February 19, 2015

Coachella Valley Salt and Nutrient Management Plan

Colorado River Regional Water Quality Control Board

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David Ringel, PE

DESERT WATER

WATER DISTRICT

Indio Water Authority
Your Water. Our Responsibility.

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Agenda

- Purpose of the Salt and Nutrient Management Plan
- Approach to Plan Development
- Work Conducted to Date
  - Work Completed
  - Key Comments and How They Have been Addressed
- Next Steps

Why a Salt and Nutrient Management Plan?

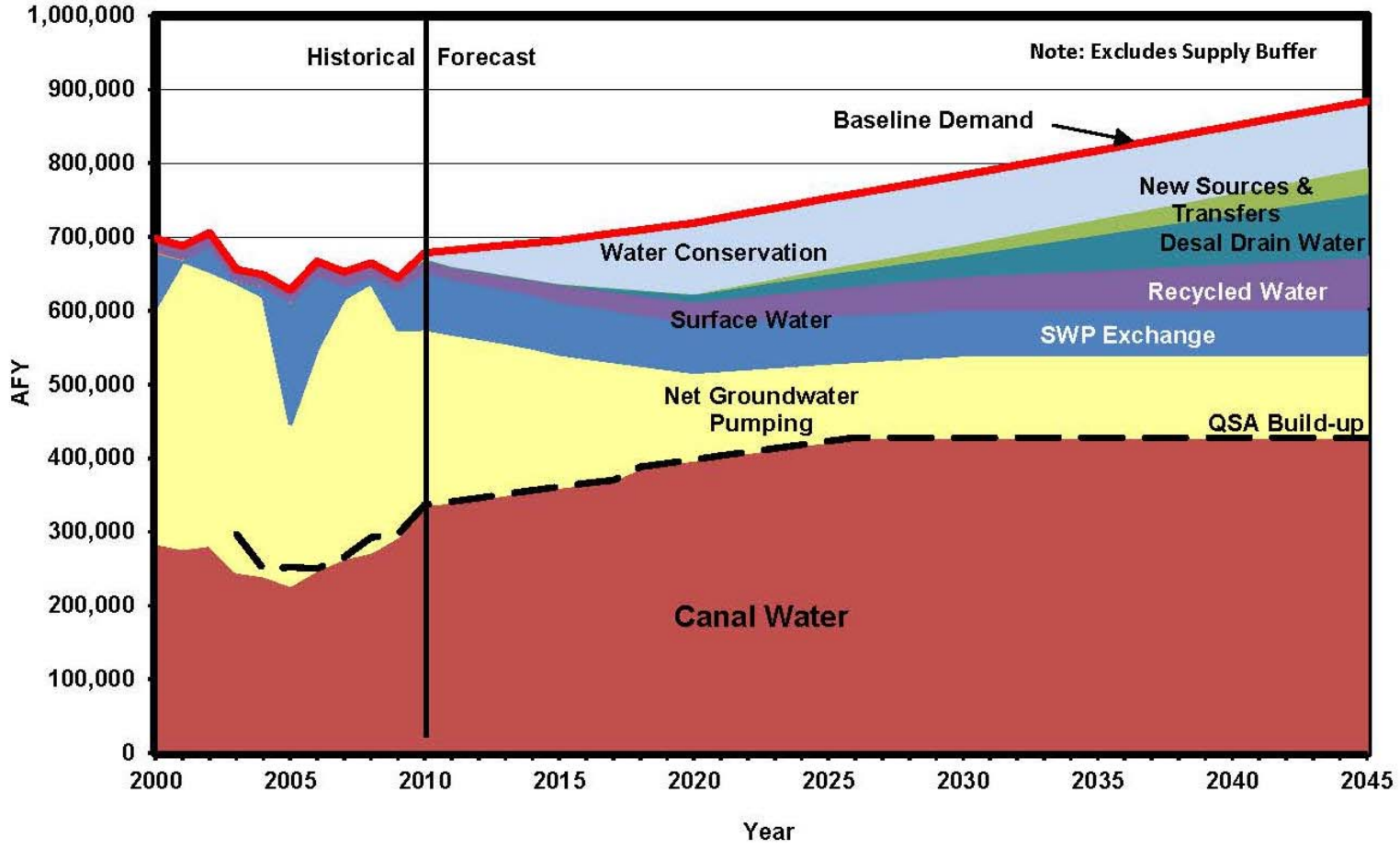
- State Water Resources Control Board Resolution No. 2009-0011*, Policy For Water Quality Control for Recycled Water (Policy)
- Goal:
  - *Facilitate basin-wide management of salts and nutrients from all sources in a manner that optimizes recycled water use while ensuring protection of groundwater supply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

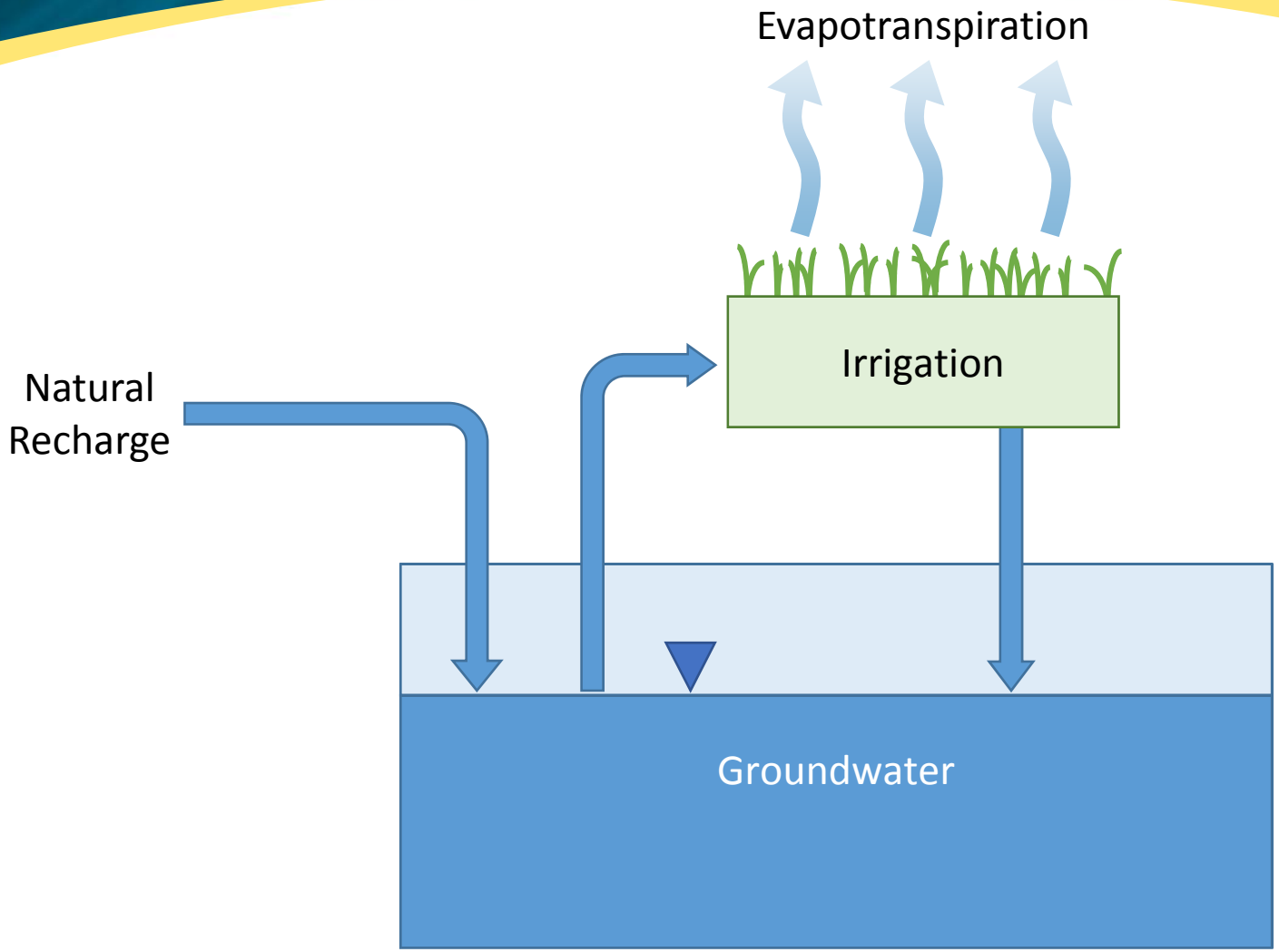
Policy Encourages Use of Recycled Water

- Supplies are limited
  - Growth, Conversion of Land
  - Drought
  - Elimination of 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

Valley Recycled Water Use



Simple Mixing Model



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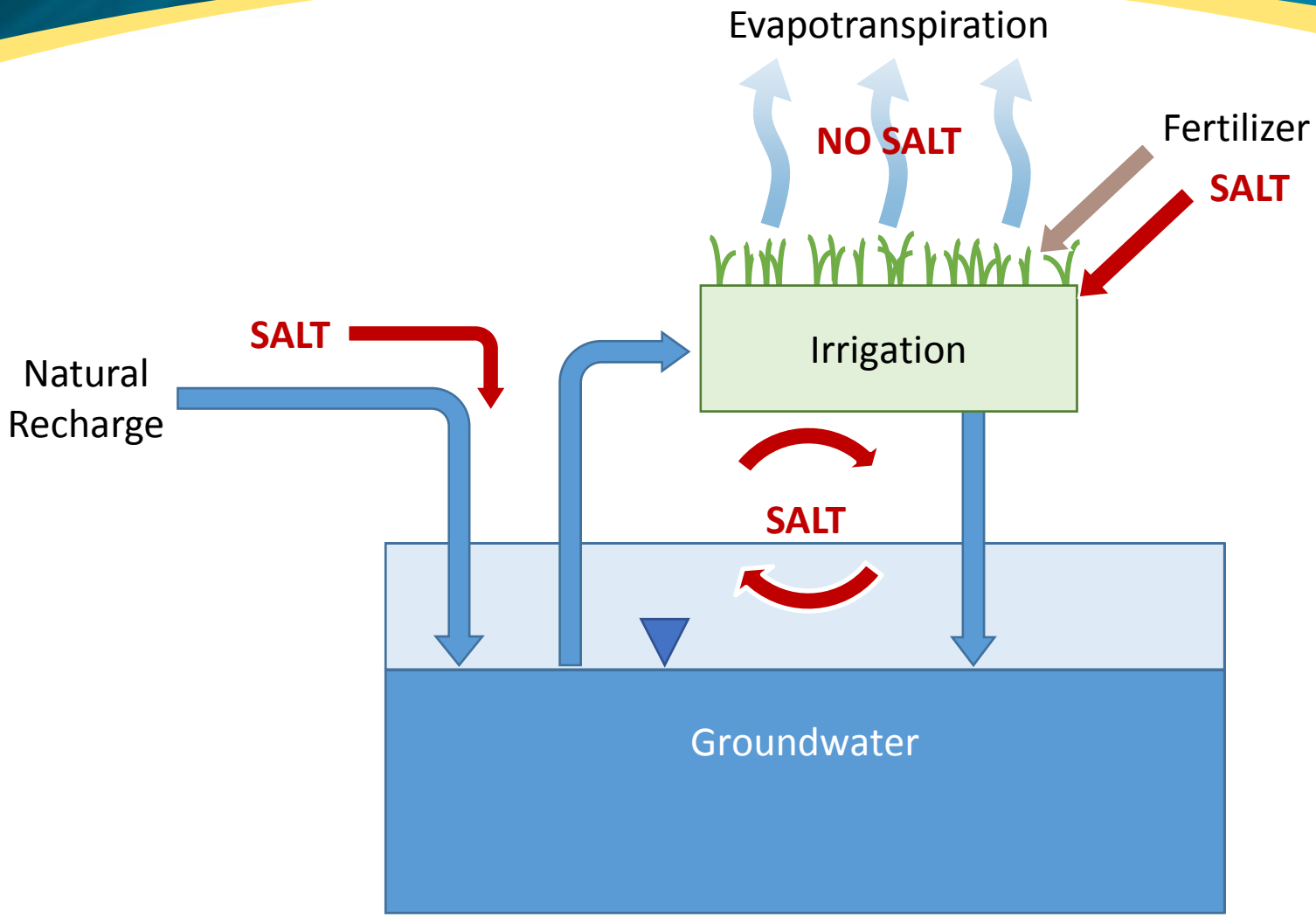


Purpose of the Coachella Valley SNMP

- Document Current Groundwater Quality
- Document Sources and Sinks of Salts and Nutrients
- Understand Where Stakeholders Want to Take Plan
- Identify Potential Projects and Practices To Protect Groundwater Quality
- Develop a Comprehensive Monitoring Strategy
- Help to Ensure a Sustainable Water Supply

What Will the Plan Look Like?

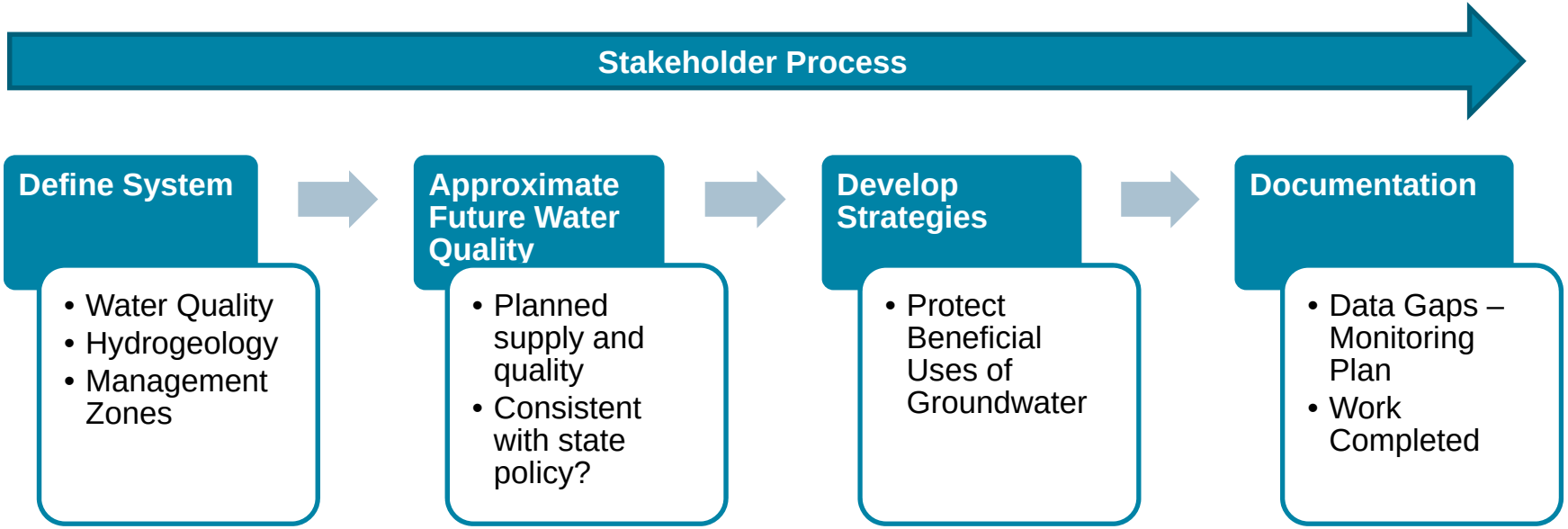
- Characterization of the Valley Groundwater Basins
- Current (or ambient) Groundwater Water Quality Relative to Salt and Nutrients
  - Total Dissolved Solids
  - Nitrate
- Sources and Sinks of Salts and Nutrients
  - Trends
  - Tools to Evaluate Strategies
- Quantify Difference Between Current Water Quality and Water Quality Objectives
- Management Goals
- Implementation Strategy
- Monitoring Plan

Presentation to:

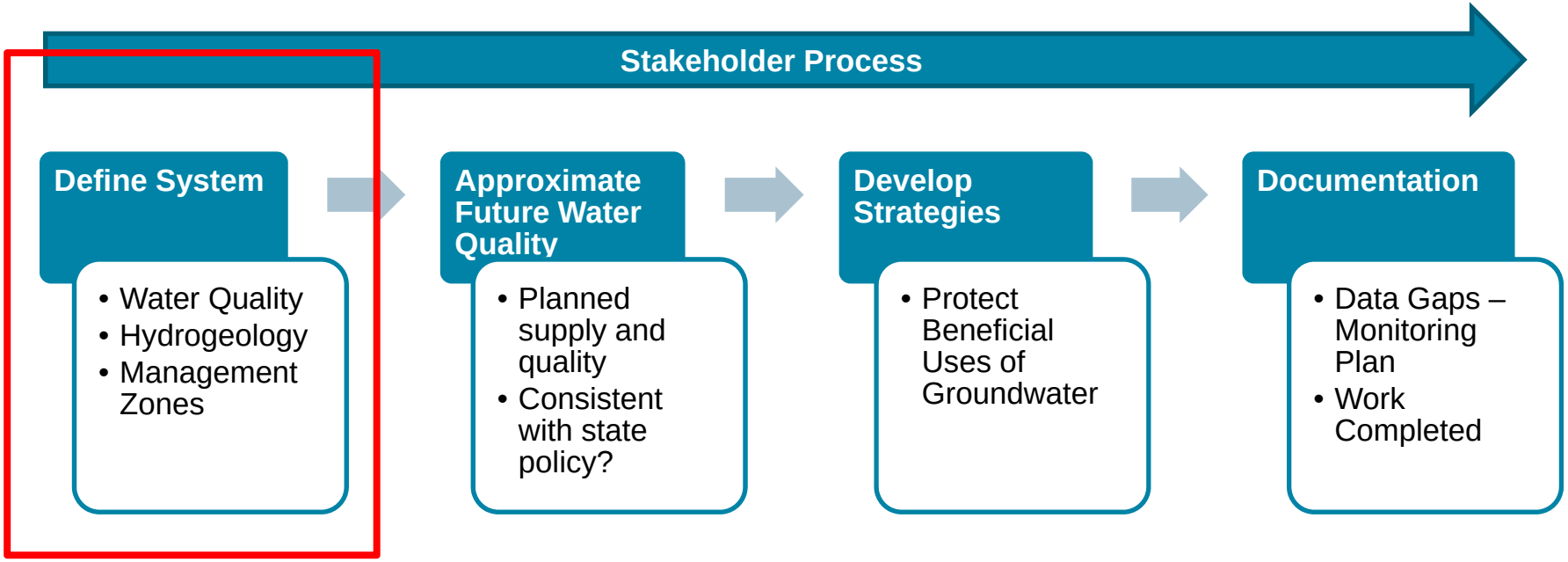
Colorado River Regional Water Quality Control Board

Approach and Work Completed

Conceptual Approach



Conceptual Process



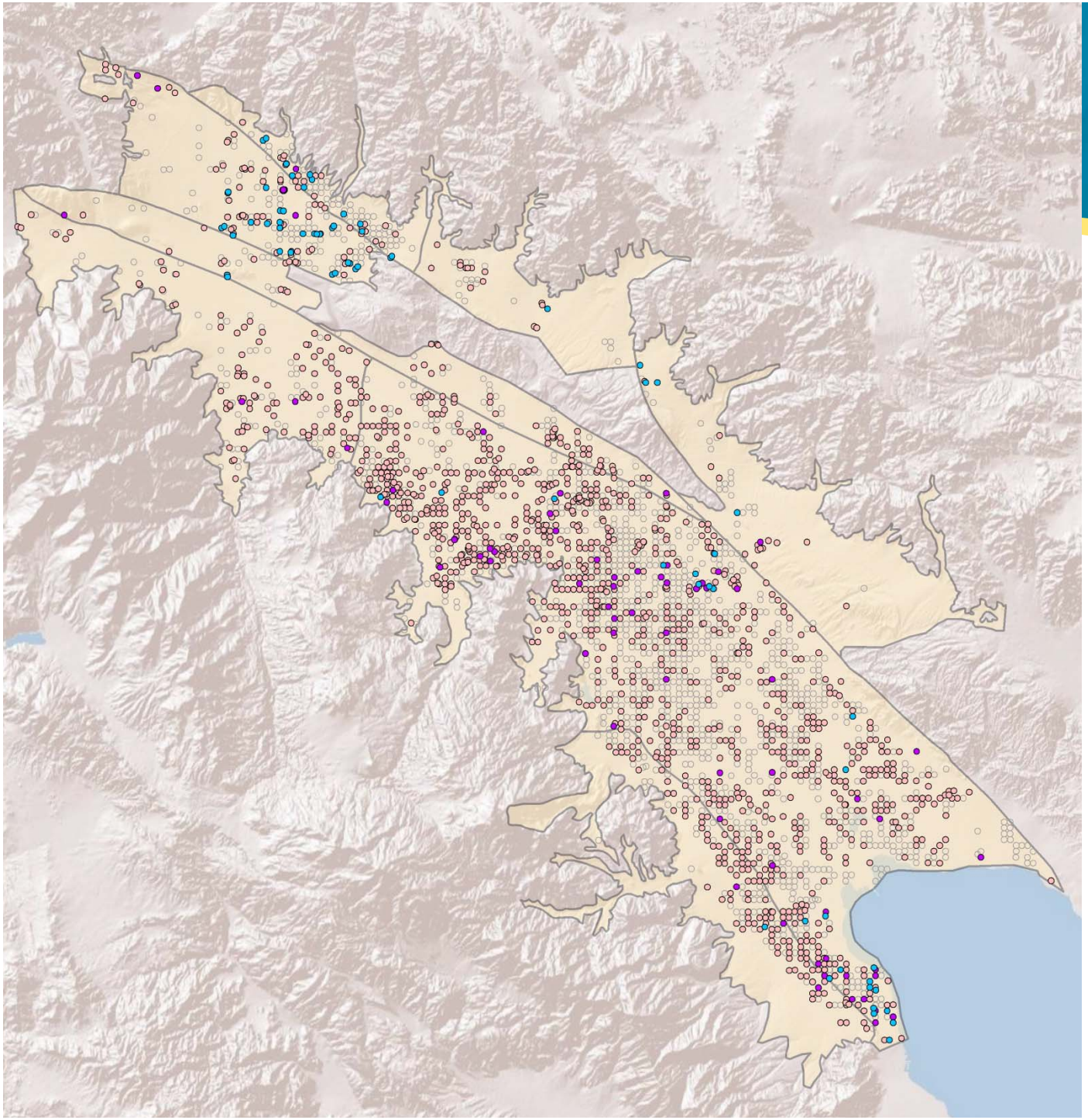
Leveraging Previous Work

- 1971 USGS Coachella Valley Groundwater Model
- 1974 Colorado River Basin Salinity Control Act (Subsequent Studies)
- 1992 USGS Coachella Valley Groundwater Model Update
- 1998 Coachella Valley Groundwater Model
- 2002 Coachella Valley Water Management Plan
- 2010 Mission Creek/Garnet Hill Groundwater Model
- 2012 Coachella Valley Groundwater Model
- 2012 Coachella Valley Water Management Plan Update
- 2013 Mission Creek/Garnet Hill Water Management Plan
- 2014 Integrated Regional Water Management Plan

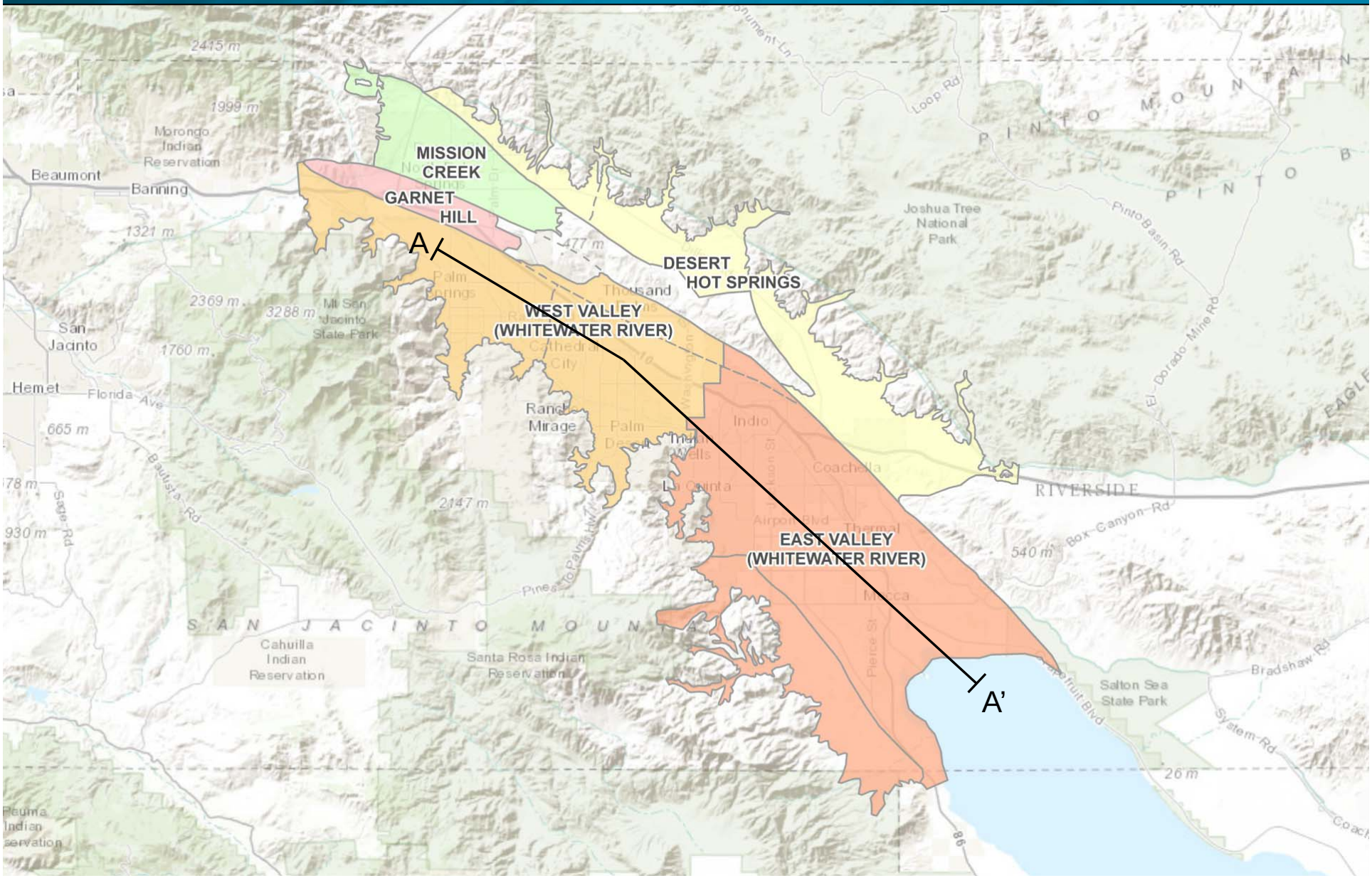
Data Sources

- Coachella Valley Water District, Desert Water Agency, Indio Water Authority, Coachella Water Authority, Mission Springs Water District, Valley Sanitation District
- County of Riverside
- Regional Water Quality Control Board
- State Water Resources Control Board: GeoTracker/Groundwater Ambient Monitoring and Assessment (GAMA)
- Cabazon Band of Mission Indians

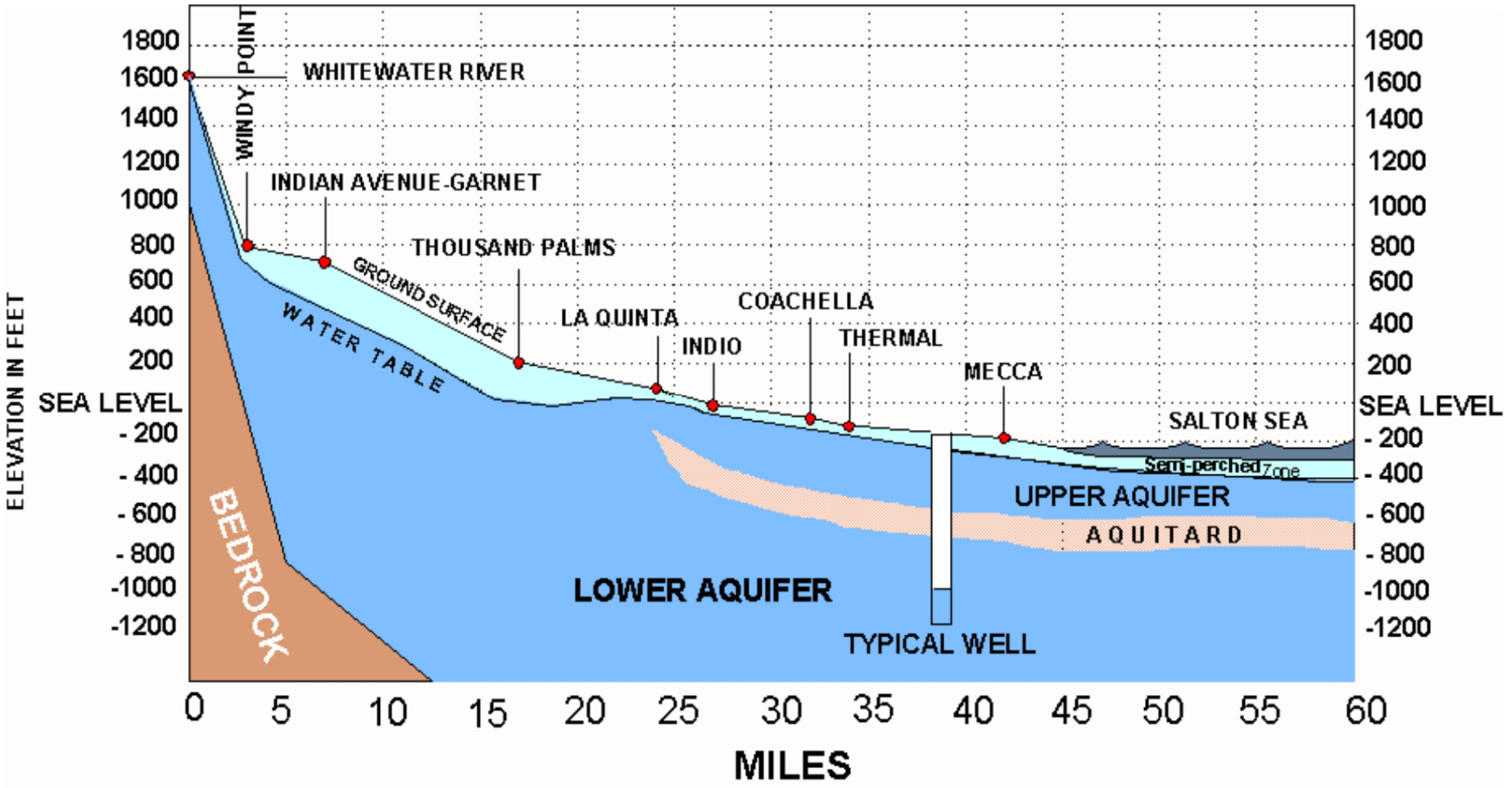
Water Quality Measurements



Management Zones

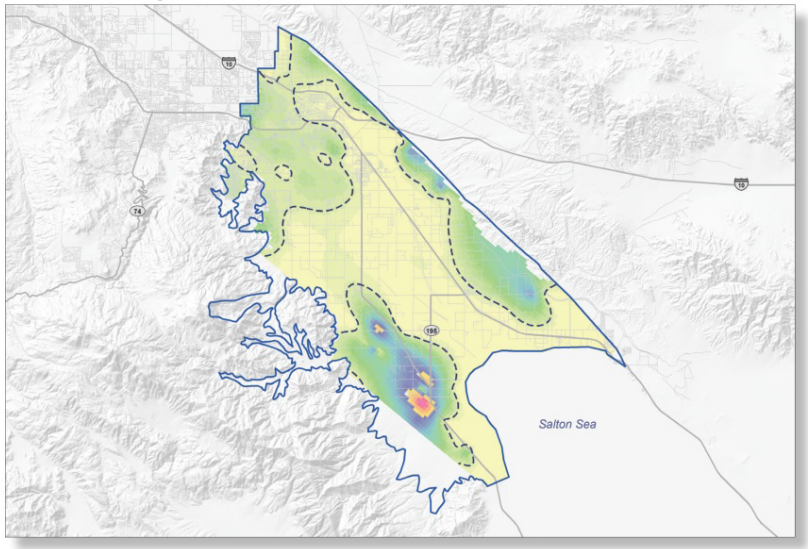


Conceptual Hydrogeologic Cross-section

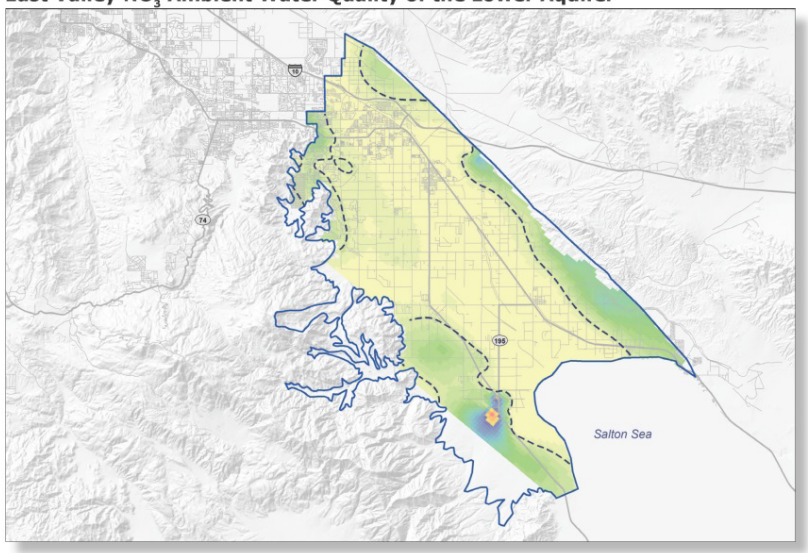


Characterize Existing Water Quality

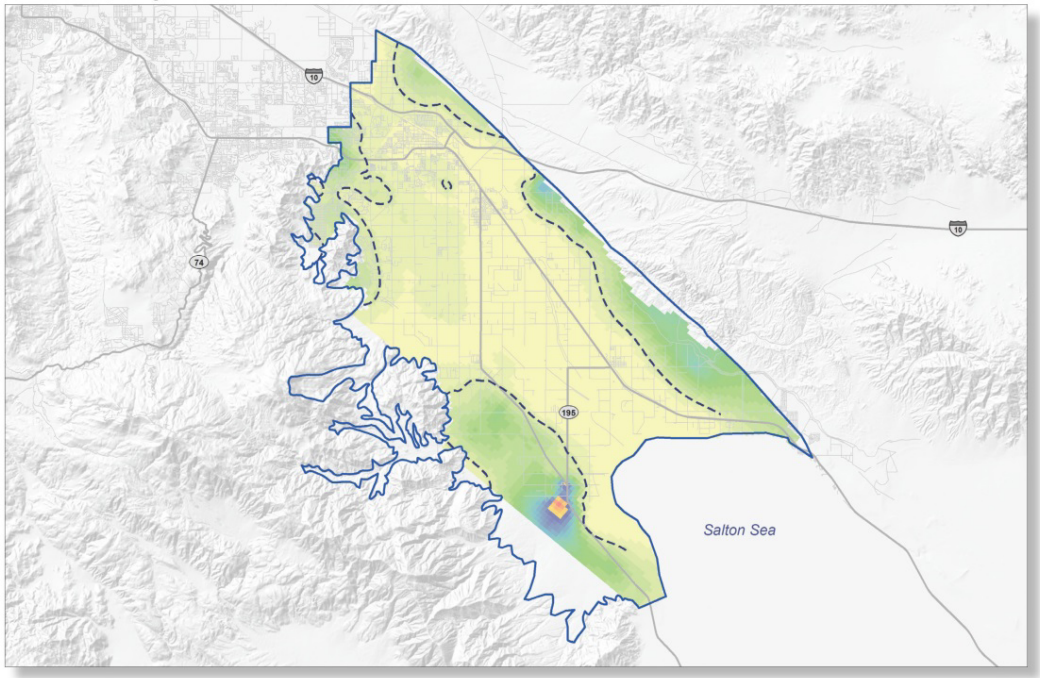
East Valley NO_3 Ambient Water Quality of the Upper Aquifer



East Valley NO_3 Ambient Water Quality of the Lower Aquifer



East Valley NO_3 Ambient Water Quality



Key to Features

Estimated Ambient Water Quality Contour (8.1 mg/L)

Management Zone

Nitrate (as NO_3)

0 mg/L – 71 mg/L

72 mg/L – 171 mg/L

Portions of the management zone that do not have an estimated concentration lie outside the extent of known aquifer properties required for the volume-weighted AWQ method; additionally, these areas lack substantial water quality data. They have been identified as data gaps and will be further described as a data need in the final SNMP.

Ambient Water Quality = 8.1 mg/L

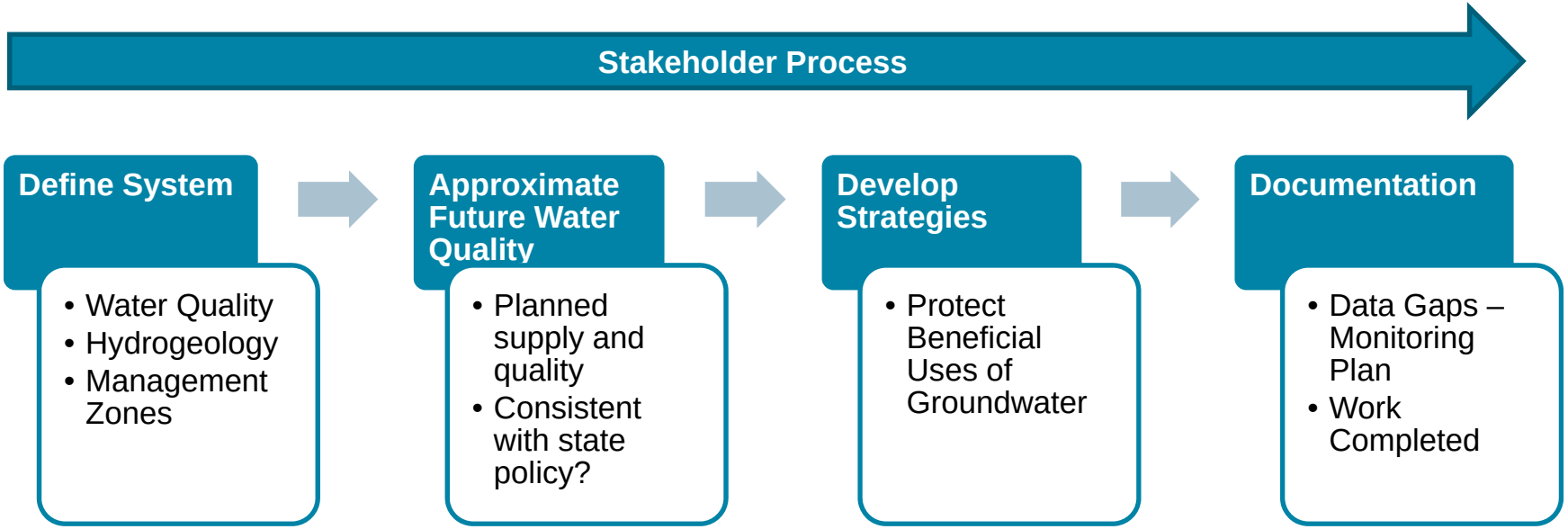
N

Water quality concentration was contoured in three layers: the upper, unconfined system and two subdivisions of the lower, confined aquifer due to its thickness. Nitrate (as NO_3) concentrations were assigned to each cell in each layer. Layers were then aggregated using the volume-weighted method to generate volume-weighted AWQ. Maps on this figure illustrate the Nitrate (as NO_3) concentrations in the upper aquifer, the lower aquifer (an aggregate of the two subdivisions), and the total management zone (an aggregate of all three layers, or the two aquifer systems). The AWQ for Nitrate (as NO_3) in the East Valley Management Zone is 8.1 mg/L.

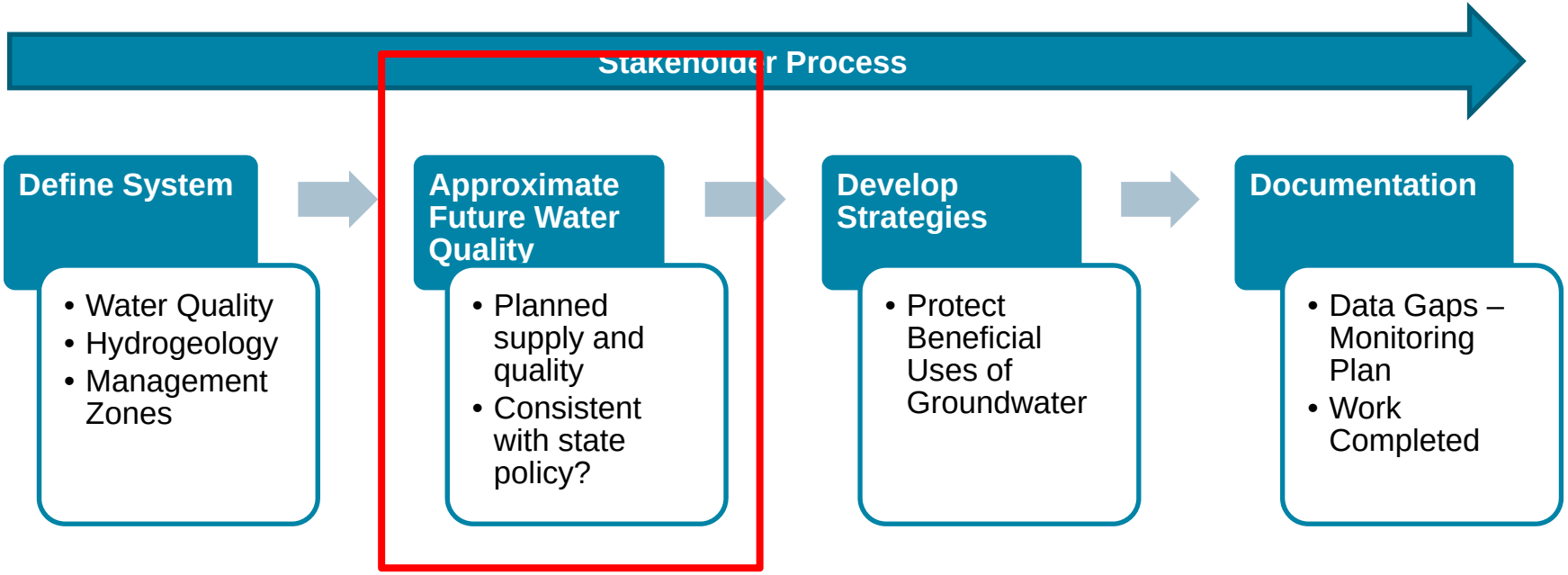
MWH

Figure 3-7
East Valley NO_3 Ambient Water Quality

Conceptual Process



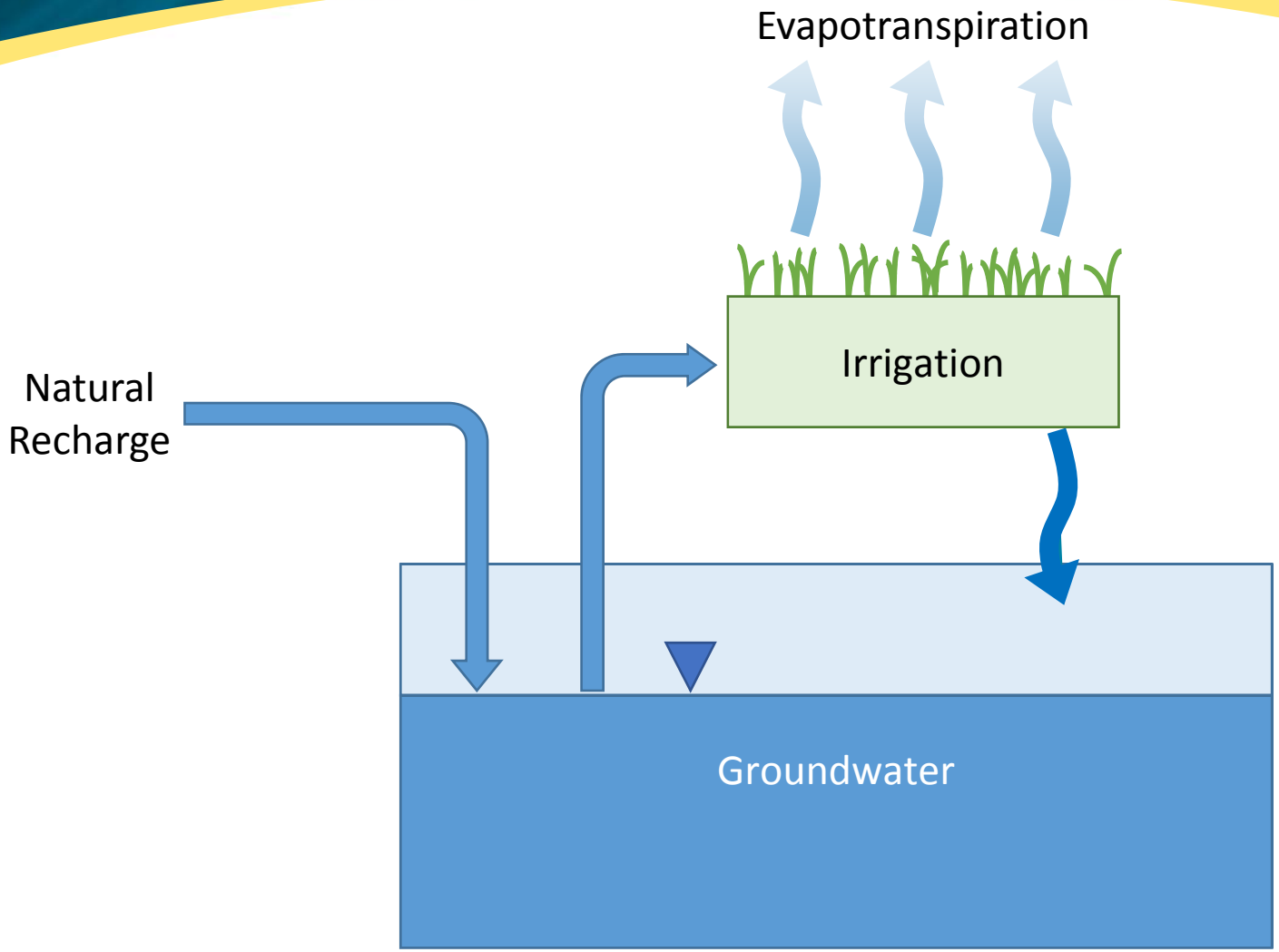
Conceptual Process



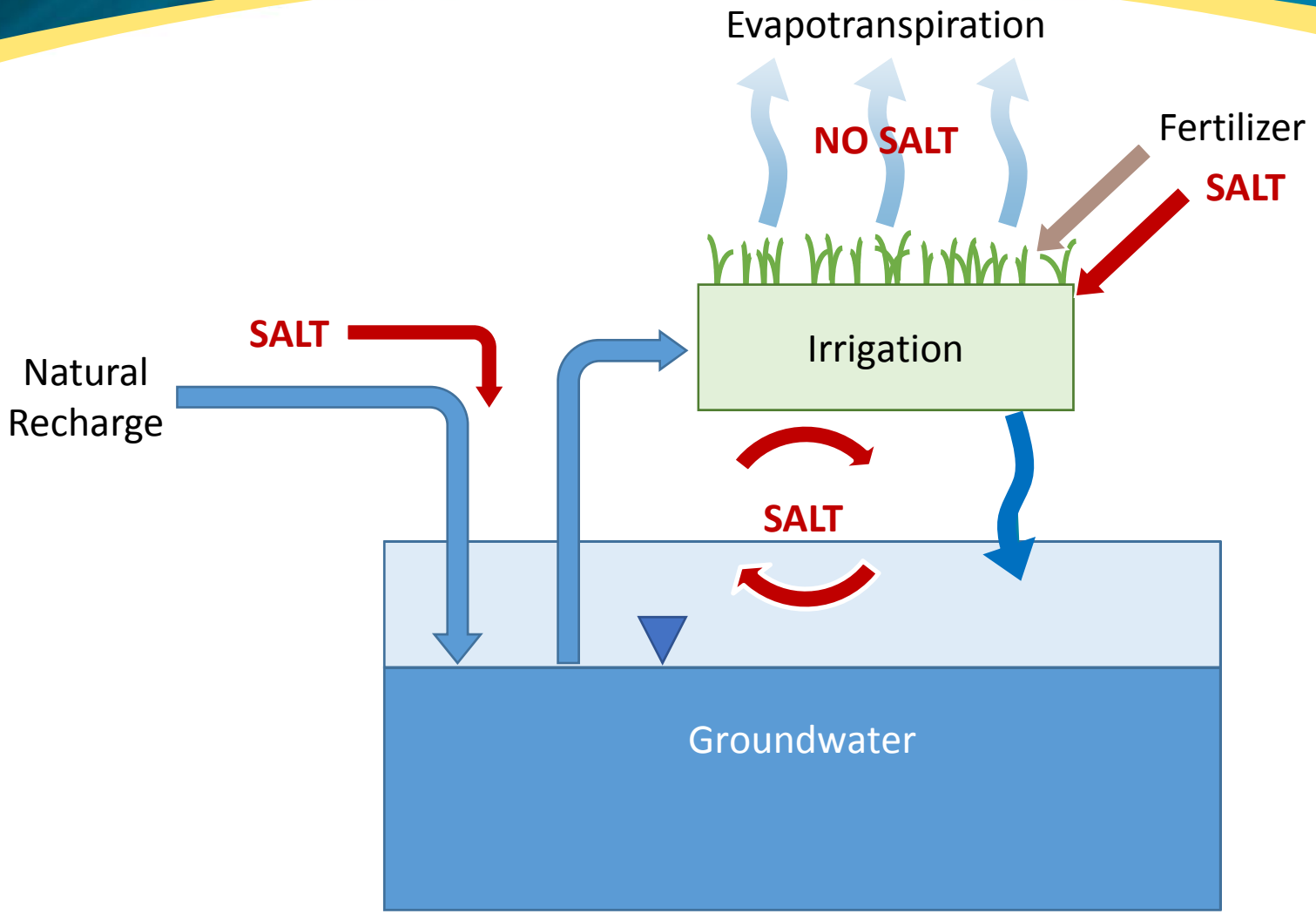
Approximate Future Water Quality – Mixing Model

- 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
  - Per Reviewed Groundwater Model
  - Complete Mass Balance
- Limitations
  - Assumes instantaneous mixing
  - Limited to management zones and not site specific
- Benefits
  - Easy to Use “Macro Tool”
  - Based on Published Material – Low Effort to Update

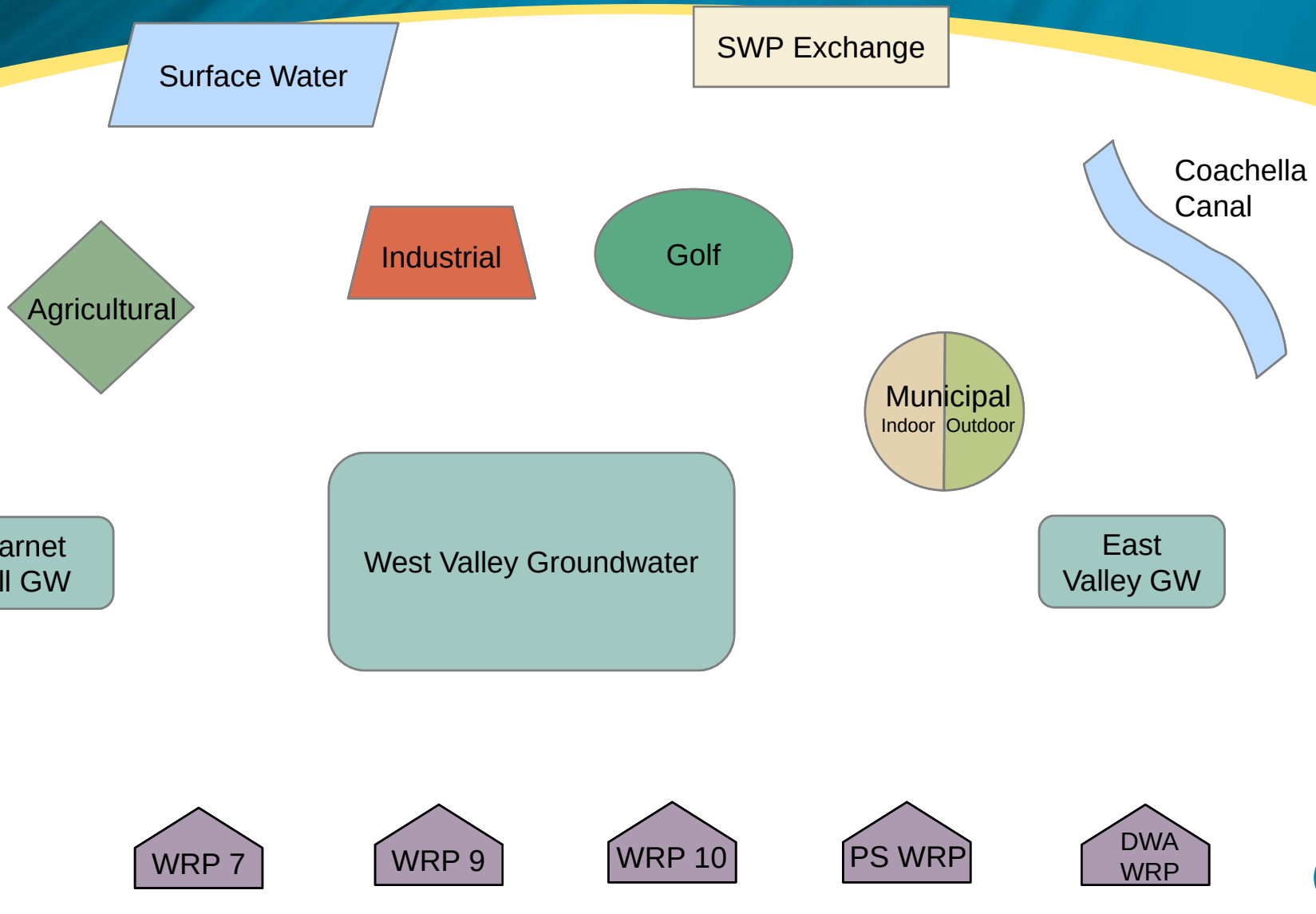
Salt/Nutrient Balance Tool



Salt/Nutrient Balance Tool



Salt/Nutrient Balance Tool – Actual Model



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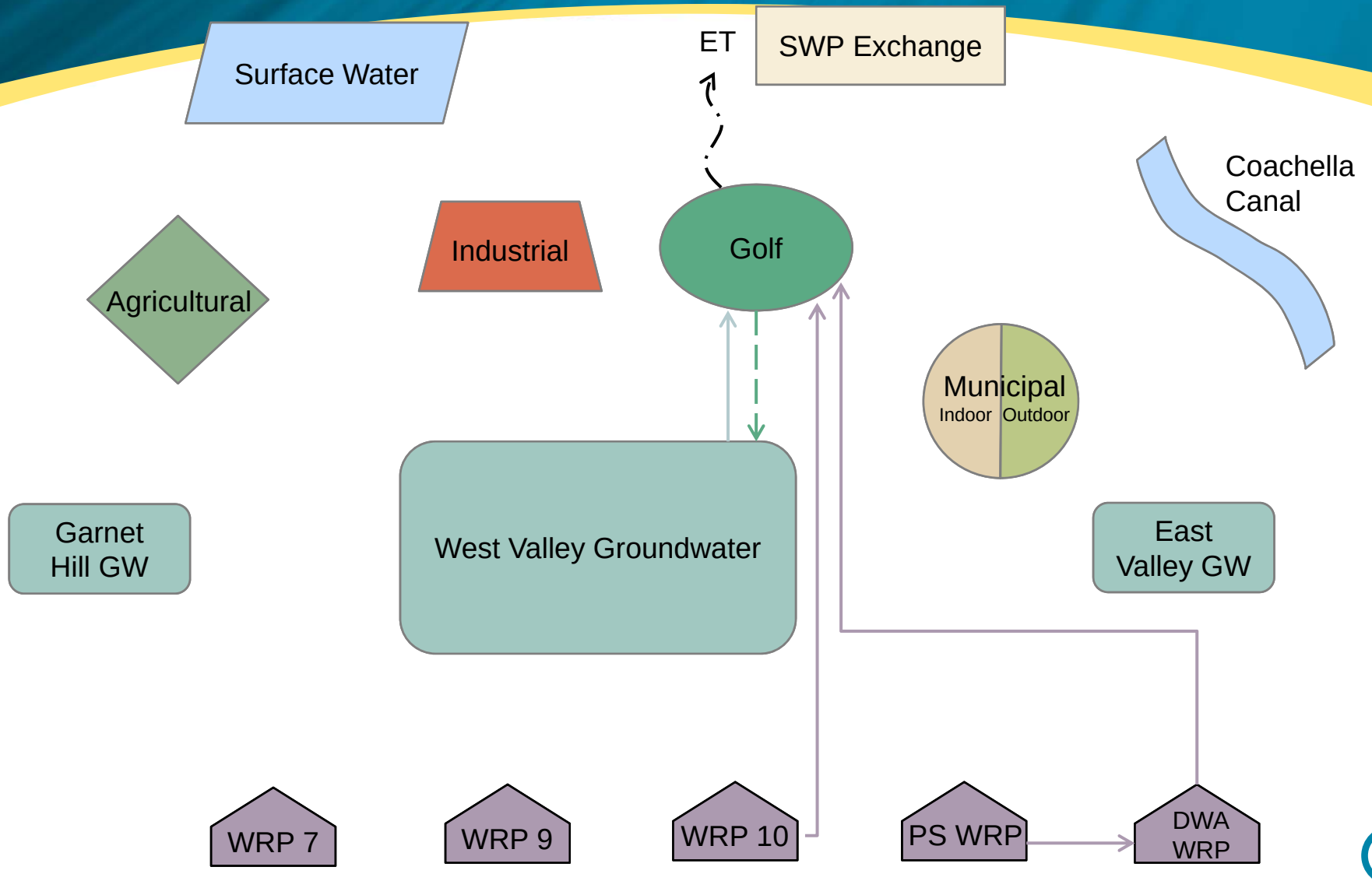

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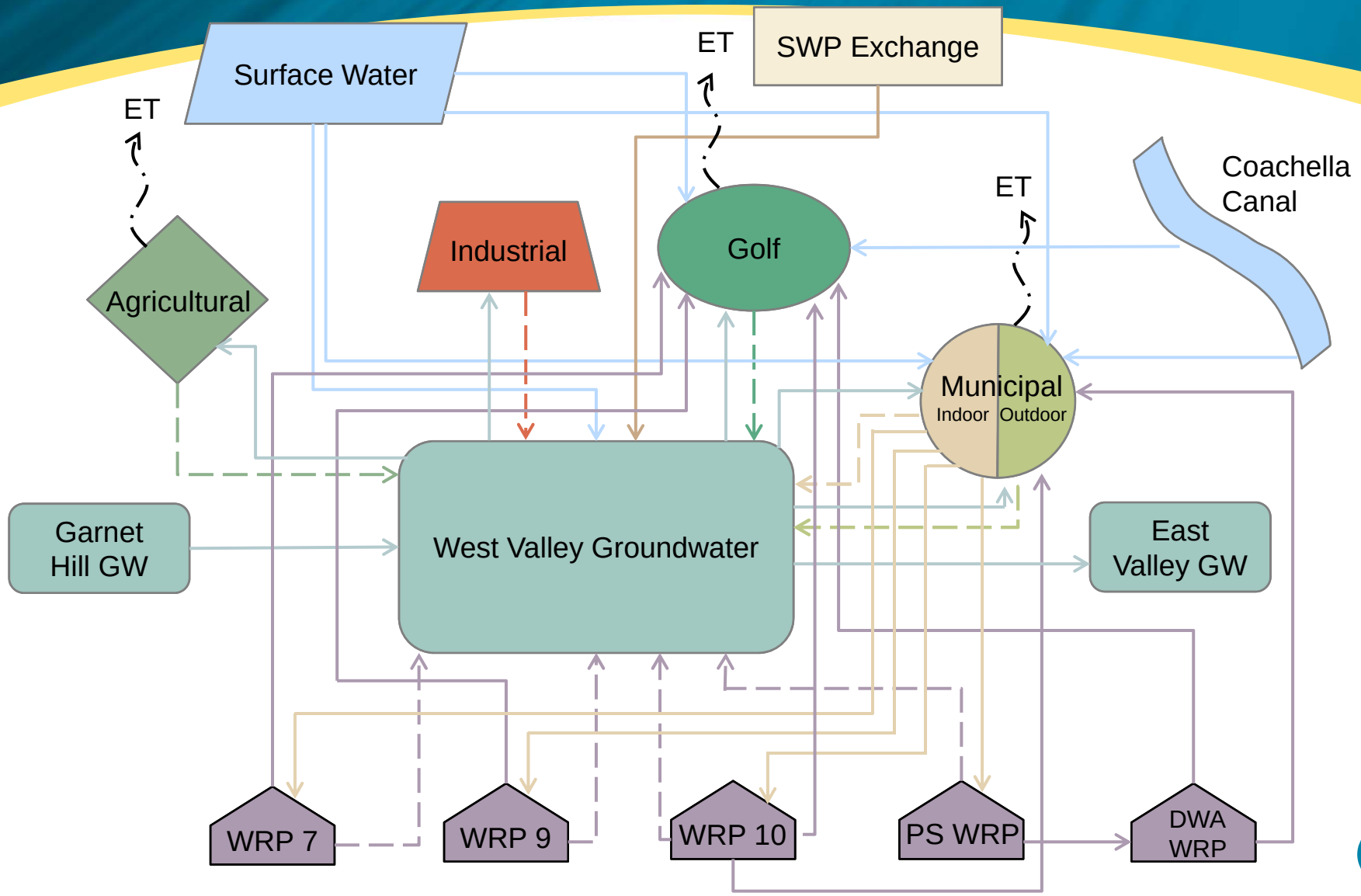
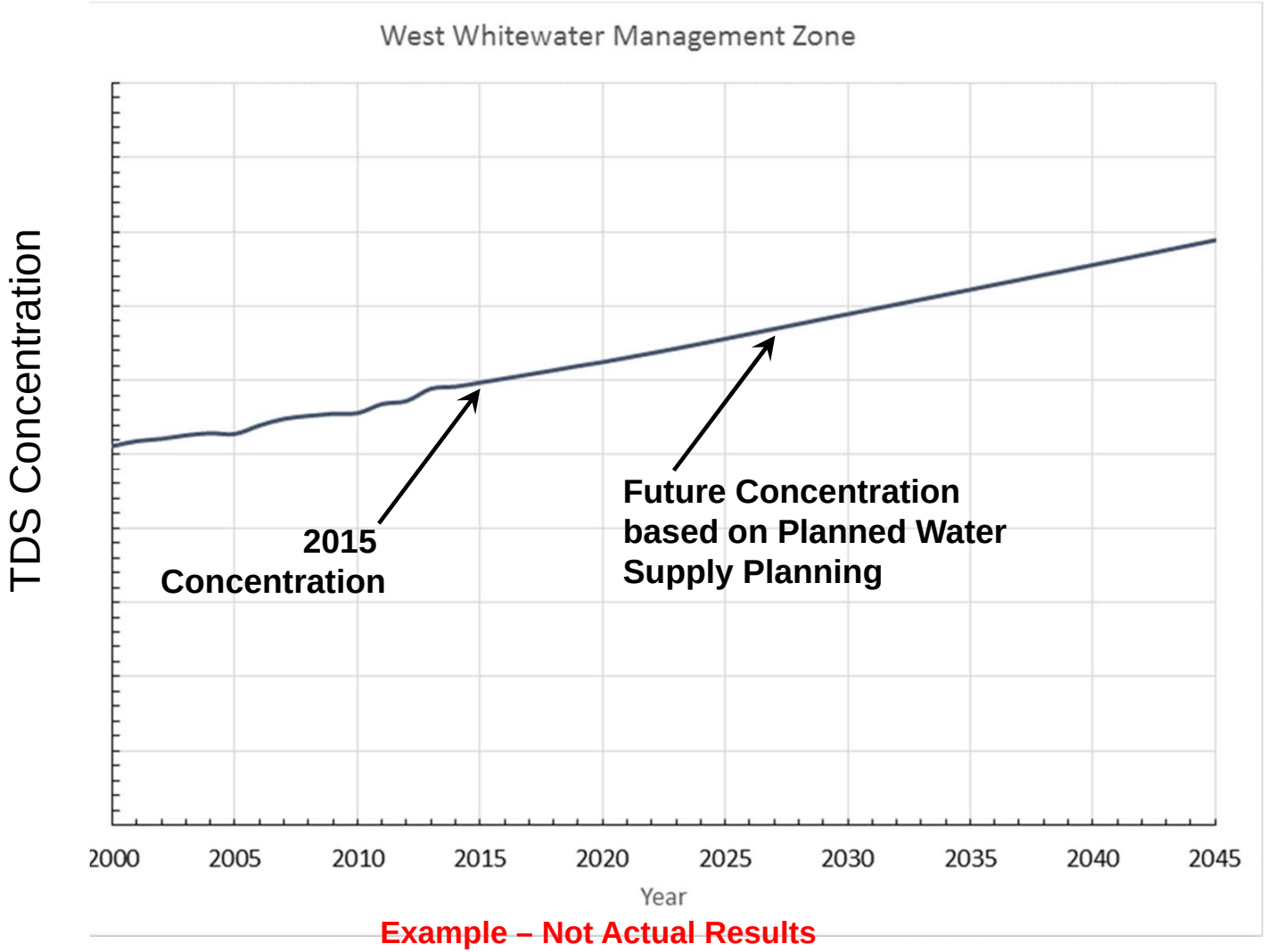
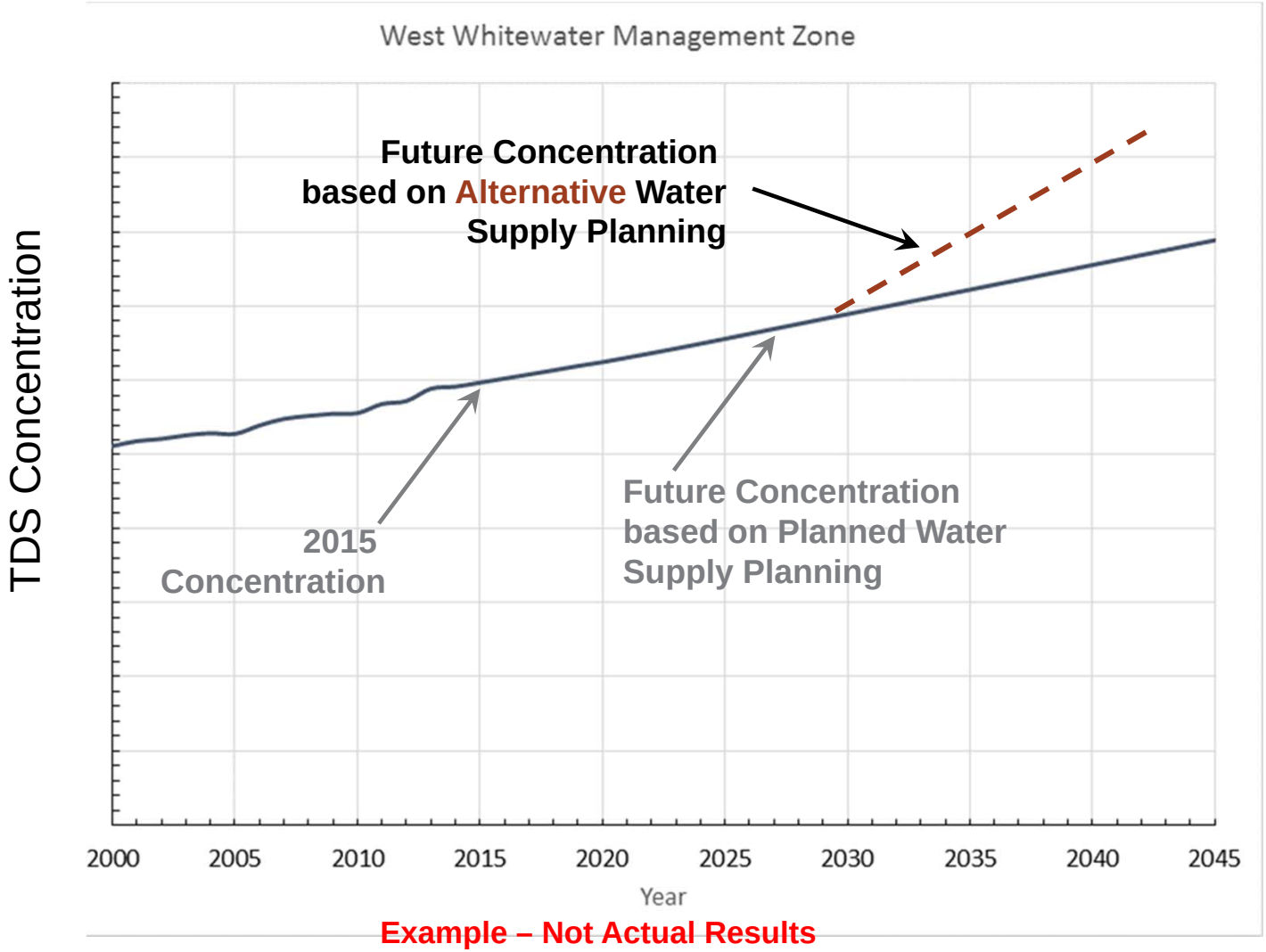


Example Results



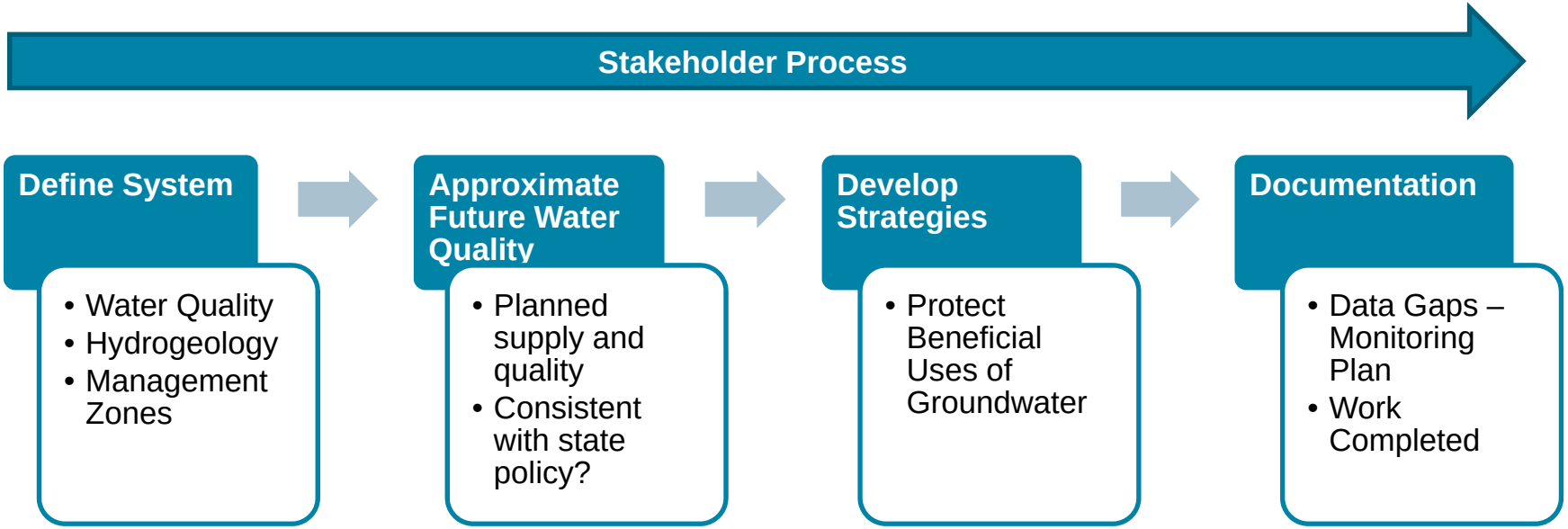
Example – Not Actual Results

Example Results – Alternative Evaluation

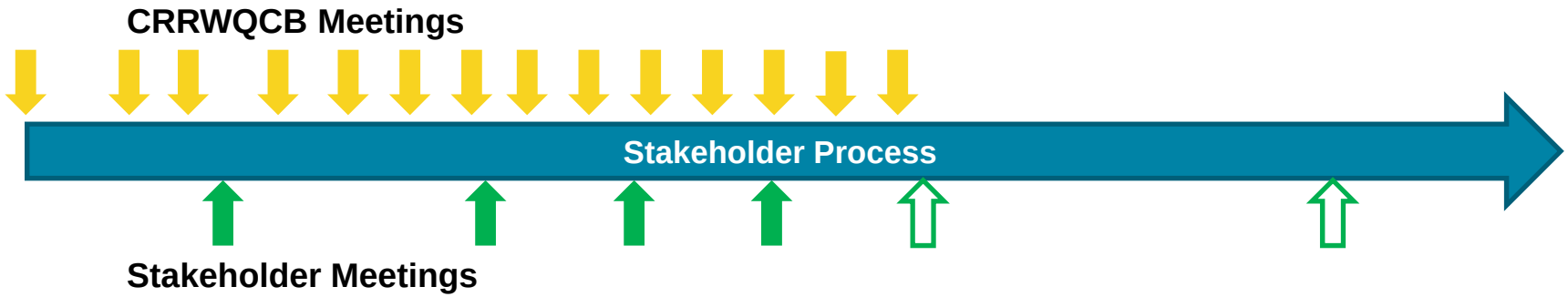


Example – Not Actual Results

Conceptual Process



Stakeholder Process



Define System

- Water Quality
- Hydrogeology
- Management Zones

Approximate Future Water Quality

- Planned supply and quality
- Consistent with state policy?

Develop Strategies

- Protect Beneficial Uses of Groundwater

Documentation

- Data Gaps – Monitoring Plan
- Work Completed

Presentation to:

Colorado River Regional Water Quality Control Board

Key Stakeholder Comments

Key Comments in Stakeholder Process

- Quality of Data

  What is considered sufficient data to calculate ambient water quality?

  Response: Spatial autocorrelation analysis and spatial distribution review were conducted for each management zone and aquifer layer. Analysis provided as Attachment to TM-2.

  What data are being used (transparency)?

  Response: Database been shared with RWQCB staff, and two data sharing meetings were conducted. Data is also provided as an Attachment to TM-2.

Key Comments in Stakeholder Process

- Baseline Period

  A 20-Year baseline may not consider data trends, is it too long for "ambient" water quality?

  Response:

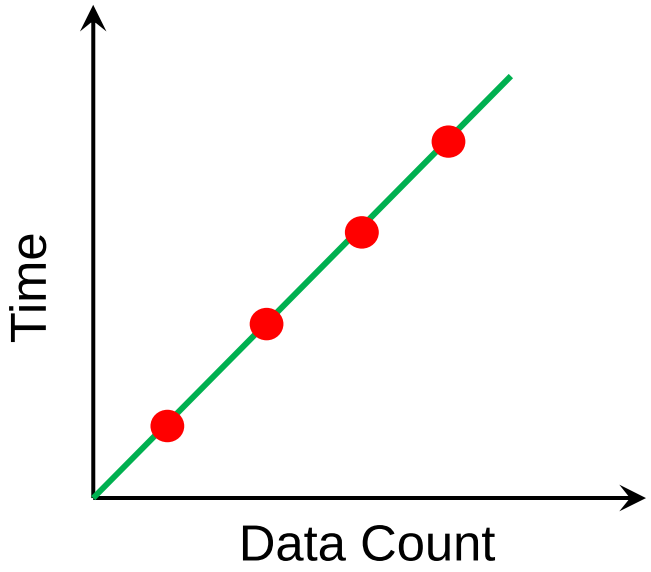
  – Method of AWQ calculation was revised based on stakeholder feedback

  – After outlier check, **most recent data point is used**

  – History extends back to fifteen years to fill data gaps

Data Quantity Versus Timing

- How Detailed? How Current?
- Conflicting Constraints
  - We are Getting Mixed Signals



Example:
East Whitewater - Layer 2
Square Miles Per Data Point

Time Period	Square Miles per Data Point	
	TDS	Nitrate
5-Year	24	24
10-Year	11	11
15-Year	6	6
20-Year	4	4

Period Summary Statistics

Summary Statistics

Period	East Whitewater		Mission Creek		West Whitewater	
	Mean TDS (mg/L)	Mean Nitrate (mg/L)	Mean TDS (mg/L)	Mean Nitrate (mg/L)	Mean TDS (mg/L)	Mean Nitrate (mg/L)
5-Year	461	12.6	473	4.1	308	10.9
10-Year	486	12.2	614	5.8	305	12.4
15-Year	474	11.4	601	5.3	324	16.8
20-Year	494	11.8	599	5.1	329	17.8

Key Comments in Stakeholder Process

- Data Gaps and Data Collection

  If there is not enough data, should it then be collected before proceeding?

  Response:

  – Policy anticipates lack of data
    - Requires identification of data gaps
    - Preparation of monitoring plan to fill the gaps

  – “Version 1”, as required by Policy, ongoing process that will be improved with time

Key Comments in Stakeholder Process

- Management Zones

  Are they too large for management purposes?

  Response:

  – Management zones are comparable to other sizes around the state
  – Similar to other SNMPs, they are based on geologic boundaries

  Is the use of a single value for the management zone ambient water quality reasonable?

  Response:

  – Consistent with Policy, Guidance Document for Salt and Nutrient Management Plans for the San Francisco Bay Region
  – Consistent with practices of others (Santa Clara Valley, Sonoma Valley, Central Valley, Santa Ana, South Orange County, Antelope Valley, and Mojave)

Key Comments in Stakeholder Process

- Ambient Water Quality Method

  Should particular aquifers be given more attention?

  Response:

  – Perfect? No – it is a model
  – Data driven process
  – Considers geology – Based on peer reviewed model, layering and hydraulic properties
  – Use of median – reduces errors, incorporates detection limits, only applied to single wells
  – Per the Policy, use what is available, identify data gaps, incorporate in monitoring plan
  – Used throughout California
  – Applied to support Basin Plan Amendments

Key Comments in Stakeholder Process

- QAQC of the Data

  There were some outliers in the DRAFT TM-2, has the data been gone through QAQC process?

  Response:

  – Yes, QAQC has been conducted by each data sharing agency
  – Data was provided as-is in the DRAFT TM for the sake of transparency
  – Based on feedback from stakeholders, outlier review has since been conducted for the FINAL TM-2

Key Comments in Stakeholder Process

- Use of a Groundwater Flow and Transport Model

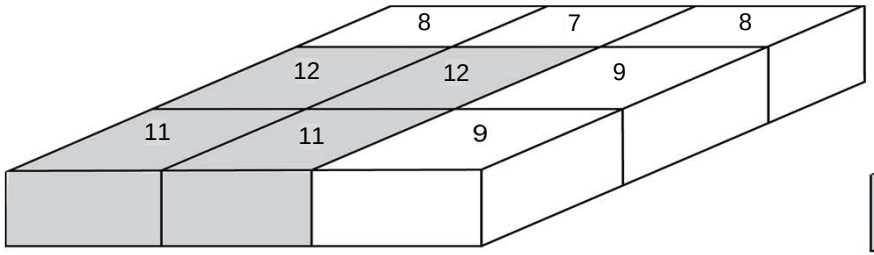
  Is this a numerical model needed to be accurate?

  Response:

  – Integrated Regional Water Resources Planning Group evaluated this issue and determined it was not feasible
  – Current model is used to determine ambient water quality
  – Hydraulic model needs calibration
  – Transport model need to be built/calibrated (No capability with current model), significant cost
  – Significant time with low benefit
    - Same result as volume weighted method
    - More conservative for planning

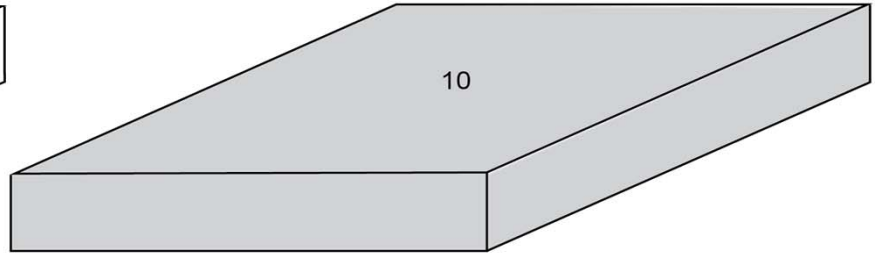
Model Examples

Numerical Model



- Discrete cells
- Initial values for all cells
- Numerous cells
- Results for each cell

Mixing Model



- Coarse
- Single “cell”
- Single result

Stakeholder Meeting No.4

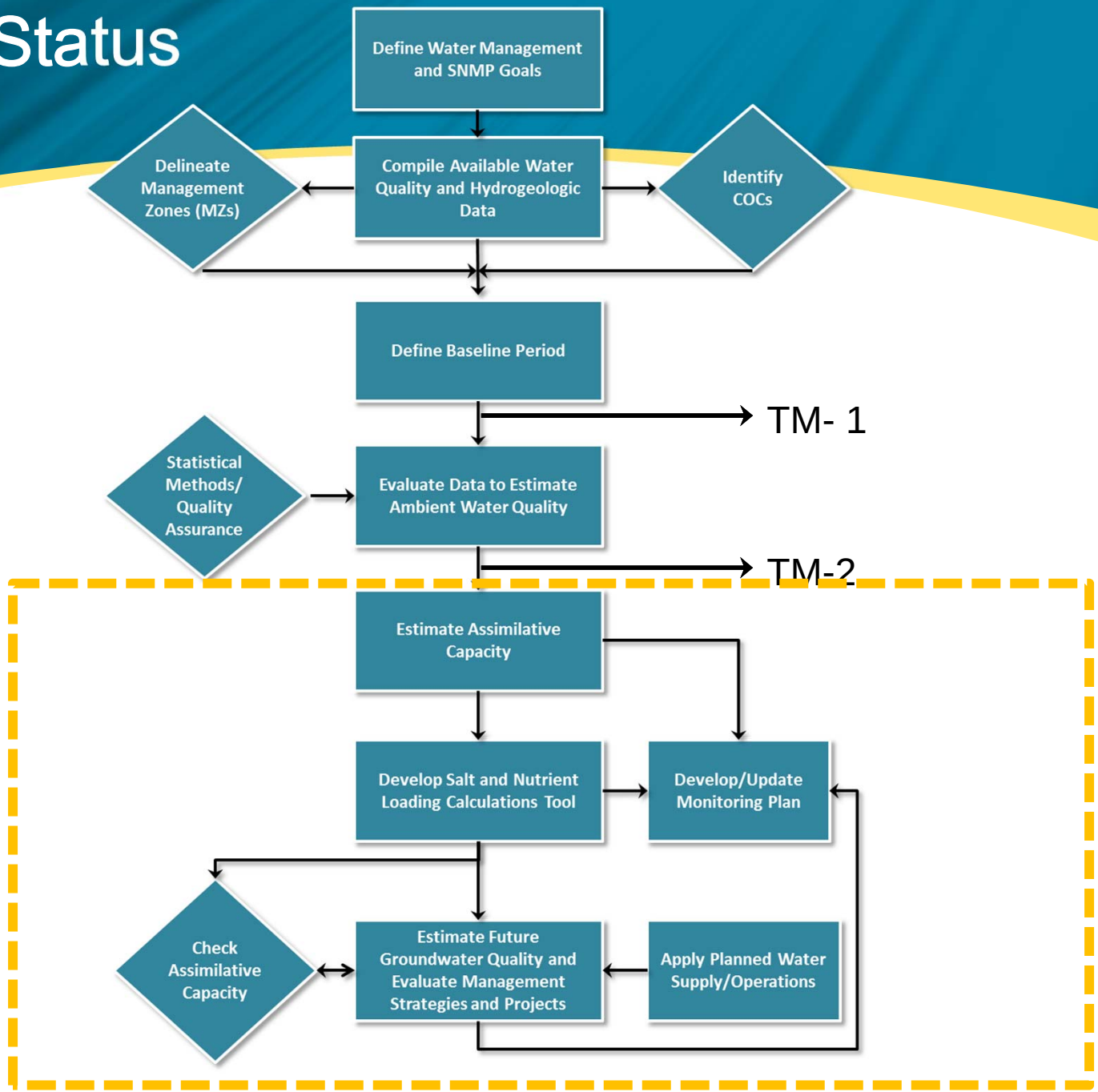
Coachella Valley Salt and Nutrient Management Plan

Next Steps

Review: Progress To Date

- Completed Two Technical Memoranda
  - Provided detailed review in public stakeholder meetings
  - Circulated them for comment
  - Provided responses to all comments
    - ***All information is made available at http://www.cvwd.org/snmp/***
- Conducted Four Stakeholder meetings
  - 2 more planned – Feb 26th and April 15th (tent.)
  - ***Added a workshop to review detailed data with all stakeholders***
  - ***Added stakeholder meetings to budget*** to improve outreach
  - Met with RWQCB staff fourteen times
- Extended Schedule to May Completion
- ***Increased budget from $500,000 to $600,000*** to facilitate
  - RWQCB communication
  - Stakeholder outreach

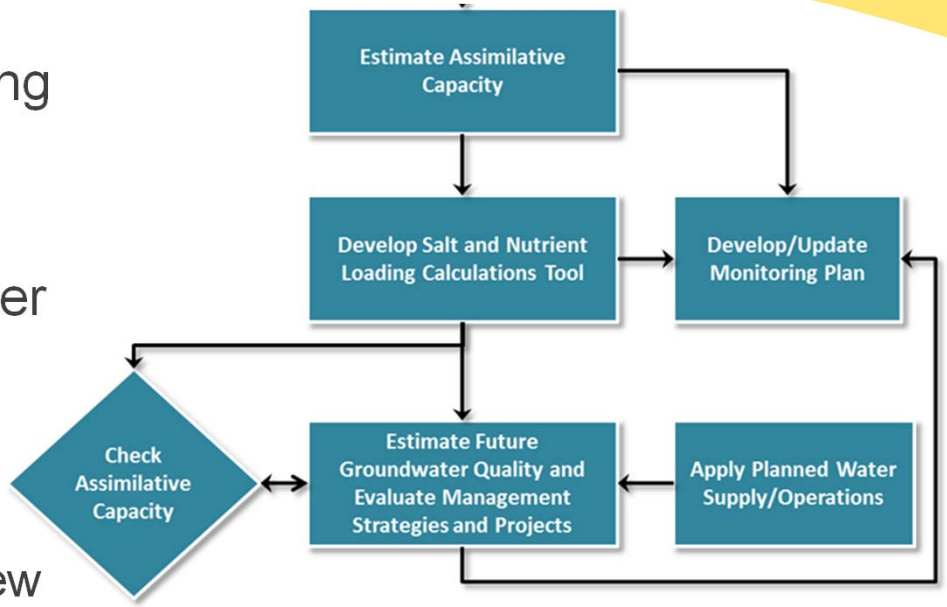
Project Status



Next Steps

- February 26th Stakeholder Meeting
  - Salt and Nutrient Loading tools
  - Basin Management Strategies
- All will be available for stakeholder review and comment

- April 15th
  - Draft Plan for Stakeholder review and comment



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