

# Dairy Impacts to Water Quality

- Aquatic Life
  - Ammonia toxicity
  - Dissolved oxygen depletion
- Drinking Water
  - Nitrates - blue baby syndrome
  - Salts – taste problems
- Agriculture
  - Nitrates and salts – sensitive crops

# Dairy Impacts to Water Quality

- Surface Water Impacts
  - 70 Notices of Violation since 2004
- Groundwater Impacts
  - 5 dairies in Stanislaus County
    - » Elevated salts and nitrates at all

# Dairy Impacts to Water Quality

- Groundwater Impacts
  - 425 supply wells at 88 dairies
    - » 39% of wells polluted with nitrate
    - » 63% of dairies polluted with nitrate
  - Monitoring at 68 dairies
    - » Nitrate and salt pollution

# Order Development

- December 2002
  - State: Waiver Program expired
    - » Dairies under waiver for 20 years
  - Federal: new USEPA regulations
    - » NPDES permit required
    - » Nutrient Management Plan required

# Order Development

- Dec 2002: New Waiver Program
- Jan 2003: 1<sup>st</sup> Draft NPDES Permit
- Mar 2003: New Waiver Rescinded
- Sep 2004: 2<sup>nd</sup> Draft NPDES Permit

# Order Development

- Feb 2005: Court Decision
  - Vacated NPDES requirement for all large CAFOs unless actual discharge
  - Upheld agricultural storm water exemption
- April 2005: Informed Board of Change in Direction
- Mar 2006: Draft Waste Discharge Requirements General Order

# Order Development

- Nov 2006: Tentative Waste Discharge Requirements General Order
- Mar 2007: Tentative Waste Discharge Requirements General Order

# Proposed Order

- Considers
  - Comments on 4 previous drafts
  - Historical Compliance
  - California Water Code, Basin Plans, State regulations (Title 27)

# Proposed Order

- Considers
  - USEPA CAFO Regulations
    - » Order prohibits
      - Discharges of waste/storm water from production area (NPDES required)
      - Discharges of storm water from land application area unless management consistent with a Nutrient Management Plan

# Proposed Order

- Considers
  - Dairies are existing
    - » Not historically regulated
    - » Documented water quality impacts
  - Improvements needed
    - » Facility evaluations
    - » Planning and time
      - Reasonable to phase in reports

# Order Requirements

- Existing Conditions Report
  - Preliminary Facility Assessment
- Waste Management Plan
- Nutrient Management Plan
- Monitoring and Reporting

# Order Requirements

- Existing Conditions Report
  - Simple Evaluation
  - Preliminary Facility Assessment
    - » Existing wastewater storage capacity
    - » Existing whole farm nutrient balance
  - Merced County Software
    - » Internet access
    - » Simplify Existing Conditions Report

# Order Requirements

- Waste Management Plan
  - Wastewater storage capacity
  - Flood protection
  - Runoff controls
  - Operation and Maintenance

# Order Requirements

- Nutrient Management Plan
  - Control runoff
  - Budget and manage nutrients
    - » application rates
    - » application timing

# Order Requirements

- Improvements will be needed
  - Phases in Waste Management and Nutrient Management Plans
  - California Dairy Quality Assurance Program
    - » Training sessions throughout Region
    - » Provide assistance

# Order Requirements

- 7 months: Existing Conditions Report
- 1 year: Propose Interim Facility Modifications  
Complete first portions of Waste and Nutrient Management Plans
- 2 years: Complete Interim Facility Modifications  
Nutrient Management Plan with Retrofitting Plan  
Waste Management Plan with Retrofitting Plan
- 4 years: Complete all modifications
- 5 years: Completely implement Nutrient Management Plan

# Order Requirements

- Monitoring
  - Visual Inspections - immediately
  - Surface Runoff – begin Oct 2007
  - Groundwater – begin in 2007
  - Nutrients – begin in 12 months

# Order Requirements

- Visual Inspections
  - Production Area
    - » Weekly during wet season
      - waste storage areas
    - » During/after significant storm events
      - storm water containment structures
  - Land Application Area
    - » Daily during wastewater applications
      - field conditions

# Order Requirements

- Nutrient Monitoring
  - Wastewater
  - Manure
  - Soil
  - Irrigation Water
  - Plant Tissue

# Order Requirements

- Surface Runoff Monitoring
  - Unauthorized Discharges
    - » Discharge and surface water monitoring
  - Storm Water Discharges
    - » Production Area
      - Discharge (prohibited) and surface water monitoring
    - » Land Application Area

# Order Requirements

- Groundwater Monitoring
  - Onsite supply wells, subsurface drainage
- Additional Groundwater Monitoring
  - Monitoring wells

# Order Requirements

- Prioritize Monitoring Wells by
  - Proximity to offsite supply wells
  - Artificial recharge areas and Groundwater Protection Areas
  - Nitrate in neighbor's domestic well
  - Number of crops per field per year
  - Whole Farm Nitrogen Balance
  - Nutrient Management

# Order Requirements

- Reporting
  - Priority Significant Events
    - » Discharges to surface water
    - » Endangers human health or environment
  - Annual reports
    - » All monitoring results
    - » Update Facility Assessment
    - » Number of cows
    - » Estimate nutrients generated, applied, removed

# Required Reports

- Section 13267 Water Code
  - Evaluate Burden for Reports
    - » Costs versus needs and benefits
    - » Evidence to support requiring reports

# Evidence to Support Required Reports

- Volume and character of waste
  - 1,000 cow dairy
    - » 21,000 tons manure/year
    - » 365,000 pounds of nitrogen/year
    - » 770,000 pounds salts/year
- Documented Impacts
  - » Surface water and groundwater

# Need for Reports

- Existing Conditions Report, Waste and Nutrient Management Plans will demonstrate:
  - Existing facility conditions
  - Need for improvements

# Need for Reports

- Monitoring Reports
  - Information:
    - » For nutrient budget
    - » On existing groundwater conditions
    - » Water quality impacts/compliance
    - » Need for and result of improvements

# Benefits

- Environmental Benefits
  - Existing Conditions Report
    - » Identify initial conditions
    - » Need for improvements
  - Monitoring Reports
    - » Identify water quality impacts
    - » Determine compliance with Order
    - » Need for improvements
    - » Proper waste applications

# Benefits

- Environmental Benefits
  - Waste Management Plan/Nutrient Management Plan
    - » Improved waste storage, flood protection, operation and maintenance, waste applications
    - » Minimize runoff and leaching of pollutants

# Benefits

- Additional Benefits
  - Avoid cost of noncompliance
    - » Penalties or court orders
    - » Remedial actions

# Cost Estimate

- Assumptions used
  - Same used by CARES
    - » 1,000 mature cows
    - » 400 acres cropland
    - » 3 supply wells, one irrigation canal
    - » 4 monitoring wells
    - » Groundwater less than 100 feet deep
    - » No discharges to surface water

# Cost Estimate

<b>Labor Cost Assumption (\$ per hour)</b>	
Dairy Manager	75
Dairy Employee	30
Engineer	125
Certified Crop Advisor	125
Technician	80

# Cost Estimate

Requirement	Upfront	Annual
Existing Conditions Report	\$2,100	\$0.00
Waste Management Plan	\$11,400	\$0.00
Nutrient Management Plan	\$800	\$3,800
Monitoring and Reporting	\$27,400	\$29,500
<b>Total Costs:</b>	<b>\$41,700</b>	<b>\$33,300</b>
<b>Cost Range:</b>	\$12,000 to \$56,000	\$30,000 to \$36,000

# Total Cost Estimate

	<b>Upfront</b>	<b>Annual</b>
<b>CARES estimate of 2006 General Order</b>	<b>\$89,000</b>	<b>\$58,000</b>
<b>CARES estimate for proposed revisions</b>	<b>\$49,850</b>	<b>\$33,550</b>
<b>Staff estimate for General Order (range of costs)</b>	<b>\$41,700</b> (\$12,000 to \$56,000)	<b>\$33,300</b> (\$30,000 to \$36,000)

# Required Reports Summary

- Evidence to Support
  - Waste volume and character
  - Documented impacts
- Need for Reports
  - Existing conditions
  - Need for and effect of improvements
  - Determine compliance
  - Budget nutrients

# Required Reports Summary

- Costs
  - Reduced to minimum necessary
  - Are reasonable

# Funding Resources

- Environmental Quality Incentives Program
- State Revolving Fund
- Dairy Water Quality Improvement Grant Program

# Available Assistance

- University of California Cooperative Extension
- Natural Resources Conservation Service
- California Dairy Quality Assurance Program
  - Environmental Stewardship
- Merced County Environmental Health

# Comments

- NPDES Permit
- CEQA
- Groundwater Monitoring
- Pond Liners
- Third Party Use of Solid Manure

# Comment - Response

- Comment – NPDES Permit
  - Necessary
    - » Protect discharger
    - » Allow enforcement options for public
- Response
  - Waste Discharge Requirements appropriate first step
  - Will draft NPDES permit next

# Comment - Response

- Comment – CEQA
  - Categorical exemptions not appropriate
  - Environmental Impact Report needed
- Response
  - Categorical exemptions appropriate
    - » Existing water quality conditions will improve

# Comment - Response

- Comment - Groundwater Monitoring
  - Monitoring wells needed at each dairy soon
- Response
  - Impractical to install monitoring wells at 1,600 dairies within short time

# Comment - Response

- Comment – Groundwater Monitoring
  - Land Application Area primary source of groundwater nitrate pollution
  - Whole Farm Nitrogen Balance critical to where monitoring wells required
- Response
  - Whole Farm Nitrogen Balance
    - » Only an estimate
    - » Does not guarantee field nitrogen balance

# Comment - Response

- Pond Design
  - Two tier option
    - » Tier 1 - Double synthetic liner with leachate collection and removal system
    - » Tier 2 - Natural Resources Conservation Service Practice Standard 313 + Demonstration
      - Maximum seepage rate  $10^{-6}$  cm/sec
      - Synthetic liner when vulnerability/risk high
      - Other alternatives for very high vulnerability/risk

# Comment - Response

- Comment - Pond Design
  - Remove Tier 1
- Response
  - Tier 1 minimal review time and protects groundwater
  - Tier 1 not required

# Comment - Response

- Comment - Pond Design
  - Remove Tier 2 model demonstration requirement
- Response
  - Tier 2 model demonstration necessary to show compliance with Anti-Degradation Policy

# Comment - Response

- Comment – Pond Design
  - Pond design standard same for existing ponds and new or reconstructed ponds
- Response
  - Groundwater monitoring will determine if existing ponds need retrofitting

# Comment - Response

- Comment – Third Party Use of Solid Manure
  - A written agreement is not needed
- Response
  - Late revision has removed this requirement

# Comment - Response

- Comment – Third Party Use of Solid Manure
  - Waste Discharge Requirements needed
- Response
  - Coverage will be under the Irrigated Lands Waiver Program

# Late Revisions

- Revisions Insignificant
  - Order
    - » Findings, Specifications, Provisions
    - » Table 1 - Schedule
  - Monitoring and Reporting Program
  - Attachments C, D, and E
  - Information Sheet

# Summary

- 5 years in development
- Order will
  - Apply to 1,600 existing facilities
  - Impose more stringent requirements
  - Improve water quality conditions
- Monitoring and Reporting costs are reasonable and necessary

# Recommendation

Adopt Proposed Order with Late  
Revisions

