The Intersection of SGMA and Groundwater Quality Management in the Sacramento Valley
Groundwater Sustainability

Sustainability Goal
Entire Basin

SUSTAINABLE GROUNDWATER MANAGEMENT
Entire Basin

Sustainable Yield
Entire Basin

Undesirable Results:
Significant and Unreasonable...

Surface Water Depletion  Reduction of Storage  Degraded Quality  Seawater Intrusion  Land Subsidence  Lowering GW Levels
Overview

• **Quick** look at Geography of regulation

• Flyover of Irrigated Lands Regulatory Program
  – Sacramento Valley Water Quality Coalition

• Groundwater Quality

• Liability, Litigation and Safe Drinking Water
State Water Board

Provides oversight of 9 semi-autonomous regional water boards

- Reviews petitions filed against regional water boards
- Rules on petitions with Orders directing regional water board action

Region 1 – North Coast
Region 2 – San Francisco
Region 3 – Central Coast
Region 4 – Los Angeles
Region 5 – Central Valley
Region 6 – Lahontan
Region 7 – Colorado River
Region 8 – Santa Ana
Region 9 – San Diego
Mission: Protect quality of Region’s waters for all beneficial uses

- Region 5 - largest of 9
- ~40% of State’s area
- ~20% of State’s population
- 2/3 of State’s drinking water
Irrigated Lands Regulatory Program

**Goal:** Ensure irrigated lands discharges don’t impact water quality

- ~75% CA irrigated ag
- ~7 million acres
- 9 General WDRs
- 14 Coalitions
Irrigated Lands Regulatory Program

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Language of Water Quality

- Quality
- Control
- Water
- Capacity
- Assimilative
- TMDL
- Delta
- Plan
- Delta
- Uses
- Joaquin
- Antidegradation
- Bodies
- Discharger
- Beneficial
- Practical
- Point
- Source
- Program
- Zone
- Porter-Cologne
- Sacramento-San
- Irrigated
- Non-point
- Treatment
- Vadose
- Best
- Regulatory
- Compliance
- Act
Who is currently being regulated? Why?

- Discharges of water from a variety of point and nonpoint sources that may ultimately enter surface or ground waters of the state.
- Protection of Beneficial Uses.
- Stormwater, irrigated agriculture, food processors, wastewater treatment.
Sources of Surface Water discharge
When did regulation of Irrigated Lands begin?

• In 1972, U.S. Congress defined discharges from irrigated lands as non-point sources

• Irrigated lands initially exempt from federal regulation

• Reserved non-point source regulation for state and local governments using management plans

• In 1987, U.S. Congress recognized the complexity of non-point source control and qualified requirements by stating practices should be selected that reduce pollution to “the maximum extent possible”
Regulatory change in the new Century (~2000 – present)

- Catalyst for change passage of SB 390 (1999) gave the Regional Board and stakeholders three years to establish policies
- Form of regulation strongly contested
  - Many Regional Board workshops, hearings, and rulings
  - State Board appeal
  - Litigation in Sacramento Superior Court
  - Effort to pass new State Legislation
  - Surface water, not groundwater
  - SVWQC Formed
Water Quality is Measured in Many Ways
Beneficial Uses

- **Municipal and Domestic Supply (MUN)** Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

- **Agricultural Supply (AGR)** Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
As Important to Agriculture Yield
Public Health - Drinking Water Standards
As it is to Aquatic Habitat
Evolving Water Quality Program

• Porter-Cologne Water Quality Control Act
  – Central Valley Regional Board

  – Waste Discharge Requirements (WDRs)
    • Conditional Waivers (up to 5 Years)

  – Basin Plan for Sacramento River Basin

  – Total Maximum Daily Loads (TMDLs)
Expanded Focus/New Requirements in ILRP

- New Waste Discharge Requirements (WDR) and Monitoring Reporting Program (MRP) have groundwater quality component
- New grower and Coalition reporting requirements on Nitrogen Management
- Identify areas where groundwater quality is impacted by developing a Groundwater Quality Assessment Report
- Trend Monitoring - baseline
- Monitoring/Management Practices Effectiveness Program
Groundwater Protection

- Management Plans
- Farm Evaluation
- Nitrogen Management
- Protective Practices
- Metric for groundwater protection
ILRP Groundwater Protection Strategy

GAR
Identifies areas where groundwater has been impacted and is vulnerable to impact

Trend Monitoring
Determines groundwater trends influenced by grower practices

MPEP
Identifies protective practices; supports development of nitrogen loading target

GQMP
Plan to achieve or ensure compliance with the groundwater receiving water limitation

Farm Plans
Document grower practices and nitrogen application information

Annual Report
Provides grower and monitoring data; completed and upcoming work

Source: Central Valley Water Board
Sacramento River Watershed Groundwater Quality Assessment

LISA PORTA, PE/CH2M
Groundwater Quality Assessment Report

• The general purpose of the Groundwater Quality Assessment Report is to

  – analyze existing monitoring data and

  – provide the foundation for designing the Management Practices Evaluation Program and the Groundwater Quality Trend Monitoring Program,

  – as well as identifying high vulnerability groundwater areas where a groundwater quality management plan must be developed and implemented.
Methodology Overview

Potential Vulnerability (susceptibility) Indicators

Hydrogeology (SACFEM and DRASTIC*)
- Soils
- Geology
- Hydrogeology

Agronomic/Soils (NHI)
- Crop type
- Irrigation method
- Soil texture

Vulnerability Indicators

Observed Water Quality**
(USGS, DWR, GAMA, CDPH, DPR, other)
- Nitrate
- Salinity
- Pesticides
- Other

*Valley floor only – at the section scale for all data
** Most recent and trends, where available
Water Quality Datasets

- SWRCB GeoTracker
  - GAMA Database
    - CDPH
    - USGS
    - DWR
    - GAMA Domestic Wells Program

- USGS NWIS Database
  - GAMA Program Priority Basin Project
  - NAWQA

- DWR
  - Water Data Library
  - Monitoring Wells Network (Multi-Completion Wells)

- DPR
  - Pesticides Groundwater Database
### Wells Used in Water Quality Analysis

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#### SACFEM AREA - Most recent Nitrate as NO3 results at each well

<table>
<thead>
<tr>
<th>Agency</th>
<th>Total Number of wells with NO3 result</th>
<th># wells less than 250 ft deep</th>
<th># wells more than 250 ft deep</th>
<th># wells with unknown depth</th>
<th># of wells above 0.5MCL</th>
<th># of wells above MCL</th>
<th>Min value (mg/L)</th>
<th>Max value (mg/L)</th>
<th>Average value (mg/L)</th>
<th>Median value (mg/L)</th>
<th>Range of most recent data</th>
</tr>
</thead>
<tbody>
<tr>
<td>USGS (NWIS and GAMA)</td>
<td>130</td>
<td>99</td>
<td>29</td>
<td>2</td>
<td>10 (8%)</td>
<td>2 (1%)</td>
<td>0</td>
<td>81</td>
<td>8.2</td>
<td>6.6</td>
<td>1981-2012</td>
</tr>
<tr>
<td>DWR (all)*</td>
<td>1299</td>
<td>92</td>
<td>87</td>
<td>1120</td>
<td>201 (15%)</td>
<td>76 (6%)</td>
<td>0</td>
<td>363</td>
<td>12.5</td>
<td>5.5</td>
<td>1935-2013</td>
</tr>
<tr>
<td>SWRCB-GAMA (Yuba/Tehama Co)</td>
<td>159</td>
<td></td>
<td>159</td>
<td>10 (6%)</td>
<td>2 (1%)</td>
<td>0</td>
<td>60</td>
<td>9.2</td>
<td>8</td>
<td>8</td>
<td>2002-2005</td>
</tr>
<tr>
<td>CDPH</td>
<td>994</td>
<td>994</td>
<td>187 (19%)</td>
<td>45 (4%)</td>
<td>0</td>
<td>132</td>
<td>12.5</td>
<td>7.1</td>
<td>1984-2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local databases**</td>
<td>63</td>
<td>7</td>
<td>31</td>
<td>25</td>
<td>10 (16%)</td>
<td>2 (3%)</td>
<td>0</td>
<td>63</td>
<td>13</td>
<td>9.6</td>
<td>1960-2009</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2645</strong></td>
<td><strong>198</strong></td>
<td><strong>147</strong></td>
<td><strong>2300</strong></td>
<td><strong>418 (15%)</strong></td>
<td><strong>127 (5%)</strong></td>
<td><strong>0</strong></td>
<td><strong>363</strong></td>
<td><strong>11.1</strong></td>
<td><strong>7.1</strong></td>
<td><strong>1960-2009</strong></td>
</tr>
</tbody>
</table>

* depth is either total well depth or sample depth
** local databases: YCFCWCD and SCWA

**NOTE:** less than 11 mg/L is considered “relative background concentration” for areas with low human development (per USGS)

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GAR will include these summaries for each Subwatershed (for NO3 and TDS)
Valley-scale Vulnerability
ILRP Groundwater Protection Strategy

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Source: Central Valley Water Board
Irrigated Lands Regulatory Program

➢ WDRs for Sacramento River Watershed
  • Regulation of discharges irrigated agriculture
  • Discharges to groundwater
  • **WDR groundwater requirements**
    • Groundwater Quality Report (GAR)
    • Groundwater Quality Management Plan
  • **Management Practices Evaluation Program (MPEP)**
    • Groundwater Quality Trend Monitoring (GQTM)
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- WDRs for Sacramento River Watershed
  - Regulation of discharges from irrigated agriculture
  - Discharges to groundwater
  - **WDR groundwater requirements**
    - Groundwater Quality Report (GAR)
    - Groundwater Quality Management Plan
    - Management Practices Evaluation Program (MPEP)
    - **Groundwater Quality Trend Monitoring (GQTM)**
GQTM Workplan Requirements

➢ Approach
  • Rationale for monitoring network:
    o Agricultural commodities
    o Vulnerability and prioritization factors
    o Communities reliant on groundwater: relationship to recharge areas

➢ Well construction details
➢ Sampling schedule and parameters
➢ Implementation and trend analysis
GQTM Monitoring Design Considerations

- Vulnerability – High and low
- Disadvantaged communities
- Hydrogeologic characteristics (e.g., recharge, depth to water)
- Land use
Why the Focus on Groundwater Quality

- SWRCB Recommendations to Legislature on nitrate in groundwater for the Tulare Lake Basin and Salinas Valley (Feb 2013).
2013 Petitions – AGUA and Environmental Justice Community Contentions about Adoption of ESJ General Order

• The General Order will allow for degradation and even pollution of groundwater quality, in violation of the State’s Antidegradation Policy and state law.

• The General Order will disproportionately impact low income communities and communities of color because it does not protect groundwater from continued degradation.
2013 Petitions – California Sportsfishing Protection Alliance (CSPA) Contentions about Adoption of ESJ General Order

- The General Order fails to comply with Resolution 68-16, the State Board’s Antidegradation Policy. With focus on *Surface Water Monitoring Programs*

- The General Order fails to comply with California’s Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program.

- The General Order fails to comply with the California Environmental Quality Act.
CV SALTS - Salt and Nitrate Basin Plan
Groundwater Quality Information
SNMP Identifies New Tools and Regulatory Options

Alternative Compliance Program

• Specific Conditions to allocate assimilative capacity or grant discharge exceptions

Management Goal 1

• Safe Drinking Water Supply
  – Short & Long Term Solutions

Management Goal 2

• Achieve Salt/Nitrate Balance
  – Timeframe & Costs Vary

Management Goal 3

• Restore Groundwater Quality
  – Where Feasible & Practicable
Ambient Nitrate Concentrations Upper Zone: Corning Subbasin

Ambient Conditions

Upper Zone
- Nitrate (mg/L as N)
  - 0.1 - 2.5
  - 2.6 - 5.0
  - 5.1 - 7.6
  - 7.6 - 10.0
  - >10

Regions:
- Region 5
- DWR B118 Basins

Attachment Figure 12

Attachment Figure 94
Ambient TDS Concentrations Upper Zone: Corning Subbasin
<table>
<thead>
<tr>
<th>NITRATE (as N)</th>
<th>Upper Zone</th>
<th>Production Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Wells</td>
<td>431</td>
<td>572</td>
</tr>
<tr>
<td>Mean Concentration (mg/L)</td>
<td>36.8</td>
<td>28.6</td>
</tr>
<tr>
<td>Median Concentration (mg/L)</td>
<td>1.9</td>
<td>2.4</td>
</tr>
<tr>
<td>75th Percentile (mg/L)</td>
<td>7.5</td>
<td>6.9</td>
</tr>
<tr>
<td>95th Percentile (mg/L)</td>
<td>186</td>
<td>135</td>
</tr>
<tr>
<td>Maximum Concentration (mg/L)</td>
<td>1,542</td>
<td>1,541</td>
</tr>
<tr>
<td>Percent of Wells &gt;10 mg/L</td>
<td>21%</td>
<td>16%</td>
</tr>
</tbody>
</table>
Average Nitrate Concentration for Wells in the PRODUCTION Zone (2000-2016)

Summary of Available Trend Data for Nitrate

<table>
<thead>
<tr>
<th>Groundwater Zone (# wells w/ trend data)</th>
<th>Decreasing Trend</th>
<th>Slightly Decreasing</th>
<th>Neutral Trend</th>
<th>Slightly Increasing</th>
<th>Increasing Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper (48)</td>
<td>13 (27%)</td>
<td>11 (23%)</td>
<td>5 (10%)</td>
<td>9 (19%)</td>
<td>10 (21%)</td>
</tr>
<tr>
<td>Production (10)</td>
<td>0</td>
<td>3 (30%)</td>
<td>1 (10%)</td>
<td>5 (50%)</td>
<td>1 (10%)</td>
</tr>
<tr>
<td>Lower (34)</td>
<td>0</td>
<td>8 (24%)</td>
<td>10 (29%)</td>
<td>16 (47%)</td>
<td>0</td>
</tr>
</tbody>
</table>
Timeline

- March 9 2017: Board received Salt Nitrate Management Plan (SNMP) Framework
- October 2017: Draft Basin Plan Policy Amendments Drafted
- January 2018: Regional Board Workshop
- May 31 2018: Adoption of Basin Plan
- Spring 2019: State Board Hears Basin Plan
- December 2019: SNMP Implementation begins
Implementation Timeline – Management Zones

Timeline is WDR & Management Zone Dependent

Revision of WDRs
- Continue to implement EAP
- Implement Workplan to develop SNMP Compliance Plan
- Implement SNMP Compliance Plan, upon approval

Initiate implementation of Early Action Plan

Preliminary Management Zone Proposal Filed
- Initial identification of wells exceeding nitrate WQO
- Submit Early Action Plan (EAP)
- Initial Management Zone Information

Revised Management Zone Proposal Filed
- Provide Workplan for development of SNMP Compliance Plan
- Implement EAP during Workplan development

Cumulative Timeline

- 9 Months
- 15 Months
- Additional Time WDR-Dependent
## Salt/Nitrate Management Strategy: General Timeline for Existing Dischargers

<table>
<thead>
<tr>
<th>Activity</th>
<th>'18</th>
<th>'19</th>
<th>'20</th>
<th>'21</th>
<th>'22</th>
<th>'23</th>
<th>'24</th>
<th>'25</th>
<th>'26</th>
<th>'27</th>
<th>2nd 10 Years</th>
<th>3rd 10 Years</th>
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</thead>
<tbody>
<tr>
<td>Effective Basin Plan amendment</td>
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<tr>
<td>Nitrate – Priority 1 Areas</td>
<td>1</td>
<td></td>
<td>3</td>
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<td>Nitrate – Priority 2 Areas</td>
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<td>Nitrate – Remaining Areas</td>
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<td>Salinity Management</td>
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<tr>
<td>Phase I Prioritization and Optimization Study (further define short and long-term projects to manage salt in the Central Valley)</td>
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<td>Phase II – Permitting, Engineering Design</td>
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<td>Phase III – Project Construction</td>
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1. **Notice to Comply (NTC) (within 1 year of BPA effective date)**
2. **NTC (within 2-4 years of BPA effective date)**
3. **Initial planning (w/i ~15 months of NTC), including develop/implement Early Action Plan to address drinking water concerns**
4. **Outcome is revised WDRs/Waivers with discharger-specific nitrate management requirements - Time to completion varies based on permitting approach**
5. **For remaining areas, the time to a NTC to be determined**
Questions/Comments