

**California Regional Water Quality Control Board
Santa Ana Region**

[DATE-TBD]

ITEM: [TBD]

**SUBJECT: Public Hearing to Consider Proposed Basin Plan Amendment to Revise
the Water Quality Objective for Nitrate in the Chino-South
Groundwater Management Zone**

EXECUTIVE SUMMARY

Federal law requires states to establish water quality standards (beneficial uses, water quality criteria, and an antidegradation policy for all surface water bodies within the state's jurisdiction and to review those standards at least once every three years. The Porter-Cologne Water Quality Control Act (Division 7, "Water Quality," of the California Water Code) establishes similar requirements in state law for both surface waters and groundwaters. For the Santa Ana Region, these standards are established in the Water Quality Control Plan for the Santa Ana River Basin (aka "Basin Plan"). In California, water quality criteria portion of water quality standards are called "water quality objectives."

Regional Board staff recommends that Table 4-1 in the Basin Plan be amended to revise the water quality objective for Nitrate in the Chino-South Groundwater Management Zone (GMZ) from its current value of 4.2 mg/L (nitrate as nitrogen) to a new value of 5.0 mg/L (nitrate as nitrogen). No other changes to the Basin Plan are being proposed or recommended. Nor would approval of the proposed Basin Plan amendment result in effluent limitation less stringent than those currently in place for permitted wastewater discharges.

The current nitrate objective of 4.2 mg/L was established by the Regional Board as part of a larger Basin Plan update in 2004 and is intended to represent the best water quality attained since state Antidegradation Policy was established in 1968. It was computed as the volume-weighted average nitrate concentration in the Chino-South GMZ using water quality sampling data collected between 1954 and 1973.

As part of the same 2004 Basin Plan amendment, the Regional Board approved a Waste Load Allocation (WLA) to prevent degradation of water quality in the Chino-South GMZ by strictly regulating the discharge of treated municipal effluent to those segments of the Santa Ana River that overlie this aquifer. Since then, all affected NPDES permits have been issued with effluent limitations that are consistent with the approved WLA.

Nevertheless, over time, the average nitrate concentration in the Chino-South GMZ has been rising. The most recent estimate, based on sampling data collected between 1993 and 2012, indicates the volume-weighted average nitrate concentration now stands at about 28 mg/L. The long-term increase is caused by legacy loads of nitrogen, from past agricultural/livestock practices, moving through the vadose zone. Urbanization has since displaced most of these former agricultural operations but water quality in the Chino-South GMZ may continue to be adversely affected for many years until nitrates are flushed from the vadose zone.

Until then, discharging of large quantities of treated municipal effluent to Reach 3 of the Santa Ana River will help reduce the average nitrate concentration in the Chino-South GMZ. The proposed Basin Plan Amendment is designed to ensure that these discharges continue by reducing the complexity and uncertainty of the permitting process.

At present, a detailed fate and transport analysis is required to demonstrate that the current effluent limits controlling the average nitrogen concentration in recycled water are adequate to prevent water quality degradation in the Chino-South GMZ. A sophisticated Wasteload Allocation Model (WLAM), that was reviewed and approved by the Regional Board when the Basin Plan was updated in 2004, is used to make this demonstration.

The WLAM keeps track of all the recycled water discharged to the Santa Ana River system and accounts for all of the added runoff from precipitation in the watershed. The model also makes appropriate adjustments for natural physical and biological processes that tend to reduce nitrate concentrations as water flows downstream or percolates to groundwater.

In the area of the Santa Ana River that overlies the Chino-South GMZ, the Regional Board has determined that 50% of the nitrogen measured at the surface is lost as the water seeps beneath the streambed and into the groundwater. Thus, recycled water which is discharged with an average nitrate concentration of 10 mg/L will have an average concentration no greater than 5 mg/L by the time it reaches the Chino-South GMZ. Dischargers must show that dilution from stormwater runoff provides enough additional dilution to ensure the volume-weighted average nitrate concentration of all water recharged is less than 4.2 mg/L in order to comply with the historical antidegradation objective. However, prolonged drought and enhanced conservation efforts (e.g. stormwater capture and harvesting) have made it more difficult to demonstrate that there will continue to be adequate natural dilution available.

If the nitrate objective for the Chino-South GMZ is increased to 5 mg/L, dischargers will no longer need to rely dilution to meet that objective. Given the 50% nitrogen loss that occurs as water from the Santa Ana River percolates to the Chino-South GMZ, the average nitrogen concentration in recycled water reaching the aquifer will be no greater than 5 mg/L (with or without dilution) as long as the municipal effluent continues to meet the current NPDES permit limits which prohibit discharges with an average nitrogen concentration greater than 10 mg/L.

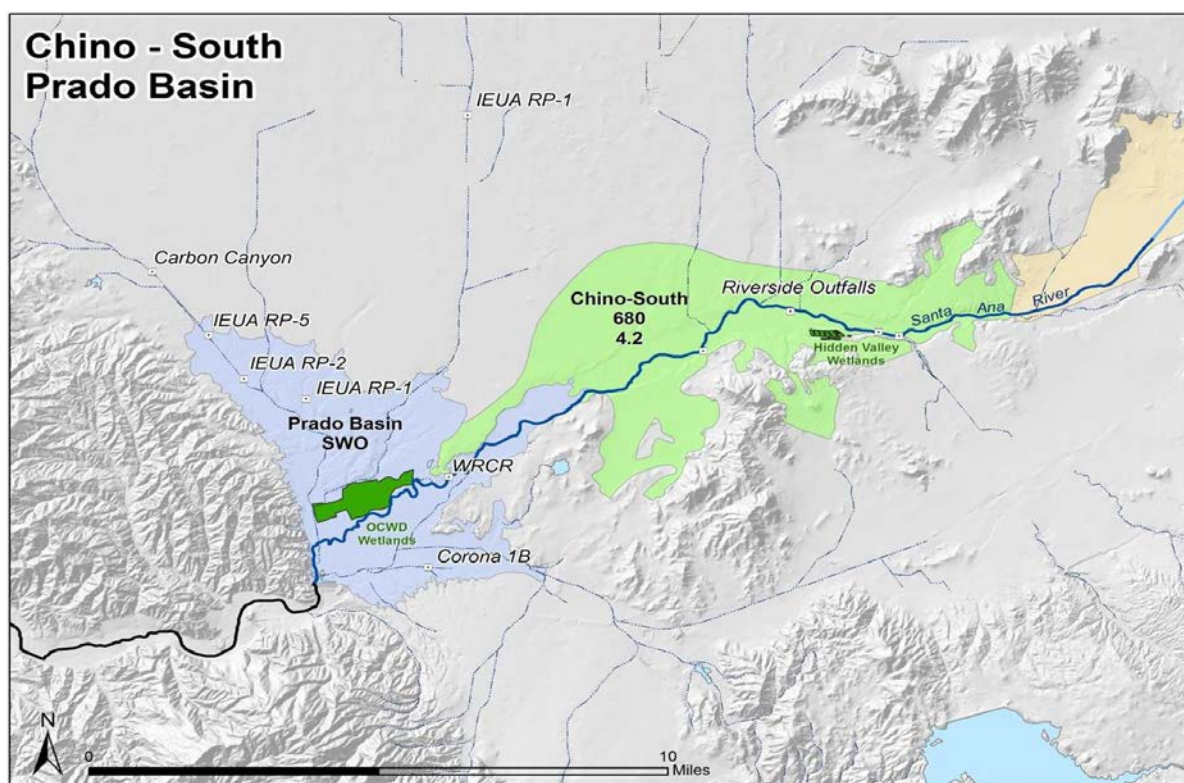
The Chino-South GMZ is designated MUN in the Basin Plan because groundwater from this area is beneficially used as a source for domestic and municipal water supply. The Primary Maximum Contaminant Level (MCL) for nitrate in drinking water is 10 mg/L. The proposed water quality objective of 5 mg/L is less than one-half this value and, therefore, provides a 100% safety factor. Existing and potential beneficial uses will remain fully protected.

Since the current average nitrate concentration in the Chino-South GMZ is already 28 mg/L, raising the water quality objective to 5 mg/L will not cause existing water quality to degrade. Rather, discharges that can comply with the proposed water quality objective of 5 mg/L will help mitigate and reverse the long-term degradation trend caused by other legacy sources of nitrate contaminating the vadose zone. For these reasons, staff recommends adoption of the proposed Basin Plan amendment to revise the water quality objective for nitrate in the Chino-South GMZ.

1. INTRODUCTION

The Chino-South Groundwater Management Zone (GMZ) is located in the extreme northwest corner of Riverside County directly under Reach 3 of the Santa Ana River (see Fig. 1). The Chino-South GMZ was established by the Santa Ana Regional Water Quality Control Board ("Regional Board") when groundwater boundaries were realigned and the Basin Plan was updated in 2004.¹ The GMZ is designated MUN to acknowledge the fact that the aquifer serves as a source of domestic or municipal drinking water supply.

Fig.1 Chino-South Groundwater Management Zone²



In 2004, the Regional Board also adopted a water quality objective of 4.2 mg/L for nitrate in the Chino-South GMZ. The objective was computed as the volume-weighted average concentration of nitrate based on all sampling data collected beginning for in 1954 and ending in 1973 (e.g. the baseline evaluation period).³

¹ Res. No. 2004-0001 (January 22, 2004).

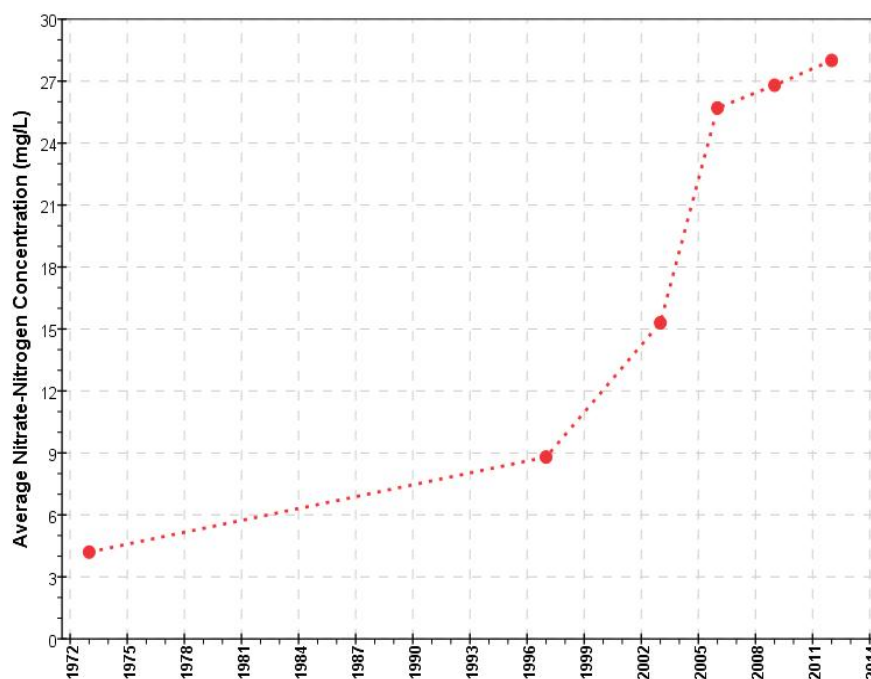
² Map provided courtesy of Wildermuth Environmental, Inc.

³ Wildermuth Environmental, Inc. TIN/TDS Study Phase 2A of the Santa Ana Watershed, Development of Groundwater Management Zones, Estimation of Historic and Current TDS and Nitrogen Concentrations in Groundwater, Final Technical Memorandum. July 27, 2000.

To minimize the risk of methemoglobinemia (aka "blue baby syndrome"), California has established a Primary Maximum Contaminant Level (MCL) of 10 mg/L nitrate-nitrogen for drinking water.⁴ This MCL is commonly applied as a water quality objective where surface or groundwaters are designated MUN. However, because water quality in the Chino-South GMZ, during the baseline evaluation period, was better than necessary to protect the designed beneficial use, the nitrate objective was set to 4.2 mg/L in order to preserve and maintain this higher quality as is required by the Antidegradation Policy.⁵

In 2004, when the Chino-South GMZ and 4.2 mg/L nitrate objective were first established, more recent data showed water quality was already degrading. Groundwater samples collected for the 20-year period beginning in 1978 and ending in 1997 showed nitrate concentration had increased by more than 100% to a volume-weighted average of 8.8 mg/L. Routine reassessments, performed every three years, indicate that nitrate levels continue to rise in the Chino-South GMZ (see Fig. 2). The most recent computation, using data collected in the 20-year period from 1993 to 2012, indicates that the volume-weighted average nitrate concentration is now approximately 28 mg/L.

Fig. 2: Long-term Trend for Average Nitrate Concentrations in the Chino-South GMZ⁶



⁴ 22 CCR §64431(a); see Table 64431-A: Maximum Contaminant Levels for Inorganic Chemicals.

⁵ State Water Resources Control Board Resolution No. 68-16: Statement of Policy with Respect to Maintaining High Quality Waters in California. (October 28, 1968).

⁶ Wildermuth Environmental, Inc. Recomputation of Ambient Water Quality in the Santa Ana Watershed for the Period 1993 to 2012. Technical Memorandum prepared for the Santa Ana Watershed Project Authority Basin Monitoring Program Task Force. August, 2014. (see Table 3-2 in original).

The pattern of nitrate concentrations evident from comprehensive well monitoring data throughout the Chino-South GMZ indicates that the long-term degradation of water quality is most likely due to past land use practices in the area. Nitrates that originated from widespread use of fertilizer or the dairy operations which were once prevalent in the area have been slowly seeping into the groundwater for many years. Most of these legacy nitrate loads occurred when there was little or no regulatory control over such discharges. Today, most of these agricultural operations have been displaced by urbanization. But, the problem will continue until the excess nitrates are finally flushed from the vadose zone.

Because the current ambient average concentration (28 mg/L) is greater than the applicable water quality objective (4.2 mg/L), the Regional Board has determined that there is no assimilative capacity for nitrate in the Chino-South GMZ. And, when permitting waste discharges to such basins, the State Water Board has declared that:

"Where the constituent in a groundwater basin is already at or exceeding the water quality objective, the Regional Board must set [effluent] limitations no higher than the objectives set forth in the Basin Plan. Exceptions to this rule may be granted where it can be shown that a higher discharge limitation is appropriate due to system mixing or removal of the constituent through percolation through the ground to the aquifer."⁷

The Regional Board relies on a Waste Load Allocation Model (WLAM) to derive appropriate discharge limitations while taking into the nitrate reductions which occur through system mixing or as a result of percolation through the streambed sediments.⁸ The Regional Board accepted and approved the WLAM as part of the 2004 Basin Plan update.⁹

The WLAM takes into account system mixing using more than 60 years of daily precipitation and streamflow data to estimate the volume and quality of stormwater runoff draining to the Santa Ana River. The WLAM also accounts for the nitrate removal that occurs as water flows downstream and percolates through the vadose zone. The Regional Board has approved a site-specific nitrogen loss coefficient of 50% for streambed recharge to groundwater where the Santa Ana River overlies the Chino-South GMZ.¹⁰

⁷ SWRCB Order No. WQ-81-5: In the Matter of the Petition of the City of Lompoc for Review of Order No. 80-03 (NPDES Permit No. CA 0048127), California Regional Water Quality Control Board, Central Coast Region. (March 19, 1981).

⁸ Wildermuth Environmental, Inc. TIN/TDS Study - Phase 2B of the Santa Ana Watershed, Wasteload Allocation Investigation Technical Memorandum. October, 2002.

⁹ Res. No. R8-2004-0001 (January 22, 2004).

¹⁰ See pg. 5-21 of the Basin Plan (Jan. 24, 1995; updated Feb., 2016).

The WLAM is periodically updated and re-run to adjust for changes in land use, wastewater discharges and precipitation patterns. The most recent update, completed in early 2015, shows that the long-term (63-year) average concentration of Total Inorganic Nitrogen (TIN) in water recharging to the Chino-South GMZ from Reach 3 of the Santa Ana River ranges from 4.03 mg/L to 4.14 mg/L depending on the how much recycled water is discharged.¹¹ This suggests that the current NPDES permit limits, which specify an average annual TIN concentration no greater than 10 mg/L, would assure compliance with the nitrate objective for the Chino-South GMZ.¹²

However, results from the most recent WLAM analysis also show that, during prolonged periods of below average rainfall (droughts), the maximum average concentration of TIN in water recharging to the Chino-South GMZ from Reach 3 of the Santa Ana River ranges from 4.25 mg/L to 4.34 mg/L depending on how much recycled water is discharged (see Table 1).¹³

Table 1: Average TIN Concentrations in Water Recharged to the Chino-South GMZ from Reach-3 of the Santa Ana River (2020 land use conditions)

Metric	Scenario 8d: Max. Recycle	Scenario 8e: Intermediate	Scenario 8f: Max. Discharge
Long-term Average (63 years)	4.03 mg/L	4.10 mg/L	4.14 mg/L
Single Highest 10-year Average	4.25 mg/L	4.31 mg/L	4.34 mg/L
Probability that average recharge quality will exceed 4.2 mg/L in any 10-yr. period	11.1%	30.2%	44.4%
Maximum amount the Basin Plan objective is exceeded	0.05 mg/L 1.1%	0.11 mg/L 2.6%	0.14 mg/L 3.3%

Although the exceedance is relatively small when it occurs, and the long-term average still complies with the Basin Plan objective, results from the WLAM complicate the process of issuing permits for wastewater discharges flowing into Reach 3 of the Santa Ana River. Federal and state law require the Regional Board to establish effluent limits which will ensure that these discharges will not cause or contribute to an exceedance of water quality objectives. At the time the permit is issued, there is no way to accurately predict what the future rainfall pattern will be. Nevertheless, permit limits must ensure compliance under all conditions that may reasonably occur including multiple years of lower than normal precipitation.

¹¹ Wildermuth Environmental, Inc. Addendum to the 2008 Santa Ana River Wasteload Allocation Model Report: Scenario 8. Technical Memorandum. January 5, 2015.

¹² NPDES permits limit the Total Inorganic Nitrogen (TIN) concentrations in wastewater discharges. On average, nitrate comprises approximately 85% of the TIN measured in municipal effluent. Comparing TIN concentrations to nitrate objectives is a conservative approach that provides a 15% safety factor.

¹³ Wildermuth Environmental, Inc. Addendum to the 2008 Santa Ana River Wasteload Allocation Model Report: Scenario 8. Technical Memorandum. January 5, 2015.

At present, all of the NPDES permits for wastewater discharges to Reach 3 of the Santa Ana River restrict the average TIN concentration to not more than 10 mg/L¹⁴. However, because the WLAM indicates that imposition of this current effluent limit does not assure consistent short-term compliance with the water quality objective in the Chino-South GMZ during droughts, the Regional Board may be obligated to impose more stringent effluent limits unless some other adjustment is made to address the short-term compliance issue. All of the available options are evaluated in the following Alternatives Analysis.

2. ALTERNATIVES ANALYSIS¹⁵

In order to ensure that wastewater discharges to Reach 3 of the Santa Ana River do not cause or contribute to an exceedance of the nitrate objective in the Chino-South GMZ, the Regional Board may elect to use one or more of the following options:

Option 1: Impose more stringent effluent limits for TIN in the NPDES permits.

Results from the WLAM indicate that an exceedance is most likely to occur during prolonged periods of below average rainfall when there is less instream dilution available. At such times, the maximum average TIN concentration in water percolating from the Santa Ana River to the Chino-South GMZ will be about 3.3% (0.14 mg/L) higher than the nitrate objective.

Short-term compliance could be restored, without relying on dilution from runoff that occurs during subsequent wetter-than-normal years (e.g. El Niño winters), by reducing the current effluent limit for TIN to 8.4 mg/L. Since 50% of the nitrogen is lost through biological transformation as the water percolates through the vadose zone, wastewater discharged at 8.4 mg/L TIN will enter the underlying groundwater with an average TIN concentration no greater than 4.2 mg/L even if there is zero stormwater dilution available.

This option would likely require some permittees discharging to the Santa Ana River to upgrade their wastewater treatment plants to assure consistent compliance with the more stringent effluent limits.¹⁶ An economic analysis, undertaken as part of this Alternatives Analysis, indicates the total cost to implement the necessary improvements would likely exceed \$XXX million.¹⁷

¹⁴ NPDES permits specify the TIN limitation as a running 12-month flow-weighted average.

¹⁵ This Alternatives Analysis summarizes a review of the regulatory policy issues. A separate CEQA-type Alternatives Analysis is presented in the Substitute Environmental Document (SED) prepared for the proposed Basin Plan Amendment.

¹⁶ Permittees most likely to be affected include: The cities of Colton, Rialto, Riverside and San Bernardino.

¹⁷ [ADD CITATION TO ECON ANALYSIS]

Regional Board staff do not believe this cost bears a reasonable relationship to the water quality benefit that would result. While the volume-weighted average TIN concentration in the recharge water may be reduced by about one-half of a milligram per liter, these reductions would hardly be noticeable in a groundwater basin where the current average nitrate concentration is already 28 mg/L.

More important, there be no water quality benefit if the permittees elect to bypass the Chino-South GMZ by relocating their wastewater outfalls to a point further downstream. Economic analysis indicates that the installing the necessary pipelines would cost much less than upgrading the treatment plant.¹⁸ If this were to occur, more stringent effluent limits might actually result in poorer average water quality in the Chino-South GMZ because recharge from existing wastewater treatment facilities is currently helping to dilute excess nitrate, from legacy sources, that is seeping out of the vadose zone.

Option 2: Use a longer averaging period to evaluate compliance with the nitrate objective.

The WLAM indicates that exceedances which may occur during periods of drought are balanced by dilution that occurs during extremely wet years. So, over the long-run, the current effluent limits may be deemed adequate to cause or contribute to the on-going nitrate degradation which is occurring in the Chino-South GMZ. The long-term (63-year) volume-weighted average nitrate concentration in the combined recharge of wastewater and stormwater that percolates from the Santa Ana River into the Chino-South GMZ is only 4.02 mg/L - a value that is more than 4% below and complies with the 4.2 mg/L water quality objective.

Technically, the Regional Board could rely on this finding to conclude that the current effluent limits are adequate, particularly since the existing ambient nitrate concentration in the Chino-South is already 28 mg/L. However, to do so, the Regional Board must assume that average rainfall over the next several decades will be similar to that observed during the last 60 years. In light of statewide concern over potential climate change, it seems imprudent to make such assumptions.

There may also may be legal issues using a very long averaging period (e.g. 60+ years) to demonstrate compliance with a water quality objective that is, itself, computed using only 20 years of sampling data. Additionally, there may problems relying on conditions which occur long after the permit has expired to demonstrate contemporary compliance during the actual 5-year period where the permit is in-effect. Given the inherent vagaries of weather, and the uncertainty associated with accurately predicting rain, staff cannot recommend Option 2 to the Regional Board.

¹⁸ [ADD CITATION TO ECON ANALYSIS]

Option 3: Increase the site-specific nitrogen loss coefficient to 56%.

The Regional Board relied on site-specific studies to approve the current nitrogen-loss coefficient of 50% for areas of the Chino-South GMZ that underlie Reach 3 of the Santa Ana River.¹⁹ These studies indicated that the average measured nitrogen loss was actually closer to 56%. That value was rounded-down because the 2004 WLAM showed that a 50% nitrogen loss coefficient was sufficient to assure compliance with the nitrate objective in the Chino-South GMZ.

It is likely that the lower nitrogen loss coefficient was adequate in 2004 because the City of Riverside was operating a series of treatment wetlands which significantly reduced the average TIN concentration in their discharge. However, these wetlands were destroyed when the Santa Ana River flooded them in the winter of 2005. Today, the 50% nitrogen loss coefficient is not quite large enough to assure compliance with the Chino-South nitrate objective despite the large investments the City of Riverside has made to reduce the average TIN concentration in its recycled water from 13 mg/L down to 10 mg/L.

If the site-specific nitrogen loss coefficient were revised to reflect the true average value documented by the original studies, then effluent discharged in accordance with the current TIN limit of 10 mg/L would be expected to enter the Chino-South GMZ at concentrations no greater than 4.4 mg/L. Some small amount of stormwater dilution would still be needed to meet the 4.2 mg/L water quality objective.

Staff is reluctant to recommend abandoning the 10% safety factor that was created when the nitrogen loss coefficient was rounded down from 56% to 50% in 2004. Moreover, revising the nitrogen loss coefficient is a relatively obscure way to restore regulatory compliance and may be perceived, by the public, as "manipulating the data." For these reasons, and to assure greater public transparency, staff prefers Option 4 (below) over Option 3.

Option 4) Raise the water quality objective for nitrate in the Chino-South GMZ to 5 mg/L.

Since 50% of the nitrogen measured in the Santa Ana River overlying the Chino-South GMZ is biologically-transformed and lost before reaching the groundwater, wastewater discharged at an average TIN concentration of 10 mg/L would enter the aquifer at the no more than 5 mg/L. Thus, continuing to meet the current effluent limits would assure that recycled water could meet a 5 mg/L nitrate objective without needing to rely on any stormwater dilution to make this demonstration.

¹⁹ Wildermuth Environmental, Inc. Demonstration of Nitrogen Loss in Reach 3 of the Santa Ana River - Technical Memorandum. October, 2005.

Raising the nitrate objective to 5 mg/L would not result in less stringent effluent limitations for the wastewater treatment plants because the anti-backsliding regulations would prevent this.²⁰ Raising the objective would, however, avoid the need to impose more restrictive permit limits in order to address the short-term compliance issues described above and the extraordinary cost associated with meeting such limits.

Raising the objective to 5 mg/L openly acknowledges that nitrate concentrations in the Chino-South GMZ greatly exceed the current water quality objective and are unlikely to return to levels at or below 4.2 mg/L for many decades. Imposing more restrictive effluent limits nominally intended to prevent degradation that has already occurred, on dischargers that bear no responsibility for this trend, is not reasonable.

Raising the nitrate objective from 4.2 mg/L to 5 mg/L makes it admittedly makes it slightly easier to comply. However, this small change greatly simplifies the regulatory analysis required to re-authorize NPDES permits without imposing more stringent effluent limits. This, in turn, makes it more likely that the permittees will continue discharging high quality recycled water to Reach 3 of the Santa Ana River.

Comprehensive water quality sampling data reveals that the lowest nitrate concentrations measured in the Chino-South GMZ are found in those areas of the aquifer closest to the Santa Ana River.²¹ The discharge of large volumes of recycled water to Reach 3 of the River is not causing or contributing to the problem, it is part of the long-term solution for improving groundwater quality.

3. ANTIDEGRADATION ANALYSIS

Raising the nitrate objective would authorize lower water quality compared to the 1954-73 baseline condition. Therefore, it is necessary to demonstrate that allowing lower water quality is comports with the Antidegradation Policy established by the State Water Quality Control Board in 1968. The policy states, in relevant part:

*"Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial uses of such water and will not result in water quality less than that prescribed in the policies."*²²

²⁰ 40 CFR §122.15(i) implementing 33 U.S.C. §1342(o) [§402(o) of the Clean Water Act]

²¹ Wildermuth Environmental, Inc. Recomputation of Ambient Water Quality in the Santa Ana Watershed for the Period 1993 to 2012. Technical Memorandum prepared for the Santa Ana Watershed Project Authority Basin Monitoring Program Task Force. August, 2014.

²² Resolution No. 68-16

The following analysis addresses each of the three required Antidegradation demonstrations.

(a) Will raising nitrate objective for the Chino-South GMZ to 5 mg/L result in water quality less than that prescribed in policies?

No. Current state policy was established when California established a Primary MCL of 10 mg/L for nitrate as nitrogen.²³ The proposed objective of 5 mg/L for the Chino-South GMZ considerably less than the maximum concentration allowed by state policy and maintains a 100% safety factor.

The proposed Basin Plan amendment authorizes no changes to the current effluent limits for treated wastewater discharged to the Santa Ana River. These limits, which are imposed as a requirement in the NPDES permits, require the volume-weighted annual average concentration of Total Inorganic Nitrogen (TIN) to be at or below 10 mg/L. On average, nitrate comprises only 85% of TIN. So, compliance with the TIN limit assures that the wastewater itself will not exceed the Primary MCL for drinking water even if 100% of the measured TIN is in the form of nitrate.

Since 50% of the nitrogen discharged in the surface stream will be biologically-transformed and lost through the process of percolation, the average TIN concentration in municipal wastewater that recharges the Chino-South GMZ will be no greater than 5 mg/L even if there is no dilution provided by stormwater runoff. Therefore, raising the nitrate objective to 5 mg/L will not result in water quality less than that prescribed in policies.

(b) Will raising the nitrate objective for the Chino-South GMZ to 5 mg/L unreasonably affect present or anticipated beneficial uses of the water?

No. As noted above, the proposed water quality objective of 5 mg/L is well below the level required to assure safe drinking water and, in fact, provides a 100% safety factor.

The Regional Board will continue to impose whatever effluent limits are needed to ensure that municipal wastewater discharged to Reach 3 of the Santa Ana River will comply with the 5 mg/L nitrate objective by the time that water percolates into the Chino-South GMA. The current permit limits for TIN are adequate to meet this requirement. And, federal antibacksliding regulation effectively preclude the Regional Board from issuing new permits with less stringent effluent limits for TIN.

²³ 22 CCR §64431(a); see Table 64431-A: Maximum Contaminant Levels for Inorganic Chemicals.

Finally, it should be noted that, in accordance with the state Sources of Drinking Water Policy, Reach 3 of the Santa Ana River is not designated MUN.²⁴ As such, it is not required to meet drinking water standards. Nevertheless, by meeting with the existing TIN limits in the current permits, the average nitrate concentration in recycled water discharged to Reach 3 will also comply with the Primary MCL for drinking water.

Reach 2 of the Santa Ana River (below Prado Dam) was also exempted from the MUN designation pursuant to the state Sources of Drinking Water Policy. However, surface water in this segment does recharge the Orange County Groundwater Management Zone which is designated MUN. Results from recent analyses performed using the WLAM indicate that the average TIN concentration below Prado Dam is not expected to exceed 7 mg/L in the surface water even during drought conditions.²⁵ And, after applying the 25% nitrogen loss coefficient approved for Reach 2, nitrate in river water recharging into the Orange County GMZ will rarely exceed 5 mg/L.

Therefore, raising the nitrate objective to 5 mg/L will not unreasonably affect present or anticipated beneficial uses of the water in the Chino-South GMZ or the Orange County GMA further downstream.

(c) Is raising the nitrate objective for the Chino-South GMZ to 5 mg/L consistent with maximum benefit to the people of the State?

Yes. The current average nitrate concentration in the Chino-South GMZ is 28 mg/L. This is substantially higher than the current water quality objective, the proposed water quality objective or the Primary MCL for drinking water. As a result, the Chino Desalter Authority (CDA) operates an extraction and treatment system designed to pump and treat the degraded aquifer so that it meets drinking water standards. The CDA system remediates both nitrate and excess salt in the Chino-South GMZ.

Raising the nitrate objective to 5 mg/L makes it easier to authorize the discharge of recycled water that will: 1) help reduce the current high nitrate concentrations and improve existing water quality in the Chino-South GMZ by providing a significant source of high quality dilution water, and 2) preserves groundwater yield by helping replace the groundwater that is extracted by the CDA's groundwater remediation project. The latter benefit is especially noteworthy following the legislature's enactment of the Sustainable Groundwater Management Act in 2014.²⁶

²⁴ State Water Resources Control Board Resolution No. 88-63.

²⁵ Wildermuth Environmental, Inc. Addendum to the 2008 Santa Ana River Wasteload Allocation Model Report: Scenario 8. Technical Memorandum. January 5, 2015 (See Tables 8d-BP, 8e-BP, and 8f-BP in Appendix A of the original document).

²⁶ AB 1739 and SB 1168 and SB 1319; Sept. 16, 2014

Discharging high quality recycled water not only helps reduce the high nitrate concentrations, it also helps dilute the rising salinity that is occurring in the Chino-South GMZ. The water quality objective for Total Dissolved Solids (TDS) in this aquifer is 660 mg/L. As with nitrate, this objective was established based on the highest water quality that has been attained since 1968 and represents the average TDS concentration during the 1954-73 baseline period. Today, the average TDS concentration is 50% higher and now stands at 990 mg/L. The long-term (63-year) average TDS concentration recharging to the Chino-South GMZ from Reach 3 of the Santa Ana River is 590 mg/L. And, does not exceed 625 mg/L even during a decade of below normal rainfall.²⁷ Raising the nitrate objective makes it easier to continue permitting existing wastewater discharges which are necessary to improve the average concentration of both nitrate and TDS in the Chino-South GMZ.

Raising the nitrate objective to 5 mg/L will avoid the need to impose more restrictive effluent limits and, therefore, the extraordinary expense associated with upgrading wastewater treatment plants to meet such limits. Upgrading the treatment processes to provide more efficient nitrogen removal would assure strict compliance with the current nitrate objective but it would do very little to improve existing water quality in the Chino-South GMZ. The high cost of compliance bears no reasonable relationship to the probable water quality improvements. Avoiding this type of inefficient allocation of scarce public resources provides maximum benefit to the People of the state.

4. REFERENCES

[TO BE INSERTED]

APPENDIX A: ENVIRONMENTAL CHECKLIST AND SUBSTITUTE ENVIRONMENTAL DOCUMENT

[TO BE ATTACHED WHEN COMPLETED BY CDM-SMITH]

APPENDIX B: ECONOMIC ANALYSIS

[TO BE ATTACHED WHEN COMPLETED BY CDM-SMITH]

²⁷ Wildermuth Environmental, Inc. Addendum to the 2008 Santa Ana River Wasteload Allocation Model Report: Scenario 8. Technical Memorandum. January 5, 2015 (see Tables 8d-CS, 8e-CS and 8f-CS in original report).