Nitrogen Management Plan Approach

Nitrogen Tracking & Reporting System Task Force
August 26, 2013

East San Joaquin
Water Quality Coalition

Parry Klassen
Executive Director
Coalition Overview

- In operation since 2003
- **3,950 Landowner / operators**
- **706,336 irrigated acres**
  - Madera, Merced, Stanislaus, Tuolumne, Mariposa counties
- *We manage group permit for our members*
• Created a reporting approach that is *hopefully* workable
  o Spent two years developing *a proposed* nitrogen use reporting system with cooperation from growers, watershed coalitions and commodity groups

• Compliance with Irrigated Lands Regulatory Program, WDR R5-2012-0116
  o WDR General Order for the Growers Within the Eastern San Joaquin River Watershed that are Members of the Third Party

• Substantial step toward answering questions about nitrogen loading due to irrigated agriculture
N Reporting is First Step

Documentation
- Record Nitrogen Use/Ratios

Outreach to Growers
- Evaluate ratios, identify outliers, and conduct outreach to reduce nitrogen load to groundwater

Additional Research
- Management Practice Effectiveness Program (MPEP) and additional research on nitrogen management

Nitrogen Loads
- Assessment of how much nitrogen is moving into groundwater due to agricultural practices
• Purpose is working toward improvements in nitrogen management (when/if needed)
  o Focuses on crop uptake – not total applied
  o Helps growers understand their use in context with like crops
  o Helps to identifies “outliers”

Outcome
  o Better management of nitrogen as information is developed leading to improved groundwater quality
Reporting Process

- Coalition members fill out annual Nitrogen Management Plan Worksheet on a field by field basis
  - Data gathered either electronically or paper reporting
- Coalition records ratio for each field and associates with Assessor Parcel Number (APN)
- Ratio associated with a specific field and crop
- Ratios compared using box and whisker plots on a crop by crop basis; outliers identified
- Coalition reports ratios by Township to Regional Board
  - Order specifies grouping by commodity, similar practices and similar soils
- Outreach focuses on selected members and their practices
  - Not on generating useless information (total applied per acre)
Nitrogen ... a simple matter of balance?

Removal

Replacement
Many processes are variable, uncontrollable or poorly predicted.
Scale - Individual Farm Map
# Nitrogen Management Plan Worksheet

**Crop Year:** 2012  
**Member ID:** 1234  
**APN:** 111-00-222  
**Owner/mgr:** Joe Almond  
**Field #:** A, B, C

## Crop Nitrogen Demand

<table>
<thead>
<tr>
<th>Crop</th>
<th>Nitrogen Needs / Uptake</th>
<th>Total N applied to field (lbs/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almonds</td>
<td></td>
<td><strong>Nitrogen fertilizers</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(conventional and organic)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Dry &amp; Liquid Fertilizers</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 105</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Foliar N fertilizers</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 90</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Other N fertilizers</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Acres</strong></td>
<td><strong>Organic Material N</strong> (manure, compost, etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Other N containing materials</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 5</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL N APPLIED</strong> (per acre)</td>
<td>215 200</td>
</tr>
</tbody>
</table>

### Soil Nitrogen Credits

<table>
<thead>
<tr>
<th>Soil N ppm</th>
<th>Lbs N/acre</th>
<th>Lbs N/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td><strong>TOTAL N CREDITS</strong> (per acre)</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

## Total N Credits and Applications:

| Total N Credits and Applications: | 275 | 260 |
| Crop N needs:                     | 250 | 250 |
| Balance                            | 25  | 10  |
| Ratio                              | 1.10 | 1.04 |
Reporting Elements

- Nitrogen Worksheet kept on farm
- Summary information submitted to coalition
  - Member ID, APN, field, crop, acres
    - Nitrogen Applied
    - Nitrogen Crop Uptake
    - Ratio:
      - Nitrogen Applied
      - Nitrogen Uptake
### NITROGEN MANAGEMENT PLAN
#### SUMMARY REPORT

<table>
<thead>
<tr>
<th>Date</th>
<th>March 15 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Joe Member</td>
</tr>
<tr>
<td>Member ID No.</td>
<td>1234</td>
</tr>
<tr>
<td>Crop Year</td>
<td>2014</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APN (1)</th>
<th>Field ID (1)</th>
<th>Crop (2)</th>
<th>Acres (3)</th>
<th>Ratio (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Township Map
Stanislaus County Example: 23,040 acres
Stanislaus County example

• Total acres: 23,040 acres
  • Irrigated: 20,210
  • Non Irrigated: 2,830
• Number of Members: 137
• Number of APNs: 304
• Number of Fields (Estimated): 286
What the township report should show

- Where most growers are with nitrogen ratios
- The “Outliers”: those who apply too much
- Outliers focus of outreach with commodity specific information/references
- Ratio not meant to be a regulatory end point at this time
Box and Whisker Plot Visual

- Potentially applying too much N (outliers)
- Ideal Range
- Median – middle of dataset
Benefits

- Ready for implementation
- Ratio
  - Captures both replacement and removal in one number
- Vetting shows support from multiple groups
  - Fertilizer suppliers, commodity groups, coalitions
  - Believe to be reasonable approach
    - (Resigned acceptance)
  - Not developed as regulatory endpoint

Challenges

- Refining crop consumption number
- Rates don’t take into account all variables
  - For example:
    - Soil conditions
    - Weather
    - Irrigation system
    - Applied water
- Reflects mass loading but is not absolute loading
Management Practice Effectiveness Studies

- Confirm that management practices implemented to improve groundwater quality are working
- Are agricultural management practices protective of groundwater?
- Modify practices if needed

Proposing coordinated effort by coalitions/commodity groups to complete

- Share expense across Central Valley
- Coalition to present Water Board with phased approach
- CURES USDA project to be starting point for approach
  - Literature search
  - Interview experts in field
Economic Costs / Impacts

Cost to Coalition
- Development of online tools
  - In house data entry from paper reports
  - Online data submittal software
- Reporting to Regional Board
- Outreach to growers
- Database Management

Cost to Grower
- Increased dues
- Certification by CCAs
  - Growers time to complete certification (if pursued)
- Grower time to complete paperwork
- Possible change of management practices
- Reduction in nitrogen applications (potential)

Reporting approach allows growers to comply with order in a cost effective manner while supplying necessary information to assist with the prioritization of outreach and effectiveness studies necessary to reduce loading of nitrogen to groundwater.