CV-SALTS SALT AND NITRATE CONTROL PROGRAMS

CVCWA Annual Meeting

Thomas Grovhoug, LWA

May 22, 2024

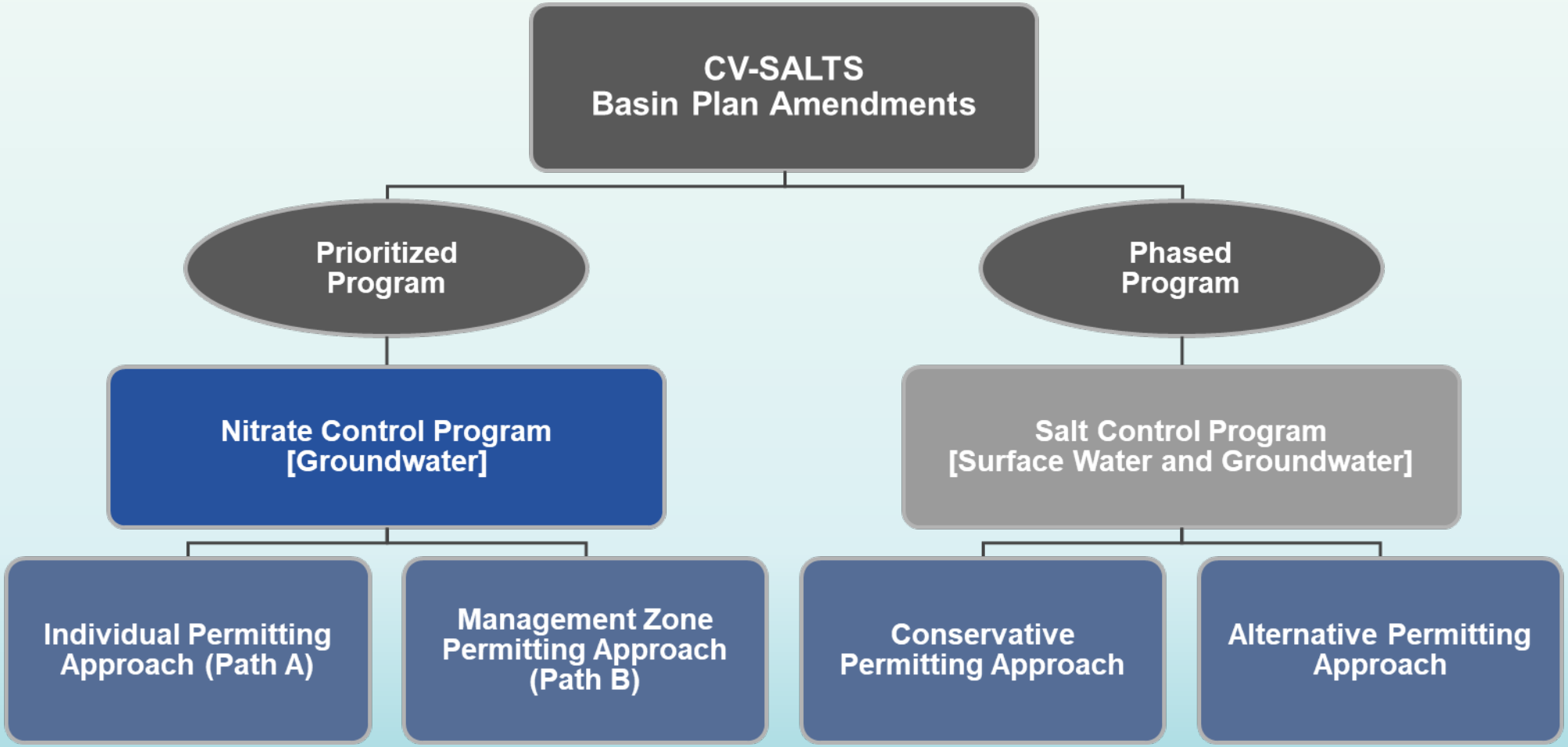
CV SALTS
Central Valley Salinity Alternatives for Long-term Sustainability

OUTLINE

- CV-SALTS Program Overview
- Update on Salt Control Program
- Update on Nitrate Control Program
- Questions

CV-SALTS Overview

SALT AND NITRATE CONTROL PROGRAM – OVERVIEW



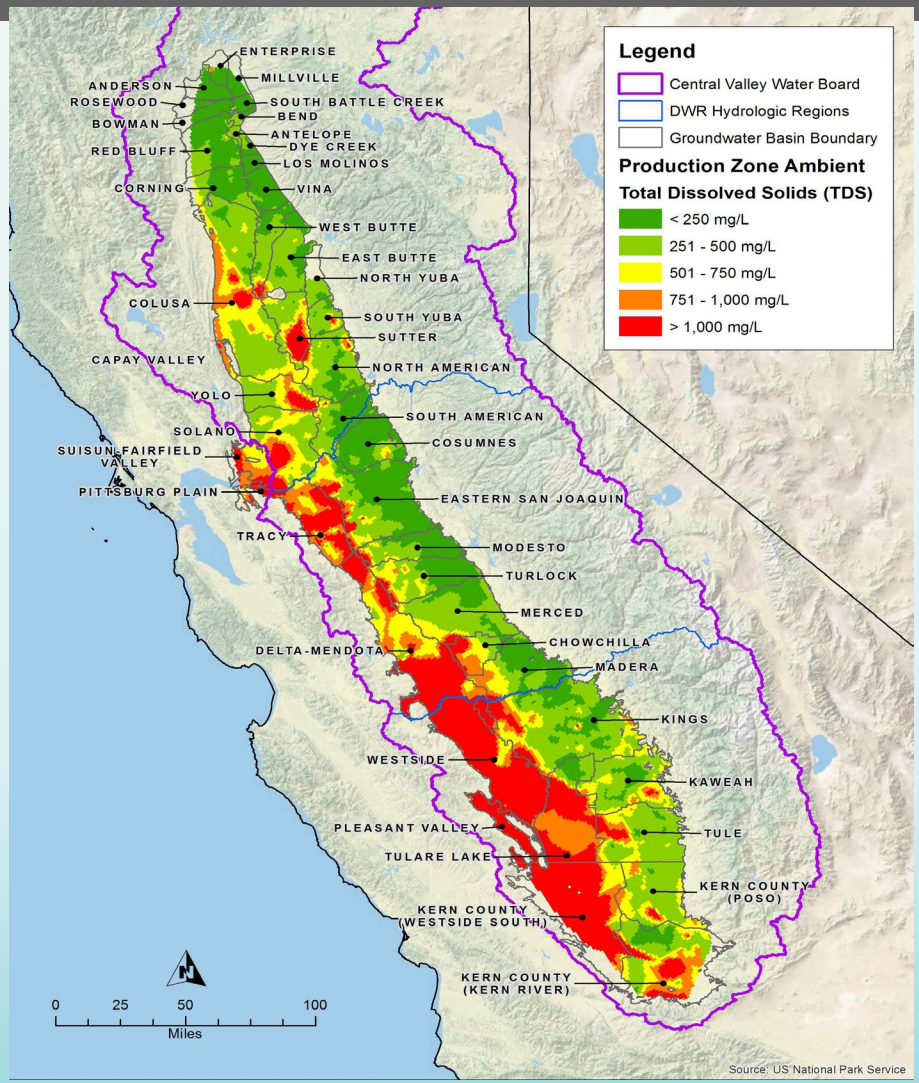
Salt Control Program

THE SALT PROBLEM

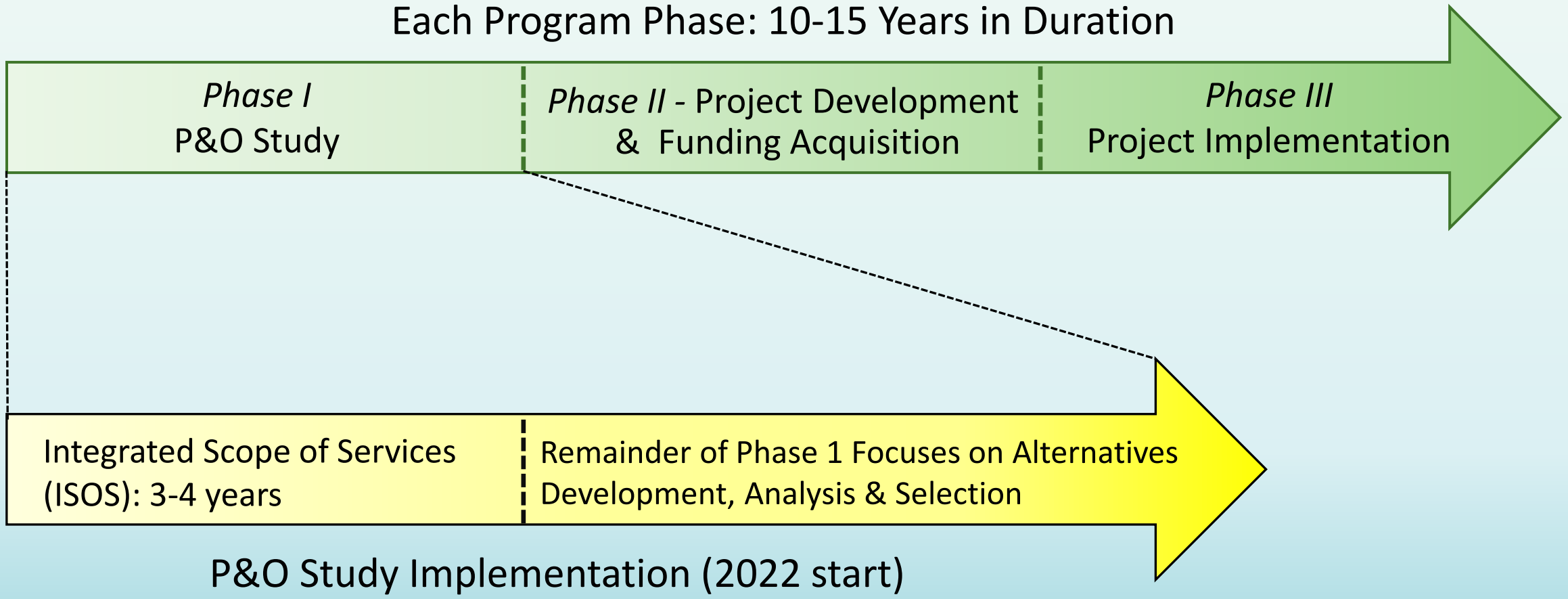
- Salt is accumulating in the Central Valley Groundwater Basin
- High salt concentrations in water supplies restricts the crops that can be grown and impacts drinking water supplies
- Long term solutions are needed to manage salts and to reduce the rate of salt concentration increases

PHASED SALT CONTROL PROGRAM
P&O STUDY APPROACH

- **Phase I: Prioritization and Optimization (P&O) Study**
  - *10 to 15 years long*
  - *Defines salt sensitive areas*
  - *Identify salt sources and impacts*
  - *Assess salt management options*
  - *Develop long-term salt management strategy*
- **Phase 2: Project Development**
  - *Potential regulatory actions*
  - *Alignment with SGMA GSAs' goals*
- **Phase 3: Project Implementation**



TIMELINE - SALT CONTROL PROGRAM



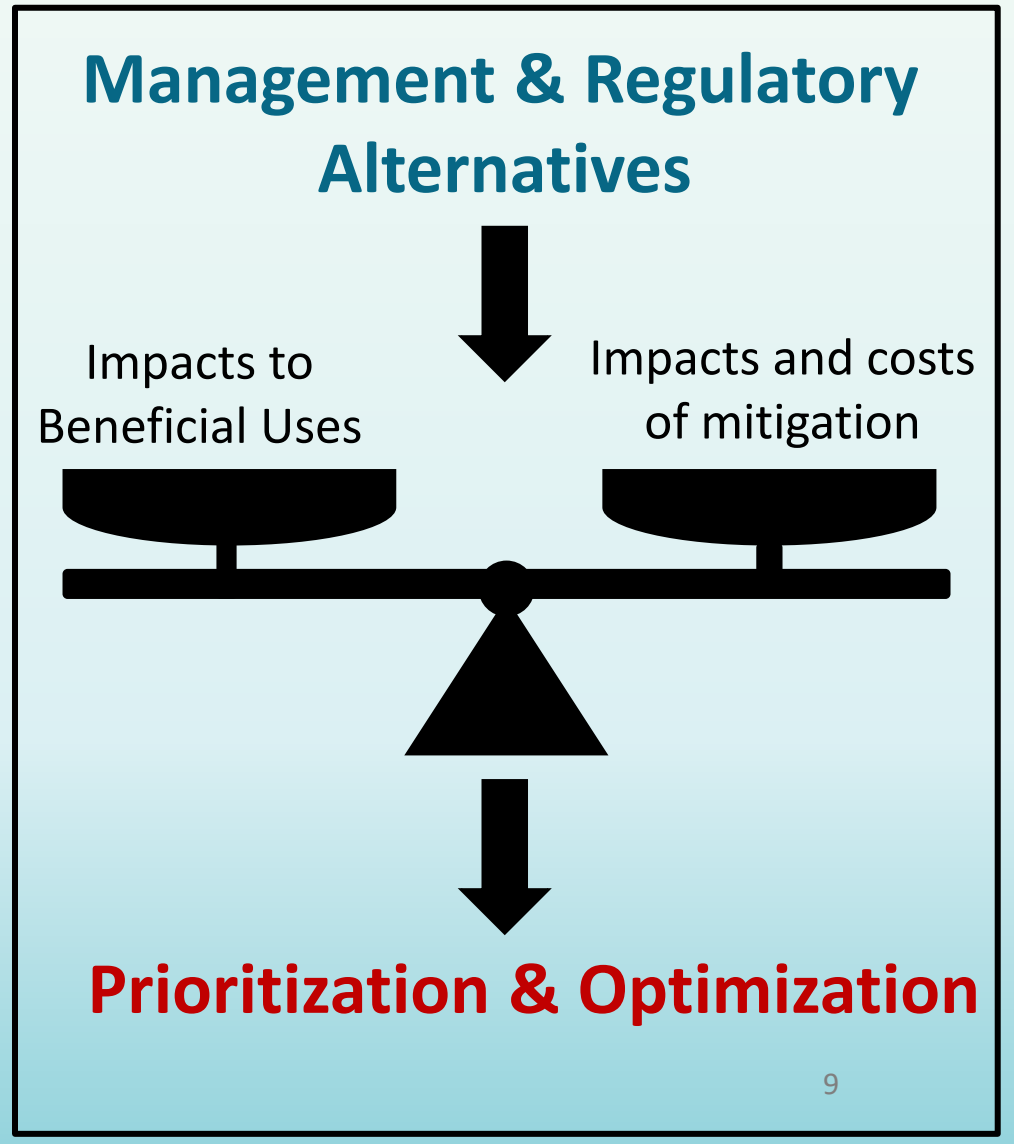
FIRST FOUR YEARS OF P&O STUDY

Purpose of this phase of Technical Work:

- Develop information/tools to inform future decisions regarding long-term salt management solutions

<u>Key Information</u>

- Understanding how the system works
  - Key drivers
  - What we can and can't manage/control
- Ability to impact salt accumulation and salinity concentrations.
  - Effectiveness of range of management and regulatory options



BASELINE CHARACTERIZATION REPORT (2024)

"Snapshot" of Conditions at Start of P&O Study (1000 plus pages)

Contents

- Central Valley Setting
- History of Water Project Development
- History of Salinity Problems in Central Valley
- Regulatory Structure to Manage Salt Sources
- Ambient conditions – surface waters, groundwater
- **Salt Sources and Estimates**

PRIORITIZATION & OPTIMIZATION STUDY

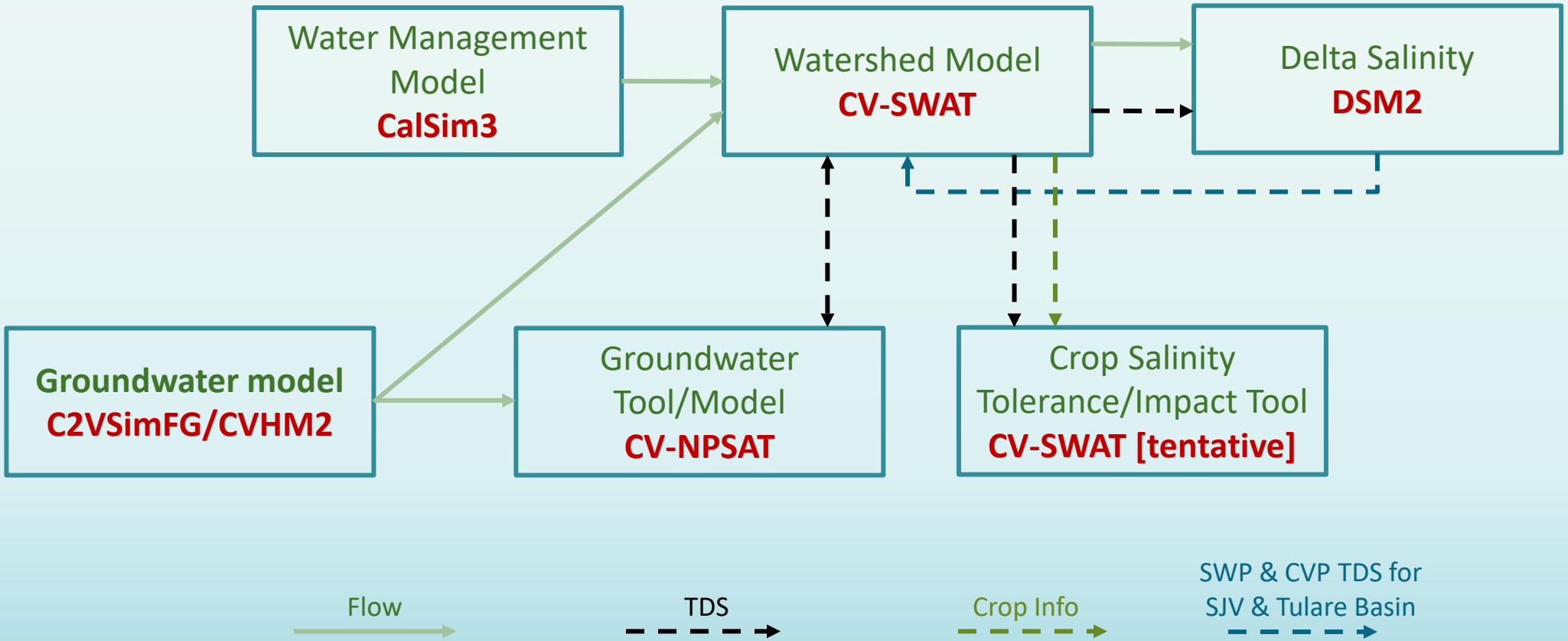
Modeling Approach and Linkage Discussion

CV SALTS
Central Valley Salinity Alternatives for Long-term Sustainability

SOPHISTICATED TOOLS ARE NEEDED

- Need a suite of modeling tools to address the complexities of the system:
  - *Surface Water hydrology of the Region 5 watershed*
  - *Reservoir operations and surface water distribution to users*
  - *Land uses throughout the Central Valley*
  - *Salt sources throughout the Central Valley*
  - *Delta water quality*
  - *Groundwater hydrology and water quality*
  - *Crop tolerance to salinity*

FLOW CHART OF LINKAGES BETWEEN TOOLS/MODELS FOR CENTRAL VALLEY ANALYSIS

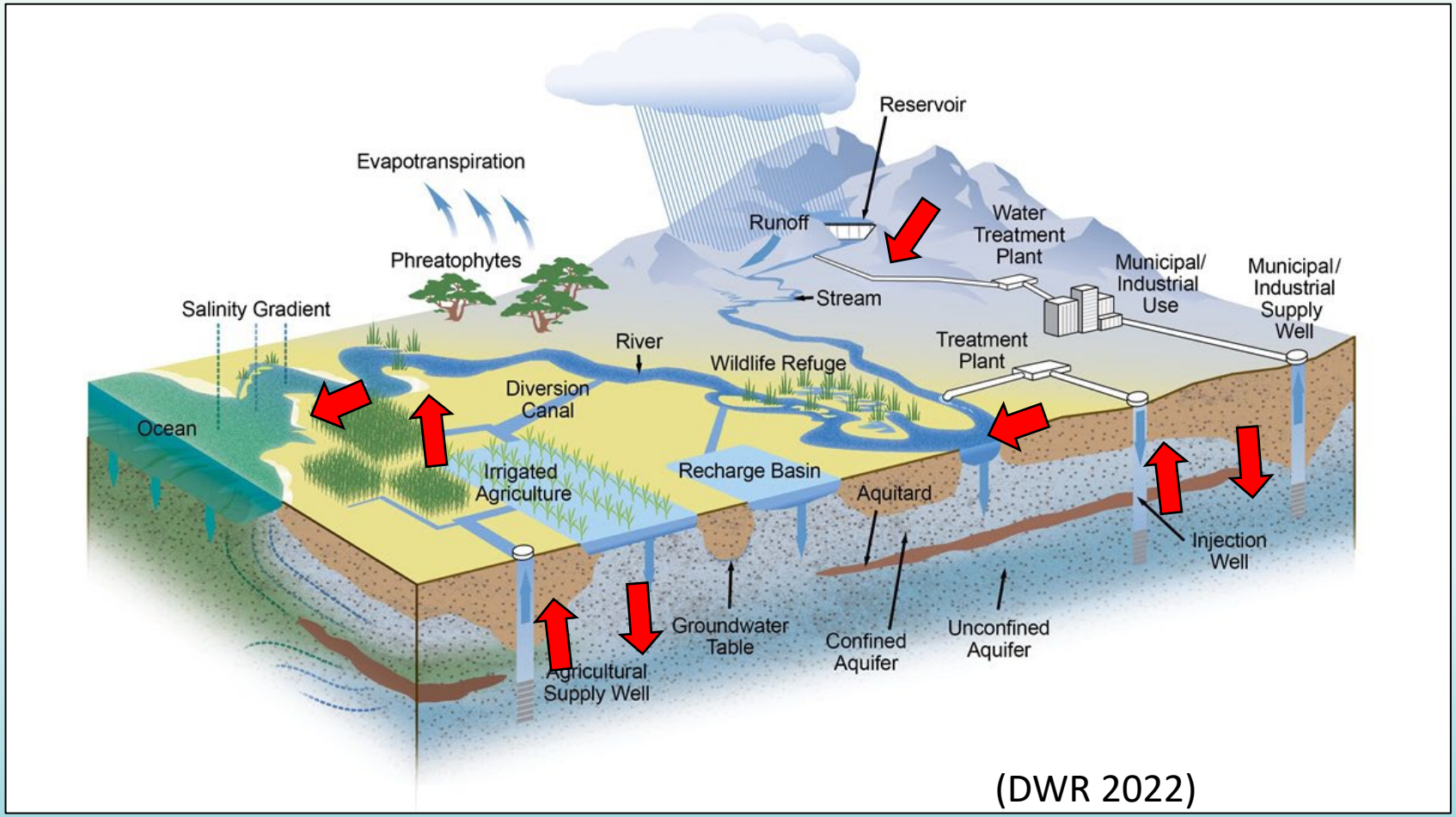


CV-SWAT ADDRESSES COMPLEX HYDROLOGY AND SALINITY

Assess key components of water and salt balances

- Inflows to valley floor
- Irrigation volumes and water sources
- Crop ET
- Surface flows and salinity
- Large scale salt fluxes

Assess key components of water and salt balances



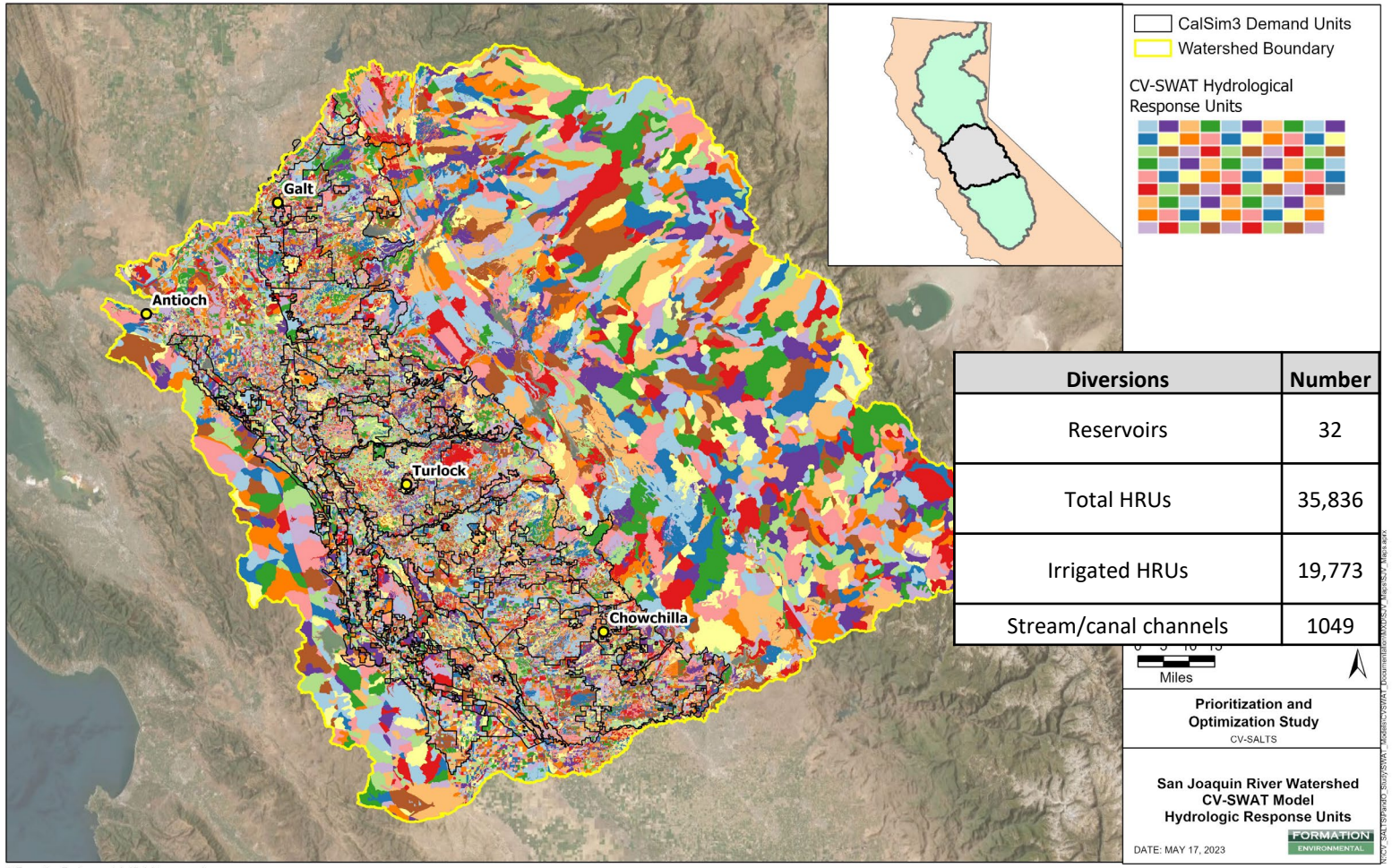
(DWR 2022)

CV-SWAT ADDRESSES WATER AND SALT INTEGRATION

- **Waterbodies**
  - ❑ **Reservoirs**
  - ❑ **streams/rivers, canals**
  - ❑ ***USGS NHD, CalSim3***
- **CalSim3 demand units**
  - ❑ **water districts**
  - ❑ **municipalities**
  - ❑ **refuges**

- **Salt source information**

- **Soils (NRCS)**
- **Climate (CIMIS, PRISM)**
- **Land use (DWR, 2019)**
- **Calibrated crop models and management (ILRP)**



Diversions	Number
Reservoirs	32
Total HRUs	35,836
Irrigated HRUs	19,773
Stream/canal channels	1049

MODELING EFFORT TO DATE - CV SCALE

2023

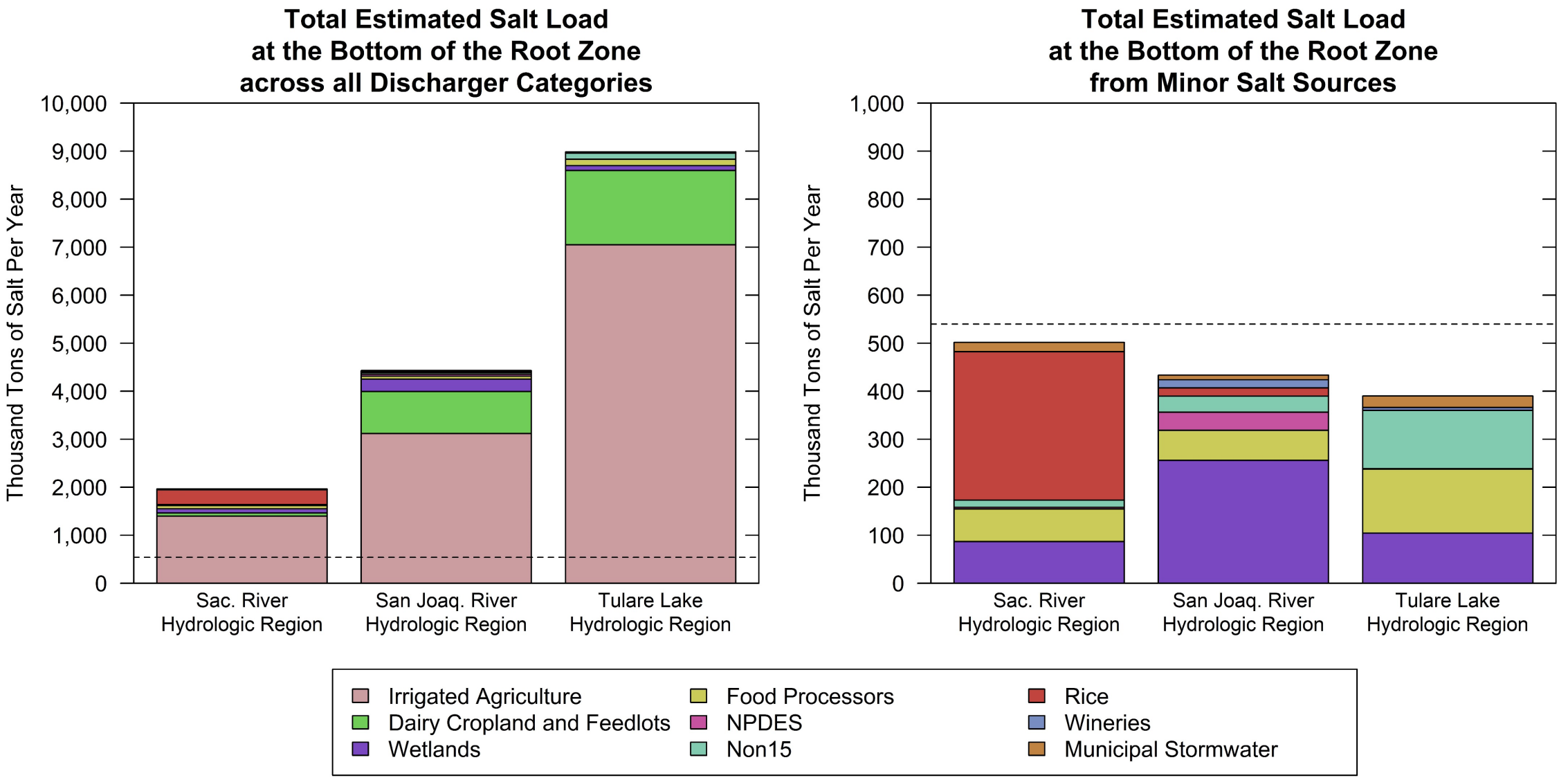
- Development of tools to model current conditions in the Central Valley
  - ***CV-SWAT***
  - ***CV-NPSAT***

- Performed initial Central Valley-scale modeling
  - *Water balance, salt balance, salt accumulation*

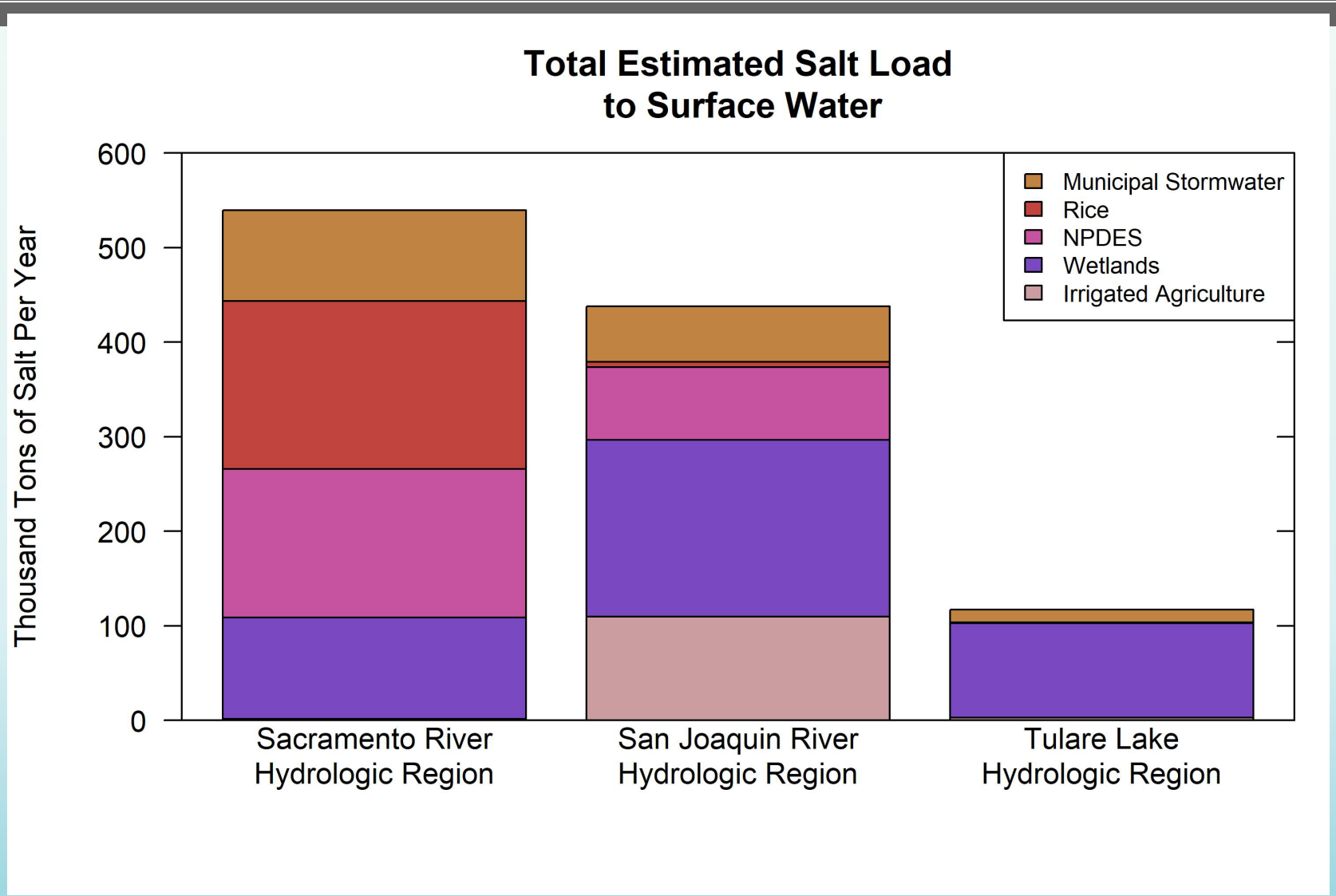
- Estimated Current Salt Loadings from Various Sources (in BCR)

- Will be used to address future scenarios:
  - *Climate change*
  - *Land use changes*
  - *Recharge*
  - *Alternative salt management measures*

ESTIMATED SALT LOADS - BOTTOM OF ROOT ZONE



TOTAL ESTIMATED SALT LOAD TO SURFACE WATER



ARCHETYPE MODELING – 2024, 2025

- Two “archetype” areas will be selected to allow more detailed analysis at smaller scale – Delta-Mendota (2024)
  - *Refined hydrology, land use, water use, etc.*
  - *Coordination with local stakeholders, GSAs, municipalities*
- Archetype modeling (CV-SWAT, CV-NPSAT, CVHM2) will be used to:
  - *Assess effectiveness of salt management actions*
  - *Develop salinity targets to protect salt sensitive crops, drinking water and other beneficial uses*

SUMMARY – P&O STUDY

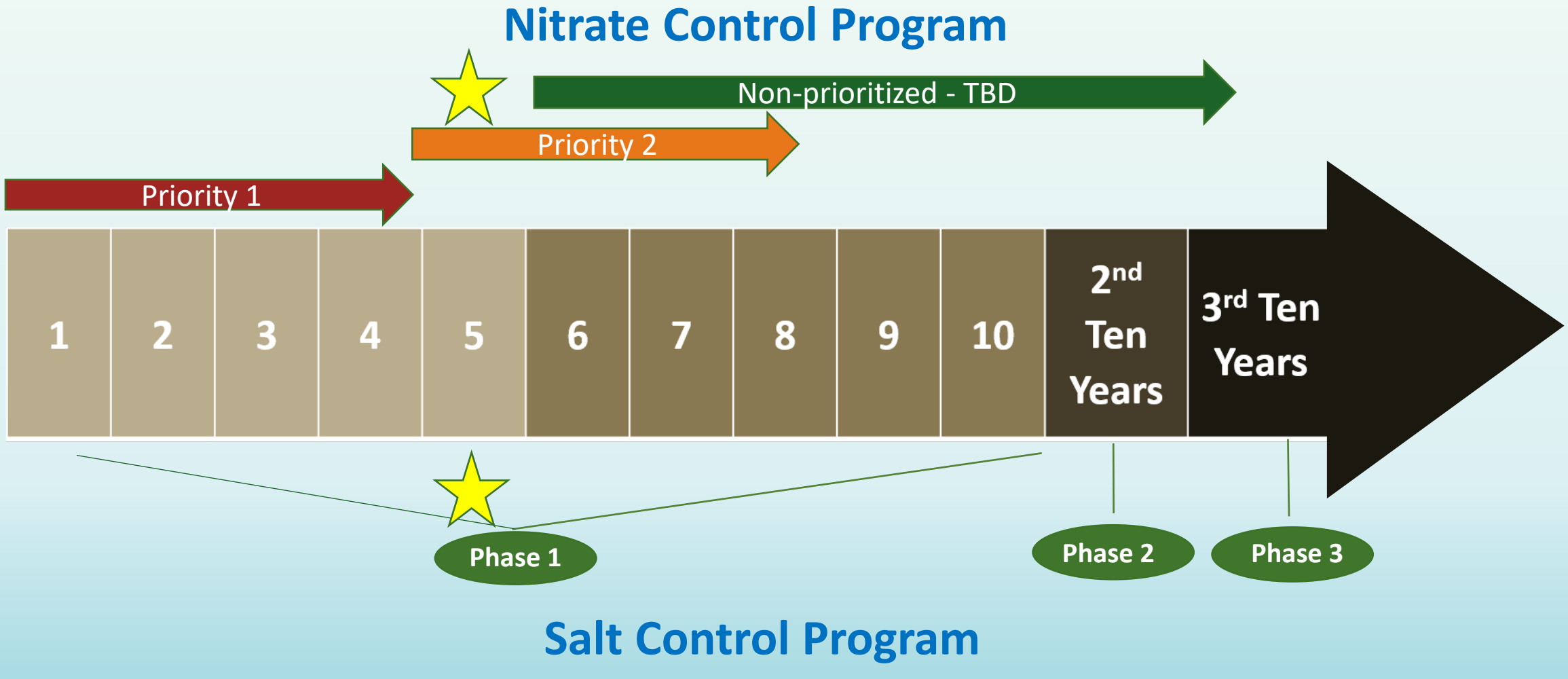
- Region-wide, integrated, holistic approach
- Information generated under SGMA in GSPs will be incorporated – (water use, recharge, land use changes, PMAs)
- Use of modeling tools to project future salt conditions in the Central Valley under different scenarios over a long planning period
- Use of modeling tools to evaluate effectiveness of alternative salt management measures to meet sustainability goals

Nitrate Control Program

THE NITRATE PROBLEM

- Nitrate in Groundwater in some areas of the Central Valley exceeds the Primary MCL of 10 mg/l
- People are at risk consuming drinking water with these levels of nitrate
- Short and Long term solutions are needed – e.g. clean drinking water through Early Action Plans, permanent solutions

CV-SALTS IMPLEMENTATION TIMELINE:
WE ARE HERE



PRIORITIZED NITRATE CONTROL PROGRAM

Priority 1 Area (Red)

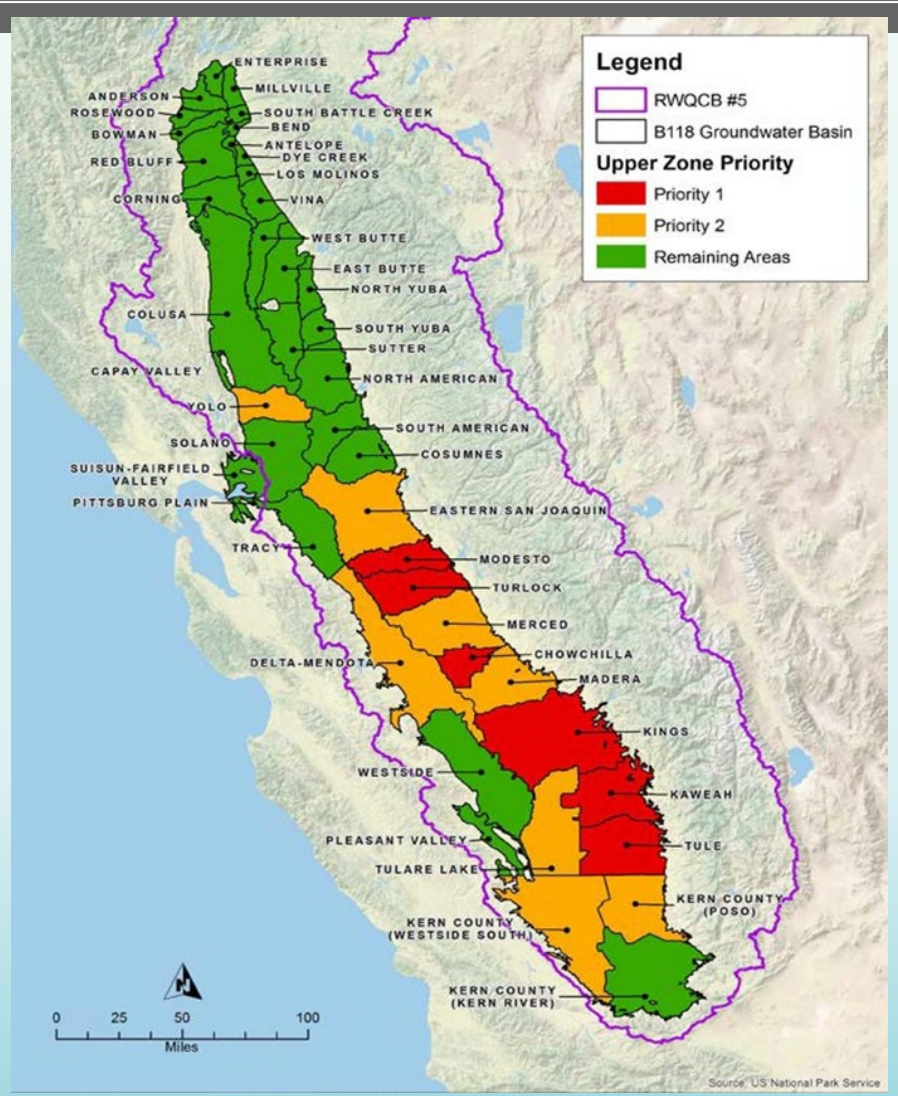
– *Implementation began May 2020*

Priority 2 Area (Orange)

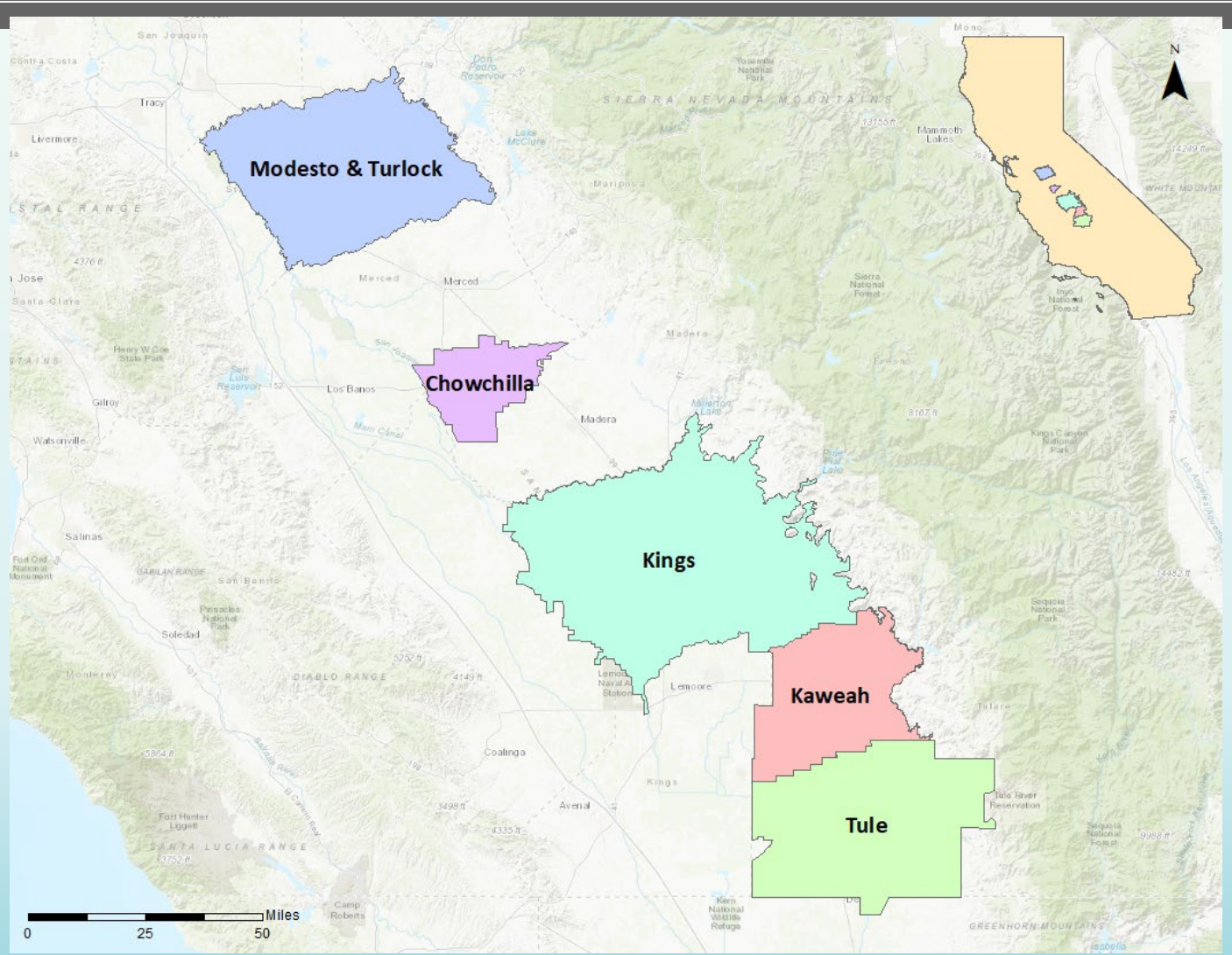
– *Implementation to begin December 2023*

Remaining Areas (Green)

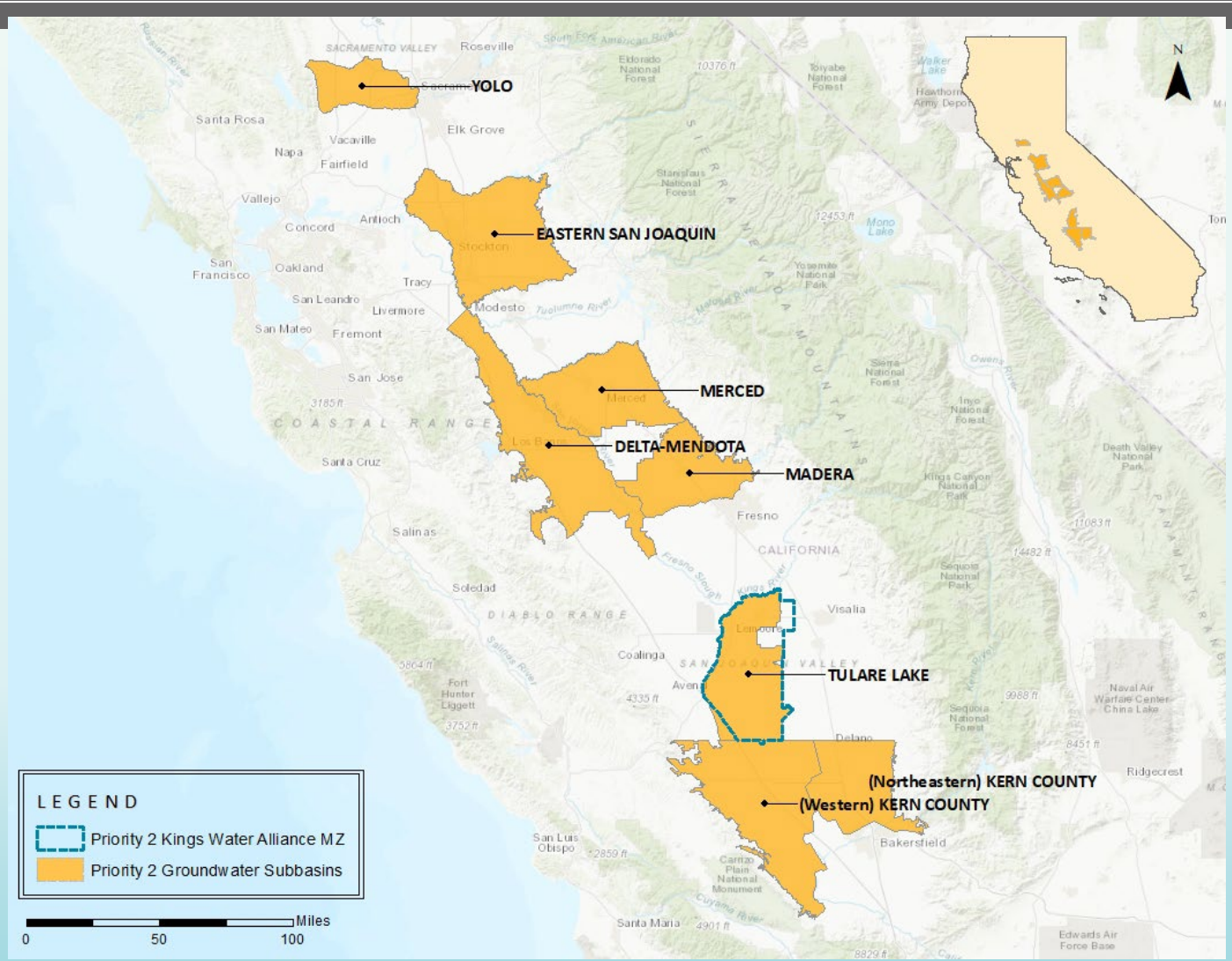
– *Implementation to be phased in after priority areas*



PRIORITY 1 MANAGEMENT ZONES



PRIORITY 2 GROUNDWATER SUBBASINS

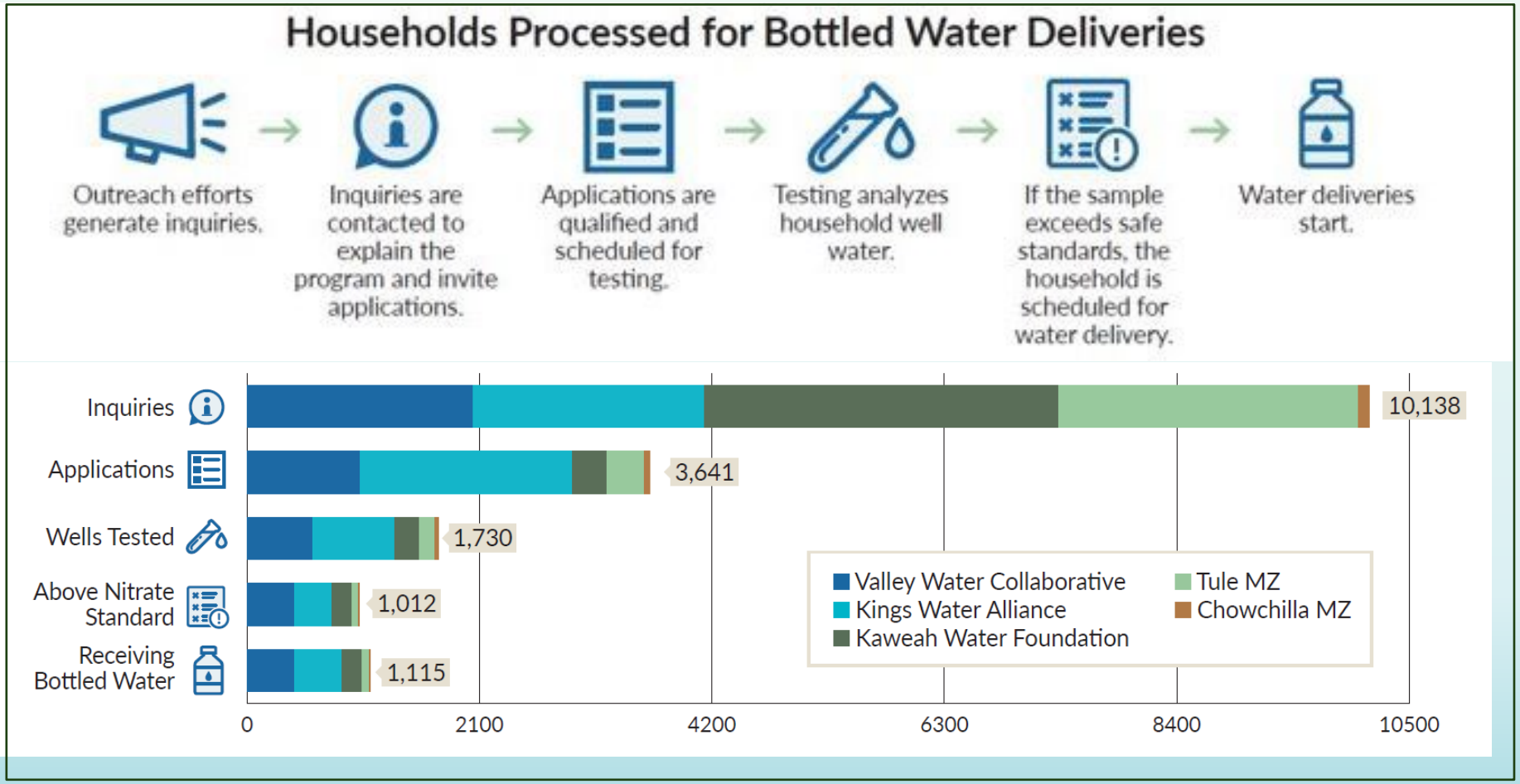


PRIORITY 1 MANAGEMENT ZONE DELIVERABLES

Deliverables following Notice to Comply (May 2020):

Deliverable	Due Date
Preliminary Management Zone Proposal/**Early Action Plan**	3/8/2021
Implementation of **Early Action Plan**	5/7/2021
Final Management Zone Proposal (FMZP)	8/29/2022
FMZP Concurrence Letters and Response to Comment Letters	2/23/2023
Management Zone Implementation Plan Submittals	**9/5/2023**

EARLY ACTION PLAN HIGHLIGHTS TOTAL: MAY 2021 - MAY 2023



NITRATE CONTROL PROGRAM OVERVIEW - CONTINUED

Deliverable	Due Date
Priority 1 Management Zone Implementation Plans (MZIPS)	**9/5/2023**
Priority 2 Notice to Comply Mailout	**December 2023**
Priority 1 MZIP Central Valley Water Board Hearing	**~April 19, 2024**
Priority 2 Preliminary Management Zone Proposals/Early Action Plans	December 2024
Priority 2 Continued Work mirroring Priority 1 MZs	2025

PRIORITY 1 MANAGEMENT ZONES - NEXT STEPS

- Incorporation of Nitrate Control Program into permits per MZIPs:
  - *~193* ***individual permits*** *to be updated*
    - 160 Non-15
    - 25 Confined Animal Facilities
    - 4 Oil/gas
    - 3 NPDES
    - 1 Composting
  - *~10* ***General Permits*** *to be updated*
    - Non-15
    - 4 Confined Animals Facilities
    - 3 Oil/Gas
    - 2 NPDES
    - 1 Dairy General Permit (~650 Dairies represented)
    - 2 ILRP General Permits (represents approximately 35,000 farms)
- Challenges:
  - *CEQA requirements, including AB 2108*

MZIP REQUIREMENTS

- Permitted dischargers must reduce nitrate loadings to cease “causing or contributing to exceedances of nitrate WQOs in groundwater”
  - *WQO = Primary MCL = 10 mg/l*
- Managements Zones will evaluate compliance at township level (36 square miles)
- In coordination with MZs, dischargers must determine nitrate reduction needed to meet “Groundwater Protection Targets”
- GWPTs = nitrogen loading per township to allow compliance with nitrate WQOs (consistent with Irrigated Lands Program)

MZIPS – NON-15 POTW REQUIREMENTS

- Over 40 POTWs in Priority 1 Management Zones
- Each POTW
  - *Must increase monitoring to develop Nitrate Reduction Program (NRP)*
  - *Must develop NRP and ultimately comply*
- Three Groups
  - *Groups 1, 2 and 3*
- Time Frames
  - *Approved NRP – 10, 15 and 20 years*
  - *Meet applicable target – 20, 25 and 35 years*

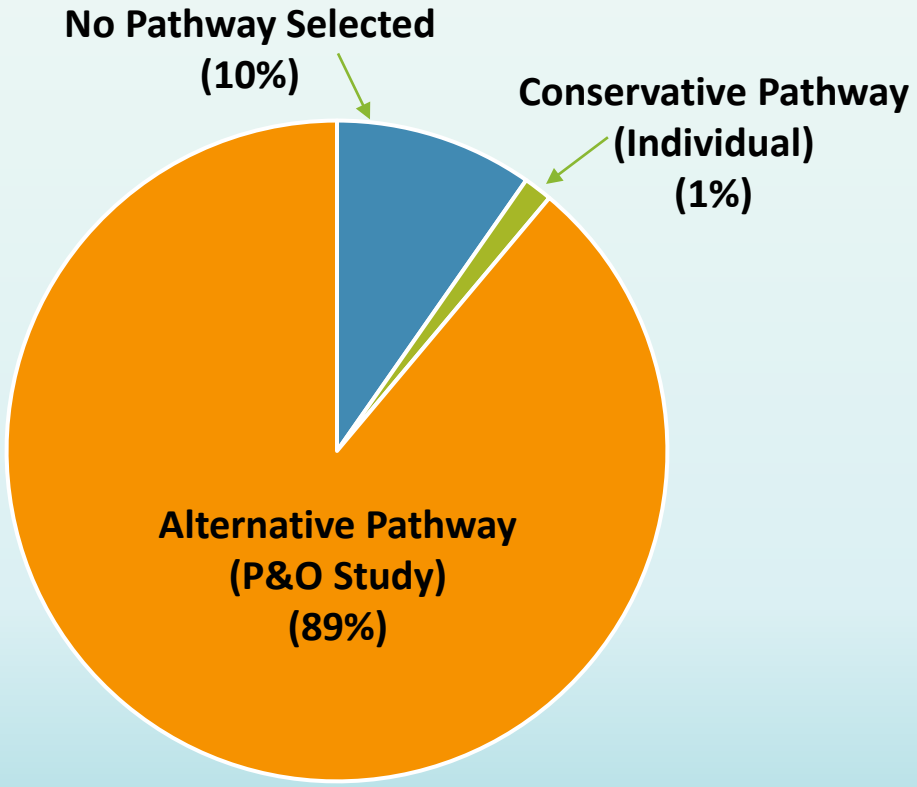

Thank You - Questions?

IMPORTANCE OF COLLABORATIVE SALINITY PROGRAM

- A unique collaboration to develop a management plan to achieve the long term goal of CVSALTS: a **Central Valley that supports irrigated agriculture and other beneficial uses** by effectively addressing long term salt accumulation
- The Central Valley Salinity Coalition is leading the effort to develop the P&O Study
- A key requirement is the development and utilization of modeling tools to evaluate the options for salt disposal and management in the Central Valley: **desalination, in valley sequestration, deep well injection, evaporation ponds, brine line for salt export, source control** and non-structural measures

SALT CONTROL PROGRAM- CURRENT STATUS

89% of 3137 Active Permittees selected Alternative Pathway/P&O Study



Salt Control Program Pathway Selection as of June 2023

PRIORITIZATION AND OPTIMIZATION STUDY STATUS

Deliverable	Date
Phase 1 of P&O Study Workplan	Approved 29 March 2021
Baseline Characterization Report Part 1	Drafted December 2022
Analytical modeling tools selected	Accepted November 2022
Modeling tool calibration, salt source quantification Baseline Characterization Report	Completed in 2023 Accepted in March, 2024
First Archetype Study to establish salinity targets	To be completed in 2024

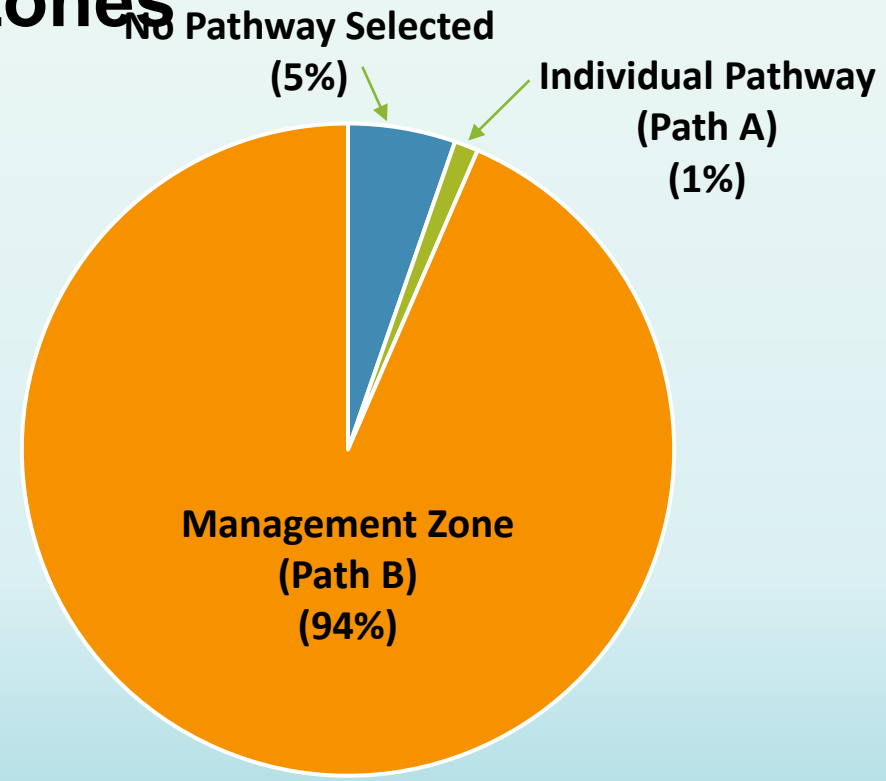
SUMMARY SCHEDULE

- Schedule established in the approved P&O Study Workplan

Key P&O Workplan Element	General Timing
Central Valley Characterization	**Years 1-2**
Numeric Tool Development	**Years 2-3**
Establishment of Numeric Salt Targets	**Years 3-4**
Evaluate Existing Salt Management Requirements, Source Control BMPs and Land Management	Years 3-4
Develop Salt Management Regions	Years 3-4
Identify Salt Management Areas	Years 4-5
Salt Management Alternatives Development	Years 4-9
• Non-Physical Projects	*Years 4-5*
• Physical Projects	*Years 5-9*

NITRATE CONTROL PROGRAM – CURRENT STATUS

94% of 1181 Priority 1 Permittees are in Management Zones



Nitrate Control Program Pathway Selection as of June 2023