California Regional Water Quality Control Board
Los Angeles Region
January 27, 1997
400th Regular Board Meeting (Glendale)

Item 8

Subject

Amendment to the *Water Quality Control Plan (Basin Plan)* to incorporate a "Policy for Addressing Levels of Chloride in Discharges of Wastewaters"

Introduction

The Regional Board set water quality objectives for chloride levels in most of the Region's waterbodies in the *Basin Plan* that was adopted in March 1975. In accordance with State Board Resolution 68-16: "*Statement of Policy with Respect to Maintaining High Quality of Waters in California*" (referred to as the *Antidegradation Policy*), background concentrations of chloride were used to set objectives in waterbodies in the Los Angeles Region. At the time the Regional Board set these chloride objectives, staff assumed that chloride concentrations in supply waters available for import into the Region always would be relatively low.

Chloride levels in supply waters imported into the Region significantly increased in the late 1980s with the onset of droughts. Consequently, many POTWs in the Region were not in compliance with chloride limits based upon existing water quality objectives. In 1990, the Regional Board provided short-term relief to POTWs by adopting Resolution No. 90-004: "*Effects of Drought Induced Water Supply Changes and Water Conservation Measures on Compliance with Waste Discharge Requirements within the Los Angeles Region*" (*Drought Policy*). This policy, which had a term of three years, provided temporarily relief to dischargers by raising chloride limits in Waste Discharge Requirements to the lesser of: (i) 250 mg/L, or (ii) the chloride concentration in water supply plus 85 mg/L.

The droughts ended before the *Drought Policy* was due to expire in 1993. Many dischargers, however, continued to face compliance problems, and the Regional Board renewed the policy in June 1993 and again in February 1995. Currently, the *Drought Policy* is due to expire on the earlier of February 27, 1997 or at that point in time when it has been determined that chloride concentrations in water supplies imported into the Region have returned to pre-drought conditions. As chloride concentrations in most supply waters imported into the Region have not returned to pre-drought conditions (and future droughts are anticipated), the Regional Board–in response to public comments during the 1995 Triennial Review–identified this issue as a priority and directed staff to prepare a long-term solution to chloride compliance problems.

Background

Chloride (Cl^-), which is a reduced form of the element chlorine, is very soluble. Chloride ions in oceans (which have a concentration of about 19,000 mg/L) account for three-quarters of the total amount of chloride in the Earth's outer crust, hydrosphere,

and atmosphere. Although it is also a naturally-occurring ion in freshwaters, chloride concentrations in freshwaters are generally relatively low. In the upper portions of some of the watersheds in our Region, chloride concentrations are as low as 10 mg/L.

Water quality objectives for chloride are as follows:

drinking water: 250 mg/L (secondary maximum contaminant level).

irrigation: Along with sodium, chloride is one of the more troublesome ions in irrigation water. Chloride standards vary, depending upon crop sensitivity, soil and drainage characteristics, and precipitation. In Ventura County, many growers have experienced difficulty in growing crops such as avocadoes when chloride levels exceed 120 mg/L. Some growers believe that irrigation problems may start when chloride levels are as low as 100 mg/L.

industry: Standards vary, depending upon particular industrial processes. In addition to process water considerations, chloride can corrode steel, aluminum, and other metals.

freshwater aquatic life: 230 mg/L.

In addition to background levels of chloride in natural waters, salt loading that occurs during many beneficial uses of supply waters can significantly raise chloride levels in wastewaters. Since chloride is such a stable ionic constituent in water, it cannot be removed from wastewaters through conventional treatment processes at POTWs. Removal of chloride (as well as certain other salts) would most likely require costly advanced treatment techniques, such as reverse osmosis. And while reverse osmosis is capable of separating chloride and other contaminants from waters and wastewaters, it produces a brine of salts and contaminants that often presents disposal problems.

Chloride Policy

In order to develop a long-term solution to the chloride compliance problems stemming from elevated levels of chloride in supply waters imported into the Region, Regional Board staff has been working with a group of technical advisors representing a variety of interests, including: water supply, reclamation, and wastewater management; environmental protection; and water softener industry interests. This group concurs with an approach to permanently reset water quality objectives for chloride in certain surface waters, using baseline levels of chloride in water supply plus a chloride loading factor. Furthermore, and in light of the difficulties in removing chloride from wastewaters (see above paragraph), Regional Board staff, the technical advisors, and other concerned parties believe that it is important to include salinity loading measures in the Chloride Policy. This policy, in the form of a tentative resolution (draft of January 14, 1997), is attached.

Agricultural Considerations

During the public review period, an issue arose concerning impacts of chloride levels on the agricultural industry in Ventura County. Many water suppliers and representatives of the agricultural industry expressed concern about the potential for future adverse impacts to agricultural resources in Ventura County. As noted above, some growers in Ventura County feel that chloride levels in irrigation waters need to be as low as 100 mg/L to 120 mg/L in order to fully protect salt-sensitive crops such as avocadoes.

Given these concerns, Regional Board staff has worked with United Water Conservation District, the Fox Canyon Groundwater Management Agency, the County of Ventura, and others to modify the proposed Chloride Policy (draft of November 15, 1996). As modified, chloride objectives in the Santa Clara River and Calleguas Creek watersheds will not be relaxed. Existing dischargers will, however, be subject to interim limits of up to 190 mg/L (compared to interim limits of 250 mg/L in the *Drought Policy,* which will expire in February 1997). Furthermore, concerned parties have agreed to work together to address chloride loading issues, including loading from agricultural activities. A preliminary schedule and set of major tasks is outlined in the attached Addendum to the Staff Report and proposed changes to the *Basin Plan.* Contingent upon the results of chloride loading analyses in the Santa Clara River and Calleguas Creek watersheds, the Regional Board will consider revisions to chloride objectives before the NPDES permits are renewed in each watershed (2001 for permits in the Santa Clara River watershed, and 2003 for permits in the Calleguas Creek watershed). Future revisions of chloride objectives will consider chloride levels in supply waters (including fluctuations that may be due to future drought conditions), reasonable loading factors during beneficial use and treatment of supply waters and wastewaters, methods to control chloride loading, and the associated costs and effectiveness of the various loading control methods.

The modifications in response to concerns about agricultural resources in the Santa Clara River and Calleguas Creek watersheds are included in the tentative resolution (draft of January 14, 1997) and proposed changes to the *Basin Plan* (draft of January 14, 1997) that are attached to Item 8.

Attachments

1. Tentative resolution (draft of January 14, 1997).
2. Proposed changes (draft of January 14, 1997) to the *Basin Plan.*
3. Addendum (dated January 14, 1997) to the Staff Report and Appendix.
4. Staff Report and Appendix (dated November 15, 1996).
5. Comment letters received as of January 16, 1996.

A copy of the public review package, including CEQA documentation, was sent to you on November 15, 1996. Staff intends to summarize all significant public comments at the Board meeting on January 27, 1997. A copy of written public comments (received as of January 17, 1997) along with staffs' responses will be sent to you the week prior to the Board meeting.

Policy Issue

Should the Board amend the *Basin Plan* to incorporate a "Policy for Addressing Levels of Chloride in Discharges of Wastewaters?" If so, should the Board include appropriate provisions regarding agricultural concerns in Ventura County?

Options

(a) Adopt a resolution that permanently relaxes chloride objectives for certain waterbody segments in all watersheds in the Region (as originally proposed in the November 15, 1996 tentative resolution). Enactment of this option would not include special provisions for evaluation of appropriate chloride objectives for irrigation in Ventura County, and development of cost-effective means to protect waters for irrigation.

(b) Adopt a resolution (as set forth in the attached) that permanently relaxes chloride objectives for certain waterbody segments in all watersheds in the Region except the Santa Clara River and Calleguas Creek watersheds. Enactment of this option would include special provisions for evaluation of appropriate chloride objectives for irrigation, and development of cost-effective means to protect waters for irrigation in both the Santa Clara River and Calleguas Creek watersheds.

(c) Adopt a resolution that permanently relaxes chloride objectives for certain waterbody segments in all watersheds in the Region except the Santa Clara River watershed. Enactment of this option would include special provisions for evaluation of appropriate chloride objectives for irrigation, and development of cost-effective means to protect waters for irrigation in the Santa Clara River watershed only.

(d) No action. The *Basin Plan* would not be amended to relax chloride objectives and to require implementation of salinity loading measures. Enactment of this option could result in the following problems:

i. Upon expiration of the *Drought Policy*, several dischargers in the Region could face compliance problems.
ii. In the event of future droughts, additional dischargers would likely face compliance problems.
iii. Salt loading measures would not be implemented.

Recommended Action

Option (a) was the original policy (dated November 15, 1996) that was proposed by staff and supported by the group of technical advisors assembled to help develop a Chloride Policy. In light of comments received from many representatives of the agricultural industry and water suppliers in Ventura County, staff prepared Option (b) last month. Most recently, representatives of municipalities and POTWs in the Calleguas Creek watershed have expressed a preference for Option (c).

Given uncertainties over minimum standards needed to protect waters for irrigation, staff prepared the attached tentative resolution supporting Option (b). Staff believes that this is the best option for assuring protection of all beneficial uses, while providing appropriate measures of relief to dischargers who might experience compliance problems due to water supplies imported into the area. Furthermore, Option (b) sets forth an efficient mechanism that will help staff achieve significant progress toward the control of pollutants from agricultural activities in both the Santa Clara River and Calleguas Creek watersheds (which is one of the high priorities Basin Planning issues that the Board set forth for staff in the last Triennial Review).

Staff recommends that the Board conduct a public hearing. Based upon testimony received during that hearing and the Board's analysis of the information submitted, staff recommends that the Board take appropriate action.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
January 27, 1997
Resolution No. 97-xx

Amendment to the Water Quality Control Plan to incorporate a Policy for Addressing Levels of Chloride in Discharges of Wastewaters

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

1. In 1975, the Regional Board established water quality objectives for chloride in most of the Region's waterbodies based on background concentrations of chloride, in accordance with the *Statement of Policy with Respect to Maintaining High Quality Water in California* (State Board Resolution No. 68-16, commonly known as the State *Antidegradation Policy*) and the federal *Antidegradation Policy* (as set forth in 40 CFR 131.12). Water quality objectives are the basis for limits in Waste Discharge Requirements that are prescribed by the Regional Board.

2. When water quality objectives for chloride were set in accordance with the State *Antidegradation Policy* and the federal *Antidegradation Policy*, the Regional Board assumed that chloride concentrations in imported waters would remain relatively low. Since 1975, however, chloride concentrations in supply waters imported into the Region have been increasing. During the late 1980s, drought in watersheds that are sources of imported supply waters made it difficult for many dischargers in the Los Angeles Region to comply with water quality limits for chloride.

3. In addition to relatively high chloride levels in supply waters, chloride levels in wastewaters in the Region can be affected by salt loading that occurs during beneficial use and treatment of supply waters and wastewaters. In some areas of the Region, a significant amount of loading may occur from the use of water softeners.

4. In 1990, the Regional Board adopted Resolution No. 90-004: *Effects of Drought-Induced Water Supply Changes and Water Conservation Measures on Compliance with Waste Discharge Requirements within the Los Angeles Region.* This resolution, commonly referred to as the *Drought Policy*, was intended to provide short-term and temporary relief to dischargers who were unable to comply with limits for chloride due to the effects of drought on chloride levels in supply waters imported into the Region.

   For those dischargers who applied for relief under the Drought Policy, the Regional Board temporarily reset limits on concentrations of chloride at the lesser of: (i) 250 mg/L, or (ii) the chloride concentrations in supply waters plus 85 mg/L. An important condition of this relief was that dischargers demonstrate that high chloride concentrations in their discharges of wastewaters are due to increased salinity levels in supply waters imported into their service areas. Several dischargers provided data that confirm that supply waters imported into the Region are the cause of exceedances of chloride limits in discharges of wastewaters. However, many other dischargers have not yet adequately assessed the source(s) of relatively high levels of chloride in wastewaters and the extent to which exceedances are due to factors such as chloride in supply waters and/or significant chloride loading during beneficial use and treatment of supply waters and wastewaters.

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November 15, 1996
Revised January 10, 1997
Revised January 14, 1997

5. The drought ended before the *Drought Policy* was due to expire in 1993. However, because water supply reservoirs still had high chloride concentrations in 1993 and because water suppliers estimated that it would take 12 to 18 months for complete replenishment of imported waters in reservoirs, the Regional Board renewed the *Drought Policy* in June 1993 and again in February 1995. The *Drought Policy* currently is due to expire on the earlier of February 27, 1997 or at that point in time when it has been determined that chloride levels in water supplies imported into the Region have returned to pre-drought conditions.

6. Chloride levels in supply waters imported into the Region and in reservoirs are no longer impacted by drought. However, chloride levels in supply waters imported into the Region are generally higher than they were before drought conditions in the late 1980. The higher levels of chloride in imported waters appear to be the result of intensifying demands for and utilization of water resources in watersheds that are the sources of supply waters. In addition, future droughts may affect levels of chloride in supply waters imported into the Region.

7. The Regional Board recognizes the shortage of water in the Region and the need to conserve supplies of fresh water for protection of beneficial uses. Accordingly, the Regional Board supports water reclamation, as described in State Board Resolution No 77-01: *Policy with Respect to Water Reclamation in California*. However, achievements in water conservation and reclamation can increase levels of chloride and other ionic constituents in reclaimed waters and wastewaters that are ultimately discharged to waterbodies in the Region.

8. In order to develop a long-term solution to the chloride compliance problems stemming from elevated levels of chloride in supply waters imported into the Region, the Regional Board has been working with a group of technical advisors, formerly know as the Chloride Subcommittee of the Surface Water Technical Review Committee. This group of technical advisors represents a variety of interests, including: water supply, reclamation, and wastewater management; environmental protection; and water softener industry interests. The group concurs with:

   (a) an approach to permanently reset water quality objectives for chloride in certain surface waters, using levels of chloride in water supply plus a chloride loading factor.

   (b) a need to assess long-term loading trends for chloride and other saline constituents.

   Furthermore, due to concerns expressed about the potential for future adverse impacts to agricultural resources in Ventura County, the Regional Board proposes to work with a local group of agencies, municipalities, representatives of the agricultural community, and other interested parties in order to clarify chloride objectives needed to protect waters used for irrigation in the Santa Clara River and Calleguas Creek watersheds. In addition, this local group concurs with the need to undertake assessments of significant sources of chloride loading and--contingent upon results--identify methods that could control chloride loading and the costs and effectiveness of the various loading control methods.

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9. The Secretary of Resources has certified the basin planning process exempt from certain requirements under the California Environmental Quality Act (CEQA), including preparation an initial study, a negative declaration and environmental impact report (Title 14, California Code of Regulations, Section 15251). As per this certification, an amendment to the *Basin Plan* is considered 'functionally equivalent' to an initial study, negative declaration, and environmental impact report.

   Any regulatory program of the Regional Board certified as functionally equivalent, however, must satisfy the documentation requirements of Title 23, California Code of Regulations, Section 377(a), which requires an environmental checklist with a description of the proposed activity, and a determination with respect to significant environmental impacts. On November 15, 1996, the Regional Board distributed information regarding a proposed amendment to the *Basin Plan* to incorporate a *Policy for Addressing Levels of Chloride in Discharges of Wastewaters* (*Chloride Policy*). This information included an environmental checklist, a description of the proposed amendment to the *Basin Plan*, and a determination that the proposed amendment could not have a significant effect on the environment.

10. The public has had reasonable opportunity to participate in review of the amendment to the *Basin Plan*. Efforts to solicit public review and comment include: public notification, more than 45 days preceding Board action; public workshops, held on December 2, 1996, December 3, 1996, and January 6, 1997; responses from the Regional Board to oral and written comments received from the public, and a public hearing held on January 27, 1997.

11. In amending the *Basin Plan*, the Regional Board considered factors set forth in section 13241 of the Porter-Cologne Water Quality Control Act (California Water Code, Division 1, Chapter 2, Article 3, et seq., plus others).

12. The amendment is consistent with the State *Antidegradation Policy* (State Board Resolution No. 68-16), in that the changes to water quality objectives (i) consider maximum benefits to the people of the state, (ii) will not unreasonably affect present and anticipated beneficial use of waters, and (iii) will not result in water qulaity less than that prescribed in policies. Likewise, the amendment is consistent with the federal *Antidegradation Policy* (40 CFR 131.12).

13. Revision of water quality objectives for chloride is subject to approval by the State Water Resources Control Board, the State Office of Administrative Law, and the US Environmental Protection Agency.

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THEREFORE, BE IT RESOLVED THAT:

1. Water quality objectives for chloride for certain surface waters will be revised as specified below.

Waterbody	New Objective
Los Angeles River--between Sepulveda Flood Control Basin and Figueroa Street (including Burbank Western Channel only)	190 mg/L
Los Angeles River--between Figueroa Street and estuary (including Rio Hondo below Santa Ana Freeway only)	190 mg/L
Rio Hondo--between Whittier Narrows Flood Control Basin and Santa Ana Frwy	180 mg/L
San Gabriel River--between Valley Blvd. and Firestone Blvd. (including Whittier Narrows Flood Control Basin, and San Jose Creek downstream of 71 Frwy only)	180 mg/L

These new objectives are set at the lower of (i) levels needed to protect beneficial uses, or (ii) chloride levels in supply waters imported into the Region plus a chloride loading factor of 85 mg/L. The levels at which the new water quality objectives have been set are expected to accommodate fluctuations in chloride concentrations that may be due to future drought. Although the new water quality objectives do not match background levels of chloride, they nevertheless are expected to be fully protective of drinking water and freshwater aquatic life.

2. Due to concerns expressed about the potential for future adverse impacts to agricultural resources in Ventura County, water quality objectives for chloride in the Santa Clara River and Calleguas Creek watersheds will not be revised at this time. However, the Regional Board will grant variances (interim relief) from limits based on existing chloride objectives in the Santa Clara River and Calleguas Creek watersheds. Under this interim relief, existing dischargers in certain waterbody segments will be subject to limits specified below.

Waterbody Segments for which Existing Dischargers Are Subject to Interim Chloride Limits	Interim Chloride Limit
Santa Clara River--between Bouquet Canyon Road Bridge and West Pier Highway 99	190 mg/L
Santa Clara River--between West Pier Highway 99 and Blue Cut gaging station	190 mg/L
Santa Clara River--between Blue Cut gaging station and A Street (Fillmore)	190 mg/L
Arroyo Simi and tributaries--upstream Madera Road	160 mg/L
Arroyo Simi--downstream Madera Road, Arroyo Las Posas, and tributaries	190 mg/L
Calleguas Creek and tributaries--between Potrero Road and Arroyo Las Posas (including Conejo Creek, Arroyo Conejo, and Arroyo Santa Rosa)	190 mg/L

The Regional Board does not anticipate that the variance period for interim relief will need to extend for more than three years following final approval of the amendment. During this period, the Regional Board expects that the local group of agencies, municipalities, representatives of the agricultural community, and other interested parties which have commented upon this policy

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will work together to: (i) clarify water quality objectives needed to protect waters used for irrigation in the Santa Clara River and Calleguas Creek watersheds, (ii) assess significant sources of chloride loading, and (iii) contingent upon results of the chloride loading assessment, identify cost-effective ways that could protect beneficial uses of waters in the Santa Clara and Calleguas Creek watersheds.

At the end of the variance period, the Regional Board may reconsider revisions to water quality objectives for chloride in the Santa Clara River and Calleguas Creek watersheds. Future revisions of water quality objectives will consider chloride levels in supply waters (including fluctuations that may be due to future drought conditions), reasonable loading factors during beneficial use and treatment of supply waters and wastewaters, methods that could control chloride loading, and the associated costs and effectiveness of the various loading control methods.

3. To address the need to continue and, as appropriate, improve tracking and assessment of salinity loading throughout the Region, publicly-owned treatment works (POTWs) shall be required, as part of their NPDES permits, to monitor and assess salinity concentrations derived from: (i) source waters, (ii) loading that occurs during beneficial use of supply waters, and (iii) loading that occurs during treatment and disinfection of supply waters and wastewaters. Furthermore, those POTWs not already monitoring and assessing chloride loading from industrial sources shall expand their pre-treatment programs to include such assessments.

   Monitoring data and assessments shall be reported by the POTWs to the Regional Board on an annual basis; the content and format of these reports shall be subject to approval by the Executive Officer of the Regional Board.

4. To address water quality problems from water softening processes throughout the Region, the Regional Board recommends that water suppliers, POTWs, and representatives of the water softener industry undertake educational campaigns, targeting residential, commercial, and industrial water consumers, on issues relating to water hardness, water quality problems associated with water softeners, and types of water softeners (encouraging the use of those types of softeners that pose less of a threat to water quality).

5. To address chloride loading that occurs during treatment and disinfection of supply waters and wastewaters, the Regional Board encourages shifts to less chlorine-intensive processes to achieve treatment and disinfection of supply waters and wastewaters, to the extent that such shifts are cost-effective and consistent with water quality and reclamation objectives.

6. Contingent upon the success of the salinity loading measures set forth in paragraphs (2) through (5) immediately above, the Regional Board may consider other salinity control measures at a later date. Such measures may include--but are not limited to--salt loading fees, bans or restrictions on inefficient water and/or "self-regenerating" types of softeners, regulatory controls of agricultural discharges, and expansion of POTW pretreatment programs to include salinity loading controls from commercial discharges.

7. Water quality objectives for chloride will not be changed for the headwaters of the Region's major stream systems. Furthermore, due to concerns over degradation of ground waters stored in the Region's basins, water quality objectives for chloride in ground waters will not be changed. In accordance with the State Board's *Antidegradation Policy*, water quality objectives currently in effect will continue to protect the naturally-high quality of such surface and ground waters.

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8. Resolution No. 90-004: *Effects of Drought-Induced Water Supply Changes and Water Conservation Measures on Compliance with Waste Discharge Requirements within the Los Angeles Region (Drought Policy)*, which was intended to provide short-term and temporary relief to dischargers who were unable to comply with limits for chloride due to the effects of drought on chloride levels in supply waters, is hereby rescinded with the adoption of this resolution.

   While this resolution and amendment to the *Basin Plan* are under review by the State Water Resources Control Board, Office of Administrative Law, and the US Environmental Protection Agency, the Regional Board will evaluate compliance consistent with provisions set forth in this resolution.

I, Robert P. Ghirelli, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Los Angeles Region, on January 27, 1997.

ROBERT P. GHIRELLI, D.Env.
Executive Officer

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Changes to Chapter One, Page 1-23

Imported Water Supply, Drought, and Salinity Loading Issues

Chloride concentrations in supply waters imported into the Region are periodically affected by drought. Moreover, baseline concentrations of chloride in supply waters imported into the Region are higher than they were in 1975, when the Regional Board set water quality objectives for chloride based upon background concentrations of chloride in the Region's waterbodies. The higher chloride concentrations in imported waters appear to be the result of impairments and/or intensifying demands for and utilization of water resources in watersheds from which the supply waters are imported.

During the most recent period of drought *starting in the late 1980s*, water supplies *imported into the Los Angeles Region* ~~from northern California~~ often had higher than normal concentrations of chlorides which, in turn, often resulted in waste discharges that exceeded chloride limitations. To provide a measure of relief to dischargers who were unable to meet chloride limitations *primarily* due to *supply waters*, the drought and/or water conservation measures, the Regional Board adopted Resolution No. 90-04, entitled *Effects of Drought Induced Water Supply Changes and Water Conservation Measures on Compliance with Waste Discharge Requirements within the Los Angeles Region (Drought Policy)*. This policy, which was adopted on March 26, 1990, temporarily raised chloride limitations to in response to chloride increases in the water supply for a period of three years. Under this policy, chloride limitations were temporarily set at the lesser of (i) 250 mg/L or (ii) the supply concentration plus 85 mg/L. *As chloride concentrations did not return to pre-drought levels, the Regional Board extended the Drought Policy for an 18-month period starting in June 1993; and extended the policy again for a 24-month period starting in February 1995.*

~~Although the drought ended in 1993, water supplies in storage still contained higher than normal levels of chlorides. Accordingly, on June 14, 1993 the Regional Board extended these temporary chloride limitations for 18 months. The Regional Board realizes that there may be a need for a longer term solution to these water supply issues, and will address these issues as part of the next Triennial Review.~~

In order to develop a long-term solution to chloride compliance problems while still protecting beneficial uses, the Regional Board worked with a group of technical experts representing a variety of interests, including: water supply, reclamation, and wastewater management; environmental protection; and water softener industry interests. This group, together with the Regional Board, developed a Policy for Addressing Levels of Chloride in Discharges of Wastewaters (Chloride Policy) to replace the short-term Drought Policy. The Chloride Policy, which the Regional Board adopted on January 27, 1997, permanently reset chloride limits for certain surface waters and also acknowledged the need to assess and manage salinity loading over the long term. The water quality objectives for chloride were reset at the lesser of (i) levels necessary to fully protect beneficial uses, or (ii) baseline levels of chloride in water supply plus a chloride loading factor. To address salinity loading issues, the Chloride Policy (i) includes requirements for monitoring and assessment of sources of salinity, (ii) encourages consumer education on water hardness issues and water quality problems associated with water softening processes, and (iii) encourages water

supply and wastewater treatment agencies to shift to less chlorine-intensive processes to achieve treatment and disinfection of supply waters and wastewaters, to the extent that such shifts are cost-effective and consistent with water quality and reclamation objectives.

Due to concerns expressed about the potential for future adverse impacts to agricultural resources in Ventura County, water quality objectives for chloride in the Santa Clara River and Calleguas Creek watersheds were not revised under the Chloride Policy. However, in the Santa Clara River watershed, water quality objectives for chloride will be reconsidered for revision within three years following final approval by the US EPA of the Chloride Policy. This will occur prior to renewal of National Pollutant Discharge Elimination System (NPDES) permits, scheduled for the year 2001 in the Santa Clara River watershed and 2003 in the Calleguas Creek watershed. In any future revisions to water quality objectives for chloride in the Santa Clara River and Calleguas Creek watersheds, the Regional Board will consider chloride levels in supply waters (including fluctuations that may be due to drought conditions), reasonable loading factors during beneficial use and disinfection of supply waters and wastewaters, methods to control chloride loading, and the associated costs and effectiveness of the various loading control methods.

Water quality objectives for chloride were not changed for the headwaters of the Region's major stream systems. Likewise, water quality objectives for chloride in ground waters were not changed, due to concerns over degradation of ground waters stored in the Region's basins. In accordance with the State Board's Antidegradation Policy, water quality objectives currently in effect will continue to protect the naturally-high quality of such surface and ground waters.

The new water quality objectives were incorporated into Table 3-8 Water Quality Objectives for Selected Constituents in Inland Surface Waters. Regional Board Resolution No. 97-0X: Policy for Addressing Levels of Chloride in Discharges of Wastewater, is included in Chapter 5 (page xx).

Changes to Chapter 2

See replacement figures on pages 3, 4, 5, and 6 of this document.

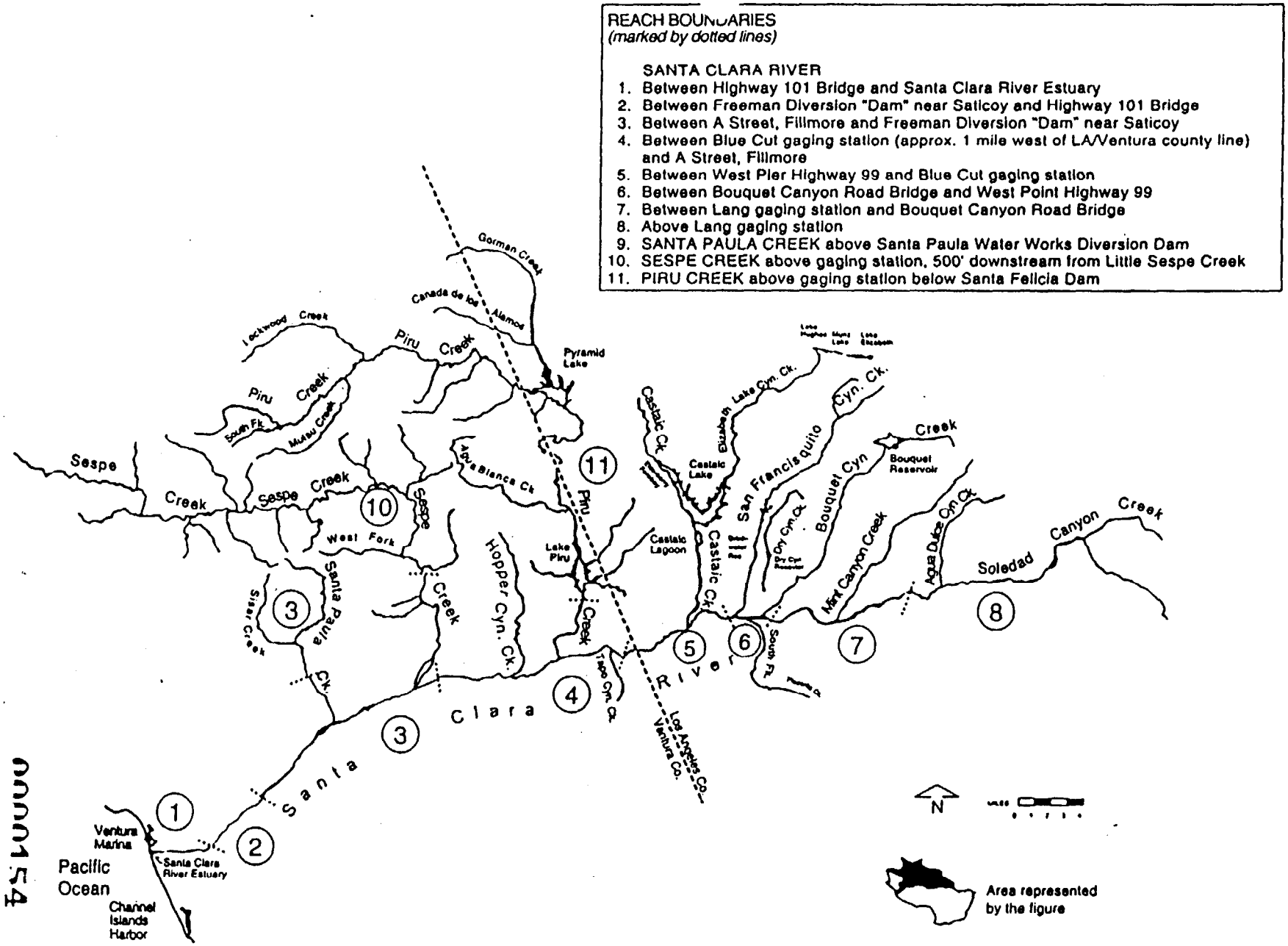

Fig 2-3. Major surface waters of the Santa Clara River watershed.

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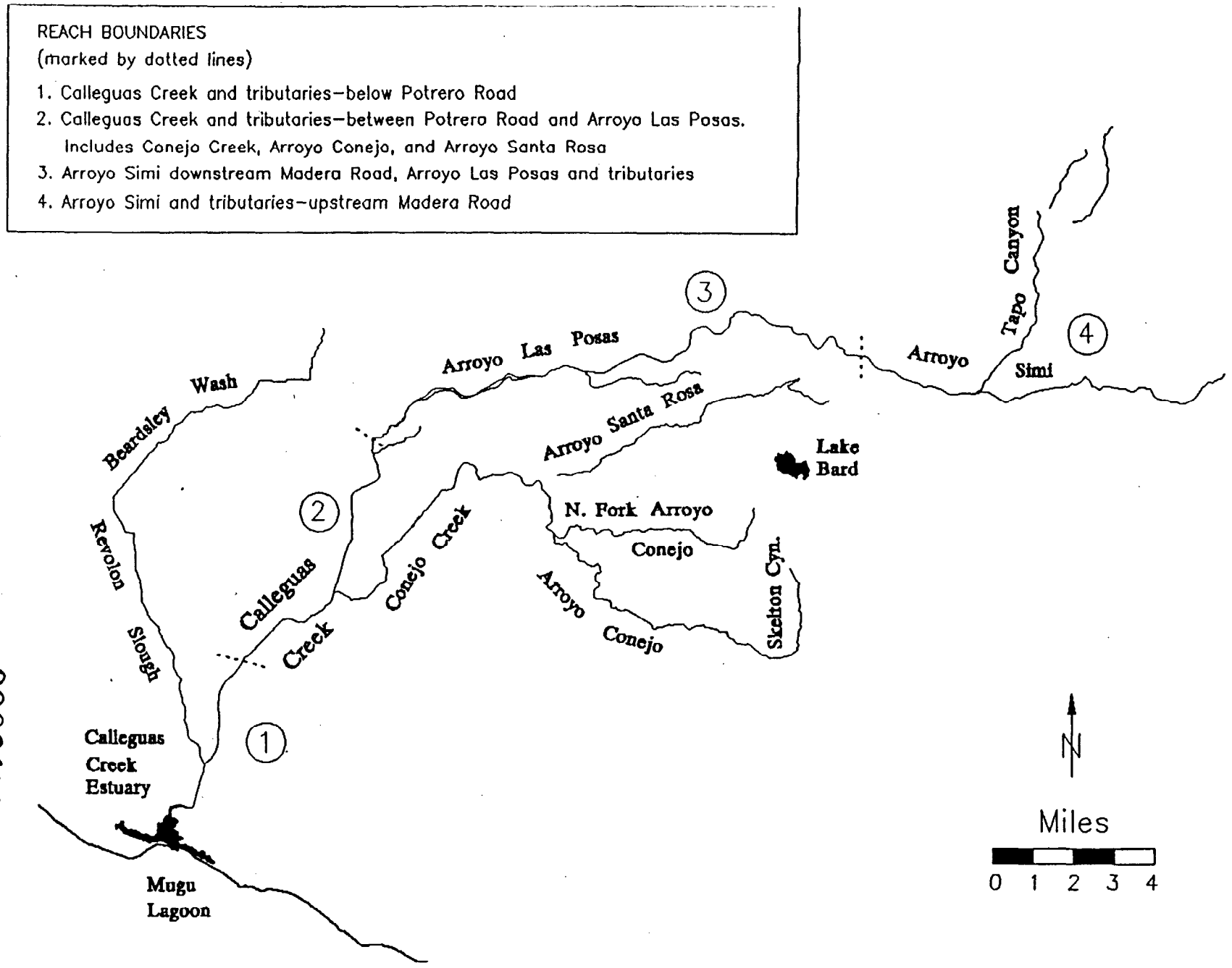

Figure 2–4. Major surface waters of the Calleguas–Conejo Creek watershed.

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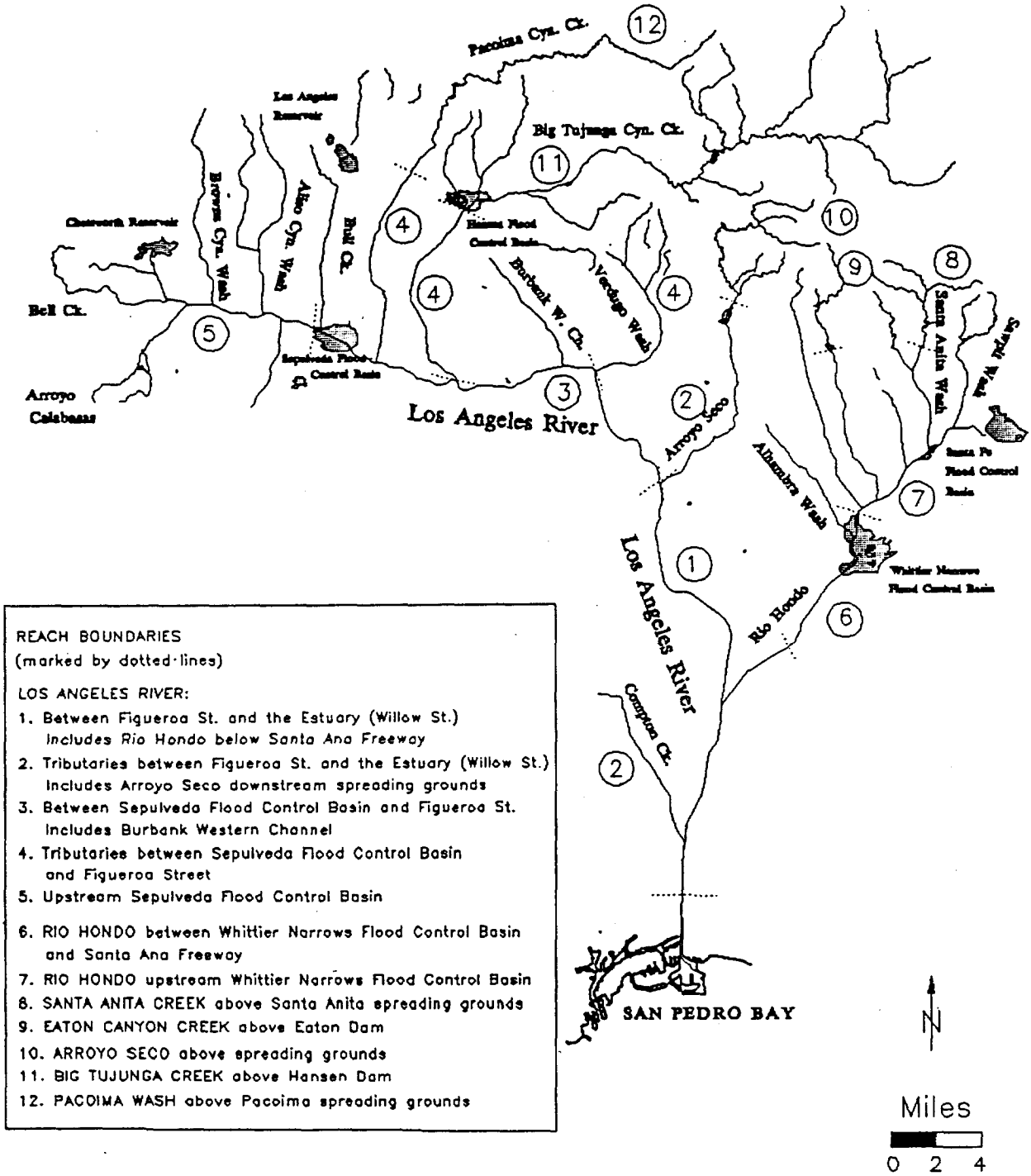

Figure 2–8. Major surface waters of the Los Angeles River watershed.

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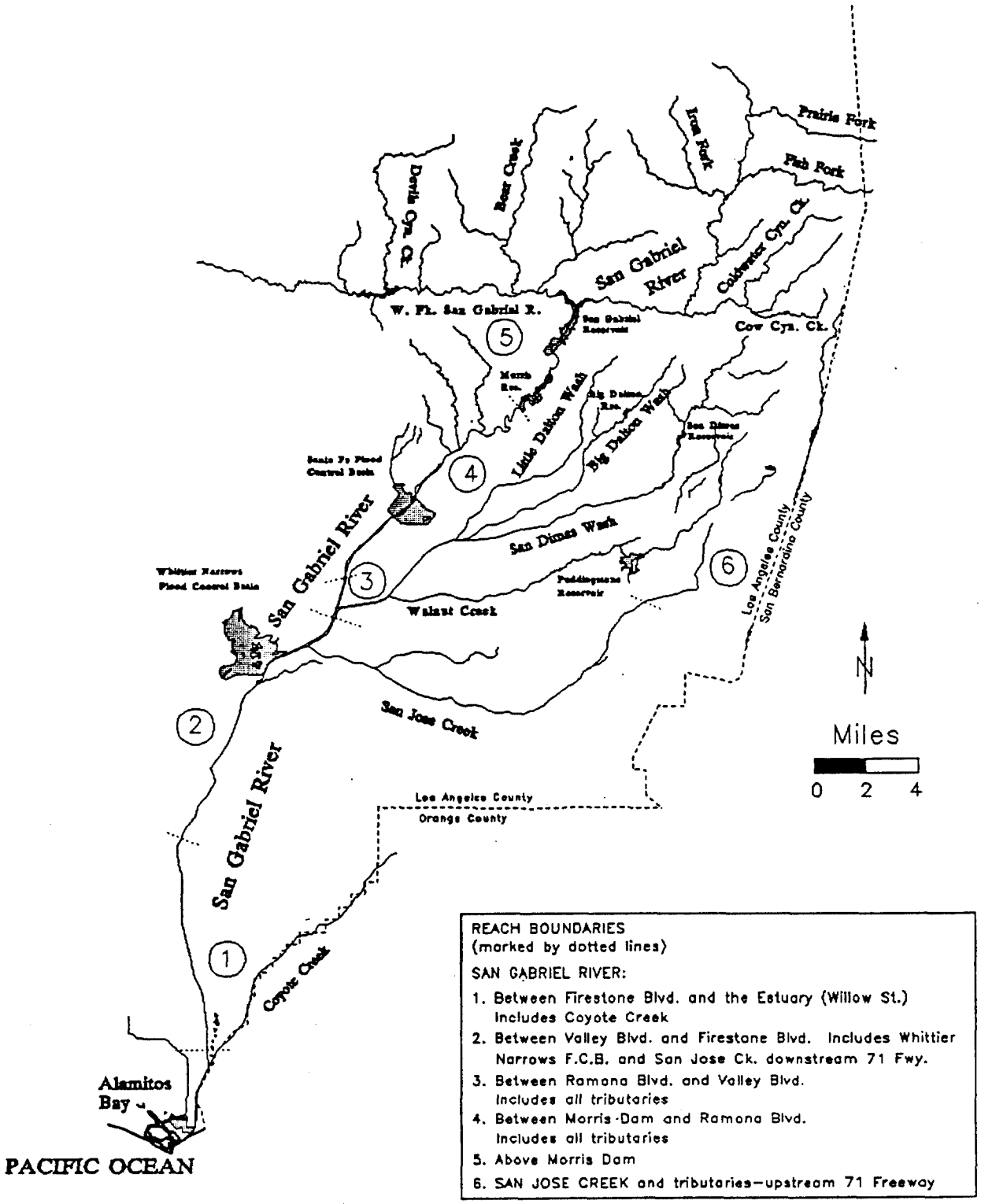

Figure 2–9. Major surface waters of the San Gabriel River watershed.

Changes to Chapter 3

See below for addition to page 3-11, ***Mineral Quality***.

As explained in Chapter 2 (page xx), many dischargers started to experience compliance problems with chloride limits in the late 1980s, largely due to chloride levels in supply waters imported into the Region. In order to provide a long-term solution to chloride compliance problems while continuing to protect beneficial uses, the Regional Board adopted Resolution No. 97-0X: Policy for Addressing Levels of Chloride in Discharges of Wastewater (Chapter 5, page xx). This Chloride Policy revised water quality objectives in selected surface waters based upon chloride levels in supply waters imported into the Region plus a loading factor. The policy also set forth measures to address salinity loading throughout the Region.

Due to concerns expressed about the potential for future adverse impacts to agricultural resources in Ventura County, water quality objectives for chloride in the Santa Clara River and Calleguas Creek watersheds were not revised under the Chloride Policy in 1997. However, the Regional Board has granted variances (interim relief) from chloride limits in NPDES permits that are based on existing water quality objectives in the Santa Clara River and Calleguas Creek watersheds. Under the variances, existing dischargers in certain waterbody segments will be subject to interim limits specified below.

Waterbody Segments for which Existing Dischargers Are Subject to Interim Chloride Limits	*Interim Limit*
Santa Clara River–between Bouquet Canyon Road Bridge and West Pier Highway 99	*190 mg/L*
Santa Clara River–between West Pier Highway 99 and Blue Cut gaging station	*190 mg/L*
Santa Clara River–between Blue Cut gaging station and A Street (Fillmore)	*190 mg/L*
Arroyo Simi and tributaries–upstream Madera Road	*160 mg/L*
Arroyo Simi–downstream Madera Road, Arroyo Las Posas, and tributaries	*190 mg/L*
Calleguas Creek and tributaries–between Potrero Road and Arroyo Las Posas (including Conejo Creek, Arroyo Conejo, and Arroyo Santa Rosa)	*190 mg/L*

The Regional Board does not anticipate that the variance period for interim relief will need to extend for more than three years following final approval of the Chloride Policy and associated amendment to the Basin Plan. During this period, the Regional Board expects that the group of local agencies, municipalities, representatives of the agricultural community, and other interested parties which have commented upon this policy will work together to (i) clarify water quality objectives needed to protect waters used for irrigation in the Santa Clara River and Calleguas Creek watersheds, (ii) assess significant sources of chloride loading, and (iii) contingent upon results of the chloride loading assessment, identify cost-effective ways to protect beneficial uses of waters in the Santa Clara and Calleguas Creek watersheds.

At the end of the variance period, the Regional Board may reconsider revisions to water quality objectives for chloride in the Santa Clara River and Calleguas Creek watersheds.

Table 3-8. Water Quality Objectives for Selected Constituents in Inland Surface Waters[a].

Reaches are in upstream to downstream order.

WATERSHED/STREAM REACH[b]	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron[c] (mg/L)	Nitrogen[d] (mg/L)	SAR[e] (mg/L)
Miscellaneous Ventura Coastal Streams	no waterbody specific objectives [f]					
Ventura River Watershed:						
Above Camino Cielo Road	700	300	50	1.0	5	5
Between Camino Cielo Road and Casitas Vista Road	800	300	60	1.0	5	5
Between Casitas Vista Road and confluence with Weldon Canyon	1000	300	60	1.0	5	5
Between confluence with Weldon Canyon and Main Street	1500	500	300	1.5	10	5
Between Main St. and Ventura River Estuary	*no waterbody specific objectives [f]*					
Santa Clara River Watershed:						
Above Lang gaging station	500	100	50	0.5	5	5
Between Lang gaging station and Bouquet Canyon Road Bridge	800	150	100	1.0	5	5
Between Bouquet Canyon Road Bridge and West Pier Highway 99	1000	300	100	1.5	10	5
Between West Pier Highway 99 and Blue Cut gaging station	1000	400	100	1.5	5	10
Between Blue Cut gaging station and A Street, Fillmore	1300	600	100	1.5	5	5
Between A Street, Fillmore and Freeman Diversion "Dam" near Saticoy	1300	650	80	1.5	5	5
Between Freeman Diversion "Dam" near Saticoy and Highway 101 Bridge	1200	600	150	1.5	-	-
Between Highway 101 Bridge and Santa Clara River Estuary	*no waterbody specific objectives [f]*					
Santa Paula Creek above Santa Paula Water Works Diversion Dam	600	250	45	1.0	5	5
Sespe Creek above gaging station, 500' downstream from Little Sespe Creek	800	320	60	1.5	5	5
Piru Creek above gaging station below Santa Felicia Dam	800	400	60	1.0	5	5

Future revisions of water quality objectives will consider chloride levels in supply waters (including fluctuations that may be due to future drought conditions), reasonable loading factors during beneficial use and treatment of supply waters and wastewaters, methods to control chloride loading, and the associated costs and effectiveness of the various loading control methods. A preliminary schedule and set of major tasks for accomplishing these goals is set forth in Table 3-X.

Table 3-X. Schedule for Chloride Loading Analyses--Santa Clara River and Calleguas Creek Watersheds[1]

Major Tasks and Questions to be Answered	*Participants*	*Targeted Completion*[2]
Irrigation Standards Research: What are the appropriate chloride standards for agriculture in the Santa Clara and Calleguas Creek watersheds?	*Regional Board, agricultural representatives, water suppliers, and other concerned parties*	*July 1997*
Source Identification: What are the sources of chloride? How can mass loadings from the identified sources be quantified?	*Regional Board, water suppliers, POTWs, and other concerned parties*	*October 1997*
Quantification: What is the mass loading of chloride from each identified source, and levels of confidence in data? What are the chloride loading trends?	*Regional Board, water suppliers, POTWs, and other concerned parties*	*October 1998*
Conclusions: What are appropriate water quality objectives for chloride? What are the significant sources of chloride? What are the impacts of chloride levels in upstream discharges on downstream beneficial uses?	*Regional Board, agricultural representatives, water suppliers, POTWs, and other concerned parties*	*Jan 1999*
Development of chloride control measures: What reasonable measures can be expected to achieve water quality objectives?	*Regional Board, agricultural representatives, water suppliers, POTWs, and other concerned parties*	*March 1999*
Consensus on management/control measures: Will concerned parties agree to implement appropriate measures that will achieve water quality objectives for chloride?	*Regional Board, agricultural representatives, water suppliers, POTWs, and other concerned parties*	*August 1999*
Consideration of revisions to water quality objectives for chloride.	*Regional Board, with public review*	*October 1999*

[1] *The scope of the analyses may be broadened to address loading concerns for other saline constituents, such as sodium and total dissolved solids. However, such efforts will not delay analyses concerning chloride objectives and impacts.*

[2] *Targeted dates are estimates. If practical, tasks will be completed sooner than indicated on this schedule.*

Table 3-8. Water Quality Objectives for Selected Constituents in Inland Surface Waters[a] (cont.)
Reaches are in upstream to downstream order.

WATERSHED/STREAM REACH[b]	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron[c] (mg/L)	Nitrogen[d] (mg/L)	SAR[e] (mg/L)
Calleguas Creek Watershed:						
Arroyo Simi and tributaries–upstream Madera Road	850	250	150	1.0	10	f
Arroyo Simi–downstream Madera Road, Arroyo Las Poses, and tributaries	850	250	150	1.0	10	f
Calleguas Creek and tributaries–between Potrero Road and Arroyo Las Posas. Includes Conejo Creek, Arroyo Conejo, and Arroyo Santa Rosa.	850	250	150	1.0	10	f
Below Potrero Road	*no waterbody specific objectives [f]*					
Miscellaneous Los Angeles County Coastal Streams	*no waterbody specific objectives [f]*					
Malibu Creek Watershed	*2000*	*500*	*500*	*2.0*	*10*	-
Ballona Creek Watershed	*no waterbody specific objectives [f]*					
Dominguez Channel Watershed	*no waterbody specific objectives [f]*					
Los Angeles River Watershed:						
Los Angeles River and tributaries–upstream Sepulveda Flood Control Basin	950	300	150	g	8	g
Los Angeles River–between Sepulveda Flood Control Basin and Figueroa Street. Includes Burbank Western Channel only.	950	300	~~150~~ *190*	g	8	g
Other tributaries to Los Angeles River–between Sepulveda Flood Control Basin and Figueroa Street	950	300	150	g	8	g
Los Angeles River–between Figueroa Street and Los Angeles River Estuary (Willow Street). Includes Rio Hondo below Santa Ana Freeway only.	1500	350	~~150~~ *190*	g	8	g
Other tributaries to Los Angeles River–between Figueroa Street and Los Angeles river Estuary. Includes Arroyo Seco downstream spreading grounds.	1500	350	150	g	8	g
Rio Hondo–between Whittier Narrows Flood Control Basin and Santa Ana Freeway [h]	750	300	~~150~~ *180*	g	8	g
Rio Hondo–upstream Whittier Narrows Flood Control Basin	750	300	150	g	8	g
Santa Anita Creek above Santa Anita spreading grounds	250	30	10	g	f	g

Table 3-8. Water Quality Objectives for Selected Constituents in Inland Surface Waters[a] (cont.)

Reaches are in upstream to downstream order.

WATERSHED/STREAM REACH[b]	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron[c] (mg/L)	Nitrogen[d] (mg/L)	SAR[e] (mg/L)
Los Angeles River Watershed (cont.):						
Eaton Canyon Creek above Eaton Dam	250	30	10	g	f	g
Arroyo Seco above spreading grounds	300	40	15	g	f	g
Big Tujunga Creek above Hansen Dam	350	50	20	g	f	g
Pacoima Wash above Pacoima spreading grounds	250	30	10	g	f	g
San Gabriel River Watershed:						
San Gabriel River--above Morris Dam	250	30	10	0.6	2	2
San Gabriel River--between Morris Dam and Ramona Blvd.	450	100	100	0.5	8	g
San Gabriel River and tributaries--between Ramona Blvd. and Valley Blvd.	750	300	150	1.0	8	g
San Gabriel River--between Valley Blvd. and Firestone Blvd. Includes Whittier Narrows Flood Control Basin, and San Jose Creek--downstream 71 Freeway only.	750	300	~~150~~ *180*	1.0	8	g
San Jose Creek and tributaries--upstream 71 Freeway	750	300	150	1.0	8	g
San Gabriel River--between Firestone Blvd. and San Gabriel River Estuary (downstream from Willow Street). *Includes* Coyote Creek.	*no waterbody specific objectives* [f]					
All other minor San Gabriel Mountain streams tributary to San Gabriel Valley [f]	300	40	15	g	f	g
Island Watercourses:						
Anacapa Island	*no waterbody specific objectives* [f]					
San Nicolas Island	*no waterbody specific objectives* [f]					
Santa Barbara island	*no waterbody specific objectives* [f]					
Santa Catalina Island	*no waterbody specific objectives* [f]					
San Clemente Island	*no waterbody specific objectives* [f]					

Table 3-8. Water Quality Objectives for Selected Constituents in Inland Surface Waters[a] (cont.)

Reaches are in upstream to downstream order.

WATERSHED/STREAM REACH[b]	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron[c] (mg/L)	Nitrogen[d] (mg/L)	SAR[e] (mg/L)
Other Watercourses:						
San Antonio Creek[j]	225	25	6	–	–	–
Chino Creek[j]	–	–	–	–	–	–

a. As part of the State's continuing planning process, data will continue to be collected to support the development of numerical water quality objectives for waterbodies and constituents where sufficient information is presently unavailable. Any new recommendations for water quality objectives will be brought before the Regional Board in the future.

b. All references to watersheds, streams and reaches include all tributaries. Water quality objectives are applied to all waters tributary to those specifically listed in the table. See Figures 2-1 to 2-10 for locations.

c. Where naturally occurring boron results in concentrations higher than the stated objective, a site-specific objective may be determined on a case-by-case basis.

d. Nitrate-nitrogen plus nitrite-nitrogen (NO3-N + NO2-N). The lack of adequate nitrogen data for all streams precluded the establishment of numerical objectives for all streams.

e. Sodium adsorption ratio (SAR) predicts the degree to which irrigation water tends to enter into cation-exchange reactions in soil.

$$SAR = Na+/((Ca++ + Mg++)/2)1/2$$

f. Site-specific objectives have not been determined for these reaches at this time. These areas are often impaired (by high levels of minerals) and there is not sufficient historic data to designate objectives based on natural background conditions. The following table illustrates the mineral or nutrient quality necessary to protect different categories of beneficial uses and will be used as a guideline for establishing effluent limits in these cases. Protection of the most sensitive beneficial use(s) would be the determining criteria for the selection of effluent limits.

Recommended objective (mg/L)	Beneficial Use Categories				
	MUN (Drinking Water Standards) [1]	PROC	AGR	AQ LIFE*(Frshwtr)	GWR
TDS	500 (USEPA secondary MCL)	50-1500 [2,7,9]	450-2000 [2,3,6]		Limits based on appropriate groundwater basin objectives and/or beneficial uses
Chloride	250 (USEPA secondary MCL)	20-1000 [2,8]	100-355 [2,3,8]	230 (4 day ave. continuous conc) [4]	
Sulfate	400-500 (USEPA proposed MCL)	20-300 [2,8]	350-600 [2,8]		
Boron			0.5-4.0 [2,6,8]		
Nitrogen	10 (USEPA MCL)				

References: 1) USEPA CFR § 141 et seq., 2) McKee and Wolf, 1963, 3) Ayers and Westcot, 1985, 4) USEPA, 1988, 5) Water Pollution Control Federation, 1989, 6) USEPA, 1973, 7) USEPA 1980, 8) Ayers, 1977.
* Aquatic life includes a variety of Beneficial Uses including WARM, COLD, SPWN, MIGR and RARE.

g. Agricultural supply is not a beneficial use of the surface water in the specified reach.

h. Rio Hondo spreading grounds are located above the Santa Ana Freeway.

i. The stated objectives apply to all other surface streams originating within the San Gabriel Mountains and extend from their headwaters to the canyon mouth.

j. These watercourses are primarily located in the Santa Ana Region. The water quality objectives for these streams have been established by Santa Ana Region. Dashed lines indicate that numerical objectives have not been established, however, narrative objectives shall apply. Refer to the Santa Ana Region Basin Plan for more details.

Changes to Chapter Five, Page 5-8

Regional Board Resolutions

The Los Angeles Regional Board has adopted many resolutions over the years. The following are summaries of the resolutions that are most important to the Regional Board's implementation of the Basin Plan and are herein incorporated by reference:

~~Resolution No. 90-04. Adopted March 26, 1990.~~

~~"Effects of of Drought Induced Water Supply Changes and Water Conservation Measures on Compliance with Waste Discharge Requirements within the Los Angeles Region." This policy temporarily raised chloride limitations in Waste Discharge Requirements to match chloride increases in the water supply for a period of 3 years. Specifically, chloride limitations were temporarily set at the lesser of (i) 250 mg/L or (ii) the supply concentation plus 85 mg/L.~~

Resolution No. 97-xx. Adopted January 27, 1997.

"Policy for Addressing Levels of Chloride in Discharges of Wastewaters" (see page 5-x)
New water quality objectives for chloride, based upon baseline levels of chloride in supply waters imported into the Los Angeles Region plus a loading factor, were established for several reaches of surface waterbodies. Additonally, the policy sets forth long-term measures to address salinity loading issues. This policy replaced Resolution No. 90-04, "Effects of Drought Induced Water Supply Changes and Water Conservation Measures on Compliance with Waste Discharge Requirements within the Los Angeles Region" (Drought Policy).

Addendum to Staff Report dated November 15, 1996
Policy for Addressing Levels of Chloride in Discharges of Wastewaters

Chloride Objectives for Irrigation

In preparing the Staff Report dated November 15, 1996, Regional Board staff considered impacts of increased chloride levels on beneficial uses including drinking water and freshwater aquatic life. Objectives for the protection of these beneficial uses are as follows:

> *Drinking water:* 250 mg/L (secondary maximum contaminant level).
> *Freshwater aquatic life:* 230 mg/L.

During the public review for the proposed *Policy for Addressing Levels of Chloride in Discharges of Wastewaters (Chloride Policy)*, representatives of the agricultural industry expressed concerns about the potential for impacts of less stringent chloride objectives on agricultural resources in the Santa Clara River and Calleguas Creek watersheds. Along with sodium, chloride is one of the more troublesome ions in irrigation water. However, chloride standards vary, depending upon crop sensitivity, soil and drainage characteristics, and precipitation. In Ventura County, many growers have experienced difficulty in growing crops such as avocadoes when chloride levels exceed 120 mg/L. Some growers believe that irrigation problems may start when chloride levels are as low as 100 mg/L. Other growers, who may have less salt-sensitive crops, may not share these concerns.

Given the concerns over potential impacts to the agricultural industry and the need to better quantify appropriate objectives for irrigation in areas of Ventura County, Regional Board staff believe that revisions to chloride objectives in Santa Clara River and Calleguas Creek watersheds should be delayed until the issue has been further studied. Toward this end, staff has worked with United Water Conservation District, the Fox Canyon Groundwater Management Agency, the County of Ventura, and others to modify the proposed Chloride Policy (draft of November 15, 1996). As modified (draft of January 14, 1997), chloride objectives in the Santa Clara River and Calleguas Creek watersheds will not be relaxed. Existing dischargers will, however, be eligible for interim limits of up to 190 mg/L (compared to interim limits of 250 mg/L that are set to expire in February 1997). Furthermore, concerned parties have agreed to work together to address chloride loading issues, including loading from agricultural activities. A preliminary schedule and set of major tasks is outlined on page 3 and also included in the proposed changes to the *Basin Plan.*

Future Revisions of Chloride Objectives

Contingent upon the results of chloride loading analyses in the Santa Clara River and Calleguas Creek watersheds, the Regional Board will consider revisions to objectives before the NPDES permits are renewed in each watershed. As currently scheduled, NPDES permits will be renewed in the Santa Clara River watershed in 2001 and in the Calleguas Creek watershed in 2003. Future revisions of chloride objectives also will consider chloride levels in

supply waters (including fluctuations that may be due to future drought conditions), reasonable loading factors during beneficial use and treatment of supply waters and wastewaters, methods to control chloride loading, and the associated costs and effectiveness of the various loading control methods.

Variance from Limits Based on Existing Chloride Objectives

During the period for the chloride loading analyses, and prior to NPDES permit renewals in the Santa Clara and Calleguas Creek watersheds, the Regional Board will grant existing dischargers variances (interim relief) from chloride limits based upon existing water quality objectives, as specified below.

Waterbody Segments for which Existing Dischargers Are Subject to Interim Chloride Limits	Interim Chloride Limit*
Santa Clara River--between Bouquet Canyon Road Bridge and West Pier Highway 99	190 mg/L
Santa Clara River--between West Pier Highway 99 and Blue Cut gaging station	190 mg/L
Santa Clara River--between Blue Cut gaging station and A Street (Fillmore)	190 mg/L
Arroyo Simi and tributaries--upstream Madera Road	160 mg/L
Arroyo Simi--downstream Madera Road, Arroyo Las Posas, and tributaries	190 mg/L
Calleguas Creek and tributaries--between Potrero Road and Arroyo Las Posas (including Conejo Creek, Arroyo Conejo, and Arroyo Santa Rosa)	190 mg/L

*Interim limits are based upon the water supply baseline plus a loading factor, as discussed in the Staff Report (November 15, 1996).

Regional Board staff believe that the interim relief is consistent with the intent of US EPA policy on variances for the following reasons:

a. Human-caused conditions, or sources of pollution, currently prevent the attainment of the existing objectives.

b. The relief does not forego an existing designated beneficial use (i.e. irrigation).

c. The period of relief will allow time for concerned parties to work together to quantify appropriate chloride objectives for irrigation.

d. In order to achieve appropriate objectives for chloride, the period of relief will allow time for concerned parties to work together to identify methods and strategies to control chloride loading, and evaluate the cost-effectiveness of the various methods.

Staff Report: Revised Policy for Addressing Levels of Chloride in Discharges of Wastewaters

Introduction

The Regional Board conducted a triennial review of priority basin planning issues during 1995. As a result of this review, which included comments from the public, the Regional Board adopted Resolution No. 95-003. This resolution designates five high-priority Basin Planning issues to be addressed during the next triennial (1995 to 1998) period. One of the high priorities designated in Resolution No. 95-003 is to develop a long-term policy that will address the compliance problems with chloride effluent limits in Waste Discharge Requirements prescribed by the Regional Board. These effluent limits are based upon water quality objectives for chloride, set forth in the *Water Quality Control Plan, Los Angeles Region (Basin Plan).*

This staff report summarizes the complexity of chloride concentrations in the Los Angeles Region, discusses the Board's current short-term policy and the need for a long-term policy, and proposes a structure for such a long-term policy.

Background

The Regional Board set water quality objectives for chloride in most of the Region's waterbodies in the *Basin Plan* that was adopted in March 1975. In accordance with State Board Resolution 68-16: "Statement of Policy with Respect to Maintaining High Quality of Waters in California" (referred to as the Antidegradation Policy), background concentrations of chloride were used to set objectives in waterbodies in the Los Angeles Region. At the time the Regional Board set these chloride objectives, staff assumed that chloride concentrations in supply waters imported into the Region[1] always would be relatively low.

Since 1975, chloride levels in supply waters imported into the Region have fluctuated, with a net increase over time (see Figure 1). Since the late 1980s, many publicly-owned treatment works (POTWs) in the Los Angeles Region have been unable to meet water quality limits that are based upon existing water quality objectives for chloride. However, data indicate that the water quality objectives set according to the Antidegradation Policy were correct; i.e., that the objectives match background concentrations of chloride in our local waterbodies.

Regional Board Resolution No. 90-004 (Drought Policy)

The most apparent reasons for chloride compliance problems in the late 1980s were drought conditions, which prevailed in many of the watersheds that are sources of supply waters imported into the Region. In response to these drought conditions, the Regional Board adopted Resolution No. 90-004: "Effects of Drought Induced Water Supply Changes and

[1]Water has been imported into the Los Angeles Region since 1913, when the City of Los Angeles--Department of Water and Power started delivering water from the Owens Valley. Since that time, water suppliers have developed complex systems of aqueducts that import water into southern California.

Water Conservation Measures on Compliance with Waste Discharge Requirements within the Los Angeles Region" (referred to as the Drought Policy) in 1990. This policy, which had a term of three years, provided temporarily relief to dischargers by raising chloride limits in Waste Discharge Requirements to the lesser of: (i) 250 mg/L, or (ii) the chloride concentration in water supply plus 85 mg/L. These temporarily limits were applied to dischargers whose water supply had high concentrations of chlorides due **solely** to the increased mineralization of supply waters imported into the Region.

In exchange for temporary relief from chloride limits based upon water quality objectives, the Drought Policy specified that dischargers must demonstrate that high chloride concentrations in wastewaters are due to increased mineralization of imported waters or water conservation efforts. Furthermore, the Drought Policy specified that each discharger seeking relief under the Drought Policy must: (i) identify major sources of chloride, (ii) determine the average chloride contribution of each major source, (iii) determine the best available options for reducing chloride levels in the discharge, and (iv) identify any negative effects on the potential for water reclamation that would result from failure to control chloride levels in the discharge. Since 1990, several dischargers have provided data that confirm that supply waters imported into the Region are indeed responsible for chloride compliance problems in discharges of wastewaters. However, many other dischargers have not yet adequately assessed the source of relatively high levels of chloride in wastewaters and the extent to which exceedances are due to factors such as significant chloride loading during beneficial use and treatment of supply waters and wastewaters.

The drought ended before the Drought Policy was due to expire in 1993. However, because water supply reservoirs still had high chloride concentrations in 1993 and because water suppliers estimated that it would take 12 to 18 months for complete replenishment of imported waters in reservoirs, the Regional Board renewed the policy in June 1993 and again in February 1995. The Drought Policy currently is due to expire on the earlier of February 27, 1997 or at that point in time when it has been determined that chloride concentrations in water supplies imported into the Region have returned to pre-drought conditions. As chloride concentrations in most supply waters imported into the Region have not returned to pre-drought conditions (and as future droughts are anticipated), the Regional Board directed staff to prepare a long-term solution to chloride compliance problems.

Sources of Chloride

At this time, Regional Board staff does not have the data to accurately quantify the relative amounts of chloride or salinity from all sources. Staff has concluded, however, that--regardless of varying definitions of drought and the resulting effects on local and imported water supplies--chloride concentrations in supply waters imported to our Region have increased since the 1970s. This conclusion is based upon information on chloride concentrations from agencies that import and wholesale water, purveyors, watermasters, and groundwater management agencies. Additionally, staff have analyzed data in quarterly reports submitted by POTWs covered under the short-term Drought Policy.

Potential sources of increased levels of chloride in discharges of wastewaters are summarized below.

a) *Levels of Chloride in Supply Waters:* To a significant degree, salt levels in wastewaters reflect levels in supply waters. Changes in salt levels in supply waters are the result of several factors, including climatic fluctuations and shifting water supply management strategies, as noted below.

   - *Climatic fluctuations:* As runoff to surface waterbodies and infiltration to ground waters are below normal during drought periods, salt concentrations–including dissolved ions of chloride–increase.

   - *Shifting water supply management strategies:* Adjustments to the distribution of water supplies to meet supply and demand can change levels of chloride in supply waters. For example, changes in blending ratios of various imported waters can affect levels of chloride. As another example, changes in turnover rates of water in reservoirs can affect levels of chloride.

   - *Salt loading trends in supply waters imported into the Region:* Increasing demand for and utilization of water resources in watersheds that are sources of imported waters can increase levels of chloride.

b) *Salt Loading:* Salt loading occurs during beneficial use of domestic, municipal, industrial, and agricultural waters, and during disinfection of supply waters and wastewaters, as summarized below.

   - *Beneficial use:* Domestic, commercial, and industrial consumers typically add salts to the water they use. On a cumulative basis, domestic water consumers who soften their water are probably responsible for significant chloride loading. Industries such as food processing also may be responsible for significant chloride loading. In the agricultural industry, evapotranspiration tends to increase salinity levels in return flows to surface waters and irrigation flows that penetrate below root zones.

   - *Disinfection:* The use of chlorine to disinfect potable water accounts for a portion of salt loading. Chlorine disinfection of wastewaters, prior to discharge to waters of the state, also adds to salt loading.

c) *Water Conservation and Reclamation:* On a cumulative basis, water conservation and wastewater reuse/reclamation can significantly decrease rates of water consumption. These water savings are accomplished through conservation measures such as installation of low-flow toilets and shower heads, and reclamation projects such as the reuse of treated wastewaters in cooling towers. These lower rates of water consumption (and hence lower rates of inflow to wastewater treatment plants) result in increased concentrations of wastes, including salts.

Proposed Basin Plan Amendment

In order to develop a long-term solution to chloride compliance problems, Regional Board staff worked with a group of technical advisors representing a variety of interests, including: water supply, reclamation, and wastewater management; environmental protection; and water softener industry interests. As a result of this effort, staff recommends that the Regional Board amend the *Basin Plan* by adopting the a resolution: "Revised Policy for Addressing Levels of Chloride in Discharges of Wastewaters." The new policy set forth in this proposed resolution will relax water quality objectives for chloride in certain surface waters and will specify salinity loading measures in order to better assess salinity loading sources and trends.

The proposed amendment to the *Basin Plan* will not change water quality objectives for chloride in the headwaters of the Region's major stream systems. Furthermore, due to concerns over degradation of ground waters stored in the Region's basins, water quality objectives for chloride in ground waters have not been changed. In accordance with the State Board's *Antidegradation Policy*, water quality objectives currently in effect will continue to protect the naturally-high quality of such surface and ground waters.

New Water Quality Objectives: Table 1 lists those waterbodies (or portions thereof) for which chloride objectives would be reset under this proposed policy. In general, new water quality objectives were set at the lower of:

(a) the chloride objective necessary to protect freshwater aquatic life (230 mg/L), or

(b) baseline levels of chloride in supply (imported) waters plus a loading factor of 85 mg/L.

The chloride objective of 230 mg/L is based on the level considered adequate for the protection of freshwater aquatic life (*Ambient Water Quality Criteria for Chloride*, EPA 1988). To determine baseline levels of chloride in supply waters, staff used information provided by agencies that import water (see Appendix). To determine the level of chloride loading that occurs during beneficial use and treatment of supply waters and wastewaters, staff used data from POTWs' self-monitoring reports and other information submitted by dischargers. Based upon these data, staff recommends use of a chloride loading factor of 85 mg/L.

Regional Board staff believe that the new chloride objectives, developed in the manner descibed above, is a long-term solution to compliance problems due to relatively high levels of chloride in imported waters. In the unlikely event that discharges from a POTW exceed chloride limits due to fluctuations of chloride concentrations in supply waters imported into the Region, such exceedances are expected to be very infrequent and short-term only, and not a cause for serious enforcement concerns or actions by regulators.

Salinity Loading Measures: The group of technical advisors and Regional Board staff also considered a variety of options for long-term tracking and control of chloride and salinity loading. These options include:

(a) monitoring of salinity levels, designed to track and quantify significant sources of salinity,

(b) educational campaigns on water hardness issues, water softeners, and water quality problems associated with water softening processes,

(c) shifts to less chlorine-intensive processes to achieve treatment and disinfection of supply waters and wastewaters, to the extent that such shifts are cost-effective and consistent with water quality and reclamation objectives,

(d) regulation of chloride in pre-treatment programs for industrial and commercial dischargers to POTWs,

(e) chloride loading fees, and

(f) bans on residential water softeners.

As significant sources of salinity loading are not clearly quantified at this time, Regional Board staff and the group of technical advisors concurred with a need to primarily focus on improved monitoring programs and assessment of significant sources of chloride and other indicators of salinity levels. In addition, staff and the group recognize the need for consumer education on water hardness. Finally, staff and the group recognize that conventional chlorine water and wastewater disinfection processes contribute to chloride loading; however, other sources of chloride loading may be more significant. Toward this end, the following measures have been included into the proposed *Basin Plan* amendment:

(a) POTWs, with support from water suppliers, shall monitor and assess salinity concentrations derived from: (i) source waters, (ii) loading that occurs during beneficial use of supply waters, and (iii) loading that occurs during treatment and disinfection of supply waters and wastewaters. Those POTWs that are not already monitoring and assessing chloride loading from industrial sources shall expand their pre-treatment programs to include such assessments. Monitoring data and assessments shall be reported to the Regional Board on an annual basis.

(b) Water suppliers, POTWs, and representatives of the water softener industry should undertake educational campaigns, targeting residential, commercial, and industrial water consumers on issues relating to water hardness, water softeners, and water quality problems associated with water softening processes.

(c) Water suppliers and POTWs should shift to less chlorine-intensive processes to achieve treatment and disinfection of supply waters and wastewaters, to the extent that such shifts are cost-effective and consistent with water quality and reclamation objectives.

Other Alternatives Considered

Regional Board staff considered several other alternatives to address chloride compliance problems. Those alternatives considered but not recommended by staff include:

- Continuation of the Current Drought Policy: The current Drought Policy sets chloride limits based upon chloride levels in imported waters during drought periods. However, definitions of drought periods vary. Furthermore, not all watersheds from which imported supplies are obtained experience drought conditions at the same time. Also, the Drought Policy was intended as a short-term relief measure, and will expire in February 1997. Finally, the Drought Policy requires extensive reporting on the part of dischargers, and compliance tracking on the part of Regional Board staff.

- Development of Total Maximum Daily Loads: Total Maximum Daily Loads (TMDLs) establish allowable waste loads that can be discharged to a waterbody without impairment to a beneficial use. However, determination of TMDLs for the quantity of chloride that can be discharged to each waterbody is not a practical solution, given limited staff resources and budgets. Also, development of waste load allocations would not address problems during periods of drought.

- Development of Use Attainability Analyses and Site Specific Objectives: Use Attainability Analyses (UAAs) are undertaken to assess the physical, chemical, biological, and economic factors that affect beneficial uses of a waterbody. Based upon the results of UAAs, Site Specific Objectives (SSOs) can be set at levels that will protect attainable uses. As with TMDLs, development of UAAs and SSOs for all waterbodies under consideration is not a practical solution, given limited staff resources and budgets. Finally, and as above, development of UAAs and SSOs would not address problems during periods of drought.

- Advanced Treatment: Reverse osmosis and other advanced treatment technologies are capable of removing chloride and other pollutants in imported supply waters and wastewaters that are discharged into waters of the state. However, from a practical perspective, such technologies are not economical to implement on a wide-spread basis at this time. Furthermore, implementation of advanced technologies will raise other problems, such as disposal of brines and backwash waters.

- Chloride Loading Controls: Chloride loading controls, such as salinity loading fees and/or bans on water softeners, could help balance salt inflows and outflows in the Region. However, until more definitive data are developed on sources of chloride loading, Regional Board staff do not believe that stringent chloride loading controls are justified at this time.

Conclusion and Recommendation

The federal Antidegradation Policy (40 CFR Section 131.12) requires that--for those waters of a quality that exceeds levels necessary to protect fish, wildlife, and recreation--higher levels of quality shall be maintained and protected unless degradation is necessary to accommodate important economic or social development. Protection of the environment may constitute important economic development.

Revision of water quality objectives for chloride, as set forth in the proposed amendment to the *Basin Plan*, will lower water quality in certain surface waters. However, alternatives to reduce chloride concentrations to meet existing water quality objectives do not appear practicable at this time. For example, until more definitive data are developed on sources of chloride loading, Regional Board staff believe that stringent chloride loading controls are not justified at this time. Other alternatives to reduce concentrations of chloride may not result in net environmental benefits. For example, advanced treatment of supply waters imported into the Los Angeles Region or advanced treatment of discharges of wastewater could result in significant economic costs with little benefit to the environment, as well as a significant increase in use of energy resources and a need to dispose of brine and other waste products. As another example, assuming that additional supplies of high quality waters could be imported from other sources (such as the Owens Valley), increasing the proportion of supply water from such areas would have further adverse environmental impacts on other beneficial uses and would necessitate construction of additional water supply systems.

In conclusion, the proposed amendment to the *Basin Plan* is justified because: (i) the new water quality objectives for chloride will still continue to be fully protective of all beneficial uses, including drinking water, fish, wildlife, and recreation; (ii) the environmental consequences of alternative actions could be more severe; and (iii) major capital expenditures for advanced treatment technology are not needed to protect beneficial uses. Accordingly, Regional Board staff recommend public support and Regional Board adoption of the proposed amendment to the *Basin Plan*.

Pending public review and Regional Board adoption, this proposed amendment to the *Basin Plan* will be subject to approval by the State Board, State Office of Administrative Law, and the US EPA.

Waterbody	Background Level	Supply Water Baseline	Loading Factor	**New Objective**	*Existing Objective*
Santa Clara River--between Bouquet Canyon Road Bridge and West Pier Highway 99	105 mg/L	105 mg/L	85 mg/L	**190 mg/L**	*100 mg/L*
Santa Clara River--between West Pier Highway 99 and Blue Cut gaging station	105 mg/L	105 mg/L	85 mg/L	**190 mg/L**	*100 mg/L*
Santa Clara River--between Blue Cut gaging station and A Street (Fillmore)	91 mg/L	105 mg/L	85 mg/L	**190 mg/L**	*100 mg/L*
Arroyo Simi and tributaries--upstream of Madera Road	159 mg/L	--	--	**160 mg/L**	*150 mg/L*
Arroyo Simi--downstream Madera Road, Arroyo Las Posas, and tributaries	166 mg/L	105 mg/L	85 mg/L	**190 mg/L**	*150 mg/L*
Calleguas Creek and tributaries--between Potrero Road and Arroyo Las Posas (including Conejo Creek, Arroyo Conejo, and Arroyo Santa Rosa)	188 mg/L	105 mg/L	85 mg/L	**190 mg/L**	*150 mg/L*
Los Angeles River and tributaries--upstream Sepulveda Flood Control Basin	128 mg/L	--	--	**150 mg/L**	*150 mg/L*
Los Angeles River--between Sepulveda Flood Control Basin and Figueroa Street (including Burbank Western Channel only)	128 mg/L	105 mg/L	85 mg/L	**190 mg/L**	*150 mg/L*
Other tributaries to Los Angeles River--between Sepulveda Flood Control Basin and Figueroa Street	108 mg/L	--	--	**150 mg/L**	*150 mg/L*
Los Angeles River--between Figueroa Street and estuary (including Rio Hondo below Santa Ana Freeway only)	140 mg/L	105 mg/L	85 mg/L	**190 mg/L**	*150 mg/L*
Other tributaries to Los Angeles River--between Figueroa Street and estuary (including Arroyo Seco downstream spreading grounds)	90 mg/L	--	--	**150 mg/L**	*150 mg/L*
Rio Hondo--between Whittier Narrows Flood Control Basin and Santa Ana Frwy	78 mg/L	95 mg/L	85 mg/L	**180 mg/L**	*150 mg/L*
Rio Hondo--upstream Whittier Narrows Flood Control Basin	84 mg/L	--	--	**150 mg/L**	*150 mg/L*
San Gabriel River and tributaries--between Ramona Blvd and Valley Blvd	95 mg/L	--	--	**150 mg/L**	*150 mg/L*
San Gabriel River--between Valley Blvd. and Firestone Blvd. (including Whittier Narrows Flood Control Basin, and San Jose Creek downstream 71 Frwy only)	102 mg/L	95 mg/L	85 mg/L	**180 mg/L**	*150 mg/L*
San Jose Creek and tributaries--upstream 71 Frwy	--	--	--	**150 mg/L**	*150 mg/L*

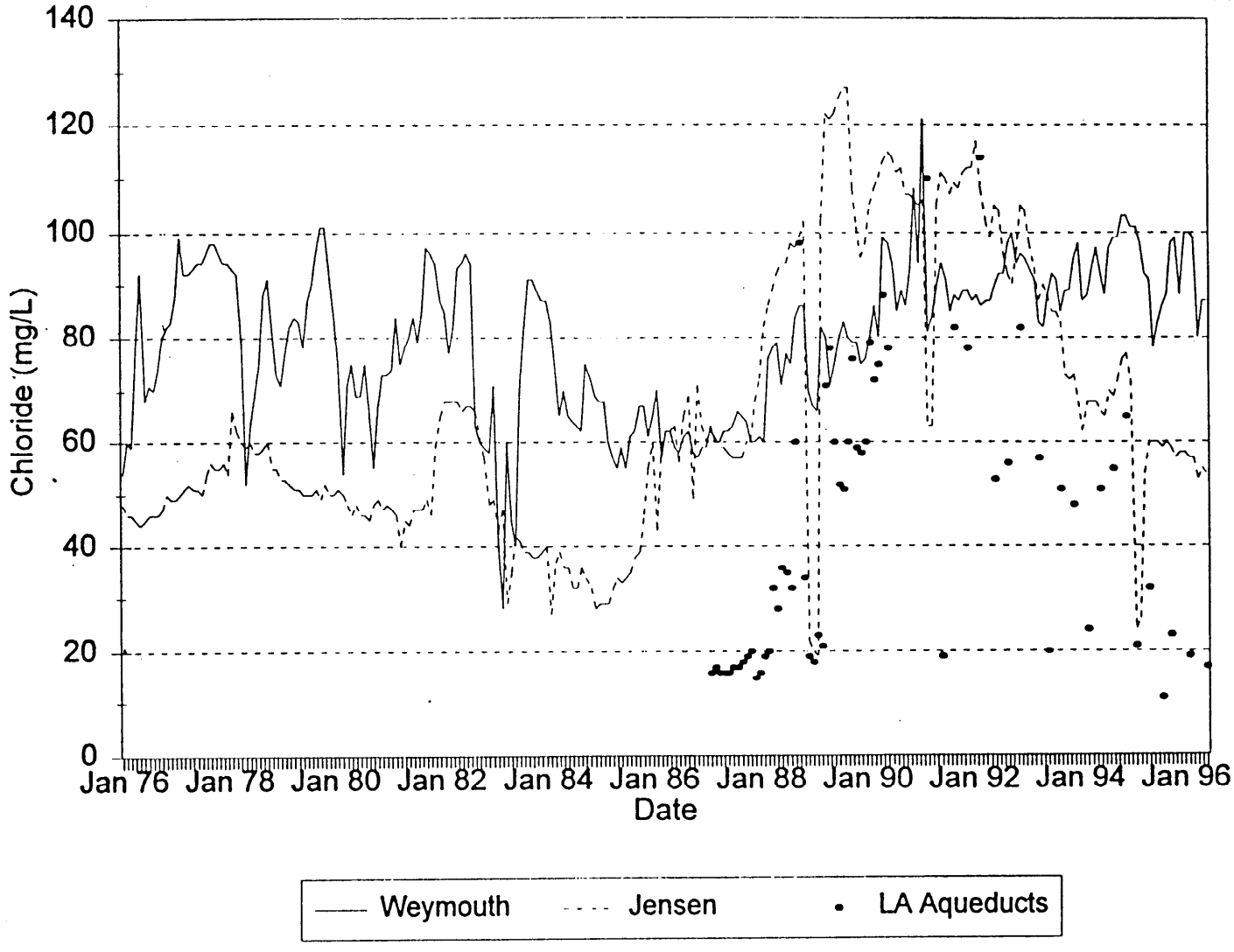

Figure 1. Chloride Concentration
Water Supply - Treatment Plants
(January 1976 - June 1996)

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Revised Policy for Addressing
Levels of Chloride in Discharges of Wastewaters

Appendix

New objectives were considered for those surface waters where dischargers are experiencing compliance problems that are primarily due to relatively high chloride concentrations in imported waters. As summarized in the Staff Report, these new objectives have been set at baseline chloride concentrations in supply waters plus a loading factor of 85 mg/L. This appendix contains a detailed description of how staff determined baseline chloride concentrations and the loading factor. Most of the information in this appendix was obtained from dischargers, Metropolitan Water District of Southern California (MWD), and City of Los Angeles Department of Water and Power.

Baseline Chloride Concentrations

(A) Imported Water Data

There are three major aqueducts that bring water to Southern California: Los Angeles Aqueduct System, Colorado River Aqueduct, and Governor Edmund G. Brown California Aqueduct (State Water Project). The Los Angeles Aqueduct System water is filtered by the Los Angeles Aqueduct Filtration Plant (LA Aqueduct). The State Water Project, branches into two sections once it reaches Southern California: (i) West Branch -- that conveys water into Castaic Lake and the Joseph Jensen Filtration Plant (Jensen); and (ii) East Branch -- that provides water to the F.E. Weymouth Filtration (Weymouth) Plant and filtration plants and reservoirs outside the Los Angeles Region. The Weymouth Filtration plant also receives water from the Colorado River Aqueduct.

Table A-1 is a statistical summary of the chloride concentrations in the water served by the three filtration plants (Jensen, Weymouth, and LA Aqueduct), as well as the water in Castaic Lake.

Joseph Jensen Filtration Plant
The Joseph Jensen Filtration Plant (Jensen) is located in Granada Hills and operated by MWD. In 1994, the source of all of the water treated at Jensen was the Bay-Delta Estuary (imported through the State Water Project). In 1995, 82% of the water treated at Jensen was from the Bay-Delta Estuary; the other 18% was from the Owens Valley (imported through the Los Angeles Aqueduct System).

In order to reflect supply water conditions and predict the most probable concentration during a drought, staff recommends that 105 mg/L be used as a water supply baseline. According to MWD records, treated water from Jensen had an average chloride concentration of 63 mg/L from January 1976 through June 1996. However, these data do not follow a normal distribution; rather, the monthly frequency distribution has two peaks, at 45 mg/L and 105

mg/L (Figure A-1). Staff believe that the second peak, of 105 mg/L, is characteristic of 'drought' conditions.

Furthermore, as some dischargers expect that post-drought concentrations of chloride will never return to pre-drought concentrations, staff analyzed data for 1993 through 1996. The average chloride concentration during this period is 62 mg/L, with a maximum of 93 mg/L. Accordingly, staff concludes that a baseline of 105 mg/L is adequate to accommodate fluctuations in supply conditions.

Table A-1. Statistical analysis of imported water.

chloride (mg/L)	Weymouth	Jensen	LA Aqueduct	Castaic Lake
	1976 - 1996	1976 - 1996	1987-1996	1990-1996
Mean	79	63	44	84
Median	80	57	35	85
Mode	87	46	16	56
Standard Deviation	14.9	25.3	27	22
Minimum	28	19	11	51
Maximum	121	127	114	117
	1993 - 1996	1993 - 1996	1993 - 1996	1993 - 1996
Mean	93	62	35	67
Median	92	60	28	66
Mode	88	60	51	56
Standard Deviation	7	13.5	18	13
Minimum	78	24	11	51
Maximum	103	93	65	103

F. E. Weymouth Filtration Plant

The F.E. Weymouth Filtration Plant (Weymouth) is located in La Verne, and operated by MWD. The water treated at Weymouth is a blend of water from the State Water Project East Branch and Colorado River Aqueduct. According to MWD records, chloride concentrations in water supplied by Weymouth had a mean of 79 mg/L for the years 1976 through 1996, and a mean of 93 mg/L for the years 1993 to 1996 (post-drought conditions). Staff also analyzed a frequency distribution of the chloride concentrations from 1976 to 1996. The data follows a step distribution, with a probability of 96% that the chloride concentrations will be between 55 mg/L and 95 mg/L (Figure A-2). Based on this analysis, staff recommends 95 mg/L as a water supply baseline for this plant.

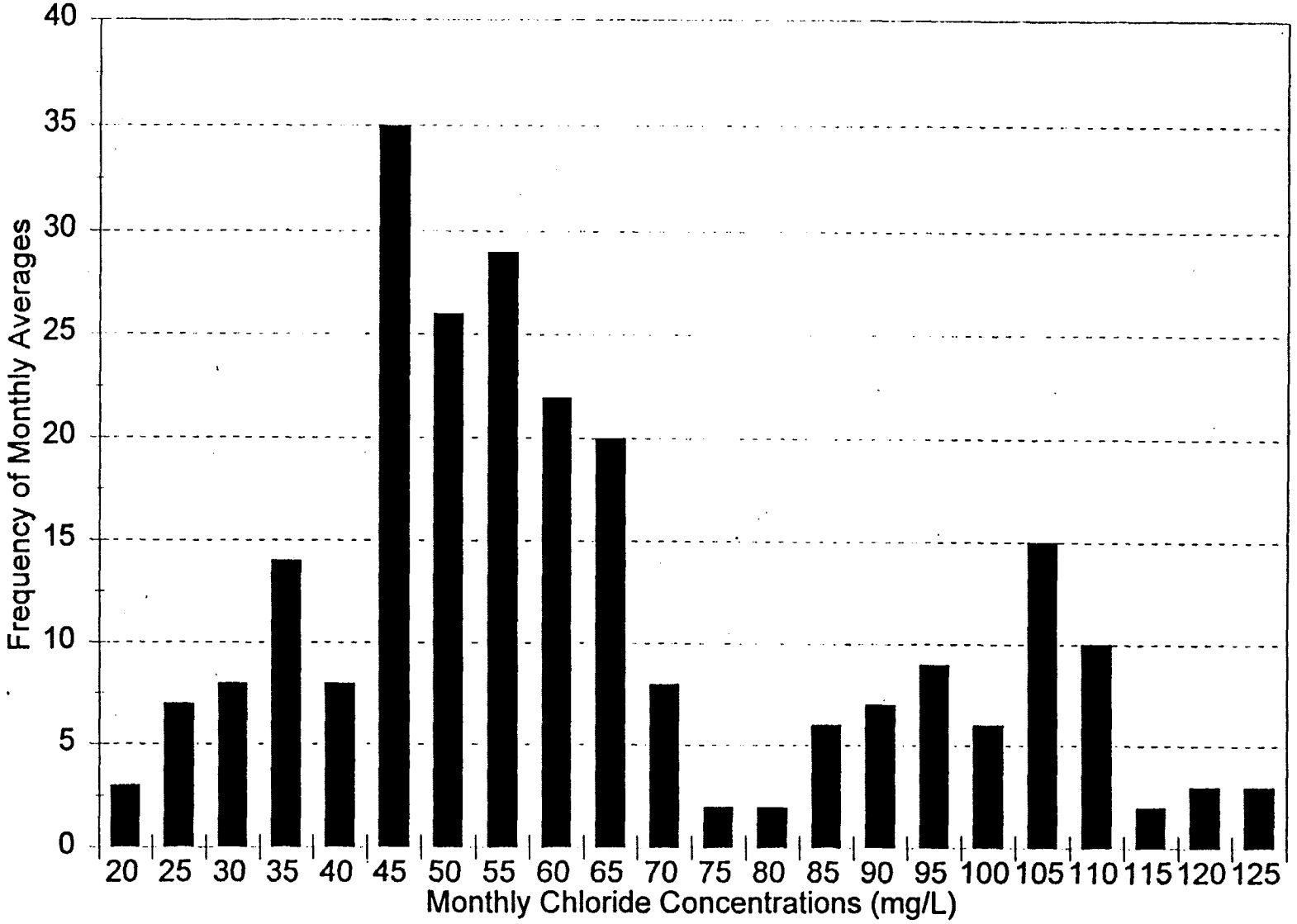

Figure A-1

Joseph Jensen Filtration Plant

(January 1976 - June 1996)

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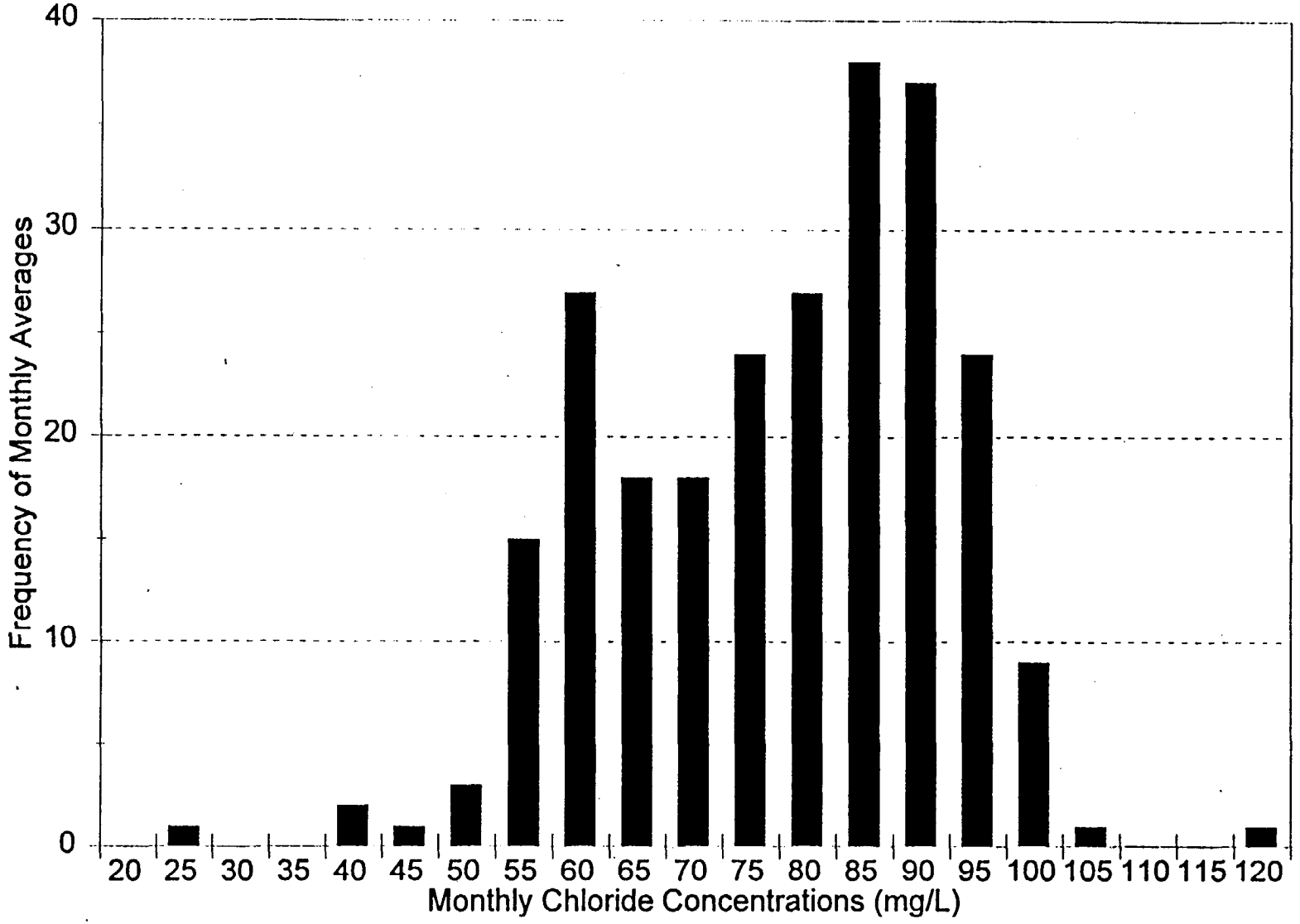

Figure A-2

F. E. Weymouth Filtration Plant

(January 1976 - June 1996)

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Los Angeles Aqueduct Filtration Plant
In 1987 the City of Los Angeles Department of Water and Power (DWP) started operation of the Los Angeles Aqueduct Filtration Plant to treat the water imported through the Los Angeles Aqueduct System. After treatment, the water is mixed in the distribution system with water from the Jensen Filtration Plant. However, under special circumstances, MWD and DWP exchange water before filtration. The chloride concentrations in water served by the Los Angeles Aqueduct Filtration Plant are lower than the chloride concentrations in the water served by Jensen.

Castaic Lake
Water from the West Branch of the State Project is stored at Castaic Lake. Data provided by the dischargers cover only the period from January 1990 to June 1996. The data are very similar to the chlorides concentrations observed at Jensen Filtration Plant. Since the imported water also comes from the State Water Project, staff recommends the use of 105 mg/L as a baseline for Castaic Lake water.

(B) Distribution of the Imported Water Supply in the Watersheds

Calleguas Creek Watershed

For purposes of establishing water quality objectives, surface flows in the Calleguas Creek watershed are categorized in the current Basin Plan (1994) into two reaches: (i) Calleguas Creek and tributaries--below Potrero Road, and (ii) Calleguas Creek and tributaries--above Potrero Road (and extending to the headwaters of the watershed). The Regional Board never set a chloride objective for the lower reach (below Potrero Road), due to tidal influence near the mouth of this watershed. For the upper reach (above Potrero Road), the Regional Board established an objective of 150 mg/L.

High levels of growth and development have necessitated increased supplies of imported water over the past decade. This imported water is delivered by the Calleguas Municipal Water District (Calleguas MWD) to purveyors who serve the communities of Camarillo, Thousand Oaks, Moorpark, and Simi Valley. The source of about 95% of the water delivered by Calleguas MWD is the Joseph Jensen Filtration Plant.[1]

Following beneficial uses of the imported water, wastewaters from municipal and industrial consumers are collected in sanitary sewer systems that flow to the following wastewater treatment plants: Camarillo Water Reclamation Plant; Moorpark Wastewater Treatment Plant, Hill Canyon Wastewater Treatment Plant (Thousand Oaks); Olsen Road Water Reclamation Plant (Thousand Oaks); and Simi Valley Water Quality Control Facility.[2] Discharges of wastewaters from these plants are subject to effluent limits for chloride of 150

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[1]Filtration and disinfection facilities are also present at Lake Bard, which can store up to 10,500 acre-feet of the water imported into the watershed.

[2]A sixth plant, the Nyeland Acres Wastewater Treatment Plant (operated by the Ventura Regional Sanitation District), discharges treated wastewater to Revolon Slough. As Revolon Slough is a tributary to the Calleguas Creek reach below Potrero Road, the discharge is not subject to chloride limits.

mg/L, which are based upon the chloride objective of 150 mg/L for surface waters in the upper reach (Calleguas Creek and tributaries--above Potrero Road).

For purposes of this analysis, staff assumed that the total supply source of water flowing to the five wastewater treatment plants in the watershed is Jensen. Therefore, a baseline of 105 mg/L should be adequate for this watershed.

Using 105 mg/L as a baseline, staff recommends that new reaches and water quality objectives for chloride be established, as follows:

Waterbody	Background Level	Supply Water Baseline	Loading Factor	New Objective
Arroyo Simi and tributaries--upstream Madera Road	159 mg/L	--	--	**160 mg/L**
Arroyo Simi--downstream Madera Road, Arroyo Las Posas, and tributaries	166 mg/L	105 mg/L	85 mg/L	**190 mg/L**
Calleguas Creek and tributaries--between Potrero Road and Arroyo Las Posas (including Conejo Creek, Arroyo Conejo, and Arroyo Santa Rosa)	188 mg/L	105 mg/L	85 mg/L	**190 mg/L**

The chloride objective for the new Arroyo Simi and tributaries--upstream Madera Road reach will be set at background, since this reach is above discharges from any POTW. The other new reaches (Arroyo Simi--downstream Madera Road, Arroyo Las Posas, and tributaries; and Calleguas Creek--between Potrero Road and Arroyo Las Posas) will be set at the supply water baseline plus the loading factor.

Los Angeles River Watershed

Staff propose to divided the upper reach of the Los Angeles River--above Figueroa Street into two new reaches: (i) Los Angeles River--above Sepulveda Flood Control Basin, and (ii) Los Angeles River--between Sepulveda Flood Control Basin and Figueroa Street. In this way, the streams in the headwaters of the watershed will be protected with the existing objective, while a new objective for the reach between Sepulveda Flood Control Basin and Figueroa Street will accommodate discharges from the following wastewater treatment plants: Donald C. Tillman and Los Angeles-Glendale Water Reclamation Plant (City of Los Angeles); and City of Burbank Water Reclamation Plant.

Data reported by the City of Los Angeles projects water supply concentrations of 40 mg/L for Tillman, and 85 mg/L for Glendale. The City of Burbank has reported concentrations for chloride at the 80th percentile of 97 mg/L for the years 1986 to 1992. Information provided by the City of Los Angeles and MWD indicates that the sources of water to the service area of the three wastewater treatment plants include the Jensen, Weymouth, and Los Angeles

Aqueduct filtration plants. As discussed on pages A-1 and A-2, staff recommends a baseline concentration is 105 mg/L for water from Jensen. This baseline is also sufficient to accommodate water supplies from Weymouth and Los Angeles Aqueduct.

The lower Los Angeles River reach, between Figueroa Street and the estuary (including Rio Hondo below Santa Ana Freeway), does not receive direct discharge from any wastewater treatment plant. However it is impacted by the upstream reach, namely the Los Angeles River--between Sepulveda Basin and Figueroa Street, and discharges into Rio Hondo--above Santa Ana Freeway. Accordingly, the recommended baseline of 105 mg/L for this reach is based on the upstream reach (Los Angeles River--between Sepulveda Basin and Figueroa Street).

Rio Hondo Sub-watershed

Staff propose to divide the Rio Hondo--above Santa Ana Freeway reach into two reaches: Rio Hondo--between Whittier Narrows Flood Control Basin and Santa Ana Freeway (including the Flood Control Basin), and Rio Hondo--above Whittier Narrows Flood Control Basin. These reaches will reflect the water quality differences at Rio Hondo downstream and upstream of the Whittier Narrows Flood Control Basin.

The Rio Hondo--above Whittier Narrows Flood Control Basin objective will not change, and will remain at 150 mg/L.

The Rio Hondo reach between Whittier Narrows Flood Control Basin and Santa Ana Freeway receives discharges from Whittier Narrows Water Reclamation Plant, operated by the County Sanitation Districts of Los Angeles County (County Sanitation Districts). According to information provided by the County Sanitation Districts and MWD, the area receives its water from Weymouth. Staff therefore recommends a baseline of 95 mg/L for this reach.

San Gabriel River Watershed

Staff proposes to divide the existing San Gabriel River reach between Ramona Blvd. and Firestone Blvd., in order to protect the higher water quality in the San Gabriel River--between Valley Blvd. and Ramona Blvd. The chloride objective for the new San Gabriel River reach between Valley Blvd. and Ramona Blvd. will remain at 150 mg/L.

The new San Gabriel River reach between Firestone Blvd. and Valley Blvd. receives discharges from two wastewater treatment plants: San Jose Creek East and West Water Reclamation Plants, and the Pomona Water Reclamation Plant, all of which are operated by the County Sanitation Districts. According to the information provided by the County Sanitation Districts and MWD, the area receives supply water from Weymouth. Therefore, staff recommends a chloride baseline of 95 mg/L for this reach.

Santa Clara River Watershed

The Santa Clara River reach between Bouquet Canyon Road Bridge and West Pier Highway 99 receives discharge from the Saugus Water Reclamation Plant, operated by the County Sanitation Districts. According to information provided by the County Sanitation Districts, the area receives supply water from Castaic Lake Water Agency. The recommended baseline for this reach is 105 mg/L.

The Santa Clara River reach between West Pier Highway 99 and the Blue Cut gaging station receives discharge from the Valencia Water Reclamation Plant, operated by the County Sanitation Districts. According to information provided by the County Sanitation Districts, the area also receives supply water from Castaic Lake Water Agency. Therefore, the recommended baseline for this reach is 105 mg/L.

The Santa Clara River reach between the Blue Cut gaging station and A Street (Fillmore) does not receive direct discharges of wastewaters. However, since this reach is impacted by upstream reaches, staff recommends a baseline of 105 mg/L for this reach. Staff notes that objectives were not changed for reaches downstream of A Street (Fillmore). This is due to mixing with baseflows in the Santa Clara River and tributaries. In particular, the flows from the Sespe sub-watershed provide a sulfate-based water for dilution of the upstream flows.

Loading Factor

In 1990, Regional Board staff estimated 85 mg/L as a loading factor. After more than 6 years of monitoring, staff confirmed that 85 mg/L is an appropriate loading factor.

The loading factor was calculated based on information provided by the dischargers covered under Resolution No. 90-004. The loading factor was defined as:

Loading factor = effluent - imported water

For each wastewater treatment plant, the data used to determine baseline were also used to determine the loading factor. From the reported monthly effluent chloride concentrations of each plant, the monthly imported water supply chloride concentration was subtracted. These calculations resulted in monthly loading factors for all dischargers in the Region. Table A-2 presents a summary of the data used during the calculation. The loading factor of 85 mg/L represents 90% of all loading factors reported by dischargers.

Table A-2. Loading factors.

Water Reclamation Plant	Dates	Mean (mg/L)	Standard Deviation	Maximum (mg/L)
City of Burbank	Aug '86 - Mar '96	71	30	293
Los Angeles-Glendale	Jun '90 - Jun '96	80	16	146
D. C. Tillman	Jun '90 - Jun '96	49	17	90
Simi Valley	Jan '82 - Jun '96	65	15	121
San Jose Creek East and West	Jan '89 - May '96	42	12	70
Whittier Narrows	Jan '89 - May '96	1.3	10	23
Pomona	Jan '89 - May '96	31	14	63
Saugus	Jan '90 - May '96	36	18	81
Valencia	Jan '90 - May '96	62	24	115
Hill Canyon	Aug '85 - Jun '96	68	13	109
Olsen Road	Jan '90 - Jun '96	67	14	131
Camarillo	July '90 - Mar '96	102	18	153