



## Item 13

# **Russian River Regulatory & TMDL Efforts**

an update to the  
North Coast Regional  
Water Quality Control Board

January 27, 2011

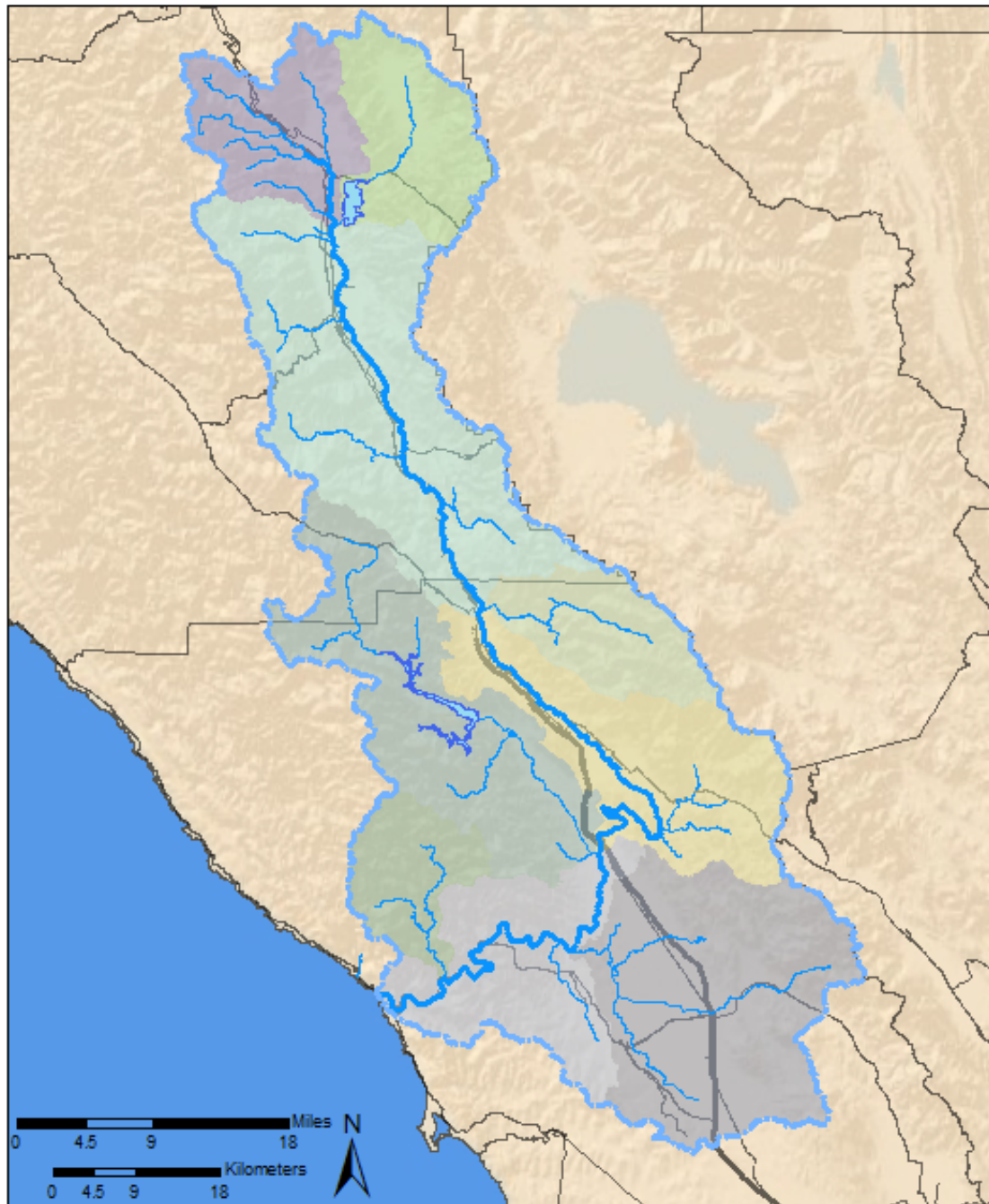


# Topics

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- Water Quality Concerns & Potential Sources
- Current Core Regulatory Efforts
  - Publicly-Owned Treatment Works
  - Wineries, Food Processors, & Dairies
  - NPDES Storm Water
  - Private Domestic Wastewater Systems
- TMDL Efforts
  - Russian River
  - Laguna de Santa Rosa
- Early Implementation Efforts

# Russian River Watershed



# Russian River Indicator Bacteria Impairments





# Laguna de Santa Rosa Impairments





# Potential Sources

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- Domestic & Municipal
  - Publically Owned Treatment Works
  - Permitted, Non-sewered Systems (e.g., septic, mound systems)
  - Unpermitted, Non-sewered Facilities & Parcels
- Industrial Discharges
- Storm Water Runoff
- Spills
- Homeless
- Migrant Worker Camps
- Recreation
- Dairies
- Grazing
- Horses & Other Animal Rearing Activities
- Wildlife



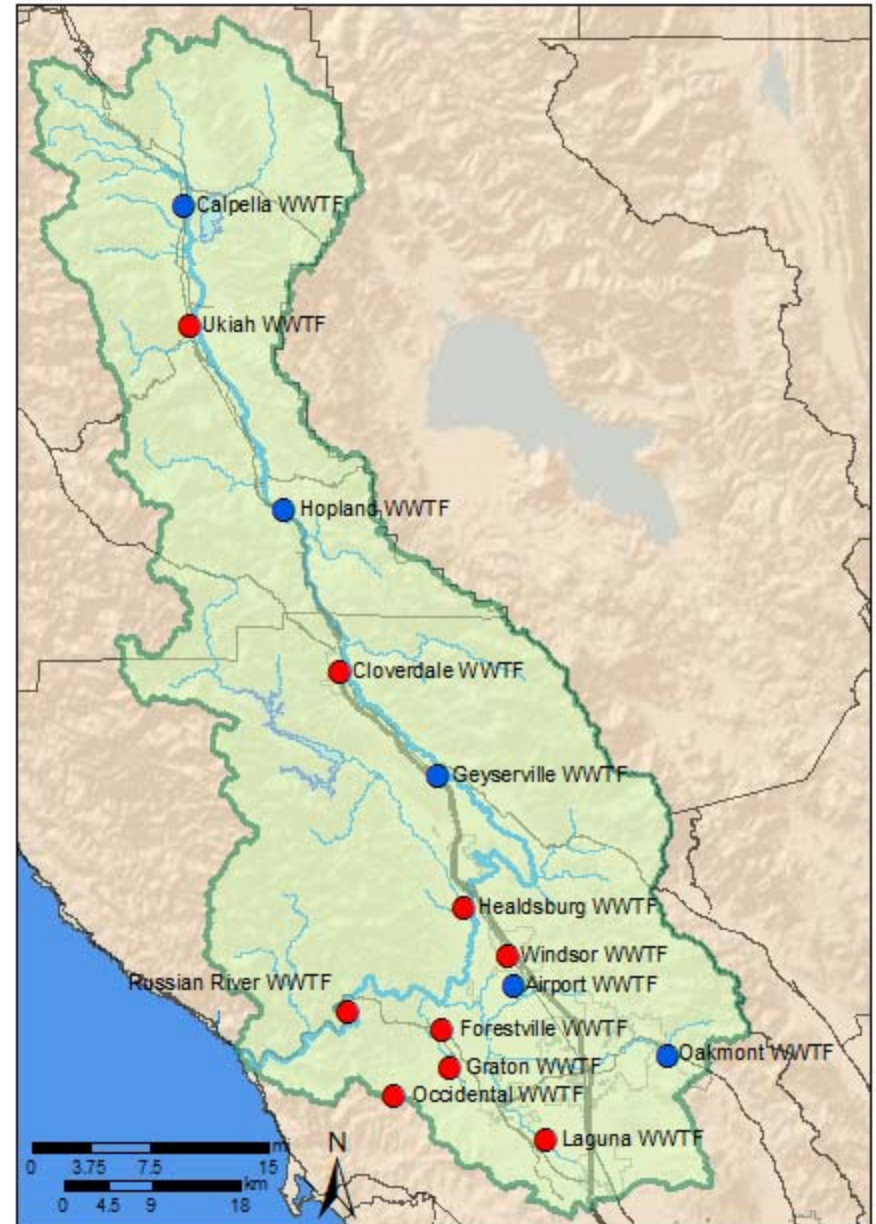
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# Municipal Wastewater Treatment Facilities

- 14 POTWs
  - 5 WDRs only
  - 9 NPDES/WDRs
- All enrolled in statewide WDRs for collection systems
- WDR Facilities
  - Land discharge only
- NPDES Facilities
  - Five year permit term
  - Seasonal discharges to surface waters (October 1 – May 14)
  - One percent of receiving water flow







# Municipal Wastewater Treatment Facilities

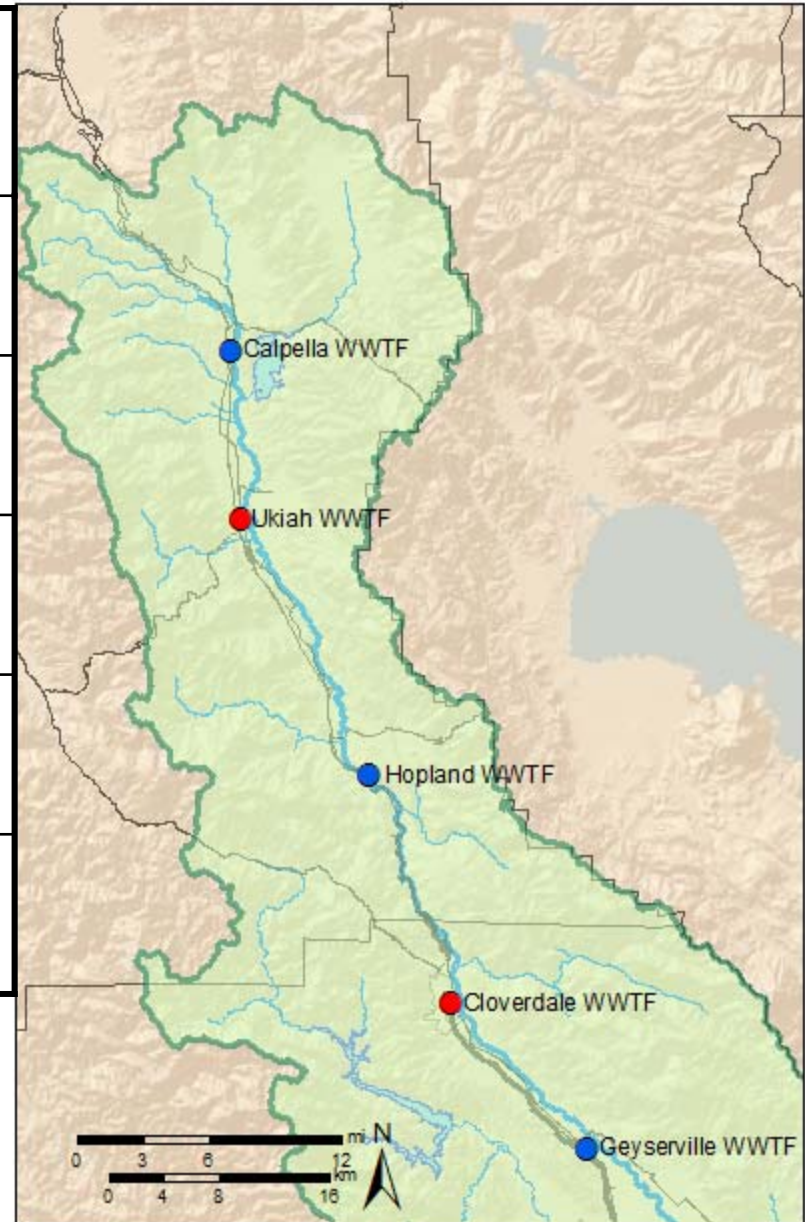
## Control of Pollutants

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- Biochemical Oxygen Demand
  - Aeration and other oxidative processes
- Total Suspended Solids
- Bacteria
  - Disinfection – Chlorination or Ultraviolet Light
- Nutrients
  - Monitor
  - Evaluate reasonable potential
  - Establish interim and/or final effluent limitations, if needed
  - Evaluate compliance methods
    - Source control and treatment (nitrification/denitrification)
  - Establish schedule to comply with final effluent limitations

# Northern Wastewater Treatment Facilities

Facility	ADWF/ Treatment	Disposal Method
Calpella	0.04 mgd Secondary	Perc pond All year
Ukiah*	3.01 mgd Second/Tertiary	Perc ponds River
Hopland**	0.09 mgd Secondary	Perc pond All year
Cloverdale*	1.0 mgd Secondary	Perc ponds All year
Geyserville	0.092 mgd Secondary	Perc pond All year



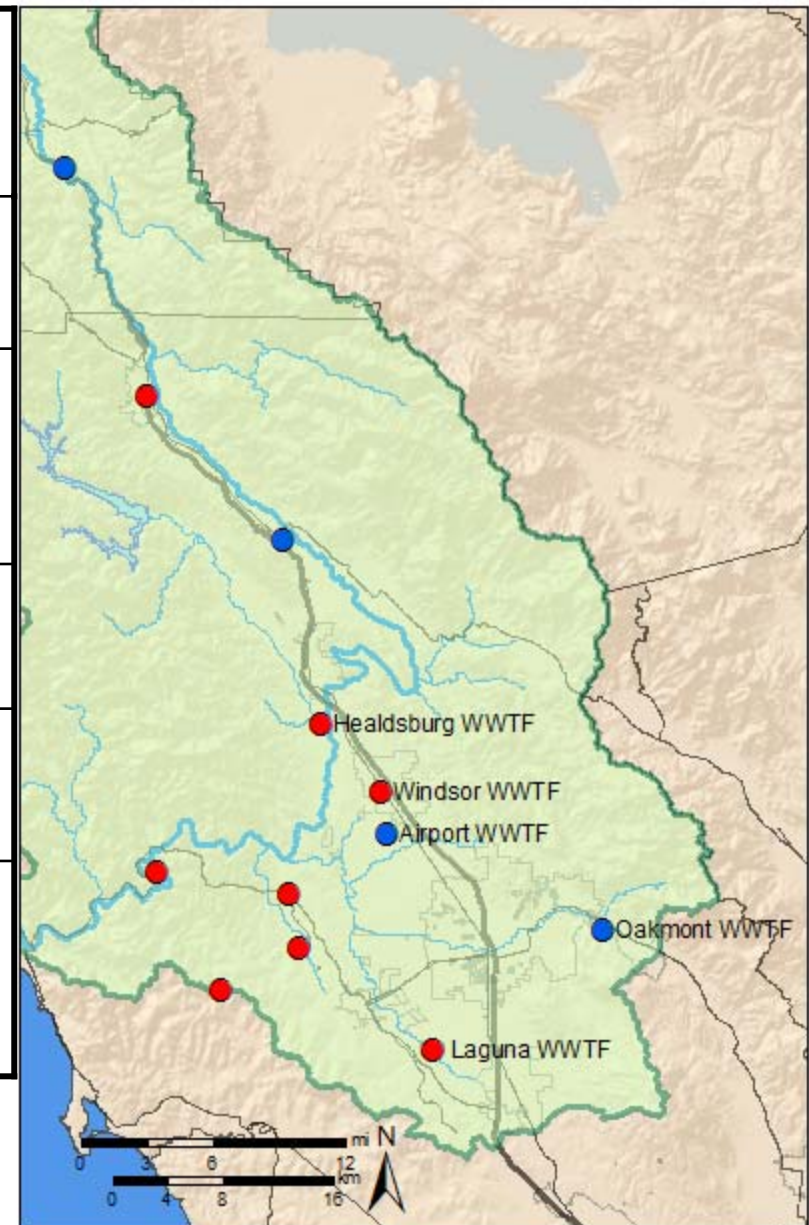
\* Permit requires evaluation of compliance with Basin Plan seasonal discharge prohibition

\* ACL requires compliance with WDRs

ADWF = Average dry weather design flow

# Southeastern Wastewater Treatment Facilities

Facility	ADWF/ Treatment	Disposal Method
Healdsburg*	1.4 mgd Tertiary - N,D	Basalt Pond All year
Windsor	2.25 mgd Tertiary - N,D	Mark West Cr Store/reclaim Geysers
Airport	0.9 mgd Second/Tertiary	Store/reclaim
Oakmont	0.065 mgd Secondary	Store/reclaim Laguna Plant
Santa Rosa	21.3 mgd Tertiary - N,D	Laguna Store/reclaim Geysers



\*CDO for compliance with Basin Plan  
seasonal discharge prohibition

N = nitrification      D = denitrification

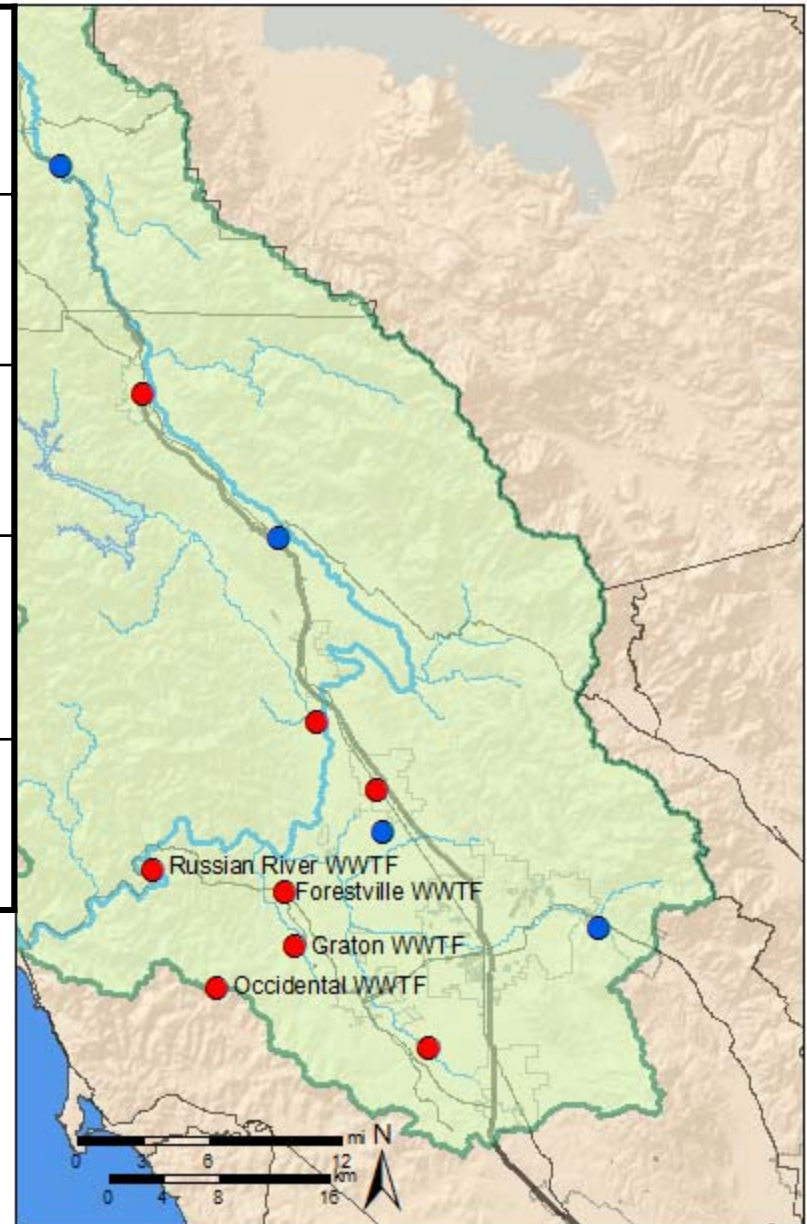


# Southwestern Wastewater Treatment Facilities

Facility	ADWF/ Treatment	Disposal Methods
Forestville	0.13 mgd Tertiary	Jones Cr Store/reclaim
Graton*	0.14 mgd Secondary*	Atascadero Cr Store/reclaim
Russian River CSD	0.71 mgd Tertiary	Russian River Reclaim/land discharge
Occidental**	0.02 mgd Secondary	Dutch Bill Cr Ag irrigation

\* CDO requires upgrade to tertiary to comply with Basin Plan

\*\* CDO requires compliance with Basin Plan (upgrade to tertiary or zero discharge)







# Topics

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- Water Quality Concerns & Potential Sources
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# Russian River Watershed

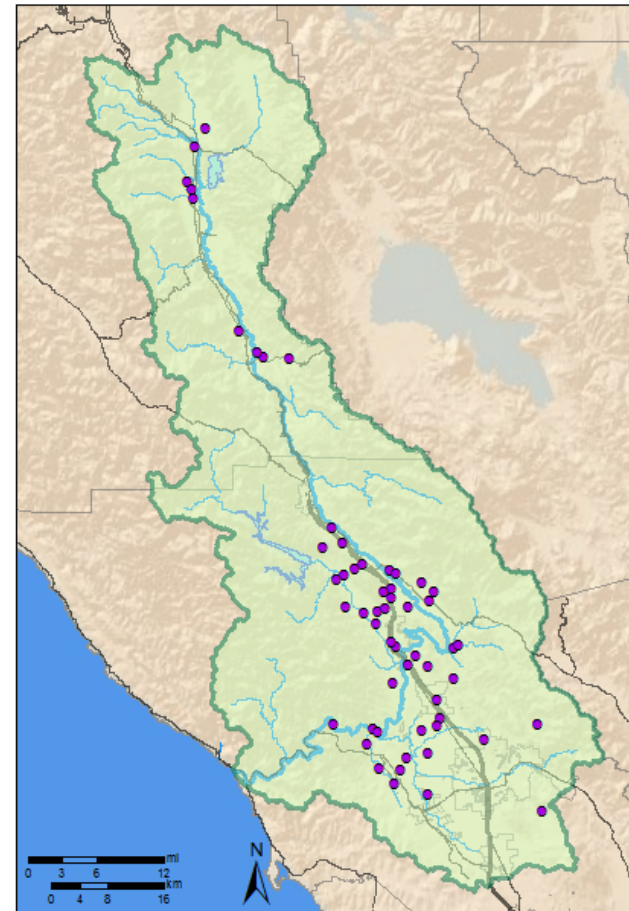
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## Food Processors and Producers

- Waste Streams
  - Liquid
  - Solid
- Waste Characteristics
  - Biochemical Oxygen Demand (BOD)
  - Total Suspended Solids (TSS)
  - Nitrogen
  - Phosphorous
  - Bacteria

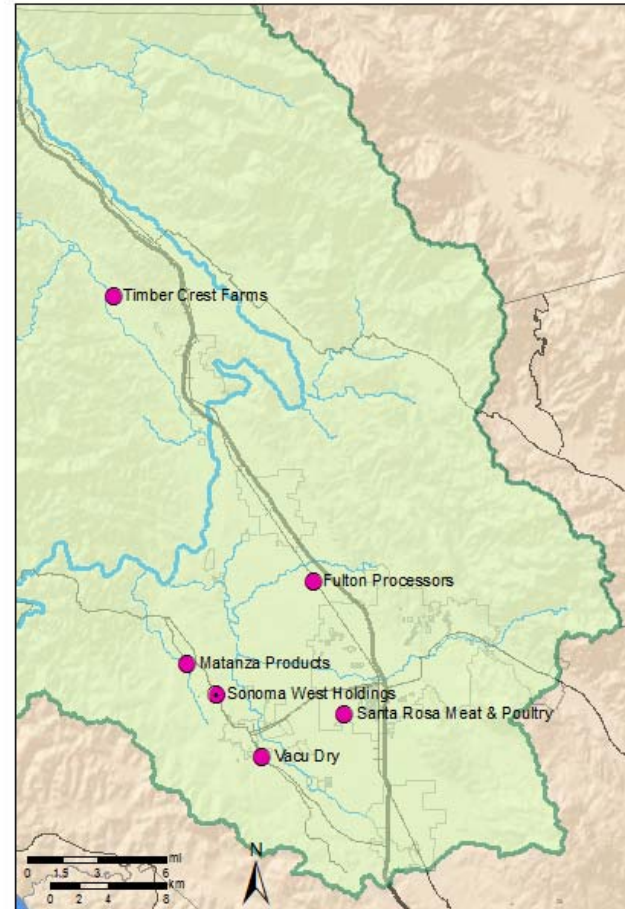
# Wineries

- 55 Permitted Facilities
- Regulated Under General Permit
- Land Application Only
- No Nutrient or Bacterial Limits or Monitoring



# Food Processors

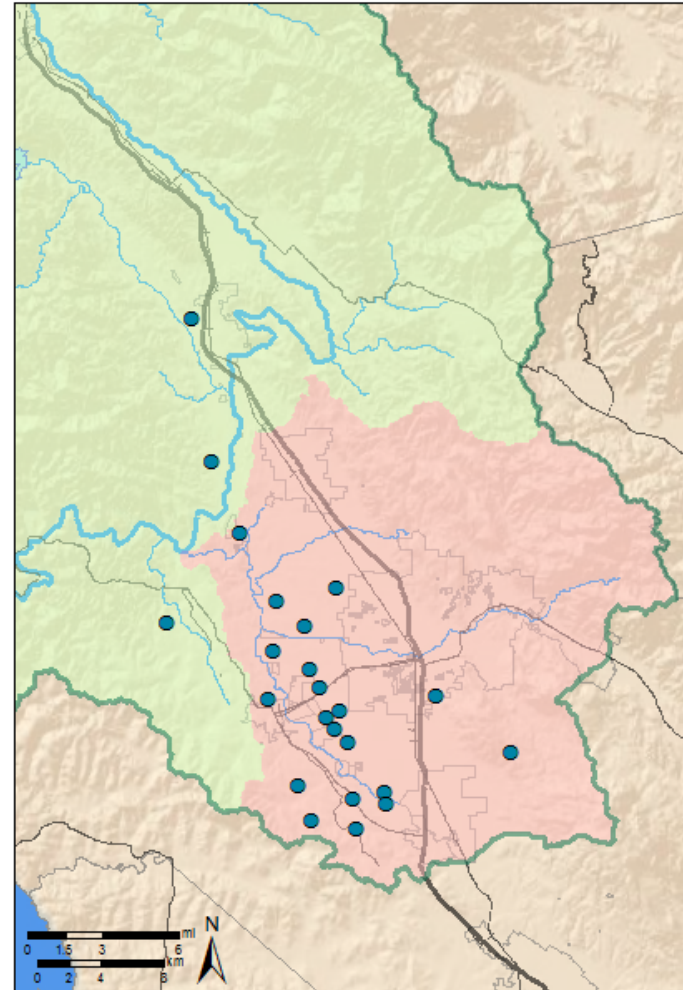
- 6 Facilities in Sonoma
- Regulated Under Individual Permits
- Primarily Land Application
- No Nutrient or Bacterial Limits or Monitoring





# Dairies

- 23 Facilities
- New Dairy Program
- Nutrient Management
- Monitoring





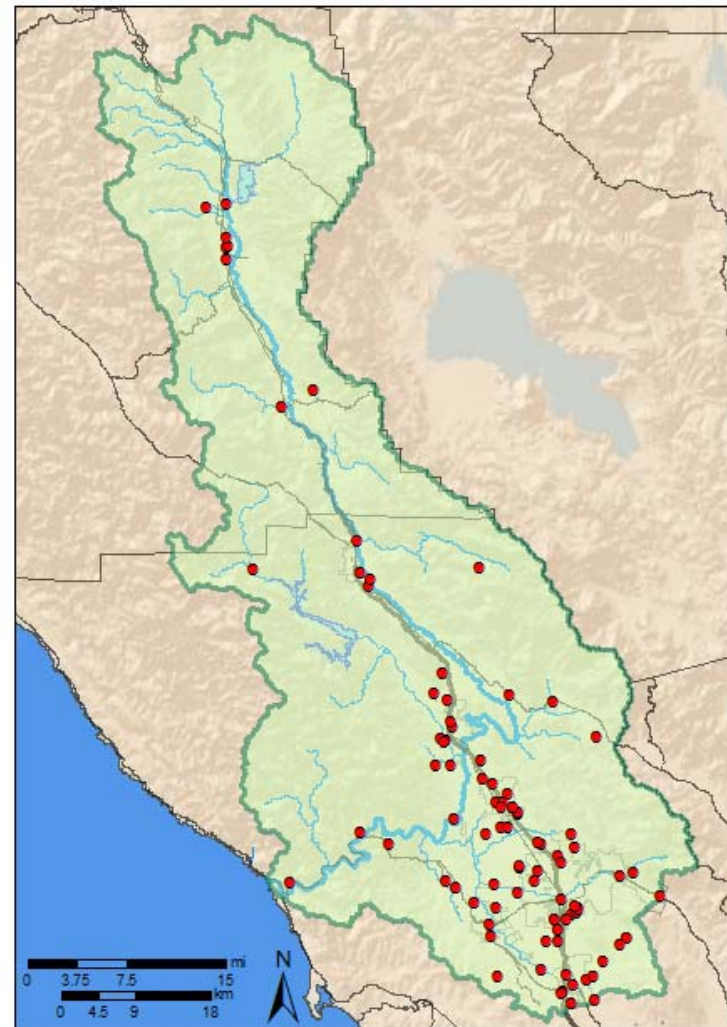
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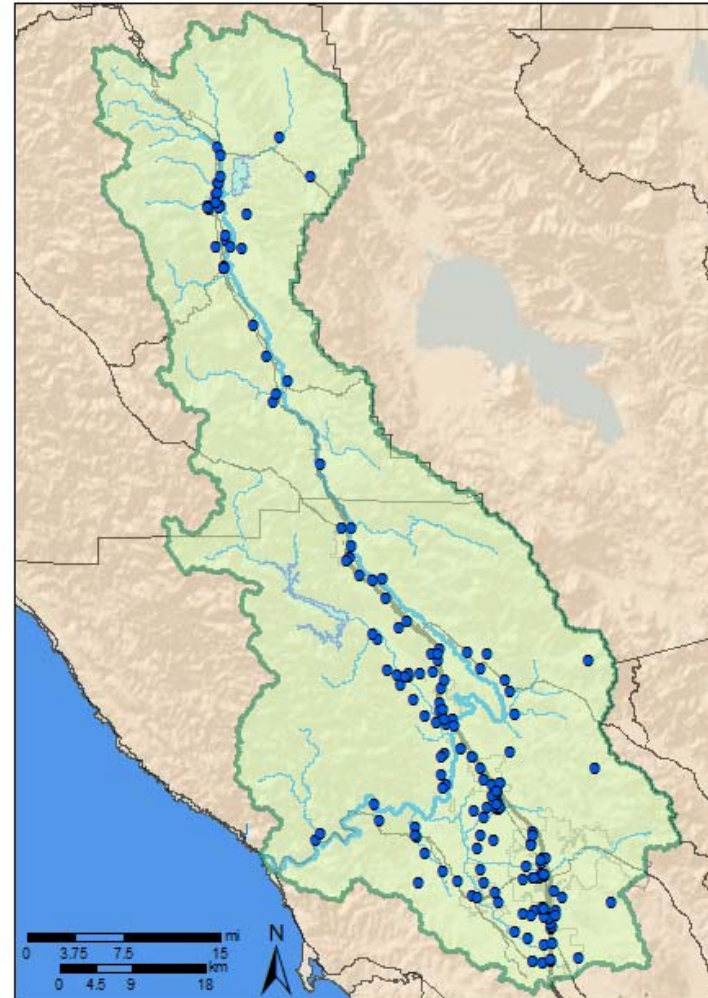
# Construction Storm Water

- New permit adopted in September 2009
- Effective July 2010
- New electronic application
  - Potentially significant number of non-filers
- Approx. 90 permitted sites in RR watershed
- Projects under 1 acre do not need permit coverage, but must comply with Basin Plan
  - No RB oversight program



# Industrial Storm Water

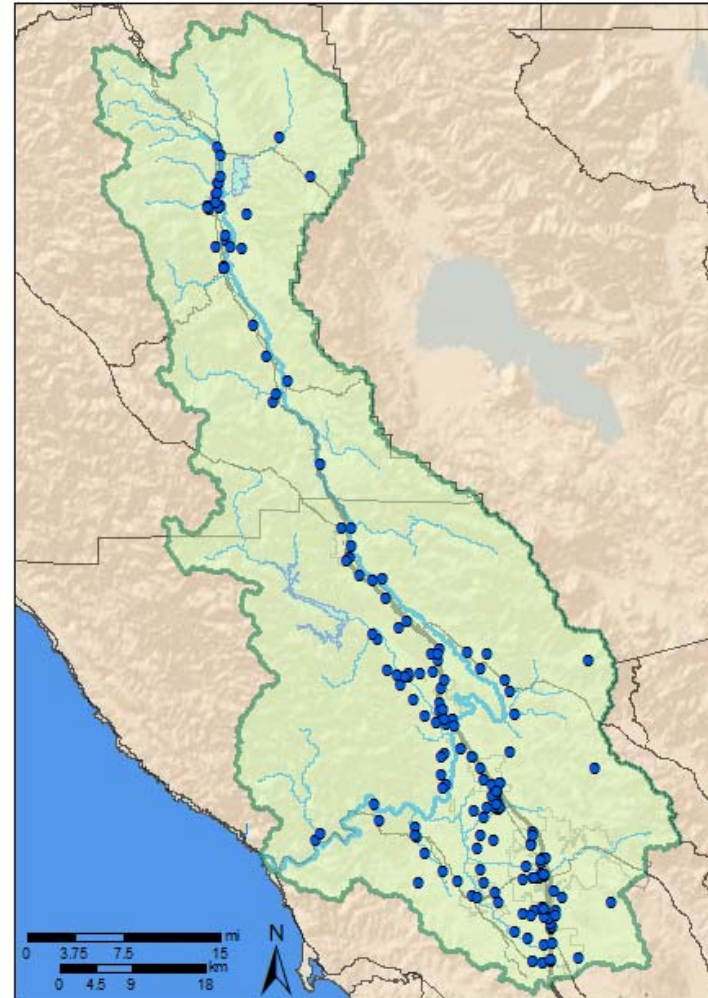
- Permit adopted in 1997, new permit in development
- 177 permitted sites in RR watershed
- Example industries covered
  - Pulp and wood mills
  - Asphalt and ready mix concrete plants
  - Mining ops, wrecking yards, airports and landfills
  - Wastewater treatment plants





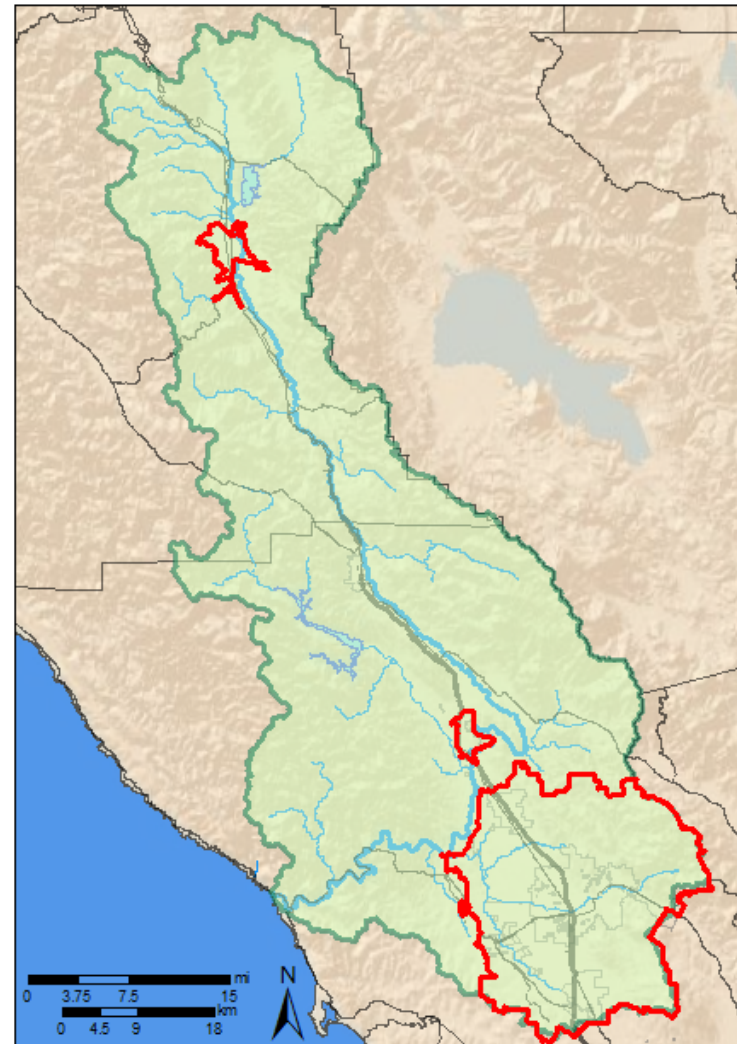
# Industrial Storm Water

- Not covered:
  - Kennels, commercial stables, boarding and doggy day-care, vets
  - Nurseries, landscaping stores, winery pomace and some composting operations, farm supply, and home improvement stores



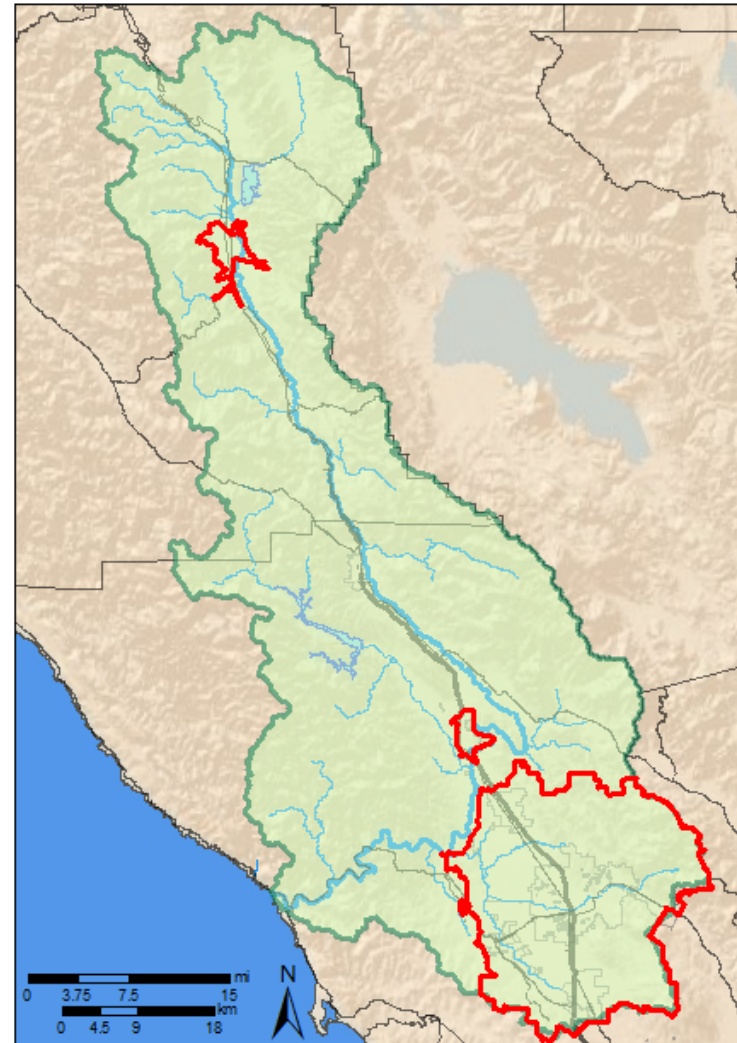
# Municipal Storm Water

- Control pollutant discharge from storm drains
- 9 permitted municipalities in RR watershed
  - Phase 1: Santa Rosa, part of Sonoma County
  - Phase 2: Rohnert Park, Cotati, Sebastopol, Windsor, Healdsburg, Ukiah, part of Mendocino County



# Municipal Storm Water

- Phase 2s have less developed program
- Most of RR watershed not covered
  - Men county adopted county-wide storm water ordinance
  - Son county adopted county-wide grading ordinance
- Future of program
  - Focus on BMPs target pollutants/activities that contribute to impairments
  - Aid in TMDL implementation





# Topics

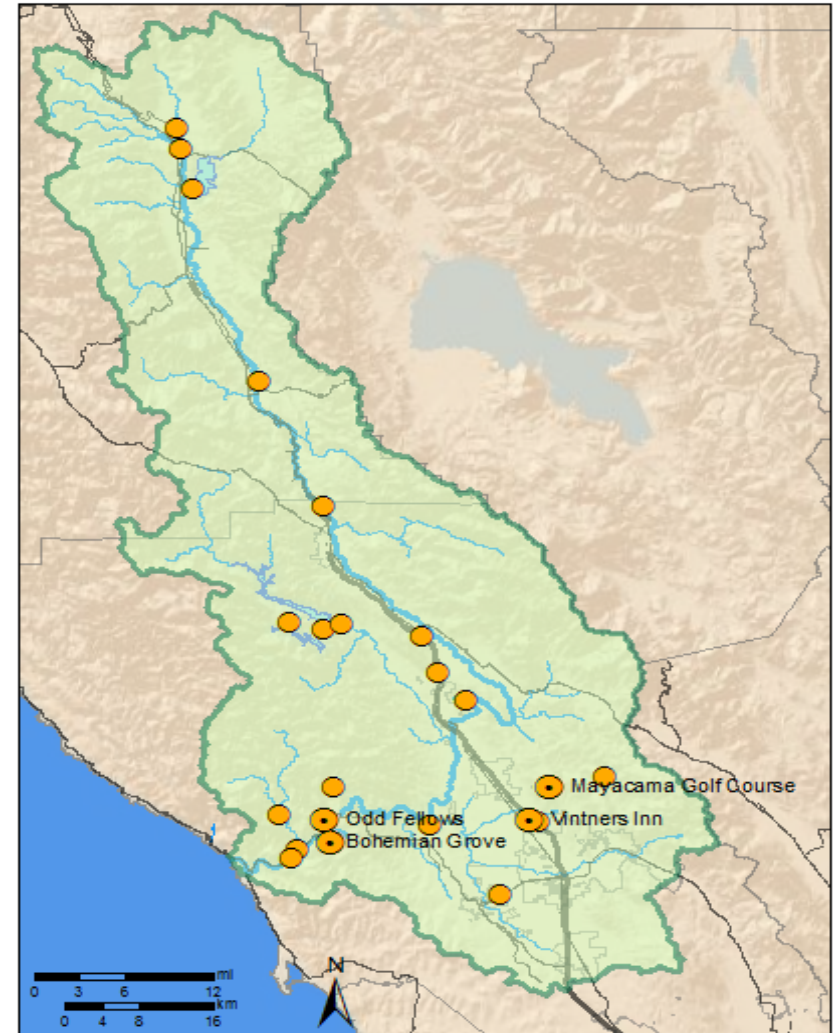
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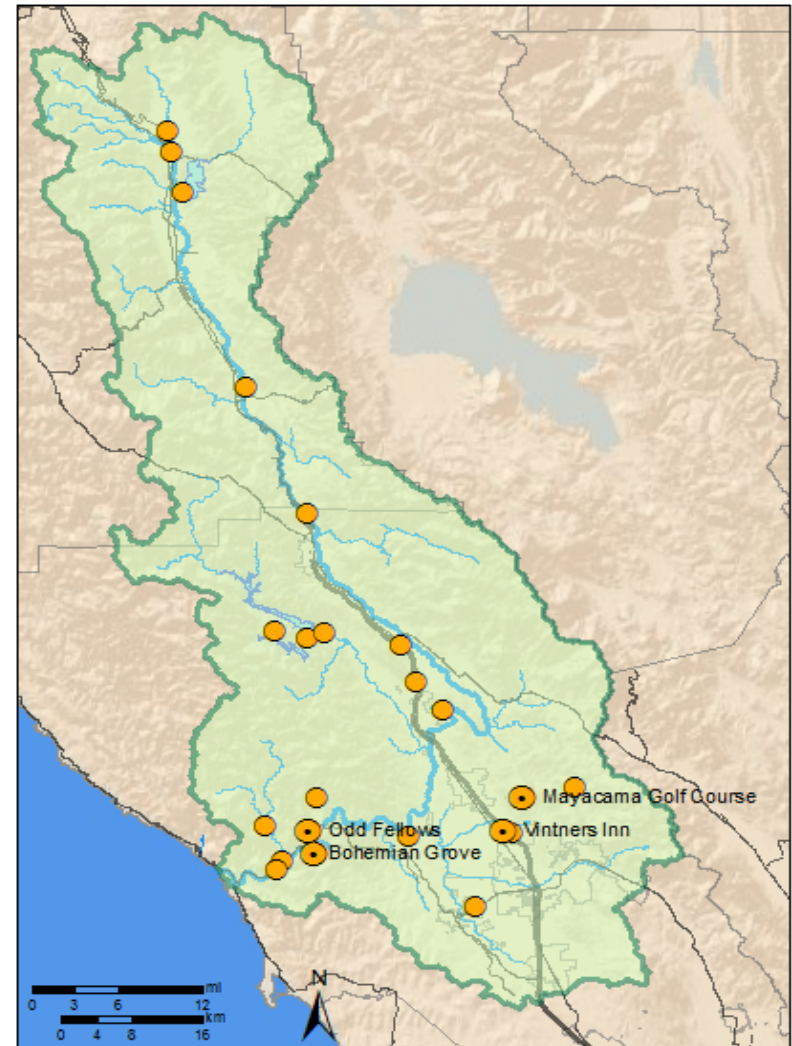
# Private Domestic Wastewater Treatment Facilities

- 23 Domestic Systems
- No NPDES Discharges
- Waste Discharges to Land
  - Septic Systems
  - Pond Treatment/Storage Systems
- Individual and General Waste Discharge Requirements



# Private Domestic Wastewater Treatment Facilities

- **Large Systems (> 20,000 gpd)**
  - Individual WDRs
  - Bohemian Grove, Vintner's Inn, Mayacamas Golf Course, Luther Burbank Center
- **Small to Medium-Sized Systems (1,500- 20,000 gpd)**
  - Individual and General WDRs
  - Mobilehome Parks, Campgrounds, Salvation Army, Odd Fellows, Farm Worker Housing





# Private Domestic Wastewater Treatment Facilities

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## Unregulated Facilities

- Campgrounds and RV Parks
- Mobilehome Parks
- Summer Camps
- Conference Facilities
- Schools
- Hotels and Lodges
- Restaurants
- Food Production/Processing Facilities



# Private Domestic Wastewater Treatment Facilities

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- Residential Systems (<1,500 gpd)
  - Regulated by County under Basin Plan Policy
  - Single and Multiple Family residences
  - Vacation Rentals
  - Small Commercial Facilities



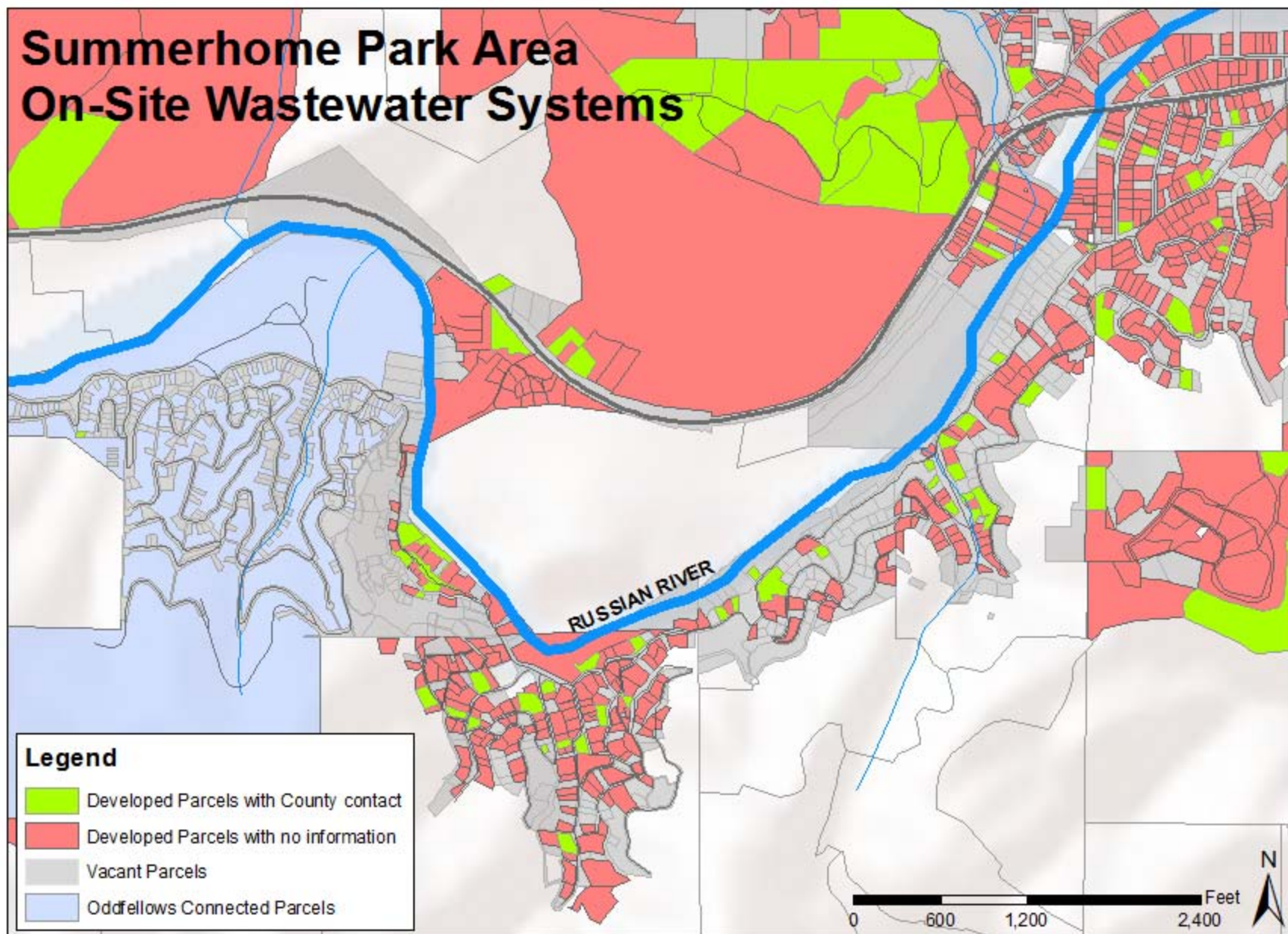
# Private Domestic Wastewater Treatment Facilities

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- Watershed-wide Parcel Analysis using GIS
  - Fill data gaps
  - Identify potential problem areas
- Local Coordination
  - Sonoma County Permit and Resource Management Department
  - Sonoma County Department of Health Services
  - Sonoma County Assessor's Office
  - Mendocino County Division of Environmental Health
  - Municipalities



# Summerhome Park Area On-Site Wastewater Systems





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# Russian River Indicator Bacteria Impairments







# Russian River Pathogen TMDL UC Davis Pilot Study

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Conducted by Aquatic Ecosystems Analysis Laboratory


Preliminary Findings for Indicator Bacteria:

- Thresholds exceeded throughout study area
- Lower levels at semi-rural, less developed sites than at urban sites
- Positive correlation with rainfall
- Human-source bacteria present in significant concentrations in agricultural and urban areas



# Russian River Pathogen TMDL UC Davis Pilot Study

Summary Report available at:  
[http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)



**Russian River Pathogen Monitoring Pilot Project**  
Report Summary

The North Coast Regional Water Quality Control Board (Regional Water Board) is in the process of studying pathogen contamination in the Russian River watershed as part of an effort to protect human health and water quality, as required by the federal Clean Water Act.

A comprehensive monitoring program, scheduled to begin in Spring 2011, is needed to identify sources of pollution and inform recommendations for corrective measures.

As part of the planning process, the Regional Water Board commissioned a pilot study of pathogen contamination in the watershed. Over six months from December 2008 through May 2009, the Aquatic Ecosystems Analysis Laboratory at the University of California, Davis conducted the study, which is summarized in this fact sheet.

The full "Russian River Pathogen TMDL Monitoring Pilot Project: A Summary Report to the North Coast Regional Water Quality Control Board" report is available on the Regional Water Board's webpage at [http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/).

**Key Findings from the Report**

- Future pathogen monitoring should include greater sampling frequency, more monitoring locations, and a greater number of samples collected from each site
- *Bacteroides* and stable isotope analysis are recommended for monitoring human-source fecal contamination, in addition to indicator bacteria
- Indicator bacteria species were present in amounts exceeding water quality standards throughout the study area
- Bacteria levels were lower at semi-rural, relatively less developed sites than in urban locations
- Bacteria concentrations were correlated with rainfall: when rainfall increased, pollution increased
- When river flows were low, human-source bacteria were present in significant concentrations in both agricultural and urban areas

**Background: Russian River Pathogen Impairments**

Levels of pathogenic indicator bacteria in several segments of the Russian River and its tributaries are high enough that these reaches are listed as "impaired" under Section 303(d) of the federal Clean Water Act. Impairment means that these waters are at times unsafe for swimming, wading, and other forms of water contact recreation. The federal Clean Water Act requires the Regional Water Board to identify sources of the contamination and adopt a cleanup plan that, when implemented, will make these waters safe for people to use for recreation.

Previous studies have identified bacteria contamination in the following river and stream reaches:

- Russian River from Fife Creek in Guerneville to Dutch Bill Creek in Monte Rio
- Russian River around Healdsburg Memorial Beach, from the railroad bridge to the Highway 101 bridge
- An unnamed creek near Fitch Mountain in Healdsburg
- Green Valley Creek and its tributaries
- The Laguna de Santa Rosa and its tributaries, including Santa Rosa Creek and its tributaries

North Coast Regional  
Water Quality Control Board

page 1  
January 2011



# Russian River Pathogen TMDL UC Davis Pilot Study

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## Monitoring Recommendations:

- Expand analyses to include *Bacteroides* and Stable Isotope Analysis
- Sample at least weekly during the dry season
- Sample on weekends, including holidays
- Sample a range of flows
- Sample in the tributaries
- Collect at least 3 samples at each site



# Russian River Pathogen TMDL Monitoring Plan

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## Management Questions

1. Are Basin Plan Water Quality Objectives being met?
2. What is the variability of indicator bacteria?
3. What are the most significant sources?
4. What are the natural background levels?
5. Do beach areas pose a higher risk to REC-1 than non-beach reaches?



# Russian River Pathogen TMDL Monitoring Plan

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## Monitoring Analytes

- *E. coli* Bacteria
  - Department of Health regulatory criteria
- *Enterococcus* Bacteria
  - Department of Health regulatory criteria
- *Bacteroides* Bacteria
  - specific to the host animal (human vs. bovine)
- Phylochip®
  - Quantifies over 50,000 different bacteria  
including human pathogens
- Stable Isotope Analysis
  - Identifies the source of the surface water





# Russian River Pathogen TMDL Monitoring Plan

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## Monitoring Tasks

### Task 1: Sampling Variability

- Laboratory, Site and Sample Replication

### Task 2: Spatial and Temporal Variability

- Wet and Dry Period Monitoring at 18 Locations

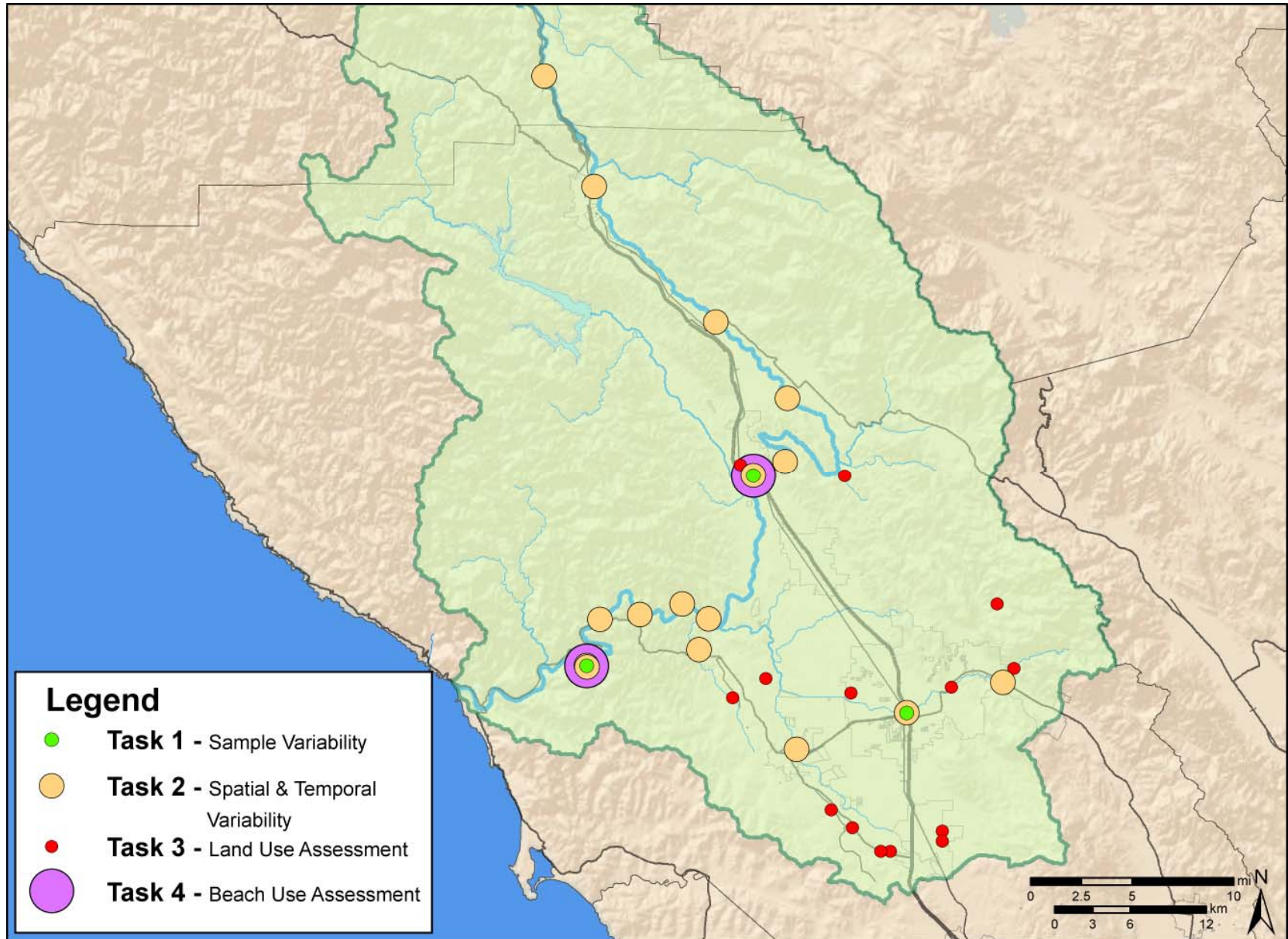
### Task 3: Land Use Assessment

- Wet and Dry Period Monitoring Runoff
- 5 Land Use Categories:  
Forest Land, Brush & Scrubland, Agriculture,  
High Density Residential, Low Density Residential Areas.

### Task 4: Beach Use Assessment

- Week-long Intensive Monitoring at 2 Listed Beaches:  
Monte Rio Beach & Healdsburg Memorial Beach.

# Pathogen TMDL Monitoring Locations





# Russian River Pathogen TMDL Monitoring Plan

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Quality Assurance Project Plan will be available at:

[http://www.waterboards.ca.gov/northcoast/  
water\\_issues/programs/tmdls/russian\\_river/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/russian_river/)



# Russian River Pathogen TMDL Schedule

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Activity	Timeframe
Regional Board Lab Certification	April 2011
Sample collection	May – Winter 2012
Monitoring Plan Report	June 2012
Draft TMDL	Early 2013
Regional Board Hearing	2013





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# Laguna de Santa Rosa TMDLs

Includes

Waterbodies:

Laguna de Santa Rosa

Windsor Creek

Mark West Creek

Santa Rosa Creek

Blucher Creek

Copeland Creek

Impairments:

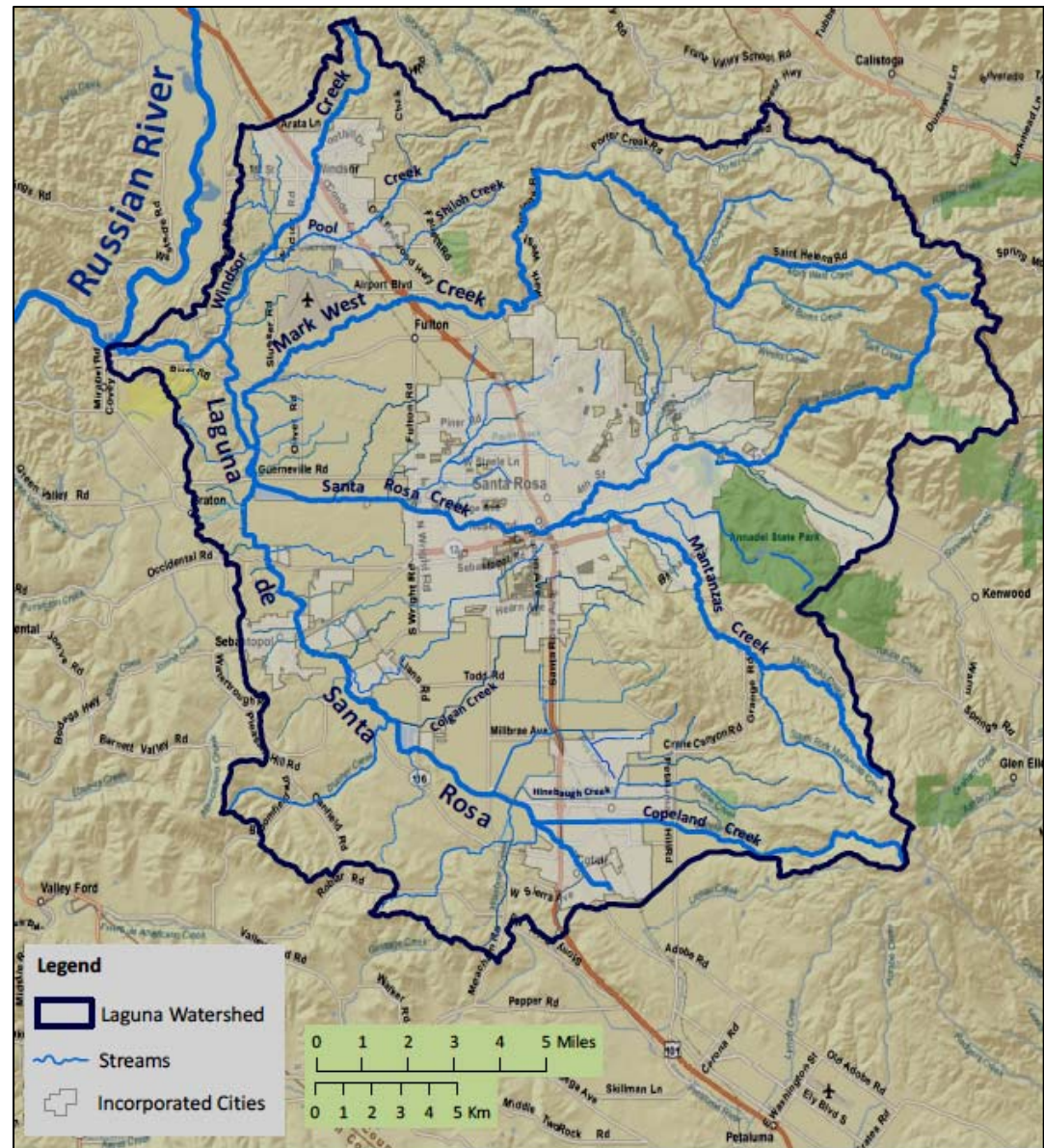
Nitrogen

Phosphorus

Dissolved Oxygen

Temperature

Sediment





# Laguna TMDLs

## Nutrient Source Analysis

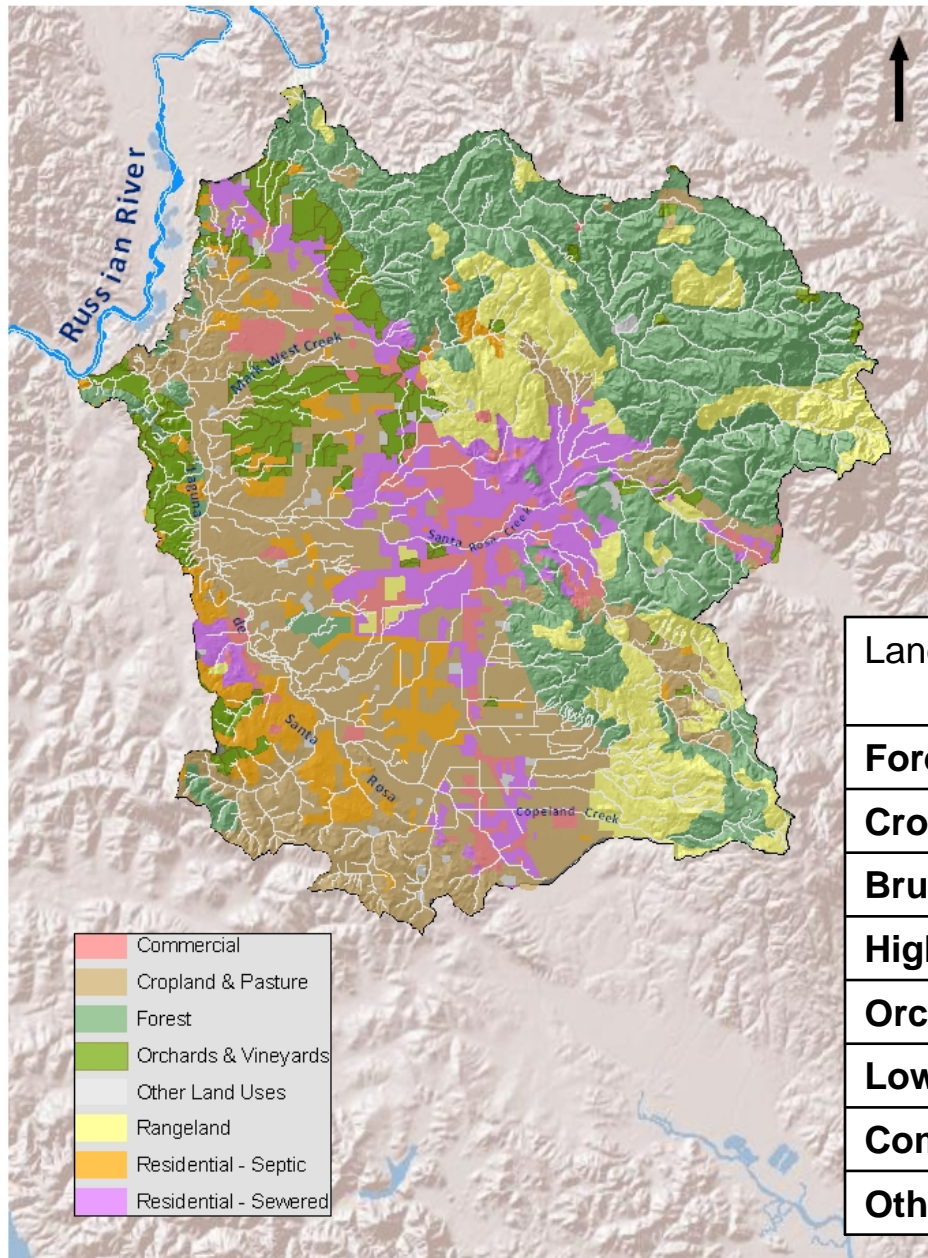
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Land Use Categories Sampled in 2009:  
Based on 2006 USGS National Land Cover Data

- Residential – High Density, Sewered
- Residential – Low density, Non-sewered
- Commercial and Services
- Cropland and Pasture
- Vineyards, Orchards, and Horticultural Areas
- Brush and Scrubland
- Forested Lands



# Current Land Cover Areas

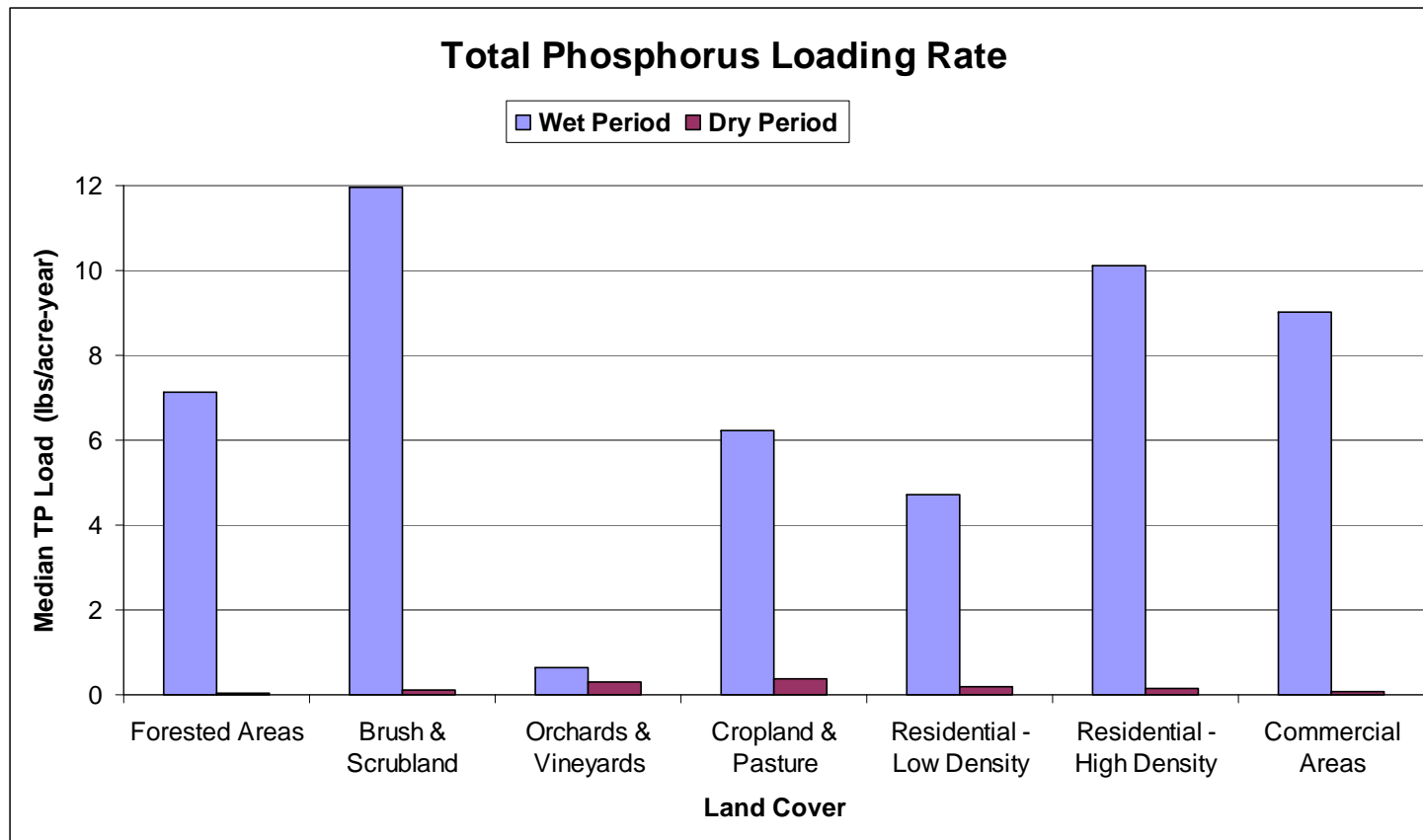


Land Cover Category	Wet Year Acreage	Percent of Watershed
<b>Forested Lands</b>	<b>48,315</b>	<b>30%</b>
<b>Cropland &amp; Pasture</b>	<b>44,458</b>	<b>28%</b>
<b>Brush &amp; Scrublands</b>	<b>21,767</b>	<b>13%</b>
<b>High Density Residential</b>	<b>15,348</b>	<b>9%</b>
<b>Orchards &amp; Vineyards</b>	<b>12,825</b>	<b>8%</b>
<b>Low Density Residential</b>	<b>9,857</b>	<b>6%</b>
<b>Commercial Areas</b>	<b>8,577</b>	<b>5%</b>
<b>Other Land Covers</b>	<b>1,461</b>	<b>1%</b>



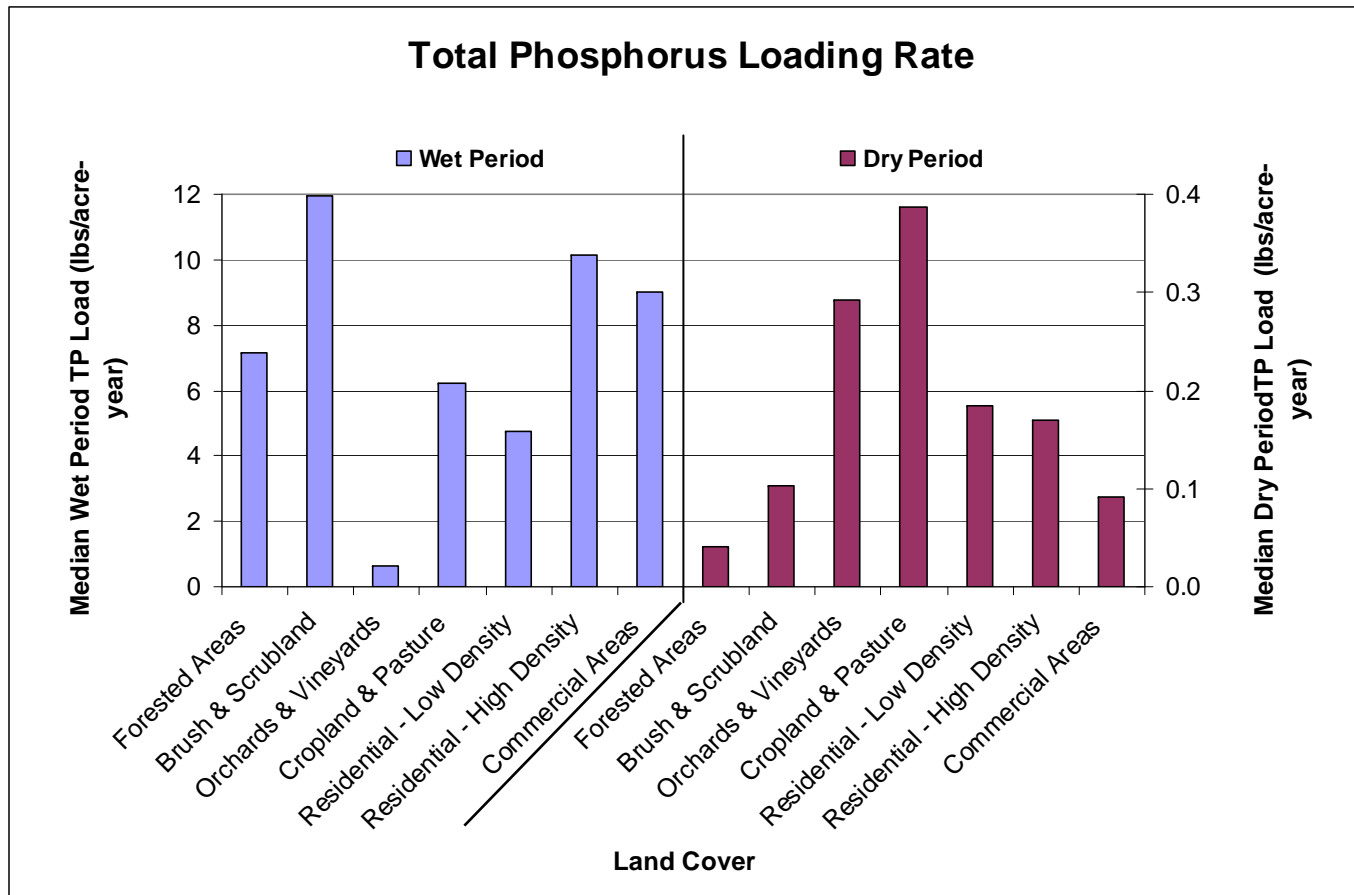
# Laguna TMDLs

## Nutrient Source Analysis



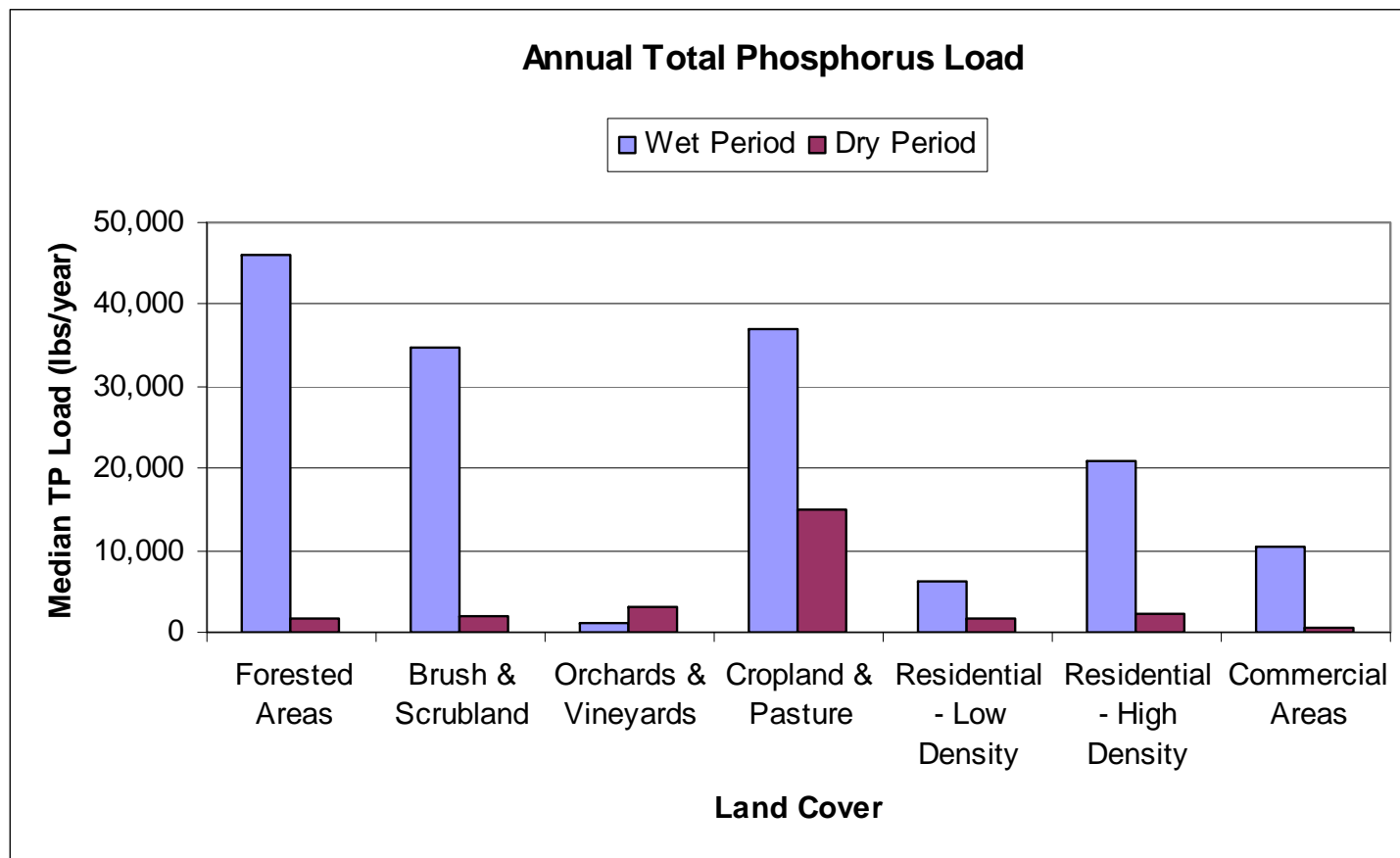
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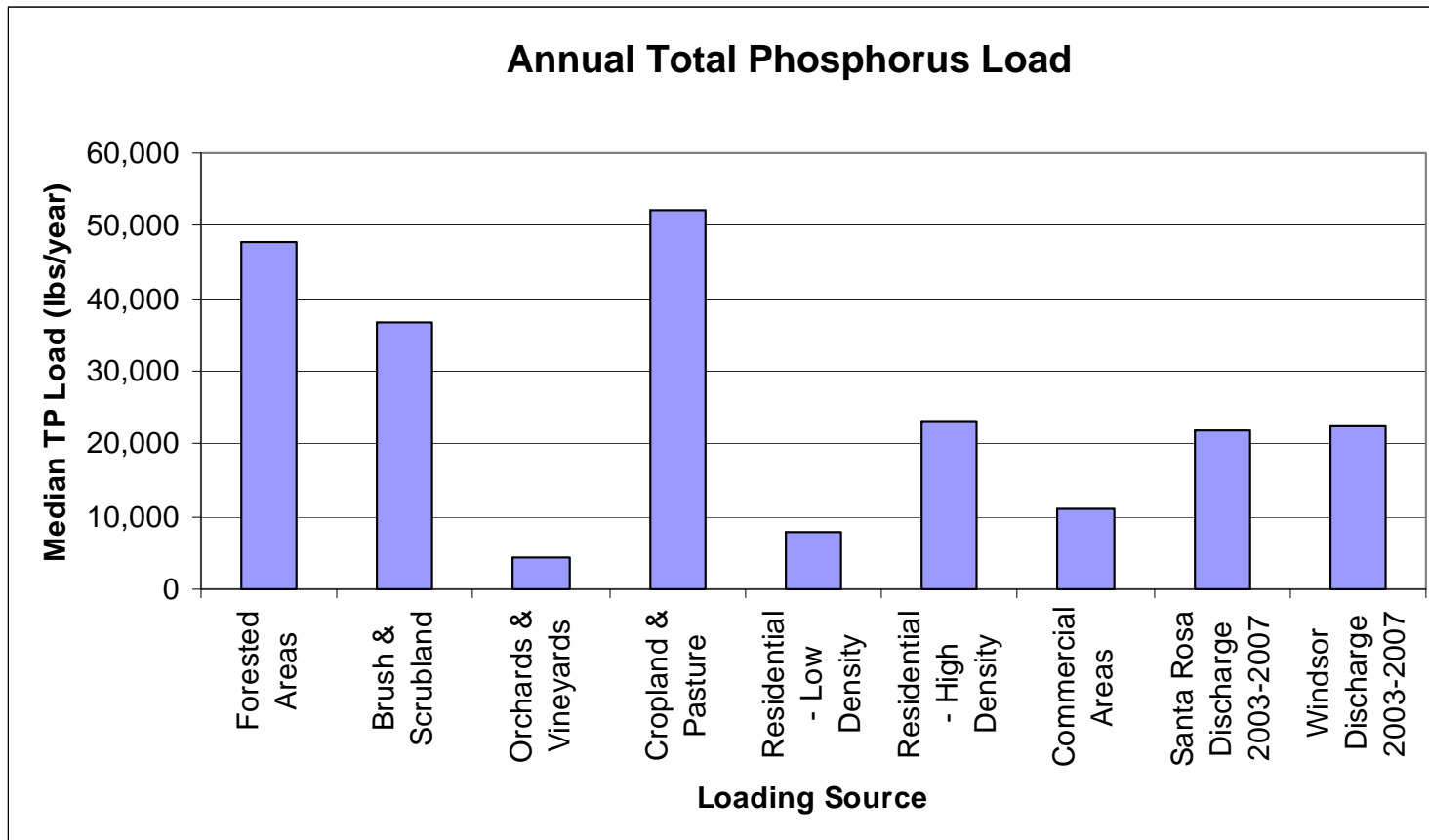
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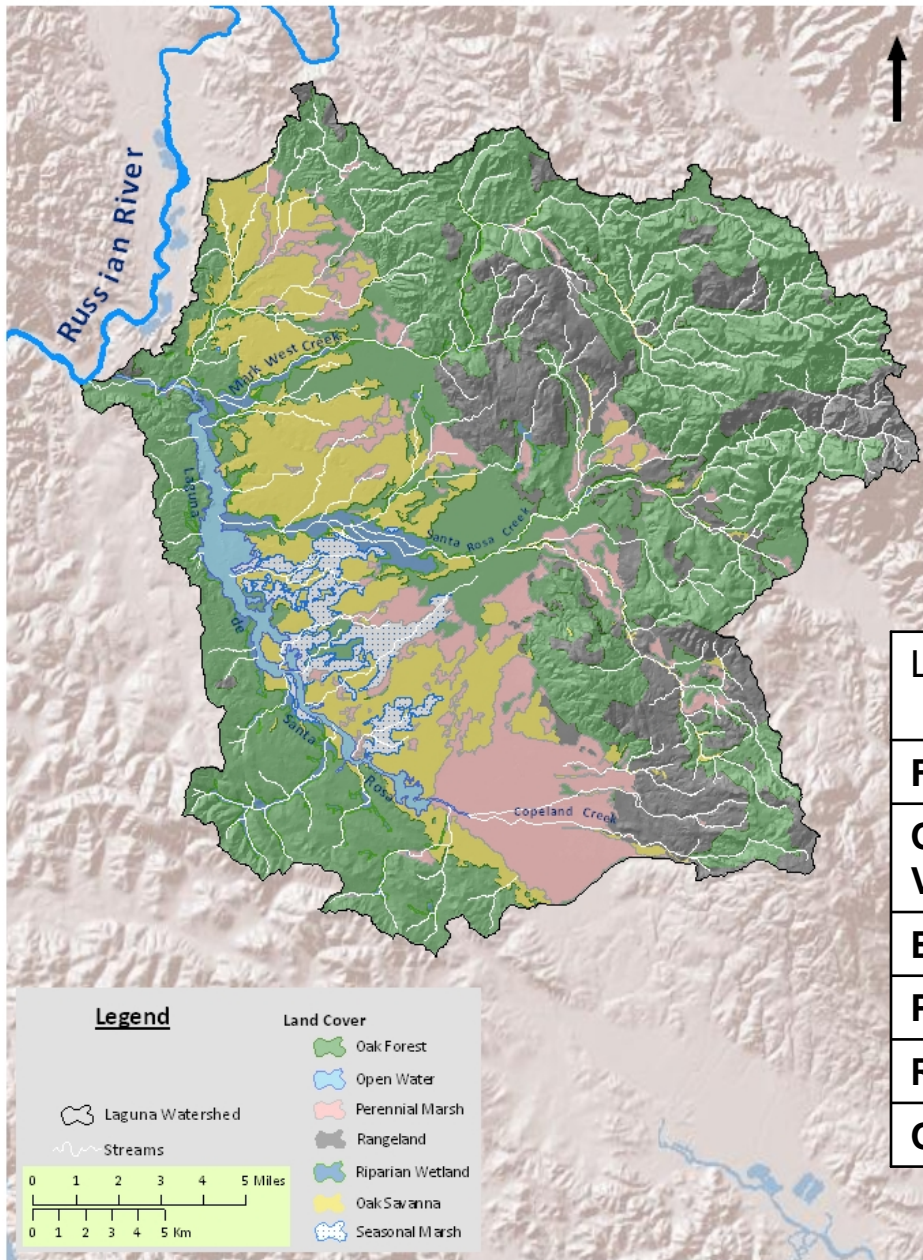
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## Nutrient Source Analysis





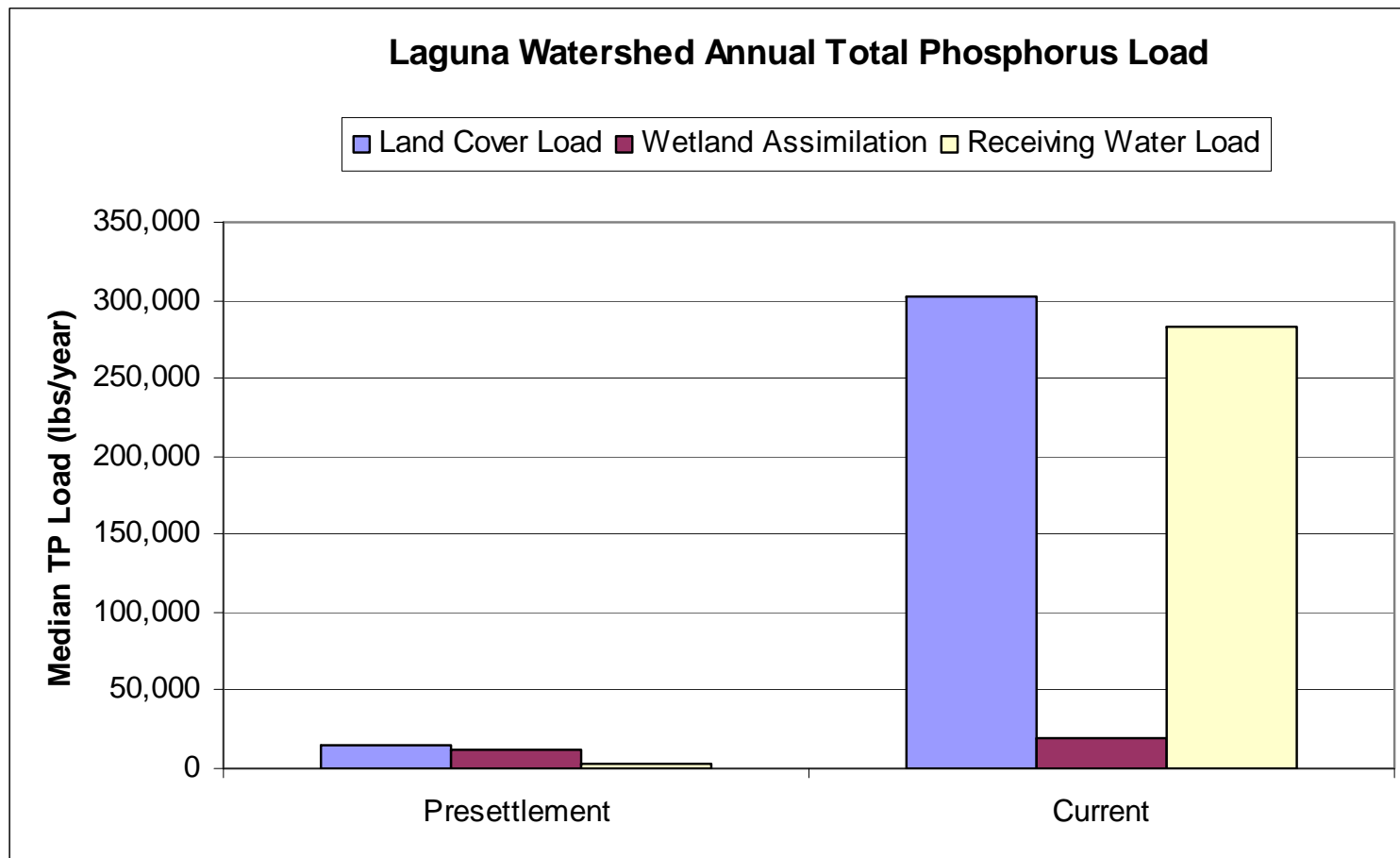
# Pre-settlement Land Cover Areas



Land Cover Category	Wet Year Acreage	Percent of Watershed
<b>Forested Lands</b>	<b>84,515</b>	<b>52%</b>
<b>Oak Savanna &amp; Vernal Pools</b>	<b>28,823</b>	<b>18%</b>
<b>Brush &amp; Scrublands</b>	<b>24,292</b>	<b>15%</b>
<b>Perennial Wetlands</b>	<b>16,969</b>	<b>10%</b>
<b>Riverine Wetlands</b>	<b>5,145</b>	<b>3%</b>
<b>Open Water</b>	<b>3,045</b>	<b>2%</b>

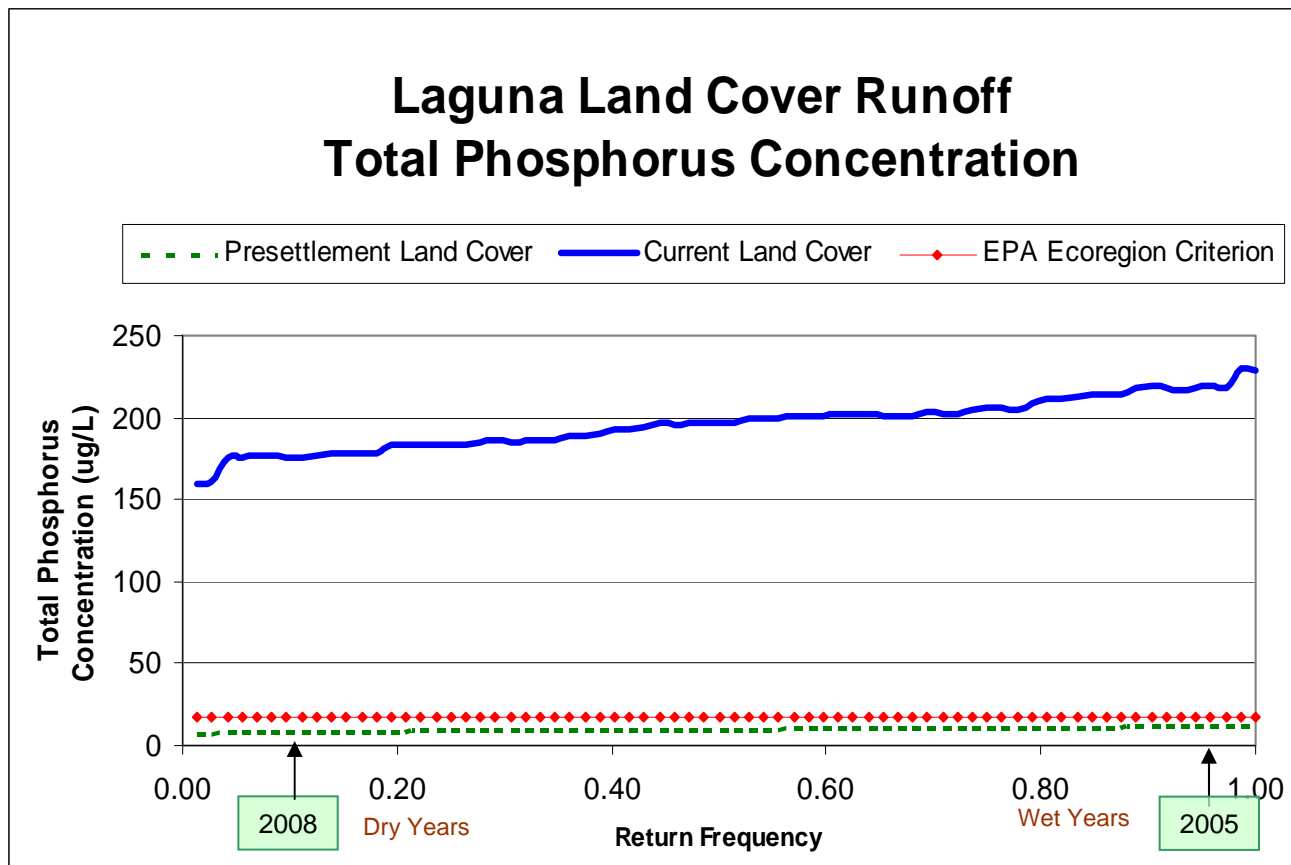
# Laguna TMDLs

## Nutrient Source Analysis



# Laguna TMDLs

## Nutrient Source Analysis



# Laguna TMDLs

## Next Steps

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### Nutrients & Dissolved Oxygen

- Linkage Analysis
- Target Conditions
- Loads & Load Allocations

### Sediment

### Temperature

### Implementation



# Stakeholder Involvement

- Critical for success
- Stakeholder Plan
  - [http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/laguna\\_de\\_santa\\_rosa](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/laguna_de_santa_rosa)
- Goals
  - Communicate with and inform stakeholders
  - Solicit and receive useful input
  - Community support





# Laguna TMDLs Schedule

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Activity	Timeframe
Stakeholder Involvement	Ongoing
Nutrient & Dissolved Oxygen Analyses	Summer 2011
Sediment & Temperature Analyses	Fall 2011
Implementation Plan Development	Fall 2011 to Early 2012
Public Review	Spring 2012
Regional Board Hearing	Fall 2012



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# Early Implementation Efforts

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- Continue regulatory programs
  - Improve municipal storm water program
  - Explore septic system coverage
  - Continue facility inspections
- Portable toilets at recreation beaches
- Engage homeless advocates/community
- Focus on migrant worker camps



# Contact Information

## Webpage:

[http://www.waterboards.ca.gov/northcoast/water\\_issues/programs/tmdls/](http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/)

## Mailing List:

[http://www.waterboards.ca.gov/resources/email\\_subscriptions/reg1\\_subscribe.shtml](http://www.waterboards.ca.gov/resources/email_subscriptions/reg1_subscribe.shtml)

## Phone:

(707) 576-2220

## E-mail:

Rebecca Fitzgerald, TMDL Unit Lead

John Short, Core Regulatory Unit Lead

Charles Reed, Russian River TMDL Project Manager

Steve Butkus, Laguna and Russian Technical Specialist



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[creed@waterboards.ca.gov](mailto:creed@waterboards.ca.gov)

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