Mojave

Salt and Nutrient Management Plan

Final - Volume II of II (Appendices)

Kennedy/Jenks Consultants and Todd Groundwater

December 2015

FINAL

Mojave Salt and Nutrient Management Plan

Volume II of II (Appendices)

December 2015

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Mojave Salt and Nutrient Management Plan Appendices

Appendix A: Mojave SNMP Scope of Work

Appendix B: Stakeholder Meeting Materials

Appendix C: Subregional Synopses

Appendix A

Mojave Salt and Nutrient Management Plan Scope of Work

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MEETING OF JANUARY 11 AND 12, 2012
APPLE VALLEY, CALIFORNIA

ITEM: **11**

SUBJECT: **PROPOSED SCOPE OF WORK AND DEVELOPMENT OF A SALT AND NUTRIENT MANAGEMENT PLAN FOR THE MOJAVE INTEGRATED REGIONAL WATER MANAGEMENT GROUP, SAN BERNARDINO COUNTY**

CHRONOLOGY: February 2009 Recycled Water Policy Adopted by State Water Resources Control Board (State Water Board)

ISSUE: To provide the Water Board an opportunity to provide input on the content and development of a regional Salt and Nutrient Management Plan (SNMP) to manage salts and nutrients within the groundwaters of the Mojave watershed (Enclosure 1). The final SNMP will likely be adopted as a Basin Plan amendment at a later date.

DISCUSSION: The Mojave Water Agency (MWA) was formed in 1959 by an act of the California Legislature and was activated by a vote of the residents in 1960 to manage groundwater resources in the Mojave, El Mirage, and Lucerne Valley basins. The Morongo and Johnson Valley basins were later annexed in 1965. The MWA service area is within the boundaries of two Regional Water Boards, the Lahontan and Colorado River Water Boards. The Mojave and El Mirage basins (collectively referred to as "Mojave basin") are located in the Lahontan Region. The Lucerne Valley, Johnson Valley, and Morongo groundwater basins are located in the Colorado River Region.

Since 1994, MWA has been proactive in the development of a comprehensive water resources plan and worked closely with stakeholders to develop an Integrated Regional Water Management Plan (IRWMP) in 2004. The IRWMP addresses components of groundwater management, urban water management, agricultural water use, environmental habitat protection and restoration, and water quality throughout the MWA service area. In 2009, the California Department of Water Resources (DWR) approved the Mojave IRWM Region as the MWA service area boundary.

The Recycled Water Policy, State Water Board Resolution No. 2009-0011 (Enclosure 2), establishes goals to manage a

sustainable water supply through increased use of recycled water, enhanced stormwater management, and improved water conservation efforts. The Water Boards have determined that regulating individual waste discharges in a groundwater basin may not be effective or efficient at ensuring long-term protection of groundwater resources and its beneficial uses without some overall evaluation of potential salt and nutrient loading. One of the key elements of the Recycled Water Policy is the development of a SNMP for every groundwater basin within California by 2014. The purpose of the SNMP is to evaluate the potential for salt and nutrient increases from all sources and to develop a management plan to protect groundwater from accumulating salts and nutrients at concentrations that would degrade the quality of groundwater and limit its beneficial uses. Waste discharges could then be regulated in a manner consistent with the SNMP. Potential sources of salts and nutrients include naturally occurring salts and minerals in soils and bedrock, irrigation water (which could originate from surface water, groundwater, and/or recycled water), water banking projects, and discharges of waste to land from activities such as agricultural, industrial, commercial, and/or residential. The development of the SNMP is to be driven, controlled, and funded by local stakeholders, such as the Mojave IRWM Group, with participation by the regional water boards. Once developed, a SNMP will provide a roadmap for water agencies to manage salt and nutrient loading within a basin. Ultimately, the regional water boards will incorporate the various SNMPs into the Basin Plans. To offset the costs of developing and implementing a SNMP, grant funds are available through Proposition 84, which is administered by DWR.

The Mojave IRWM Group is in the process of updating its IRWMP and intends to incorporate the SNMP as an appendix to the updated plan. The objectives of the SNMP are: 1) gather available water quality data to evaluate the quality of surface water and groundwater at the watershed and sub-basin level; 2) identify potential sources of salt and nutrients and quantify loads for those sources; 3) determine assimilative capacity of the groundwater based on hydrologic/geologic characteristics and source water quality for individual sub-basins; 4) develop a water quality monitoring and reporting plan that is designed to evaluate and track the long-term impacts to groundwater quality resulting from past, current, and future land uses; 5) identify and recommend most appropriate methods and best management practices for reducing and/or maintaining salt and nutrient loadings; and 6) demonstrate that implementation of the SMP will satisfy the requirements of the State Antidegradation Policy, State Water Board Resolution No. 68-16 and the Recycled Water Policy. The scope of work for the Mojave SNMP follows draft guidance provided by the State Water Board (Enclosure 3). A timeline for tasks associated with the development of the SNMP is outlined in Enclosure 4.

Lahontan Water Board staff has provided comments to the Mojave IRWM Group on the draft scope of work dated November 2011 (Enclosure 5). Technical comments were made in an effort to clarify the purpose and goals of the SNMP as well as to guide the Mojave IRWM Group toward developing a comprehensive and defensible SNMP based on a reliable dataset. In essence, the intent of the SNMP is to serve as a long-term planning tool. Staff comments included: 1) stakeholder participation is critical to identify potential sources of salts and nutrients, to compile available water quality data, and to encourage successful implementation of the plan; 2) the model chosen to evaluate assimilative capacity needs to be adaptable and capable of integrating source loading from future projects; 3) the effects of importation of water and transferring recycled water sources between sub-basins should be considered; 4) long-term monitoring should continue until steady state conditions within the basin have been achieved; and 5) identify which agencies are responsible for managing current and future anthropogenic loads and what actions these agencies must take to provide the Water Board with assurances that local entities will manage the groundwater basin using their authorities or by other means to achieve the water quality specified in the plan. Based on the actual conditions over time, planning time scales may need to be adjusted. It is anticipated that the Mojave IRWM Group will submit a revised scope of work incorporating staff comments by December 23, 2011. The Mojave IRWM Group will present its revised scope of work at the Water Board meeting.

Water Board staff has solicited comments from the Mojave IRWM Group and interested parties regarding this agenda item.

RECOMMENDA-TION:

This is an informational item only. Water Board members may provide direction and input on the proposed scope of work and content of the SNMP for the groundwaters within the Mojave basin.

ENCLOSURE:	ITEM:	**BATES NUMBER:**
1	Proposed Scope of Work, November 2011 (Revised Scope of Work to be submitted to Water Board members prior to the Board meeting)	**11-7**
2	Recycled Water Policy	**11-13**
3	Suggested Elements of a SNMP (State Water Board Draft Guidance)	**11-33**
4	Timeline of Tasks	**11-39**
5	Staff Comments on Draft Scope of Work, December 2011	**11-43**

ENCLOSURE 1

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DRAFT SCOPE OF WORK
Salt/Nutrient Management Plan
Prepared by the Mojave IRWM Group

PURPOSE

To develop a regional Salt/Nutrient Management Plan (SMP) for the Mojave Water Agency Integrated Regional Water Management (IRWM) Region that will identify and manage, on a regional basis, salts and nutrients from sources within the region, for the purpose of maintaining regional water quality objectives and supporting beneficial uses. The intention is to involve surface water users, groundwater users and wastewater dischargers in the Mojave IRWM Region, as appropriate, to participate in efforts to protect these waters from accumulating concentrations of salt and nutrients that would degrade the quality of water supplies in the Mojave IRWM Region to the extent that it may limit their use.

BACKGROUND

On February 3, 2009, the State Water Resources Control Board (SWRCB) adopted a Recycled Water Policy (Policy) that addresses the concern for protecting the quality of California's groundwater basins. In response to this Policy, the Mojave Water Agency (MWA) and Victor Valley Wastewater Reclamation Authority (VVWRA), with support from Lahontan Regional Water Quality Control Board (Lahontan Water Board) and Colorado River Regional Water Quality Control Board (Colorado Water Board) staff, initiated efforts to organize a group to develop a regional SMP for the Mojave IRWM Region.

MWA will soon begin preparation of an update to its IRWM Plan and has proposed including the SMP within the IRWMP update. In 2009, MWA completed a “Region Acceptance Process” with the CA Department of Water Resources (DWR), and DWR approved the Mojave IRWM Region as submitted. The Mojave IRWM Region follows MWA boundaries and includes the Mojave River Groundwater Basin and its subareas, as well as the Morongo Basin Area and its groundwater basins. A majority of the Region falls within the South Lahontan Hydrologic Region and a portion in the Colorado River Hydrologic Region.

Per the Policy, the SMP shall be completed and proposed to the Lahontan and Colorado Water Boards by May 14, 2014. If the Water Boards find that the stakeholders are making substantial progress toward completion of the plan, the deadline, at the discretion of the Water Boards may extend the deadline till May 14, 2016. In no case shall the period for the completion of the plan exceed seven years from the date of the Policy.

GOALS

1. Manage salts and nutrients on a regional basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses.

2. Prepare a Salt/Nutrient Management Plan, in a collaborative effort with stakeholders, which meets the requirements for a SMP as described in the SWRCB Policy.

3. Audit and leverage existing information and studies conducted within the Mojave IRWM Region in order to avoid duplication of efforts in preparing the SMP.

4. Develop the Plan to be consistent with and incorporated into the IRWMP ultimately adopted by the MWA.

WORK PLAN

Task 1: Stakeholder Participation

Collaborate with Lahontan and Colorado Water Board staff and other stakeholders, receive and review stakeholder input. It is anticipated that most of the stakeholder participation will occur during meetings of the Technical Advisory Committee to the MWA, in the context of the IRWMP update. A primary initial outcome of this task will be to reach consensus regarding the stakeholder participants appropriate for this planning effort and to identify ways to effectively involve as many of those stakeholders with the TAC as is practical.

Task 2: Review/Assemble Existing Data & Research

Evaluate existing data and previously completed water quality management efforts to prepare an adequate SMP. An extensive amount of research and data collection has already occurred with respect to salts and nutrients in the Mojave IRWM Region. A Groundwater Quality Analysis[1] and associated Salt Model was developed in 2007 that identified contributors to salt within the Region, evaluated current and past trends in water quality, and modeled potential changes over time due to loading from various existing and anticipated sources under different scenarios. Existing information and research may need to be updated, but to the extent possible, new research should be minimized and existing information should be leveraged for inclusion within the SMP. At a minimum, the following sources should be reviewed:

- The 2007 Groundwater Quality Analysis
- Groundwater Quality Planning Model (Salt Model) developed for the 2007 Groundwater Quality Analysis
- MWA's groundwater monitoring program and associated water quality database
- MWA's 2004 RWMP, which includes a Groundwater Management Planning component, and associated EIR

[1] Groundwater Quality Analysis Technical Memorandum/Phase 1 Between Mojave Water Agency and Schlumberger Water Services. May 7, 2007

- Potential for Ground-Water Contamination from Movement of Wastewater Through the Unsaturated Zone, Upper Mojave River Basin, California, 1993
- Technical Study to Evaluate a Long-Term Water Management Program Between MWA and Metropolitan Water District, and associated EIR, December 2005
- July 29, 2004 MOU between MWA, Lahontan Water Board, and High Desert Power Project, LLC.
- Antidegradation Studies for Discharges to Surface and Groundwater, VVWRA 2009
- Mojave River Characterization Study, VVWRA 2010
- Cumulative Impact Analysis, VVWRA 2011
- Various USGS studies

Task 3: Salt/Nutrient Characterization
Characterize salt and nutrients within the Mojave IRWM Region and groundwater basins, utilizing to the extent possible, existing information identified in Task 2. Leverage work already completed in the existing 2007 Groundwater Quality Analysis and Salt Model to compile the following information into the SMP:

- Existing and background water quality.
- Current and projected sources of salts/nutrients. Review/update existing planning scenarios, including a map and database of current land uses contributing to salt/nutrients. Include the quality and quantity of existing and projected wastewater/recycled water discharges to basins, imported water recharge, septic discharges, return flow from applied agricultural and dairy water, and other sources of salt/nutrients.
- The basins' assimilative capacity of salts/nutrients, to the extent possible with the current body of knowledge.
- The regional effects and loading estimates of salt/nutrients from existing and projected land uses and water management practices identified, to the extent possible with the current body of knowledge.
- Update and refine existing model to serve as a tool to identify potential short and long-term regional water quality impacts associated with implementing projects identified in the accompanying IRWMP consistent with the State Antidegradation Policy (Resolution No. 68-16).
- Prepare a draft report to the stakeholders including data collected and results found in the Salt/Nutrient characterization.

Task 4: Monitoring & Reporting Plan
Review existing monitoring programs, identify data gaps, and recommend changes if needed, in order to comply with SMP requirements. Include in the SMP a Monitoring Plan that provides a reasonable means of determining whether the concentrations of salts, nutrients, and other constituents of concern are consistent with applicable water quality objectives. The monitoring plan should be designed to evaluate the long-term regional impacts to groundwater quality resulting from current and future land uses, as well as localized impacts in critical areas where appropriate, and should include the following:

- Recommendations for additional appropriate monitoring locations and frequencies that collectively would represent the regional-level water quality and changes in water quality for basins within the SMP. In addition, the monitoring program should identify critical localized areas where additional monitoring should be concentrated near water supply wells and areas proximate to large water recycling projects and groundwater recharge projects.
- Include a provision for identifying and monitoring Constituents of Emerging Concern.
- List stakeholders responsible for development of new monitoring sites/facilities, conducting, compiling, and reporting the monitoring data.
- Determine the cost of additional monitoring and possible funding sources.
- Data from the Monitoring Plan will be reported to the Lahontan and Colorado Water Boards every 3 years by the appropriate collecting parties.

Task 5: Implementation Measures
Identify and recommend methods and regional Best Management Practices (BMP's) to manage salt and nutrient loadings on a sustainable basis. Development of implementation measure recommendations and BMP's should be of a regional nature and through a collaborative process with the stakeholders.

Task 6: Recycled Water & Stormwater Use/Recharge
Identify recycled water and stormwater use/recharge goals and objectives.

Task 7: Prepare Plan for Submittal to Water Boards
The SMP shall be completed and proposed to the Lahontan and Colorado Water Boards by May 14, 2014, unless the Water Boards find that the stakeholders are making substantial progress toward completion of the plan. In no case shall the period for the completion of the plan exceed seven years. The SMP will be included within the IRWMP update, and CEQA compliance will be conducted at the IRWMP level; therefore, CEQA was not included as a task within SMP preparation.

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ENCLOSURE 2

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Enclosure 2

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2009-0011

ADOPTION OF A POLICY FOR
WATER QUALITY CONTROL FOR RECYCLED WATER

WHEREAS:

1. The Strategic Plan Update 2008-2012 for the Water Boards includes a priority to increase sustainable local water supplies available for meeting existing and future beneficial uses by 1,725,000 acre-feet per year, in excess of 2002 levels, by 2015, and ensure adequate water flows for fish and wildlife habitat. This Recycled Water Policy (Policy) is intended to support the Strategic Plan priority to Promote Sustainable Local Water Supplies. Increasing the acceptance and promoting the use of recycled water is a means towards achieving sustainable local water supplies and can result in reduction in greenhouse gases, a significant driver of climate change. The Policy is also intended to encourage beneficial use of, rather than solely disposal of, recycled water.

2. California Water Code section 13140 authorizes the State Water Resources Control Board (State Water Board) to adopt state policy for water quality control.

3. On March 20, 2007, the State Water Board conducted a public workshop on recycled water.

4. On September 28, 2007, staff circulated a draft Recycled Water Policy and a draft staff report/certified regulatory program environmental analysis/California Environmental Quality Act (CEQA) checklist for public comment.

5. On October 2, 2007, the State Water Board conducted a public workshop on the draft Recycled Water Policy.

6. On February 15, 2008, the State Water Board circulated an updated version of the draft Policy and the draft staff report/certified regulatory program environmental analysis/CEQA checklist.

7. On November 21, 2008, the State Water Board circulated another updated version of the draft Policy and the draft staff report/certified regulatory program environmental analysis/ CEQA checklist.

8. Staff has responded to significant verbal and written comments received from the public and made revisions to the draft Policy in response to the comments.

9. On January 6, 2009, the State Water Board conducted a public hearing on the draft Policy. In response, staff has revised the draft Policy, which is available at http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/draft_recycled_water_policy_011609.pdf. Staff has also revised the draft staff report, which is available at http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/docs/020309_draftstaffreport_checklist_01162009.pdf.

10. The Policy includes findings, including findings related to compliance with State Water Board Resolution No. 68-16, that are hereby incorporated by reference.

11. The State Water Board received a letter from statewide water and wastewater entities dated December 19, 2008, strongly urging their member agencies to commit funding and in-kind resources to facilitate development of salt/nutrient management plans within the five-year timeframe established by the State Water Board in the Policy.

12. The Resources Agency has approved the State Water Board's and the Regional Water Quality Control Boards' water quality control planning process as a "certified regulatory program" that adequately satisfies the CEQA requirements for preparing environmental documents. State Water Board staff has prepared a "substitute environmental document" for this project that contains the required environmental documentation under the State Water Board's CEQA regulations. (California Code of Regulations, title 23, section 3777.) The substitute environmental documents include the "Draft Staff Report and Certified Regulatory Program Environmental Analysis Recycled Water Policy," which includes an environmental checklist, the comments and responses to comments, the Policy itself, and this resolution. The project is the adoption of a Recycled Water Policy.

13. In preparing the substitute environmental documents, the State Water Board has considered the requirements of Public Resources Code section 21159 and California Code of Regulations, title 14, section 15187, and intends these documents to serve as a Tier 1 environmental review. The State Water Board has considered the reasonably foreseeable consequences of adoption of the draft Policy; however, potential site-specific recycled water project impacts may need to be considered in any subsequent environmental analysis performed by lead agencies, pursuant to Public Resources Code section 21159.1.

14. Consistent with CEQA, the substitute environmental documents do not engage in speculation or conjecture but, rather, analyze the reasonably foreseeable environmental impacts related to methods of compliance with the draft Policy, reasonably foreseeable mitigation measures to reduce those impacts, and reasonably feasible alternative means of compliance that would avoid or reduce the identified impacts.

15. The draft Policy incorporates mitigation that reduces to a level that is insignificant any adverse effects on the environment. From a program-level perspective, incorporation of the mitigation measures described in the substitute environmental document will foreseeably reduce impacts to less than significant levels.

16. A policy for water quality control does not become effective until adopted by the State Water Board and until the regulatory provisions are approved by the Office of Administrative Law (OAL).

17. If, during the OAL approval process, OAL determines that minor, non-substantive modifications to the language of the Policy are needed for clarity or consistency, the Executive Director or designee may make such changes consistent with the State Water Board's intent in adopting this Policy, and shall inform the State Water Board of any such changes.

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves and adopts the CEQA substitute environmental documentation, which includes the staff report/certified regulatory program environmental analysis/CEQA checklist, and the response to comments, which was prepared in accordance with the requirements of the State Water Board's certified regulatory CEQA process (as set forth in California Code of Regulations, title 23, section 3775, et seq.), Public Resources Code section 21159, and California Code of Regulations, title 14, section 15187, and directs the Executive Director or designee to sign the environmental checklist.

2. After considering the entire record, including oral testimony at the public hearing, adopts the Recycled Water Policy.

3. Authorizes the Executive Director or designee to submit the Recycled Water Policy to OAL for review and approval.

4. If, during the OAL approval process, OAL determines that minor, non-substantive modifications to the language of the Policy are needed for clarity or consistency, directs the Executive Director or designee to make such changes and inform the State Water Board of any such changes.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on February 3, 2009.

AYE:	Chair Tam M. Doduc Charles R. Hoppin Frances Spivy-Weber
NAY:	None
ABSENT:	Arthur G. Baggett, Jr.
ABSTAIN:	None

Jeanine Townsend
Clerk to the Board

Recycled Water Policy

1. ***Preamble***

California is facing an unprecedented water crisis.

The collapse of the Bay-Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River and failing levees in the Delta to create a new reality that challenges California's ability to provide the clean water needed for a healthy environment, a healthy population and a healthy economy, both now and in the future.

These challenges also present an unparalleled opportunity for California to move aggressively towards a sustainable water future. The State Water Resources Control Board (State Water Board) declares that we will achieve our mission to "preserve, enhance and restore the quality of California's water resources to the benefit of present and future generations." To achieve that mission, we support and encourage every region in California to develop a salt/nutrient management plan by 2014 that is sustainable on a long-term basis and that provides California with clean, abundant water. These plans shall be consistent with the Department of Water Resources' Bulletin 160, as appropriate, and shall be locally developed, locally controlled and recognize the variability of California's water supplies and the diversity of its waterways. We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling, water conservation, and maintenance of supply infrastructure and the use of stormwater (including dry-weather urban runoff) in these plans; these sources of supply are drought-proof, reliable, and minimize our carbon footprint and can be sustained over the long-term.

We declare our independence from relying on the vagaries of annual precipitation and move towards sustainable management of surface waters and groundwater, together with enhanced water conservation, water reuse and the use of stormwater. To this end, we adopt the following goals for California:

- **Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.**
- **Increase the use of stormwater over use in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.**
- **Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020.**
- **Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.**

The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in Water Code section 13050(n), in a manner that implements state and federal water quality laws. The State Water Board expects to

develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

When used in compliance with this Policy, Title 22 and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses.

2. *Purpose of the Policy*

a. The purpose of this Policy is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards), proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects.

b. It is the intent of the State Water Board that all elements of this Policy are to be interpreted in a manner that fully implements state and federal water quality laws and regulations in order to enhance the environment and put the waters of the state to the fullest use of which they are capable.

c. This Policy describes permitting criteria that are intended to streamline the permitting of the vast majority of recycled water projects. The intent of this streamlined permit process is to expedite the implementation of recycled water projects in a manner that implements state and federal water quality laws while allowing the Regional Water Boards to focus their limited resources on projects that require substantial regulatory review due to unique site-specific conditions.

d. By prescribing permitting criteria that apply to the vast majority of recycled water projects, it is the State Water Board's intent to maximize consistency in the permitting of recycled water projects in California while also reserving to the Regional Water Boards sufficient authority and flexibility to address site-specific conditions.

e. The State Water Board will establish additional policies that are intended to assist the State of California in meeting the goals established in the preamble to this Policy for water conservation and the use of stormwater.

f. For purposes of this Policy, the term "permit" means an order adopted by a Regional Water Board or the State Water Board prescribing requirements for a recycled water project, including but not limited to water recycling requirements, master reclamation permits, and waste discharge requirements.

3. *Benefits of Recycled Water*

The State Water Board finds that the use of recycled water in accordance with this Policy, that is, which supports the sustainable use of groundwater and/or surface water, which is

sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water, is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the California Environmental Quality Act (CEQA).

4. *Mandate for the Use of Recycled Water*

a. The State Water Board and Regional Water Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws.

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through the cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

(2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

(3) The State Water Board hereby declares that, pursuant to Water Code sections 13550 *et seq.*, it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject to the conditions established in sections 13550 *et seq.* The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible to enforce the mandates of this subparagraph.

b. These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.

c. The water industry and the environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.

d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC), and the California Department of Water Resources (CDWR) to use their respective authorities to the fullest extent practicable to assist the State Water Board and the Regional Water Boards in increasing the use of recycled water in California.

5. *Roles of the State Water Board, Regional Water Boards, CDPH and CDWR*

The State Water Board recognizes that it shares jurisdiction over the use of recycled water with the Regional Water Boards and with CDPH. In addition, the State Water Board recognizes that CDWR and the CPUC have important roles to play in encouraging the use of recycled water. The State Water Board believes that it is important to clarify the respective roles of each of these agencies in connection with recycled water projects, as follows:

a. The State Water Board establishes general policies governing the permitting of recycled water projects consistent with its role of protecting water quality and sustaining water supplies. The State Water Board exercises general oversight over recycled water projects, including review of Regional Water Board permitting practices, and shall lead the effort to meet the recycled water use goals set forth in the Preamble to this Policy. The State Water Board is also charged by statute with developing a general permit for irrigation uses of recycled water.

b. The CDPH is charged with protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. Regional Water Boards shall appropriately rely on the expertise of CDPH for the establishment of permit conditions needed to protect human health.

c. The Regional Water Boards are charged with protection of surface and groundwater resources and with the issuance of permits that implement CDPH recommendations, this Policy, and applicable law and will, pursuant to paragraph 4 of this Policy, use their authority to the fullest extent possible to encourage the use of recycled water.

d. CDWR is charged with reviewing and, every five years, updating the California Water Plan, including evaluating the quantity of recycled water presently being used and planning for the potential for future uses of recycled water. In undertaking these tasks, CDWR may appropriately rely on urban water management plans and may share the data from those plans with the State Water Board and the Regional Water Boards. CDWR also shares with the State Water Board the authority to allocate and distribute bond funding, which can provide incentives for the use of recycled water.

e. The CPUC is charged with approving rates and terms of service for the use of recycled water by investor-owned utilities.

6. *Salt/Nutrient Management Plans*

a. *Introduction.*

(1) Some groundwater basins in the state contain salts and nutrients that exceed or threaten to exceed water quality objectives established in the applicable Water Quality Control Plans (Basin Plans), and not all Basin Plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salt or nutrients. These conditions can be caused by natural soils/conditions, discharges of waste, irrigation using surface water, groundwater or recycled water and water supply augmentation using surface or recycled water. Regulation of recycled water alone will not address these conditions.

(2) It is the intent of this Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address salt and nutrient issues is through the development of regional or subregional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects.

b. *Adoption of Salt/ Nutrient Management Plans.*

(1) The State Water Board recognizes that, pursuant to the letter dated December 19, 2008 and attached to the Resolution adopting this Policy, the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Regional Water Board staff.

(a) It is the intent of this Policy for every groundwater basin/sub-basin in California to have a consistent salt/nutrient management plan. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality. It is also the intent of the State Water Board that because stormwater is typically lower in nutrients and salts and can augment local water supplies, inclusion of a significant stormwater use and recharge component within the salt/nutrient management plans is critical to the long-term sustainable use of water in California. Inclusion of stormwater recharge is consistent with State Water Board Resolution No. 2005-06, which establishes sustainability as a core value for State Water Board programs and

also assists in implementing Resolution No. 2008-30, which requires sustainable water resources management and is consistent with Objective 3.2 of the State Water Board Strategic Plan Update dated September 2, 2008.

(b) Salt and nutrient plans shall be tailored to address the water quality concerns in each basin/sub-basin and may include constituents other than salt and nutrients that impact water quality in the basin/sub-basin. Such plans shall address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects.

(c) Such plans may be developed or funded pursuant to the provisions of Water Code sections 10750 *et seq.* or other appropriate authority.

(d) Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.

(e) The requirements of this paragraph shall not apply to areas that have already completed a Regional Water Board approved salt and nutrient plan for a basin, sub-basin, or other regional planning area that is functionally equivalent to paragraph 6(b)3.

(f) The plans may, depending upon the local situation, address constituents other than salt and nutrients that adversely affect groundwater quality.

(2) Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.

(3) Each salt and nutrient management plan shall include the following components:

(a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable,

cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

(i) The monitoring plan must be designed to determine water quality in the basin. The plan 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 adjacent surface waters.

(ii) The preferred approach to monitoring plan development 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.

(iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.

(b) A provision for annual monitoring of Emerging Constituents/ Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.

(c) Water recycling and stormwater recharge/use goals and objectives.

(d) Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.

(e) Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.

(f) An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.

(4) Nothing in this Policy shall prevent stakeholders from developing a plan that is more protective of water quality than applicable standards in the Basin Plan. No Regional Water Board, however, shall seek to modify Basin Plan objectives without full compliance with the process for such modification as established by existing law.

7. *Landscape Irrigation Projects*

a. *Control of incidental runoff.* Incidental runoff is defined as unintended small amounts (volume) of runoff from recycled water use areas, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence. Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a National Pollutant Discharge Elimination System (NPDES) permit, including municipal separate storm water system permits, but regardless of the regulatory instrument, the project shall include, but is not limited to, the following practices:

(1) Implementation of an operations and management plan that may apply to multiple sites and provides for detection of leaks, (for example, from broken sprinkler heads), and correction either within 72 hours of learning of the runoff, or prior to the release of 1,000 gallons, whichever occurs first,

(2) Proper design and aim of sprinkler heads,

(3) Refraining from application during precipitation events, and

(4) Management of any ponds containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and there is notification of the appropriate Regional Water Board Executive Officer of the discharge.

b. *Streamlined Permitting*

(1) The Regional Water Boards shall, absent unusual circumstances (i.e., unique, site-specific conditions such as where recycled water is proposed to be used for irrigation over high transmissivity soils over a shallow (5' or less) high quality groundwater aquifer), permit recycled water projects that meet the criteria set forth in this Policy, consistent with the provisions of this paragraph.

(2) If the Regional Water Board determines that unusual circumstances apply, the Regional Water Board shall make a finding of unusual circumstances based on substantial evidence in the record, after public notice and hearing.

(3) Projects meeting the criteria set forth below and eligible for enrollment under requirements established in a general order shall be enrolled by the State or Regional Water Board within 60 days from the date on which an application is deemed complete by the State or Regional Water Board. For projects that are not enrolled in a general order, the Regional Water Board shall consider permit adoption within 120 days from the date on which the application is deemed complete by the Regional Water Board.

(4) Landscape irrigation projects that qualify for streamlined permitting shall not be required to include a project specific receiving water and groundwater monitoring component unless such project specific monitoring is required under the adopted salt/nutrient management plan. During the interim while the salt management plan is under development, a landscape irrigation project proponent can either perform project specific monitoring, or actively participate in the development and implementation of a salt/nutrient management plan, including basin/sub-basin monitoring. Permits or requirements for landscape irrigation projects shall include, in addition to any other appropriate recycled water monitoring requirements, recycled water monitoring for CECs on an annual basis and priority pollutants on a twice annual basis. Except as requested by CDPH, State and Regional Water Board monitoring requirements for CECs shall not take effect until 18 months after the effective date of this Policy. In addition, any permits shall include a permit reopener to allow incorporation of appropriate monitoring requirements for CECs after State Water Board action under paragraph 10(b)(2).

(5) It is the intent of the State Water Board that the general permit for landscape irrigation projects be consistent with the terms of this Policy.

c. *Criteria for streamlined permitting.* Irrigation projects using recycled water that meet the following criteria are eligible for streamlined permitting, and, if otherwise in compliance with applicable laws, shall be approved absent unusual circumstances:

(1) Compliance with the requirements for recycled water established in Title 22 of the California Code of Regulations, including the requirements for treatment and use area restrictions, together with any other recommendations by CDPH pursuant to Water Code section 13523.

(2) Application in amounts and at rates as needed for the landscape (i.e., at agronomic rates and not when the soil is saturated). Each irrigation project shall be subject to an operations and management plan, that may apply to multiple sites, provided to the Regional Water Board that specifies the agronomic rate(s) and describes a set of reasonably practicable measures to ensure compliance with this requirement, which may include the development of water budgets for use areas, site

supervisor training, periodic inspections, tiered rate structures, the use of smart controllers, or other appropriate measures.

(3) Compliance with any applicable salt and nutrient management plan.

(4) Appropriate use of fertilizers that takes into account the nutrient levels in the recycled water. Recycled water producers shall monitor and communicate to the users the nutrient levels in their recycled water.

8. *Recycled Water Groundwater Recharge Projects*

a. The State Water Board acknowledges that all recycled water groundwater recharge projects must be reviewed and permitted on a site-specific basis, and so such projects will require project-by-project review.

b. Approved groundwater recharge projects will meet the following criteria:

(1) Compliance with regulations adopted by CDPH for groundwater recharge projects or, in the interim until such regulations are approved, CDPH's recommendations pursuant to Water Code section 13523 for the project (e.g., level of treatment, retention time, setback distance, source control, monitoring program, etc.).

(2) Implementation of a monitoring program for constituents of concern and a monitoring program for CECs that is consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy and that takes into account site-specific conditions. Groundwater recharge projects shall include monitoring of recycled water for CECs on an annual basis and priority pollutants on a twice annual basis.

c. Nothing in this paragraph shall be construed to limit the authority of a Regional Water Board to protect designated beneficial uses, *provided* that any proposed limitations for the protection of public health may only be imposed following regular consultation by the Regional Water Board with CDPH, consistent with State Water Board Orders WQ 2005-0007 and 2006-0001.

d. Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing the dissolution of constituents, such as arsenic, from the geologic formation into groundwater.

e. Projects that utilize surface spreading to recharge groundwater with recycled water treated by reverse osmosis shall be permitted by a Regional Water Board within one year of receipt of recommendations from CDPH. Furthermore, the Regional Water Board shall give a high priority to review and approval of such projects.

9. *Antidegradation*

a. The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the Legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state.

b. Activities involving the disposal of waste that could impact high quality waters are required to implement best practicable treatment or control of the discharge necessary to ensure that pollution or nuisance will not occur, and the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

c. Groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law is to the benefit of the people of the state of California. Nonetheless, the State Water Board finds that groundwater recharge projects using recycled water have the potential to lower water quality within a basin. The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:

(1) A project that utilizes less than 10 percent of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20 percent of the available assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board, until such time as the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the Regional Water Board shall calculate the impacts of the project or projects over at least a ten year time frame.

(2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1), then a Regional Water Board-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the Regional Water Board to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

d. Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.

(1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

(2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a groundwater basin).

10. *Emerging Constituents/Chemicals of Emerging Concern*

a. *General Provisions*

(1) Regulatory requirements for recycled water shall be based on the best available peer-reviewed science. In addition, all uses of recycled water must meet conditions set by CDPH.

(2) Knowledge of risks will change over time and recycled water projects must meet legally applicable criteria. However, when standards change, projects should be allowed time to comply through a compliance schedule.

(3) The state of knowledge regarding CECs is incomplete. There needs to be additional research and development of analytical methods and surrogates to determine potential environmental and public health impacts. Agencies should minimize the likelihood of CECs impacting human health and the environment by means of source control and/or pollution prevention programs.

(4) Regulating most CECs will require significant work to develop test methods and more specific determinations as to how and at what level CECs impact public health or our environment.

b. *Research Program.* The State Water Board, in consultation with CDPH and within 90 days of the adoption of this Policy, shall convene a "blue-ribbon" advisory panel to guide future actions relating to constituents of emerging concern.

(1) The panel shall be actively managed by the State Water Board and shall be composed of at least the following: one human health toxicologist, one environmental toxicologist, one epidemiologist, one biochemist, one civil engineer familiar with the design and construction of recycled water treatment facilities, and one chemist familiar with the design and operation of advanced laboratory methods for the detection of emerging constituents. Each of these panelists shall have extensive experience as a principal investigator in their respective areas of expertise.

(2) The panel shall review the scientific literature and, within one year from its appointment, shall submit a report to the State Water Board and CDPH describing the current state of scientific knowledge regarding the risks of emerging constituents to public health and the environment. Within six months of receipt of the panel's report the State Water Board, in coordination with CDPH, shall hold a public hearing to consider recommendations from staff and shall endorse the recommendations, as appropriate, after making any necessary modifications. The panel or a similarly constituted panel shall update this report every five years.

(3) Each report shall recommend actions that the State of California should take to improve our understanding of emerging constituents and, as may be appropriate, to protect public health and the environment.

(4) The panel report shall answer the following questions: What are the appropriate constituents to be monitored in recycled water, including analytical methods and method detection limits? What is the known toxicological information for the above constituents? Would the above lists change based on level of treatment and use? If so, how? What are possible indicators that represent a suite of CECs? What levels of CECs should trigger enhanced monitoring of CECs in recycled water, *groundwater and/or surface waters*?

c. *Permit Provisions.* Permits for recycled water projects shall be consistent both with any CDPH recommendations to protect public health and with any actions by the State Water Board taken pursuant to paragraph 10(b)(2).

11. *Incentives for the Use of Recycled Water*

a. *Funding*

The State Water Board will request CDWR to provide funding ($20M) for the development of salt and nutrient management plans during the next three years (i.e., before FY 2010/2011). The State Water Board will also request CDWR to provide priority funding for projects that have major recycling components; particularly those that decrease demand on potable water supplies. The State Water Board will also request priority funding for stormwater recharge projects that augment local water supplies. The State Water Board shall promote the use of the State Revolving Fund (SRF) for water purveyor, stormwater agencies, and water recyclers to use for water reuse and stormwater use and recharge projects.

b. *Stormwater*

The State Water Board strongly encourages all water purveyors to provide financial incentives for water recycling and stormwater recharge and reuse projects. The State Water Board also encourages the Regional Water Boards to require less stringent monitoring and regulatory requirements for stormwater treatment and use projects than for projects involving untreated stormwater discharges.

c. TMDLs

Water recycling reduces mass loadings from municipal wastewater sources to impaired waters. As such, waste load allocations shall be assigned as appropriate by the Regional Water Boards in a manner that provides an incentive for greater water recycling.

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ENCLOSURE 3

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Enclosure 3

DRAFT
SALT/NUTRIENT MANAGEMENT PLANS
— SUGGESTED ELEMENTS —

I. BACKGROUND

- **Purpose**
  - **Protection of Beneficial Use**
  - **Sustainability of Water Resources**
  - **Problem Statement**
- **Salt/Nutrient Management Objectives**
- **Regulatory Framework**
- **Groundwater Beneficial Uses**
- ***Stakeholder Roles and Responsibilities***
- **Process to Develop Salt/Nutrient Management Plan**

II. GROUNDWATER BASIN CHARATERISTICS

1. GROUNDWATER BASIN OVERVIEW

- **Physiographic Description**
- **Groundwater Basin and/or Sub-Basin Boundaries**
- **Watershed Boundaries**
- **Geology**
- **Hydrogeology/Hydrology**
- **Aquifers**
- **Recharge Areas**
- **Hydrologic Areas Tributary to the Groundwater Basin**
- **Climate**
- **Land Cover and Land Use**
- **Water Sources**

2. GROUNDWATER INVENTORY

- **Groundwater Levels**
  - **Historical, Existing, Regional Changes**
- **Groundwater Storage**
  - **Historical, Existing, Changes**
- **Groundwater Production**
  - **Historical, Existing, Spatial and Temporal Changes, Safe Yield**
- **Groundwater Mixing and Movement**
  - **Subsurface Inflow/Outflow**
  - **Horizontal and Vertical Movement and Mixing**

3. *BASIN WATER QUALITY*

- ***Groundwater Quality***
  - **Background, Historical, Existing**
  - **Water Quality Objectives**
- **Surface Water Quality**
- **Delivered Water Quality**
- **Imported Water Quality**
- **Recycled Water Quality**

Bold = Required by the Recycled Water Policy

DRAFT
SALT/NUTRIENT MANAGEMENT PLANS
— SUGGESTED ELEMENTS —

III. BASIN EVALUATION

1. WATER BALANCE

- Conceptual Model
- Basin Inflow/Outflow
- Groundwater, Surface Water, Imported Water, Water Transfers, Recycled Water Irrigation, Waste Water Discharges, Agricultural Runoff, Stormwater Runoff (Urban, Agriculture, Open Space), Precipitation
- Infiltration, Evaporation, Evapotranspiration, Recharge, Surface Water and Groundwater Connectivity

2. *SALT AND NUTRIENT BALANCE*

- Conceptual Model
- ***Salt and Nutrient Source Identification***
- ***Salt and Nutrient Loading Estimates***
  - Historical, Existing, Projected
- Import/Export
- ***Basin/Sub-Basin Assimilative Capacity for Salt and Nutrients***
- ***Fate and Transport of Salt and Nutrients***

3. *CONSTITUENTS OF EMERGING CONCERNS (CECs)**

* - Requirements for monitoring CECs will be determined following State Water Board review of the CEC Advisory Panel's report due in June 2010.

- Constituents
- CEC Source Identification

4. PROJECTED WATER QUALITY

IV. SALT AND NUTRIENT MANAGEMENT STRATEGIES

- Load Reduction Goals
- Future Land Development and Use
- Salt/Nutrient Management Options
- Salt/Nutrient Management Strategies and Modeling
  - Management Strategy Model Results
  - Feasibility
  - Cost

V. BASIN MANAGEMENT PLAN ELEMENTS

1. GROUNDWATER MANAGEMENT GOALS

- Groundwater Management Goals
- ***Recycled Water and Stormwater Use/Recharge Goals and Objectives***

2. *BASIN MONITORING PROGRAMS*

- ***Identify Responsible Stakeholder(s) Implementing the Monitoring***
- Monitoring Program Goals
- Sampling Locations
- ***Water Quality Parameters***
- ***Sampling Frequency***
- Quality Assurance/Quality Control
- Database Management

Bold = Required by the Recycled Water Policy

- Data Analysis and Reporting
- Groundwater Level Monitoring
- ***Basin Water Quality Monitoring***
- ***Groundwater Quality Monitoring***
  - ***Areas of Surface Water and Groundwater Connectivity***
  - ***Areas of Large Recycled Water Projects***
  - ***Recycled Water Recharge Areas***
- Surface Water Quality Monitoring
- Stormwater Monitoring
- Wastewater Discharge Monitoring
- Recycled Water Quality Monitoring
- Salt and Nutrient Source Loading Monitoring
- Other Constituents of Concern
- Water Balance Monitoring
  - Climatological Monitoring
  - Surface Water Flow Monitoring
  - Groundwater Production Monitoring

3. SALT AND NUTRIENT LOAD ALLOCATIONS

VI. ***CEQA ANALYSIS***

VII. ***ANTIDEGRADATION ANALYSIS***

VIII. PLAN IMPLEMENTATION

1. ***SALT AND NUTRIENT MANAGEMENT PROGRAM***

- Organizational Structure
- ***Stakeholder Responsibilities***
- ***Implementation Measures to Manage Salt and Nutrient Loading***
- Salt/Nutrient Management
  - Water Supply Quality
  - Regulations of Salt/Nutrients
  - Load Allocations
  - Salt and Nutrient Source Control
  - CEC Source Control
  - Site Specific Requirements
- Groundwater Resource Protection
- Additional Studies

2. PERIODIC REVIEW OF SALT/NUTRIENT MANAGEMENT PLAN

- Adaptive Management Plan
- Performance Measures
- Performance Evaluation

3. COST ANALYSIS

- CWC § 13141, "...prior to implementation of any agricultural water quality control program, an estimate of the total cost of such a program, together with an identification of potential sources of funding, shall be indicated in any regional water quality control plan."

4. IMPLEMENTATION SCHEDULE

Bold = Required by the Recycled Water Policy

5. PUBLIC HEARING AND ADOPTION

Bold = Required by the Recycled Water Policy

ENCLOSURE 4

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Enclosure 4

TIMELINE FOR TASKS ASSOCIATED WITH THE DEVELOPMENT OF A SALT AND NUTRIENT MANAGEMENT PLAN FOR THE MOJAVE INTEGRATED REGIONAL WATER MANAGEMENT GROUP

COMPLETED TASKS:	July 1959	Davis-Grunsky Act authorized the formation of the Mojave Water Agency (MWA) for the purpose of managing declining groundwater levels in the Mojave, El Mirage, and Lucerne Basins
	June 1960	MWA, a local water agency, formed by majority public vote
	June 2002	Settlement agreement reached and full implementation of the Mojave Basin adjudication
	February 2005	Mojave Integrated Regional Water Management Plan (IRWMP) adopted by MWA
	February 2009	Mojave IRWM Region approved by the California Department of Water Resources (DWR)
	February 2009	Recycled Water Policy Adopted by State Water Resources Control Board (State Water Board)
SCHEDULE FOR UPCOMING TASKS:	February 2012	Submit application to DWR for planning grant funds to update the Mojave IRWMP and offset costs of developing a Salt and Nutrient Management Plan (SNMP)
	2013	Draft Mojave SNMP available for review
	2014	Final Mojave SNMP presented to Water Board
	2014/2016	Compliance with statewide requirement to develop SNMP for all groundwater basins (State Water Board may grant a two-year extension if there is substantial progress towards completion of a plan)

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ENCLOSURE 5

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Matthew Rodriquez
Secretary for
Environmental Protection

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Lahontan Region

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Enclosure 5

Edmund G. Brown Jr.
Governor

December 8, 2011

File: Mojave Basin Planning
General File

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COMMENTS ON THE DRAFT SCOPE OF WORK FOR DEVELOPMENT OF A SALT/NUTRIENT MANAGEMENT PLAN FOR THE MOJAVE INTEGRATED REGIONAL WATER MANAGEMENT GROUP, SAN BERNARDINO COUNTY

California Regional Water Quality Control Board, Lahontan Region (Water Board) staff has reviewed the above-referenced Scope of Work (SOW) dated November 2011. The SOW was prepared by the Mojave Water Agency (MWA) and submitted to the Water Board on behalf of the member agencies and stakeholders of the Mojave Integrated Regional Water Management Group (Mojave Group). It is our understanding that the Mojave Group is in the process of updating the Integrated Regional Water Management Plan (IRWMP) and that the Salt and Nutrient Management Plan (SMP) will be incorporated as an appendix to the updated IRWM plan. The Mojave IRWMP area encompasses the jurisdiction of two Regional Water Boards, the Lahontan and Colorado River Water Boards. The Mojave and El Mirage basins (collectively referred to here as "Mojave basin") are located in an area under the jurisdiction of the Lahontan Water Board. Water Board staff are providing these comments in an effort to clarify the purpose and goals of the SMP as well as to guide the Mojave Group toward developing a comprehensive and defensible SMP based on a reliable dataset. Our comments are specific to the SMP planning process for those areas of the Lahontan Region and are organized below by heading in the MWA SOW.

Purpose

We request that the first sentence of the Purpose statement be revised to read: "To develop a regional Salt/Nutrient Management Plan (SMP) for the Mojave Water Agency Integrated Regional Water Management Plan (IRWMP) Region that will identify, monitor and manage, on a regional basis, salts and nutrients from various sources within the region for the purpose of maintaining high quality waters, where feasible, achieving and maintaining water quality objectives, and supporting beneficial uses."

Background

The SOW should clearly define the SMP area boundaries. For example, the headwaters of the Mojave River are outside the boundaries of MWA jurisdiction, yet these areas contribute to salt and nutrient loading in groundwaters of the Mojave basin. All salt and nutrient sources need to be considered for the SMP to be comprehensive.

Surface water resources are defined using a watershed approach and are categorized based on a hierarchy of hydrologic systems including basins, units, areas, and subareas, which may or may not coincide with groundwater basin nomenclature as defined by the Department of Water Resources. For clarity and consistency, surface water hydrologic areas and subareas should be identified and correlated, to the extent practical, with the groundwater basins identified within the SMP area.

If the SMP subareas of the Mojave basin are defined as Este, Oeste, Alto, Transition, Centro, and Baja subareas, then the results may be too gross-scale to be meaningful or effective. While this effort is intended to evaluate basins on a larger scale, it is also important to understand the variability of constituent levels in a basin or sub-basin as beneficial uses are not just to be protected at a basin level. Smaller sub-basins should be considered (i.e. the George sub-basin, as well as localized conditions related to upper and lower aquifers, perched zones, and structural discontinuities). The planning effort should include an evaluation of all data and existing and proposed sources to determine if more detailed analysis is needed.

Goals

Goal No. 1 should be revised to read: "Manage salts and nutrients on a sub-regional basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses as defined in the Water Quality Control Plans (Basin Plans) for the Lahontan and Colorado River regions."

Consider including the following additional goals within the SOW.

- Through the development of the SMP, the need to consider changes to specific water quality objectives may be identified.
- The SMP will be considered for adoption by the individual Regional Water Boards and incorporated into their respective Basin Plans.
- The SMP will be used as a tool to allow for planning and implementation of local ordinances.

Task 1: Stakeholder Participation

Stakeholder participation is critical to identify all potential salt and nutrient sources in order to prepare a complete and comprehensive SMP. Other stakeholders that may

not participate in the Technical Advisory Committee (TAC) should be encouraged to participate including: out-of-basin stakeholders (i.e. Lake Arrowhead Community Services District and Crestline Sanitation District); environmental groups and conservation districts; small domestic wastewater dischargers; and parties conducting groundwater cleanup.

Minor editorial comments are shown as "strike-out, underline" in Enclosure 1.

Task 2: Review/Assemble Existing Data & Research

The SOW should define the salts and nutrients that will be evaluated. Other Constituents of Concern (COCs) that have the potential to be mobilized or concentrated in groundwater as a result of recycle/reuse/recharge projects should also be identified and included in the SMP (i.e. arsenic, fluoride, chromium, boron). Stakeholder participation is critical to identify localized COCs and to compile all available water quality data sources as well as coordinate any needed data collection.

Additional water quality data may be available from the Department of Public Health and San Bernardino County. Water quality data is also available online through the State Water Resource Control Board's (SWRCB) GeoTracker database at http://www.waterboards.ca.gov/ust/electronic_submittal/.

Minor editorial comments are shown as "strike-out, underline" in Enclosure 1.

Task 3: Salt/Nutrient Characterization

Additional/new water quality data may need to be gathered to adequately characterize salts and nutrients and other COCs for the different sub-basins/areas.

Baseline conditions for salts, nutrients, and other COCs in groundwater need to be established on a sub-basin level. Atmospheric deposition should be considered as part of the overall nutrient budget.

Impacts to aquatic life and riparian habitat should be considered, especially in the floodplain aquifer, in connection with potential hyporheic nutrient and mineral cycling processes that may be changed if groundwater recharge changes redox conditions.

Specific areas not currently in compliance with water quality objectives should be identified (spatially and geographically by mass, volume, constituent, and concentration) as related to natural or anthropogenic sources.

Validation methods are critical and may be subject to peer review. It must be established that the chosen model is valid and will effectively correlate historical and observed conditions before reliance can be given to predicted conditions. The model needs to be adaptable and capable of integrating source loading from future projects. How will data collected in Task 4 be incorporated and utilized to update the model?

An analysis of the anticipated groundwater and surface water quality degradation should be listed as a separate task and must address all of State Water Board's Resolution 68-16 requirements. The model may be one tool utilized in the analysis; however, other inputs are needed to evaluate the socio-economic factors required by the policy. The analysis should include both short-term and long-term degradation impacts, all reasonable and foreseeable control measures, anticipated levels of degradation specific to each sub-basin/area, and why the level of degradation should be considered acceptable over the time period.

The effects of importation of water and transferring imported and recycled water sources between sub-basins should be considered. For example, consider the effects of source water derived from the Alto subarea that is recycled and subsequently transferred to the Centro subarea for reuse as irrigation.

Minor editorial comments are shown as "strike-out, underline" in Enclosure 1.

Task 4: Monitoring & Reporting Plan

The long-term monitoring program should continue until steady state conditions within the basin have been achieved.

We request that the water quality data be combined and synthesized into one reporting document. The data collected should be made available in an electronic format consistent with the SWRCB Groundwater Ambient Monitoring and Assessment Program (GAMA). Related data such as land uses and well screen depths should be noted for each monitoring point.

Minor editorial comments are shown as "strike-out, underline" in Enclosure 1.

Task 5 - Implementation Measures

Engaging stakeholders throughout the entire SMP development process will encourage successful implementation of Task 5. This section should clearly identify which agencies are responsible for managing current and future anthropogenic loads and what actions these agencies must take to provide the Water Board with assurances that local entities will manage the groundwater basin using their authorities or by other means to achieve the water quality specified in the plan.

Task 6: Recycled Water & Stormwater Use/Recharge

Please see Enclosure 1 for editorial comments on Task 6.

Task 7: Prepare Plan for Submittal to Water Boards

Sufficient detail regarding the SMP must be included in the IRWMP CEQA process. The Water Board will utilize this CEQA document in our environmental review for a

potential Basin Plan Amendment. Please be advised that external scientific peer review may be required, therefore it is imperative that adequate scientific justification be provided as part of the planning process.

Minor editorial comments are shown as "strike-out, underline" in Enclosure 1.

Other Comments

In the revised SOW, please include an executive summary and table of contents, a proposed schedule with estimated completion dates to perform the tasks identified, and a list of acronyms and abbreviations used in the text of the SOW. We support your efforts and look forward to sharing your plan with the Water Board at its January 2012 meeting. Please provide a revised SOW by **December 23, 2011**, along with any justification for not incorporating our comments.

We are happy to discuss any of our comments. Please contact Jan Zimmerman at (760) 241-7376 (jzimmerman@waterboards.ca.gov) or Patrice Copeland, Senior Engineering Geologist, at (760) 241-7404 (pcopeland@waterboards.ca.gov).

Harold J. Singer

HAROLD J. SINGER
EXECUTIVE OFFICER

Enclosure: Track-Changes on Scope of Work

cc: Logan Olds, VVWRA
John, Rokke, Colorado River Water Board
(via email, jrokke@waterboards.ca.gov)
Lance Eckhart, Mojave Water Agency
(via email, leckhart@mojavewater.org)

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Water Board staff editorial revisions shown as track changes. December 5, 2011

DRAFT SCOPE OF WORK
Salt/Nutrient Management Plan
~~For~~ Prepared by the Mojave IRWM Group

WORK PLAN

Task 1: Stakeholder Participation

Collaborate with Lahontan and Colorado Water Board staff and other stakeholders, receive and review stakeholder input. It is anticipated that most of the stakeholder participation will occur during meetings of the Technical Advisory Committee (TAC) to the MWA, in the context of the IRWMP update. A primary initial outcome of this task will be to reach consensus regarding the stakeholder participants appropriate for this planning effort and to identify ways to effectively involve as many of those stakeholders in addition to ~~with~~ the TAC members~~. as is practical~~.

Task 2: Review/Assemble Existing Data & Research

Evaluate existing data and previously completed water quality management efforts to prepare an adequate SMP. An extensive amount of research and data collection has already occurred with respect to salts and nutrients in the Mojave IRWM Region. A Groundwater Quality Analysis[1] and associated Groundwater Quality Planning Model (Salt Model) was developed in 2007 that identified contributors to salt within the Region, evaluated current and past trends in water quality, and modeled potential changes over time due to loading from various existing and anticipated sources under different scenarios. Existing information and research may need to be updated, but to the extent possible, new research should be minimized and existing information should be leveraged for inclusion within the SMP. At a minimum, the following sources should be reviewed:

- The 2007 Groundwater Quality Analysis
- ~~Groundwater Quality Planning Model (~~Salt Model~~)~~ developed for the 2007 Groundwater Quality Analysis
- MWA's groundwater monitoring program and associated water quality database
- MWA's 2004 RWMP, which includes a Groundwater Management Planning component, and associated EIR
- Potential for Ground-Water Contamination from Movement of Wastewater Through the Unsaturated Zone, Upper Mojave River Basin, California, 1993
- Technical Study to Evaluate a Long-Term Water Management Program Between MWA and Metropolitan Water District, and associated EIR, December 2005
- July 29, 2004 MOU between MWA, Lahontan Water Board, and High Desert Power Project, LLC.
- Antidegradation Studies for Discharges to Surface and Groundwater, VVWRA 2009
- Mojave River Characterization Study, VVWRA 2010
- Cumulative Impact Analysis, VVWRA 2011

[1] Groundwater Quality Analysis Technical Memorandum/Phase 1 Between Mojave Water Agency and Schlumberger Water Services. May 7, 2007

- Various USGS studies

Task 3: Salt/Nutrient Characterization
Characterize salt and nutrients within the Mojave IRWM Region and groundwater basins, utilizing to the extent possible, existing information identified in Task 2. Leverage work already completed in the existing 2007 Groundwater Quality Analysis and Salt Model to compile the following information into the SMP:

- Existing and background water quality.
- Current and projected sources of salts/nutrients. Review/update existing planning scenarios, including a map and database of current land uses contributing to salt/nutrients, and tabulate ~~. Include~~ the quality and quantity of existing and projected wastewater/recycled water discharges to basins, imported water recharge, septic discharges, stormwater/flood control recharge, return flow from applied agricultural and dairy water, and other sources of salt/nutrients.
- The basins' assimilative capacity of salts/nutrients, to the extent possible with the current body of knowledge.
- The regional effects and loading estimates of salt/nutrients from existing and projected land uses and water management practices identified, to the extent possible with the current body of knowledge.
- ~~Update~~ and refine existing model to serve as a tool to identify potential short and long-term regional water quality impacts associated with implementing projects identified in the accompanying IRWMP. ~~consistent with the State Antidegradation Policy (Resolution No. 68-16).~~
- Perform a degradation analysis in accordance with the State Water Board's Antidegradation Policy (Resolution No. 68-16)
- Prepare a draft report to the stakeholders including data collected and results found in the Salt/Nutrient characterization.

Task 4: Monitoring & Reporting Plan
Review existing monitoring programs, identify data gaps, and recommend changes if needed, in order to comply with SMP requirements. Include in the SMP a Monitoring Plan that provides a reasonable means of determining whether the concentrations of salts, nutrients, and other constituents of concern are consistent with applicable water quality objectives. The monitoring plan should be designed to evaluate the long-term regional/sub-regional impacts and temporal changes to groundwater quality resulting from current and future land uses, as well as localized impacts in critical areas where appropriate, and should include the following:

- Recommendations for additional appropriate monitoring locations and frequencies that collectively would represent the regional-level water quality and changes in water quality for basins within the SMP. In addition, the monitoring program should identify critical localized areas where additional monitoring should be concentrated near ~~water supply wells~~current and future water extraction areas and areas proximate to ~~large~~ significant sources of salt and nutrient such as water recycling projects and groundwater recharge projects.
- Include a provision for identifying and monitoring Constituents of Emerging Concern, as specified in the Recycled Water Policy~~.~~

- List stakeholders responsible for development of new monitoring sites/facilities, conducting, compiling, and reporting the monitoring data.
- Determine the cost of additional monitoring and identify possible funding sources.
- Data from the Monitoring Plan will be reported to the Lahontan and Colorado Water Boards every 3 years by the appropriate collecting parties.

Task 5: Implementation Measures
Identify and recommend methods and regional Best Management Practices (BMP's) to manage salt and nutrient loadings on a sustainable basis. Development of implementation measure recommendations and BMP's should be of a regional nature and through a collaborative process with the stakeholders.

Task 6: Recycled Water & Stormwater Use/Recharge
Identify recycled water and stormwater use/recharge goals and objectives for any potential or planned projects.~~.~~

Task 7: Prepare Plan for Submittal to Water Boards
The SMP shall be completed and proposed to the Lahontan and Colorado Water Boards by May 14, 2014. If ~~, unless~~ the Lahontan and Colorado Water Boards find that the stakeholders are making substantial progress toward completion of the plan. These Water Boards may grant an extension until May 14, 2016, to complete the plan. In no case shall the period for the completion of the plan exceed seven years. The SMP will be included within the IRWMP update, and CEQA compliance will be conducted at the IRWMP level; therefore, CEQA was not included as a task within SMP preparation.

Appendix B

Stakeholder Meeting Materials

Mojave Water Agency
Update of Integrated Regional Water Management Plan

Wednesday, January 23, 2013

8:00 am-12:00 pm

Mojave Water Agency Headquarters

13846 Conference Center Drive Apple Valley, CA 92307

Kick-off Meeting Agenda

a. Welcome and Introductions

b. Meeting Purpose

   1. Discuss goals for updating IRWM Plan
   2. Discuss DWR 2012 Guidelines requirements
   3. Review SNMP Preparation
   4. Discuss IRWM planning process/ Engagement Plan Outline
   5. Review IRWMP Preparation

c. Goals for updating IRWM Plan

   1. What would you like to accomplish by the end of this planning process?

d. Required IRWMP Changes per DWR 2012 Guidelines requirements (see Handout #1)

e. SNMP Preparation

   1. Approach for Developing the SNMP (See Handout #2)
   2. Coordination with Schlumberger on Stella Modeling
   3. Schedule (See Handout #3)
   4. How can SNMP be used for SWRCB new policy on Onsite Wastewater Treatment Systems (OWTS) and the required Local Agency Management Plan (LAMP)?

f. MWA IRWM Planning Process/ Engagement Plan Outline

   1. Participants Concerns/Goals
   2. How to get Agencies and interested parties to Participate in Planning Process? / Available Funding for participants
   3. Who Gets Invited? Who Does What?

g. IRWMP Preparation

   1. Approach for Developing the Plan (See Handout #4)
   2. Schedule (See Handout #5)
   3. Plan Content (See Handout #6)

h. Wrap Up / Action Items

Mojave Water Agency
Update of Integrated Regional Water Management Plan

Wednesday, January 23, 2013

8:00 am-12:00 pm

Mojave Water Agency Headquarters

13846 Conference Center Drive Apple Valley, CA 92307

List of Handouts

1. New DWR IRWMP Standards
2. SNMP Development
3. SNMP Schedule
4. IRWM Plan Meeting Approach
5. IRWMP Schedule
6. IRWM Plan Content (Topics of Engagement)

Mojave Water Agency

New DWR IRWMP Standards

DWR IRWMP Guidelines published November 2012:

- Plan Objectives must address major water-related issues and conflicts
- Objectives must be **measurable** by some practical means
    - quantitatively or "qualitatively"
- Objectives should be prioritized (if not, why not)
- Objectives must be focused on addressing the region's water management issues, including flood management of the region
- Must consider overarching goals that apply to the area and are consistent with objectives:
    - **Basin Plan Objectives**
    - **SBX7-7 (20x2020) water efficiency goals**
    - Various **minimum requirements** of CWC

IRWM Plan Standards are as follows:

Table 2 – IRWM Plan Standards

Governance (New RWMG Standard)	Data Management
Region Description	Finance
Objectives	Technical Analysis
Resource Management Strategies (RMS)	Relation to Local Water Planning
Integration	**Relation to Local Land Use Planning (New)**
Project Review Process (New)	Stakeholder Involvement
Impact and Benefit	Coordination
Plan Performance and Monitoring	**Climate Change**

New IRWM Plan Standard for Climate Change must address:

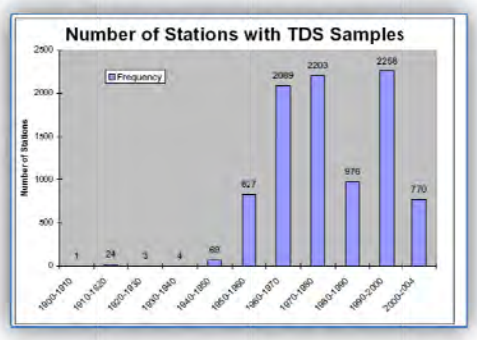
- Adaptation to Climate Change Effects
- Mitigation of Greenhouse Gas (GHG) Emissions

Mojave Water Agency

Developing the SNMP

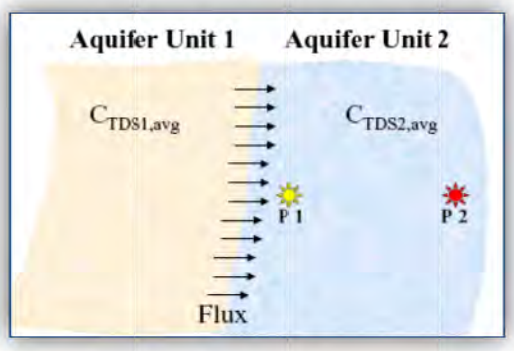
Understand the data (and limitations!)

- Focus on data since 2005
- Concentration of data in certain areas
- Increased frequency over time
- Trends – how did we get here?
- Ambient groundwater concentrations



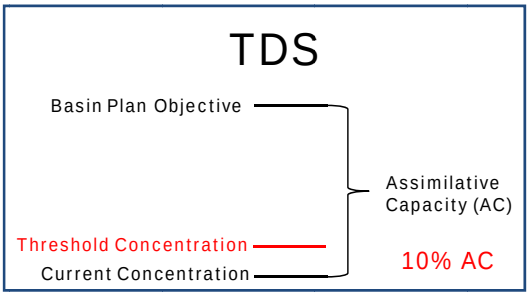
Apply Stella Model

- Baseline - 2012
- No Project Scenario
- Future Scenarios – timing?



Characterize Salt/Nutrient

- Loading estimates
- Calibration to trends!
- Assimilative capacity
- CECs – acknowledge potential sources
- Evaluation of project impacts

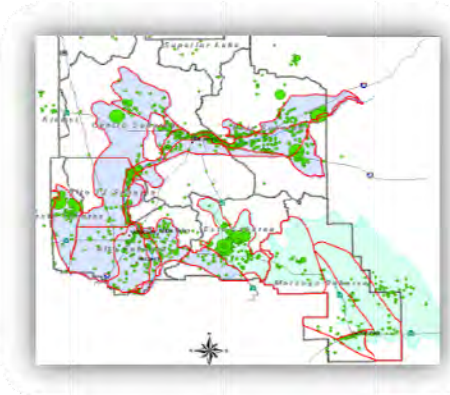


Develop Monitoring Plan

- Numerous regional monitoring programs
- Monitoring plan for future projects
- Identification of stakeholder responsibilities

Identify Implementation Measures

- Existing practices
- Additional Best Management Practices



Address Recycled Water and Stormwater

- Ongoing Projects
- Additional projects from IRWMP

Stakeholder Participation/Regulatory Acceptance

- Communication
- Transparency
- Partnership

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD

Mojave Water Agency

SNMP Schedule

Stakeholder Participation	Description	SNMP Elements Discussed	Proposed Date
Kickoff Meeting	Kickoff Meeting to replace one workshop.		January 23, 2013
Workshop No. 1 - Introduction	This meeting will introduce the team to the TAC, identify other potential stakeholders…	Review/Assemble Existing Data and Research	April 4, 2013
Two Regional Board Workshops	Present MWA's strategy and approach for SMP.	n/a	May 8 - Lahanton, May 16 - Colorado
Workshop No. 2 – Water Quality Baseline and Assimilative Capacity	This workshop will present the results of the review of groundwater quality data. We will describe how these data are used to characterize baseline conditions and the existing assimilative capacity of the basins. We will also discuss how these data will are being used in the modeling.	Update And Run Water Quality Model	June 6
Workshop No. 3 – Modeling Results	This workshop will review the results of the water quality monitoring and how future conditions compare to the assimilative capacity. These data will be used to develop potential implementation actions and a monitoring and reporting plan.	STELLA Model updates and outputs, Salt/Nutrient Characterization	August 1
Workshop No. 4 – Implementation	This meeting will focus on interactions with entities most impacted by Best Management Plan (BMP) implementation. The Draft SMP will be presented at this time	Monitoring & Reporting Plan, Implementation Measures, Recycled Water and Storm Water Use/Recharge	October 3
Workshop No. 5 - Present SMP	The final meeting will include a presentation of the Final SMP, which will incorporate comments from Stakeholders.	CEQA Analysis	December 16
Two Regional Board Workshops	Present MWA's Final SMP.	n/a	Jan 15 - Lahanton, Jan 16 - Colorado

Mojave Water Agency

Engagement Approach for Updating the Plan

Considering the potential stakeholders and our proposed topics, we have outlined a series of meetings in a recommended sequence that will be key to updating the IRWM Plan. The description of potential meetings identifies the number of expected meetings, highlights the topics of primary focus in each meeting, the scale of the meeting (regional or local), and any special considerations for particular stakeholders.

We recommend that each meeting (after the Team Alignment meeting) will be open to all interested stakeholders. At select meetings, we will provide draft sections of the IRWM Plan that include content from the appropriate topics for discussion and review. All regional meetings are assumed to be held at MWA Headquarters where existing TAC meetings are currently held.

Meeting 1: Team Alignment – one meeting with the key participants who will be helping develop content for the updated IRWM Plan. We will introduce Topic 1: Team Charter, Topic 2: Plan Update Process, Topic 3: Plan Scope, and Topic 12: Governance. (January 23, 2013)

Meeting 2: Project Kick-off – one regional meeting at MWA Headquarters inviting all potentially interested stakeholders (assumed to include the TAC) to discuss Topic 1: Team Charter, Topic 2: Plan Update Process, Topic 3: Plan Scope, and Topic 12: Governance.

Meeting 3: Discuss Current Conditions, Future Conditions, and Challenges and Opportunities; Refine Objectives – one regional meeting to discuss Topic 4: Current Conditions, Topic 5: Future Conditions, and Topic 6: Challenges and Opportunities. We will also review and refine Plan objectives.

DAC Workshops: Introduce Plan Update Process, Describe Opportunities to Participate, Explore Modes of Participation, and Identify Potential DAC Challenges and Opportunities – three meetings at different local venues with California Native American Tribes and representatives of disadvantaged communities (DACs). Each workshop will include discussions of the Plan Update process, identify reasons and opportunities to participate in updating the Plan, explore promising modes of participation for the Tribes and DACs, and identify challenges and opportunities for these residents of the Region.

Meeting 4: Discuss Approach for Identifying and Evaluating Potential Projects; Discuss Process for Integration; Prepare to Issue Call for Projects – one regional meeting to review draft content from (Topics 4, 5, and 6), if needed refine Plan objectives (Topic 3), and introduce Topic 7: Potential Projects, Topic 8: Integration, and Topic 9: Benefits and Impacts. Discuss the expected process for submitting projects for consideration for inclusion in the Plan Update and the date project submittals will be due.

Public Workshops: Introduce Plan Update Process, Describe Opportunities to Participate, Explore Modes of Participation, and Identify Potential Public Challenges and Opportunities – to encourage broader public participation in the IRWMP Update process, three public meetings at different local venues (these workshops are preliminarily anticipated to be held in Apple Valley (MWA headquarters), Barstow, and Yucca Valley). Each workshop will include discussions of the Plan Update process, identify reasons and opportunities to participate in updating the Plan, explore promising modes of participation

for the various public organizations and agencies that might be interested, and identify challenges and opportunities for these residents of the Region.

Meeting 5: Summarize Project Proposals, Review Opportunities for Integration, and Discuss Process for Project Screening and Prioritization – one regional meeting to present a summary list of potential projects (Topic 7), review Topic 8: Integration in light of proposed projects, discuss proposed evaluation methods (Topic 9), and discuss process to screen and prioritize projects (Topic 10).

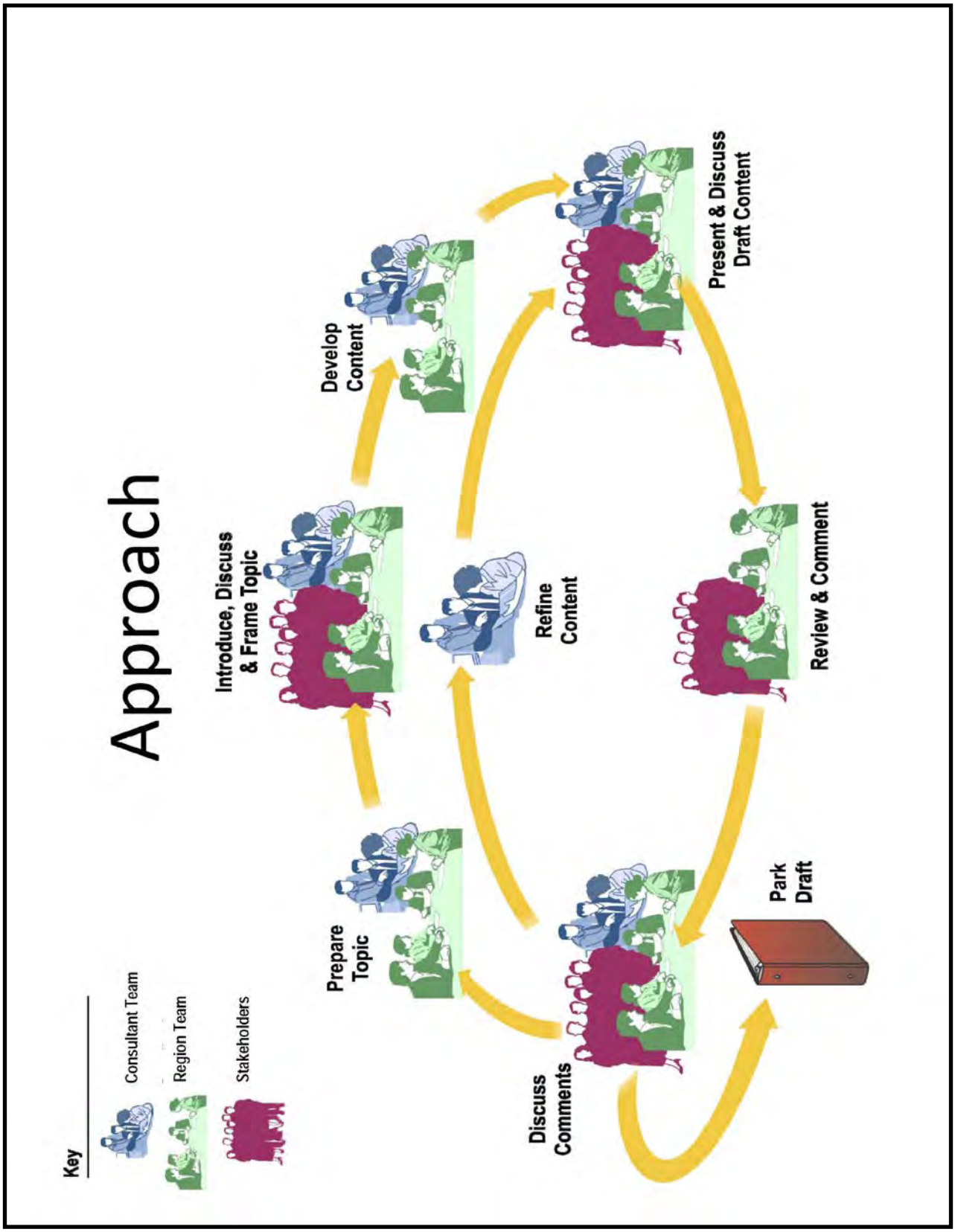
Meeting 6: Select and Prioritize Projects – one meeting to present evaluation results for potential integrated projects (Topics 7, 8, and 9), reconsider opportunities for integration, and select which projects to include in the Plan Update and group them by priority (Topic 10).

Meeting 7: Refine Projects, Discuss Plan Recommendations, and Revisit Governance – one regional meeting to refine list and priority of projects (Topic 10), discuss Plan recommendations (Topic 11), and discuss any remaining items related to long-term governance for Plan implementation (Topic 12).

Meeting 8: Finance and Plan Performance and Monitoring – one regional meeting to refine Plan Recommendations (Topic 11) and discuss Topic 13: Finance and Topic 14: Plan Performance and Monitoring.

Meeting 9: Present Public Review Draft of Entire Plan – one regional meeting to present a fully assembled draft of IRWM Plan. Highlight new material added beyond previous draft sections that had been previously reviewed.

Meeting 10: Prepare Plan for Adoption – one regional meeting to discuss comments received and how they were addressed, present final draft of the updated Plan, and discuss resources needed to proceed to Plan adoption.


Approach
Key
Consultant Team
Region Team
Stakeholders
Introduce, Discuss & Frame Topic
Develop Content
Present & Discuss Draft Content
Refine Content
Review & Comment
Prepare Topic
Discuss Comments
Park Draft

Mojave Water Agency

IRWMP Schedule

Workshop No.	Proposed Date	DWR Standard Addressed	Meeting Approach No. (Handout #4)	Proposed Agenda Topic
Kickoff Meeting	January 23, 2013	n/a	Mtg 1: Plan Dev & Scoping	Kickoff Meeting to replace one Board Meeting.
TAC Meeting 1	February 7, 2013 (could do 3/5 or 3/6 as alt)	Governance, Coordination, Objectives, Stakeholder Involvement	Mtg 2: Project Kick-off	This meeting will introduce the team to the TAC, identify other potential stakeholders, initiate data collection efforts, and provide for the download of valuable knowledge from the audience to the Kennedy/Jenks IRWMP Team.
TAC Meetings 2 & 3	April 4, 2013, June 6, 2013,	Objectives, Regional Description, Relation to Local Water Use Planning, Relation to Local Land Use Planning, Climate Change	Mtg 3: Discuss Current Conditions, Future Conditions, and Challenges and Opportunities; Refine Objectives Mtg 4: Discuss Approach for Identifying and Evaluating Potential Projects; Discuss Process for Integration; Prepare to Issue Call for Projects	Phase 1 - The first few months the meetings will focus on revisiting the Basin Management Objectives (BMOs), conducting a needs assessment, and identifying/soliciting suggested projects and management alternatives from stakeholders.
TAC Meeting 4	August 1, 2013	Resource Management Strategies, Integration, Project Review Process, Climate Change	Mtg 5: Summarize Project Proposals, Review Opportunities for Integration, and Discuss Process for Project Screening and Prioritization	Phase 2 - Present the screening model to the TAC.
MWA Board Meeting	August 8, 2013	n/a	n/a	Phase 1 Summary and Phase 2 Introduction
TAC Meeting 5	October 3, 2013	Project Review Process, Impact and Benefits, Stakeholder Involvement	Mtg 6: Select and Prioritize Projects	Using performance measures, projects will be evaluated and grouped using input from TAC.
TAC Meeting 6	December 16, 2013	Plan Performance and Monitoring, Data Management, Governance, Coordination	Mtg 7: Refine Projects, Discuss Plan Recommendations, and Revisit Governance	Phase 3 – TAC discussion on Final Project Prioritization and documentation process.
MWA Board Meeting	January 9, 2014	n/a	n/a	Phase 2 Summary and Final Projects.

Workshop No.	Proposed Date	DWR Standard Addressed	Meeting Approach No. (Handout #4)	Proposed Agenda Topic
TAC Meeting 7	February 6, 2014	Finance, Technical Analysis, Governance, Coordination,	Mtg 8: Finance and Plan Performance and Monitoring	Work with the TAC to determine appropriate updates or changes to management actions.
TAC Meeting 8 – Draft IRWMP	April 3, 2014	Plan Performance and Monitoring, Data Management	Mtg 9: Present Public Review Draft of Entire Plan	The meeting will include a presentation of the DRAFT IRWMP, which can be reviewed by the Stakeholders.
TAC Meeting 9 – Final IRWMP	June 5, 2014	n/a	Mtg 10: Prepare Plan for Adoption	The meeting will include a presentation of the FINAL IRWMP, which will incorporate comments from Stakeholders.
MWA Board Meeting	June 12, 2014	n/a	n/a	Adopt IRWMP – Public Hearing
MWA Board Meeting	June 28, 2014	n/a	n/a	Final IRWMP

MWA Area IRWM Plan Update - Kennedy/Jenks Schedule

		2013												2014					
	Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	**Meetings & Stakeholder Outreach**																		
1.1	Technical Advisory Committee - 9 TAC Meetings		2/7		4/4		6/6		8/1		10/3		12/16		2/8		4/5		6/7
1.2	Public Workshops - 3 workshops						6/5,6,7												
1.3	MWA Board of Directors - 5 meetings	1/23							8/8					1/9					6/12,6/26
1.4	Disadvantaged Communities (DACs) - 3 workshops				4/3,4,5														
1.5	Facilitator for Stakeholder Groups																		
1.6	Meetings with MWA Staff - Bi-weekly conference calls																		
2	**Salt/Nutrient Management Plan***																		
2.1	Stakeholder participation (6 meetings)	1/23			4/4		6/6		8/1		10/3		12/16						
	Water Board Meeting** (4 meetings)					5/8,5/16								1/15,1/16					
2.2	Review/assemble existing data & research																		
2.3	Update and Run Water Quality Model																		
2.4	Salt/nutrient characterization																		
2.5	Monitoring & reporting plan																		
2.6	Implementation measures																		
2.7	Recycled water & stormwater use/recharge																		
2.8	Preliminary CEQA Analysis																		
2.9	Prepare plan for submittal to Water Boards																		
3	**Plan Update**																		
3.2	Update Chapter 1, Introduction																		
3.3	Update Chapter 2, Agency and Stakeholder Background																		
3.4	Update Chapter 3, Physical Setting																		
3.5	Update Chapter 4, Water Supply																		
3.6	Update Chapter 5, Water Demand																		
3.7	New Chapter, Water-Related Needs of Disadvantaged Communities																		
3.8	Update Chapter 6, Water Shortage Contingency Planning																		
3.9	New Chapter, Climate Change Analysis																		
3.10	Update Chapter 7, Water Conservation and DMMs																		
3.10.1	*Summarize Regulatory Requirements*																		
3.10.2	*Develop New Conservation Programs*																		
3.11	New Chapter, Integrated Flood Management																		
3.12	Update Chapter 8, Stakeholder Assessment and Public Outreach																		
3.13	Update Chapter 9, Basin Management Objectives and Alternatives																		
3.13.1	*Needs Assessment/Identify Projects - Phase 1*																		
3.13.2	*Evaluate & Prioritize Projects - Phase 2*																		
3.13.3	*Incorporate Final Project Priorities - Phase 3*																		
3.14	Update Chapter 10, Management Actions																		
3.15	Update Appendices to the IRWMP																		
3.17	Prepare Draft and Final IRWMP Report																DRAFT		FINAL
4	Program Management and QA/QC																		
4.1	Program Management and QA/QC																		

Notes: * RWQCB Lahanton Region's due date for SNMP is May 14, 2014 without an extension.

** Lahanton Water Board meeting scheduled for 5/8 (4pm) in Barstow and for 1/15 (4pm) at undetermined location at this time. Colorado Water Board meeting is scheduled for 5/16/13 (9am) in Palm Desert and for 1/16/14 (9am) in Palm Desert, as well.

IRWM Plan Content (Topics for Engagement)

In order to keep the Plan update process focused and productive, we have identified a set of "topics" to focus on and interact around through the planning process.

These topics include items related to the Plan update process and also include content items defined in DWR's published standards for IRWM Plans (see *Integrated Regional Water Management Proposition 84 & Proposition 1E Grant Program Guidelines*; November 2012). Table 2 in the DWR Guidelines Document lists 16 standards that must be covered in the IRWM Plan to qualify as an acceptable Plan.

The Topics for Engagement include related items to be covered in one or more meetings. Draft Plan content will be prepared based on the discussion of each topic and then provided for review and comment. The draft content will be revised and resubmitted for review and comment until broadly acceptable. The list of topics includes (each of the topics is described in more detail below and is annotated with the *DWR 2012 Guidelines IRWM Plan Standards*):

- Topic 1: Team Charter
- Topic 2: Plan Update Process
- Topic 3: Plan Scope
- Topic 4: Current Conditions
- Topic 5: Future Conditions
- Topic 6: Challenges and Opportunities
- Topic 7: Potential Projects
- Topic 8: Integration
- Topic 9: Benefits and Impacts
- Topic 10: Project Selection and Priority
- Topic 11: Plan Recommendations
- Topic 12: Governance
- Topic 13: Finance
- Topic 14: Plan Performance and Monitoring

Topic 1: Team Charter

We believe that one of the most important factors for success of this project will be to establish and maintain effective working relationships among those from MWA and the Technical Advisory Committee who will be working to help develop content for the

updated IRWM Plan (Regional Team) and the Kennedy/Jenks Team (Consultant Team). We propose to call this group of people responsible to develop content the Plan Update Team.

Therefore, early in the Plan update process, we propose to develop and adopt a charter with the Plan Update Team that defines how we will work together during the life of the project. As part of the chartering process, we will draft goals intended to be accomplished during the planning process (these differ from the IRWM Plan objectives that will set the target for Plan performance to be developed later in the process). We also intend to refine our proposed project approach, if needed.

Topic 2: Plan Update Process (*Governance, Stakeholder Involvement, Coordination*)

While engaging on this topic we intend to:

- Describe our intended process to update the IRWM Plan
- Highlight planned engagement opportunities and target audiences
- Invite participation in the Plan development, including disadvantaged communities (DACs) and California Native American Tribes
- Assess the level of interest in participating in various parts of the Plan update process
- Solicit feedback regarding our intended approach from potentially interested stakeholders
- Refine intended approach as needed based on feedback received

Topic 3: Plan Scope (*Objectives, Technical Analyses*)

While engaging on this topic we intend to:

- Describe the intended content of the updated IRWM Plan
- Adopt a planning horizon (minimum of 20 years)
- Develop initial IRWM Plan objectives (and discuss whether we intend to prioritize Plan objectives)
- Discuss intent or need for AB 3030 and other relevant compliance

Topic 4: Current Conditions (*Region Description, Resource Management Strategies, Relation to Local Water Planning, Relation to Local Land Use Planning, Coordination*)

While engaging on this topic we intend to:

- Refine Region description

- Inventory existing Plans and studies that may be useful to inform the current conditions description
- Describe current conditions in terms of demographics, agency boundaries and roles, land use, water supply, water quality, habitat, flood management, invasive species management, etc.
- Develop a current water balance for each Area and the Region as a whole for average and dry years
- Develop other helpful interaction diagrams for Areas for topics such as flood threats, habitat connectivity, potential invasive species migration, etc.
- Identify the topics, locations, and agencies where integration and collaboration appear to be most useful

Topic 5: Future Conditions (*Objectives, Resource Management Strategies, Technical Analyses, Relation to Local Water Planning, Relation to Local Land Use Planning, Coordination*)

While engaging on this topic we intend to:

- Identify how to characterize potential effects of climate change
- Inventory existing Plans and studies that may be useful to inform the development of the future conditions description
- Describe future conditions (according to the adopted planning horizon) in terms of demographics, agency boundaries and roles, land use, water supply, water quality, habitat, flood management, invasive species management, etc.
- Develop a future water balance for each Area and the Region as a whole for average and dry years
- Develop other helpful interaction diagrams for Areas for topics such as flood threats, habitat connectivity, potential invasive species migration, etc.
- Identify the topics, locations, and agencies where integration and future collaboration appear to be most useful

Topic 6: Challenges and Opportunities (*Objectives, Impacts and Benefits, Integration*)

While engaging on this topic we intend to identify challenges and opportunities throughout the Region that fit within the intended scope of the updated IRWM Plan. We plan to explore these challenges and opportunities from various perspectives including:

- Current

- Future
- Area
- Disadvantaged Communities
- California Native American Tribes
- Delta-specific

We will refine IRWM Plan objectives as part of this topic.

Topic 7: Potential Projects (*Objectives, Resource Management Strategies, Impacts and Benefits, Integration, Climate Change, Stakeholder Involvement*)

While engaging on this topic we intend to:

- Develop a template for required project information
- Issue a call for projects that could meet one or more IRWM Plan objectives
- Develop a potential project summary list

Topic 8: Integration (*Objectives, Resource Management Strategies, Impacts and Benefits, Integration, Climate Change, Stakeholder Involvement, Coordination*)

While engaging on this topic we intend to:

- Characterize potential projects as they relate to DWR's resource management strategies
- Evaluate whether the potential projects address all of the IRWM Plan objectives
- Conduct brainstorming sessions to identify potential new projects or ways to further integrate previously identified potential projects

Topic 9: Benefits and Impacts (*Objectives, Impacts and Benefits, Integration, Climate Change, Technical Analyses, Stakeholder Involvement*)

While engaging on this topic we intend to:

- Define the key performance metrics to be used for project evaluation
- Characterize potential benefits according to IRWM Plan objectives (using best available information)
- Characterize potential negative impacts (using best available information) and identify strategies to avoid or mitigate them

Topic 10: Project Selection and Priority (*Project Review Process, Objectives, Resource Management Strategies, Impacts and Benefits, Integration, Technical Analyses, Climate Change, Stakeholder Involvement*)

While engaging on this topic we intend to:

- Establish a process to screen and prioritize projects for inclusion in the updated IRWM Plan
- Screen and prioritize projects for inclusion in the updated IRWM Plan

Topic 11: Plan Recommendations (*Objectives, Resource Management Strategies, Impacts and Benefits, Integration, Climate Change, Data Management*)

While engaging on this topic we plan to develop recommendations for action to occur upon adoption of the IRWM Plan. This will include recommended actions related to the prioritized projects and other related actions such as data gathering, further analysis, etc.

Topic 12: Governance (*Governance, Coordination)*

While engaging on this topic we intend to:

- Describe current governance that was used to guide the Plan update process
- Develop a method for updating project list and prioritization after the IRWM Plan is adopted
- Make recommendations (as needed) for adjusting governance to manage Plan implementation and updating

Topic 13: Financing (*Finance, Coordination*)

While engaging on this topic we intend to:

- Estimate required funding to implement the recommended actions
- Identify potential funding sources to implement the recommended actions
- Make recommendations for securing additional funding as needed

Topic 14: Plan Performance and Monitoring (*Plan Performance and Monitoring*, *Data Management*)

While engaging on this topic we intend to:

- Identify specific measures of success for the updated IRWM Plan
- Establish roles and responsibilities for monitoring of progress based on Plan actions

- Discuss approach for long-term data management
- Define a strategy for periodic reporting on Plan performance

Mojave Region
Update of Integrated Regional Water Management Plan

Stakeholder Group Meeting #2 – Summary

April 4, 2013
Mojave Water Agency Headquarters
Apple Valley, CA

Meeting Purpose and Overview

This was the second of nine scheduled meetings of the Stakeholder Group for the Update of the Integrated Regional Water Management (IRWM) Plan for the Mojave Region. The purpose was to review and build on work from the first meeting of the Stakeholder Group on March 4, 2013 as well as to introduce new topics for discussion. Thirty-seven individuals completed the meeting sign-in sheet, with the California Department of Water Resources (DWR) staff person (Tracie Billington) and the Colorado River Regional Water Quality Control Board (RWQCB) staff person (Jon Rokke) calling in via conference call.

Several topics were addressed during the Stakeholder Group meeting, including:

- Provide an Overview of the Planning Process
- Present Updates to Planning Process Goals
- Discuss Challenges and Opportunities of the Mojave Region
- Present the Mojave IRWM Plan Outline
- Introduce Current and Future Conditions of the Mojave Region
- Introduce Preliminary Draft Mojave IRWM Plan Objectives
- Discuss Recommendations made by DWR Regarding Changes to Mojave IRWM Region Boundary

This meeting also included the first presentation related to preparation of a Salt & Nutrient Management Plan, which is being developed in conjunction with the IRWM Plan Update.

Ken Kirby, of Kirby Consulting Group and a member of the Kennedy/Jenks consultant team, served as the facilitator for the meeting.

Establishment of the IRWM Region

The meeting began with introductions led by Scott Weldy, Chairman of the Technical Advisory Group (TAC) to the MWA. The Stakeholder Group was then asked to consider a motion to authorize the TAC Committee Chairman to sign the Memorandum of Understanding (MOU) that establishes the Regional Water Management Group (RWMG) of the Mojave Region IRWM Plan. The RWMG will consist of the following five agencies:

- Mojave Water Agency (MWA)
- Victor Valley Wastewater Reclamation Authority (VVWRA)
- Technical Advisory Committee to the Mojave Water Agency (TAC)
- Mojave Desert Resource Conservation District (MDRCD)
- Morongo Basin Pipeline Commission

The motion was carried through a showing of hands with all voting in favor.

The Stakeholder Group was then reminded that the RWMG will guide the development of the IRWM Plan through a Coordinating Committee, consisting of two representatives from each member of the RWMG. As representatives have already been designated from the other four members of the RWMG, the Stakeholder Group was asked to authorize the recommended representatives from the TAC, which they did. As a result, the full Coordinating Committee will consist of the following representatives, one of whom is the designated representative and the other who serves as an alternate.

- MWA – Kimberly Cox, Kirby Brill
- VVWRA – Logan Olds, Ryan Orr
- TAC – Scott Weldy, Jeanette Hayhurst
- MDRCD – Chuck Bell, Paul Johnson
- Morongo Basin Pipeline Commission – Bob Stadum, Frank Coate

Recap of Kickoff Meeting

Ken Kirby began by reviewing the summary from the March 4, 2013 kickoff meeting and stating that all meeting summaries, handouts, presentations and other information from that meeting and all upcoming meetings can be accessed at the Mojave Region IRWM Plan website, www.mywaterplan.com. Mr. Kirby emphasized that plan development will be an iterative process with multiple opportunities to weigh in on content, topic by topic, over the coming months before the Plan is finalized.

Tim Gobler from MWA provided a tour of the website which was projected onto a large screen.

Mary Lou Cotton from Kennedy/Jenks reviewed the plan development schedule, including the completion date which is July 2014. Ms. Cotton then turned the meeting back over to Ken Kirby, who reminded the group of the respective roles of all participants in the Plan Update process. These participants include the RWMG, Mojave Water Agency, Stakeholder Group and the Project Team. The Project Team is responsible for developing content for the Plan and includes people from the Coordinating Committee, the Consultant Team and Participating Agency Staff.

Updates to Planning Process Goals

During the regional kickoff meeting on March 4, 2013, the Stakeholder Group had been asked to consider draft goals for the IRWM planning process, which were specific things they would like to accomplish by the end of the planning process. These planning process goals had been revised in response to comments and suggestions provided by participants at that time. Ken Kirby introduced these changes to the planning process goals, which are highlighted in handout #1, available on the IRWM Plan website. No additional questions or suggested changes were provided by meeting participants at this time.

Challenges and Opportunities

In the previous Stakeholder Group meeting, participants wrote down their ideas for challenges and opportunities that they believe the IRWM Plan should address, and they posted them on a wall in the meeting room. All of these suggestions were grouped into common themes and then transcribed as written by the participants. This list of suggestions was reviewed by Ken Kirby (see handout #2a), who then a presented a draft synthesis of these challenges and opportunities (see handout #2b) that had been prepared by the Project Team. The challenges and opportunities will be used to draft the Plan Objectives. Nine major themes emerged from this synthesis of challenges and opportunities, consisting of the following:

- Coordination
- Engagement
- Disadvantaged Community Needs
- Water Supplies
- Water Quality

- Finance and Affordability
- Risk and Uncertainty
- Judgment and Water Rights
- Project Ideas

This summary of challenges and opportunities led to a variety of comments, questions and suggestions from meeting participants:

Engagement

- A pro-active approach is required to encourage engagement by all those who can benefit from the IRWM Plan but who may not yet recognize or understand that.
- It is essential that efforts be undertaken to identify critical groups that might be missing from the process.
- Outreach to these groups must clearly explain what is in it for them.
    - As an example, there are 13 minimum water producers in the Baja subarea who do not know they are minimum water producers, why they should participate in the IRWM planning process, or how they can participate.
- One idea to reach people was to send outreach letters inviting all the Community Services Districts (CSDs) in the rural areas.
- Ensure that both the Colorado River RWQCB and the Lahontan RWQCB are participating in the IRWM planning process.

Disadvantaged Communities (DACs)

- In response to a map of the Mojave Region showing the locations of all the disadvantaged communities, it was noted that almost the entire area appeared to be classified as a DAC, and that there were only a few exceptions. Is that correct?
    - It was explained that the map showing DACs throughout the Mojave Region, was based on a combination of Census Block Groups, Census Tracts, and Census Designated Places. The Project Team will review the map and make sure that it is accurate.
- Residents in Hinkley may not realize that they are classified as a DAC.

Water Supplies

- The challenge to "expect increasing competition between different water uses in the region" appears to conflict with the goal of increasing cooperation.
    - These challenges represent what people feel to be true for the Region now. Both of these challenges seem to be true now.

- One of the purposes of the IRWM planning process is to work toward solutions that will reduce conflict and enhance cooperation.

Water Quality

- What "new regulations" are you referring to? It was discussed that the issue was drinking water contaminants.

Finance and Affordability

- Proposed water rate increases will inspire public interest.
- It is important to be creative while addressing challenges and opportunities, i.e. to propose possible projects/solutions, without initially determining a revenue source for the effort.

Project Ideas, Other Suggestions, and Clarifications

- Prospective project proponents should recognize that some projects likely will not qualify for grant funding through DWR and Propositions 84 and 1E, and some projects may qualify for funding sources other than DWR's current grant programs.
- Introduce the concept of "Resource Management Strategies" by providing a link on the Mojave Region IRWM Plan website to the resource management strategies described in DWR's California Water Plan.
- One of the great challenges and opportunities we face is trying to balance the need to capture stormwater while also successfully managing flood risk.
- A challenge that appears to be missing – capturing contaminants before they can enter the water supply.
- How will projects be prioritized?
    - A great question; that topic will be tackled in the next meeting.
- One difference for this Plan update from the previous plan is that MWA may not be the lead project proponent for projects included in the Plan. It is hoped that some high priority projects will be implemented by proponents other than MWA.
- Concern expressed about moving water outside subareas and even outside the region, i.e. exporting water for sale.
- The IRWM Plan will need to address the problem of water pumping that is not in alignment with the Judgment. This is associated with new producers that were not in existence at the time of the adjudication.
- Alternative water conservation methods are needed in the Baja subarea.

IRWM Plan Outline and Current/Future Conditions

Mary Lou Cotton provided a brief review of an updated version of the proposed outline for the IRWM Plan (handout #3). She explained that the outline identifies the content that will be included in the Plan. The updated Plan will recycle everything possible from the 2004 Plan, but it must also comply with new IRWM Plan guidelines defined by Propositions 84 and 1E.

Following the overview of the Plan Outline, Sandra Carlson, also from Kennedy/Jenks, explained in detail some of the content required for the Plan; current and future conditions of the region (handout #4). Specific topics included land use, species and habitat of special concern, water supply, water quality, and flood management. One of the only questions at this time was to clarify the meaning of "wastewater imports," which was featured in the water supply table.

Preliminary Draft Plan Objectives

Ken Kirby referred to handout #5 which presented fourteen preliminary draft Plan objectives. He explained that the objectives from the 2004 IRWM Plan would no longer satisfy new DWR guidelines, which require that objectives be measurable, and preferably quantifiable. Also, given the importance of the objectives, the group will devote a considerable amount of time to the objectives during the Plan development process. Questions and comments included:

- What should be the long-term planning horizon referred to in objective #1?
    - 2035 was suggested for consistency with MWA's recently completed 2010 Urban Water Management Plan.
- Protecting ephemeral washes (which have multiple benefits) from development should be included as part of the objective to protect and restore riparian habitat areas.
- How are objectives different from goals?
    - Goals provide a long-term direction for the Plan, but are probably never fully attainable, while objectives are more short-term and measurable.
- Are goals required for the Plan?
    - Some people think that identifying goals is a clarifying step required to help determine objectives.

DWR Recommendations Regarding Changes to Mojave IRWM Region Boundary

When DWR accepted the Mojave Region as part of the Regional Acceptance Process (RAP), DWR "strongly suggested that the Mojave RWMG expand their Region boundary to include the upper watershed (Lake Arrowhead area) and the lower watershed (Afton Canyon). DWR also encouraged the Mojave RWMG to continue efforts to reach out to the Twentynine Palms area and to continue coordination and cooperation regarding the minor overlap areas with the Antelope Valley IRWM Region." Some of these areas are not included within any other IRWM region.

Early in the meeting the question was asked as to what are the benefits of adding areas outside the MWA service area.

- In order to be more hydrologically inclusive and aligned, DWR wants IRWM regions to reflect natural watershed boundaries rather than political ones.
- Areas that are not part of an IRWM Plan will not qualify for Proposition 84 funding.

To accommodate DWR's suggestions and to further answer this and other questions, Tracy Billington from the DWR, called in to the meeting and participated via a speaker phone.

- Will expansion of the IRWM boundary require the annexation of water agencies operating in those regions?
    - The boundaries of water service agencies are not affected by changes in the boundaries of the IRWM region.
- Have there been any discussions with the Bureau of Land Management about including the Afton Canyon Region in the Mojave IRWM Region?
- A representative from the Twentynine Palms Water District stated there was interest in participating in the Mojave Region IRWM process.
- A representative from the Lake Arrowhead Community Services District stated the District is interested in improving communication between upstream and downstream areas; recognizing at this time they do not yet know the needs of the downstream region.
- The key questions for communities within the existing Mojave IRWM Region and those in the outlying areas: what are they committing to and what are the benefits of joining?
    - Changes to the Mojave IRWM Region boundary would affect all agencies within the area.
    - Areas added to the Mojave IRWM Region could submit projects for inclusion in the IRWM Plan and those projects may qualify for implementation grants from DWR.

- DWR believes the recommendations could enhance water management within the Region as the Mojave IRWM Region will then be aligned with the natural hydrologic boundaries of the watershed.

Salt and Nutrient Management Plan Overview

Phyllis Stanin from Todd Engineers, a member of the Kennedy/Jenks Consulting Team, presented an overview of the Salt and Nutrient Management Plan (SNMP) process.

- Key technical components of that process include:
  - The stakeholder process
  - Goals and objectives
  - Conceptual model
  - Water quality and assimilative capacity
  - Salt and nutrient balances
  - Future water quality
  - Anti-degradation analysis
  - Monitoring program
  - Implement measures

Ms. Stanin pointed out that a great deal of prior research work has been done in this Region, so they already have a solid data base to build upon. While describing the salt and nutrient loading hydrologic process, it was explained that one key benefit of this project is to make sure that future efforts to increase the water supply do not at the same time inadvertently introduce contaminants (artificial or natural) that damage water quality.

The technical analysis will utilize the STELLA software model to project salt loading and mixing in 22 groundwater sub-regions in the Mojave Region over a 70 year period. Existing data collected in the Region will be used to establish baseline conditions for salt and nutrient loading in each of these sub-regions. Ms. Stanin explained that although the nutrient loading process is understood in general, it is a very complicated process involving a number of sub-process/elements, so in each sub-region it is difficult to know which portions of the nutrient loading process are actually happening and to what extent the processes are happening.

A key outcome of the SNMP process will be determining the available assimilative capacity of total dissolved solids (TDS) in each of the 22 sub-regions. An area could be deemed to have no assimilative capacity if the existing average groundwater quality

exceeds the water quality objective for TDS. In contrast, areas where TDS levels are below the water quality objective do have assimilative capacity. Proponents of proposed projects that are projected to take up all the available assimilative capacity in a sub-region will need to make the case for why their project should proceed, as it will preclude opportunities for any other projects in that sub-region.

During this presentation, a staff representative (Jon Rokke) from the Colorado River RWQCB was listening via a phone conference line. In addition, Mike Plaziak, agency staff from the Lahontan RWQCB, attended the meeting. In response to this presentation, several questions and comments were raised by the audience. Mike Plaziak (in conjunction with the Colorado River RWQCB staff) assisted by volunteering to address some of the questions raised in the audience, which are listed below:

- What date will be used for baseline salt/nutrient loading conditions – today's date or an earlier point in time?
    - Data that has been collected over the previous five years will be used to determine an appropriate baseline date.
- What is the impact of salt carried into the Region from imported water?
    - The SNMP takes the impact of all sources of salt into account.
- Will this study fill the need for the Local Area Management Plans (LAMPs)?
    - The SNMP will do some of the heavy lifting in terms of data analysis and projections, but each jurisdiction will still need to do their own particular LAMP if they require one.
- Will it be possible to adjust LAMP deadlines while waiting for results from the SNMP?
    - Yes, MOUs are still in effect through 2016.

Conclusion

Ken Kirby wrapped up the meeting by asking members of the Stakeholder Group to review and provide comments by April 18, 2013 on all the materials and information presented during the meeting, all of which will be posted on the website. In particular, this included drafts of the:

- Challenges and opportunities
- IRWM Plan outline
- Information sheets
- IRWM Plan objectives
- Mojave Region boundary approach

The next meeting of the Stakeholder Group is scheduled for June 6, 2013. Three public meetings will likely be scheduled to take place on days leading up to and including this meeting. Materials for the June 6 meeting will be posted to the website one week in advance.

Mojave Region
Update of Integrated Regional Water Management Plan

Stakeholder Group Meeting #3 – Summary

June 6, 2013
Mojave Water Agency Headquarters
Apple Valley, CA

Meeting Purpose and Overview

This was the third of nine scheduled meetings of the Stakeholder Group for the Update of the Integrated Regional Water Management (IRWM) Plan for the Mojave Region. The major purpose for today's meeting was to prioritize the objectives of the Plan Update and to present and discuss the proposed approach to identify, select and prioritize projects and programs. Between this meeting and the next Stakeholder Group meeting scheduled for August 20, a Call for Projects will take place beginning on July 1. The deadline to submit proposed projects is August 1.

Objectives for today's meeting included:

- Review progress to date
- Discuss Draft IRWM Plan Sections 1 and 2
- Status of Possible Planning Boundary Expansion
- Status of Salt & Nutrient Management Plan
- Approach for Project Identification, Screening, Selection and Prioritization
- Refine and Prioritize Plan Objectives

Sixty-seven individuals, including staff and consultants were in attendance. Ken Kirby, of Kirby Consulting Group and a member of the Kennedy/Jenks Consultant Team, once again served as the facilitator for the meeting.

Recap of Stakeholder Meeting #2

Ken Kirby began the meeting with a brief review of the April 4 stakeholder group meeting. During this 2nd meeting, stakeholders had reviewed the updated planning process goals for the IRWM Plan, which Mr. Kirby reminded the group, are now posted on the Mojave Region IRWM website: www.mywaterplan.com. During Meeting #2, Mr. Kirby also had presented a synthesized version of challenges and opportunities in the Mojave Region originally identified by the stakeholders during their 1st group meeting in March. The challenges and opportunities are seen as key for the development of draft IRWM Plan

objectives, which in turn will contribute to the criteria needed to prioritize proposed projects.

The update of the IRWM Plan will reflect both changed conditions in the Region as well as new guidance from the State. During the April 4 meeting, information about the intended updates to the IRWM Region Description were presented and discussed. The information is also available on the Mojave Region IRWM Plan website. An iterative planning approach will offer multiple opportunities throughout the 18-month planning process to review and provide feedback on the emerging Plan, section by section, rather than one large draft document in the final phase of the process.

Other topics addressed during the previous meeting had been the potential expansion of the Mojave IRWM Region planning boundary, and an update of the Salt & Nutrient Management Plan which is being developed in conjunction with the IRWM Plan Update.

IRWM Plan Draft Content – Sections 1 and 2

Mary Lou Cotton from Kennedy Jenks Consultants described the two draft sections of the IRWM Plan that are now available for review on the Mojave IRWM Plan website at: http://www.mywaterplan.com/irwm-plan-documents.html. Sandra Carlson, also with Kennedy Jenks Consultants, asked for a show of hands on how many had already visited the website, and a majority indicated they had.

Section 1, the Introduction, includes new text describing the Regional Water Management Group, and how the Plan will be developed and adopted. Section 2 is the Region Description. Although the content included in the previous Mojave Region Description section has not changed much since the last IRWM Plan, the updated Region Description includes new content required by the Department of Water Resources (DWR), such as land use, ecological process and environmental resources, demographics and population, disadvantaged communities and tribes in the Region, and climate change.

Mary Lou Cotton stated that guidance on how to provide feedback for these draft sections was described in Meeting Handout #1. Comments should be provided to the Plan Development Team via comments@mywaterplan.com. It was requested that comments be submitted either as a Word document or as email text with the handout # or section #, page #, and paragraph # included for each comment.

Status of Potential Mojave IRWM Region Expansion

Ken Kirby set the context for this discussion topic. In 2004, DWR had accepted the boundary of the MWA service area as the boundary for the Mojave IRWM Region (also sometimes referred to as the Mojave IRWM Planning Region). During the 2009 Regional Acceptance Process (RAP), DWR approved the proposed Mojave IRWM Region and at that time DWR strongly suggested that the Mojave Regional Water Management Group (RWMG) "expand their Region boundary to include the upper watershed (Lake Arrowhead area) and the lower watershed (Afton Canyon)."

If the Mojave RWMG decides to include the recommended geographic areas within the Mojave IRWM Region, these areas do not become a part of the MWA service area. It is important to DWR that the entire state by covered by an IRWM Plan, as any areas not part of an IRWM plan are not eligible to access DWR IRWM grant funds. However, DWR has emphasized in recent conversations that while DWR has "strongly suggested" that these areas be included, the decision of whether to include them is to be made by the stakeholders involved. DWR has requested that the Mojave RWMG inform DWR by letter of the decision about the potential expansion of the Mojave IRWM Region boundary and the reasoning associated with that decision.

Lance Eckhart and Tim Gobler from the Mojave Water Agency provided an update on the status of communication and coordination regarding this potential expansion of the Mojave IRWM Region that had occurred since Stakeholder Meeting #2. In general, a positive response had been received in response to letters that had been sent to stakeholders in these adjacent areas to see if they were interested in exploring the possible changes to the Mojave IRWM Region boundary further. This introduction and status update was followed by an extensive round of comments and questions from meeting participants, including the following:

- If the Mojave IRWM Region does expand into new geographic areas, will MWA then be required to financially assist and/or take the lead on projects that are located outside its service area?
    - The answer to that is no, MWA will not be required to assist with projects; however they could choose to participate if the proposed project provides benefits for the MWA service area. In fact, MWA does not even need to be the lead for IRWM projects within the current Mojave IRWM Region which currently coincides with the MWA service area.
- Who identified the new area boundaries?
    - DWR identified the target areas adjacent to the Mojave IRWM Region that they suggested be included. If the Mojave IRWM Region boundary is

changed, it will be the result of a collaborative process among stakeholders within the current Mojave IRWM Region and between stakeholders in these adjacent areas. At this stage, the Plan Development Team is exploring whether there is interest in expanding the boundary of the Mojave IRWM Region.

- There are many federal agencies located within the adjacent areas that are being considered for inclusion in the Mojave IRWM Region. Do we know what the implications or potential benefits of this might be?
    - It is difficult to know today but it does suggest that there could be advantages with federal agency participants. The DWR Prop 84 funding represents seed money and is not nearly enough to do all that is necessary in the Region, which likely will cost more than a billion dollars.
    - The real benefit of the IRWM Plan stems from identifying what we can do collectively working together with all the stakeholders to manage water and related resources to help the Mojave Region thrive over the long term.-
- Are these adjacent areas all unincorporated areas?
    - No, they include a mix of incorporated and unincorporated areas.
- Who is in charge of monitoring unauthorized water pumping in these areas?
    - Expansion of the Mojave IRWM Region boundary would not change the existing authorities now operating in these areas.
- What are the drawbacks of bringing these adjacent areas into the Region?
    - It will increase the cost of updating the Plan.
    - It means project proponents in these areas will be eligible to compete for DWR grant funding. (Although if the Mojave RWMG decides not to include the recommended areas, they may be able to establish another accepted Region and also qualify for IRWM grant funds.)
    - It was recommended that if the Mojave IRWM Region boundary is expanded that the recommended areas not be subdivided. In other words, if the upper watershed portion of the Mojave IRWM Region is adjusted, that it be adjusted to include the entire boundary of the upper watershed. And likewise, if the Mojave IRWM Region boundary is expanded to include the lower watershed portion of the Region, that the Mojave IRWM Region boundary be adjusted to include the entire portion of the lower watershed.
- Do these areas have to agree to be included and who in these areas is involved in that decision?
    - It is a joint decision. The current Mojave RWMG cannot impose the decision on stakeholders located within the areas recommended for inclusion.
    - A majority of the interested parties within these geographic areas will need to agree to the decision to join.

- What are some of the benefits of adding their projects to the Mojave IRWM Region Plan?
    - They will become eligible to receive currently available State grants and other future grants from the State.
    - The real long term benefit is to encourage integration by enabling stakeholders with similar projects to work together.
    - It is possible that DWR will view the Mojave Region more favorably by expanding into these adjacent areas located within the Mojave watershed, which could attract more funding to the Region.
- Given the likely increase in costs that will be incurred to develop the Mojave IRWM Plan with the addition of these adjacent areas, what will be the basis for allocating this additional cost to the new areas? Will it be on the basis of "incremental costs" versus their "fair share" of the additional costs (given their potential share of full IRWM Plan benefits)?
    - We will need to have a conversation to determine a reasonable and fair basis for allocating the additional cost that will arise.
- There is concern about what will be the win/win balance between new outside areas that may join the Region and areas located within the original Region. Are we diluting our potential share of future grant funding?
    - In fairness, there is going to be only one grant application from the Mojave IRWM Region and the Mojave IRWM Stakeholder Group as a whole will decide for the Region on the projects that will be included in that grant application.
    - Also, the currently available funds that the Mojave IRWM Region is eligible for is allocated across two funding areas: Colorado and Lahontan. Other IRWM planning regions within the funding areas will be competing for these same funds.
- What are the advantages for us?
    - Good planning
    - The mountain ranges are our headwaters. For that reason alone it is very important to include them in the Mojave IRWM Region.
    - We need to be concerned about the impact these outlying areas may already be having on our water quality (e.g. septic tanks in the Wrightwood area). So, working with them as part of an integrated planning process in search of collective solutions will be to our benefit.
    - We should recognize the progress that we have already made by working together as a Region and that our water resources are impacted by the plans in the upper watershed area. We will be better off as a Region if we can work with them.

    - We should simply see ourselves as one hand with many fingers; we can all benefit by recognizing we are already joined together in reality. An expanded Mojave IRWM Region simply reflects that fact.
- Are there other disadvantaged communities in these outlying areas?
- What will it cost us to participate? (question from a representative of Arrowhead, one of the adjacent areas that is being considered for expansion of the Mojave Region)
    - A cost estimate will have to be made following an inventory of water resource and infrastructure information available for the IRWM planning process; this is a task the Project Team will complete.

Status of Salt and Nutrient Management Plan

A brief update on the status of the Salt and Nutrient Management Plan (SNMP) was provided. Data being used for the SNMP will be provided in forthcoming meetings. The current challenge is synthesizing available data that now exists but in multiple different data sets that have been collected for different purposes and in different ways.

A key purpose of the SNMP is to determine the assimilative capacity for salt and nutrients of groundwater throughout basins in the Mojave Region. This is critical information that is needed to ensure the long term sustainability of the Region, and will help with the project selection process.

Approach for Project Identification, Screening, Selection, and Prioritization

Ken Kirby reviewed steps in the proposed process that will be used to identify projects, as outlined in Handout #2. This included explaining why identifying and then prioritizing Plan objectives is so important, as it will be very difficult to prioritize projects if the stakeholder group has not first prioritized objectives. The principal recommendation to prioritize projects is to assess the extent to which they contribute to the high priority objectives.

In addition to reviewing the proposed 11-step process for identifying projects, Mr. Kirby presented the proposed screening criteria that projects would need to meet to be included in the Mojave IRWM Plan, and the project review and prioritization factors that could be applied to projects that pass the screening criteria.

Mary Lou Cotton then introduced a matrix (Handout #3) that project proponents can use to help think about their proposed projects when putting together an application. The matrix is a tool designed to help project proponents to identify which Plan Objectives, as well as which IRWM Plan Preferences from DWR, their proposed project will address. It

also will help proponents to identify the California Water Plan Water Management Strategies that will be utilized by their proposed project.

Ms. Cotton emphasized that projects will be selected for inclusion in the Mojave Region IRWM Plan based on the proposed criteria; primarily the Plan Objectives identified and prioritized by the stakeholder group. Considerations about which projects to include in future grant applications will come into play later during the grant application phase, after the IRWM Plan has been developed and adopted.

Ms. Cotton then reviewed two proposed forms that are to be used by project proponents to submit their projects for consideration in the Mojave IRWM Plan. The Project Identification –Short Form (Handout #4) is a two page form that captures the minimum amount of information required to submit a project, although more information will likely be required at a later date. The Project Identification – Long Form (Handout #4b) is a more comprehensive form that can be used for well-developed project proposals. The deadline for submitting either project submittal form is August 1.

Questions and comments concerning the project identification and prioritization process included the following:

- What is meant by "integration" which is referred to in step #4 of the process?
    - The principle is to encourage project proponents to talk to each other about their ideas before submitting their projects. Talk first then submit.
    - There are three types of integration – (1) stakeholder/institutional integration where two or more agencies work together on a project, (2) resource integration where project proponents are sharing funding, personnel and expertise, and (3) project implementation integration designed to achieve multiple objectives.
- If a project idea is not technically feasible today but may be in the future should we go ahead and submit promising concepts to be explored in the future?
    - Yes
- Can Plan priorities change over its 25-year timeframe?
    - Yes. The Mojave IRWM Plan will include a process that details how the Plan can be updated in the future.
- Who will prioritize the projects?
    - The Project Team will review project submittals and make recommendations which are then presented to the Stakeholder Group for review, refinement and revision.
- Can we resubmit projects from the current IRWM Plan project list?

    - Yes
- Prioritization criteria reflects State and not Federal guidelines
- Now is the time to submit project ideas (e.g. Hinkley). If in doubt, submit it and we can discuss it later.
- Is the Plan a living document that will change as new funding sources become available?
    - Yes, the Plan can and will be updated as conditions change.
- How to get the County involved when needed to implement projects located in unincorporated areas?
    - We recommend that if you have an idea for a project or program that the County should be involved in that you approach the County and request that they participate in developing and submitting the project. If they do not respond, you can submit the project anyway, but it would be better to include them early in the process.

Refine Plan Objectives

Following the review of the project identification and prioritization process, Ken Kirby introduced the latest revised version of the IRWM Plan Objectives (Handout #5). Comments and questions concerning the list of 16 proposed objectives include:

- Concern was expressed about exceeding State conservation goals, as described by Objective #2. In the past, early adopters of water conservation often found themselves penalized by new conservation regulations. A new baseline was set after they had already implemented conservation measures (rather than before these measures went into effect), so they were more likely to fall short of the new targets and be penalized by higher water rates.
    - Kirby Brill, MWA General Manager, stated that the Mojave Region already meets State water conservation goals and that water conservation is an important goal for us as a Region. Ken Kirby added that water conservation is an important part of our overall portfolio of water resource management strategies.
- It was observed that there are possibly too many objectives and that they somehow be consolidated to reduce the number from the current sixteen objectives.
- Ken Kirby then asked the group to participate in an initial prioritization exercise for the proposed objectives. Objectives and projects can be ranked in terms of two factors i.e. their (1) importance and (2) urgency.
    - Importance reflects the relative significance or consequence of achieving a particular objective, when compared to the other objectives.

    - Urgency reflects the degree to which an objective warrants speedy attention or action, when compared to the other objectives.
- Objectives can be grouped into different tiers of priority based on whether they are of high, medium or low importance and high, medium or low urgency.
    - Objectives can be grouped in up to four tiers based on the intersection of importance and urgency
- It was observed by a participant that "urgency" seems to carry more weight than "importance"
    - Reflects the reality that timing is essential when responding to an urgent need or opportunity.
- The group was asked through a show of hands to indicate in which of four tiers they believed a particular objective should be grouped based on what they saw as its importance and urgency.
- Voting results are shown on the next page. There was not sufficient time during the meeting to vote on the priority for all Plan objectives.

Informal Vote on Revised Objectives for Mojave IRWM Plan – Results

URGENCY	LOW	MEDIUM	HIGH
HIGH	***TIER 2***	***TIER 1*** **Obj. 4** – (3 votes) **Obj. 2** – (5 votes) **Obj. 3** – (1 votes)	***TIER 1*** **Obj. 1**- Balance average future water demand (34 votes) **Obj. 2** - (2 votes) **Obj. 3** - Maintain stability in previously overdrafted groundwater basins (17 votes) **Obj. 4** - (5 votes) **Obj. 5** - (7 votes) **Obj. 7**- Provide tools to DAC (16 votes) **Obj. 9** – Improve stormwater management (11 votes) **Obj. 12** – Obtain financial assistance from outside sources (8 votes) **Obj. 14** – (3 votes)
MEDIUM	***TIER 3*** **Obj. 6** – (6 votes)	***TIER 3*** **Obj. 2** – (5 votes) **Obj. 3** – (3 votes) **Obj. 4**- Reduce reliance on the Delta (10 votes) **Obj. 5** - Optimize use of region's assets to maximize available SWP supplies (15 votes) **Obj. 7** –(1 votes) **Obj. 9** - (5 votes) **Obj. 14** – (3 votes)	***TIER 2*** **Obj. 1** – (2 votes) **Obj. 2** – Continue improve regional water use efficiency (12 votes) **Obj. 3** – (10 votes) **Obj. 4** – (6 votes) **Obj. 5** – (7 votes) **Obj. 7** – (10 votes) **Obj. 9** - (8 votes) **Obj. 12-** Obtain financial assistance from outside sources (12 votes) **Obj. 14** – Increase use of recycled water (13 votes)
LOW	***TIER 4*** **Obj. 6** – Prevent land subsidence (12 votes)	***TIER 3*** **Obj. 4** – (2 votes) **Obj. 6** – (8 votes) **Obj. 9** –(2 votes) **Obj. 12** –(1 votes)	***TIER 2*** **Obj. 2** – (4 votes) **Obj. 4** – (3 votes) **Obj. 9** – (3 votes) **Obj. 14** – (6 votes)

IMPORTANCE

Conclusion/Meeting Wrap Up

The meeting concluded with a reminder of what the group was being asked to do and of upcoming dates and deadlines.

- **June 14** – submit questions, comments or suggestions concerning the following items:
    - 1st two sections of the IRWM Plan (Draft Introduction and Region Description)
    - Proposed process for project identification, screening, selection and prioritization (Handout 2)
    - Draft Project Submittal Forms (Handouts 4 and 4b)
- **July 1**- Call for Projects
- **August 1** – Deadline to submit project proposals
- **August 20** – Stakeholder Group Meeting #4, which has been rescheduled from the original August 1 date to provide the Plan Development Team the time needed to review the project submittals.

Scott Weldy, Chairman to the TAC for the MWA, closed the meeting by remarking that a great product depended on receiving great input from the members of the Stakeholder Group.

Mojave Region
Update of Integrated Regional Water Management Plan

Stakeholder Group Meeting #5 – Summary

November 5, 2013
Mojave Water Agency Headquarters
Apple Valley, CA

Meeting Purpose and Overview

This was the fifth of eight scheduled meetings of the Stakeholder Group for the Update of the Integrated Regional Water Management (IRWM) Plan for the Mojave Region. Objectives for the meeting were to:

- Review progress to date
- Present status of the Salt and Nutrient Management Plan
- Discuss status of the planning boundary expansion
- Discuss and adopt prioritized Plan objectives
- Review results of project screening and prioritization
- Discuss next steps

A major portion of the 4-hour meeting was devoted to a review of the project screening and prioritization process and a discussion of the project submittals and preliminary recommendations resulting from that process.

Thirty-three individuals completed the meeting sign-in sheet. Ken Kirby, of EVOTO Company and a member of the Consultant Team, served as the facilitator for the meeting.

Introductions

The stakeholder group meeting began immediately following a brief session of the Technical Advisory Committee (TAC) to the Mojave Water Agency (MWA). The TAC meeting was led by Scott Weldy, Chairman of the TAC, during which members of the TAC nominated and elected TAC officers and appointments to the TAC Executive Committee for 2014.

Kirby Brill, General Manager for the MWA, opened the stakeholder group meeting by asking Lance Eckhart, from MWA staff, to provide a brief overview of the agenda. Mr. Eckhart explained that the meeting will provide an opportunity to share results of the project prioritization process that had been underway since the last stakeholder meeting

on August 20. He indicated that by December they hope to have a final list of all the projects that will form the basis for the proposed Plan. He then turned the meeting over to Ken Kirby who reminded the group that the IRWM Plan they are now developing is not set in stone but will be updated over time. Between today's meeting and the next meeting on December 16, the process and conversation will determine those projects that will be included in the 2014 version of the Plan.

Mr. Kirby also provided a recap of Stakeholder Group Meeting #4 and reminded the group that summaries of all the meetings are available on the project website, www.mywaterplan.com, enabling them to review the ebb and flow of the Plan development process over the past year. He also provided an update on the IRWM Plan development process and restated the fact that the IRWM Plan is being written in stages so they can provide feedback as the process goes along, rather than being saddled at the end with the task of having to review and provide feedback on the entire document only during the final phase of the process.

Salt and Nutrient Management Plan Update

Lance Eckhart provided an update on the Salt and Nutrient Management Plan (SNMP), which is being developed in concert with the IRWM Plan. The SNMP is focused on water quality as measured by the accumulation of nutrients and salts in the groundwater of the Mojave River Basin and the Morongo Basin. Results from the IRWM Plan Update are being used to inform and guide development of the SNMP.

The goal of the SNMP is to provide a snapshot of existing water quality conditions in these two basins. It will also help answer the question as to whether water quality is staying the same, getting better or growing worse within different areas in the Region. Both Total Dissolved Solids (TDS) and nitrate have been selected as indicators of salt and nutrients. Water quality from over 100 different sites is being used by the SNMP Model to determine assimilative capacity in each sub basin (i.e. the amount of additional TDS that can be absorbed into the groundwater without exceeding the Basin Plan Objective), to project trends over a 20 year time period, and to determine the impact of proposed projects on existing TDS levels. It can also consider impacts stemming from of range of possible options, including different projects or no project at all (the base case).

Questions raised by the group in response to this presentation included the following:

- Can you provide us an example of the types of projects the SNMP model will be evaluating?
    - As an example, it can help us determine the respective impacts on water quality of a sewer system compared to septic tanks. Think of the SNMP

Model as a screening tool which will be used to determine the impact on water quality over a 20 year span.

- What is the ideal salt level? 500 mg per liter of TDS seems high.
    - Regulators will ultimately be the ones to determine the ideal salt level and this is often driven by drinking water standards.
- Is it fair to consider the Regional Water Quality Boards as our "salt cops?"
    - Yes, but the SNMP model will help make the Regional Board decision-making process more science-based and holistic.
- Are dischargers responsible for cleaning up to the background level or to drinking water standards?
    - It depends on each case.

Status of Mojave IRWM Planning Region Expansion

Lance Eckhart also provided an update on the expansion of the IRWM Planning Region, which had been a major item of discussion during the last stakeholder group meeting in August. Mr. Eckhart reminded the group that DWR is encouraging watershed-wide planning and management, rather than leave any geographic areas within a watershed as isolated islands outside the boundaries of an IRWM planning region. In the case of the Mojave IRWM Region, there were four such areas: Afton Canyon, Twentynine Palms, San Bernardino Mountain Communities (also called the Upper Mojave Area), and Wrightwood. During the last meeting, the stakeholder group agreed to add both Afton Canyon and Twentynine Palms to the Region, but there was still a question concerning the two remaining areas as there was a need to determine whether groups representing communities in the other two areas were willing to financially participate in the IRWM planning process. An incremental financial contribution was needed to carry out the data collection and analysis work required by the IRWM planning process in each of these additional areas. Since the last meeting, the County of San Bernardino has stepped in to financially participate in the IRWM planning process on behalf of both of these areas. All four areas will now be included in the Mojave IRWM Plan Region.

- Since it is the County of San Bernardino that is financially supporting the IRWM planning work in these two areas, do we know whether these communities will now actually participate in the IRWM planning process?
    - They can definitely participate if they choose to do so and it is our expectation that they will.
- Will these four areas now come under the Judgment?
    - No. The IRWM Plan has no impact on existing legal structures. The advantage of including these areas in the Mojave IRWM Region is that we

will now have a more integrated planning process that does encompass the entire watershed region.

Governance after Plan Adoption

Ken Kirby introduced the topic of governance during implementation of the Mojave IRWM Plan. The State has requirements that every IRWM Region adopt a governance structure for implementation of the Plan which will ensure the current region-wide collaborative process does not end once the Plan is adopted. It will be designed to foster implementation, track progress, and provide a structure for Plan updates.

At the next meeting on December 16, the Stakeholder Group will be presented with a governance proposal for their consideration. There are two major options. The first will be to continue with a similar governance structure that has been used during the development of the Plan. The other is to adjust the governance approach for implementation. There were no questions or comments from the Stakeholder Group at this time.

Review and Adopt Refined and Prioritized Plan Objectives

Ken Kirby began this topic by reminding the group that Objectives are the foundation for the Plan. It is hard to know what to do with proposed projects without first having clearly defined objectives. This is the reason the Project Team and Stakeholder Group have spent so much time throughout all the meetings identifying and refining the objectives. The purpose of today's discussion was to confirm and adopt the objectives.

Mr. Kirby then referred the group to two handouts: Final Draft Mojave IRWM Plan Objectives (Handout 1a), and Plan Objectives Arranged by Priority (Handout 1b). Unlike the first handout which shows the objectives in numerical order, Handout 1b organizes them in tiers so it is clear which objectives the Group has agreed are the most important. Handout 1a shows the changes made to the objectives during the discussion that took place at the last meeting. Mr. Kirby reviewed each of the changes and then asked if anyone had any questions or comments:

- How does Objective #7, "Provide support and assistance to disadvantaged communities…" which has been ranked high in both importance and urgency relate to small water systems requiring financial assistance as measured in Objective #11a, which ranked high in importance but only medium in urgency?
    - Actions taken to meet Objective 11 (Obtain financial assistance from outside sources) for small water systems can also help satisfy Objective 7 (Provide

support and assistance to disadvantaged communities). We can think of the actions taken to help provide financial assistance for small water systems as a subset of the potential actions that can be taken to support disadvantaged communities overall.

- Does California Fish & Wildlife agree with the changes made to Objective #8, "Improve environmental stewardship related to waterways and water management in the Region," which originally was ranked High in both Importance and Urgency, but is now Medium/Medium? At this point, [Alisa Ellsworth] (a representative from Fish & Wildlife who was participating by phone) stated a concern about the proposed priority and asked that the group reconsider the ranking.
    - It was explained that the revised ranking reflected the views of the group as expressed during the last meeting, including the view that it was not as important as objectives that relate directly to balancing water supply.
    - The Fish & Wildlife representative and others offered the perspective that this environmental stewardship objective will help achieve the high priority water supply objectives.
    - Some pointed out that successfully addressing Objective #3 (which is ranked as High/High), "Maintain stability in previously overdrafted groundwater basins and reduce overdraft in groundwater basins experiencing ongoing water table declines," will support riparian health. For this reason, they proposed that measurement 8a, "Measured by acres of sensitive environmental/habitat areas restored or new sensitive environmental areas set aside for protection," be moved to Objective #3.
    - Rather than combining measurement #8a with Objective #3, it was proposed that the ranking for Objective #8 be changed from Medium Importance/Medium Urgency to High Importance/Medium Urgency. The representative from Fish & Wildlife agreed with this recommendation as did the rest of the Stakeholder Group. As a result, Objective #8 will be moved from Tier 3 (Medium/Medium) to Tier 2 (High/Medium).
- Will expending resources for Objective #8 detract from resources needed for our priority Objective #3?
    - It's difficult to know for sure. However, these objectives are clearly interdependent. Actions taken to satisfy Objective #8 may qualify for outside funding sources that might not otherwise be available to us and in effect expand overall resources.

Project Screening and Prioritization Process

Ken Kirby reviewed the project selection and prioritization process as outlined in Handout 2. A total of 129 projects had been submitted to the project team. 61 of these projects were

combined to form 15 integrated projects. 9 projects were screened out. As a result, 68 projects are now proposed for the IRWM Plan. All of these project submissions were listed in four handouts which Mr. Kirby reviewed with the group.

Handout 3a: Mojave Region Plan Potential Projects (Project Summary) lists projects by the number they were assigned as they came in. However, projects highlighted in yellow were the newly integrated projects, which have been assigned new project numbers beginning with 1,001. Lance Eckhart explained that these projects had been integrated during a meeting in which sponsors of similar projects had an opportunity to come together for that purpose.

Handout 3b lists the nine projects that have been screened out along with the reasons why. In many cases the project did not yet have a sponsor, the applicant withdrew the submittal, or the applicant had not responded to a request for additional information about the project and so it was withdrawn.

Handout 3c provided a preliminary ranking of projects based on the priority of the primary objective(s) the project would contribute to. In some cases, Ken Kirby revised the expected contributions to objectives according to the information provided in the project submittals. These proposed revisions were shown in the handout. Project sponsors were asked to review these changes and to send in their comments if they disagreed with the revisions. The final column in the handout showed a Get Real Index (GRI) assigned to each project.

Mr. Kirby explained that projects submitted were initially prioritized based on the priority ranking of the primary objective(s) most likely impacted by the project. Since relying on objectives alone did not lead to a significant distribution of projects across the priority rankings (too many projects were in Tier 1), prioritization was considered based on other review factors as listed on page 3 of Handout 2. However, many of the proposed projects are in the conceptual stage of development and so do not yet provide much detail. In order to further refine the project prioritization, the Project Team reviewed each project and assigned a "Get Real Index" on a scale of 1 to 3.

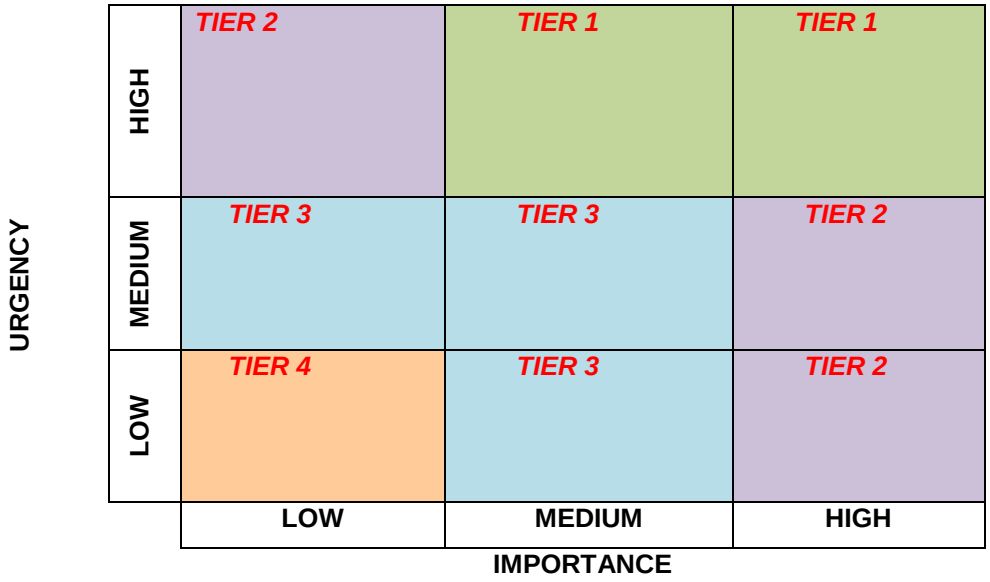
GRI 1 - Well advanced, ready to proceed
GRI 2 - Very likely (there is momentum, funding and a committed sponsor)
GRI 3 - Needs work – not yet ready to move into implementation, no demonstrated momentum

Using the GRI review factor, Mr. Kirby recommended reclassifying projects that received a GRI of 3 as follows:

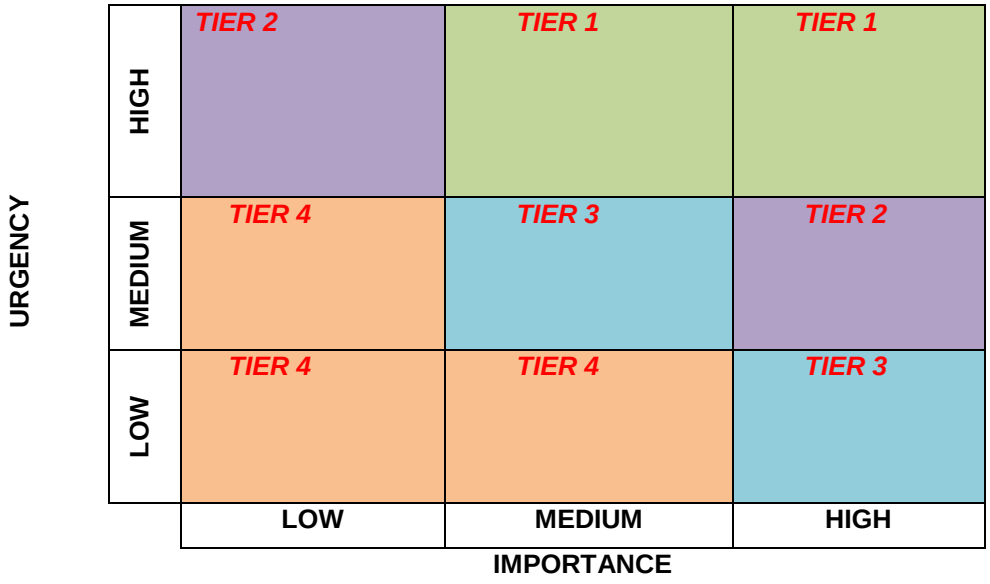
- If projects that received a GRI = 3 were initially ranked in High Importance/High Urgency or High Importance/ Medium Urgency then move them to High Importance/Low Urgency.
- If projects that received a GRI = 3 were initially ranked in Medium Importance/Medium Urgency then move them to Medium Importance/Low Urgency.

The result was a new project list with proposed priorities, Handout 3d: Projects Arranged by Proposed Priority. However, Ken emphasized that this initial screening and prioritization was meant to serve as a starting place for the conversation during the Stakeholder Meeting. Final decisions for whether a project is included in the Plan and where it is prioritized will be based on a broad agreement among the stakeholders.
As a result of the project screening and prioritization process results, Mr. Kirby also proposed a modification of the priority tier structure to provide more meaningful distinctions between tiers. The changes are shown on the next page.

Original Priority Tier Structure



Revised Priority Tier Structure



Project Submittals and Preliminary Recommendations

After reviewing the project prioritization process and the four handouts (3a through 3d) that summarized results of that process, Ken Kirby invited comments and questions from the Stakeholder Group. The initial questions were primarily about projects that had been screened out (Handout 3b), or in one case a request was made about a project that did not appear on the current list of projects:

- What about submitted projects that appear to be missing?
    - Most likely these are projects that have become a part of one of the larger integrated projects, but we will check to make sure this is the case.
- What happens to projects that have been screened out?
    - They will not be included in the Plan but a record of the screened out projects will be indicated in the Plan, probably in an appendix.
- If a sponsor for a screened out project can be found, can they then be prioritized and included in the Plan?
    - Yes, if the reason for being screened out is a lack of sponsor, but in order to be included in the 2014 Plan being developed it will be important to identify a sponsor before our next meeting on December 16.
- Why was Project #12, the Cadiz Valley Water Conservation, Recovery and Storage Project, screened out?
    - The project proponent did not respond to a request for additional information needed based on the initial submittal.
- Project #48R, Mojave River Dam-Deep Creek Spillway Wetlands restoration, was screened out for lack of a sponsor. If the Army Corp of Engineers steps up as sponsor can it be put back on the project list?
    - Yes, any project that was screened out due to a lack of a sponsor can be included if a valid sponsor steps forward between now and December 15.
- Project #62R, Water Conservation Ordinance, has been screened out for not yet having a sponsor. Has the County and MWA been asked to sponsor this project?
    - It is recommended that the advocates for this project talk with the County to work through the details of the County's possible sponsorship. If there is not a sponsor now, this project can still be added at a later date when the Plan is amended.
    - Becoming a project sponsor does not mean that the organization is committing to executing the project outside of their normal review and decision making processes, but rather that the organization supports the project and agrees to move it through its normal processes in order to make a decision to implement or not.
    - The County Planning Department has expressed interest and is considering the proposed ordinance.

Many other questions and comments were offered related to projects that had made it onto the preliminary ranked list of projects (Handout 3c). During the discussion that followed, some stakeholders asked if the group could be persuaded to change the priority ranking of a project or its Get Real Index revised based on additional information or other project details.

- Is it possible to change the Get Real Index of Project #95, Adelanto Pearmain Relief Sewer Line, from GRI 2 to GRI 1? All the necessary elements are in place except for the funding. However, the need is urgent. In addition, this project will directly benefit a disadvantaged community.
- How do we determine whether or not a project is really shovel ready?
- Can the GRI of a project change as it moves forward? – yes
- Isn't the whole point of this exercise to get money for our projects?
    - It is a point but not the whole point. The number and scope of projects in the Plan will far exceed the grant funding that is available to us.
- Both Project #44, Lucerne Valley Small Water Systems Feasibility Study, and the integrated Project #1003, Assistance Program for Small Drinking Water Systems are in the same project category. I believe Project #44 fits with Project #1003. Is the group supportive of integrating them? The group agreed to this.
- Can the priority ranking of Project #32, Helendale Community Services District Tertiary Treatment Upgrade, be changed from High Importance/Medium Urgency (Tier 2) to High Importance/High Urgency (Tier 1)?
    - The project was ranked high/medium because the primary objective it impacts is water quality, which is a high importance/medium urgency objective. We are looking for consistency between objectives and the overall Plan.
    - There are no guarantees that high/high projects will be implemented first.
    - The stakeholders agreed as a group to change the ranking of Project #32 to High Importance/High Urgency.
- If a community or water provider is slapped with a water quality violation will that event change the prioritization of a wastewater project? It could, but it is likely the sponsors will move forward with the project anyway, regardless of the priority assigned in the Mojave IRWM Plan.
- Can the priority ranking of Project #93, Apple Valley and Hesperia Subregional Water, be changed from High Importance/Medium Urgency (Tier 2) to High Importance/High Urgency (Tier 1)? The project already has a GRI of 1, is on the verge of receiving $1.5 million in funding and is ready to go.
    - The stakeholders agreed as group to change the ranking of Project #93 to High Importance/High Urgency.
- Two of the scores for the Objectives met by Project #18R, Commercial/Industrial/Multi-Family Cash for Grass Program (Objectives #1 and #3) were changed from 1's (Primary) to 2's (Secondary), but we disagree with this change. The primary reason for this project is to reduce water demand, so we would like it changed from a High Importance/Medium Urgency (Tier 2) to High Importance/High Urgency (Tier 1).

    - Some argued that changing to tiered water rates would be a more cost effective strategy and based on past results will achieve better results. Others observed that most commercial properties are not on tiered rates and are less influenced by them where they do apply.
    - After discussion and a show of hands, the stakeholders reached broad agreement to change the priority ranking of Project #18R to High Importance/High Urgency.
- The project category for Project #1012, Cedar Street / Bandicoot Detention Basin, should be changed from conservation and education to groundwater recharge. Also, MWA has agreed to be a partner for the project, so the GRI should be a 2, not 3, and the priority ranking should change from High Importance/Medium Urgency (Tier 2) to High Importance/High Urgency (Tier 1).
    - The Stakeholder Group agreed that the GRI for Project #1012 should change from 3 to 2 and the priority ranking should be High Importance/High Urgency.
- It is important to recognize that this is a dynamic process and rankings can change up or down over time. What we need to know today is what the rankings should be for the 2014 Plan.

Wrap Up/Next Steps

Lance Eckhart provided a brief funding update explaining that the second round of Prop 84 funding recommendations had just been announced. Given that the Mojave Region overlaps two funding areas, the Colorado and Lahontan, we have two possible bites at the apple. As it turns out, no funding was received for the High Desert Water District in the Colorado River Funding Area. In the Lahontan Funding Area, $1.5 million of the $3 million requested has been recommended for award. It was surprising that the remaining $1.5 million has been shifted to other funding regions. As this represents a change of direction on the part of DWR, they have been asked to reconsider this decision and are in the process of doing so.

At the end of the meeting, stakeholders were asked to review all the project summaries (Handouts 3a to 3d) to make sure they were factually correct, to assess if recommended priorities were appropriate, and if they believed any of these proposed projects should not be in the Plan. If they did have any questions or comments, they were asked to submit them to the Plan Development Team by November 15 to comments@mywaterplan.com. Ken Kirby added that any project sponsorship changes should be sent in as soon as possible. The next Stakeholder Meeting is scheduled for December 16.

Mojave Region
Update of Integrated Regional Water Management Plan

Stakeholder Group Meeting #6 – Summary

December 16, 2013
Mojave Water Agency Headquarters
Apple Valley, CA

Meeting Purpose and Overview

This was the sixth of nine scheduled meetings of the Stakeholder Group for the Update of the Integrated Regional Water Management (IRWM) Plan for the Mojave Region. Objectives for the meeting were to:

- Review project lists and revised projects
- Provide status update of draft IRWM Plan document
- Discuss proposed Governance structure for implementation
- Discuss Plan Performance Monitoring and Data Management
- Introduce Finance Requirements
- Review next steps

The meeting discussions revolved around specific projects revised in the project lists, the governance structure for implementation of the Plan, and defining criteria for monitoring performance of the Plan upon its implementation.

Twenty-nine individuals completed the meeting sign-in sheet, however over forty people attended the meeting as indicated by the introductions held at the start of the meeting. Ken Kirby, of EVOTO Company and a member of the Consultant Team, served as the facilitator for the meeting.

Introductions

Scott Weldy, Chairman of the Technical Advisory Committee (TAC) to the Mojave Water Agency (MWA), opened the meeting with introductions by all those in attendance followed by approval of the November 5, 2013 Stakeholder Meeting Summary. Lance Eckhart, from MWA staff, thanked representatives from the newly expanded boundary areas of the IRWM Plan for attending the meeting and then turned the meeting over to Ken Kirby. Mr. Kirby provided a brief overview of the agenda indicating that a large portion of the discussions would be about Plan Performance Monitoring and Data Management as specified by State guidelines.

Mr. Kirby also provided a recap of Stakeholder Group Meeting #5 and gave a status update on the project schedule, stating that the public review draft of the IRWM Plan will be completed in May 2014 and the final draft should be ready for adoption in June 2014.

Mr. Kirby followed by opening the floor for questions and comments from the group. Mr. Floyd Wicks of Cadiz, Inc. representing the Cadiz Valley Water Conservation, Recovery and Storage Project had a comment regarding the mention of his project on page 9 of the Stakeholder November 5th 2013 Meeting Summary. Mr. Wicks expressed concern over the removal of the project from the IRWM Plan due to lack of response from the project proponent and assured that Cadiz, Inc. was very interested in being involved in the IRWM Plan. Mr. Kirby clarified that individual project proponents were not contacted directly, but rather the second round of the project submittal phase for the IRWM Plan served as a collective notice to the group requesting additional information on projects (the first round was the initial call for projects). Mr. Kirby further explained there would be an opportunity for further discussion about specific projects during a later part of the meeting.

Mr. Kirby continued the meeting by providing an overview of the Code of Conduct for the meeting before providing a brief update on the status of projects included in the IRWM Plan:

- 128 total submittals received
    - 63 combined, resulting in 15 integrated projects
- 72 total projects proposed for the Plan
    - 8 projects screened out

Revised Project Lists (see Handouts 1a-1e)

Mr. Kirby reviewed the project lists and their revisions during this session of the meeting. As shown in each project list handout, those projects highlighted in pink had been changed in some respect (e.g. priority ranking) or added to the list, while projects highlighted in yellow had been integrated with others into a single, larger project. The following is an overview of revisions to each project handout list, identifying the affected projects, and related comments and questions from the group:

Mojave Region IRWM Plan Potential Projects (Project Summary)-Handout #1a
Revision(s): Includes projects previously missed

Projects discussed:

<u>62R – Water Conservation Ordinance</u>

- Previously screened out (lacked project proponent to carry out project)

- Currently recommended for inclusion in the IRWM Plan
    - County of San Bernardino to sponsor project

126 – Community Park and Demo Garden

- Previously missed
- Currently recommended for inclusion in the IRWM Plan

127 – Water Well No. 10

- Previously missed
- Currently recommended for inclusion in the IRWM Plan

128 – Transition Zone Water Quality Study

- Previously missed
- Currently recommended for inclusion in the IRWM Plan

129 – Well Abandonment

- Previously missed
- Currently recommended for inclusion in the IRWM Plan

Mojave Region IRWM Plan Potential Projects (Project Submittals Screened Out) – Handout 1b

Revision(s): Project 62R, Water Conservation Ordinance, was transferred from the screened out project list to the list of recommended projects)

Projects discussed:

12 – Cadiz Valley Water Conservation, Recovery, and Storage

- Lacking project details (Description is too broad. How will the project fit into the IRWM Plan?)
- Further review recommended
    - Work with project proponent to revise project description
    - Project Team to review revised project and formulate recommendation
    - Include revised project as discussion item in upcoming meeting with TAC and Stakeholders

Comments/Questions:

- Per Floyd Wicks of Cadiz Inc.
    - Project involves connection of 30-inch pipeline from Cadiz to MWA's 42-inch water line in Barstow
    - One benefit of connection would be provision of water supply for fire protection services in Yermo (eliminating the need for a new reservoir)
    - Water quality of project is comparable to that of the State Water Project
    - Project would help the County retain 20 percent of water currently lost via evaporation

- Will there be a State Agency involved to control inter-basin transfer of water?
- What criteria must projects meet to be included in IRWM Plan?
    - Previously published, will provide review of criteria at later time

Mojave Region IRWM Plan Potential Projects (Preliminary Ranking by Priority Objectives) – Handout 1c

Revision(s): Ranking of several projects revised

- All revised projects moved up in rank
- Some projects were placed in different categories as a result of integration with other projects
- Some upward shifts in project rankings are a result of priority shifts of related Objectives

Projects discussed:

62R – Water Conservation Ordinance

- Previously a missed project, now included with associated priority ranking

13R – Camp Cady: Tamarisk Removal

- Objective 8: Improve Environmental Stewardship
    - Changed to Get Real Index (GRI) 1
        - Associated with an Objective that moved up a priority level from Tier 3 to Tier 2.

Comments/Questions:

- What is the relation of priority 2 on project 13R? How was priority ranking decided for?
    - Project submittals are reviewed for consistency of primary and secondary contributions
    - Inconsistent projects were changed
        - Project rankings were revised if it was determined to be a direct/primary contributor to a priority objective.
        - Projects changed depending on level of contribution (primary or secondary)
        - Projects were removed
    - Project rankings were adjusted during previous stakeholder and TAC meeting based on additional information provided

128 – Transition Zone Water Quality Study

- Previously a missed project, now included with associated priority ranking
- Objective 12: Improve Public Awareness
    - Changed to GRI 2

        - Study without additional effort will not change public awareness
        - Scientific study not typically read by public

129 – Well Abandonments

- Previously a missed project, now included with associated priority ranking
- Objective 13: Establish Reliable Maintenance Funding
    - Removed
        - Need something specific within the project to address objective
        - New project doesn't count for improving maintenance funding

115 – Land and Water Rights Acquisition

- Objective 8: Improve Environmental Stewardship
    - Changed as primary contributor (level 1) to this objective
        - Associated with Objective that moved up in priority level

126 – Community Park and Demo Garden

- Previously a missed project, now included with associated priority ranking
- Integrated into Project 1005 Regional Demonstrations Gardens
    - Related Objectives changed due to integration

127 – Water Well No. 10

- Previously a missed project, now included with associated priority ranking
- Integrated into Project 1003 Assistance Program for Small Water Systems
    - Related Objectives changed due to integration

Comments/Questions:

- Is Helendale considered a small water system?
    - Yes. 2,800 accounts is defined as small

Projects Arranged by Proposed Priority – Handout #1d

Revision(s): Ranking of several projects revised:

Projects discussed:

62R – Water Conservation Ordinance

- Now Tier 1, GRI = 3

126 – Community Park and Demo Garden

- Recommended to integrate with Project 1005 "Regional Demonstration Garden Program." After integration, project will be Tier 2, GRI=2

127 – Water Well No. 10

- Recommended to integrate with Project 1003 "Assistance Program for Small System Improvements." After integration, project will be Tier 1, GRI=2

Mojave Region IRWM Plan Project Number and Title – **Handout #1e**
This is a new list that includes final project numbers, original project numbers, integrated projects, and shows screen-out and changed projects.

Comments/Questions:

- Running Springs Water District: Is it too late to add projects? (Regarding project to replace two sewer lift station near the headwaters of Deep Creek. Application submitted with Clean Water State Fund Program. In design stage now. Construction projected for late summer 2014)
    - Initial response was that project should not be added at this point to avoid schedule delays with IRWM Plan, but the Plan can later be amended upon adoption.

- Were agencies in the newly expanded IRWM Plan boundary notified and given time to participate in IRWM Plan process?
    - Yes, larger agencies in these areas were notified and encouraged to participate
    - When would amendment process start?
        - As soon as Plan is adopted - recommended that Plan be updated at least once a year
    - Since Running Springs Water District project is set for construction in near future and addressed water quality can this project be included in IRWM Plan now?
        - Recommendation: Because of nature of boundary expansion and lack of information flow, the IRWM Plan should include this project even though it is after the deadline for project submittals
        - Recommendation: This project should be included in one of the integrated projects for small water systems
        - Project team will work with project proponent on submittal and formulate recommendation for stakeholders and TAC
    - Does this invitation to participate in IRWM Plan beyond the project submittal deadline extend to Crestline Sanitation District (also in expanded boundary area)?
        - Crestline Sanitation District has been present in past IRWM Plan meetings - may be apt to participate upon completion of boundary expansion
    - Recommendation: Open project submittal to all entities in newly expanded boundary areas
        - Applications can be submitted by early January for review by group in February
        - How will IRWM Plan schedule be affected by these new submittals

        - It will depend of the number of submittals

- Joshua Basin is opposed to Cadiz project because it originates outside the IRWM Region.
    - At the next meeting, there will be an opportunity for the group to discuss and review Cadiz project

- If Project 48R, Mojave River Dam-Deep Creek Spillway Wetlands Restoration (currently screened out), ever got endorsed by Army Corps of Engineers, it would be good mitigation for other projects - best dealt with as amendment to IRWM Plan after adoption or include it now?
    - Since Army has not taken on the project yet, best to deal with it as amendment

Mojave Integrated Regional Water Management Plan – Status Update

Sandra Carlson, a member of the consultant team, provided a brief status of the Plan document:

- Section 4 Objectives presented for review and comment
- Section 2 (Region Description) and Section 3 (Water Supply and Demand) will need to be updated to reflect expansion areas. Each expansion area to get its own section which will be added to the end of the current Section 2 and Section 3 as appropriate:
    - Afton- to be completed for review by end of December 2013
    - 29 Palms – under review
    - Upper Mojave - to be completed for review by end of December 2013
    - Wrightwood - to be completed for review by end of December 2013

Governance after Plan Adoption (see Handout #2)

This portion of the meeting focused on establishing a governance structure for the implementation of the Mojave IRWM Plan. The proposed governance structure is essentially the same as the one that has been in place during the development of the IRWM Plan, but with less involvement from consultants

The recommended changes for adapting the current Governance Structure for implementation include:

- Continue with Regional Water Management Group as is
- Replace Project Team with Implementation Support Team.
    - The Implementation Support Team will:
        - Focus on fostering implementation of projects
        - Track progress

- Perform Plan updates

NOTE: Does NOT mean Implementation Support Team is responsible for carrying out projects listed in IRWM Plan but rather will help project proponents move projects forward through coordination and collaboration to support development of the projects.

- Use same decision making approach as in Plan development (i.e. facilitated broad agreement)

Comments/Questions:

- What role would a participating agency from newly expanded boundary area have? Particularly if it does not have a project listed in the Plan?
    - Agencies with projects in the Plan may be more participatory. Those without can still participate to help move other projects forward to uphold regional objectives
    - Plan meetings provide many opportunities for participation
        - Move projects forward
        - Develop new projects to help meet regional objectives
        - Explore funding mechanisms to implement projects
- If Broad Agreement not reached by the Implementation Support Team, what is the format for vote by the Coordinating Committee (CC)?
    - If full representation of the CC is present at the meeting they can be asked to vote right then or a meeting can be scheduled for further discussion and vote by CC
    - If no sufficient CC representation at the meeting than another meeting will need to be scheduled
- Clarification of difference between implementation of IRWM Plan versus implementation of individual projects within the plan:
    - IRWM Plan is not set up to give any of the proponents? veto authority or operational control for projects
    - IRWM Plan does not interfere with the authority of agencies or organizations in the Region (i.e. MWA boundary not affected by IRWM Plan boundary expansion)
- Are there budgeting guidelines for implementation of the Plan?
    - No, the Project Team included this as part of the planned decision-making structure for budgeting implementation activities

NOTE: IRWM Plan does not preclude projects from all applicable permitting processes and CEQA and NEPA processes. It defines projects that meet regional objectives and as a collective group will work together to help the projects move forward.

- Do other agencies need to adopt the Plan?
    - Yes, agencies and entities within the Region need to adopt the Plan to qualify for Prop. 84 funds
        - Projects on the list for IRWM Plan still need to go out and get funding
- How are changes to members of the Regional Water Management Group made?
    - No formal procedures for replacing members of the RWMG. The State requires 3 representatives from legal entities responsible for water management - if one needs replacing, than a new memorandum of understanding is needed

NOTE: IRWM Plan projects are not guaranteed grant priority and funding but rather are given community support.

- IRWM Plan is:
    - Regional agreement on what is important (i.e. objectives)
    - Does not in any way interfere with the authority of agencies and entities responsible for permitting projects
    - Identifies all possible funding resources for implementation of projects

Plan Performance Monitoring Objectives for the Mojave IRWM Plan (see Handout #3)

The State guidelines include performance monitoring to ensure progress toward implementation of the IRWM Plan. Discussion about criteria for evaluating projects revolved around:

- Setting targets
- Data sources
- Process for gathering data
- Frequency for reporting

The following is a list of recommended criteria for evaluating the progress of projects as reviewed by the group and described in the Plan Performance Monitoring Objectives handout.

Objective 1- *"Balance average annual future water demands with available future water supplies …."*

Recommendation: Leave as is

Comments/Questions:

- Will use Urban Water Management Plans to assess supply and demand balance, supplemented with data from small water systems and outlying areas.
- Can smaller providers use existing reporting mechanisms for State reporting processes?
    - The data is already available from the Watermaster
    - MWA keeps track annually of water needs and supply.
- Should there be a shorter review period than 5 years?
    - More rigid stipulation is not needed since MWA already monitors water conditions on a more frequent basis.
- Is MWA extrapolating the impact of potential state wide water shortages on future water supplies in our region? - Yes

Objective 2- *"Continue improving regional water use efficiency by implementing a portfolio of conservation actions…."*

Recommendation: AWAC to formulate draft targets/criteria for 2a – 2c by mid-January 2014

Comments/Questions:

- Efficiency can be overridden by growth. Shouldn't land use be considered in setting targets?
    - Land use is addressed in Objective 1
- Should DWR target be used? At what point do we reach diminishing returns on conservation efforts?
    - We have already met DWR target for 2020 (20%) - at some point we do reach the floor, where that is we do not know yet
- Do cities and counties include vacant lots in projections for future water needs?
    - No, use population growth by percentage rate. Counting lots is not an effective method for projecting per capita use
- Need to not penalize urban areas that have already achieved conservation goals
    - These are regional goals and not city/county/town specific

Objective 3- *"Maintain stability in previously overdrafted groundwater basins…"*

Recommendation: Project team will devise criteria

Comments/Questions:

- Is this addressed by the adjudication?
    - MWA handles monitoring and tracking for basins within its boundaries
- It is difficult to track overdraft on annual basis, although annual changes need to be done. Should be long term targets
- Need to figure out how do address those smaller entities outside MWA service area

Objective 4 – *"Address the State policy goal of reducing reliance on the Delta…."*

Recommendation: MWA will take lead on devising criteria

Comments/Questions:

- MWA has data on banked reserves, the issue is additional data needed from the newly expanded areas
    - Need to determine where we have data and where we do not
    - Need to identify alternative sources for data

Objective 5 – *"Optimize the use of the Region's water related assets to maximize available supplies to meet projected demands …"*

Recommendation: Project team will devise exact description and process

Comments/Questions:

- How to track these items across the region?
    - Projects with cost savings should share their data with the IRWM Plan groups
        - Forms for reporting

Objective 6 – *"Prevent land subsidence throughout the Region"*

Recommendation: Zero subsidence is the target; 5-yr interval for reporting

Comments/Questions:

- USGS already measures subsidence every 5 years through existing program

Objective 7 – *"Provide support and assistance to disadvantaged communities."*

Recommendation: Measure and track the number of programs implemented in Disadvantaged Communities on an ongoing basis. Target is 10 projects (~ 2 projects per year), programs or investments to be made in the first five years that benefit Disadvantaged Communities

Comments/Questions:

- How will we track projects implemented and programs in Disadvantaged Communities (DAC)?
- Many DACs lack the capacity to collect and track data. There is a lot of uncertainty is quantifying their needs
    - Perhaps measuring grants or debt forgiveness in those areas is a way to track
    - A specific focus instead of a target might be a better way to go
    - Can partner with utility providers
    - Can set a number of projects per year or amount of funding as target in those areas to show progress in Disadvantaged Communities

Objective 8 –*"Improve environmental stewardship related to waterways and water management in the Region."*

Quantitative Measurement 8a

Recommendation: MWA to work with Resource Conservation District (RCD) to develop target

Comments/Questions:

- MWA already works with RCD and U.S. Fish and Wildlife
    - Measurement is covered
    - Data available just need to set a target

Quantitative Measurement 8b

Recommendation: MWA to work with cities and counties develop target

Comments/Questions:

- Different from 8A - many cities and counties have their own programs in environmental stewardship
    - Will need to communicate with communities that border sensitive habitat areas to obtain information on specific programs related to this topic

Quantitative Measurement 8c

Recommendation: MWA to work with RCD to set target

Comments/Questions:

- Same as 8A

Objective 9 – *"Improve floodplain management throughout the Plan area."*

Quantitative Measurement 9a

Recommendation: MWA to develop target

Comments/Questions:

- Look at the IRWM Plan and high priority level projects and then develop a goal to match the implementation of those projects

Quantitative Measurement 9b

Recommendation: MWA to contact flood control coordinators to obtain data and develop a target

Comments/Questions:

- Need to talk to floodplain manager about expected damages and then show reductions with implemented projects

Objective 10 –*"Preserve water quality as it relates to local beneficial use of water supplied by each source…"*

Quantitative Measurement 10a

Recommendation: MWA to work with local Regional Water Quality Board to develop target

Quantitative Measurement 10b

Recommendation: MWA to develop target

Comments/Questions:

- Data is already collected from various sources by MWA, just need to report it

Objective 11 –*"Obtain financial assistance from outside sources to help implement the Plan…"*

Recommendation: Kathy Cortner, MWA chief financial officer, to develop a target for both categories of projects

Comments/Questions:

- Of the projects implemented over the next five years, 25% of total project costs should be through special assistance and cost savings interest loans
- Recommendation for both small and other projects?
    - Should have a different target of each category of projects
- This is easy to track
    - Many state agencies issue statements showing grants and other funds that they have given
    - Project can also provide this information as they progress and report back to IRWM Plan group
- Include low interest and special loans?
    - Yes
- Will there be repercussions if target is not met?
    - No
- Is 25% reasonable?
    - Depends on the scale of the project

Objective 12 – *"Improve public awareness of water supply, conservation…"*

Recommendation: AWAC to develop a target

Objective 13 – *"Identify and establish reliable funding sources to maintain, modernize and improve water infrastructure…"*

Recommendation: Set up a subcommittee to establish criteria and targets after adoption of IRWM Plan

Comments/Questions:

- Deferred maintenance is an issue and methods to ensure projects are maintained is important

Objective 14 – *"Increase the use of recycled water in the Region…"*

Recommendation: Project Team to develop target

Finance Requirements

State guidelines require that the IRWM Plan discuss financing:

- Program level description of the sources of funding which could or will be used for the development and ongoing maintenance
- Potential sources of funding for implementing projects that go beyond what the Plan already has listed
- Potential sources of funding for projects coming into the Plan that go beyond what is already listed

IRWM Plan must address and identify funding sources of all the projects on the list. Currently there is uncertainty about the source funding for many projects on the list.

Comments/Questions:

- What level of detail is required?
    - Not defined yet, will need to establish this soon
- Will need a list of projects sorted by aide entities from MWA
- Need a methodology for generating funding information from project proponents to include in the IRWM Plan document

Wrap Up/Next Steps

Ken Kirby brought the meeting to a close by giving a brief overview of activities and meetings coming up.

- Next meeting is February 6, 2014
    - Revisit Finance
    - Introduce Technical Analysis and Plan Recommendation
    - Confirm Groundwater Management Plan Objectives
    - Address comments from the group on draft sections of the Plan
    - Follow up on project discussions
- Meeting #8 is May 19, 2014
    - Present and discuss public review draft of IRWM Plan
- Meeting #9
    - Prepare for IRWM Plan adoption

At the end of the meeting, stakeholders were asked to review all the discussion handouts and answer the questions on Handout 4 regarding Handouts 1a-1e and Handout 2. Mr. Kirby also encouraged the group to provide comments on Section 4 of the draft IRWM Plan which is available on the project website. As additional sections of the document are posted, the group will be invited to comment. Meeting summaries

are always posted on the project website as well for comment and review. Mr. Kirby then turned the meeting over to Scott Weldy to adjourn the meeting.

Mojave Region
Update of Integrated Regional Water Management Plan

Stakeholder Group Meeting #7 – Summary

February 6, 2014
Mojave Water Agency Headquarters
Apple Valley, CA

Meeting Purpose and Overview

This was the seventh of nine scheduled meetings of the Stakeholder Group for the Update of the Integrated Regional Water Management (IRWM) Plan for the Mojave Region. Objectives for the meeting were to:

- Provide a status update of the IRWM Plan document
- Provide a status update of the Salt Nutrient Management Plan
- Discuss the update of the MWA Groundwater Management Plan
- Discuss final steps for adoption of the IRWM Plan
- Update approach to developing Finance section of Plan
- Finalize Project Lists
- Finalize Plan Performance Monitoring and Reporting
- Introduce Climate Change Vulnerability Assessment

The meeting discussions revolved around the status of the Mojave Integrated Regional Water Management Plan and other related plans, the latest projects recommended for inclusion in the Plan, and finalizing criteria for monitoring performance of the Plan upon its implementation.

There were forty-nine individuals in attendance at the meeting as indicated during the introductions. Ken Kirby, of EVOTO Company and a member of the Consultant Team, served as the facilitator for the meeting.

Introductions

Scott Weldy, Chairman of the Technical Advisory Committee (TAC) to the Mojave Water Agency (MWA), opened the meeting with introductions by all those in attendance followed by approval of the December 16, 2013 Stakeholder Meeting Summary. Mr. Weldy turned the meeting over to Ken Kirby who then provided a brief overview of the agenda and stated that this would be the last meeting in which new topics and plan content would be introduced to the group. There were no comments or questions from

the group at this point and Mr. Kirby continued by providing an overview of the Code of Conduct for the meeting.

Mojave Integrated Regional Water Management Plan – Status Update

Plan Completion

Sandra Carlson, a member of the consultant team, provided a brief status of the Plan document:

- First four sections of the Plan have been completed and are available for public review on the project website.
- Sections 5 through 8 to be completed and available for review by February 14, 2014.
- Sections 9 through 12 are in draft form. Discussions and input from the group during this meeting will inform the remaining sections of the Plan. The remaining sections are projected to be completed and available for internal review by the Stakeholder Group by April 2014.
- Complete draft of the IRWM Plan to be available for review and comment by May 12, 2014.
- Draft Plan sections addressing the expanded boundary areas are under review and pending comments from the agencies within those expanded areas.

Governance

Ms. Carlson also proposed making the Project List an Appendix to the Plan in order to facilitate and streamline amendment of projects and project priorities without requiring formal re-adoption or amendment of the Plan. Revisions to the project list would still require discussion with the Stakeholder Group and the decision making process as previously described.

Comments/Questions:

- Can new projects be added at any point, or do they need to wait until the Plan is updated?
  - Whichever method the group would like to do it will work. The intent is to allow amendment of the projects without a full amendment to the Plan that requires formal adoption.
- Would this include changing a project in Tier 3 to Tier 1?
  - Yes, any changes to the project list, including priority, would be included in this process.
- Is there a potential downside such as projects slipping onto the project list without the agencies knowing?

    - No. Changes to the project list would still require discussion with the Stakeholder Group and the decision making process as previously described.
- To maintain transparency and openness to input, the Plan should clearly define the process for updating the project list.
    - The Plan already includes a description of the process for amendment of projects. The Project Team is only proposing that adoption of the amendments to the project list would not require that the entire IRWM Plan be revised and readopted. Instead, the updated project list could be appended to the existing plan using the existing decision making process. All of the steps for amending the project list will remain (how the decisions will be made, call for projects, public notice).

The group was in favor of making the project list an appendix to the Plan in order to streamline the process for adding new projects to the Plan in the future.

Salt Nutrient Management Plan Status

Lance Eckhart, from MWA staff, provided a brief update on the status of the Salt Nutrient Management Plan:

Recent activities

- Establishment of a comprehensive water quality database for the Region.
- Development of an analytical approach, that has been reviewed and approved by the Regional Boards, to represent the accumulation of salts, total dissolved solids, and nitrates in the groundwater basin.
- With Regional Board buy-in to the proposed approach, we are now proceeding with the analysis (the regional modeling).

Timelines

- The timeline for the Salt Nutrient Management Plan is different from the IRWM Plan, so the SNMP will be adopted through a separate process.
- Adoption of the Salt Nutrient Management Plan is set for September 2014, to coincide with the Lahontan and Colorado RWQCBs adoption schedule of their Basin Regional Management Plan Updates.

Jurisdiction

- The Mojave Planning Area overlaps the jurisdictions of two of the Regional Water Quality Control Boards (RWQCB); the Lahontan RWQCB and the Colorado River RWQCB.

Current Modeling Boundaries

- The model used for the SNM Plan is based on hydrogeology and groundwater quality within the two major basins – Mojave River Groundwater Basin and Morongo Basin.
- Building on 2007 model which measures the accumulation of TDS or salts in the groundwater basins.
- Modeling improvements since 2007
    - Include nitrate accumulation in addition to salts.
    - Increased knowledge of geology – better definition of mixing that can be expected to occur based on the depth of wells instead of the geologic depths the basins.
    - Recent and advanced modeling efforts for surrounding areas are included.
    - More robust water quality data available.
    - Back testing of model to check validity of the results.
- The model will identify trends by simulating the balance of salts over a projected 70 year time period if nothing is done to change the current operational trends, and can also assess whether a proposed project will add to or reduce the accumulation of salts and nutrients.
- Modeling helps to improve understanding of conditions within the groundwater basins past, present, and future (i.e. identify variability of water quality within basins).
- The model will help improve management of the basins to improve water quality throughout the Region.

Comments/Questions:

- With the variability of concentration of salts and nutrients in the areas, is the point of the Salt and Nutrient Management Plan to identify point sources that may be causing over-concentration in certain areas?
    - The model is intended to help identify big changes and trends of water conditions over time in the various basins. A better understanding of the activities within the basins will help agencies identify appropriate regulatory tools and projects to manage specific areas in the Region. It's up to the regulatory agencies to decide how they will use these tools.
- Why were nutrients added to the salt model? What does this do for us in the future?
    - Directive to include nutrients in the salt models resulted from an effort to expedite the use of recycled water and increase water conservation.

- The purpose of the Salt and Nutrient Management Plan is to provide information to the regulatory bodies to help them understand the current conditions of water in the basins and provide a projection of what will happen based on known inputs using the models.

NOTE: The Salt and Nutrient Management Plan, including the modeling of salt and nutrients, is intended to provide information and help identify cause and effect in relation to development. The Regional Board is asking for this data and information for purpose of analysis.

- Do the Regional Boards have consistent guidelines and standards across the State?
  - The Basin Plans drive the standards from region to region. There are nine regions in the State. These Basin Plans vary depending on local and regional conditions.
- How will the Regional Boards use this information and set expectations?
  - The Regional Boards expect to use this information to provide valuable context about the entire Region and within basins and sub-basins as they address questions about specific locations. They may have to conduct additional analysis to assess specific problem areas and identify potential solutions.
- This effort is funded by Victor Valley Wastewater Reclamation Authority through the RWQCB (via fines, etc.) as a Supplemental Environmental Project (SEP).

Mojave Water Agency Ground Water Management Plan Update

Ken Kirby indicated that a Ground Water Management Plan was prepared in conjunction with the Integrated Regional Water Management Plan in 2004, and therefore this effort to update the IRWM Plan in 2014 also includes an update of the Groundwater Management Plan to stay current and meet new requirements from the State. Mr. Kirby clarified that the Groundwater Management Plan is under the purview of Mojave Water Agency and not the Regional Water Management Group, which is guiding the Salt and Nutrient Management Plan and the IRWM Plan. However, it will be available for all the water districts in the area and so they are invited to participate.

Goals of the Groundwater Management Plan:

- Increase awareness of groundwater quality.
- Increase coordination among the agencies in the Region.

- Improve the management of water resources.
- A groundwater management plan is required to qualify for State funding for groundwater projects.
- Tool to help meet the California Statewide Groundwater Elevation Monitoring requirements.

The Project Team proposes that the objectives of the IRWM Plan be used for the Groundwater Management Plan Update as they are relevant and meet the State's requirements (see Handout #1 Proposed Groundwater Management Plan Basin Management Objectives). The Stakeholder Group agreed that the objectives developed for the IRWM Plan are appropriate for the GWM Plan.

Schedule for Completion of IRWM Plan

Mr. Kirby reviewed the IRWM Plan schedule for January 2014 through June 2014 (see Handout #2 Schedule of Important Events to Complete Mojave IRWM Plan and Companion Documents). At this point, the upcoming schedule of activities reflects the fact that after today's meeting we are no longer developing new content for the Plan but are now moving forward towards final review and adoption of the Plan. The Final IRWM Plan is expected to be presented at the 9th Stakeholder Meeting, scheduled for June 23. After that date Regional Water Management Group members and project proponents will be asked to adopt the Mojave IRWM Plan at their earliest convenience.

Revisions to the schedule include the following:

- February 14: Comments due from Stakeholder Meeting #7 and IRWM Plan Sections 5-8. *Due date changed to February 21.*
- Since additional review and preparation of the Salt and Nutrient Management Plan is needed, the schedules for the Salt and Nutrient Management Plan and the IRWM Plan will no longer coincide. *The time frames reflected in the Schedule will be revised.*

Project Financing Discussion

Kathy Cortner, Chief Financial Officer for the MWA, discussed the intended financial aspects of the IRWM Plan. In compliance with the California Water Code, projects in the IRWM Plan must provide specific financing information. The Project Team is developing a form to get financial information about projects, their budgets, and financing options. The information will be used to identify funding resources and prepare the Financing section of the Plan. The form should be available March 3, 2014.

NOTE: While all the projects in the Plan should complete the form by providing as much financial information as possible, Projects in Tier 1 are expected to fully complete the form because at this point they are the highest priority projects in the Region and are expected to proceed in the near future.

Comments/Questions:

- How is this going to work for projects like Project 1003 Assistance Programs for Small System Improvements which is made up of several individual entities?
    - That program was created to capture all the proposed small water system improvement projects. As individual projects become more fully defined, then they will be pulled out of that Project 1003 umbrella and ranked accordingly.
- How is this applicable for conceptual projects?
    - The forms can be completed with as much information that is known. If there is no information, or it is still being figured out, then that should be indicated on the form.
- Do projects in Tier 3 also need to provide budget information?
    - It can be provided later. As projects move up in priority ranking then the detailed budget information becomes more critical and the form should be filled out.
- Regarding the proposed Cadiz project, if budget information is provided and funding is secured, would the project be moved up in ranking from Tier 3?
    - The proposed Cadiz project is up for discussion by the group later in the meeting. While it is recommended to be included in the Plan as a Tier 3 project, the group has yet to discuss and formally decide whether to include the project in the Plan.
- If a project does not provide budget information, will it lose its priority ranking?
    - It is preferred that the information be provided as soon as possible. In order for projects to go beyond conceptual or plan stages, a budget will eventually be needed in order to move forward.

Finalizing the Project List

Mr. Kirby provided a recap of the screening and review process for projects, and of changes made to the Project List since the previous Stakeholder meeting on December 16, 2013 (see Handouts 3a-3c). This included a new project submitted from Running Springs Water (Project No. 130) and additional information submitted by the project sponsor for

the proposed Cadiz Valley Water Conservation, Recovery, and Storage Project. Before these projects were reviewed, there was a discussion concerning projects that may benefit disadvantaged communities (DACs).

Comments/Questions:

- What is the difference between Disadvantaged and Severely Disadvantaged Communities, and why aren't Severely Disadvantaged Communities included in the Plan?
    - The Plan was developed using the description and criteria of a Disadvantaged Community prescribed by the Department of Water Resources (DWR) as they relate to the Integrated Regional Water Management Plan. DWR does not differentiate between Severely Disadvantaged and Disadvantaged Communities. If a project addresses critical water supply or water quality needs of a Disadvantaged Community, then that project could qualify for 100% financing from DWR after the project is completed – it is reimbursable funding.
    - Different organizations that are administering financial assistance programs for projects have their own criteria for funding and some of those include a distinction between Severely Disadvantaged and Disadvantaged Communities. The IRWM Plan is being developed under the DWR purview for funding and is therefore using their guidelines regarding Disadvantaged Communities. However, Prop 84 funds as offered by DWR are just one funding source and there are other sources available to projects particularly for those in a Disadvantaged Community. Inclusion in the IRWM Plan can help a project qualify for a variety of funding programs and projects proponents are encouraged to explore those options in addition to Prop 84.

Project 130 Sewer Lift Stations Nos. 1 and 3 Improvements (Running Springs Water District)

During the last Stakeholder Meeting on December 15, 2013, a special call for projects was made to accommodate the submission of potential projects from proponents in the IRWM Plan boundary expansion areas on or before January 15, 2014. One additional project from the recently included areas was submitted for review and inclusion in the IRWM Plan: Project 130 Sewer Lift Stations Nos. 1 and 3 Improvements (Running Springs Water District). A representative from the Running Springs Water District explained that the project was designed to protect the headwaters of Deep Creek from a possible overflow

from two sewer lift stations. The project was recommended to be included with a priority of Tier 2: high importance, medium urgency. Mr. Kirby explained that he had made this initial recommendation based on a review of the project submittal as a starting point for conversation. The Stakeholder Group agreed with the recommendations as proposed.

Project 12 Cadiz Valley Water Conservation, Recovery, and Storage Project

Mr. Kirby explained that during the original screening process for projects, Project 12 Cadiz Valley Water Conservation, Recovery, and Storage Project was screened out due to a lack of information. During the December 16, 2013 meeting, the Stakeholders group asked the project representative to submit additional information needed for the review process so it could be considered for inclusion in the IRWM Plan by the group at today's February 6, 2014 meeting. Additional project details were provided by the project representative:

- The proposed project for the Mojave IRWM Plan includes a subset of the overall proposed Cadiz Valley Water Conservation, Recovery, and Storage Project.
- Under the proposed project for the IRWM Plan, groundwater extractions would occur outside of the Mojave Planning Area and would be imported into the Mojave Planning Area via two pipelines.
- Santa Margarita Water District was the lead agency for the overall Cadiz project and certified the EIR.
- San Bernardino County approved the associated Groundwater Management Plan and is responsible for the onsite monitoring of the groundwater at the Cadiz site.
- The proposed project for the Mojave IRWM Plan involves two potential pipelines between Cadiz and the Mojave Region.
- The overall Cadiz project is expected to be able to deliver 50,000 acre/feet of water per year to potential future project partners and at least 20% of this amount (i.e. 10,000 acre/feet) has been committed for the benefit of San Bernardino County

Meeting participants were given the opportunity to ask questions regarding the proposed project at this point.

Questions:

- Is the inter-basin transfer of water OK with the State, i.e. transferring water out of one basin into another?
  - Yes, both surface water and groundwater can be transferred. The Mojave Region already receives and uses significant amounts of water from outside the Region through the State Water Project.
- Based on the screening criteria for the projects, what agency from the Mojave Region is identified as the project proponent?

    - The criteria we used for the update of the Mojave IRWM Plan does not require that a project proponent has to be local, just that each project must have a qualified proponent that can carry the project forward. A local agency has not yet been identified as project proponent for the project submittal.
    - Mr. Floyd Wicks (the Cadiz project representative present at the Stakeholder meeting) stated that there is a high degree of interest in the potential project. However none within the Mojave Region have committed to participate in the project at this time.
- What are the project benefits to the Mojave Region, specifically?
    - Mr. Wicks stated that the project would dedicate at least 10,000 acre/feet exclusively to the county. If a local agency within the Planning Area expressed interest in participating in the project, Mr. Wicks reported that he believes there is a strong likelihood that county leadership would support the Cadiz project water committed for use in San Bernadino County be for the Mojave Region given the water constraints and high needs in the area.
    - The project could add an additional source of reliable water supply to the Mojave Region during a period when the State Water Project and other sources of water are becoming increasingly uncertain.
- How much of the Cadiz project water is committed to the Santa Margarita Water District given the assumption that this project is largely financed by them? And, how much water is truly available after that commitment is fulfilled?
    - Mr. Wicks explained that the project is not directly financed by the Santa Margarita Water District but rather the pipeline between Cadiz and the Colorado Aqueduct is. They have committed to purchase 5,000 acre feet with an option to go up to 15,000 acre feet of the total 50,000 acre feet. There are other utility companies that have signed up to purchase water from the project (Golden State Water will purchase 5,000 acre feet).
- Has there been a resolution to discrepancies in the project's hydrological reports for the Cadiz Basin?
    - Mr. Wicks indicated that they weren't sure what the discrepancies are. If there is a specific issue in question we can find out.
- How long have you (Mr. Wicks) been on the project's management team and how often has it changed hands in the past year?
    - Mr. Wicks stated that he has been on retainer for the project for two years. He is not an employee of Cadiz. He represents Cadiz as

a consultant, and has been hired to oversee the engineering analysis for the project.

- Is the 10,000 acre feet of the project's water that is committed to San Bernardino County 20% of the total project water or only a portion of that 20%?
    - The project is presented as a 50,000 acre foot project. 20% is 10,000 acre feet.
- If an entity in this area wanted to contract with Cadiz for water, how quickly could the project move water to this area?
    - Mr. Wicks stated that currently, delivery of water from the Cadiz project is projected to take place in year 30 of the project, but if needed it could be supplied in approximately two years.
- Is that 10,000 acre feet of water dedicated to all of San Bernardino County or to the Mojave Region?
    - Mr. Wicks stated that as part of the original formulation of the project, there was a commitment that at least 20% of the water would stay in San Bernardino County. The project proposal for IRWM Plan indicated that the project could provide up to 10,000 acre feet of water to the Mojave Region if there were interested parties.
    - There have not been discussions regarding the provision of water to the County beyond the Mojave Region.

Mr. Kirby made an initial recommendation to the Stakeholder Group that the Cadiz project be included in the Mojave IRWM Plan was based on the following assessment:

- The project meets the high priority objectives of the Plan, particularly Objective 4 to decrease reliance on the Delta.
- The project was ranked 3 on the Get Real Index because there is no vocal local supporter for the project to give it momentum to move forward.

At this point in the meeting, participants were given the opportunity to discuss the project, provide comments and express their opposition and/or support for the project.

Comments/Questions:

- Mojave Water Agency received a fax on February 6, 2014, from the Archeological Heritage Association in Needles, CA stating their opposition to including the Cadiz project in the Mojave IRWM Plan.
- Seth Shteir, a representative from the National Parks Conservation Association (NPCA) stated his group was also opposed to including the Cadiz project to be in the Mojave IRWM Plan. Reading from a letter

signed by U.S. Senator Diane Feinstein and U.S. Congressman Paul Cook, Mr. Shteir of NPCA said that their major concerns about the proposed project include that the project is highly controversial, unsustainable, and could harm the seeps and springs of the Mojave National Preserve. The project would pump 50,000 acre feet of water per year for 50 years putting a fragile desert aquifer in overdraft for the life of the project.

- Does the IRWM Plan address legal process and its impact on projects?
    - The screening criterion for IRWM Plan projects does not include lawsuits.
- Mr. Shteir of NPCA stated that all stakeholders in the area, those directly and indirectly affected, should be given an opportunity to voice their concerns about the project and learn about potential impacts to them. The Needles community is opposed to the project due to associated potential negative impacts as are local tribes and ranchers.
- How much water is being lost via evaporation and over what time frame?
    - Mr. Wicks stated they had estimated it to be approximately 35, 000 acre feet per year. The primary reason for pumping 50,000 acre feet is to bring down the water level below the hydraulic system that transfers the water to the dry lake beds and is then evaporated.
- Mr. Shteir of NPCA stated that most of the recharge studies about the area that were not conducted in association with the project sponsor indicate that the projects' recharge estimate is 3 to 16 times too high and that the project will lead to significant depletion of water resources in the area. In addition, while perhaps not all of the seeps and streams are connected to the aquifer, there are almost certainly a few that are and further site specific analysis should be done to accurately identify and assess impacts.
- Is there new information with regard to how seeps and streams are affected by the project?
    - Mr. Wicks stated that a more recent report has been conducted since the original 2012 studies, which indicates that there are no seeps and streams hydraulically connected to the pumping of the aquifer and therefore not a concern for the project. The report will be provided to group for their review.
- Mr. Shteir of NPCA stated that even though the previous studies were conducted in 2012 to assess conditions of the aquifer and potential impacts related to the project, the aquifer conditions haven't changed to render different conclusions in 2014. In addition, the cone of depletion

could continue to expand for 50 years in a delayed response of the aquifer to pumping activities of the project.

- Another stakeholder suggested that a contingency list should be developed in the Plan for contentious projects with major issues of concern that may later get resolved and can then be added to the Plan, such as the Cadiz project.
- What sort of requirements in the project have been placed on Cadiz to monitor and avoid negative impacts if any?
    - Mr. Wicks stated that the project includes a very detailed Ground Water Management Plan. San Bernardino County is the policing agency for the project.
    - Specific information and details about the recourse for the project if negative impacts occur will be provided to the group for their review.
- A stakeholder noted that although the Mojave Region is challenged by cut backs from the State Water Project and diminishing natural resources, it is difficult to support a project that would export 4/5 of the water outside the area of origin for use elsewhere just to have access to 1/5 of the water supply within this Region.

Mr. Kirby closed the discussion and comment session for the Cadiz project and called for a vote from the group.

Recommendation: Include Project 12 Cadiz Valley Water Conservation, Recovery, and Storage Project in the Mojave Integrated Regional Water Management Plan as a Tier 3 project.

1st Vote: In favor of the recommendation to include Project 12 in the Plan – 14
Deny the recommendation and not include Project 12 in the Plan – 14
Include Project 12 in the Plan but at a lower priority ranking – 5

Since the decision making process emphasizes reaching broad agreement, Mr. Kirby pointed out that the show of hands indicated that the group had not yet reached broad agreement about what whether to include the proposed project in the IRWM Plan.

2nd Vote: In favor of the recommendation to include Project 12 in the Plan – 11
Deny the recommendation and not include Project 12 in the Plan – 20

Based on the second show of hands, Mr. Kirby summarized that the Stakeholder Group appeared to have reached broad agreement that the proposed Project 12 would not be included in the IRWM Plan at this time. The group concurred.

Reasons for not including the project at this time:

- Participants have concerns about the potential negative effects (from this project) on local water resources that have not been reconciled by the conflicting findings of studies conducted to date.
- There is not a local sponsor or strong proponent for the project within the Mojave Planning Region.

NOTE: Even if a project is not included in the IRWM Plan now, it could be added at a later date through the periodic review and update processes described in the Plan.

Finalize Plan Performance Monitoring and Reporting

During the previous Stakeholder Meeting on December 16, 2013, members of the Stakeholder Group and the Project Team were assigned to develop recommendations for specific targets and approaches for the Plan Performance Monitoring Objectives to finalize that portion of the Plan during this February 6, 2014 meeting.

Mr. Kirby reviewed the recommendations for targets and approaches of the Plan Performance Monitoring Objectives (see Handout 4 Updated Plan Performance Monitoring Objectives for the Mojave Integrated Regional Water Management Plan). The recommended changes and additions to the Plan Performance Monitoring Objectives were supported by the group with minor revisions made during the meeting.

The following is a list of additional revisions to the recommended criteria for evaluating the progress Plan implementation as reviewed by the group and described in the Updated Plan Performance Monitoring Objectives handout.

Objective 2- *"Continue improving regional water use efficiency by implementing a portfolio of conservation actions…."*

Recommendation: Accept recommended targets/criteria for 2a – 2c (reflected in the Handout 4)

Comments/Questions:

- Do these goals and targets take into account future urban growth?

    - Yes, targets are based on per capita use. For example, the target for 166 gallons per person per day is based upon the total population instead of the amount of water that is pumped.
    - The State's goals are 170 gallons per person per day and the IRWM Plan is looking to go beyond that with a target of 166 gallons per person per day.
    - It was noted that some recent reductions in water use may be due, in part, to the economic downturn, and not just progress achieved through local conservation.
- How does this target work in areas that are predominately set up with septic systems
    - These targets are about applied water use efficiency and not return flows, and therefore not affected by the use of septic systems.

Objective 5 – *"Optimize the use of the Region's water related assets to maximize available supplies to meet projected demands …"*

The Project Team developed a target and approach for 5a and 5b, and requested assistance from the group during the meeting for 5c.

Recommendation: Develop a form/questionnaire for project proponents to provide estimated cost savings related to project improvements and efficiency that can then be compiled to estimate what the cost savings are for the Region.

Objective 8 –*"Improve environmental stewardship related to waterways and water management in the Region."*

Recommendation: MWA to work with Resource Conservation District (RCD) to develop targets for 8a and 8c.

Qualitative Measurement 8b to read "Measured by the number of new and enhanced recreational projects that are connected to the environmental stewardship programs.

Add new Qualitative Measurement 8d to include constructed wetlands. Target to be one constructed wetland every 5 years.

Comments/Questions:

- Is 50 wet acres a reasonable target for 8a?
    - To be determined between MWA and Resource Conservation District (RCD).

- To avoid confusion, remove the word "new" and replace with "new and enhanced" for Qualitative Measurement 8b.
- Add a component to this objective regarding constructed wetlands to expand environmental stewardship.

Objective 10 –*"Preserve water quality as it relates to local beneficial use of water supplied by each source…"*

Recommendation: Remove Target and Approach 10a.

Target 10b to read "Maintain water quality objectives in the Basin Plan".

Comments/Questions:

- Regarding target 10a, there is no tangible way to track meetings.

Objective 12 – *"Improve public awareness of water supply, conservation…"*

Recommendation: Remove Target and Approach 12c.

Comments/Questions:

- Target 12c is identical to 8b.

Objective 13 – *"Identify and establish reliable funding sources to maintain, modernize and improve water infrastructure…"*

Recommendation: Set up a subcommittee to establish criteria and targets after adoption of IRWM Plan and reference current laws that require tracking of deferred maintenance.

Comments/Questions:

- No one really tracks their deferred maintenance.
- Could we leave this blank and say it's something to think about in the Plan?
- Current requirements (i.e. AB 240 and AB 54) are now changing with regard to tracking of deferred maintenance, especially for smaller water systems.

Climate Change Vulnerability Assessment

The IRWM Plan includes climate change considerations as required by the State guidelines. MWA, in joint effort with U.S. Bureau of Reclamation, prepared a Climate Action Plan that focused on three objectives:

- Assess future water supplies, including native surface water flows and imports
- Project potential changes in flood frequency

- Develop a green house gas emissions (GHG) inventory for the water sector. (The findings related to GHG will be included in the IRWM Plan).

Main findings and projections in the Climate Action Plan were:

- Slight declines in precipitation with large variability and increases in temperature.
- Greater decreases in native surface water flows in the future (time frame 2050 to 2070).
- 25% to 40% reduction in snow from the Sierra Nevadas.
- Slightly lower delivery from the State Water Project than estimated in previous studies.
- No change in flood flows from the Mojave River Dam and Lower Narrows in Victorville (inflows and outflows).

A checklist, per State guidelines, has been developed for the Plan to identify watershed characteristics that are vulnerable to future climate changes and help assess regional vulnerabilities (see Handout 5 Draft Climate Change Vulnerability Checklist). The completed Checklist will be included as an Appendix to the Plan.

Status Update of Proposition 84 Grant Applications

Lance Eckhart from Mojave Water Agency provided a brief update on the status of the two grant applications previously submitted for Prop 84 Round 2 grant funding.

1. Subregional Recycled Water Treatment Plants (Apple Valley and Hesperia). This project is located in the Lahontan Funding Region. Originally requested $3 million. The project was awarded $1.5 million. After lobbying efforts to show how the project and grant application was a collaboration of different agencies and entities and that the funding was intended to assist several projects in the Region, the award was amended to $3 million. This $3 funding should be available within one year.
2. Hi--Desert Water District Wastewater Treatment Plant. This project is located in the Colorado Funding Region. The project was not funded.

Wrap Up/Next Steps

Ken Kirby brought the meeting to a close by asking stakeholders to review all the discussion handouts and answer the questions on Handout 6: Summary of Requested Review, Comments and Input. Mr. Kirby reminded the group that this was the last meeting in which new information would be presented. He also asked that projects in Tier 1 complete the financial worksheet as soon as possible.

Mr. Kirby then turned the meeting over to Scott Weldy who thanked the Project Team and consultants for their efforts on the Plan. He announced that the next Stakeholder Meeting would be May 19, 2014. Mr. Weldy then thanked everyone for their participation in the process and adjourned the meeting.

Mojave Region
Update of Integrated Regional Water Management Plan

Monday, May 19, 2014
9:30 am-1:30 pm
Mojave Water Agency Headquarters
13846 Conference Center Drive Apple Valley, CA 92307

Regional IRWM Plan Meeting No. 8 Agenda

1. Welcome and Introductions (10 minutes) (Note: Durations for agenda items are approximate)
2. Review IRWM Plan Development Process (10 minutes)
    a. Review Goals for the IRWM Planning Process (Handout 1)
    b. Review the overall approach to updating the IRWM Plan
    c. What has happened since previous Stakeholder Meeting
    d. Highlight Significant Changes in draft Mojave IRWM Plan (Handout 2)
3. Discuss public review draft of the Mojave IRWM Plan (60 minutes)
    a. An overview (Handout 3)
    b. Verify results from ranking of Climate Vulnerability Assessment (Handout 4)
    c. Consider a request for change in priority for Project 57 – Recycled Water Distribution System (City of Hesperia)
    d. Questions and discussion about the entire Plan
    e. Comments and recommended revisions
4. Update on Salt Nutrient Management Plan (SNM Plan) (10 minutes)
5. Break (10 minutes)
6. Discuss Update of the MWA Groundwater Management Plan (GWM Plan) (10 minutes)
7. Discuss Remaining Steps to Completion and Adoption (15 minutes)
    a. IRWM Plan - Process for submittal to DWR for Plan Review Process (PRP)
    b. SNM Plan
    c. GWM Plan
    d. Schedule of Important Events (Handout 5)
8. Update on Drought Grant Funding - $200M through IRWM Plan, need approved IRWM Plan early fall - Project Selection Discussion (Handout 6) (45 minutes)
9. Wrap Up / Action Items (10 minutes)
    a. Questions or Discussion about Next Steps
    b. What We Are Asking of You (Handout 7)
    c. Thank You!

Handouts
Handout 1 – Goals for the IRWM Planning Process
Handout 2 – Significant Changes to the Draft IRWM Plan since Previously Posted
Handout 3 – Overview of 2014 IRWM Plan Compared to 2004 RWMP
Handout 4 – Prioritized Climate Change Vulnerabilities
Handout 5 – Schedule of Important Events
Handout 6 – Prop 84 Grant Drought Funding Project Recommendations
Handout 7 – Summary of Requested Review, Comments, and Input

Technical Advisory Committee

AGENDA

Mojave Water Agency
Board Room
13846 Conference Center Drive
Apple Valley, CA 92307

February 5, 2015
10:00 a.m.

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1. **Call to Order**

2. **Pledge of Allegiance**

3. **Introductions of Attendees**

4. **Approval of Agenda**

5. **Consider Adoption of Committee Meeting Summary from December 18, 2014**

   Draft Meeting Summary

6. **Mojave Water Agency Strategic Partnership Video**

7. **Presentation and Workshop on the Salt Nutrient Management Plan**

8. **Other Business**

   A. **2015 Discussion Topics**

TECHNICAL ADVISORY COMMITTEE
TO THE
MOJAVE WATER AGENCY

February 5, 2015
10:00 A.M.

MEETING SUMMARY

1. **CALL TO ORDER** – Chairperson Hayhurst called the meeting to order at 10:03 a.m.

2. **PLEDGE OF ALLEGIANCE** – Ms. Kathy Cortner with the Mojave Water Agency led the pledge.

3. **INTRODUCTIONS OF ATTENDEES** – Forty-three (43) members of the Technical Advisory Committee (TAC) and staff attended this meeting.

4. **APPROVAL OF AGENDA –** The agenda was approved as presented.

5. **CONSIDER ADOPTION OF MEETING SUMMARY FROM DECEMBER 18, 2014**

   The summary was approved as presented.

6. **MOJAVE WATER AGENCY STRATEGIC PARTNERSHIP VIDEO**

   Chairperson Hayhurst mentioned that this video had been presented at a previous Mojave Water Agency Board meeting and she thought it would be of interest to the TAC. Ms. Yvonne Hester, Mojave Water Agency Community Liaison Officer, introduced Mr. Nick Schneider, Mojave Water Agency Water Conservation Program Manager. Mr. Schneider played a video highlighting the water conservation efforts being implemented through partnerships with the following organizations: Alliance for Water Awareness and Conservation; Barstow Community College; Mojave Educational Environmental Consortium; Victor Valley College; Mojave Desert Resource Conservation District; and The Lewis Center for Educational Research. Mr. Schneider mentioned that more participants are encouraged in the future and that the Mojave Water Agency and grant funding will be available to assist in future eligible projects that promote water conservation/education. He requested any projects meeting the criteria be submitted to the Mojave Water Agency.

7. **PRESENTATION AND WORKSHOP ON THE SALT NUTRIENT MANAGEMENT PLAN (SNMP)**

   Chairperson Hayhurst introduced this item. Mr. Lance Eckhart, Mojave Water Agency Director of Basin Management, provided background on the Plan. He noted that it has been 10 years since this plan has been updated and it is a regional mandate by the State to examine future water quality. This plan would

not have been possible if it weren't for a fine imposed on Victor Valley Wastewater Reclamation Authority (VVWRA) by the Lahontan Regional Water Quality Control Board (Water Board) for an uncontrolled release into the basin. It was allowable by the Water Board that the monies for this fine be allocated locally which allowed for a partnership on this project with VVWRA and the Mojave Water Agency. Mr. Logan Olds, VVWRA General Manager, emphasized that development of a SNMP is required by the State for the region. Had these monies not been available locally, a SNMP still would have been required but would have taken longer to accomplish as well as required contributions from other local agencies. Mr. Eckhart noted that the SNMP does not necessarily dictate what septic policies should be but provide the science behind making good decisions going forward. He noted that a draft SNMP will be released for review in the next 30 days.

Mr. Edwin Lin, Senior Hydrogeologist with Todd Groundwater, reviewed information provided in a PowerPoint presentation.

Mr. Mike Plaziak, Lahontan Regional Water Quality Control Board, noted that the Basin Plan provides a target number not to be exceeded in order to maintain the beneficial uses of the basin. He mentioned that the Basin Plan is available on the Water Board's website.

Mr. Plaziak clarified the Assimilative Capacity analysis from the Water Board's perspective. He stated that permits may be issued based on the three standards used in determining beneficial use of an area, but are based on the ambient water quality levels which are kept as low as possible within reason. The Water Board feels this methodology is practical not only for the project proponent but also for the community funding the project. He added that this data also allows the Water Board to determine which sub basins need to have tighter water quality controls to ensure the Basin Plan objectives are met and beneficial uses are maintained.

Mr. Eckhart encouraged consideration of a thorough understanding of how the groundwater system and basins interact when making decisions related to policy.

Mr. Lin illustrated three (3) possible scenarios used in modeling—no growth, growth without recycled water, and growth with recycled water. He noted that the recycling projects used in the modeling were limited to only those projects that have been permitted.

Mr. Eckhart summarized that the results of the three scenarios indicated that there is improved water quality with implementing the current recycled water projects especially in areas which have a potential for issues with septic systems.

Mr. Eckhart noted that there are many hydrogeological factors that need to be considered when looking at the results of the modeling. As an example, he mentioned that the use of recycled water not only is an additional water supply,

but eliminates the need for groundwater depletion which could allow surrounding potentially poor quality water to be introduced into the basin that would not have naturally been present (subsurface inflows).

Due to the complexity and size of the report, Mr. Eckhart encouraged those in attendance to review the summary but really examine the appendix for their groundwater basins in order to completely understand the results. The report will be posted and available for review in the next couple of months. An email notification will be sent out when the report is available.

Mr. Lin noted that the modeling indicated the water released in the Alto Transition Zone floodplain from the Victor Valley Wastewater Reclamation Authority treatment plant actually lower TDS levels in the groundwater. State Water Project water was also an area of focus and resulted in an evident benefit of improved water quality than existing groundwater in 4 of 6 sub-regions.

The following Key Findings were summarized by Mr. Lin:

- Effect of recycled water projects do not result in significant assimilative capacity use in affected subregions
- The SNMP does not recommend any changes to Basin Plan Objectives
- Groundwater characterization and Salt Nutrient modeling results provide the technical foundation to guide local planning and future Regional Board policy decisions

He also emphasized that the SNMP is designed to provide the technical foundation to guide future policies and planning.

An informal Question and Answer period on the information presented followed a brief recess.

8. **OTHER BUSINESS**

A. 2015 Discussion Topics
B. Next meeting scheduled for April 2, 2015 at 10:00 am

9. **ADJOURNMENT** – Chairperson Hayhurst adjourned the meeting at 12:57 p.m.

_____

Jeanette Hayhurst – Chairperson

Attachments on file:
Item 7 - Presentation – *Mojave Salt and Nutrient Management Plan, February 5, 2015 MWA TAC Meeting* (Edwin Lin, Todd Groundwater)
Sign-in Sheets

Audio recording of this meeting is available upon request.

Appendix C: Subregional Synopses

Table of Contents

List of Time-Concentration Plot Map Figures

Note: Figures 13/14, 17/18, 29/30, and 37/38 each contain information for two subregions. As such, these figures are included in two subregional synopses.

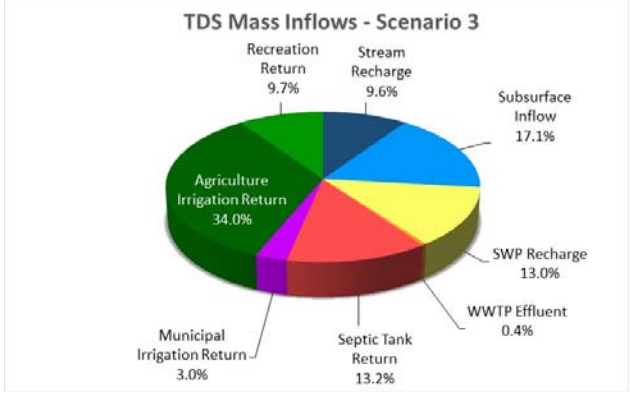
C1. Baja – Floodplain

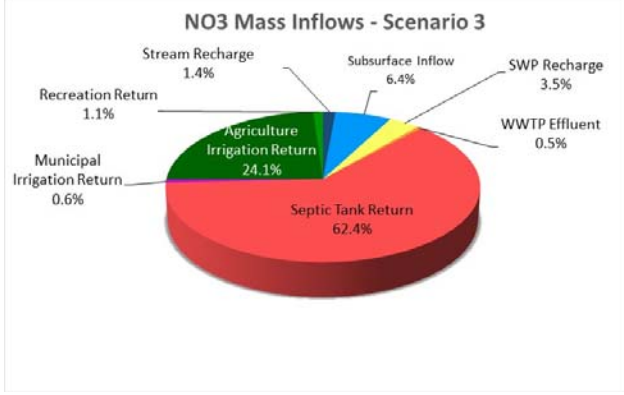
Scenario 3 Summary

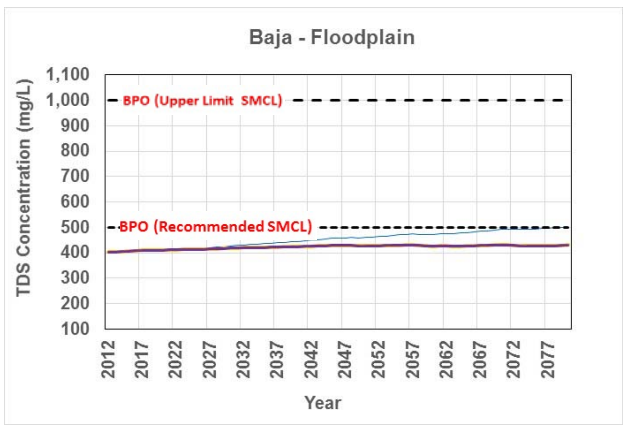
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Stream Recharge	10,293	43%	110	10%	0.6	1%
SWP Recharge	6,104	25%	250	13%	2.5	4%
Subsurface Inflow	3,135	13%	639	17%	8.9	6%
Agriculture Irrigation Return	1,985	8%	2,011	34%	52.5	24%
Septic Tank Return	1,535	6%	1,010	13%	176.2	62%
Recreation Return	810	3%	1,407	10%	5.9	1%
Municipal Irrigation Return	165	1%	2,121	3%	15.2	1%
WWTP Effluent	96	0.4%	522	0.4%	22.3	0.5%
Flow-Weighted Average Concentration of Total Inflows			487		18.0	
Flow-Weighted Average Concentration of Total Inflows (with no SWP Recharge)[a]			567		23.2	
Initial (2012) Groundwater Concentration			401		3.9	
Simulated Final (2081) Groundwater Concentration			429		7.9	

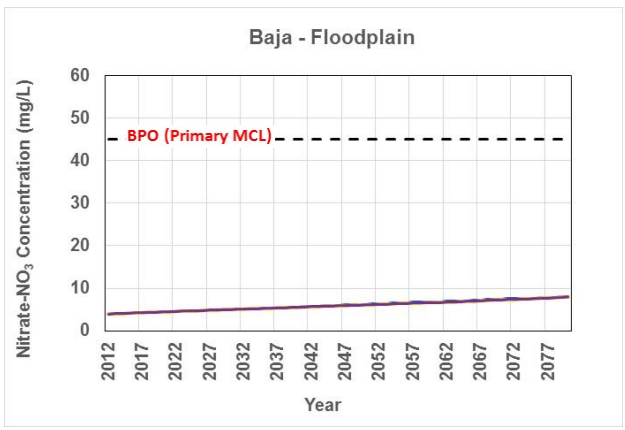
Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
(a) Concentration assumes other flows and concentrations remain the same

Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L) (a)	Scenario 1 (Baseline): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (b)	Scenario 1 (Baseline): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (b - a)	Scenario 2 (Growth with No Recycled Water Projects): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (c)	Scenario 2 (Growth with No Recycled Water Projects): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (c - a)	Scenario 2 (Growth with No Recycled Water Projects): Effect of Projected Growth (mg/L) (c - b)	Scenario 3 (Growth with Recycled Water Projects): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (d)	Scenario 3 (Growth with Recycled Water Projects): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (d - a)	Scenario 3 (Growth with Recycled Water Projects): Effect of Recycled Water Projects (mg/L) (d - c)
Baja - Floodplain	TDS	401	503	102	430	29	-73	429	28	-1
	Nitrate-NO_3	3.9	8.2	4.3	7.9	4.0	-0.3	7.9	4.0	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

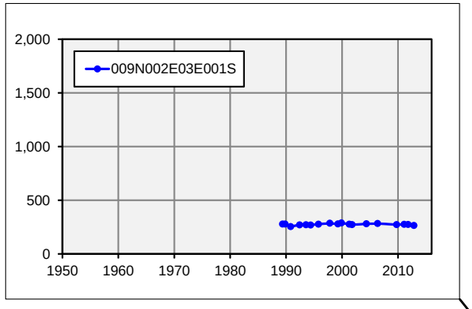
- Key loading factors are agricultural irrigation return (34%), subsurface inflow (17%), SWP water recharge (13%), and septic tank return (13%). Contribution from agricultural irrigation return can be apportioned into contribution from crop irrigation return (33%) and dairy operation return (1%).
- Projected future groundwater concentration change is from 401 to 429 mg/L (+28 mg/L).
- Impact of population growth on groundwater concentration is -73 mg/L, which is attributable to projected future declines in agricultural land use and associated irrigation return flows.
- There is no measurable impact from upgradient recycled water projects.
- The TDS concentration of SWP water (250 mg/L) is lower than the simulated TDS concentration range over the 70-year simulation period. The flow-weighted average concentration of total inflows is lower (487 mg/L) with SWP recharge than without SWP recharge (567 mg/L), indicating that SWP improves TDS concentrations in the subregion.

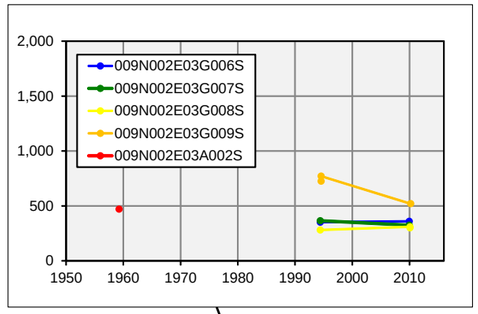
Nitrate-NO_3:

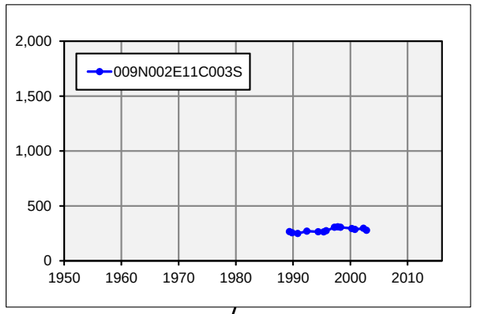
- Key loading factors are septic tank return (62%) and agricultural irrigation return (24%). Contribution from agricultural irrigation return can be apportioned into contribution from crop irrigation return (23.9%) and dairy operation return (0.1%).
- Projected future groundwater concentration change is from 3.9 to 7.9 mg/L (+4.0 mg/L).
- Impact of population growth on groundwater concentration is -0.3 mg/L;
- There is no measurable impact from recycled water projects in other upgradient subregions.
- The nitrate-NO_3 concentration of SWP water (2.5 mg/L) is lower than the simulated nitrate-NO_3 concentration range over the 70-year simulation period. The flow-weighted average concentration of total inflows is lower (18.0 mg/L) with SWP recharge than without SWP recharge (23.2 mg/L), indicating that SWP improves nitrate-NO_3 concentrations in the subregion.

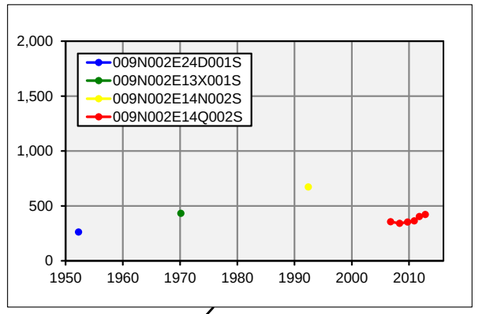
Conclusions:

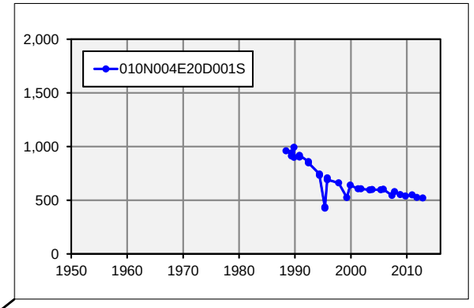
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- Imported SWP water improves groundwater TDS and nitrate concentrations assuming fixed flows and concentrations for other inflows. This does not consider reductions in return flow concentrations tied to pumped groundwater quality and benefits from increased groundwater storage volume from imported SWP water, such as the reduction in subsurface inflow (which has an average TDS concentration above the simulated TDS concentration range). Improvements in the water quality of subsurface inflows as a result of SWP water recharge in upgradient subregions are also possible.

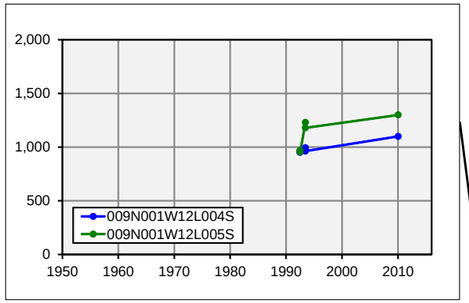


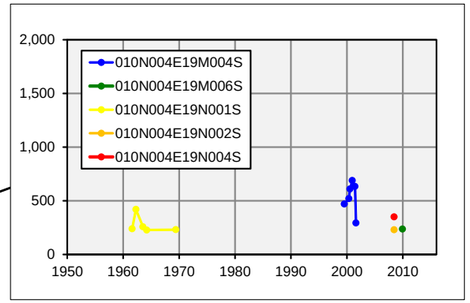


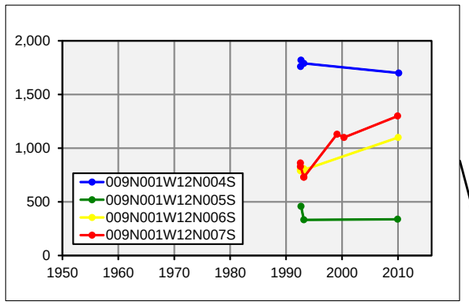


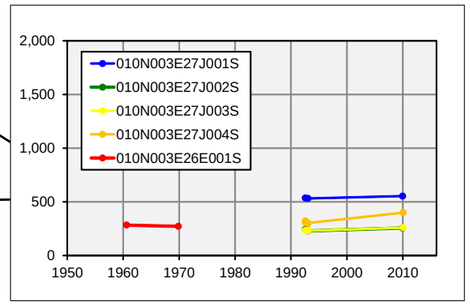


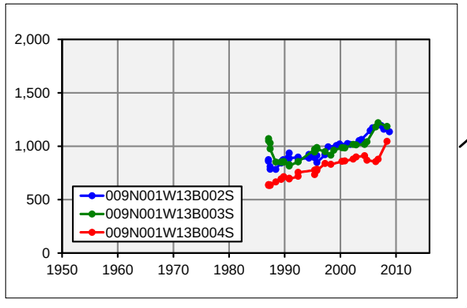


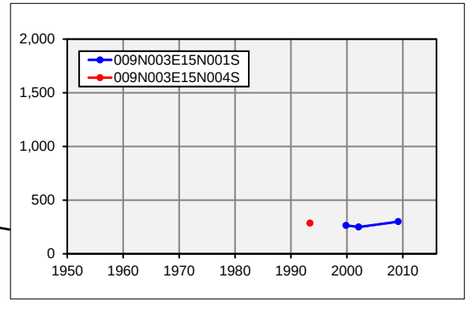


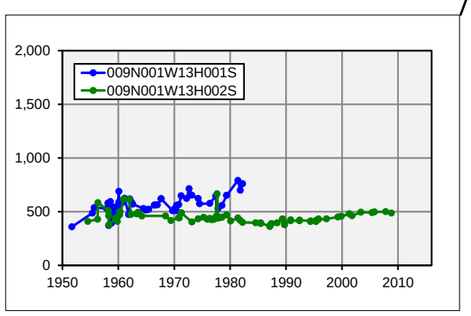


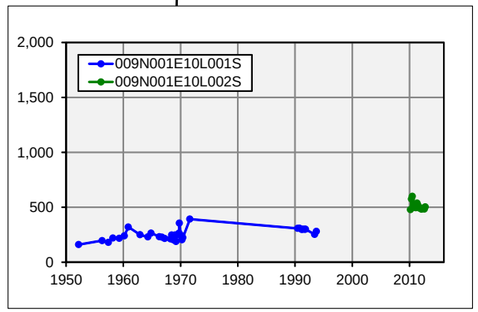


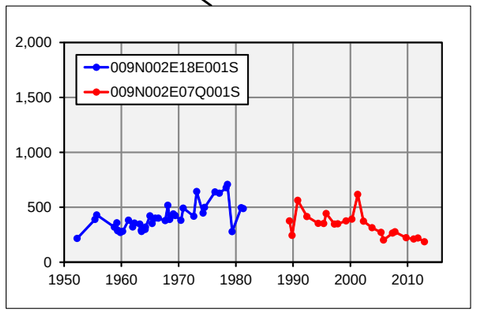


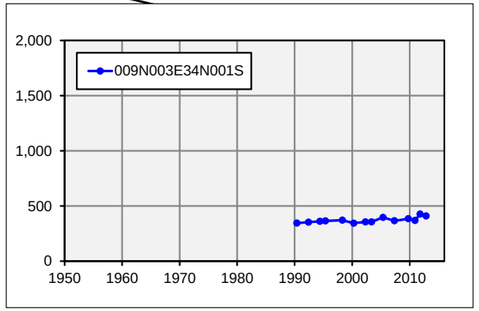


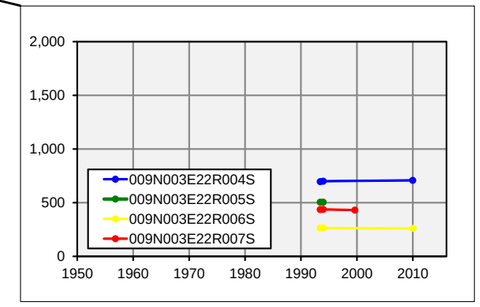


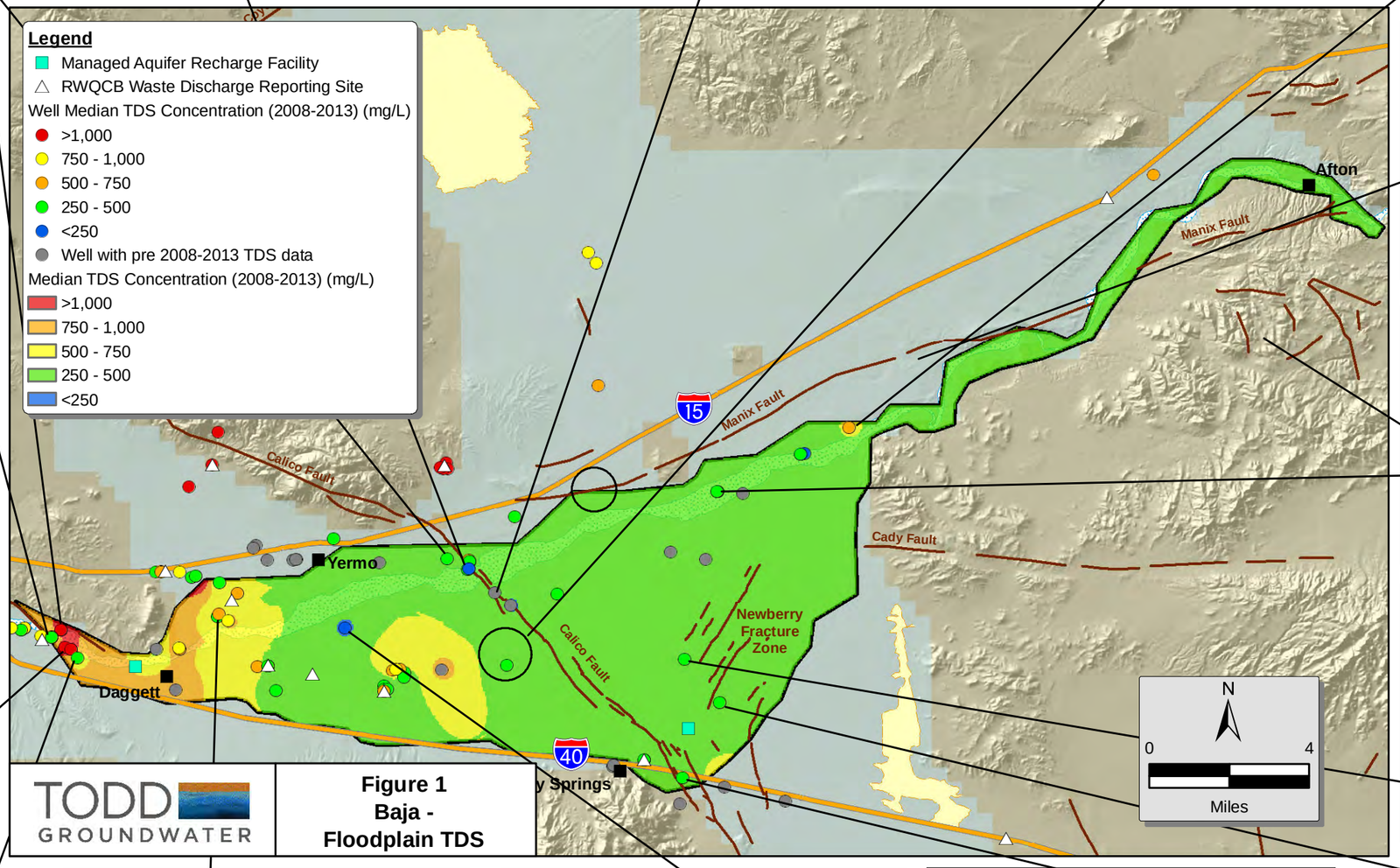






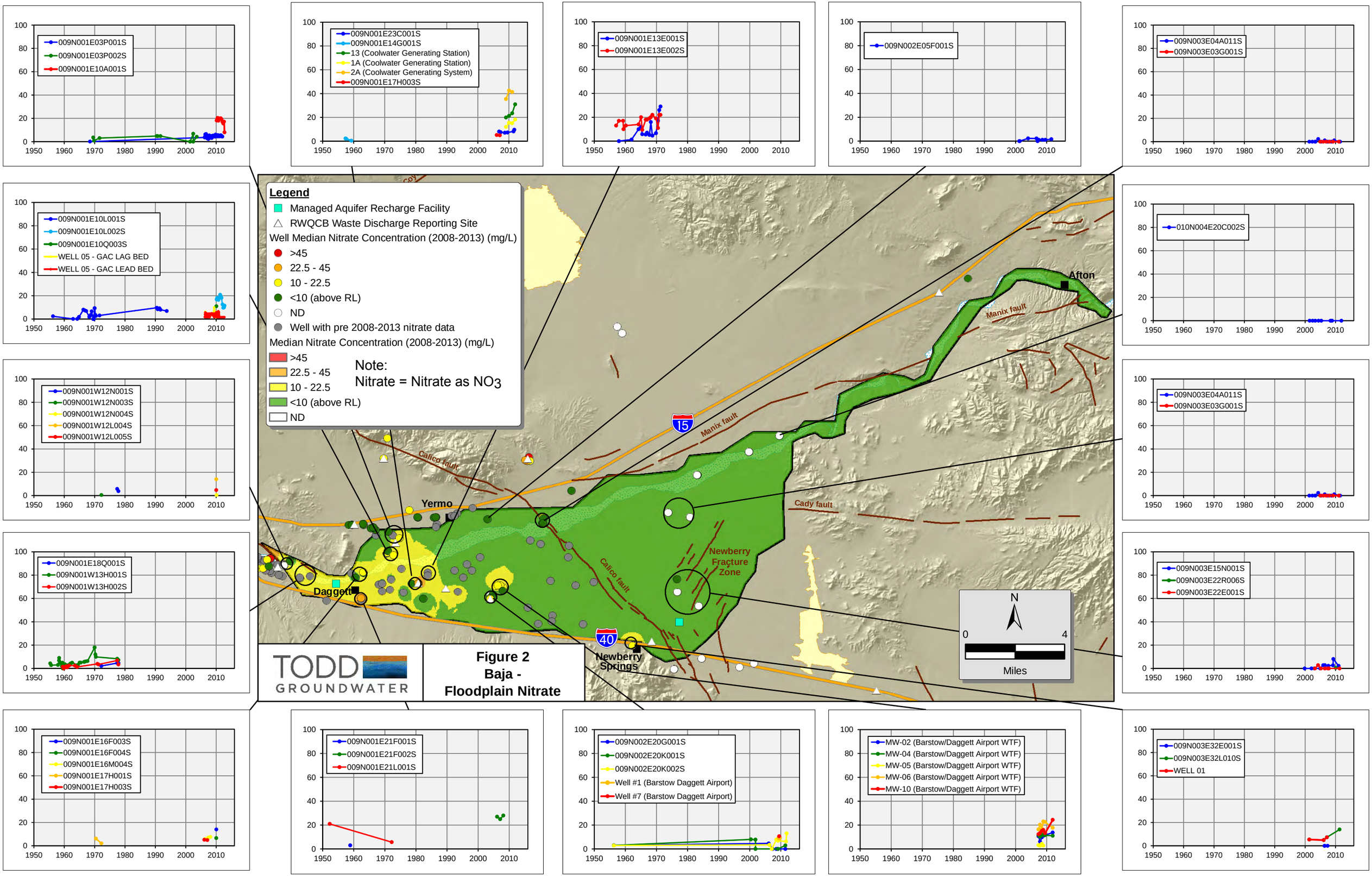






TODD GROUNDWATER

Figure 1
Baja - Floodplain TDS

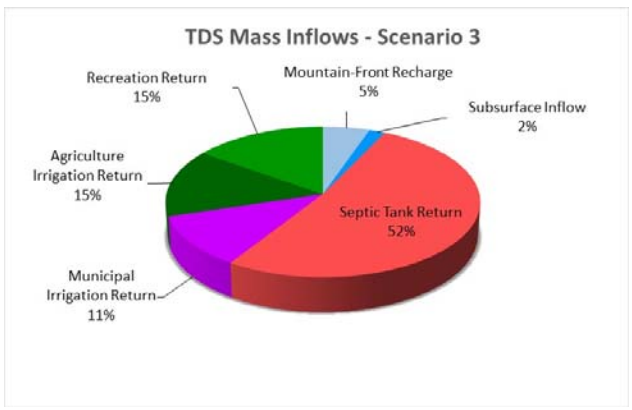

009N001E03P001S
009N001E03P002S
009N001E10A001S
009N001E23C001S
009N001E14G001S
13 (Coolwater Generating Station)
1A (Coolwater Generating Station)
2A (Coolwater Generating System)
009N001E17H003S
009N001E13E001S
009N001E13E002S
009N002E05F001S
009N003E04A011S
009N003E03G001S
009N001E10L001S
009N001E10L002S
009N001E10Q003S
WELL 05 - GAC LAG BED
WELL 05 - GAC LEAD BED
010N004E20C002S
009N001W12N001S
009N001W12N003S
009N001W12N004S
009N001W12L004S
009N001W12L005S
009N001E18Q001S
009N001W13H001S
009N001W13H002S
009N003E15N001S
009N003E22R006S
009N003E22E001S
009N001E16F003S
009N001E16F004S
009N001E16M004S
009N001E17H001S
009N001E17H003S
009N001E21F001S
009N001E21F002S
009N001E21L001S
009N002E20G001S
009N002E20K001S
009N002E20K002S
Well #1 (Barstow Daggett Airport)
Well #7 (Barstow Daggett Airport)
MW-02 (Barstow/Daggett Airport WTF)
MW-04 (Barstow/Daggett Airport WTF)
MW-05 (Barstow/Daggett Airport WTF)
MW-06 (Barstow/Daggett Airport WTF)
MW-10 (Barstow/Daggett Airport WTF)
009N003E32E001S
009N003E32L010S
WELL 01
Legend
Managed Aquifer Recharge Facility
RWQCB Waste Discharge Reporting Site
Well Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Well with pre 2008-2013 nitrate data
Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Note:
Nitrate = Nitrate as NO3
Afton
Manix fault
Calico fault
Yermo
Cady fault
Newberry Fracture Zone
Daggett
Newberry Springs
15
40
N
0
4
Miles
TODD GROUNDWATER
Figure 2
Baja -
Floodplain Nitrate

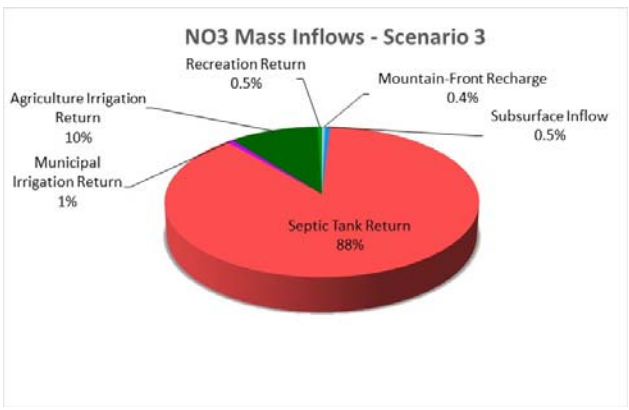
C2. Baja – Regional

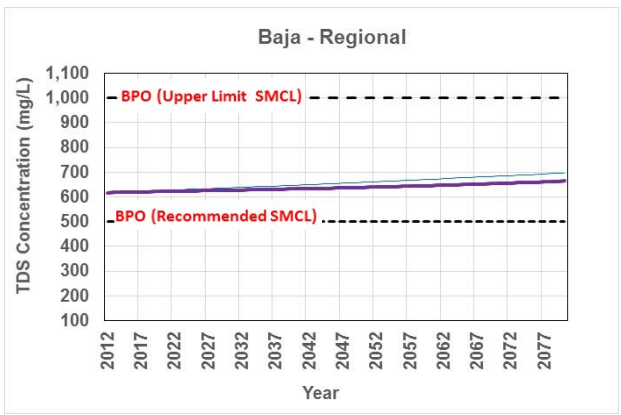
Scenario 3 Summary

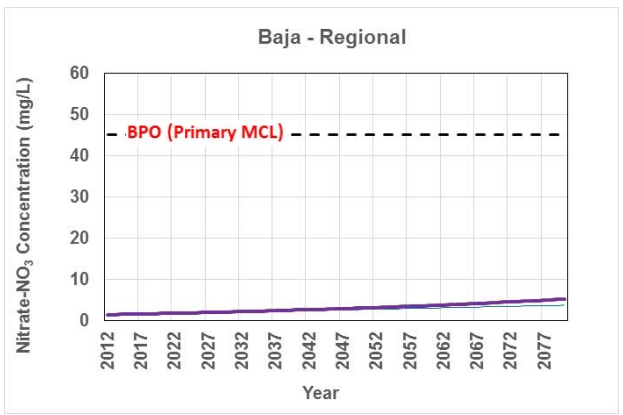
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Septic Tank Return	925	46%	1,432	52%	103.4	88%
Mountain-Front Recharge	647	32%	210	5%	0.6	0.4%
Recreation Return	182	9%	2,125	15%	3.0	1%
Agriculture Irrigation Return	122	6%	3,041	15%	90.7	10%
Municipal Irrigation Return	89	4%	3,208	11%	8.4	1%
Subsurface Inflow	61	3%	752	2%	9.4	1%
Flow-Weighted Average Concentration of Total Inflows			1,259		53.8	
Initial (2012) Groundwater Concentration			617		1.4	
Simulated Final (2081) Groundwater Concentration			664		5.2	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Baja - Regional	TDS	617	697	80	664	47	-33	664	47	0
	Nitrate-NO_3	1.4	3.7	2.3	5.2	3.8	1.5	5.2	3.8	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

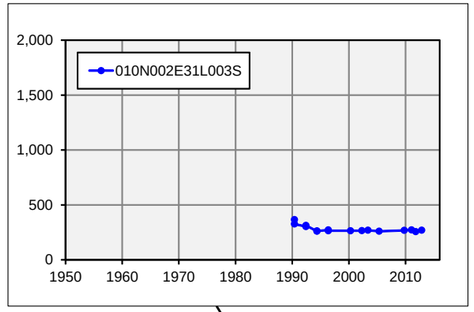
- Key loading factors are septic tank return (52%), agricultural irrigation return (15%), recreation (lake) return (15%), and municipal irrigation return (11%).
- Projected future groundwater concentration change is from 617 to 664 mg/L (+47 mg/L).
- Impact of population growth on groundwater concentration is -33 mg/L, due to projected future planned reductions in agricultural production and associated, irrigation return flows (from 288 AFY in 2012 to an average of 122 AFY over 70-year simulation period). The reduction in agricultural return flows compensates for increased septic tank return.
- There is no measurable impact from recycled water projects in other upgradient subregions.

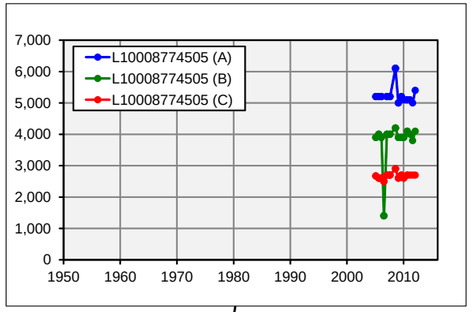
Nitrate-NO_3:

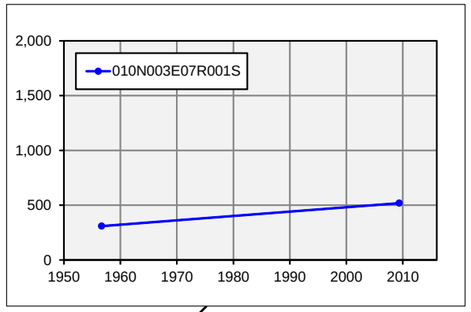
- The key loading factor is septic tank return (88%).
- Future groundwater concentration change is from 1.4 to 5.2 mg/L (+3.8 mg/L).
- Impact of population growth on groundwater concentration is +1.5 mg/L due to increase in septic tank return (385 to 925 AFY) that overrides the decrease in agricultural irrigation return.
- There is no measurable impact from recycled water projects in other upgradient subregions.

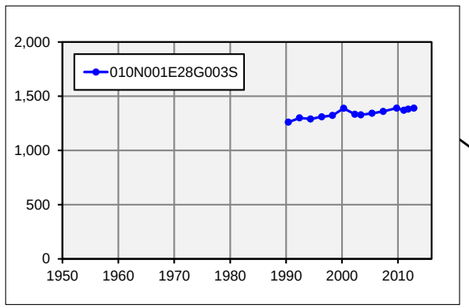
Conclusions:

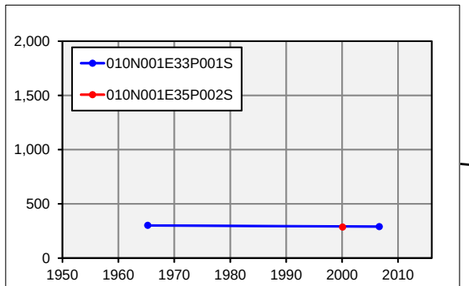
- Simulated future groundwater TDS and nitrate-NO_3 concentrations do not exceed or threaten to exceed BPOs (1,000 mg/L for TDS).
- Simulated future groundwater TDS concentration increases are a function of population growth and not recycled water projects.
- Concentrations of most anthropogenic recharge sources indicate that population growth will increase TDS and nitrate concentrations throughout the simulation. The one exception is recreation (lake) return, which has an average nitrate concentration within the range of simulated groundwater nitrate concentrations. Thus, recreational lakes partially mitigated increasing groundwater nitrate concentrations once they exceeded 3.0 mg/L.
- Projected reductions in agricultural demand (in Scenarios 2 and 3) will decrease future TDS and nitrate loading and reduce groundwater TDS concentrations and partially mitigate septic return flow impacts on groundwater nitrate concentrations.

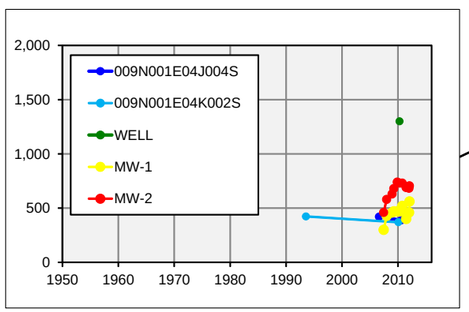


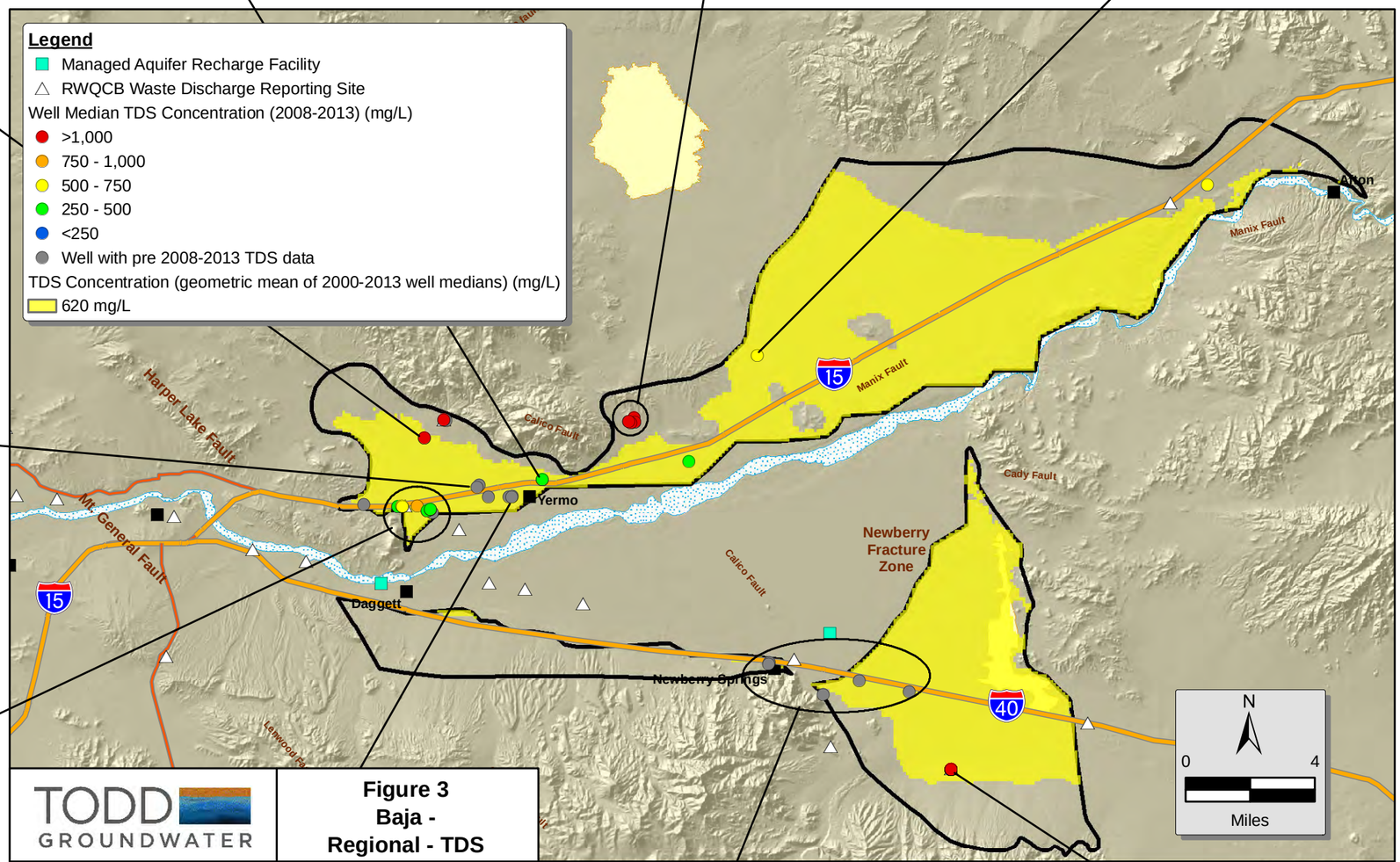






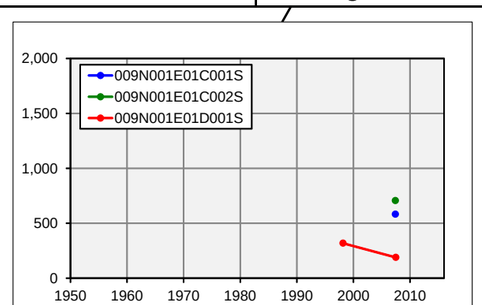


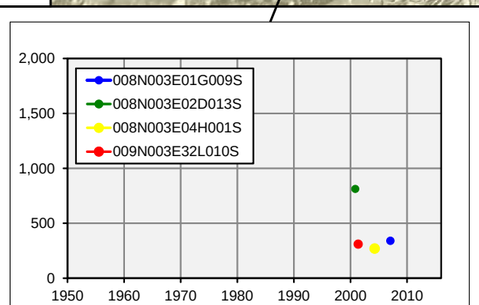


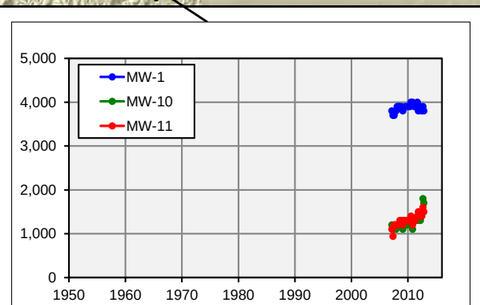


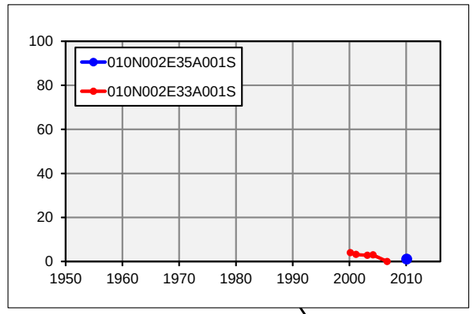
TODD GROUNDWATER

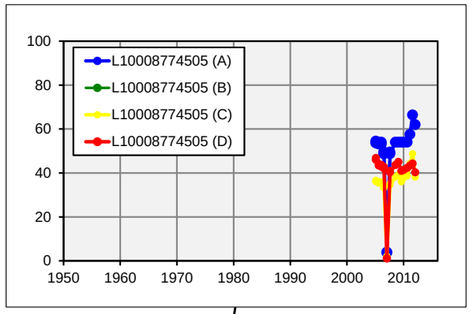
Figure 3
Baja -
Regional - TDS

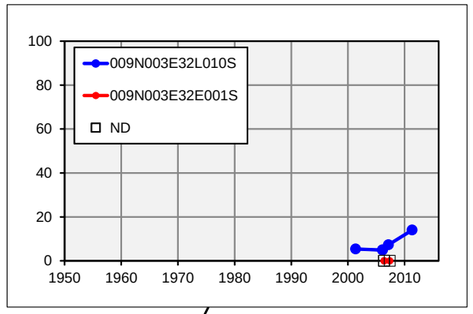


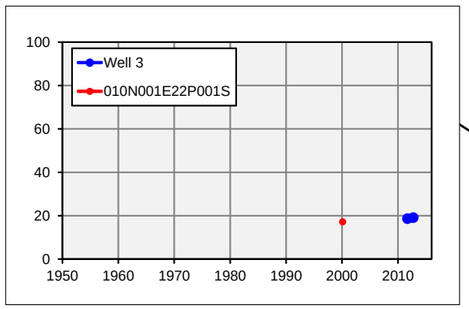


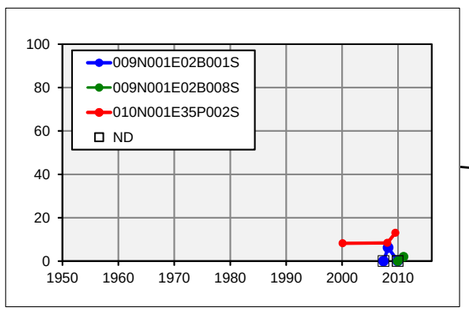


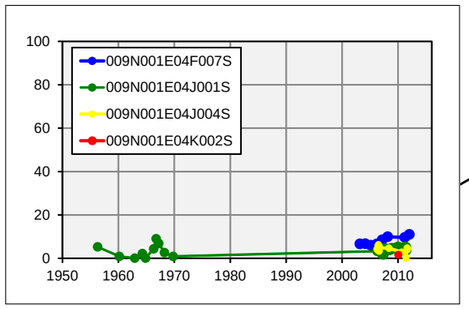


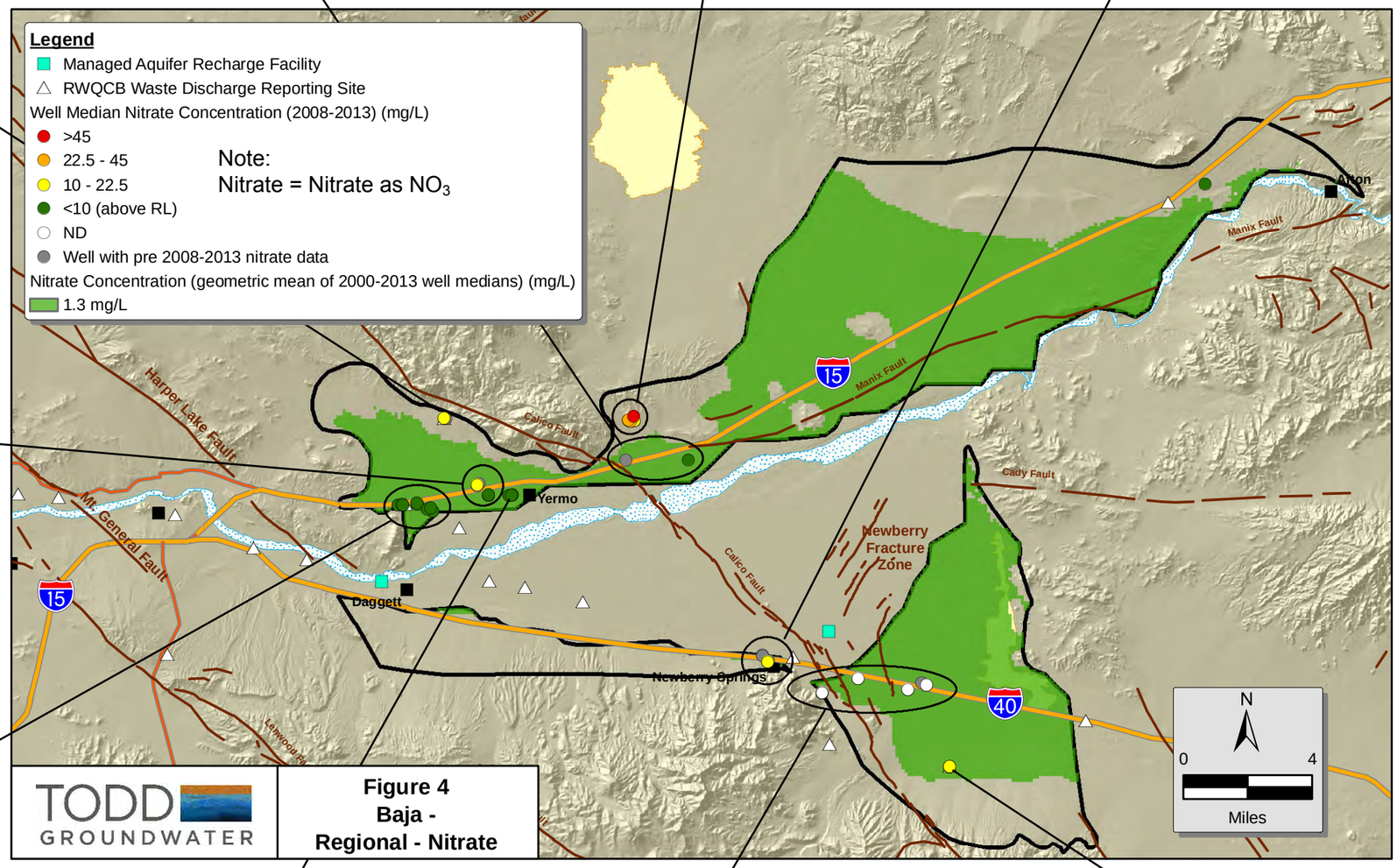






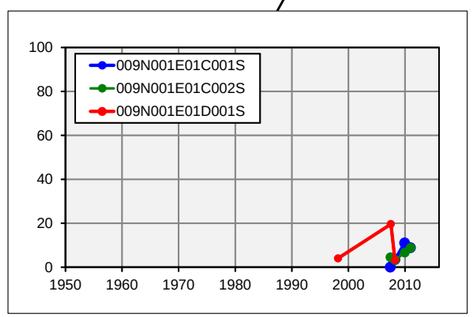


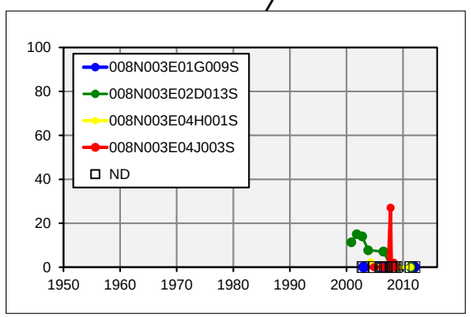


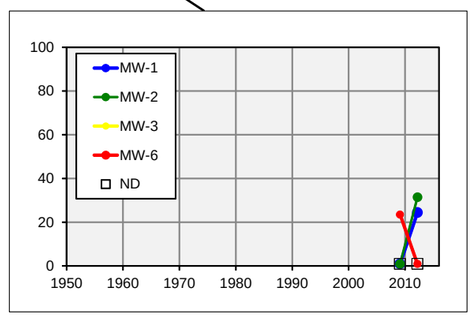


TODD GROUNDWATER

Figure 4
Baja - Regional - Nitrate







C3. Centro – Floodplain

Scenario 3 Summary

Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Stream Recharge	19,960	66%	110	16%	0.6	1%
WWTP Effluent	4,253	14%	524	16%	28.3	12%
Agriculture Irrigation Return	3,606	12%	1,743	46%	198.9	71%
Subsurface Inflow	1,530	5%	871	10%	12.4	2%
Septic Tank Return	672	2%	1,425	7%	200.0	13%
Municipal Irrigation Return	177	1%	3,197	4%	40.8	1%
Flow-Weighted Average Concentration of Total Inflows			449		33.4	
Initial (2012) Groundwater Concentration			711		20.7	
Simulated Final (2081) Groundwater Concentration			598		35.5	

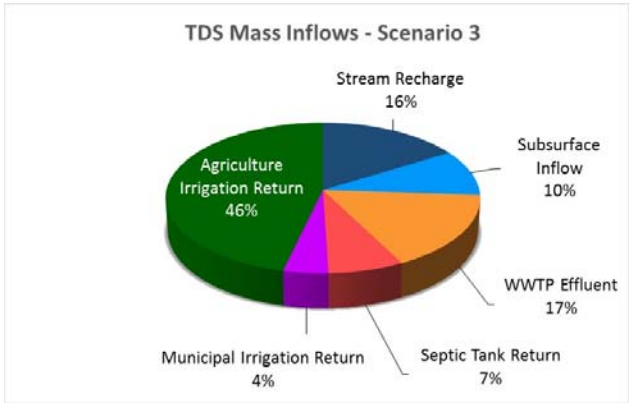
Notes:

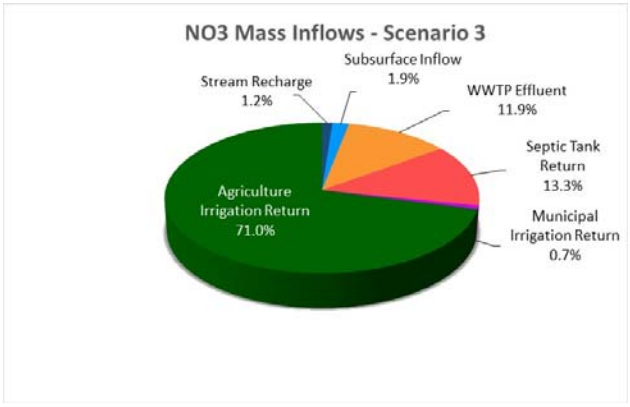
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation

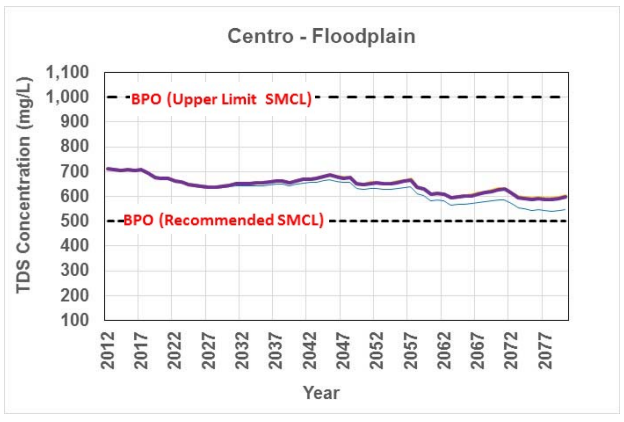
Concentration is above simulated groundwater concentration range

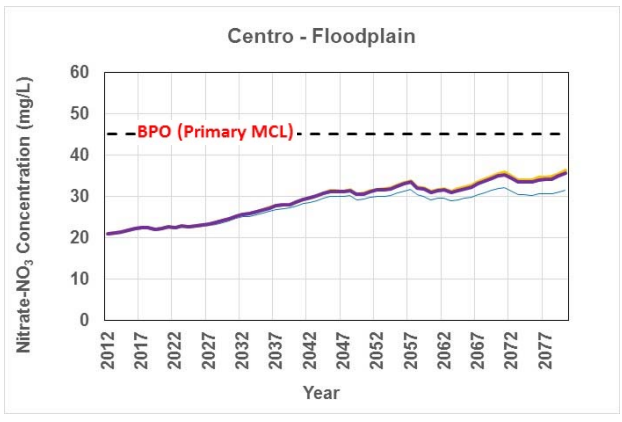
Concentration is within simulated groundwater concentration range

Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L) (a)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L) (b)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (b - a)	Simulated Future (2081) Groundwater TDS Concentration (mg/L) (c)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (c - a)	Effect of Projected Growth (mg/L) (c - b)	Simulated Future (2081) Groundwater TDS Concentration (mg/L) (d)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (d - a)	Effect of Recycled Water Projects (mg/L) (d - c)
Centro - Floodplain	TDS	711	548	-163	601	-110	54	598	-113	-4
	Nitrate-NO_3	20.7	31.4	10.7	36.2	15.5	4.8	35.5	14.8	-0.6

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration

blue color indicates no change in concentration

green color indicates net decrease in concentration

TDS:

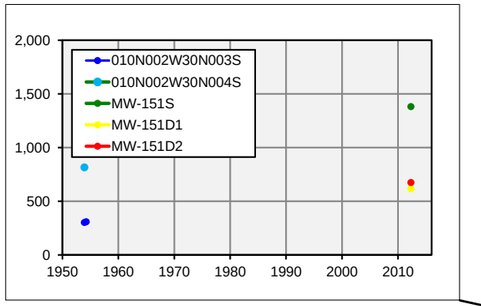
- While SWP water has historically been imported and recharged in the Centro – Floodplain, there is no projected future SWP water demand.
- Key loading factors are agricultural irrigation return (46%), WWTP effluent (16%), and stream recharge (16%). Agricultural irrigation return can be apportioned into contribution from crop irrigation return (43%) and dairy operation return (3%).
- Projected future groundwater concentration change is from 711 to 598 mg/L (-113 mg/L), due primarily to the benefits afforded by stream recharge. The climatic conditions over the 70-year future simulation period (based on 1930-1999 climate) are similar to the Base Period (1930-1990) of the MBA Judgment.
- Impact of population growth on groundwater concentration is +54 mg/L, due to increased septic return and WWTP effluent.
- There is a small groundwater quality benefit (-4 mg/L) from recycled water projects in upgradient subregions.

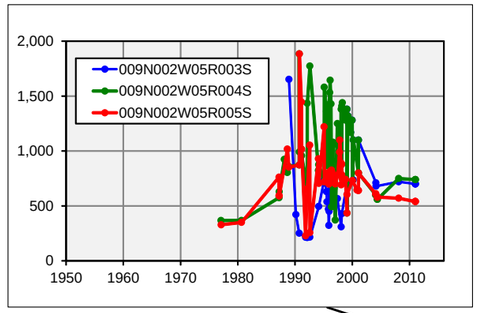
Nitrate-NO_3:

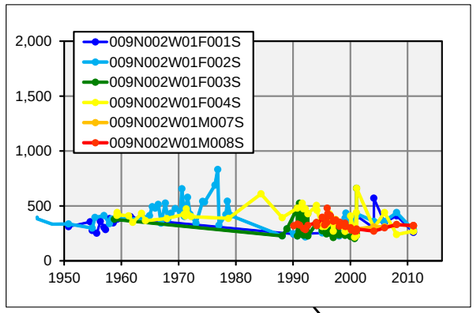
- Key loading factors are agricultural irrigation return (71%) followed by septic tank return (13%) and WWTP effluent (12%). Agricultural irrigation return can be apportioned into contribution from crop irrigation (44%) and dairy operations (27%).
- Projected future groundwater concentration change is from 20.7 to 35.5 mg/L (+14.8 mg/L). The future concentration slightly exceeds the flow-weighted average concentration of total inflows due to evapotranspiration of riparian vegetation.
- Impact of population growth on groundwater concentration is +4.8 mg/L due primarily to increases in septic tank return (from 358 AFY in 2012 to 672 AFY by the end of the simulation).
- There is small groundwater quality benefit (-0.6 mg/L) from recycled water projects in upgradient subregions.

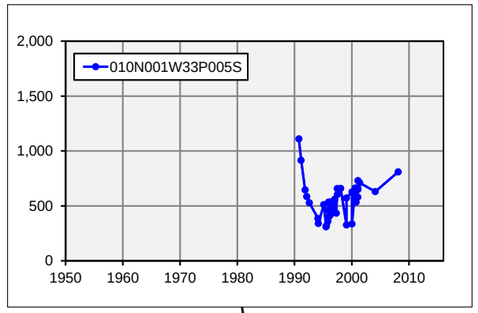
Conclusions:

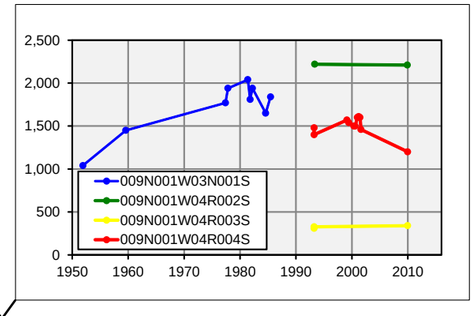
- Simulated future TDS concentrations are projected to decline and thus will not exceed or threaten to exceed the BPO of 1,000 mg/L. Projected TDS declines suggest that current and future TDS loading in the subregion has decreased compared to historical TDS loading conditions.
- Simulated future nitrate-NO_3 concentrations increase over time but do not exceed or threaten to exceed the BPO.
- With the exception of WWTP effluent, other anthropogenic inflows increase TDS and nitrate concentrations in this subregion. Wastewater effluent stabilizes groundwater concentrations throughout the simulation with respect to TDS and contributes to increasing groundwater nitrate-NO_3 concentrations until it reaches 28.3 mg/L (the concentration of wastewater effluent) around 2040, after which groundwater nitrate-NO_3 concentrations are stabilized by wastewater effluent and fluctuate as a result of intermittent stream recharge events.

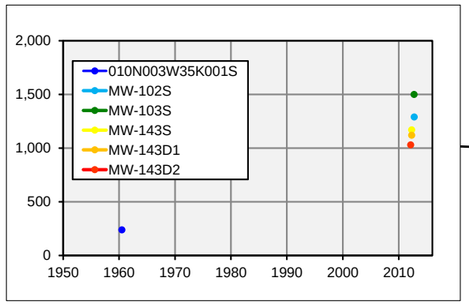


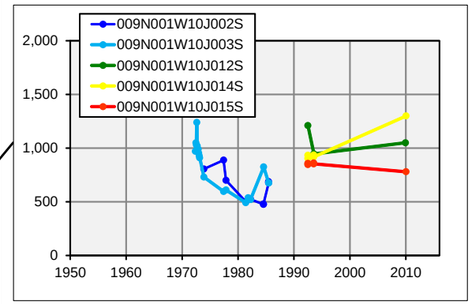


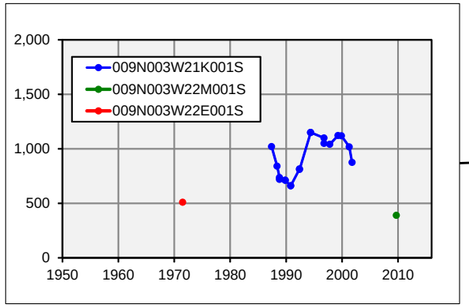


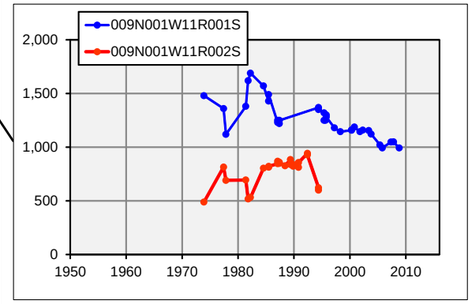


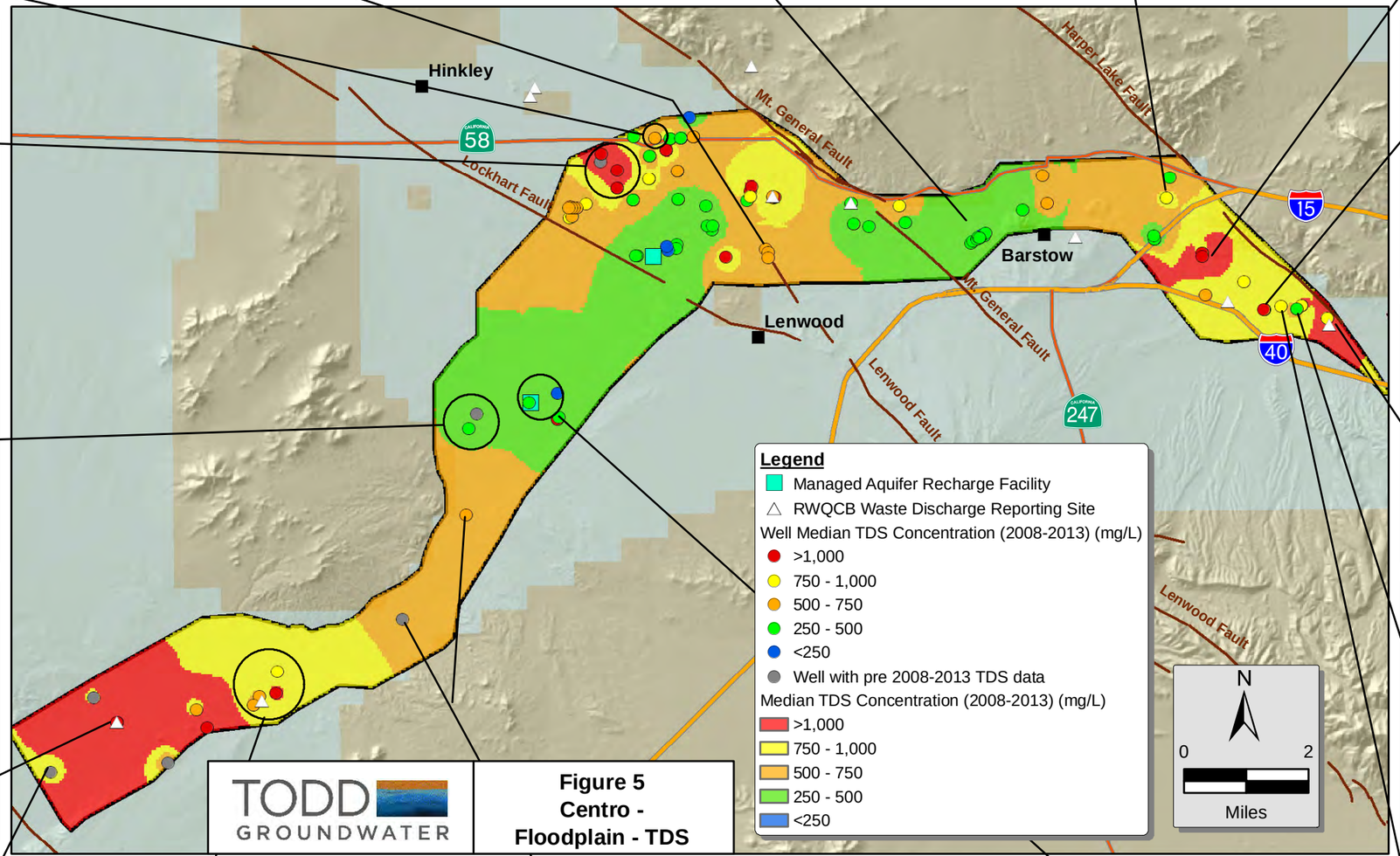


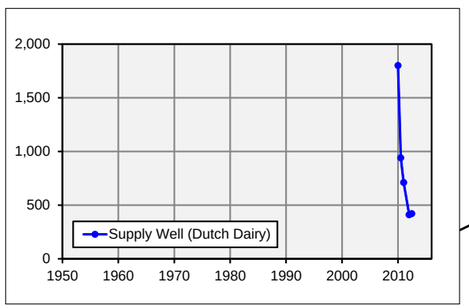


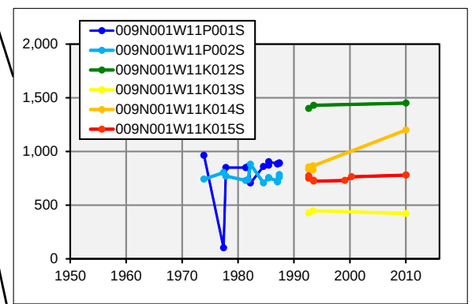


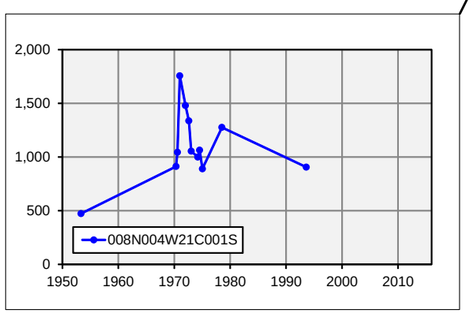


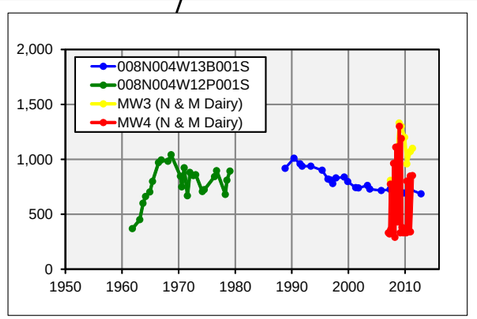


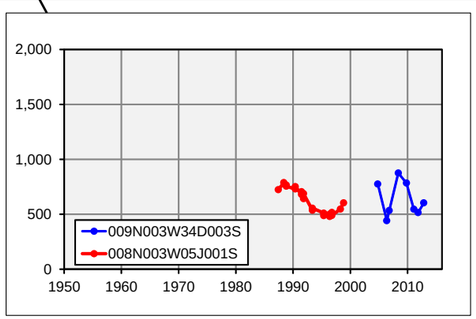


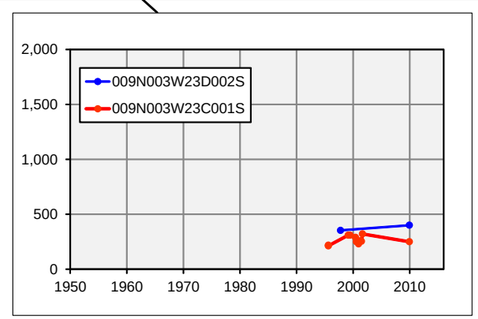


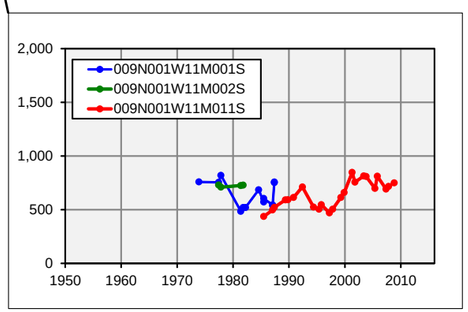






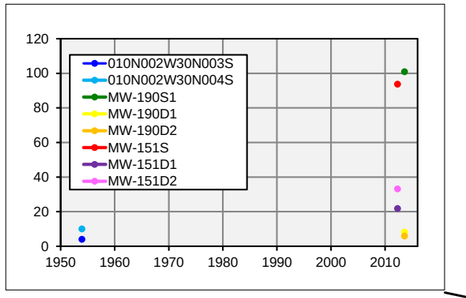


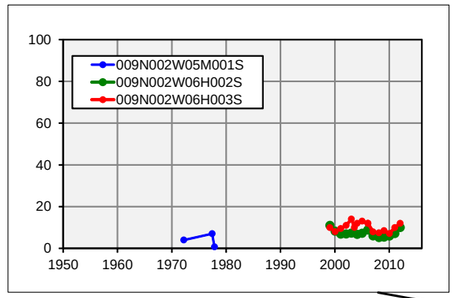


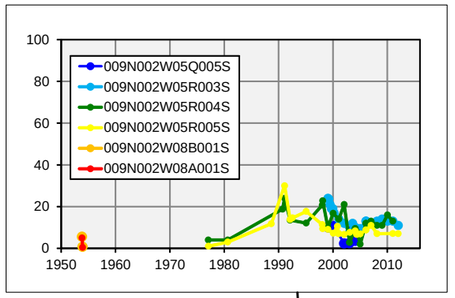


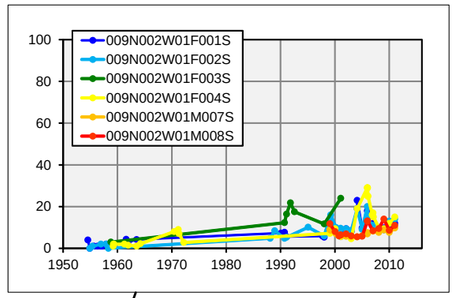
TODD GROUNDWATER

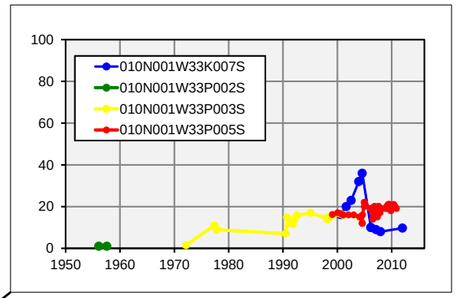
Figure 5
Centro - Floodplain - TDS

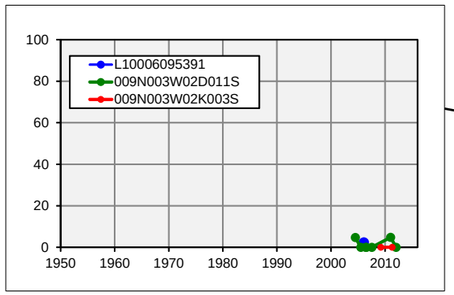


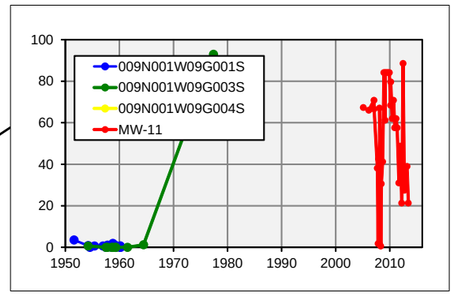


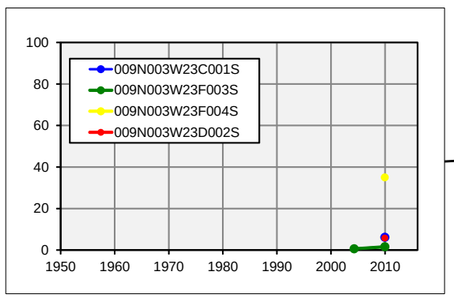


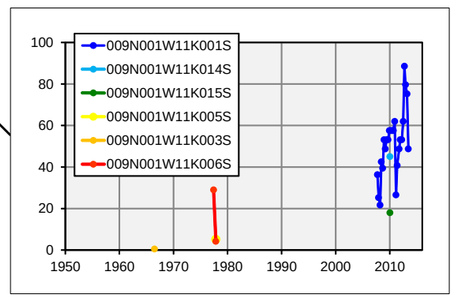


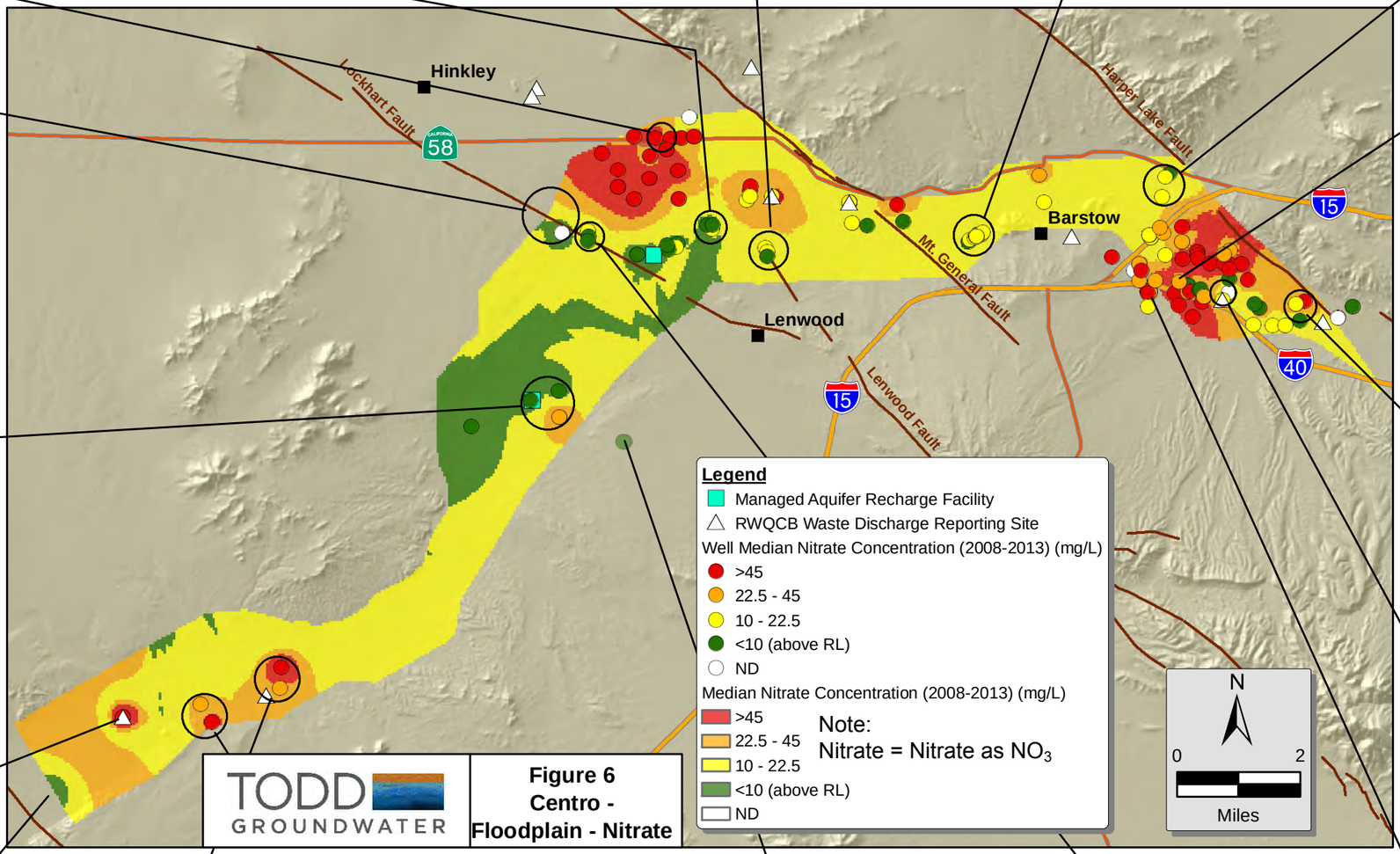


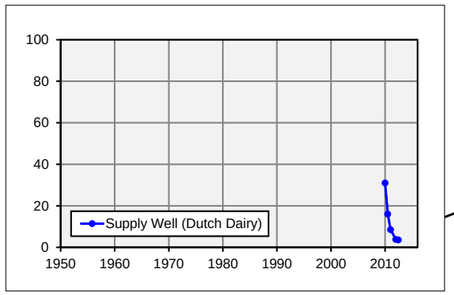


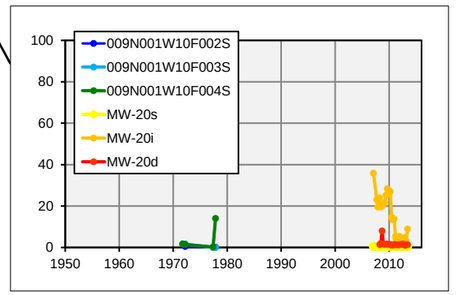


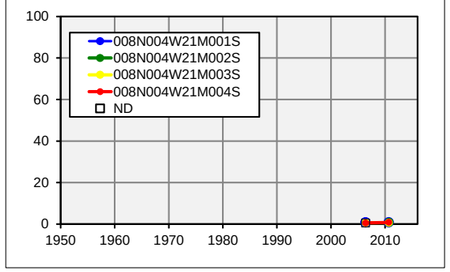


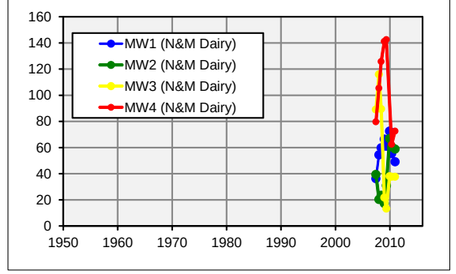


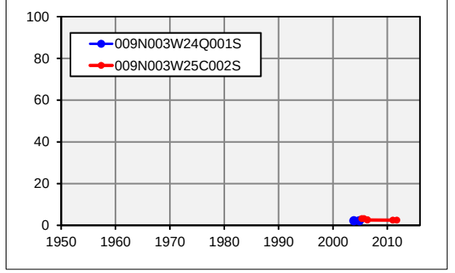


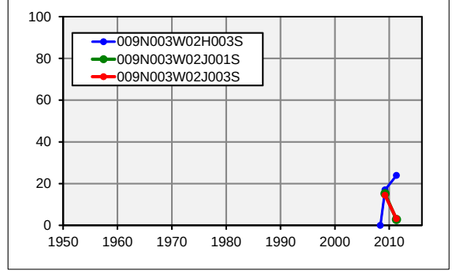


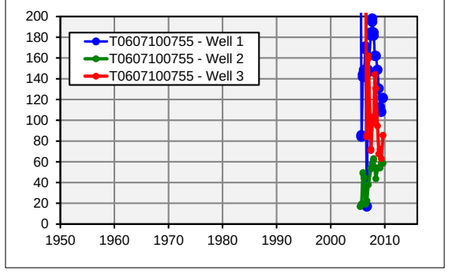












TODD GROUNDWATER

Figure 6
Centro - Floodplain - Nitrate

C4. Centro – Regional

Scenario 3 Summary

Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Subsurface Inflow	3,326	67%	618	38%	20.1	38%
Septic Tank Return	838	17%	1,654	25%	109.7	52%
Municipal Irrigation Return	231	5%	3,777	16%	16.7	2%
Agriculture Irrigation Return	561	11%	2,029	21%	27.4	9%
Flow-Weighted Average Concentration of Total Inflows			1,100		35.9	
Initial (2012) Groundwater Concentration			747		7.0	
Simulated Final (2081) Groundwater Concentration			786		11.8	

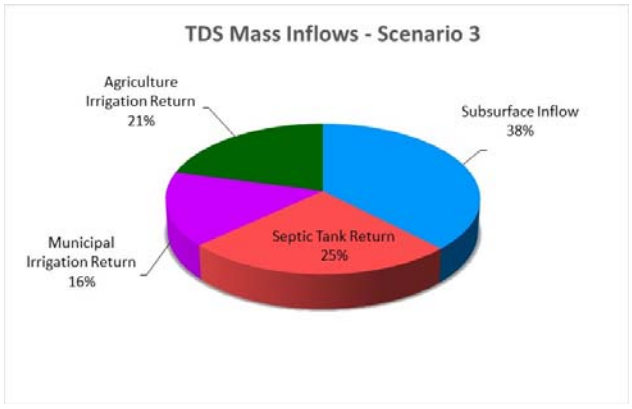
Notes:

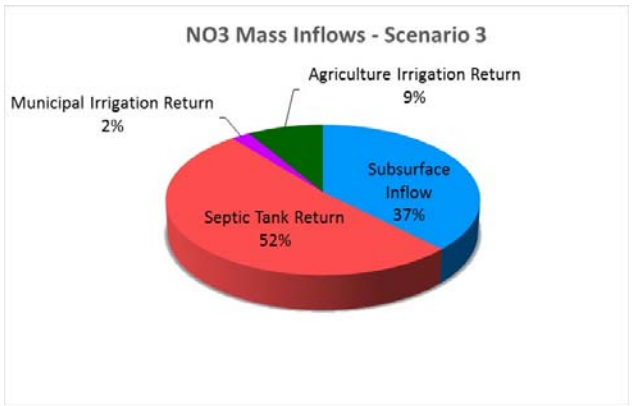
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation

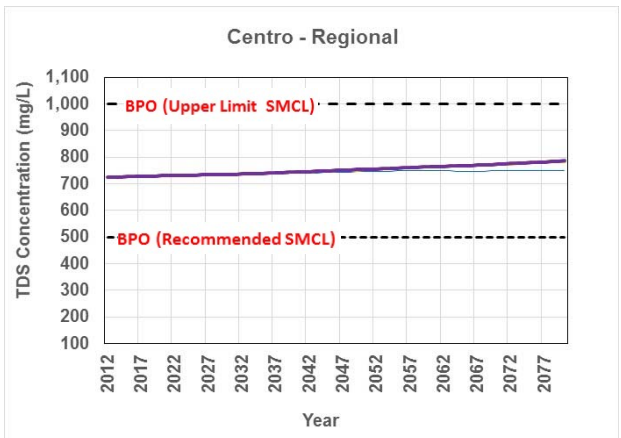
Concentration is above simulated groundwater concentration range

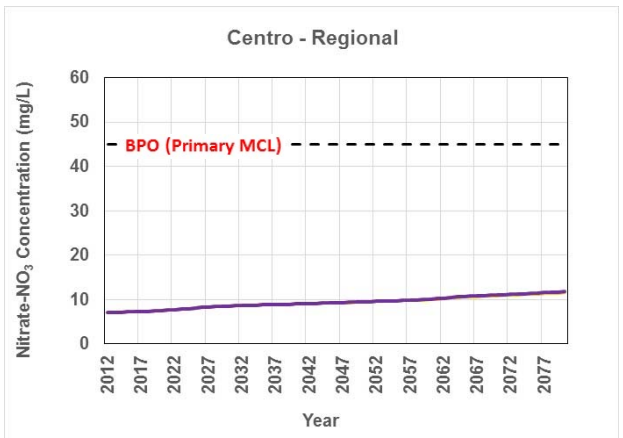
Concentration is within simulated groundwater concentration range

Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L) (a)	Scenario 1: Simulated Future (2081) Groundwater TDS Concentration (mg/L) (b)	Scenario 1: Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (b - a)	Scenario 2: Simulated Future (2081) Groundwater TDS Concentration (mg/L) (c)	Scenario 2: Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (c - a)	Scenario 2: Effect of Projected Growth (mg/L) (c - b)	Scenario 3: Simulated Future (2081) Groundwater TDS Concentration (mg/L) (d)	Scenario 3: Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (d - a)	Scenario 3: Effect of Recycled Water Projects (mg/L) (d - c)
Centro - Regional	TDS	747	748	2	785	39	37	786	39	0
	Nitrate-NO_3	7.0	11.9	4.9	11.6	4.6	-0.3	11.8	4.8	0.2

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration

blue color indicates no change in concentration

green color indicates net decrease in concentration

TDS:

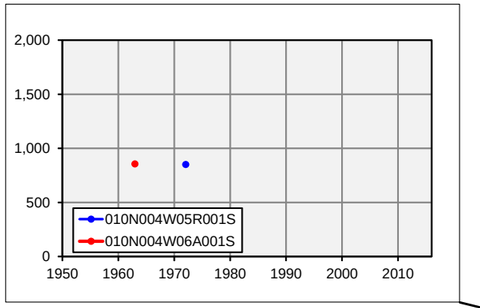
- Key loading factors are subsurface inflow (38%), septic tank return (25%), and agricultural irrigation return (21%). Contribution from agricultural irrigation return can be apportioned into contribution from crop irrigation return (11%) and dairy operation return (10%).
- Projected future groundwater concentration change is from 747 to 786 mg/L (+39 mg/L).
- Impact of population growth on groundwater concentration is +37 mg/L
- There is no measurable impact from upgradient recycled water projects.

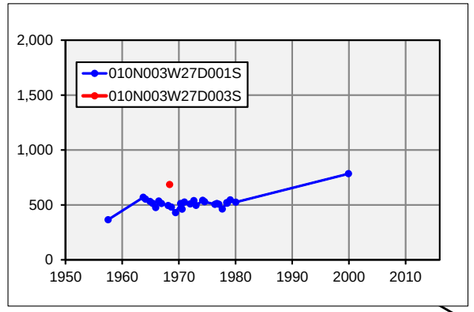
Nitrate-NO_3:

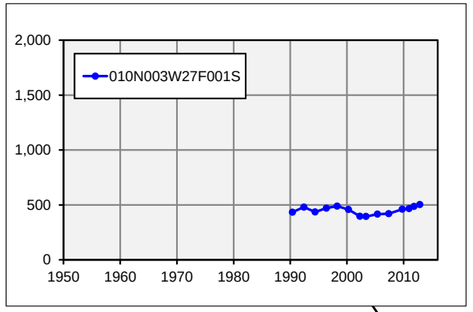
- Key loading factors are septic tank return (52%) and subsurface inflow (37%). Contribution from agricultural irrigation return (9%) can be apportioned into contribution from crop irrigation return (8.5%) and dairy operation return (0.5%).
- Projected future groundwater concentration change is from 7.0 to 11.8 mg/L (+4.8 mg/L).
- There is a small groundwater quality benefit from population growth on groundwater concentration (-0.3 mg/L), suggesting that future nitrate loading (even with projected population growth) will be less than historical nitrate loading.
- There is negligible impact (+0.2 mg/L) from upgradient recycled water projects.

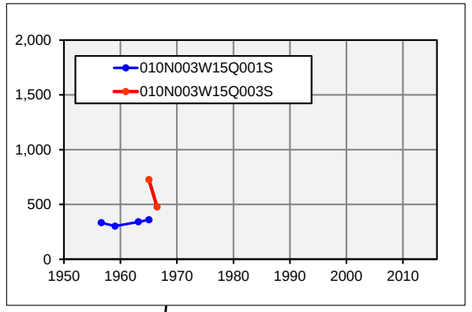
Conclusions:

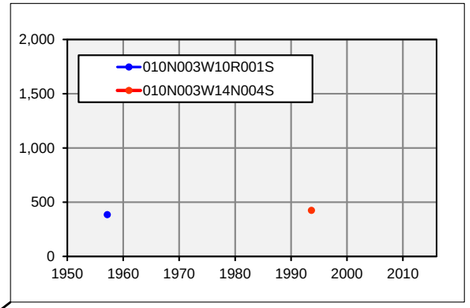
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (1,000 mg/L).
- Simulated future groundwater TDS concentration increases are a function of population growth and not recycled water projects.

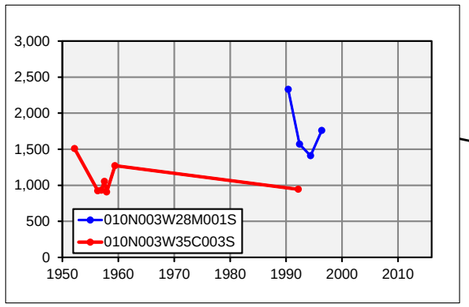


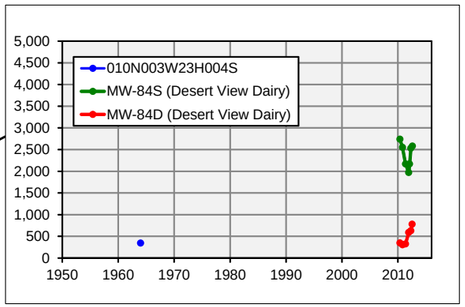


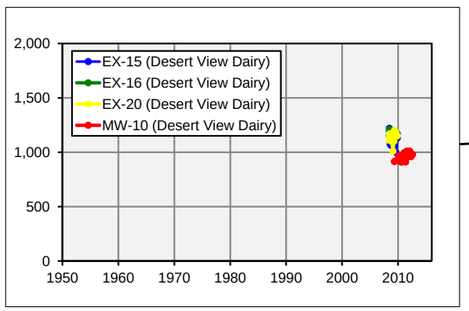


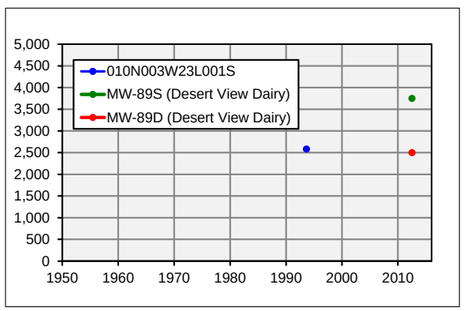


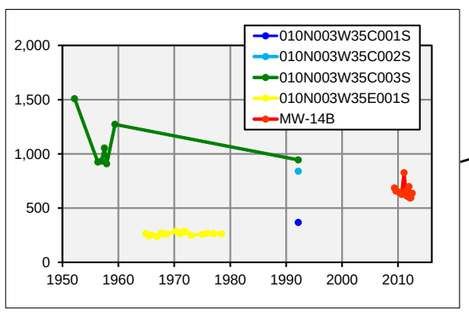


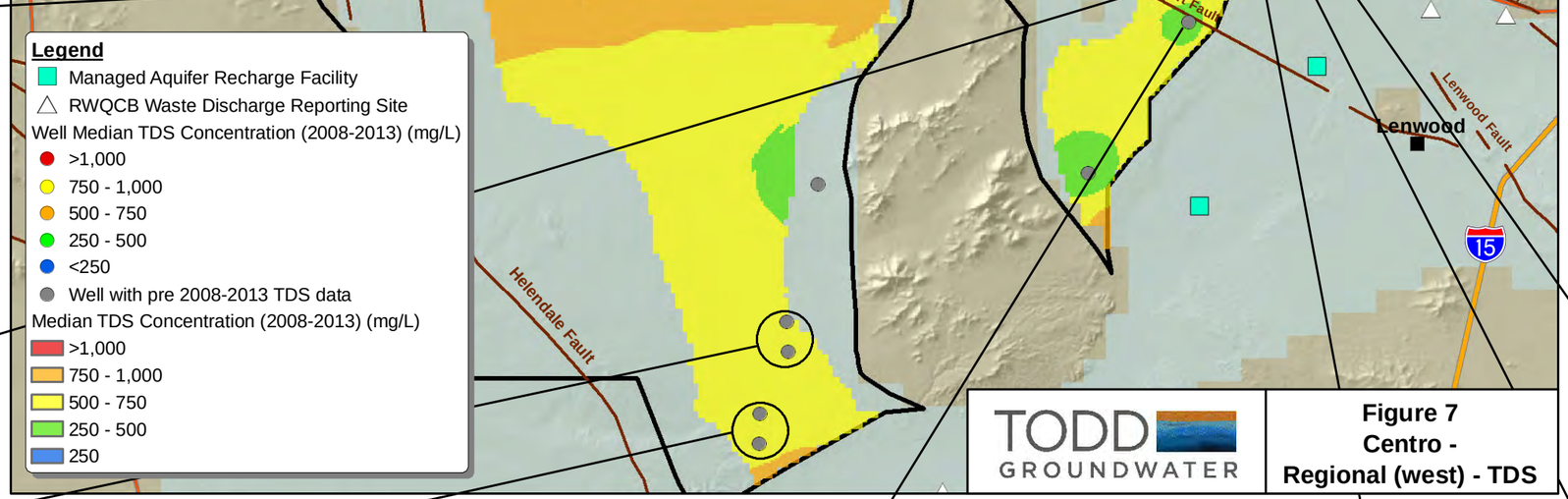


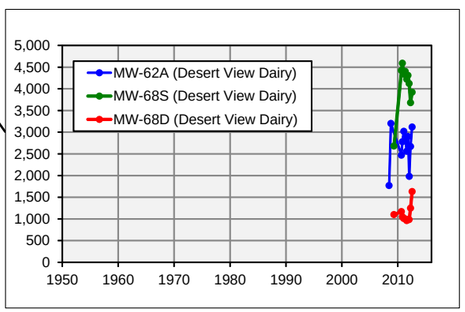


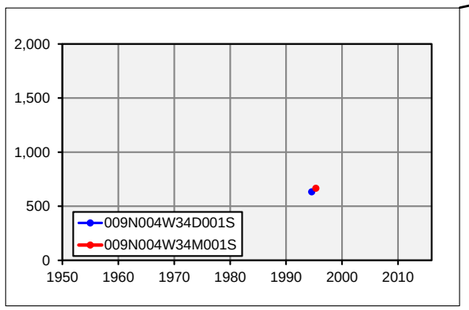


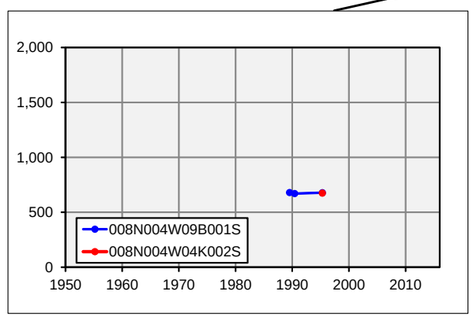


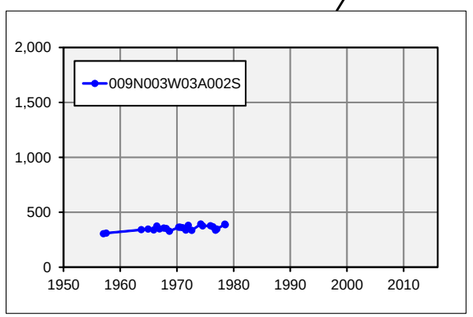


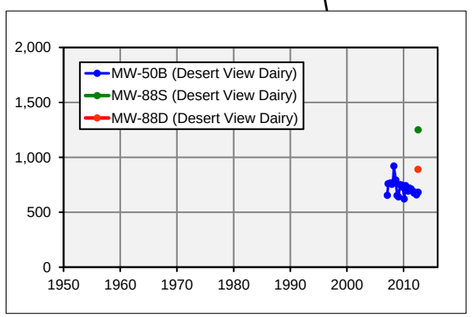


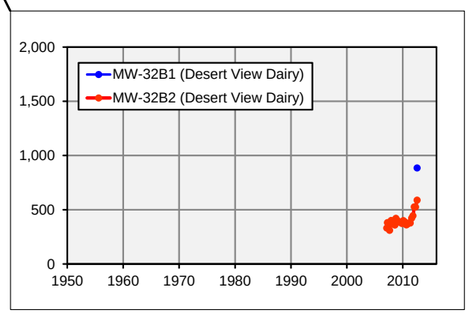






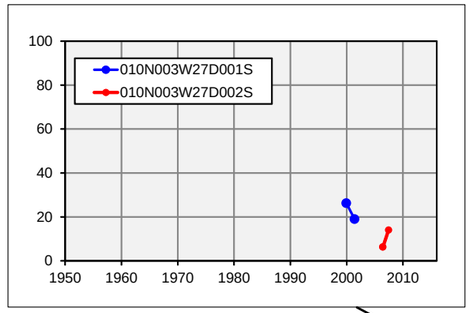






TODD GROUNDWATER

Figure 7
Centro - Regional (west) - TDS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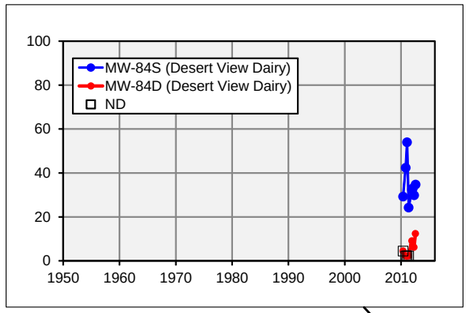
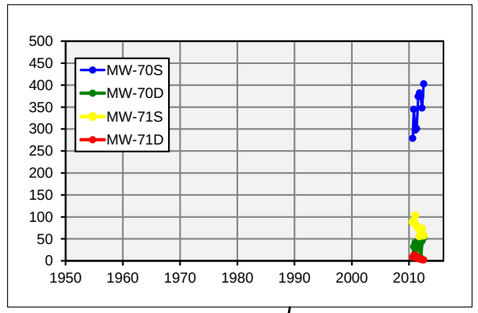
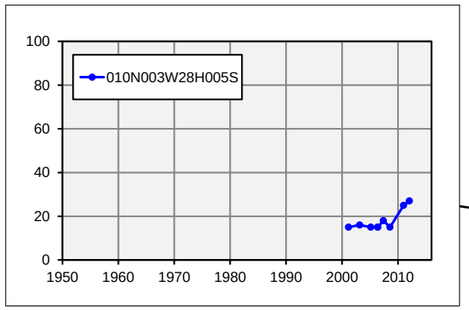
010N003W27D002S


MW-84S (Desert View Dairy)
MW-84D (Desert View Dairy)
ND


MW-70S
MW-70D
MW-71S
MW-71D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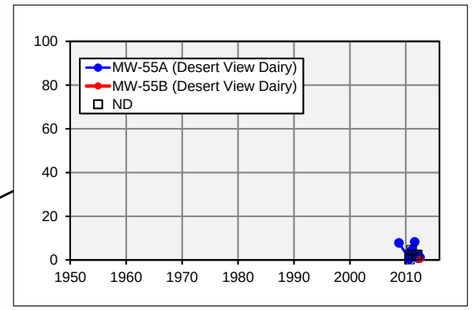
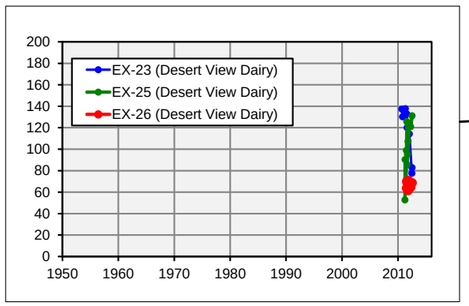
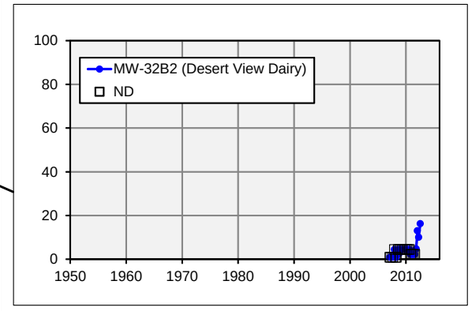
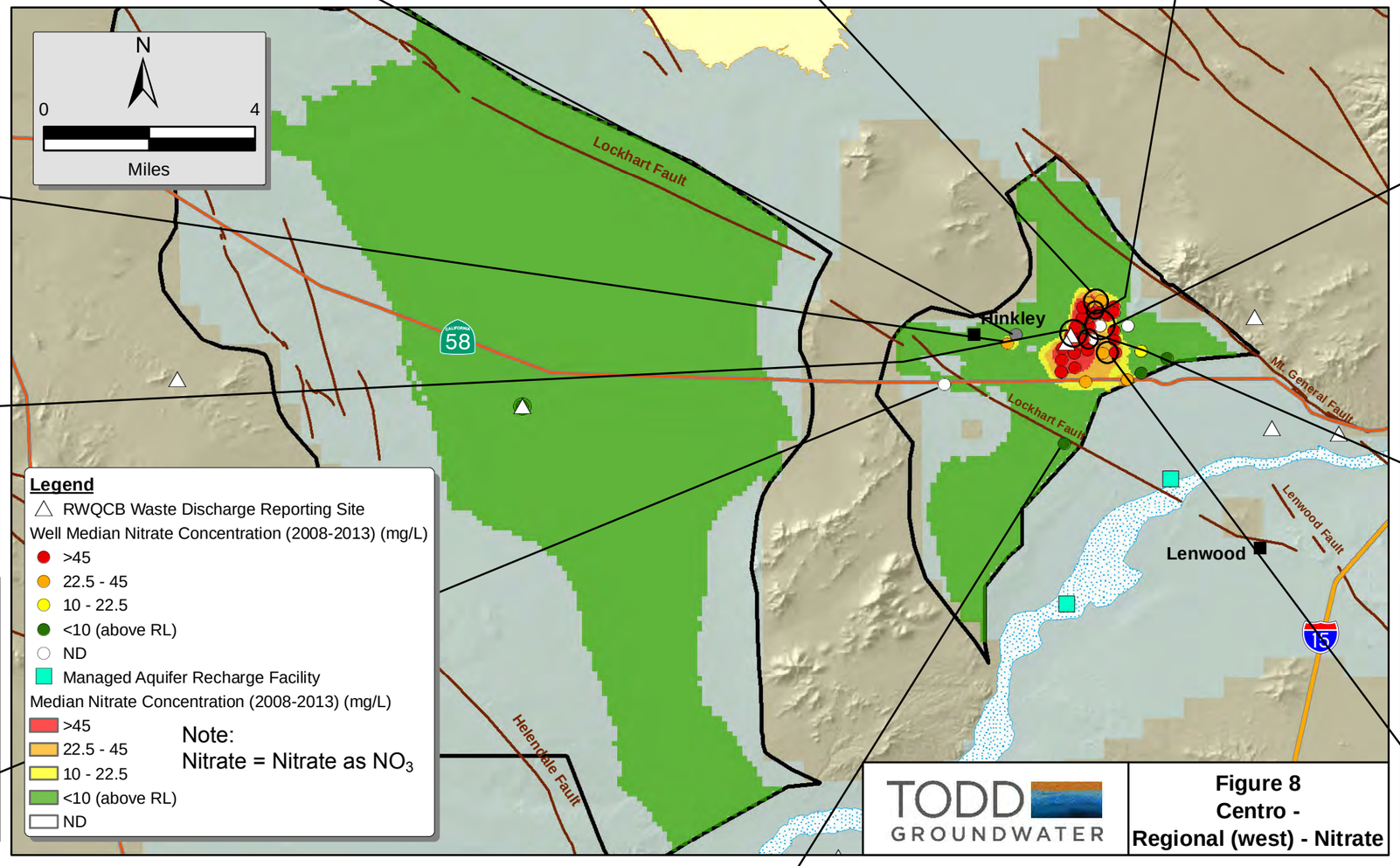

MW-55A (Desert View Dairy)
MW-55B (Desert View Dairy)
ND

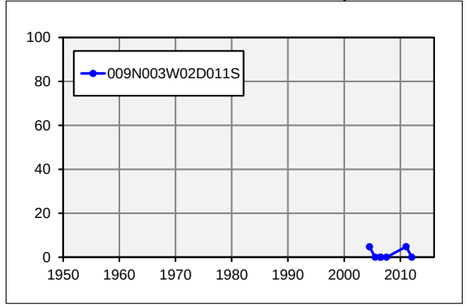

EX-23 (Desert View Dairy)
EX-25 (Desert View Dairy)
EX-26 (Desert View Dairy)


MW-32B2 (Desert View Dairy)
ND


N
0
4
Miles
Lockhart Fault
Helendale Fault
Mt. General Fault
Lenwood Fault
Hinkley
Lenwood
58
15
Legend
RWQCB Waste Discharge Reporting Site
Well Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Managed Aquifer Recharge Facility
Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Note:
Nitrate = Nitrate as NO3
TODD GROUNDWATER
Figure 8
Centro -
Regional (west) - Nitrate

010N003W32A018S
ND

MW-50B (Desert View Dairy)
MW-88S (Desert View Dairy)
MW-88D (Desert View Dairy)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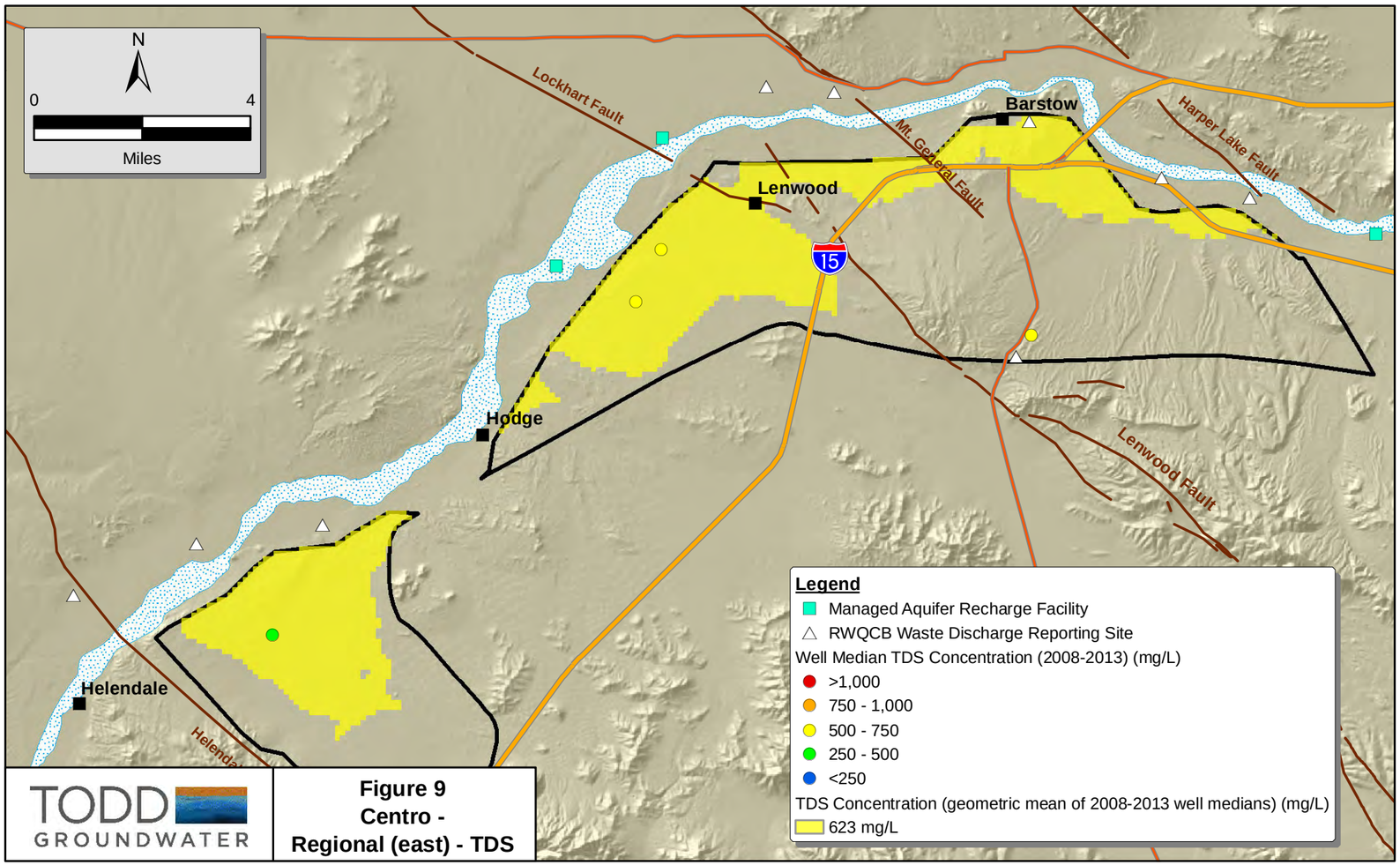
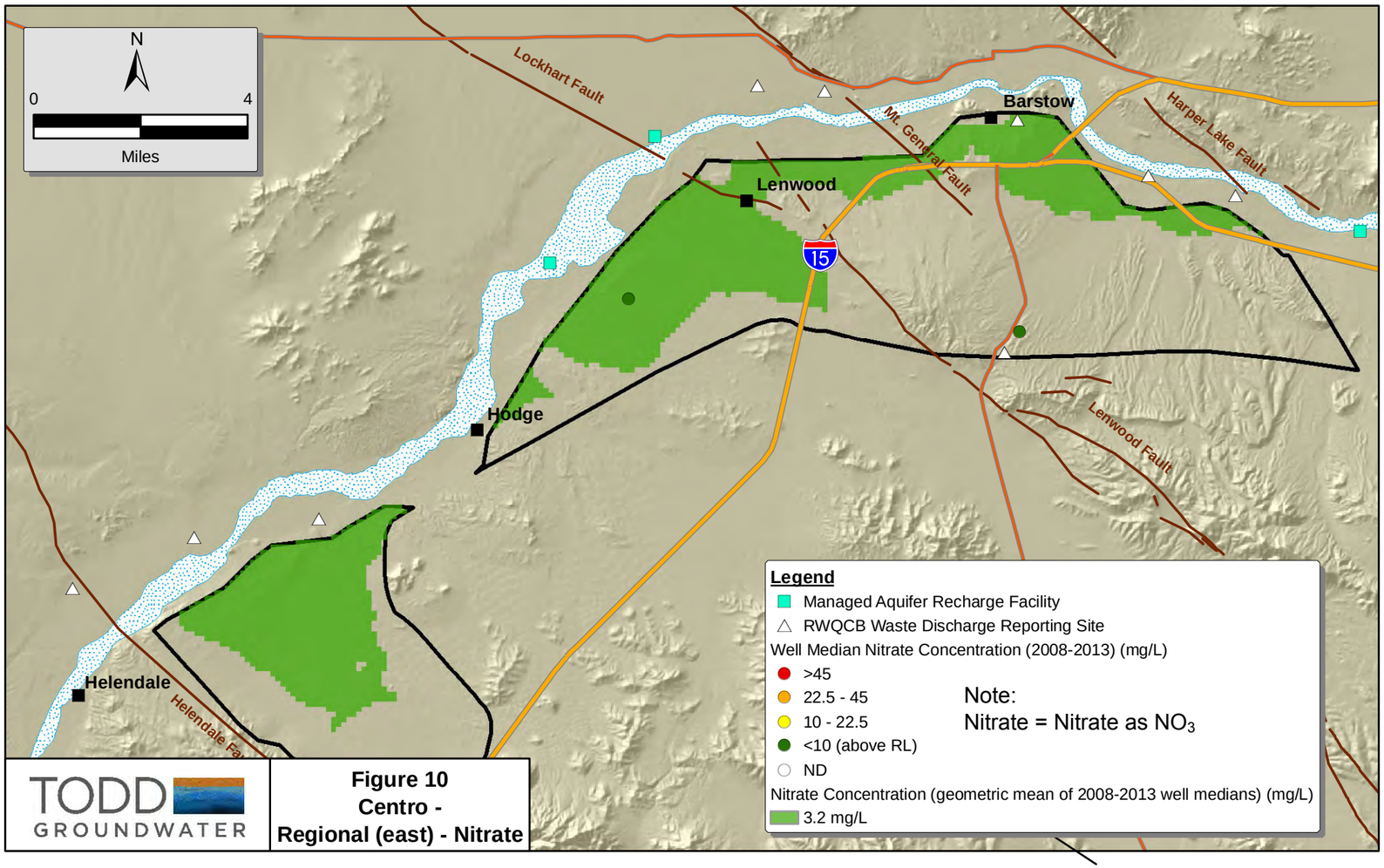


TODD GROUNDWATER

Figure 9
Centro -
Regional (east) - TDS



TODD GROUNDWATER

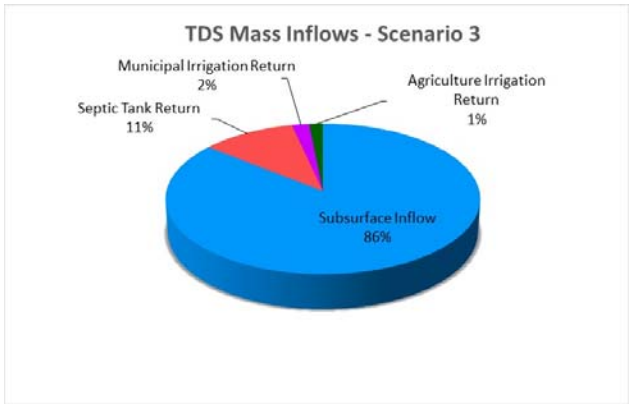
Figure 10
Centro -
Regional (east) - Nitrate

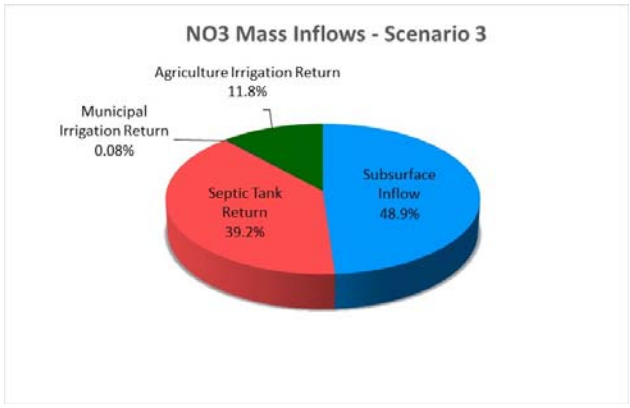
C5. Centro – Regional (Harper Dry Lake)

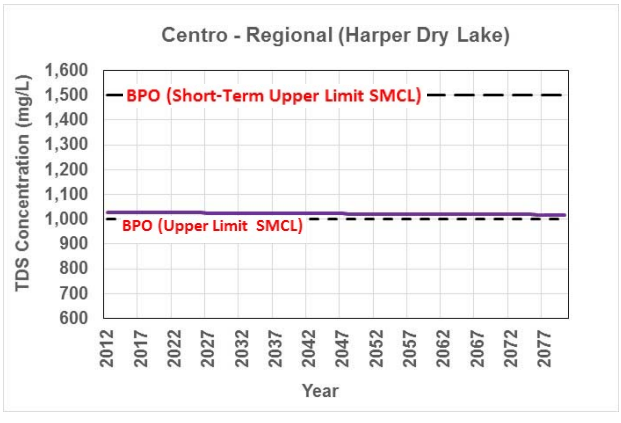
Scenario 3 Summary

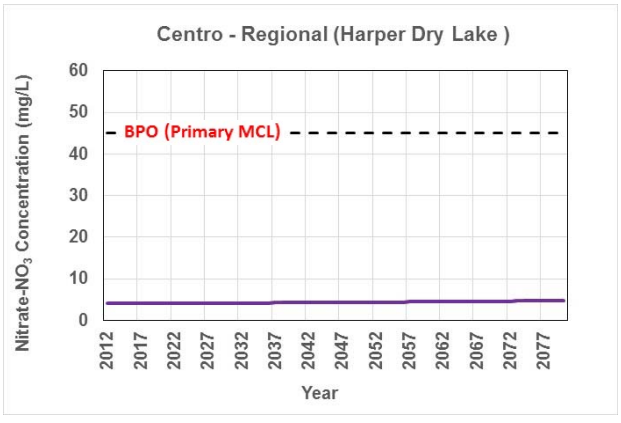
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Subsurface Inflow	1,576	95%	751	86%	9.4	49%
Septic Tank Return	68	4%	2,169	11%	174.4	39%
Municipal Irrigation Return	5	0%	5,108	2%	4.4	0.1%
Agriculture Irrigation Return	8	0%	2,760	2%	457.3	12%
Flow-Weighted Average Concentration of Total Inflows			833		18.3	
Initial (2012) Groundwater Concentration			1,028		4.0	
Simulated Final (2081) Groundwater Concentration			1,018		4.7	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Centro - Regional (Harper Dry Lake)	TDS	1,028	1016	-12	1018	-10	2	1018	-10	0
	Nitrate-NO_3	4.0	4.6	0.6	4.7	0.7	0.2	4.7	0.7	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

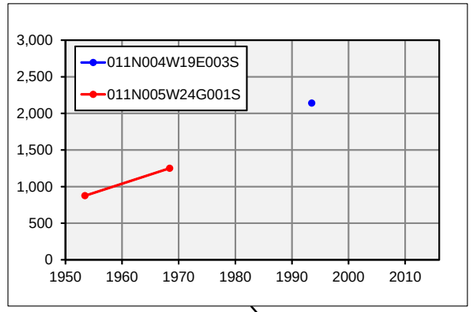
- Key loading factors are subsurface inflow (86%) and some septic tank return (11%).
- Projected future groundwater concentration change is from 1,028 to 1,018 mg/L (-10 mg/L).
- Impact of population growth on groundwater concentration is minimal (+2 mg/L).
- There is no measurable impact from recycled water projects in other upgradient subregions.

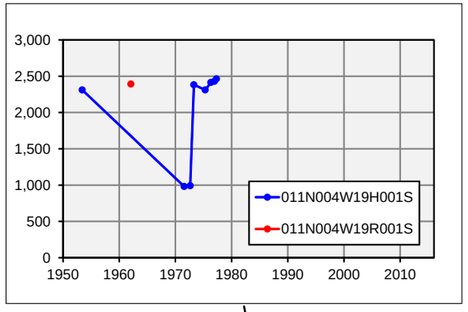
Nitrate-NO_3:

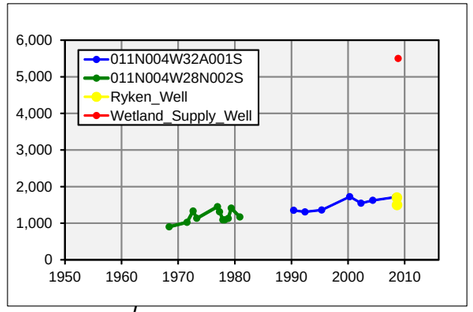
- Key loading factors are subsurface inflow (49%) and septic tank return (39%).
- Projected future groundwater concentration change is from 4.0 to 4.7 mg/L (+0.7 mg/L).
- Impact of population growth on groundwater concentration is minimal (+0.2 mg/L).
- There is no measurable impact from recycled water projects in other upgradient subregions.

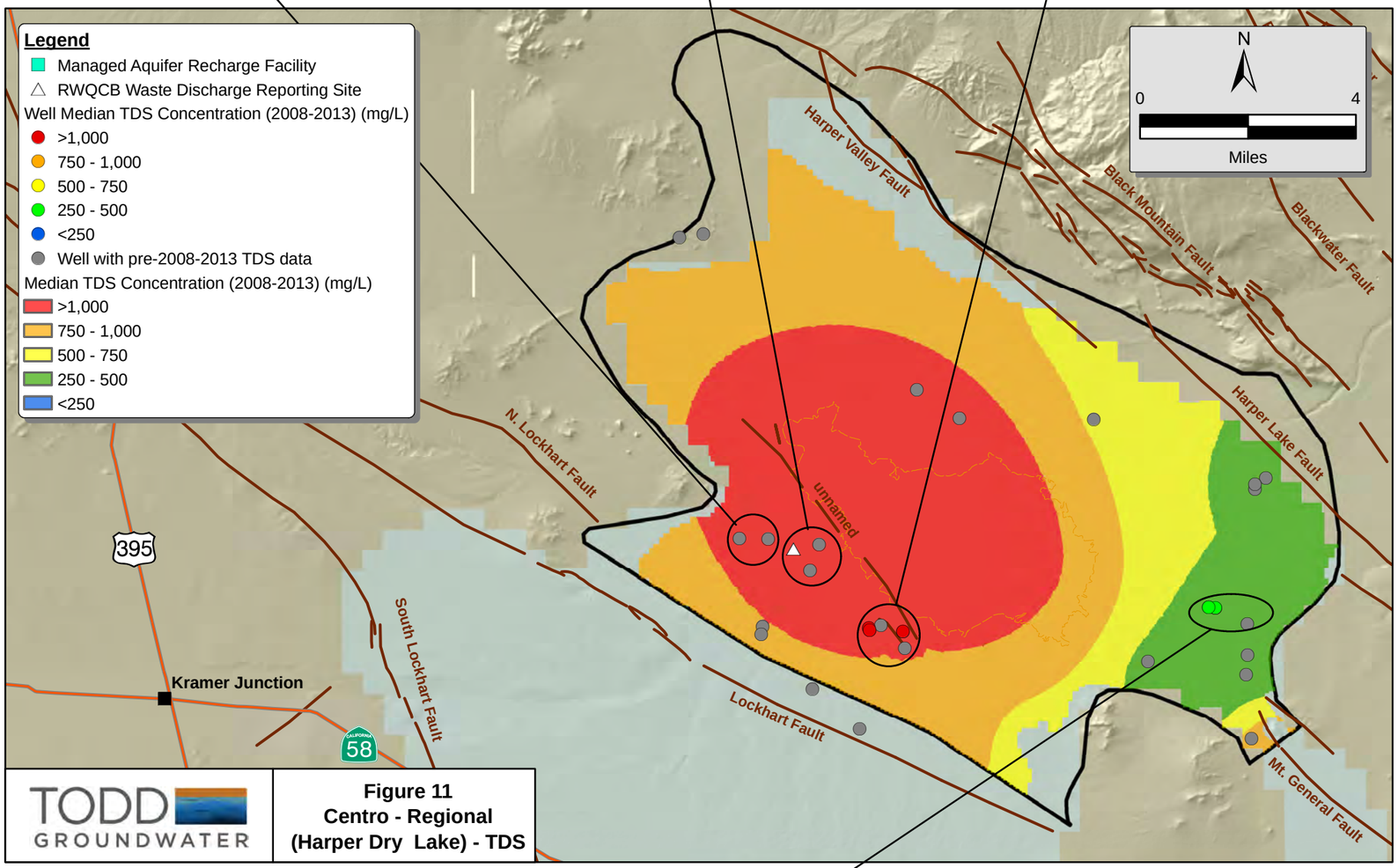
Conclusions:

- The subregion is relatively passive with S/N loading controlled primarily by subsurface inflows from Centro – Regional.
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (1,500 mg/L for TDS).
- There are no measurable impacts from recycled water projects in upgradient subregions.



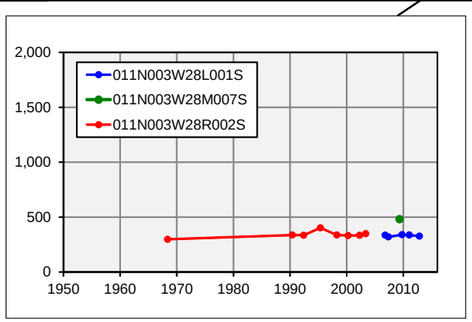


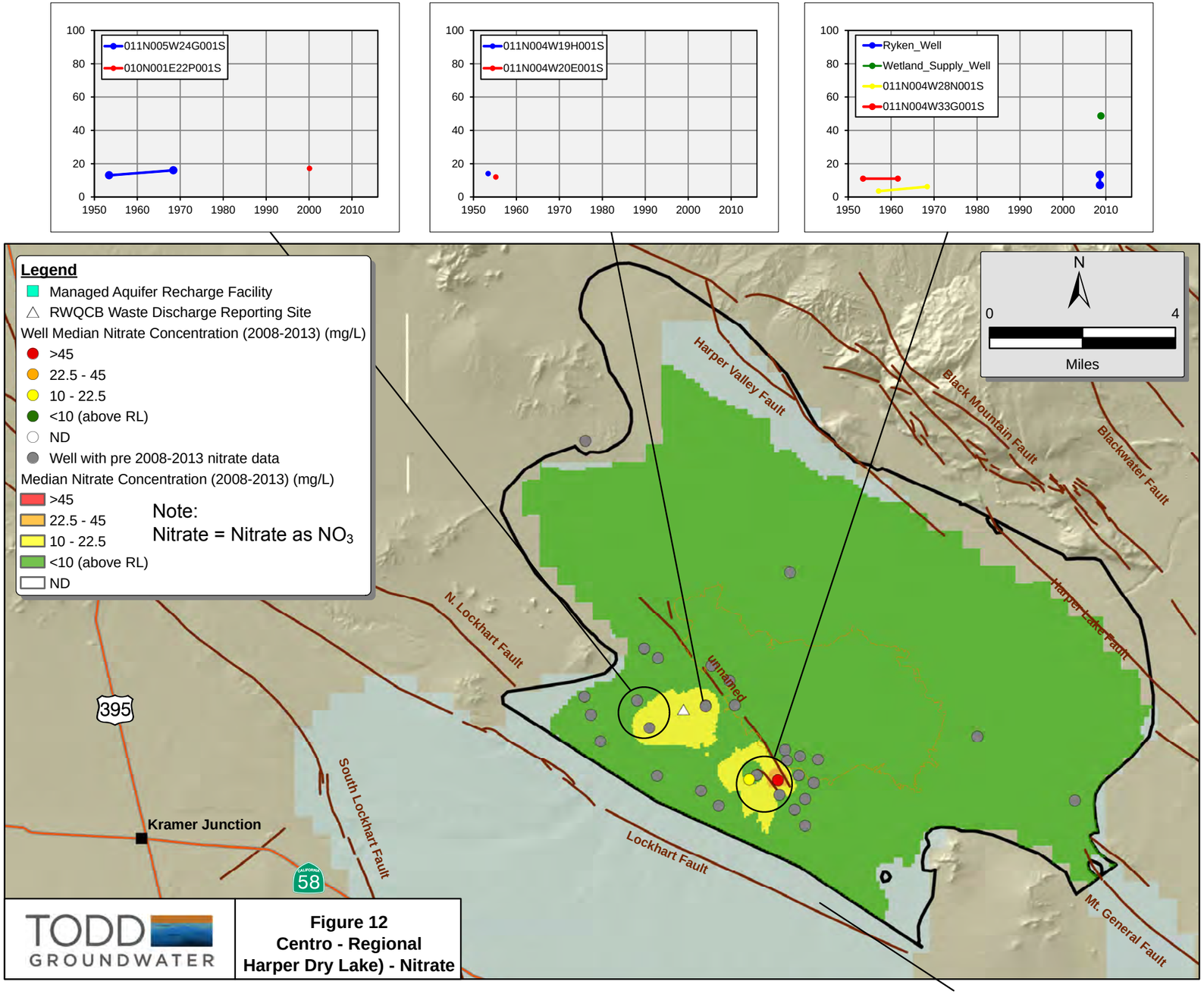




TODD GROUNDWATER

Figure 11
Centro - Regional
(Harper Dry Lake) - TDS





TODD GROUNDWATER

Figure 12
Centro - Regional
Harper Dry Lake) - Nitrate

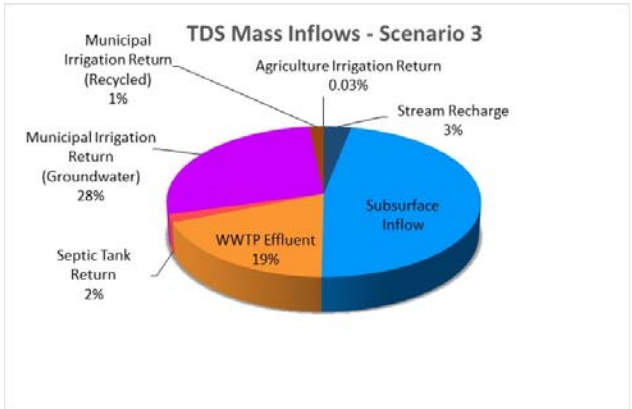
C6. Alto Transition Zone – Floodplain (Helendale)

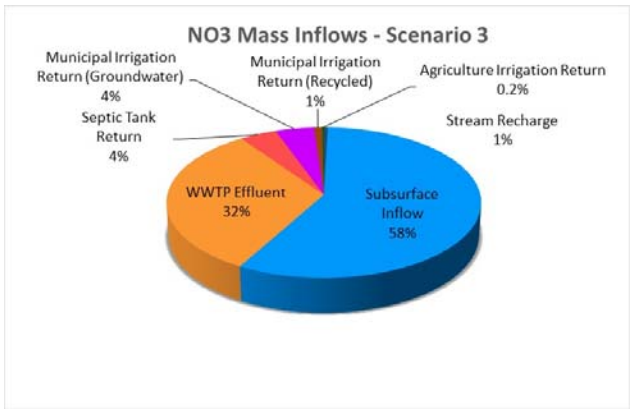
Scenario 3 Summary

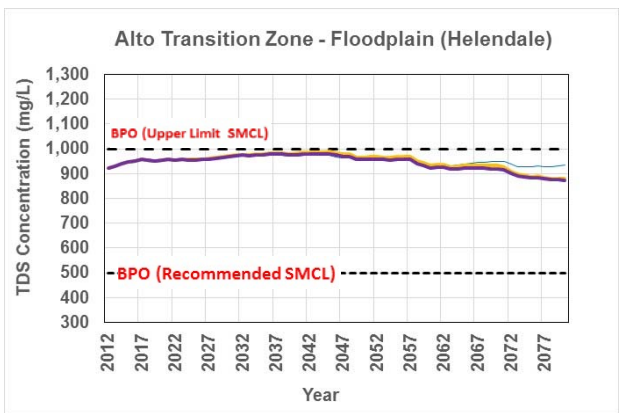
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Stream Recharge	1,222	19%	110	3%	0.6	0.4%
Subsurface Inflow	3,772	60%	540	47%	25.5	58%
WWTP Effluent	977	16%	830	19%	54.9	32%
Septic Tank Return	38	1%	2,003	2%	185.5	4%
Municipal Irrigation Return (GW)	254	4%	4,708	28%	28.8	4%
Municipal Irrigation Return (RW)	28	0%	2,500	2%	54.4	1%
Agriculture Irrigation Return	0.2	0%	4,719	0.03%	1,190.4	0.2%
Flow-Weighted Average Concentration of Total Inflows			688		26.5	
Initial (2012) Groundwater Concentration			915		10.0	
Simulated Final (2081) Groundwater Concentration			874		21.0	

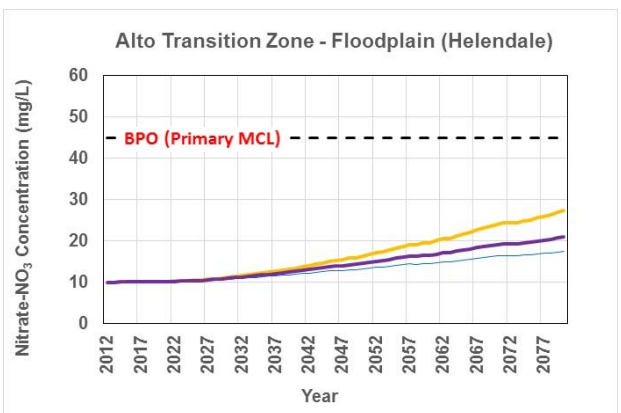
Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
GW = groundwater; RW = recycled water

Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Alto Transition Zone - Floodplain (Helendale)	TDS	915	935	20	879	-36	-55	874	-41	-6
	Nitrate-NO_3	10.0	17.0	7.0	27.4	17.4	10.5	21.0	11.0	-6.4

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

- Key loading factors are subsurface inflow (47%) and municipal (groundwater) irrigation return (28%).
- Projected future groundwater concentration change is from 915 to 874 mg/L (-41 mg/L).

  Impact of population growth on groundwater concentration is -55 mg/L, due to increased subsurface inflow at lower TDS concentrations from the Alto Transition Zone – Floodplain. The lower TDS concentrations from Alto Transition Zone – Floodplain in Scenario 2 are the result of increased effluent discharge at the VVWRA WWTP, which is simulated at 375 mg/L TDS (lower than the ambient TDS groundwater concentration of 500 mg/L).

  Effect of Recycled Water Projects
- There is a -6 mg/L impact (benefit) from recycled water projects.
- Due to the upwelling of high TDS groundwater upgradient of the Helendale Fault, the effect of recycled water projects on TDS concentrations for various inflow components in the subregion cannot be easily isolated. The SNMP model accounts for these complexities and quantifies the small but measurable change in groundwater TDS concentrations as a result of the Helendale CSD recycled water project in Alto Transition Zone – Floodplain (Helendale) and recycled water projects in other upgradient subregions.

Nitrate-NO_3:

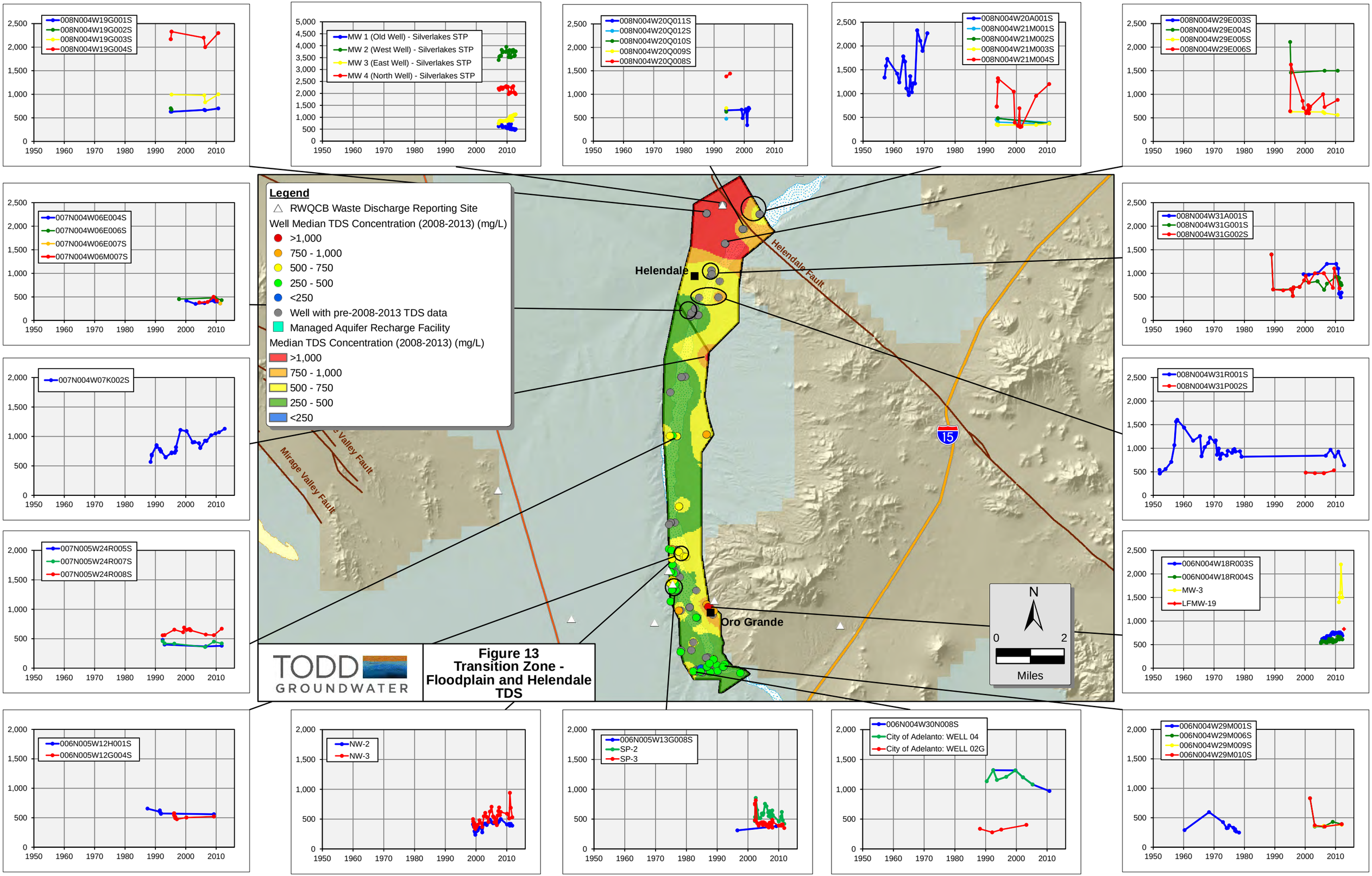
- Key loading factors are subsurface inflow (58%) and WWTP effluent (32%).
- Projected future groundwater concentration change is from 10.0 to 21.0 mg/L (+11.0 mg/L).
- Impact of population growth on groundwater concentration is +9.8 mg/L.

Effect of Recycled Water Projects

- There is a -6.4 mg/L impact (benefit) from recycled water projects.
- Modeling results indicate that the measurable benefit from recycled water projects to groundwater nitrate concentrations is associated with 1) decreased subsurface inflow from the Alto Transition Zone – Floodplain and 2) decreased effluent discharge from the Helendale CSD WWTP. Nitrate concentrations for both of the abovementioned inflows have elevated nitrate concentrations relative to current groundwater concentrations in Alto Transition Zone – Floodplain (Helendale).

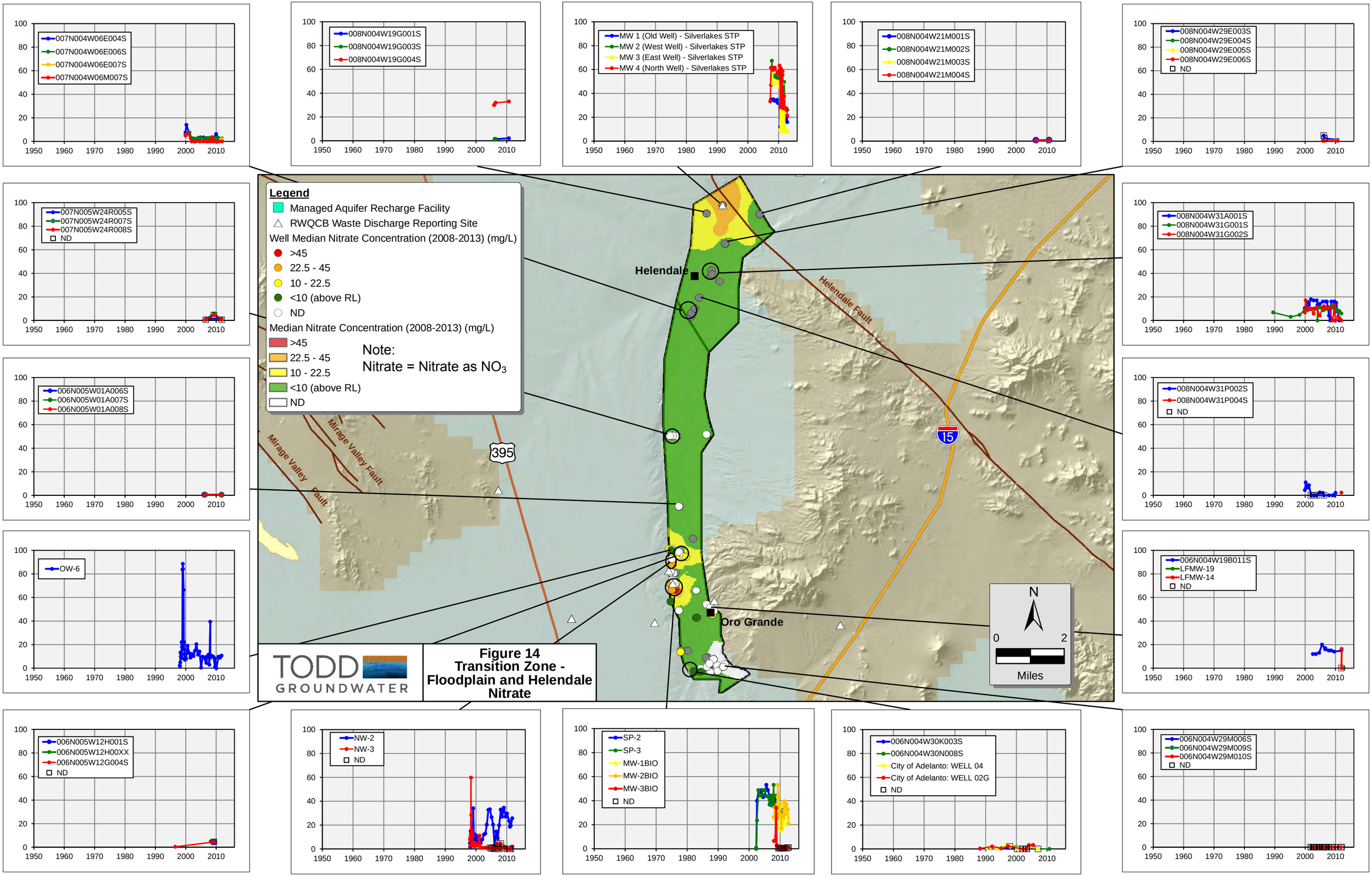
Conclusions:

- TDS concentrations in the subregion are naturally elevated as a result of upwelling of high TDS groundwater southwest (upgradient) of the Helendale Fault.
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (1,000 mg/L for TDS).
- Recycled water projects in the subregion result in a small net benefit to groundwater quality for TDS and nitrate.



TODD GROUNDWATER

Figure 13
Transition Zone - Floodplain and Helendale TDS



TODD GROUNDWATER

Figure 14
Transition Zone - Floodplain and Helendale Nitrate

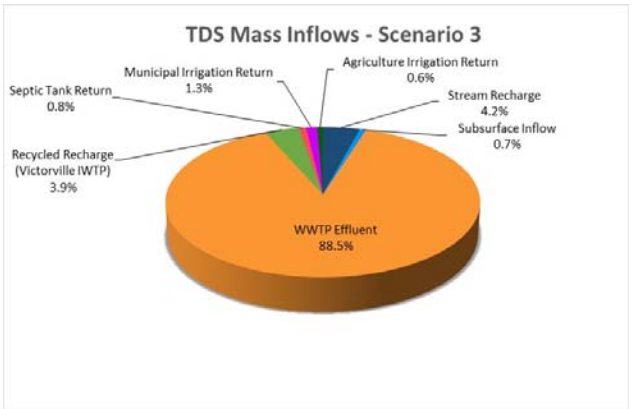
C7. Alto Transition Zone – Floodplain

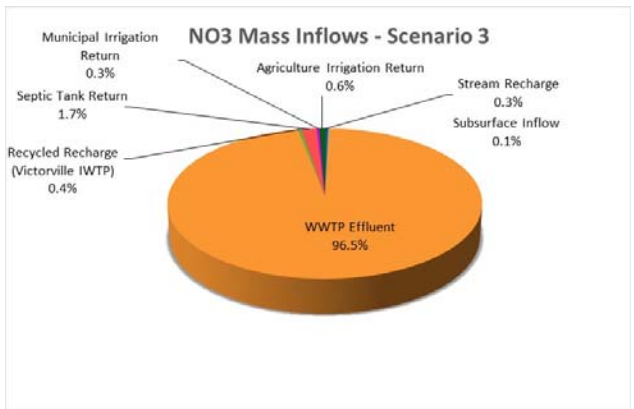
Scenario 3 Summary

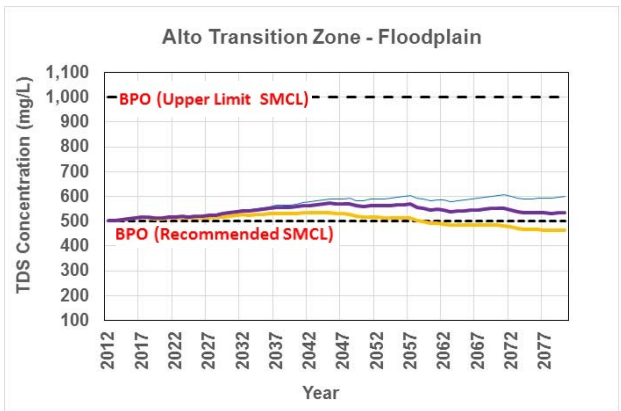
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Stream Recharge	3,207	14%	110	4%	0.6	0.3%
Subsurface Inflow	161	1%	355	1%	5.3	0.1%
WWTP Effluent	19,720	83%	375	88%	30.9	97%
Victorville IWWTP (Net Pond 14)	430	2%	763	4%	6.2	0.4%
Septic Tank Return	54	0.2%	1,243	1%	198.5	2%
Municipal Irrigation Return	39	0.2%	2,722	1%	49.5	0.3%
Agriculture Irrigation Return	19	0.1%	2,710	1%	204.7	1%
Flow-Weighted Average Concentration of Total Inflows			354		26.7	
Initial (2012) Groundwater Concentration			500		3.4	
Simulated Final (2081) Groundwater Concentration			535		36.6	

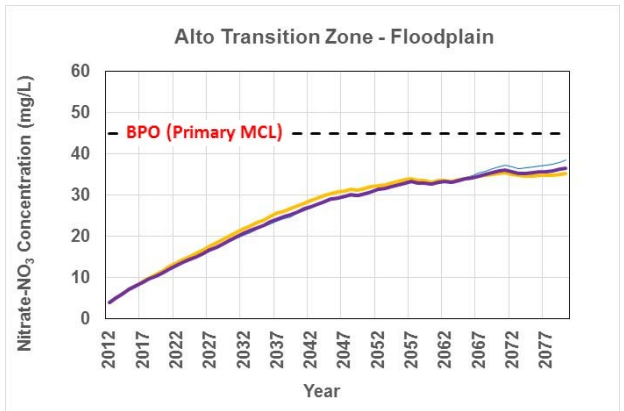
Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation

Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Alto Transition Zone - Floodplain	TDS	500	601	101	462	-38	-138	535	35	73
	Nitrate-NO_3	3.4	37.5	34.1	35.3	31.9	-2.2	36.6	33.2	1.3

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

- The key loading factor is WWTP effluent discharge (89%).
- Projected future groundwater concentration change is from 500 to 535 mg/L (+35 mg/L).
- Impact of population growth on groundwater concentration is -138 mg/L, due primarily to the increase in effluent discharge at the VVWRA Regional WWTP in Scenario 2 versus Scenario 1. VVWRA effluent is simulated at a constant TDS concentration of 375 mg/L (based on average 2012 effluent concentrations) and thus benefits groundwater TDS concentrations in the subregion (initial average TDS concentration in Alto Transition Zone – Floodplain is 500 mg/L).

Effect of Recycled Water Projects

- There is a +73 mg/L impact from recycled water projects, due primarily to the reduction in effluent discharge at the VVWRA regional WWTP plant (in Scenario 3 compared to Scenario 2) and associated changes to other inflows and outflows. VVWRA effluent is simulated at a constant TDS concentration of 375 mg/L and thus benefits groundwater TDS concentrations in the subregion (initial average TDS concentration in Alto Transition Zone – Floodplain is 500 mg/L). Additionally, excess recycled water from the Victorville IWWTP (average TDS concentration of 763 mg/L) to VVWRA Pond 14 are projected to increase (with a net increase of 56 AFY from 2016 to 2020 and 482 AFY from 2021 to 2081). Together, these two factors increase groundwater TDS concentrations in Scenario 3 relative to Scenario 2.

Nitrate-NO_3:

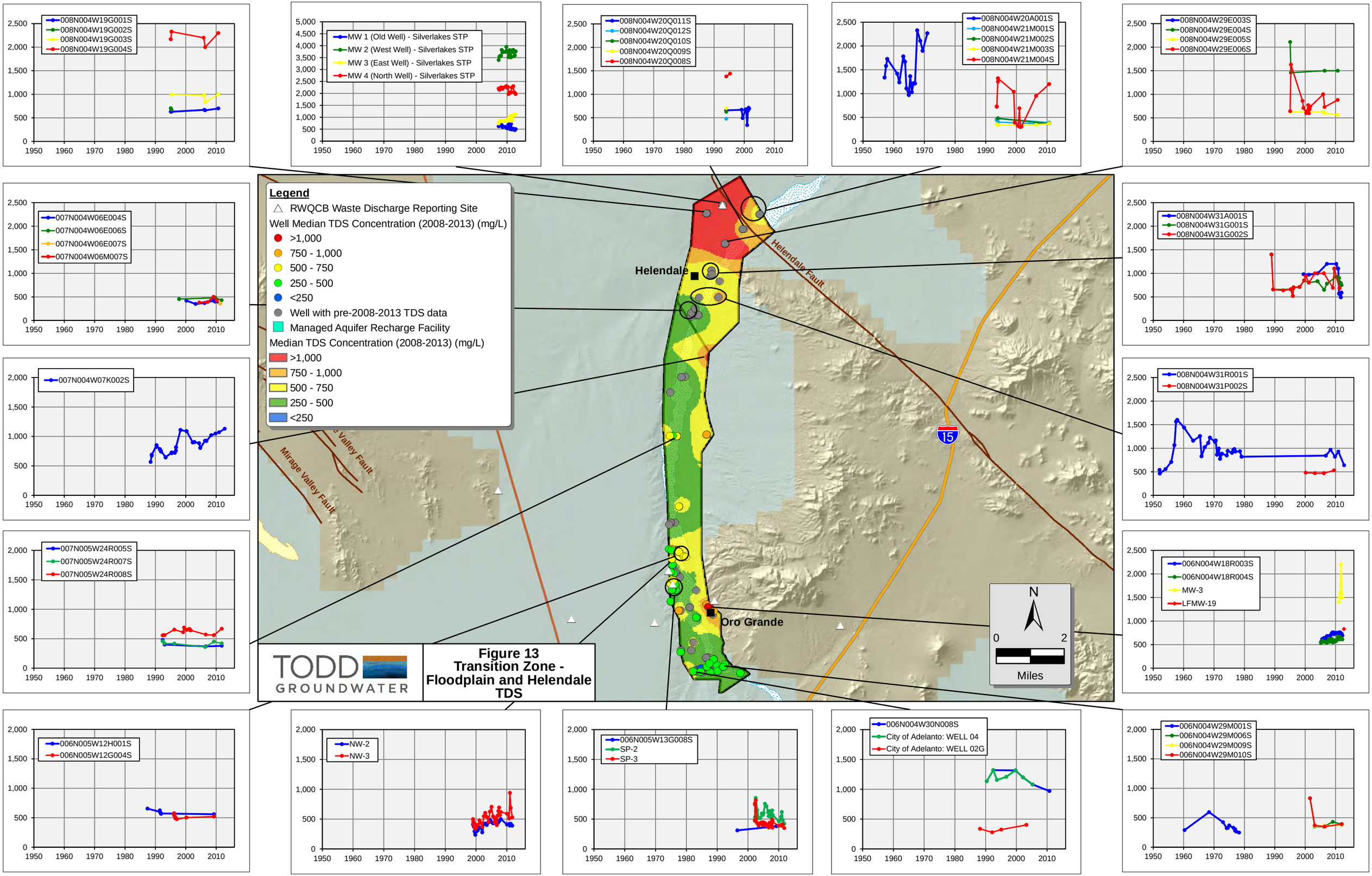
- The key loading factor is WWTP effluent discharge (97%).
- Projected future groundwater concentration change is from 3.4 to 36.6 mg/L (+33.2 mg/L). Final groundwater concentration exceeds flow-weighted average concentration of total inflows due to concentrating effect of evapotranspiration by riparian vegetation in the subregion.
- There is a small benefit (-2.2 mg/L) to groundwater concentrations from population growth, due primarily to increased effluent discharge in the Alto Transition Zone – Floodplain, which is simulated at a constant 30.9 mg/L. Groundwater concentrations increase above 30.9 mg/L in the latter portion of the simulation due to riparian ET. The increase in effluent discharge in Scenario 2 (versus Scenario 1) serves to stabilize concentrations closer to 30.9 mg/L, while concentrations in Scenario 1 increase slightly higher.

Effect of Recycled Water Projects

- There is a small impact (+1.3 mg/L) from recycled water projects, which is attributable to decreased effluent discharges projected for the VVWRA Regional WWTP and associated impacts including reduction in subsurface outflows.
- Effluent discharge from VVWRA's regional WWTP is the dominant loading factor in the subregion, the nitrate-NO_3 concentration for which is simulated at a constant 30.9 mg/L. Because average subregional groundwater nitrate-NO_3 concentrations range from 3.4 to 37 mg/L through the 70-year future simulation (and are above 30.9 mg/L at the end of the simulation), a decrease in WWTP effluent in Scenario 3 relative to Scenario 2 results in 1) slight improvement in nitrate concentrations (relative to Scenario 2) prior to concentrations reaching 30.9 mg/L, and 2) a slight impact or increase in nitrate concentrations (relative to Scenario 2) when groundwater concentrations exceed 31.0 mg/L. This effect is illustrated by the yellow and purple lines crossing in the time-concentration chart for nitrate on the previous page. Modeling results show that the effect of recycled water projects is small but measurable.

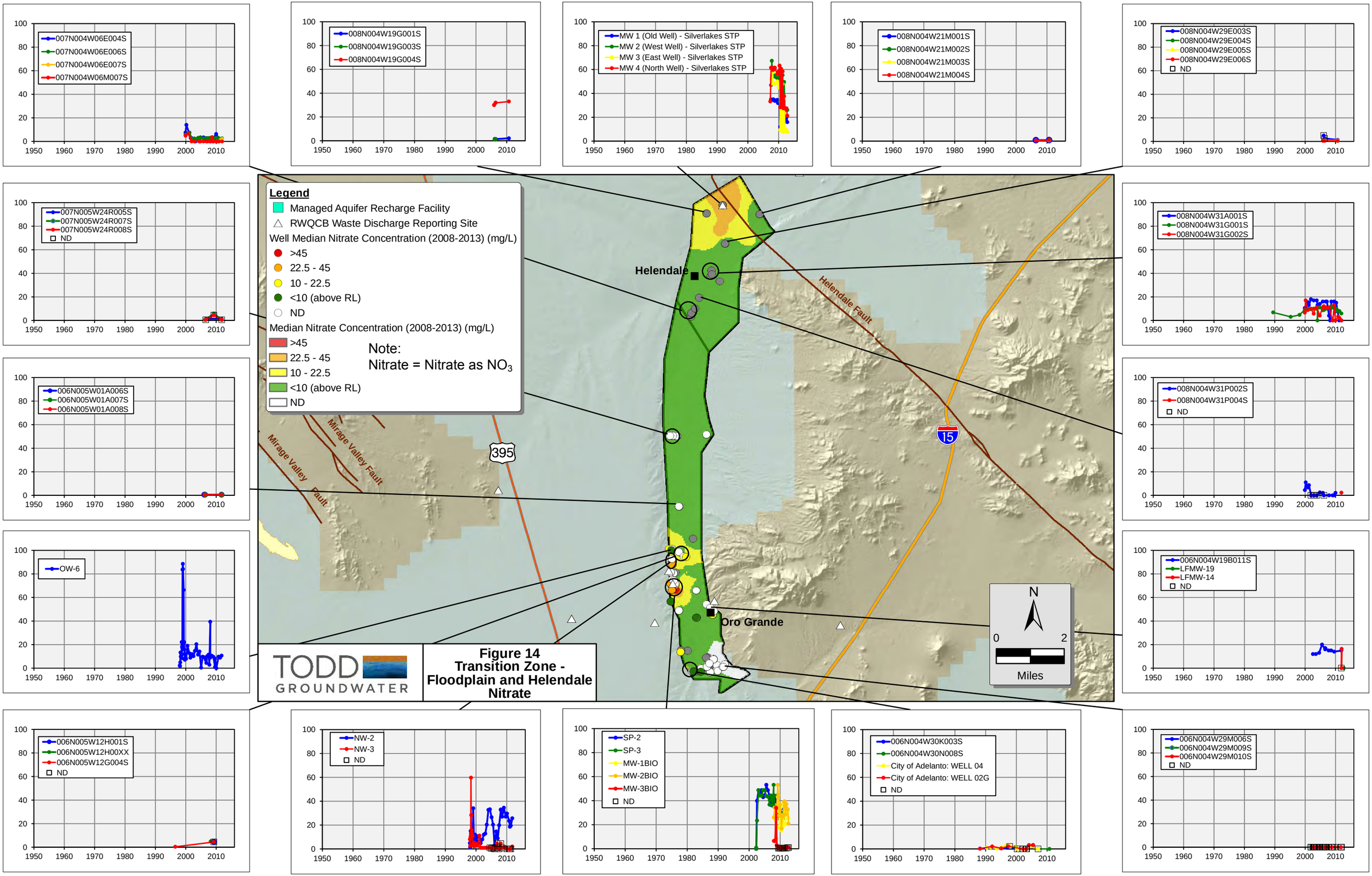
Conclusions:

- VVWRA regional treatment plant effluent is the dominant loading factor in the subregion. With respect to TDS, simulated concentration trends indicate that VVWRA regional treatment plant effluent improves groundwater TDS concentrations in the subregion. The current average TDS concentration of VVWRA effluent discharge (375 mg/L, based on the flow-weighted average 2012 concentration to effluent ponds and Mojave River discharge) is lower than the initial ambient groundwater TDS concentration (500 mg/L). Scenario 2 simulates the most effluent discharge, resulting in declining groundwater TDS concentrations relative to the 2012 base case (Scenario 1). With the subregional water reclamation plants projected to come online in 2017, less effluent discharge from the regional treatment plant is simulated in Scenario 3 compared to Scenario 2. Additionally, in Scenario 3, excess recycled water flows from the Victorville IWWTP (average TDS concentration of 763 mg/L) to VVWRA Pond 14 are projected to increase (with a net increase of 56 AFY from 2016 to 2020 and 482 AFY from 2021 to 2081). Together, these two factors cause groundwater TDS concentrations to increase in Scenario 3 relative to Scenario 2.
- With respect to nitrate, nitrate-NO_3 concentrations in the subregion increase in all three scenarios, reaching the range of 33 to 38 mg/L. Concentrations fluctuate as a response to intermittent stream recharge. Effluent discharge from VVWRA's regional WWTP is the dominant loading factor in the subregion, the nitrate-NO_3 concentration for which is simulated at a constant 30.9 mg/L in all three scenarios. The average subregional concentration in the latter portion of all three simulations is slightly higher than the VVWRA effluent concentration, because minor additional nitrate loading from septic tanks, irrigation return, and agriculture, combined with evapotranspiration by riparian vegetation (which removes only 3 mg/L of nitrate-NO_3) overrides the dilution effect of stream recharge. Modeling results show that the effect of recycled water projects is small but measurable.
- It is noted that no subsurface attenuation of WWTP effluent discharge is applied in the mixing model (either in the vadose zone or along groundwater flowpaths away from the effluent ponds); thus, simulated groundwater nitrate concentrations are highly conservative and should be interpreted as a worst-case scenario.



TODD GROUNDWATER

Figure 13
Transition Zone - Floodplain and Helendale TDS



TODD GROUNDWATER

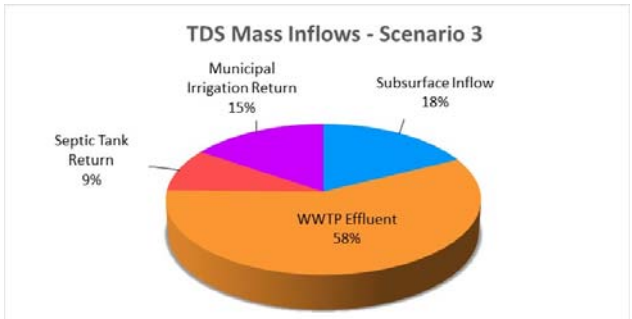
Figure 14
Transition Zone - Floodplain and Helendale Nitrate

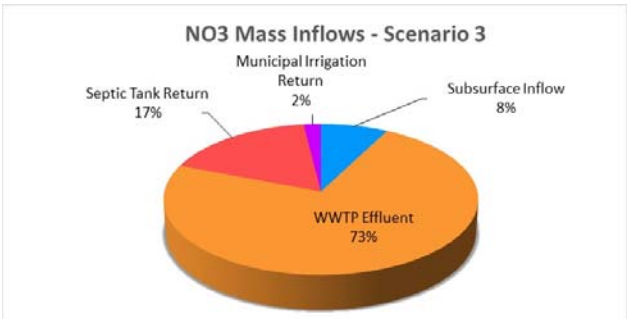
C8. Alto Transition Zone – Regional

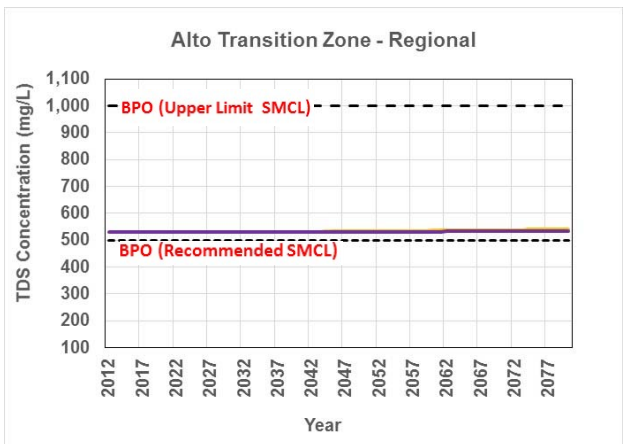
Scenario 3 Summary

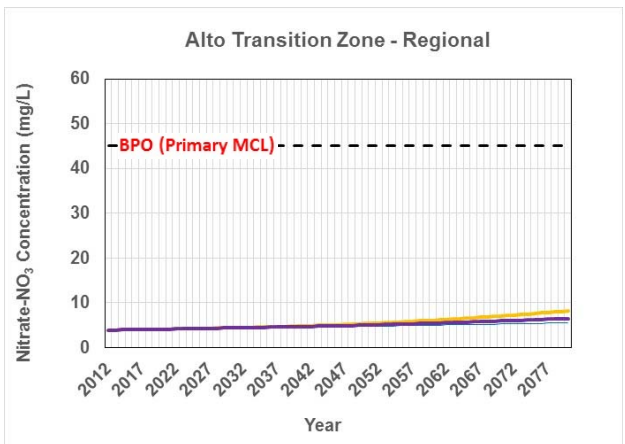
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Subsurface Inflow	1,493	22%	609	18%	12.1	8%
WWTP Effluent	4,706	68%	631	58%	36.7	73%
Septic Tank Return	387	6%	1,218	9%	105.3	17%
Municipal Irrigation Return	302	4%	2,656	16%	15.3	2%
Flow-Weighted Average Concentration of Total Inflows			748		34.3	
Initial (2012) Groundwater Concentration			529		3.9	
Simulated Final (2081) Groundwater Concentration			534		6.5	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Alto Transition Zone - Regional	TDS	529	537	8	540	11	3	534	5	-6
	Nitrate-NO_3	3.9	5.5	1.6	8.3	4.4	2.7	6.6	2.7	-1.7

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

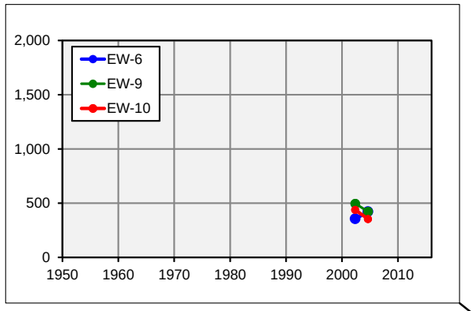
- Key loading factors are WWTP effluent (58%), subsurface inflow (18%), and municipal irrigation return flow (15%).
- Projected future groundwater concentration change is from 529 to 534 mg/L (+5 mg/L).
- Impact of population growth on groundwater concentration is minimal (+3 mg/L).
- There is a small impact (benefit) of -6 mg/L from recycled water projects in other upgradient subregions.

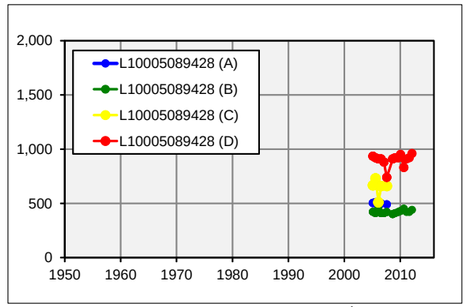
Nitrate-NO_3:

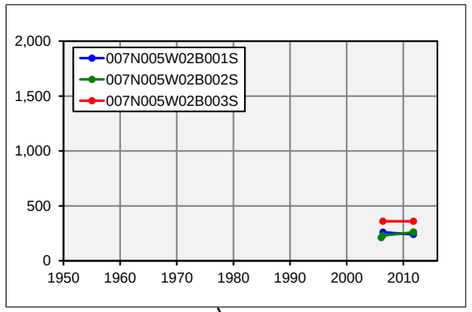
- Key loading factors are WWTP effluent (73%) and septic tank return (17%).
- Projected future groundwater concentration change is from 3.9 to 6.5 mg/L (+2.7 mg/L).
- Impact of population growth on groundwater concentration is +2.7 mg/L.
- There is a small impact (benefit) of -1.7 mg/L from recycled water projects in other upgradient subregions.

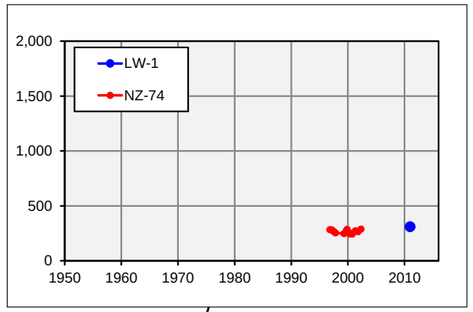
Conclusions:

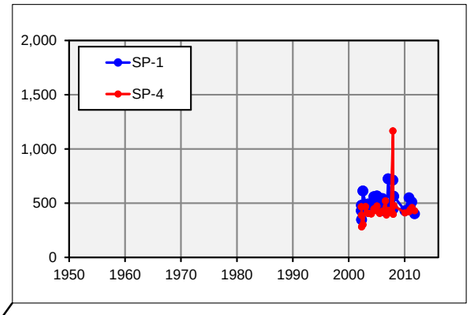
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (1,000 mg/L for TDS).
- Simulated future groundwater TDS concentration increases are a function of population growth and not recycled water projects.

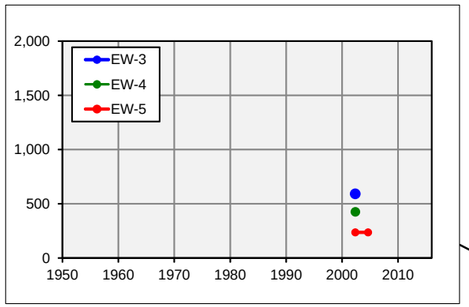


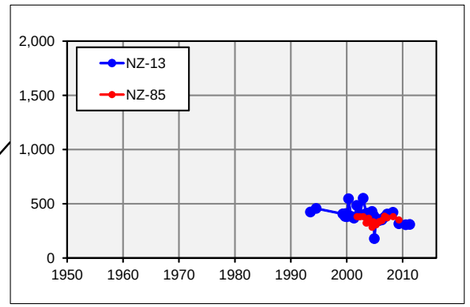


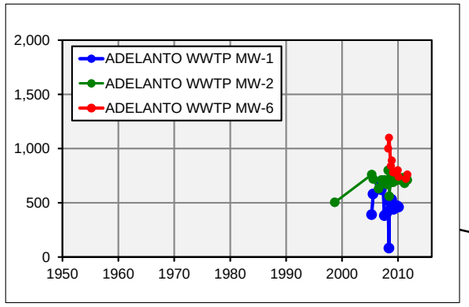


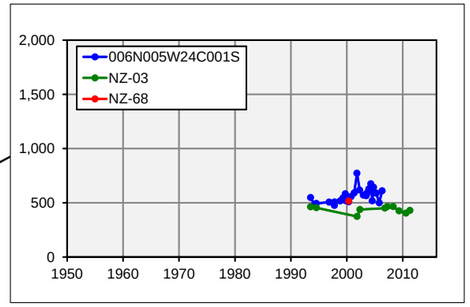


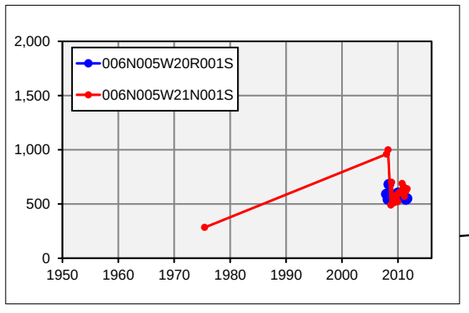


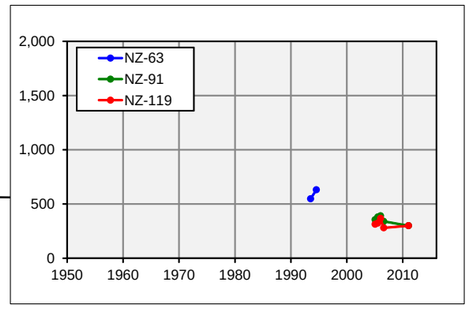


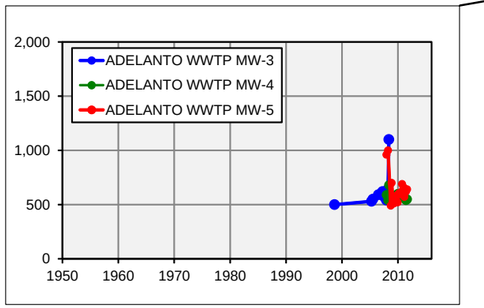


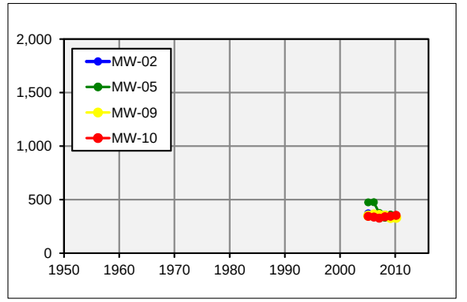


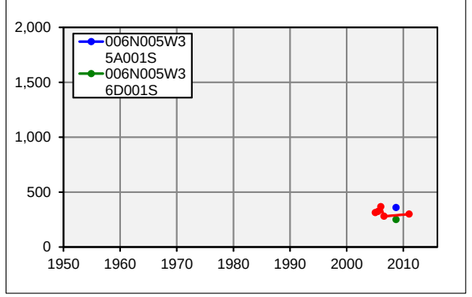


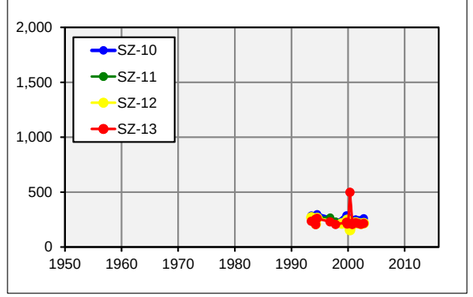


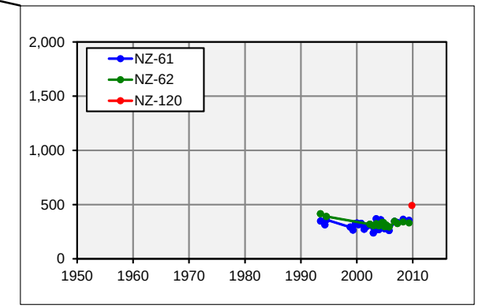


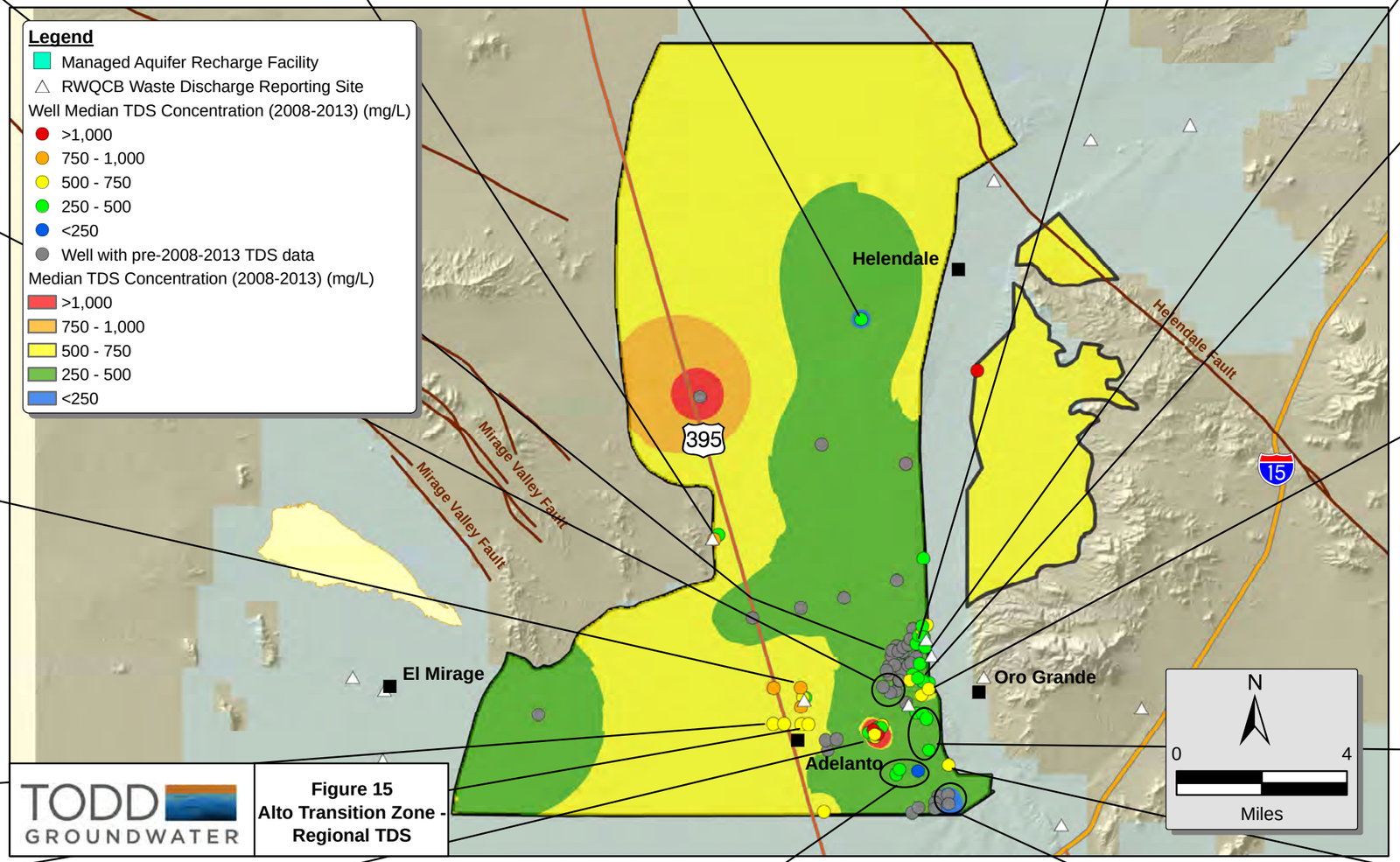






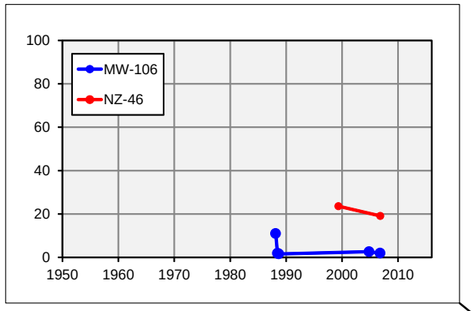


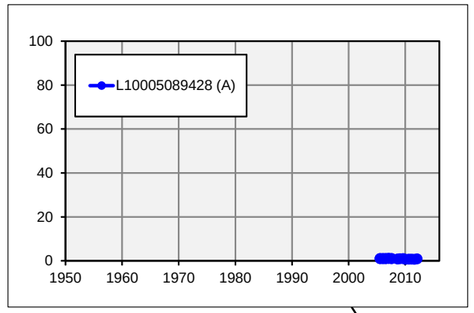


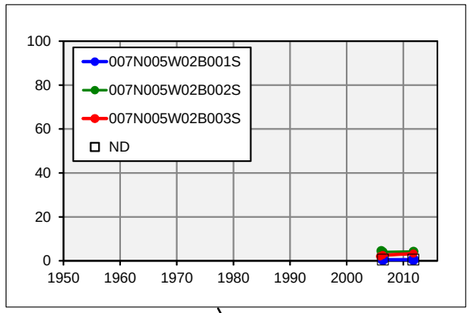


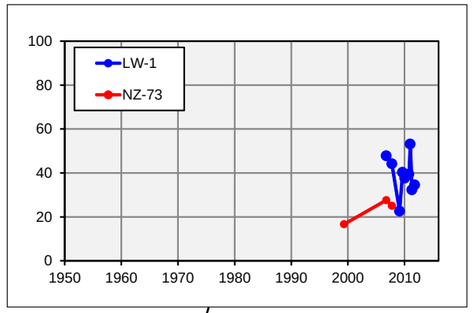
TODD GROUNDWATER

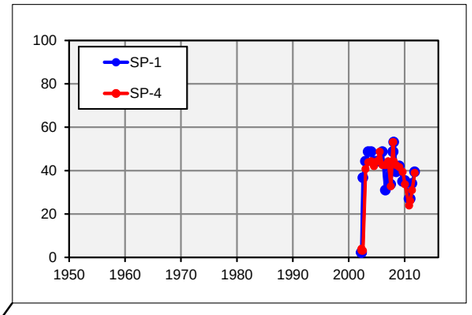
Figure 15
Alto Transition Zone - Regional TDS

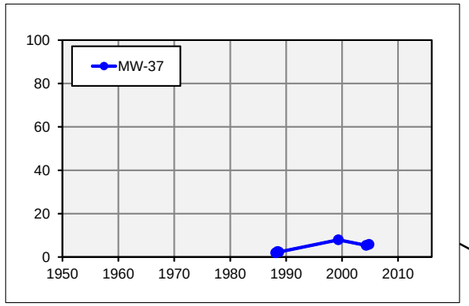


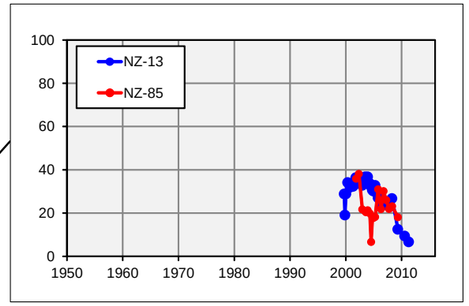


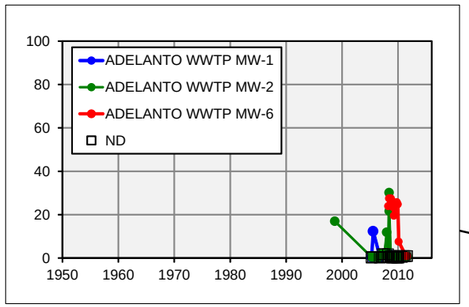


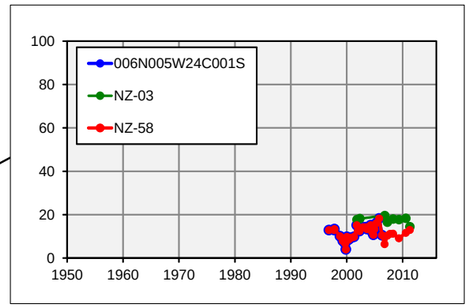


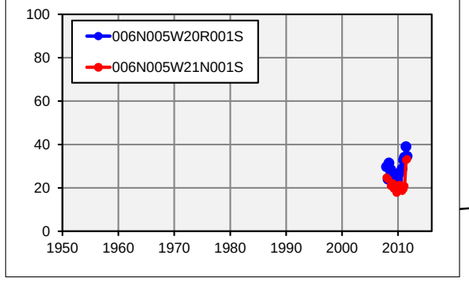


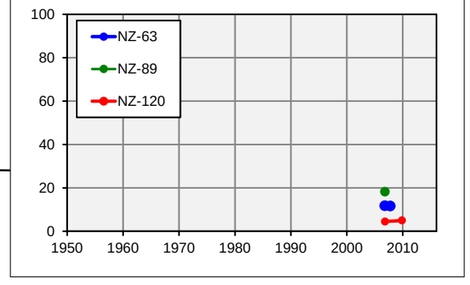


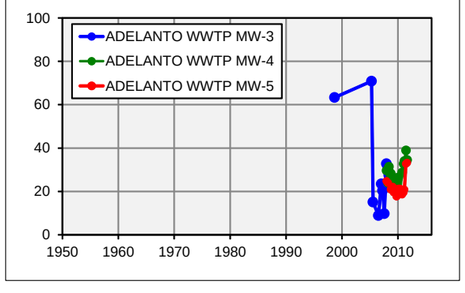


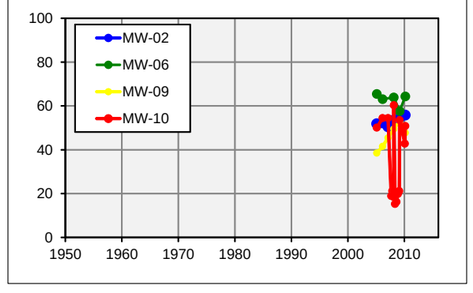


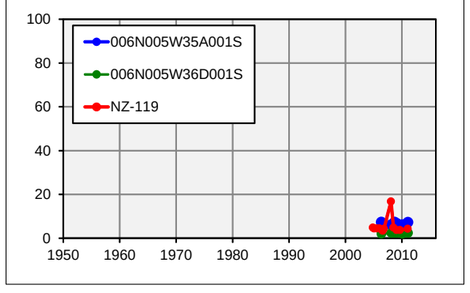


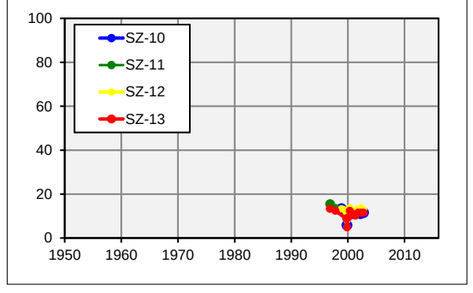


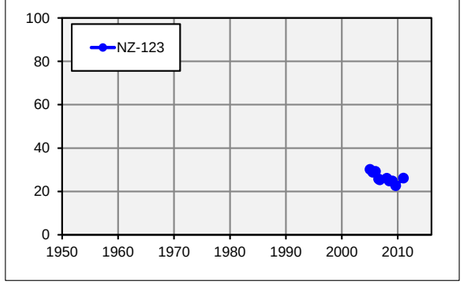


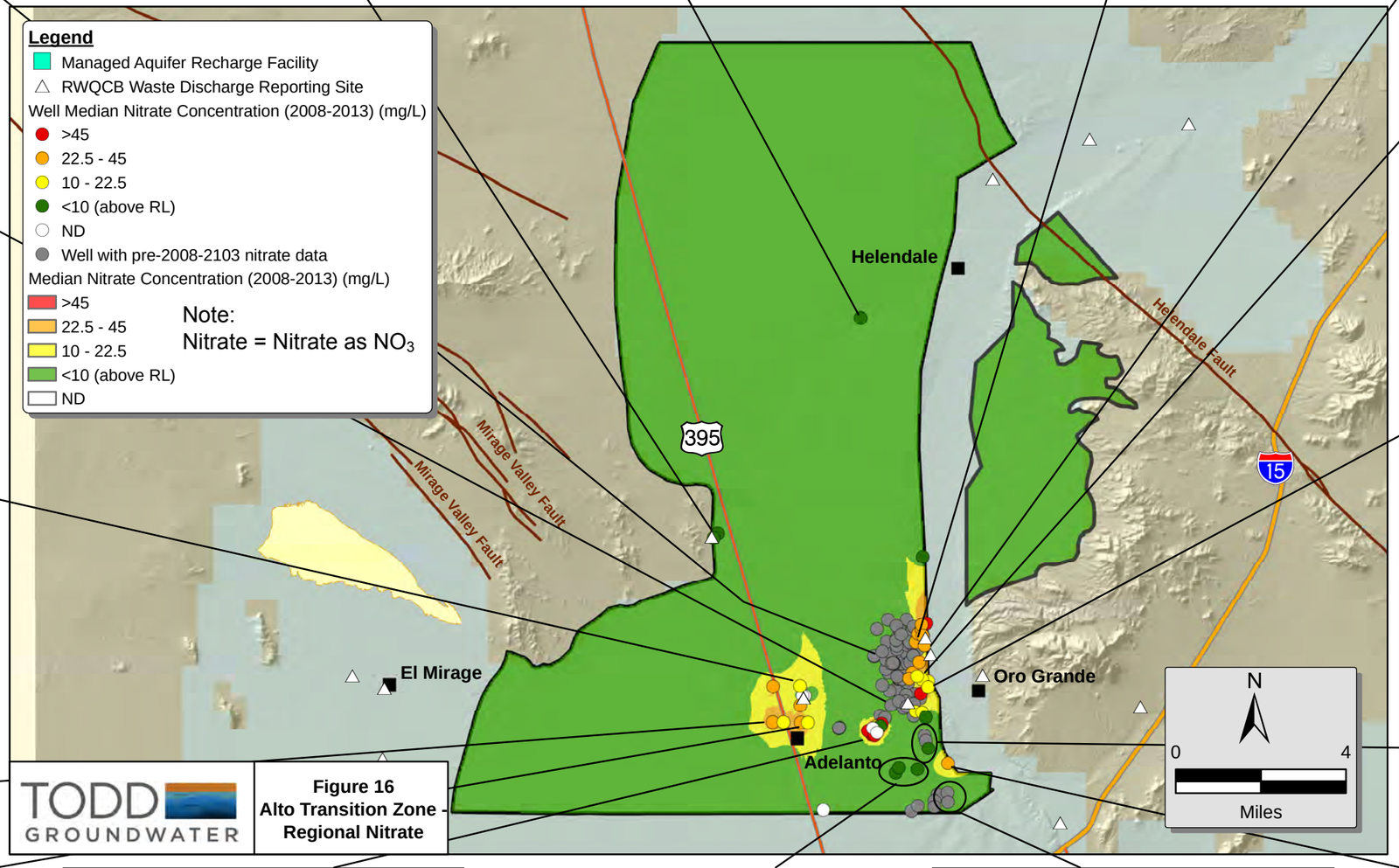












TODD GROUNDWATER

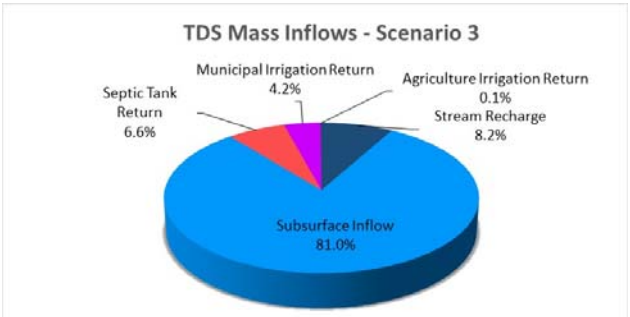
Figure 16
Alto Transition Zone - Regional Nitrate

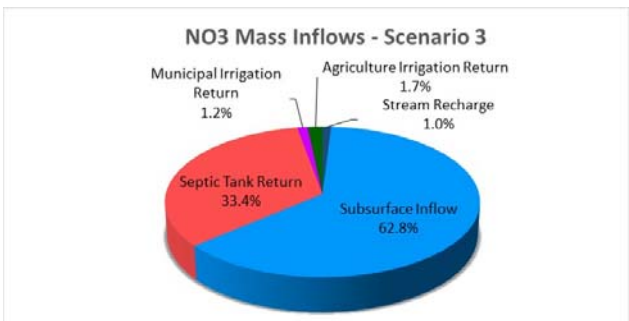
C9. Alto – Floodplain (Narrows)

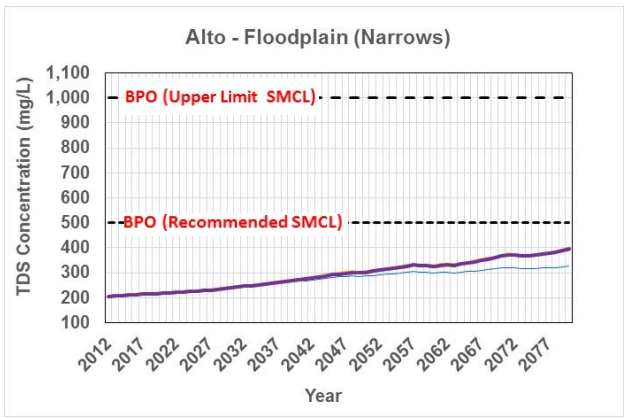
Scenario 3 Summary

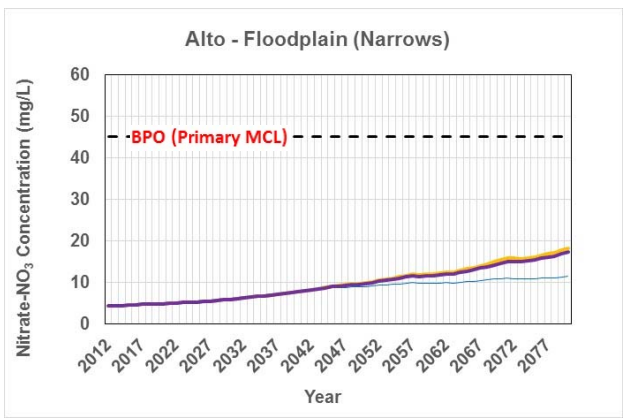
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Stream Recharge	1,922	21%	110	8%	0.6	1%
Subsurface Inflow	6,894	76%	305	81%	10.7	63%
Septic Tank Return	218	2%	787	7%	180.7	33%
Municipal Irrigation Return	70	1%	1,547	4%	19.7	1%
Agriculture Irrigation Return	1	0.01%	1,456	0.1%	1,642.4	2%
Flow-Weighted Average Concentration of Total Inflows			285		12.9	
Initial (2012) Groundwater Concentration			205		4.3	
Simulated Final (2081) Groundwater Concentration			395		17.3	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Alto - Floodplain (Narrows)	TDS	205	326	121	394	189	68	395	190	2
	Nitrate-NO_3	4.3	10.1	5.8	18.3	14.0	8.2	17.3	13.0	-1.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

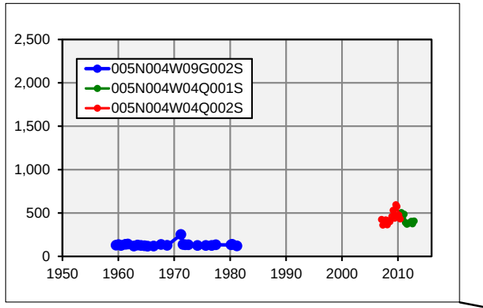
- Key loading factor is subsurface inflow (81%).
- Projected future groundwater concentration change is from 205 to 395 mg/L (+190 mg/L). Final groundwater concentration exceeds flow-weighted average concentration of total inflows due to significant concentrating effect of evapotranspiration by riparian vegetation in the subregion
- Impact of population growth on groundwater concentration is +68 mg/L.
- There is negligible indirect impact (+2 mg/L) from recycled water projects in other upgradient subregions.

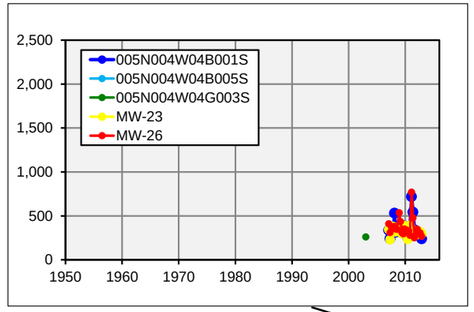
Nitrate-NO_3:

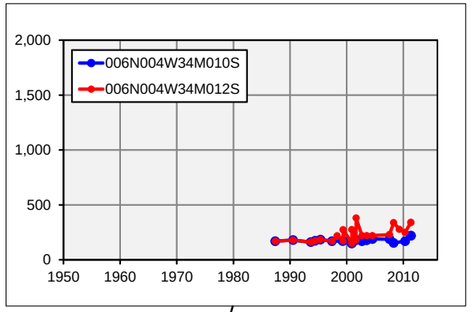
- Key loading factor is subsurface inflow (63%) and septic return (33%).
- Projected future groundwater concentration change is from 4.3 to 17.3 mg/L (+13.0 mg/L). Final concentration exceeds flow-weighted average concentration of total inflows due to the concentrating effect of riparian evapotranspiration in the subregion.
- Impact of population growth on groundwater concentration is +8.2 mg/L.
- There is a small indirect impact (benefit) (-1.0 mg/L) from recycled water projects.

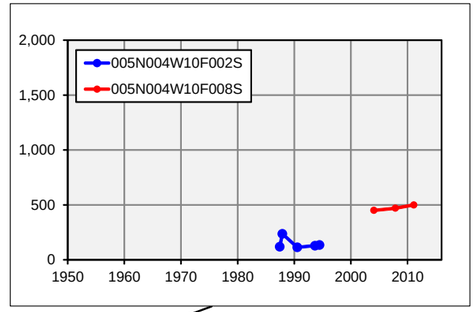
Conclusions:

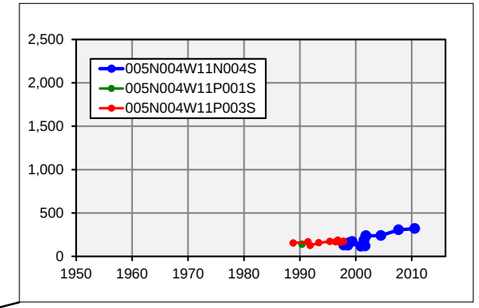
- The subregion is relatively passive, with subsurface inflows and stream recharge accounting for 98% of total inflows.
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- Simulated future groundwater TDS and nitrate concentration increases are associated with population growth and not recycled water projects.

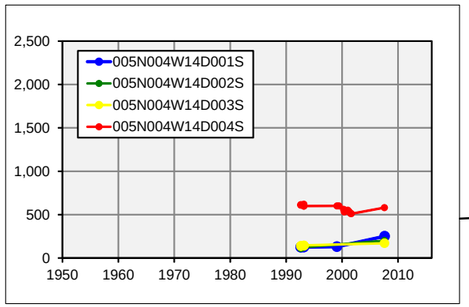


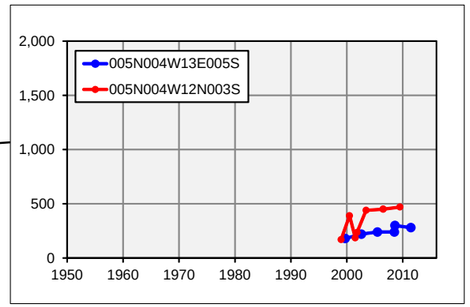


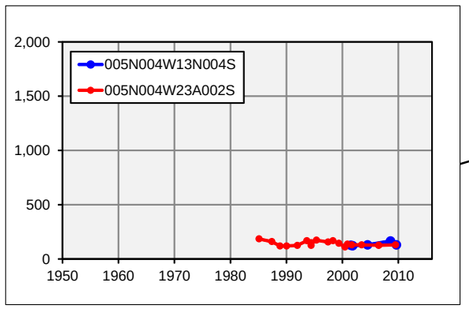


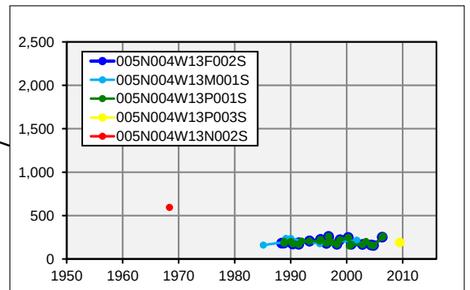


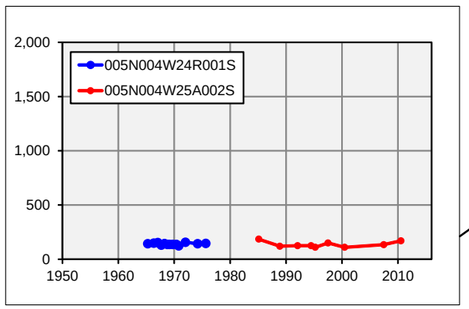


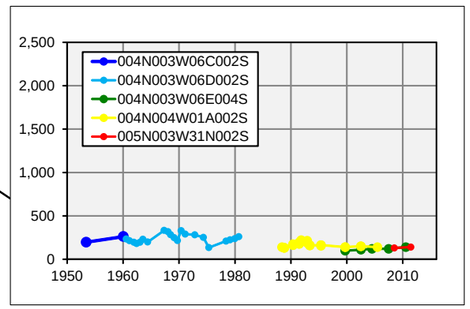


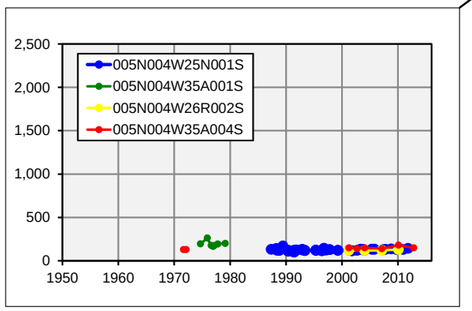


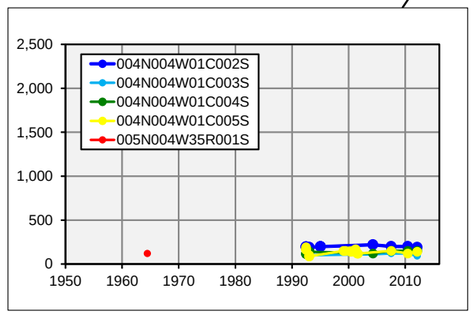


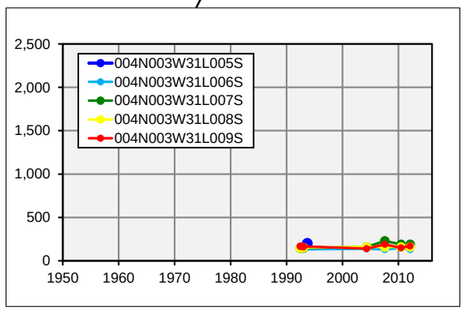


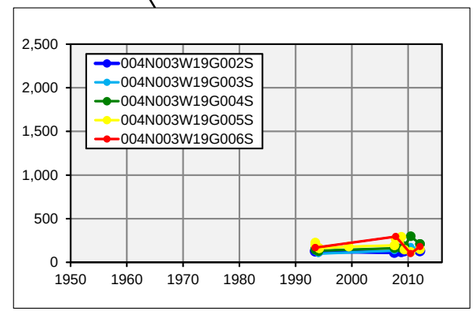


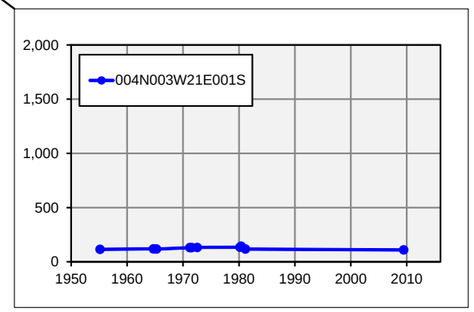


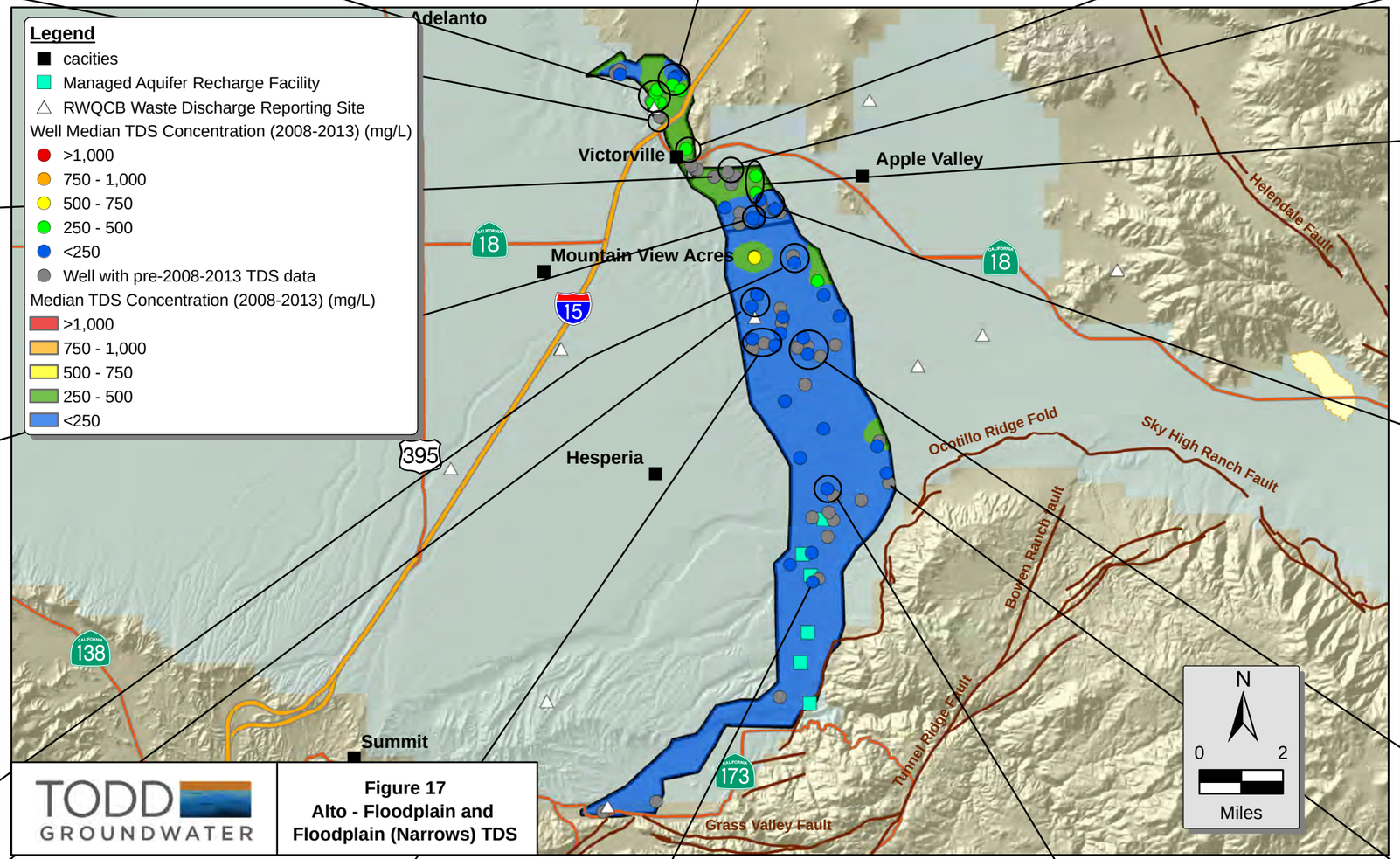






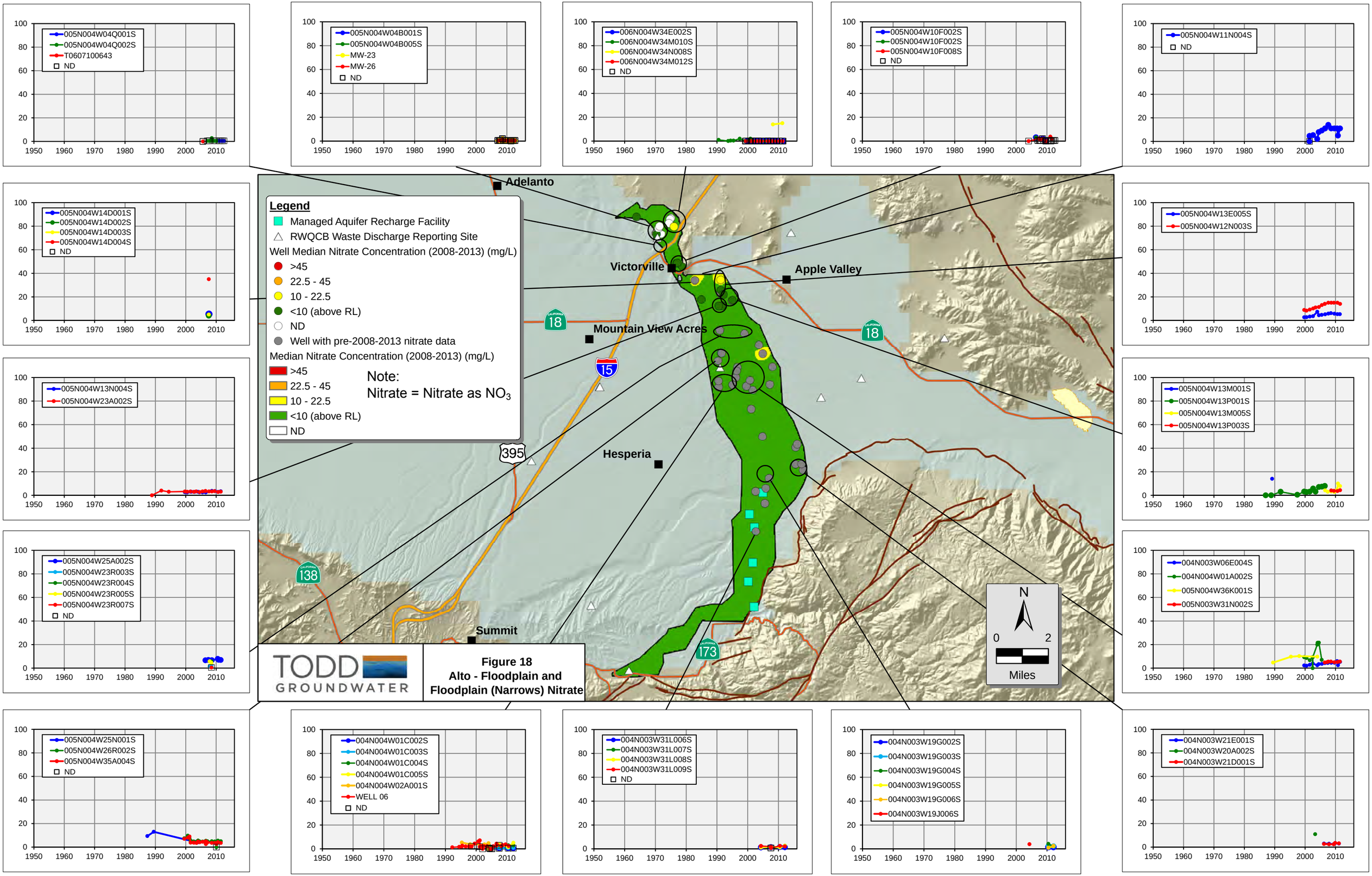






TODD GROUNDWATER

Figure 17
Alto - Floodplain and Floodplain (Narrows) TDS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WELL 06
ND
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004N003W31L008S
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ND
004N003W19G002S
004N003W19G003S
004N003W19G004S
004N003W19G005S
004N003W19G006S
004N003W19J006S
004N003W21E001S
004N003W20A002S
004N003W21D001S
Legend
Managed Aquifer Recharge Facility
RWQCB Waste Discharge Reporting Site
Well Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Well with pre-2008-2013 nitrate data
Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Note:
Nitrate = Nitrate as NO3
Adelanto
Victorville
Apple Valley
Mountain View Acres
Hesperia
Summit
18
15
395
138
173
N
0
2
Miles
TODD GROUNDWATER
Figure 18
Alto - Floodplain and
Floodplain (Narrows) Nitrate

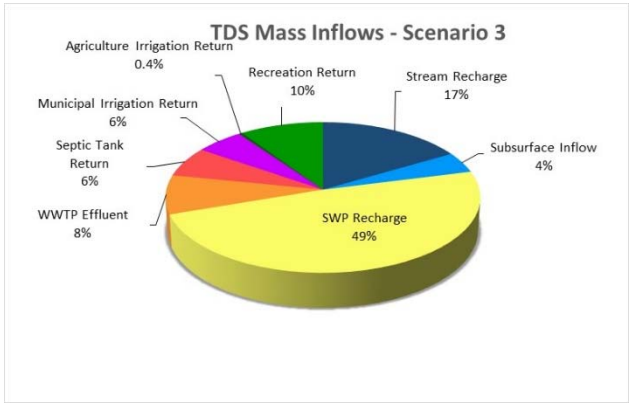
C10. Alto – Floodplain

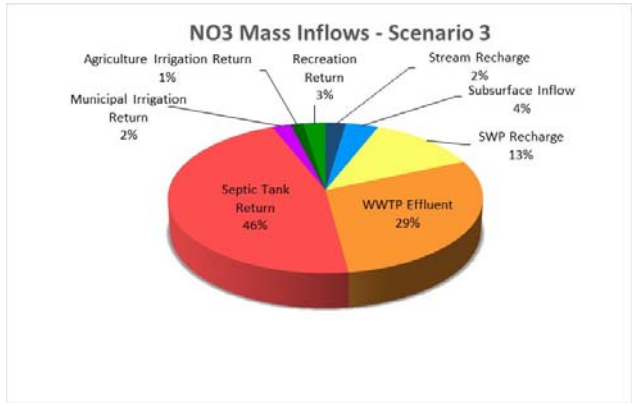
Scenario 3 Summary

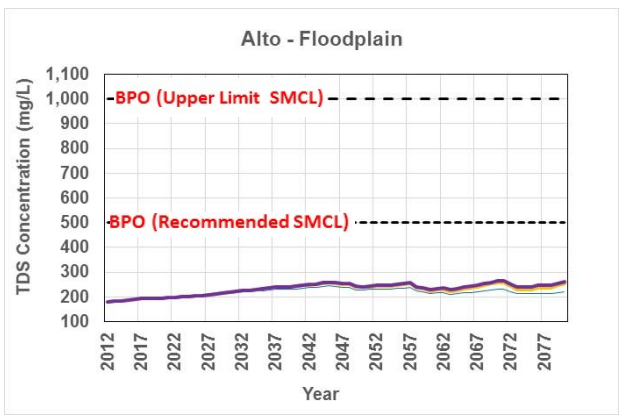
Inflow	Average Annual Rate (AFY)	Average Annual Rate (% of Total)	TDS Concentration (mg/L)	TDS Mass Loading (%)	Nitrate-NO_3 Concentration (mg/L)	Nitrate-NO_3 Mass Loading (%)
Stream Recharge	24,134	38%	110	17%	0.6	2%
Subsurface Inflow	932	1%	764	4%	24.9	4%
SWP Recharge	31,233	49%	250	49%	2.5	12%
WWTP Effluent	3,668	6%	366	8%	50.0	29%
Septic Tank Return	1,612	3%	639	6%	178.5	46%
Municipal Irrigation Return	750	1%	1,178	6%	17.8	2%
Agriculture Irrigation Return	57	0.1%	1,160	0.4%	157.0	1%
Recreation Return	1,964	3.1%	773	9%	8.0	3%
Flow-Weighted Average Concentration of Total Inflows			249		9.7	
Flow-Weighted Average Concentration of Total Inflows (with no SWP Recharge)[a]			248		16.5	
Initial (2012) Groundwater Concentration			177		3.3	
Simulated Final (2081) Groundwater Concentration			262		10.7	

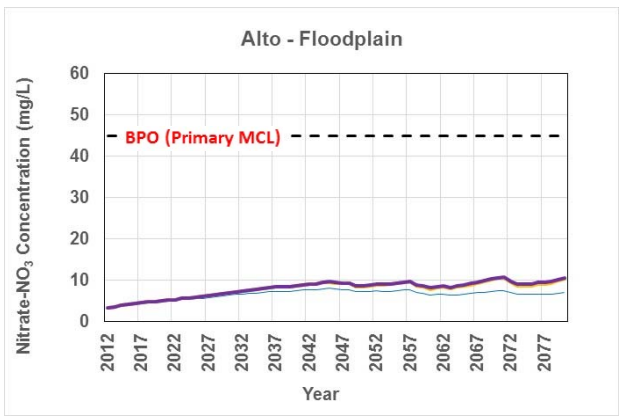
Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
(a) Concentration assumes other flows and concentrations remain the same

Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L) (a)	Scenario 1 (Baseline): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (b)	Scenario 1 (Baseline): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (b - a)	Scenario 2 (Growth with No Recycled Water Projects): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (c)	Scenario 2 (Growth with No Recycled Water Projects): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (c - a)	Scenario 2 (Growth with No Recycled Water Projects): Effect of Projected Growth (mg/L) (c - b)	Scenario 3 (Growth with Recycled Water Projects): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (d)	Scenario 3 (Growth with Recycled Water Projects): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (d - a)	Scenario 3 (Growth with Recycled Water Projects): Effect of Recycled Water Projects (mg/L) (d - c)
Alto - Floodplain	TDS	177	220	43	254	77	34	262	85	8
	Nitrate-NO_3	3.3	6.9	3.6	10.5	7.2	3.5	10.7	7.4	0.3

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

- Key loading factor is SWP recharge (49%).
- Projected future groundwater concentration change is from 177 to 262 mg/L (+85 mg/L). Final simulated groundwater concentrations exceed the average concentration of total inflows due to concentrating effect of riparian evapotranspiration.
- Impact of population growth on groundwater concentration is +34 mg/L.
- There is a minor indirect impact (+8 mg/L) from recycled water projects in neighboring subregions due to slight increases in subsurface inflow which has an average TDS concentration above 700 mg/L.
- The flow-weighted average concentration of total inflows with SWP water recharge (249 mg/L) and without SWP recharge (248 mg/L) is nearly identical, indicating that SWP generally stabilizes TDS concentrations in the subregion over time (assuming fixed flows and concentrations for other inflows - see additional discussion in conclusions).

Nitrate-NO_3:

- Key loading factor is septic tank return (46%) and [imported Lake Arrowhead CSD and Crestline CSD] WWTP effluent (29%).
- Projected future groundwater concentration change is from 3.3 to 10.7 mg/L (+7.4 mg/L). Final groundwater concentration exceeds flow-weighted average concentration of total inflows due to concentrating effect of evapotranspiration in the subregion.
- Impact of population growth on groundwater concentration is +3.5 mg/L.
- There is a minor indirect impact from recycled water projects in neighboring subregions (+0.3 mg/L) due to a small increase in subsurface inflows, which have an average nitrate-NO_3 concentration above 20 mg/L.
- The flow-weighted average concentration of total inflows with SWP recharge (9.7 mg/L) is lower than without SWP recharge (16.5 mg/L), indicating that SWP improves nitrate-NO_3 concentrations in the subregion.

Conclusions:

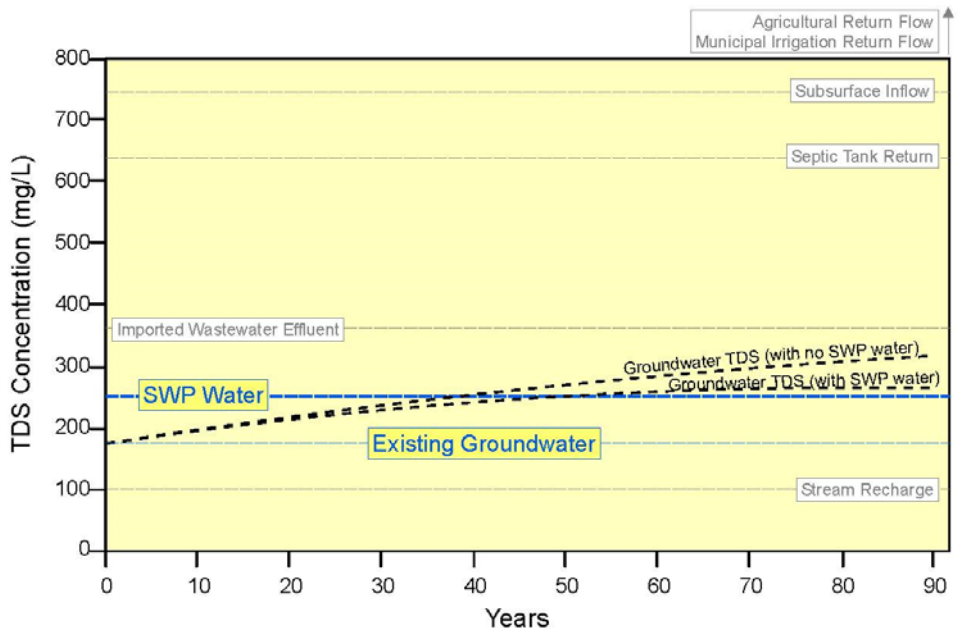
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- Simulated future groundwater TDS and nitrate concentration increases are associated with population growth.
- Based on comparison of the average concentration of total inflows, imported SWP water stabilizes groundwater TDS concentrations and lowers groundwater nitrate concentrations in the Alto – Floodplain subregion. However, this conclusion does not consider other related benefits from imported SWP water, including 1) reduction in pumping and associated loading from return flows, and 2) increased S/N loading buffering capacity and reduction in high-TDS subsurface inflows due to increased storage volume from SWP water recharge. Consideration of these factors suggests that imported SWP water recharge benefits groundwater quality for both TDS and nitrate.

Evaluation of Imported SWP Water Impacts (Benefits) on Groundwater TDS and Nitrate Concentrations

The synopses for Alto - Floodplain and other subregions projected to receive SWP water for recharge in the Mojave SNMP Study Area clearly demonstrate that SWP water improves future groundwater TDS and nitrate concentrations in subregions that 1) have better groundwater quality (i.e., subregions with lower existing groundwater TDS and nitrate concentrations compared to SWP water) and 2) worse average groundwater quality (i.e., subregions with higher existing groundwater TDS and nitrate concentrations compared to SWP water).

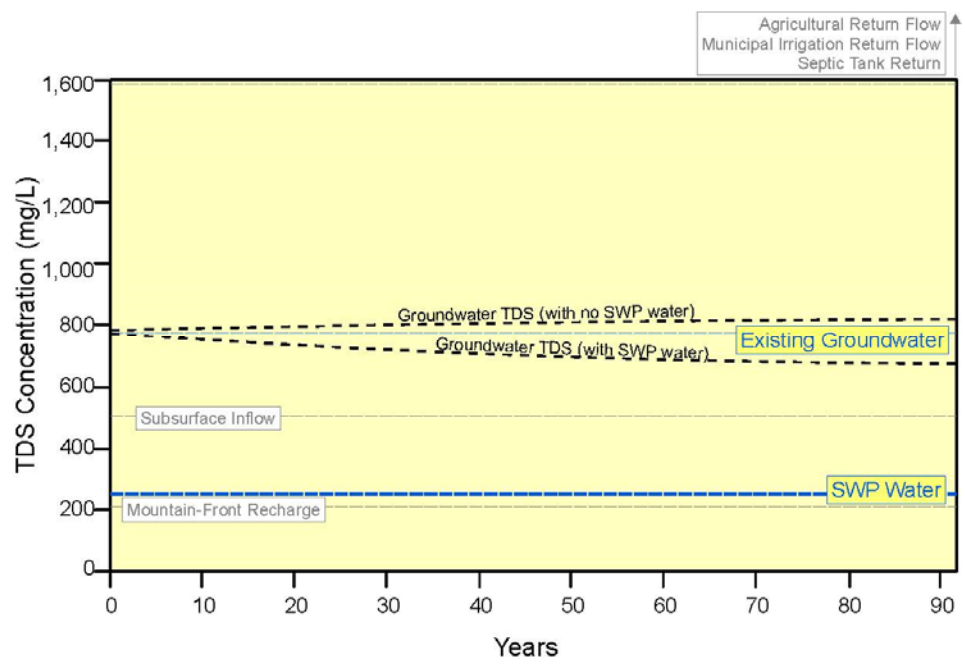
To illustrate the effect of imported SWP water on groundwater quality, two charts are shown below. In each chart, TDS concentrations of various inflows are shown along with the projected groundwater concentration trend with and without SWP water. For Scenario A, (flow-weighted) average TDS concentrations from the Alto - Floodplain Scenario 3 simulation are shown. For Scenario B, (flow-weighted) average TDS concentrations from the Oeste – Regional Scenario 3 simulation are shown.

Conceptual Benefit of Imported SWP Water Recharge on Groundwater Quality in Subregion with Better Groundwater Quality Example: Alto – Floodplain (TDS)

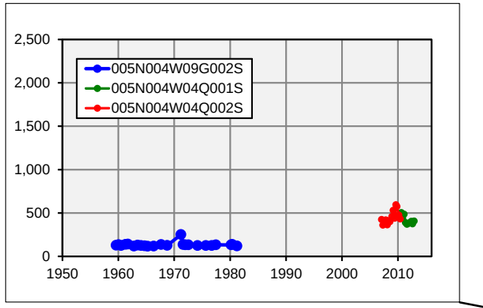


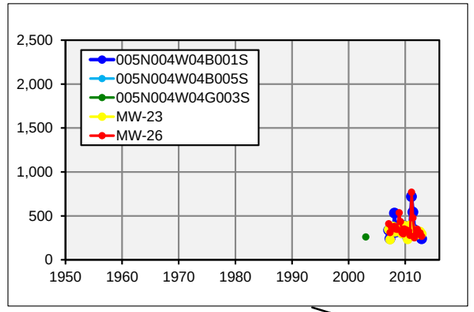
In Alto – Floodplain, where the average imported SWP water TDS concentration of 250 mg/L is higher than the existing groundwater TDS concentration (177 mg/L), future groundwater TDS concentrations are expected to increase towards the flow-weighted average concentration of total inflows (249 mg/L). Future TDS concentrations in Alto- Floodplain increase slightly above SWP water concentrations (due to the effect of evapotranspiration in the subregion). Without SWP water, the flow-weighted average TDS concentration of total inflows (based on fixed rate for other inflows) does not change significantly (248 mg/L). However, subregional groundwater concentrations are expected to increase more quickly, because groundwater storage would decline in the subregion (reducing the capacity of the subregion to buffer against loading from annual inflows) and, in turn, subsurface inflows from neighboring subregions (which have average TDS concentrations above 700 mg/L) would increase.

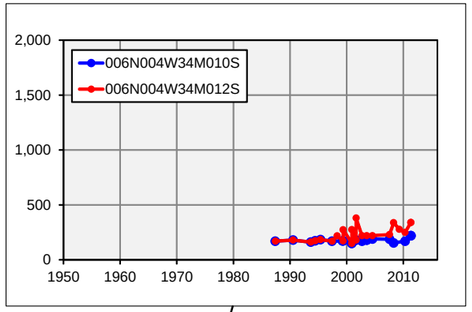
Conceptual Benefit of Imported SWP Water Recharge on Groundwater Quality in Subregion with Poorer Groundwater Quality Example: Oeste – Regional (TDS)

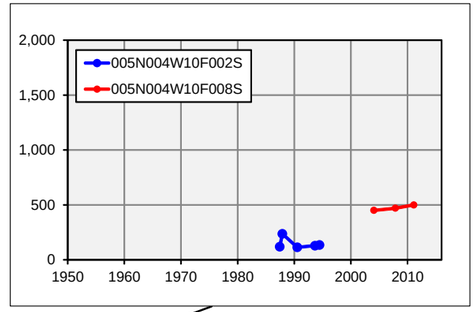


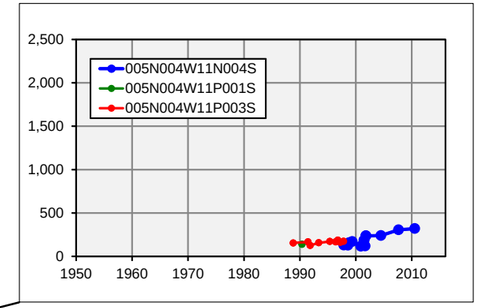
With the exception of Alto – Floodplain, the average imported SWP water TDS concentration of 250 mg/L is lower than the existing groundwater TDS concentration in all other subregions projected to receive SWP water recharge. In Oeste - Regional, the existing groundwater TDS concentration is (781 mg/L), and future groundwater TDS concentrations are expected to decrease towards the flow-weighted average concentration of total inflows (583 mg/L). Without SWP water, the flow-weighted average TDS concentration of total inflows (based on fixed rate for other inflows) increases significantly (to 868 mg/L). Thus, without SWP water, subregional groundwater concentrations are expected to actually increase over time.

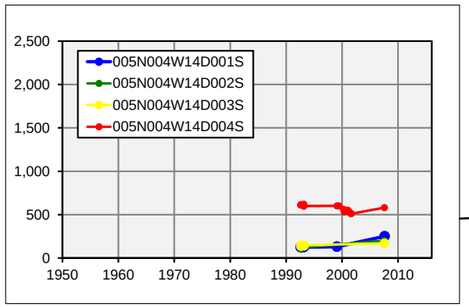


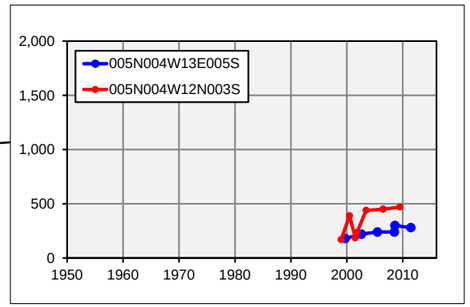


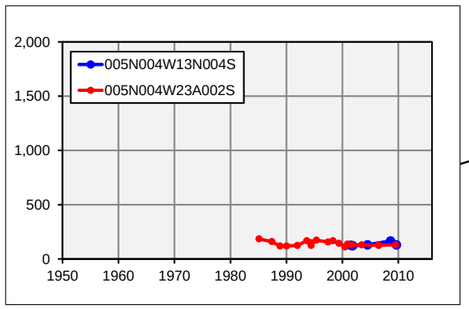


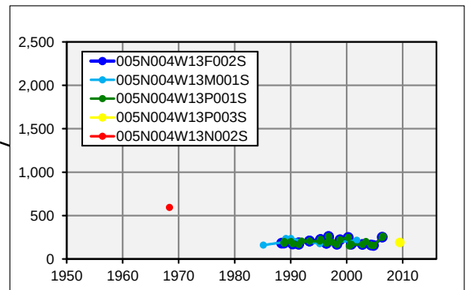


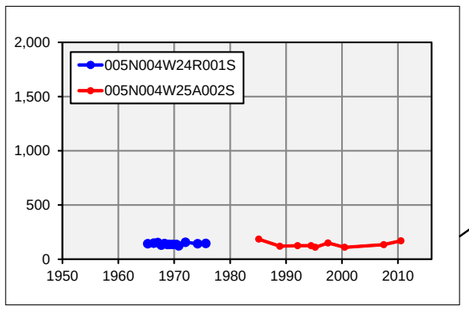


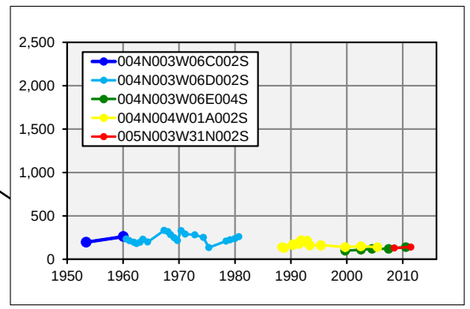


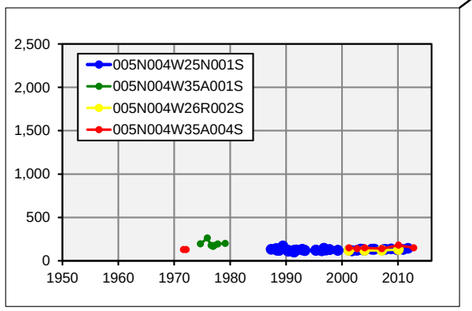


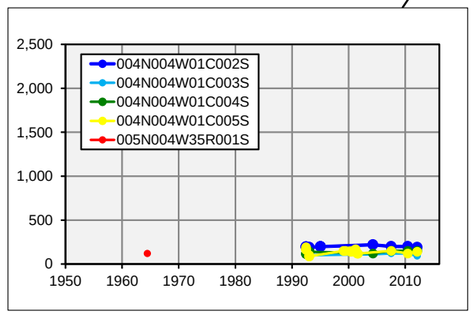


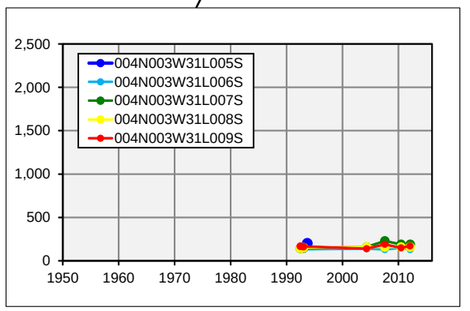


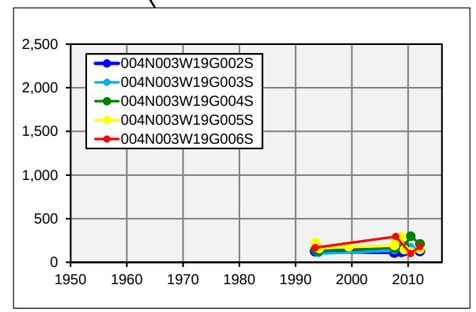


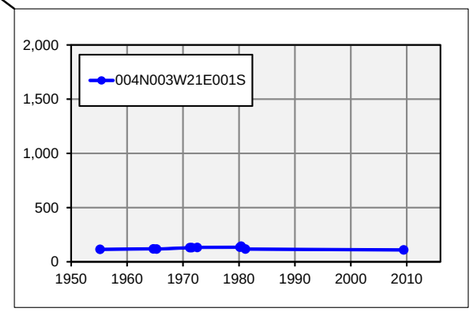


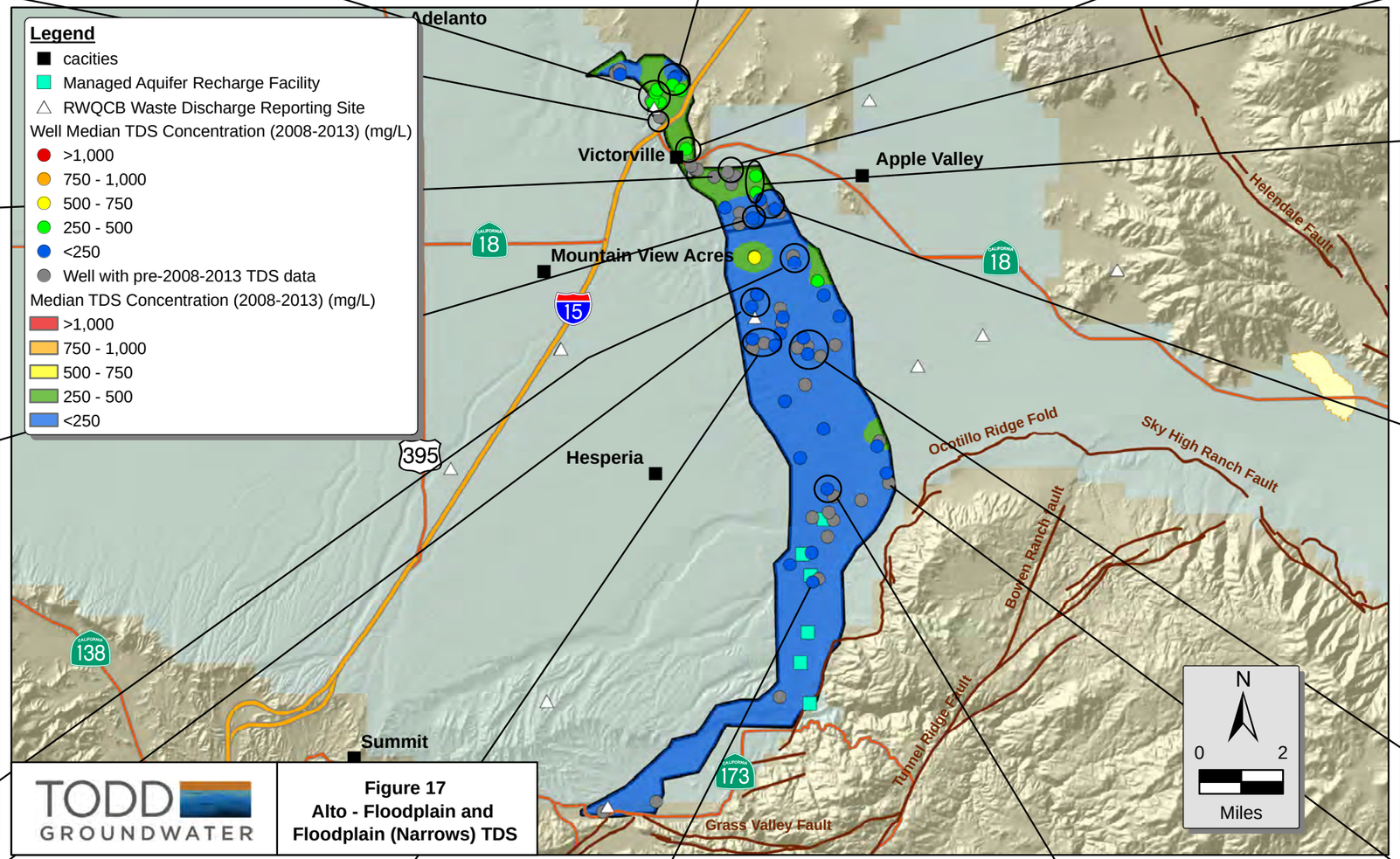






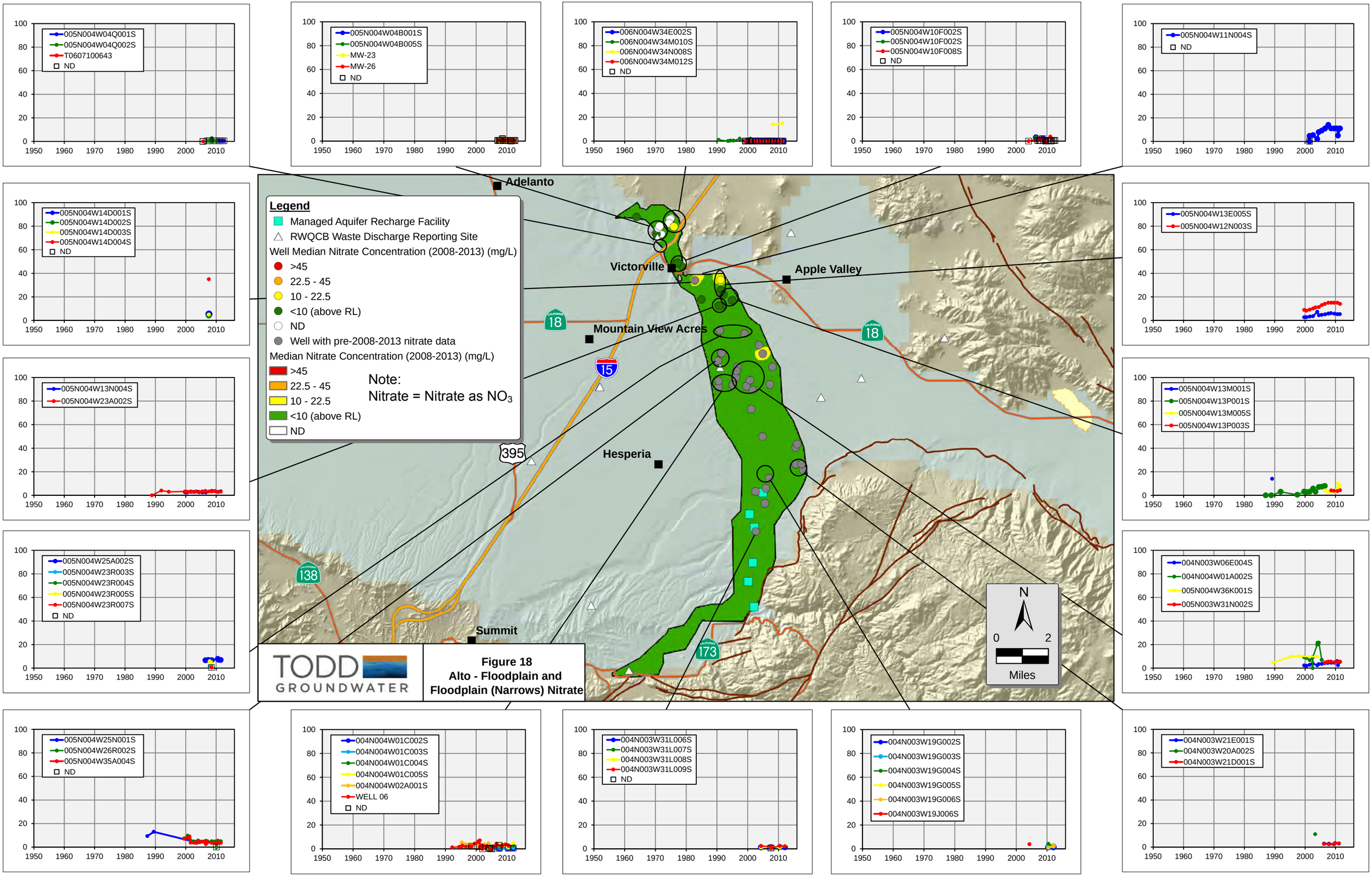






TODD GROUNDWATER

Figure 17
Alto - Floodplain and Floodplain (Narrows) TDS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MW-23
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006N004W34M010S
006N004W34N008S
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ND
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ND
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005N004W12N003S
005N004W13N004S
005N004W23A002S
005N004W13M001S
005N004W13P001S
005N004W13M005S
005N004W13P003S
005N004W25A002S
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004N004W02A001S
WELL 06
ND
004N003W31L006S
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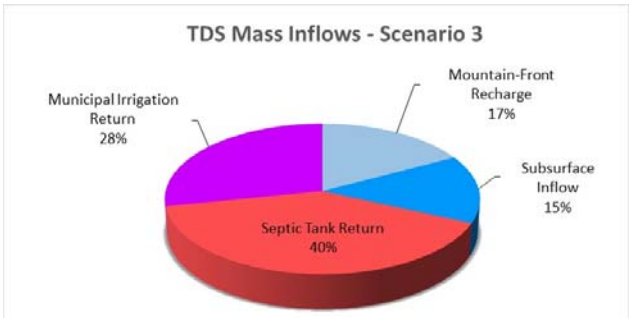
004N003W31L008S
004N003W31L009S
ND
004N003W19G002S
004N003W19G003S
004N003W19G004S
004N003W19G005S
004N003W19G006S
004N003W19J006S
004N003W21E001S
004N003W20A002S
004N003W21D001S
Legend
Managed Aquifer Recharge Facility
RWQCB Waste Discharge Reporting Site
Well Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Well with pre-2008-2013 nitrate data
Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Note:
Nitrate = Nitrate as NO3
Adelanto
Victorville
Apple Valley
Mountain View Acres
Hesperia
Summit
18
15
395
138
173
N
0
2
Miles
TODD GROUNDWATER
Figure 18
Alto - Floodplain and
Floodplain (Narrows) Nitrate

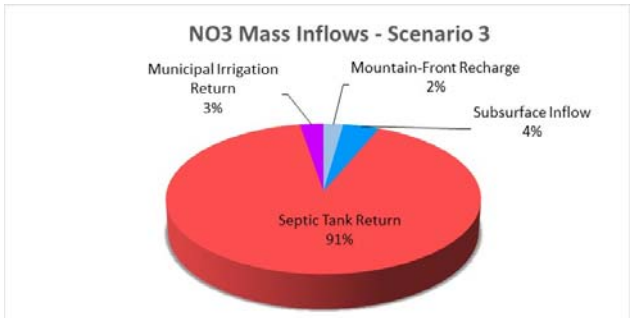
C11. Alto – Left Regional

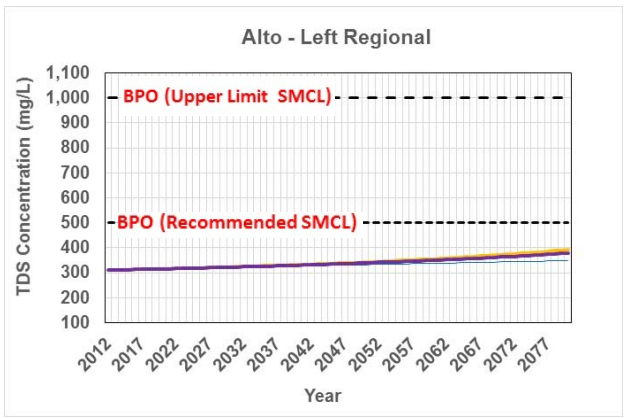
Scenario 3 Summary

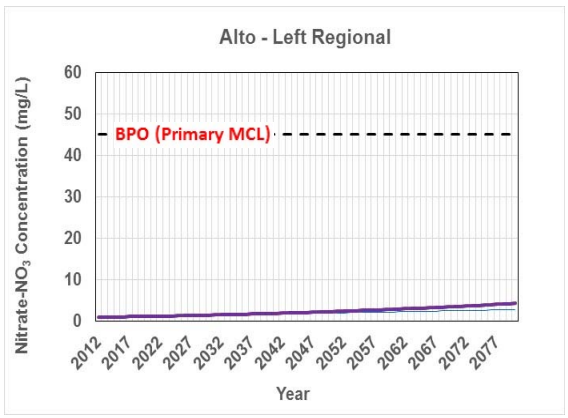
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	3,626	50%	210	17%	0.6	2%
Subsurface Inflow	869	12%	744	15%	4.6	4%
Septic Tank Return	2,072	28%	856	40%	42.5	91%
Municipal Irrigation Return	726	10%	1,708	28%	3.4	3%
Flow-Weighted Average Concentration of Total Inflows			606		13.3	
Initial (2012) Groundwater Concentration			310		0.9	
Simulated Final (2081) Groundwater Concentration			378		4.2	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Alto - Left Regional	TDS	310	348	38	392	82	44	378	68	-14
	Nitrate-NO_3	0.9	2.8	1.9	4.2	3.3	1.5	4.2	3.3	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

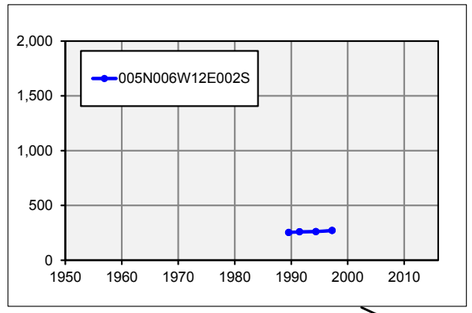
- Key loading factors are septic tank return (40%) and municipal irrigation return (28%).
- Projected future groundwater concentration change is from 310 to 378 mg/L (+68 mg/L).
- Impact of population growth on groundwater concentration is +44 mg/L.
- There is an indirect impact (benefit) from recycled water projects in other subregions.

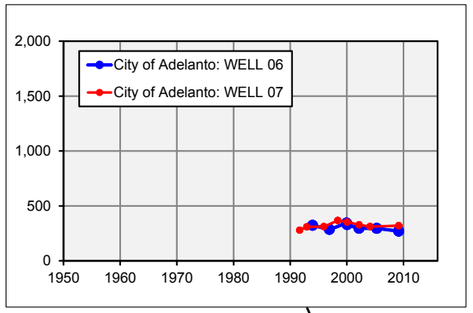
Nitrate-NO_3:

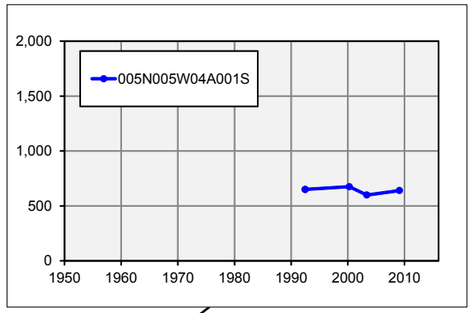
- The key loading factor is septic tank return (91%).
- Projected future groundwater concentration change is from 0.9 to 4.2 mg/L (+3.3 mg/L).
- Impact of population growth on groundwater concentration is +1.5 mg/L.
- There is no measurable impact from recycled water projects.

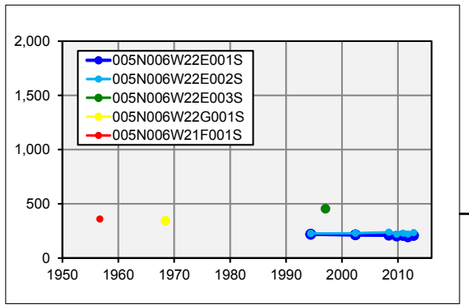
Conclusions:

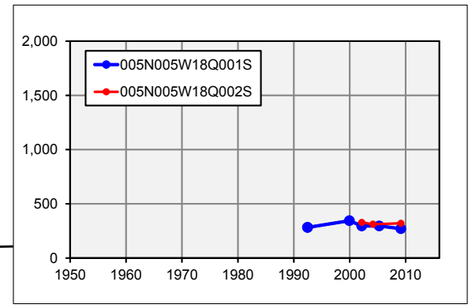
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- Simulated future groundwater TDS and nitrate concentration increases are associated with population growth.
- There is an indirect benefit from recycled water projects in other subregions.

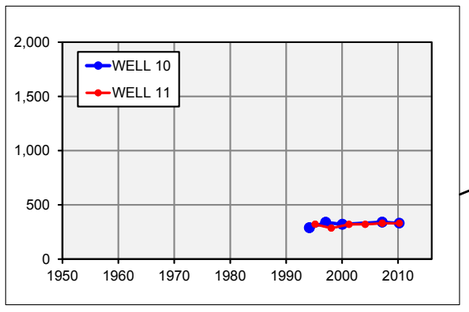


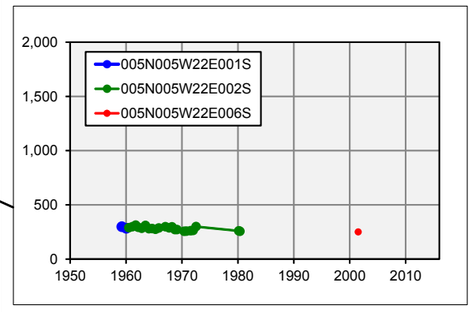


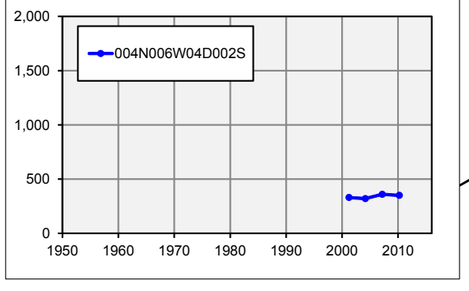


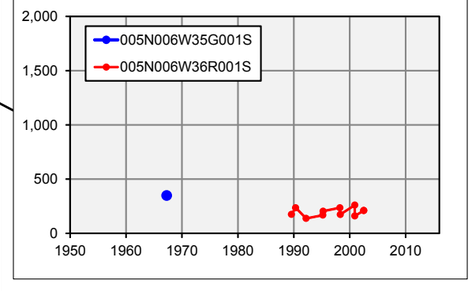


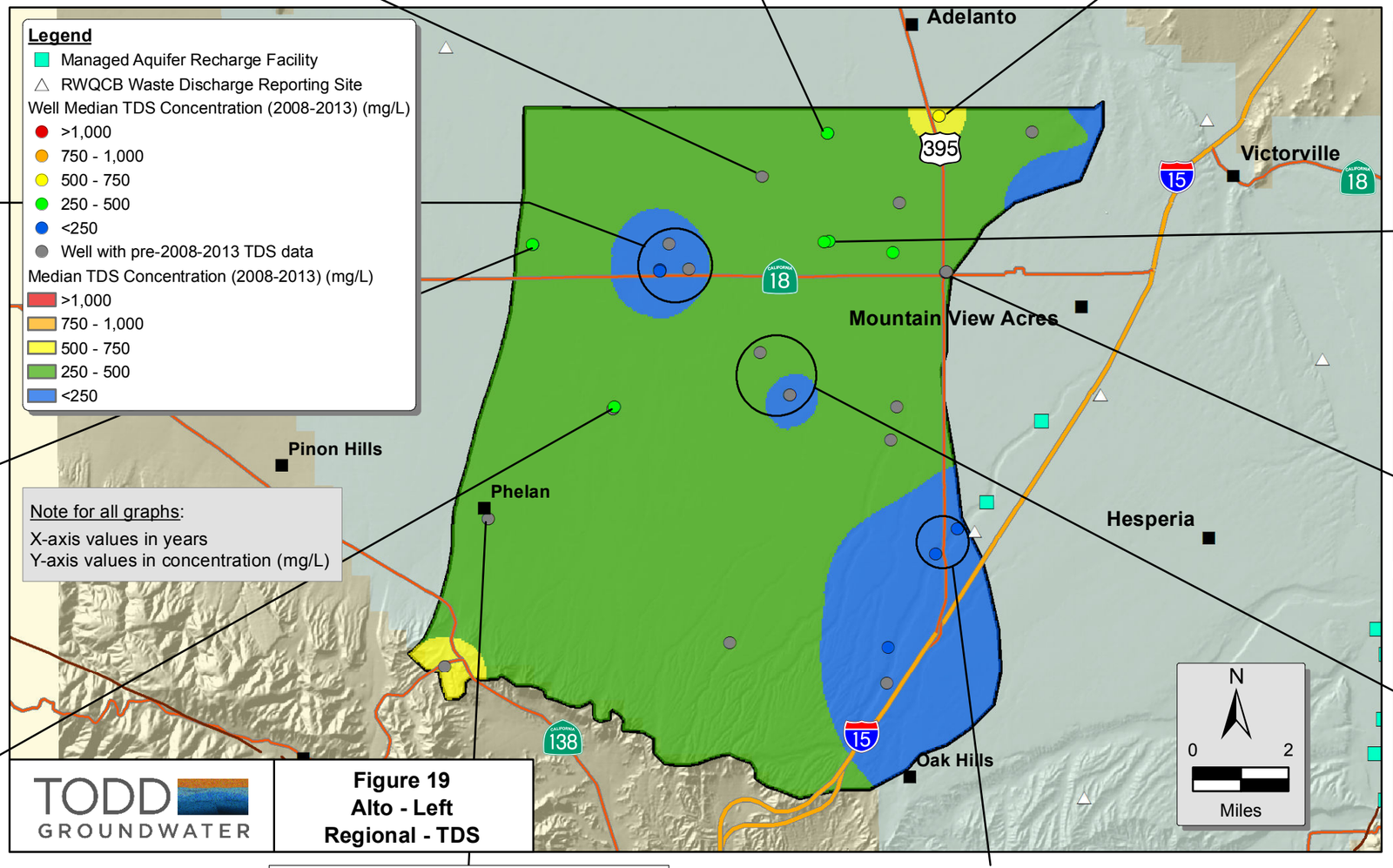


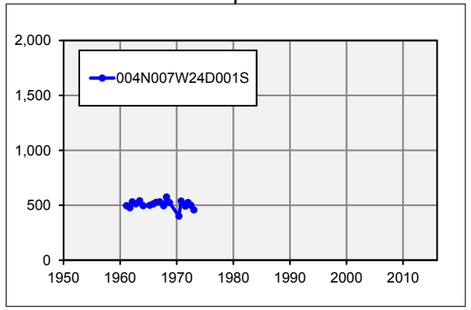


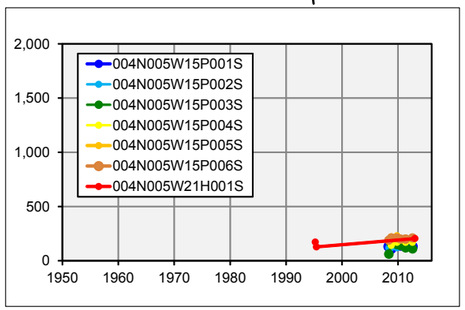






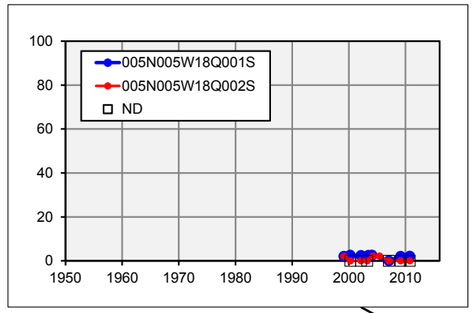


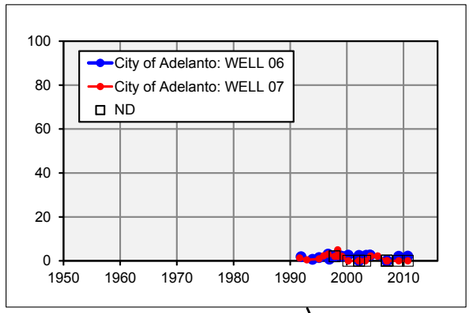


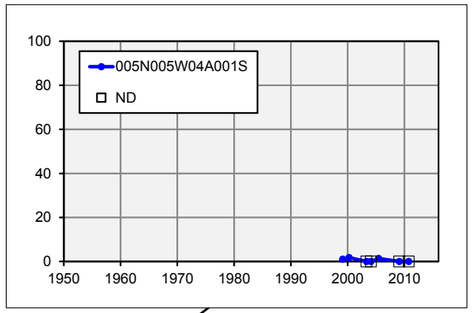


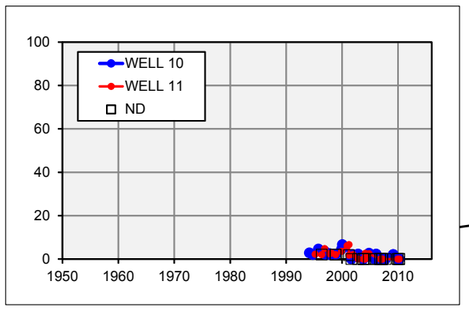
TODD GROUNDWATER

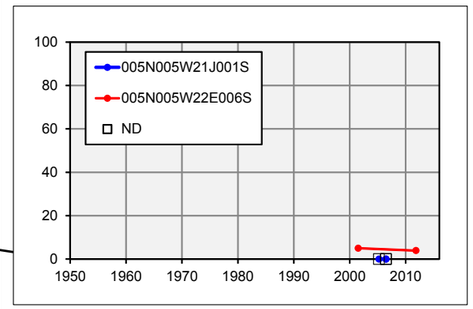
Figure 19
Alto - Left
Regional - TDS

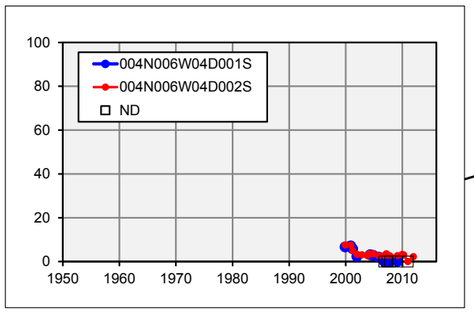


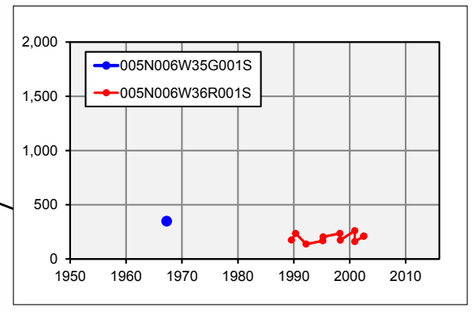


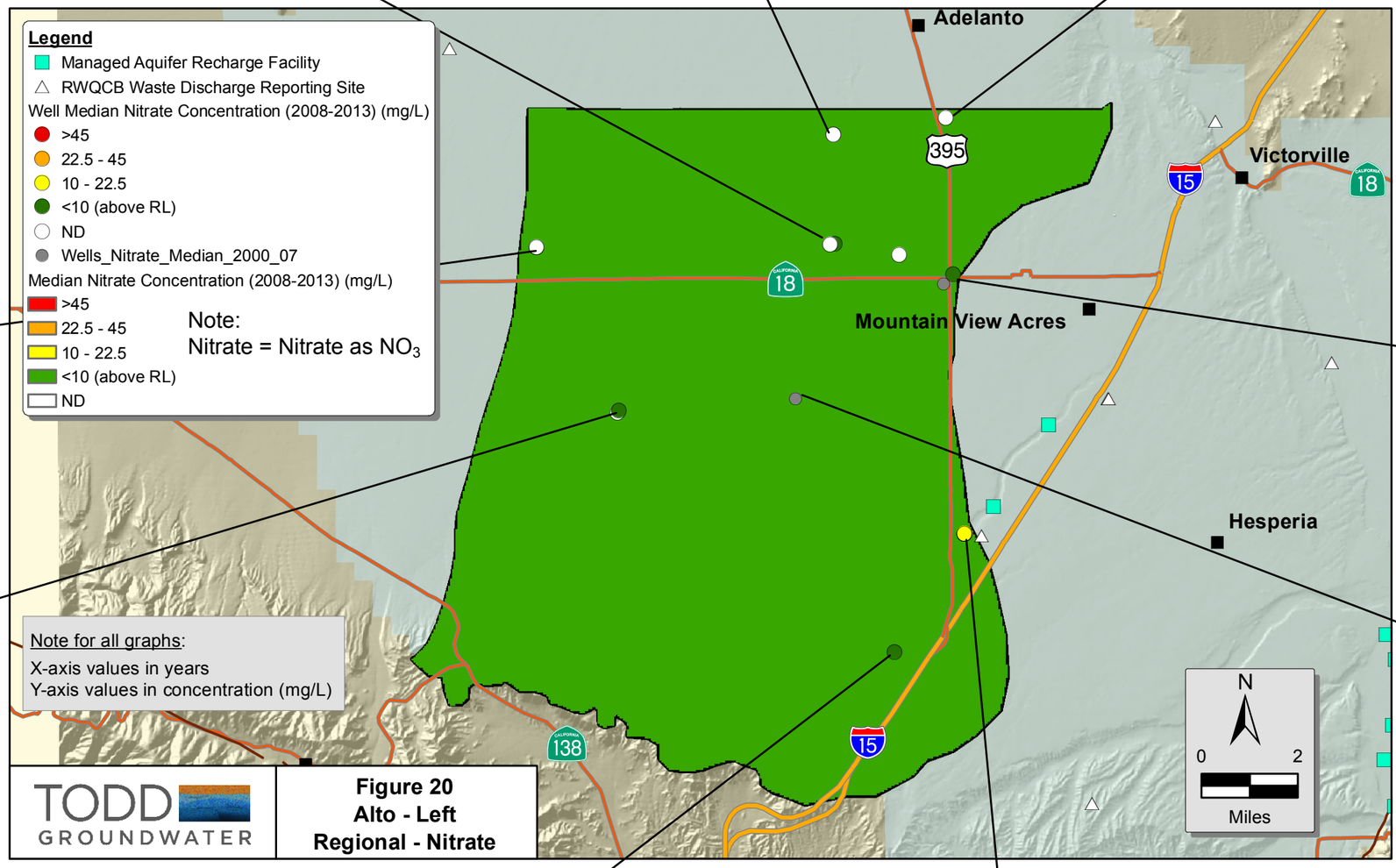








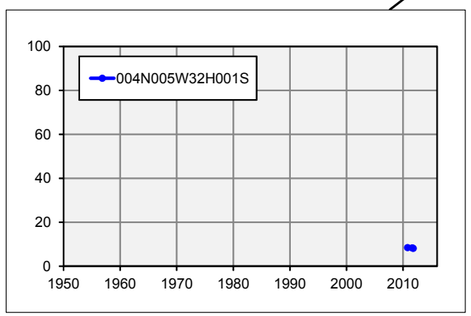


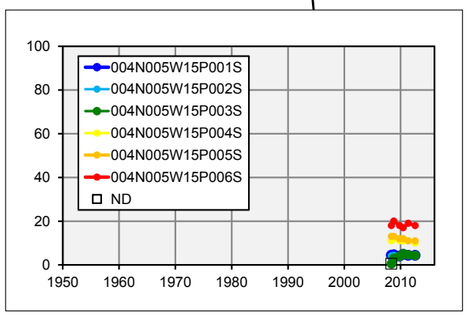


Note for all graphs:
X-axis values in years
Y-axis values in concentration (mg/L)

TODD GROUNDWATER

Figure 20
Alto - Left
Regional - Nitrate





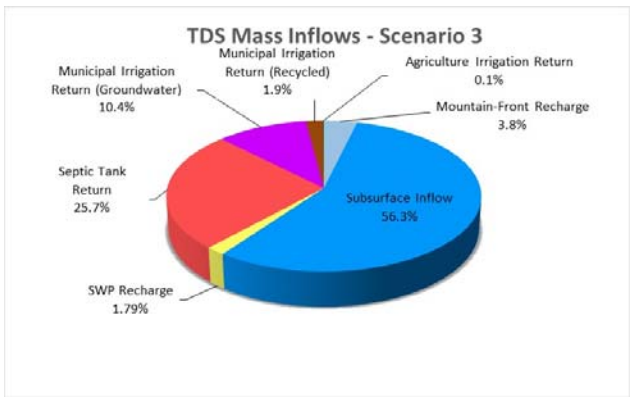
C12. Alto – Mid Regional

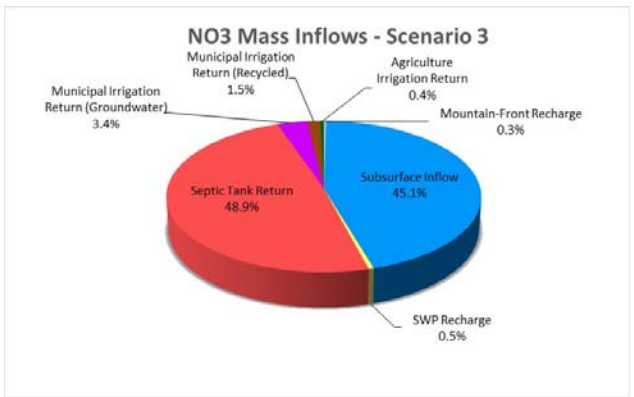
Scenario 3 Summary

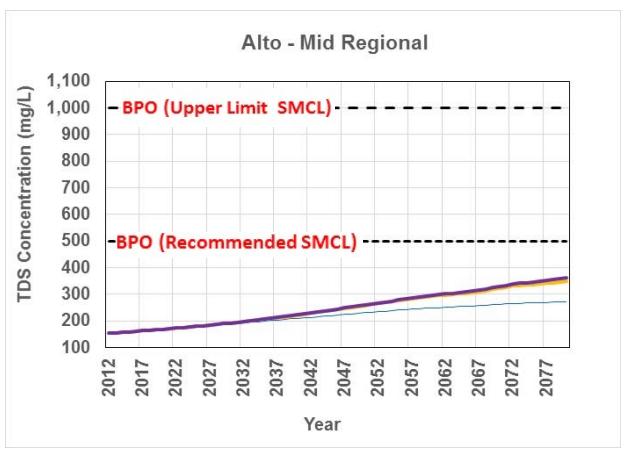
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	3,361	6%	210	4%	0.6	0.3%
Subsurface Inflow	40,587	76%	259	56%	7.6	45%
SWP Recharge	1,335	2%	250	2%	2.5	0.5%
Septic Tank Return	6,796	13%	707	26%	49.0	49%
Municipal Irrigation Return (GW)	1,233	2%	1,576	10%	18.7	3%
Municipal Irrigation Return (RW)	220	0.4%	1,650	2%	45.5	1%
Agriculture Irrigation Return	13	0.0%	1,244	0.1%	221.0	0.4%
Flow-Weighted Average Concentration of Total Inflows			349		12.7	
Flow-Weighted Average Concentration of Total Inflows (with no SWP Recharge)[a]			351		13.0	
Initial (2012) Groundwater Concentration			153		3.5	
Simulated Final (2081) Groundwater Concentration			355		13.3	

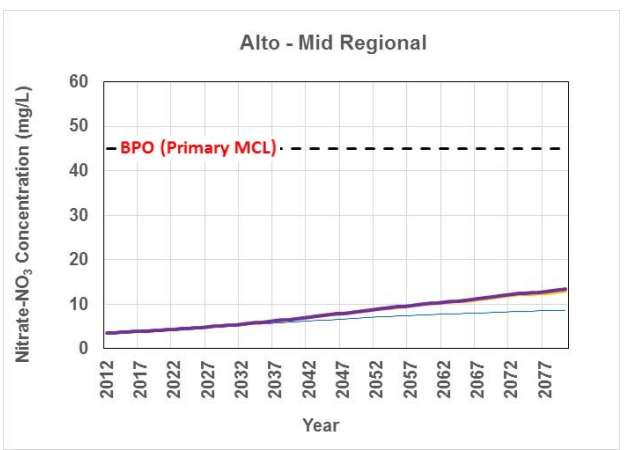
Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation

Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Alto - Mid Regional	TDS	153	273	120	350	197	77	355	202	5
	Nitrate-NO_3	3.5	8.7	5.2	13.0	9.5	4.4	13.3	9.8	0.3

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

- Key loading factors are subsurface inflow (56%) and septic tank return (26%).
- Projected future groundwater concentration change is from 153 to 355 mg/L (+202 mg/L).
- Impact of population growth on groundwater concentration is +77 mg/L.

Effect of Recycled Water Projects

- There is small impact of +5 mg/L from recycled water projects.
- The small impact results primarily from a decrease in subsurface inflows (in Scenario 3 versus Scenario 2) that have a relatively low TDS concentration of about 250 mg/L.

Effect of SWP water recharge

- The TDS concentration of SWP water (250 mg/L) is lower than the simulated TDS concentration range over the 70-year simulation period. The flow-weighted average concentration of total inflows is lower with SWP recharge (349 mg/L) than without SWP recharge (351 mg/L), indicating that SWP slightly improves TDS concentrations in the basin.

Nitrate-NO_3:

- Key loading factors are septic tank return (49%) and subsurface inflow (45%).
- Projected future groundwater concentration change is from 3.5 to 13.3 mg/L (+9.8 mg/L).
- Impact of population growth on groundwater concentration is +4.4 mg/L.

Effect of Recycled Water Projects

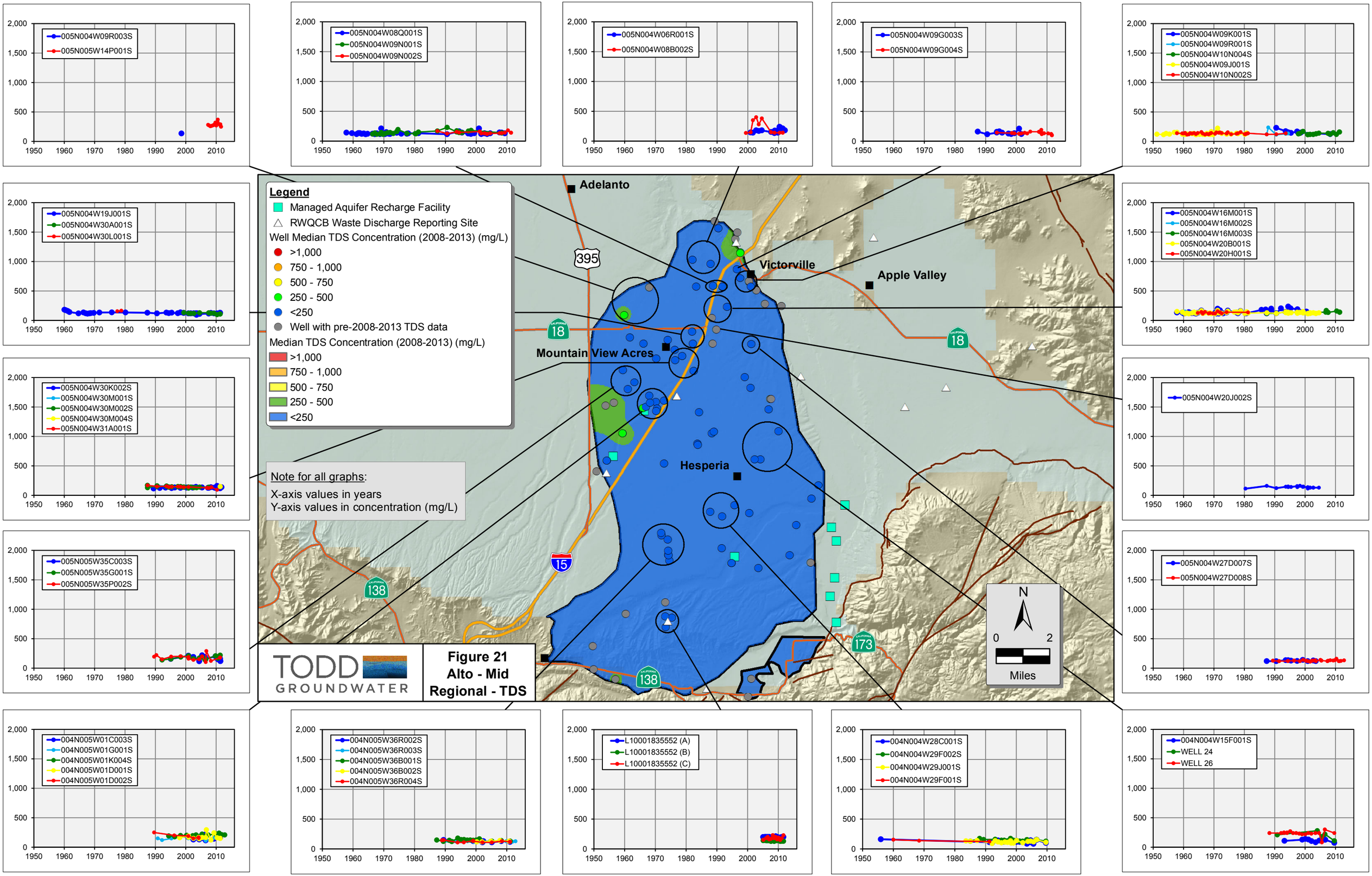
- There is negligible impact of +0.3 mg/L from recycled water projects.

Effect of SWP water recharge

- The nitrate-NO_3 concentration of SWP water (2.5 mg/L) is lower than the simulated nitrate-NO_3 concentration range over the 70-year simulation period. The flow-weighted average concentration of total inflows is lower with SWP recharge (12.7 mg/L) than without SWP recharge (13.0 mg/L), indicating that SWP slightly improves nitrate-NO_3 concentrations in the basin.

Conclusions:

- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- Simulated future groundwater TDS and nitrate concentration increases are associated primarily with population growth, with effectively negligible impacts from recycled water projects.
- Imported SWP water slightly improves groundwater TDS and nitrate concentrations.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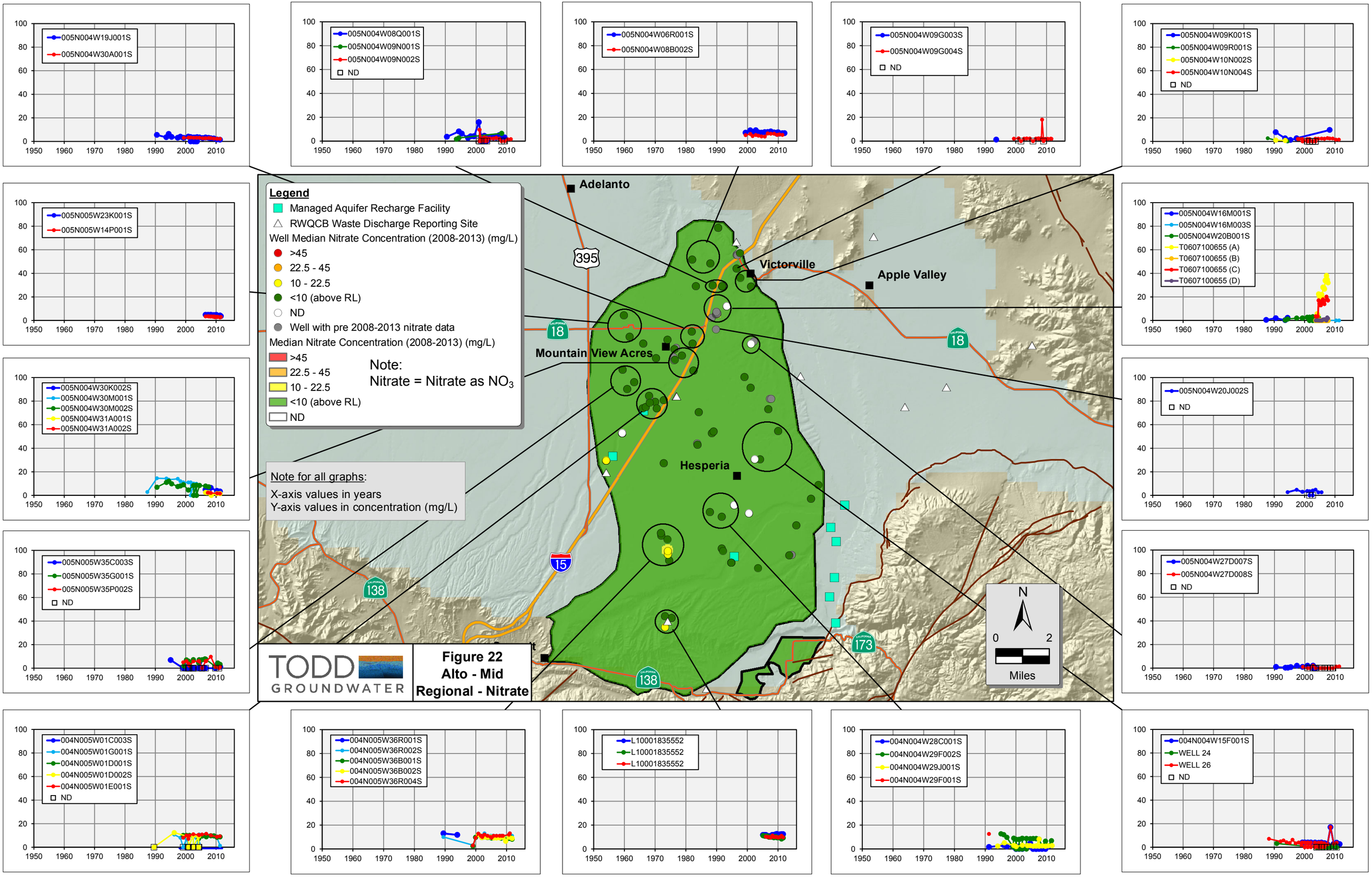
L10001835552 (B)
L10001835552 (C)
004N004W28C001S
004N004W29F002S
004N004W29J001S
004N004W29F001S
004N004W15F001S
WELL 24
WELL 26
Legend
Managed Aquifer Recharge Facility
RWQCB Waste Discharge Reporting Site
Well Median TDS Concentration (2008-2013) (mg/L)
>1,000
750 - 1,000
500 - 750
250 - 500
<250
Well with pre-2008-2013 TDS data
Median TDS Concentration (2008-2013) (mg/L)
>1,000
750 - 1,000
500 - 750
250 - 500
<250
Note for all graphs:
X-axis values in years
Y-axis values in concentration (mg/L)
Adelanto
Victorville
Apple Valley
Mountain View Acres
Hesperia
395
18
15
138
173
N
0
2
Miles
TODD GROUNDWATER
Figure 21
Alto - Mid Regional - TDS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004N004W29J001S
004N004W29F001S
004N004W15F001S
WELL 24
WELL 26
ND
Legend
Managed Aquifer Recharge Facility
RWQCB Waste Discharge Reporting Site
Well Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Well with pre 2008-2013 nitrate data
Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Note:
Nitrate = Nitrate as NO3
Note for all graphs:
X-axis values in years
Y-axis values in concentration (mg/L)
Adelanto
Victorville
Apple Valley
Mountain View Acres
Hesperia
395
18
15
138
173
N
0
2
Miles
TODD GROUNDWATER
Figure 22
Alto - Mid Regional - Nitrate

C13. Alto – Right Regional

Scenario 3 Summary

Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Subsurface Inflow	693	12%	305	2%	6.8	1%
Septic Tank Return	4,430	77%	1,610	77%	122.1	95%
Municipal Irrigation Return (GW)	424	7%	3,565	16%	29.2	2%
Municipal Irrigation Return (RW)	220	4%	1,650	4%	45.5	2%
Flow-Weighted Average Concentration of Total Inflows			1,598		98.5	
Initial (2012) Groundwater Concentration			579		7.5	
Simulated Final (2081) Groundwater Concentration			896		36.0	

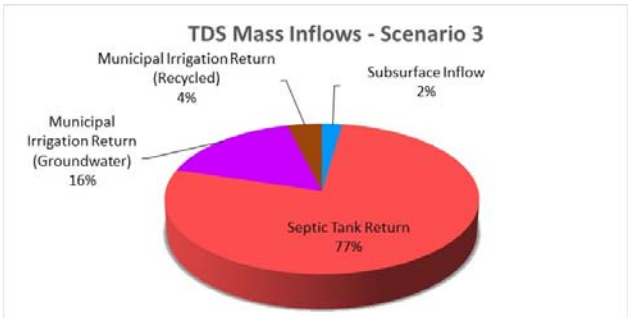
Notes:

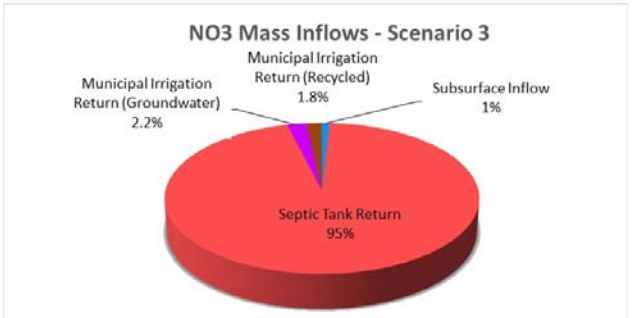
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation

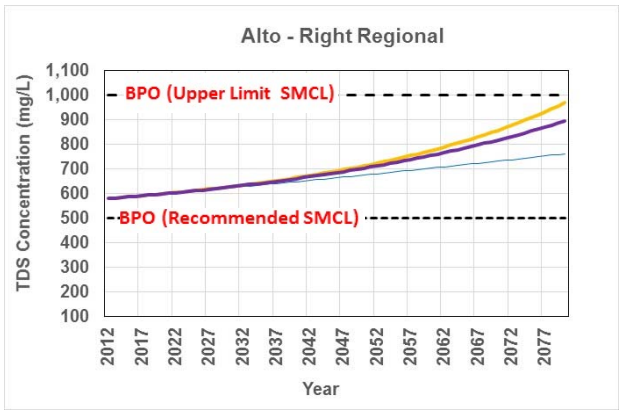
Concentration is above simulated groundwater concentration range

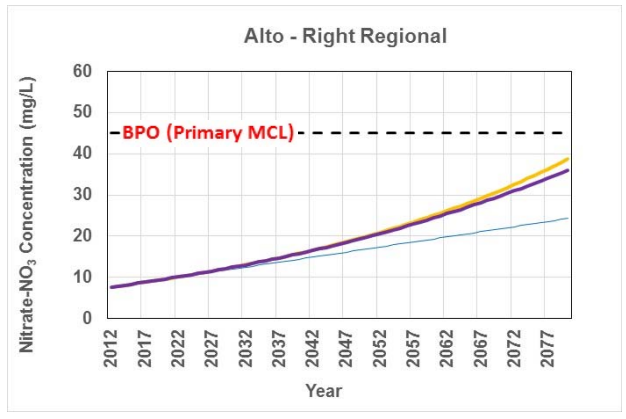
Concentration is within simulated groundwater concentration range

Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Alto - Right Regional	TDS	579	763	184	970	391	207	896	317	-74
	Nitrate-NO_3	7.5	24.3	16.8	38.7	31.2	14.3	36.0	28.5	-2.6

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration

blue color indicates no change in concentration

green color indicates net decrease in concentration

TDS:

- Key loading factor is septic tank return (77%).
- Projected future groundwater concentration change is from 579 to 896 mg/L (+317 mg/L).
- Impact of population growth on groundwater concentration is +391 mg/L.

Effect of Recycled Water Projects

There is significant benefit (-74 mg/L) to groundwater TDS concentration from recycled water projects.

- The benefit from recycled water projects results from 1) decreased S/N loading from landscape irrigation return flow using recycled water in lieu of groundwater (which has a higher TDS concentration compared to recycled water), and 2) more initially low-TDS groundwater remaining in storage in the subregion in Scenario 3 (due to decreased groundwater pumping).

Nitrate-NO_3:

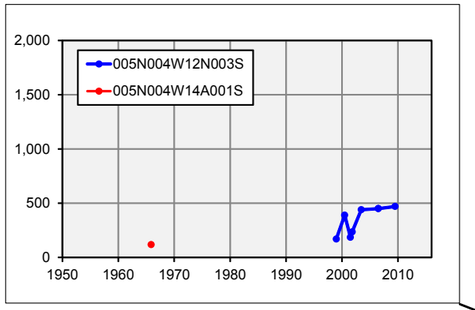
- Key loading factor is septic tank return (95%).
- Projected future groundwater concentration change is from 7.5 to 36.0 mg/L (+28.5 mg/L).
- Impact of population growth on groundwater concentration is +14.3 mg/L.

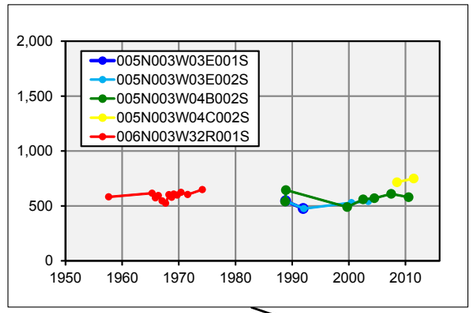
Effect of Recycled Water Projects

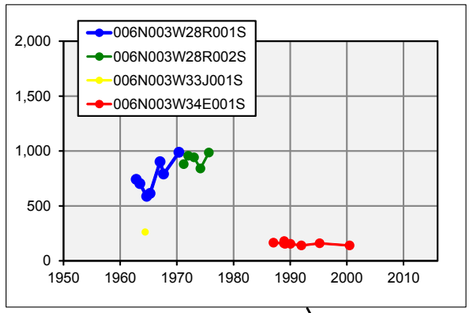
- There is an impact (benefit) of -2.6 mg/L from recycled water projects
- The benefit from recycled water projects result from more initially low-nitrate groundwater remaining in storage in the subregion in Scenario 3 (due to decreased groundwater pumping). This compensates for the slight increase in nitrate loading from landscape irrigation return flow using recycled water in lieu of groundwater.

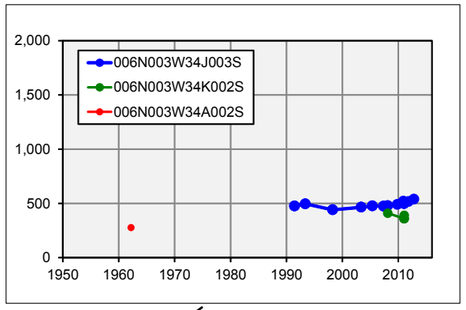
Conclusions:

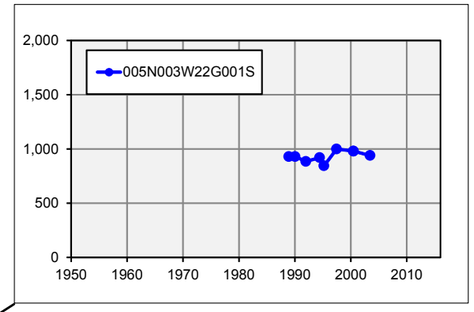
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (1,000 mg/L for TDS).
- Simulated future groundwater TDS and nitrate concentration increases are associated primarily with population growth.
- TDS and nitrate concentrations in Alto – Right Regional are most sensitive to septic tank return flows associated with population growth. This is illustrated by the steeper increases in nitrate and TDS concentrations observed in Scenarios 2 and 3 compared to Scenario 1.
- The VVWRA subregional treatment plant (and associated recycled water irrigation return and reduced pumping) results in a benefit to groundwater TDS (-74 mg/L) and nitrate-NO_3 concentrations (-2.6 mg/L). This occurs because 1) more low-TDS and low-nitrate groundwater remains in storage in the subregion in Scenario 3 (due to decreased groundwater pumping). Additionally, with respect to TDS, there is a decrease in S/N loading from landscape irrigation return flow using recycled water in lieu of groundwater. With respect to nitrate, the additional loading from use of recycled water for irrigation is negated by the storage increase in low-nitrate groundwater from reduced pumping.

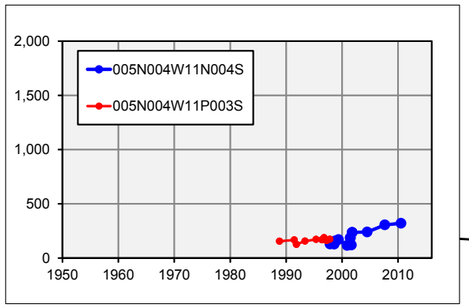


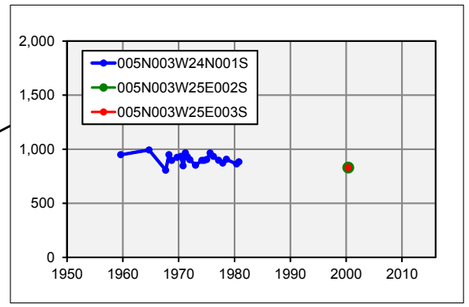


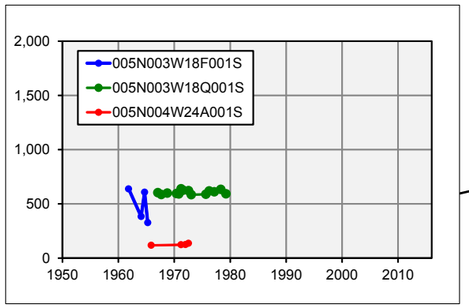


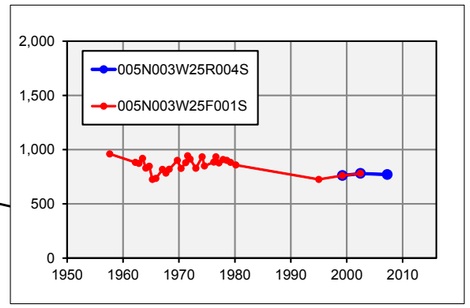


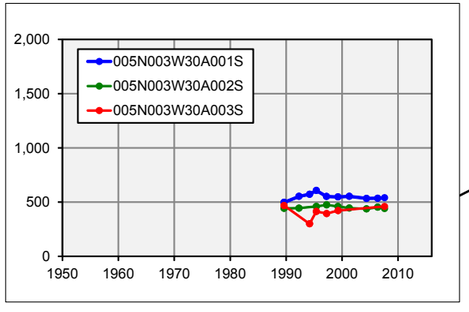


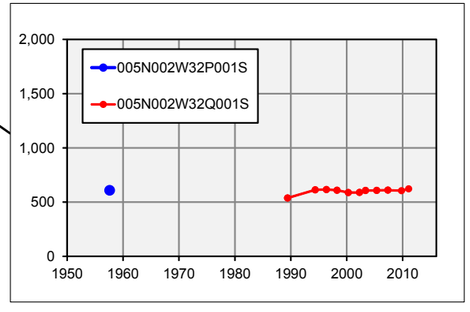


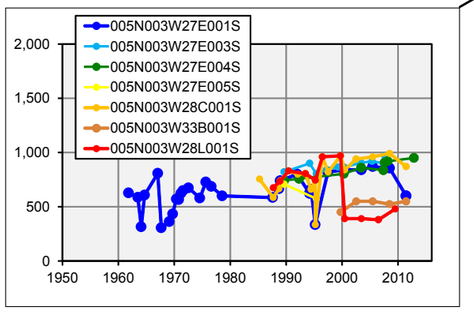


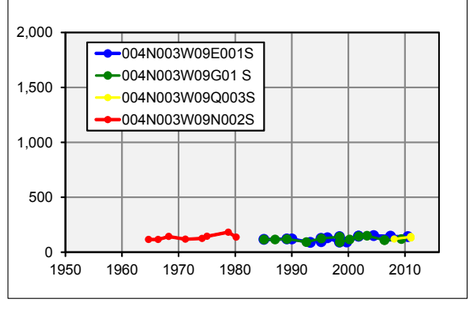


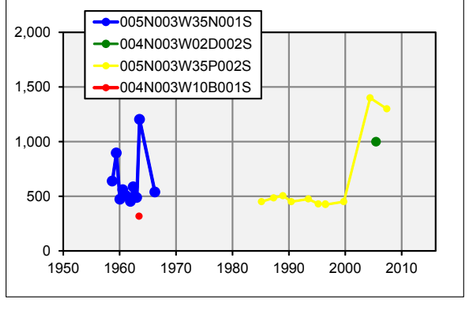


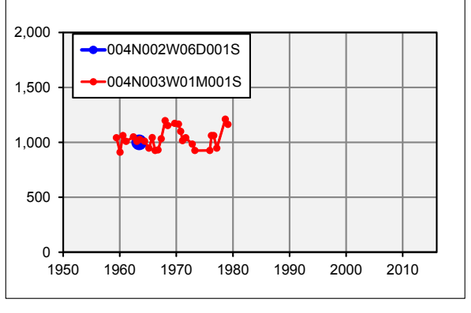


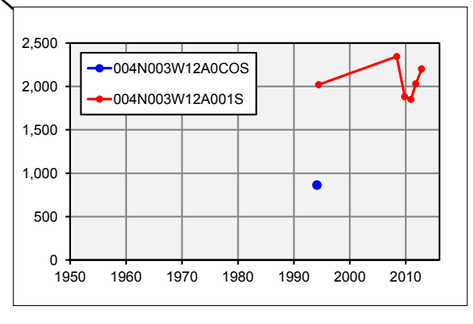


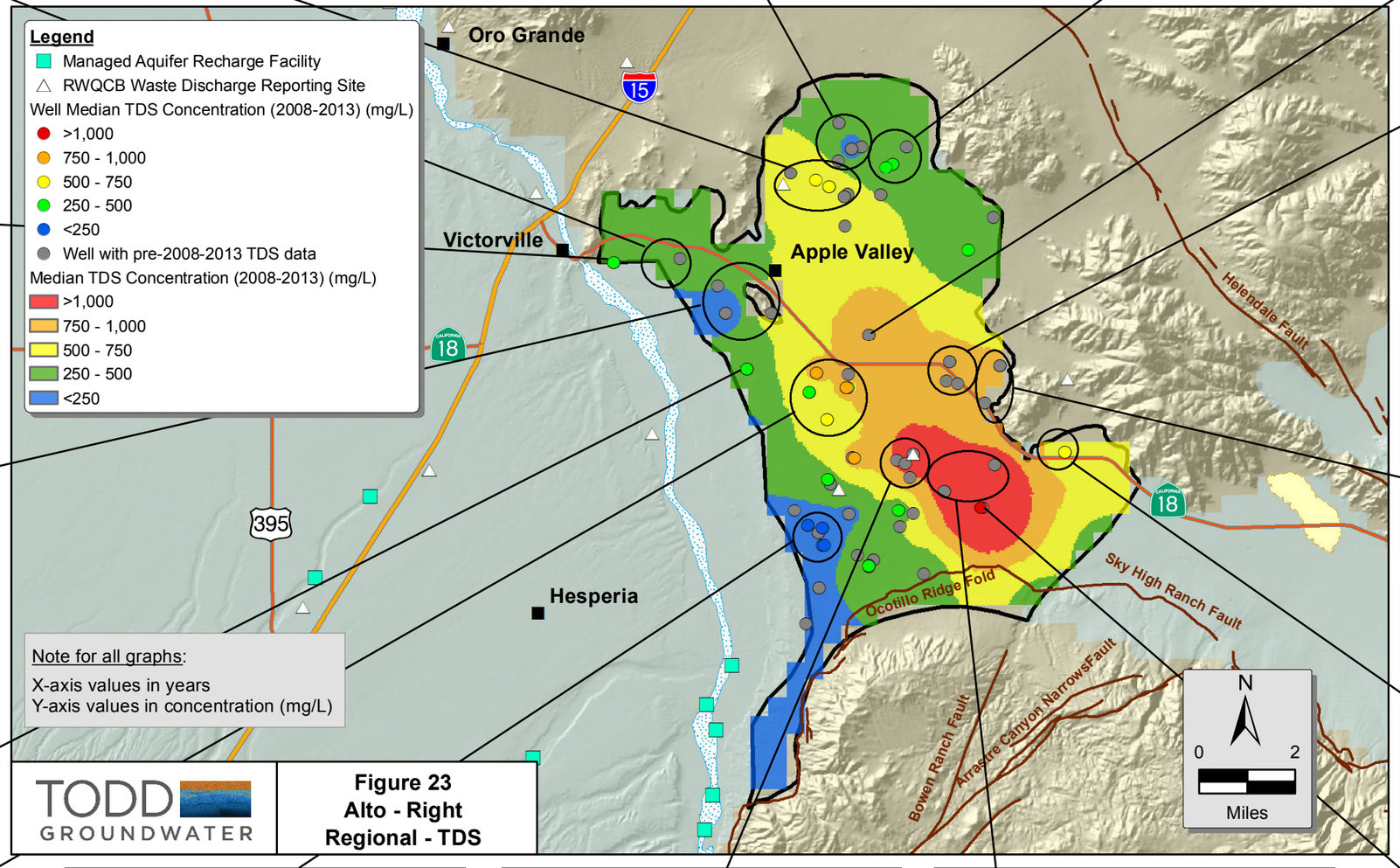










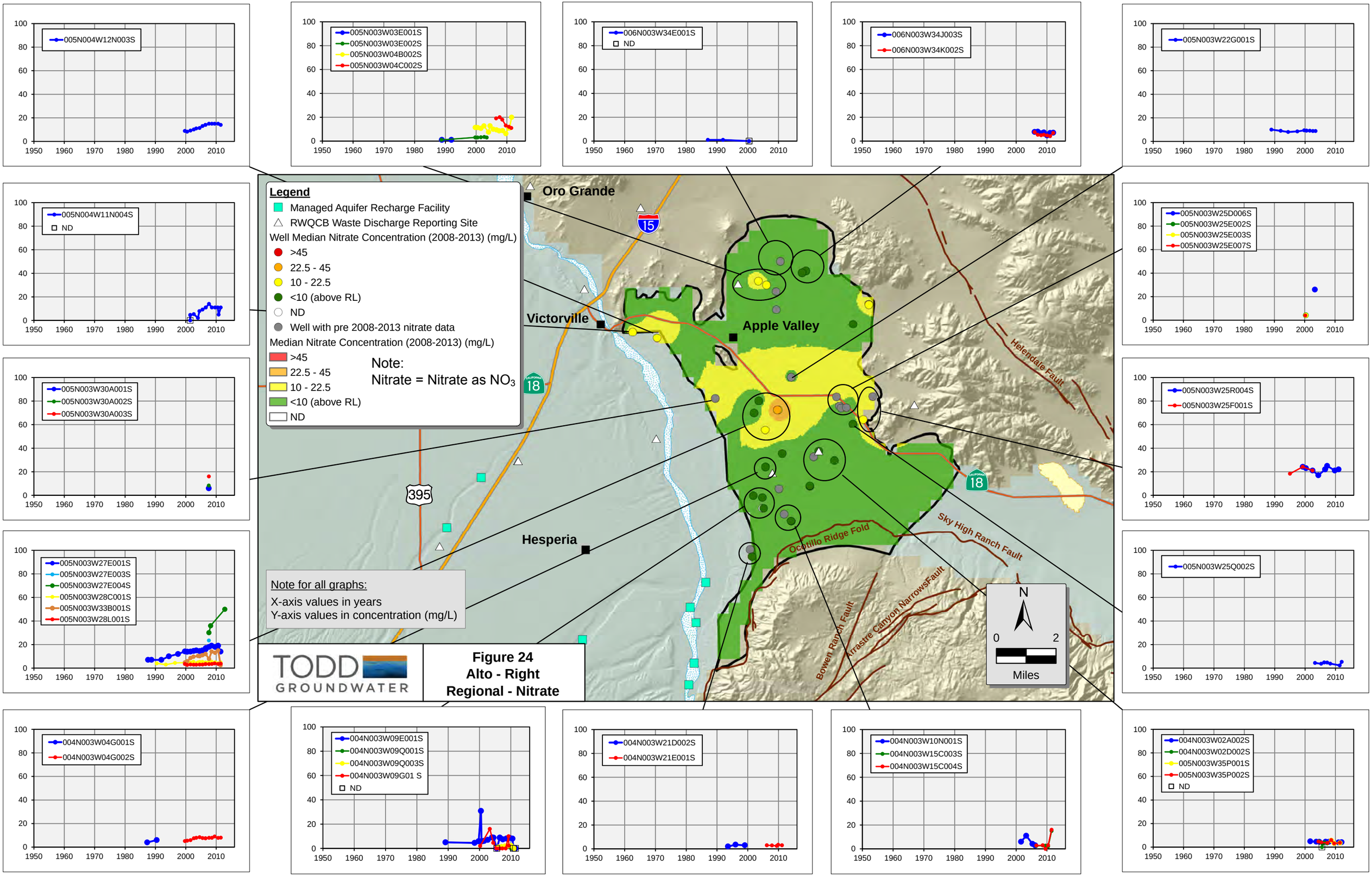


Note for all graphs:

X-axis values in years
Y-axis values in concentration (mg/L)

TODD GROUNDWATER

Figure 23
Alto - Right
Regional - TDS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006N003W34J003S
006N003W34K002S
005N003W22G001S
005N004W11N004S
ND
005N003W25D006S
005N003W25E002S
005N003W25E003S
005N003W25E007S
005N003W30A001S
005N003W30A002S
005N003W30A003S
005N003W25R004S
005N003W25F001S
005N003W27E001S
005N003W27E003S
005N003W27E004S
005N003W28C001S
005N003W33B001S
005N003W28L001S
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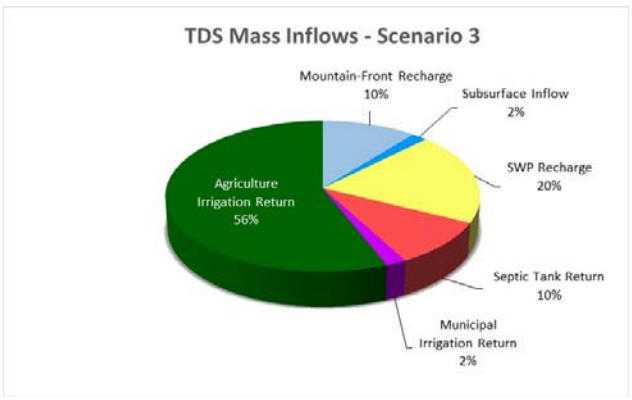
004N003W04G001S
004N003W04G002S
004N003W09E001S
004N003W09Q001S
004N003W09Q003S
004N003W09G01 S
ND
004N003W21D002S
004N003W21E001S
004N003W10N001S
004N003W15C003S
004N003W15C004S
004N003W02A002S
004N003W02D002S
005N003W35P001S
005N003W35P002S
ND
Legend
Managed Aquifer Recharge Facility
RWQCB Waste Discharge Reporting Site
Well Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Well with pre 2008-2013 nitrate data
Median Nitrate Concentration (2008-2013) (mg/L)
>45
22.5 - 45
10 - 22.5
<10 (above RL)
ND
Note:
Nitrate = Nitrate as NO3
Oro Grande
Victorville
Apple Valley
Hesperia
15
18
395
Helendale Fault
Sky High Ranch Fault
Ocotillo Ridge Fold
Bowen Ranch Fault
Arrastre Canyon NarrowsFault
N
0
2
Miles
Note for all graphs:
X-axis values in years
Y-axis values in concentration (mg/L)
TODD GROUNDWATER
Figure 24
Alto - Right
Regional - Nitrate

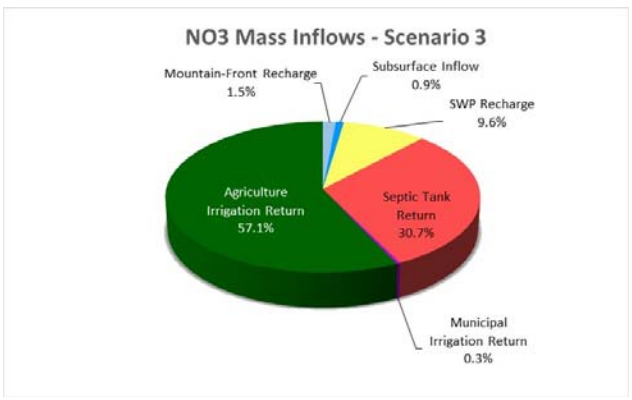
C14. Oeste – Regional

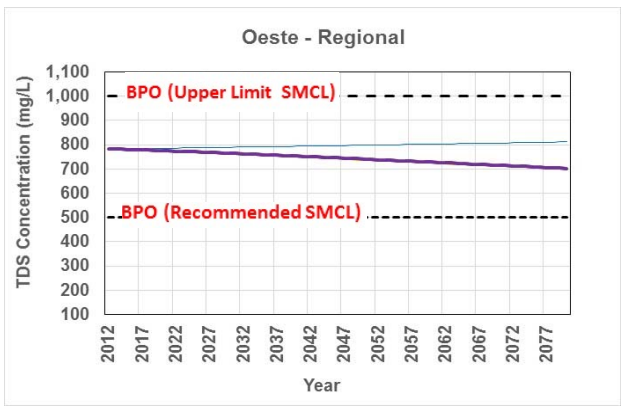
Scenario 3 Summary

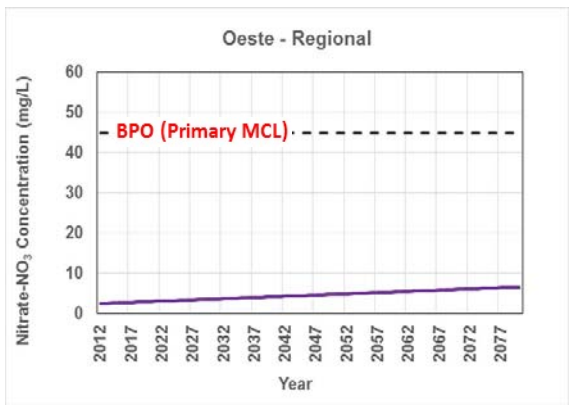
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	1,941	30%	210	11%	0.6	1%
Subsurface Inflow	128	2%	525	2%	5.4	1%
SWP Recharge	3,007	46%	250	20%	2.5	10%
Septic Tank Return	229	4%	1,619	10%	104.9	31%
Municipal Irrigation Return	19	0%	3,688	2%	12.0	0.3%
Agriculture Irrigation Return	1,190	18%	1,787	56%	37.6	57%
Flow-Weighted Average Concentration of Total Inflows			583		12.0	
Flow-Weighted Average Concentration of Total Inflows (with no SWP Recharge)[a]			868		20.2	
Initial (2012) Groundwater Concentration			781		2.5	
Simulated Final (2081) Groundwater Concentration			702		6.7	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
(a) Concentration assumes other flows and concentrations remain the same
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Oeste - Regional	TDS	781	811	30	702	-79	-109	702	-79	0
	Nitrate-NO_3	2.5	6.9	4.4	6.7	4.2	-0.2	6.7	4.2	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

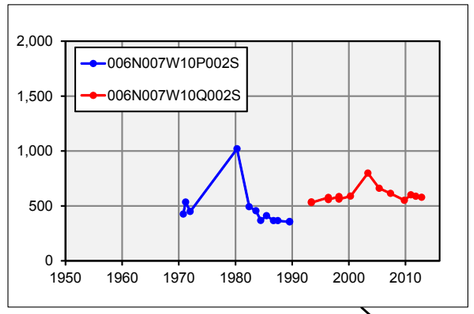
- The key loading factor is agricultural irrigation return (56%). Agricultural irrigation return can be apportioned into contribution from crop irrigation return (27%) and dairy operation return (29%).
- Projected future groundwater concentration change is from 781 to 702 mg/L (-79 mg/L).
- Impact of population growth on groundwater concentration is -109 mg/L, due to projected increases in SWP water recharge.
- There is no impact from recycled water projects in other neighboring subregions.
- The TDS concentration of SWP water (250 mg/L) is lower than the simulated TDS concentration range over the 70-year simulation period. The flow-weighted average concentration of total inflows with SWP recharge (583 mg/L) is lower than without SWP recharge (868 mg/L), indicating that SWP improves TDS concentrations in the subregion.

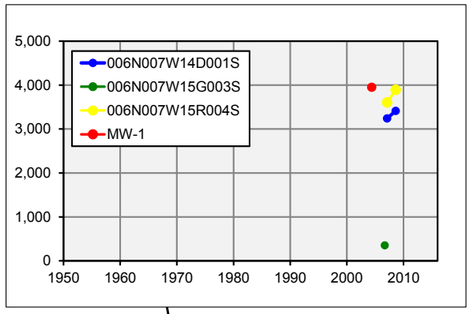
Nitrate-NO_3:

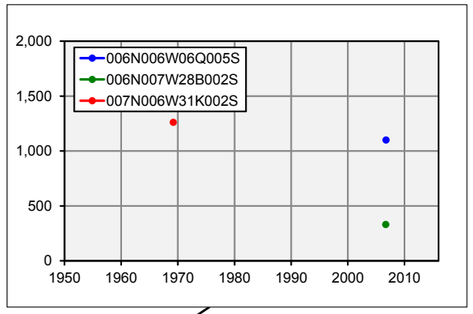
- The key loading factors are agricultural irrigation return (57%) and septic tank return (31%). Agricultural irrigation return can be apportioned into contribution from crop irrigation return (44%) and dairy operation return (13%).
- Projected future groundwater concentration change is from 2.5 to 6.7 mg/L (+4.2 mg/L).
- Impact of population growth on groundwater concentration is +3.4 mg/L.
- There is a minor indirect impact from recycled water projects in neighboring subregions (+0.3 mg/L) due to a small increase in subsurface inflows, which have an average nitrate-NO_3 concentration above 20 mg/L.
- The nitrate-NO_3 concentration of SWP water (2.5 mg/L) is lower than the simulated nitrate-NO_3 concentration range over the 70-year simulation period. The flow-weighted average concentration of total inflows with SWP recharge (12.0 mg/L) is lower than without SWP recharge (20.2 mg/L), indicating that SWP improves nitrate-NO_3 concentrations in the subregion.

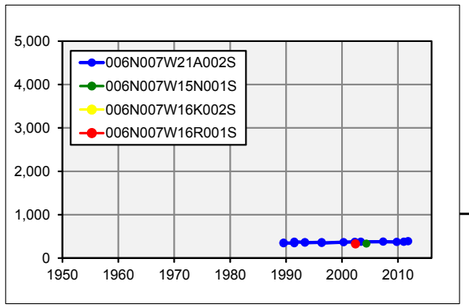
Conclusions:

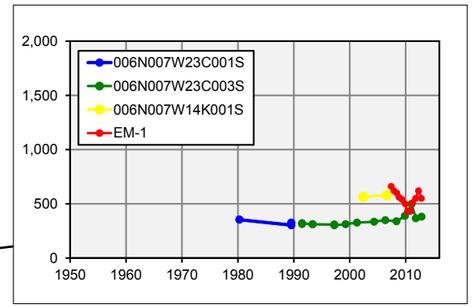
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (1,000 mg/L for TDS).
- Simulated future groundwater TDS concentration decreases are attributable to projected increases in SWP water recharge.
- Simulated future groundwater nitrate concentration increases are associated with population growth.
- Imported SWP water improves groundwater TDS and nitrate concentrations.

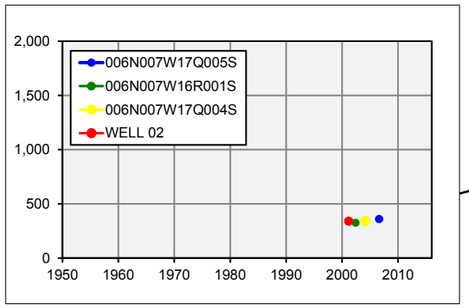


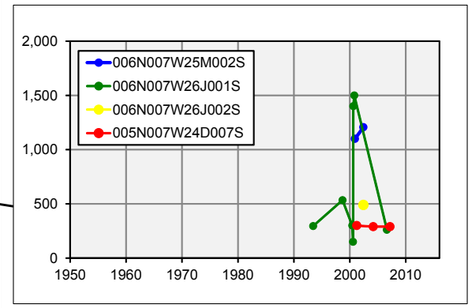


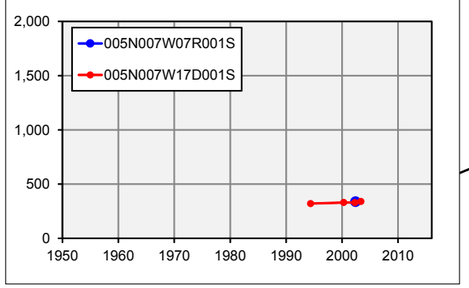


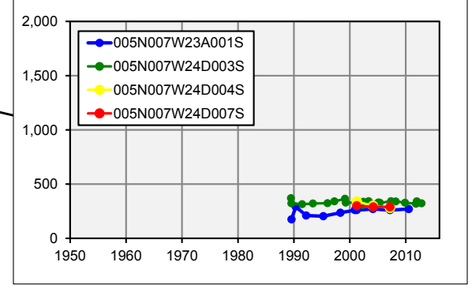


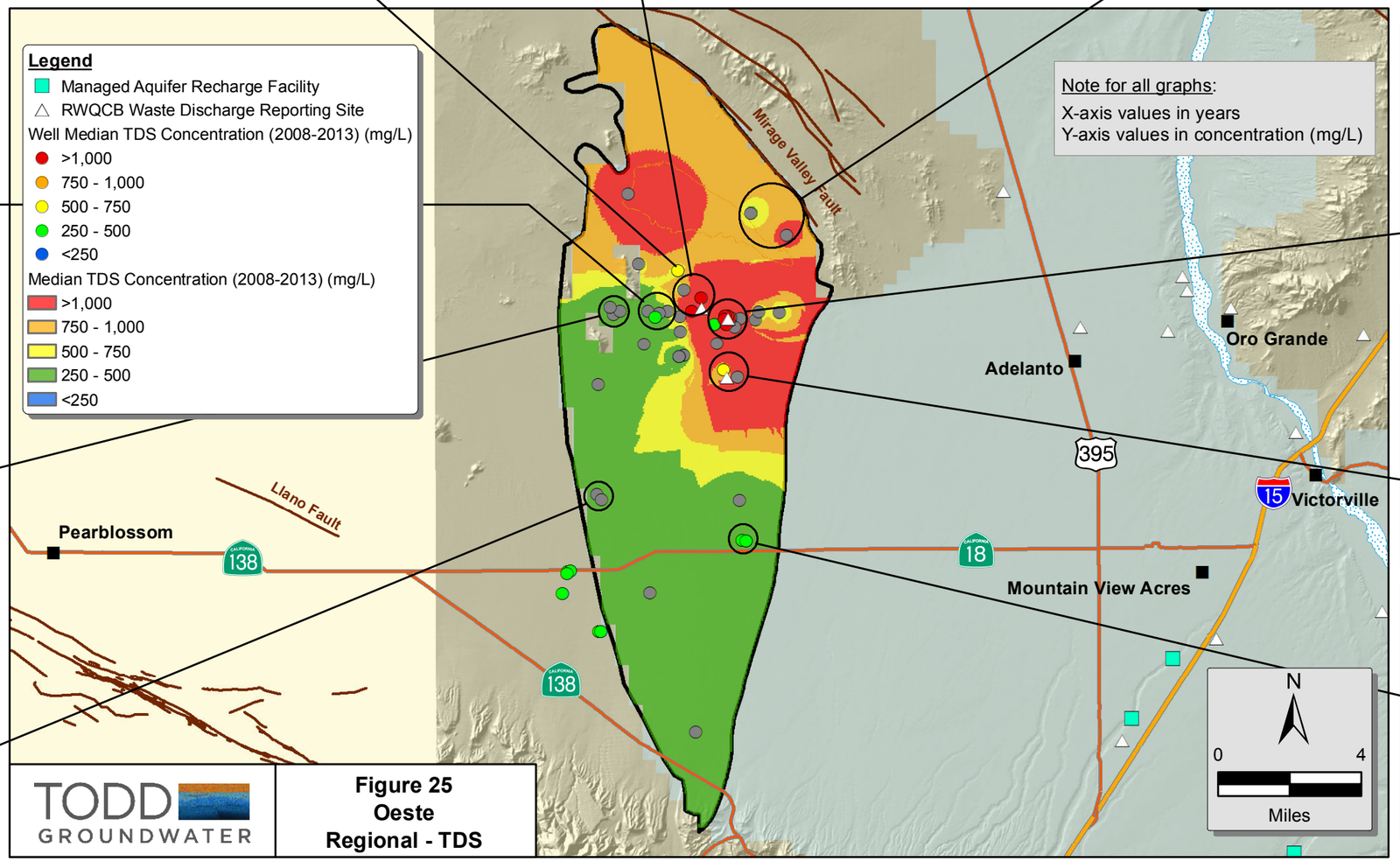






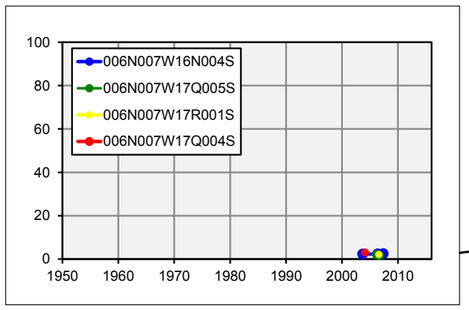


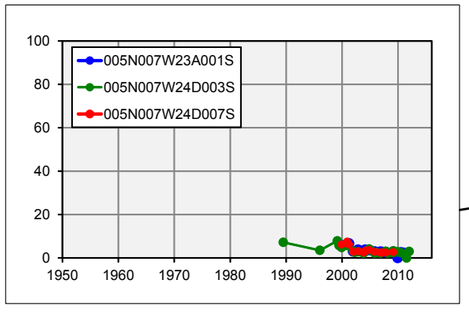


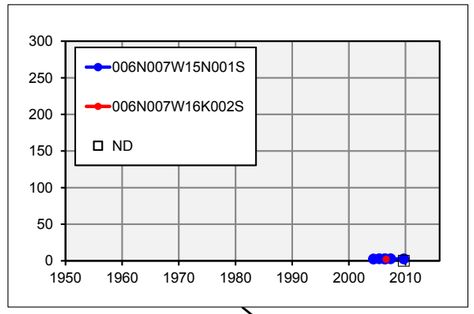


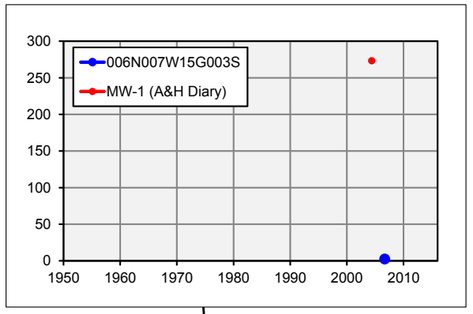
TODD GROUNDWATER

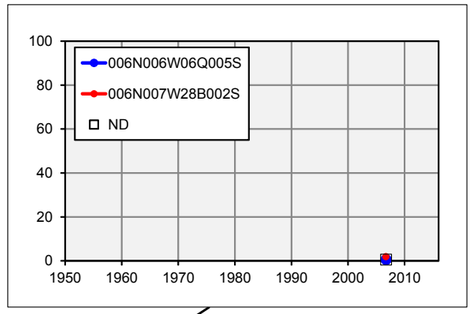
Figure 25
Oeste
Regional - TDS

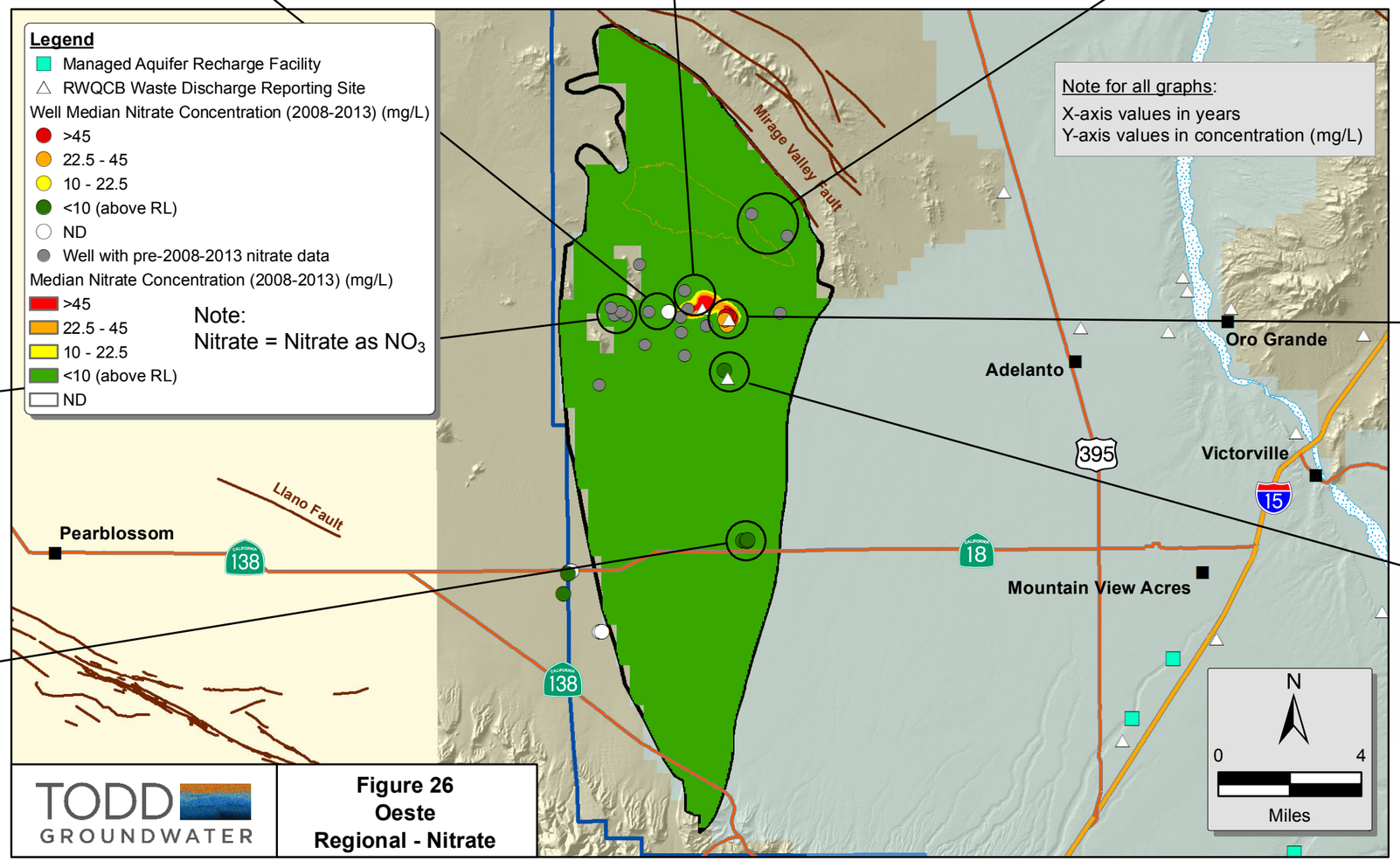


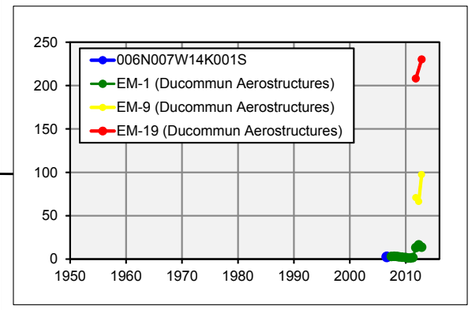


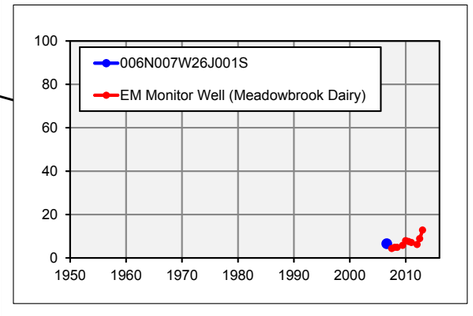












TODD GROUNDWATER

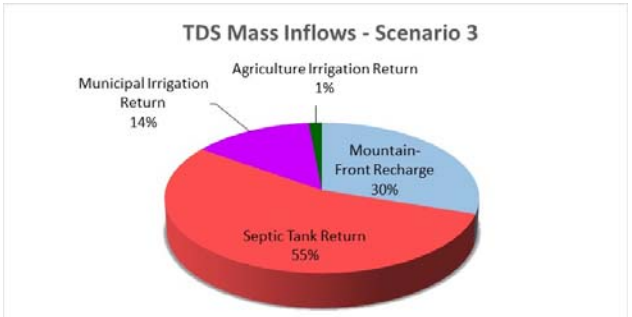
Figure 26
Oeste
Regional - Nitrate

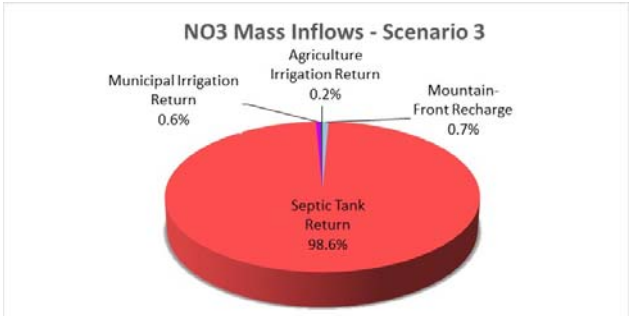
C15. Este – Regional

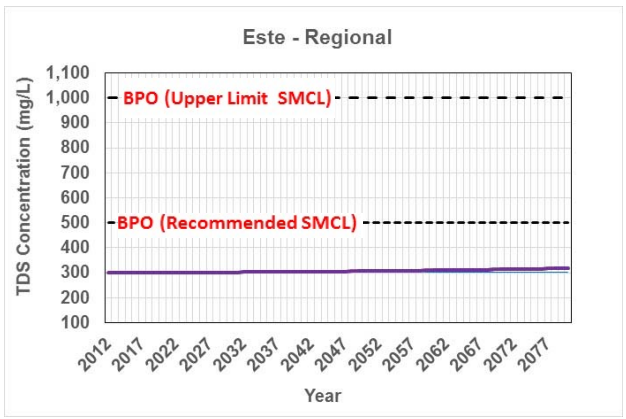
Scenario 3 Summary

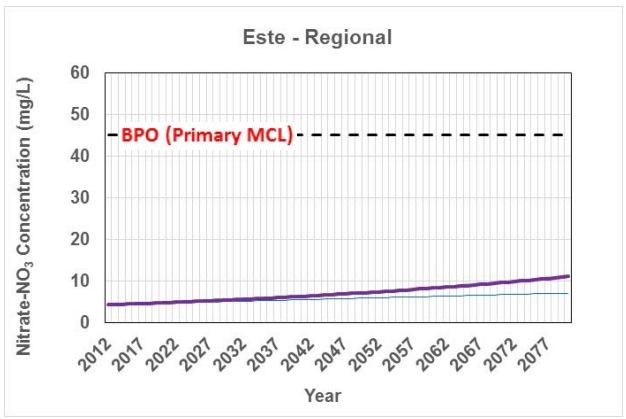
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	1,035	64%	210	30%	0.6	1%
Septic Tank Return	505	31%	785	55%	177.7	99%
Municipal Irrigation Return	53	3%	1,856	14%	9.4	1%
Agriculture Irrigation Return	26	2%	421	2%	6.4	0.2%
Flow-Weighted Average Concentration of Total Inflows			447		56.2	
Initial (2012) Groundwater Concentration			299		4.3	
Simulated Final (2081) Groundwater Concentration			318		11.1	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Este - Regional	TDS	299	303	4	318	19	15	318	19	0
	Nitrate-NO_3	4.3	7.1	2.8	11.1	6.8	4.0	11.1	6.8	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

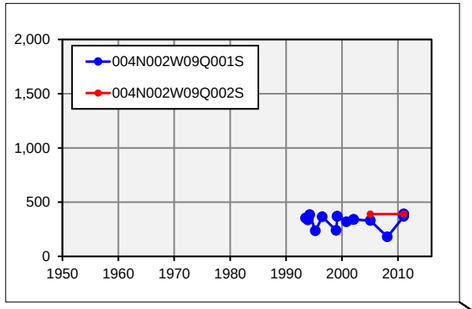
- Key loading factors are septic tank return (55%) and mountain-front recharge (30%).
- Projected future groundwater concentration change is from 299 to 318 mg/L (+19 mg/L).
- Impact of population growth on groundwater concentration is +15 mg/L.
- There is no measurable impact from recycled water projects.

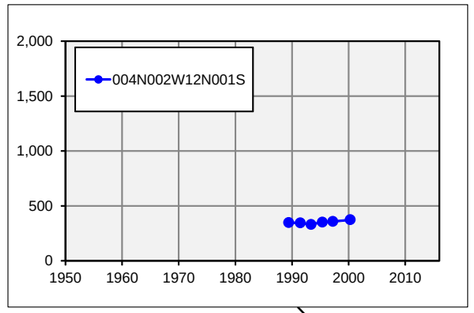
Nitrate-NO_3:

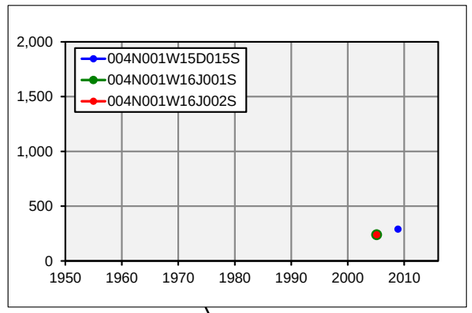
- Key loading factor is septic tank return (99%).
- Projected future groundwater concentration change is from 4.3 to 11.1 mg/L (+6.8 mg/L).
- Impact of population growth on groundwater concentration is +4.0 mg/L.
- There is no measurable impact from recycled water projects.

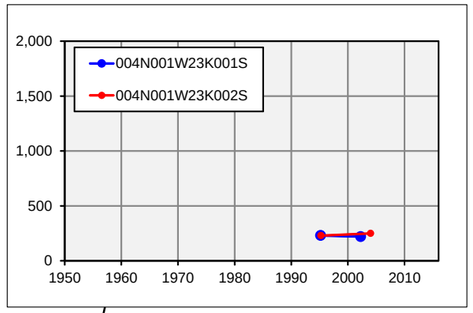
Conclusions:

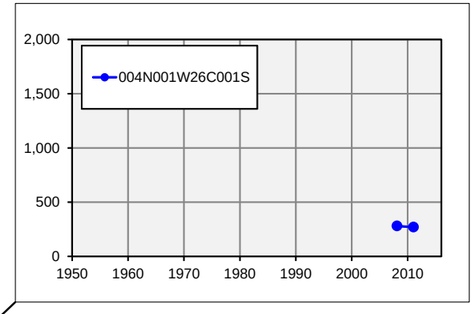
- Salt and nutrient loading in the Este – Regional subregion is minor for TDS and relatively minor for nitrate. Projected average annual total inflows (1,618 AFY) represent a small percentage (0.2%) of the estimated groundwater in storage (840,000 AF, currently).
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- Simulated future groundwater TDS and nitrate concentration increases are associated with population growth.

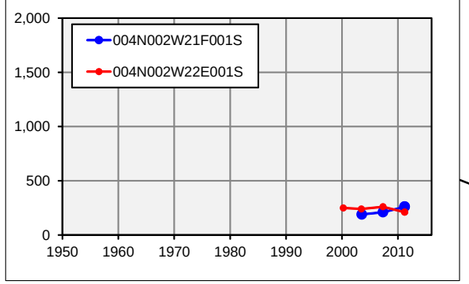


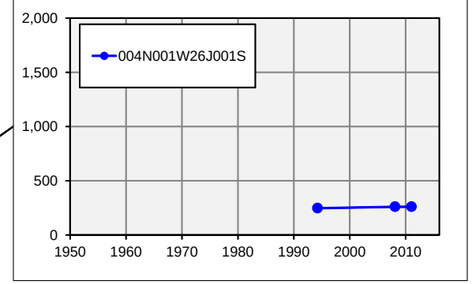


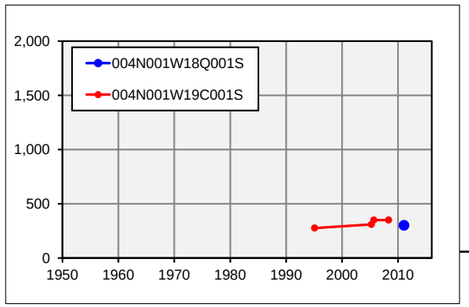


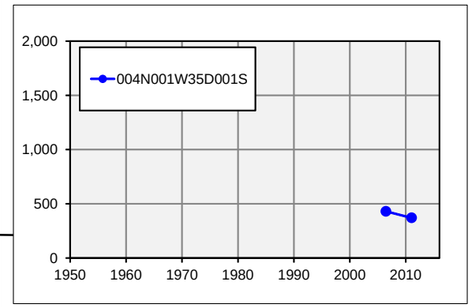


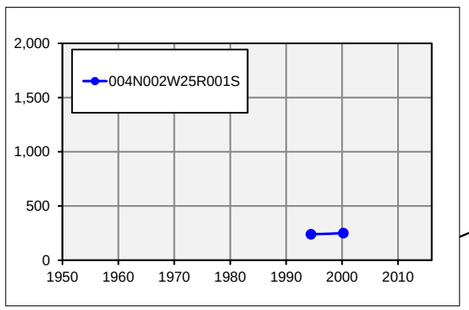


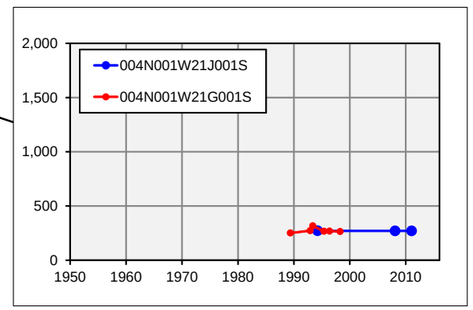


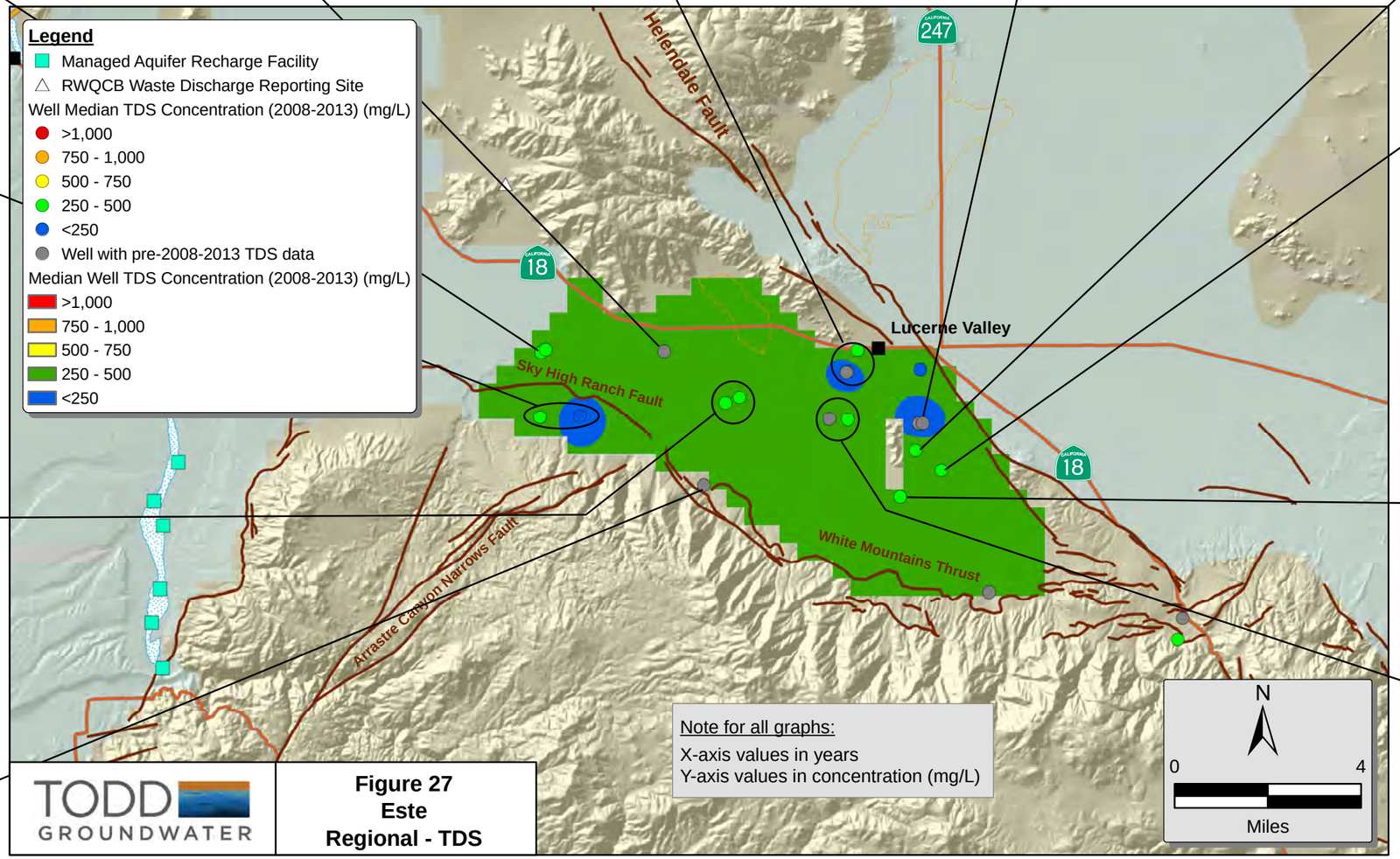






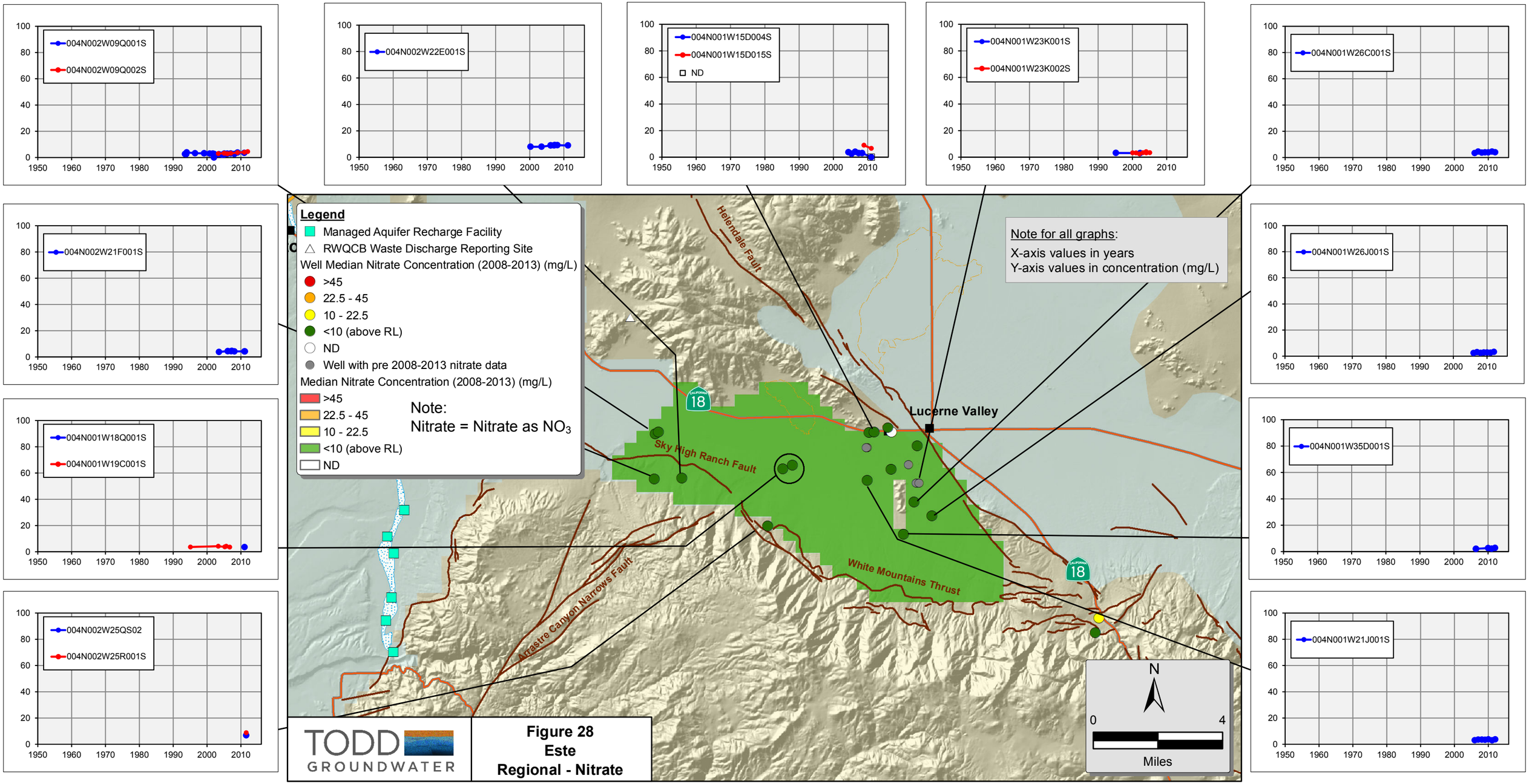






TODD GROUNDWATER

Figure 27
Este
Regional - TDS



TODD GROUNDWATER

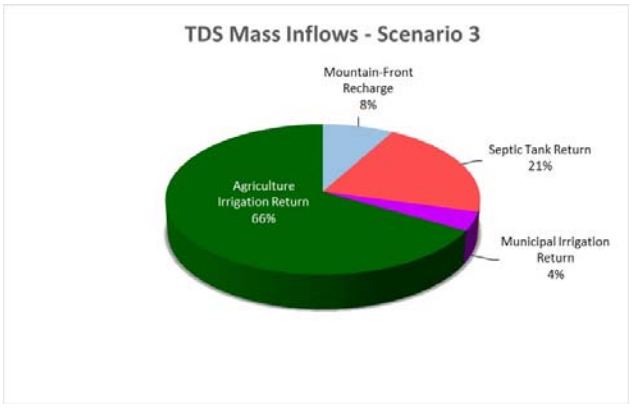
Figure 28
Este
Regional - Nitrate

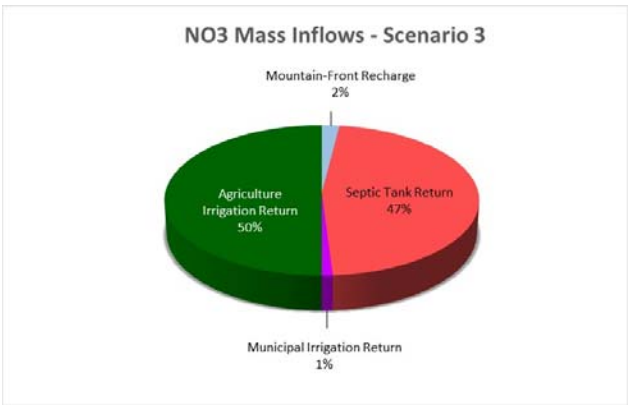
C16. Lucerne Valley (north)

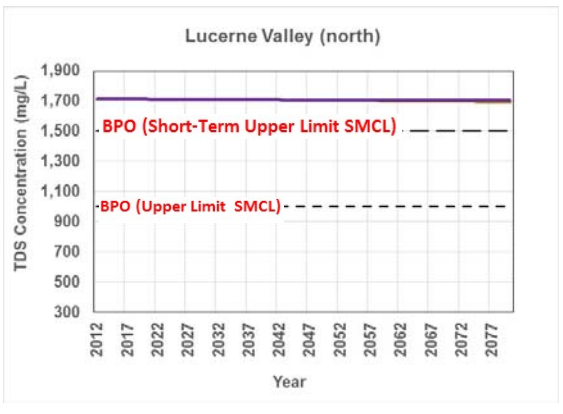
Scenario 3 Summary

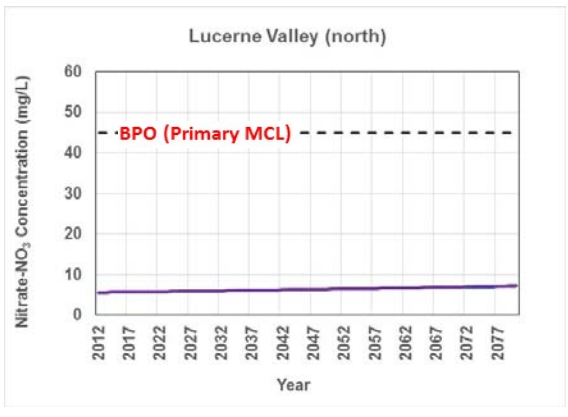
Inflow	Average Annual Rate (AFY)	Average Annual Rate (% of Total)	TDS Concentration (mg/L)	TDS Mass Loading (%)	Nitrate-NO_3 Concentration (mg/L)	Nitrate-NO_3 Mass Loading (%)
Mountain-Front Recharge	875	64%	210	8%	0.6	2%
Septic Tank Return	133	10%	3,561	21%	106.5	47%
Municipal Irrigation Return	10	1%	8,537	4%	42.5	1%
Agriculture Irrigation Return	357	26%	4,100	66%	42.4	50%
Flow-Weighted Average Concentration of Total Inflows			1,605		22.0	
Initial (2012) Groundwater Concentration			1,716		5.6	
Simulated Final (2081) Groundwater Concentration			1,705		7.3	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L) (a)	Scenario 1 (Baseline): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (b)	Scenario 1 (Baseline): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (b - a)	Scenario 2 (Growth with No Recycled Water Projects): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (c)	Scenario 2 (Growth with No Recycled Water Projects): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (c - a)	Scenario 2 (Growth with No Recycled Water Projects): Effect of Projected Growth (mg/L) (c - b)	Scenario 3 (Growth with Recycled Water Projects): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (d)	Scenario 3 (Growth with Recycled Water Projects): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (d - a)	Scenario 3 (Growth with Recycled Water Projects): Effect of Recycled Water Projects (mg/L) (d - c)
Lucerne Valley (north)	TDS	1,716	1693	-23	1705	-11	12	1705	-11	0
	Nitrate-NO_3	5.6	6.8	1.2	7.3	1.7	0.5	7.3	1.7	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

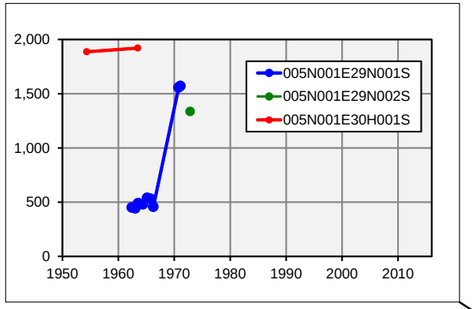
- Key loading factors are agricultural irrigation return (66%) and septic tank return (21%).
- Projected future groundwater concentration change is from 1,716 to 1,705 mg/L (-11 mg/L).
- Impact of population growth on groundwater concentration is +12 mg/L.
- There is no impact from recycled water projects.

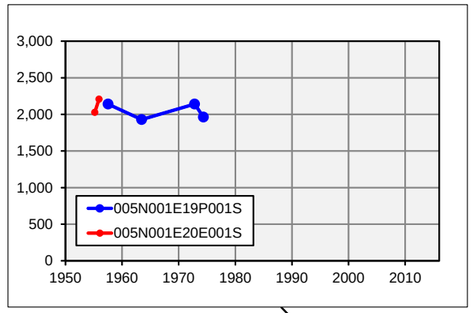
Nitrate-NO_3:

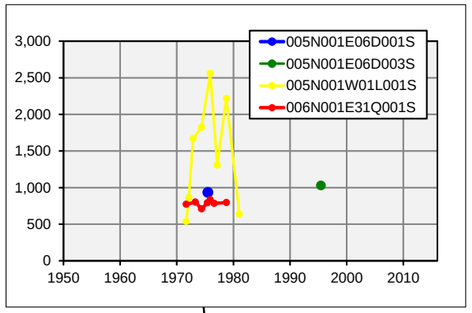
- Key loading factor is agricultural irrigation return (50%) and septic tank return (47%).
- Projected future groundwater concentration change is from 5.6 to 7.3 mg/L (+1.7 mg/L).
- Impact of population growth on groundwater concentration is +0.5 mg/L.
- There is no impact from recycled water projects.

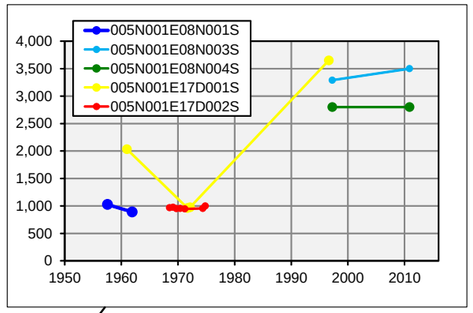
Conclusions:

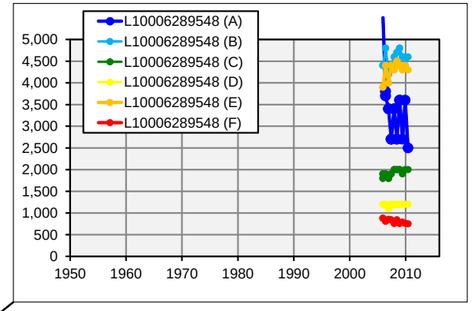
- Groundwater TDS concentrations in Lucerne Valley (north) are naturally elevated as a result of mineralization in the north and east and evapoconcentration effects in the vicinity of Lucerne Dry Lake.
- Salt and nutrient loading in Lucerne Valley (north) is controlled primarily by agricultural irrigation return.
- Simulated future groundwater TDS concentrations are above BPOs (1,500 mg/L for TDS).
- Simulated future nitrate concentrations are well below the BPO of 45 mg/L.
- Small simulated future groundwater TDS and nitrate concentration increases are associated with population growth.

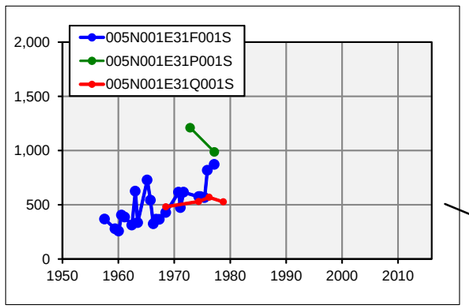


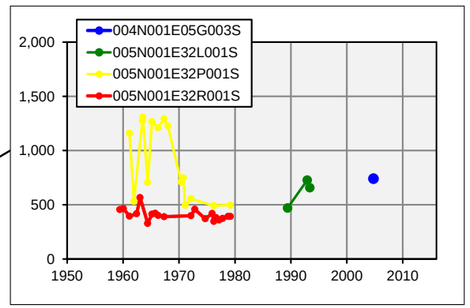


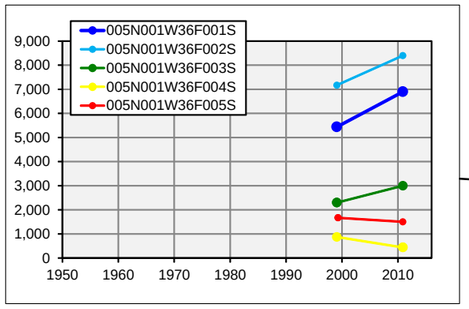


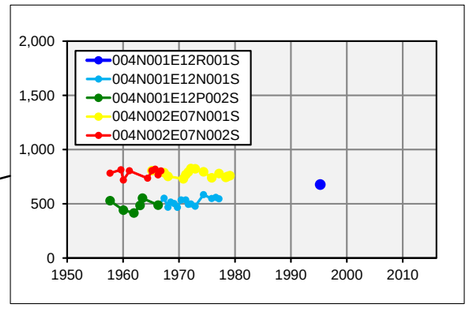


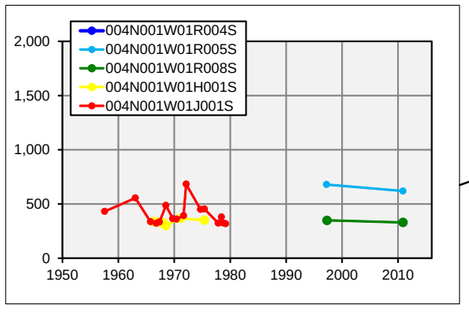


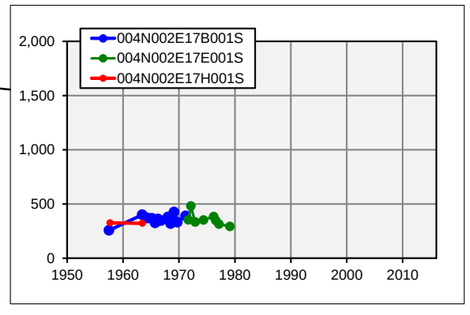


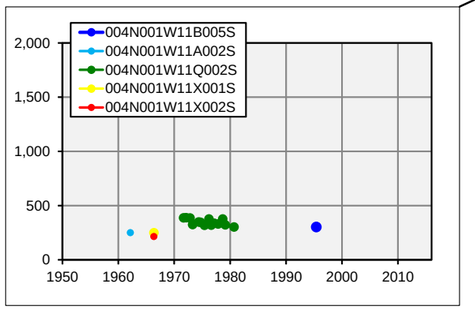


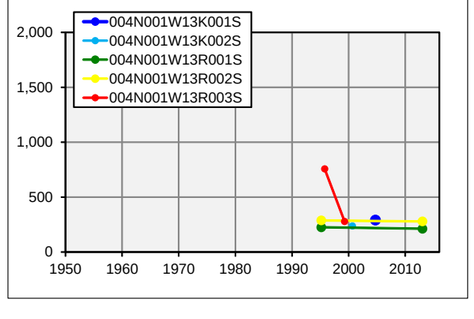


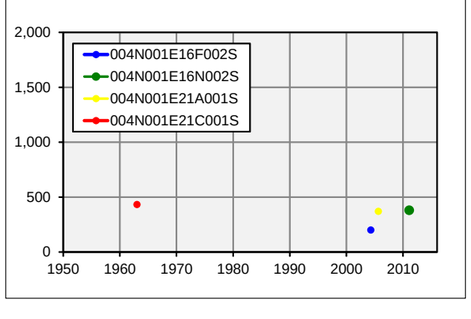


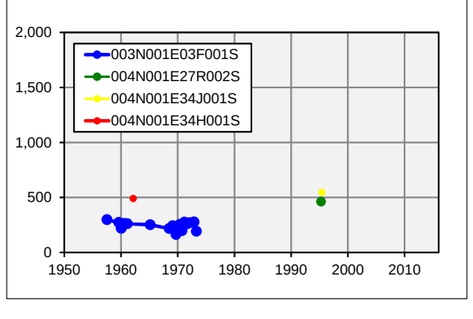


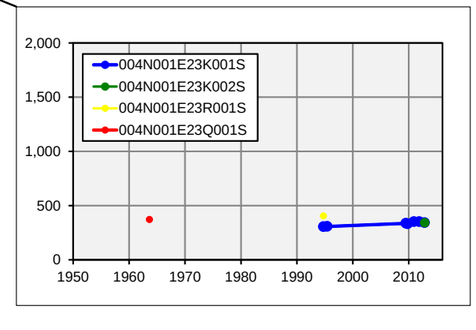


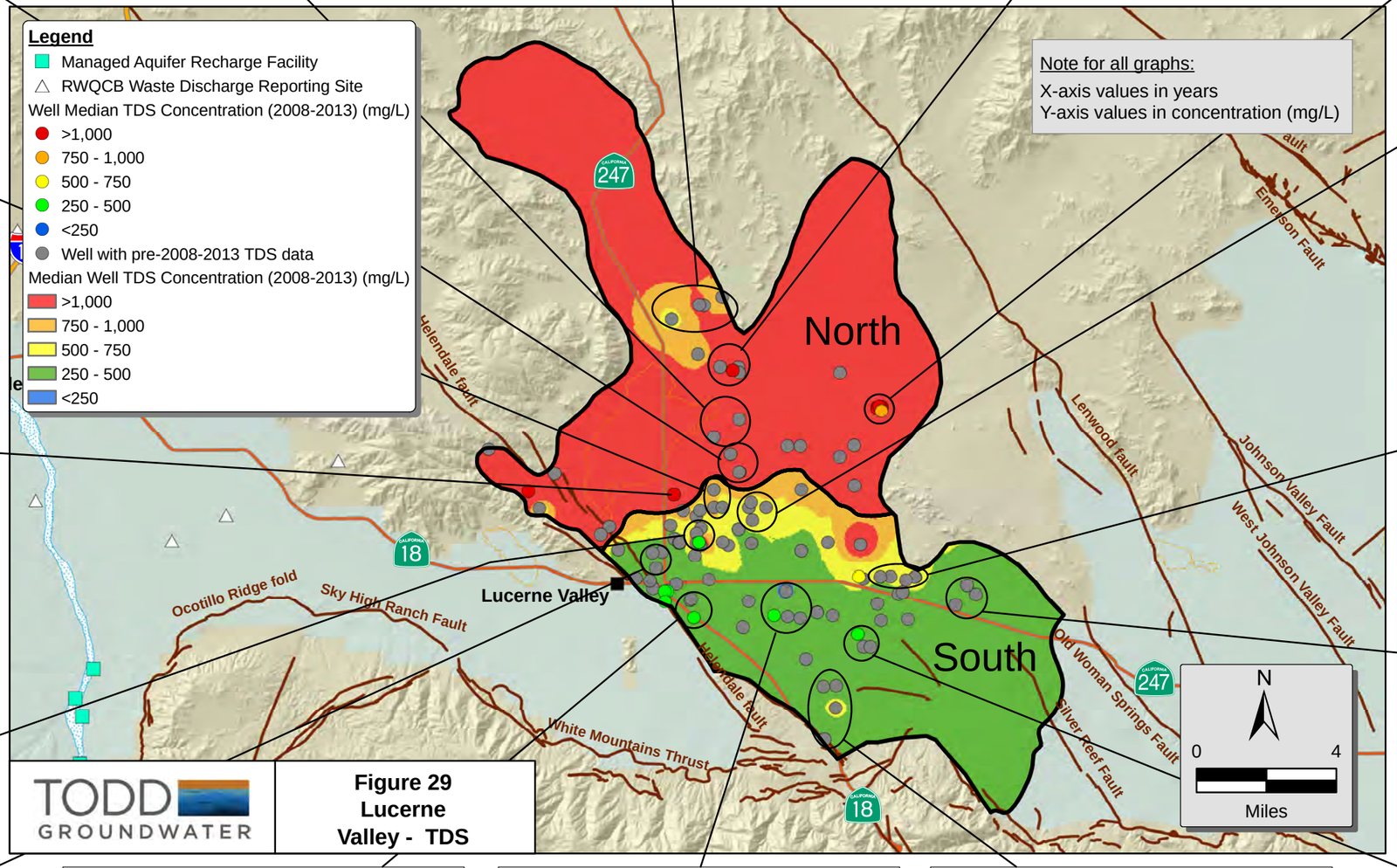






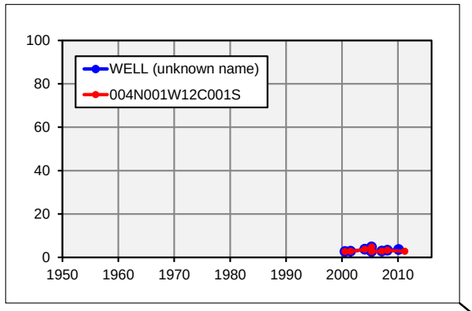


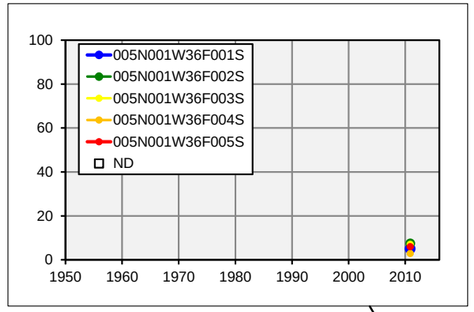


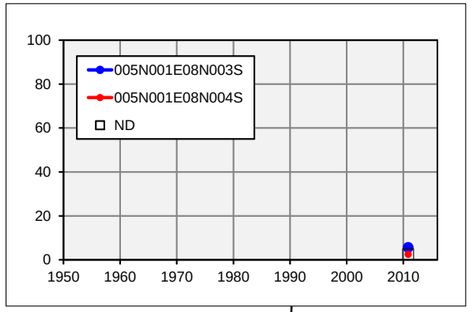


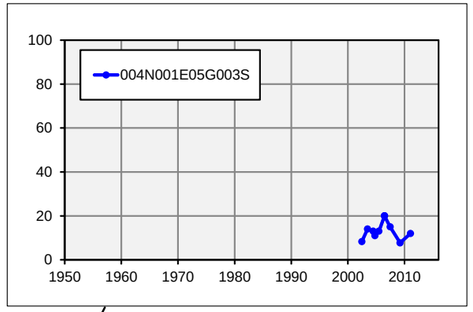
TODD GROUNDWATER

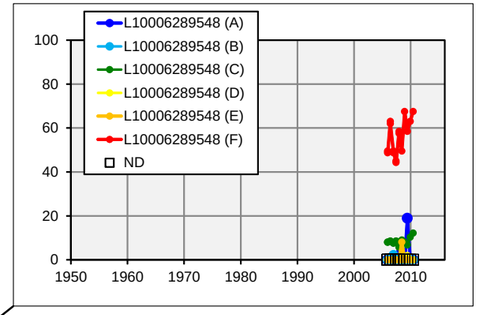
Figure 29
Lucerne Valley - TDS

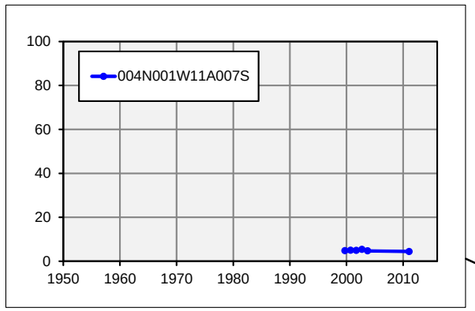


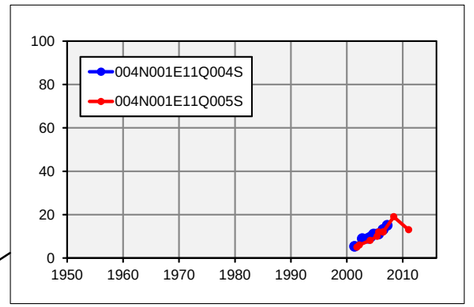


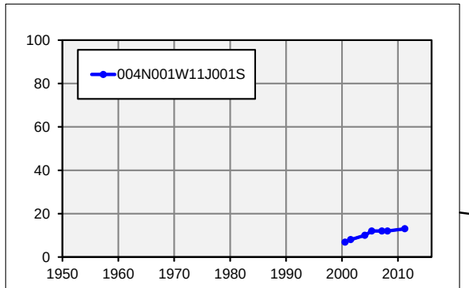


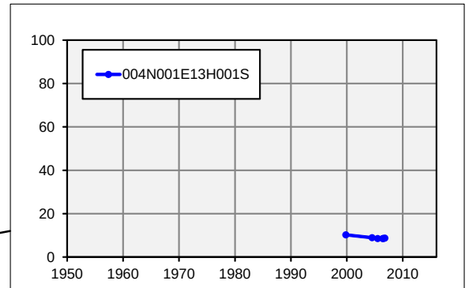


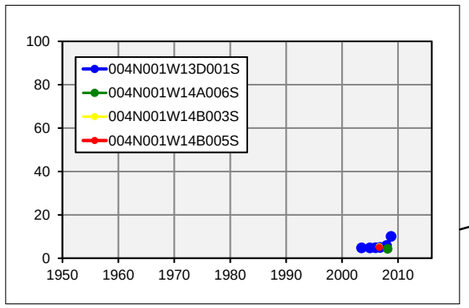


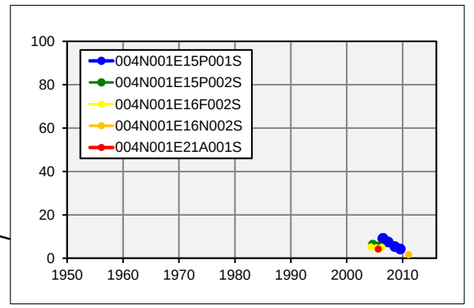


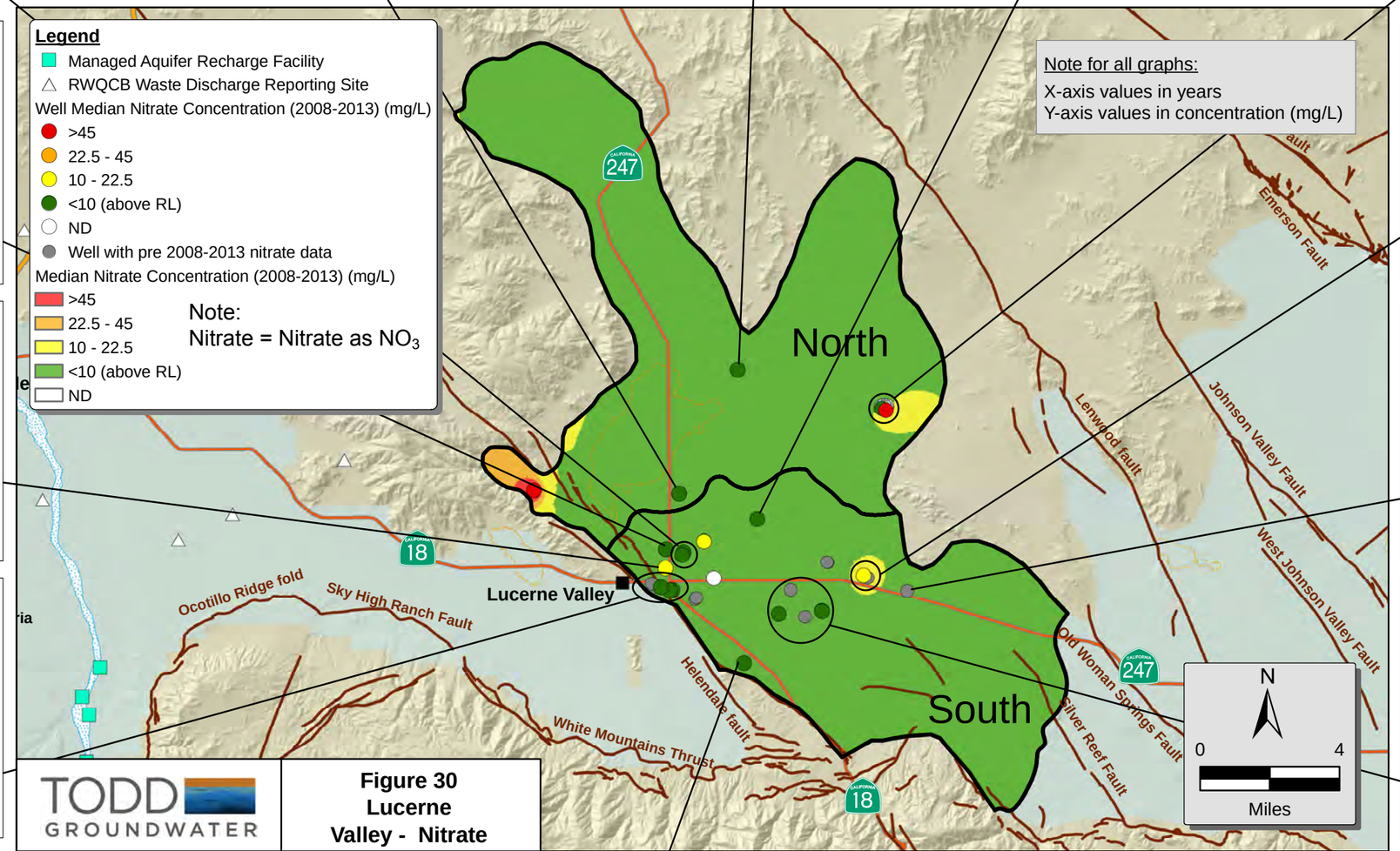


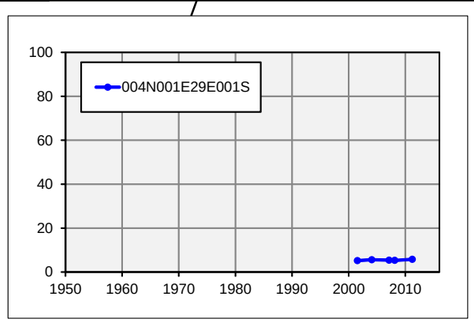












TODD GROUNDWATER

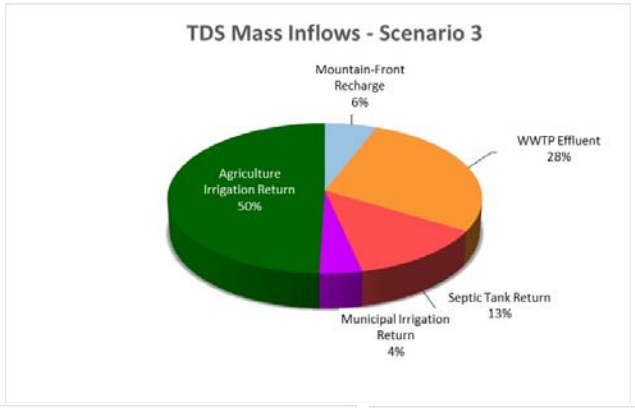
Figure 30
Lucerne Valley - Nitrate

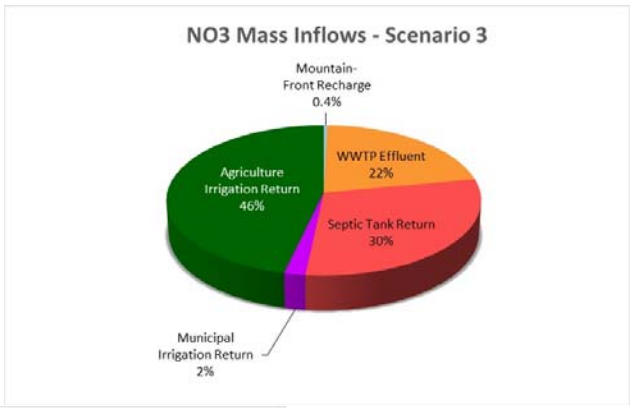
C17. Lucerne Valley (south)

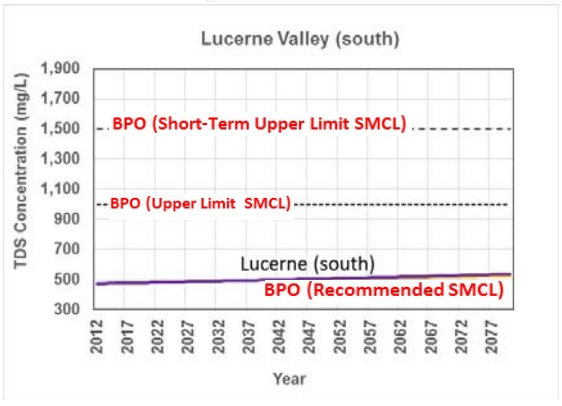
Scenario 3 Summary

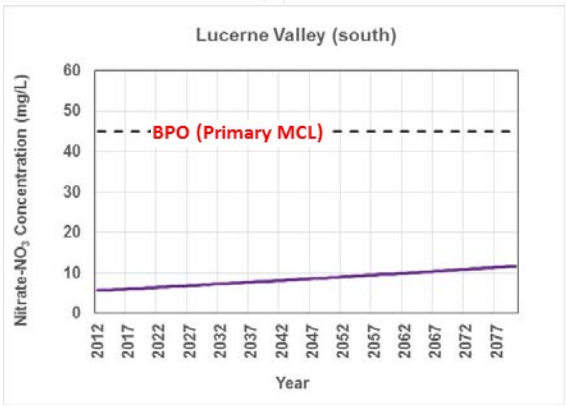
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	875	19%	210	6%	0.6	0.4%
WWTP Effluent	2,068	44%	445	28%	13.4	22%
Septic Tank Return	351	7%	1,220	13%	109.1	30%
Municipal Irrigation Return	46	1%	2,531	4%	45.0	2%
Agriculture Irrigation Return	1,342	29%	1,205	50%	44.6	47%
Flow-Weighted Average Concentration of Total Inflows			698		27.4	
Initial (2012) Groundwater Concentration			472		5.7	
Simulated Final (2081) Groundwater Concentration			535		11.7	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Lucerne Valley (south)	TDS	472	522	50	535	63	13	535	63	0
	Nitrate-NO_3	5.7	7.8	2.1	11.7	6.0	4.0	11.7	6.0	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

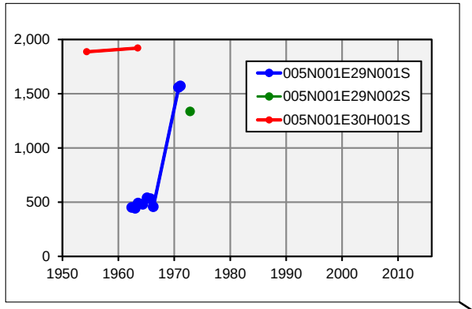
- Key loading factors are agricultural irrigation return (50%), (imported Big Bear Area Regional Wastewater Agency [BBARWA]) WWTP effluent (28%), and septic tank return (13%).
- Projected future groundwater concentration change is from 472 to 535 mg/L (+63 mg/L).
- Impact of population growth on groundwater concentration is +13 mg/L.
- There is no impact from recycled water projects.

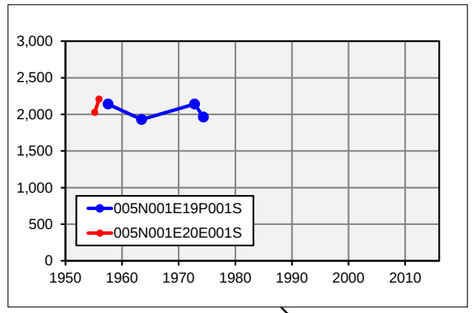
Nitrate-NO_3:

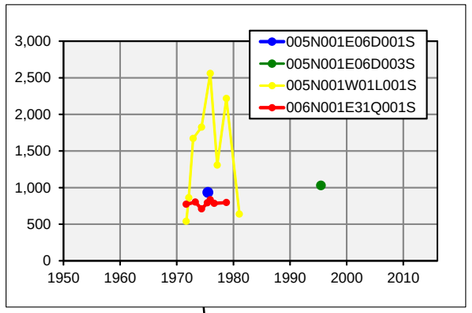
- Key loading factor is agricultural irrigation return (46%), septic tank return (30%) and imported BBARWA WWTP effluent (22%).
- Projected future groundwater concentration change is from 5.7 to 11.7 mg/L (+6.0 mg/L).
- Impact of population growth on groundwater concentration is +4.0 mg/L.
- There is no impact from recycled water projects.

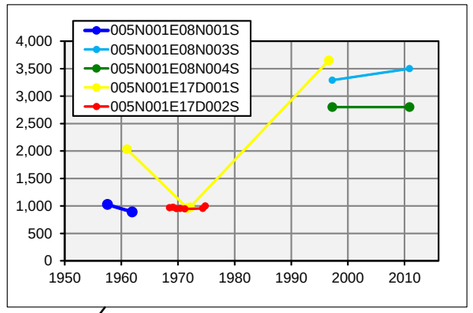
Conclusions:

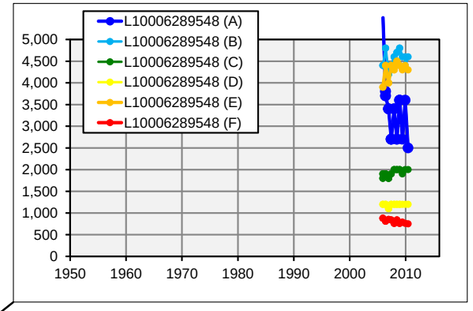
- Salt and nutrient loading in Lucerne Valley (south) is controlled primarily by agricultural irrigation followed by septic tank return/imported BBARWA WWTP effluent.
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (1,000 mg/L for TDS).
- Small simulated future groundwater TDS and nitrate concentration increases are associated with population growth.

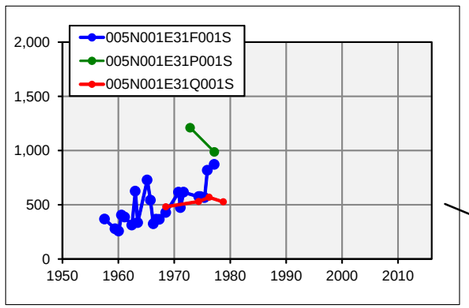


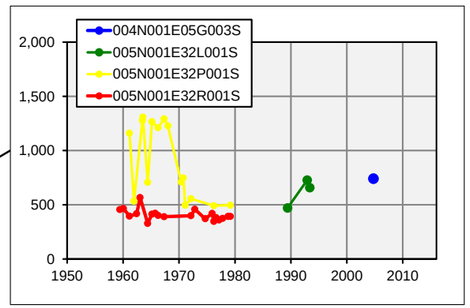


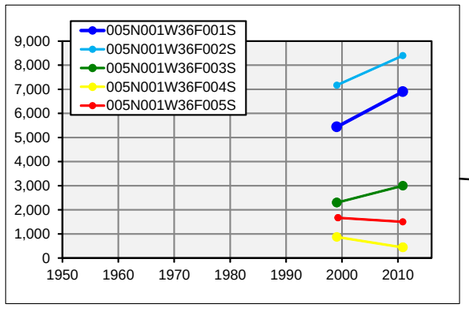


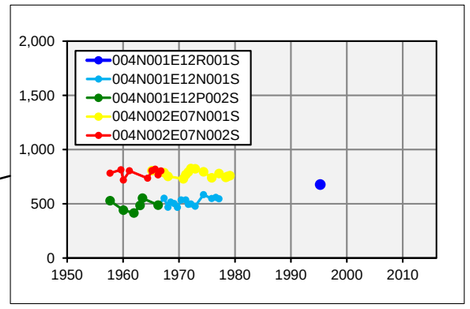


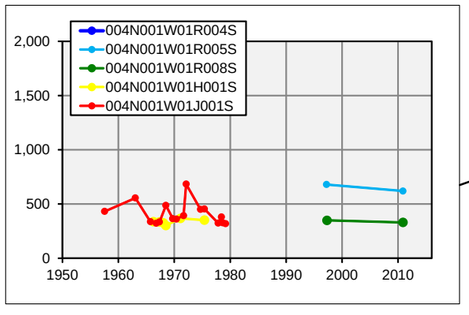


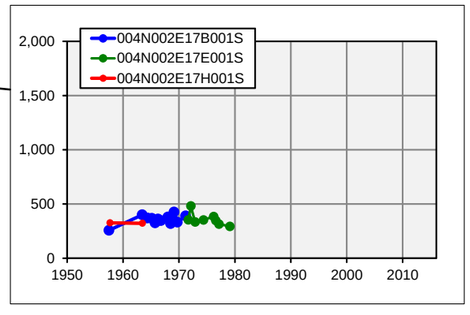


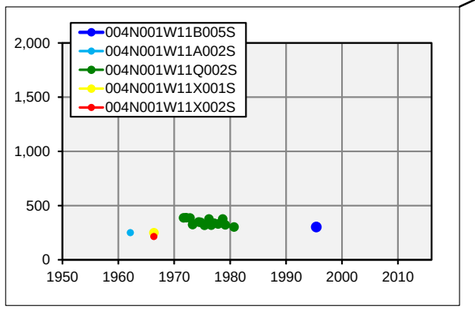


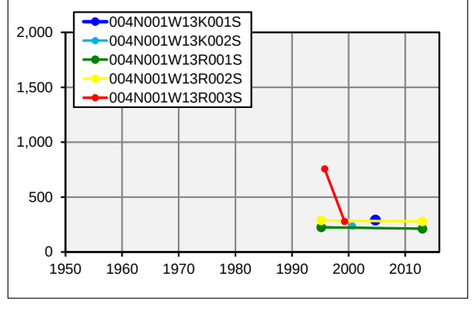


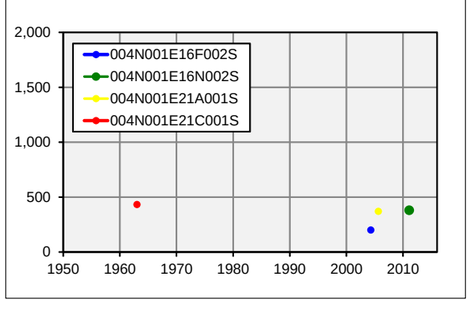


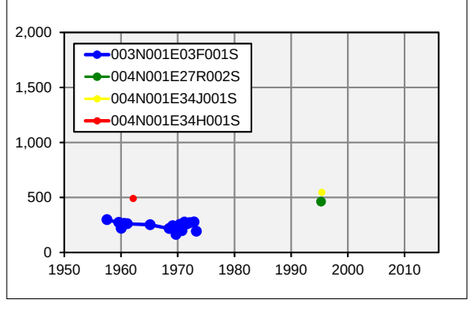


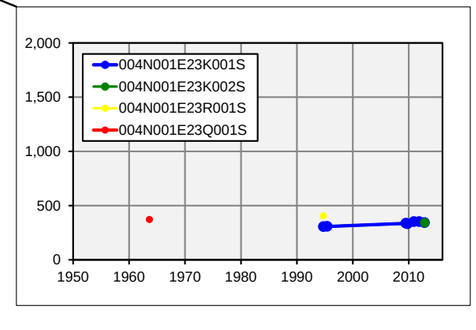


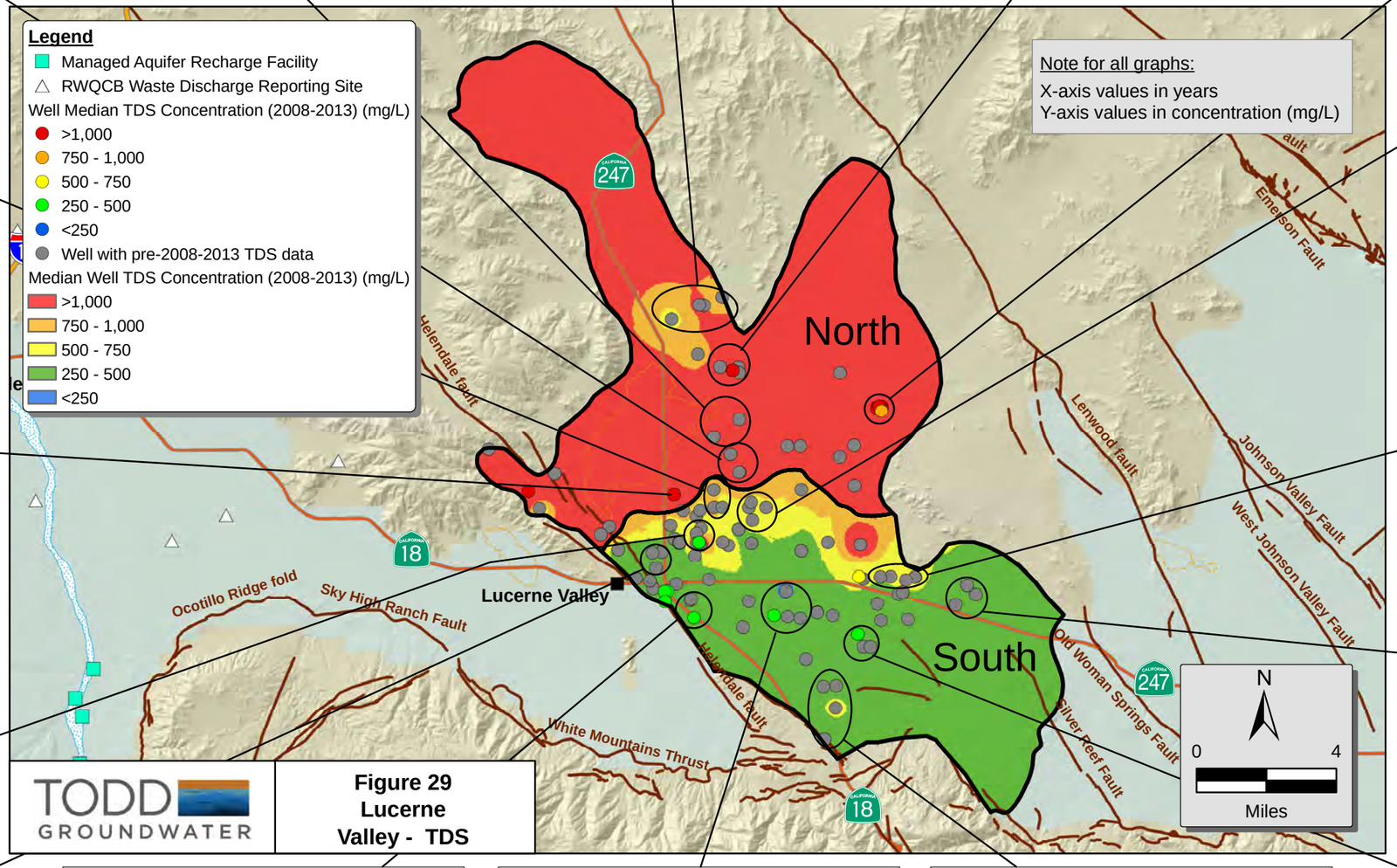






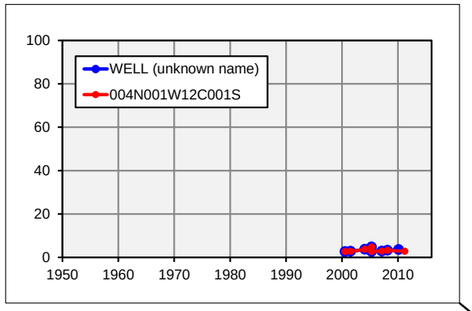


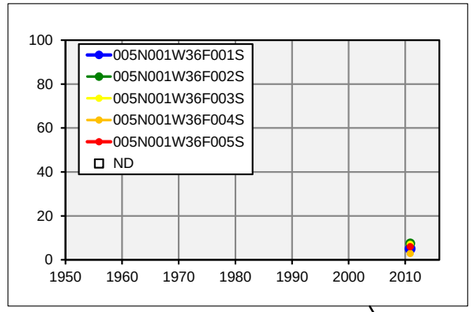


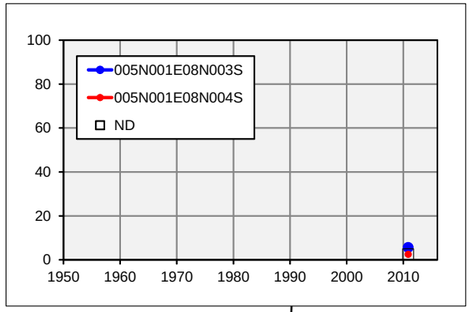


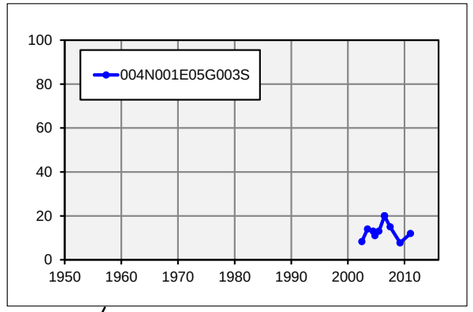
TODD GROUNDWATER

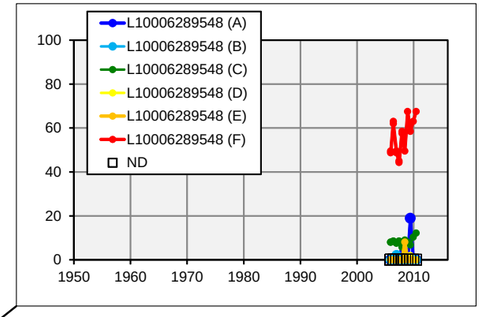
Figure 29
Lucerne Valley - TDS

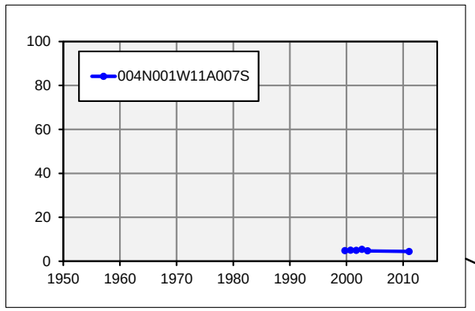


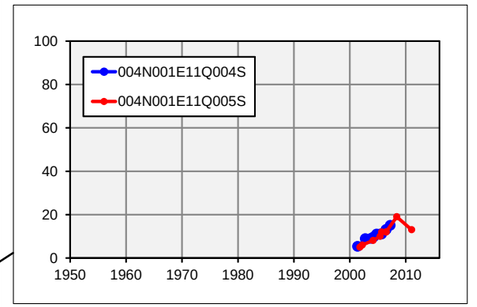


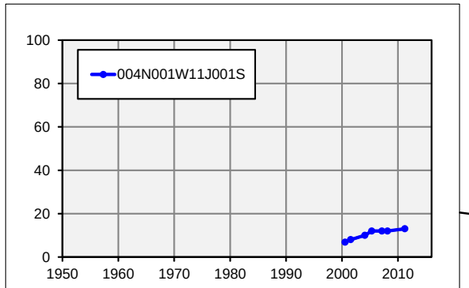


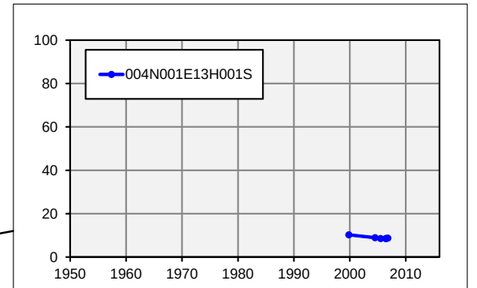


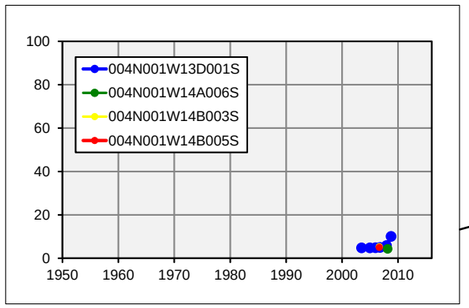


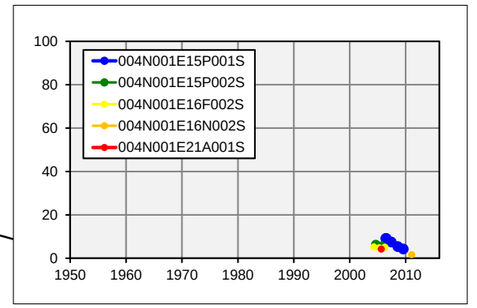


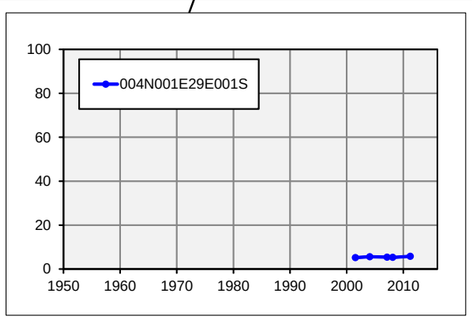


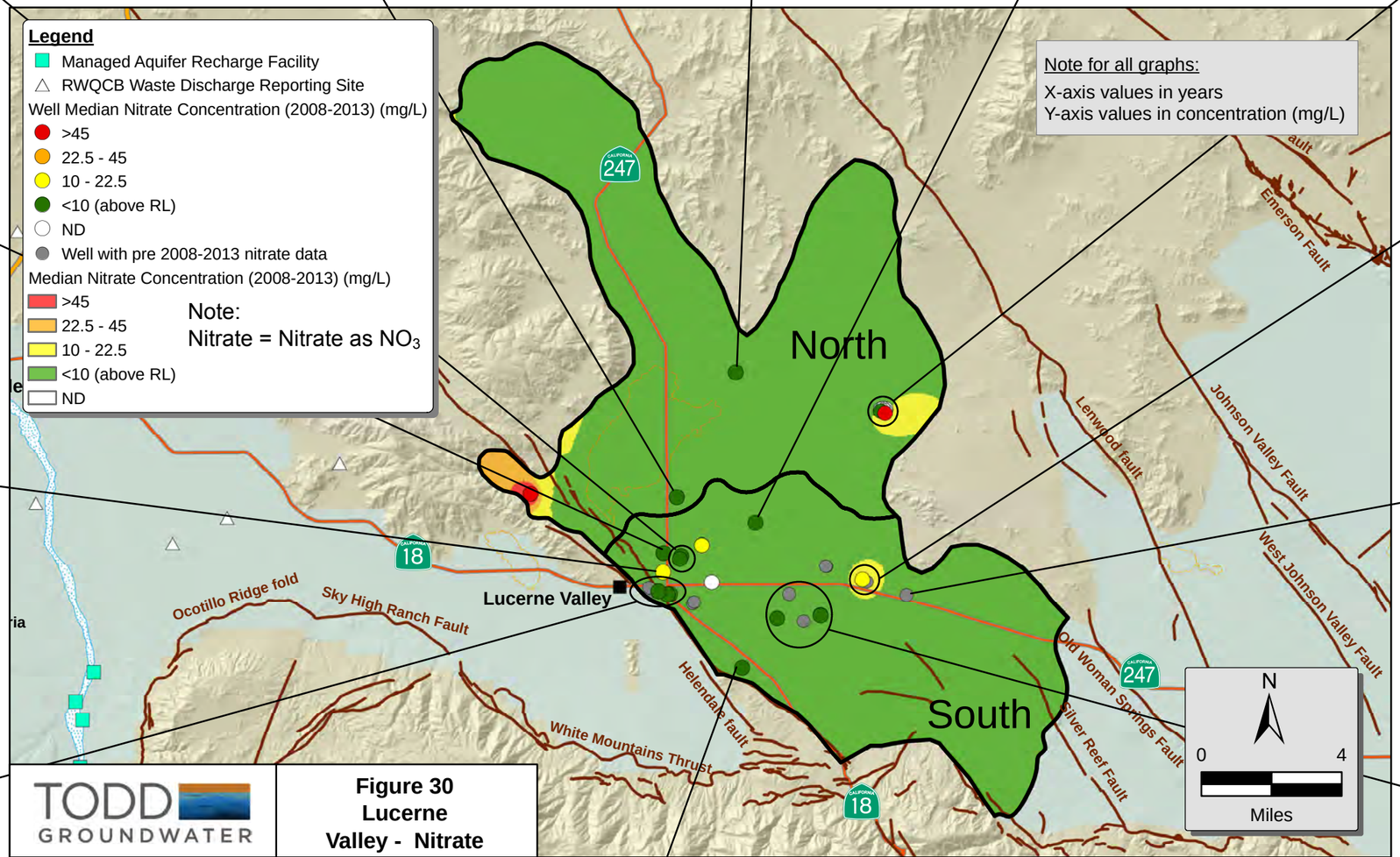












TODD GROUNDWATER

Figure 30
Lucerne Valley - Nitrate

C18. Johnson Valley

Scenario 3 Summary

Inflow	Average Annual Rate (AFY)	Average Annual Rate (% of Total)	TDS Concentration (mg/L)	TDS Mass Loading (%)	Nitrate-NO_3 Concentration (mg/L)	Nitrate-NO_3 Mass Loading (%)
Mountain-Front Recharge	921	97%	210	81%	0.6	9%
Septic Tank Return	30	3%	1,510	19%	176.6	91%
Flow-Weighted Average Concentration of Total Inflows			251		6.2	
Initial (2012) Groundwater Concentration			678		6.2	
Simulated Final (2081) Groundwater Concentration			686		7.0	

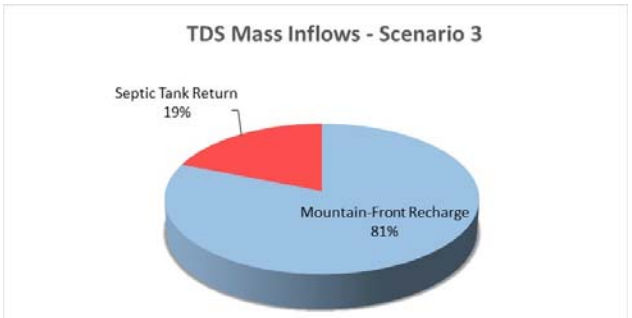
Notes:

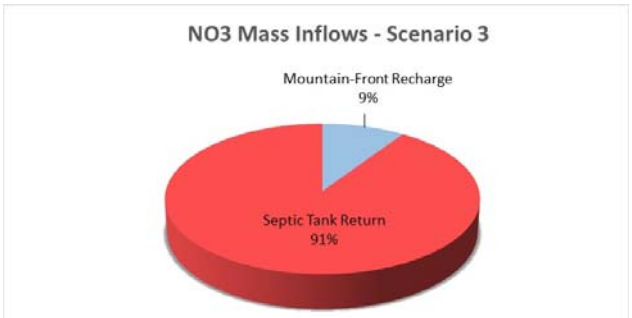
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation

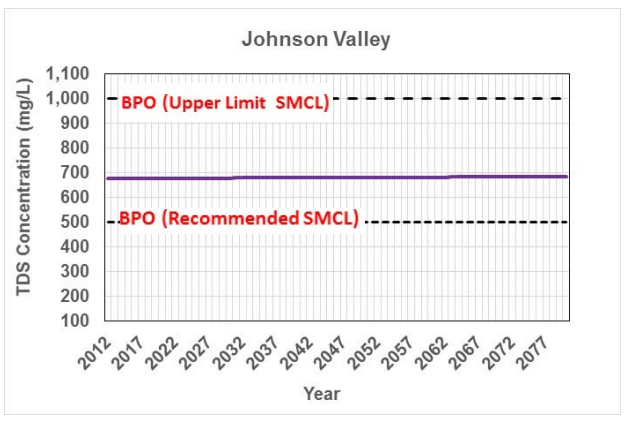
Concentration is above simulated groundwater concentration range

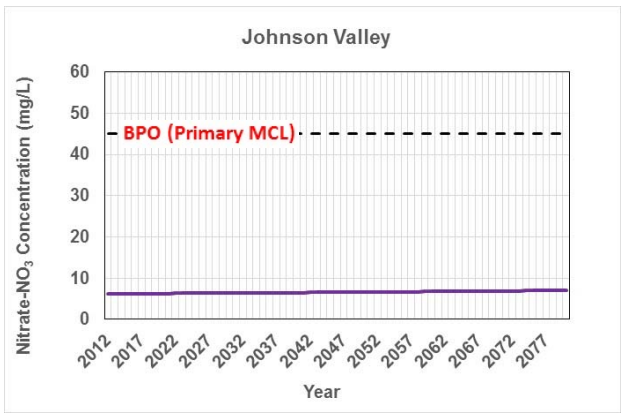
Concentration is within simulated groundwater concentration range

Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L) (a)	Scenario 1 (Baseline): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (b)	Scenario 1 (Baseline): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (b - a)	Scenario 2 (Growth with No Recycled Water Projects): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (c)	Scenario 2 (Growth with No Recycled Water Projects): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (c - a)	Scenario 2 (Growth with No Recycled Water Projects): Effect of Projected Growth (mg/L) (c - b)	Scenario 3 (Growth with Recycled Water Projects): Simulated Future (2081) Groundwater TDS Concentration (mg/L) (d)	Scenario 3 (Growth with Recycled Water Projects): Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L) (d - a)	Scenario 3 (Growth with Recycled Water Projects): Effect of Recycled Water Projects (mg/L) (d - c)
Johnson Valley	TDS	678	685	7	686	8	1	686	8	0
	Nitrate-NO_3	6.2	6.9	0.7	7.0	0.8	0.1	7.0	0.8	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration

blue color indicates no change in concentration

green color indicates net decrease in concentration

TDS:

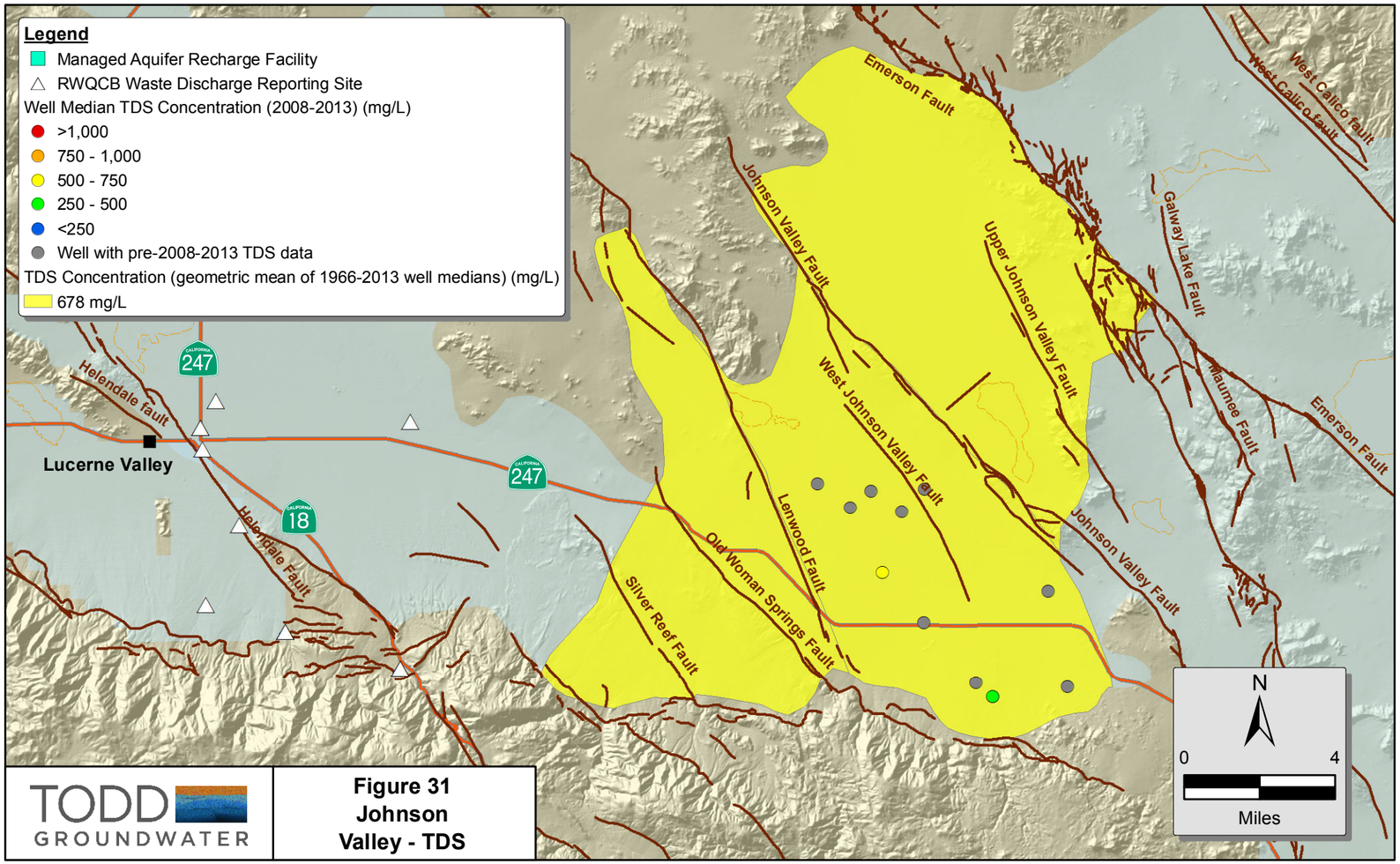
- Key loading factor is mountain-front recharge (81%).
- Projected future groundwater concentration change is from 678 to 686 mg/L (+8 mg/L). Final groundwater concentration exceeds flow-weighted average concentration of total inflows due to concentrating effect of dry lake evaporation in the subregion.
- Impact of population growth on groundwater concentration is small (+1 mg/L).
- There is no impact from recycled water projects.

Nitrate-NO_3:

- Key loading factor is septic tank return (91%).
- Projected future groundwater concentration change is from 6.2 to 7.0 mg/L (+0.8 mg/L). Final groundwater concentration exceeds flow-weighted average concentration of total inflows due to concentrating effect of dry lake evaporation in the subregion.
- Impact of population growth on groundwater concentration is negligible (+0.1 mg/L).
- There is no impact from recycled water projects.

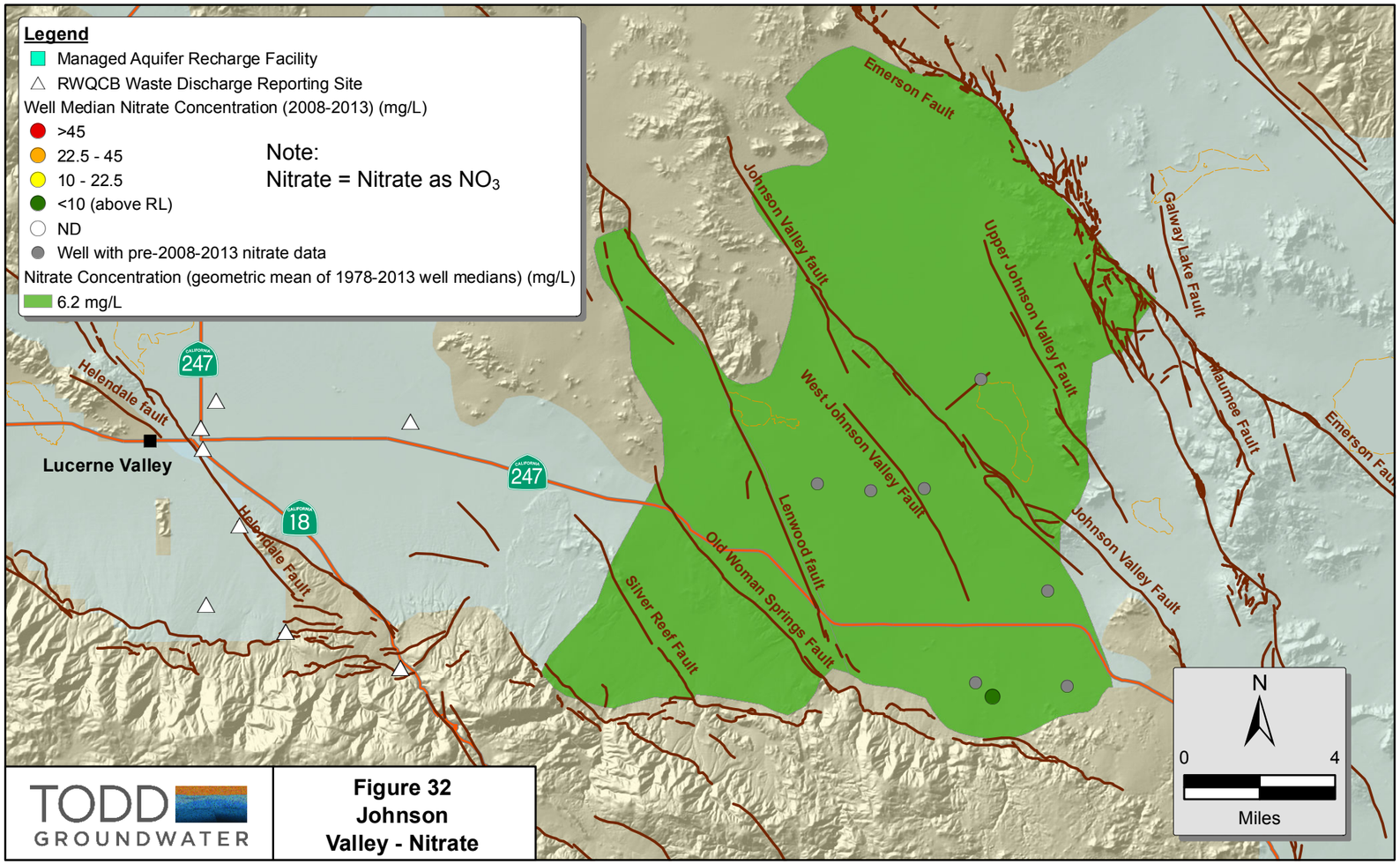
Conclusions:

- Salt and nutrient loading in the Johnson Valley subregion is minor. Projected average annual total inflows (951 AFY) represent a small percentage (0.04%) of the estimated groundwater in storage (2,273,000 AF, currently).
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (1,000 mg/L for TDS).
- Future groundwater TDS and nitrate concentrations are not expected to be impacted by projected population growth.



TODD GROUNDWATER

Figure 31
Johnson Valley - TDS



TODD GROUNDWATER

Figure 32
Johnson Valley - Nitrate

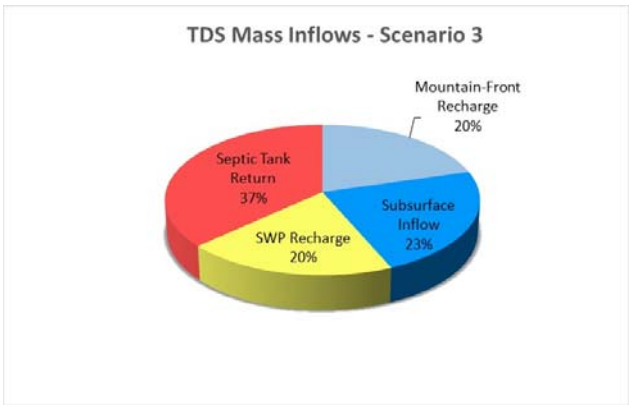
C19. Ames-Means Valley

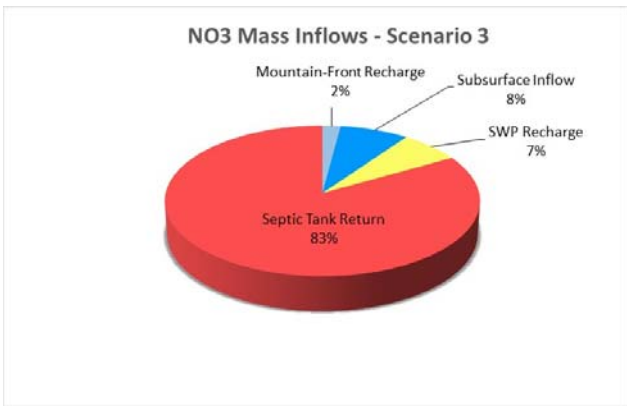
Scenario 3 Summary

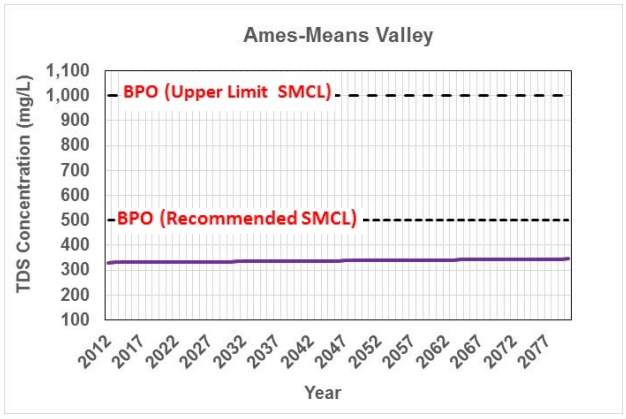
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	790	38%	210	20%	0.6	2%
Subsurface Inflow	273	13%	682	23%	6.6	8%
SWP Recharge	637	31%	250	20%	2.5	7%
Septic Tank Return	354	17%	843	37%	54.6	83%
Flow-Weighted Average Concentration of Total Inflows			394		11.3	
Flow-Weighted Average Concentration of Total Inflows (with no SWP Recharge)[a]			459		15.3	
Initial (2012) Groundwater Concentration			330		5.7	
Simulated Final (2081) Groundwater Concentration			345		6.5	

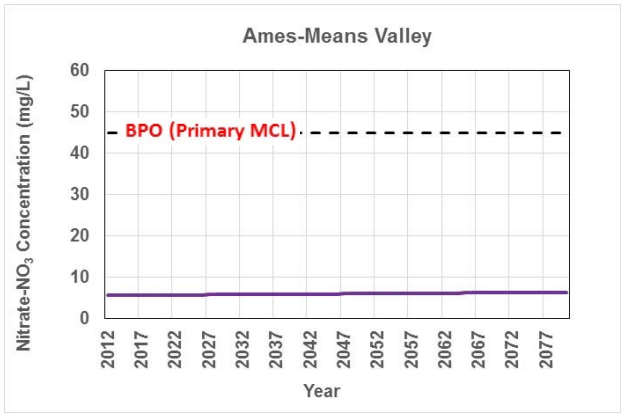
Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
(a) Concentration assumes other flows and concentrations remain the same

Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Ames-Means Valley	TDS	330	345	15	343	13	-2	343	13	0
	Nitrate-NO_3	5.7	6.4	0.7	6.5	0.8	0.0	6.5	0.8	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

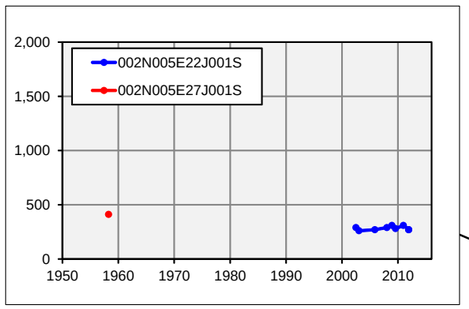
- Loading factors are septic tank return (37%), subsurface inflow (23%), mountain-front recharge and SWP recharge (20% each).
- Projected future groundwater concentration change is from 330 to 345 mg/L (+15 mg/L).
- There is a small impact (benefit) from population growth (-3 mg/L) due to projected delivery of imported SWP water for recharge.
- There is no impact from recycled water projects.
- The flow-weighted average concentration of total inflows with SWP recharge (394 mg/L) is lower than without SWP recharge (459 mg/L), indicating that SWP improves groundwater TDS concentrations.

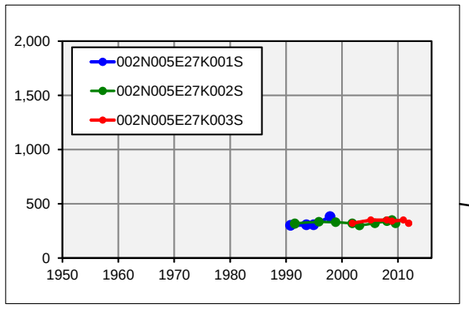
Nitrate-NO_3:

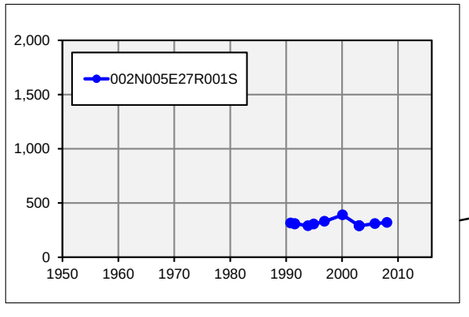
- Key loading factor is septic tank return (83%).
- Projected future groundwater concentration change is from 5.7 to 6.5 mg/L (+0.8 mg/L).
- There is no impact from population growth, due to the projected delivery of imported SWP water for recharge.
- There is no impact from recycled water projects.
- The flow-weighted average concentration of total inflows with SWP recharge (11.3 mg/L) is lower than without SWP recharge (15.3 mg/L), indicating that SWP improves groundwater nitrate-NO_3 concentrations.

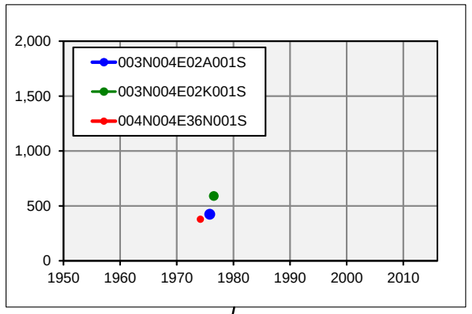
Conclusions:

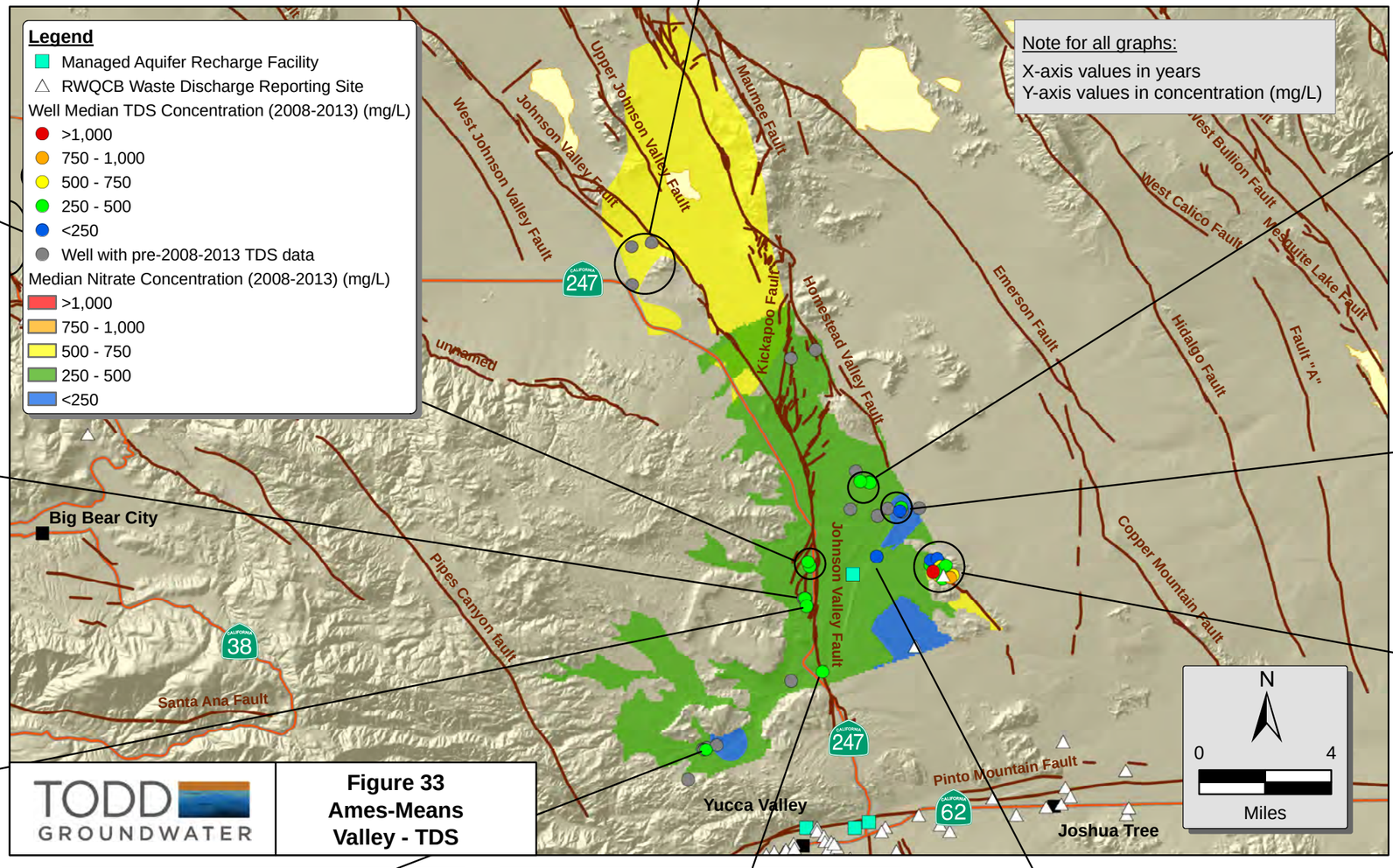
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- SWP water recharge improves groundwater TDS and nitrate concentrations in the subregion.

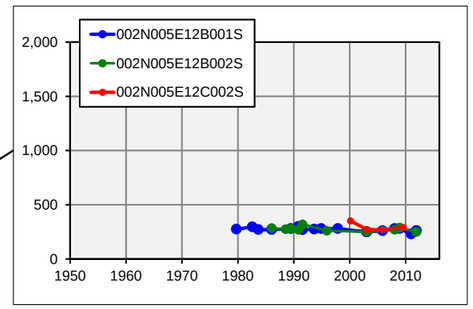


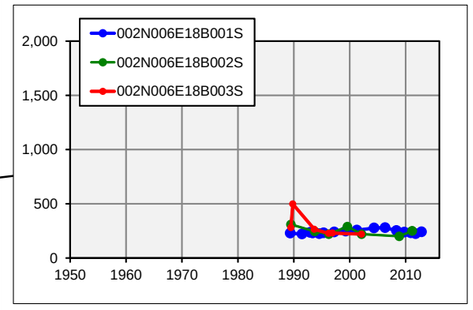


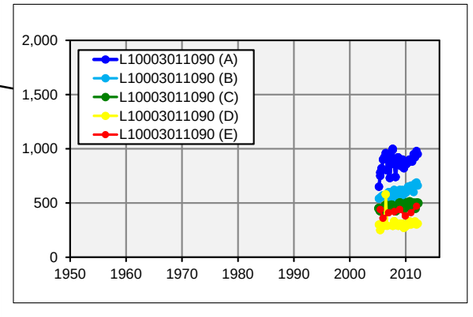


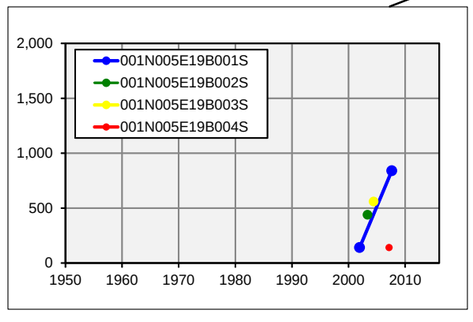


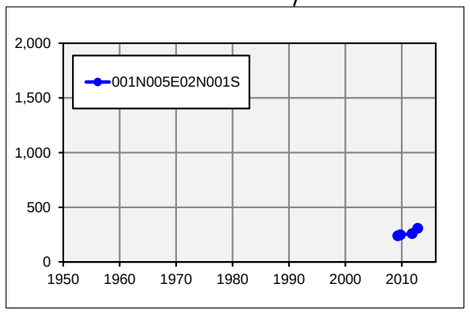


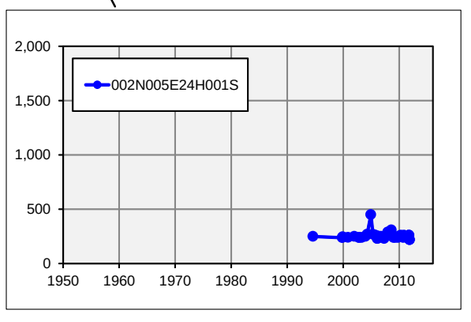






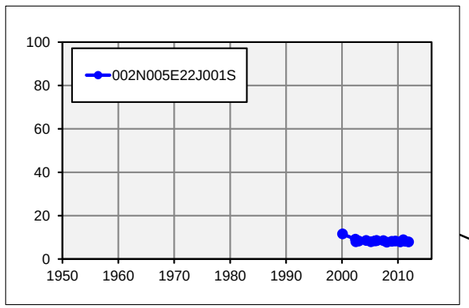


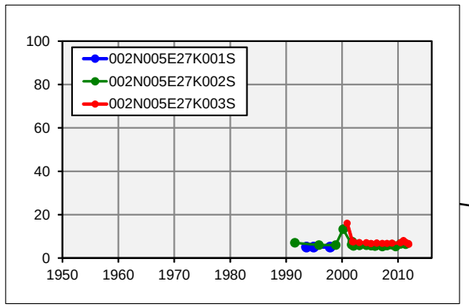


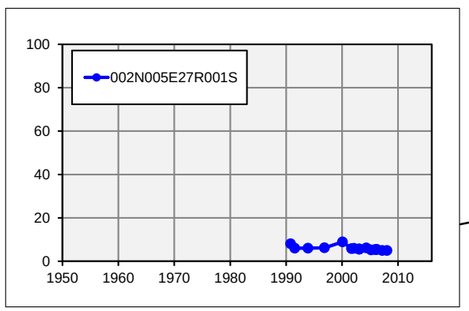


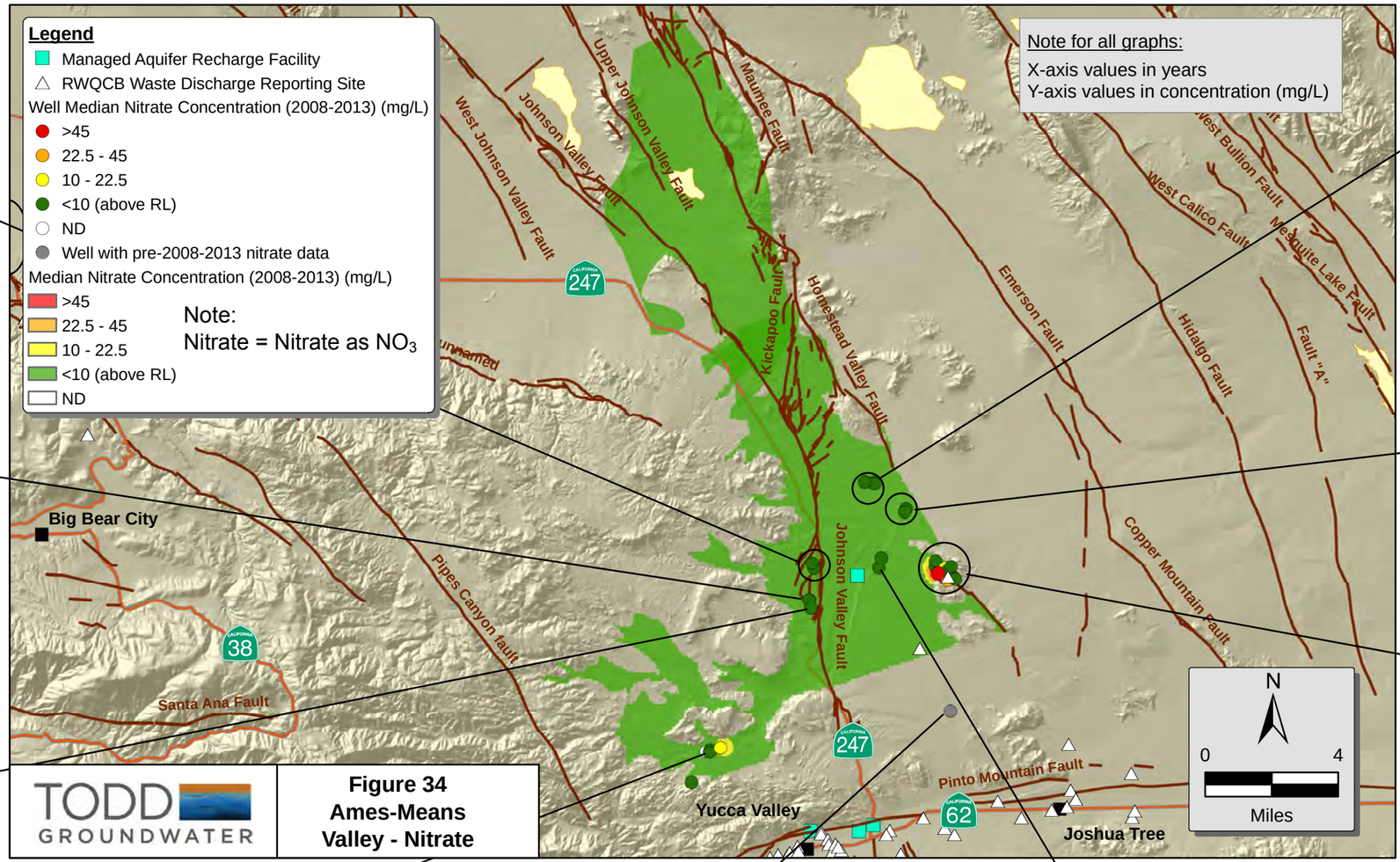
TODD GROUNDWATER

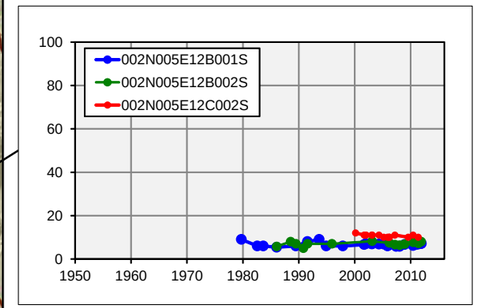
Figure 33
Ames-Means Valley - TDS

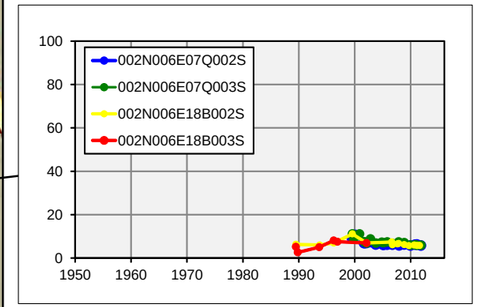


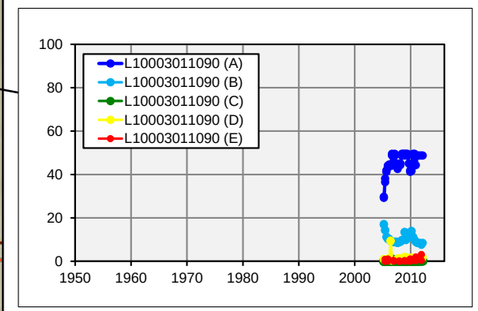


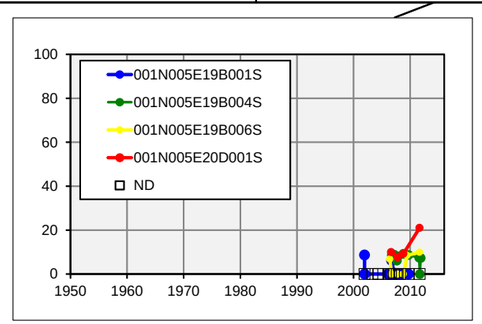


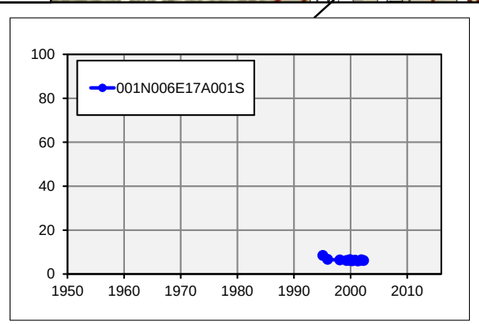


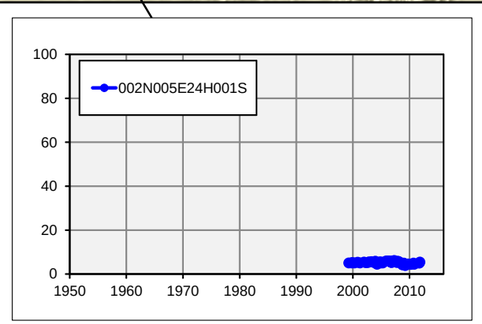












TODD GROUNDWATER

Figure 34
Ames-Means Valley - Nitrate

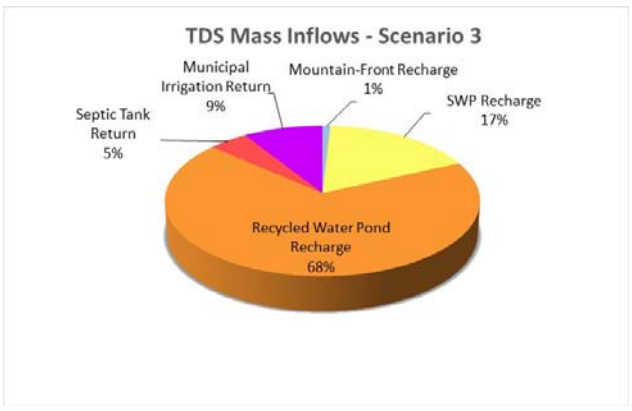
C20. Warren Valley

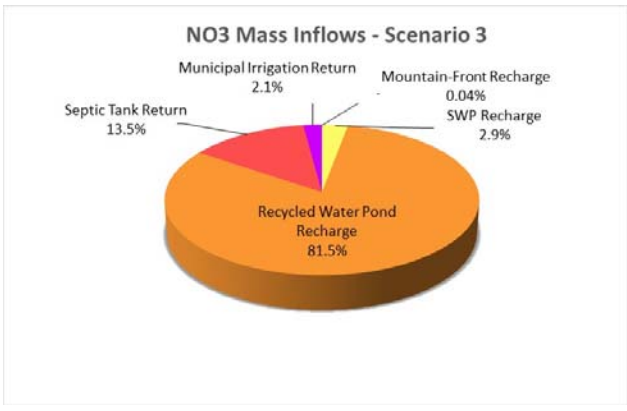
Scenario 3 Summary

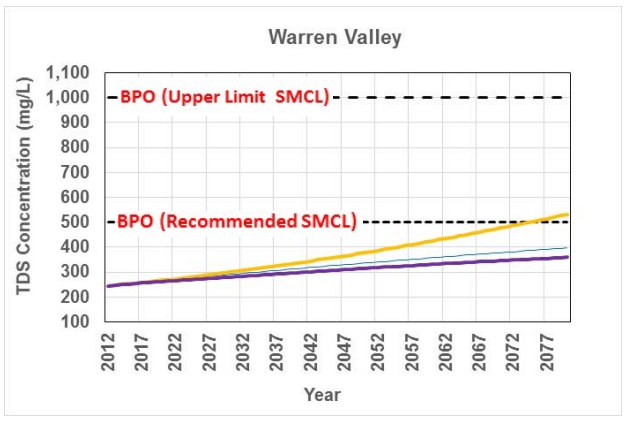
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	83	2%	210	1%	0.6	0.04%
SWP Recharge	1,327	31%	250	17%	2.5	3%
Recycled Water Pond Recharge	2,628	61%	500	68%	35.4	81%
Septic Tank Return	129	3%	674	5%	119.1	13%
Municipal Irrigation Return	113	3%	1,532	9%	26.4	3%
Flow-Weighted Average Concentration of Total Inflows			449		26.8	
Flow-Weighted Average Concentration of Total Inflows (with no SWP Recharge)[a]			539		37.7	
Initial (2012) Groundwater Concentration			243		15.4	
Simulated Final (2081) Groundwater Concentration			359		21.4	

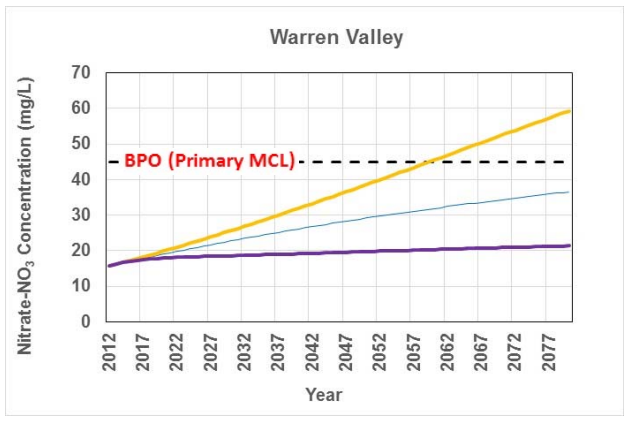
Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
(a) Concentration assumes other flows and concentrations remain the same

Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Warren Valley	TDS	243	397	154	532	289	134	359	116	-173
	Nitrate-NO_3	15.4	36.5	21.1	59.3	43.9	22.7	21.4	6.0	-37.9

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

- Key loading factors are recycled water pond recharge associated with the HDWD regional treatment plant (68%) and SWP water recharge (17%).
- Projected future groundwater concentration change is from 243 to 359 mg/L (+116 mg/L).
- Impact of population growth on groundwater concentration is +134 mg/L.
- The construction and operation of the HDWD regional treatment plant and phasing out of septic tanks in the subregion has a significant positive benefit on groundwater TDS concentrations (-173 mg/L).
- The flow-weighted average concentration of total inflows with SWP recharge (449 mg/L) is lower than without SWP recharge (539 mg/L), indicating that SWP stabilizes TDS concentrations in the subregion.

Nitrate-NO_3:

- Key loading factors are recycled water pond recharge associated with the HDWD regional treatment plant (81%) and septic tank recharge (13%). Septic tanks will be effectively phased out by 2022.
- Projected future groundwater concentration change is from 15.4 to 21.4 mg/L (+6.0 mg/L).
- Impact of population growth (without the HDWD regional treatment plant) on groundwater concentration is +22.7 mg/L.
- There is large direct benefit (-37.9 mg/L) from the construction and operation of the HDWD regional treatment plant and phasing out of septic tanks in the subregion.
- The flow-weighted average concentration of total inflows with SWP recharge (26.8 mg/L) is lower than without SWP recharge (37.7 mg/L), indicating that SWP water stabilizes concentrations in the subregion.

Conclusions:

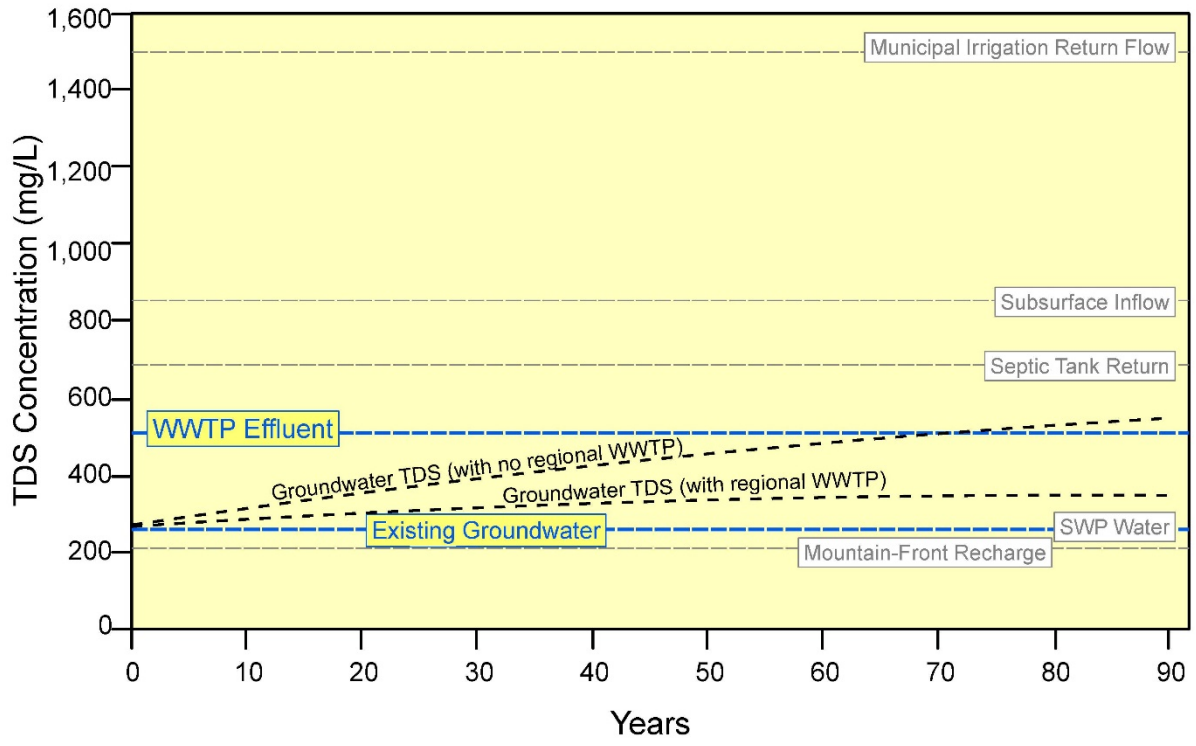
- Salt and nutrient loading the Warren Valley is controlled predominantly by two factors: wastewater treatment facilities (and associated effluent discharges) and SWP water recharge.
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/l for TDS) under Scenario 3, as a result of the construction of the HDWD wastewater treatment/reclamation plant and phasing out of septic tanks.
- Simulated future groundwater TDS and nitrate concentration increases are associated with population growth; however, the construction of the HDWD regional wastewater treatment/reclamation plant and phasing out of septic tanks from 2016 through 2022 are expected to significantly improve groundwater quality. While TDS and nitrate concentrations increase slightly over time, projected salt and nutrient loading in the subregion will be less than current (2012) loading conditions.
- SWP water recharge improves groundwater TDS and nitrate concentrations in the subregion.

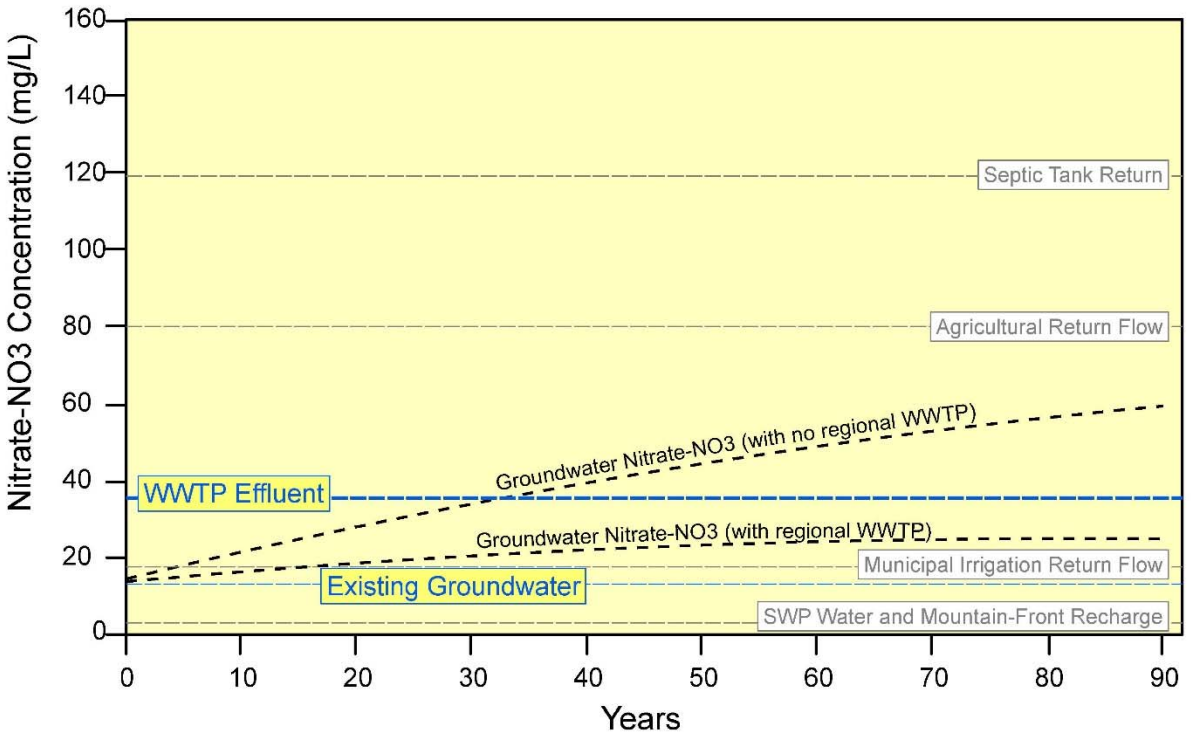
Evaluation of Regional Wastewater Treatment/Reclamation Plant Impacts (Benefits) on Groundwater TDS and Nitrate Concentrations

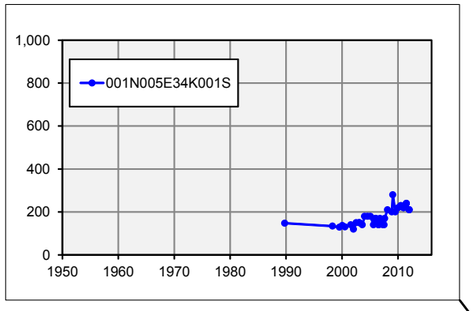
The synopsis for the Warren Valley shows the benefits of a regional wastewater treatment/reclamation plant (and phasing out of individual septic tank systems) on future groundwater TDS and nitrate concentrations.

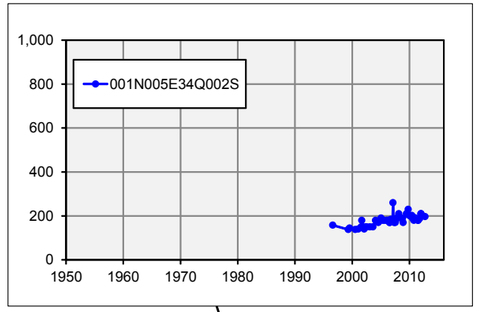
Nitrate and TDS concentrations for the Scenario 3 simulation of Warren Valley are shown in the charts below. The upper chart shows the benefits of a regional treatment plant on groundwater nitrate and TDS concentrations. Replacement of septic tank discharge (which has an average TDS concentration of 674 mg/L and nitrate-NO_3 concentration of 120 mg/L) with WWTP effluent (which has a TDS concentration of 500 mg/L and nitrate-NO_3 concentration of 35.4 mg/L) helps to stabilize groundwater concentrations.

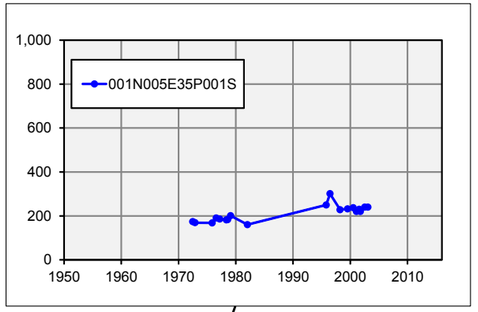
Conceptual Benefit of Regional Wastewater Treatment/Reclamation Plant on Groundwater Quality
Example: Warren Valley

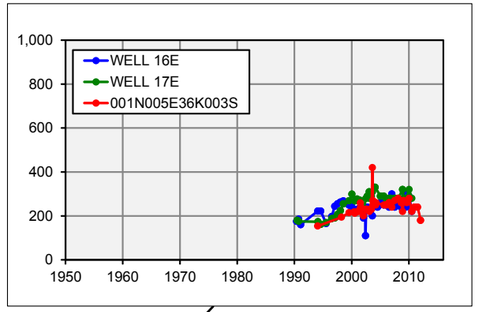


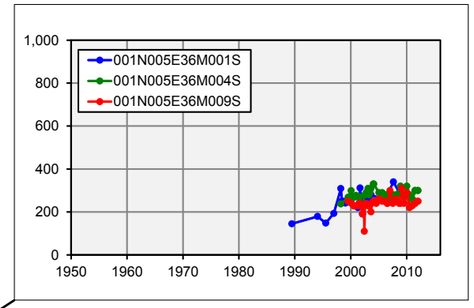


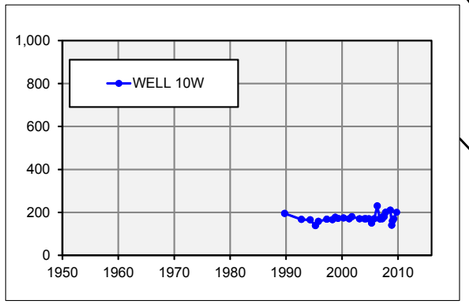


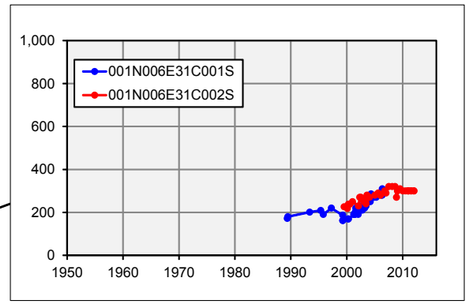


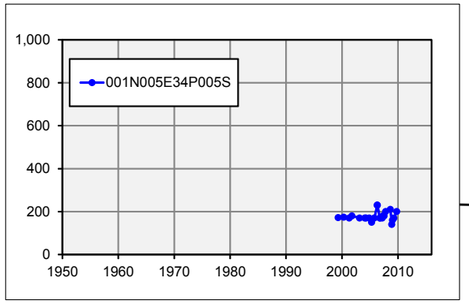


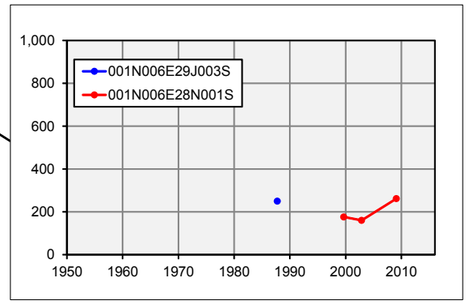


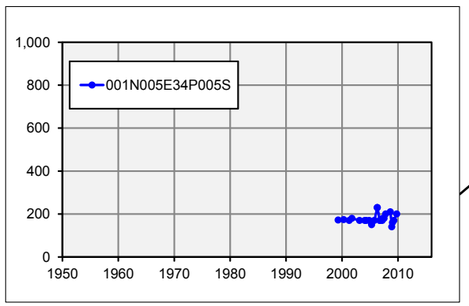


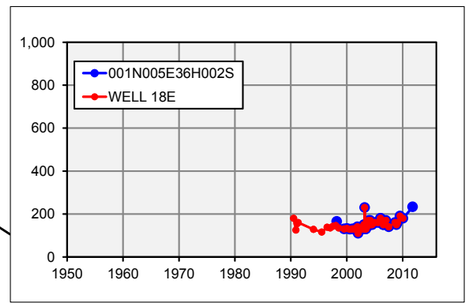


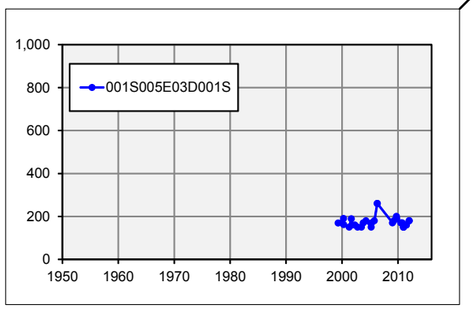


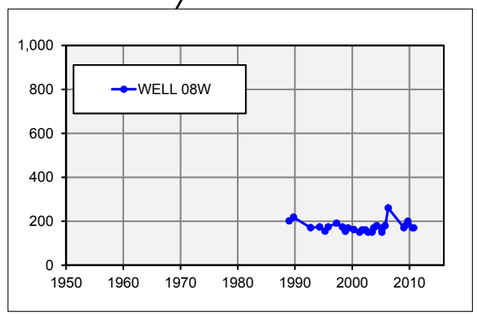


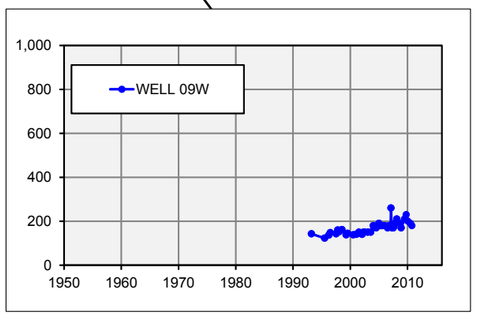


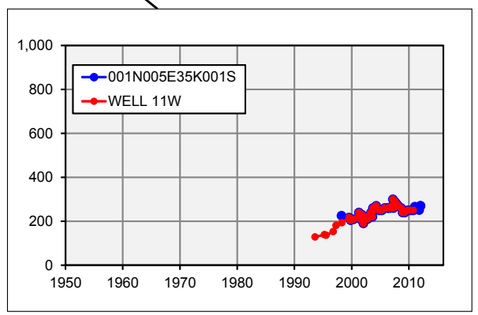


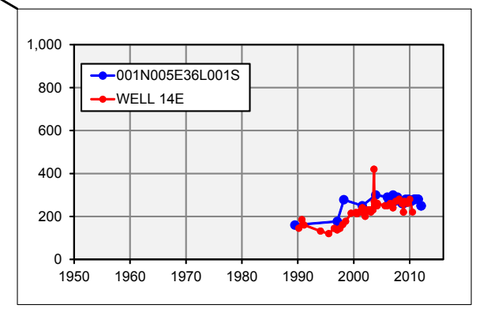


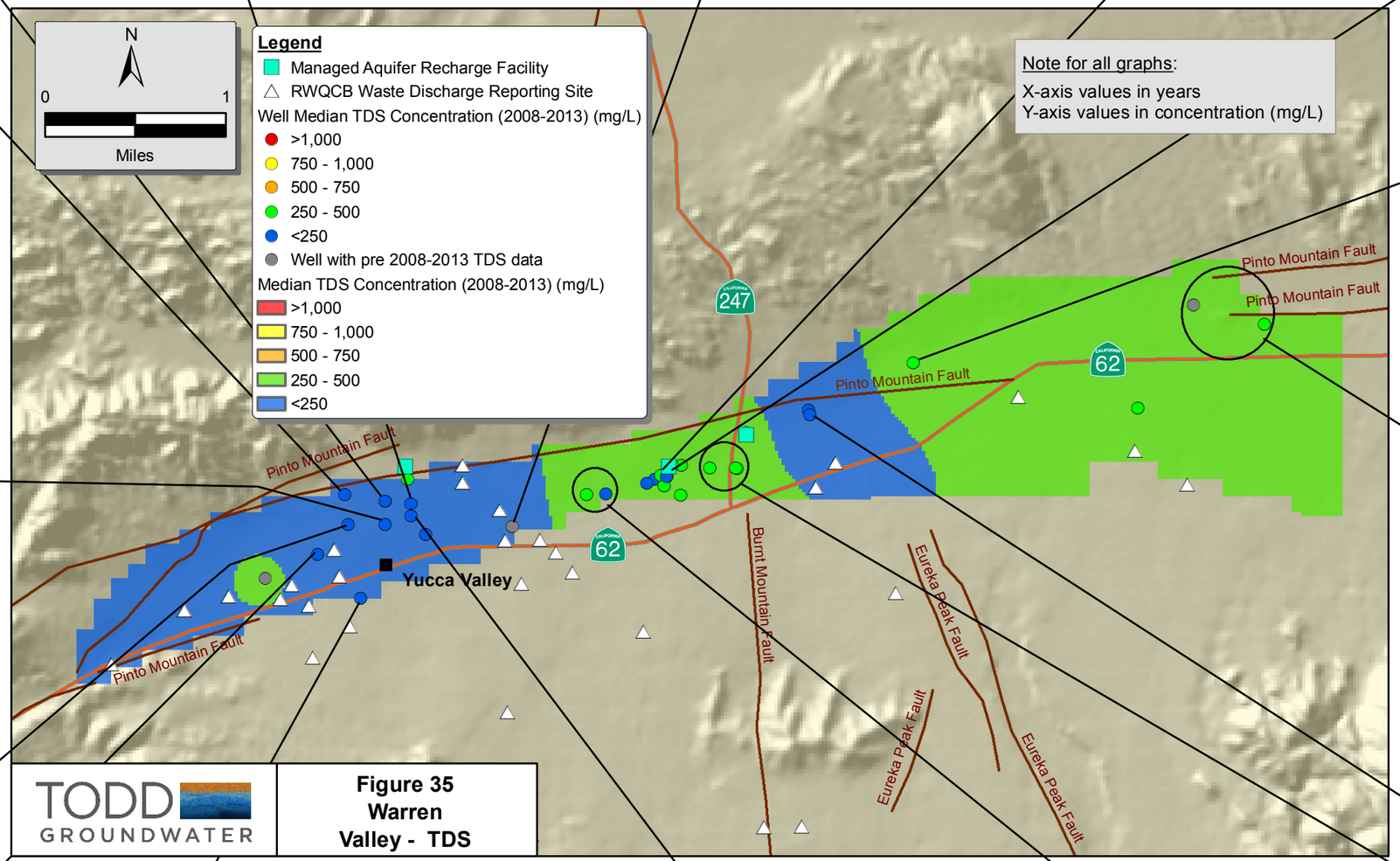






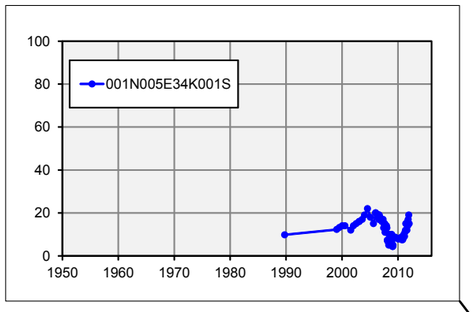


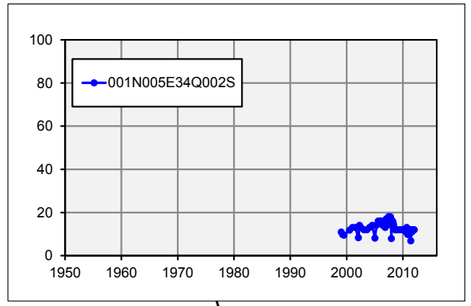


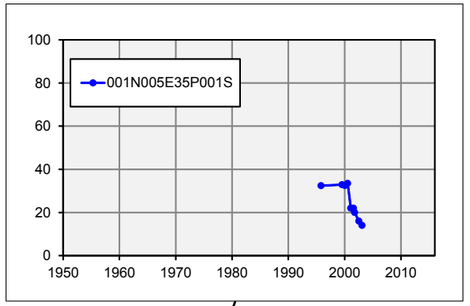


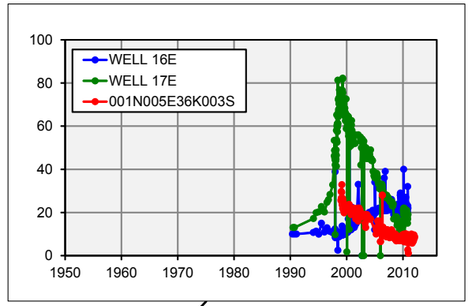
TODD GROUNDWATER

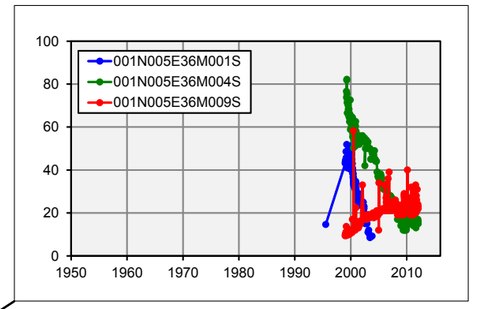
Figure 35
Warren Valley - TDS

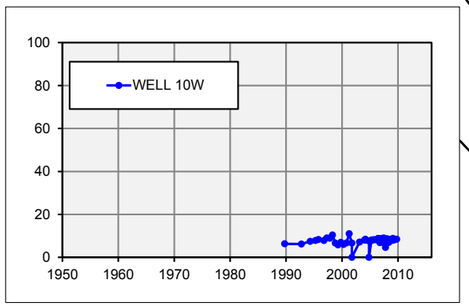


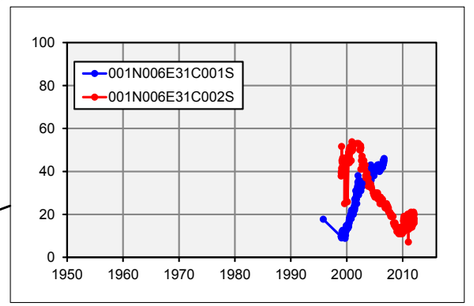


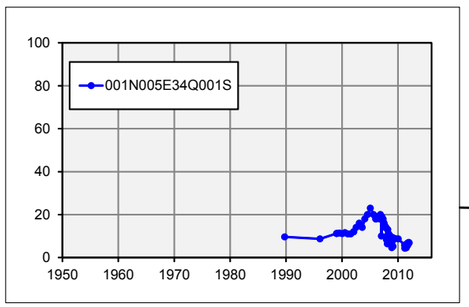


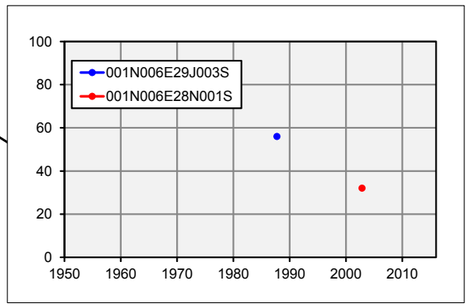


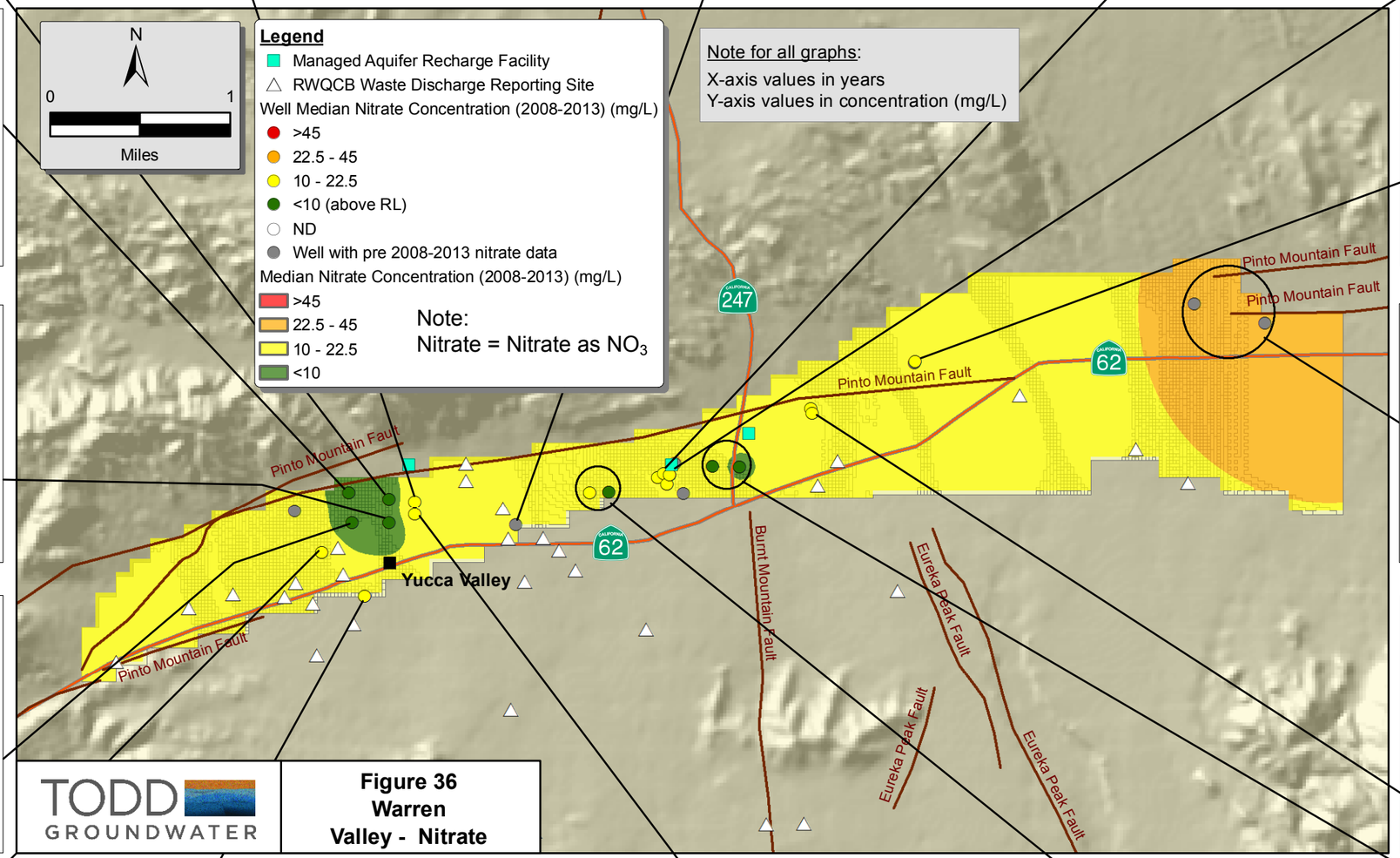


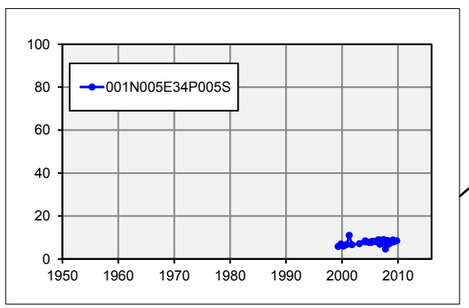


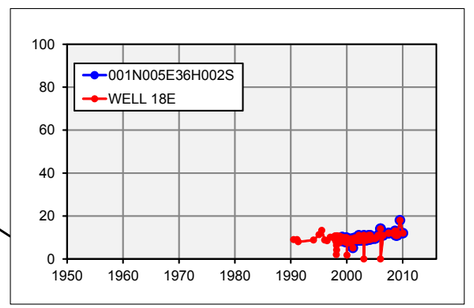






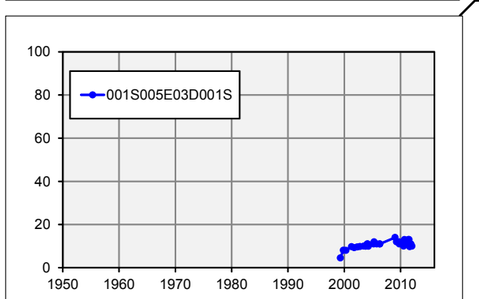


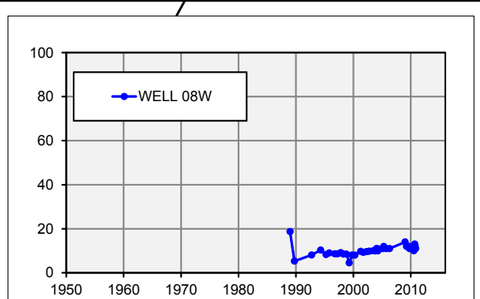


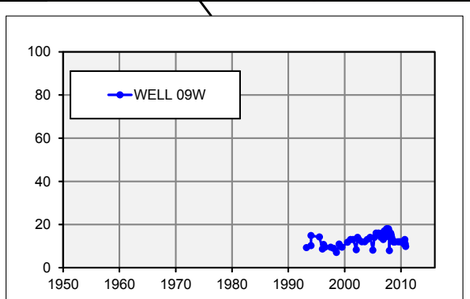


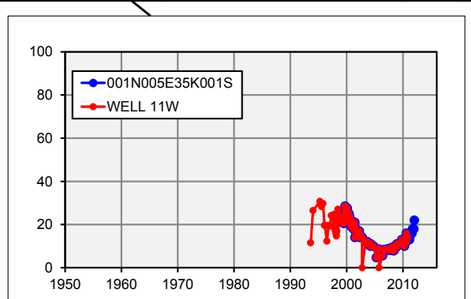
TODD GROUNDWATER

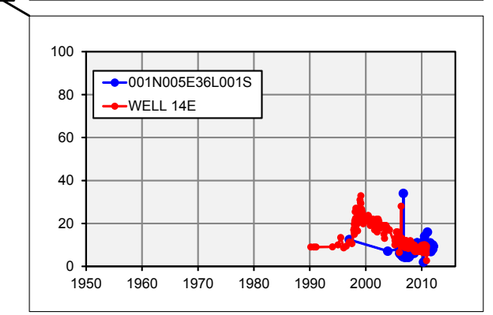
Figure 36
Warren Valley - Nitrate









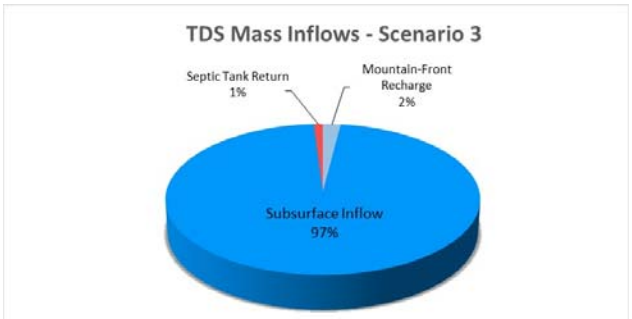


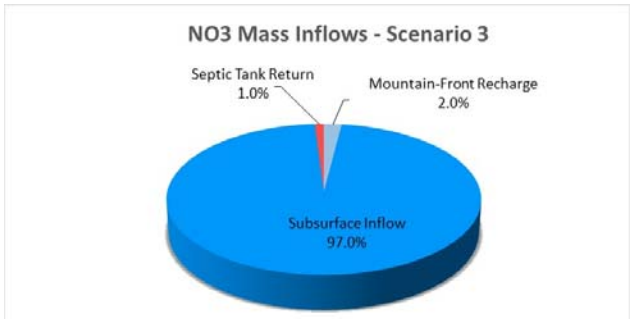
C21. Copper Mountain-Giant Rock

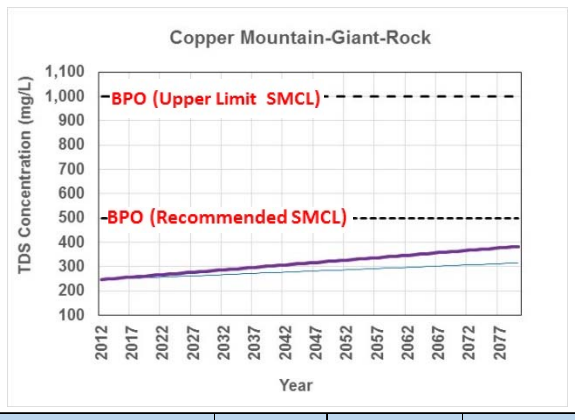
Scenario 3 Summary

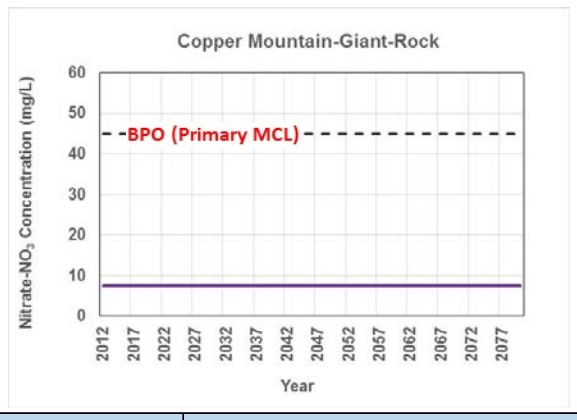
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	23	4%	210	2%	0.6	0.4%
Subsurface Inflow	579	96%	336	96%	6.1	95%
Septic Tank Return	4	1%	704	1%	47.5	5%
Flow-Weighted Average Concentration of Total Inflows			333		6.1	
Initial (2012) Groundwater Concentration			247		7.5	
Simulated Final (2081) Groundwater Concentration			248		7.5	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Copper Mountain-Giant Rock	TDS	247	248	1	248	1	0	248	1	0
	Nitrate-NO_3	7.5	7.5	0.0	7.5	0.0	0.0	7.5	0.0	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

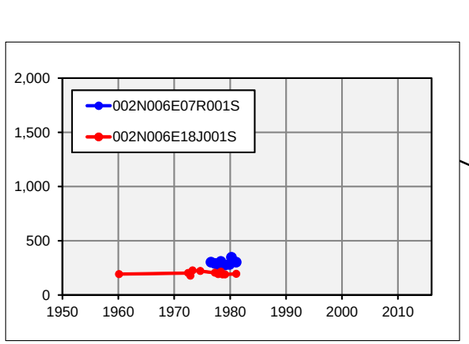
- Key loading factor is subsurface inflow (97%).
- Projected future groundwater concentration change is from 247 to 248 mg/L (+1 mg/L).
- Impact of population growth on groundwater concentration is +1 mg/L.
- There is no impact from recycled water projects.

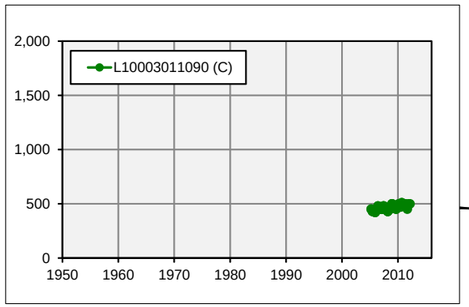
Nitrate-NO_3:

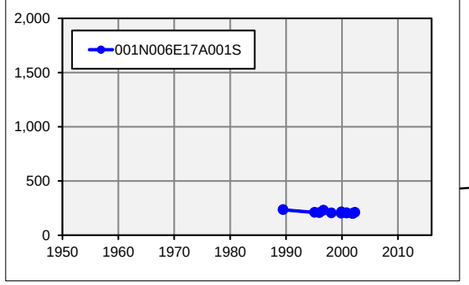
- Key loading factor is subsurface inflow (97%).
- There is not projected future groundwater concentration change. Future concentration remains at 7.5 mg/L.
- There is no impact from population growth or recycled water projects on groundwater concentration.

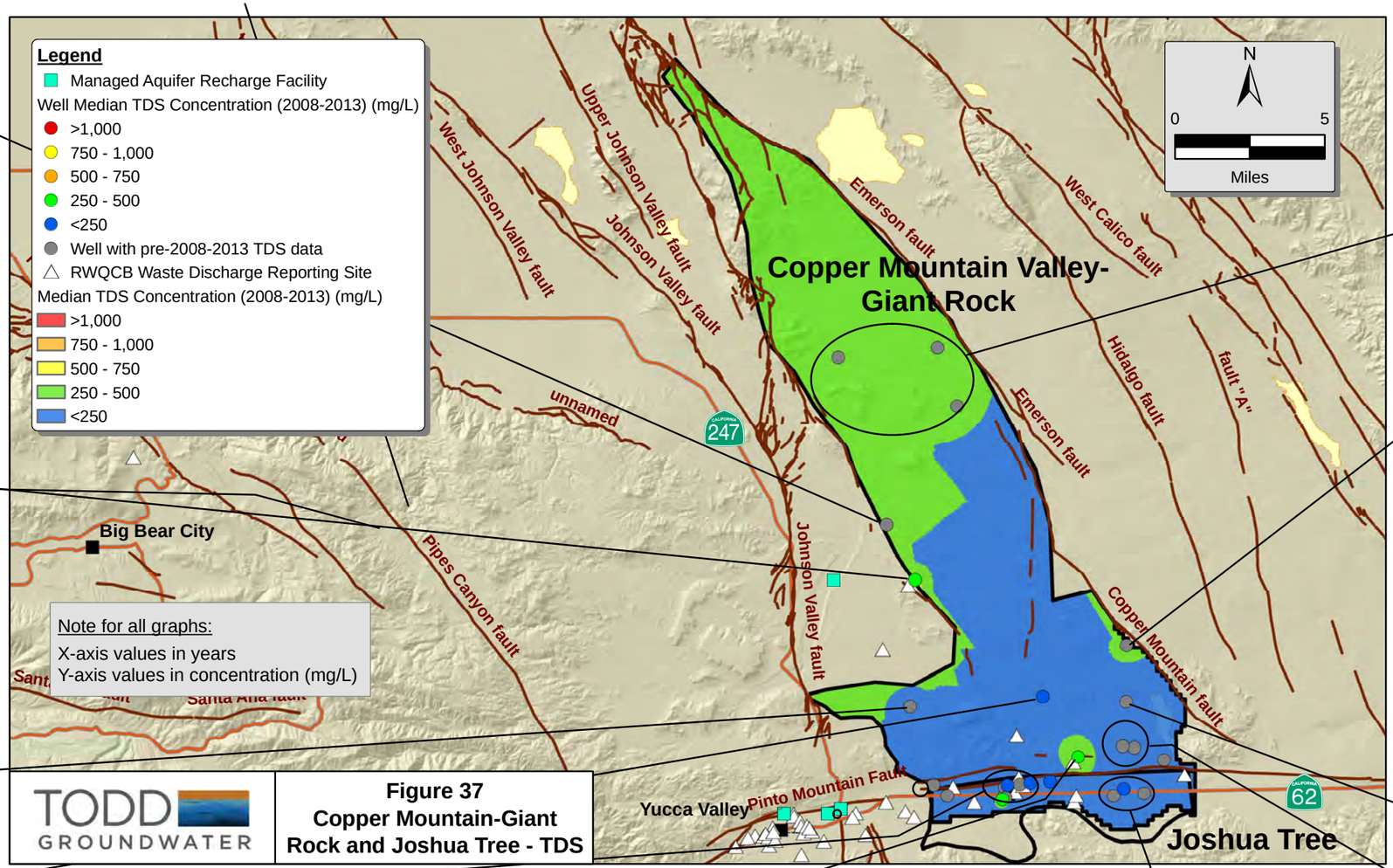
Conclusions:

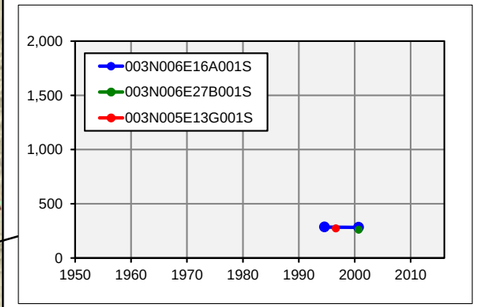
- Salt and nutrient loading in Copper Mountain-Giant Rock is minor. Projected average annual total inflows (606 AFY) represent a small percentage of the estimated groundwater in storage.
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- Small increases in groundwater TDS and nitrate concentrations are associated with population growth.

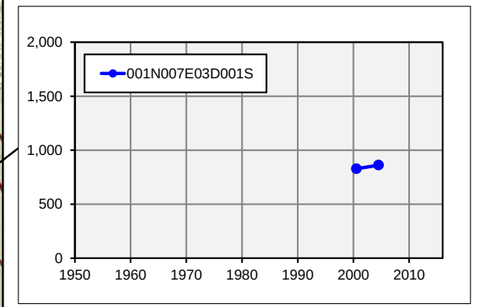












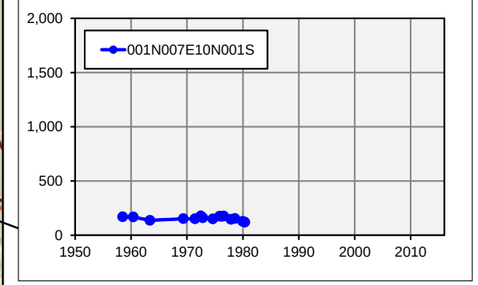
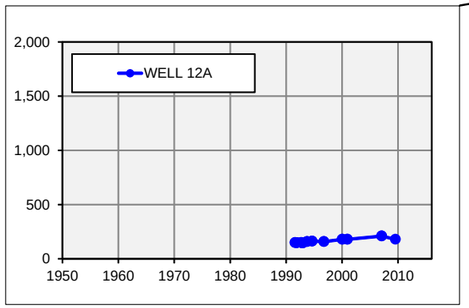
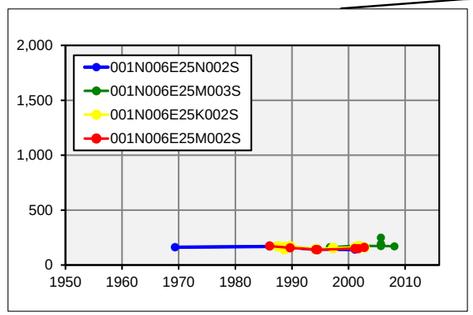
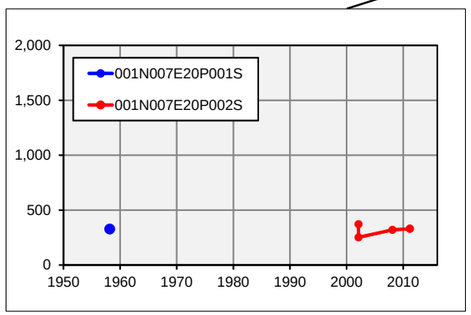


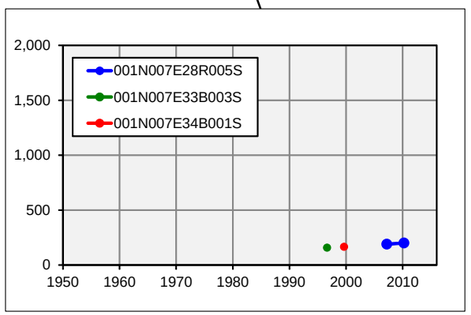
Figure 37
Copper Mountain-Giant Rock and Joshua Tree - TDS

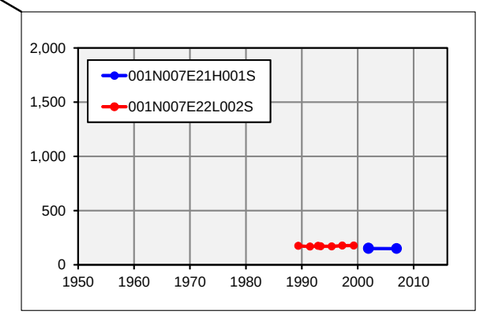
TODD GROUNDWATER

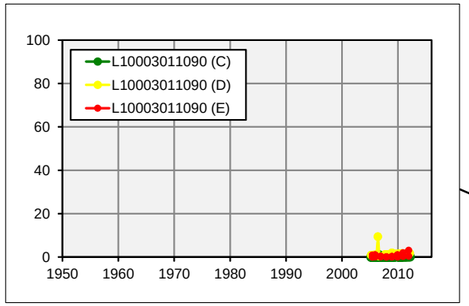


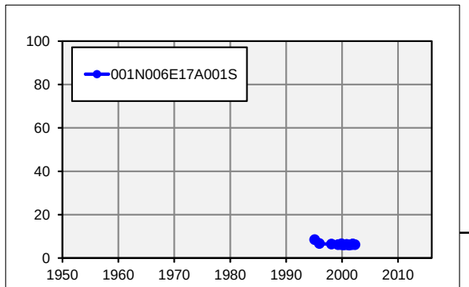


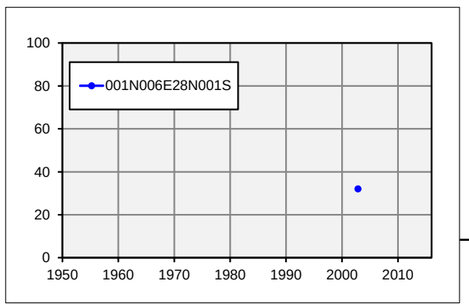


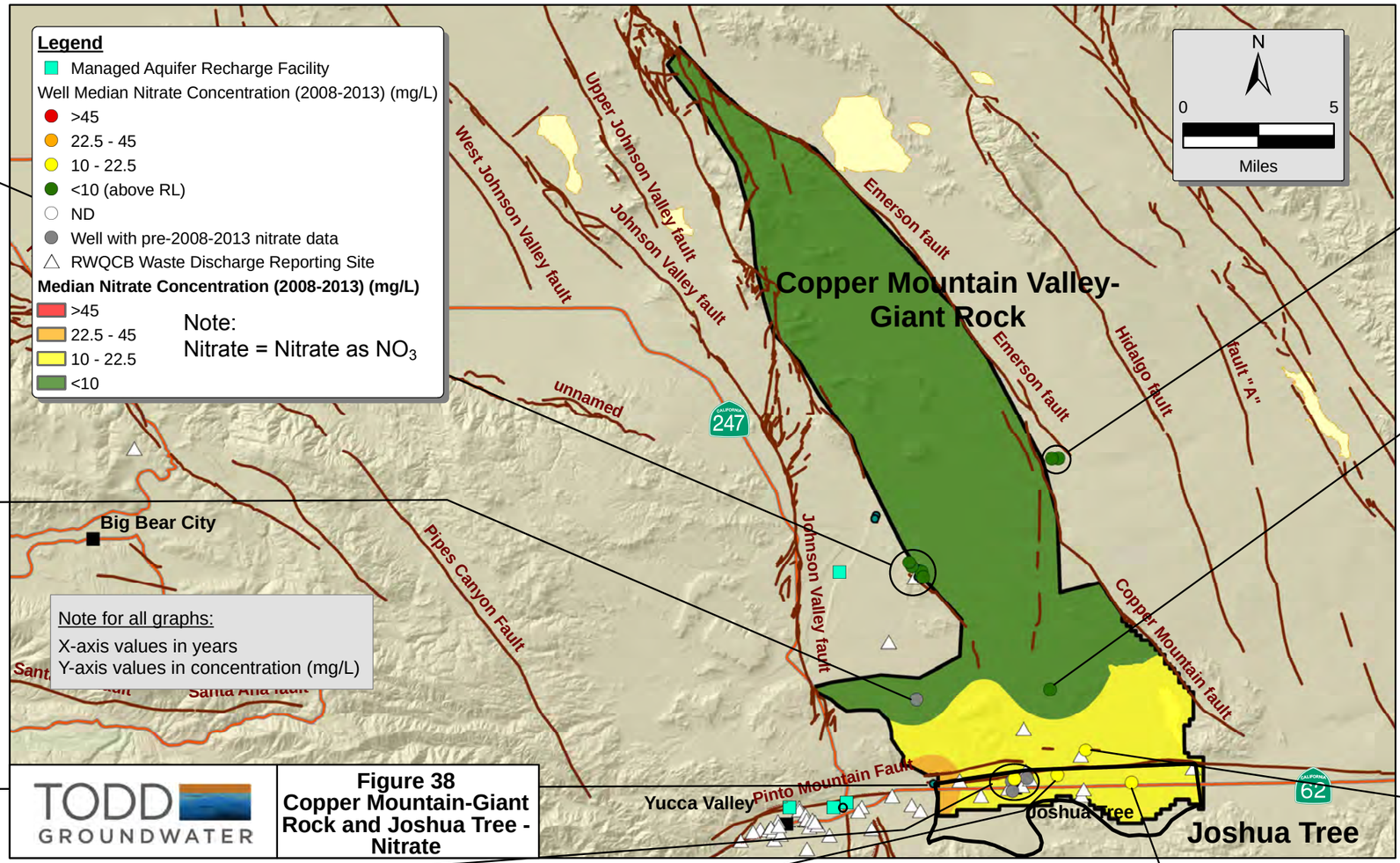


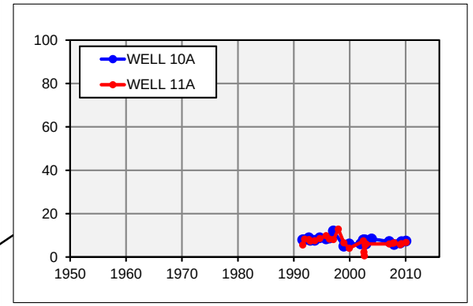


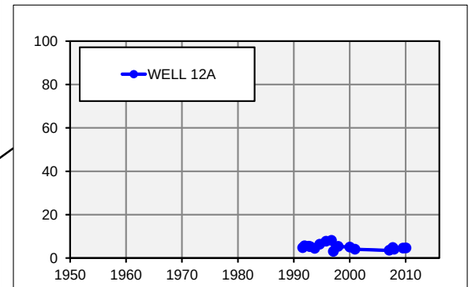


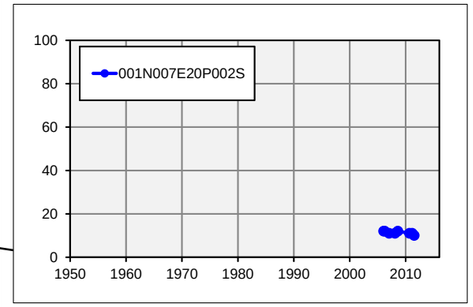








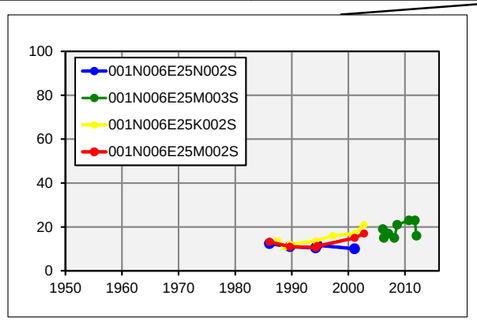


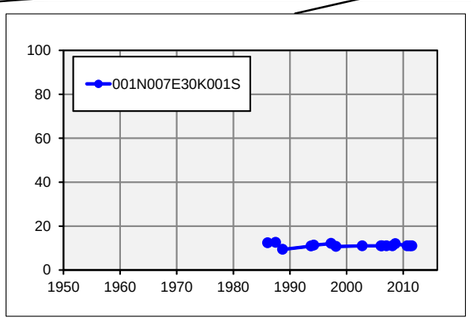


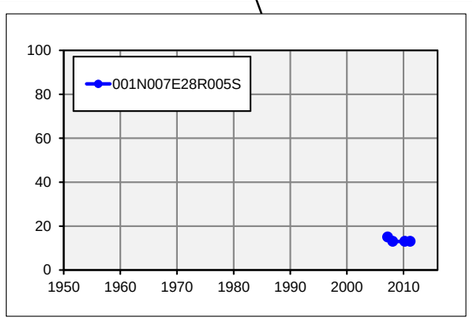
Note for all graphs:
X-axis values in years
Y-axis values in concentration (mg/L)

TODD GROUNDWATER

Figure 38
Copper Mountain-Giant Rock and Joshua Tree - Nitrate





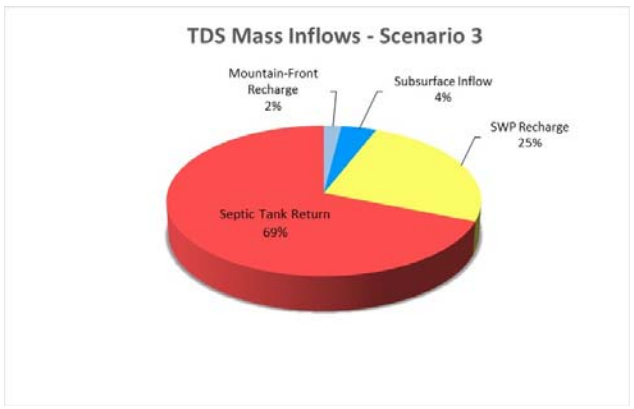


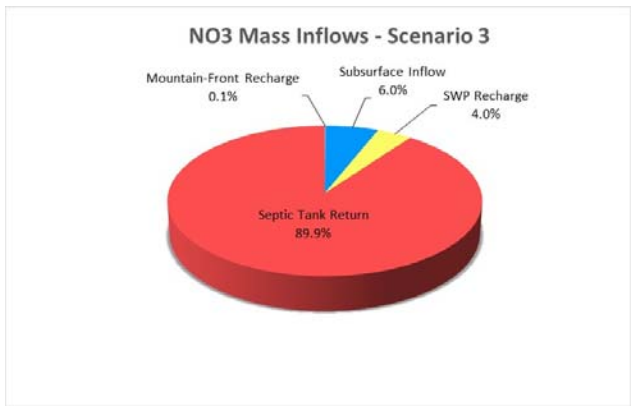
C22. Joshua Tree

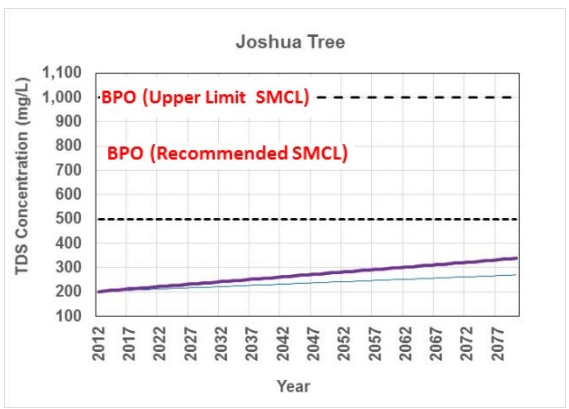
Scenario 3 Summary

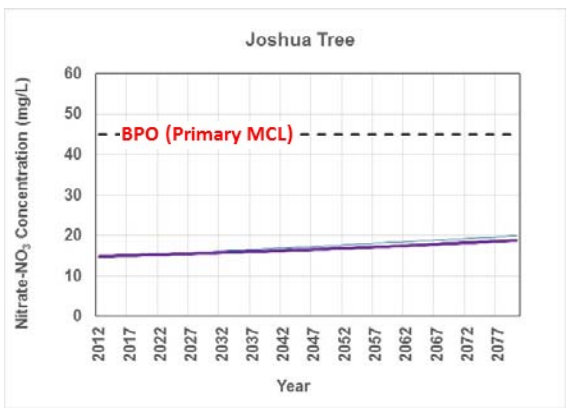
Inflow	Average Annual Rate		TDS		Nitrate-NO_3	
	(AFY)	(% of Total)	Concentration (mg/L)	Mass Loading (%)	Concentration (mg/L)	Mass Loading (%)
Mountain-Front Recharge	100	5%	210	2%	0.6	0.1%
SWP Recharge	850	45%	250	25%	2.5	4%
Subsurface Inflow	84	4%	375	4%	36.4	6%
Septic Tank Return	842	45%	699	69%	56.7	90%
Flow-Weighted Average Concentration of Total Inflows			455		28.2	
Flow-Weighted Average Concentration of Total Inflows (with no SWP Recharge)[a]			625		49.6	
Initial (2012) Groundwater Concentration			202		14.7	
Simulated Final (2081) Groundwater Concentration			279		18.8	

Notes:
TDS and nitrate concentration for individual inflows represents flow-weighted average over 70-year simulation
Concentration is above simulated groundwater concentration range
Concentration is within simulated groundwater concentration range
Concentration is below simulated groundwater concentration range









Subregion	S/N	Current (2012) Average Groundwater TDS Concentration (mg/L)	Scenario 1 (Baseline)		Scenario 2 (Growth with No Recycled Water Projects)			Scenario 3 (Growth with Recycled Water Projects)		
			Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Projected Growth (mg/L)	Simulated Future (2081) Groundwater TDS Concentration (mg/L)	Simulated Future (2013 to 2081) Groundwater TDS Concentration Change (mg/L)	Effect of Recycled Water Projects (mg/L)
		(a)	(b)	(b - a)	(c)	(c - a)	(c - b)	(d)	(d - a)	(d - c)
Joshua Tree	TDS	202	264	62	279	77	15	279	77	0
	Nitrate-NO_3	14.7	19.9	5.2	18.8	4.1	-1.1	18.8	4.1	0.0

Notes: Subregional modeling results shown in the table above are extracted from Tables 5-11 and 5-12 in the main report and show the differences between the blue, yellow, and purple concentration trend lines at the end of the simulation period (WY 2081) in the charts above.

red color indicates net increase in concentration
blue color indicates no change in concentration
green color indicates net decrease in concentration

TDS:

- Key loading factor is septic tank return (69%).
- Projected future groundwater concentration change is from 202 to 279 mg/L (+77 mg/L).
- Impact of population growth on groundwater concentration is +15 mg/L.
- There is no impact from recycled water projects.

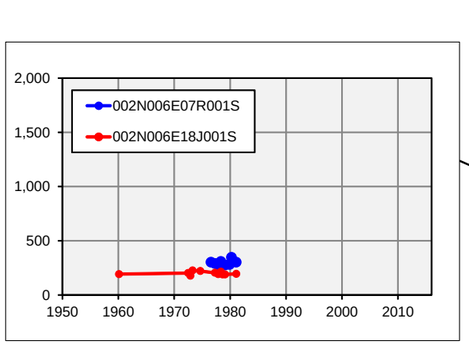
Nitrate-NO_3:

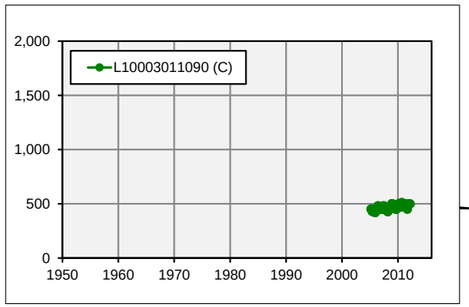
- Key loading factor is septic tank return (90%).
- Projected future groundwater concentration change is from 14.7 to 18.8 mg/L (+4.1 mg/L).
- Impact of population growth on groundwater concentration is -1.1 mg/L. This reflects the benefit of SWP water recharge on nitrate concentrations in the basin.
- There is no impact from recycled water projects.

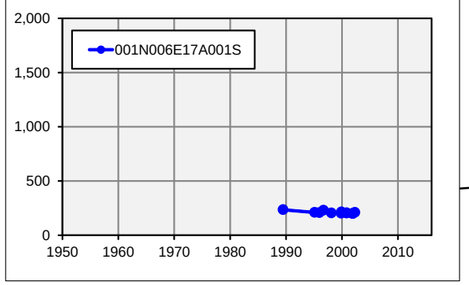
Conclusions:

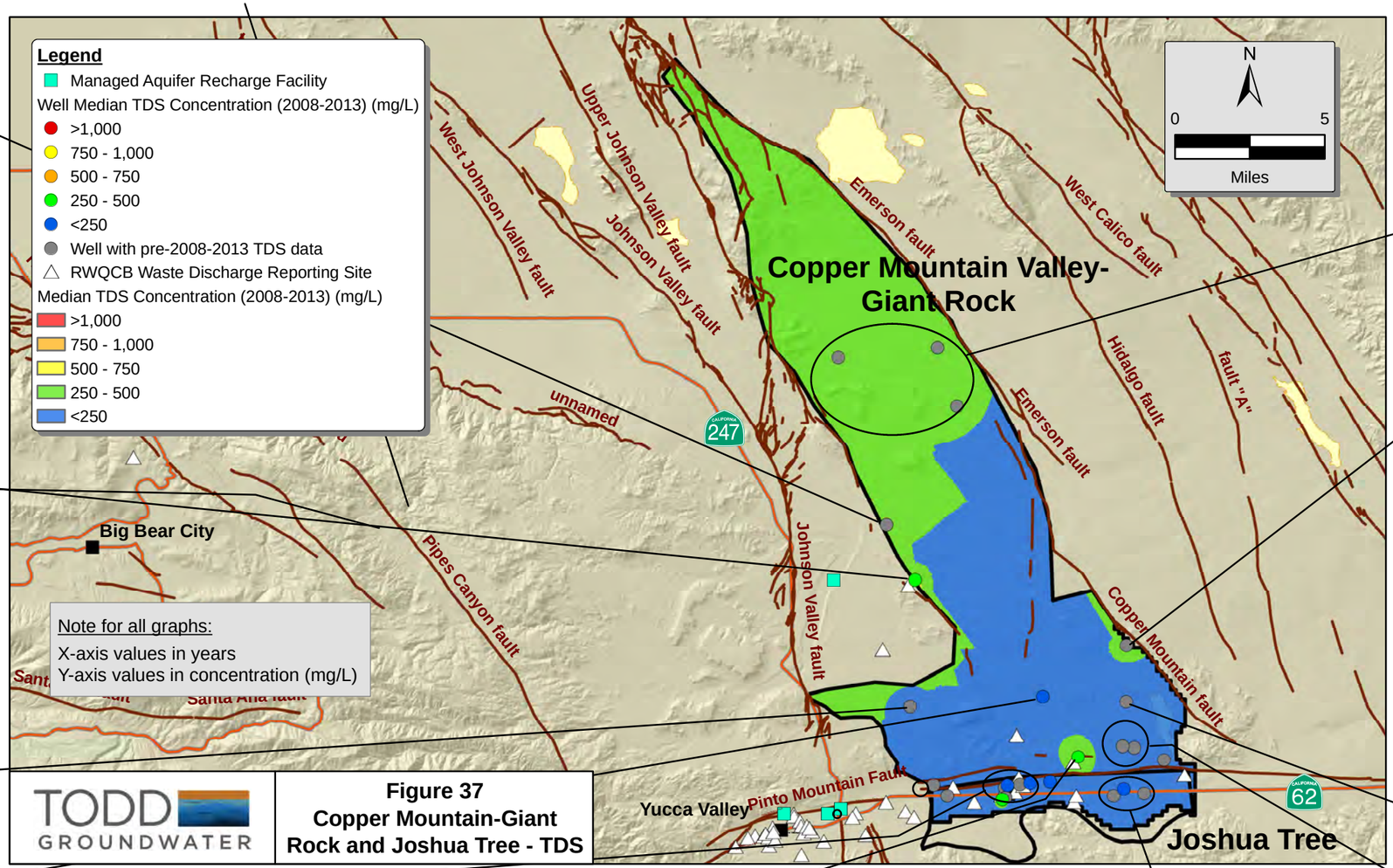
- Salt and nutrient loading in the Joshua Tree subregion is controlled primarily by septic tank returns.
- Simulated future groundwater TDS and nitrate concentrations do not exceed or threaten to exceed BPOs (500 mg/L for TDS).
- Increases in groundwater TDS concentrations are associated with population growth. The effect of population growth on nitrate concentrations is outweighed by the benefit of associated planned increases in imported SWP water recharge.
- SWP recharge in the Joshua Tree Subbasin began in 2014 (312 AFY) and is projected to increase from about 600 AFY in 2015/2016 to 900 AFY in 2019. While the current average TDS concentration in the Joshua Tree subregion (202 mg/L) is lower

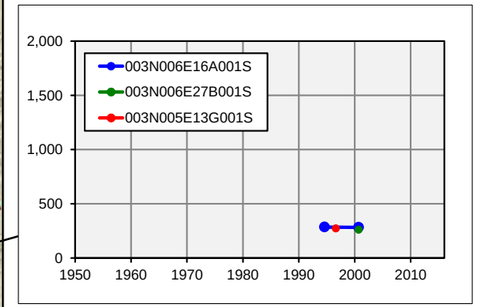
than SWP water (250 mg/L), the flow weighted-average TDS concentration of total inflows without SWP water is 625 mg/L. The nitrate concentration of SWP water (2.5 mg/L) is lower than the ambient groundwater concentration (14.7 mg/L) and concentration of non-SWP water inflows (49.6 mg/L). Therefore, SWP water will improve both TDS and nitrate concentrations in the subregion.

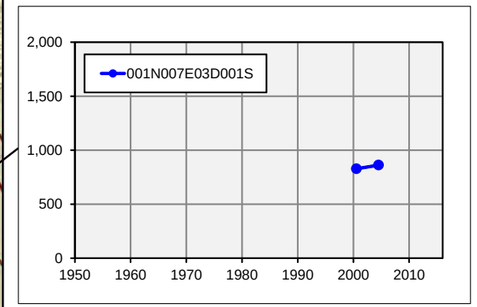












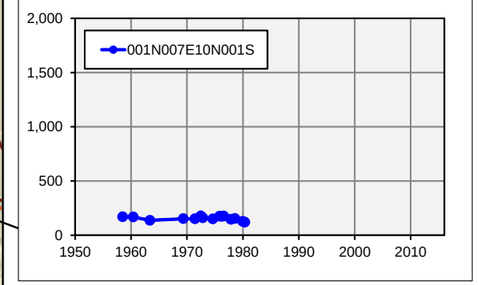
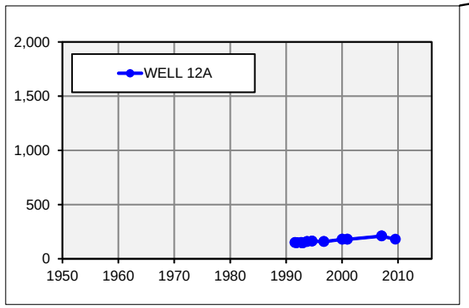
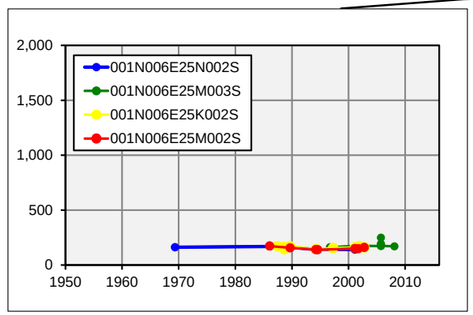
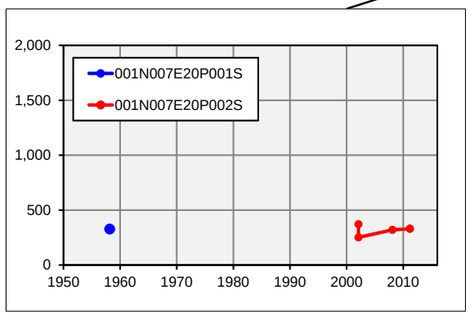


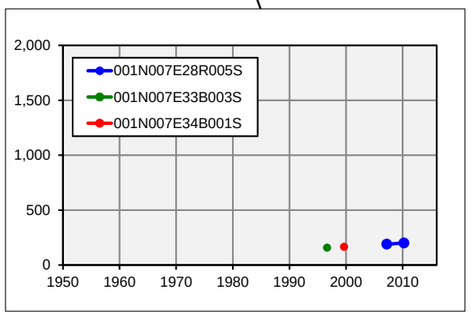
Figure 37
Copper Mountain-Giant Rock and Joshua Tree - TDS

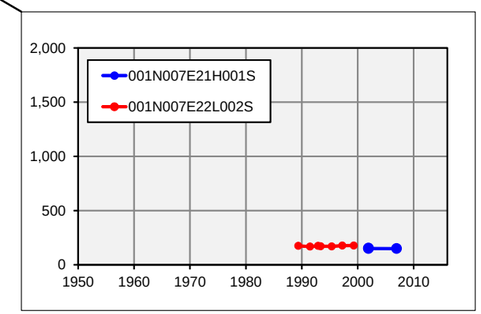
TODD GROUNDWATER

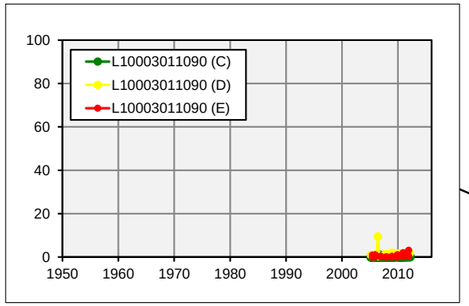


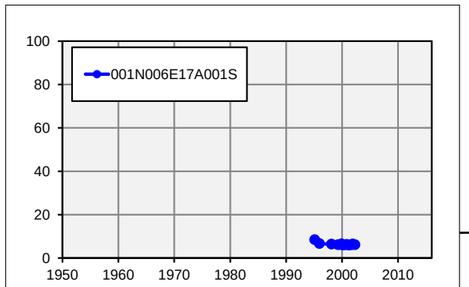


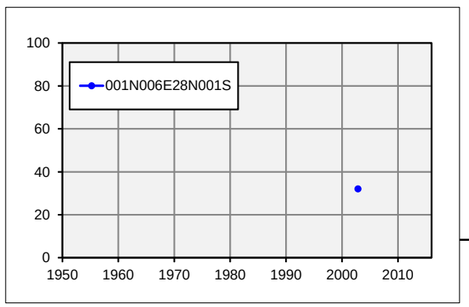


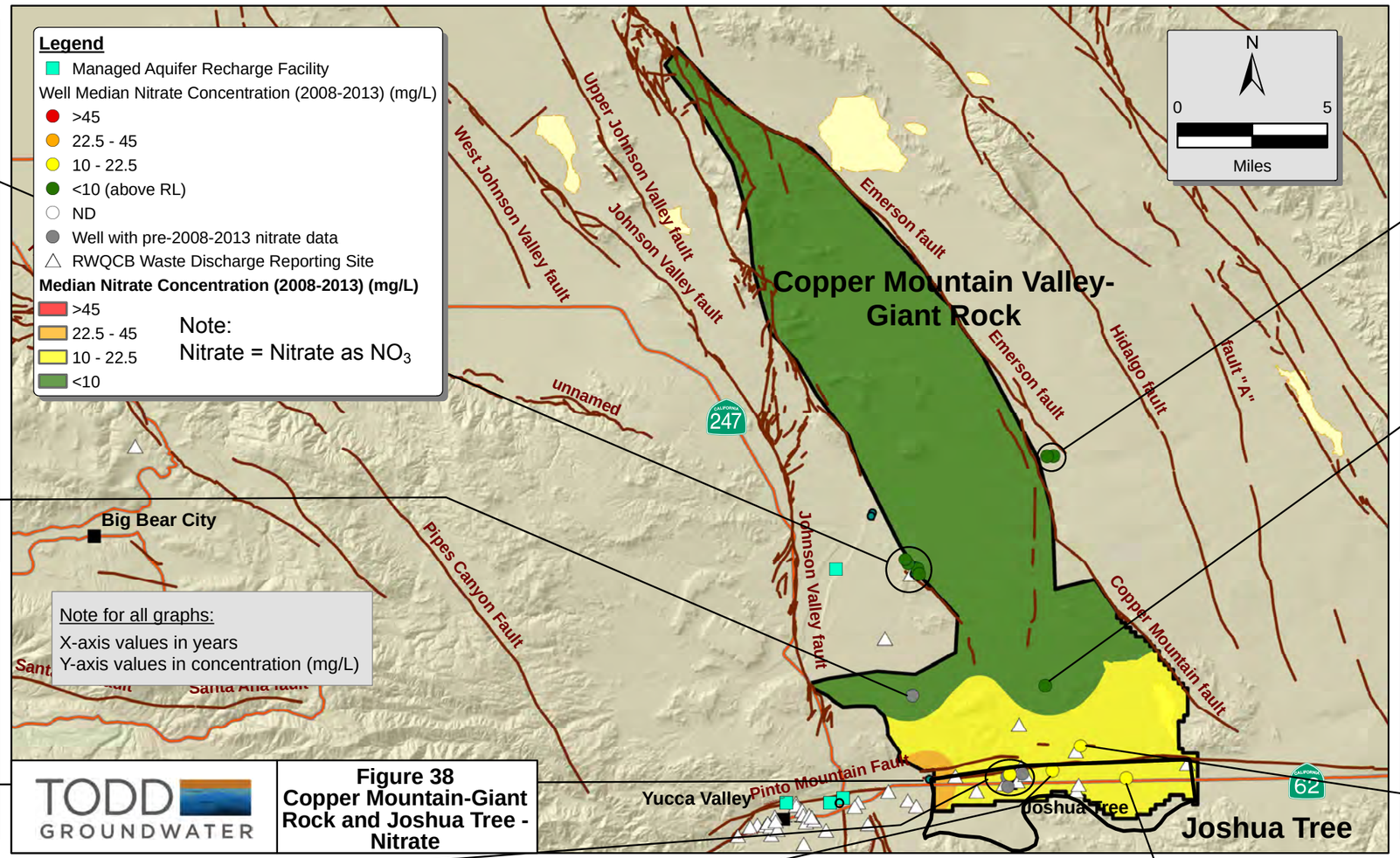


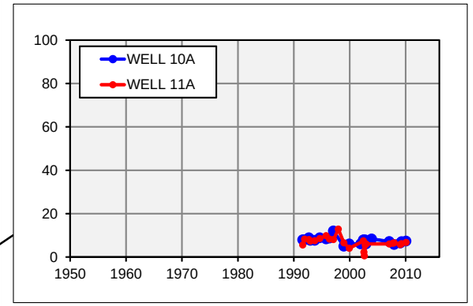


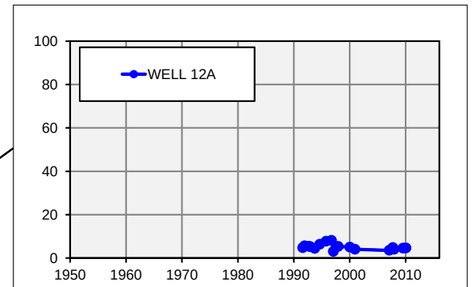


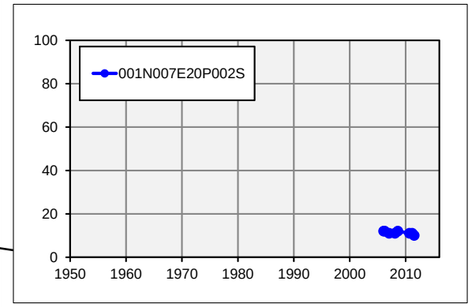


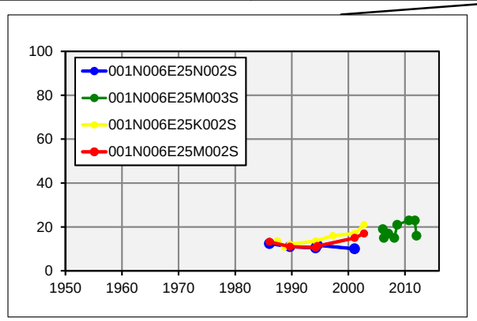


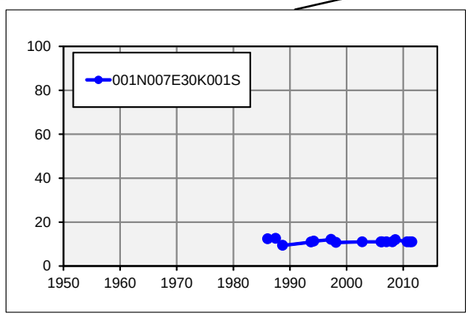


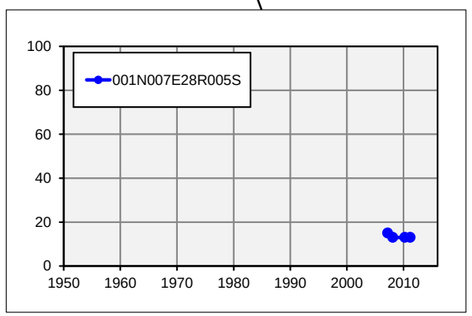












TODD GROUNDWATER

Figure 38
Copper Mountain-Giant Rock and Joshua Tree - Nitrate