4.7	5.7	5.5	10.5	9.4	9.5	22.6	18.4	5.58	5.6	10.9
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	28.8	ND	ND	1.7
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	2.5	2.2	2	1.9	1.9	2.1	3.3	6.4	2.75	2.7	3.11
Sodium, Total, ICAP				mg/l	62	48.2	61	39.3	45.6	35.9	127	174	24.3	25	24.2
Sulfate	250	500		mg/l	53.2	44.7	63	42	30.3	26	23.2	126	16	16.5	73
Surfactants		0.5		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	101	110	121	152	131	152	280	350	125	121	230
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	28.8	ND	ND	1.7
Total Organic Carbon				mg/l	ND	ND	ND	ND	ND	ND	1.1	1.4	1.0	ND	ND
General Physical:															
Apparent Color		15		ACU	ND	3	ND	ND	ND	ND	5	10	ND	5	ND
Lab pH				Units	8.3	8.2	8.2	8	8.1	8	7.6	7.9	8.0	8.1	7.8
Odor		3		TON	1	8	1	4	1	1	1	1	1	1	1
pH of CaCO3 saturation(25C)				Units	7.63	7.63	7.54	7.47	7.54	7.43	7	7	7.6	7.6	7.3
pH of CaCO3 saturation(60C)				Units	7.2	7.2	7.1	7	7.1	7	6.6	6.5	7.1	7.1	6.8
Specific Conductance		1600		umho/cm	460	420	490	440	420	430	1070	1370	350	340	560
Radon				pCi/l							185	84			
Metals:															
Hexavalent Chromium (CrVI low)				mg/l											
Chromium, Total, ICAP/MS	50			ug/l	9.8	11	11	13	13	13	17	12	5.2	14	4.6
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	16	12	25	7.1	14	41	4.9	14	3.5	3.6	3.0
Barium, Total, ICAP/MS	1000			ug/l	53	96	110	60	72	84	100	26	91	94	150
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	ND	ND	2.2	ND	ND	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	ND	ND	ND	100	ND	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Volatile Organics:															
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l											
2,4-D	70			ug/l											
Bentazon	18			ug/l											
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l											
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l											
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l											
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l											
Perchlorate			18	ug/l	ND	ND	ND	ND	ND	ND	ND	4.7		ND	
Phenanthrene				ug/l											
Picloram	500			ug/l											
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l											
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Downey #1 Zone 2 6/30/99	Downey #1 Zone 3 12/7/98	Downey #1 Zone 3 6/30/99	Downey #1 Zone 4 12/7/98	Downey #1 Zone4 6/30/99	Downey #1 Zone5 12/7/98	Downey #1 Zone 5 6/30/99	Downey #1 Zone 6 12/7/98	Downey #1 Zone 6 6/30/99	Gardena #1 Zone 1 11/25/98	Gardena #1 Zone 1 4/15/99
General Mineral:															
Total Dissolved Solid (TDS)	500	1000		mg/l	330	570	470	520	530	560	510	710	760	350	340
Cation Sum				meq/l	5.75	8.12	8.07	8.80	9.08	8.31	8.89	13.0	14.1	5.69	5.8
Anion Sum				meq/l	5.7	9.23	8.16	8.36	9.04	9.19	8.78	13.9	13.9	6.43	6.34
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND	ND		ND		ND		ND
Manganese, Total, ICAP/MS		50		ug/l	ND	ND	ND	4.2	2.2		**160**		**79**		**44**
Turbidity		5		NTU	0.3	0.20	ND	0.10	ND	0.10	1.3	6.0	0.5	0.80	1.4
Alkalinity				mg/l	166	194	166	167	195	245	239	289	283	297	291
Bicarbonate as HCO3,calculated				mg/l	202	236	202	203	238	299	291	352	345	361	354
Calcium, Total, ICAP				mg/l	71.7	106	103	95.8	97.2	103	113	142	159	13.7	14.1
Carbonate as CO3, Calculated				mg/l	1.31	0.485	0.828	0.661	0.775	0.774	1.19	0.456	0.709	2.95	2.9
Chloride	250	500		mg/l	25.7	79	65.6	67	74.9	94	57	94	98	17	18
Fluoride	2			mg/l	0.36	0.38	0.42	0.32	0.5	0.32	0.36	0.29	0.36	0.21	0.2
Free CO2 (25C)				mg/l	4.04	14.9	6.4	8.10	9.5	15.0	9.22	35.3	21.8	5.74	5.62
Hydroxide as OH, Calculated				mg/l	0.017	0.005	0.011	0.009	0.009	0.007	0.011	0.003	0.005	0.021	0.021
Langelier Index - 25 degree				None	0.7	0.5	0.7	0.5	0.6	0.6	0.9	1.3	0.8	0.3	0.4
Magnesium, Total, ICAP				mg/l	11.4	18.9	19.4	18.8	20	21.4	21.9	30.9	32.7	7.31	7.52
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	1.71	2.6	2.79	2.7	2.57	ND	ND	ND	ND	ND	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	3.5	2.97	3.2	4.05	4.4	4.0	4	5.51	5.4	10.5	10.8
Sodium, Total, ICAP				mg/l	26.1	27.3	28.5	54.3	56.7	29.9	30.6	73.9	75.5	95.1	96.5
Sulfate	250	500		mg/l	72.7	140	133	140	135	120	114	260	262	ND	ND
Surfactants		0.5		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.08
Total Hardness as CaCO3 by ICP				mg/l	226	342	337	316	325	345	372	482	531	64	66
Total Nitrate, Nitrite-N, CALC	10			mg/l	1.71	2.6	2.79	2.7	2.57	ND	ND	ND	ND	ND	ND
Total Organic Carbon				mg/l	ND	ND	ND	0.6	ND	1.3	ND	1.4	ND	2.6	2.7
General Physical:															
Apparent Color		15		ACU	ND	ND	ND	ND	ND	ND	5	ND	ND	30	**35**
Lab pH				Units	8	7.5	7.8	7.7	7.7	7.6	7.8	7.3	7.5	8.1	8.1
Odor		3		TON	1	1	1	1	1	1	1	1	1	3	**4**
pH of CaCO3 saturation(25C)				Units	7.3	7.0	7.1	7.2	7.1	7.0	6.9	6.7	6.7	7.8	7.7
pH of CaCO3 saturation(60C)				Units	6.8	6.6	6.7	6.7	6.6	6.5	6.5	6.3	6.3	7.3	7.3
Specific Conductance		1600		umho/cm	505	880	730	805	810	855	770	1270	1150	540	590
Radon				pCi/l											
Metals:															
Hexavalent Chromium (CrVI low)				mg/l											
Chromium, Total, ICAP/MS	50			ug/l	15	4.3	15	2.9	16	2.3	19	3.5	27	7.9	2.9
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	660	ND	1050	ND	ND	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	3.8	3.7	3.9	2.0	2.6	2.5	6.1	2.3	3.5	22	22
Barium, Total, ICAP/MS	1000			ug/l	150	175	160	96	100	310	330	81	66	15	18
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	2.6	ND	5.1	ND	ND	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	ND	0.99	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	ND	ND	ND	8.0	6.9	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	10	ND	ND	15	ND	15	ND	57	ND
Volatile Organics:															
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	0.6	0.6	1.7	2.5	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l											
2,4-D	70			ug/l											
Bentazon	18			ug/l											
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l											
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	4.5	5	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l											
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l											
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l											
Perchlorate			18	ug/l	6		6		ND		ND		ND		ND
Phenanthrene				ug/l											
Picloram	500			ug/l											
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l											
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Gardena #1 Zone 2 11/25/98	Gardena #1 Zone 2 5/19/99	Gardena #1 Zone 3 11/25/98	Gardena #1 Zone 3 5/19/99	Gardena #1 Zone 4 11/25/98	Gardena #1 Zone 4 5/19/99	Huntington Park #1 Zone 1 12/1/98	Huntington Park #1 Zone 1 7/8/99	Huntington Park #1 Zone 2 12/1/98	Huntington Park #1 Zone 2 7/8/99	Huntington Park #1 Zone 3 12/1/98
General Mineral:															
Total Dissolved Solid (TDS)	500	1000		mg/l	310	310	300	310	1070	1390	320	350	320	360	600
Cation Sum				meq/l	5.30	5.65	5.36	5.88	19.8	22.1	5.71	5.86	6.10	6.16	10.8
Anion Sum				meq/l	5.35	5.39	5.32	5.52	20.5	19.5	5.81	5.92	6.01	6.13	11.1
Iron, Total, ICAP		0.3		mg/l		0.14		0.11		ND	0.27	0.21	ND	ND	ND
Manganese, Total, ICAP/MS		50		ug/l		115		29		ND	58	55	ND	2.8	ND
Turbidity		5		NTU	3.3	12	3.2	0.9	2.5	16	2.2	1.5	1.6	0.5	0.10
Alkalinity				mg/l	185	184	167	169	222	208	176	177	182	183	252
Bicarbonate as HCO3,calculated				mg/l	225	224	203	205	271	254	214	216	222	223	307
Calcium, Total, ICAP				mg/l	50.3	53	52.8	56.4	211	230	58.3	58.4	61.0	62.1	119
Carbonate as CO3, Calculated				mg/l	0.923	1.16	1.32	1.68	0.279	0.415	0.877	0.704	0.723	0.914	0.794
Chloride	250	500		mg/l	23	22.6	23	23.5	490	470	21	21.5	21	22.5	65
Fluoride	2			mg/l	0.40	0.38	0.34	0.33	0.14	0.19	0.51	0.53	0.43	0.46	0.33
Free CO2 (25C)				mg/l	7.13	5.64	4.06	3.26	34.2	20.2	6.78	8.62	8.86	7.07	15.4
Hydroxide as OH, Calculated				mg/l	0.011	0.014	0.017	0.021	0.003	0.004	0.011	0.009	0.009	0.011	0.007
Langelier Index - 25 degree				None	0.4	0.5	0.6	0.7	0.5	0.7	0.4	0.4	0.4	0.5	0.7
Magnesium, Total, ICAP				mg/l	11.3	12.3	10.6	11.7	61.4	71.2	13.8	14.2	14.6	15.4	28.9
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	13	14.4	ND	ND	ND	ND	6.5
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	3.31	3.8	3.05	3.6	5.12	5.9	2.99	3.3	3.12	3.1	4.27
Sodium, Total, ICAP				mg/l	40.7	43.5	40.8	46.1	93.4	105	36.4	38.7	40.6	39.4	54.3
Sulfate	250	500		mg/l	47	50.5	63	70	63	50	80	83.9	84	86.8	180
Surfactants		0.5		mg/l	ND	ND	ND	ND	ND	ND	0.05	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	172	183	175	189	779	867	202	204	212	218	416
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND	ND	ND	ND	13	14.4	ND	ND	ND	ND	6.50
Total Organic Carbon				mg/l	ND	ND	ND	ND	ND	0.5	ND	ND	ND	4	1.3
General Physical:															
Apparent Color		15		ACU	3	3	3	3	3	5	ND	ND	ND	ND	ND
Lab pH				Units	7.8	7.9	8.0	8.1	7.2	7.4	7.8	7.7	7.7	7.8	7.6
Odor		3		TON	2	1	1	2	2	1	1	1	1	1	1
pH of CaCO3 saturation(25C)				Units	7.4	7.4	7.4	7.4	6.7	6.7	7.4	7.344	7.3	7.304	6.9
pH of CaCO3 saturation(60C)				Units	6.9	6.9	7.0	6.9	6.2	6.2	6.9	6.9	6.9	6.9	6.4
Specific Conductance		1600		umho/cm	465	485	480	490	1890	2090	540	560	560	565	940
Radon				pCi/l											
Metals:															
Hexavalent Chromium (CrVI low)				mg/l											
Chromium, Total, ICAP/MS	50			ug/l	ND	18	ND	12	7.0	27	4.6	12	4.8	12	20
Aluminum, Total, ICAP/MS	1000	200		ug/l	210	ND	150	ND	120	ND	28	ND	110	ND	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	1.6	ND	1.7	ND	ND
Barium, Total, ICAP/MS	1000			ug/l	45	54	26	24	210	275	57	61	68	70	115
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	9.9	13	ND	ND	ND	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	7.4	ND	5.3	7.0	8.1	ND	ND	ND	ND	ND
Volatile Organics:															
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	9.2	0.5	29
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l											
2,4-D	70			ug/l											
Bentazon	18			ug/l											
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.7
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6
Chlorthalonil (Draconil,Bravo)				ug/l											
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l											
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l											
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l											
Perchlorate			18	ug/l		ND		ND		ND		ND		ND	
Phenanthrene				ug/l											
Picloram	500			ug/l											
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l											
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Huntington Park #1 Zone 3 7/8/99	Huntington Park #1 Zone 4 12/1/98	Huntington Park #1 Zone 4 7/8/99	Inglewood #1 Zone 1 5/19/99	Inglewood #1 Zone 3 12/8/98	Inglewood #1 Zone 3 5/19/99	Inglewood #1 Zone 4 12/8/98	Inglewood #1 Zone 4 5/19/99	Inglewood #1 Zone 5 12/8/98	Inglewood #1 Zone 5 5/19/99
General Mineral:														
Total Dissolved Solid (TDS)	500	1000		mg/l	560	630	660	**1220**	900	830	910	580	640	**1010**
Cation Sum				meq/l	9.36	11.0	11.2	24.1	13.4	15.3	9.40	11	12.2	17.1
Anion Sum				meq/l	9.24	11.4	11.5	25.8	15.2	14.9	11.9	11.1	11.0	16.1
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND		0.26		**0.31**		ND
Manganese, Total, ICAP/MS		50		ug/l	ND	ND	ND	24		**285**		**190**		10
Turbidity		5		NTU	0.1	0.10	0.15	0.5	4.3	1.1	4.9	1	5.6	ND
Alkalinity				mg/l	217	251	258	430	313	308	219	222	217	255
Bicarbonate as HCO3,calculated				mg/l	264	306	314	524	382	375	267	270	264	311
Calcium, Total, ICAP				mg/l	97.6	123	123	94.9	83.5	94.7	69.6	80.5	133	158
Carbonate as CO3, Calculated				mg/l	0.86	0.629	1.02	1.36	0.785	0.97	0.346	1.11	0.683	0.805
Chloride	250	500		mg/l	51.2	65	63.3	**544**	230	221	170	176	171	285
Fluoride	2			mg/l	0.37	0.37	0.39	0.35	0.49	0.49	0.25	0.42	0.41	0.23
Free CO2 (25C)				mg/l	10.5	19.4	12.5	26.3	24.2	18.8	26.8	8.56	13.3	15.6
Hydroxide as OH, Calculated				mg/l	0.009	0.005	0.009	0.007	0.005	0.007	0.003	0.011	0.007	0.007
Langelier Index - 25 degree				None	0.7	0.6	0.8	0.9	0.6	0.7	0.1	0.7	0.5	0.8
Magnesium, Total, ICAP				mg/l	24.4	29.4	30.3	36	34.0	37.4	29.9	35.4	40.4	49.4
Mercury	2			ug/l	ND	ND	ND	ND	ND	0.296	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	4.98	4.7	4.46	2.33	ND	ND	7.2	ND	ND	8.5
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	4.4	4.05	4.5	11.8	5.87	7	7.08	8.8	5.80	6.4
Sodium, Total, ICAP				mg/l	54.2	53.6	56.6	370	145	168	75.3	89.2	107	114
Sulfate	250	500		mg/l	148	200	204	78.1	115	121	106	81.5	86	113
Surfactants		0.5		mg/l	ND	0.05	ND	0.06	ND	0.06	ND	ND	ND	0.05
Total Hardness as CaCO3 by ICP				mg/l	344	428	432	385	348	390	297	347	498	598
Total Nitrate, Nitrite-N, CALC	10			mg/l	4.98	4.70	4.46	2.33	ND	ND	7.2	ND	ND	8.5
Total Organic Carbon				mg/l	3.9	ND	ND	20.9	1.3	1.2	0.8	0.7	0.9	0.8
General Physical:														
Apparent Color		15		ACU	ND	ND	ND	**100**	5	3	5	5	3	ND
Lab pH				Units	7.7	7.5	7.7	7.6	7.5	7.6	7.3	7.8	7.6	7.6
Odor		3		TON	1	1	1	2	1	1	1	1	2	1
pH of CaCO3 saturation(25C)				Units	7.034	6.9	6.858	6.7	6.9	6.9	7.2	7.1	7.1	6.8
pH of CaCO3 saturation(60C)				Units	6.6	6.4	6.4	6.3	6.5	6.4	6.7	6.7	6.7	6.3
Specific Conductance		1600		umho/cm	860	960	1040	**2090**	1500	1390	1550	1060	1100	1560
Radon				pCi/l										
Metals:														
Hexavalent Chromium (CrVI low)				mg/l										
Chromium, Total, ICAP/MS	50			ug/l	31	9.9	21	2.2	2.4	31	3.1	22	3.6	28
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	175	36	80	ND	115	28
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	ND	ND	ND	5	ND	ND	ND	ND	ND	ND
Barium, Total, ICAP/MS	1000			ug/l	87	100	130	71	37	36	66	88	145	185
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.6
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	1.4	ND	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	5.5	ND	ND	ND	ND	ND	ND	6.7
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	5.6	ND	13	8.6	12	6.0	7.5	13	19
Volatile Organics:														
Trichloroethylene (TCE)	5			ug/l	**19**	**5.1**	1.6	2	ND	ND	ND	ND	**5.7**	**14**
Tetrachloroethylene (PCE)	5			ug/l	0.6	ND	ND	0.9	ND	ND	ND	ND	3.0	**6.8**
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	2.9	5.4
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l										
2,4-D	70			ug/l										
Bentazon	18			ug/l										
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	**13**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	2.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l										
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l										
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l										
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l										
Perchlorate			18	ug/l	6.1		5.2	ND		ND		ND		ND
Phenanthrene				ug/l										
Picloram	500			ug/l										
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l										
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Lakewood #1 Zone 1 11/23/98	Lakewood #1 Zone 1 7/1/99	Lakewood #1 Zone 2 11/23/98	Lakewood #1 Zone 2 7/1/99	Lakewood #1 Zone 3 11/23/98	Lakewood #1 Zone 3 7/1/99	Lakewood #1 Zone 4 11/23/98	Lakewood #1 Zone 4 7/1/99	Lakewood #1 Zone 5 11/23/98	Lakewood #1 Zone 5 7/1/99
General Mineral:														
Total Dissolved Solid (TDS)	500	1000		mg/l	180	160	160	190	180	210	220	240	210	230
Cation Sum				meq/l	3.27	2.86	3.25	3.43	3.59	3.88	4.32	4.41	4.13	4.28
Anion Sum				meq/l	3.29	2.8	3.27	3.23	3.59	3.7	4.28	4.31	4.10	4.61
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND		ND		ND		ND
Manganese, Total, ICAP/MS		50		ug/l	12	4.1	22	19		26		135		53
Turbidity		5		NTU	0.10	0.05	0.20	0.05	1.9	6.8	1.9	1.6	0.30	0.3
Alkalinity				mg/l	138	96	139	136	152	155	175	176	176	201
Bicarbonate as HCO3,calculated				mg/l	167	115	169	165	185	188	213	214	214	245
Calcium, Total, ICAP				mg/l	25.3	10.2	31.3	33	37.8	40.5	47.1	48.2	47.7	48.4
Carbonate as CO3, Calculated				mg/l	3.43	4.72	1.74	2.14	1.91	2.44	0.873	1.39	1.10	1.59
Chloride	250	500		mg/l	8.8	19.3	5.9	5.95	8.7	8.98	16	16.5	9.2	9.24
Fluoride	2			mg/l	0.30	0.57	0.26	0.32	0.29	0.36	0.27	0.31	0.48	0.56
Free CO2 (25C)				mg/l	1.06	0.365	2.13	1.65	2.33	1.88	6.75	4.28	5.39	4.9
Hydroxide as OH, Calculated				mg/l	0.054	0.107	0.027	0.034	0.027	0.034	0.011	0.017	0.014	0.017
Langelier Index - 25 degree				None	0.7	0.4	0.5	0.6	0.6	0.7	0.4	0.6	0.5	0.6
Magnesium, Total, ICAP				mg/l	0.95	0.36	3.65	4	4.60	5.1	5.69	6.1	8.40	9
Mercury	2			ug/l	ND	0.225	ND	ND	ND	0.221	ND	0.217	ND	0.22
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	1.03	ND	2.04	2	2.22	2.3	2.62	2.5	2.35	2.4
Sodium, Total, ICAP				mg/l	43.7	53.4	30.7	32.1	29.2	31.7	32.8	33	22.8	24.4
Sulfate	250	500		mg/l	13	14.8	15	15.6	14	15.5	15	14.9	14	14.4
Surfactants		0.5		mg/l	ND	ND	0.19	ND	ND	ND	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	67	27	93	99	113	122	141	145	154	158
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Organic Carbon				mg/l	ND	0.9	ND	ND	ND	0.5	ND	ND	ND	ND
General Physical:														
Apparent Color		15		ACU	3	15	3	ND	3	ND	3	ND	3	ND
Lab pH				Units	8.5	8.8	8.2	8.3	8.2	8.3	7.8	8	7.9	8
Odor		3		TON	1	3	1	1	1	1	1	2	1	1
pH of CaCO3 saturation(25C)				Units	7.8	8.4	7.7	7.7	7.6	7.6	7.4	7.4	7.4	7.4
pH of CaCO3 saturation(60C)				Units	7.4	7.9	7.3	7.3	7.2	7.1	7.0	7	7.0	6.9
Specific Conductance		1600		umho/cm	295	260	280	295	315	330	370	400	355	375
Radon				pCi/l										
Metals:														
Hexavalent Chromium (CrVI low)				mg/l										
Chromium, Total, ICAP/MS	50			ug/l	ND	5.5	2.9	8.1	ND	9.2	3.6	10	2.9	11
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	130	ND	71	ND	ND	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	9.8	12	1.7	2	1.4	1.2	19	18	3.1	3.7
Barium, Total, ICAP/MS	1000			ug/l	39	14	24	20	30	26	81	87	100	100
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	12	ND	ND	ND	ND	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Volatile Organics:														
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l										
2,4-D	70			ug/l										
Bentazon	18			ug/l										
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l										
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l										
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l										
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l										
Perchlorate			18	ug/l		ND		ND		ND		ND		ND
Phenanthrene				ug/l										
Picloram	500			ug/l										
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l										
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Lakewood #1 Zone 6 11/23/98	Lakewood #1 Zone 6 7/1/99	La Mirada #1 Zone 1 6/2/99	La Mirada #1 Zone 2 6/2/99	La Mirada #1 Zone 3 6/2/99	La Mirada #1 Zone 4 6/2/99	La Mirada #1 Zone 5 6/2/99	Lomita #1 Zone 1 12/2/98	Lomita #1 Zone1 5/28/99	Lomita #1 Zone1 9/28/99	Lomita #1 Zone 2 12/2/98
General Mineral:															
Total Dissolved Solid (TDS)	500	1000		mg/l	570	790	320	260	310	410	470	**1450**	**1420**	**1400**	760
Cation Sum				meq/l	9.49	12.8	5.98	4.42	5.85	7.63	8.36	23.6	21.5	20.7	12.4
Anion Sum				meq/l	9.32	11.6	6.09	4.33	5.77	6.73	7.9	27.5	22.6	25.1	13.4
Iron, Total, ICAP		0.3		mg/l		0.14	ND	ND	ND	ND	ND		ND	ND	
Manganese, Total, ICAP/MS		50		ug/l		**490**	12	9.3	27	**120**	**68**		**175**	**165**	
Turbidity		5		NTU	0.90	0.5	0.1	0.2	0.3	**15**	1.1	1.7	0.5	0.45	**20**
Alkalinity				mg/l	188	220	158	137	185	199	198	268	233	236	289
Bicarbonate as HCO3,calculated				mg/l	229	268	191	166	225	243	241	326	284	288	351
Calcium, Total, ICAP				mg/l	129	175	15.5	9.54	19.4	39.7	46.2	90.7	100	95.4	35.9
Carbonate as CO3, Calculated				mg/l	0.471	0.42	3.12	2.71	1.84	0.629	0.785	2.12	0.584	0.938	2.87
Chloride	250	500		mg/l	170	223	27.8	16	19	27.3	54.1	**770**	**567**	**641**	250
Fluoride	2			mg/l	0.19	0.16	0.81	0.61	0.8	0.59	0.55	0.18	0.11	0.11	0.29
Free CO2 (25C)				mg/l	14.5	13.5	1.52	1.32	3.57	12.2	9.62	6.52	18	11.5	5.58
Hydroxide as OH, Calculated				mg/l	0.005	0.007	0.043	0.043	0.021	0.007	0.009	0.017	0.005	0.009	0.021
Langelier Index - 25 degree				None	0.5	0.7	0.4	0.2	0.3	0.1	0.3	1.0	0.5	0.7	0.8
Magnesium, Total, ICAP				mg/l	12.3	17.6	3.4	1.78	5.95	12.9	14.8	25.8	30.1	27.8	13.8
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND	ND	1.24	ND	0.38	0.1	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	4.18	5.2	2.16	2.1	2.85	4.1	3.56	15.5	14.1	14	13.2
Sodium, Total, ICAP				mg/l	44.1	57.9	112	86	99.2	103	109	381	315	305	210
Sulfate	250	500		mg/l	36	43.2	101	53.1	71.6	93.6	110	20	92.8	111	28
Surfactants		0.5		mg/l	0.15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	373	509	53	31	73	152	176	311	373	352	146
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND	ND	ND	ND	ND	ND	1.24	ND	0.38	0.1	ND
Total Organic Carbon				mg/l	1.2	1.6	ND	ND	0.7	ND	ND	2.3	1.6	1.4	4.6
General Physical:															
Apparent Color		15		ACU	3	ND	ND	ND	3	3	ND	15	3	3	25
Lab pH				Units	7.5	7.6	8.4	8.4	8.1	7.6	7.7	8.0	7.5	7.7	8.1
Odor		3		TON	1	1	1	1	1	1	1	**4**	1	**4**	3
pH of CaCO3 saturation(25C)				Units	7.0	6.9	8	8.2	7.8	7.5	7.4	7.0	7	7.006	7.3
pH of CaCO3 saturation(60C)				Units	6.5	6.4	7.5	7.8	7.4	7	7	6.5	6.5	6.6	6.9
Specific Conductance		1600		umho/cm	885	1200	575	415	550	635	720	**2580**	**2270**	**2310**	1310
Radon				pCi/l										80	
Metals:															
Hexavalent Chromium (CrVI low)				mg/l										ND	
Chromium, Total, ICAP/MS	50			ug/l	ND	13	9.3	4.5	9	8	5.6	ND	13	10	ND
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	ND	30	60	ND	ND	200
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	2	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	20	7.9	8.9	15	24	35	16	7.9	ND	ND	3.1
Barium, Total, ICAP/MS	1000			ug/l	330	510	58	20	29	21	36	65	83	65	23
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	19	ND	ND	ND	ND	ND	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	ND	0.54	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	7.6	ND	ND	ND	ND	ND	ND	6.8	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	ND	ND	ND	17	8.8	10	17
Volatile Organics:															
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l											
2,4-D	70			ug/l											
Bentazon	18			ug/l											
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l											
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l											
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l											
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l											
Perchlorate			18	ug/l		ND	ND	ND	ND	ND	ND		ND	ND	
Phenanthrene				ug/l											
Picloram	500			ug/l											
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l											
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Lomita #1 Zone 2 5/28/99	Lomita #1 Zone 2 9/28/99	Lomita #1 Zone 3 12/2/98	Lomita #1 Zone 3 6/1/99	Lomita #1 Zone3 9/28/99	Lomita #1 Zone 4 12/2/98	Lomita #1 Zone 4 6/1/99	Lomita #1 Zone 4 9/28/99	Lomita #1 Zone 5 12/2/98	Lomita #1 Zone 5 6/1/99	Lomita #1 Zone 5 9/28/99	Lomita #1 Zone 6 6/1/99	PM-3 Madrid Zone 1 11/24/98
General Mineral:																	
Total Dissolved Solid (TDS)	500	1000		mg/l	980	850	680	780	870	480	690	780	800	1330	1190	980	390
Cation Sum				meq/l	15.4	14.4	10.7	13.8	14.7	8.59	12.5	12.5	19.8	19.8	18.3	16	6.77
Anion Sum				meq/l	16.3	15.3	12.0	13	14.8	9.48	10.9	13.1	21.5	19.5	20	15.5	6.95
Iron, Total, ICAP		0.3		mg/l	ND	ND		ND	ND		ND	ND		0.11	ND	ND	
Manganese, Total, ICAP/MS		50		ug/l	145	140		130	135		110	110		205	195	95	
Turbidity		5		NTU	2.2	14	14	0.7	0.95	6.4	0.1	0.15	8.8	0.2	0.25	53	0.90
Alkalinity				mg/l	223	230	299	269	265	234	238	253	241	218	226	228	313
Bicarbonate as HCO3,calculated				mg/l	272	280	364	327	323	284	290	308	293	265	275	276	380
Calcium, Total, ICAP				mg/l	88.6	90.1	46.5	85.6	92.4	31.9	66.3	61.2	104.5	125	111	83.6	13.5
Carbonate as CO3, Calculated				mg/l	0.886	1.45	2.37	2.68	1.67	2.93	1.88	2.52	1.51	1.72	1.79	4.51	3.91
Chloride	250	500		mg/l	393	350	200	254	300	160	210	274	570	521	527	213	24
Fluoride	2			mg/l	0.15	0.16	0.21	0.16	0.16	0.27	0.22	0.22	0.14	0.12	0.13	0.97	0.31
Free CO2 (25C)				mg/l	10.9	7.05	7.28	5.19	8.13	3.58	5.8	4.89	7.38	5.3	5.5	2.2	4.80
Hydroxide as OH, Calculated				mg/l	0.009	0.014	0.017	0.021	0.014	0.027	0.017	0.021	0.014	0.017	0.017	0.043	0.027
Langelier Index - 25 degree				None	0.6	0.9	0.8	1.1	0.9	0.7	0.8	0.9	0.9	1.1	1	1.3	0.5
Magnesium, Total, ICAP				mg/l	25.8	26.1	15.6	25.5	27.5	11.0	19.5	17.7	28.6	35.8	31.1	31.4	9.19
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	0.29	0.16	ND	0.64	0.56	ND	ND	ND	ND	ND	ND	10.7	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	11.5	11	8.04	9.8	11	6.97	9.3	9.6	13.2	12.8	13	11.1	13.1
Sodium, Total, ICAP				mg/l	196	171	158	166	173	136	169	179	273	237	226	206	115
Sulfate	250	500		mg/l	33.4	40.9	20	18.8	46.7	13	12.1	15	28	22.7	29.8	197	ND
Surfactants		0.5		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.078	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	327	332	180	319	344	125	246	226	340	459	405	338	71
Total Nitrate, Nitrite-N, CALC	10			mg/l	0.29	0.16	ND	0.64	0.56	ND	ND	ND	ND	ND	ND	10.7	ND
Total Organic Carbon				mg/l	1.7	1.5	4.7	2.8	1.9	3.8	2.1	2.3	2.8	1.2	1.3	1.5	4.0
General Physical:																	
Apparent Color		15		ACU	10	3	15	15	5	15	15	15	5	5	3	5	30
Lab pH				Units	7.7	7.9	8.0	8.1	7.9	8.2	8	8.1	7.9	8	8	8.4	8.2
Odor		3		TON	1	4	3	1	4	2	2	3	3	4	4	1	3
pH of CaCO3 saturation(25C)				Units	7.1	7.043	7.2	7	6.97	7.5	7.2	7.17	7.0	6.9	6.96	7.1	7.7
pH of CaCO3 saturation(60C)				Units	6.6	6.6	6.8	6.6	6.5	7.0	6.7	6.7	6.5	6.5	6.5	6.6	7.3
Specific Conductance		1600		umho/cm	1570	1480	1080	1370	1430	810	1240	1290	2010	2010	1980	1570	595
Radon				pCi/l		160			120			83			170		
Metals:																	
Hexavalent Chromium (CrVI low)				mg/l		ND			ND			ND			ND		
Chromium, Total, ICAP/MS	50			ug/l	16	11	ND	20	13	2.3	18	11	2.1	18	10	21	8.2
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	280	ND	ND	255	ND	ND	390	94	ND	34	100
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	2	ND	4.1	ND	ND	5.5	ND	ND	5.3	ND	ND	2	ND
Barium, Total, ICAP/MS	1000			ug/l	62	52	22	53	50	15	43	40	59	87	75	33	36
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.5	ND	3.9	8.5
Lead, Total, ICAP/MS			15	ug/l	ND	ND	3.1	ND	ND	0.81	ND	ND	1.1	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	5.6	ND	ND	ND	ND	ND	ND	ND	ND	6.5	ND	9.1	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	32	ND	ND	31	ND	ND	25	12	ND	12	6.6
Volatile Organics:																	
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l													
2,4-D	70			ug/l													
Bentazon	18			ug/l													
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l													
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l													
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l													
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l													
Perchlorate			18	ug/l	ND	ND		ND	ND		ND	ND		ND	ND	5.4	
Phenanthrene				ug/l													
Picloram	500			ug/l													
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l													
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	PM-3 Madrid Zone 1 6/17/99	PM-3 Madrid Zone 1 9/28/99	PM-3 Madrid Zone 2 11/24/98	PM-3 Madrid Zone 2 6/17/99	PM-3 Madrid Zone 2 9/28/99	PM-3 Madrid Zone 3 11/24/98	PM-3 Madrid Zone 3 6/18/99	PM-3 Madrid Zone 3 9/28/99	PM-3 Madrid Zone 4 11/24/98	PM-3 Madrid Zone 4 6/18/99	PM-3 Madrid Zone 4 9/28/99	PM-4 Mariner Zone 1 7/11/99	PM-4 Mariner Zone 1 9/26/99	PM-4 Mariner Zone 2 7/11/99	PM-4 Mariner Zone 2 9/26/99
General Mineral:																			
Total Dissolved Solid (TDS)	500	1000		mg/l	400	400	270	270	280	500	520	550	820	820	820	330	340	**9840**	**9060**
Cation Sum				meq/l	7	7.01	4.88	5.04	4.87	8.95	8.96	8.37	13.2	13.2	13	6.03	5.89	155	149
Anion Sum				meq/l	7.01	6.88	4.88	4.97	4.63	8.84	9.59	8.05	13.4	13	12.7	6	6	135	177
Iron, Total, ICAP		0.3		mg/l	ND	ND		0.14	ND		0.12	ND	**0.59**	**0.5**	**0.46**	ND	0.13	ND	ND
Manganese, Total, ICAP/MS		50		ug/l	**64**	**56**		**69**	**62**		**63**	**61**	**380**	**330**	**330**	**55**	**46**	**1400**	**1200**
Turbidity		5		NTU	0.9	3.3	0.30	1.3	0.2	2.8	0.95	**6.4**	2.4	2.5	4.5	0.35	ND	2	0.8
Alkalinity				mg/l	314	312	192	197	198	185	183	176	201	205	202	258	259	155	158
Bicarbonate as HCO3,calculated				mg/l	381	379	234	240	241	226	223	214	245	250	246	314	315	189	193
Calcium, Total, ICAP				mg/l	12.9	12.4	36.1	37	35.2	75.8	76.5	70.2	106	105	102	27	26.2	1300	1200
Carbonate as CO3, Calculated				mg/l	4.94	3.9	1.21	1.24	1.57	0.464	0.577	0.877	0.400	0.514	0.801	2.57	3.24	0.309	0.397
Chloride	250	500		mg/l	25.2	22	36	35.6	23	180	185	160	300	292	254	28.9	28.5	**4300**	**5680**
Fluoride	2			mg/l	0.33	0.33	0.38	0.4	0.4	0.37	0.39	0.39	0.29	0.31	0.3	0.39	0.36	0.12	0.11
Free CO2 (25C)				mg/l	3.82	4.78	5.89	6.04	4.82	14.3	11.2	6.78	19.5	15.8	9.82	4.99	3.98	15	12.2
Hydroxide as OH, Calculated				mg/l	0.034	0.027	0.014	0.014	0.017	0.005	0.007	0.011	0.004	0.005	0.009	0.021	0.027	0.004	0.005
Langelier Index - 25 degree				None	0.6	0.4	0.4	0.4	0.5	0.3	0.4	0.5	0.4	0.5	0.7	0.6	0.7	1.3	1.4
Magnesium, Total, ICAP				mg/l	9.3	9.2	10.6	11	10.5	23.1	23	21.1	31.1	31	30	11.6	11.5	390	380
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND	ND	0.25	ND	ND	0.34	ND	ND	ND	8	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	12.9	13	3.14	3.1	3.2	4.68	4.7	4.7	6.55	6.7	6.9	7.1	7.1	36	40
Sodium, Total, ICAP				mg/l	121	122	48.7	50.7	49.8	72.2	71.7	69.1	119	121	122	81.4	79.4	1300	1300
Sulfate	250	500		mg/l	ND	ND	ND	ND	ND	2.1	32.1	ND	41	32.1	70	ND	ND	**508**	**651**
Surfactants		0.5		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.051
Total Hardness as CaCO3 by ICP				mg/l	70	69	134	138	131	284	286	262	393	390	378	115	113	4850	4560
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34	ND	ND	ND	8	ND
Total Organic Carbon				mg/l	2.9	2.9	1.4	ND	0.6	0.8	0.6	0.6	1.0	0.8	0.9	1.5	1	0.9	0.5
General Physical:																			
Apparent Color		15		ACU	**25**	**30**	3	3	5	3	3	3	5	3	5	15	15	5	5
Lab pH				Units	8.3	8.2	7.9	7.9	8	7.5	7.6	7.8	7.4	7.5	7.7	8.1	8.2	7.4	7.5
Odor		3		TON	1	3	1	1	1	1	2	**4**	2	3	**4**	1	3	1	**4**
pH of CaCO3 saturation(25C)				Units	7.75	7.773	7.5	7.5	7.516	7.2	7.21	7.268	7.0	7.03	7.045	7.517	7.528	6.055	6.08
pH of CaCO3 saturation(60C)				Units	7.3	7.3	7.1	7.1	7.1	6.8	6.8	6.8	6.6	6.6	6.6	7.1	7.1	5.6	5.6
Specific Conductance		1600		umho/cm	620	645	425	445	460	850	830	880	1250	1250	1340	550	550	**15000**	**15300**
Radon				pCi/l		72			180			120			250		75		63
Metals:																			
Hexavalent Chromium (CrVI low)				mg/l		ND			ND			ND			ND		ND		ND
Chromium, Total, ICAP/MS	50			ug/l	7.1	16	4.3	5.8	9.2	7.4	5.5	10	5.5	5.6	10	15	15	19	10
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	250	ND	ND	ND	ND	ND	ND	ND	ND	125
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	8.0	4.5	ND	ND	ND	ND	ND
Barium, Total, ICAP/MS	1000			ug/l	31	27	27	27	24	62	54	50	82	83	75	31	27	255	265
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.1	15
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	0.55	ND	ND	ND	ND	ND	ND	ND	ND	1.7
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	ND	6.8	ND	ND	6.0	ND	5.8	ND	ND	ND	49
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	40
Volatile Organics:																			
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	1.0	1.1	1.1	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	6.7	3	4.8	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	38	**18**	**28**	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l															
2,4-D	70			ug/l															
Bentazon	18			ug/l															
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l															
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	2.0	1.6	1.7	1.0	0.7	0.7	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l															
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l															
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l															
Perchlorate			18	ug/l	ND	ND		ND	ND		ND	ND		ND	ND	ND	ND	ND	ND
Phenanthrene				ug/l															
Picloram	500			ug/l															
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l															
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	PM-4 Mariner Zone 3 7/11/99	PM-4 Mariner Zone 3 9/26/99	PM-4 Mariner Zone 4 7/11/99	PM-4 Mariner Zone 4 9/26/99	Pico #1 Zone 1 12/9/98	Pico #1 Zone 2 12/9/98	Pico #1 Zone 2 6/29/99	Pico #1 Zone 3 12/9/98	Pico #1 Zone 3 6/29/99	Pico #1 Zone 4 12/9/98	Pico #1 Zone 4 6/29/99	Pico #2 Zone 1 12/11/98	Pico #2 Zone 1 6/23/99	Pico #2 Zone 2 12/11/98
General Mineral:																		
Total Dissolved Solid (TDS)	500	1000		mg/l	860	800	720	690	370	310	320	670	610	620	600	510	430	560
Cation Sum				meq/l	14.1	13.6	11.8	11.4	5.99	4.94	5.13	10.7	10.9	9.57	9.82	7.98	7.79	9.24
Anion Sum				meq/l	14.3	14.5	12.1	12.1	6.01	4.73	5.22	10.8	11.4	9.73	9.89	8.15	8	9.16
Iron, Total, ICAP		0.3		mg/l	ND	ND	0.18	0.19	2.7	0.23	0.21	0.53	0.5	ND	ND	ND	ND	ND
Manganese, Total, ICAP/MS		50		ug/l	100	100	105	95	66	43	52	26	27	4.6	3	255	255	2.1
Turbidity		5		NTU	3.6	0.65	0.6	0.45	5.6	1.6	1.5	0.40	4.9	0.10	0.1	0.40	0.2	0.10
Alkalinity				mg/l	154	152	187	187	293	157	166	204	212	197	202	188	169	231
Bicarbonate as HCO3,calculated				mg/l	187	185	228	227	357	191	202	249	259	240	246	229	206	282
Calcium, Total, ICAP				mg/l	111	108	88	83.9	11.5	62.0	63.7	124	118	97.4	97.4	87.3	62.1	120
Carbonate as CO3, Calculated				mg/l	1.22	1.51	1.48	2.34	2.32	0.494	0.658	0.406	0.212	0.392	0.402	0.471	0.53	0.730
Chloride	250	500		mg/l	165	165	135	138	3.1	15	18.4	83	88.1	75	73.7	52	68.1	57
Fluoride	2			mg/l	0.26	0.26	0.29	0.27	0.27	0.31	0.39	0.20	0.24	0.31	0.35	0.33	0.37	0.28
Free CO2 (25C)				mg/l	3.74	2.94	4.56	2.86	7.14	9.60	8.06	19.8	41.1	19.1	19.6	14.5	10.3	14.2
Hydroxide as OH, Calculated				mg/l	0.017	0.021	0.017	0.027	0.017	0.007	0.009	0.004	0.002	0.004	0.004	0.005	0.007	0.007
Langelier Index - 25 degree				None	0.9	1	0.9	1	0.2	0.2	0.4	0.4	0.1	0.3	0.3	0.4	0.3	0.7
Magnesium, Total, ICAP				mg/l	31	30.5	23.2	22.2	4.19	11.0	11.6	23.1	24.5	17.7	18.6	20.4	18.8	22.9
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	2.05	2.7	1.98	2.9
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	7.3	7.2	6.6	6.6	4.54	2.60	2.9	4.42	5	4.55	4.8	6.05	6.7	3.62
Sodium, Total, ICAP				mg/l	133	127	123	119	114	19.9	21	57.2	66.4	71.9	75.8	41.0	68.2	29.0
Sulfate	250	500		mg/l	313	324	216	216	2.4	55	65.4	210	223	170	173	130	122	130
Surfactants		0.5		mg/l	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	405	395	315	301	46	200	207	405	395	316	320	302	232	394
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	2.05	2.7	1.98	2.9
Total Organic Carbon				mg/l	1.2	1.3	0.9	1	2.9	ND	ND	0.7	ND	0.7	ND	0.7	1.2	ND
General Physical:																		
Apparent Color		15		ACU	5	5	ND	5	30	ND	5	ND	5	ND	ND	ND	5	ND
Lab pH				Units	8	8.1	8	8.2	8.0	7.6	7.7	7.4	7.1	7.4	7.4	7.5	7.6	7.6
Odor		3		TON	1	4	1	1	2	1	1	1	1	1	1	2	1	1
pH of CaCO3 saturation(25C)				Units	7.128	7.144	7.143	7.165	7.8	7.4	7.3	7.0	7	7.1	7.1	7.1	7.3	6.9
pH of CaCO3 saturation(60C)				Units	6.7	6.7	6.7	6.7	7.4	6.9	6.9	6.5	6.5	6.6	6.6	6.7	6.9	6.5
Specific Conductance		1600		umho/cm	1330	1310	1120	1140	575	480	505	1020	1020	930	890	765	700	850
Radon				pCi/l		81		520										
Metals:																		
Hexavalent Chromium (CrVI low)				mg/l		ND		ND										
Chromium, Total, ICAP/MS	50			ug/l	8.4	9	10	11	6.6	2.4	12	6.3	18	4.4	17	3.0	15	2.9
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	1200	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	ND	ND	ND	1.2	9.1	ND	1	ND	ND	3.6	3.8	7.0	14	2.7
Barium, Total, ICAP/MS	1000			ug/l	140	130	63	61	31	62	68	62	67	65	67	125	125	145
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	2.3	ND	ND	ND	ND	ND	2.0	ND	ND	ND	2.3	4.3	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	0.61	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	5.1	ND	ND	ND	ND	ND	ND	ND	5.5	ND	ND	ND	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	7.7	ND	ND
Volatile Organics:																		
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.4
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l														
2,4-D	70			ug/l														
Bentazon	18			ug/l														
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l														
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l														
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l														
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l														
Perchlorate			18	ug/l	ND	ND	ND	ND			ND		ND		ND		ND	
Phenanthrene				ug/l														
Picloram	500			ug/l														
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l														
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Pico #2 Zone 2 6/23/99	Pico #2 Zone 3 12/11/98	Pico #2 Zone 3 6/23/99	Pico #2 Zone 4 12/11/98	Pico #2 Zone 4 6/23/99	Pico #2 Zone 5 12/11/98	Pico #2 Zone5 6/23/99	Pico #2 Zone 6 12/11/98	Pico #2 Zone 6 6/23/99	Rio Hondo #1 Zone 1 12/3/98	Rio Hondo #1 Zone1 6/28/99	Rio Hondo #1 Zone 2 12/3/98	Rio Hondo #1 Zone 2 6/28/99
General Mineral:																	
Total Dissolved Solid (TDS)	500	1000		mg/l	500	500	520	590	520	520	460	520	400	250	250	410	440
Cation Sum				meq/l	8.86	8.59	8.62	9.27	9.06	8.22	7.98	8.37	7.34	4.33	4.44	7.29	7.36
Anion Sum				meq/l	9.26	8.81	8.73	9.58	9.33	8.38	8.08	8.61	7.44	4.47	4.5	7.49	7.67
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese, Total, ICAP/MS		50		ug/l	ND	4.9	2.1	**51**	27	13	16	**1000**	**850**	31	27	**125**	**110**
Turbidity		5		NTU	0.2	0.40	0.3	0.10	0.2	0.10	0.35	0.10	0.4	0.30	3.6	0.40	0.2
Alkalinity				mg/l	233	195	193	179	174	162	157	154	137	144	146	165	169
Bicarbonate as HCO3,calculated				mg/l	284	238	235	218	212	198	191	188	167	175	178	201	206
Calcium, Total, ICAP				mg/l	112	108	106	87.3	81	74.5	64	69.0	56.1	39.5	40.1	95.1	94.8
Carbonate as CO3, Calculated				mg/l	0.925	0.616	0.964	0.356	0.548	0.323	0.494	0.244	0.343	1.43	1.46	0.655	0.845
Chloride	250	500		mg/l	56.9	62	61.6	100	97.3	86	82.2	91	75.8	19	19	52	52.8
Fluoride	2			mg/l	0.3	0.32	0.35	0.42	0.45	0.31	0.34	0.39	0.49	0.25	0.28	0.19	0.23
Free CO2 (25C)				mg/l	11.3	12.0	7.45	17.4	10.7	15.8	9.6	18.8	10.6	2.78	2.83	8.02	6.53
Hydroxide as OH, Calculated				mg/l	0.009	0.007	0.011	0.004	0.007	0.004	0.007	0.003	0.005	0.021	0.021	0.009	0.011
Langelier Index - 25 degree				None	0.8	0.6	0.7	0.2	0.4	0.1	0.2	0.0	0	0.5	0.5	0.5	0.6
Magnesium, Total, ICAP				mg/l	22.5	20.5	21	17.4	17.1	17.8	15.9	20.4	16.8	7.89	8.2	16.5	17
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	2.98	3.2	3.29	3.4	2.91	2.7	1.14	0.35	2.26	ND	ND	ND	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	3.7	3.95	4.1	4.37	4.3	4.32	4.1	6.40	6.3	2.69	2.9	3.43	3.7
Sodium, Total, ICAP				mg/l	30.3	32.2	34.3	77.3	80.3	67.1	77.4	70.8	68.8	37.7	38.8	25.1	25.9
Sulfate	250	500		mg/l	133	140	138	140	138	120	121	140	114	50	49.3	130	134
Surfactants		0.5		mg/l	ND	ND	ND	0.05	ND	0.06	0.07	0.08	ND	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	372	354	351	290	273	259	225	256	209	131	134	305	307
Total Nitrate, Nitrite-N, CALC	10			mg/l	2.98	3.2	3.29	3.4	2.91	2.7	1.14	0.35	2.26	ND	ND	ND	ND
Total Organic Carbon				mg/l	ND	ND	ND	1.0	0.7	1.5	1	2.4	1.3	ND	ND	ND	ND
General Physical:																	
Apparent Color		15		ACU	ND	ND	ND	ND	ND	ND	3	5	5	ND	ND	ND	ND
Lab pH				Units	7.7	7.6	7.8	7.4	7.6	7.4	7.6	7.3	7.5	8.1	8.1	7.7	7.8
Odor		3		TON	1	1	1	1	1	1	1	3	1	1	1	1	1
pH of CaCO3 saturation(25C)				Units	6.9	7.0	7.1	7.2	7.2	7.3	7.4	7.3	7.5	7.6	7.6	7.2	7.2
pH of CaCO3 saturation(60C)				Units	6.5	6.6	6.6	6.7	6.8	6.8	6.9	6.9	7	7.2	7.1	6.7	6.7
Specific Conductance		1600		umho/cm	765	805	790	920	860	810	770	830	715	385	410	650	670
Radon				pCi/l													
Metals:																	
Hexavalent Chromium (CrVI low)				mg/l													
Chromium, Total, ICAP/MS	50			ug/l	21	2.7	19	2.4	16	ND	12	ND	12	ND	10	ND	12
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	3.2	ND	2.4	3.7	3.6	ND	1.6	27	30	ND	ND	1.6	ND
Barium, Total, ICAP/MS	1000			ug/l	155	190	205	70	76	87	90	130	125	17	15	54	49
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	2.1	2.9	5.3	3.5	ND	ND	ND	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	5.1	ND	5.1	ND	ND	ND	ND	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	ND	ND	ND	5.2	ND	ND	ND	ND	ND
Volatile Organics:																	
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	4.3	**12**	**12**	ND	0.7	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l													
2,4-D	70			ug/l													
Bentazon	18			ug/l													
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l													
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l													
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l													
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l													
Perchlorate			18	ug/l	ND		ND		ND		ND		ND		ND		ND
Phenanthrene				ug/l													
Picloram	500			ug/l													
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l													
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Rio Hondo #1 Zone 3 12/3/98	Rio Hondo #1 Zone 3 6/28/99	Rio Hondo #1 Zone 4 12/3/98	Rio Hondo #1 Zone 4 6/29/99	Rio Hondo #1 Zone 5 12/3/98	Rio Hondo #1 Zone5 6/29/99	Rio Hondo #1 Zone 6 12/3/98	Rio Hondo #1 Zone 6 6/29/99	Santa Fe Springs # 1 Zone 1 10/15/98	South Gate #1 Zone 1 7/6/99	South Gate #1 Zone 2 7/6/99
General Mineral:															
Total Dissolved Solid (TDS)	500	1000		mg/l	400	410	430	470	320	370	220	300	2280	300	390
Cation Sum				meq/l	7.04	7.2	7.43	7.32	5.76	5.81	3.83	4.68	34.1	5.27	6.62
Anion Sum				meq/l	7.40	7.13	7.58	7.48	5.76	5.97	4.02	4.89	38.0	5.29	6.3
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND		ND	ND	ND	2.5	ND	ND
Manganese, Total, ICAP/MS		50		ug/l	5.4	7.7	5.1	3.8		36	24	31	57	47	14
Turbidity		5		NTU	0.10	ND	0.10	ND	7.6	7.5	2.4	0.4	26	1	1
Alkalinity				mg/l	149	150	148	149	117	124	94	109	515	168	125
Bicarbonate as HCO3,calculated				mg/l	182	183	180	182	143	151	115	133	623	204	152
Calcium, Total, ICAP				mg/l	78.6	79.5	70.9	69.2	48.4	52.3	30.4	37.7	17.4	49.2	72.4
Carbonate as CO3, Calculated				mg/l	0.593	0.75	0.370	0.593	0.294	0.391	0.188	0.273	12.8	2.1	0.623
Chloride	250	500		mg/l	61	56.1	67	65.5	51	52.4	29	39.9	970	22.3	47.4
Fluoride	2			mg/l	0.28	0.32	0.37	0.44	0.33	0.36	0.33	0.41	0.74	0.32	0.34
Free CO2 (25C)				mg/l	7.26	5.8	11.4	7.26	9.04	7.59	9.16	8.41	3.94	2.57	4.82
Hydroxide as OH, Calculated				mg/l	0.009	0.011	0.005	0.009	0.005	0.007	0.004	0.005	0.054	0.027	0.011
Langelier Index - 25 degree				None	0.4	0.5	0.2	0.4	-0.1	0.1	-0.5	-0.2	1.1	0.8	0.4
Magnesium, Total, ICAP				mg/l	14.1	14.5	13.5	13.3	11.2	10.8	8.03	10.3	7.31	8.2	14
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	2.6	2.5	2.9	2.63	1.2	1.47	1.3	1.33	ND	ND	2.46
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	3.46	3.7	3.76	3.8	4.15	3.5	3.03	3.7	6.00	2.6	3.3
Sodium, Total, ICAP				mg/l	42.7	44.6	61.5	61.4	53.1	51	36.1	42.5	746	47.6	40.6
Sulfate	250	500		mg/l	120	113	120	117	90	90.8	58	70.3	15	61.6	109
Surfactants		0.5		mg/l	ND	ND	0.12	ND	ND	ND	ND	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	254	258	233	227	167	175	109	136	73	157	238
Total Nitrate, Nitrite-N, CALC	10			mg/l	2.60	2.5	2.90	2.63	1.20	1.47	1.30	1.33	ND	ND	2.46
Total Organic Carbon				mg/l	ND	ND	0.9	0.5	0.7	0.6	0.6	0.5		ND	ND
General Physical:															
Apparent Color		15		ACU	ND	ND	ND	ND	3	ND	ND	3	150	ND	ND
Lab pH				Units	7.7	7.8	7.5	7.7	7.5	7.6	7.4	7.5	8.5	8.2	7.8
Odor		3		TON	1	2	1	1	1	1	1	1	67	3	3
pH of CaCO3 saturation(25C)				Units	7.3	7.3	7.3	7.3	7.6	7.5	7.9	7.7	7.4	7.443	7.403
pH of CaCO3 saturation(60C)				Units	6.8	6.8	6.9	6.9	7.2	7.1	7.5	7.3	7.0	7	7
Specific Conductance		1600		umho/cm	655	675	680	750	520	600	370	495	3930	495	630
Radon				pCi/l											
Metals:															
Hexavalent Chromium (CrVI low)				mg/l											
Chromium, Total, ICAP/MS	50			ug/l	ND	11	ND	12	4.7	9.4	ND	5.7	6.6	11	9.9
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	1700	ND	62	ND	2400	ND	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	2.8	2.8	3.0	3.2	3.3	2.4	1.9	1.6	ND	2.4	4.3
Barium, Total, ICAP/MS	1000			ug/l	120	110	61	59	98	47	43	55	54	135	90
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	3.8	ND	ND	ND	3.2	ND	ND
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	4.1	ND	ND	ND	2.9	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	27	ND	ND	ND	15	ND	ND
Volatile Organics:															
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
2,4,5-TP (Silvex)	50			ug/l											
2,4-D	70			ug/l											
Bentazon	18			ug/l											
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l											
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l									ND		
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Di-n-Butylphthalate				ug/l									25		
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Oil and Grease by IR				mg/l									ND		
Perchlorate			18	ug/l		ND		ND		ND		ND		ND	ND
Phenanthrene				ug/l									ND		
Picloram	500			ug/l											
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
Toxaphene	3			ug/l											
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	South Gate #1 Zone 3 7/7/99	South Gate #1 Zone 4 7/7/99	South Gate #1 Zone 5 7/7/99	Willowbrook #1 Zone 1 11/30/98	Willowbrook #1 Zone 1 6/3/99	Willowbrook #1 Zone 2 11/30/98	Willowbrook #1 Zone 2 6/3/99	Willowbrook #1 Zone 3 11/30/98	Willowbrook #1 Zone 3 6/3/99	Willowbrook #1 Zone 4 11/30/98
General Mineral:														
Total Dissolved Solid (TDS)	500	1000		mg/l	430	470	430	300	330	290	320	290	320	300
Cation Sum				meq/l	7.34	8.05	7.67	5.61	6.29	5.37	5.42	5.35	5.66	6.12
Anion Sum				meq/l	7.38	8.01	7.42	5.91	6.32	5.46	5.46	5.64	5.73	5.72
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Manganese, Total, ICAP/MS		50		ug/l	14	12	**99**	45	39	49	**51**	30	28	
Turbidity		5		NTU	0.8	0.9	4.3	0.30	0.1	0.10	0.05	0.30	0.2	3.3
Alkalinity				mg/l	169	181	198	206	262	163	163	173	178	174
Bicarbonate as HCO3,calculated				mg/l	206	221	241	251	318	198	198	211	216	212
Calcium, Total, ICAP				mg/l	79.6	87.9	69.8	46.6	39.3	54.8	53.8	54.6	56.4	57.7
Carbonate as CO3, Calculated				mg/l	1.06	0.72	0.785	1.30	3.28	1.62	2.04	1.09	2.22	1.09
Chloride	250	500		mg/l	49.5	55.4	62.7	20	16.8	21.3	21.4	21	20.9	24
Fluoride	2			mg/l	0.39	0.37	0.49	0.32	0.28	0.31	0.3	0.44	0.42	0.40
Free CO2 (25C)				mg/l	5.19	8.82	9.62	6.32	4.01	3.15	2.5	5.31	2.73	5.34
Hydroxide as OH, Calculated				mg/l	0.014	0.009	0.009	0.014	0.027	0.021	0.027	0.014	0.027	0.014
Langelier Index - 25 degree				None	0.7	0.5	0.5	0.5	0.9	0.7	0.8	0.5	0.8	0.5
Magnesium, Total, ICAP				mg/l	16.5	17.1	18.5	9.69	8.8	9.50	9.8	11.5	12.1	11.4
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	2.57	1.72	ND	ND	ND	ND	ND	ND	ND	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	3.3	3.3	2.9	3.82	5	2.63	2.7	3.05	3.4	3.54
Sodium, Total, ICAP				mg/l	44.2	49.7	59.3	54.9	79.8	40.9	42.7	36.8	40.3	50.7
Sulfate	250	500		mg/l	115	129	80	58	28.4	76.1	76.1	75	74.9	74
Surfactants		0.5		mg/l	ND	ND	ND	ND	0.16	ND	ND	ND	ND	0.15
Total Hardness as CaCO3 by ICP				mg/l	267	290	250	156	134	176	175	184	191	191
Total Nitrate, Nitrite-N, CALC	10			mg/l	2.57	1.72	ND	ND	ND	ND	ND	ND	ND	ND
Total Organic Carbon				mg/l	5.2	5	4.8	1.2	2.1	ND	ND	ND	ND	ND
General Physical:														
Apparent Color		15		ACU	ND	ND	5	10	**20**	ND	3	ND	3	ND
Lab pH				Units	7.9	7.7	7.7	7.9	8.2	8.1	8.2	7.9	8.2	7.9
Odor		3		TON	1	1	1	2	1	2	3	2	**8**	2
pH of CaCO3 saturation(25C)				Units	7.23	7.157	7.219	7.4	7.3	7.4	7.4	7.4	7.4	7.4
pH of CaCO3 saturation(60C)				Units	6.8	6.7	6.8	6.9	6.9	7.0	7	6.9	6.9	6.9
Specific Conductance		1600		umho/cm	670	730	685	535	565	480	500	495	525	500
Radon				pCi/l										
Metals:														
Hexavalent Chromium (CrVI low)				mg/l										
Chromium, Total, ICAP/MS	50			ug/l	12	12	13	4.1	12	3.2	7.7	3.5	7.6	3.5
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	ND	51	ND	ND	1150
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	6.2	3.7	12	6.5	6.2	ND	ND	ND	3.4	6.3
Barium, Total, ICAP/MS	1000			ug/l	145	77	115	56	53	51	53	74	77	120
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	3.5	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.7
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	48
Volatile Organics:														
Trichloroethylene (TCE)	5			ug/l	ND	0.8	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	0.6	**7.9**	0.5	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l										
2,4-D	70			ug/l										
Bentazon	18			ug/l										
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l										
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l										
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l										
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l										
Perchlorate			18	ug/l	4.1	ND	ND		ND		ND		ND	
Phenanthrene				ug/l										
Picloram	500			ug/l										
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l										
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Willowbrook #1 Zone 4 6/3/99	Wilmington #1 Zone 1 11/17/98	Wilmington #1 Zone 1 5/11/99	Wilmington #1 Zone 1 9/23/99	Wilmington #1 Zone 2 11/17/98	Wilmington #1 Zone 2 5/11/99	Wilmington #1 Zone 2 9/23/99	Wilmington #1 Zone 3 11/17/98	Wilmington #1 Zone 3 5/11/99	Wilmington #1 Zone 3 9/23/99
General Mineral:														
Total Dissolved Solid (TDS)	500	1000		mg/l	320	540	590	560	570	1000	990	1830	2200	1860
Cation Sum				meq/l	5.71	8.39	8.68	10.5	9.34	15.4	15.2	29.3	31.3	27.4
Anion Sum				meq/l	5.77	8.81	8.99	8.81	9.55	14.2	15.9	29.6	31.1	30.8
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese, Total, ICAP/MS		50		ug/l	87	22	20	21	11	19	20	15	14	12
Turbidity		5		NTU	5.4	0.10	ND	0.3	0.10	ND	0.15	0.40	0.6	0.3
Alkalinity				mg/l	179	130	136	131	144	133	134	139	144	172
Bicarbonate as HCO3,calculated				mg/l	218	158	165	159	175	162	163	169	176	210
Calcium, Total, ICAP				mg/l	55.7	49.8	50.9	49.8	66.7	137	131	218	218	193
Carbonate as CO3, Calculated				mg/l	1.78	0.816	1.7	1.64	0.903	0.836	0.841	0.219	0.362	0.432
Chloride	250	500		mg/l	23.7	220	222	219	200	364	424	930	967	944
Fluoride	2			mg/l	0.39	0.16	0.17	0.17	0.12	0.1	0.11	ND	ND	0.07
Free CO2 (25C)				mg/l	3.46	3.98	2.08	2.01	4.41	4.08	4.1	16.9	11.1	13.3
Hydroxide as OH, Calculated				mg/l	0.021	0.014	0.027	0.027	0.014	0.014	0.014	0.003	0.005	0.005
Langelier Index - 25 degree				None	0.7	0.4	0.7	0.7	0.5	0.8	0.8	0.4	0.6	0.7
Magnesium, Total, ICAP				mg/l	10.1	16.0	16.2	16.4	14.7	29.5	28.9	48.2	47.9	43.6
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	3	6.89	7.5	7.2	4.08	6.2	5.9	9.54	10.1	9.7
Sodium, Total, ICAP				mg/l	46.3	102	106	105	108	137	140	327	372	320
Sulfate	250	500		mg/l	72.2	ND	ND	ND	49	63	59.9	26	44.1	33.6
Surfactants		0.5		mg/l	ND	0.34	0.24	0.348	0.27	0.32	0.499	0.58	0.49	0.576
Total Hardness as CaCO3 by ICP				mg/l	181	190	194	286	227	463	446	742	741	661
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND		ND	ND		ND	ND		ND	ND
Total Organic Carbon				mg/l	ND	3.1	2.4	2.3	2.5	3.8	3.2	6.3	5.3	4.9
General Physical:														
Apparent Color		15		ACU	3	3	5	3	3	3	3	10	10	10
Lab pH				Units	8.1	7.9	8.2	8.2	7.9	7.9	7.9	7.3	7.5	7.5
Odor		3		TON	1	17	40	17	17	17	17	200	40	67
pH of CaCO3 saturation(25C)				Units	7.4	7.55	7.5	7.546	7.4	7.1	7.116	6.9	6.9	6.837
pH of CaCO3 saturation(60C)				Units	6.9	7.1	7.1	7.1	6.9	6.7	6.7	6.4	6.4	6.4
Specific Conductance		1600		umho/cm	535	970	900	960	1030	1580	1670	3260	3320	3140
Radon				pCi/l				76			67			69
Metals:														
Hexavalent Chromium (CrVI low)				mg/l				ND			ND			ND
Chromium, Total, ICAP/MS	50			ug/l	7.5	ND	11	8.2	ND	13	9	5.9	11	11
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	7.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium, Total, ICAP/MS	1000			ug/l	125	11	11	11	8.4	12	12	31	28	29
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	2.0	ND	ND	ND	ND	ND	3.5	3.7	4.7
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	ND	ND	ND	ND	5	ND	20	8	7.8
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	ND	ND	ND	7.1	ND	ND	ND	ND	6.2	ND
Volatile Organics:														
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l		ND			ND			ND		
2,4-D	70			ug/l		ND			ND			ND		
Bentazon	18			ug/l		ND			0.86			ND		
Benzene	1			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l		ND			0.01			0.02		
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l		ND			ND			ND		
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND	ND	7.4	7.0	ND	ND
Di-n-Butylphthalate				ug/l		ND			ND			ND		
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l		ND			ND			ND		
Perchlorate			18	ug/l	ND		ND	ND		ND	ND		ND	ND
Phenanthrene				ug/l		ND			ND			ND		
Picloram	500			ug/l		ND			ND			ND		
sec-Butylbenzene				ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	3			ug/l		ND			ND			ND		
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Wilmington #1 Zone 4 11/17/98	Wilmington #1 Zone 4 5/13/99	Wilmington #1 Zone 4 9/23/99	Wilmington #1 Zone 5 11/17/98	Wilmington #1 Zone 5 5/13/99	Wilmington #1 Zone 5 9/23/99	Wilmington #2 Zone 1 11/18/98	Wilmington #2 Zone 1 5/26/99	Wilmington #2 Zone 2 11/18/98	Wilmington #2 Zone 3 11/18/98
General Mineral:														
Total Dissolved Solid (TDS)	500	1000		mg/l	**2690**	**2680**	**2810**	**1060**	860	910	600	490	**1250**	350
Cation Sum				meq/l	42.5	42.8	44.7	17.7	13.8	15.6	8.76	9.67	21.3	5.49
Anion Sum				meq/l	47.9	34.4	48.6	16.9	14.4	15.8	9.36	8.89	21.9	5.88
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND		0.21		0.15	0.12	ND	ND
Manganese, Total, ICAP/MS		50		ug/l	**56**	**55**	**52**		**120**		7.5	9.7	24	24
Turbidity		5		NTU	0.10	0.1	0.15	**14**	**17**	**22**	0.50	0.2	0.50	0.30
Alkalinity				mg/l	139	142	153	291	213	232	378	371	443	189
Bicarbonate as HCO3,calculated				mg/l	169	173	186	355	260	283	458	448	539	230
Calcium, Total, ICAP				mg/l	300	300	290	98.9	90.9	96.5	3.4	3.6	28.4	18.7
Carbonate as CO3, Calculated				mg/l	0.437	0.448	0.606	0.579	0.673	0.922	7.48	11.6	4.410	0.943
Chloride	250	500		mg/l	**1400**	**895**	**1390**	330	259	304	62	50.3	460	74
Fluoride	2			mg/l	ND	ND	0.07	0.12	0.14	0.13	0.91	0.93	0.29	0.22
Free CO2 (25C)				mg/l	8.49	8.69	7.42	28.3	13.1	11.3	3.65	2.25	8.56	7.29
Hydroxide as OH, Calculated				mg/l	0.007	0.007	0.009	0.004	0.007	0.009	0.043	0.068	0.021	0.011
Langelier Index - 25 degree				None	0.9	0.9	1	0.5	0.5	0.7	0.2	0.4	0.8	0.0
Magnesium, Total, ICAP				mg/l	96.8	96.5	98.4	35.6	30.4	34.9	2.4	2.6	19.5	6.78
Mercury	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	12.5	11	13	7.97	5.4	7.9	5.1	5.5	10.5	4.25
Sodium, Total, ICAP				mg/l	443	450	500	222	152	178	190	210	413	89.4
Sulfate	250	500		mg/l	270	303	304	87	134	126	ND	ND	ND	ND
Surfactants		0.5		mg/l	0.19	0.22	0.396	**3.74**	**0.63**	**2.38**	ND	ND	ND	ND
Total Hardness as CaCO3 by ICP				mg/l	1150	1150	1.13E+03	393	352	384	18	20	151	75
Total Nitrate, Nitrite-N, CALC	10			mg/l		ND	ND		ND	ND		ND		
Total Organic Carbon				mg/l	2.4	3.1	3.5	16.8	10.1	11	15.6	14.5	2.8	3.0
General Physical:														
Apparent Color		15		ACU	3	ND	5	10	5	5	**300**	**300**	**100**	**25**
Lab pH				Units	7.6	7.6	7.7	7.4	7.6	7.7	8.4	8.6	8.1	7.8
Odor		3		TON	**67**	**40**	**40**	**200**	**200**	**67**	**4**	**4**	**8**	3
pH of CaCO3 saturation(25C)				Units	6.74	6.7	6.713	6.9	7.1	7.009	8.25	8.2	7.3	7.8
pH of CaCO3 saturation(60C)				Units	6.3	6.3	6.3	6.5	6.6	6.6	7.8	7.8	6.8	7.4
Specific Conductance		1600		umho/cm	**4600**	**4430**	**4720**	**1820**	1440	1540	935	845	**2210**	605
Radon				pCi/l			88			100				
Metals:														
Hexavalent Chromium (CrVI low)				mg/l			ND			ND				
Chromium, Total, ICAP/MS	50			ug/l	2.8	13	9.8	4.9	19	16	2.4	2.8	3.4	3.5
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	ND	ND	ND	ND	ND	26	ND	92	65
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium, Total, ICAP/MS	1000			ug/l	140	130	ND	185	98	135	8.6	9.7	50	22
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	2.4	ND	ND	ND	ND	ND	ND	2.9	ND	7.3
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	ND	ND	ND	1.8	ND	1.5	ND
Nickel, Total, ICAP/MS	100			ug/l	22	10	11	7.3	ND	ND	ND	ND	ND	ND
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	5.8	ND	8.1	ND	ND	ND	ND	13	15	ND
Volatile Organics:														
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	0.5	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l	ND			ND			ND		ND	ND
2,4-D	70			ug/l	ND			0.25			ND		ND	ND
Bentazon	18			ug/l	ND			ND			ND		ND	ND
Benzene	1			ug/l	ND	ND	ND	1.1	0.9	0.8	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l	ND			ND			ND		ND	ND
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l	ND			ND			1.4		0.8 J	ND
Di-isopropyl ether				ug/l	ND	ND	7	ND	ND	6.7	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l	ND			ND			ND		ND	ND
Isopropylbenzene				ug/l	ND	ND	ND	5.1	5.3	4.8	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	1.7	1.4	1.2	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	4.9	5.9	4.7	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	0.5	ND	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	0.6	ND	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l	ND			1.2			ND		ND	ND
Perchlorate			18	ug/l		ND	ND		ND	ND		ND		
Phenanthrene				ug/l	0.03			0.1			ND		ND	ND
Picloram	500			ug/l	ND			0.21			ND		ND	ND
sec-Butylbenzene				ug/l	ND	ND	ND	0.6	0.8	0.7	ND	ND	ND	ND
Toxaphene	3			ug/l	ND			ND			ND		ND	ND
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 4.2
WATER QUALITY RESULTS
REGIONAL GROUNDWATER MONITORING, WATER YEAR 1998-1999

CONSTITUENT	PRIM. MCL	SEC. MCL	ACTION LEVEL	UNITS	Wilmington #2 Zone 3 5/26/99	Wilmington #2 Zone 4 11/18/98	Wilmington #2 Zone 4 5/27/99	Wilmington #2 Zone 5 11/18/98	Wilmington #2 Zone 5 5/27/99
General Mineral:									
Total Dissolved Solid (TDS)	500	1000		mg/l	330	**2410**	**2090**	**9620**	**8800**
Cation Sum				meq/l	6.22	36.1	34.7	156	160
Anion Sum				meq/l	6.02	37.4	37	174	165
Iron, Total, ICAP		0.3		mg/l	ND	ND	ND	0.30	ND
Manganese, Total, ICAP/MS		50		ug/l	21	**68**	**70**	**220**	**235**
Turbidity		5		NTU	0.05	0.60	1.8	4.6	1.9
Alkalinity				mg/l	183	277	276	200	201
Bicarbonate as HCO3,calculated				mg/l	222	338	336	244	245
Calcium, Total, ICAP				mg/l	21	151	149	660	640
Carbonate as CO3, Calculated				mg/l	2.29	0.552	1.38	0.398	0.4
Chloride	250	500		mg/l	83.3	**1100**	**1090**	**5600**	**5170**
Fluoride	2			mg/l	0.27	0.22	0.27	0.16	0.15
Free CO2 (25C)				mg/l	2.8	26.9	10.7	19.4	19.5
Hydroxide as OH, Calculated				mg/l	0.027	0.004	0.011	0.004	0.004
Langelier Index - 25 degree				None	0.4	0.7	1.1	1.2	1.2
Magnesium, Total, ICAP				mg/l	7.9	67.9	72.6	319	330
Mercury	2			ug/l	ND	ND	0.243	ND	ND
Nitrate-N by IC	10			mg/l	ND	ND	ND	ND	ND
Nitrite, Nitrogen by IC	1			mg/l	ND	ND	ND	ND	ND
Potassium, Total, ICAP				mg/l	4.9	16.4	16.8	33.5	33.7
Sodium, Total, ICAP				mg/l	101	518	480	2200	2300
Sulfate	250	500		mg/l	ND	40	35.8	**560**	**703**
Surfactants		0.5		mg/l	ND	0.06	ND	0.05	ND
Total Hardness as CaCO3 by ICP				mg/l	85	656	670	2960	2950
Total Nitrate, Nitrite-N, CALC	10			mg/l	ND		ND		ND
Total Organic Carbon				mg/l	3	6.1	5.8	2.9	2.7
General Physical:									
Apparent Color		15		ACU	**25**	**35**	**35**	10	10
Lab pH				Units	8.2	7.4	7.8	7.4	7.4
Odor		3		TON	1	**200**	**67**	**8**	**4**
pH of CaCO3 saturation(25C)				Units	7.8	6.7	6.7	6.24	6.2
pH of CaCO3 saturation(60C)				Units	7.3	6.3	6.3	5.8	5.8
Specific Conductance		1600		umho/cm	580	**3980**	**3380**	**16200**	**14700**
Radon				pCi/l					
Metals:									
Hexavalent Chromium (CrVI low)				mg/l					
Chromium, Total, ICAP/MS	50			ug/l	12	3.0	2.1	4.2	20
Aluminum, Total, ICAP/MS	1000	200		ug/l	ND	31	ND	65	ND
Antimony, Total, ICAP/MS	6			ug/l	ND	ND	ND	ND	ND
Arsenic, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND
Barium, Total, ICAP/MS	1000			ug/l	24	155	145	155	285
Beryllium, Total, ICAP/MS	4			ug/l	ND	ND	ND	ND	ND
Cadmium, Total, ICAP/MS	5			ug/l	ND	ND	ND	ND	ND
Copper, Total, ICAP/MS		1000	1300	ug/l	ND	ND	ND	8.9	5.6
Lead, Total, ICAP/MS			15	ug/l	ND	ND	ND	0.67	ND
Nickel, Total, ICAP/MS	100			ug/l	ND	7.3	9.2	36	42
Selenium, Total, ICAP/MS	50			ug/l	ND	ND	ND	ND	ND
Silver, Total, ICAP/MS		100		ug/l	ND	ND	0.61	ND	ND
Thallium, Total, ICAP/MS	2			ug/l	ND	ND	ND	ND	ND
Zinc, Total, ICAP/MS		5000		ug/l	8.4	ND	8.9	15	9.3
Volatile Organics:									
Trichloroethylene (TCE)	5			ug/l	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	5			ug/l	ND	ND	ND	ND	ND
1,1-Dichloroethane	5			ug/l	ND	ND	ND	ND	ND
1,1-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				ug/l	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	50			ug/l		ND		ND	
2,4-D	70			ug/l		ND		ND	
Bentazon	18			ug/l		ND		ND	
Benzene	1			ug/l	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5			ug/l	ND	ND	ND	ND	ND
Chloroform (Trichloromethane)	100			ug/l	ND	ND	ND	ND	ND
Chlorthalonil (Draconil,Bravo)				ug/l		ND		ND	
cis-1,2-Dichloroethylene	6			ug/l	ND	ND	ND	ND	ND
Di(2-Ethylhexyl)phthalate	4			ug/l		ND		ND	
Di-isopropyl ether				ug/l	ND	ND	ND	ND	ND
Di-n-Butylphthalate				ug/l		ND		ND	
Isopropylbenzene				ug/l	ND	ND	ND	ND	ND
Methyl Tert-butyl ether (MTBE)	13	5	13	ug/l	ND	ND	ND	ND	ND
m,p-Xylenes	1750			ug/l	ND	ND	ND	ND	ND
n-Propylbenzene				ug/l	ND	ND	ND	ND	ND
Naphthalene				ug/l	ND	ND	ND	ND	ND
o-Xylene	1750			ug/l	ND	ND	ND	ND	ND
Oil and Grease by IR				mg/l		ND		ND	
Perchlorate			18	ug/l	ND		ND		ND
Phenanthrene				ug/l		ND		ND	
Picloram	500			ug/l		ND		ND	
sec-Butylbenzene	.			ug/l	ND	ND	ND	ND	ND
Toxaphene	3			ug/l		ND		ND	
Vinyl chloride (VC)	0.5			ug/l	ND	ND	ND	ND	ND

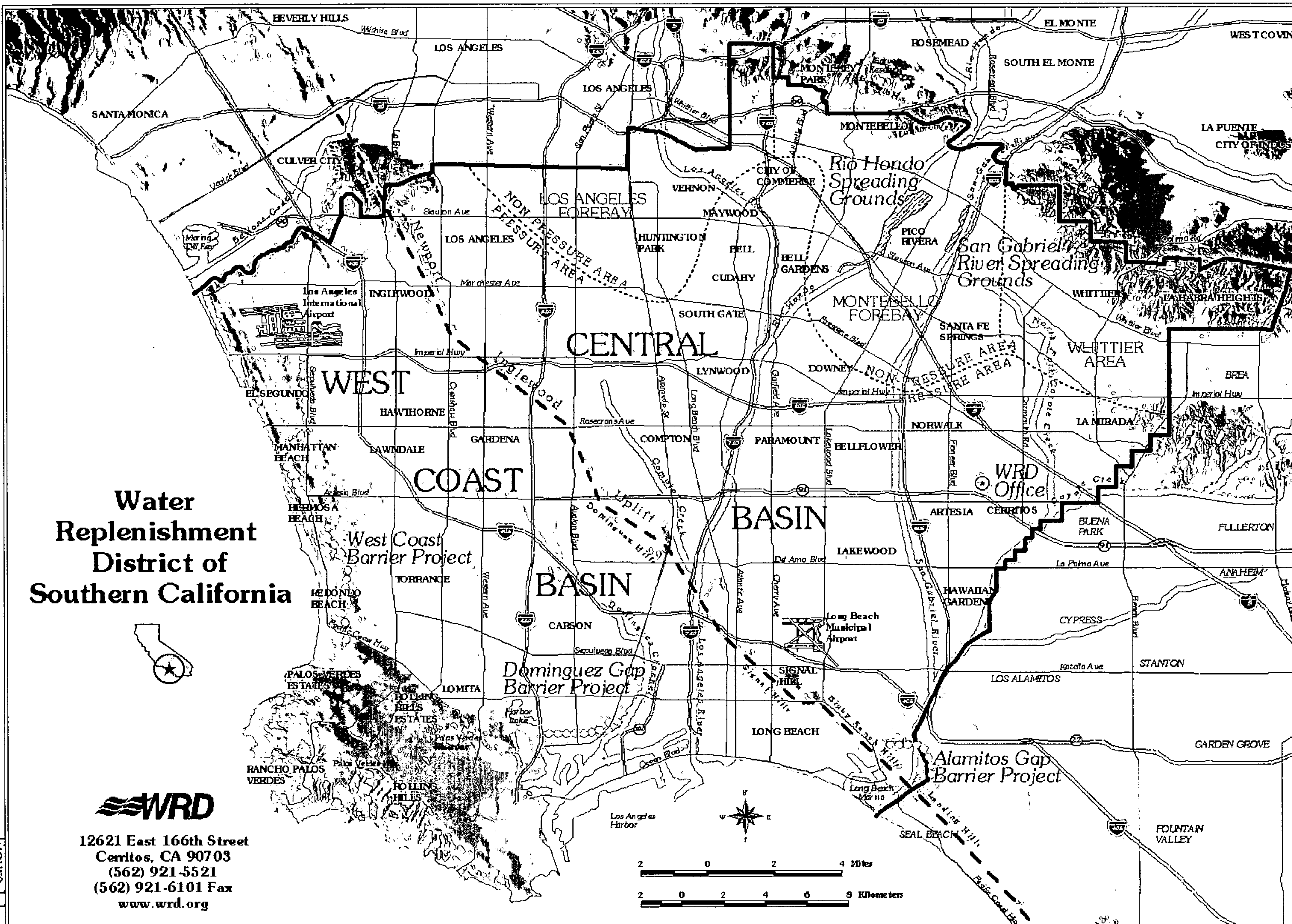
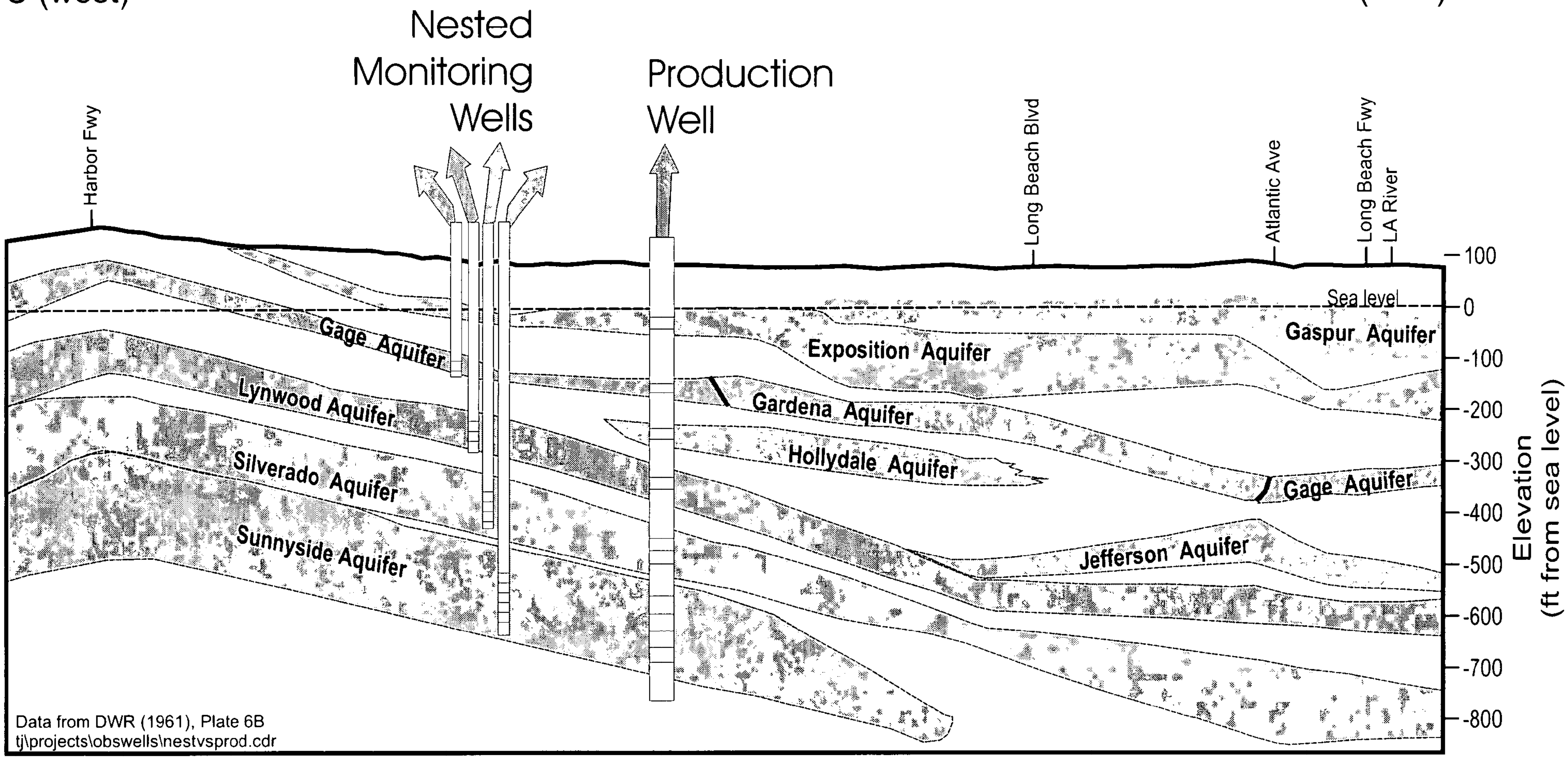

Water Replenishment District of Southern California
WRD
12621 East 166th Street
Cerritos, CA 90703
(562) 921-5521
(562) 921-6101 Fax
www.wrd.org
WEST COAST BASIN
CENTRAL BASIN
LOS ANGELES FOREBAY
MONTEBELLO FOREBAY
WHITTIER AREA
NON PRESSURE AREA
PRESSURE AREA
Rio Hondo Spreading Grounds
San Gabriel River Spreading Grounds
WRD Office
West Coast Barrier Project
Dominguez Gap Barrier Project
Alamitos Gap Barrier Project
Newport
Inglewood
Uplift
Dominguez Hills
Signal Hills
Bixby Ranch Hills
Landing Hills
BEVERLY HILLS
LOS ANGELES
SANTA MONICA
CULVER CITY
Marina Del Rey
Los Angeles International Airport
INGLEWOOD
EL SEGUNDO
HAWTHORNE
LAWNDALE
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
TORRANCE
GARDENA
CARSON
LOMITA
PALOS VERDES ESTATES
ROLLING HILLS ESTATES
ROLLING HILLS
RANCHO PALOS VERDES
VERNON
CITY OF COMMERCE
MAYWOOD
HUNTINGTON PARK
BELL
BELL GARDENS
CUDAHY
SOUTH GATE
LYNWOOD
COMPTON
PARAMOUNT
DOWNEY
BELLFLOWER
NORWALK
SANTA FE SPRINGS
PICO RIVERA
MONTEBELLO
MONTEREY PARK
ROSEMEAD
EL MONTE
SOUTH EL MONTE
WEST COVINA
LA PUENTE
CITY OF INDUSTRY
WHITTIER
LA HABRA HEIGHTS
LA MIRADA
BREA
ARTESIA
CERRITOS
LAKEWOOD
HAWAIIAN GARDENS
Long Beach Municipal Airport
SIGNAL HILL
LONG BEACH
Long Beach Marina
SEAL BEACH
Los Angeles Harbor
Harbor Lake
BUENA PARK
FULLERTON
ANAHEIM
CYPRESS
STANTON
LOS ALAMITOS
GARDEN GROVE
FOUNTAIN VALLEY
Wilshire Blvd
Venice Blvd
Slauson Ave
Manchester Ave
Imperial Hwy
Rosecrans Ave
Artesia Blvd
Del Amo Blvd
Sepulveda Blvd
Pacific Coast Hwy
Ocean Blvd
La Brea Ave
Western Ave
Crenshaw Blvd
Avalon Blvd
Alameda St
Long Beach Blvd
Atlantic Ave
Cherry Ave
Garfield Ave
Lakewood Blvd
Pioneer Blvd
Carmenita Rd
Whittier Blvd
Rosemead Blvd
La Palma Ave
Katella Ave
Beach Blvd
Harbor Blvd
Los Angeles River
San Gabriel River
Rio Hondo
Compton Creek
Dominguez Channel
Coyote Creek
Ballona Creek
N
W
E
2 0 2 4 Miles
2 0 2 4 6 8 Kilometers

Figure 1.1

NESTED WELLS versus PRODUCTION WELLS FOR AQUIFER-SPECIFIC DATA



Production wells are typically perforated across multiple aquifers producing an average water quality. Nested monitoring wells are screened in a portion of a specific aquifer, providing water quality and water level information for the specific zone.

Figure 1.2

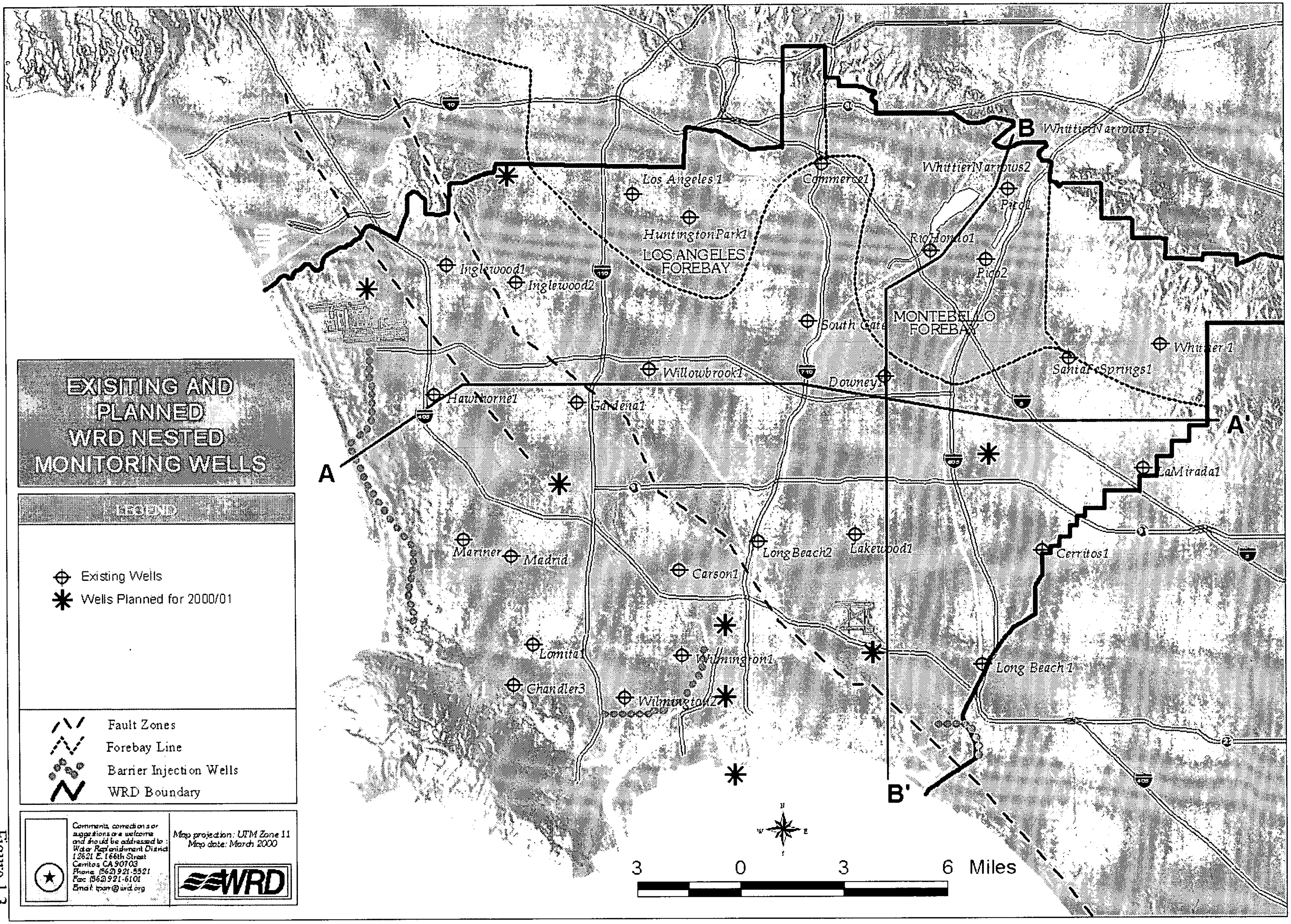
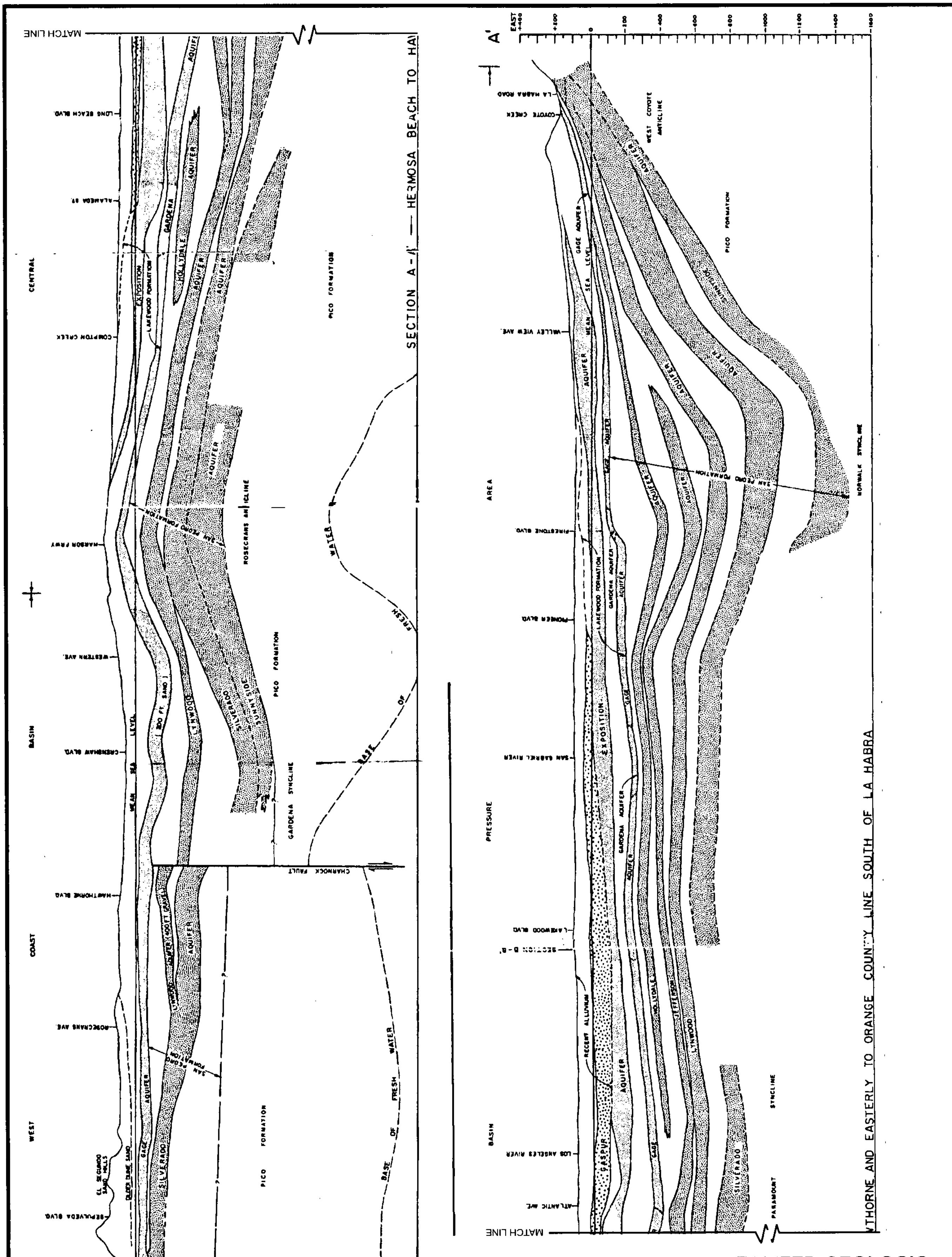

EXISITING AND
PLANNED
WRD NESTED
MONITORING WELLS
LEGEND
Existing Wells
Wells Planned for 2000/01
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District
12621 E. 166th Street
Cerritos CA 90703
Phone (562) 921-5521
Fax (562) 921-6101
Email: tparr@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
A
A'
B
B'
LOS ANGELES FOREBAY
MONTEBELLO FOREBAY
Los Angeles1
HuntingtonPark1
Commerce1
WhittierNarrows1
WhittierNarrows2
Pico1
Pico2
RioHondo1
Inglewood1
Inglewood2
South Gate
Whittier1
SantaFeSprings1
Willowbrook1
Downey1
Hawthorne1
Gardena1
LaMirada1
Mariner
Madrid
LongBeach2
Lakewood1
Cerritos1
Carson1
Lomita1
Wilmington1
Long Beach 1
Chandler3
Wilmington2
3
0
3
6
Miles

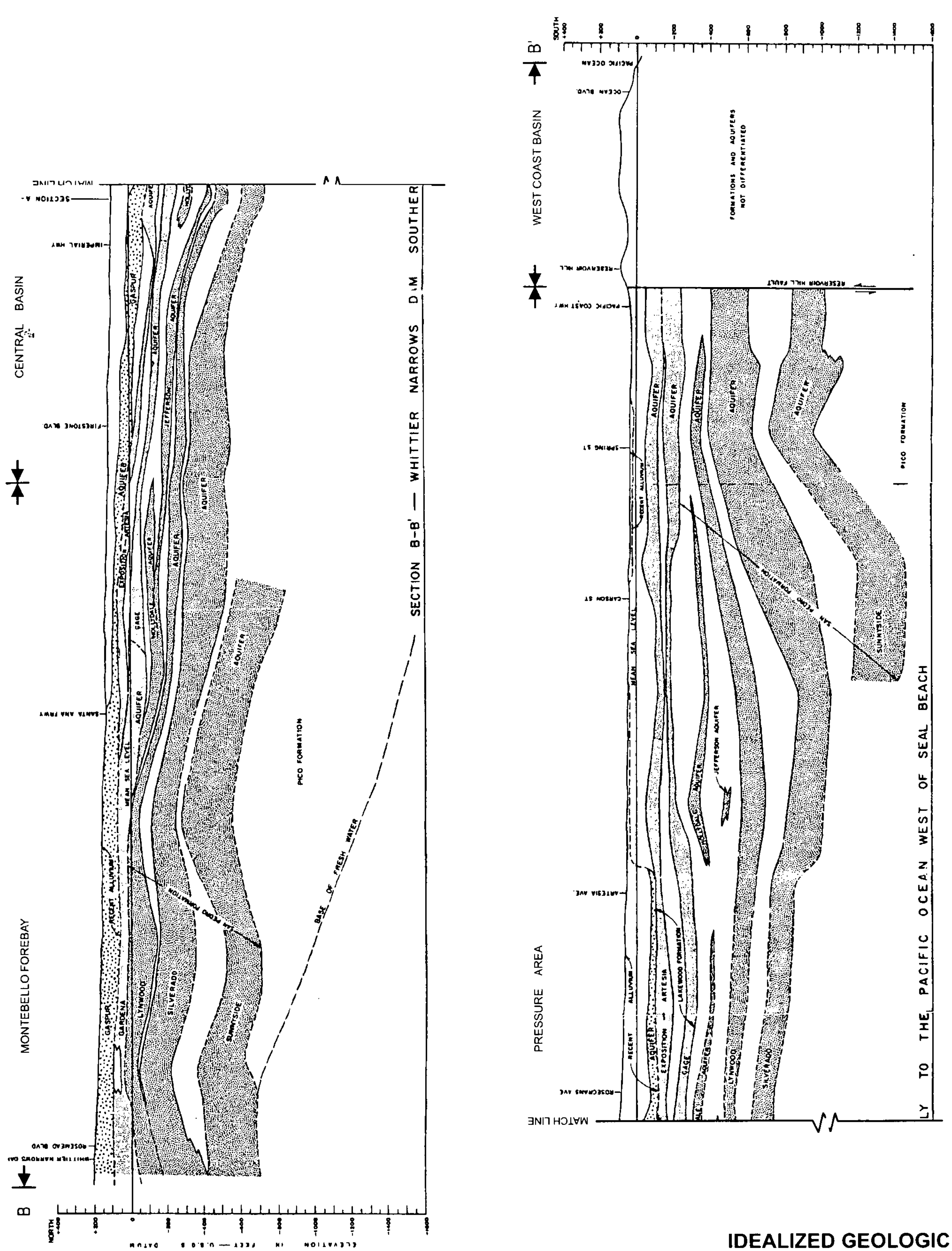
Figure 1.3



IDEALIZED GEOLOGIC CROSS SECTION AA'

Adapted from
CDWR Bull. 104 App. B

FIGURE 1.4



IDEALIZED GEOLOGIC CROSS SECTION BB'

Adapted from
CDWR Bull. 104 App. B

FIGURE 1.5

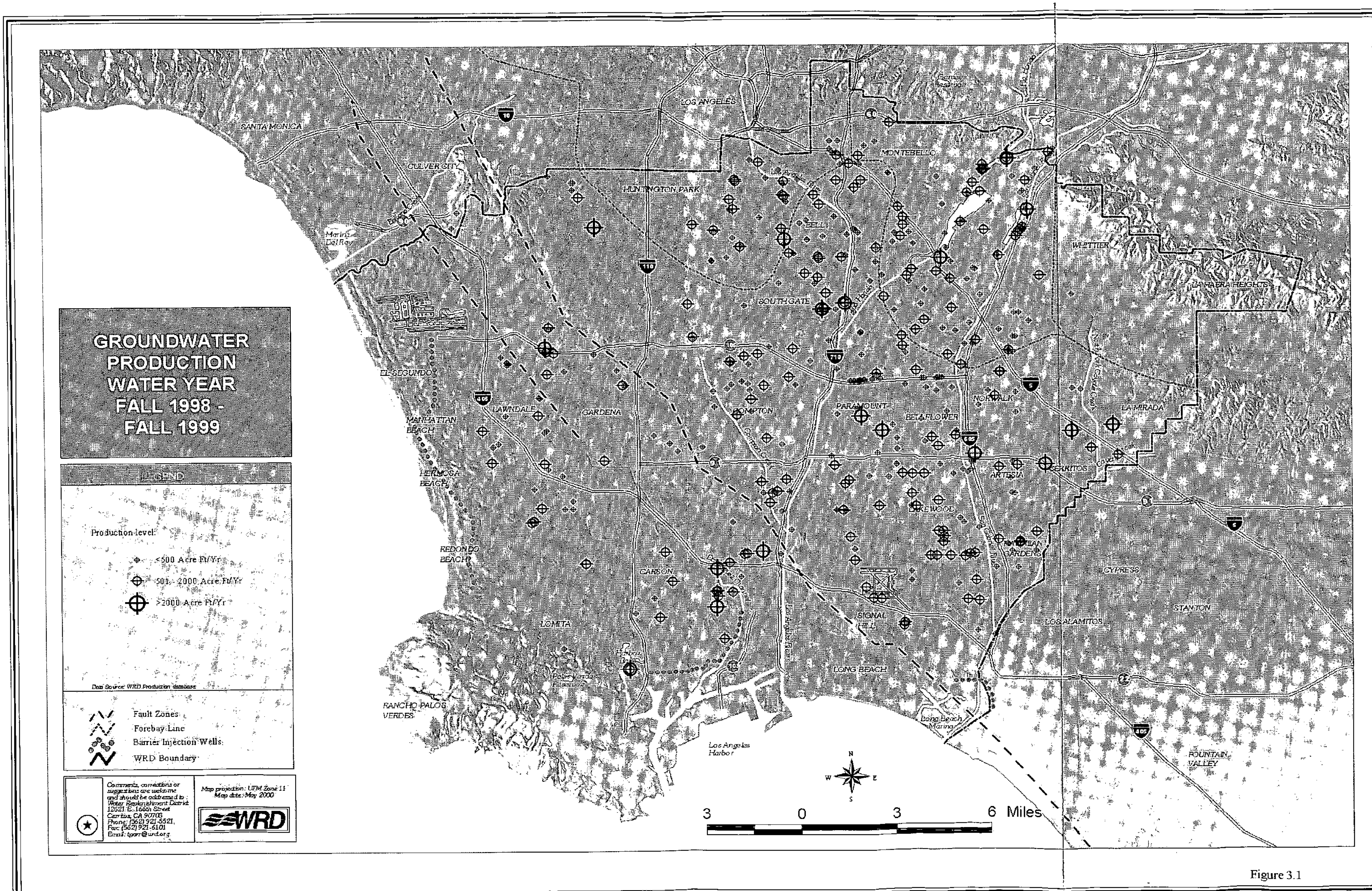

GROUNDWATER PRODUCTION WATER YEAR FALL 1998 - FALL 1999
LEGEND
Production level:
<500 Acre Ft/Yr
501 - 2000 Acre Ft/Yr
>2000 Acre Ft/Yr
Data Source: WRD Production database
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521, Fax: (562) 921-6101
Map projection: UTM Zone 11
Map date: May 2000
WRD
SANTA MONICA
CULVER CITY
LOS ANGELES
MONTEBELLO
HUNTINGTON PARK
BELL
SOUTH GATE
WHITTIER
LA HABRA HEIGHTS
EL SEGUNDO
LAWNDALE
GARDENA
COMPTON
PARAMOUNT
BELLFLOWER
NORWALK
LA MIRADA
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
ARTESIA
CERRITOS
LAKEWOOD
CARSON
HAWAIIAN GARDENS
CYPRESS
STANTON
LOS ALAMITOS
SIGNAL HILL
LOMITA
LONG BEACH
RANCHO PALOS VERDES
Los Angeles Harbor
Long Beach Marina
FOUNTAIN VALLEY
Marina Del Rey
3 0 3 6 Miles
N
S
E
W

Figure 3.1

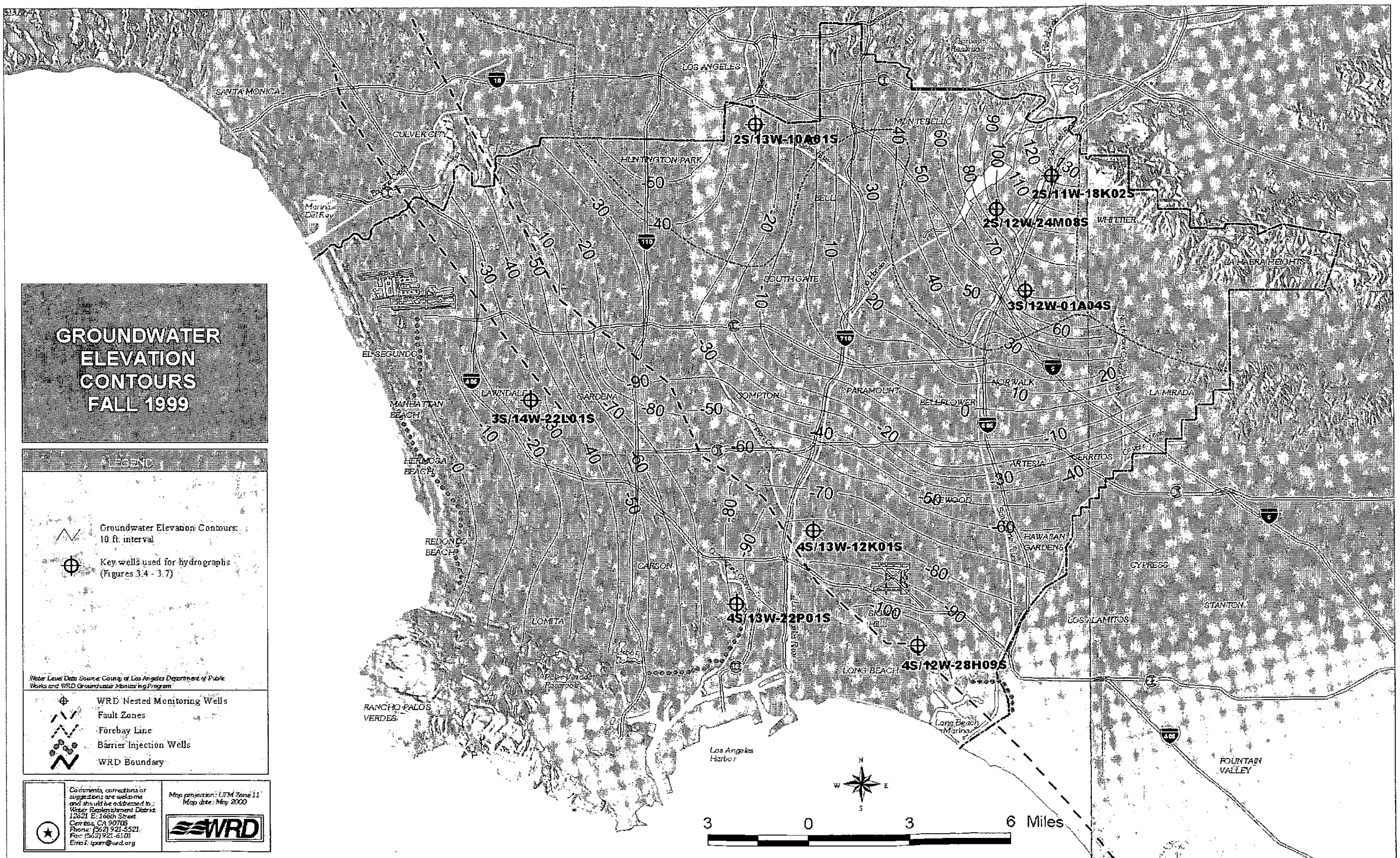

GROUNDWATER
ELEVATION
CONTOURS
FALL 1999
LEGEND
Groundwater Elevation Contours; 10 ft. interval
Key wells used for hydrographs (Figures 3.4 - 3.7)
Water Level Data Source: County of Los Angeles Department of Public Works and WRD Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tparr@wrd.org
Map projection: UTM Zone 11
Map date: May 2000
WRD
2S/13W-10A01S
2S/11W-18K02S
2S/12W-24M08S
3S/12W-01A04S
3S/14W-22L01S
4S/13W-12K01S
4S/13W-22P01S
4S/12W-28H09S
SANTA MONICA
CULVER CITY
LOS ANGELES
HUNTINGTON PARK
MONTEBELLO
BELL
WHITTIER
LA HABRA HEIGHTS
SOUTH GATE
EL SEGUNDO
MANHATTAN BEACH
LAWNDALE
GARDENA
COMPTON
PARAMOUNT
BELLFLOWER
NORWALK
LA MIRADA
HERMOSA BEACH
REDONDO BEACH
ARTESIA
CERRITOS
HAWAIIAN GARDENS
CARSON
CYPRESS
LOMITA
LOS ALAMITOS
STANTON
LONG BEACH
RANCHO PALOS VERDES
Los Angeles Harbor
Long Beach Marina
FOUNTAIN VALLEY
3 0 3 6 Miles

Figure 3.2

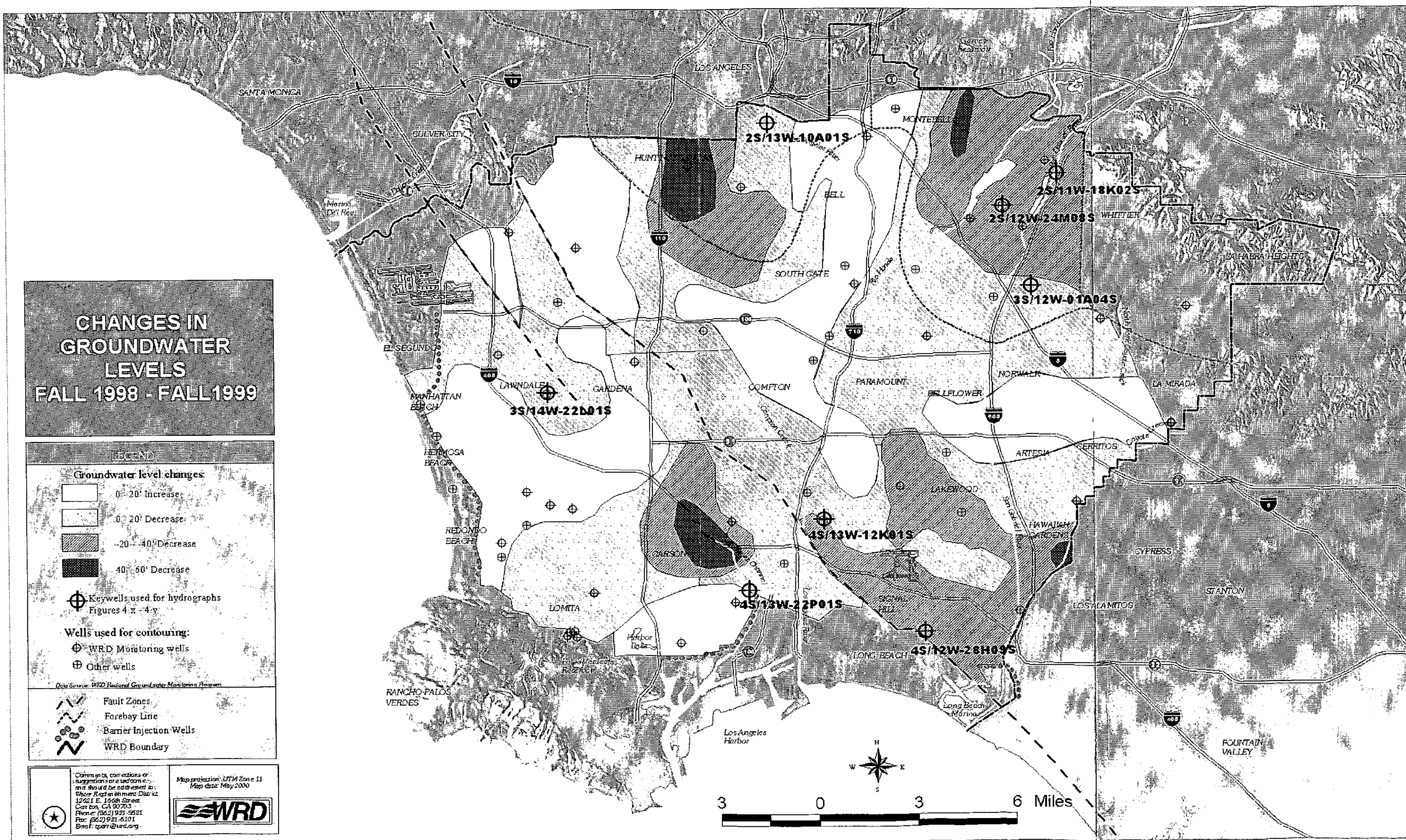
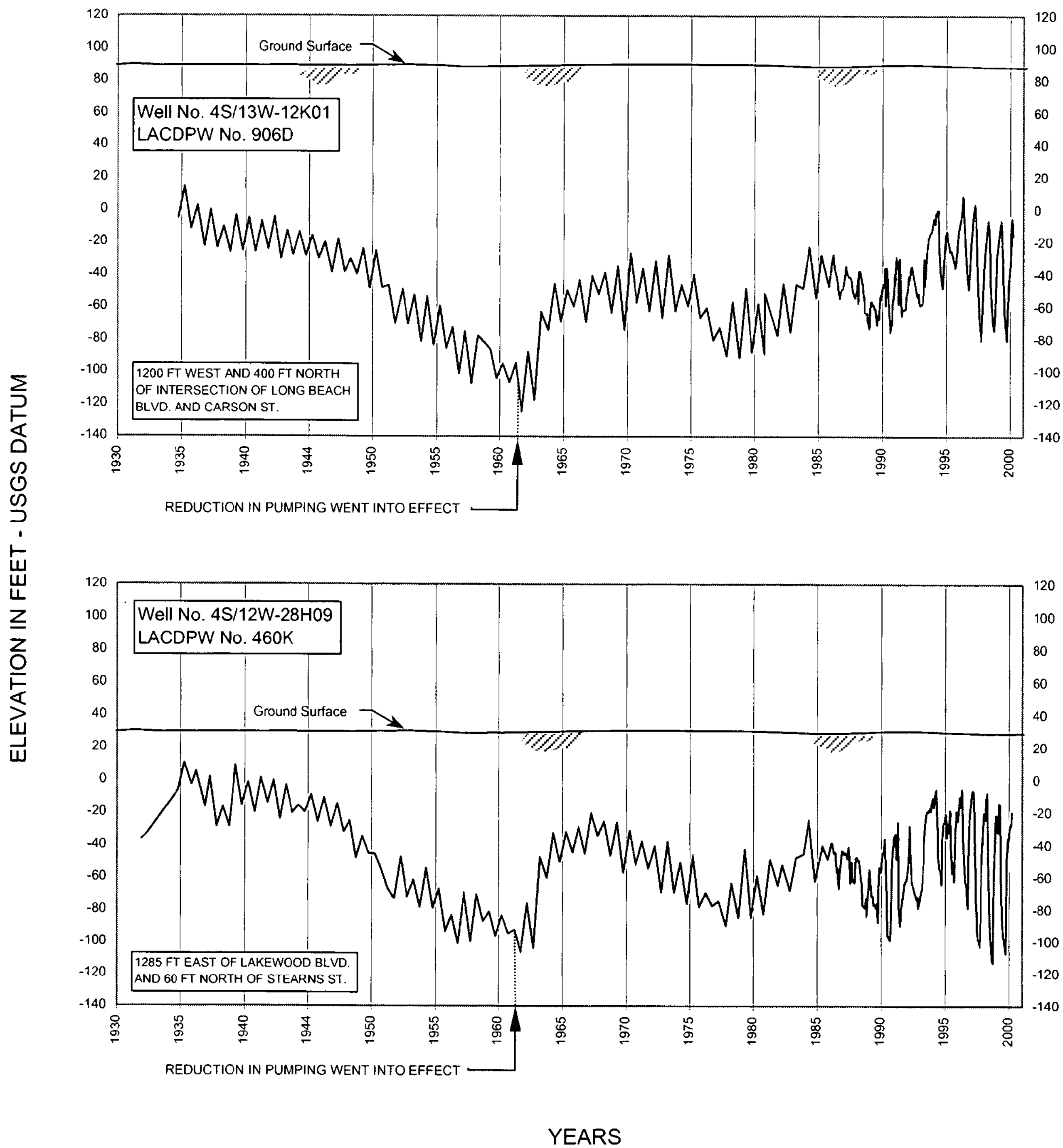

CHANGES IN GROUNDWATER LEVELS
FALL 1998 - FALL1999
LEGEND
Groundwater level changes:
0 - 20' Increase
0 - 20' Decrease
-20 - -40' Decrease
40 - 60' Decrease
Keywells used for hydrographs Figures 4.x - 4.y
Wells used for contouring:
WRD Monitoring wells
Other wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Map projection: UTM Zone 11
Map date: May 2000
WRD
2S/13W-10A01S
2S/11W-18K02S
2S/12W-24M08S
3S/12W-01A04S
3S/14W-22D01S
4S/13W-12K01S
4S/13W-22P01S
4S/12W-28H09S
SANTA MONICA
CULVER CITY
LOS ANGELES
MONTEBELLO
BELL
SOUTH GATE
WHITTIER
EL SEGUNDO
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
LAWNDALE
GARDENA
COMPTON
PARAMOUNT
BELLFLOWER
NORWALK
LA MIRADA
ARTESIA
CERRITOS
LAKEWOOD
HAWAIIAN GARDENS
CYPRESS
STANTON
LOS ALAMITOS
CARSON
LOMITA
SIGNAL HILL
LONG BEACH
RANCHO PALOS VERDES
Los Angeles Harbor
FOUNTAIN VALLEY
3 0 3 6 Miles

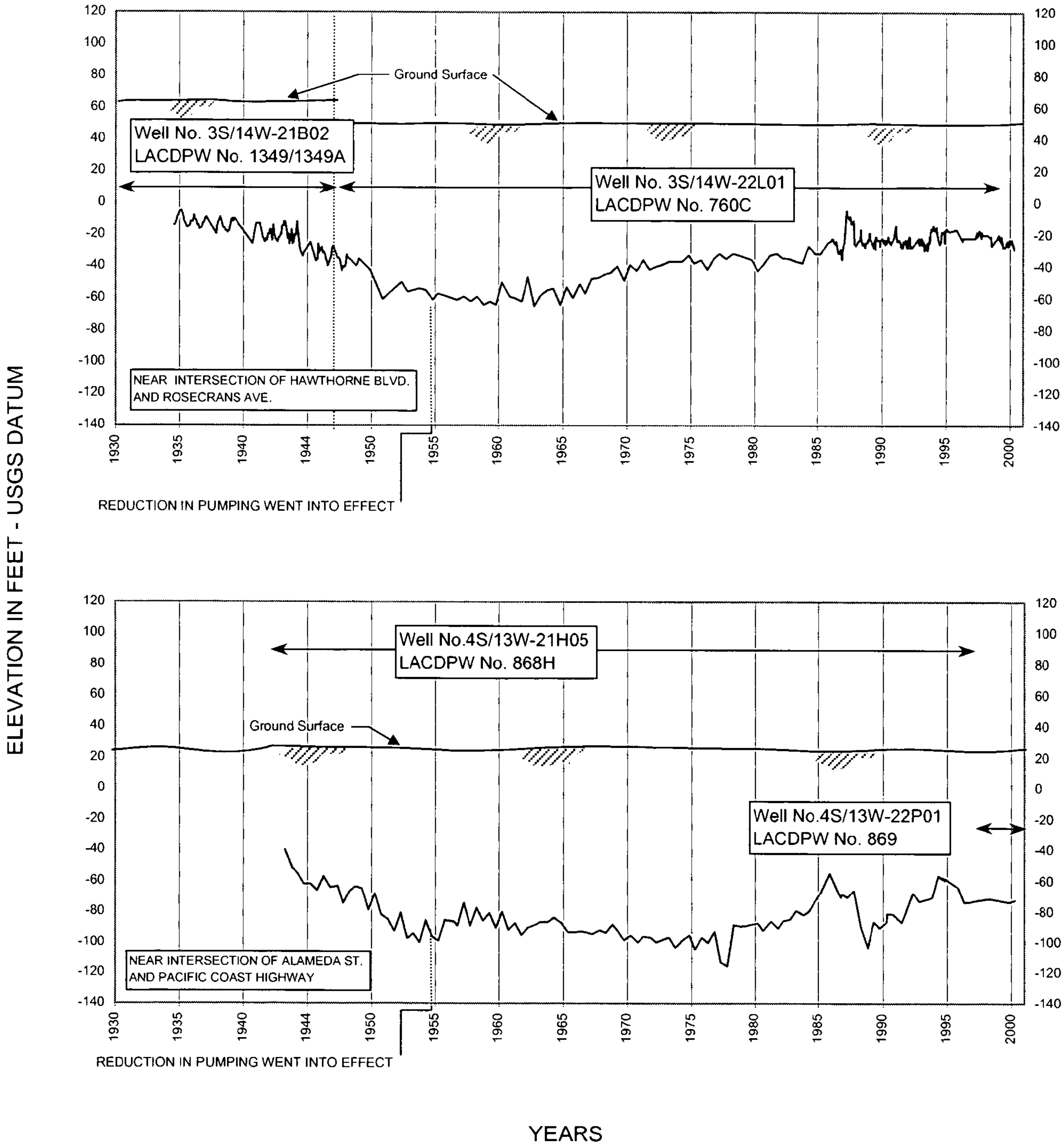
Figure 3.3



FLUCTUATIONS OF WATER LEVEL AT WELLS

CENTRAL BASIN PRESSURE AREA

FIGURE 3.4

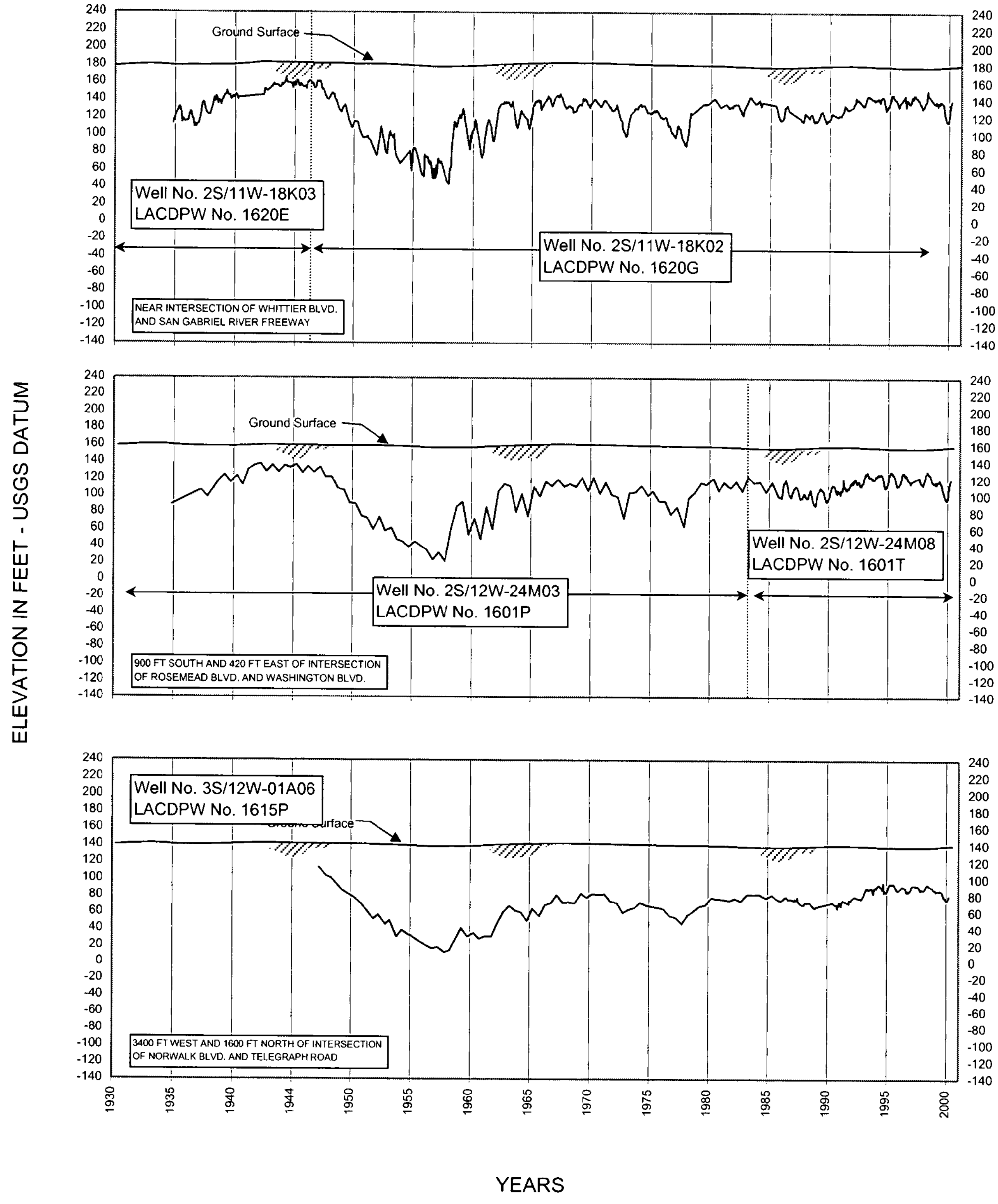


NOTE: WATER LEVEL DATA FOR WELL 868H HAS NOT BEEN AVAILABLE SINCE 1995, DATA FROM WELL 869 SUBSTITUTED SINCE 1995

FLUCTUATIONS OF WATER LEVEL AT WELLS

WEST BASIN

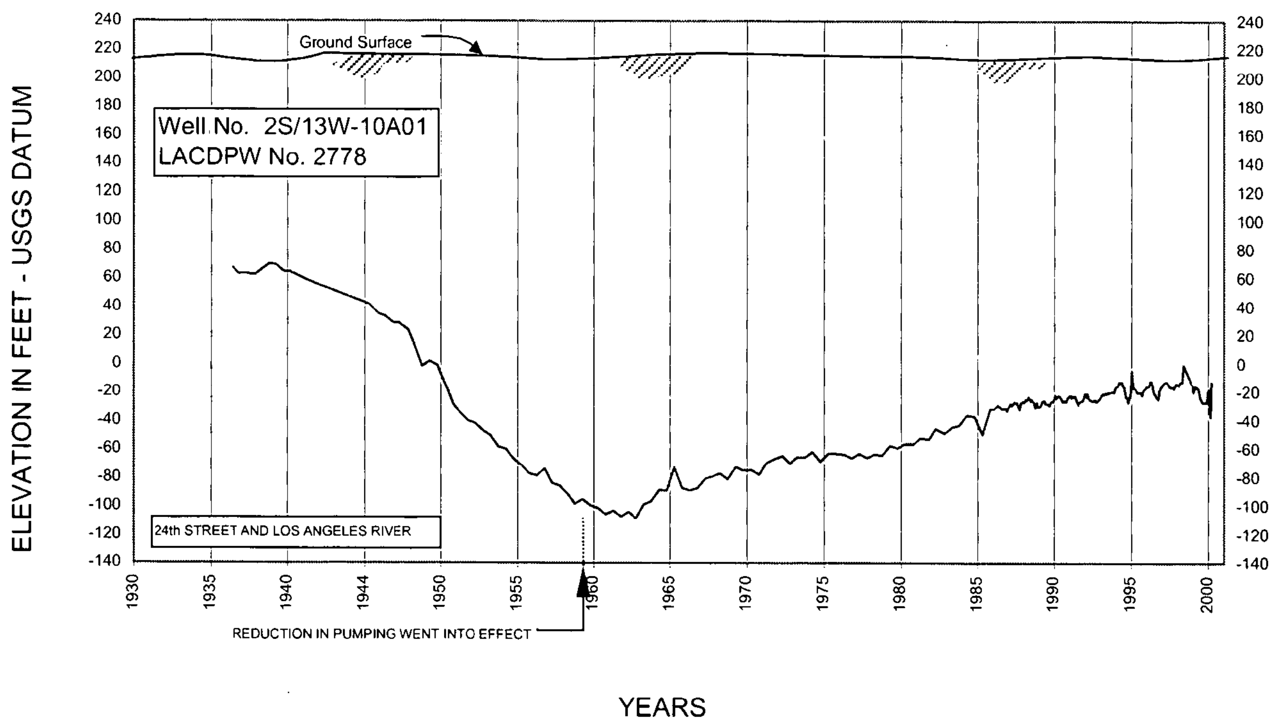
FIGURE 3.5



FLUCTUATIONS OF WATER LEVEL AT WELLS

MONTEBELLO FOREBAY

FIGURE 3.6

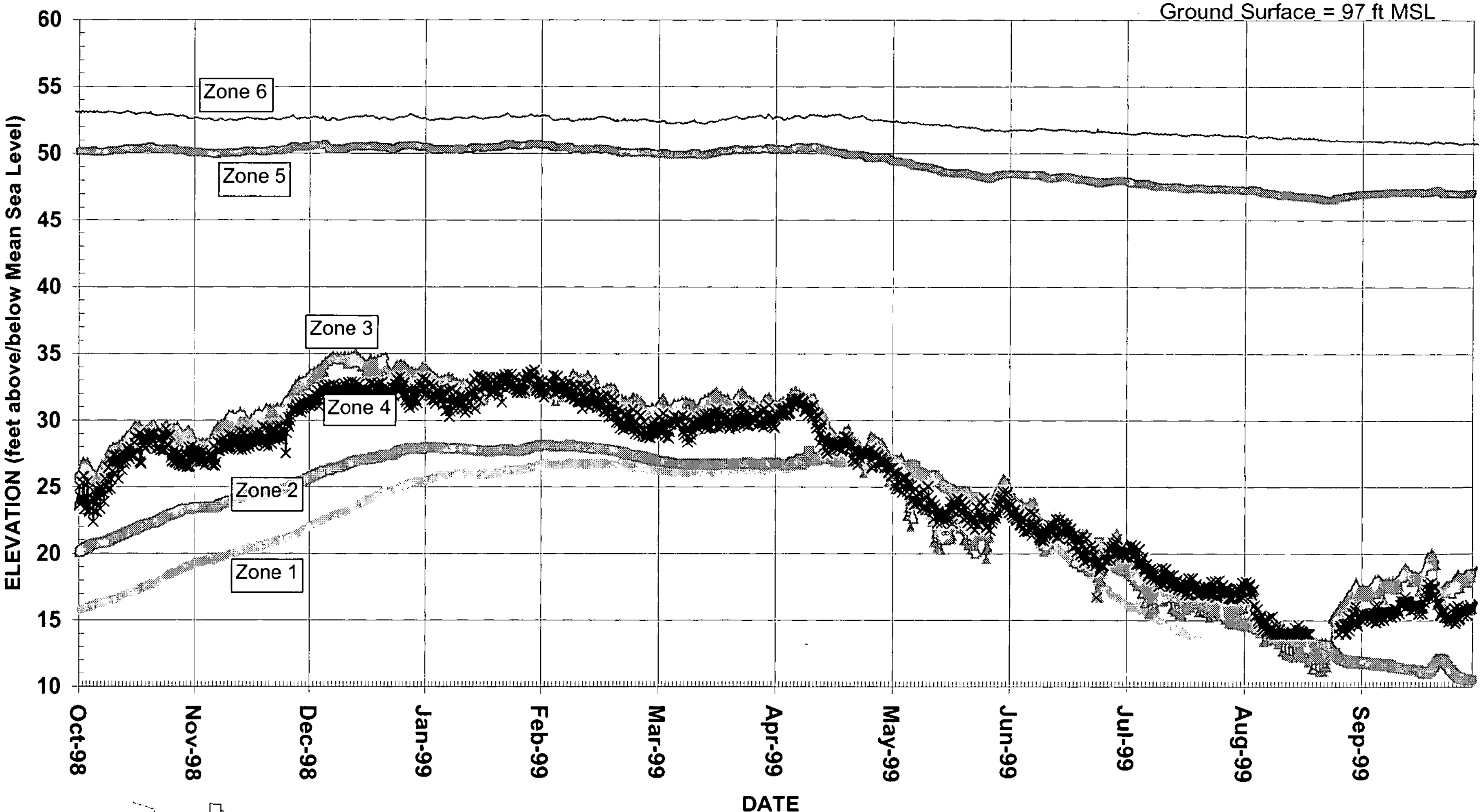


FLUCTUATIONS OF WATER LEVEL AT WELLS

LOS ANGELES FOREBAY

FIGURE 3.7

GROUNDWATER ELEVATION HYDROGRAPH
WRD Nested Monitoring Well - Downey #1



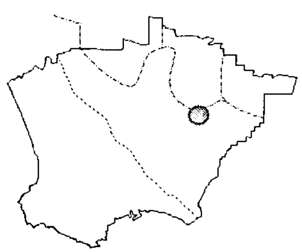


Figure 3.8

7/18/00 8:49 AM

GROUNDWATER ELEVATION HYDROGRAPH
WRD Nested Monitoring Well - Downey #1

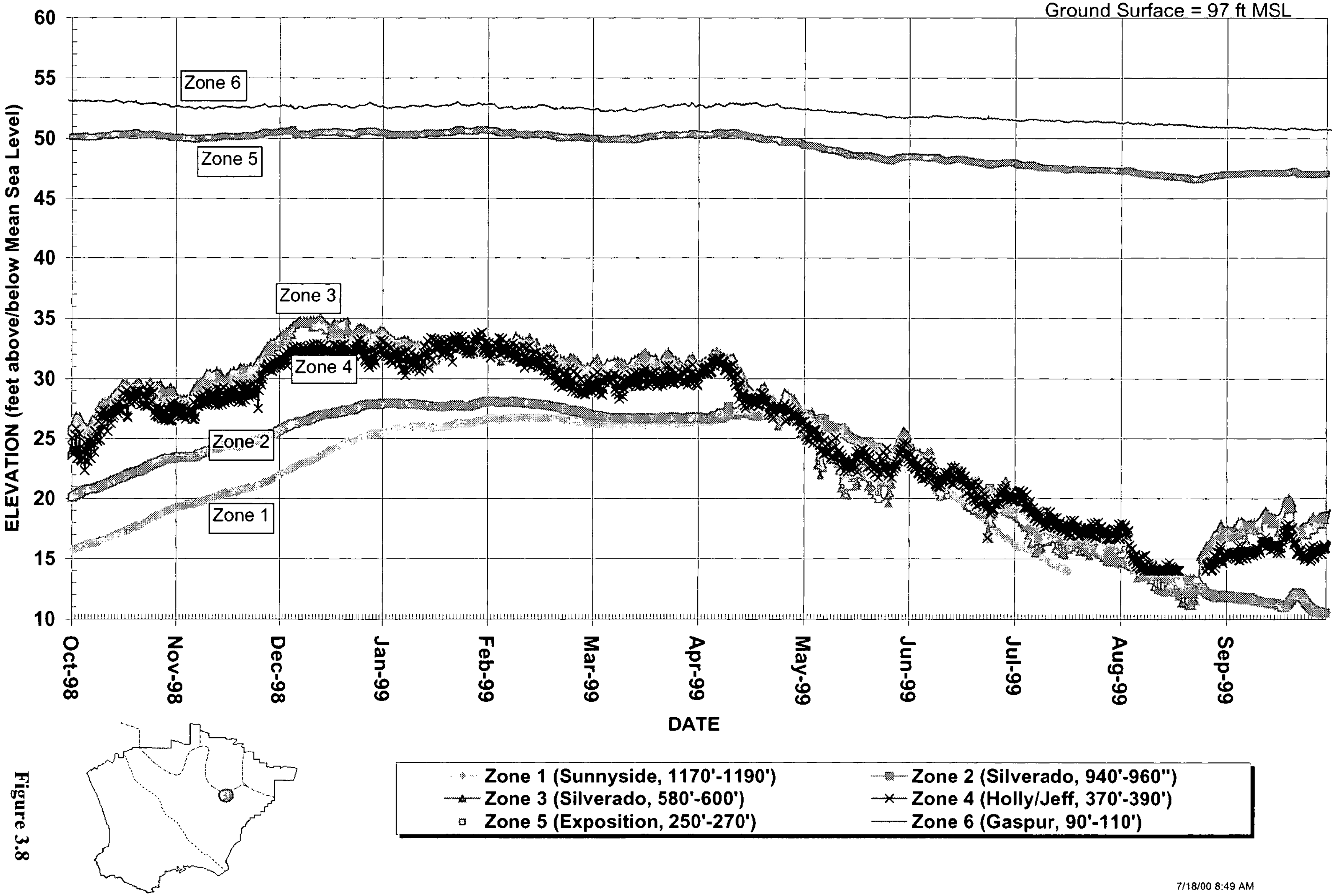
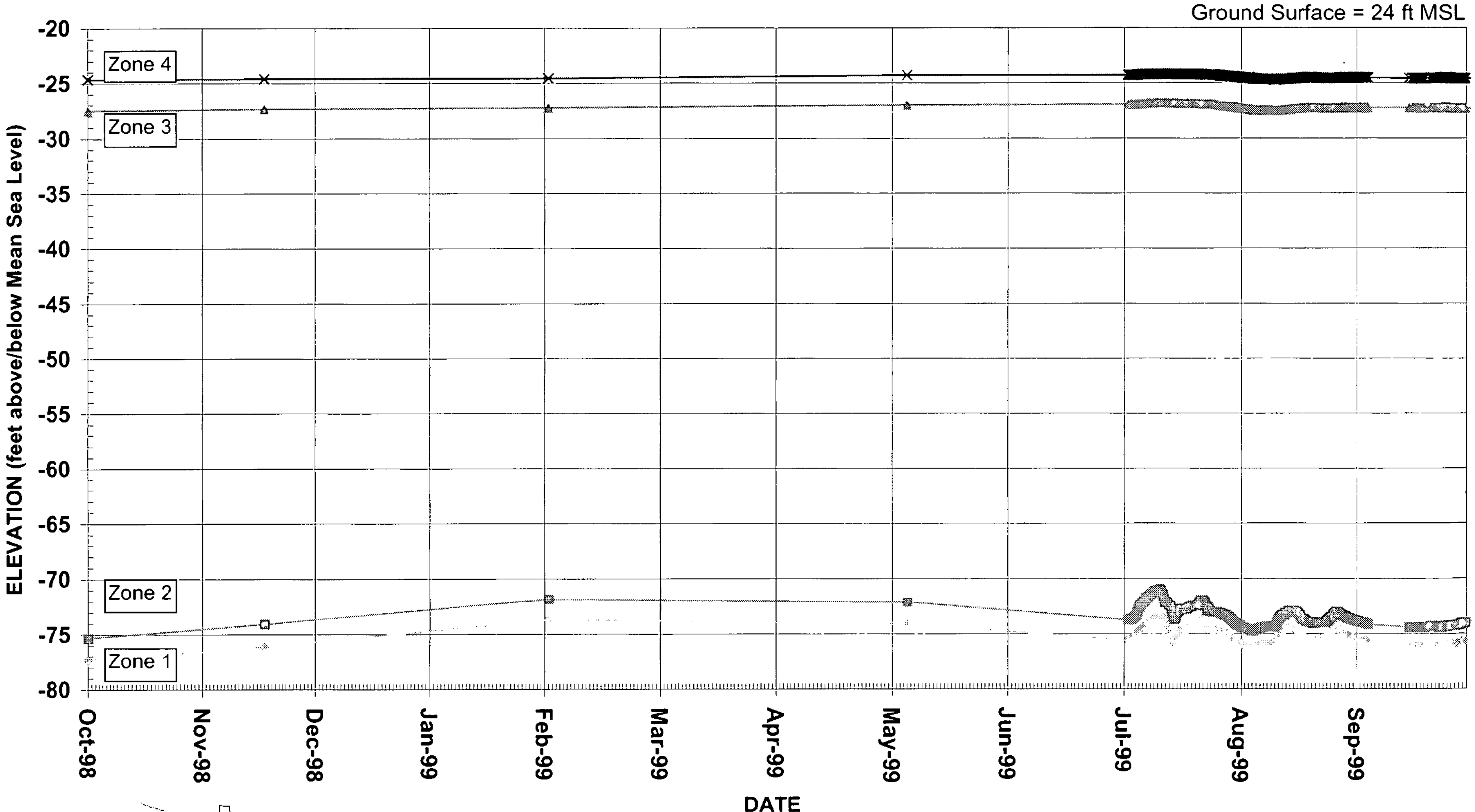


Figure 3.8

7/18/00 8:49 AM

GROUNDWATER ELEVATION HYDROGRAPH
WRD Nested Monitoring Well - Carson #1



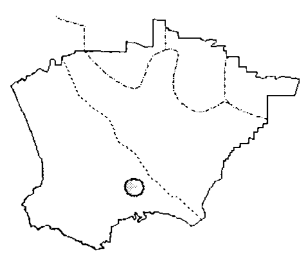
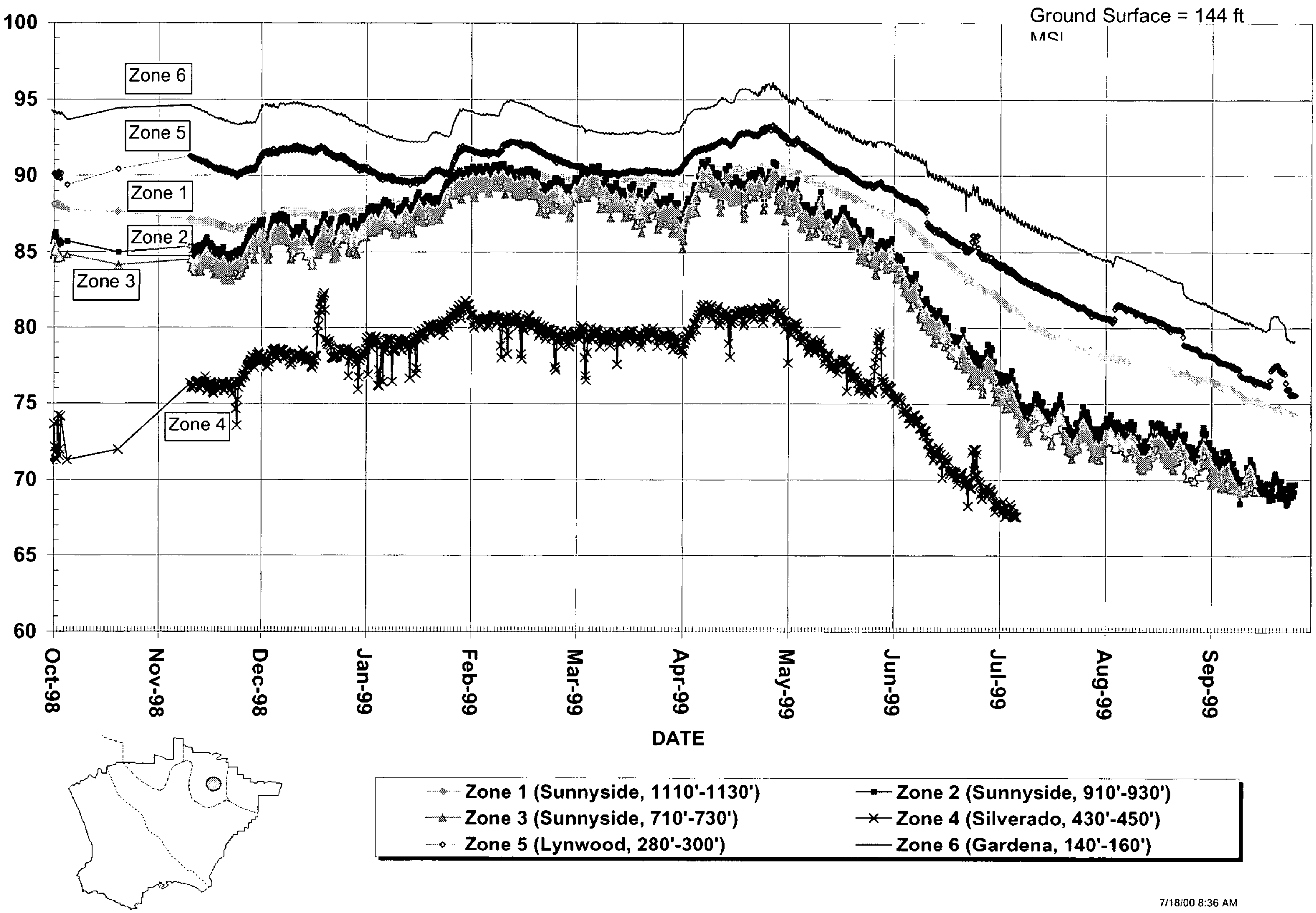


Figure 3.9

7/18/00 8:48 AM

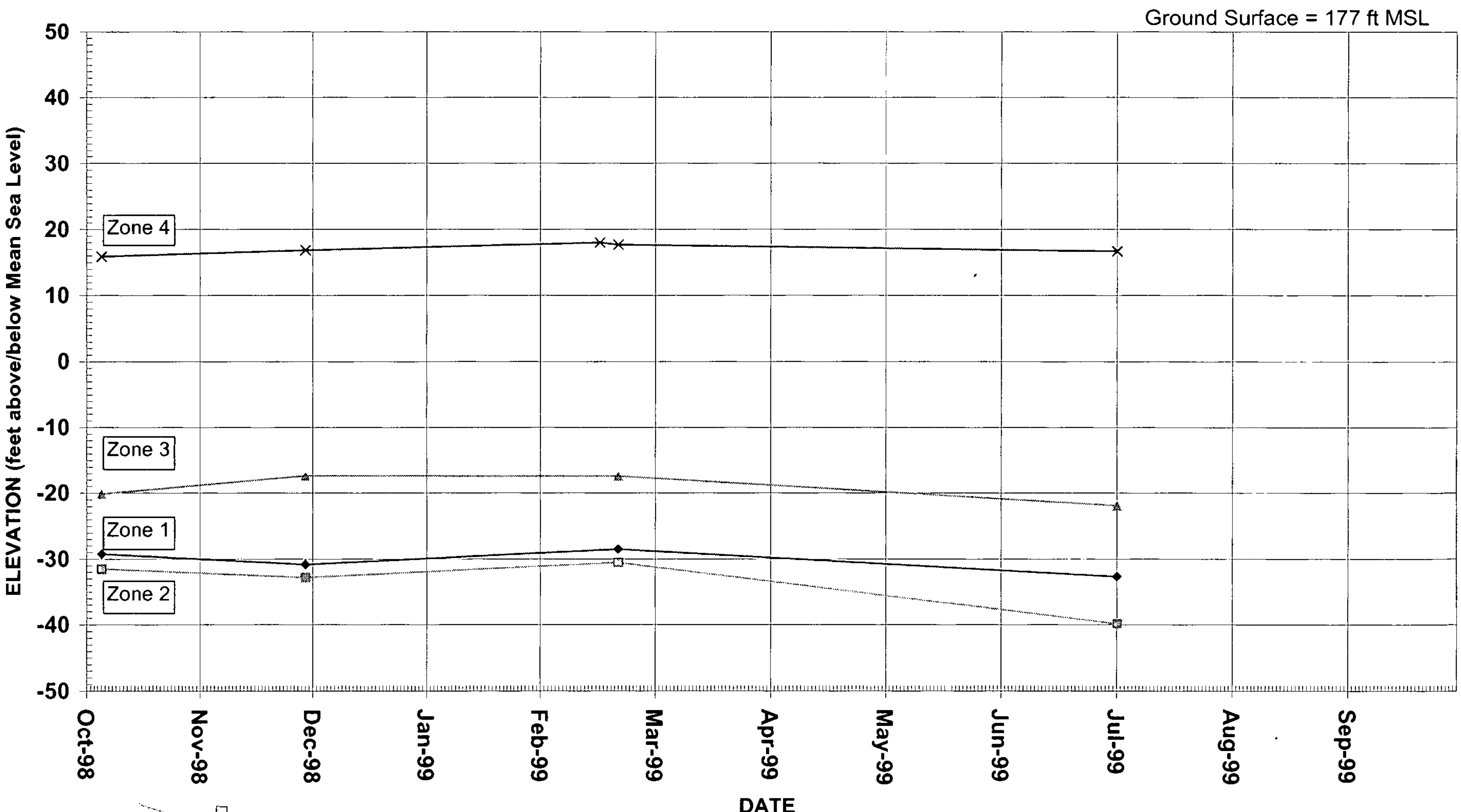
GROUNDWATER ELEVATION HYDROGRAPH
WRD Nested Monitoring Well - Rio Hondo #1



7/18/00 8:36 AM

Figure 3.10

GROUNDWATER ELEVATION HYDROGRAPH
WRD Nested Monitoring Well - Huntington Park #1



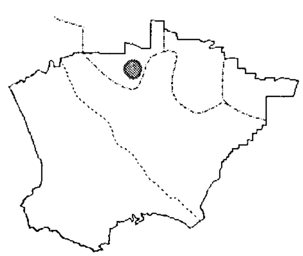
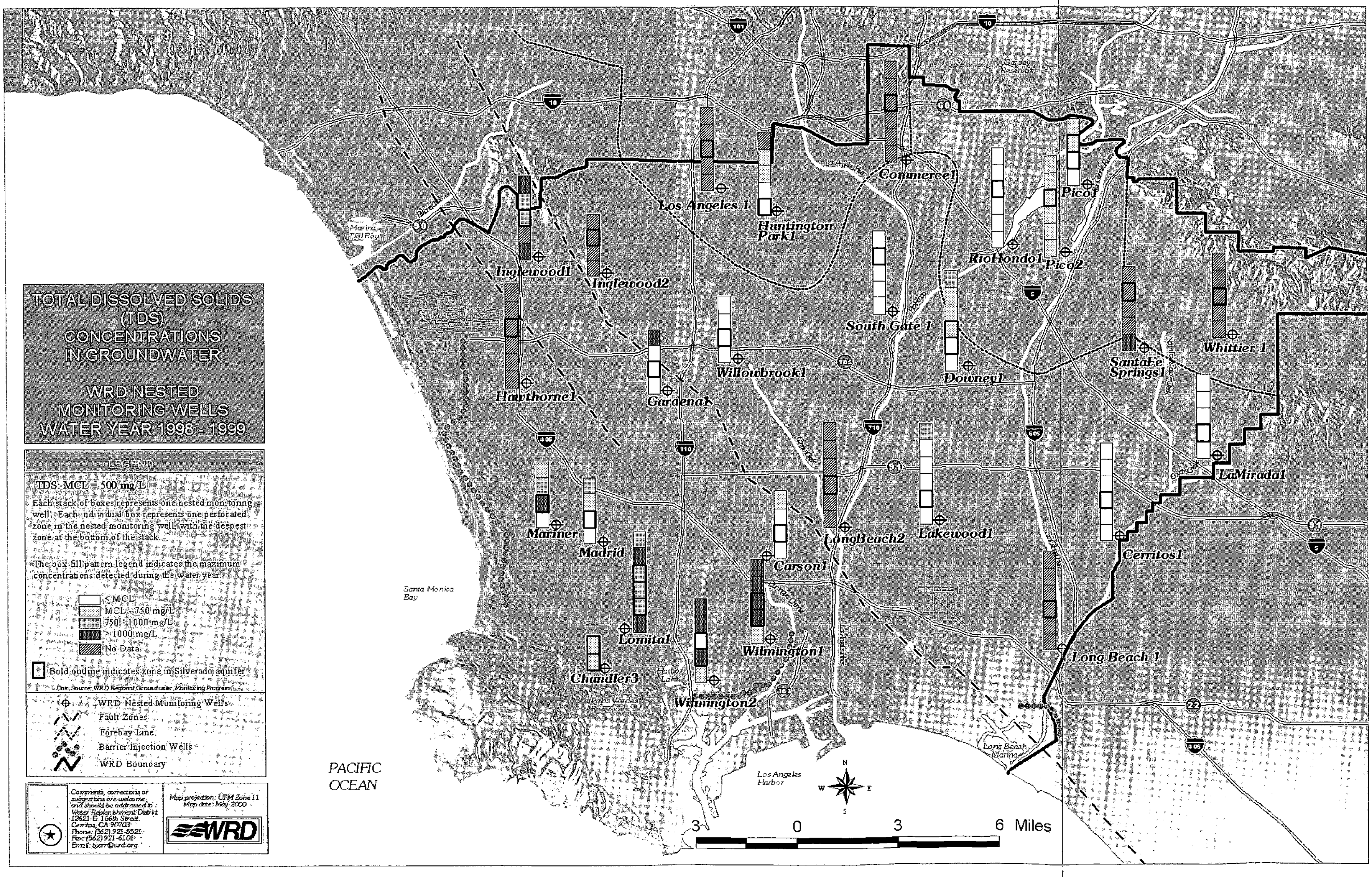


Figure 3.11

7/18/00 8:45 AM



TOTAL DISSOLVED SOLIDS (TDS) CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS WATER YEAR 1998 - 1999
LEGEND
TDS: MCL = 500 mg/L
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
< MCL
MCL - 750 mg/L
750 - 1000 mg/L
> 1000 mg/L
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome, and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tjohnson@wrd.org
Map projection: UTM Zone 11
Map date: May 2000
WRD
PACIFIC OCEAN
Santa Monica Bay
Los Angeles Harbor
Marina Del Rey
Long Beach Marina
Inglewood1
Inglewood2
Hawthorne1
Gardena1
Willowbrook1
Los Angeles 1
Huntington Park1
Commerce1
South Gate 1
Downey1
RioHondo1
Pico1
Pico2
SantaFe Springs1
Whittier 1
LaMirada1
Cerritos1
Lakewood1
LongBeach2
Long Beach 1
Carson1
Mariner
Madrid
Lomita1
Chandler3
Wilmington1
Wilmington2
3 0 3 6 Miles
N
S
E
W

Figure 4.1

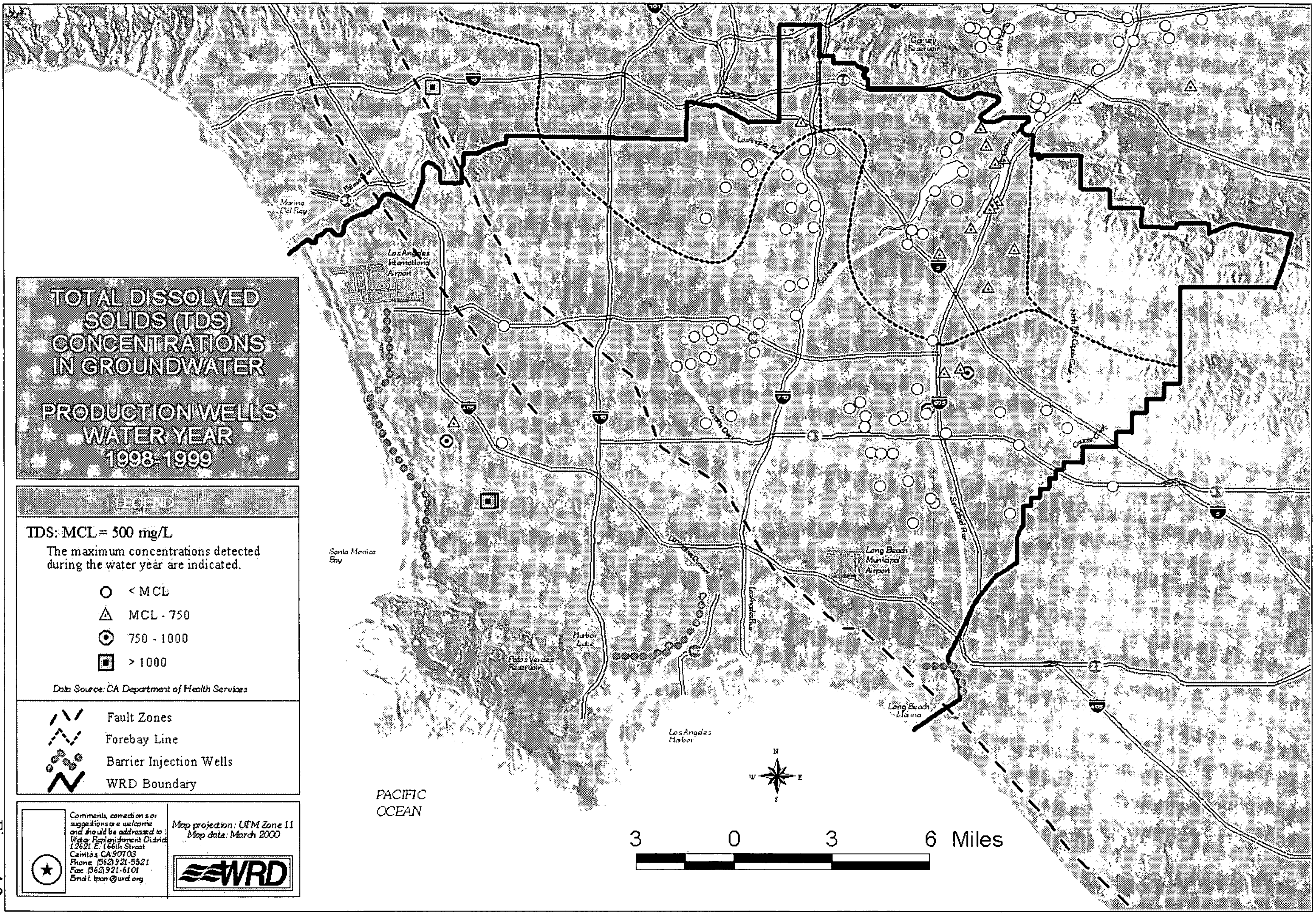

TOTAL DISSOLVED SOLIDS (TDS) CONCENTRATIONS IN GROUNDWATER
PRODUCTION WELLS WATER YEAR 1998-1999
LEGEND
TDS: MCL = 500 mg/L
The maximum concentrations detected during the water year are indicated.
< MCL
MCL - 750
750 - 1000
> 1000
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: lpan@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Marina Del Rey
Los Angeles International Airport
Santa Monica Bay
PACIFIC OCEAN
Palos Verdes Reservoir
Harbor Lake
Los Angeles Harbor
Long Beach Municipal Airport
Long Beach Marina
Garvey Reservoir
N
W
E
S
3
0
3
6
Miles

Figure 4.2

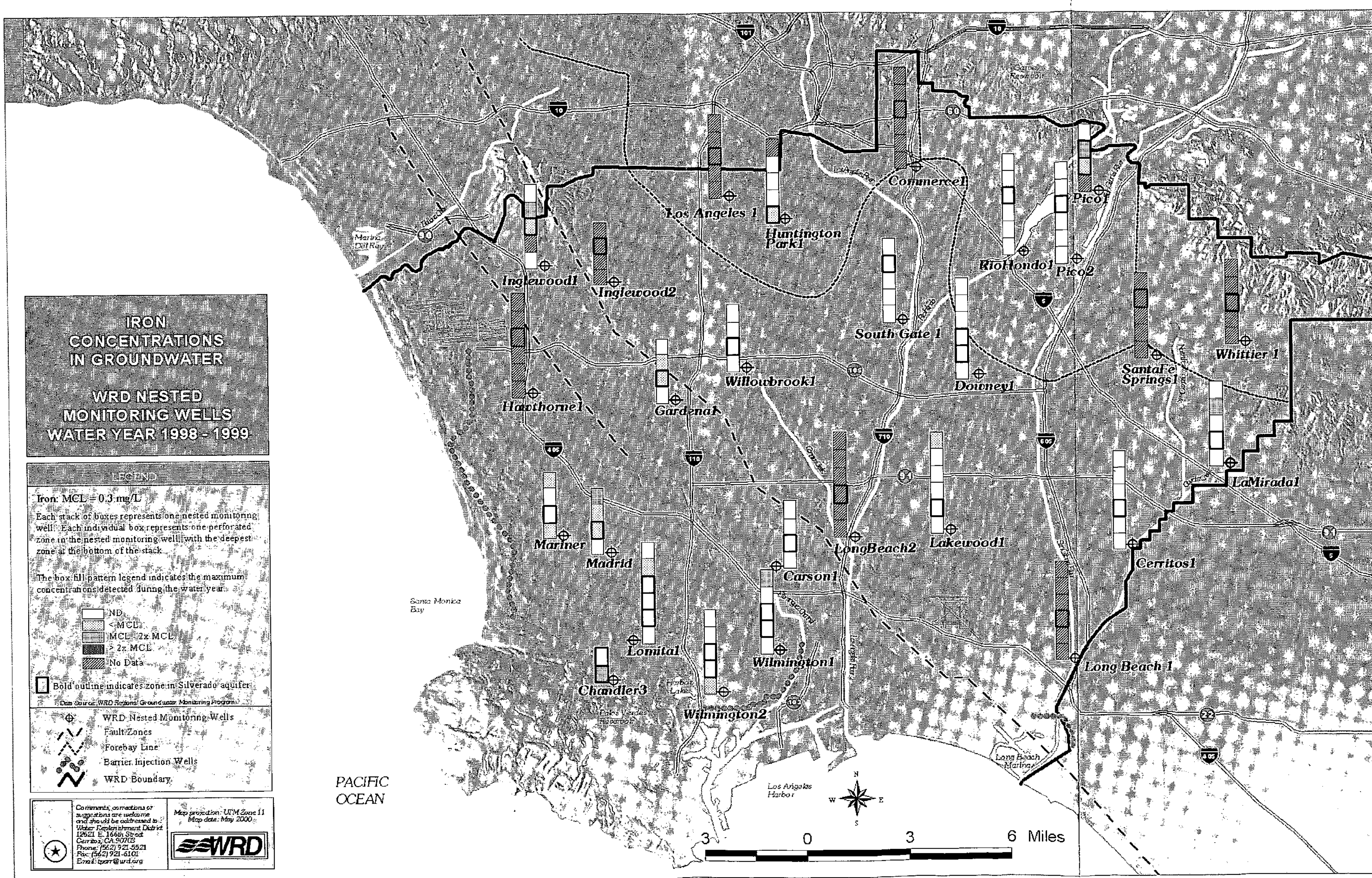
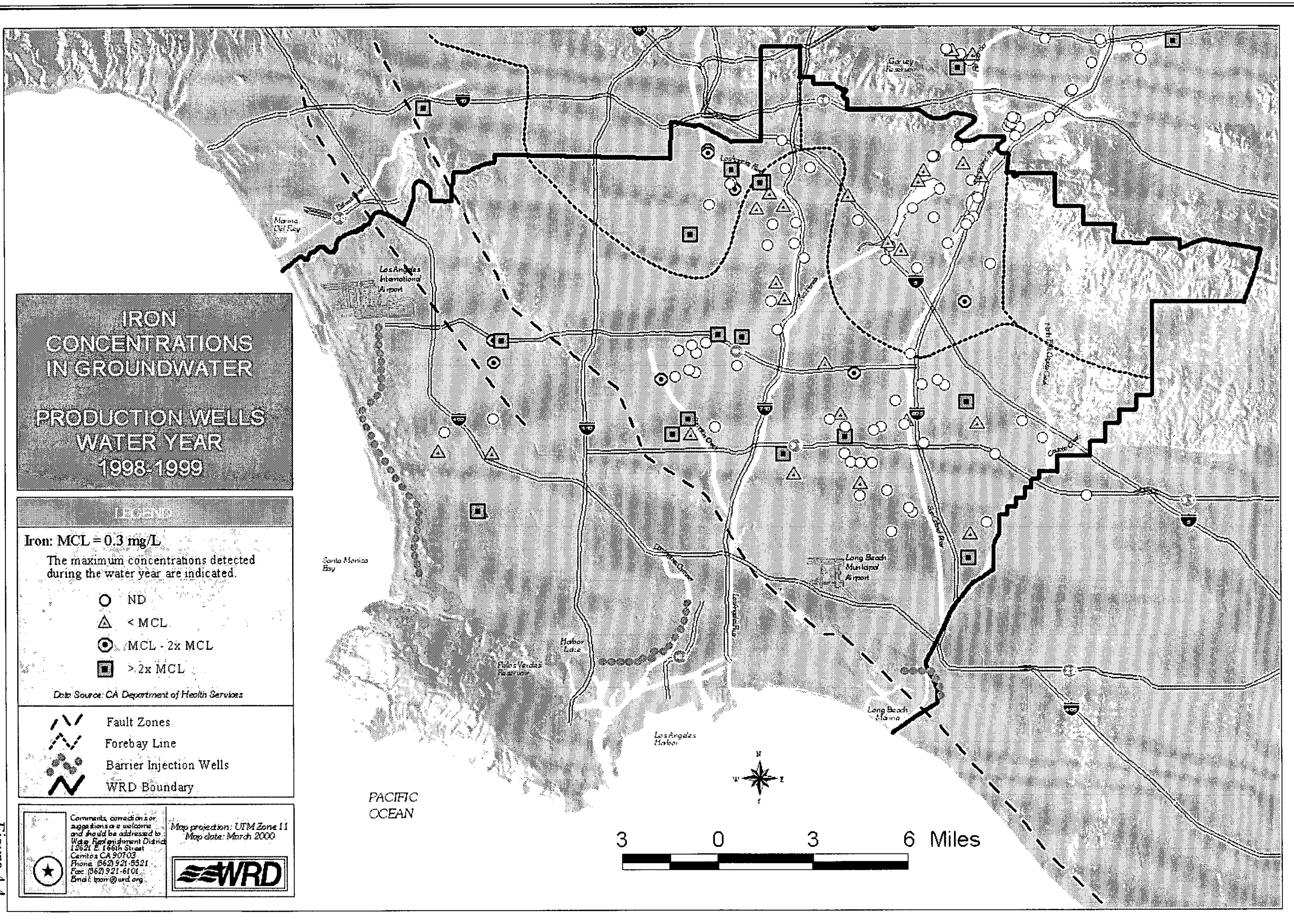

IRON
CONCENTRATIONS
IN GROUNDWATER
WRD NESTED
MONITORING WELLS
WATER YEAR 1998 - 1999
LEGEND
Iron: MCL = 0.3 mg/L
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< MCL
MCL - 2x MCL
> 2x MCL
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101
Map projection: UTM Zone 11
Map date: May 2000
WRD
PACIFIC
OCEAN
Santa Monica
Bay
Marina
Del Rey
Los Angeles
Harbor
Long Beach
Marina
Inglewood1
Inglewood2
Hawthorne1
Gardena1
Willowbrook1
Los Angeles 1
Huntington
Park1
Commerce1
South Gate 1
Downey1
RioHondo1
Pico2
Pico1
SantaFe
Springs1
Whittier 1
LaMirada1
Cerritos1
Lakewood1
LongBeach2
Long Beach 1
Carson1
Wilmington1
Wilmington2
Lomita1
Chandler3
Madrid
Mariner
3
0
3
6 Miles

Figure 4.3



IRON
CONCENTRATIONS
IN GROUNDWATER
PRODUCTION WELLS
WATER YEAR
1998-1999
LEGEND
Iron: MCL = 0.3 mg/L
The maximum concentrations detected during the water year are indicated.
ND
< MCL
MCL - 2x MCL
> 2x MCL
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to Water Replenishment District 12621 E. 166th Street Cerritos CA 90703 Phone (562) 921-5521 Fax (562) 921-6101 Email: lporr@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Marina Del Rey
Los Angeles International Airport
Santa Monica Bay
PACIFIC
OCEAN
Long Beach Municipal Airport
Long Beach Marina
Los Angeles Harbor
Harbor Lake
Palos Verdes Reservoir
Garvey Reservoir
3 0 3 6 Miles

Figure 4.4

MANGANESE CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS WATER YEAR 1998 - 1999
LEGEND
Manganese: MCL = 50 ug/L
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< MCL
MCL - 2x MCL
> 2x MCL
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tjoseph@wrd.org
Map projection: UTM Zone 11
Map date: May 2000
WRD
PACIFIC OCEAN
Santa Monica Bay
Los Angeles Harbor
Long Beach Marina
Marina Del Rey
Inglewood1
Inglewood2
Hawthorne1
Gardena1
Willowbrook1
Los Angeles 1
Huntington Park1
Commerce1
South Gate 1
Downey1
Rio Hondo1
Pico2
Pico1
Whittier 1
SantaFe Springs1
LaMirada1
Cerritos1
Long Beach 1
LongBeach2
Lakewood1
Carson1
Wilmington1
Wilmington2
Lomita1
Chandler3
Madrid
Mariner
3 0 3 6 Miles

Figure 4.5

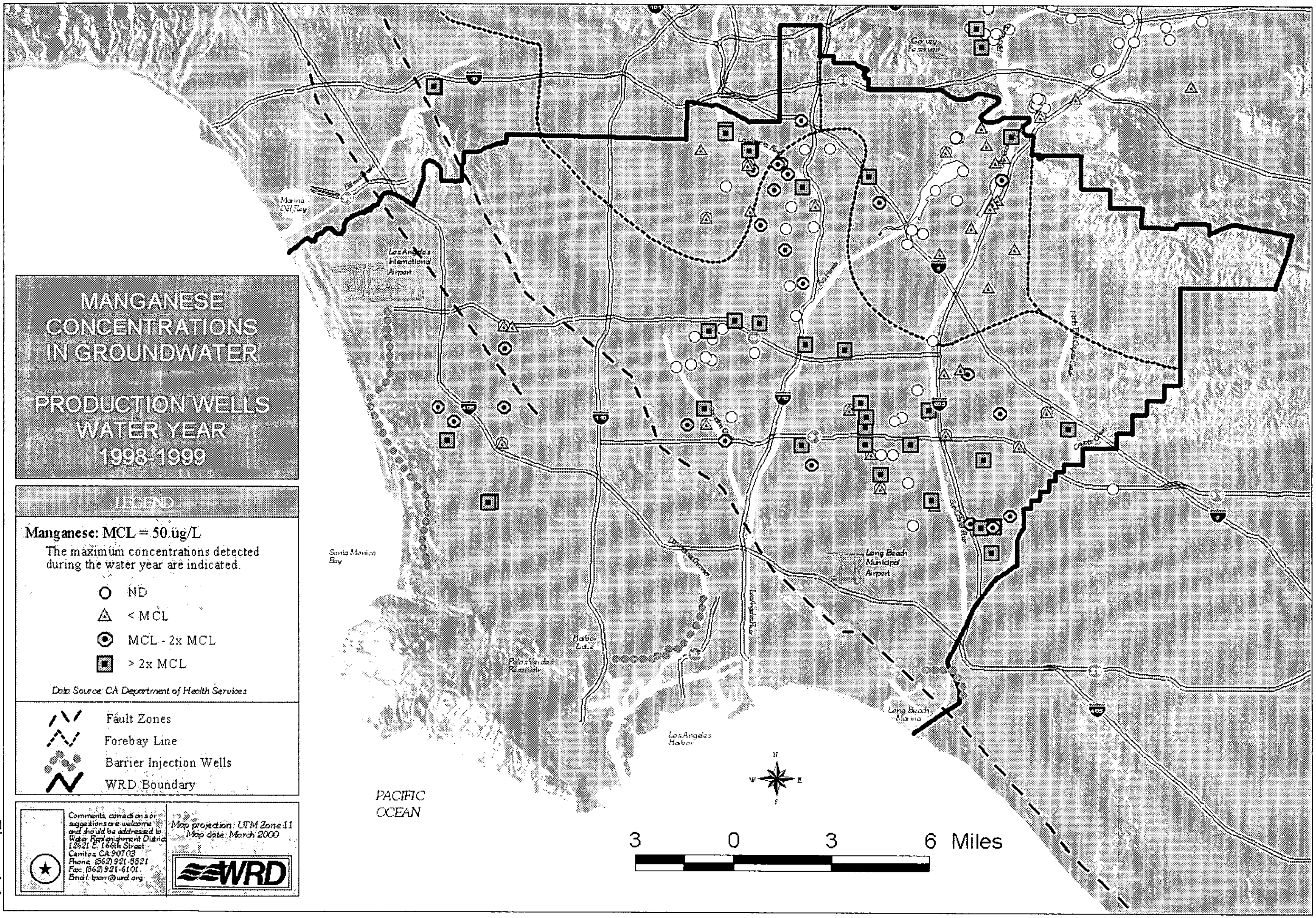
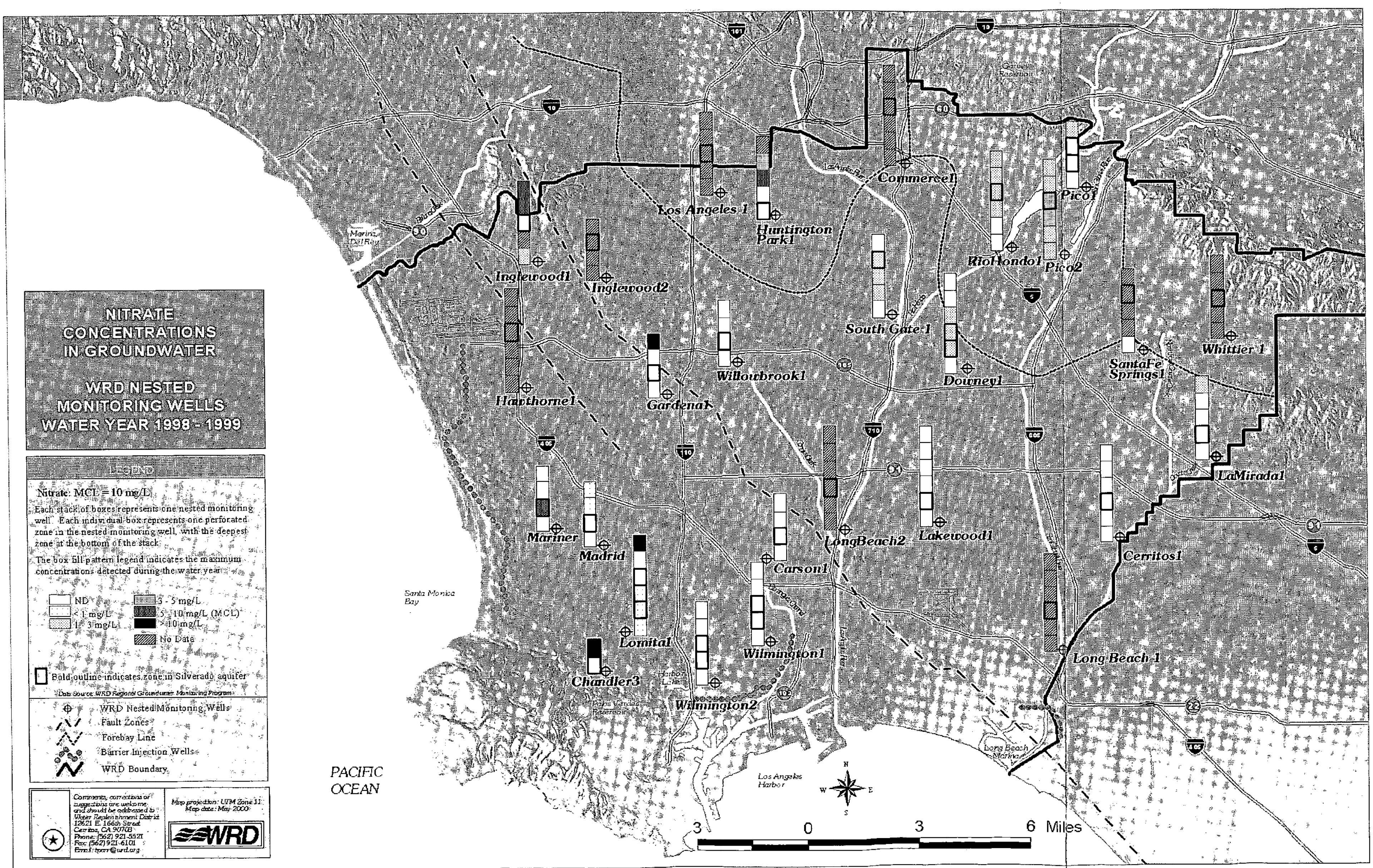

MANGANESE CONCENTRATIONS IN GROUNDWATER
PRODUCTION WELLS WATER YEAR 1998-1999
LEGEND
Manganese: MCL = 50 ug/L
The maximum concentrations detected during the water year are indicated.
ND
< MCL
MCL - 2x MCL
> 2x MCL
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: lpom@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Marina Del Rey
Los Angeles International Airport
Santa Monica Bay
PACIFIC OCEAN
Palos Verdes Reservoir
Harbor Lake
Los Angeles Harbor
Long Beach Municipal Airport
Long Beach Marina
Garvey Reservoir
3 0 3 6 Miles

Figure 4.6



NITRATE CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS
WATER YEAR 1998 - 1999
LEGEND
Nitrate: MCL = 10 mg/L
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< 1 mg/L
1 - 3 mg/L
3 - 5 mg/L
5 - 10 mg/L (MCL)
> 10 mg/L
No Date
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101
Map projection: UTM Zone 11 Map date: May 2000
WRD
PACIFIC OCEAN
Santa Monica Bay
Los Angeles Harbor
Long Beach Marina
Marina Del Rey
Inglewood1
Inglewood2
Los Angeles 1
Huntington Park1
Commerce1
Rio Hondo1
Pico1
Pico2
South Gate 1
Downey1
Santa Fe Springs1
Whittier 1
Hawthorne1
Gardena1
Willowbrook1
LongBeach2
Lakewood1
LaMirada1
Cerritos1
Mariner
Madrid
Carson1
Lomita1
Chandler3
Wilmington1
Wilmington2
Long Beach 1
3
0
3
6 Miles

Figure 4.7

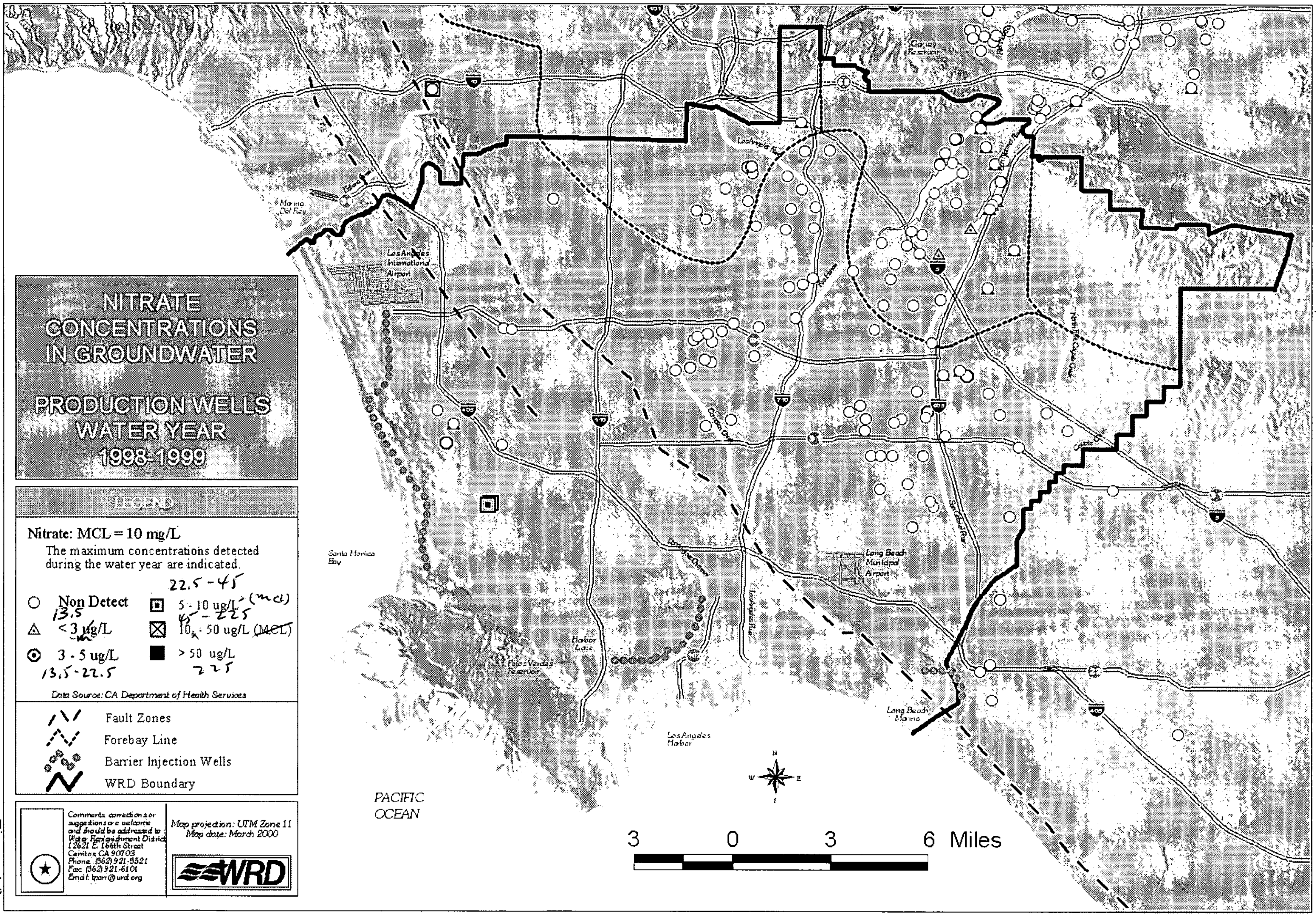

NITRATE CONCENTRATIONS IN GROUNDWATER
PRODUCTION WELLS WATER YEAR 1998-1999
LEGEND
Nitrate: MCL = 10 mg/L
The maximum concentrations detected during the water year are indicated.
Non Detect
< 3 ug/L
3 - 5 ug/L
5 - 10 ug/L
10 - 50 ug/L (MCL)
> 50 ug/L
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tpan@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Marina Del Rey
Los Angeles International Airport
Santa Monica Bay
Harbor Lake
Palos Verdes Reservoir
Los Angeles Harbor
Long Beach Municipal Airport
Long Beach Marina
PACIFIC OCEAN
3 0 3 6 Miles
N
W
E
S

Figure 4.8

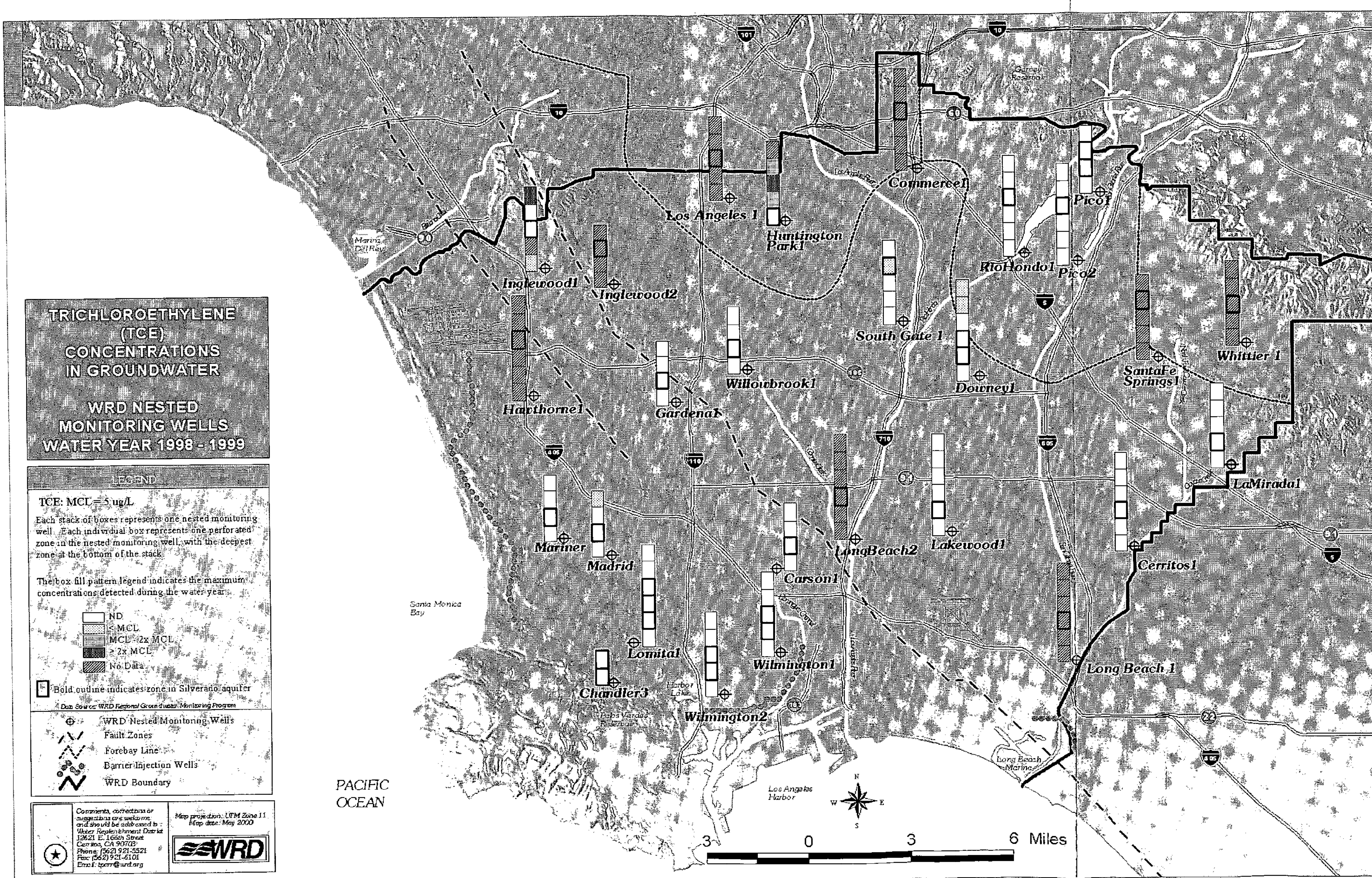

TRICHLOROETHYLENE (TCE) CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS WATER YEAR 1998 - 1999
LEGEND
TCE: MCL = 5 ug/L
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< MCL
MCL - 2x MCL
> 2x MCL
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Map projection: UTM Zone 11
Map date: May 2000
WRD
Inglewood1
Inglewood2
Hawthorne1
Gardena1
Willowbrook1
Los Angeles 1
Huntington Park1
Commerce1
South Gate 1
Downey1
RioHondo1
Pico1
Pico2
SantaFe Springs1
Whittier 1
LaMirada1
Cerritos1
Lakewood1
LongBeach2
Long Beach 1
Carson1
Wilmington1
Wilmington2
Lomita1
Chandler3
Madrid
Mariner
Santa Monica Bay
PACIFIC OCEAN
Los Angeles Harbor
Long Beach Marina
3 0 3 6 Miles

Figure 4.9

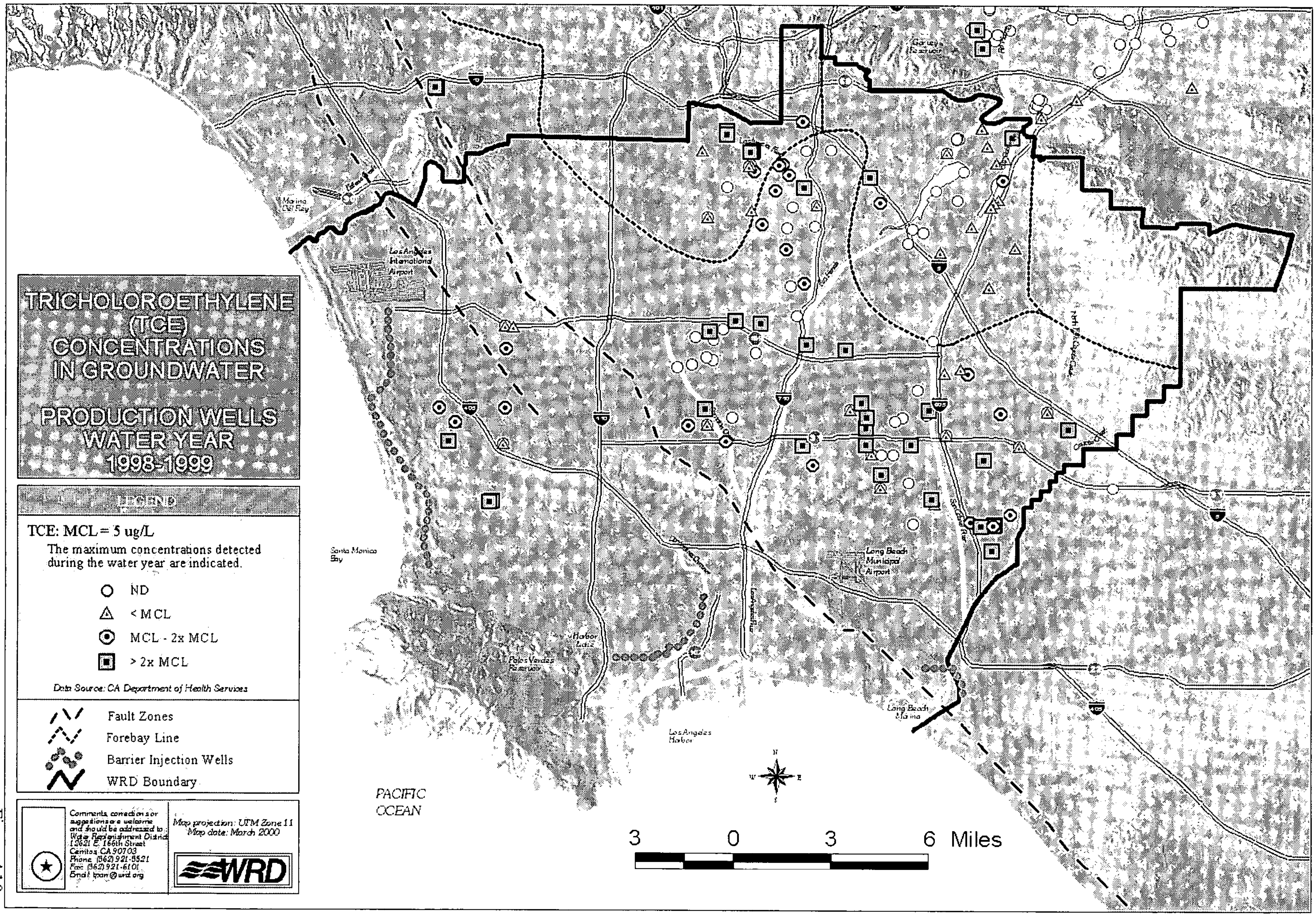

TRICHOLOROETHYLENE (TCE) CONCENTRATIONS IN GROUNDWATER
PRODUCTION WELLS WATER YEAR 1998-1999
LEGEND
TCE: MCL = 5 ug/L
The maximum concentrations detected during the water year are indicated.
ND
< MCL
MCL - 2x MCL
> 2x MCL
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone (562) 921-5521 Fax (562) 921-6101 Email: tpan@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Marina Del Rey
Los Angeles International Airport
Santa Monica Bay
Long Beach Municipal Airport
Harbor Lake
Palos Verdes Reservoir
Los Angeles Harbor
Long Beach Marina
PACIFIC OCEAN
3 0 3 6 Miles

Figure 4.10


TETRACHLOROETHYLENE (PCE) CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS WATER YEAR 1998 - 1999
LEGEND
PCE: MCL = 5 ug/l
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< MCL
MCL - 2x MCL
> 2x MCL
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tpcsm@wrd.org
Map projection: UTM Zone 11 Map date: May 2000
WRD
Inglewood1
Inglewood2
Hawthorne1
Los Angeles 1
Huntington Park1
Commerce1
Pico1
Pico2
RioHondo1
South Gate 1
Downey1
Willowbrook1
Gardena1
SantaFe Springs1
Whittier 1
LaMirada1
Mariner
Madrid
Lomita1
Chandler3
Wilmington1
Wilmington2
Carson1
LongBeach2
Lakewood1
Cerritos1
Long Beach 1
Santa Monica Bay
PACIFIC OCEAN
Los Angeles Harbor
Long Beach Marina
3 0 3 6 Miles

Figure 4.11

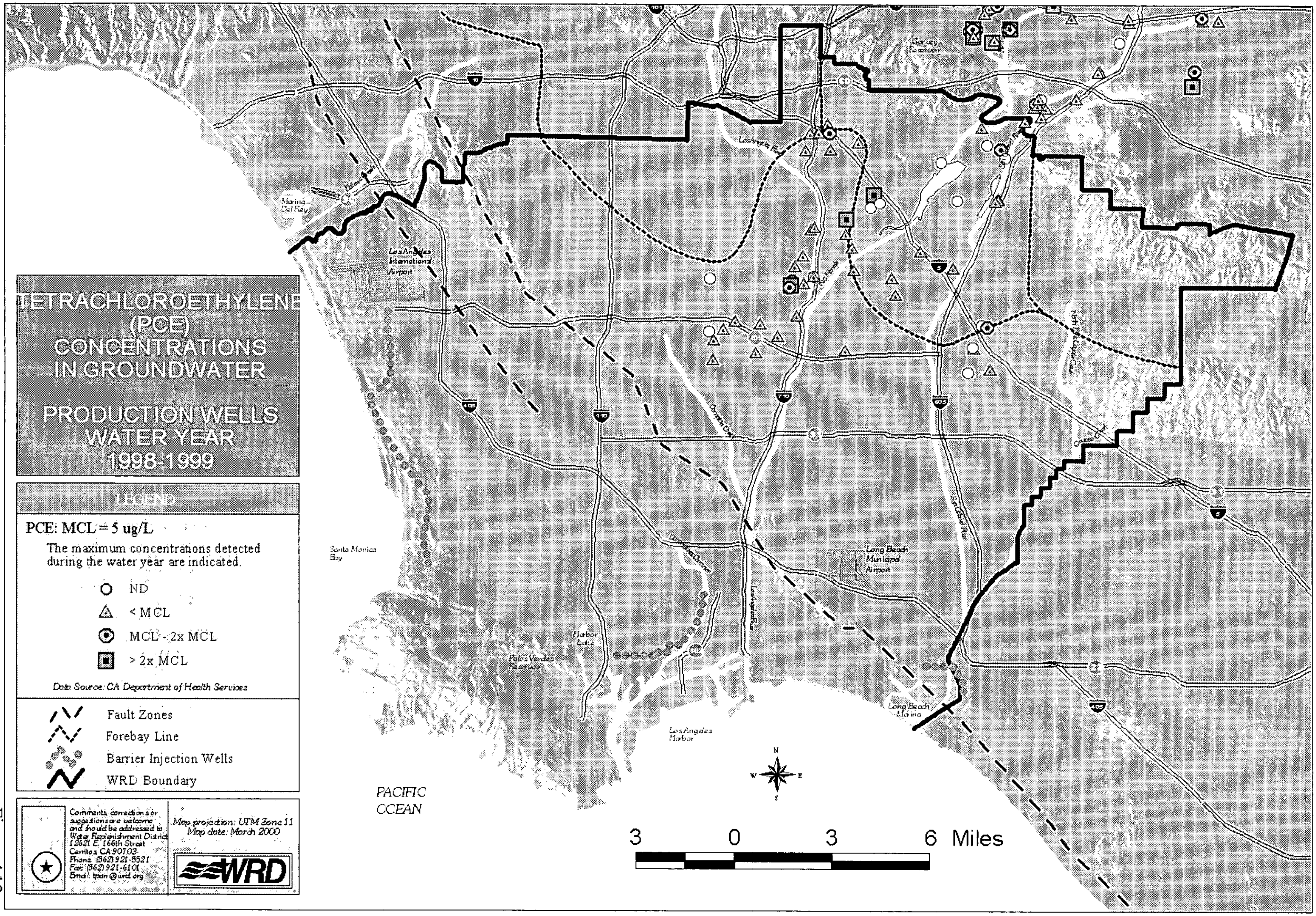

TETRACHLOROETHYLENE (PCE) CONCENTRATIONS IN GROUNDWATER
PRODUCTION WELLS WATER YEAR 1998-1999
LEGEND
PCE: MCL = 5 ug/L
The maximum concentrations detected during the water year are indicated.
ND
< MCL
MCL - 2x MCL
> 2x MCL
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos CA 90703 Phone (562) 921-5521 Fax (562) 921-6101 Email: tpan@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Santa Monica Bay
PACIFIC OCEAN
Marina Del Rey
Los Angeles International Airport
Long Beach Municipal Airport
Long Beach Marina
Los Angeles Harbor
Harbor Lake
Palos Verdes Peninsula
3 0 3 6 Miles

Figure 4.12

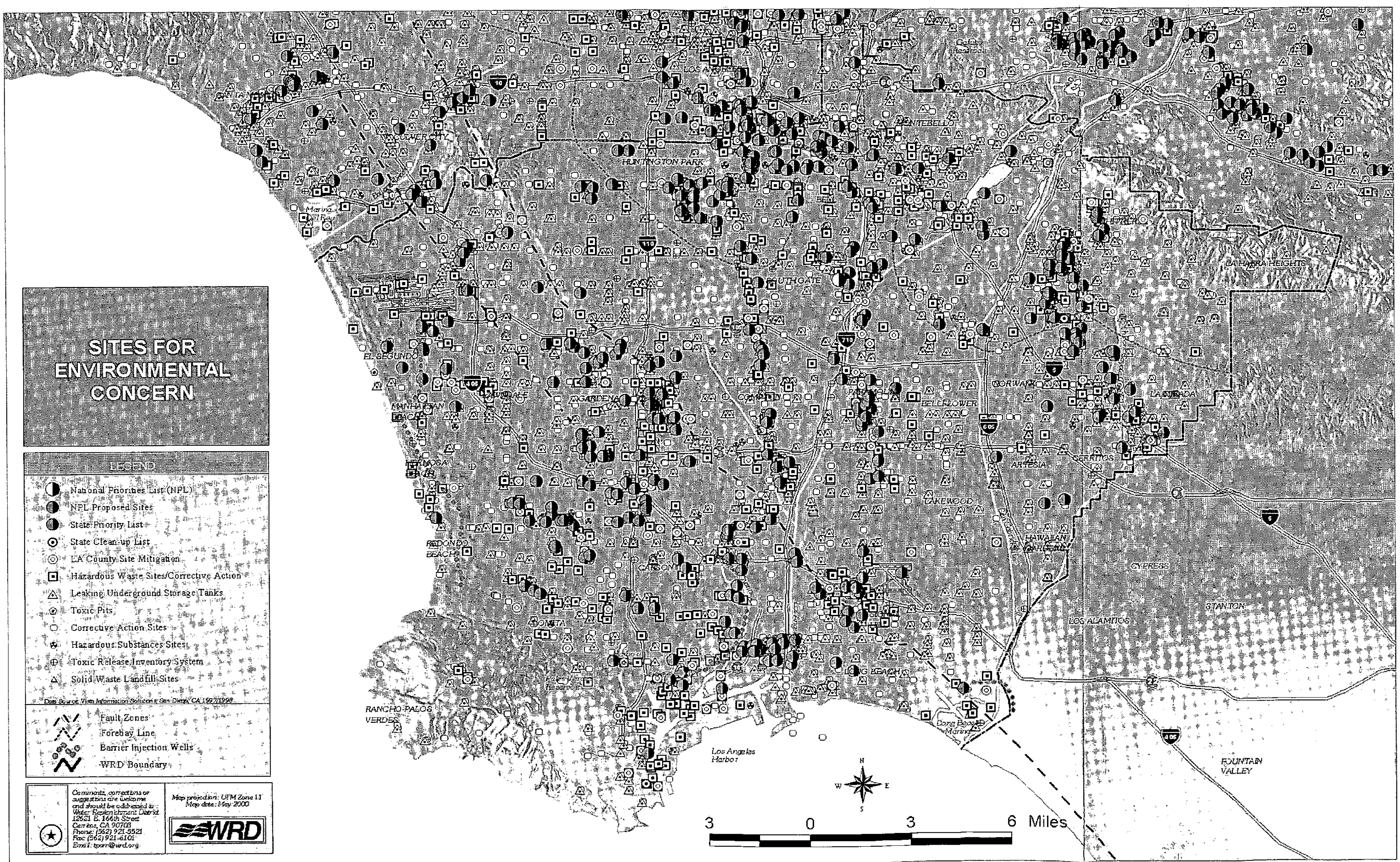

SITES FOR ENVIRONMENTAL CONCERN
LEGEND
National Priorities List (NPL)
NPL Proposed Sites
State Priority List
State Clean-up List
LA County Site Mitigation
Hazardous Waste Sites/Corrective Action
Leaking Underground Storage Tanks
Toxic Pits
Corrective Action Sites
Hazardous Substances Sites
Toxic Release Inventory System
Solid Waste Landfill Sites
Data Source: Vista Information Solutions, San Diego, CA 1997/1998
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tparr@wrd.org
Map projection: UTM Zone 11
Map date: May 2000
WRD
HUNTINGTON PARK
MONTEBELLO
SOUTH GATE
EL SEGUNDO
GARDENA
BELLFLOWER
NORWALK
LA MIRADA
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
ARTESIA
CERRITOS
LAKEWOOD
HAWAIIAN GARDENS
CYPRESS
CARSON
STANTON
LOS ALAMITOS
LONG BEACH
RANCHO PALOS VERDES
Los Angeles Harbor
FOUNTAIN VALLEY
N
W
E
S
3 0 3 6 Miles

Figure 4.13

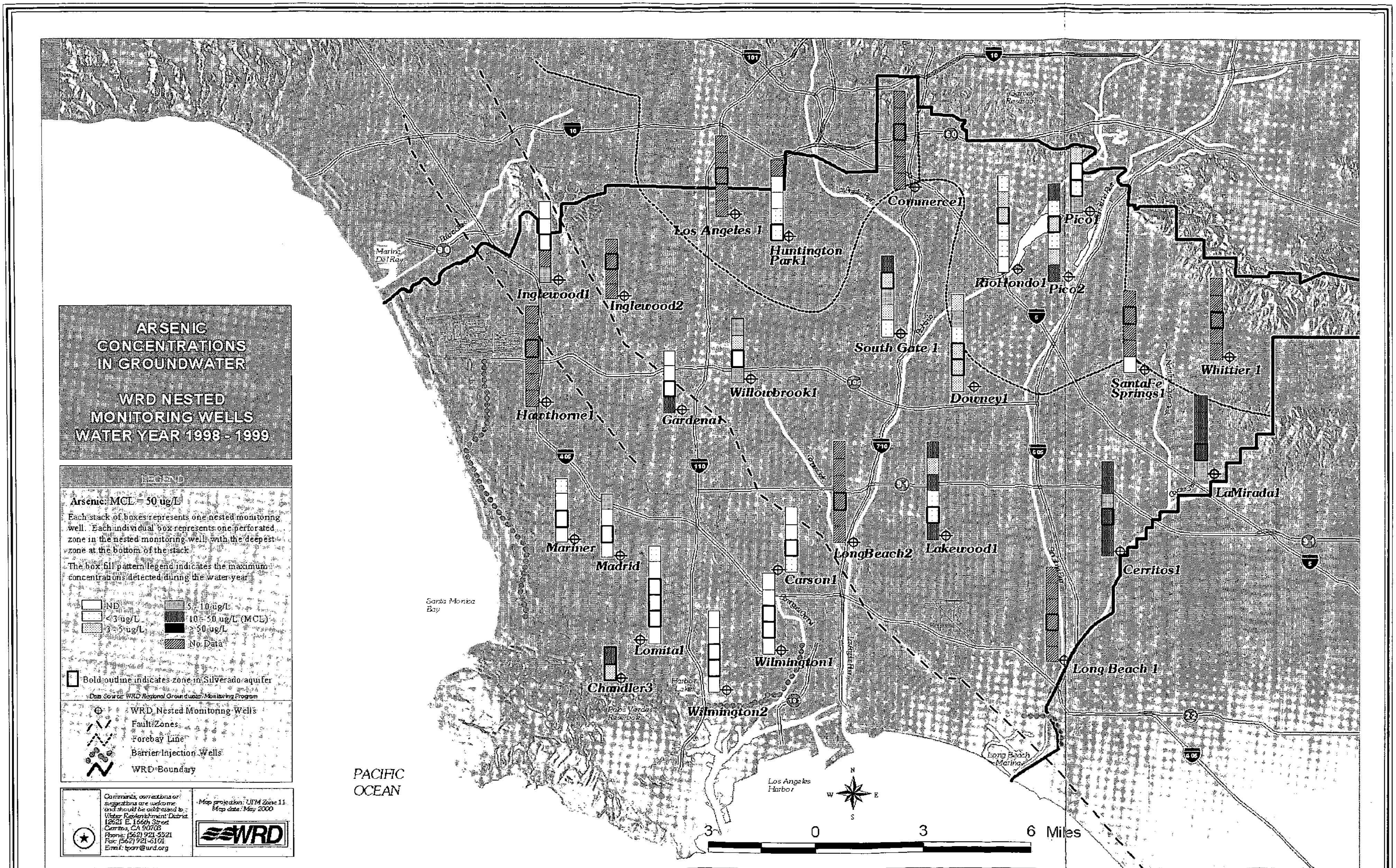
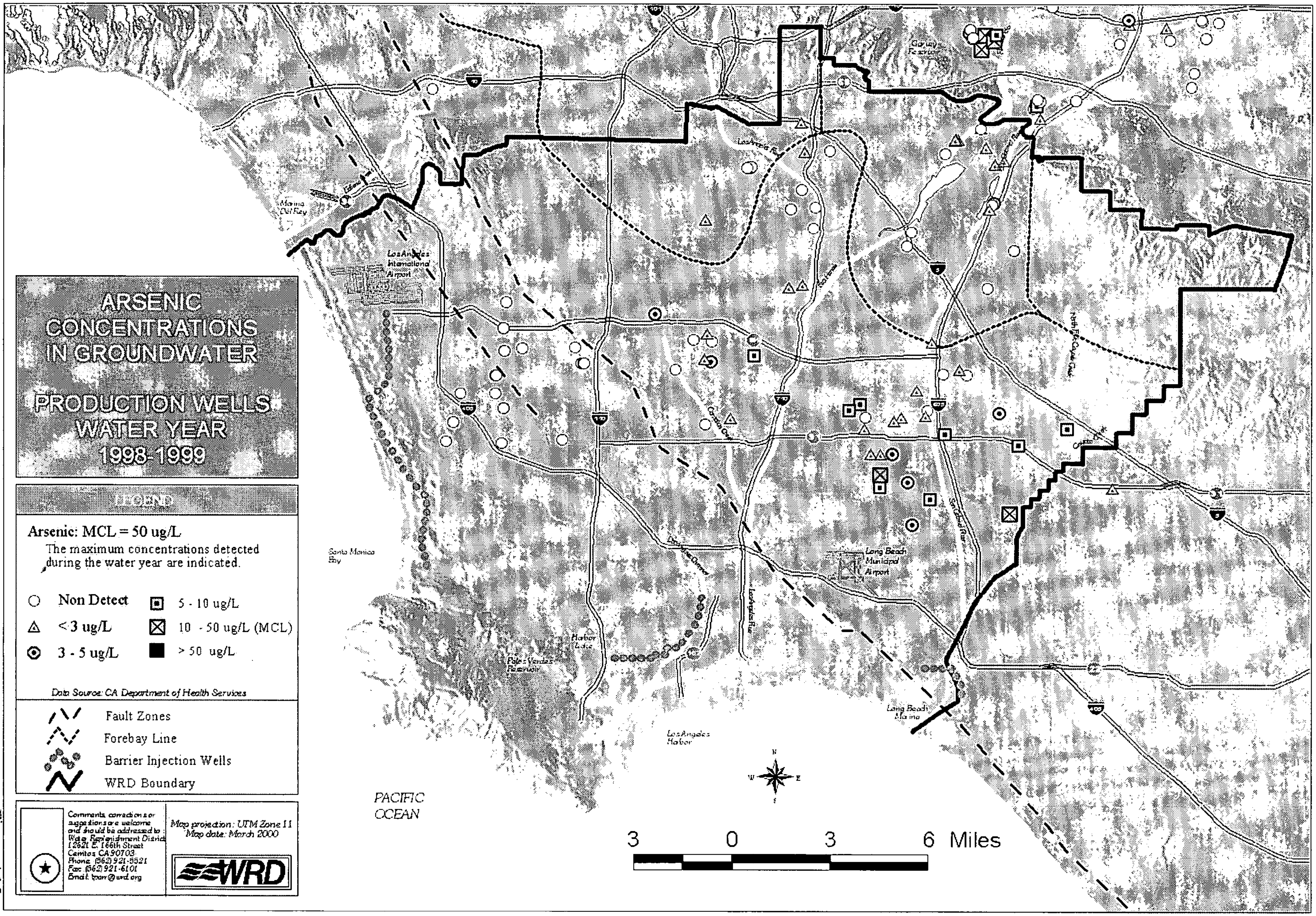
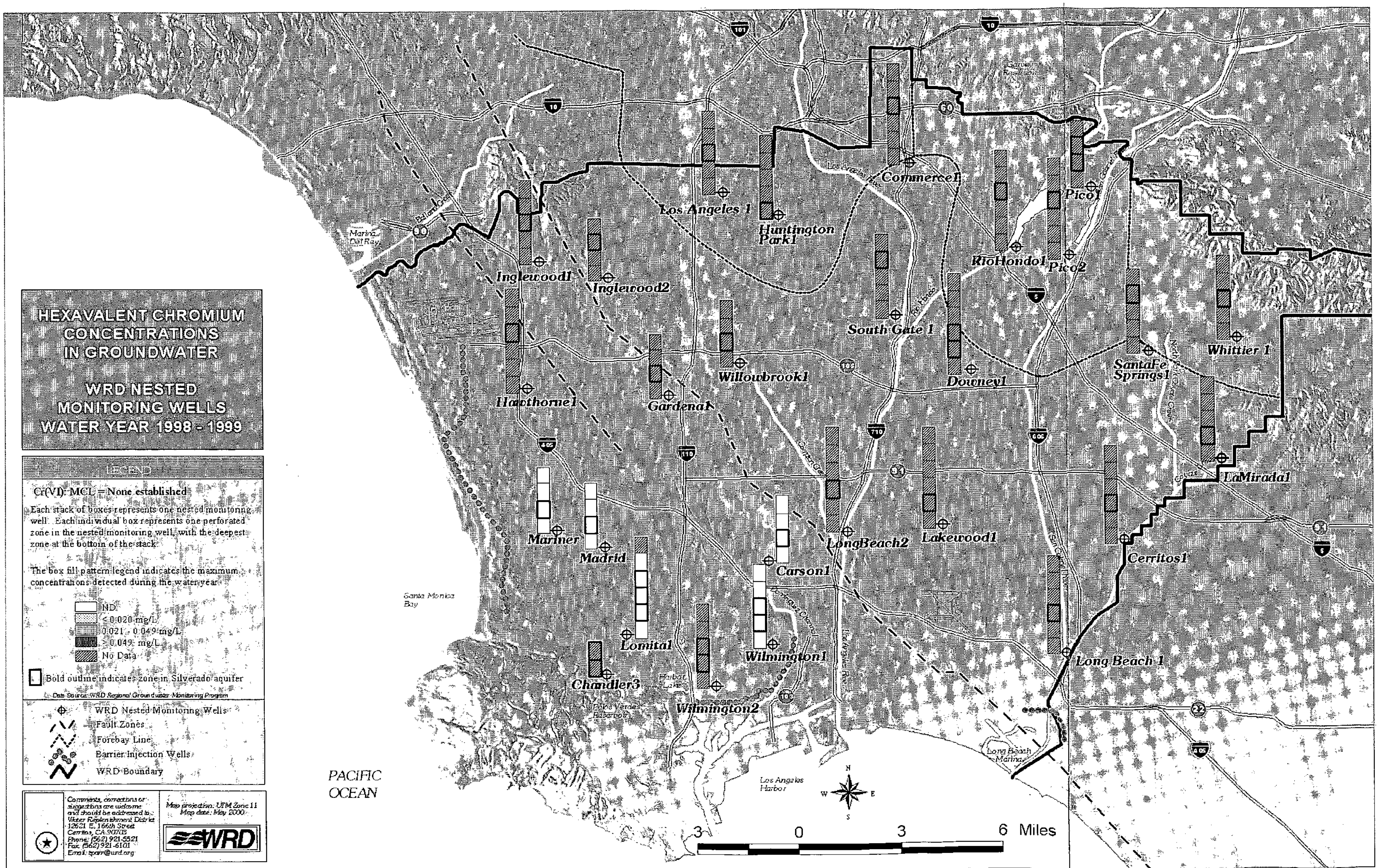

ARSENIC CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS WATER YEAR 1998 - 1999
LEGEND
Arsenic: MCL = 50 ug/L
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
<3 ug/L
3 - 5 ug/L
5 - 10 ug/L
10 - 50 ug/L (MCL)
> 50 ug/L
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tjohn@wrd.org
Map projection: UTM Zone 11 Map date: May 2000
WRD
Inglewood1
Inglewood2
Los Angeles 1
Huntington Park1
Commerce1
Rio Hondo1
Pico2
Pico1
South Gate 1
Downey1
Santa Fe Springs1
Whittier 1
Hawthorne1
Gardena1
Willowbrook1
LongBeach2
Lakewood1
LaMirada1
Cerritos1
Mariner
Madrid
Carson1
Lomita1
Wilmington1
Wilmington2
Chandler3
Long Beach 1
Marina Del Rey
Santa Monica Bay
PACIFIC OCEAN
Los Angeles Harbor
Long Beach Marina
Harbor Lake
3 0 3 6 Miles
N S E W

Figure 4.14



ARSENIC CONCENTRATIONS IN GROUNDWATER
PRODUCTION WELLS
WATER YEAR 1998-1999
LEGEND
Arsenic: MCL = 50 ug/L
The maximum concentrations detected during the water year are indicated.
Non Detect
<3 ug/L
3 - 5 ug/L
5 - 10 ug/L
10 - 50 ug/L (MCL)
> 50 ug/L
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos CA 90703 Phone (562) 921-5521 Fax (562) 921-6101 Email: tjoan@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Marina Del Rey
Los Angeles International Airport
Santa Monica Bay
PACIFIC OCEAN
Los Angeles Harbor
Long Beach Marina
Long Beach Municipal Airport
Harbor Lake
Palos Verdes Reservoir
Garvey Reservoir
3 0 3 6 Miles
N
S
E
W

Figure 4.15


HEXAVALENT CHROMIUM CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS WATER YEAR 1998 - 1999
LEGEND
Cr(VI): MCL = None established
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< 0.020 mg/L
0.021 - 0.049 mg/L
> 0.049 mg/L
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tparr@wrd.org
Map projection: UTM Zone 11 Map date: May 2000
WRD
Inglewood1
Inglewood2
Los Angeles 1
Huntington Park1
Commerce1
RioHondo1
Pico2
Pico1
South Gate 1
Downey1
Whittier 1
SantaFe Springs1
Hawthorne1
Gardena1
Willowbrook1
LaMirada1
Mariner
Madrid
Lomital
Chandler3
Carson1
LongBeach2
Lakewood1
Cerritos1
Long Beach 1
Wilmington1
Wilmington2
Marina Del Rey
Santa Monica Bay
PACIFIC OCEAN
Los Angeles Harbor
Long Beach Marina
3 0 3 6 Miles
Figure 4.16

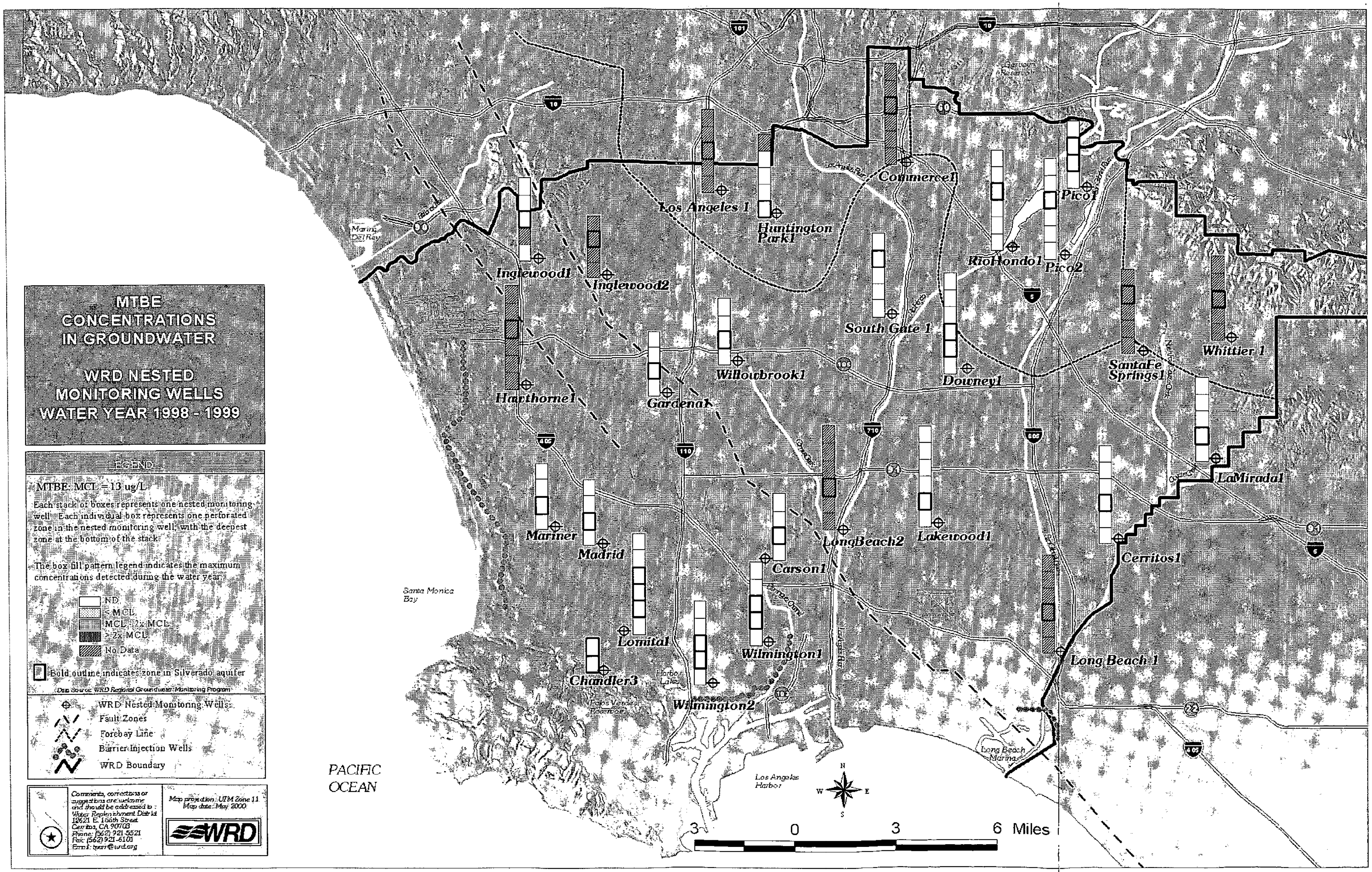

MTBE CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS WATER YEAR 1998 - 1999
LEGEND
MTBE: MCL = 13 ug/L
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< MCL
MCL - 2x MCL
> 2x MCL
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tjohnson@wrd.org
Map projection: UTM Zone 11
Map date: May 2000
WRD
PACIFIC OCEAN
Santa Monica Bay
Los Angeles Harbor
Long Beach Marina
Marina Del Rey
Inglewood1
Inglewood2
Hawthorne1
Los Angeles 1
Huntington Park1
Commerce1
Rio Hondo1
Pico1
Pico2
South Gate 1
Downey1
Willowbrook1
Gardena1
SantaFe Springs1
Whittier 1
LaMirada1
Mariner
Madrid
Lomita1
Chandler3
Wilmington2
Wilmington1
Carson1
LongBeach2
Lakewood1
Cerritos1
Long Beach 1
3 0 3 6 Miles
N S E W

Figure 4.17

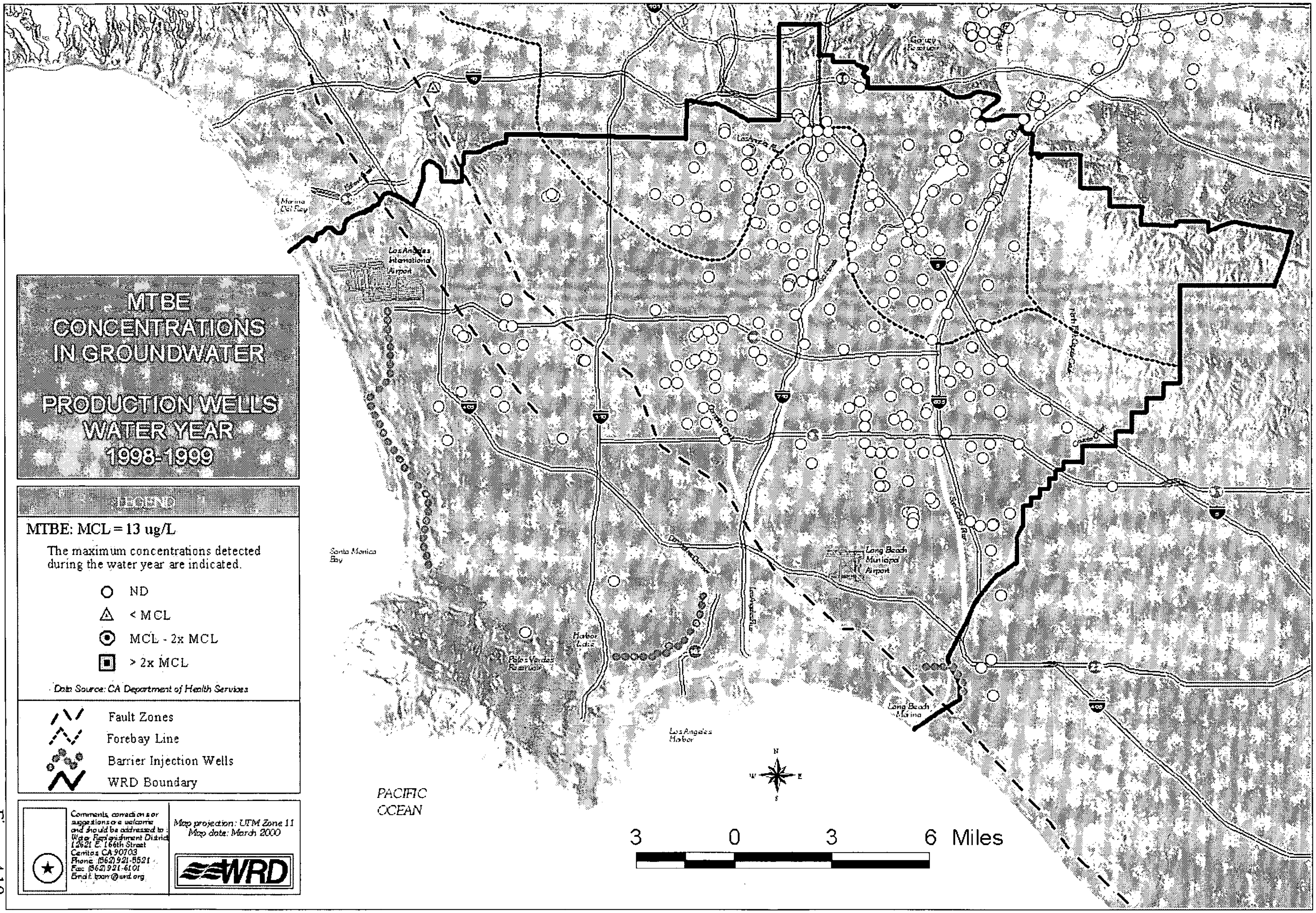

MTBE
CONCENTRATIONS
IN GROUNDWATER
PRODUCTION WELLS
WATER YEAR
1998-1999
LEGEND
MTBE: MCL = 13 ug/L
The maximum concentrations detected during the water year are indicated.
ND
< MCL
MCL - 2x MCL
> 2x MCL
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: lpan@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Marina Del Rey
Los Angeles International Airport
Santa Monica Bay
PACIFIC OCEAN
Palos Verdes Reservoir
Harbor Lake
Los Angeles Harbor
Long Beach Municipal Airport
Long Beach Marina
3 0 3 6 Miles

Figure 4.18

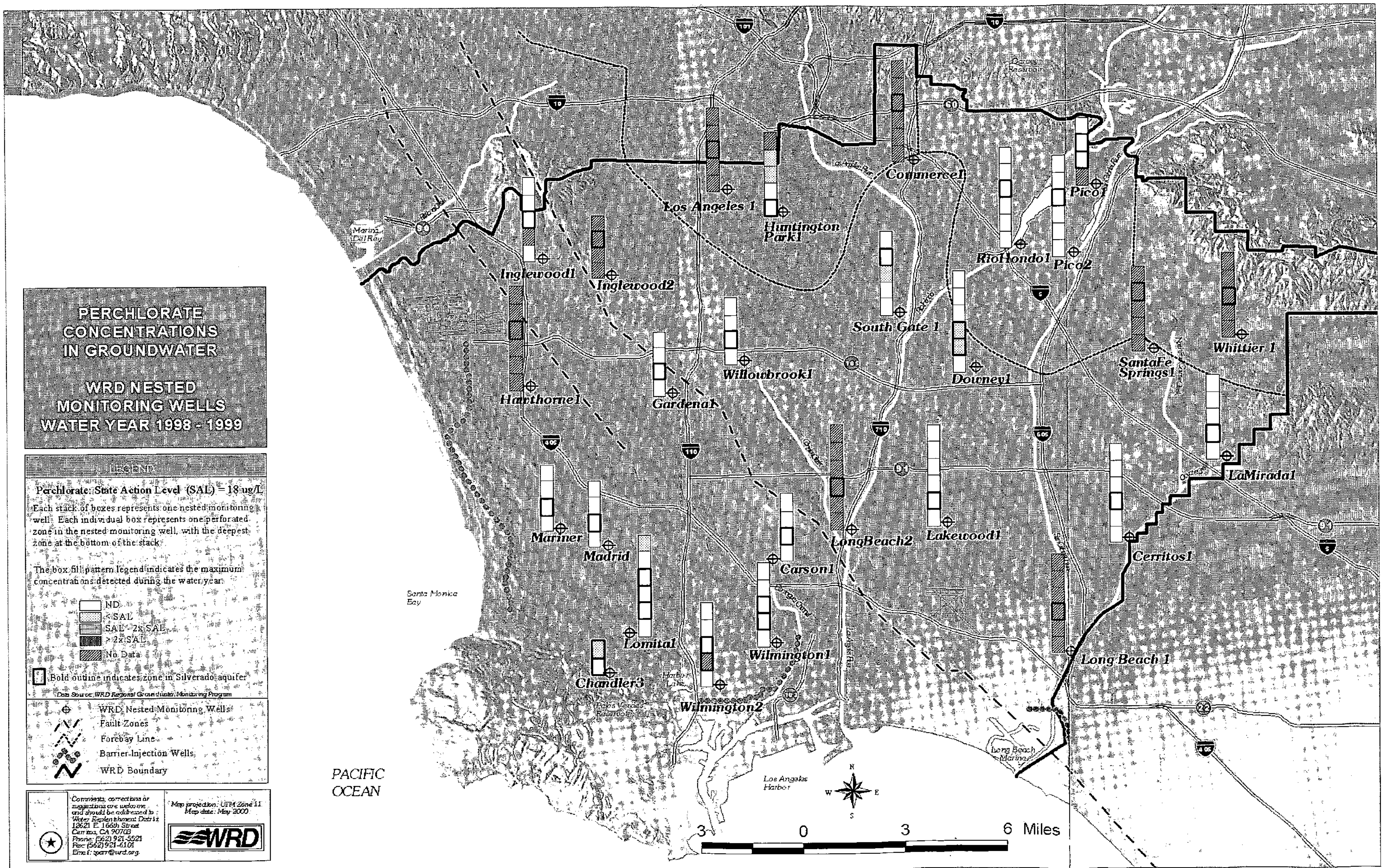

PERCHLORATE CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS WATER YEAR 1998 - 1999
LEGEND
Perchlorate: State Action Level (SAL) = 18 ug/L
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< SAL
SAL - 2x SAL
> 2x SAL
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier-Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tjohnson@wrd.org
Map projection: UTM Zone 11
Map date: May 2000
WRD
Inglewood1
Inglewood2
Los Angeles 1
Huntington Park1
Commerce1
Pico1
Pico2
RioHondo1
South Gate 1
Downey1
SantaFe Springs1
Whittier 1
Hawthorne1
Gardena1
Willowbrook1
LongBeach2
Lakewood1
Cerritos1
LaMirada1
Mariner
Madrid
Lomital
Carson1
Wilmington1
Wilmington2
Chandler3
Long Beach 1
Santa Monica Bay
PACIFIC OCEAN
Los Angeles Harbor
Long Beach Marina
Marina Del Rey
N
S
W
E
3
0
3
6 Miles

Figure 4.19

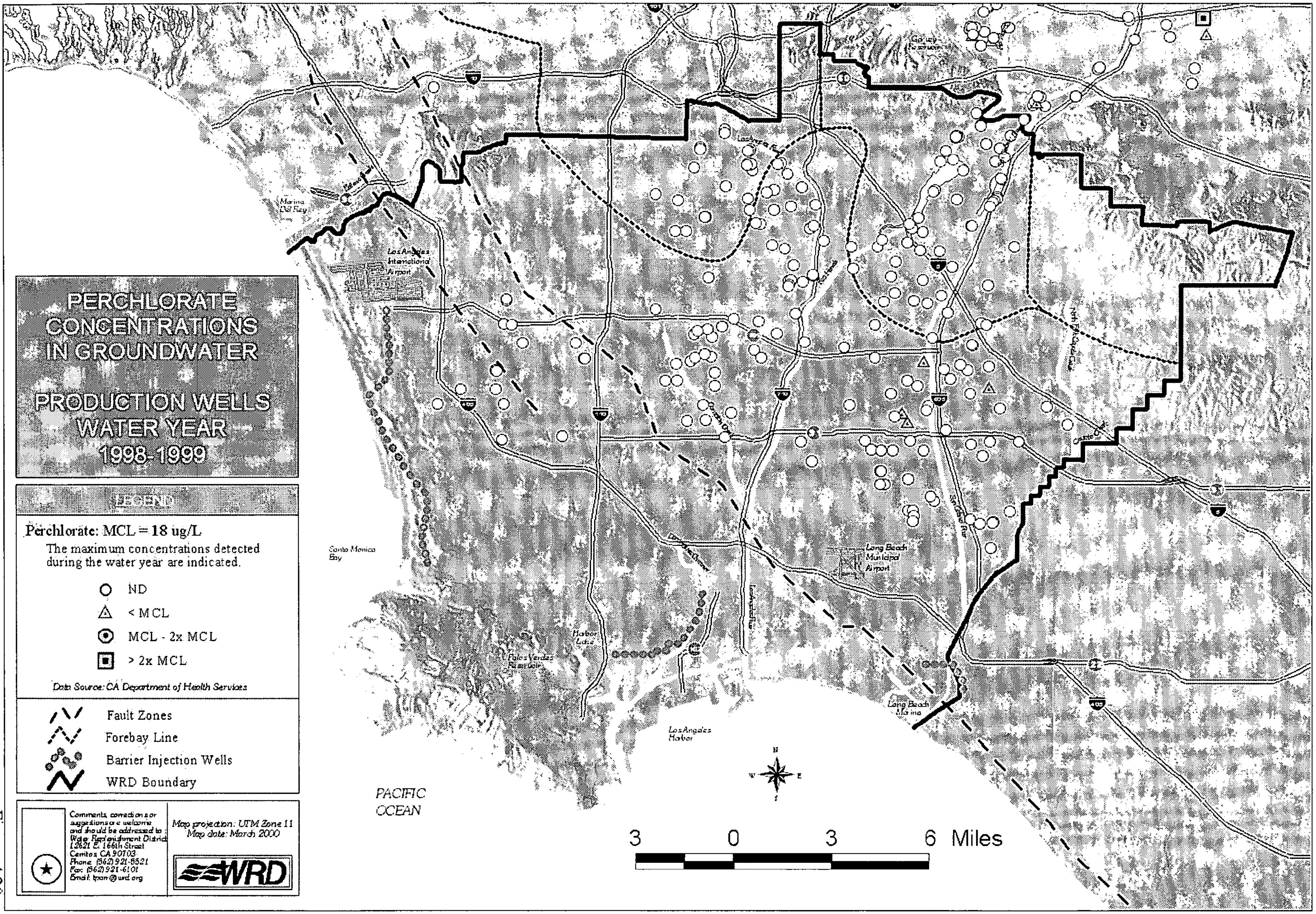

PERCHLORATE CONCENTRATIONS IN GROUNDWATER
PRODUCTION WELLS WATER YEAR 1998-1999
LEGEND
Perchlorate: MCL = 18 ug/L
The maximum concentrations detected during the water year are indicated.
ND
< MCL
MCL - 2x MCL
> 2x MCL
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to Water Replenishment District 12621 E. 166th Street Cerritos CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: tpan@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
PACIFIC OCEAN
Santa Monica Bay
Marina Del Rey
Los Angeles International Airport
Long Beach Municipal Airport
Long Beach Marina
Los Angeles Harbor
Harbor Lake
Palos Verdes Reservoir
3 0 3 6 Miles

Figure 4.20

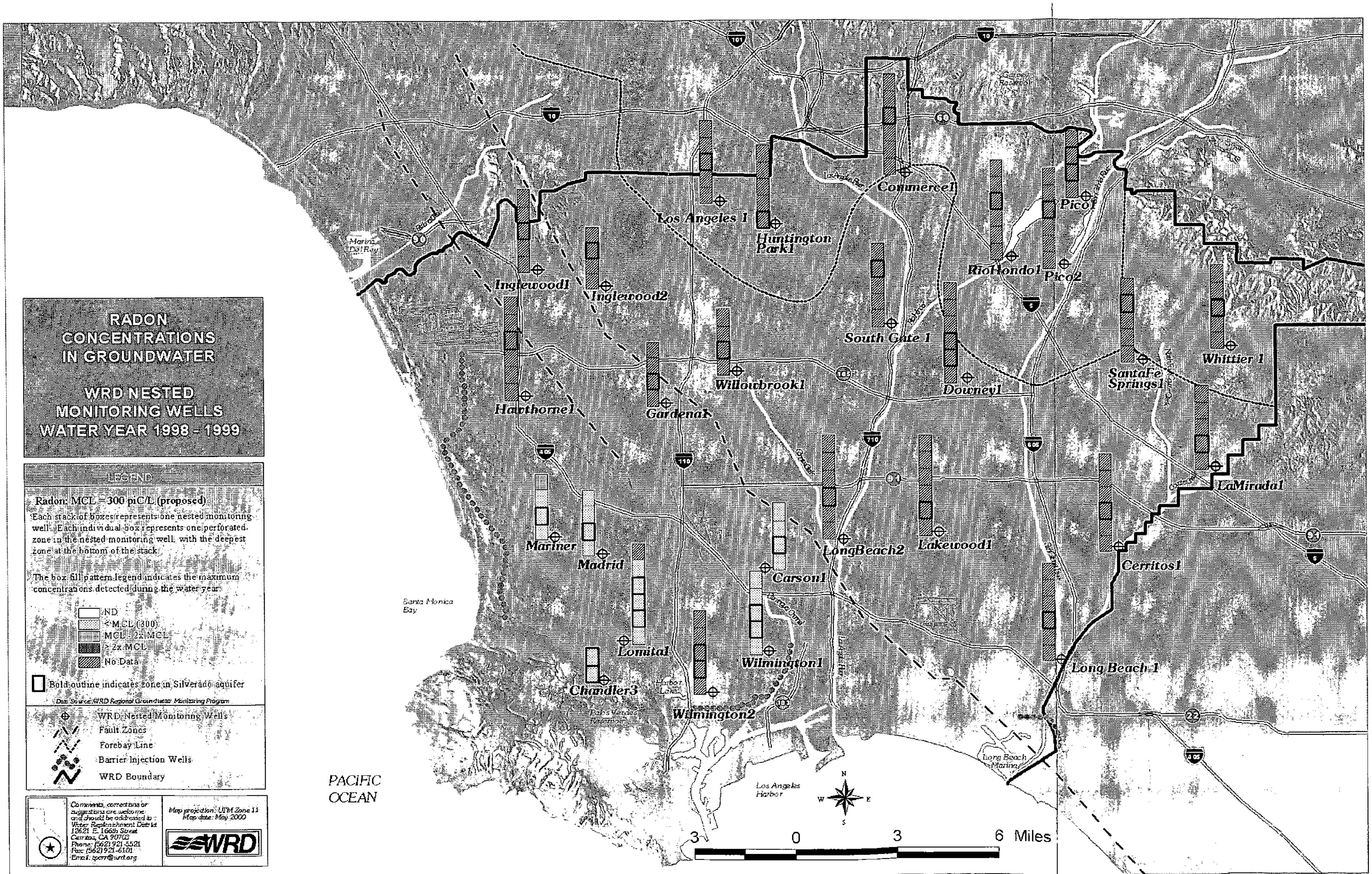

RADON CONCENTRATIONS IN GROUNDWATER
WRD NESTED MONITORING WELLS
WATER YEAR 1998 - 1999
LEGEND
Radon: MCL = 300 piC/L (proposed)
Each stack of boxes represents one nested monitoring well. Each individual box represents one perforated zone in the nested monitoring well, with the deepest zone at the bottom of the stack.
The box fill pattern legend indicates the maximum concentrations detected during the water year.
ND
< MCL (300)
MCL - 2x MCL
> 2x MCL
No Data
Bold outline indicates zone in Silverado aquifer
Data Source: WRD Regional Groundwater Monitoring Program
WRD Nested Monitoring Wells
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos, CA 90703 Phone: (562) 921-5521 Fax: (562) 921-6101 Email: rporr@wrd.org
Map projection: UTM Zone 11
Map date: May 2000
WRD
Inglewood1
Inglewood2
Hawthorne1
Gardena1
Los Angeles 1
Huntington Park1
Willowbrook1
Commerce1
South Gate 1
Downey1
RioHondo1
Pico1
Pico2
SantaFe Springs1
Whittier 1
LaMirada1
Cerritos1
Long Beach 1
Lakewood1
LongBeach2
Carson1
Wilmington1
Wilmington2
Lomita1
Madrid
Mariner
Chandler3
Santa Monica Bay
PACIFIC OCEAN
Los Angeles Harbor
3 0 3 6 Miles

Figure 4.21

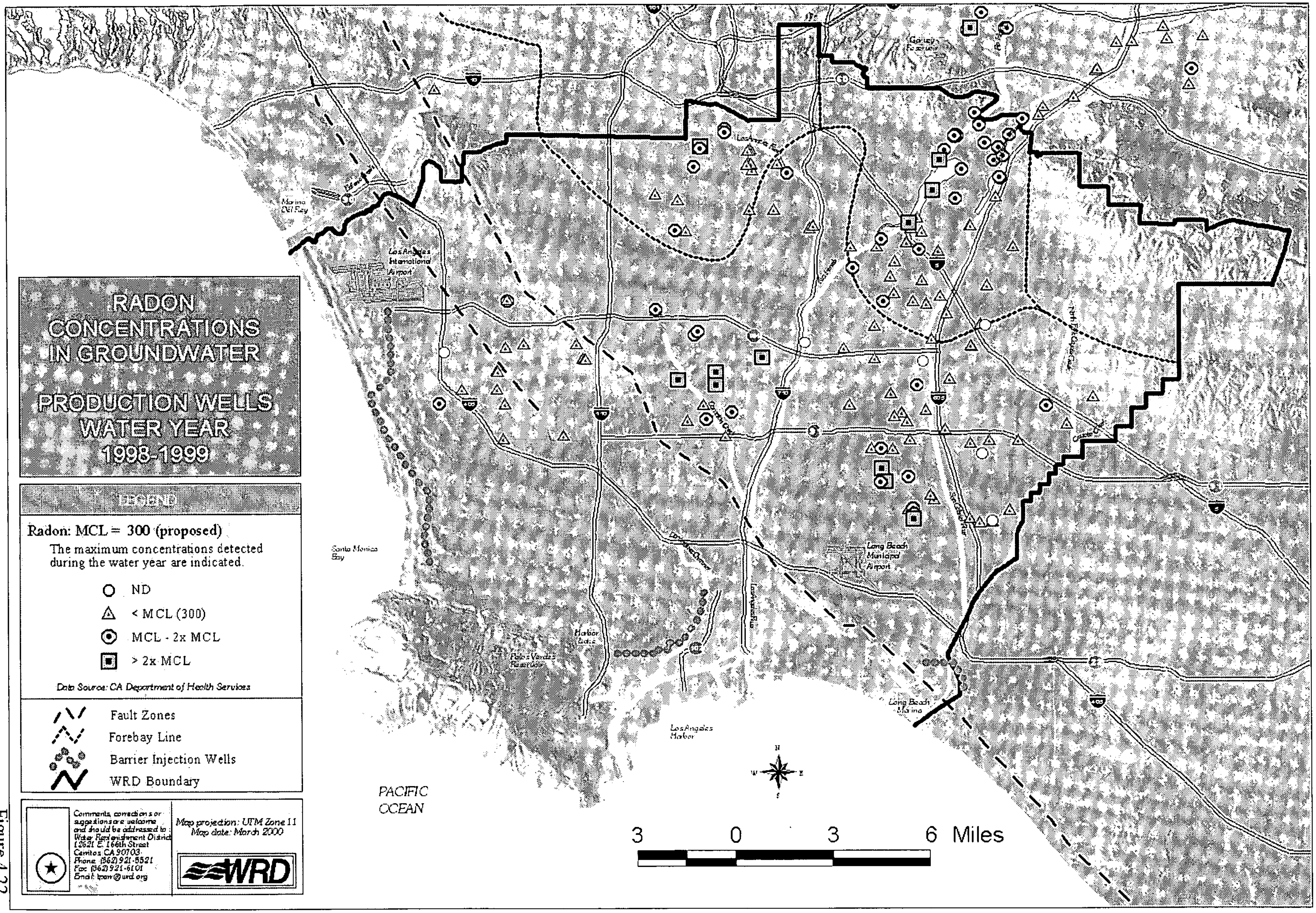

RADON CONCENTRATIONS IN GROUNDWATER
PRODUCTION WELLS WATER YEAR 1998-1999
LEGEND
Radon: MCL = 300 (proposed)
The maximum concentrations detected during the water year are indicated.
ND
< MCL (300)
MCL - 2x MCL
> 2x MCL
Data Source: CA Department of Health Services
Fault Zones
Forebay Line
Barrier Injection Wells
WRD Boundary
Comments, corrections or suggestions are welcome and should be addressed to: Water Replenishment District 12621 E. 166th Street Cerritos CA 90703 Phone (562) 921-5521 Fax (562) 921-6101 Email: tpow@wrd.org
Map projection: UTM Zone 11
Map date: March 2000
WRD
Marina Del Rey
Los Angeles International Airport
Santa Monica Bay
PACIFIC OCEAN
Los Angeles Harbor
Long Beach Marina
Long Beach Municipal Airport
3 0 3 6 Miles

Figure 4.22