

California Department of Food and Agriculture  
ENVIRONMENTAL FARMING ACT SCIENCE ADVISORY PANEL  
INCENTIVES WORKING GROUP

MEETING AGENDA

1220 N Street  
Room 133  
California Department of Food and Agriculture  
Sacramento, CA 95833  
(916) 654-0433

April 23, 2012  
1:00 PM to 5:00 PM

Jeff Dlott, PhD, Member and Chair

Mark Nechodom, PhD, Member

Don Cameron, Member

Mike Tollstrup, Member

Ann Thrupp, PhD, Member

Luana Kiger, MSc, Subject Matter Expert

Louise Jackson, PhD, Subject Matter Expert

Amrith Gunasekara, PhD, CDFA Liaison

1. Introductions and other business (10 minutes) Jeff Dlott  
Science Panel Chair
2. Presentation on Market Systems and Nutrient Management in the Chesapeake Bay (40 minutes) Doug Parker, PhD  
Director, California Institute for Water Resources  
Office of the Associate Vice President-Academic Programs & Strategic Initiatives  
University of California
3. Market Systems and the Willamette Partnership, Oregon (40 minutes) Bobby Cochran  
Executive Director  
Willamette Partnership
4. City of Santa Rose Project Kieser & Associates, LLC (K&A) (40 minutes) Valerie Minton  
Conservation Program Manager  
Sotoyome Resource Conservation District  
Mark S. Kieser  
Senior Scientist and owner
5. State and Regional Water Quality Control Board panel (40 minutes) Johnny Gonzalez  
Irrigated Lands Program Manager, SWQCB  
Joe Karkoski  
Division Chief, CVRWQCB  
Lisa H. McCann  
Environmental Program Manager  
Representatives from other regions
6. Public comment (30 minutes)
7. Discussion and next steps (40 minutes)
8. Adjournment

All meeting facilities are accessible to persons with disabilities. If you require reasonable accommodation as defined by the American with Disabilities Act, or if you have questions regarding this public meeting, please contact Amrith Gunasekara at (916) 654-0433.

<http://cdfa.ca.gov/Meetings.html>

[http://www.cdfa.ca.gov/EnvironmentalStewardship/Meetings\\_Presentations.html](http://www.cdfa.ca.gov/EnvironmentalStewardship/Meetings_Presentations.html)

**CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE (CDFA)  
ENVIRONMENTAL FARMING ACT SCIENCE ADVISORY PANEL  
INCENTIVES WORKING GROUP**

2800 Gateway Oaks Drive, Room 101  
Sacramento, CA 95833

March 1, 2011

**MEETING MINUTES**

**Panel Members**

Jeff Dlott, PhD, Chairman  
Ann Thrupp, PhD, Member  
Mike Tollstrup, Member  
Don Cameron, Member  
Louise Jackson, PhD, Subject Matter Expert  
Luana Kiger, PhD, Subject Matter Expert

**Interested Parties**

Jeanne Merrill, CalCAN  
Steven Shaffer, American Farmland Trust  
John Kadyszewski, American Carbon Registry  
Gabriele Ludwig, Almond Board

**CDFA Staff**

Amrith Gunasekara, PhD  
Casey Walsh Cady

**INTRODUCTIONS**

The meeting was called to order at 1:10 p.m. by Dr. Amrith Gunasekara. -Introductions were made and a quorum was established. This was a public meeting announced 10 days prior to the meeting on the CDFA Environmental Stewardship website.

**INCENTIVES FOR IMPLEMENTING ECOSYSTEM SERVICES**

Mr. John Kadyszewski, a guest speaker, introduced himself and opened the discussion by providing background information on work that American Carbon Registry is involved with in 65 countries.

Ms. Merrill inquired what the expected outcomes are for the Incentives Working Group. Dr. Dlott noted that the Cannella Environmental Farming Act of 1995 is not specific regarding incentives and broad language is used; "The program shall provide incentives to farmers whose practices promote the well-being of ecosystems, air quality, and wildlife and their habitat." Dr. Gunasekara noted that market-based systems can be classified as an incentive under the Cannella Act. Ms Merrill noted that there is interest in market-based incentives such as reducing greenhouse gases (GHG) through ecosystem services and that there are funds available for such work through NRCS conservation programs.

Ms. Kiger from NRCS noted that the incentives groups should be careful about creating disincentives in the process of creating incentives. She used the example of carbon stacking in relation to AB 32 GHG cap and trade programs.

Ms. Ludwig noted that incentives should focus on water and nutrients rather than GHG offsets. She highlighted that one incentive is the sustainability program for almonds, under

development, similar to the winegrowers sustainability program. The incentive in such a program was not monetary but also lead to simplifying compliance and rewarding almond growers for "what they do".

Dr. Jackson suggested that it would be beneficial to take into account the whole farm approach where yields can make a difference rather than focus on market-based systems. The goal of this approach was to keep farms profitable.

Mr. Cameron noted that much of the cost of moving towards implementing a stewardship practice, such as replacing 24 older, polluting tractors, is an investment by growers with about 40% of total funds provided by programs such as NRCS.

Mr. Shaffer noted that best management practices (BMPs) can be adopted as an incentive. He noted that growers need to be comfortable with the practices to be implemented and that technical assistance is important. By providing trust and helping growers through the adoption process, a considerable amount of risk is minimized.

Dr. Dlott noted that a list of guiding principles for ecosystem services will be useful. The principals should first identify what incentives will be appropriate and potentially lead to a list of projects that can be implemented. Next, a scope of universal incentives (e.g., what has been provided) and market place issues, such as providing technical assistance, will be useful. Third, the group should identify some projects and run the project through the guiding principles established. Finally, the science panel should make some policy recommendations to reduce regulatory barriers in implementation and long term establishment. He noted that things like nutrient management can be incentivized and that creating the incentive at the coalition level can be beneficial.

Ms. Kiger referred to the dairy model as an example of how incentives should be set up for the early adopters. Incentives could include training and building a technical partnership to move a specific industry in a step-wise method towards environmental stewardship.

Ms. Merrill noted that the group should examine how market systems have worked in other states.

Mr. Cameron shared with the group that farmers follow other farmer's actions. For example, he has several farmers who have visited him for guidance on particular issues. He noted that crop commodity groups should support farmers and that Certified Crop Advisors has been established to help farmers.

Dr. Jackson suggested that modules on ecology and nitrogen cycle (e.g., soil microbial communities) would be beneficial for training.

Mr. Kadyszewski noted that the group must include some steps to recognizing incentives and market-based systems. These include 1. Have a clear "goal" on how and what must be accomplished, 2. Be clear on how performance will be measured, 3. Have grower participation and "listen" to what the growers want, 4. Planners must know their buyer of trading credits, 5. Recognize ways to reduce any potential negative impacts from implemented stewardship

practices, and 6. Work to incentivize the 10% innovators. All these steps will lead to successful pilot projects.

Ms. Kiger noted that the group should bring together coalitions, commodity groups, conservation district representatives and other stakeholders to understand the best incentives to provide.

**DISCUSSION AND DIRECTION FOR NEXT MEETING**

The group decided to focus on guiding principles, to identify universal incentives and pilot projects, and explore policy recommendations.

**NEXT MEETING DATE AND TIME**

The next meeting will be in approximately two months. Dr. Dlott adjourned the meeting at 4:00 p.m.

Respectfully submitted by:

\_\_\_\_\_  
Amrith Gunasekara, Ph.D.

04/23/2012  
Date

## Amrith Gunasekara

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**From:** Karen Ross  
**Sent:** Friday, March 30, 2012 6:32 PM  
**To:** Jeff Dlott; Don Cameron; Mark Nechodom; Ann Thrupp; Mike Tollstrup (mtollstr@arb.ca.gov); Louise Jackson; Kiger, Luana - NRCS, Davis, CA  
**Cc:** Amrith Gunasekara; Sandra Schubert; Nate Dechoretz; Rick Jensen; Asif Maan; Jim Houston  
**Subject:** Request to Prioritize Work of the Environmental Farming Science Advisory Panel

Dear Science Panel Members and Subject Experts,

Thank you for your time and effort serving on the science panel and welcome to the newest member from Resources Agency, Dr. Mark Nechodom, Director, Department of Conservation. Mark and I have known each other for several years and I had the distinct honor of working with him during my short tenure at USDA where he was the senior advisor to Undersecretary Sherman on environmental markets, among other topics. The contributions of the panel are already being used by the Department. **The ecosystem services definition is now posted on the CDFA website** and I look forward to completion of the evaluation framework which is another tool we will use in the department.

The recent UC Davis report for the SWRCB SB X21 report to the legislature on nitrate contaminated groundwater (<http://groundwaternitrate.ucdavis.edu/>) has raised an issue of great importance. The report points out that greater than 90% of the nitrate in groundwater is from agriculture use of nitrogen fertilizers. The report has already generated legislative discussions on addressing the nitrate problem from the perspective of providing clean drinking water for the many people who live in the two most impacted regions, the Salinas Valley and the Tulare Lake Basin. If we are to fix this problem on a long term basis, we have to address it from an agricultural perspective. We need to deploy all the tools available to us and find new ways to incentivize use of only the required nitrogen fertilizer required by the crops.

Herein lies a very timely and unique opportunity for the panel to make a substantive contribution to the creation of real and practical ecosystem services markets in California that address compelling water quality needs. I fully understand that ecosystem services are broader than water quality and markets are one of several types of incentives. **However, for the panel's work to be relevant it will require focus.** I can think of no greater nor timely initial focus than on nitrogen trading markets and working to establish pilot projects designed to reduce nitrates in surface and groundwater by incentivizing growers to optimize nitrogen use. Given the priority for state and regional water boards, I am sure many will be thrilled to know that this panel is working to find solutions that will maintain food production while enhancing environmental stewardship.

The work undertaken on this specific issue could model an approach to successfully solve other priority California environmental issues facing the agricultural community. This focused work can form the foundation to address multiple ecosystem services, multiple benefits, and multiple types of incentives in the near future. I'm concerned that trying to tackle all of these issues at once will dilute the potential of the panel to directly contribute to developing ecosystem services solutions that are urgently needed.

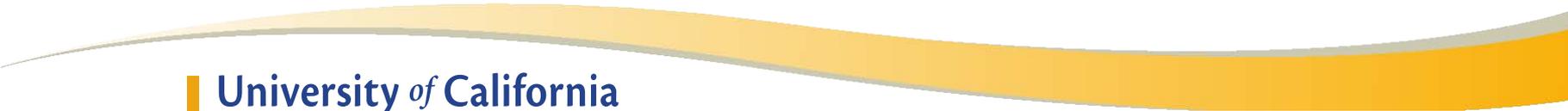
Ami and I have discussed this matter and I have asked him to invite to your next meeting potential "buyers" of such water quality services, as well as experts who have worked with the grower community on environmental markets in other states. If you have concerns about my request to prioritize water quality as the subject of your focused attention in the panel, please do not hesitate to contact me. Again, thanks very much for your time, your expertise and your dedication to serve as a member of the inaugural Environmental Farming Science Advisory Panel.

*Karen*

Secretary Karen Ross  
California Department of Food and Agriculture

# Ecosystem Service Markets in the Mid-Atlantic Region

Doug Parker  
California Institute for Water Resources  
University of California

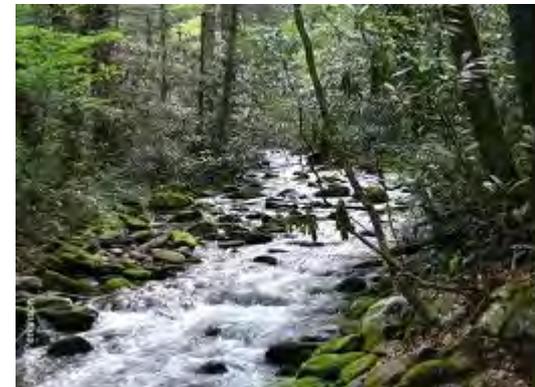
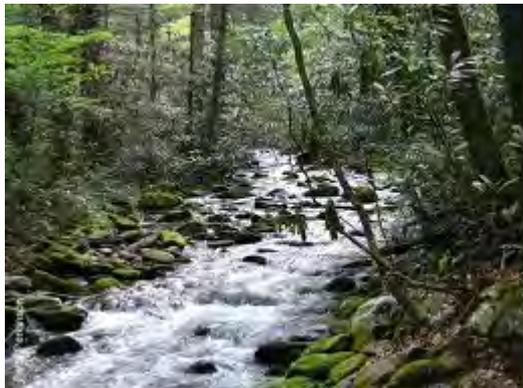
A decorative wavy line in shades of yellow and orange spans the width of the slide, positioned above the footer text.

**University of California**

Agriculture and Natural Resources ■ California Institute for Water Resources

# What Are Ecosystem Services Markets?

- Markets can be a Mechanism to Meet Environmental Objectives
- Markets can be Cost Effective
- Markets Require Institutional Support
  - Rules of the Game



# What can be Traded in an Ecosystem Services Market

- Water Quality
- Water Quantity
- Water Temperature
- Carbon
- Wetlands
- Wildlife Habitat
- Biodiversity
- ...



# Assess Potential for Markets

- Share of Load from Buyers and Sellers
  - Need Some Balance to Create a Market
    - Supply AND Demand
  - Potential to Reduce Load for Buyers and Sellers



# How Do Markets Work?

- Define the “Good” in Question
- Select the “Players”
- Create Demand
- Allow Market to Create Supply



# What is “water quality credit trading”?

- **Water quality credit trading** is one tool
  - To reduce the cost of meeting environmental goals by reducing pollutants that degrade lakes, streams, rivers, and estuaries. Pollutants like:
    - Nutrients (nitrogen and phosphorous): Cause algal blooms and oxygen depletion in water
    - Sediments: Diminishes water quality and reduces available habitat for aquatic life

# Challenges in water quality credit trading

- Most challenges relate to PS/NPS trades – where the regulated meets the unregulated
- Challenges include:
  - Setting pollution caps (Sometimes done outside the trading program) - TMDL
  - Establishing baseline pollution loads (TMDL?)
  - Complexities in establishing credits
  - Cost-Shared BMPs?
  - Transaction costs
  - Enforcing contracts and liability issues

# Complexities in establishing credits

- Accurately measuring pollution reduction
  - BMP efficiency depends on site specific conditions – e.g. age, how BMP is maintained
- Scientific models estimate load reductions from BMPs
  - Chesapeake Bay Model
    - Coefficients for BMPs
  - Watershed models are imperfect



# Water Quality Credit Trading Mid-Atlantic Region

- Individual States Responsible for Creating Programs
  - States with Existing Trading Programs
    - Maryland (Market, Calculated Loads)
    - Pennsylvania (Market, Fixed BMPs)
    - Virginia (Exchange, Fixed BMPs)
    - West Virginia (Market, Calculated Loads)
  - States Creating Trading Programs
    - Delaware

# Maryland's Water Quality Credit Trading Program

- Rationale
  - Point Source Upgrades
  - Point Source Caps
    - Accommodate Growth
- Point Source Program (2008)
  - MDE
- Non Point Source Program (2009)
  - MDA (with MDE oversight)

# Maryland's Water Quality Credit Trading Program: Process

## Workgroup Membership

- MDA
- DNR
- MD/DE Agro
- MASCD
- MDP
- CBP
- SSCC
- CBF
- FB
- NRCS
- USDA
- U of MD
- MDE
- Enviro Banc
- WRI

# Maryland's Proposed Water Quality Credit Trading Program: Topics Reviewed

- Maryland Fundamental Trading Principles
- Determining Trade Eligibility
- Setting Baselines
- Performing Trade Administration
- Ensuring Accountability
- Measuring Progress



# Maryland's Water Quality Credit Trading Program

- Credits
  - Nitrogen, Phosphorus
- Players
  - Point Sources, Nonpoint Sources, Aggregators or Brokers, 3<sup>rd</sup> Parties
- PS Baseline
  - ENR Required
  - Cap (TMDL) and Trade (Trade to Maintain the Cap)
- NPS Baseline
  - TMDL targets

# Calculating Baseline for Maryland Agriculture

## Example: Upper Choptank

1985 model residual load for Agriculture

22 lbs./ac.

64% reduction = 8.9 lbs/ac. to meet TMDL

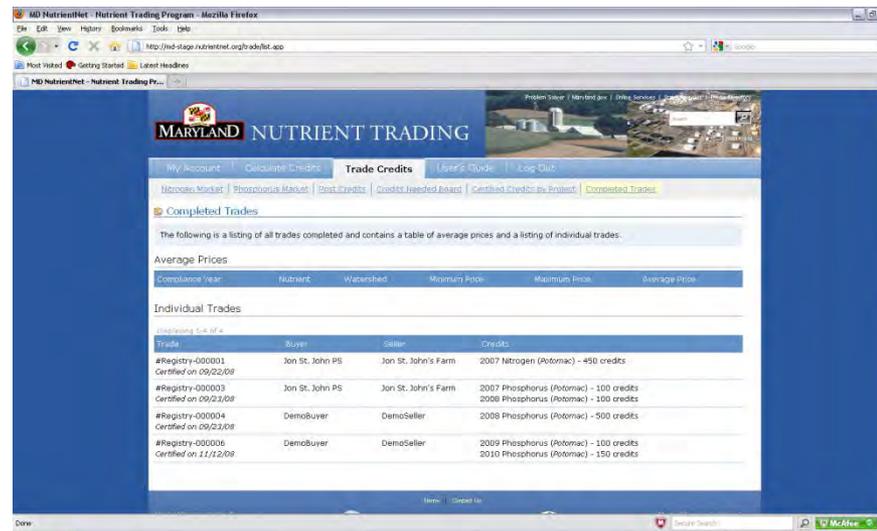


## Example: Current on farm loadings

Residuals in soil	5 lbs./ac.
Total Application	<u>133 lbs./ac.</u>
Total available	138 lbs./ac.
Crop up take (from yield)	<u>114 lbs./ac.</u>
New Residual	24 lbs./ac.
<u>Current BMP's</u>	
Grass Buffers	– 11.5 lbs./ac.
Conservation Tillage	– <u>4 lbs./ac.</u>
Current Reductions	– 15.5 lbs./ac.
Net Loading	8.5 lbs/ac. *Eligible to Trade
Options:	
Cover Crops	– 6 lbs. ac. (credits)
Commodity Cover Crops	– 2 lbs. ac. (credits)

# Maryland's Water Quality Credit Trading Program: Process

- Web based mapping tool to calculate credits
  - Can optimize for market
- Web based market place to facilitate trading
- Tracking and Registry



The screenshot displays the Maryland Nutrient Trading Program web application. The page title is 'Completed Trades'. Below the title, there is a text block stating: 'The following is a listing of all trades completed and contains a table of average prices and a listing of individual trades.' This is followed by a section for 'Average Prices' with a table that has columns for 'Compliance Year', 'Nutrient', 'Watershed', 'Minimum Price', 'Maximum Price', and 'Average Price'. Below this is a section for 'Individual Trades' with a table listing specific trade transactions.

Trade	Buyer	Seller	Credits
#Registry-000001 Certified on 09/22/09	Jon St. John PS	Jon St. John's Farm	2007 Nitrogen (Potomac) - 450 credits
#Registry-000003 Certified on 09/23/09	Jon St. John PS	Jon St. John's Farm	2007 Phosphorus (Potomac) - 100 credits 2008 Phosphorus (Potomac) - 100 credits
#Registry-000004 Certified on 09/23/09	DemoBuyer	DemoSeller	2008 Phosphorus (Potomac) - 500 credits
#Registry-000006 Certified on 11/12/09	DemoBuyer	DemoSeller	2009 Phosphorus (Potomac) - 100 credits 2010 Phosphorus (Potomac) - 150 credits

# Mid-Atlantic Market Activity (As of 2011)

- Very Little Demand
  - Over Supplied
- Pennsylvania: 1 trade in works
- Virginia: Nothing yet
- Maryland: Designed for future trades

# Extensions for Maryland's Water Quality Trading Program

MDA Exploring Incorporation of Carbon with Nutrient Trading Market

- Carbon Sequestration/Trading Advisory Committee

The Chesapeake Fund

- Voluntary Water Quality Market



# Carbon Markets

## Maryland Greenhouse Gas Reduction Act of 2009

- Reduce Emissions 25% by 2020
- MDE to Draft Plan by Dec. 31 2011
- Begin Implementation in 2012
- MDE to work with MDA and Agricultural Interests
- Sequestration possible



# Carbon Markets

## Regional Greenhouse Gas Initiative (RGGI)

- 9 Northeastern States
- Reduce Emissions 10% by 2018
- Very Limited Allowance of Offsets
  - Afforestation
  - Avoided Methane Emissions



# Ecosystem Service Markets

## The Bay Bank

- Clearinghouse for multiple programs
- Marketplace for:
  - Carbon Sequestration
  - Water Quality Protection
  - Habitat Conservation
  - Conservation Programs and Forest Conservation
- Land Server to educate and direct farmers to various programs

# Concerns About Ecosystem Service Markets?

- Separate Markets for Separate Services
  - Air (Sox, Nox, Carbon,...)
  - Water (Nitrogen, Phosphorus, Sediment,...)
  - Biota (Wetlands, Forest Buffers,...)
- Overlapping Services
  - Ammonia reductions (air) benefit water quality
  - Wetlands restoration (wildlife) benefits water quality
- Stacking
  - Conservation tillage benefits water quality and provides carbon sequestration

# Stacking vs. Double Counting

One Practice (Cons. Tillage)

Benefit A (WQ)

Benefit B (Carbon)

Payment for

Benefit A (WQ Market)

Benefit B (Carbon Market)

One Practice (Cover Crop)

Benefit A (WQ)

Payment for

Benefit A (Cost Share Program)

Benefit A (WQ Market)

# Lessons for Ecosystem Service Markets

- Heterogeneity Across Ecosystems Implies Heterogeneity of Market Design
- Assess Situation to See if Markets are Right Tool
- All Trading Programs Require Institutional Involvement
- Regulation Necessary to Set Baseline: Create Demand
- Unregulated Players Need Baseline to Ensure Real Environmental Change

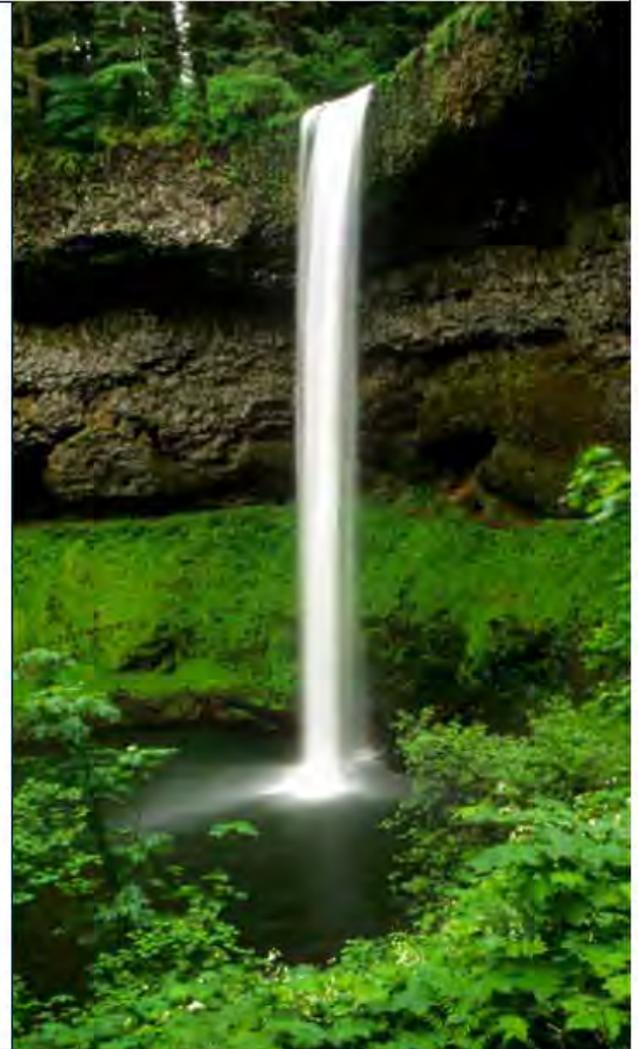
# Counting on the Environment



# Three Keys for Moving \$ to Green

For restoration to be a viable compliance alternative...

- **CLEAR AUTHORITY:** Regulators must adopt and promote required rules
- **CLEAR PATH:** Approved standards and protocols for measuring ecosystem services and implementing credit-generating projects
- **CLEAR RISK:** Third parties (such as TFT) willing to assure delivery of compliance-grade credits







## Counting on the Environment Metrics

**Upland Habitat:** Upland Prairie; Oak; Sagebrush; Floodplain

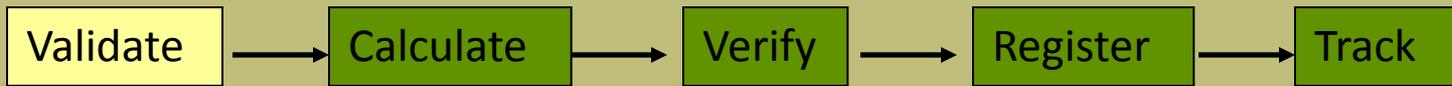
**Aquatic Habitat:** Floodplain; Wetlands; Salmon Streams

**Water Quality:** Temperature; Nutrients

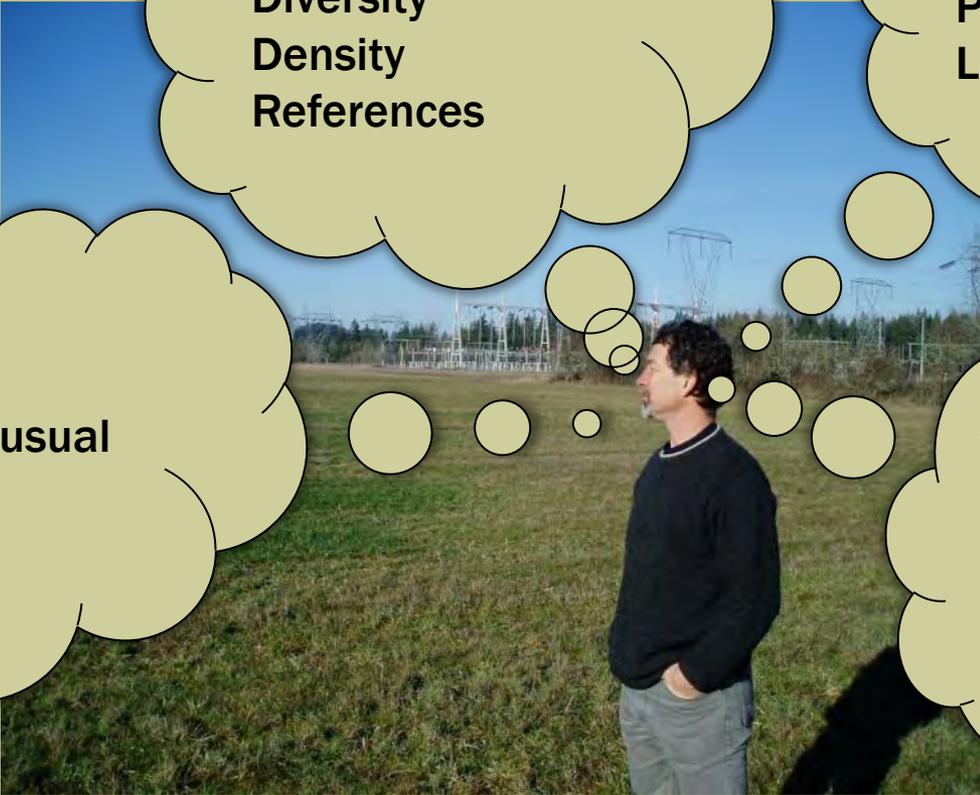
**Coming Soon:** Stream Functional Assessment



# VALIDATION & ELIGIBILITY



# VALIDATION & ELIGIBILITY



## Suitable

Local natives  
Diversity  
Density  
References

## Sustainable

Steward  
Costs  
Plans  
Legal protection

## Additional

Required  
Business as usual  
No flipping

## Avoid

Minimize  
Permitted

Validate

Calculate

Verify

Register

Track



# Calculate Baseline

Kral Property – Baseline Map Units



Validate

**Calculate**

Verify

Register

Track



# Kral Property - Design Alternative Map Units

Project Change



Validate

Calculate

Verify

Register

Track



# Calculating Credits

Credit Type		Baseline	Post-Restoration	Functional Gain
Wetlands ( <i>Functional acres</i> )		1.07	11.12	10.05
Salmonid Habitat ( <i>Functional in feet</i> )		723	1,429	707
Upland Prairie ( <i>Functional acres</i> )		0.5	3.75	3.25
Temperature ( <i>kcal/day</i> )		8,015,377	10,968,404	2,953,027



# Traditional Restoration vs. Compliance Grade Credits

Traditional Restoration Steps	Compliance-Grade Credit Generation Steps
Identify project site	Identify project site
Fundraising	Financing
	Negotiate 20+ year contract with landowner
	Collect baseline data
Project design	Project design
	Estimated credit values
Implement	Implement
	Verification that implementation meets standards
	Certification that credits meet accounting protocols
	Credit registration
Monitoring and maintenance (Years 1 – 3)	Monitoring and maintenance (Years 1 – 3)
	Monitoring and maintenance (Years 4 – 20)
	Annual payments to landowners (20+ years)

 = Local Project Managers

 = The Freshwater Trust



The  
Freshwater Trust® [www.thefreshwatertrust.org](http://www.thefreshwatertrust.org)



# Case Study: City of Medford

## FACTS

**Population:** 90,000

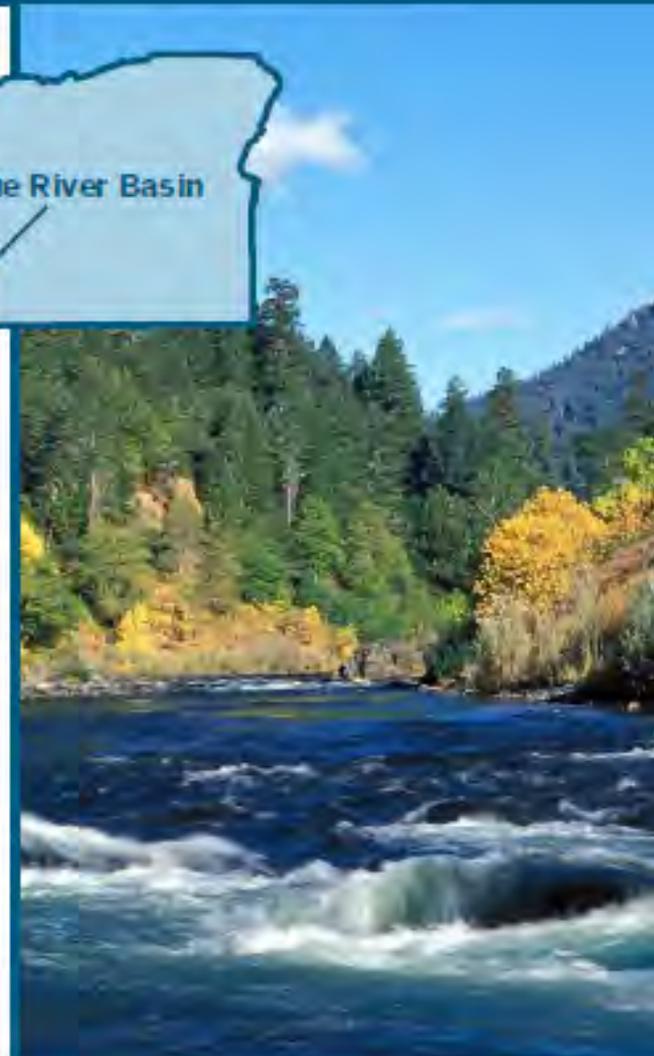
**Projected Excess Heat under TMDL limits:**  
44 million kcals/day

### Options:

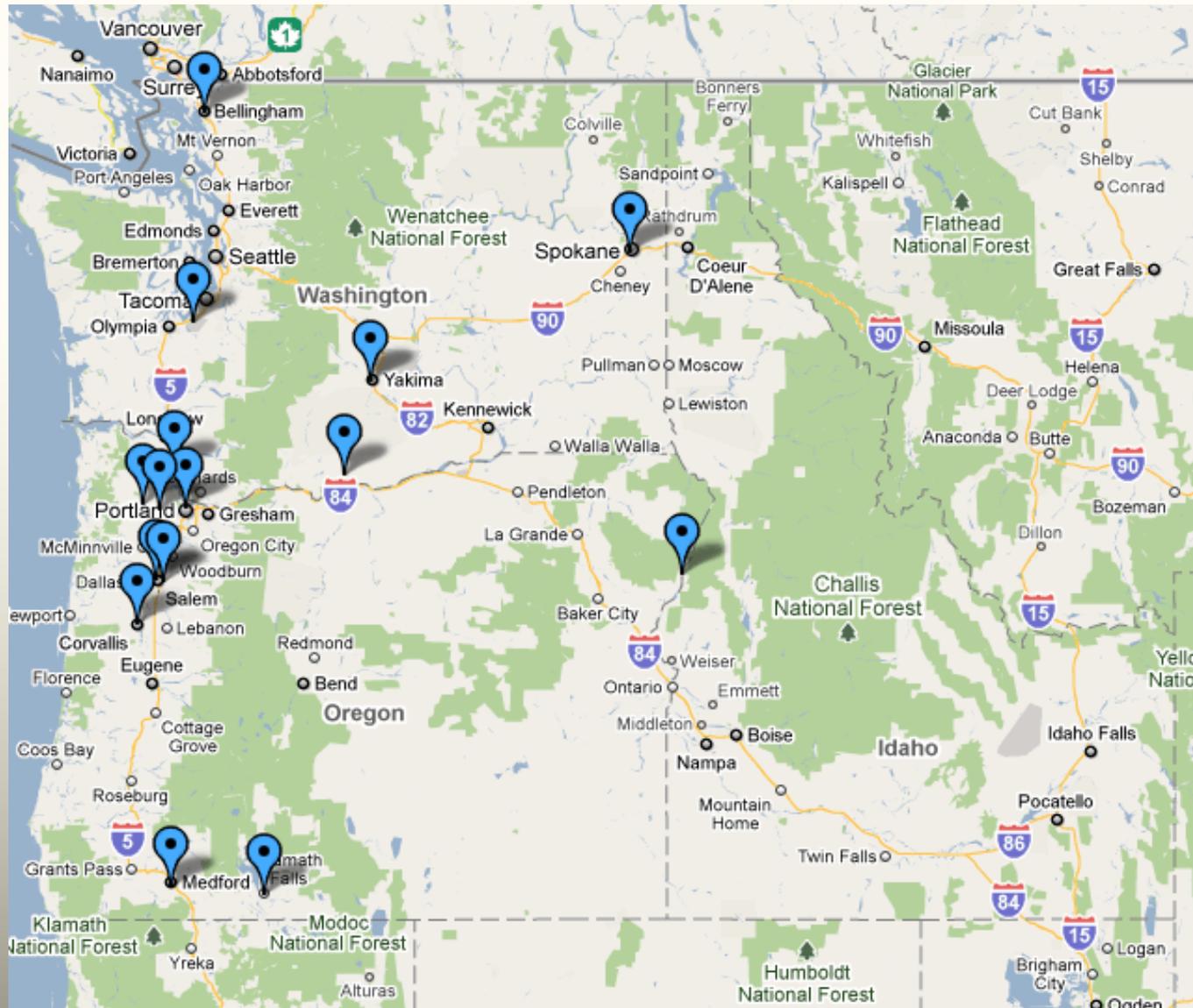
- *Giant holding pond to store water for 1 month of each year: **\$16 Million***
- *30 miles of native riparian vegetation restored and maintained for 20 years: **\$8 Million***

### Money stays in local economy

- Money pays local restoration contractors;
- Farmers get annual lease payments
- Restoration = **20 jobs per \$1 Million spent**



# Existing/Emerging Markets in the Northwest





## Projects in the Works

**Hydropower relicensing**: Klamath and Snake Rivers

**Energy facility mitigation**: Sagebrush country

**Linking incentives delivery (certification, regulatory assurances and markets)**: Willamette Valley vineyards and prairie

**Precompliance habitat mitigation**: Multiple areas

**Quantifying ecosystem services**: Klamath, Yakima



# QUESTIONS



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**[WWW. WILLAMETTEPARTNERSHIP.ORG](http://WWW.WILLAMETTEPARTNERSHIP.ORG)**

# Santa Rosa Nutrient Offset Program

April 23, 2012

California Department of Food and Agriculture  
ENVIRONMENTAL FARMING ACT SCIENCE ADVISORY PANEL  
INCENTIVES WORKING GROUP

Mark S. Kieser  
Senior Scientist  
Kieser & Associates, LLC

Valerie Minton  
Program Director  
Sotoyome Resource Conservation District



Sotoyome Resource  
Conservation District



# Topics for Meeting

- Resolution offset program considerations
- Laguna de Santa Rosa setting
- Crediting considerations/challenges
- Crediting project opportunities
- Future program options
- Take home message

# City of Santa Rosa Offset Need

- City's Subregional Treatment Plant NPDES permit requires zero net discharge for TP and TN (pre/post-TMDL)
- NCRWQCB resolution allows the City to:
  1. Implement further wastewater treatment
  2. Increase water reclamation (steam power generation/irrigation)
  3. Use nutrient credits to offset any nutrient discharge
- City expects wet year discharges beyond reclamation
- Costs to upgrade existing wastewater facility >\$40M
- Crediting alternatives with Ag are cheaper
- First application of offsets for CA treatment plant
- Substantial void exists for efficient offset program options

# City's Crediting Objectives

- 50,000 credits/year offset goal
  - N/P ratio 4:1
- Diversified credit portfolio
- Long credit life
- Minimized credit discounts

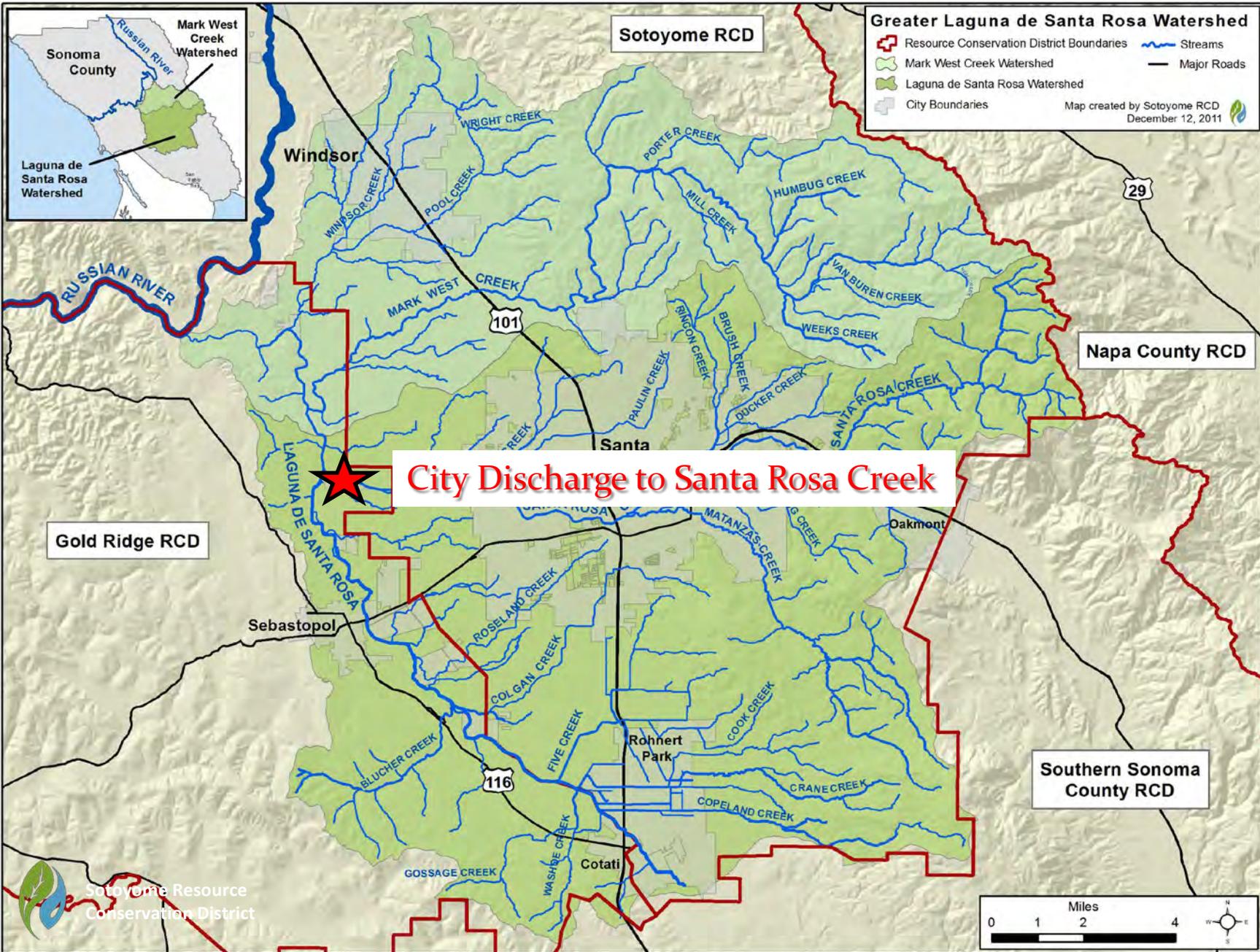
# Laguna de Santa Rosa Setting



# It's a Big Deal

- Ecologically and economically important
- Largest freshwater wetlands complex on northern CA coast
- “Wetland of International Importance”
- Largest trib. of Russian River
- Drains approximately 254 mi<sup>2</sup>
- City of Santa Rosa largest in CA North Coast Region; 12th largest metro area in CA
- 70 mi<sup>2</sup> of “important farmland” (per CADC)











# Current Focus – Dairies

- Long-term relationships with City
- New water quality regulations
- Outreach
- Project Identification & Development
- Project Implementation

# Dairy Operations in the Laguna



## FACTORS:

- Manure “potent” credit option
- Dairy WDR/Waiver baselines
- Timeframe with order issuance
- Site-specific data
- Solid project cost estimates
- Credit calculation method
- Discount factor application
- Credit life
- Transition between Resolution & TMDL
- “Ag conversion” sensitivity

# RCD Trajectory

- Expansion to other Ag land uses
  - Irrigated lands water quality regulations on the horizon



# Crediting Considerations

- Margin of safety
- Bioavailability factor
  - *Nitrogen (N) and Phosphorus (P) from offset project vs. Delta Pond discharge*
- Laguna de Santa Rosa location factor
  - *Instream tributary losses to Laguna*
- Delivery ratio
  - *Overland runoff between project and stream*
  - *100% if adjacent to stream*

# 30-year Compliance Costs

Assumes 50,000 credits needed per year

Credit Life	Credit Cost (\$/credit)				
	\$1	\$5	\$10	\$15	\$20
1	\$1,500,000	\$7,500,000	\$15,000,000	\$22,500,000	\$30,000,000
4	\$375,000	\$1,875,000	\$3,750,000	\$5,625,000	\$7,500,000
10	\$150,000	\$750,000	\$1,500,000	\$2,250,000	\$3,000,000
15	\$100,000	\$500,000	\$1,000,000	\$1,500,000	\$2,000,000
30	\$50,000	\$250,000	\$500,000	\$750,000	\$1,000,000

# Offset Credit Project Approval Process

Step 1

- Initial contacts with landowners

Step 2

- Site visits with RWQCB staff to identify opportunities

Step 3

- Outline credit generating practices for operator feedback and concurrence

Step 4

- Preliminary cost-effectiveness review

Step 5

- Detailed discussions with RWQCB

Step 6

- Preliminary design through RCD, and contract negotiation for years of practice operation

Step 7

- Formal credit proposal for RWQCB EO approval

Step 8

- Design, construction and verification of practices by RCD

# The Crediting Challenge...

No standardized set of quantification  
tools or calculations in California  
for Ag BMPs

# Liquid Manure Pit Stacking Pad





## Credit Generation Estimate Options:

1. Direct runoff (during stacking and storm events)
2. Equivalent manure application rate

# Stacking pad credit estimate: Option 1 (Direct Runoff)

## Assumptions:

- Watershed location factor: 100%
- Manure pile leachate runoff
- Delivery ratio based on 65 feet: 42% runs off
- Bioavailability factor of TN and TP: 85%
- Loading per acre:
  - TN = 590 lbs annually
  - TP = 175 lbs annually
- *Generous crediting approach, but baseline question of manure runoff*

# Stacking pad credit estimate: Option 2 (Application Rate)

## Assumptions:

- Watershed location factor: 100%
- Delivery ratio: N/A
- EoF nutrient-enriched soil runoff
- Bioavailability factor of TN and TP: 85%
- Loading per acre:
  - TN = equivalent to 45 tons of manure applied/yr
  - TP = equivalent to 59 tons of manure applied/yr
- *Conservative crediting approach, but realistic?*

# Stacking Pad Crediting Comparison

Life of Eligible Credit Generation	Option 1 TN Credits	Option 2 TN Credits	Option 1 TP Credits	Option 2 TP Credits	Option 1 Combined Credits	Combined Credits Option 2
1 year	211	64	63	3	274	67
4 years	846	256	251	12	1,096	268
10 years	2,114	640	627	30	2,741	670

Option 1: Direct runoff of leachate from stacking pile

Option 2: Area runoff assuming manure applied at agronomic rates

# Stacking Pad Estimated Costs

- Stacking pad: \$7,500
- Design: \$1,125
- Inspection and reporting: 2% annually

Life of Eligible Credit Generation	Option 1 Combined Credit Cost	Option 2 Combined Credit Cost
1 year	\$31	\$130
4 years	\$8	\$34
10 years	\$4	\$14

# Santa Rosa Current Crediting Options

Project	Annual Credits		<i>Est. Project Costs</i>	# of credits with 4-yr life	<i>Credit Cost (4-yr life)</i>	# of credits with 30-yr life	<i>Credit Cost (30-yr life)</i>	Project Uncertainty
	Credits	% of Need						
Dairy #1	1,987	4	<i>\$59K</i>	7,974	<i>\$7.40</i>	59,863	<i>\$0.98</i>	M
Dairy #2	588	1	<i>\$100K</i>	2,351	<i>\$42.53</i>	17,635	<i>\$5.67</i>	H
Dairy #3	32,751	66	<i>\$5.22M</i>	131,004	<i>\$40.32</i>	982,530	<i>\$7.11</i>	H
P-wood <sup>a</sup>	23,965 <sup>b</sup>	19-48	<i>\$279K</i>	23,965 <sup>b</sup>	<i>\$27.00<sup>b</sup></i>	9,586 <sup>c</sup>	<i>\$28.00<sup>c</sup></i>	H
<b>TOTAL</b>	<b>59,291<sup>b</sup></b>	<b>90-119</b>	<b><i>\$7.158M</i></b>	<b>165,294</b>	<b><i>\$36.83<sup>d</sup></i></b>	<b>1,069,614</b>	<b><i>\$6.93<sup>d</sup></i></b>	--

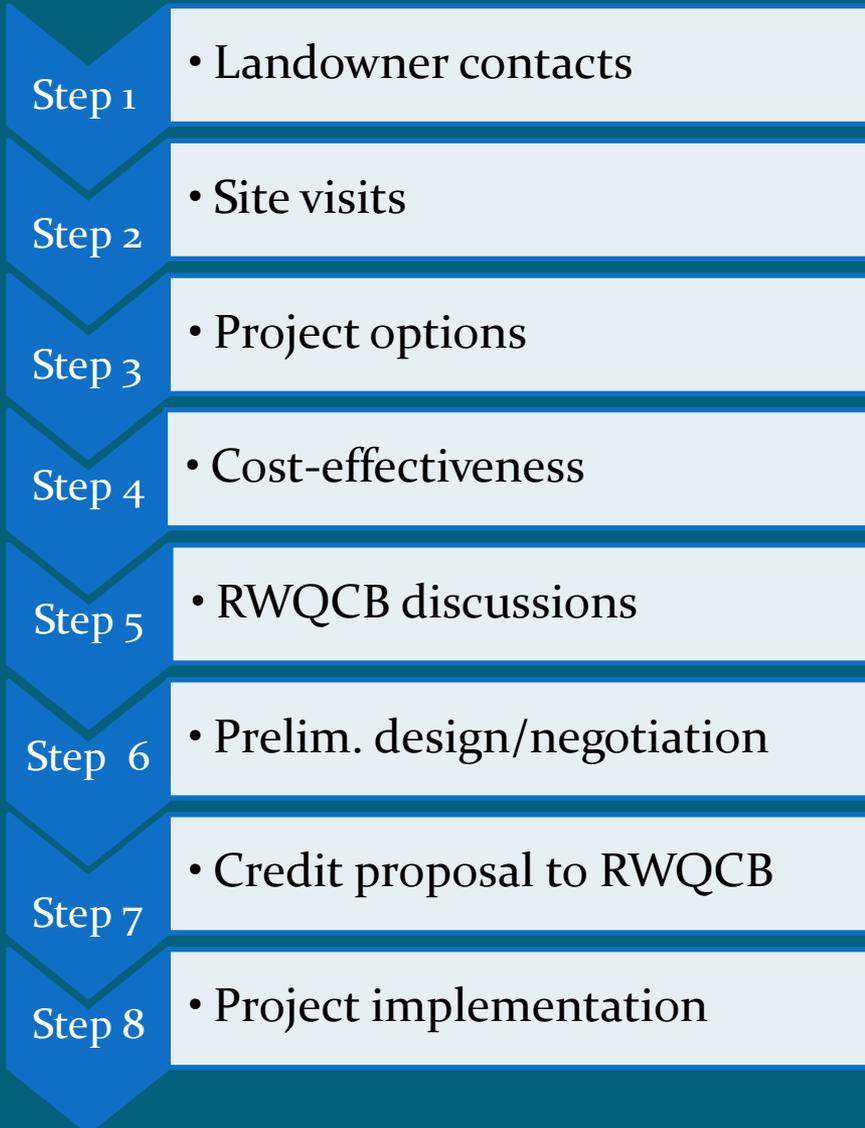
<sup>a</sup> Assumes all non-renewable, 1-time credits

<sup>b</sup> Credit life distribution over 4 years

<sup>c</sup> Credit life distribution over 10 years vs. 30 years for dairies

<sup>d</sup> Weighted average credit price

# Offset Program Structure



Responsible Parties	
<i>Current</i>	<i>Future</i>
K&A, MS, RCD, WUD, RWQCB	RCD
K&A, MS, RCD, Tt, WUD, RWQCB	RCD+technicians
K&A, RCD+, WUD, Tt	
K&A, MS, Staff	RCD, Staff
K&A, MS, Staff	RCD, Staff
K&A, MS, RCD+, WUD, Staff	RCD+, Staff
K&A, MS, RCD+, WUD, Staff	RCD, Staff
RCD+, WUD, K&A, Staff	RCD+

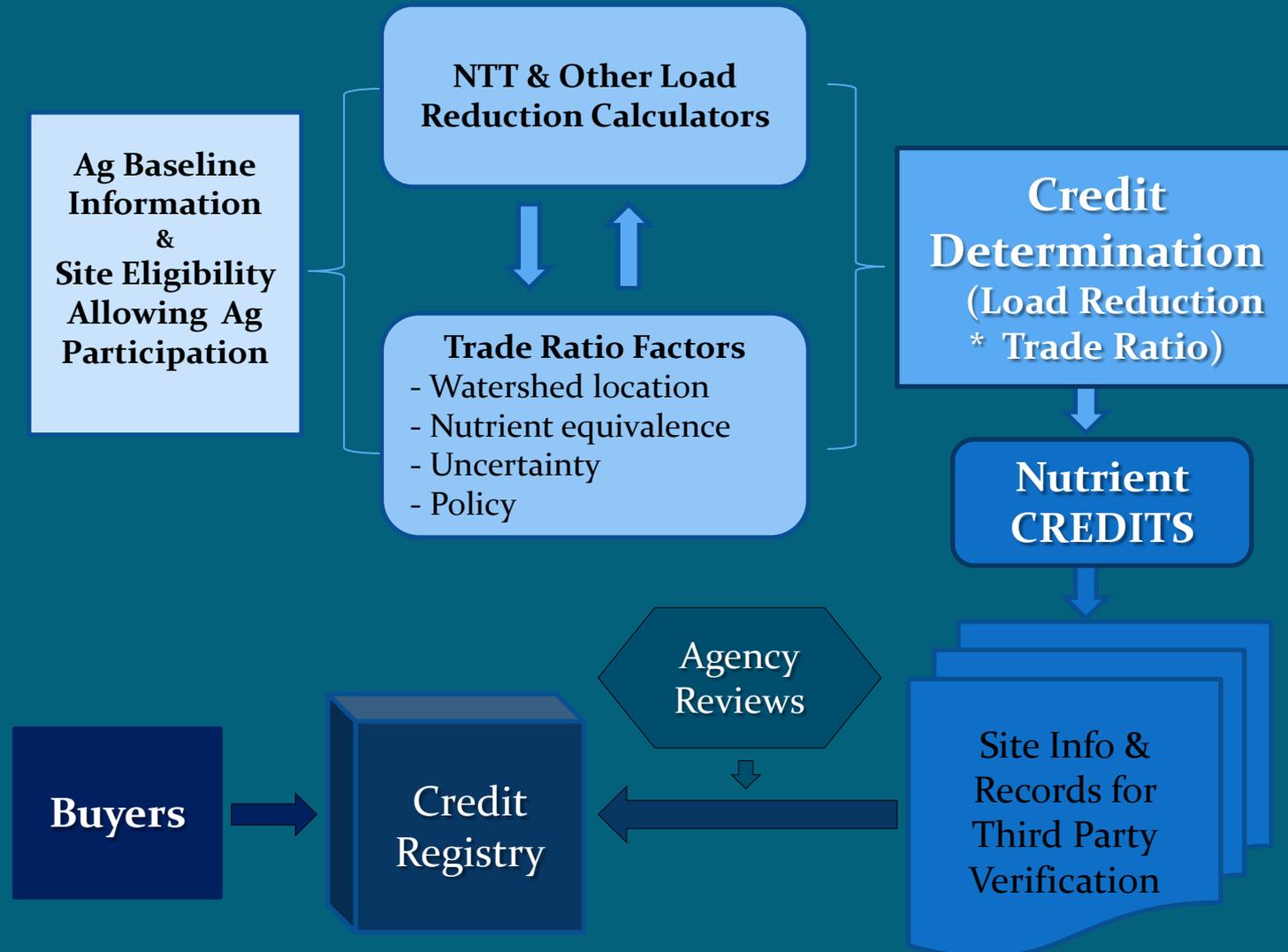
# Future Offset Program Development

USDA Conservation Innovation Grant Opportunity:

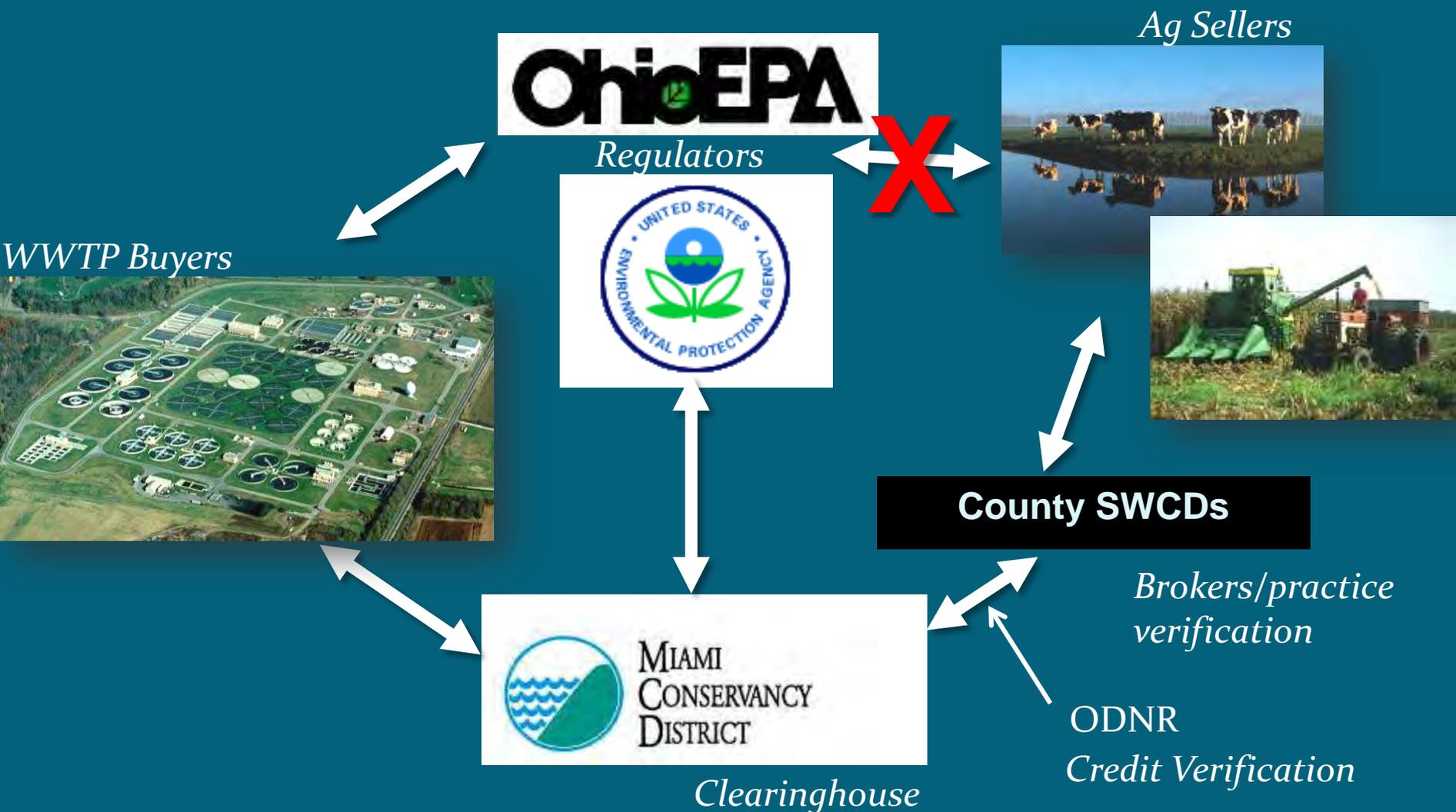


- Program Set-up (grant-funded):
  - WQT Program Development under a TMDL
  - Agricultural Liaison and Technician Training
- On-going Program Actions
  - Offset/BMP Verification (Third Party)
  - Site-specific Proposal Preparation & Review
  - Monitoring (if required/desired)
  - Program Administration/Reporting

# Potential WQT Framework



# Great Miami River Trading Program Example



# Agricultural Perspectives

American Farmland Trust Listening Sessions: 2009-2010

- Simple, flexible contracts, differing lengths
- WQT \$s to keep practices in-place/raise to higher standard
- Trust for farm/commodity groups (SWCDs, TSPs, CCAs) though technical assistance funding needed
- Like local programs; mainly need to know rules
- Address non-performance by appeals process or insurance pool
- One-stop shopping
- Web-based crediting tools
- Reward/recognition for good actors

# Take Home Message

- Real need exists for Ag credits
- Millions to be spent by City
- Credit calculation/baseline clarity needed
- Currently very expensive process
- Future program should be...
  - More efficient
  - Locally applicable
  - RCD-led
  - Broadly applicable for other CA settings

# Contact Information

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Santa Rosa, CA 95406  
(707) 569-1448  
[VMinton@sotoyomerccd.org](mailto:VMinton@sotoyomerccd.org)

Mark S. Kieser  
Kieser & Associates, LLC  
536 E. Michigan Ave., Suite 300  
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(269) 344-7117  
[mkieser@kieser-associates.com](mailto:mkieser@kieser-associates.com)



Sotoyome Resource  
Conservation District



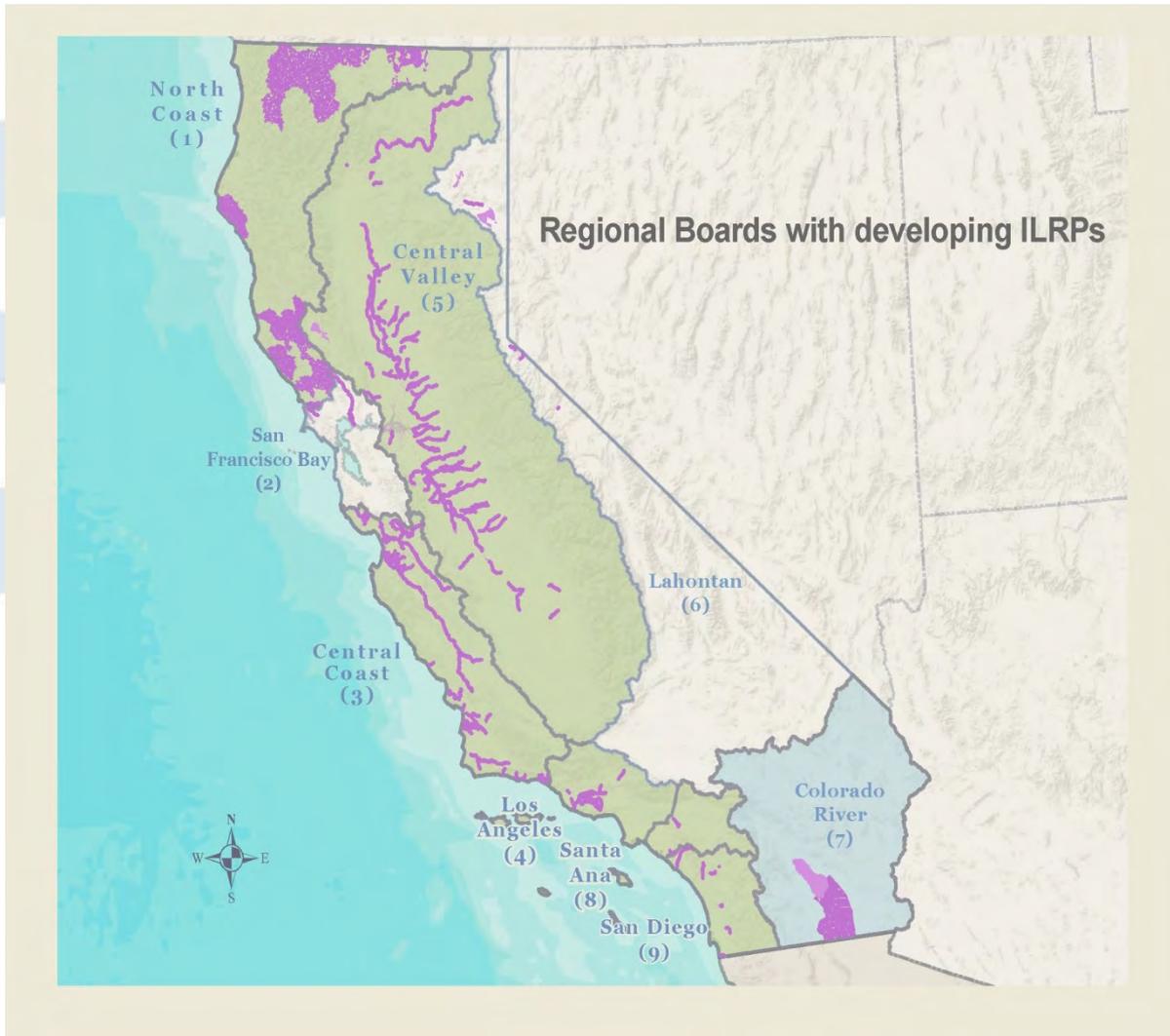
# **AGRICULTURAL REGULATORY PROGRAMS**

**SWRCB Presentation for the CDFA  
Science Panel  
April 23, 2012**

# WASTE DISCHARGE REQUIREMENTS:

- California Water Code authorizes State and Regional Water Boards to issue Waste Discharge Requirements or conditional waivers of waste discharge requirements.
- One of the drivers for developing the ILRP is the fact that on-going monitoring has identified many surface water bodies and groundwater aquifers in California as being impaired by pollutants that are commonly used by agricultural operations, including pesticides nutrients, sediment and bacteria.

# AGRICULTURAL RELATED WATER QUALITY IMPAIRMENT



# PRESSING CONCERNS

- Nitrate/nutrient impairment in both surface water and groundwater
- Sediment impairment in many waters of the state
- Chlorpyrifos, diazinon, malathion, simazine, diuron, and pyrethroids are among the pesticides found in many surface waters of the state.
- Farming operations near these impacted surface waters are required to develop water quality management plans and implement management practices to mitigate the water quality impairments.
  - How to assist growers to comply
- Enrollment

# MULTI-AGENCY PARTNERSHIPS

- Multi-agency partnerships are being developed
  - Butte and Glenn County MOU and pilot project that has proven successful.
  - Management level SWRCB and DPR discussion group
  - ILRP/DPR Focus Group
  - CDFA FREP coordinator participates in the ILRP RT
  - CDFA and SWRCB MOU development
  - RCD and CAC collaboration
  - SWRCB-USEPA-NRCS Water Quality Initiative
  - ILRP Team Concept

# HOW CAN YOU HELP

- Continue collaborative effort in participating in the SWRCB ILRP Team Concept
- Develop a fertilizer use and application tracking system
  - Database managed by CDFA
  - Compatible with SWRCB systems (i.e. GeoTracker)
- Develop a funding mechanism to increase FREP development of fertilizer use management practices with a water quality protection element
- Work with Certified Crop Advisor's (CCAs) to include water quality protection elements to certification criteria

# HOW CAN YOU HELP

- Assist CCAs on how to develop and implement NMPs and fertilizer management and application methods.
- Assist CCAs to understand the water quality regulatory requirements and fertilizer related nitrate/nutrient - related water quality impairments in the areas where they are applying fertilizers, CCAs can consult with Regional Water Board staff.
- CCAs can assist growers to find management practices that protect water quality
  - Consult with RCDs, NRCS, and UCCE Farm Advisor's.

# Central Valley Regional Water Quality Control Board



## Irrigated Lands Regulatory Program

Joe Karkoski, Central Valley RWQCB

## Nine Regional Water Boards

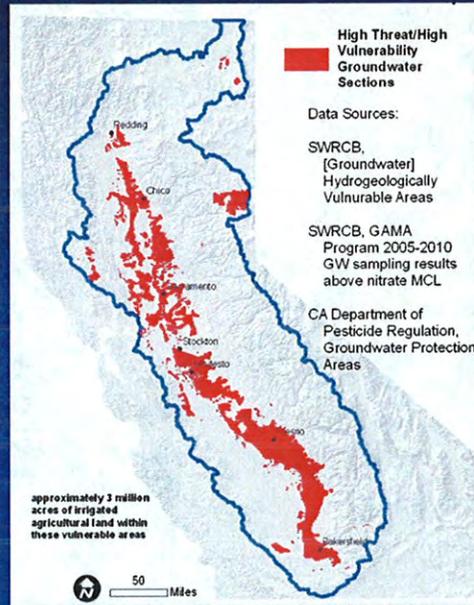


- Implement State and federal water quality laws based on region specific conditions
- Regulate discharges of waste

by RWQCB

2

## Preliminary Assessment

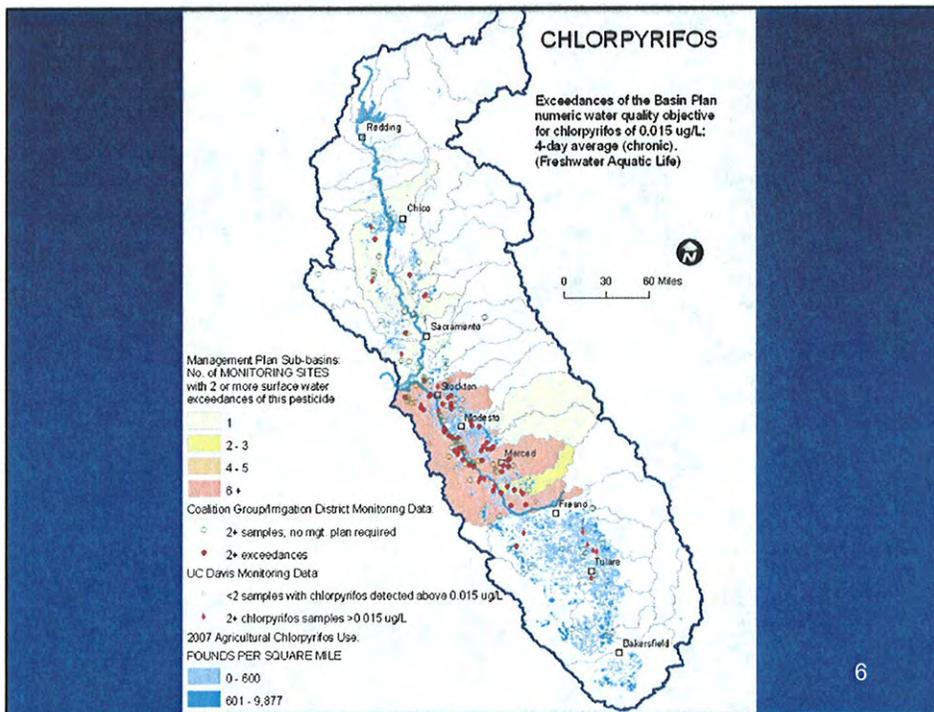
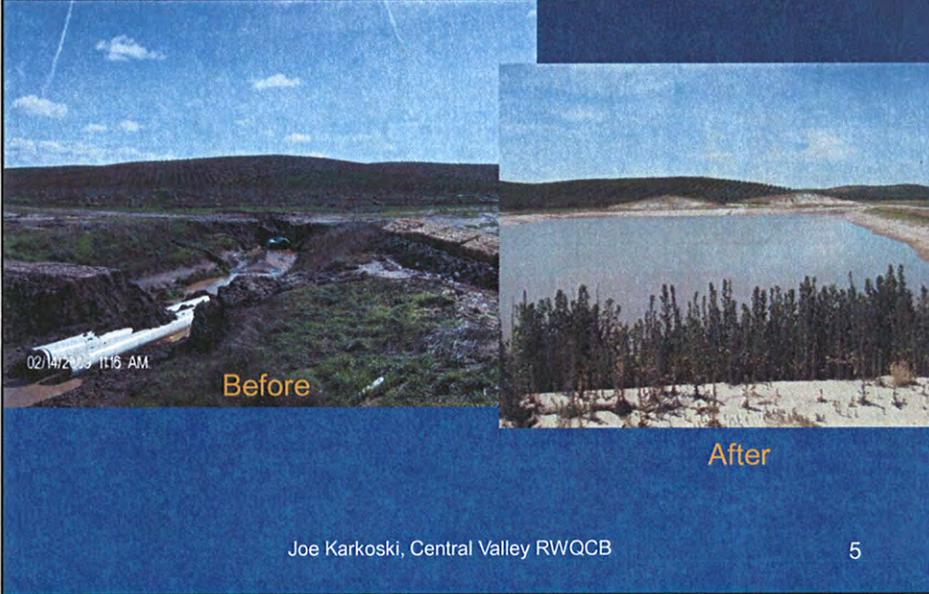


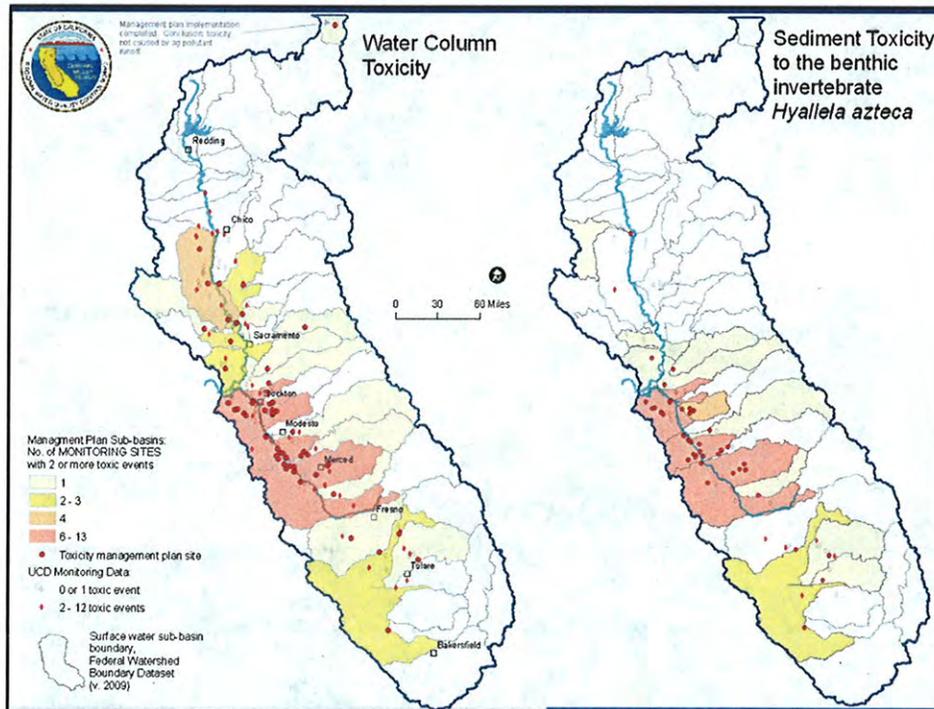
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## Nitrates and Groundwater

- Pollution pathways for nitrates and pesticides are similar
- Nitrates/water soluble pesticides leach through soil to groundwater
- Nitrates/pesticides can be in surface runoff to unprotected/improperly sealed wells or other conduits to groundwater

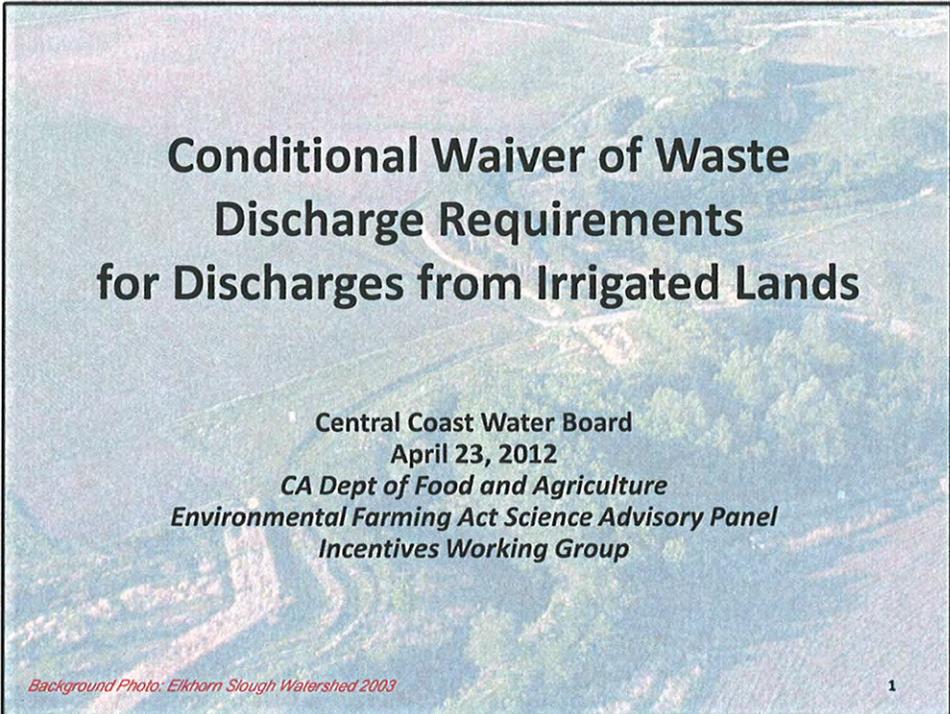
# Erosion/Sediment Problems





## Possible Incentives

- Piggy-back on existing certification/sustainability efforts
- Set State fees based on threat to water quality (higher threat=>higher fee)
- Increase fees for products that are of concern – use funds to support implementation of better practices

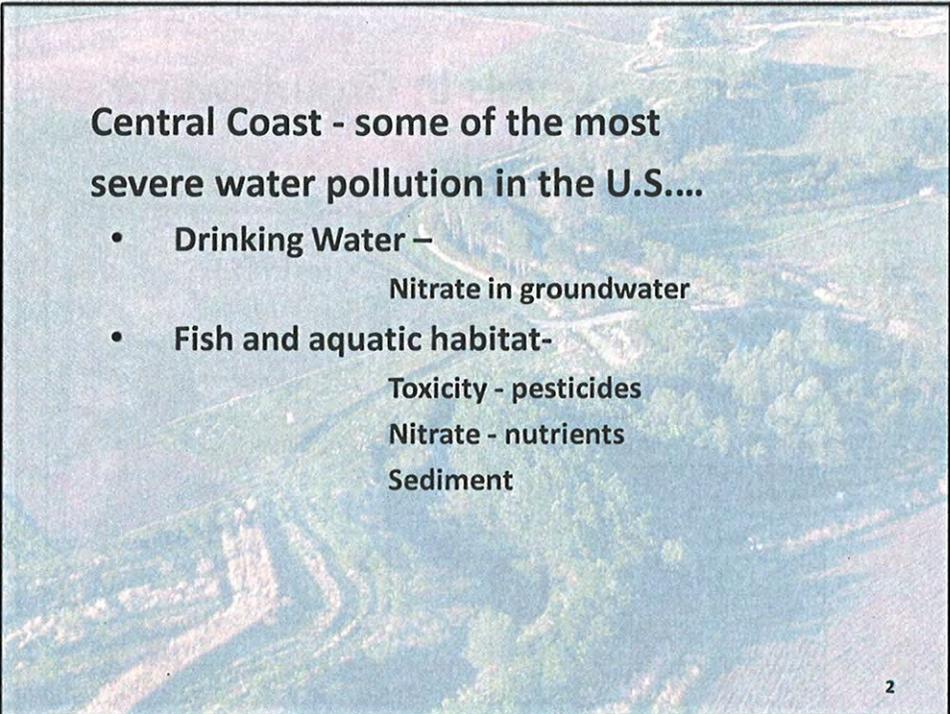


## Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands

Central Coast Water Board  
April 23, 2012  
CA Dept of Food and Agriculture  
Environmental Farming Act Science Advisory Panel  
Incentives Working Group

*Background Photo: Elkhorn Slough Watershed 2003*

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Central Coast - some of the most  
severe water pollution in the U.S....

- **Drinking Water –**  
Nitrate in groundwater
- **Fish and aquatic habitat-**  
Toxicity - pesticides  
Nitrate - nutrients  
Sediment

2

# Nitrate in Drinking Water

Regional-scale groundwater pollution



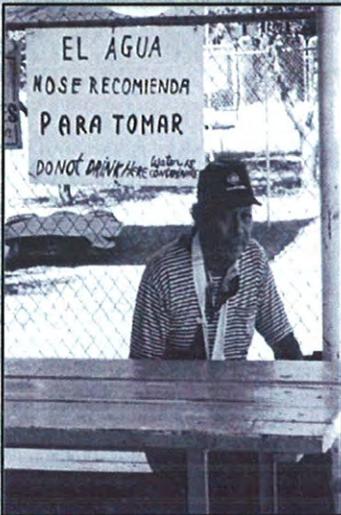
“Every citizen of California has the right to pure and safe drinking water.”

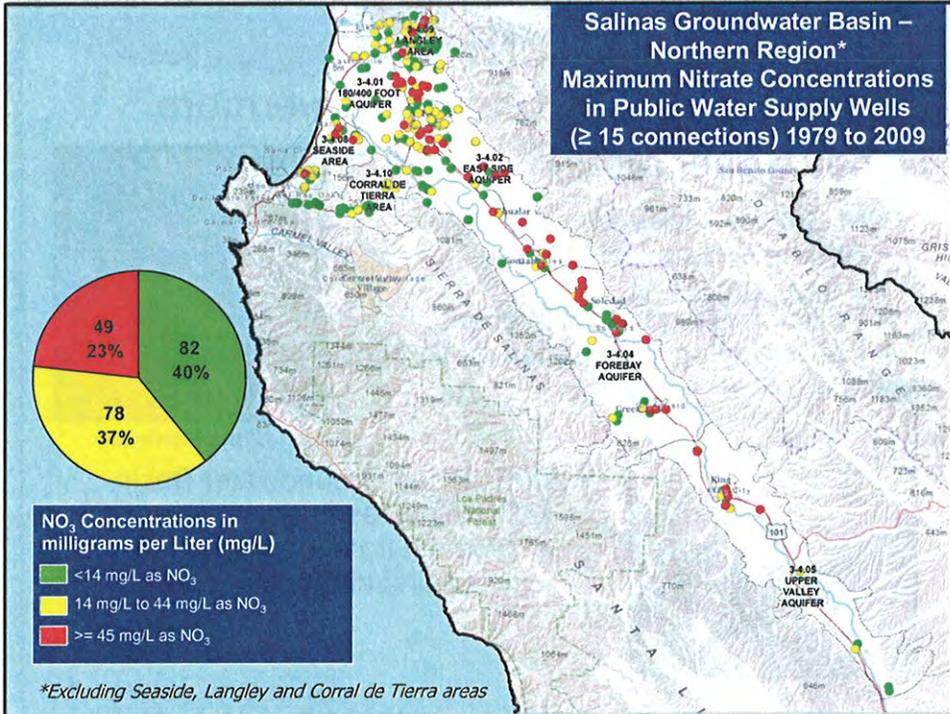
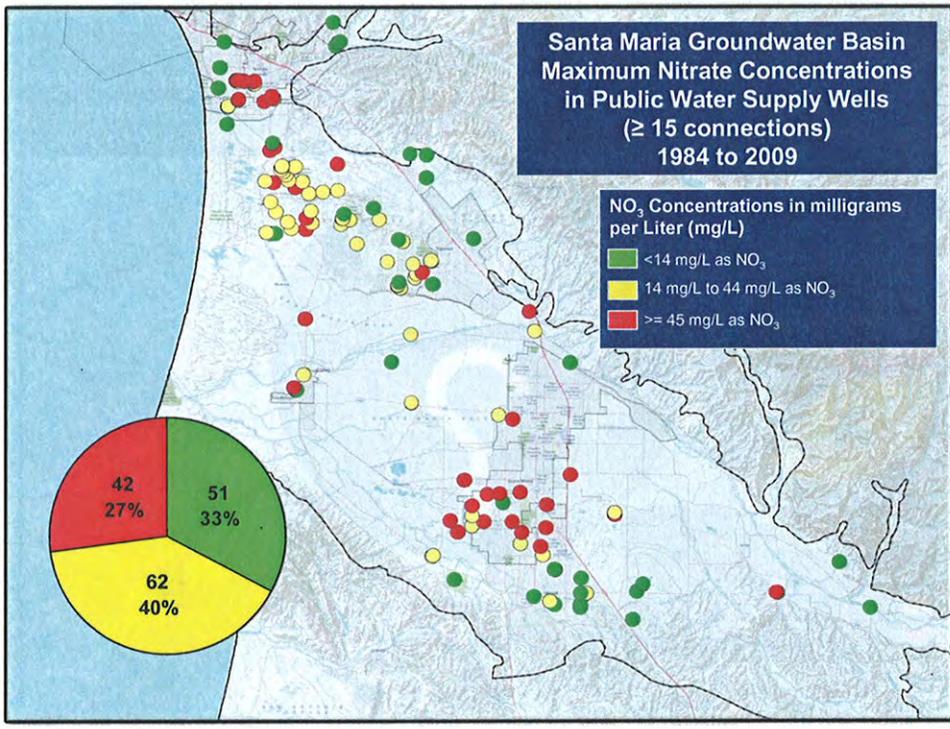
Section 116270(a) of the California Health and Safety Code

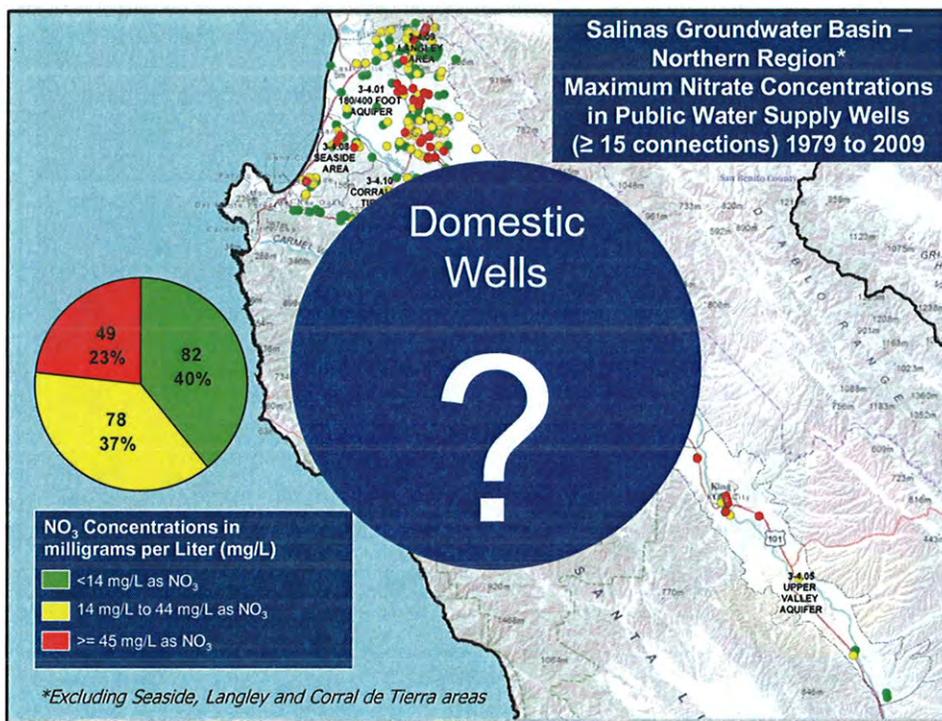
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## High Nitrate Levels in Groundwater

- Groundwater – Provides 90% Drinking Water
- Nitrate above the maximum contaminant level (MCL) of 45 mg/L  $\text{NO}_3$  can harm infants and pregnant women
- Blood does not carry oxygen efficiently causing brain damage/death “Blue-Baby Syndrome”
- Studies have linked high nitrate levels to thyroid problems/cancer; Parkinson’s; diabetes; and potential endocrine system disruption





## Recent Research by Lawrence Livermore National Laboratory

- 2011 Salinas Valley nitrate study
  - Source is chemical fertilizer
    - San Jerardo well
  - Pollution is legacy AND recent
  - Well pumping accelerates movement



Gloria Martinez



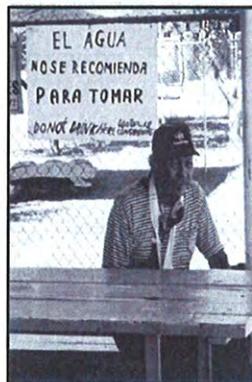
Mercedes Amezquita

- 2005 Llagas Groundwater Basin
  - Chemical fertilizer
  - Recent nitrate loading (years)
  - Increasing nitrate trends

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## Water Board's Highest Priorities

- Domestic well users
- Farm labor camps
- Schools
  - Anchor point Academy
- Local Communities
  - San Lucas
  - King City
  - San Jerardo
- Protecting all Beneficial Uses



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## Surface Water Quality in Agricultural Areas

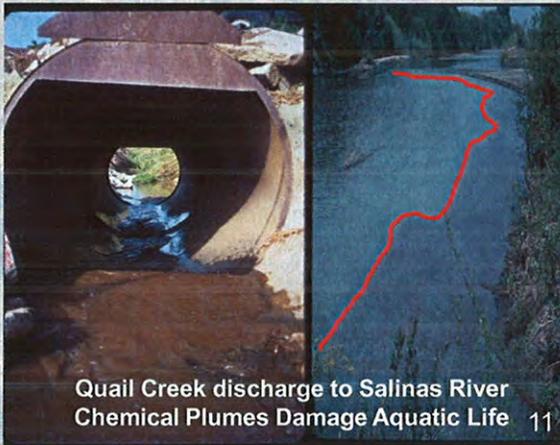
Karen Worcester  
Staff Environmental Scientist

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### “Toxicity in California Waters”

2010 State Board (SWAMP) Report

- Central Coast streams- highest % of toxic sites statewide
- 56% of R3 sites are toxic
- 22% of R3 sites are *highly toxic*

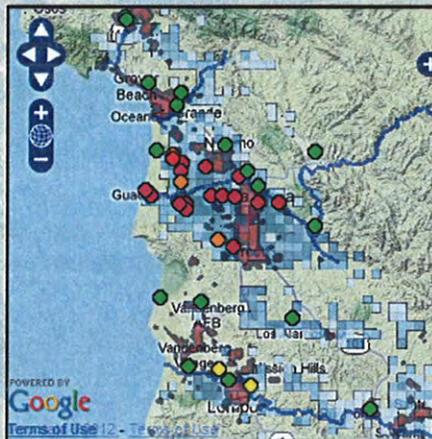


### Salinas and Santa Maria areas are severely impaired by toxicity

Lower Salinas Area



Lower Santa Maria Area



### **Order includes...**

- **Requirements scaled by threat to water quality (tiers)**
- **Implementation practices**
  - Groundwater protection**
  - Discharge control or treatment**
  - Irrigation and nutrient management**
- **Monitoring & reporting - effectively indicate pollution reduction and water quality improvement**

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### **Incentives**

- **Sustainable Certifications (Condition #14.1d)**
- **Transfer to lower tier (Condition #17)**
- **Cooperative projects (e.g. treatment wetlands and managed aquifer recharge) → alternative monitoring and time schedules (Finding #11)**

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## Flexibility / Alternatives

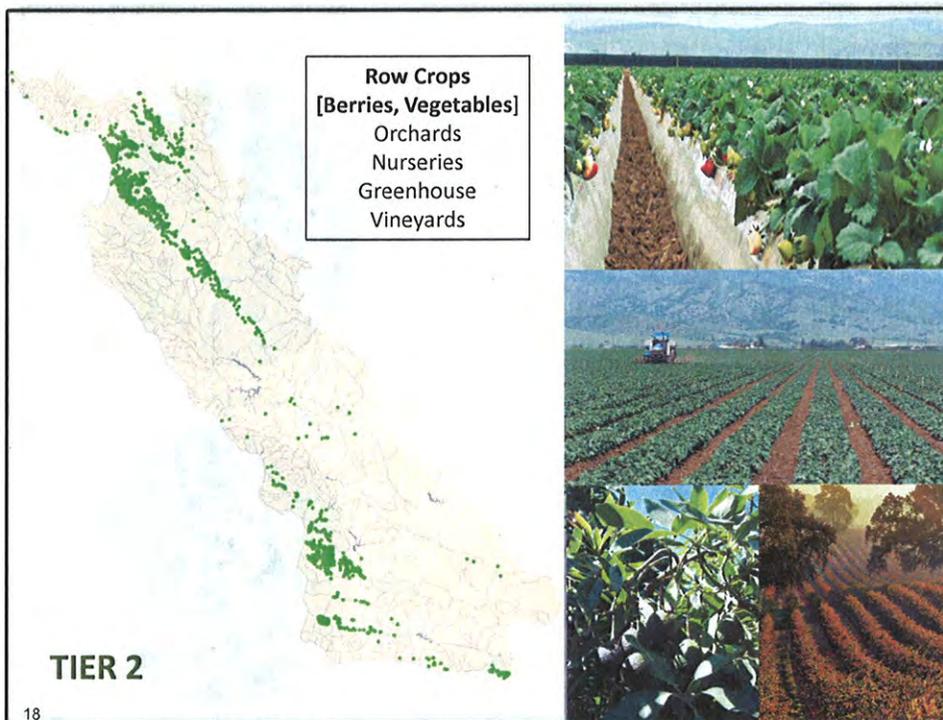
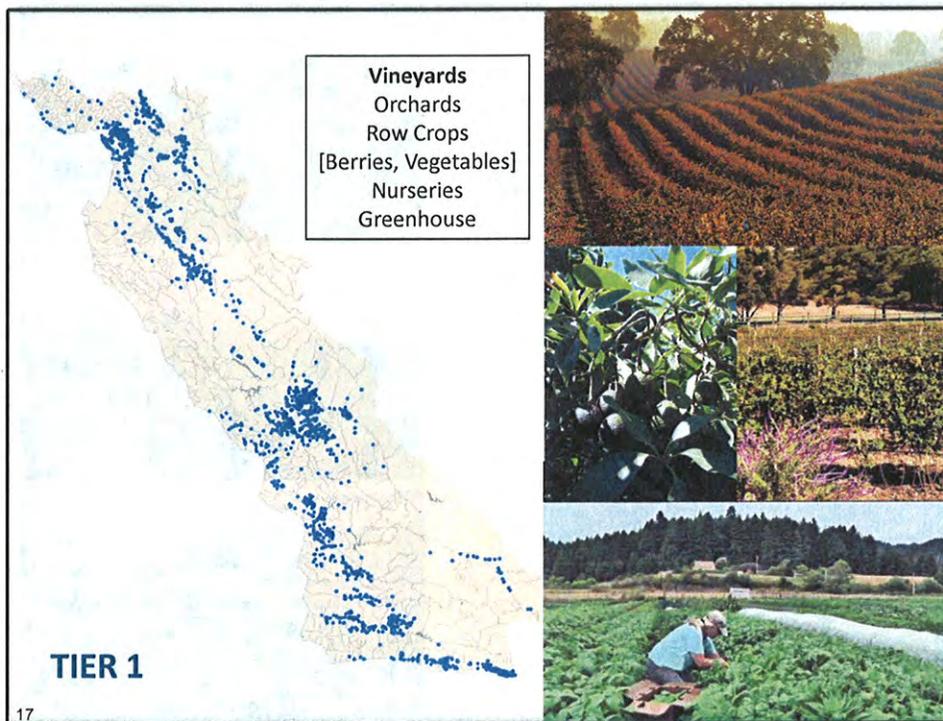
- Individuals or groups can request specific order (Condition #6)
- Third-party groups acceptable (Condition #10)
- Cooperative or individual surface receiving water monitoring (Condition #51)
- Cooperative or individual groundwater monitoring (MRP Part 2A.6)
- Use of existing groundwater data (MRP Part 2A.3)

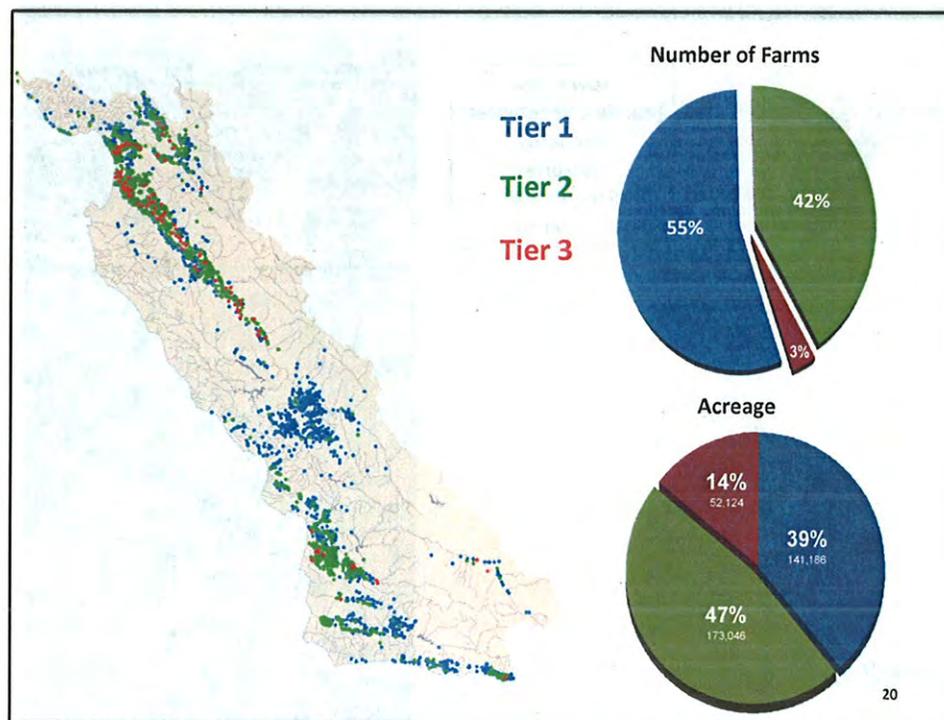
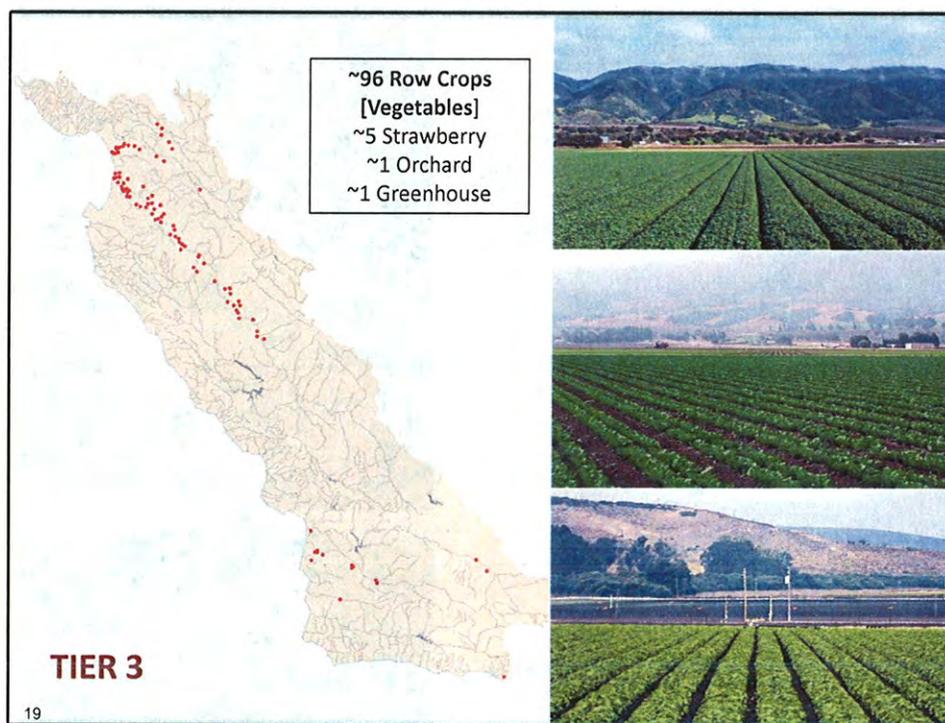
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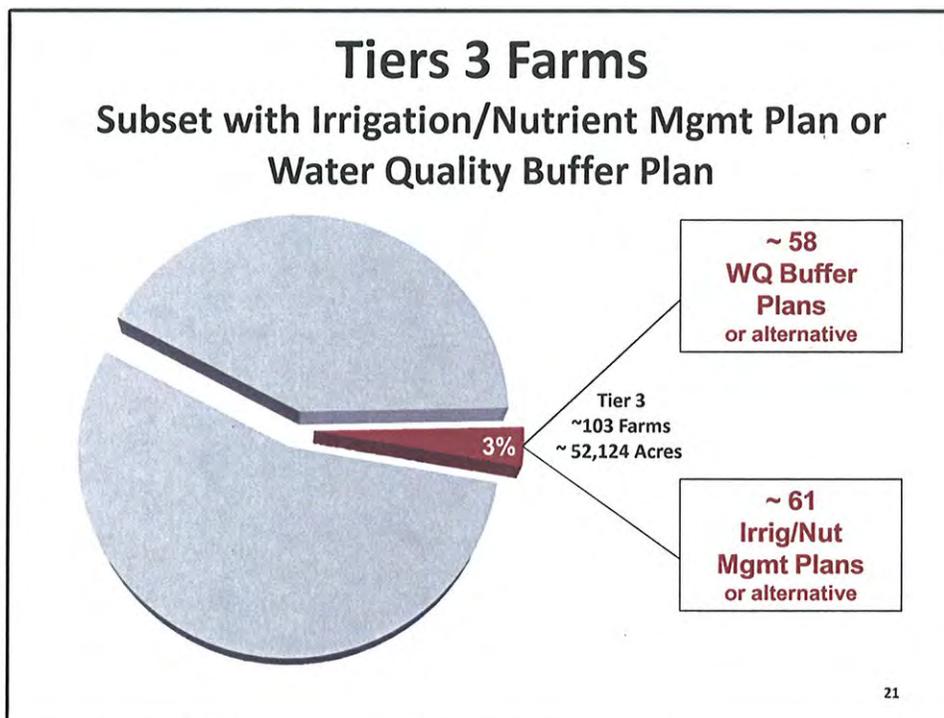
## Flexibility / Alternatives cont.

- Evaluate nitrate loading risk by farm or unit (Condition #68)
- Alternative to Tier 2 reporting total nitrogen applied (Condition #71)
- Alternative to Tier 3 certified Irrigation and Nutrient Management Plan (Condition #76)
- Alternative to Tier 3 Water Quality Buffer Plan (Condition #80b)

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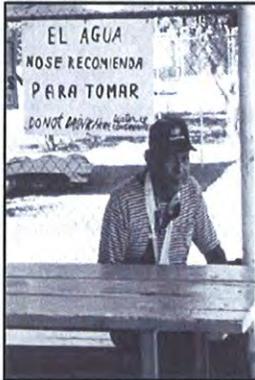






Porter Cologne says the Water Board:

*...must be prepared to exercise its full power and jurisdiction to protect the quality of waters in the state from degradation...*

“Every citizen of California has the right to pure and safe drinking water.”  
Section 116270(a) of the California Health and Safety Code

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# Fact Sheet

## Central Coast Regional Water Quality Control Board Solutions to the Nitrate Problem

The Central Coast Regional Water Quality Control Board plan to address the nitrate problem is based on a three-pronged strategy consisting of 1) informing and protecting water users from known public health threats due to nitrate pollution, 2) implementing source control to reduce nitrate loading over time, and 3) supporting ongoing monitoring and assessment to document measurable improvements in source reduction and groundwater and drinking water quality.

### Protecting Public Health

**Local Agency Outreach** - In the spring of 2010, the regional board began reaching out to the state and local (county) health agencies, public health officials and board of supervisors within our region via letters, meetings and teleconferences. These efforts have been focused on urging the local agencies to address the population most at-risk of nitrate pollution, those relying on domestic wells and local small and state small water system wells for drinking water.

**Domestic Well Outreach and Sampling** – The board is currently in the process of developing a domestic well outreach and sampling program in the Central Coast Region to help educate domestic well users about the nitrate pollution problem and provide them with free nitrate sampling. The board is working to ensure that all stakeholders are involved in discussions related to the nitrate pollution, and have deliberately engaged environmental justice organizations and rural communities affected by the nitrate pollution.

**Provision of Replacement Water** – The board is currently in the process of evaluating and developing three individual enforcement cases which may require dischargers who have caused nitrate pollution of drinking water wells/systems to provide replacement water to the individuals connected to the polluted water wells/systems.

### Source Control

**Agricultural Regulatory Program** - The Agricultural Regulatory Program regulates discharges from irrigated agricultural lands to protect surface water and groundwater. This program is the cornerstone of our nitrate source control implementation efforts. The Ag Order focuses on priority water quality issues, such as toxicity, nutrients, and sediments with nitrate impacts to groundwater that serve as a drinking water source as the highest priority.

The Regional Board is currently prioritizing implementation efforts in the major agricultural areas of the region with the most severe and widespread nitrate impacts - the Salinas River,



Santa Maria, and Pajaro River watersheds. Renewal of the Ag Order has been an ongoing and extensive internal and public process since mid-2008, with an increased emphasis on addressing nitrate loading to groundwater from irrigated agriculture.

The current updated draft of the Ag Order includes requirements focused on monitoring to identify priority areas, source reduction via improved nutrient and irrigation efficiency, and monitoring and reporting to document the short- and long-term effectiveness of source reduction measures.

**Wastewater Permitting** – The board began including salt and nutrient management planning requirements and associated effluent or receiving water limits and monitoring requirements within our wastewater (WDR/NPDES) permits in 2004/2005 as permits came up for renewal or when we received new permit applications. The board is also participating in the development of regional salt and nutrient management plans per the State Water Board's Recycled Water Policy.

**Grants Program** – In 2007/2008 the board aligned its grants program with the various programs, expertise and regional priorities in an effort to address and leverage our highest water quality priorities through grant funded projects. This was particularly important for the implementation of nutrient and irrigation efficiency projects.

Since 2006, the board has funded millions of dollars for grant projects to test new practices and techniques that would mitigate or treat discharges from irrigated lands or to implement practices to improve irrigation and nutrient management practices. Results of the various studies demonstrate that significant reductions in nitrate loading are possible and the results are being used to educate growers in the region about effective management practices that can improve surface water and groundwater quality.

Most recently, the Water Board awarded \$3 Million in Proposition 84 funds to implement a Central Coast Irrigation and Nutrient Management Program to reduce nitrate loading in the most severely impaired agricultural areas of the region.

### **Regional Monitoring and Assessment**

As part of the Ag Order renewal process the board reviewed and compiled an extensive amount of available reports and data and conducted a regional assessment of nitrate loading and groundwater and drinking water impacts associated with irrigated agriculture. The information is being used to support both the implementation and renewal of the Ag Order. One of the outcomes of this process was the need to develop more effective and efficient regional monitoring and assessment tools.

The board is also currently developing a groundwater assessment and protection program. This program is intended to leverage and build on existing regional groundwater monitoring efforts being implemented by local agencies/entities and to coordinate with other pending programs such the salt and nutrient management plans and California Statewide Groundwater Elevation Monitoring (CASGEM) program. *(This fact sheet was last updated March 12, 2012)*

## **Environmental Farming Act Science Advisory Panel**

**April 23, 2012**

### **Incentives Workgroup Meeting**

#### **Next steps for Incentives focus group**

Need to propose several action items as a group for consideration by all Science Panel members

1. Propose topic to focus on – Nitrogen trading markets per email by Secretary Ross
2. Recommend incentive – monetary, regulatory relief, other
3. Propose type of project to focus on – Pilot versus large scale watershed level project
4. Recommend where CDFA should focus attention in state – GIS
5. Funding to support proposed activities (e.g., pilot projects)
6. Specify critical components of any project
  - a. Nutrient budget worksheets
  - b. Monitoring
  - c. Quantification on nitrogen off irrigated lands
  - d. Modeling
7. Continue with working group to figure out details
8. Monitor progress of any projects and create reporting structure
9. White paper documentation and distribution
10. Peer review of proposed activities by other agencies