Item 4 LATE ADDITION

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MEETING OF FEBRUARY 10 AND 11, 2016
APPLE VALLEY

FINAL MOJAVE SALT AND NUTRIENT MANAGEMENT PLAN FOR THE MOJAVE AND MORONGO GROUNDWATER BASINS

Please add the attached *Executive Summary of the Mojave SNMP* behind Bates Page 4-35.

A copy of the *Final Mojave Salt and Nutrient Management Plan* can be downloaded from Mojave Water Agency, website at: http://www.mojavewater.org/SNM-plan.html.

A hard copy of the Final Mojave SNMP will be available at the Board Meeting.

Executive Summary

Section 1: Introduction

The State Water Resources Control Board (SWRCB) Recycled Water Policy encourages the use of recycled water as a safe, local, drought-proof, and highly reliable source of water supply. The Policy also encourages recharge of stormwater as a clean local water supply. Because of the potential water quality concern associated with recycled water, the Recycled Water Policy requires completion of a Salt and Nutrient Management Plan (SNMP) for each groundwater basin in California. SNMPs are intended to help streamline the permitting of new recycled water and stormwater projects while ensuring compliance with water quality objectives.

The Mojave SNMP has been prepared for the Mojave Water Agency (MWA) service area. The MWA service area includes portions of both the South Lahontan and Colorado River California Department of Water Resources (DWR)-defined Hydrologic Regions and is governed by the Regional Water Quality Control Boards (RWQCB) Lahontan Region and Colorado River Basin Region.

The purpose of the Mojave SNMP is to (1) promote reliance on local sustainable water sources such as recycled water and stormwater, while maximizing the use of available high-quality imported State Water Project (SWP) supplies in the MWA service area, and (2) manage salts and nutrients from all sources on a sustainable basis to ensure attainment of water quality objectives and protection of beneficial uses so compliance with the Regional Water Quality Control Plans (Basin Plans) is met.

The Mojave SNMP is organized in to ten sections, as listed below:

- Introduction (Section 1)
- Stakeholder Process (Section 2)
- Conceptual Hydrogelogic Model (Section 3)
- Groundwater Quality Analysis (Section 4)
- Salt and Nutrient Loading Analysis (Section 5)
- Project Review, Prioritization, and Implementation Measures (Section 6)
- Anti-Degradation Assessment (Section 7)
- Groundwater Monitoring Program (Section 8)
- CEQA Analysis (Section 9)
- Conclusions (Section 10)

Section 2: Stakeholder Process

The Recycled Water Policy states that development of the SNMP shall be a stakeholder-driven process. The Mojave SNMP was developed in a collaborative setting with input from a wide array of stakeholders through a series of meetings and workshops. SNMP outreach efforts were directed at stakeholders from local water agencies, state and federal agencies, municipalities, regulatory agencies, and local community groups, including environmental organizations, development and real estate interests, tribal communities, disadvantaged communities and other community associations.

Eight stakeholder group meetings were held on a bi-monthly basis, from February 2013 through June 2014 in conjunction with the MWA Integrated Regional Management Plan development. The stakeholder group included 58 municipal water purveyors, several municipal and county agencies, fourteen state and federal agencies, and over 30 local community interest groups. In addition to the regular stakeholder meetings, four separate public workshops and three meetings with disadvantaged communities and tribes were held at various locations around the MWA service area to encourage participation. The Draft SNMP was presented at a MWA Technical Advisory Committee meeting held on February 5, 2015.

In addition to the stakeholder meetings, several workshops/meetings were held with Lahontan and Colorado Regional Board staff during SNMP development to discuss data collection efforts, analysis methodologies, preliminary findings, and the Regional Boards' approach to SNMP adoption and environmental review requirements.

Other outreach activities included the creation of the Mojave SNMP project website, project status updates in MWA newsletters, and invitation to stakeholders for participation and comment via email.

Section 3: Conceptual Hydrogeologic Model

The hydrogeologic conceptual model describes the Study Area characteristics necessary to account for all inflows and outflows of S/Ns as well as existing S/N mass and groundwater volume in storage. The Mojave SNMP Planning Area (Study Area) includes approximately 1,600 square miles of the Mojave River and Morongo groundwater basins. A conceptual hydrogeologic model of the Study Area was developed with emphasis on parameters that define the volume of groundwater and S/N mass in storage and control groundwater flow and S/N transport. Key elements of the conceptual hydrogeologic model include (1) mapping the depth of the production zone, aquifer hydraulic properties, and groundwater occurrence and elevations and (2) identification of major basin/subbasin inflows and outflows.

To facilitate the characterization of groundwater quality, estimation of S/N loading, the Study Area was divided into 22 analysis subregions. Subregional boundaries are based on established groundwater basin/subbasin boundaries with refinements to account for key factors influencing groundwater flow and water quality.

The volume of groundwater in operational storage represent the initial mixing volume of groundwater for the fate and transport modeling of salts and nutrients and is a critical component for understanding the effect of S/N loading on groundwater quality. A basin with a large volume of groundwater in storage has a commensurate capacity to buffer the effect of S/N loading. Conversely, a basin with a small volume of groundwater in storage is more sensitive to S/N loading and groundwater quality changes. The estimated total volume of groundwater in operational storage across the Study Area is about 35,000,000 acre-feet (af), with approximately 26,000,000 af in the Mojave River Basin and 9,000,000 af in the Morongo Basin. These storage estimates do not include potentially extractable groundwater below the base of the current production zone and are thus deemed reasonably conservative (i.e., more sensitive to S/N loading activities). By subregion, the groundwater volume in operational storage is generally near or above 1,000,000 af. Three subregions in the Mojave River Basin (Alto Transition Zone – Floodplain (Helendale), Alto Transition Zone – Floodplain, and Alto – Floodplain Narrows)) and two subregions in the Morongo Basin (Warren Valley and Joshua Tree) have relatively small volumes of groundwater in operational storage (less than 500,000 af) and are thus relatively more sensitive to S/N loading activities.

Natural inflows to the groundwater system in the Mojave River Basin are represented primarily by stream recharge from intermittent storm flows through the Mojave River bed. Subregions in the Morongo Basin are recharged naturally by runoff infiltrating through relatively small ephemeral stream channels, entering as subsurface inflow or mountain-front recharge along the margins of the basin. Due to the relatively low annual amount of precipitation on the valley floor, deep percolation of areal precipitation is considered negligible across the Study Area. The one exception is the Lucerne Valley, where deep percolation of precipitation and mountain-front recharge are natural recharge sources. In addition to recharge from rainfall and storm runoff, subsurface inflows from neighboring subregions represent a major natural recharge source for many subregions.

Anthropogenic inflows to each subregion include managed aquifer recharge, municipal outdoor and agricultural irrigation return flow, treated WWTP effluent discharge, and septic system return flow.

Natural outflows from each subregion include subsurface outflow, groundwater discharge to surface water, evapotranspiration of phreatophytes, and dry lake evaporation. The sole anthropogenic outflow from each subregion is groundwater pumping.

Section 4: Groundwater Quality Analysis

For the Mojave SNMP, TDS and nitrate were selected as appropriate indicator constituents of salts and nutrients (S/Ns) for the Study Area and used to estimate existing and future assimilative capacity for each Study Area analysis subregion.

According to the Lahontan and Colorado River Region basin plans, groundwater designated for municipal or domestic supply (MUN) shall not contain concentrations of chemical constituents exceeding their respective maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in Title 22 of the California Code of Regulations (CCR). Title 22 of the CCR designates SMCLs for TDS. The recommended SMCL for TDS is 500 mg/L with an upper limit of 1,000 mg/L and a short-term limit of 1,500 mg/L. Title 22 of the CCR designates a primary MCL for nitrate as nitrate (nitrate-NO_3) of 45 mg/L.

In accordance with the SWRCB Recycled Water Policy, the available assimilative capacity for each analysis subregion was calculated by comparing the Basin Plan Objectives (BPOs) with the average concentration of each analysis subregion over the most recent five years of available groundwater quality data. Samples collected from January 2008 through mid-2013 were used to incorporate the last five years of data for all wells. The water quality data set includes routine monitoring of a network of MWA wells and CDPH drinking water wells. Waste Discharge Requirement (WDR) site wells were also included to help establish water quality concentrations near active waste discharge facilities, where other monitoring and production well data were not available.

TDS data were available for 1,987 wells across the Study Area, of which TDS data since 2008 were available for 800 wells. Nitrate data were available for 1,379 wells in the Study Area, of which nitrate data since 2008 were available for 836 wells.

The median groundwater concentration for the recent 5-year water quality averaging period for TDS and nitrate was used to develop dots maps and concentration contour maps across the Study Area. These maps show the variability of groundwater quality within a given subregion. Older historical well concentration data were used to supplement areas lacking recent water quality data using an iterative approach. For four subregions, Baja – Regional, Centro – Regional (east), the western portion of Centro – Regional (west) and Johnson Valley, the narrow distribution of water quality data was deemed inadequate for reliable interpolation. For these subregions, the average subregional concentration was estimated by averaging available well median data.

As shown on **Figure ES-1**, TDS concentrations generally increase in downgradient portions of the Mojave River Basin and along groundwater flowpaths away from the primary recharge source in the basin, the Mojave River. Elevated TDS concentrations (greater than 1,000 mg/L) are generally associated with natural processes including mineralization and evaporation beneath dry lake beds. In the Morongo Basin, groundwater TDS concentrations generally increase along groundwater flowpaths away from the southwestern margins of the basin where mountain-front recharge occurs.

As shown on **Figure ES-2**, few areas in the Mojave River basin have nitrate concentrations near or above the BPO of 45 mg/L. Areas include the Centro – Floodplain and Centro – Regional subregions in the vicinity of Hinkley and northeast of the Helendale Fault. Elevated concentrations in each of these areas are associated with either legacy and/or existing dairy operations and agricultural operations. Elevated nitrate concentrations above 45 mg/L are also observed in the central portion of the Oeste subregion in the vicinity of an active dairy and industrial facility. Elevated nitrate concentrations (between 10 to 22.5 mg/L as NO_3) in the Alto – Mid Regional subregion are likely associated with septic tanks return flows.

In the Morongo Basin, elevated nitrate concentrations in Warren Valley are associated with the entrainment of septage residing in the vadose zone by rising groundwater following enhanced recharge of SWP water from the mid-1990s to early-2000s. Current groundwater nitrate concentrations are significantly below their historical peak in the early-2000s as a result of recent groundwater management. Elevated nitrate in the Joshua Tree subregion and southern portion of the Copper Mountain-Giant Rock subregion is associated with higher-density septic tank use.

Figure ES-1
2008-2013 TDS Concentration Contours

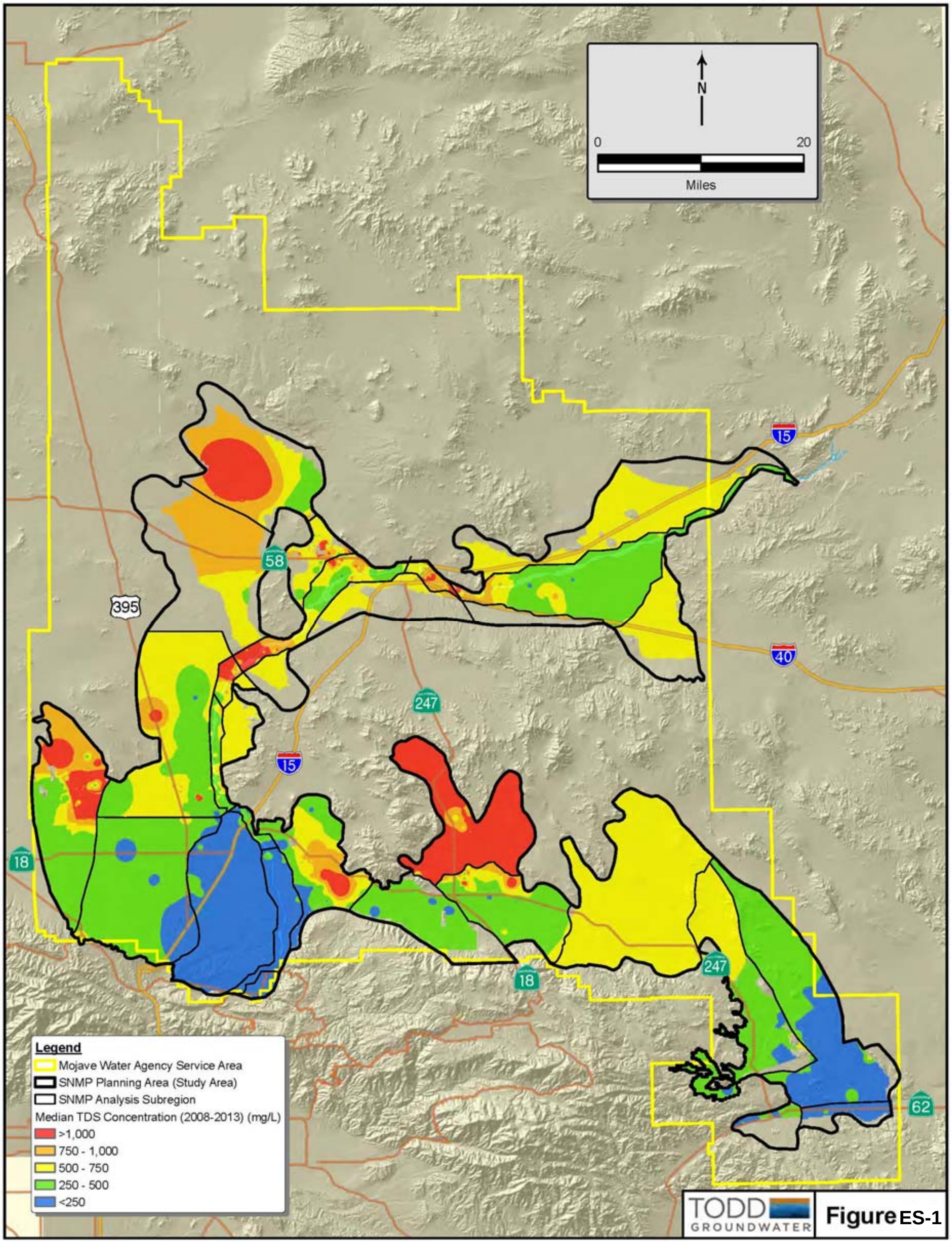

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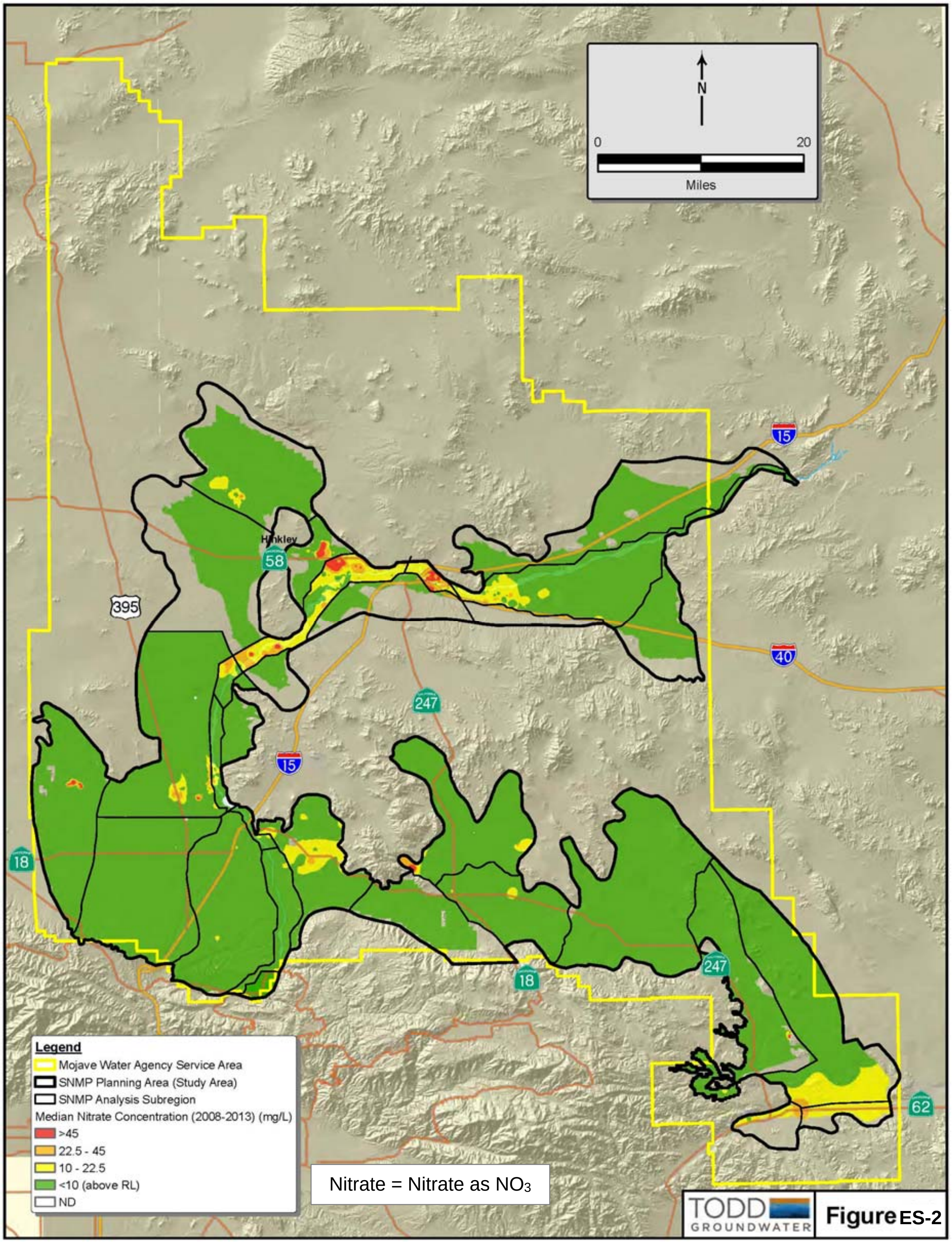
Figure ES-2
2008-2013 Nitrate Concentration Contours



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The volume-weighted average TDS and nitrate-NO_3 concentrations were calculated for each subregion by weighting the variable concentration contour surface by the surface representing the volume of extractable groundwater in storage. Results are summarized in **Table ES-1** and depicted on **Figure ES-3**.

Assimilative capacity calculations for TDS and nitrate for each subregion are shown in **Table ES-2**.

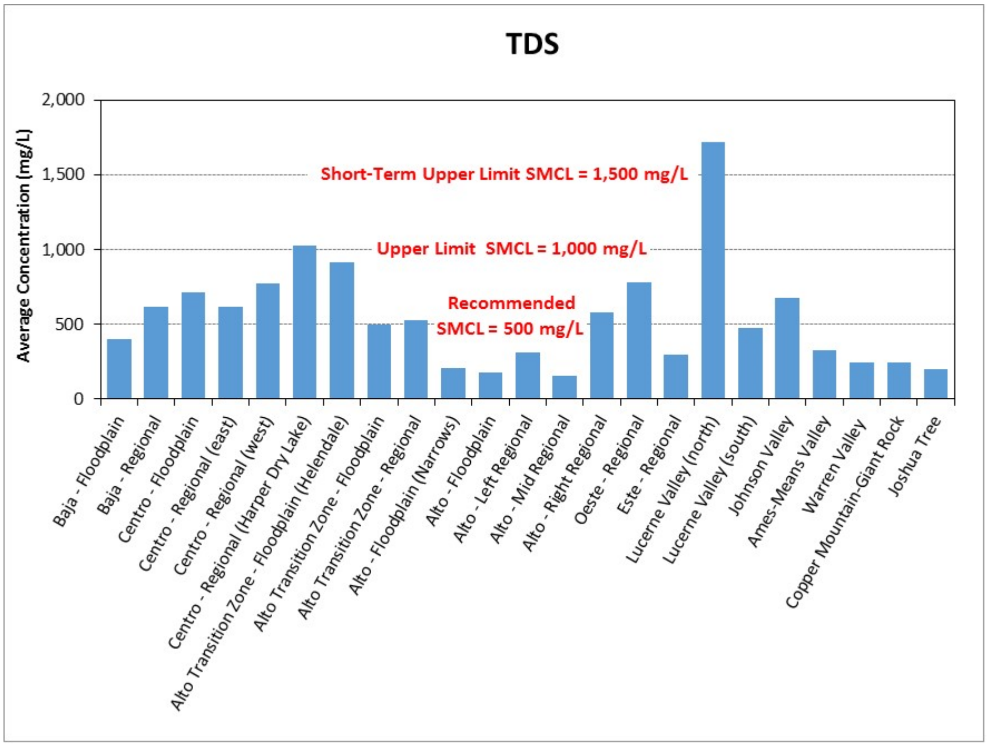
TDS and nitrate time-concentration plot maps for selected wells in each subregion were also generated for the SNMP (and are presented in Subregional Synopses in Appendix C). While the well median and groundwater concentration contour maps illustrate the distribution of existing groundwater quality, the time-concentration plots further provide a historical perspective on groundwater quality and support insights into the relationship between evolving historical land uses on groundwater quality.

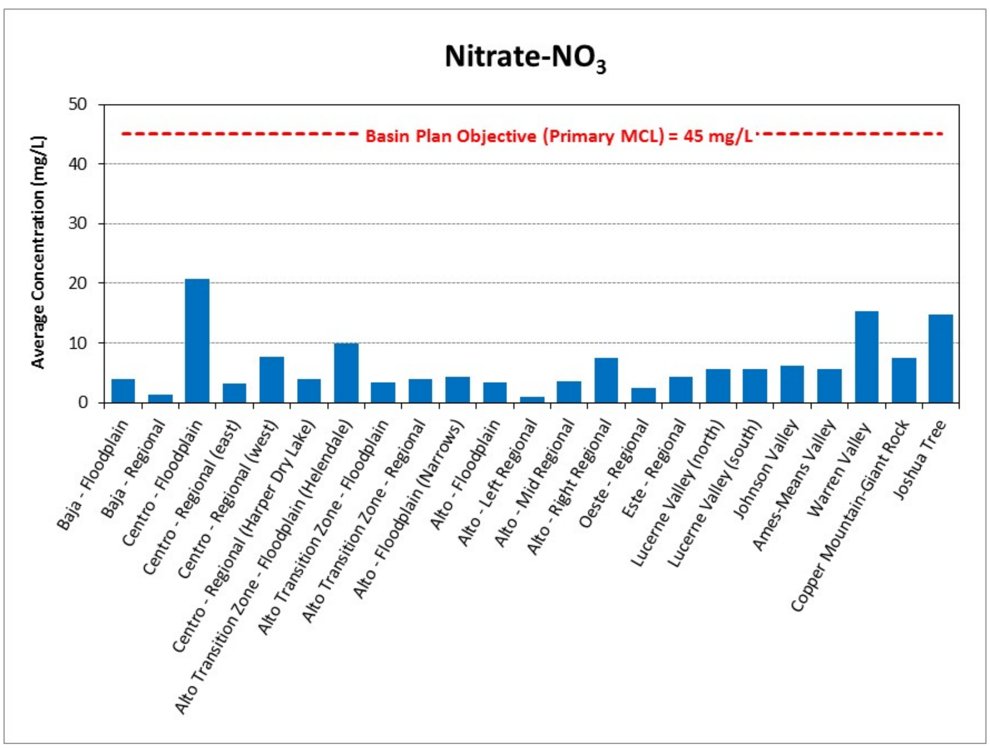
Table ES-1
Average Existing TDS and Nitrate Concentrations by Subregion

SNMP Analysis Subregion	Estimated Groundwater in Operational Storage[a] (acre-feet)	Volume-Weighted Average Existing TDS Concentration (mg/L)	Volume-Weighted Average Existing Nitrate-NO_3 Concentration (mg/L)
MOJAVE RIVER BASIN			
Baja - Floodplain	4,886,000	401	3.9
Baja - Regional	2,014,000	617	1.4
Centro - Floodplain	1,405,000	711	20.7
Centro - Regional (east)	301,000	618	3.2
Centro - Regional (west)	1,580,000	771	7.7
Centro - Regional (Harper Dry Lake)	2,128,000	1,028	4.0
Alto Transition Zone - Floodplain (Helendale)	269,000	915	10.0
Alto Transition Zone - Floodplain	431,000	500	3.4
Alto Transition Zone - Regional	5,067,000	529	3.9
Alto - Floodplain (Narrows)	264,000	205	4.3
Alto - Floodplain	801,000	177	3.3
Alto - Left Regional	1,812,000	310	0.9
Alto - Mid Regional	1,893,000	153	3.5
Alto - Right Regional	1,052,000	579	7.5
Oeste - Regional	807,000	781	2.5
Este - Regional	840,000	299	4.3
Mojave River Basin Total	**25,550,000**		
MORONGO BASIN			
Lucerne Valley (north)	869,000	1,716	5.6
Lucerne Valley (south)	996,000	472	5.7
Johnson Valley	2,273,000	678	6.2
Ames-Means Valley	692,000	330	5.7
Warren Valley	330,033	243	15.4
Copper Mountain-Giant Rock	3,827,410	247	7.5
Joshua Tree	376,748	202	14.7
Morongo Basin Total	**9,364,190**		
MOJAVE RIVER BASIN AND MORONGO BASIN TOTAL	**34,914,190**		

Notes:
mg/L = milligrams per liter
(a) Volume of groundwater above estimated base of groundwater production zone

Figure ES-3
Average TDS and Nitrate Concentrations by Subregion





Notes:
SMCL = Secondary Maximum Contaminant Level; MCL = Maximum Contaminant Level

Table ES-2
Existing TDS and Nitrate Assimilative Capacity

Subregion	TDS				Nitrate-NO_3	
	Average TDS Groundwater Concentration	Assimilative Capacity(a)			Average Nitrate-NO_3 Groundwater Concentration	Assimilative Capacity(a)
		BPO = 500 mg/L	BPO = 1,000 mg/L	BPO = 1,500 mg/L		BPO = 45 mg/L
MOJAVE RIVER BASIN						
Baja - Floodplain	401	99	599	1,099	3.9	41.1
Baja - Regional	617	-117	383	883	1.4	43.6
Centro - Floodplain	711	-211	289	789	20.7	24.3
Centro - Regional (east)	618	-118	382	882	3.2	41.8
Centro - Regional (west)	771	-271	229	729	7.7	37.3
Centro - Regional (Harper Dry Lake)	1,028	-528	-28	472	4.0	41.0
Alto Transition Zone - Floodplain (Helendale)	915	-415	85	585	10.0	35.0
Alto Transition Zone - Floodplain	500	0	500	1,000	3.4	41.6
Alto Transition Zone - Regional	529	-29	471	971	3.9	41.1
Alto - Floodplain (Narrows)	205	295	795	1,295	4.3	40.7
Alto - Floodplain	177	323	823	1,323	3.3	41.7
Alto - Left Regional	310	190	690	1,190	0.9	44.1
Alto - Mid Regional	153	347	847	1,347	3.5	41.5
Alto - Right Regional	579	-79	421	921	7.5	37.5
Oeste - Regional	781	-281	219	719	2.5	42.5
Este - Regional	299	201	701	1,201	4.3	40.7
MORONGO BASIN						
Lucerne Valley (north)	1,716	-1,216	-716	-216	5.6	39.4
Lucerne Valley (south)	472	28	528	1,028	5.7	39.3
Johnson Valley	678	-178	322	822	6.2	38.8
Ames-Means Valley	330	170	670	1,170	5.7	39.3
Warren Valley	243	257	757	1,257	15.4	29.6
Copper Mountain-Giant Rock	247	253	753	1,253	7.5	37.5
Joshua Tree	202	298	798	1,298	14.7	30.3

Notes:
Red highlighted cell indicates that average concentration exceeds respective BPO, and there is no available assimilative capacity.
(a) Assimilative capacity equals BPO minus average concentration (in mg/L); positive value indicates available assimilative capacity; a negative value indicates no available assimilative capacity.

Section 5: Salt and Nutrient Loading Analysis

A salt and nutrient (S/N) loading analysis was conducted to estimate the impact of planned future land uses and associated water use on groundwater quality in the Study Area. The S/N loading analysis considers the existing S/N mass in groundwater storage and the source water volumes of key inflows and outflows and their associated TDS and nitrate concentrations. The analysis also considers any added TDS and nitrate from use as well as other fate and transport processes that influence groundwater concentrations.

To satisfy the goals and objectives of the SNMP, a regional groundwater quality mixing model (SNMP mixing model) focusing on TDS and nitrate was developed to perform two primary functions:

1) Simulate regional groundwater quality within the Study Area over the 70-year future simulation period from water year (WY) 2012-13 through WY 2081-82 under various future S/N loading conditions (or scenarios), and

2) Quantify the effect of planned future recycled water projects and other land use/water use changes on regional groundwater quality.

The original MWA water quality mixing model developed using the Structural Thinking Experimental Learning Laboratory with Animation (STELLA) software package (MWA, 2007) served as the basis for development of the SNMP mixing model. The original STELLA model simulated storage-head-flow relationships in the calibrated USGS Mojave River Basin MODFLOW model. The SNMP model further incorporates fluxes from three separate calibrated MODFLOW models developed for areas in the Morongo Basin covering Ames Valley, Warren Valley, Copper Mountain Valley, and Joshua Tree.

The SNMP mixing model accounts for key stresses and natural volumetric flow rates within each Study Area subregion. The updated (February 26, 2014) MWA demand forecast model served as the primary basis for estimating key stresses on the groundwater system, including anthropogenic inflows (MWA 2014b). These include managed aquifer recharge with imported SWP water; return flow from municipal and agricultural irrigation, including crops and dairies; return flows (leakage) from recreational lakes; WWTP effluent discharge and septic tank discharge; and outflows represented by groundwater pumping for the various water demand sectors.

Because changes in regional groundwater quality and quasi-equilibration to changing land use (loading) conditions may take several decades, a simulation period beyond 2035 was applied to determine the long-term effect of individual and collective S/N loading factors on groundwater quality. Accordingly, water budgets for a future simulation period from 2013 to 2081 were developed for each analysis subregion and input into the SNMP water quality mixing model.

Three future scenarios were simulated to evaluate the impact of population growth and planned future recycled water projects:

- Scenario 1 – 2012 Baseline
- Scenario 2 – Growth (with no recycled water projects)

- Scenario 3 – Growth (with recycled water projects)

Recycled water projects shown in **Table ES-3** were all identified and selected during the development of the recently completed Mojave IRWM Plan (MWA, 2014c). The selected projects were required to meet certain planning requirements such as having completed permits, satisfied project-level environmental review requirements, and finalized future flows and water quality concentrations associated with each project.

Table ES-3
Recycled Water Projects Simulated in Mojave SNMP Future Scenario 3

Agency	Simulated Planned Future Recycled Water Projects	Subregion(s) directly affected	Recycled Water Use
VVWRA	SWRP (Apple Valley)	Alto - Right Regional Alto Transition Zone - Floodplain	Landscape Irrigation
	SWRP (Hesperia)	Alto - Mid Regional Alto Transition Zone - Floodplain	Landscape Irrigation
City of Victorville	IWWTP - Excess Recycled Water Recharge at VVWRA Pond 14	Alto Transition Zone - Floodplain	Excess Recycled Water Pond Discharge
Helendale CSD	Recycled Water Reclamation Plant	Alto Transition Zone - Floodplain (Helendale)	Landscape Irrigation
HDWD	Regional Water Reclamation Plant	Warren Valley	Pond Recharge

Notes:
Victor Valley Wastewater Reclamation Authority (VVWRA)
Helendale Community Services District (Helendale CSD)
Hi-Desert Water District (HDWD)
Subregional Water Reclamation Plant (SWRP)
Industrial Wastewater Treatment Plant (IWWTP)

The Adjudication of the Mojave Basin Area (Judgment) includes an injunction against diverting stormwater flow away from downstream users of the Mojave River; therefore, no major stormwater capture projects are proposed in the area. Although some stormwater related projects were identified in the Mojave River Basin in the IRWM Plan, all projects are in conceptual pre-design phase and, therefore, were not modeled. At this time, there are no immediate plans to capture the stormwater runoff in the Morongo Basin for groundwater recharge. Review of the Mojave River Watershed Group (MRWG) Phase 2 Municipal Separate Storm Sewer System (MS4) annual reports on post-construction Best Management Practices (BMPs) and development of a stormwater resources plan by the Mojave IRWM Regional Water Management Group will be considered during the next SNMP update.

TDS and nitrate concentrations were estimated from the most current, pertinent information available for the following key inflows: Mojave River stream recharge, mountain-front recharge, SWP water Recharge, municipal WWTP effluent discharges, septic tank return flows, and municipal and agricultural irrigation return flows.

The key output of the mixing model is the estimated S/N concentration in each subregion, which was calculated as a volume-weighted average concentration at the end of each annual time step, in mg/L. The concentration difference between Scenario 2 versus Scenario 1 shows the effect of projected growth and associated increased water demand and imported water with no recycled water projects. The concentration difference between Scenario 3 versus Scenario 2 shows the effect of recycled water projects alone.

Similar to existing groundwater conditions, average groundwater TDS concentrations in the Mojave River Basin are below all three BPO concentrations in 4 out of 5 Alto subregions (Floodplain, Floodplain (Narrows), Left Regional, and Mid Regional), Baja – Floodplain, and Este – Regional. Assimilative capacity exists for all subregions based on a BPO of 1,000 mg/L, with the exception of Centro – Regional (Harper Dry Lake), which has historically high TDS concentrations due to dry lake evaporation and natural mineralization processes. At a BPO of 1,500 mg/L, assimilative capacity exists for all Mojave River Basin subregions.

In the Morongo Basin, average groundwater TDS concentrations are below all three BPO concentrations (and thus there is available assimilative capacity) in 4 of the 7 subregions (Ames-Means Valley, Warren Valley, Copper Mountain-Giant Rock, and Joshua Tree). Average TDS concentrations are above 500 mg/L in Lucerne Valley (south) and Johnson Valley. Average TDS concentrations in Lucerne Valley (north) are above 1,500 mg/L due to dry lake bed evaporation and natural mineralization. Therefore, no assimilative capacity exists in Lucerne Valley (north).

Despite some projected increases in nitrate concentrations in selected subregions, groundwater nitrate-NO_3 concentrations are generally well below the BPO concentration in all subregions. The average assimilative capacity is 30.9 mg/L across the Study Area, equating to about 8 mg/L use of current assimilative capacities on average. Subregions with below-average nitrate-NO_3 assimilative capacities (less than 30.9 mg/L) include the following:

- Centro – Floodplain
- Alto Transition Zone – Floodplain (Helendale)
- Alto Transition Zone – Floodplain
- Alto - Floodplain (Narrows)
- Alto – Right Regional
- Warren Valley
- Joshua Tree

Modeling results indicate that planned future recycled water projects have minimal impact on future groundwater TDS and nitrate concentrations in their respective subregions, and in some cases incrementally improve groundwater quality.

Modeling results also demonstrate that imported SWP water recharge would benefit groundwater TDS concentrations in each of the seven subregions projected to receive imported SWP water for groundwater recharge.

Section 6: Project Review, Prioritization, and Implementation Measures

During the Mojave IRWM Plan update process, 14 objectives were developed that reflect the broad range of current challenges and opportunities related to integrated water management in the

Mojave Region (an expanded version of the MWA service area). Two of the 14 objectives are related to recycled water and stormwater. These include the following:

1. Preserve water quality as it relates to local beneficial uses of water supplied by each source, including groundwater, stormwater, surface water, imported water, and recycled water.

2. Increase the use of recycled water in the Region, while maintaining compliance with the Mojave Basin Area Judgment as applicable.

Several ongoing programs are already being implemented that include measures for the management of water quality including salts and nutrients. These include the Mojave Basin Area and Warren Valley adjudications. 2004 RWMP, MWA Groundwater Storage Program, and Mojave IRWM Plan.

Projected future groundwater quality concentrations are not expected to exceed the SNMP water quality management goals and implementation of identified recycled water and stormwater projects will not unreasonably affect the MWA service area groundwater basins' designated beneficial uses. Therefore, no new or additional implementation measures are recommended to manage salts and nutrients within the Study Area. Several programs that help manage groundwater supplies and quality are underway in the basin; these programs fall under six categories, as follows:

- Groundwater Management (including SWP Water Recharge)
- Municipal Wastewater Management
- Recycled Water Irrigation
- Onsite Wastewater Treatment System Management
- Stormwater
- Agricultural

Section 7: Anti-Degradation Assessment

Resolution 68-16, the Statement of Policy with Respect to Maintaining High Quality Waters in California, was adopted by the SWRCB in 1968. The policy is the driving force behind the analysis and planning required for SNMPs.

Based on the evaluation of salt and nutrient loading, impacts from recycled water projects to groundwater TDS and nitrate concentrations (concentration differences between Scenario 3 and Scenario 2) are small, and in some subregions, result in a small incremental benefit to groundwater quality. The one exception is in the Warren Valley, where the new HDWD Regional WRP (which will treat wastewater to recycled water quality) will significantly improve TDS and nitrate groundwater concentrations.

Mixing model results indicate the following:

- No individual recycled water project uses more than 10% of the available assimilative capacity, and combined effects of simulated recycled water projects do not use more than 20% of the assimilative capacity.

- The water quality changes will not result in groundwater quality less than prescribed in the Basin Plan(s).
- The water quality changes will not unreasonably affect existing and anticipated beneficial uses.
- The water quality changes are consistent with the maximum benefit to the people of the state of California.

Accordingly, planned future recycled water projects evaluated under this SNMP are in compliance with SWRCB Resolution No. 68-16.

Section 8: Groundwater Monitoring Program

With respect to groundwater monitoring, the Recycled Water Policy states that the SNMP should include a monitoring program that consists of a network of monitoring locations "… adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salts, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives." Additionally, the SNMP "… must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with the adjacent surface waters." The preferred approach is to "… collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin. The monitoring plan shall identify those stakeholders responsible for conducting, sampling, and reporting the monitoring data. The data shall be reported to the RWQCBs at least every three years."

Existing groundwater quality monitoring programs implemented across the Study Area are deemed adequate for determining whether the concentrations of salts, nutrients, and other constituents of concern as identified in this SNMP are consistent with applicable water quality objectives on a subregional scale. The current MWA groundwater monitoring program includes groundwater quality data collected by MWA and the USGS through their cooperative water resources program and through the Drinking Water Program directed by the SWRCB DDW. The SNMP Groundwater Quality Monitoring Program will include data collected from these programs. Available data from special/technical studies conducted in the Study Area pertinent to S/Ns will be included along with RWQCB Waste Discharge Requirement (WDR) site monitoring data and future USGS GAMA monitoring data.

Data from the DDW Title 22 Drinking Water Well Program, MWA-USGS Cooperative Water Resource Program (CWRP), and MWA-led groundwater quality monitoring programs (collectively comprising the bulk of proposed SNMP Groundwater Quality Monitoring Program wells) are uploaded to the SWRCB Division of Drinking Water (DDW) water quality portal and USGS NWIS website on a regular basis. Data are publicly available. While no additional reporting is proposed, MWA is committed in supporting the Regional Boards to protect groundwater quality objectives through its participation in both groundwater monitoring and management. MWA maintains active GIS databases that can aid in the development of future regional policies as well as address localized groundwater quality issues.

Section 9 – CEQA Analysis

In discussions with the Lahontan and Colorado River Basin Regional Board staff, it was determined that if a Regional Board is going to do a basin plan amendment to incorporate the SNMP Implementation Plan, then a Substitute Environmental Document (SED) is required and the Regional Board will be the lead agency for the SED. The SED is the SWRCB's document akin to a programmatic environmental impact report (EIR) under CEQA.

While modeling results indicate that TDS and nitrate increases are anticipated in some subregions with recycled water projects, the assimilative capacity analysis indicates that the increases are in compliance with SWRCB Resolution 68-16 and Section 9.C.(1) of the Recycled Water Policy.

Because the Mojave SNMP makes no request to amend the Water Quality Control Plan or change established water quality control objectives, beneficial use designation, or implementation programs, the Lahontan and Colorado River Basin Regional Boards have determined that no SED is required.

Section 10 – Conclusions

Based on the requirements of the SWRCB Recycled Water Policy, groundwater quality characterization, salt and nutrient loading analysis, and assessment of S/N implementation measures and groundwater monitoring programs, the following conclusions can be made with respect to the Mojave SNMP:

- The extent and scale of existing groundwater monitoring programs is sufficient to characterize existing groundwater quality and evaluate groundwater quality trends with respect to S/Ns on a subbasin/subregion scale.

- Technical information used to develop regional water management planning documents, including the MWA UWMP, MWA IRWM Plan, and MBA Watermaster consumptive use evaluations provide sufficient resolution to reliably estimate contributions from major S/N loading sources on a subbasin/subregional scale.

- Three future scenarios were simulated using the SNMP groundwater quality mixing model to evaluate the individual effects of background population growth (and associated water demand and imported water use) and recycled water projects on future groundwater quality on a subbasin/subregional scale.

- Results of the modeling indicate that while increasing TDS and nitrate concentrations are anticipated in some subregions, planned recycled water projects do not contribute significantly to assimilative capacity use and in some subregions improve groundwater quality with respect to TDS and nitrate.

- The Mojave SNMP is in compliance with SWRCB Resolution 68-16 and Section 9.C.(1) of the Recycled Water Policy with respect to anti-degradation. No individual recycled water project uses more than 10% of the available assimilative capacity, and combined effects of simulated recycled water projects do not use more than 20% of the assimilative capacity. The water quality changes will not result in groundwater quality less than prescribed in the

Basin Plans. The water quality changes will not unreasonably affect existing and anticipated beneficial uses, and the water quality changes are consistent with the maximum benefit to the people of the state of California.

- Modeling results demonstrate that imported SWP water recharge improves groundwater quality with respect to salts and nutrients. TDS and nitrate concentrations of total inflows for subregions projected to receive SWP recharge water are lower with SWP water than without SWP water, clearly demonstrating the benefit of SWP recharge water.

- Existing groundwater monitoring programs implemented across the Study Area comprise the proposed SNMP groundwater monitoring program. Existing groundwater quality monitoring programs are deemed adequate for determining whether the concentrations of salts, nutrients, and other constituents of concern as identified in this SNMP are consistent with applicable water quality objectives on a subregional scale. Water quality data are uploaded to the SWRCB DDW water quality portal and USGS NWIS website on a regular basis. Data are publicly available and can be downloaded to evaluate future basin water quality changes and for comparison with model predictions. While no additional reporting is proposed, MWA is committed in supporting the Regional Boards to protect groundwater quality objectives through its participation in both groundwater monitoring and management.

- Because the SNMP does not propose to change water quality objectives, beneficial uses, or implementation programs, preparation of a SED was not required for the Mojave SNMP.