

Status of the Central Valley Salt & Nitrate Management Plan



Presenters

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Central Valley Water Board

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Central Valley Salinity Coalition

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Outline

- CV-SALTS Background
- CV-SALTS Approach & Management Zone
- Implementation Strategy
 - Addressing Nitrate Drinking Water Issues
 - Sustainable Salt Management
 - Connections with other developments
- Next Steps and Future

CV

Central Valley



SALTS

Salinity Alternatives for Long-term Sustainability



- Collaborative Basin Planning Effort
- Utilizing Stakeholder Process to Develop Salinity and Nitrate Management Plan

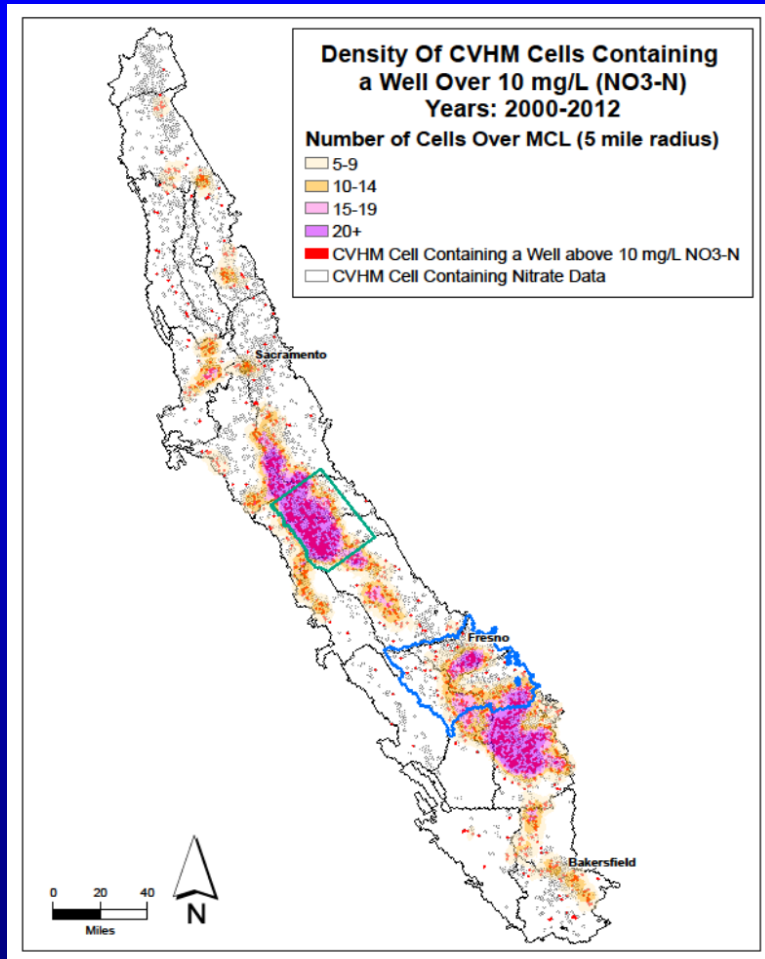
Central Valley Salt Issues



More salt enters the region than leaves

- Impacts (current/legacy)
 - Agricultural Production
 - Drinking Water Supplies
- Economic Cost
 - Direct Annual: \$1.5 Billion
 - Statewide annual income impact: \$3.0 Billion
- Diverse Sources

Central Valley Nitrate Issues



- Legacy Conditions
- Current Loading
- Direct Impacts
 - Drinking Water Supplies
- Economic Costs
 - Treatment
 - Alternate Supply
- Diverse Sources

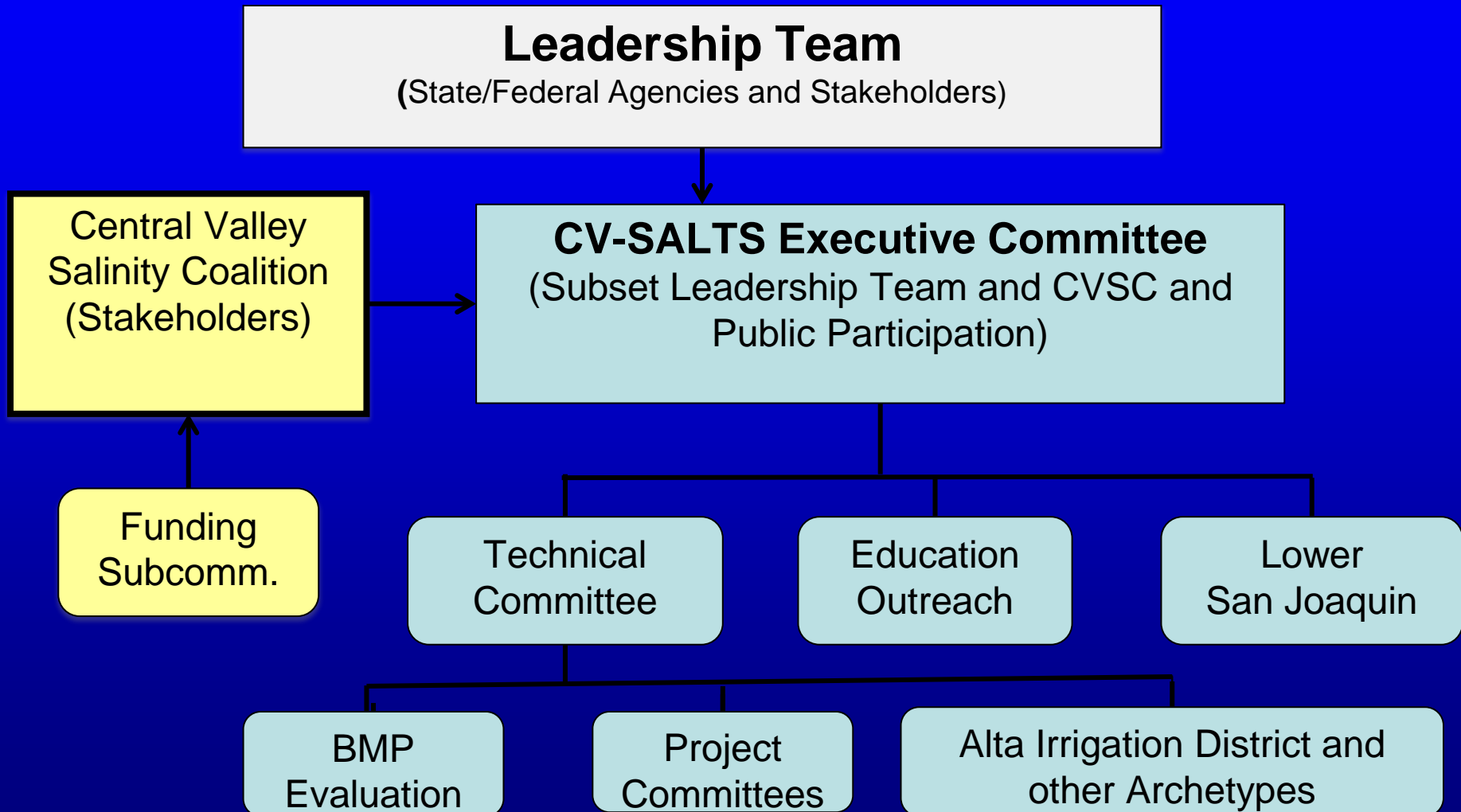
CV-SALTS Goals

Safe Drinking Water in Areas
with Nitrate Impacted
Groundwater

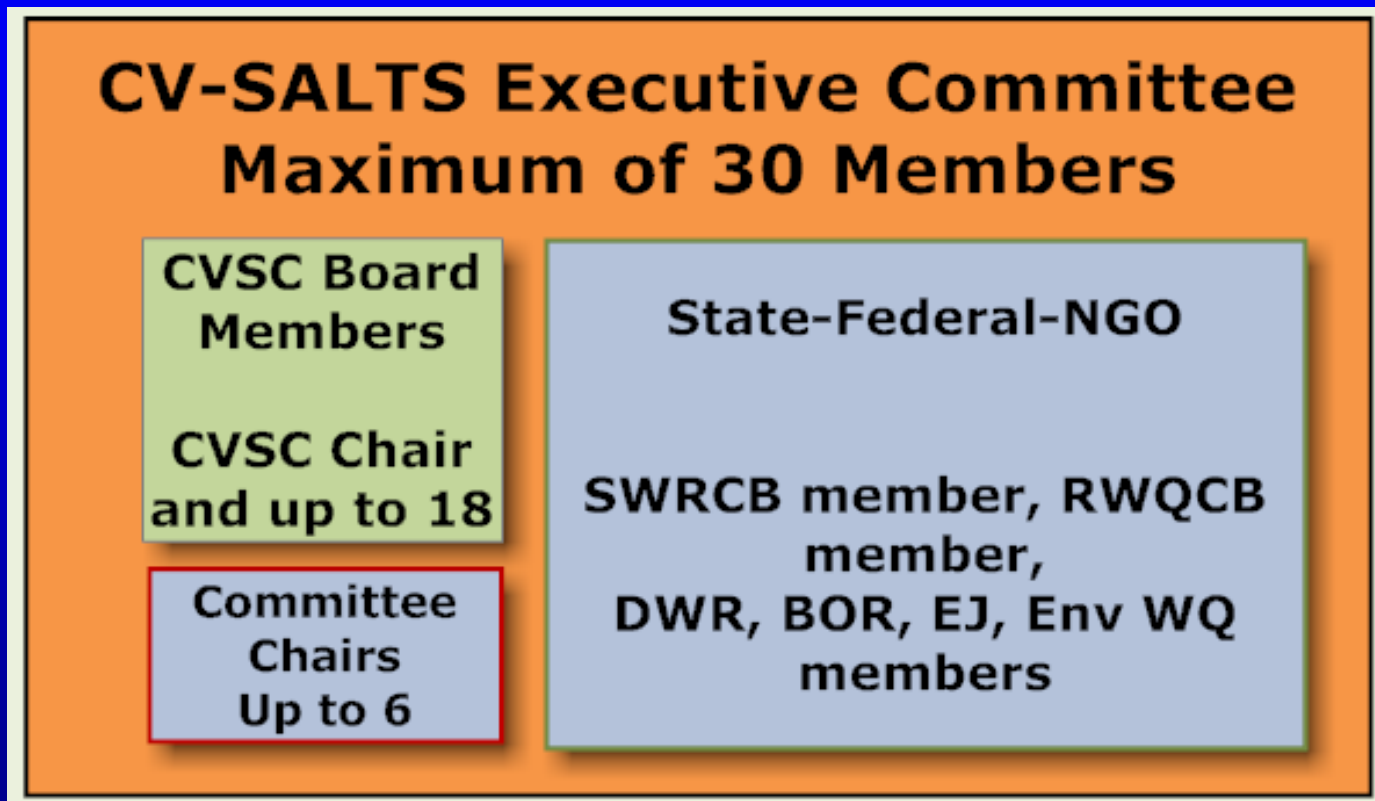


Environmental and
Economic Sustainability

CV-SALTS Organization



CV-SALTS Executive Committee Membership



All Meetings are Noticed and Open to the Public

CVSC 28 Member Benefit Non-Profit

- County of San Joaquin
- City of Stockton
- Stockton East Water District
- The Wine Institute
- City of Tracy
- California Rice Commission
- City of Manteca
- City of Modesto
- San Joaquin River Group
- City of Vacaville
- City of Fresno
- City of Davis
- Westlands Water District
- California Resources Corporation
- California Association of Sanitation
- Central Valley Clean Water Association
- California League of Food Processors
- Tulare Lake Drainage District/ Tulare Lake Basin Water Storage District
- San Joaquin Valley Drainage Authority
- Sacramento Regional County Sanitation
- Western Plant Health Association
- East San Joaquin Water Quality Coalition
- California Cotton Growers and Ginners
- Southern San Joaquin Valley Water Quality Coalition
- Northern California Water Association
- Dairy CARES/Western United Dairymen
- Pacific Water Quality Association
- Los Angeles County San District

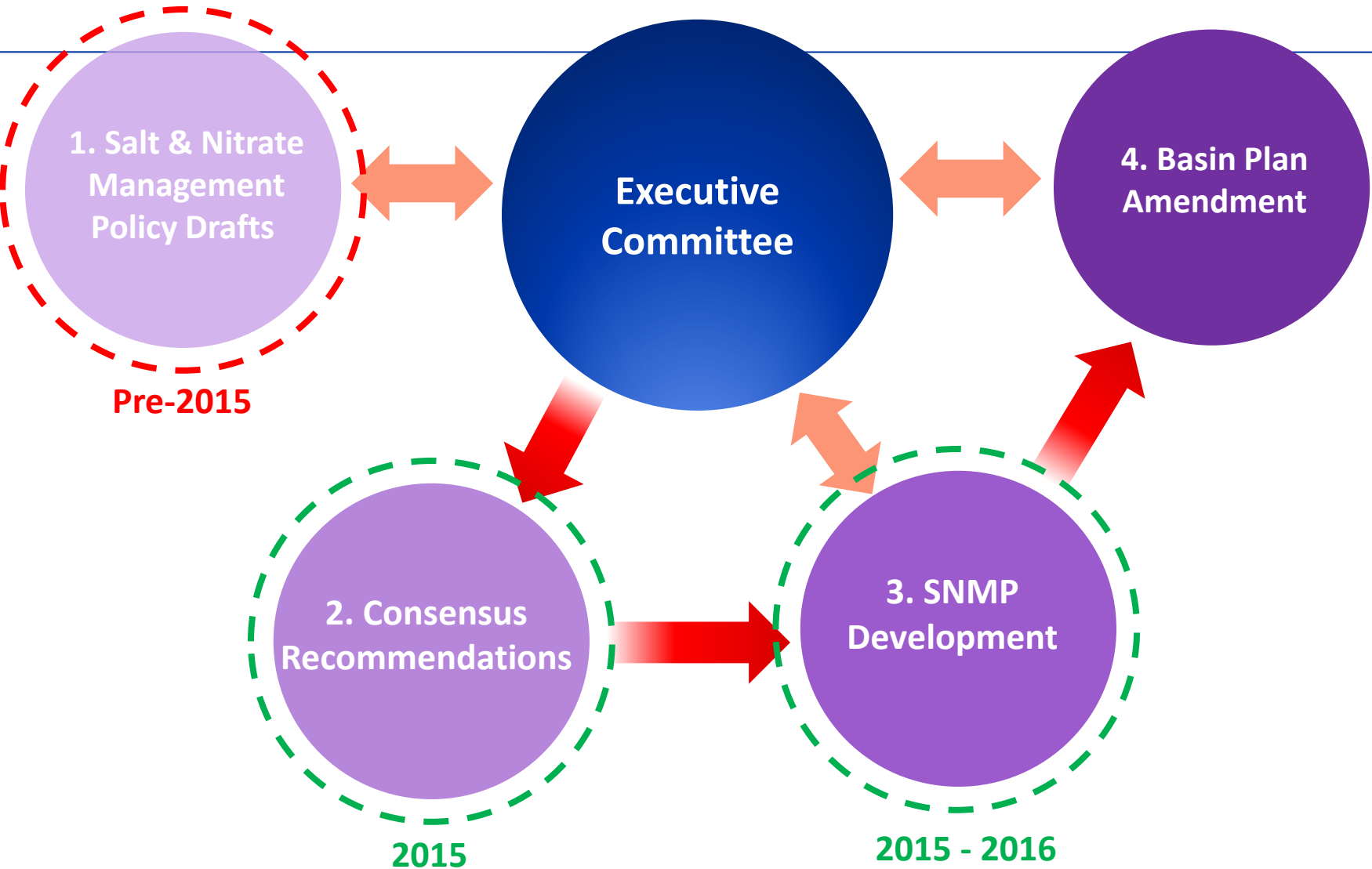
2015 Policy Discussion Topics

- **Alternative Compliance Strategies**
 - Management Zones for Nitrate and/or Salt
- **Interpreting narrative AGR objective**
- **Guidance for utilizing Secondary MCLs as Water Quality Objectives**
- **Factors to consider when evaluating antidegradation**
 - BPTC; “best efforts; economically achievable
 - Maximum Benefit

2015 Policy Discussion Topics

- **Integration with other state policies**
 - Conservation
 - Recycled water
 - Drought
 - Stormwater harvest,
 - Groundwater Sustainability Act
- **Extending and expanding variance and exceptions policies**

Policy Discussion Process



Technical Foundation

Data Compilation and Modeling

- ✓ Conceptual Model
- ✓ GIS Beneficial Use/ AGR Zone Efforts

Beneficial Use

- Tulare Lake Groundwater
- MUN in Ag Dominated Waterbodies

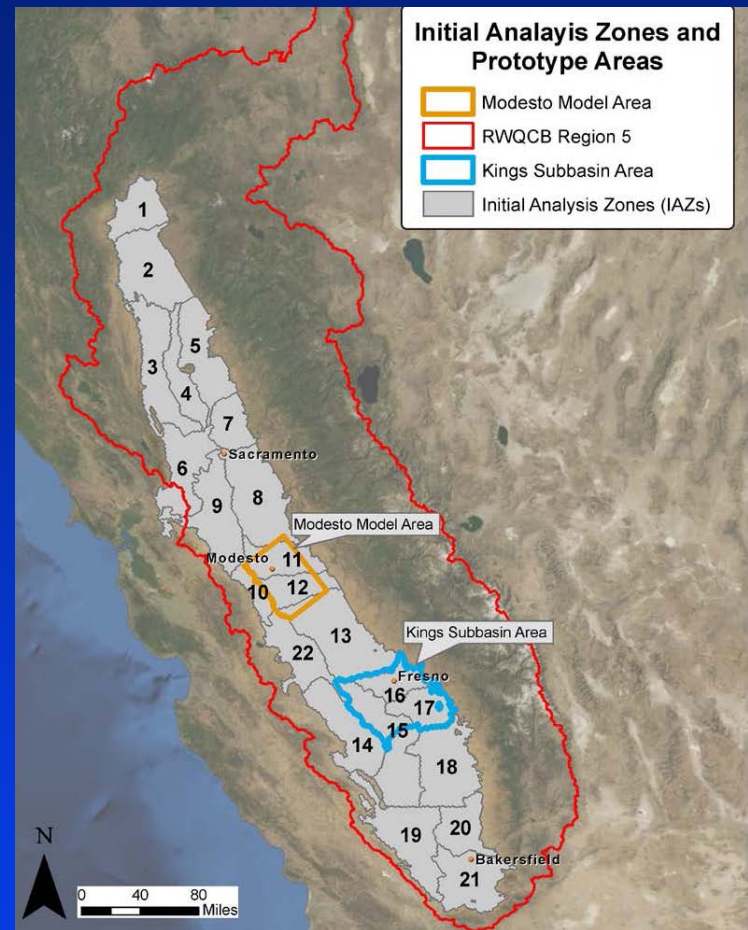
Water Quality Objectives

- ✓ Aquatic Life
- ✓ Stock Watering
- ✓ Salt Effects on Irrigated Ag
- ✓ Salt Effects on MUN

- Lower San Joaquin River

Implementation

- SSALTS (Accumulation/Transport)
- Alternate Compliance Strategy (Current & Legacy Nitrate)



Technical Area	Primary Activities	SNMP Support	2012	2013	2014	2015	2016 (May) Final SNMP	
Conceptual Model Development	Initial Conceptual Model	<ul style="list-style-type: none"> Source identification Assimilative capacity Loading estimates 	→					
	Phase 2	<ul style="list-style-type: none"> Preliminary SNMP (technical elements) Background WQ/ assimilative capacity calculation methods Management zone study 			→			
	Phase 3	<ul style="list-style-type: none"> Antidegradation analysis Monitoring/Surveillance plan Economics analysis 				→		
Data Development	GIS – Phase 2	<ul style="list-style-type: none"> Baseline database 	→					
	Agriculture Zone Mapping	<ul style="list-style-type: none"> AGR implementation tools 		→				
Beneficial Use Studies	Tulare Lake Bed MUN Archetype	<ul style="list-style-type: none"> MUN implementation tools 	→					
	MUN Beneficial Use in Agriculturally Dominated Water Bodies Archetype	<ul style="list-style-type: none"> MUN implementation tools 	→					
Water Quality Objectives	Salinity-related Effects on Agricultural Irrigation Uses	<ul style="list-style-type: none"> Evaluation of science behind establishment of salinity related objectives 	→					
	Salinity Effects on MUN-related Uses of Water		→					
	Stock Watering Study		→					
	Aquatic Life Study		→					
Implementation Planning	Strategic Salt Accumulation Land and Transport Study (SSALTS)	<ul style="list-style-type: none"> SNMP implementation measures to manage salt and nitrate on a sustainable basis 	→					
	Salt/Nitrate Management Alternatives Assessment				→			
Lower San Joaquin River Committee	Technical Analyses (salt loading characterization, modeling)	<ul style="list-style-type: none"> Coordination with CV-SALTS SNMP development activities to ensure consistency 		→				
	Basin Planning Activities (WQOs, SED, economics, monitoring, implementation)			→				

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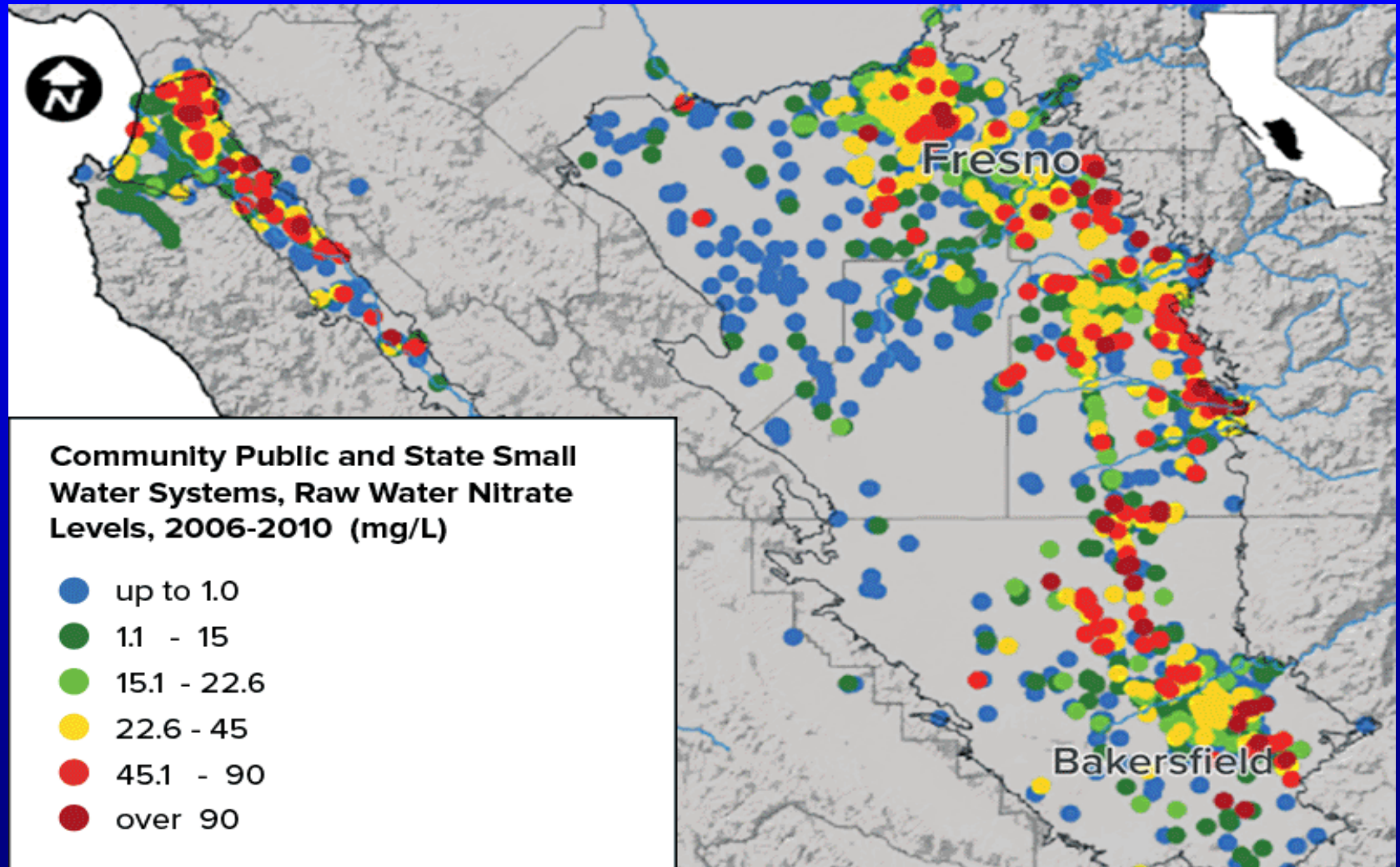
Implementation Strategy

- Addressing Nitrate Drinking Water Issues and remediation
 - Current Tools
 - Management Practice Implementation for current and future sources
 - Additional Tools
 - Alternative Compliance
 - Management Zones
- Sustainable Salt Management

Effective Groundwater Protection Program is Needed

- Nitrate contamination in groundwater is widespread
- Nitrate contamination has serious health implications
- Nitrate contamination undermines financial security for lower income residents
- Still uncertainty about the extent and degree of nitrate contamination

Nitrate in Raw Water



The Economic Burden of Nitrates

- Families spent an average of 4.6% of household income on drinking water*
 - Households spent an average of > \$30 on filters /bottled water in addition to monthly water*
- 95% of families one community paid over the affordability standard (1.5% of household income) for drinking water*
- Burdens fall hardest on small communities without economies of scale necessary to treat water and on communities reliant on domestic wells

**From “The Human Cost of Nitrate Contamination”, a study of four representative communities*

And There is Much We Still Don't Know

- Counties, State don't maintain adequate information regarding state small and private wells
- 2 million Californians – and an estimated 20% of rural Region 5 residents -- are not served by a public water system

All Impacted Residents Need
Safe Drinking Water Now

Mitigation of Nitrate Contamination (Alternative Compliance Projects)

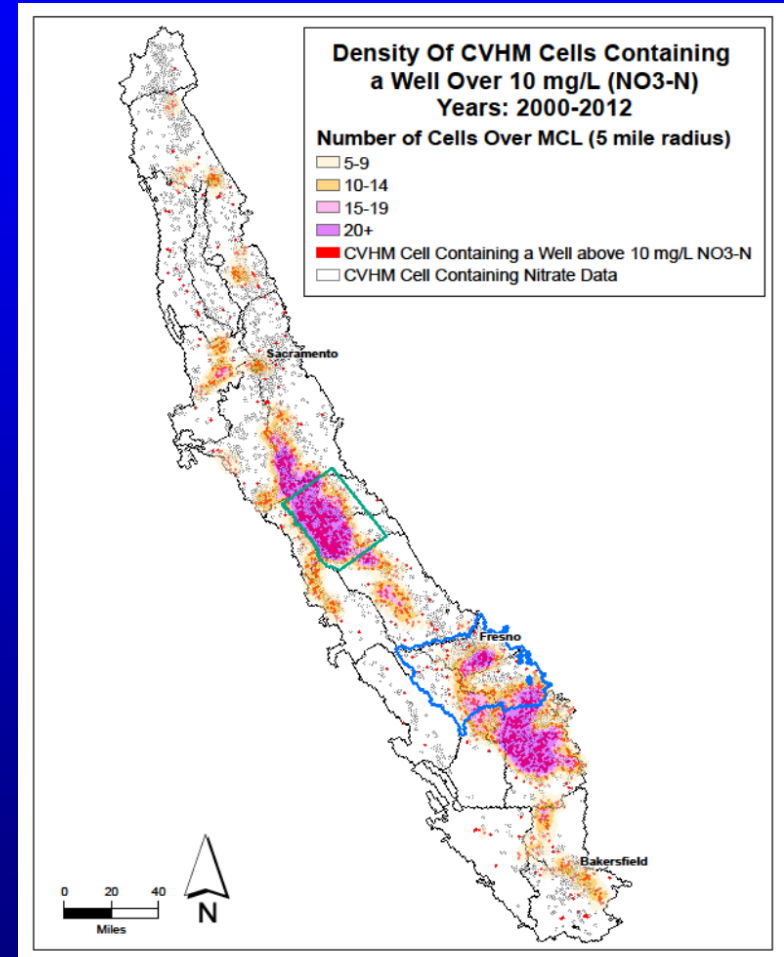
- Must mitigate both
 - Nitrate Contamination that causes / contributes to MCL exceedances
 - Nitrate Contamination that increases the cost of providing or acquiring drinking water
- Provide the best solution to provide currently impacted communities with safe and affordable drinking water
- Provide permanent solutions for communities / residents that will not have access to affordable, safe drinking water over the long term
- Protect current and future MUN Beneficial Use

Restore Aquifers for Beneficial Uses Within An Enforceable Time Frame

- Include measurable, enforceable timelines and milestones to ensure restoration of impacted aquifers to Beneficial Uses
- Ensure that Pollution does not disproportionately impact lower income communities and communities of color
- Identify and require best management practices for nitrate application and management

Addressing Nitrate in Drinking Water

- Addressing current sources
- Addressing legacy nitrate will take years (decades)
- User protection needs to occur much sooner
- Current regulatory scheme could result in prohibited discharges without addressing drinking water
- Irrigated lands and dairy order are key strategies



Current System: Key State Board Orders that Control WDRs

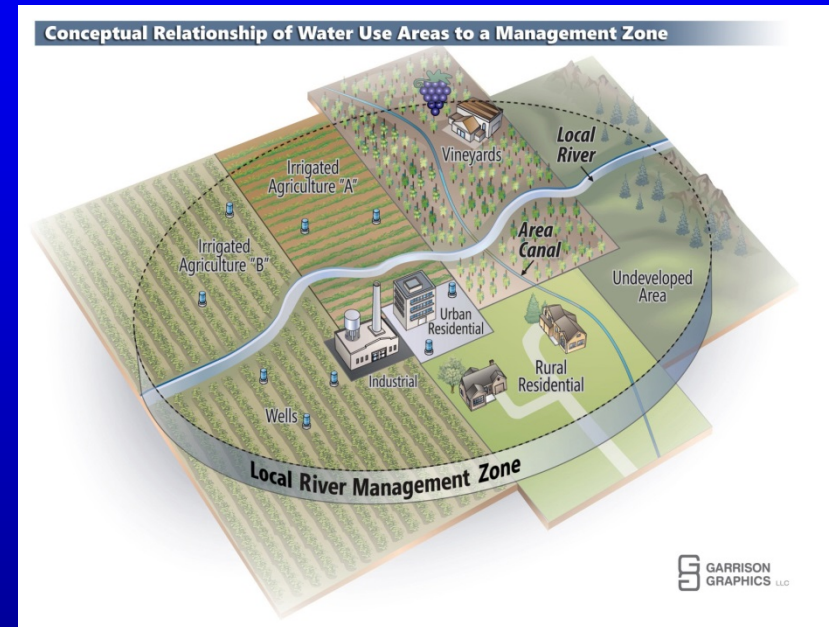
- Order No. 73-4 – Rancho Caballero
 - (*WDRs must implement Basin Plan*)
- Order No. 81-5 – City of Lompoc
 - (*Sets principles for establishing limits depending on if constituent is in receiving water above or below the water quality objective*)
- Order No. 88-12 – San Diego Co. Milk Producers
 - (*May need to prohibit the discharge*)

Order No. 88-12 – San Diego Co. Milk Producers

- Water exceeds objectives, thus limits are required
- Limits could be applied beneath root zone of irrigated field or at point of discharge
- But, in this case, dairy unable to meet potential limits
- Unless new data and information is provided showing assimilative capacity, discharges should be prohibited

Need Alternative Compliance Strategy

- Would give Regional Board *authority* to permit discharges that cannot meet objectives
- Prioritize:
 1. Safe Drinking Water
 2. Reduce Ongoing Impacts
 3. Managed Restoration



Used at Regional Water Board Discretion

Potential Regulatory Pathways

Traditional	Alternative Compliance
<p>Meet water quality objective or better at first encountered groundwater</p>	<p>Conditional allocation of groundwater assimilative capacity; alternative compliance project; exceptions</p>
<p>Board adopts:</p> <ul style="list-style-type: none"> • Compliance Schedule • Prohibition 	<p>Discharger(s) proposes actions, jointly with local water users, that allow continued operations while implementing:</p> <ul style="list-style-type: none"> • Source control • User Protection • with Planned Managed Restoration and timelines <p><i>Enforceable through WDR requirements</i></p>

Alternative Compliance Strategy

Alternative Compliance Project

- Allows responsible discharge, along with proposed alternative compliance project (e.g., well-head treatment, point of use treatment, connection to surface water supply), to result in better user protection than if discharge were prohibited

Antidegradation Analysis Requirement

- Must show maximum benefit to people of the state, cannot unreasonably impact beneficial uses

Benefits of Alternative Compliance Strategy

- Addresses nitrate drinking water issues sooner – becomes an enforceable provision in WDR
- Provides immediate relief to impacted water users and protects the Central Valley's economy better than prohibition of discharge
- Provides for implementation of long-term compliance strategies and managed restoration

Alternative Compliance - Management Zone Concept

- Defined basin or area
- Voluntary request to the Regional Board to take ownership of water supply, quality and supports dischargers needs in the region
- Includes most or all of the dischargers, groundwater producers, disadvantaged communities
- Links to IRWM Planning Areas and Groundwater Sustainability Agencies



Alternative Compliance - Management Zone Concept

- Opportunity to utilize assimilative capacity for maximum benefit across the management zone
- Requirement to ensure drinking water supply quality for currently impacted water users
- Minimizes costs and maximizes benefits to community and water users

Ongoing Nitrate Actions in Existing WDRs

- POTWs, Dairy, Industry
 - Effluent & Groundwater Limitations
 - Monitoring
 - Compliance and Enforcement Actions
- Ag
 - Groundwater Assessment Reports
 - Farm Evaluation Reports
 - Nitrogen Management Plan
 - Grower Outreach & Education

SSALTS – Identify Sustainable Salt Management Alternatives

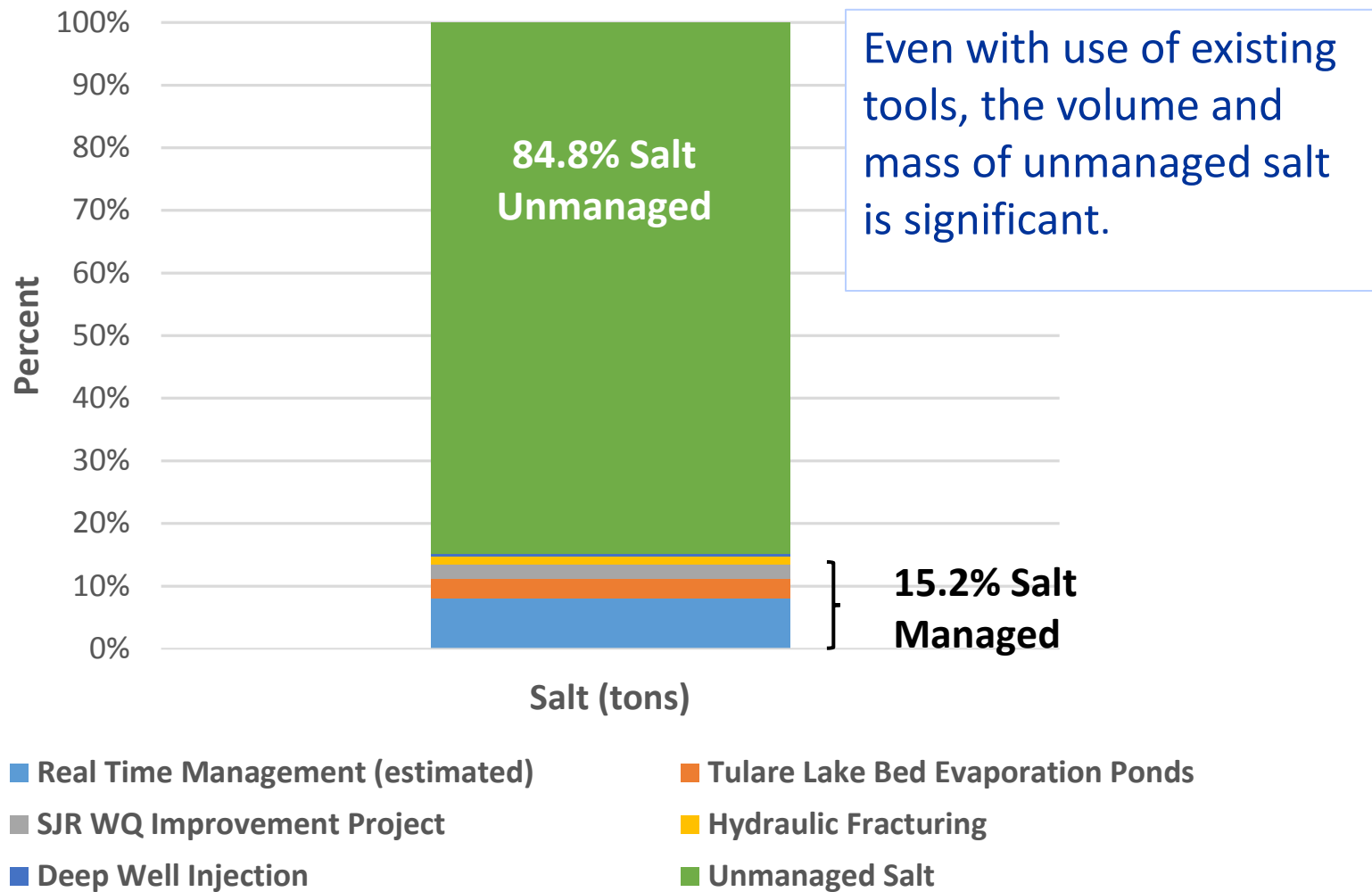
- SSALTS investigating:
 - Magnitude of the problem
 - Requirements to achieve sustainability
 - Available salt management tools - now vs. future
 - Implementation measures for inclusion in the SNMP



Key Salt Management Alternatives

Treatment & Salt Recovery Technology	Brine Disposal and Storage
<ul style="list-style-type: none"> • Mature Technologies <ul style="list-style-type: none"> • Reverse Osmosis • Ion Exchange • Lime Softening • Evaporation Ponds • Emerging Technologies <ul style="list-style-type: none"> • Smart Integrated Membrane System (SIMS) • WaterFX Aqua4 System – Multi-effect Distillation • Zero Discharge Distillation by Veolia – Electrodialysis Metathesis • New Sky Energy – Temperature Control and Electrodialysis • Element Renewal – addition of polymers to remove trace elements 	<ul style="list-style-type: none"> • Brine Supply for Hydraulic Fracturing • Deep Well Injection • Salt Management Disposal Areas <ul style="list-style-type: none"> • Landfills • Dedicated Disposal Sites • San Joaquin River Improvement Project • San Joaquin River Real Time Management • Transport Brine Out of Valley <ul style="list-style-type: none"> • Truck/Rail Brine • Regulated Brine Line • Bay Area WWTP • New, permitted Bay Area Outfall

Achieving Salt Sustainability – Example Scenario from Southern Part of Central Valley

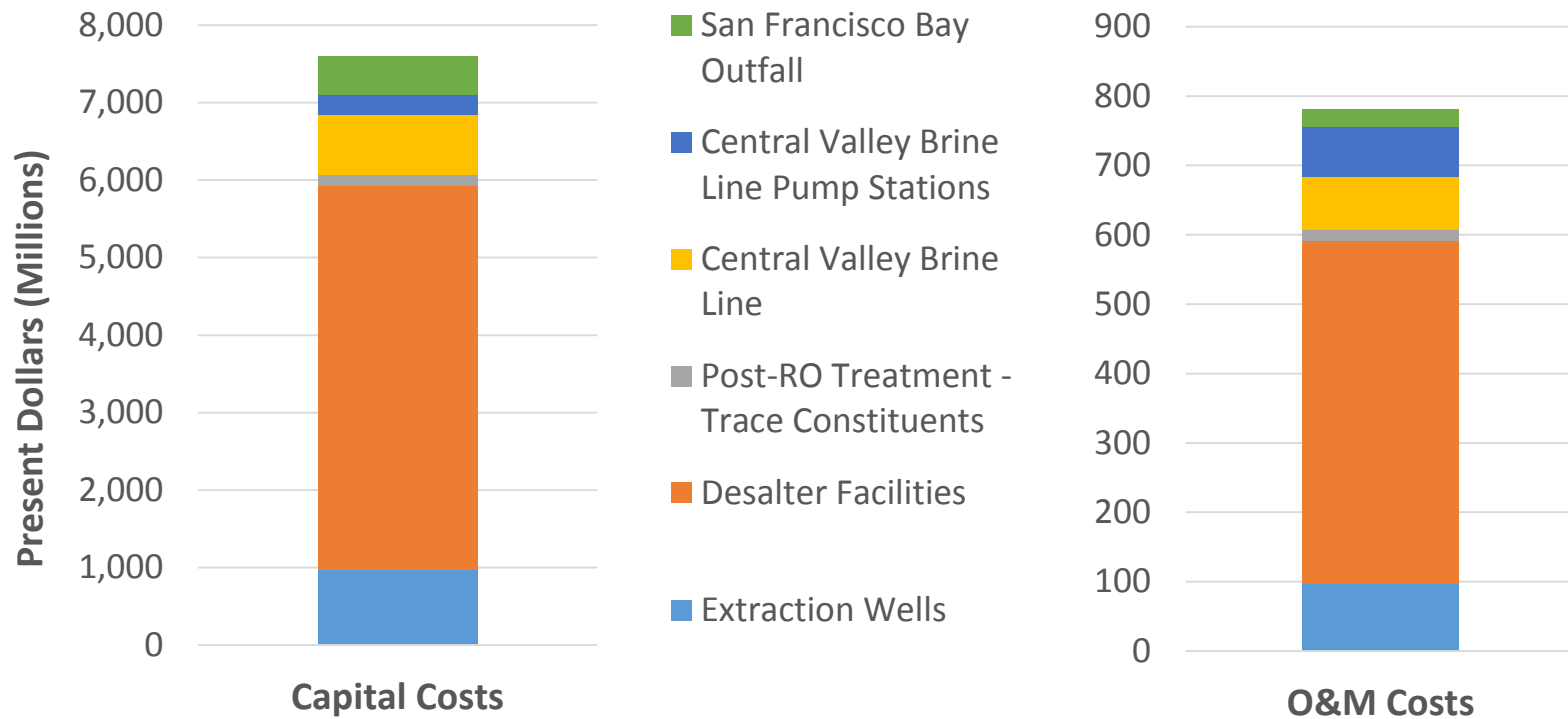


Achieving Sustainability Requires Having the Means to Move Salt Out of the Central Valley

- Central to all evaluated salt management alternatives is a **regulated Central Valley brine line**
- Concept level analysis completed
 - Alternative Central Valley routes
 - Preliminary Brine Discharge Alternatives
 - Via existing East Bay Municipal Utility District outfall
 - Via an alternative outfall to San Francisco Bay
 - Concept-level cost estimate – Capital and O&M

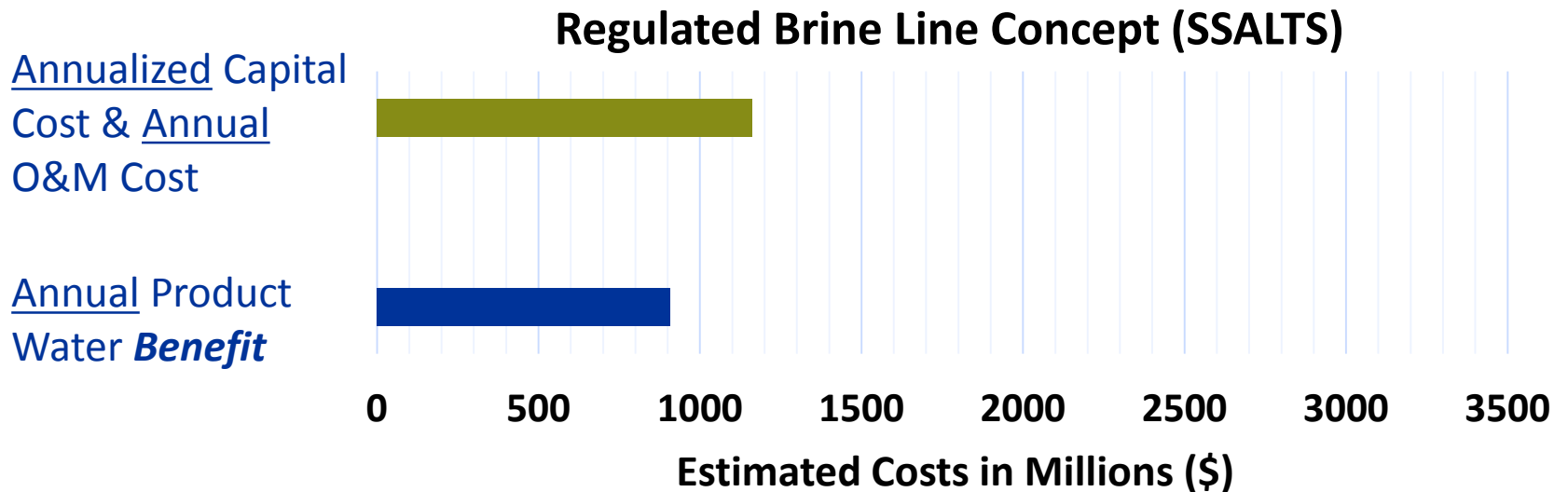
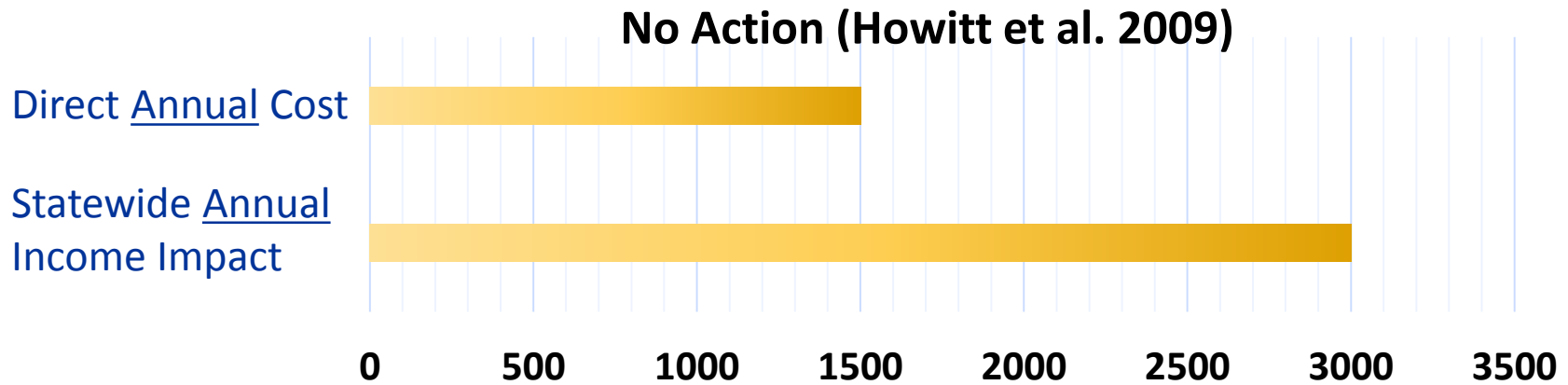


Conceptual Level Costs for Regulated Brine Line Alternative – Outfall to San Francisco Bay



Implementation of this alternative would yield product water with an estimated value of \$909M/year

Regulated Brine Line Concept vs. No Action



Implementation Measures – Next Steps

- Complete Salt Implementation Strategy (Phase 3 Report)
 - Finalize implementation process
 - Incorporate into SNMP
- Nitrate Alternatives Analysis
 - Parallel analysis to SSALTS
 - Nitrate implementation alternatives for SNMP
 - Short and long term measures



Moving Forward

➤ Continued Plan Development



Summarized CV-SALTS Workplan Schedule

Figure 2 - Summarized CV-SALTS Workplan Schedule

Revised 11/1/13

CV-SALTS Program Element	2011	2012	2013	2014	2015	2016	2017	2018	+
Program Management	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	
Technical Studies	Green	Green	Green	Green	Green	Green			
Archetypes/Case Studies		Green	Green	Green	Green	Green			
Groundwater MUN (Tulare)		Green	Green	Green	Green	Green			
Surface Water MUN (Sac Valley POTWs)		Green	Green	Green	Green				
Management Practice Development	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	
Lower San Joaquin River Salt and Boron Objectives	Blue	Blue	Blue	Blue	Blue				
Implementation Planning		Red	Red	Red	Red				
Documentation for Approval						Dark Blue	Dark Blue	Dark Blue	
CEQA Equivalent Documentation						Dark Blue			
BPA Documentation Process Support						Dark Blue	Dark Blue	Dark Blue	
Initial Implementation			Dark Red	Dark Red	Dark Red	Dark Red	Dark Red	Dark Red	
Monitoring and Reporting							Orange	Orange	
Phase II SNMP								Grey	

Water Board's Role

Step	Deliverable	Regional Board's Role	
1) Development	Salt and Nitrate Management Plan (SNMP)	Participate in collaborative stakeholder process to recommend an integrated regulatory strategy for managing salt and nitrates that: <ul style="list-style-type: none"> * Assures safe drinking water (near-term) * Minimizes water quality degradation * Restores degraded aquifers where feasible and practicable (long-term). 	
2) Authorization	Basin Plan Amendments	Revise Basin Plans to include the SNMP and expand the range of available regulatory tools/options needed to implement it.	
3) Execution	Waste Discharge Requirements (WDRs); ACP	Traditional WDRs	ACPs, Management Zones, Variances and Exceptions
4) Implementation	Traditional and Alt. Compliance Programs, Enforcement	Ensure that dischargers take actions needed to comply with their commitments and implement the SNMP as required.	

Approval Process

Many opportunities for public review and comment:

- ... **As the SNMP is being developed by the stakeholders (2015);**
- ... **and** when the SNMP is formally submitted to the Reg. Bd. (2016);
- ... **and** when the Reg. Bd. is considering any related BPAs (2017);
- ... **and** when the State Board reviews any BPAs (2018);
- ... **and** each time the Reg. Bd. issues, revises or renews WDRs (2018+);
- ... **and** each time the Reg. Bd. is asked to approve any ACP (2018+)

However, Decisions made now will determine the options that will be available for consideration in the future

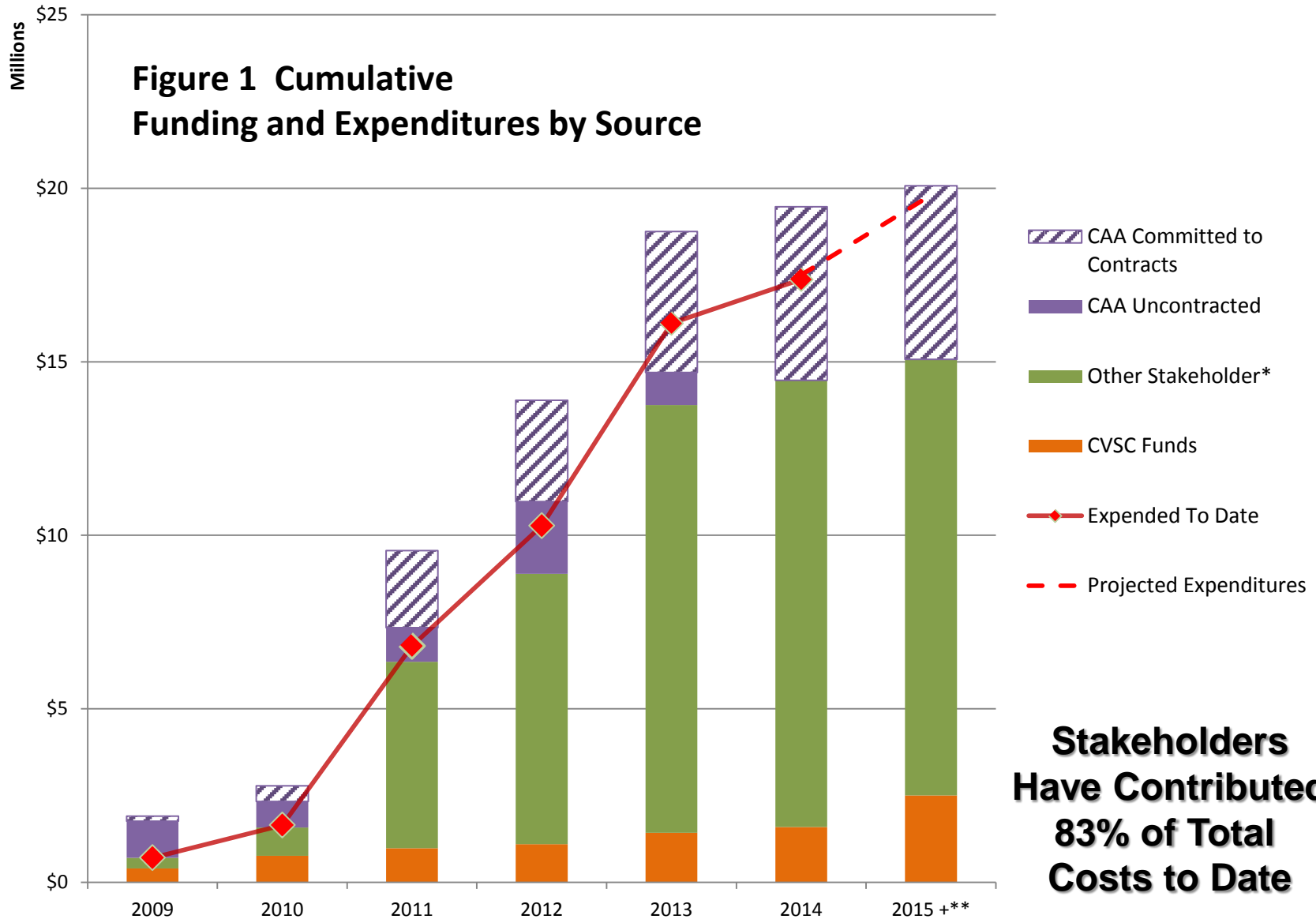
Anticipated Outcomes

- Compliance with Recycled Water Policy
- Updated Central Valley Basin Plans
- Implemented Strategies that:
 - Address Nitrate Drinking Water Issues
 - Achieve Salt Sustainability

Moving Forward

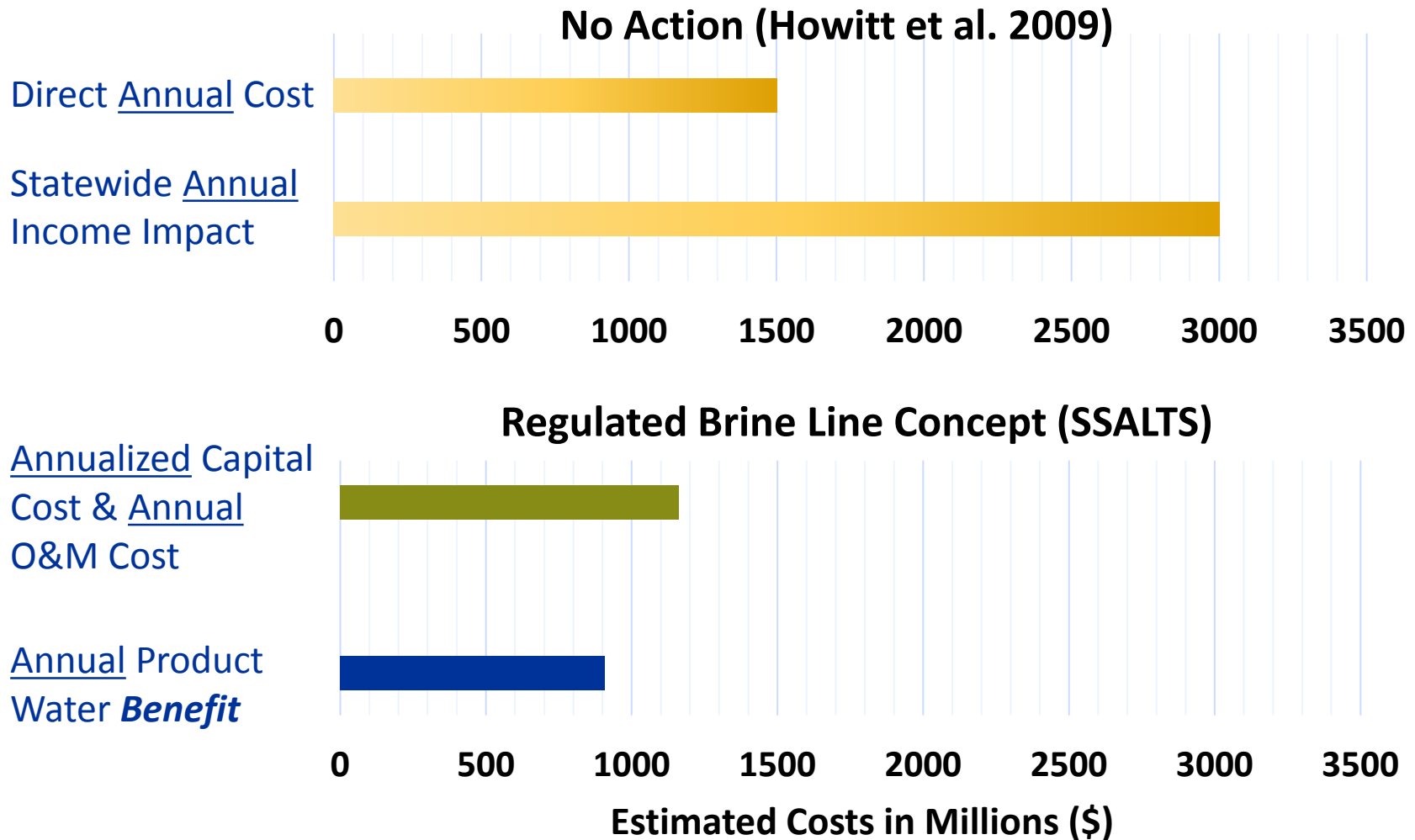
➤ Short/Long-term Funding





**Stakeholders
Have Contributed
83% of Total
Costs to Date**

Regulated Brine Line Concept vs. No Action



Moving Forward

➤ Extensive Outreach



Outreach Target Audiences

- Federal, State & Local Policy Makers
- Agricultural Interests
- POTWs & Stormwater Agencies
- Industrial / Manufacturing Interests
- Water Supply and Delivery Interests
- EBMUD (Salt Management)

Outreach Target Audiences

- Environmental Justice Interest
- Environmental Advocacy Interest
- Cities and Counties
- Potential Sustainable Groundwater Management Act (SGMA) Entities

Outstanding Questions (Handout)

- **Will ACPs fully mitigate impacts on existing and future drinking water users?**
 - How does the program account for increase in impacted population?
 - How will the program ensure that drinking water contamination that extends beyond the lifespan of the permit is mitigated?
 - How will the program ensure that current and future beneficial uses are protected through Alternative Compliance Projects and / or a restored aquifer?
 - How will impacted communities play a meaningful role in choosing appropriate mitigation measures?
 - What measures will be in place to ensure that the mitigation measure chosen is the best project to address the drinking water contamination in an impacted community / set of communities?

Outstanding Questions (Handout)

- Under what circumstances will exceptions be granted and what process will the Board apply to considering exceptions?
- What measures will be in place to ensure restoration of aquifers within strict timelines?
- What monitoring and reporting requirements will be in place to ensure accessible and robust data regarding nitrate application and contamination?
- What are the criteria for identifying management zones and how will management zones ensure inclusion of all impacted communities?
- How will management zones be governed and how will impacted communities be represented in a governance structure?
- How will assimilative capacity be calculated and allocated to dischargers / management zones?

Closing

- High Level of Commitment
- High Level of Coordination
- Addressing the Critical Questions
 - Implementation Planning
 - Basin Plan Changes
 - Drinking Water issues

Questions?