April 13, 2015

# Coachella Valley Salt and Nutrient Management Plan

## Stakeholder Meeting No. 6

DESERT WATER

WATER DISTRICT

Indio Water Authority
Your Water. Our Responsibility.

MWH®

# Agenda

- SNMP Overview
  - Introduction
  - Regulatory Framework
  - Water Quality Objectives
  - Basin Characterization
  - Ambient Water Quality and Assimilative Capacity
  - Estimate of Future Water Quality
  - Salt and Nutrient Management Strategies
  - Monitoring Plan

# Introduction

# Introduction

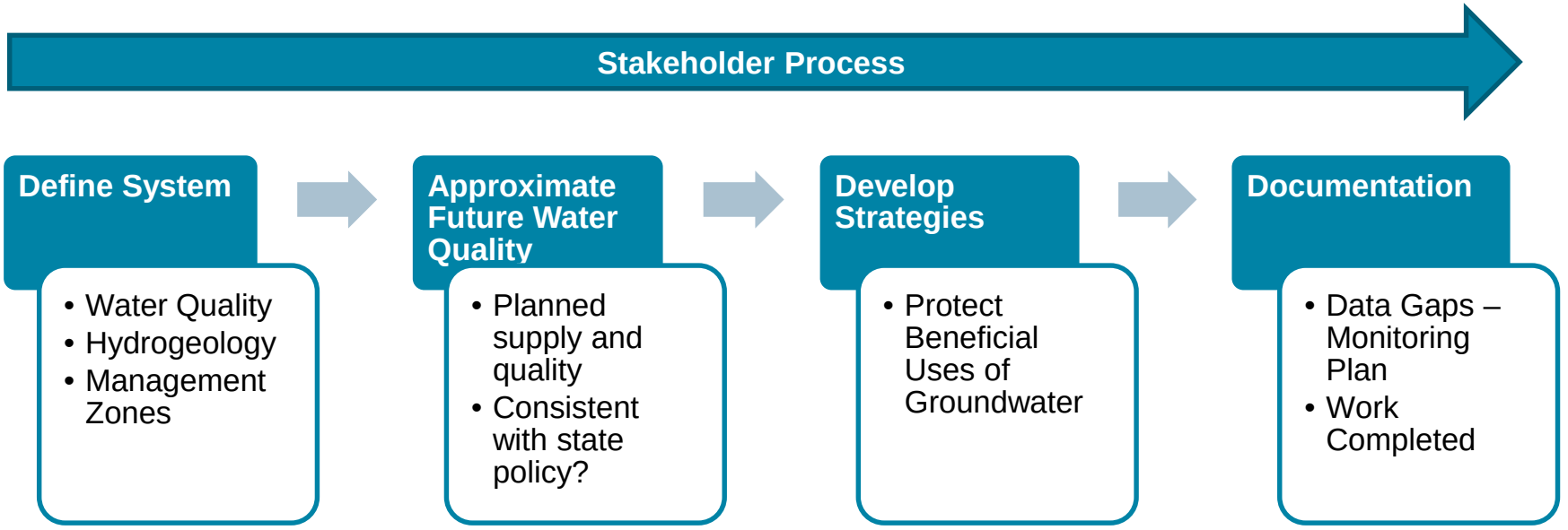
- Coachella Valley Regional Water Management Group (CVRWMG)
  - Held public workshops on the SNMP process
  - Developed an approach and scope of work
- Approach
  - Phase I: Initial SNMP scoping and work plan development
  - Phase II: SNMP development
  - Phase III: SNMP monitoring and other follow-up work
- Phase II – Current Phase
  - Preliminary data review and determination of quantitative methods
  - Determination of ambient water quality (AWQ) and documentation of salt and nutrient sources and sinks
  - Identification of water management goals and salt and nutrient management strategies

# Why a Salt and Nutrient Management Plan?

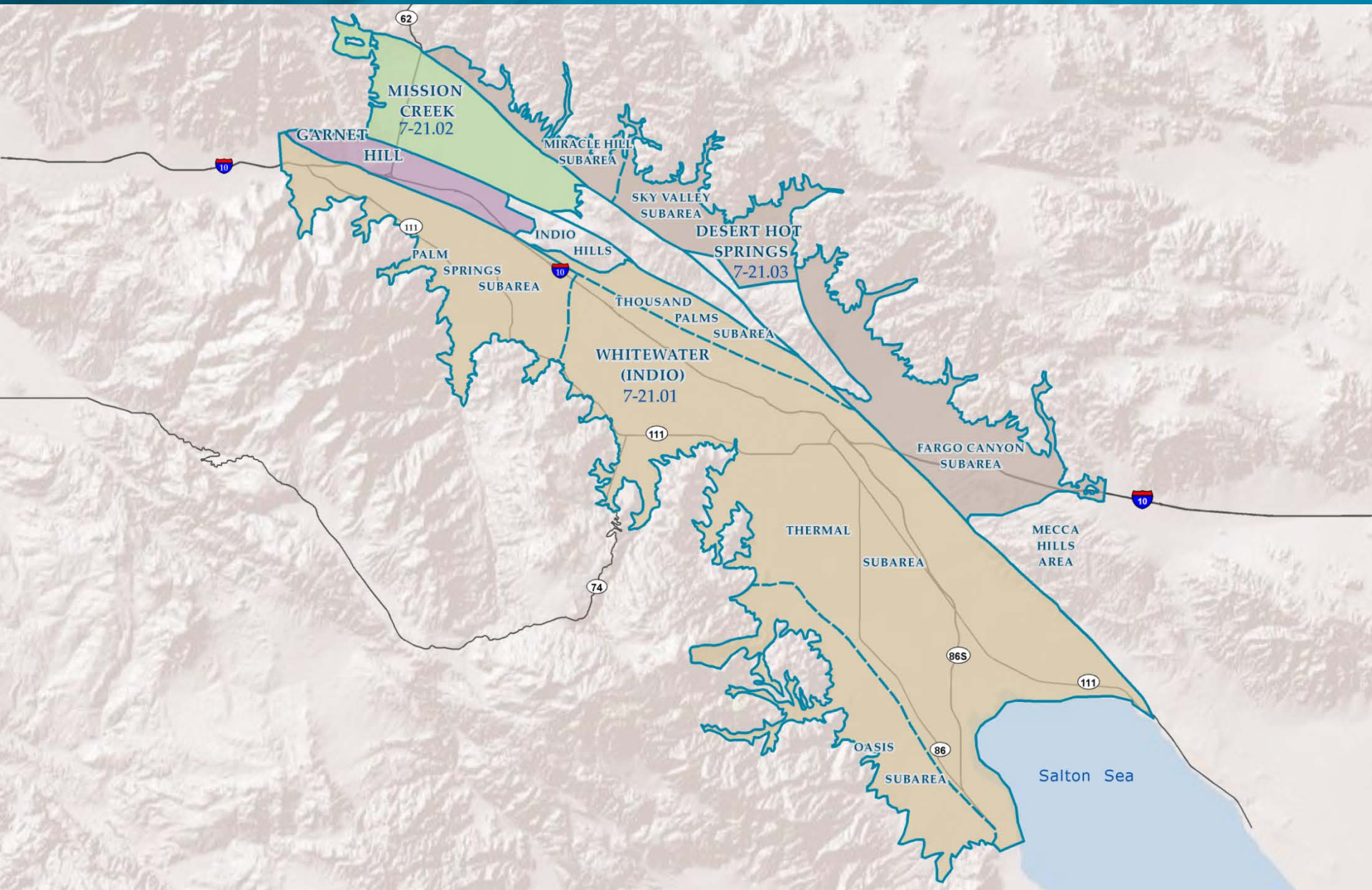
2009 Recycled Water Policy Requirement:

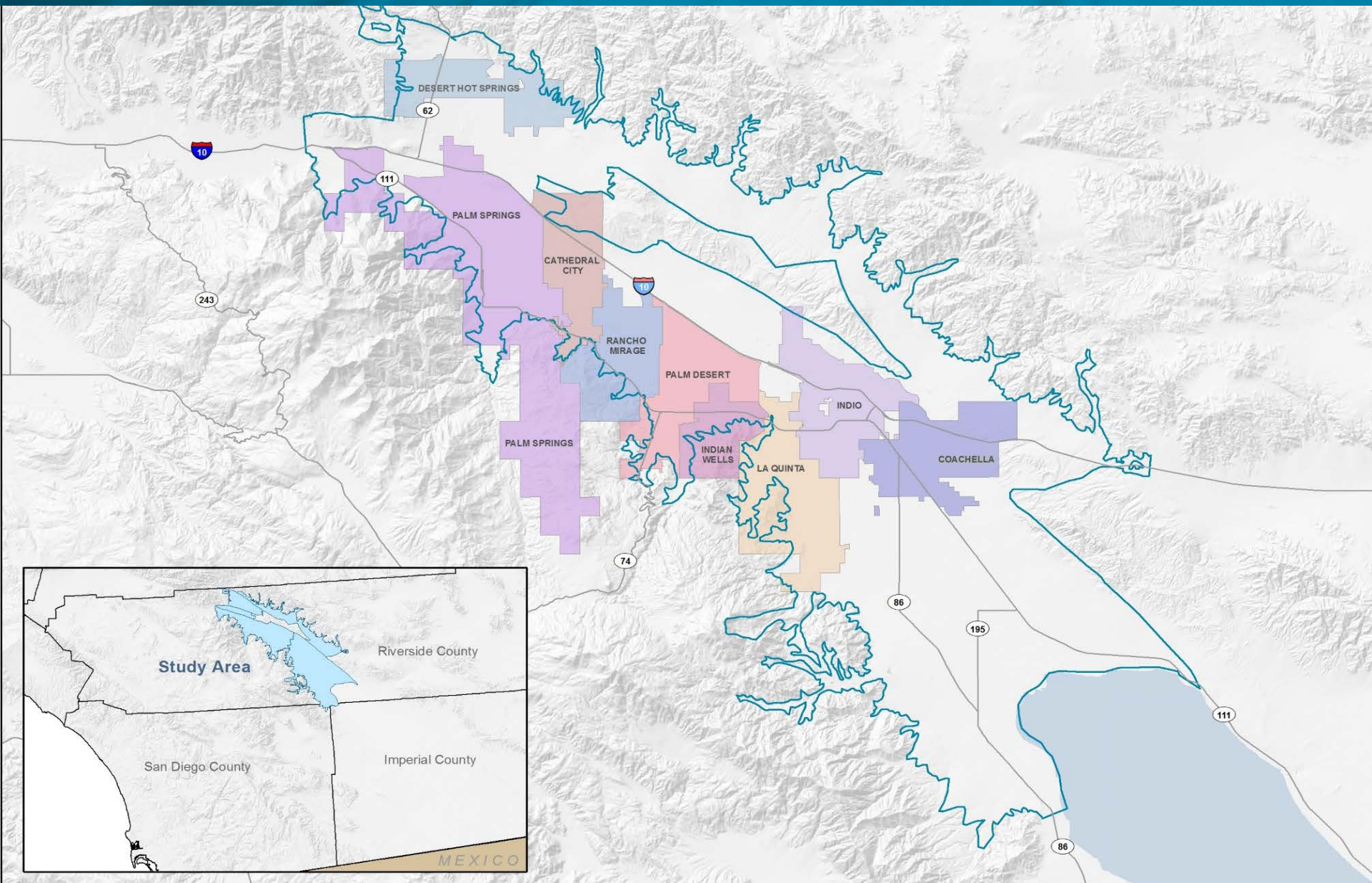
*"Facilitate basin-wide management of salts and nutrients from all sources in a manner that optimizes recycled water use while ensuring protection of groundwater supply and beneficial uses, agricultural beneficial uses, and human health."*

# Conceptual Approach for the SNMP



# DWR Subbasins and Subareas




DESERT HOT SPRINGS
62
10
111
PALM SPRINGS
CATHEDRAL CITY
10
243
RANCHO MIRAGE
PALM DESERT
INDIO
PALM SPRINGS
INDIAN WELLS
LA QUINTA
COACHELLA
74
86
195
111
86
Study Area
Riverside County
San Diego County
Imperial County
MEXICO

SNMP

# Regulatory Framework

# Applicable Regulations

- Recycled Water Policy (Policy) (2009/2013)
- Porter-Cologne Act
  - Water Quality Control Plans (Basin Plans)
    - Water quality objectives
    - Beneficial uses
    - Implementation plan
- Resolution No. 68-16 - State Anti-degradation Policy

# Recycled Water Policy

- State Water Resources Control Board Resolution No. 2009-0011*, Policy For Water Quality Control for Recycled Water (Policy)
- Goal:
  - *Facilitate basin-wide management of salts and nutrients from all sources in a manner that optimizes recycled water use while ensuring protection of groundwater supply and beneficial uses, agricultural beneficial uses, and human health.*
- Streamline Recycled Water Project Permitting

*2013-0003- Amended in 2013, now includes monitoring for constituents of emerging concern from groundwater replenishment reuse projects

# Policy Encourages Use of Recycled Water

- Supplies are limited due to:
  - Growth, Conversion of Land
  - Drought
  - Overdraft
  - Environmental Constraints
  - Climate Change Uncertainty
- State Policy Encourages Increased Recycled Water and Stormwater Use
  - Promotes Sustainable Local Water Supply
  - Additional Supply to Offset Freshwater Supply
  - Drought Resistant
  - Highly Reliable

SNMP

# Water Quality Objectives

# Basin Plan

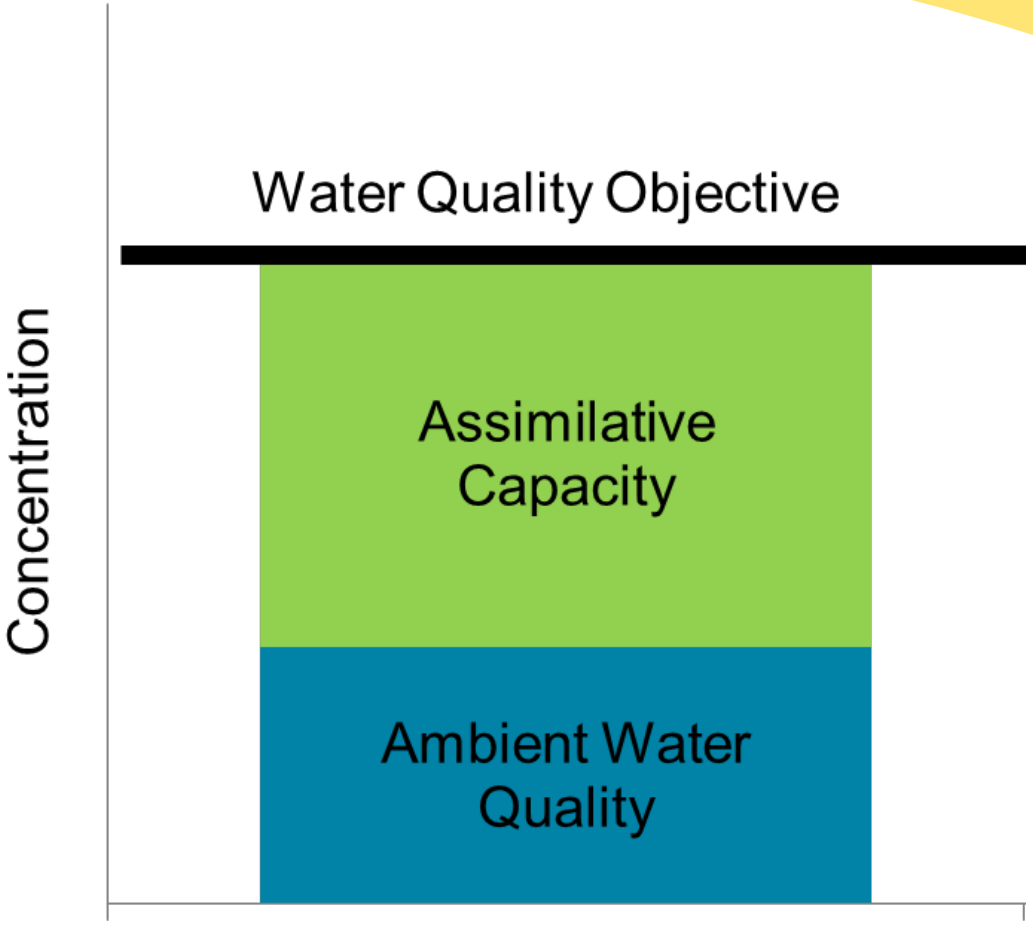
| Constituent | Water Quality Objective (WQO) |
|---|---|
| **Taste and Odors (TDS)** | Ground waters for use as domestic or municipal supply shall not contain taste or odor-producing substances in concentrations that adversely affect beneficial uses as a result of human activity. |
| **Chemical and Physical Quality (Nitrate)** | Sections 64431 (Inorganic Chemicals), 64444 (Organic Chemicals), and 64678 (Lead and Copper) of California Code of Regulations, Title 22. |
| **Brines** | Discharges of water softener regeneration brines, other mineralized wastes, and toxic wastes to disposal facilities which ultimately discharge in areas where such wastes can percolate to ground waters usable for domestic and municipal purposes are prohibited. |

# Water Quality Objectives (WQOs)

- Nitrate
  - Based on drinking water standards specified in Title 22 = 45 mg/L (Nitrate as $NO_3$)
- TDS
  - Shall not adversely affect beneficial uses as a result of human activity
  - Based on Title 22 “Consumer Acceptance” allows municipal use up to 1,000 mg/L
    - Levels above 1,000 mg/L are only acceptable for existing consumers on a temporary basis
  - Based on Colorado River objectives
    - Imperial Dam = 879 mg/L
    - Lake Havasu = 747 mg/L

# Assimilative Capacity

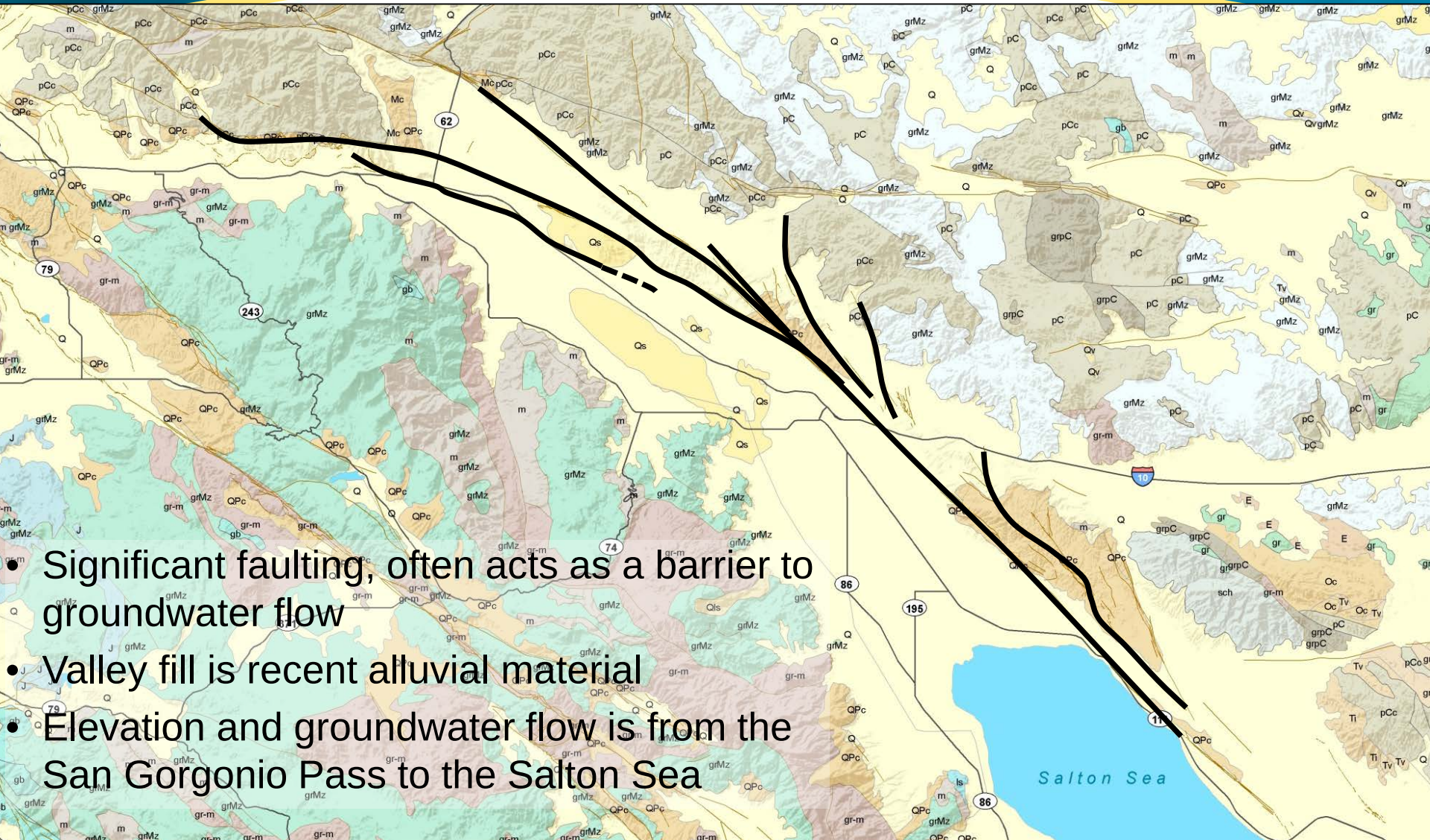
- Ability of a water body to receive and accommodate natural and anthropogenic sources of pollutants, while maintaining water quality standards that are protective of the beneficial uses of the water resource



SNMP

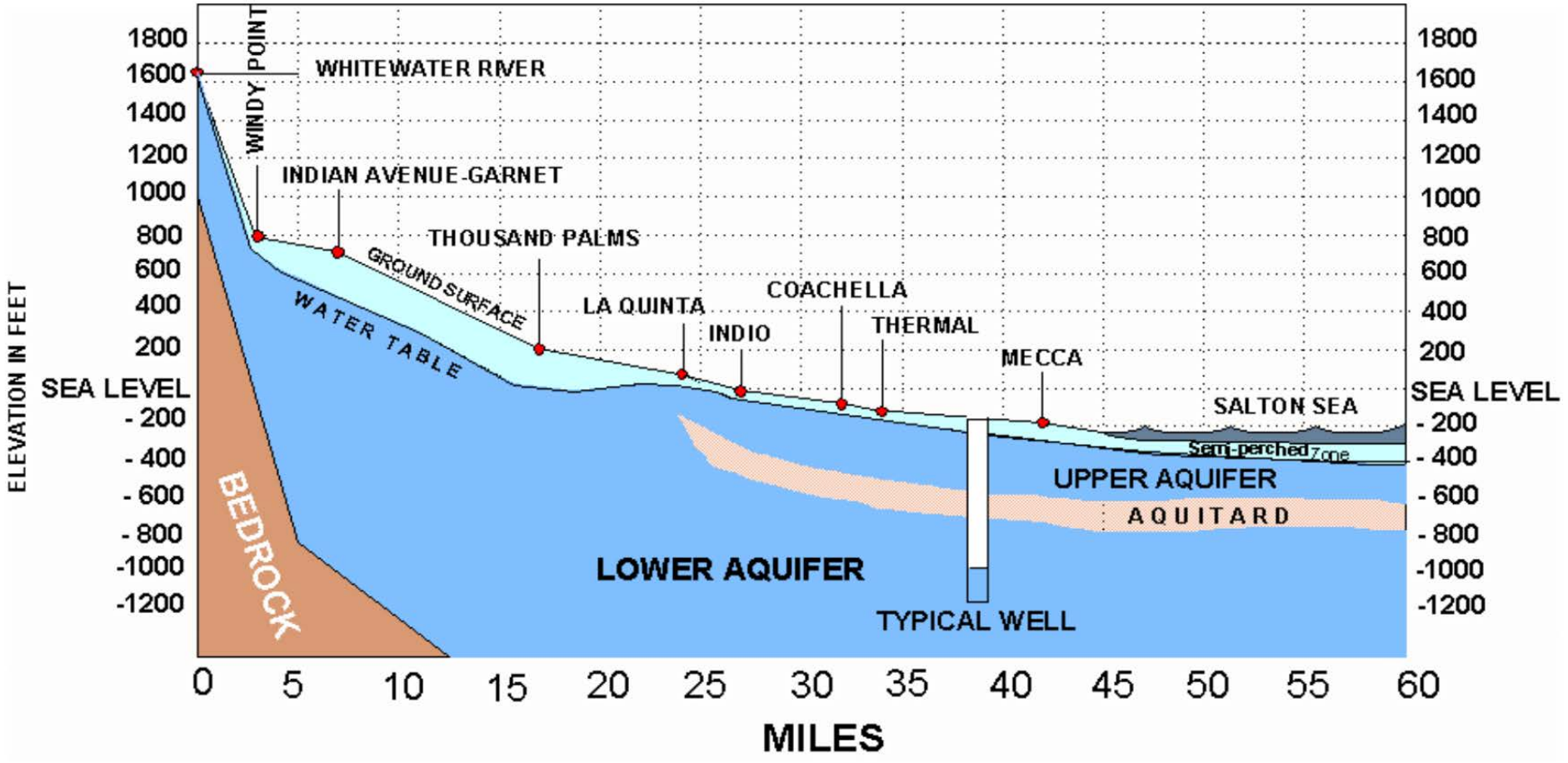
# Basin Characterization

# Geology of the Coachella Valley

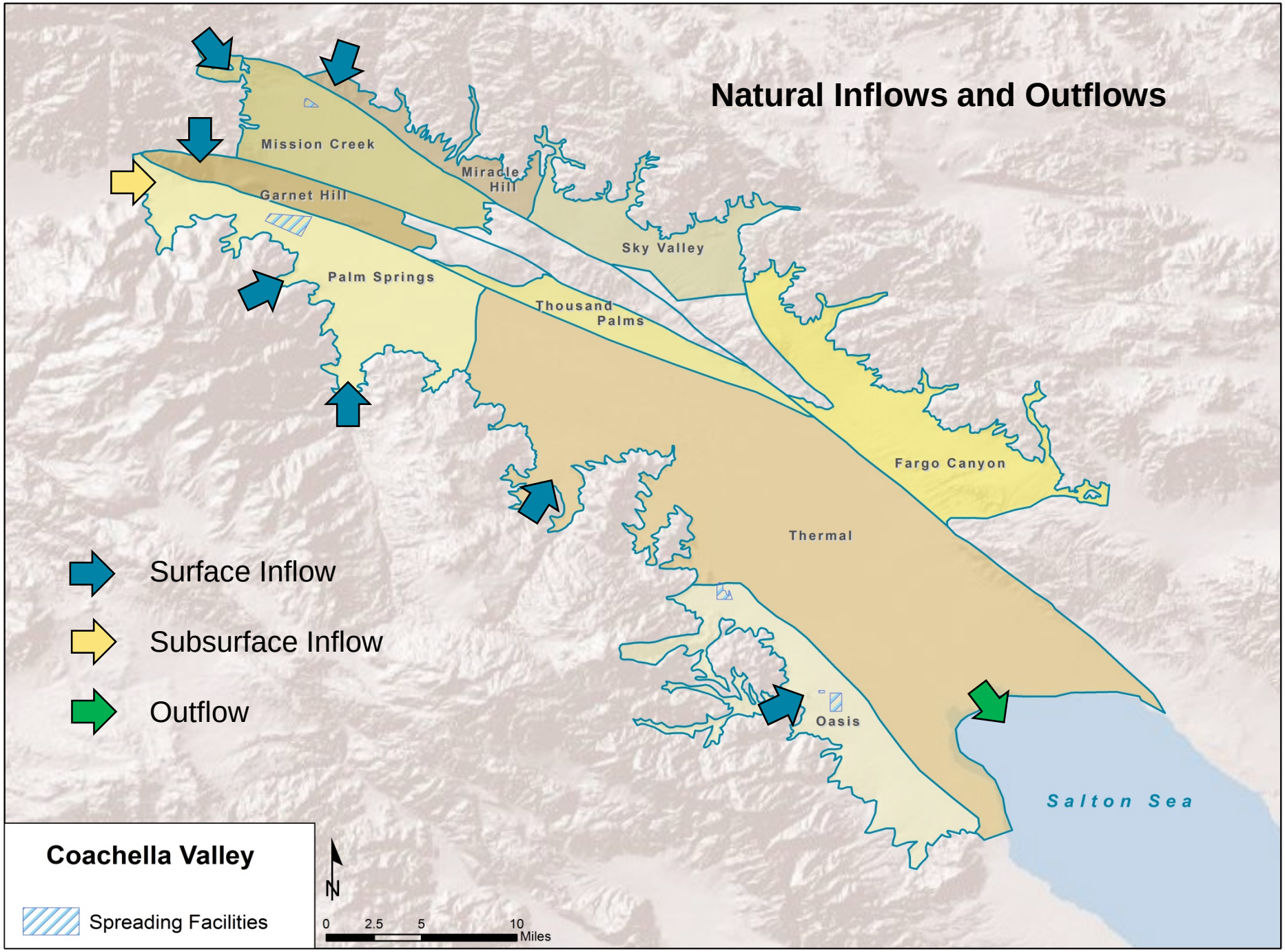



- Significant faulting, often acts as a barrier to groundwater flow
- Valley fill is recent alluvial material
- Elevation and groundwater flow is from the San Gorgonio Pass to the Salton Sea

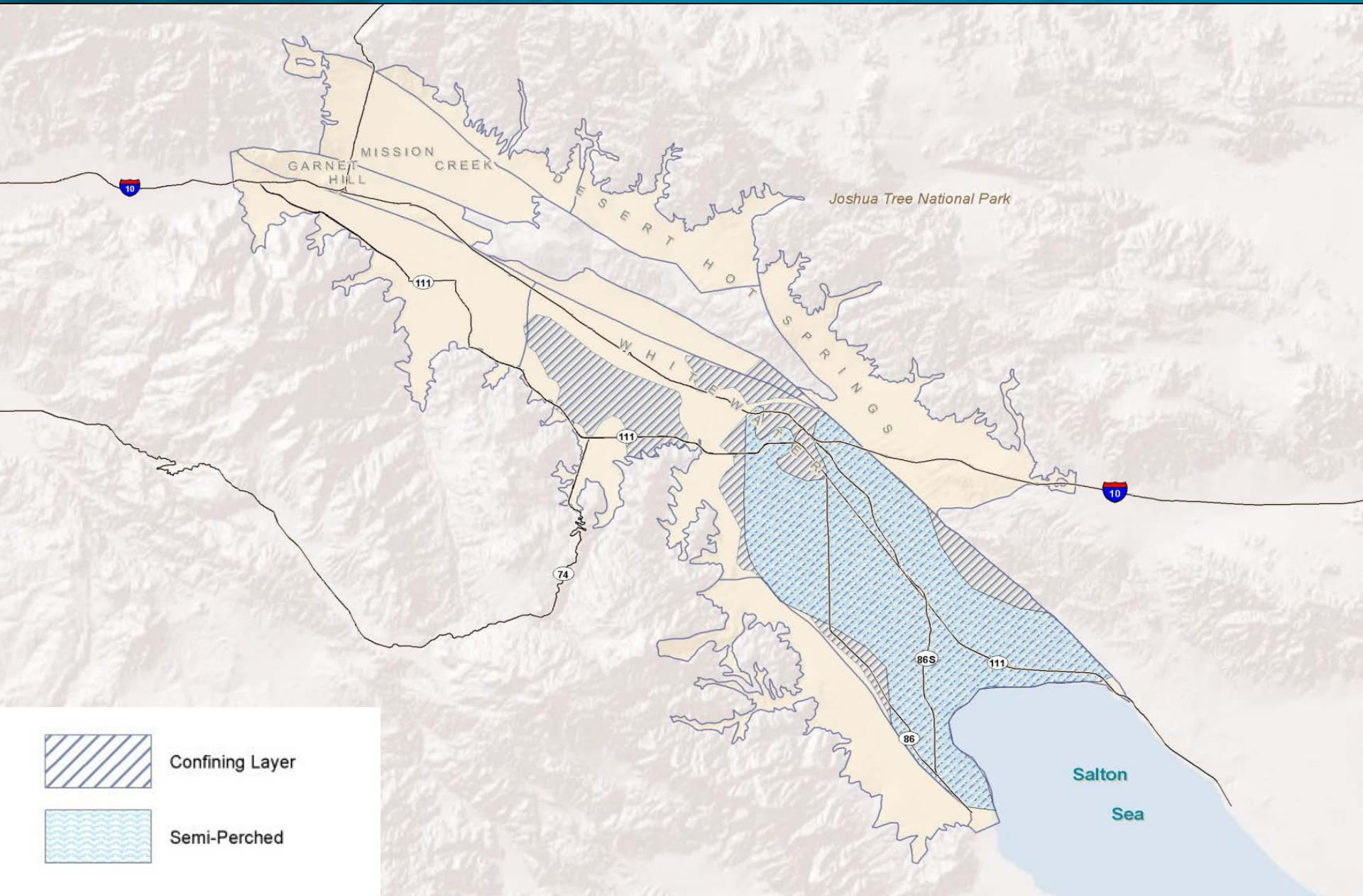
# General Down Valley Cross-Section



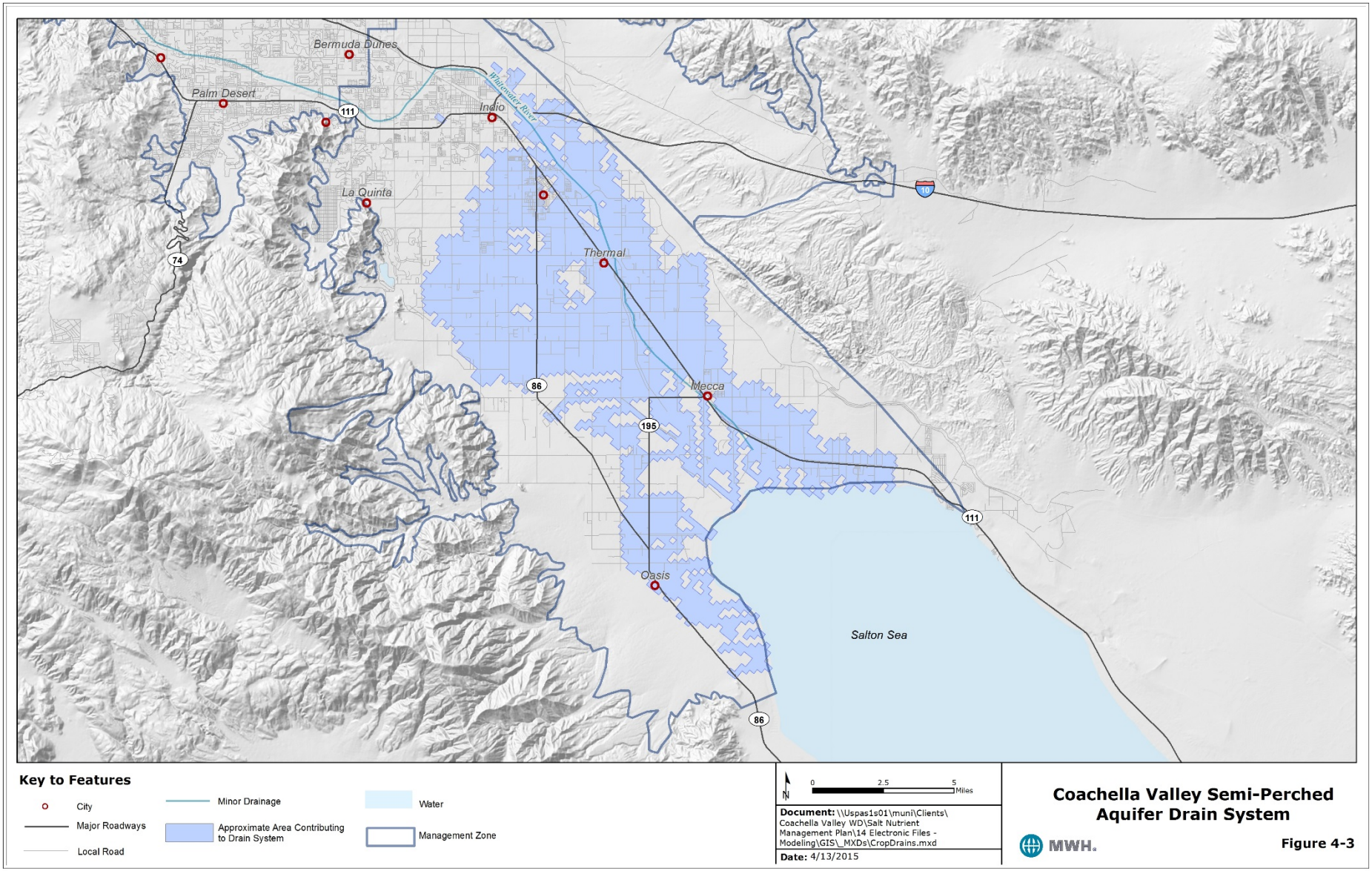

- Western portion of Whitewater River Basin is unconfined, eastern portion is confined
- Outflow is to Salton Sea
- Planned increase in storage will increase outflow to Salton Sea


Natural Inflows and Outflows
Mission Creek
Garnet Hill
Miracle Hill
Sky Valley
Palm Springs
Thousand Palms
Fargo Canyon
Thermal
Oasis
Salton Sea
Surface Inflow
Subsurface Inflow
Outflow
Coachella Valley
Spreading Facilities
N
0 2.5 5 10
Miles

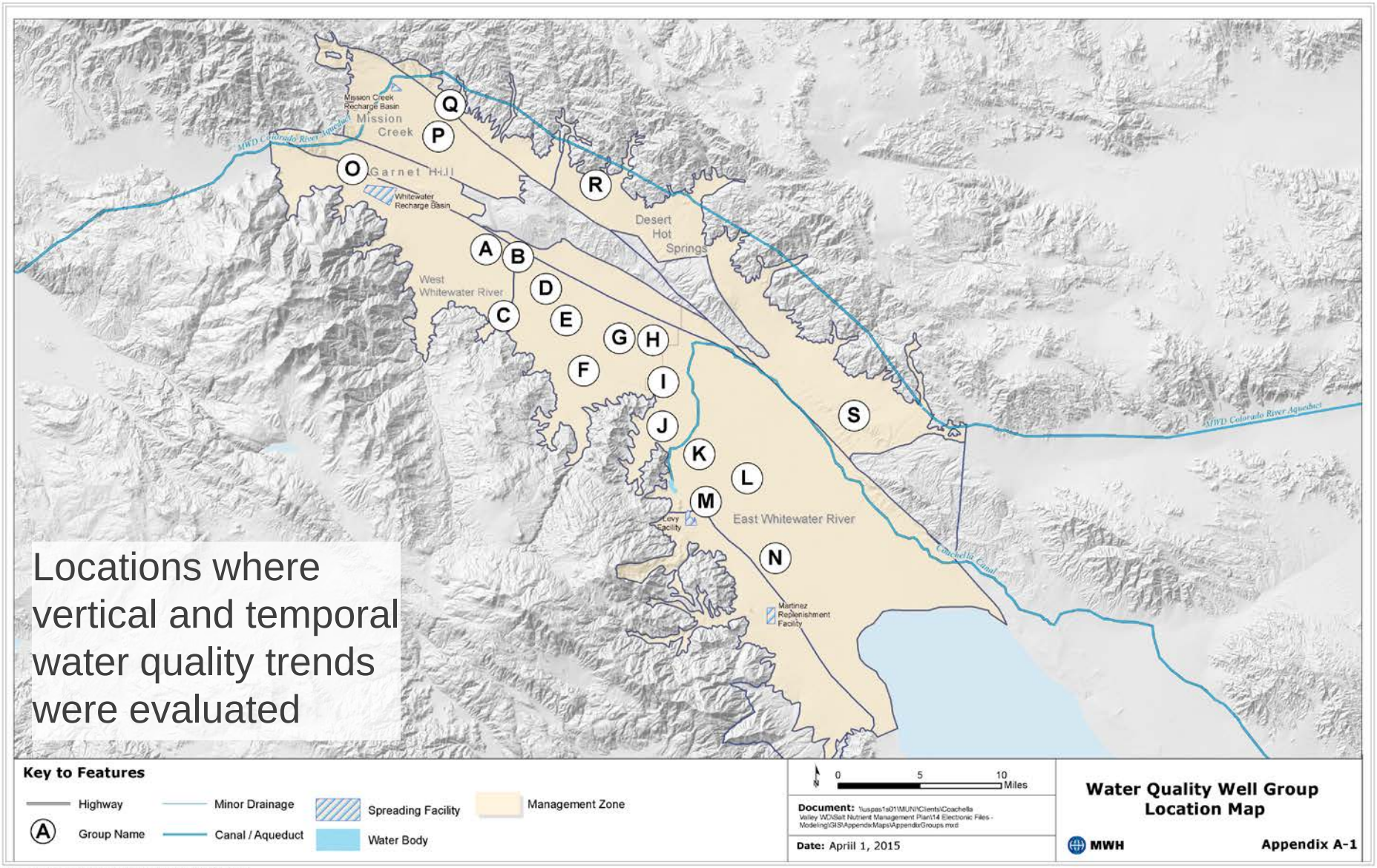
# Confining Layer and Semi-perched Extent



# Agricultural Drains



# Water Quality Trend Locations

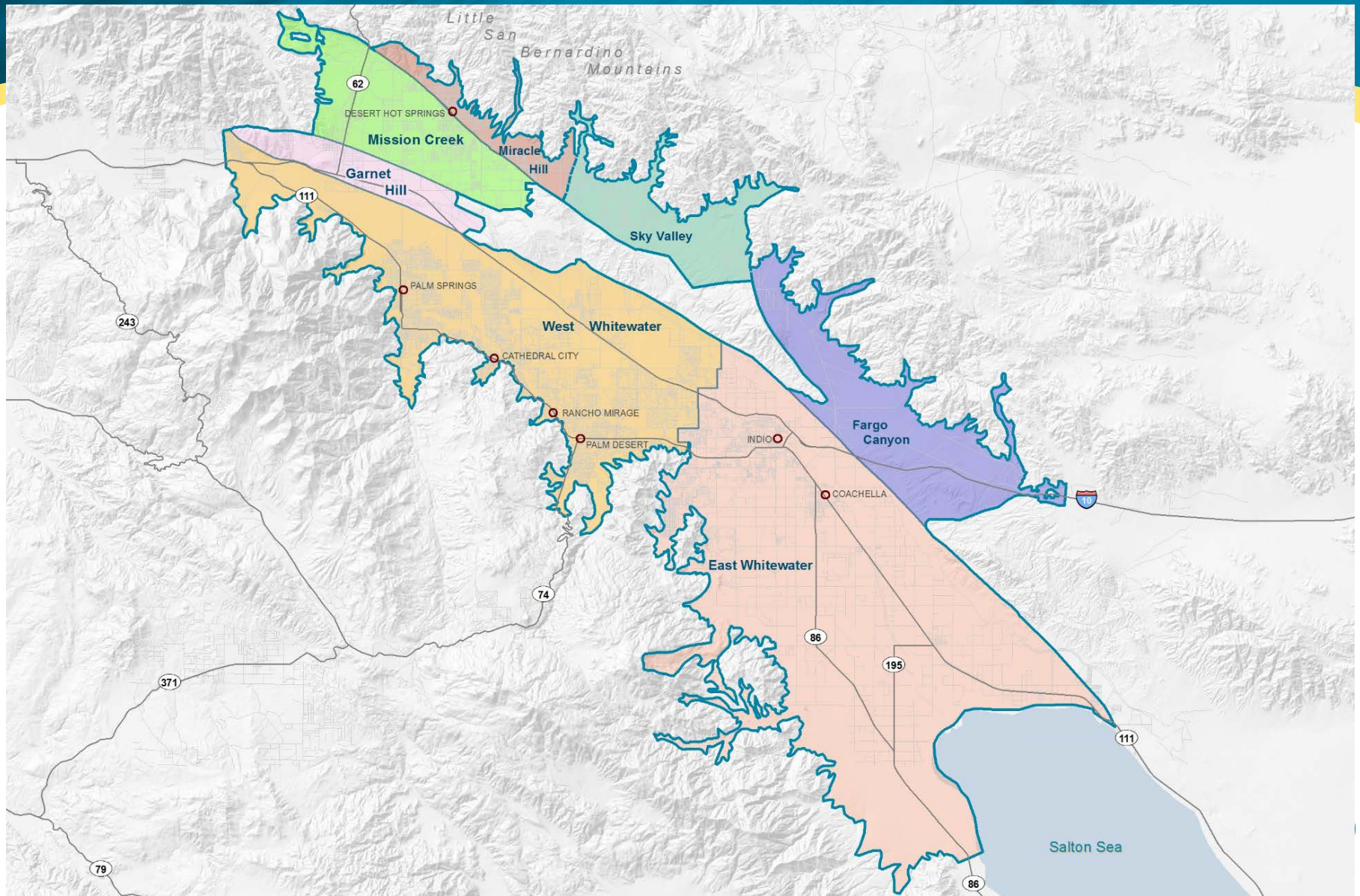



This map has been designed to print size 11" by 17".

# Salt and Nutrient Trends

- TDS trends vary depending on area
  - Desert Hot Springs, naturally occurring high concentration
    - Few data points
    - Little well construction information
    - No vertical data to evaluate vertical trends
  - Pumping zones tend to be mixed/lower
  - Very deep (little known) typically higher concentration
- Concentration can increase with time in many cases
- Few data points in western portion of Mission Creek Subarea

# Management Zones



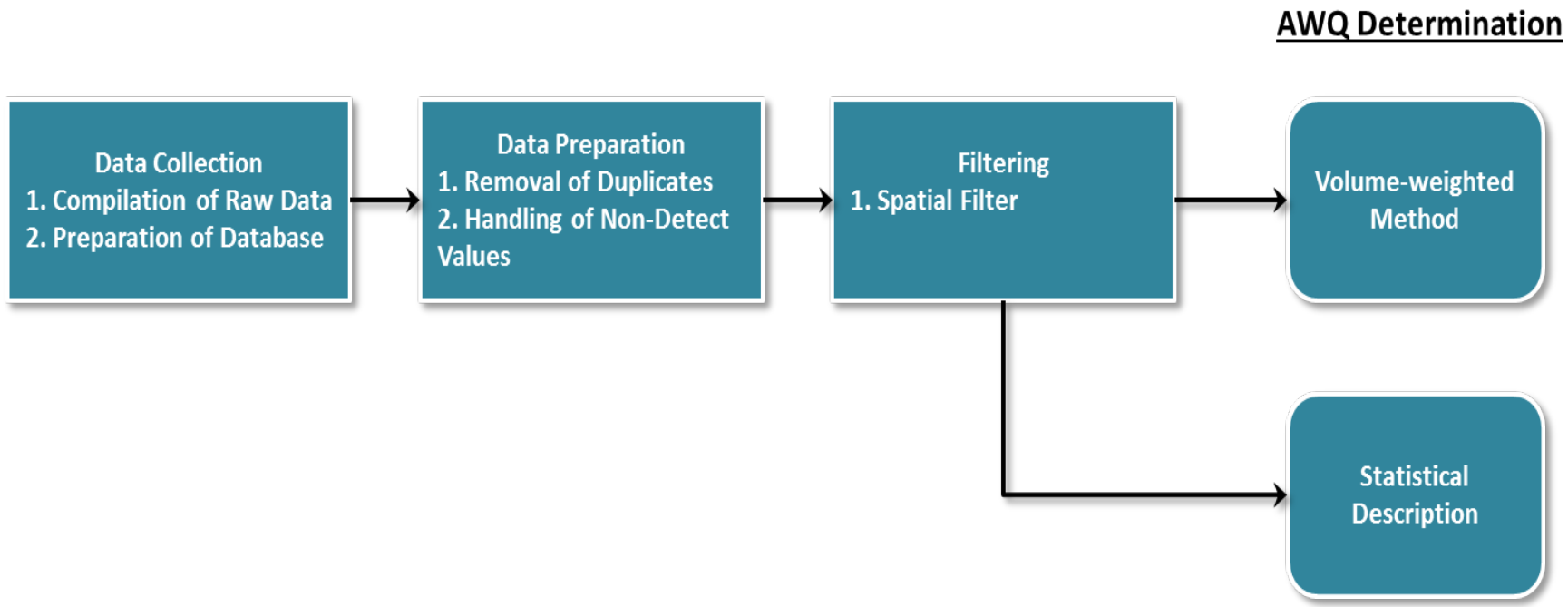
SNMP

# Ambient Water Quality and Assimilative Capacity

# Constituents of Concern

- Salts
  - Chloride
  - Sulfate
  - **Total dissolved solids (TDS)**
- Nutrients
  - Ammonia and Organic Nitrogen (TKN)
  - Nitrite ($NO_2$)
  - **Nitrate ($NO_3$)**
- Other
  - Arsenic
  - Fluoride
  - Chromium VI

# Ambient Water Quality

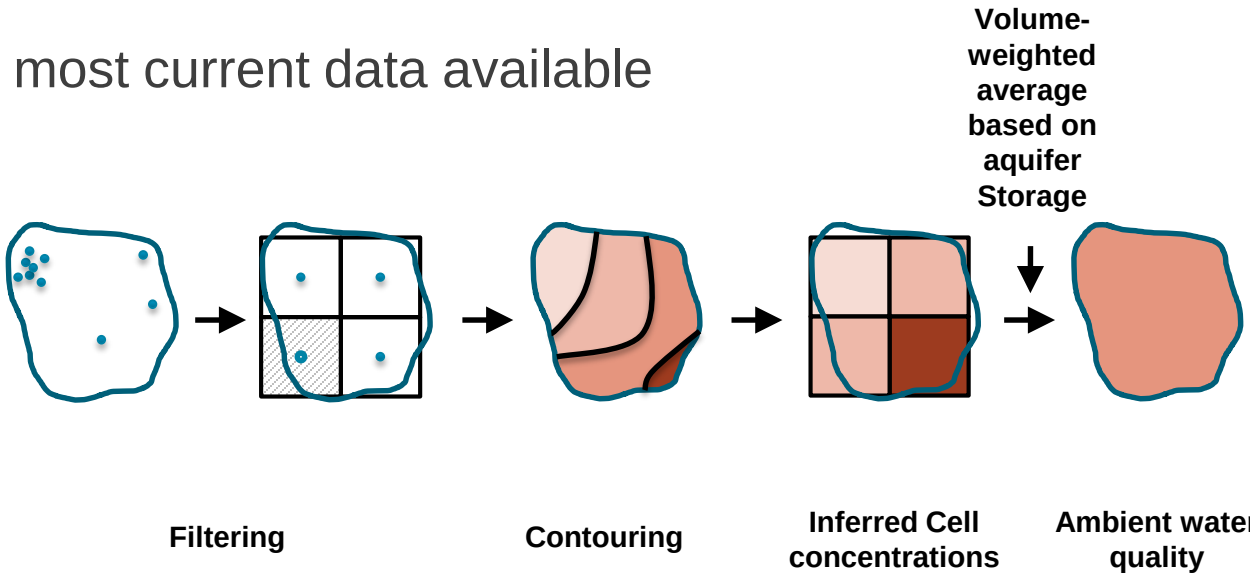


# Statistical Summary Method

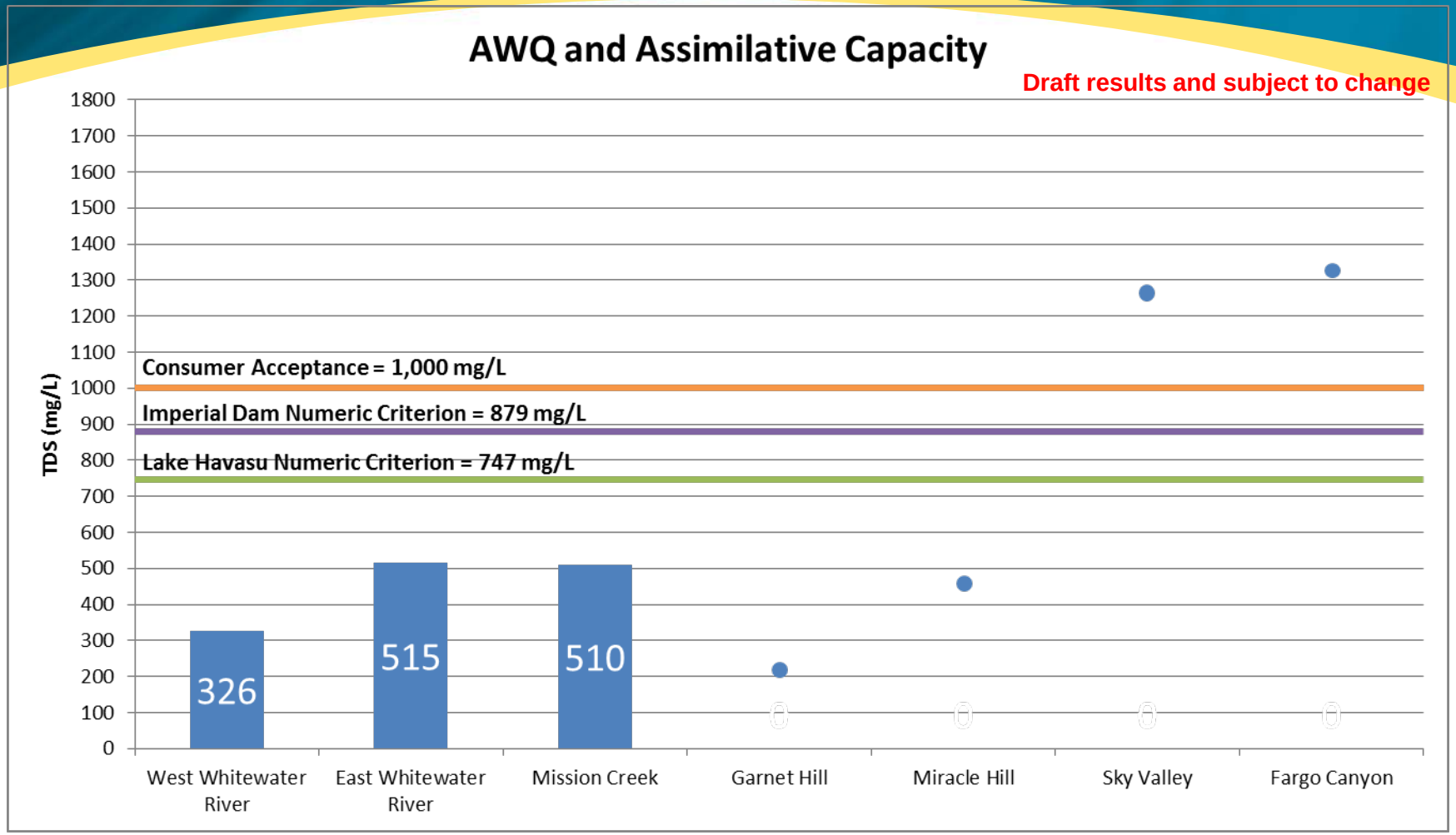
- Statistical analyses completed for all management zones
  - Period of 1999 to 2013
- Within TM-2, descriptive statistics are provided for both unfiltered and filtered datasets
- AWQ is evaluated based on the filtered dataset

# Volume-weighted Method

- TM-2 provides detailed information
- Considers the amount of water in storage and its concentration
- Applied when an adequate amount of data exist for a management zone
- Uses most current data available

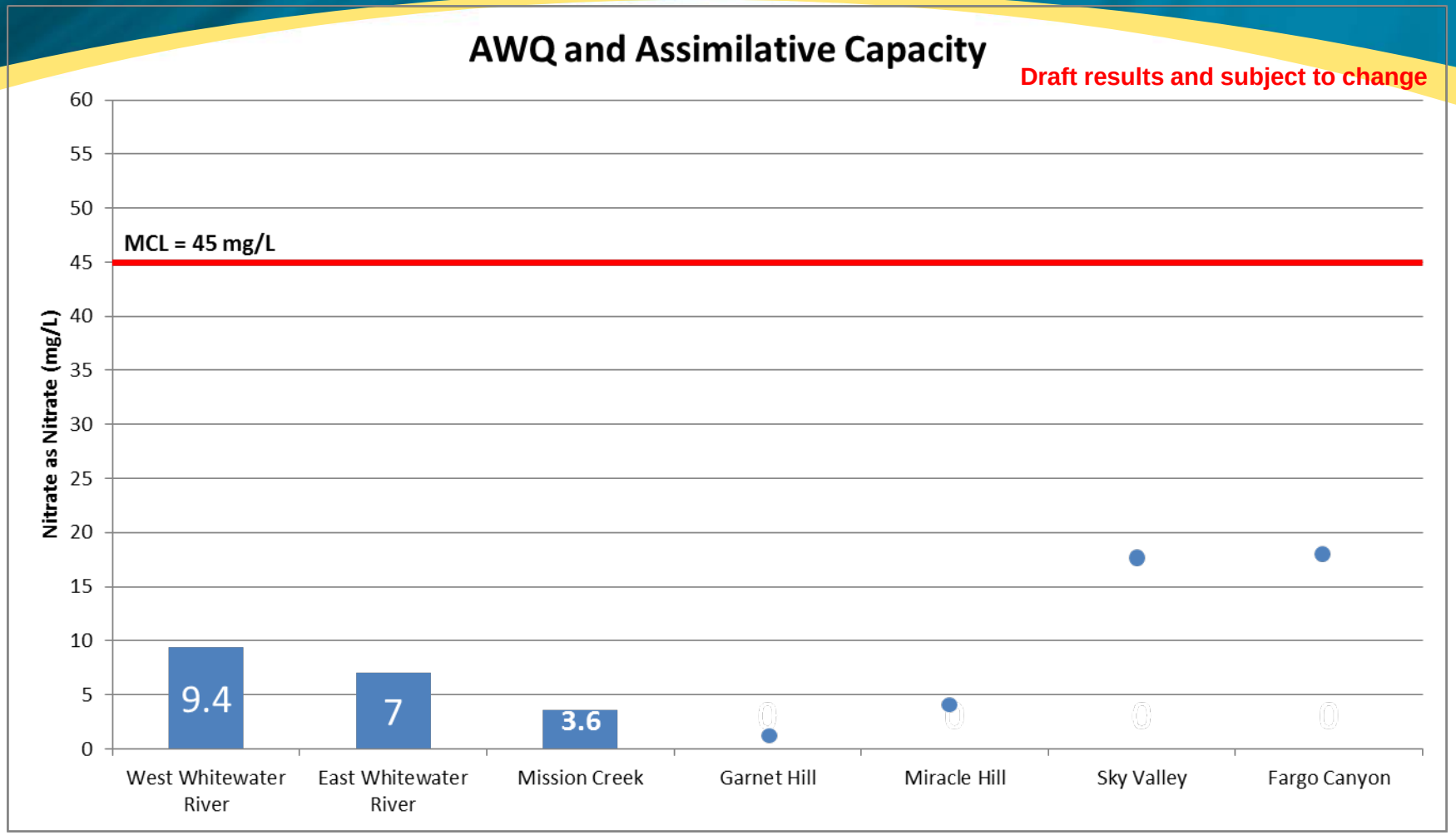


# Assimilative Capacity (TDS)




1. TDS water quality objective is based on the Title 22 CCR "Consumer Acceptance" for municipal beneficial use. A protective water quality objective of 879 mg/L and 747 mg/L TDS is currently being used for this surface water at Imperial Dam and Lake Havasu, respectively.
2. Layer 1 of West Whitewater River has too few data points for the volume-weighted method, therefore the median is used for this layer.
3. Garnet Hill, Miracle Hill, and Sky Valley have less than 10 data points; Fargo Canyon has 13 – AWQ is not calculated, the median is shown as a point for reference.

# Assimilative Capacity (Nitrate)

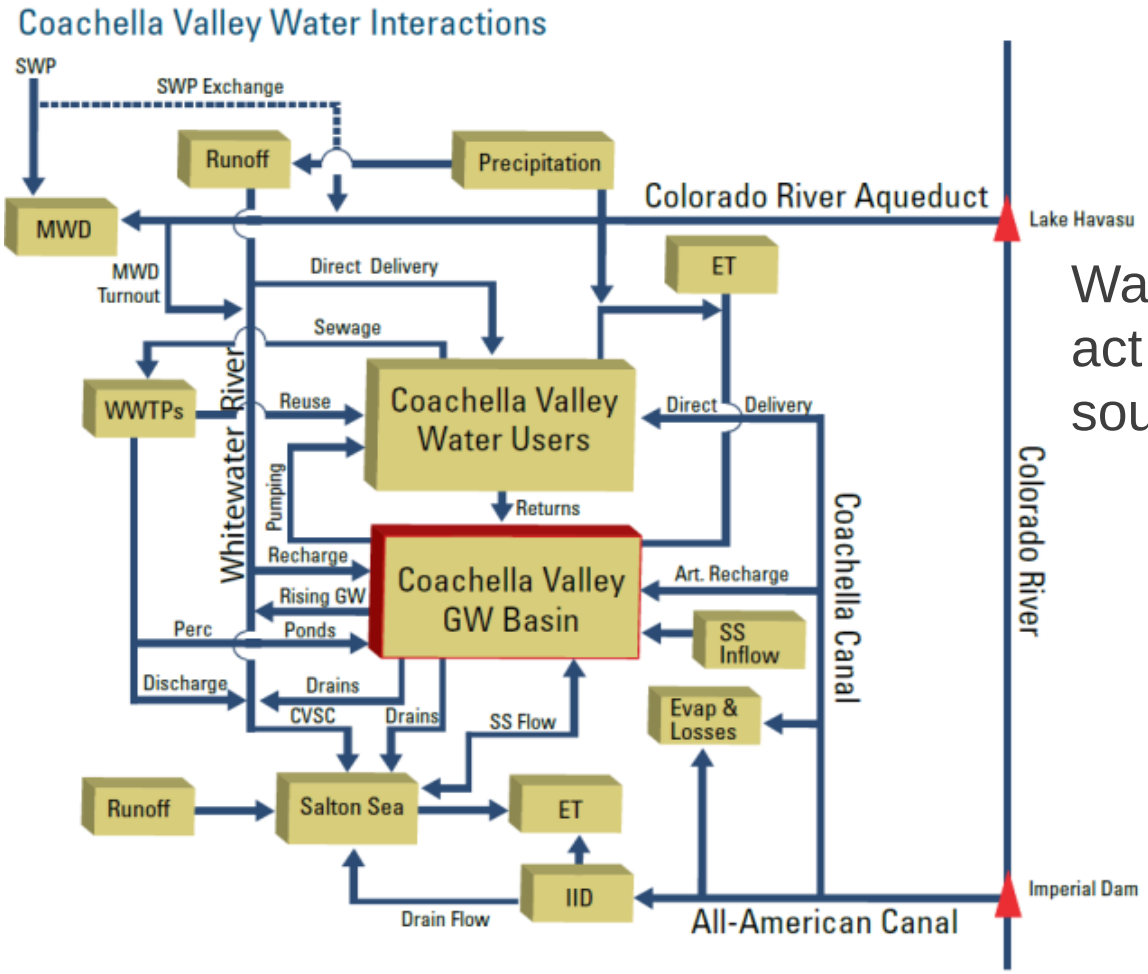



1. Nitrate water quality objective is based on the Title 22 MCL of 45 mg/L.
2. Layer 1 of West Whitewater River has too few data points for the volume-weighted method, therefore the median is used for this layer.
3. Garnet Hill, Miracle Hill, and Sky Valley have less than 10 data points; Fargo Canyon has 13 – AWQ is not calculated, the median is shown as a point for reference.

SNMP

# Estimate of Future Water Quality

# Water Balance




Water balance components act as either a salt/nutrient source or sink to the basin

# Salt/Nutrient Sources and Sinks

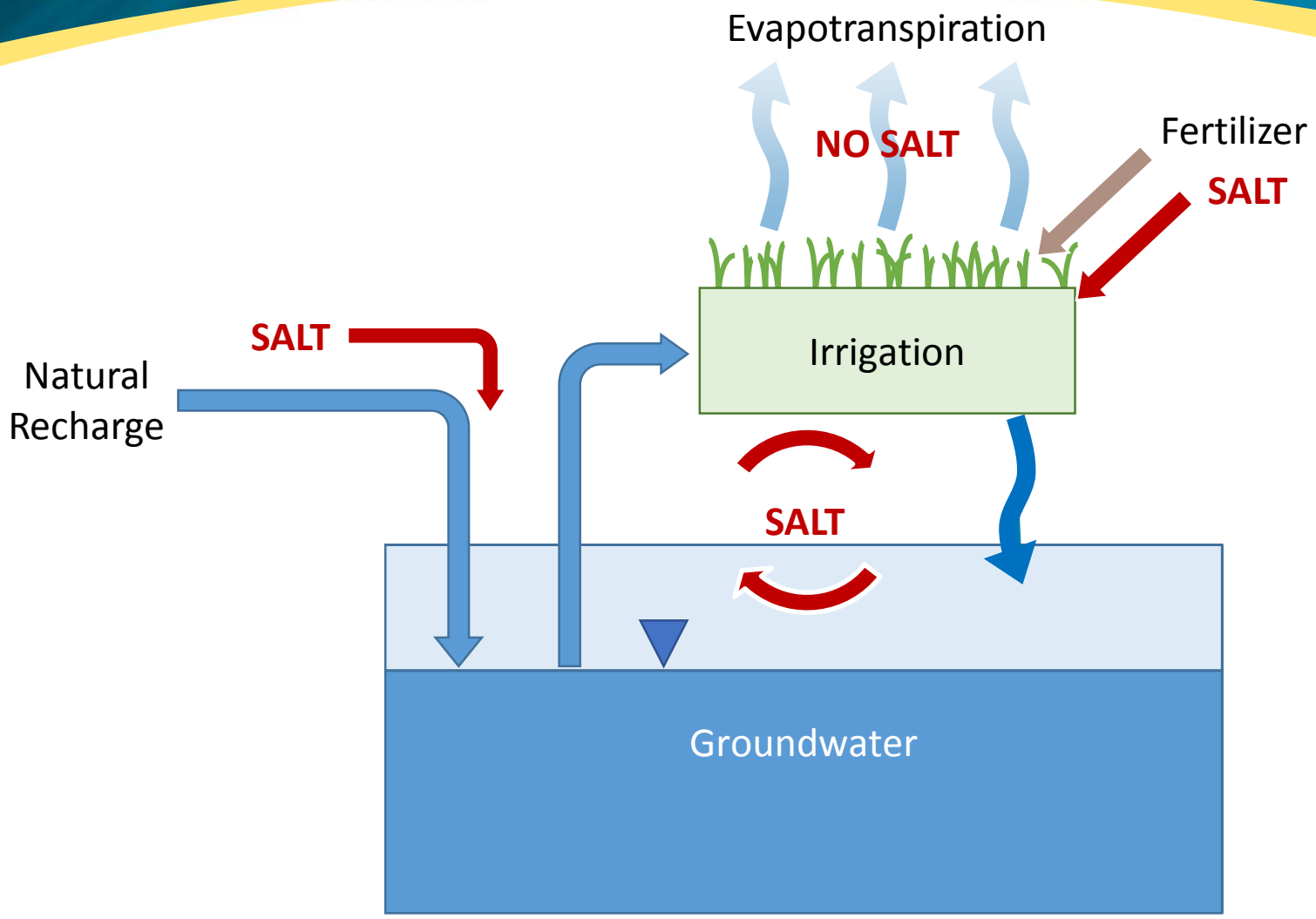
- Sources:
  - Artificial Recharge
    - Imported
  - Natural Recharge
    - Precipitation
    - Surface Water
  - Return flows
    - Agricultural
    - Golf
    - Municipal
    - Industrial
    - Fish Farms/Duck Clubs
  - Subsurface Inflow
  - Wastewater Percolation

- Sinks:
  - Groundwater pumping
  - Drain Flows
  - Subsurface Outflow
  - Treatment
  - Wastewater Surface Discharge

# Approximate Future Water Quality – Salt/Nutrient Loading Model

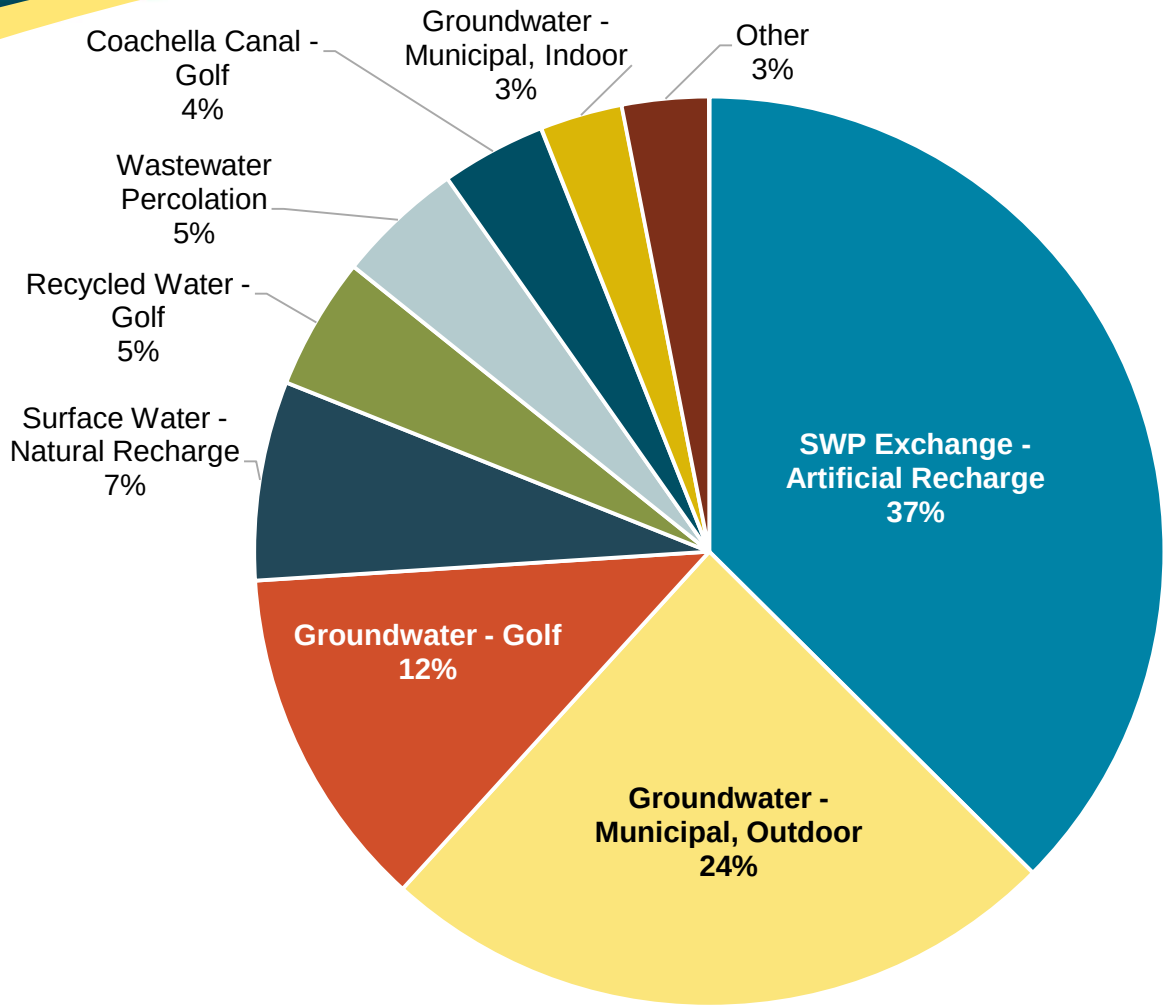
- Identify Inflows and Outflows for each Management Zone
  - Quantity and Quality (Sources and Sinks)
- Build Water Budget for the Future
  - Based on Published Water Plans
  - Peer Reviewed Groundwater Model
  - Complete Mass Balance
- Limitations
  - Assumes instantaneous mixing
  - Single vertical layer
  - Limited to management zones and not site specific
- Benefits
  - Accomplishes goal of basin-wide management tool for salts and nutrients
  - Can be used by multiple stakeholders
  - Can be used to quickly evaluate projects
  - Based on published material – low effort to update

# Salt and Nutrient Model

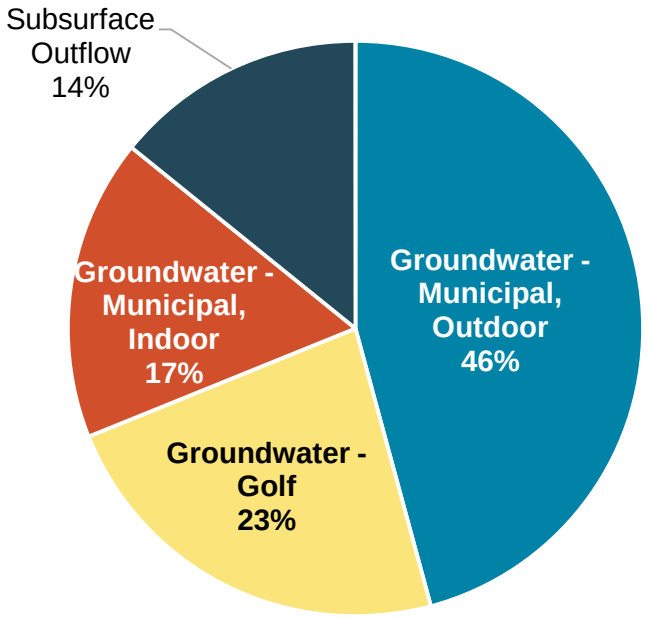


# Salt Balance Components for West Whitewater River Management Zone - 2014

**Salt Additions to GW - 164,902 Tons in 2014**



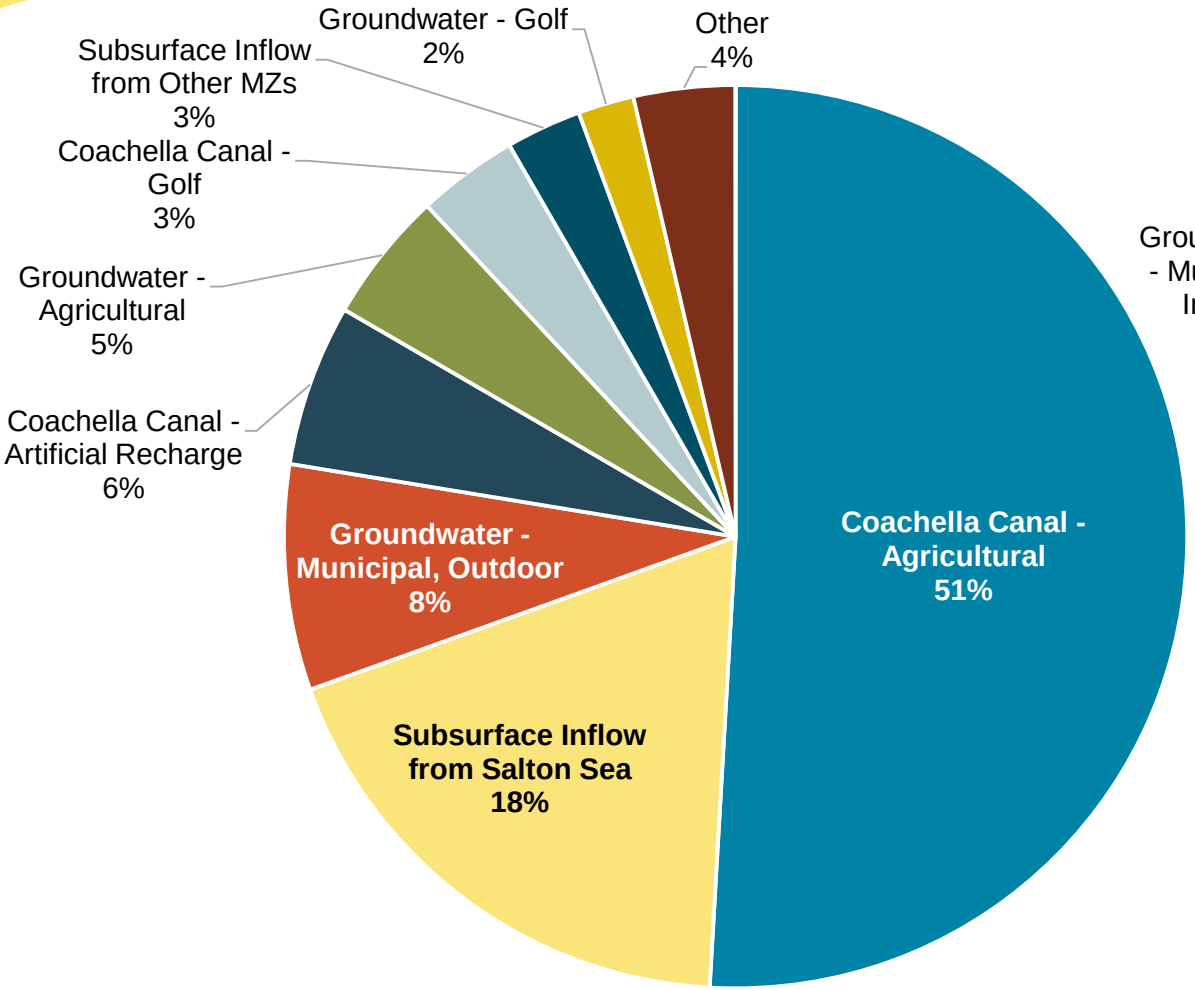

**Salt Subtractions from GW – 87,019 Tons in 2014**



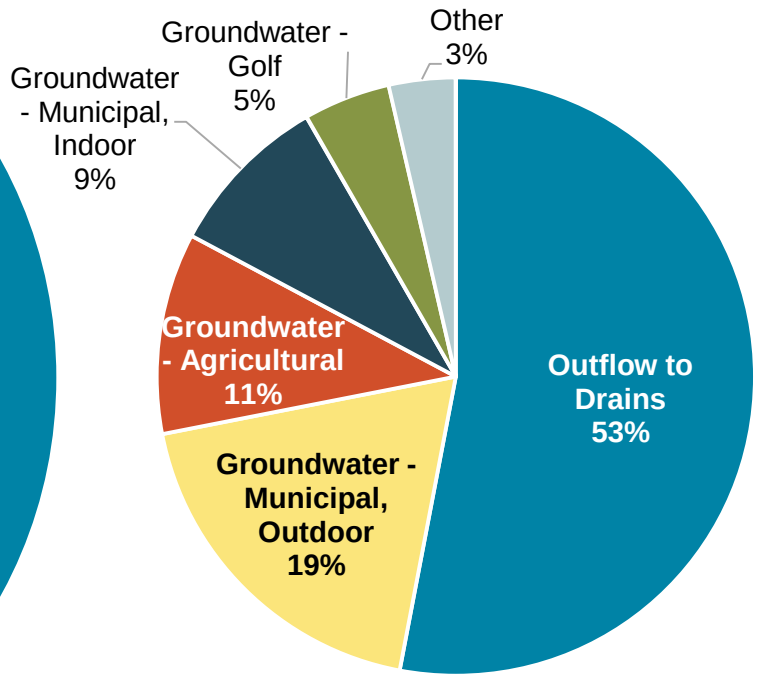

**Draft Results – Subject to Change**

# Salt Balance Components for East Whitewater River Management Zone - 2014

**Salt Additions to GW - 467,873 Tons in 2014**

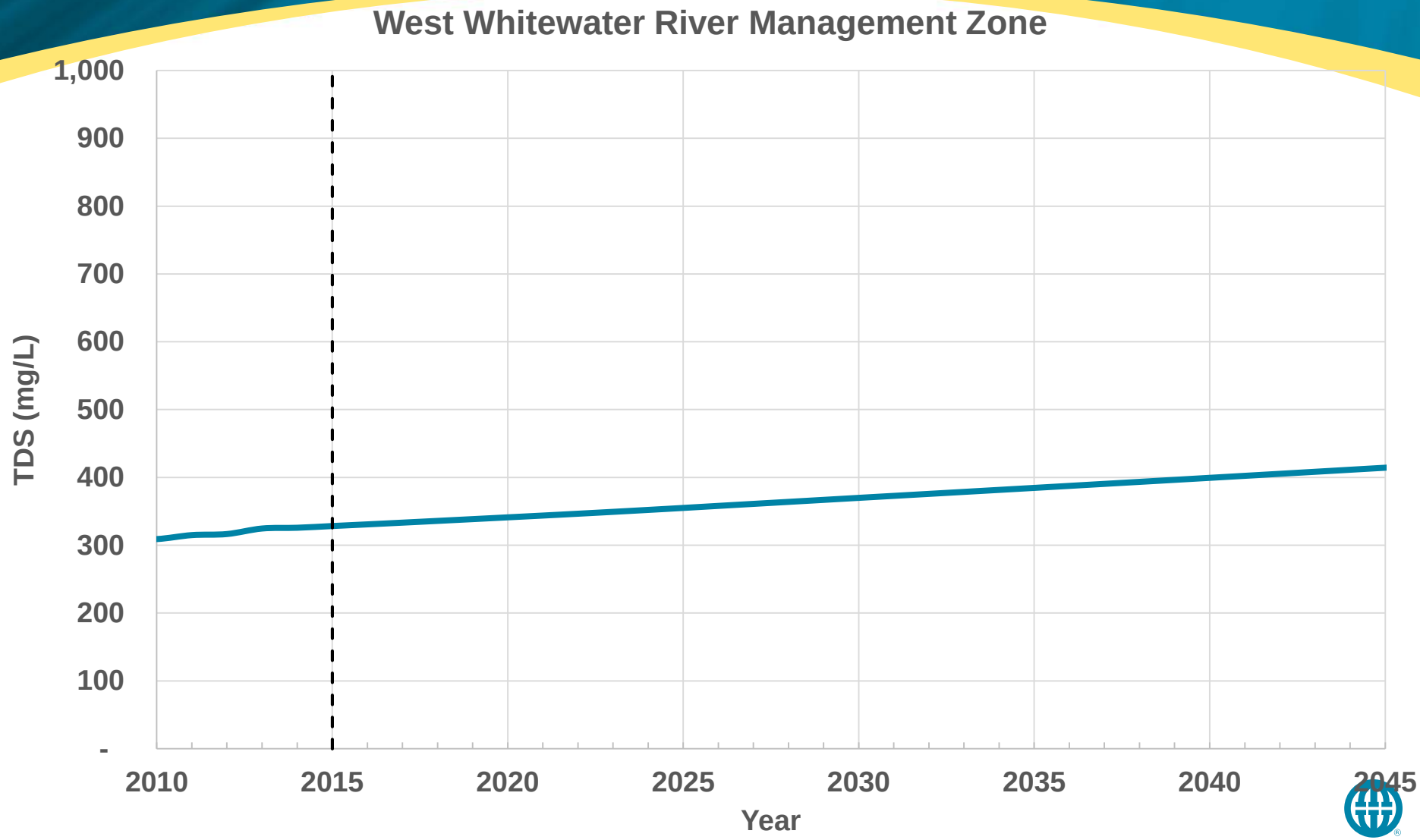



**Salt Subtractions from GW - 205,865 Tons in 2014**

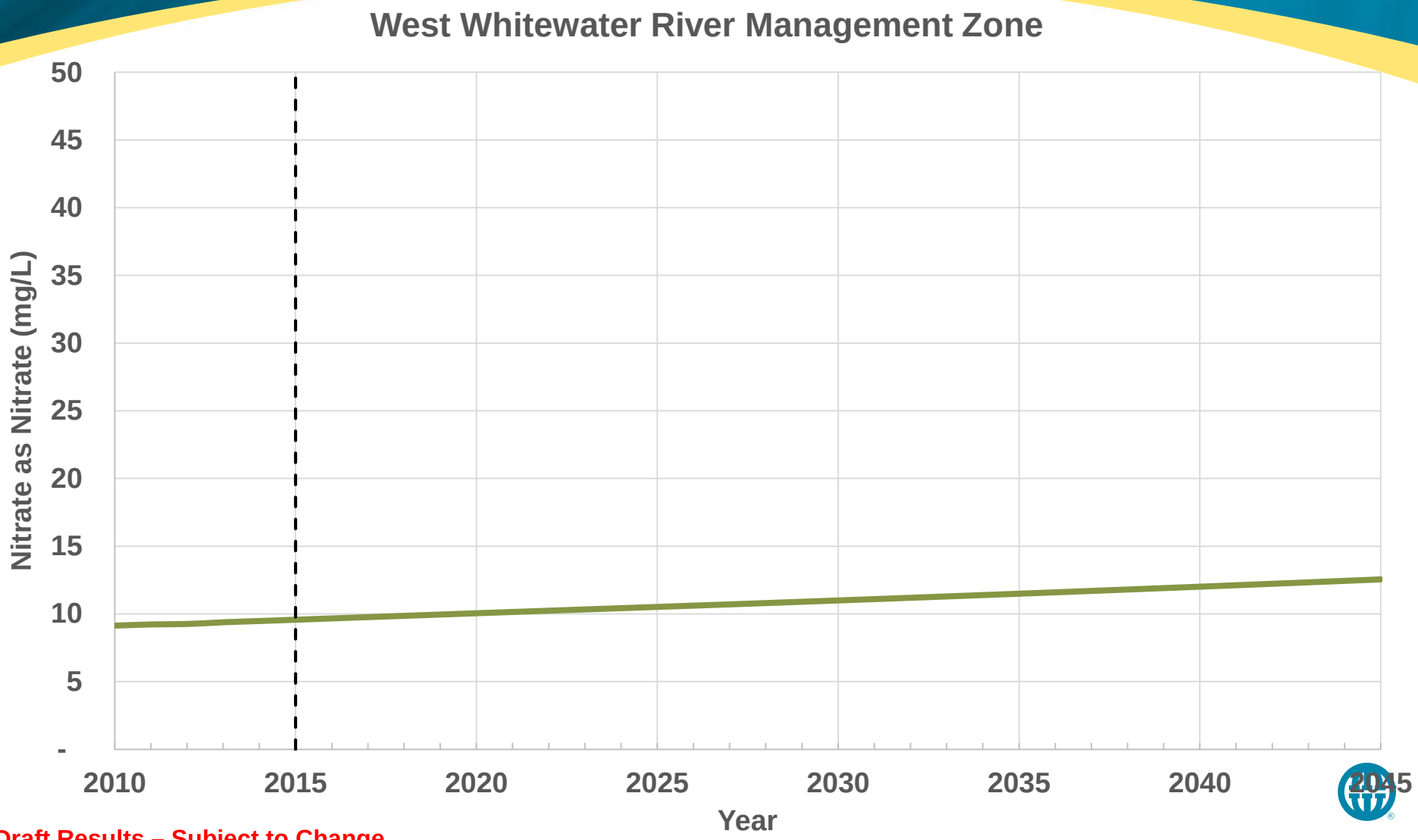



**Draft Results – Subject to Change**

# Estimate of Future Water Quality – West Whitewater River MZ TDS

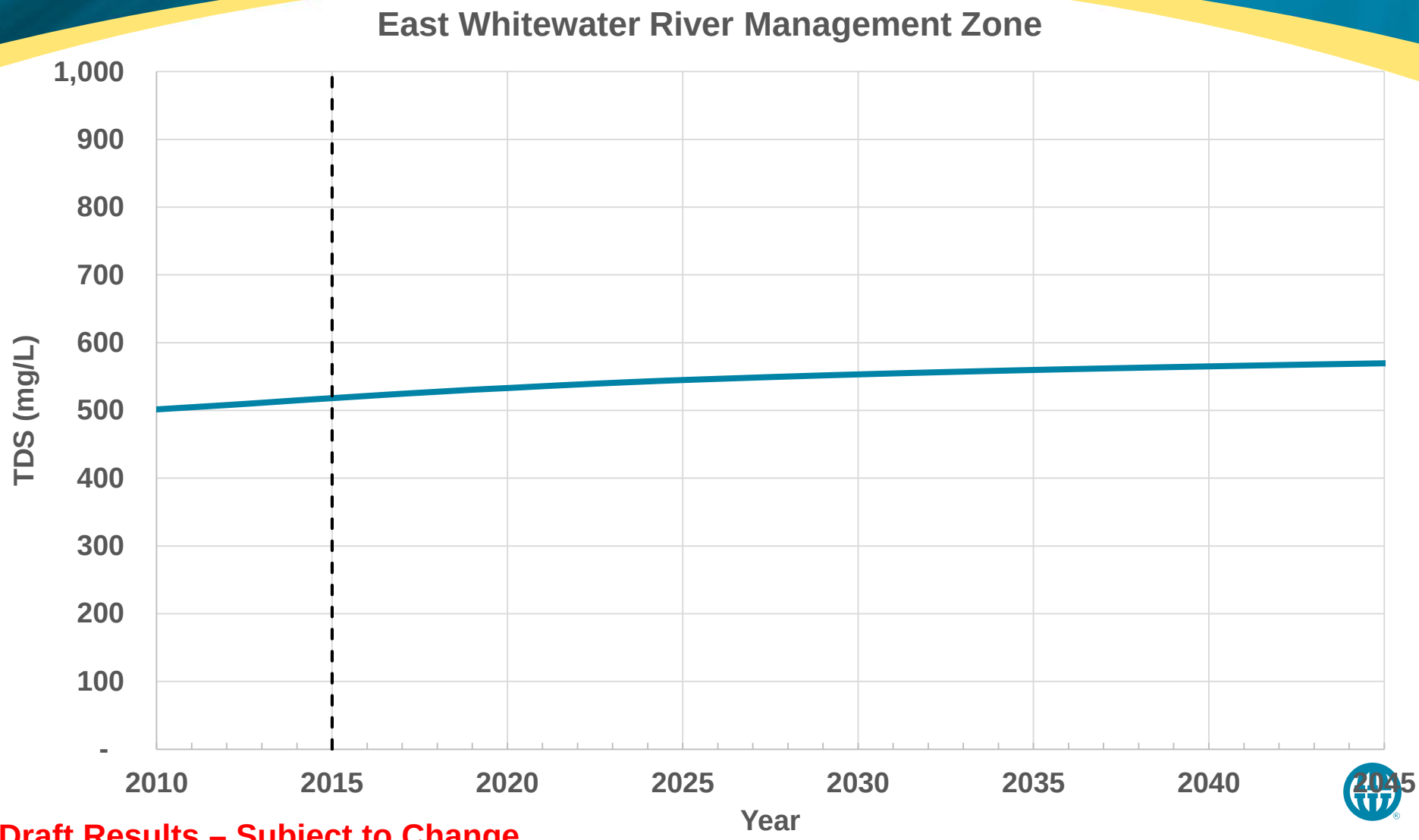


# Estimate of Future Water Quality – West Whitewater River MZ Nitrate



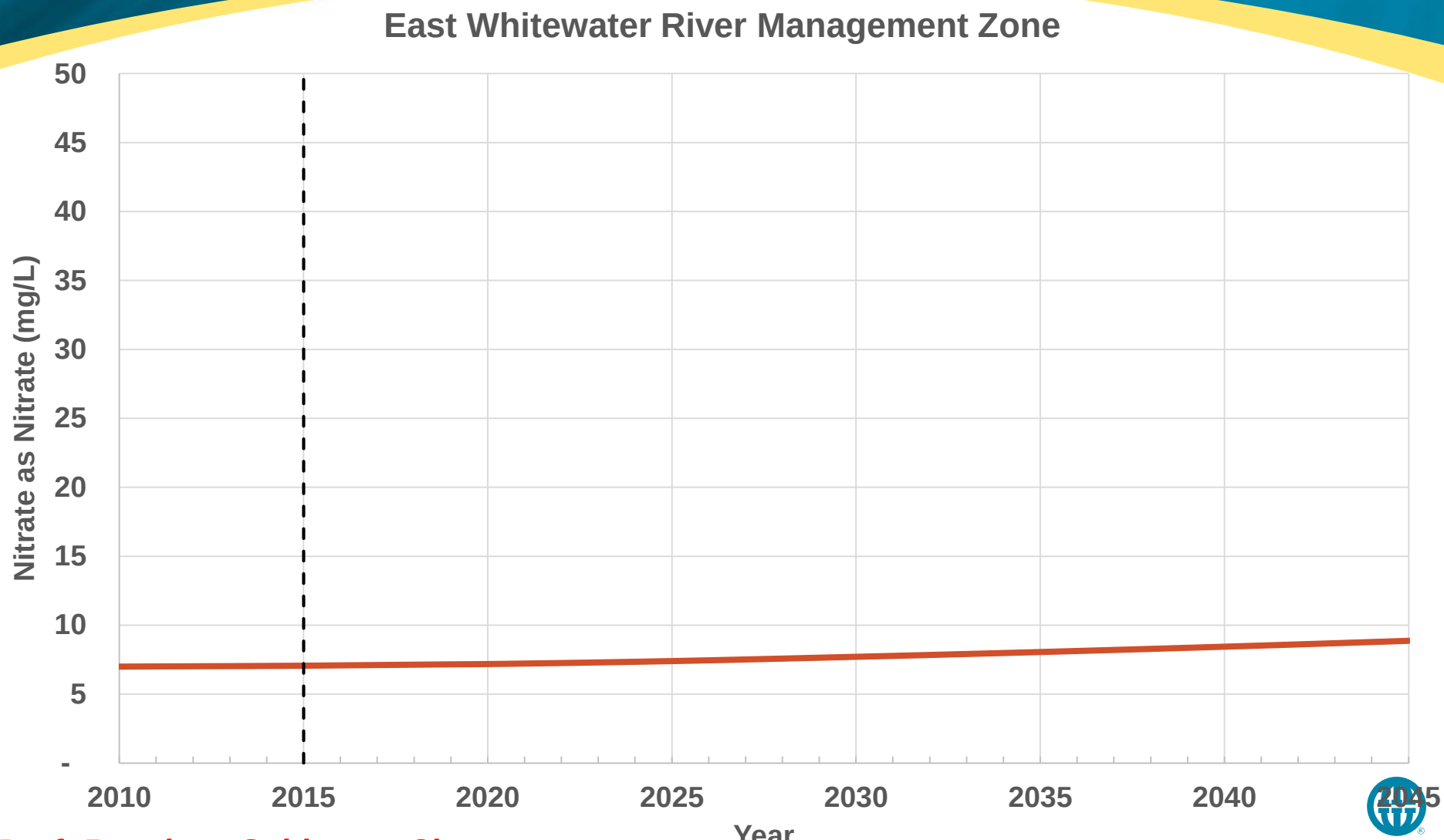

Draft Results – Subject to Change

# Estimate of Future Water Quality – East Whitewater River MZ TDS




**Draft Results – Subject to Change**

# Estimate of Future Water Quality – East Whitewater River MZ Nitrate




**Draft Results – Subject to Change**

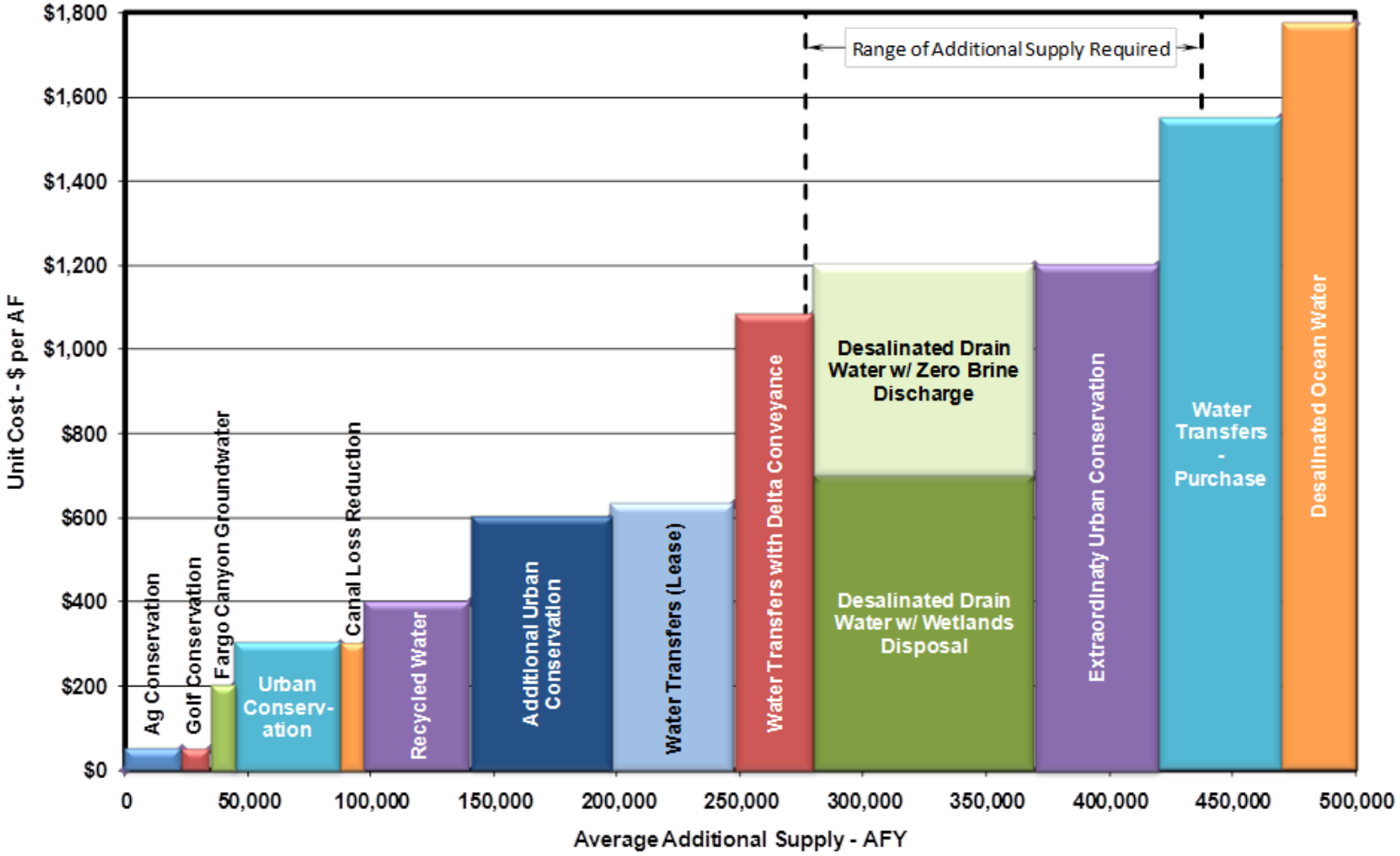
SNMP

# Salt and Nutrient Management Strategies

# Water Supply Planning Goals – Consistent with SNMP

- Meet current and future demands with a 10 percent supply buffer;
- Eliminate long-term groundwater overdraft;
- Manage and protect water quality;
- Comply with state and federal laws and regulations;
- Manage future costs; and
- Minimize adverse environmental impacts.

# Water Management Plan Management Strategy Portfolio



# SNMP Management Strategy Focus Areas

Salt/Nutrient Management Goals focus on strategies to control salt and nutrient loading while staying consistent with other management efforts (WMPs, IRWM goals, etc.):

- Public Outreach/Awareness
- **Managing Source Water Quality**
- **Demand Management and Conservation**
- **Wastewater/Source Control and Infrastructure**
- Stormwater Management
- Planned Projects
- Data Collection and Improved Basin Understanding

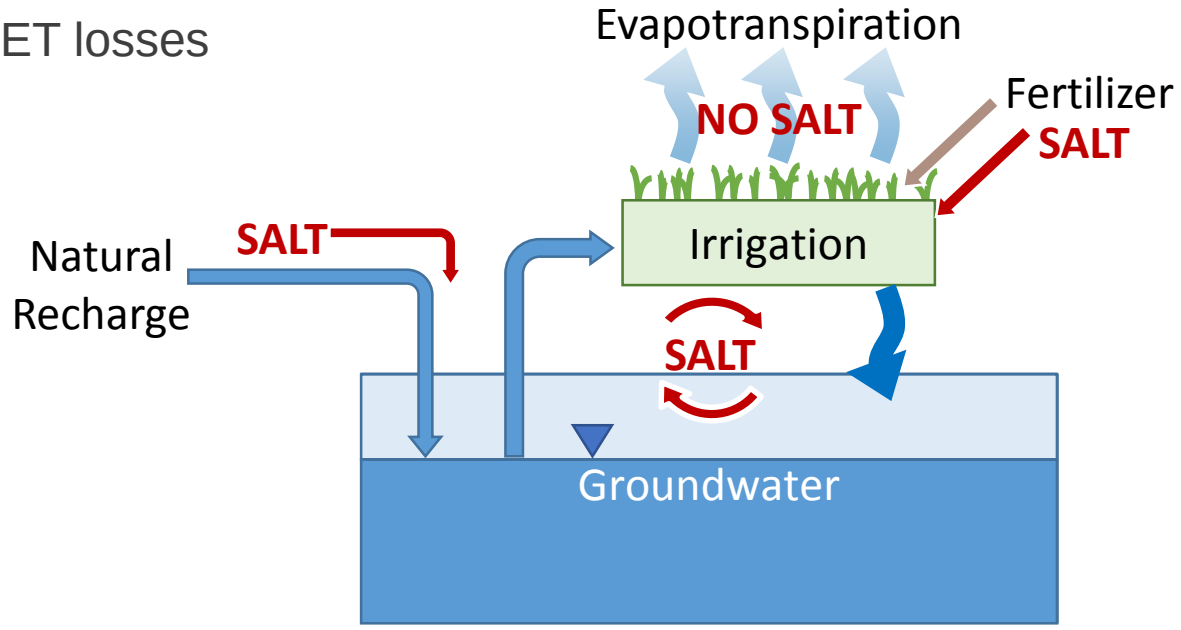
# Managing Source Water Quality

- Colorado River Salinity Control Program
  - Reduction of salt load by human activity
- Direct State Water Project Delivery
- Desalination of Colorado River Water
- Desalination of Drain Flows
- Wellhead Treatment

# Demand Management and Conservation

- Improved Irrigation Efficiency (Golf and Agricultural Users)
  - Reduction in ET losses

- Desert Landscaping Incentives
  - Reduction in ET losses



# Wastewater/Source Control and Infrastructure

- Septic to Sewer Conversion
  - Also enhanced septic systems
- Agricultural Drain System
- Recycled Water Use on Turf for Nitrogen Uptake
- Wastewater Treatment Upgrades
  - Nitrification/de-nitrification
- Self-regeneration Water Softeners
- Fertilizer Application Management

SNMP

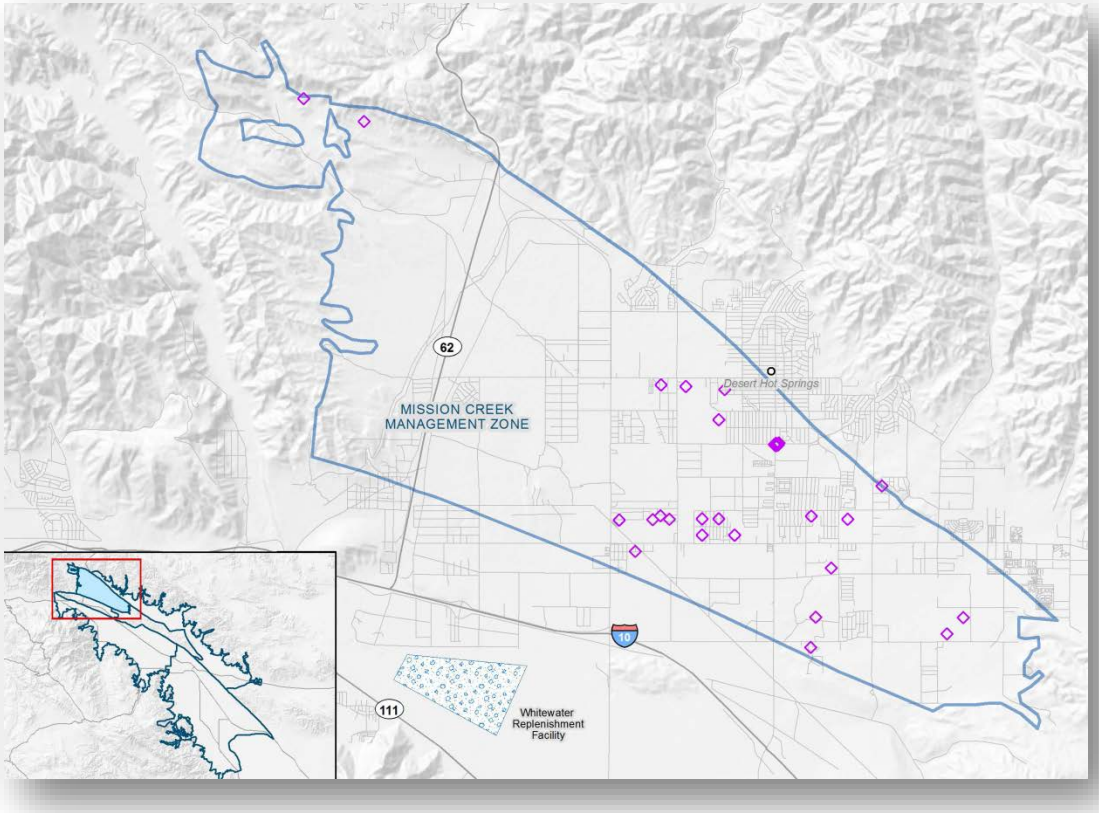
# Monitoring Plan

# Policy Monitoring Plan Requirements

- Design to determine water quality in the basin
- Focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly recycled water groundwater recharge projects.
- Focus on existing wells
- Identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data.

# Monitoring Approach

- Focus on existing wells and areas where recycled water projects and or supply wells are located
- Leverage existing monitoring programs
- Fill data gaps



# Data Gaps

| Management Zone | Major Data Gaps |
|---|---|
| **West Whitewater River** | Shallow data in northern portion of MZ, northern Cathedral City and northern Palm Springs, within I-10 corridor (limited by conservation and preservation areas) |
| **East Whitewater River** | East of Grapefruit Blvd and north 66$^{th}$ Ave., deeper areas east of Grapefruit Blvd, the Oasis subarea: west of Harrison St. and south of 74$^{th}$ Ave. |
| **Mission Creek** | West of N. Indian Canyon Dr., evaluate existing non-monitored wells for construction information/vertical water quality profile |
| **Garnet Hill** | Ensure data collection at or near supply wells *(recycled water projects and pumping for supply are limited)* |
| **Desert Hot Springs** | Ensure data collection at or near supply wells *(recycled water projects and pumping for supply are limited)* |

# Monitoring Recommendations

- Evaluate existing (currently non-monitored) wells where data is needed
  - Video if needed
  - Incorporate into existing monitoring program, responsibility based upon location
- Compile and maintain a single database of well construction and quality records
  - Annual compilation and reporting responsibility: All stakeholders
  - Maintenance responsibility: CVWD, an extension of their Department of Water Resources Responsibilities
- Vertical water quality
  - Seek opportunities to collect vertical profile data
- Complete a water quality report summary to the RWQCB every three years
- Ensure monitoring at recycled water application areas is completed
  - Initiate a data sharing with stakeholders, e.g., golf and agriculture

SNMP

# Next Steps

# Next Steps

- Draft Plan for Stakeholder review and comment – Week of April 20th
- Three week comment period
- Submit SNMP to RWQCB

***All meetings, meeting materials, comment letters, responses to comments, Tech. Memos and Contact information are posted at*** *http://www.cvwd.org/snmp/*

April 13, 2015

# Coachella Valley
# Salt and Nutrient Management Plan
## Stakeholder Meeting No. 6