



Item 13

Russian River Regulatory & TMDL Efforts

an update to the
North Coast Regional
Water Quality Control Board

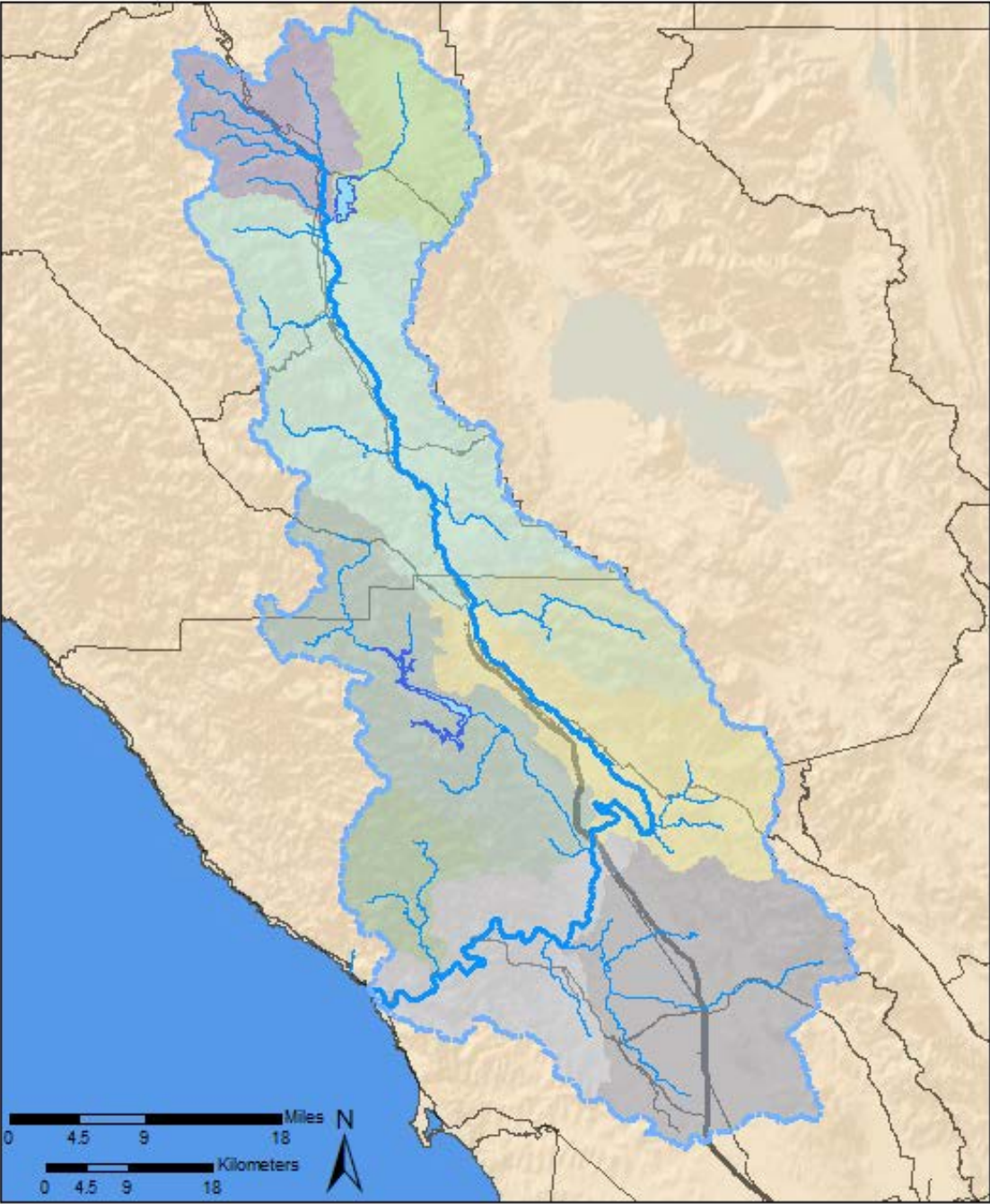
January 27, 2011



Topics

- **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

- 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

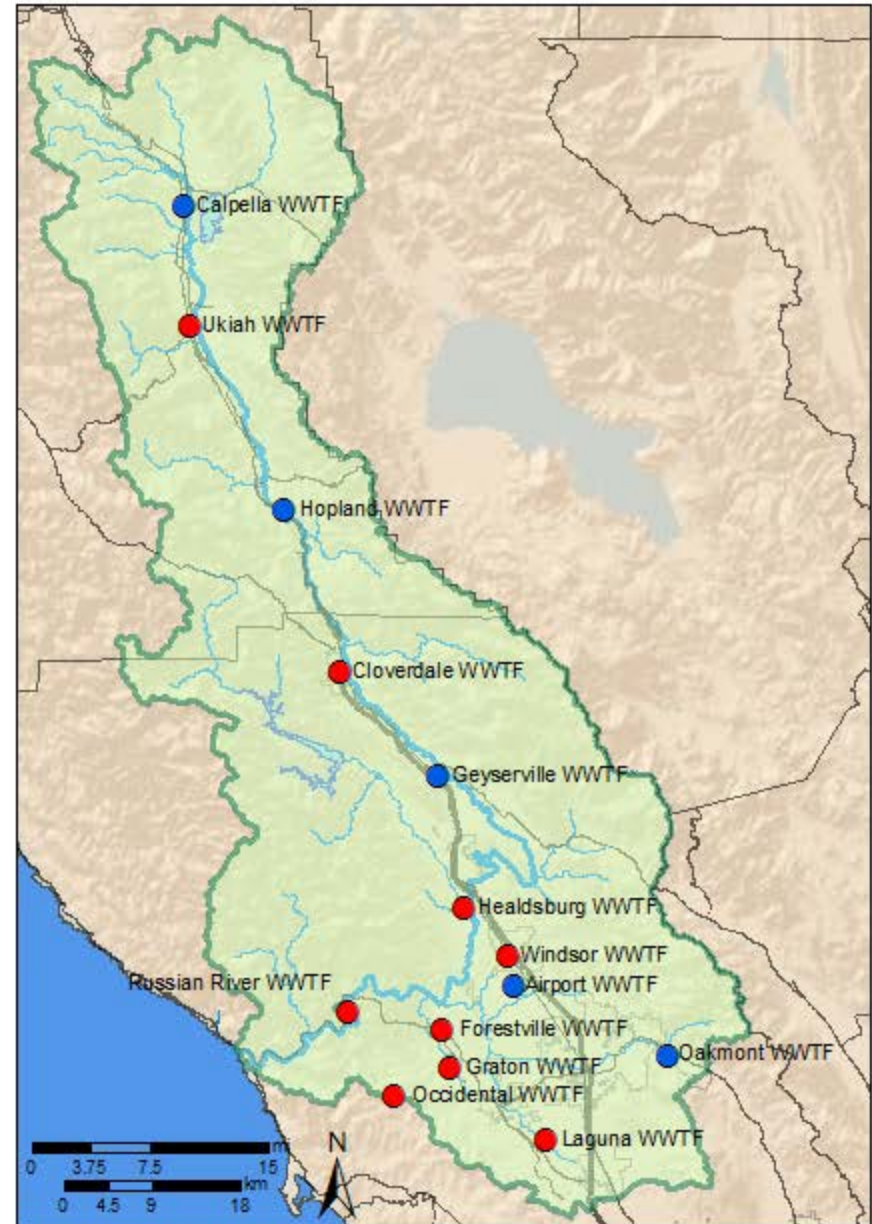


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Municipal Wastewater Treatment Facilities

- 14 POTW/s
 - 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





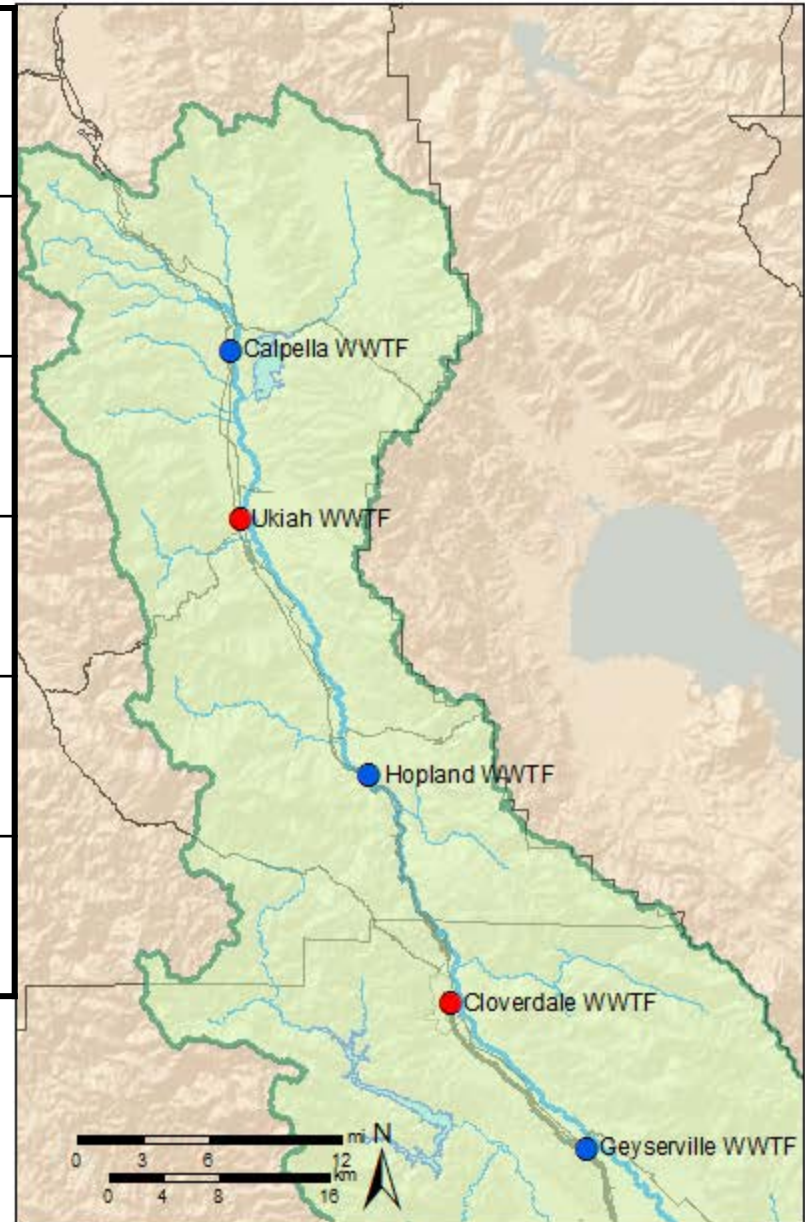
Municipal Wastewater Treatment Facilities

Control of Pollutants

- 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



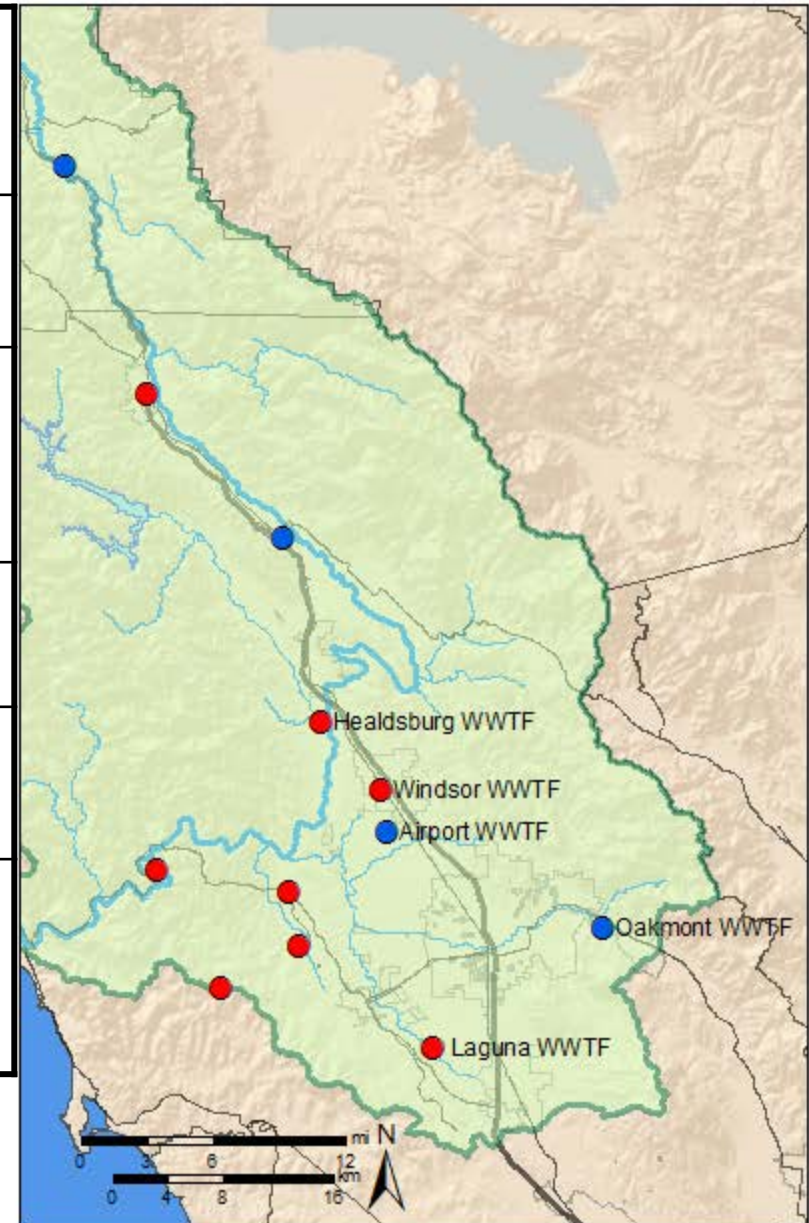
* Permit requires evaluation of compliance with Basin Plan seasonal discharge prohibition

* 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

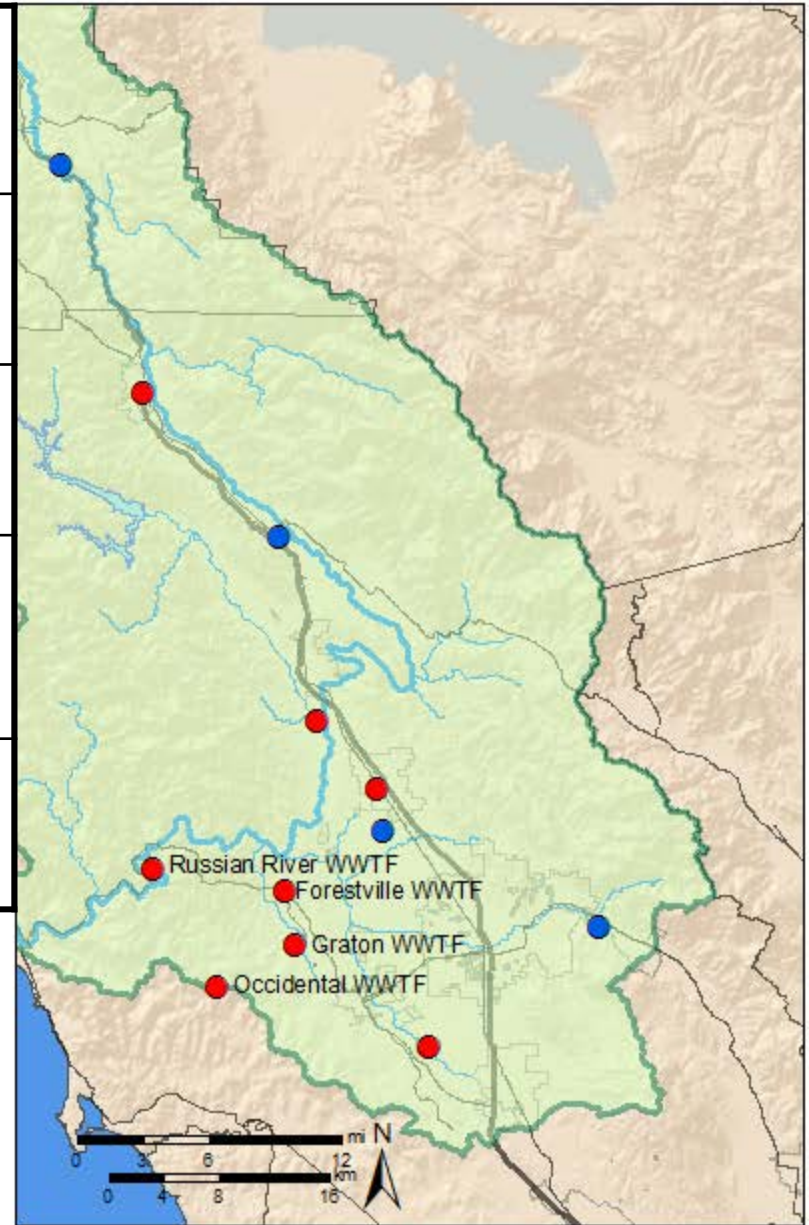


* CDO for compliance with Basin Plan seasonal discharge prohibition

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)



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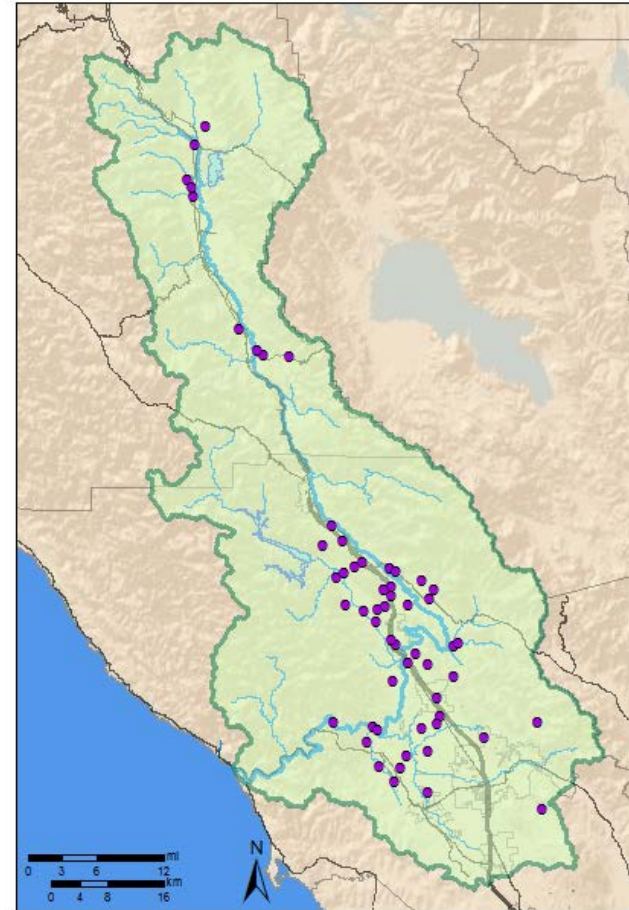
Russian River Watershed

Food Processors and Producers

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

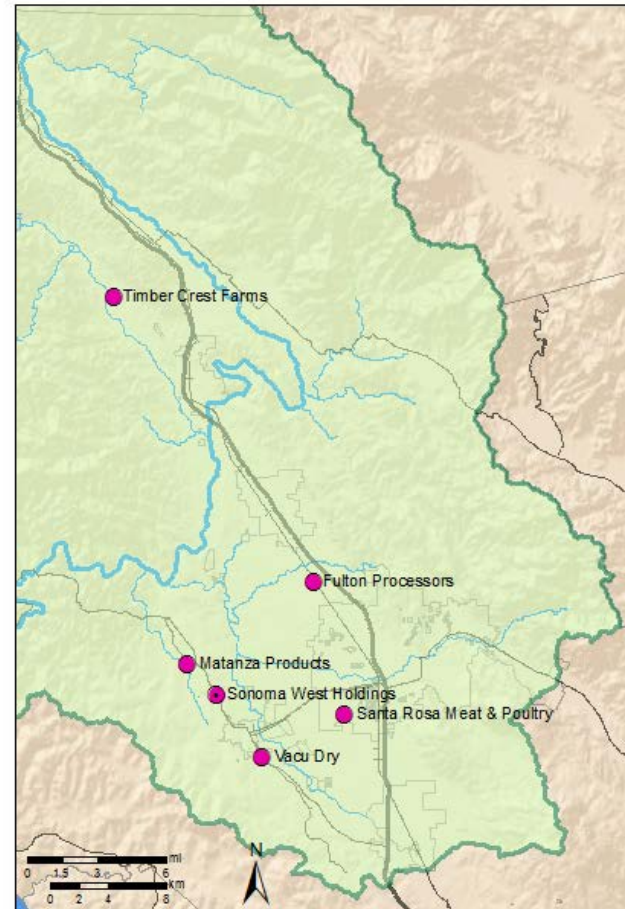
Wineries

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



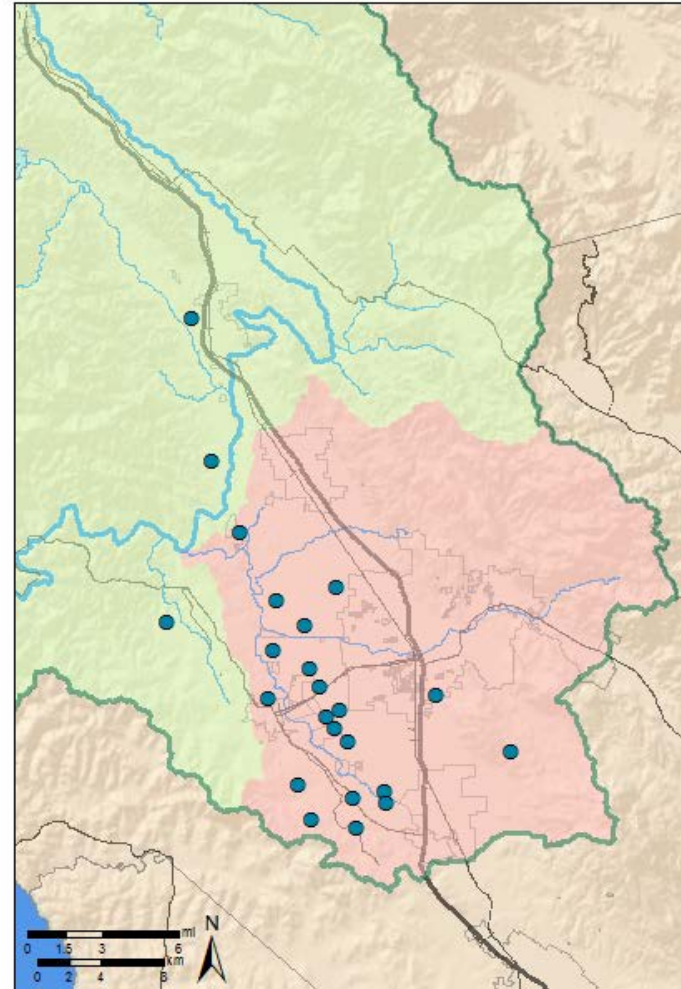
Food Processors

- 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



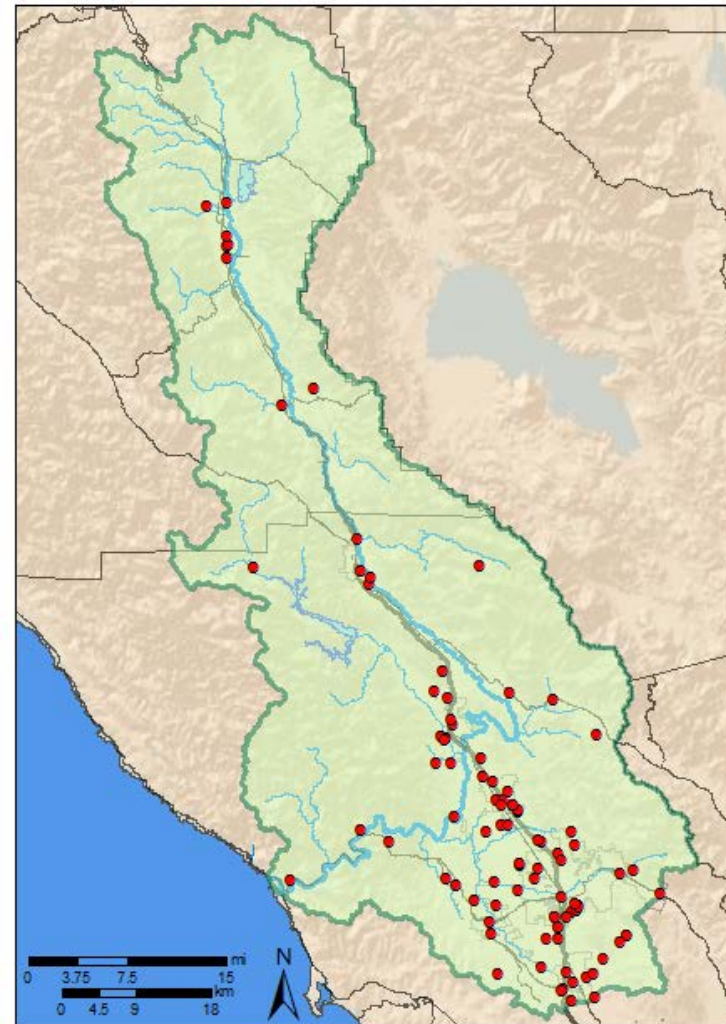


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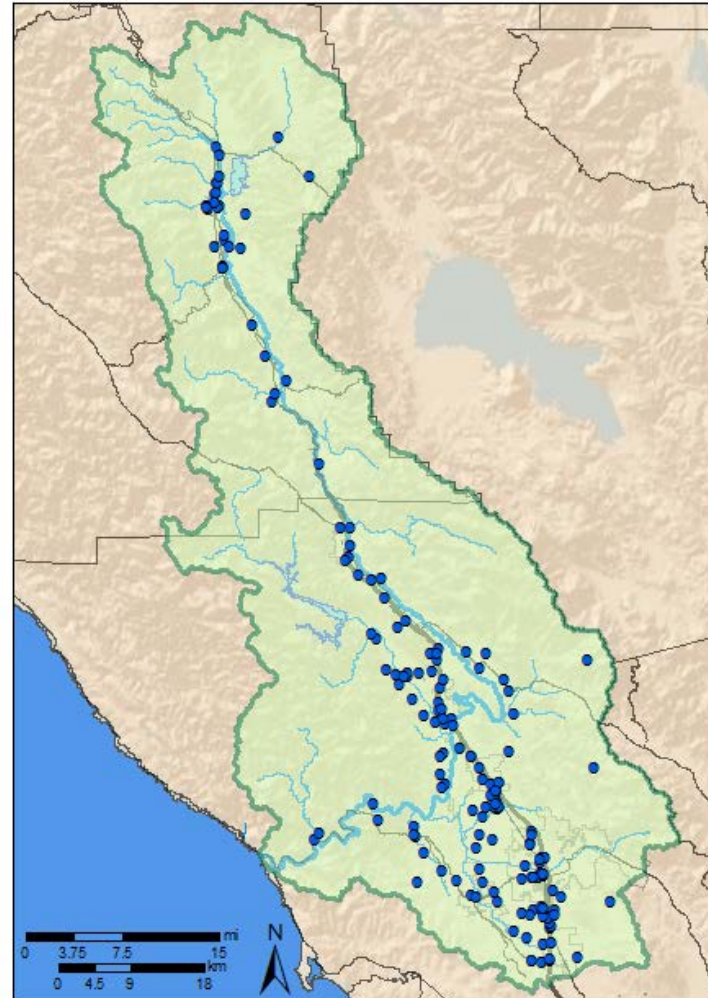
Construction Storm Water

- 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



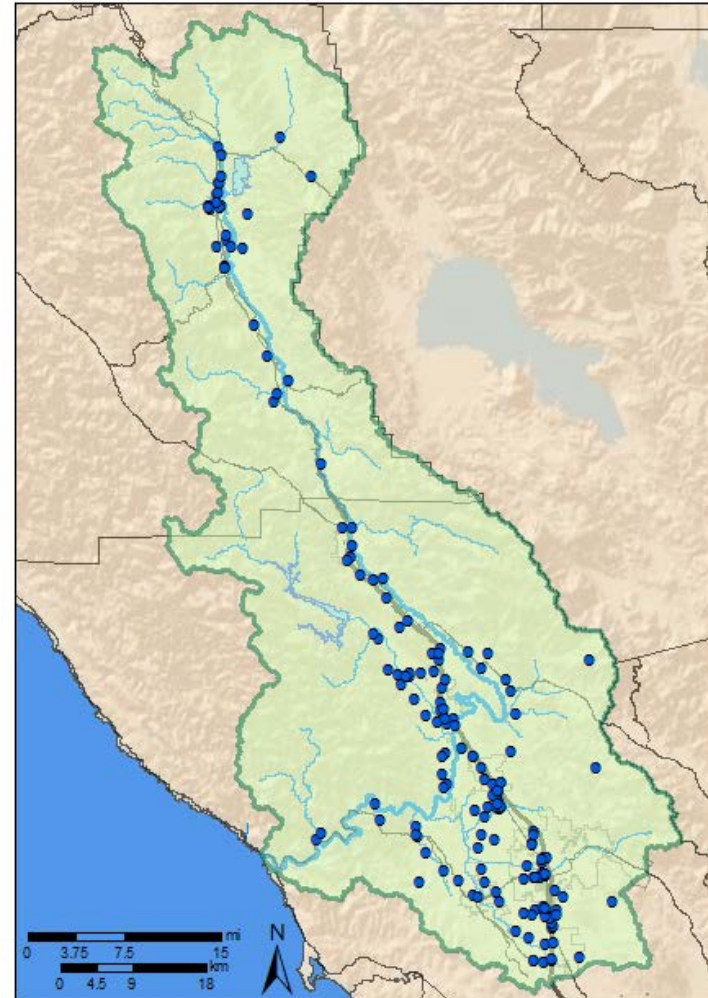
Industrial Storm Water

- 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



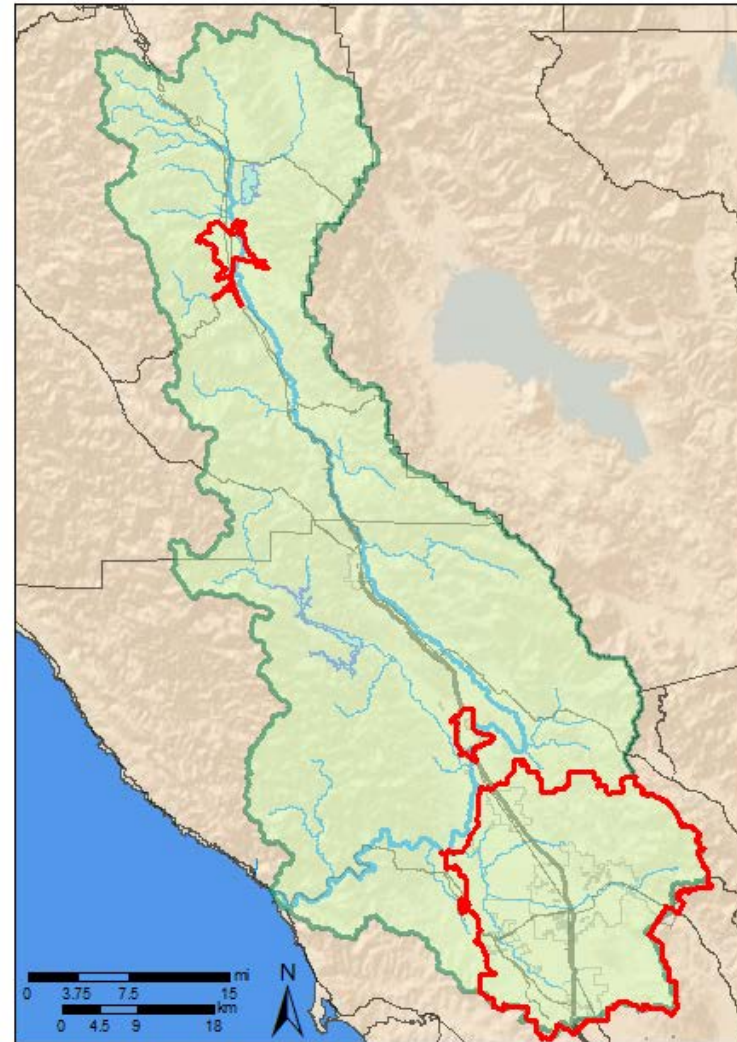
Industrial Storm Water

- 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



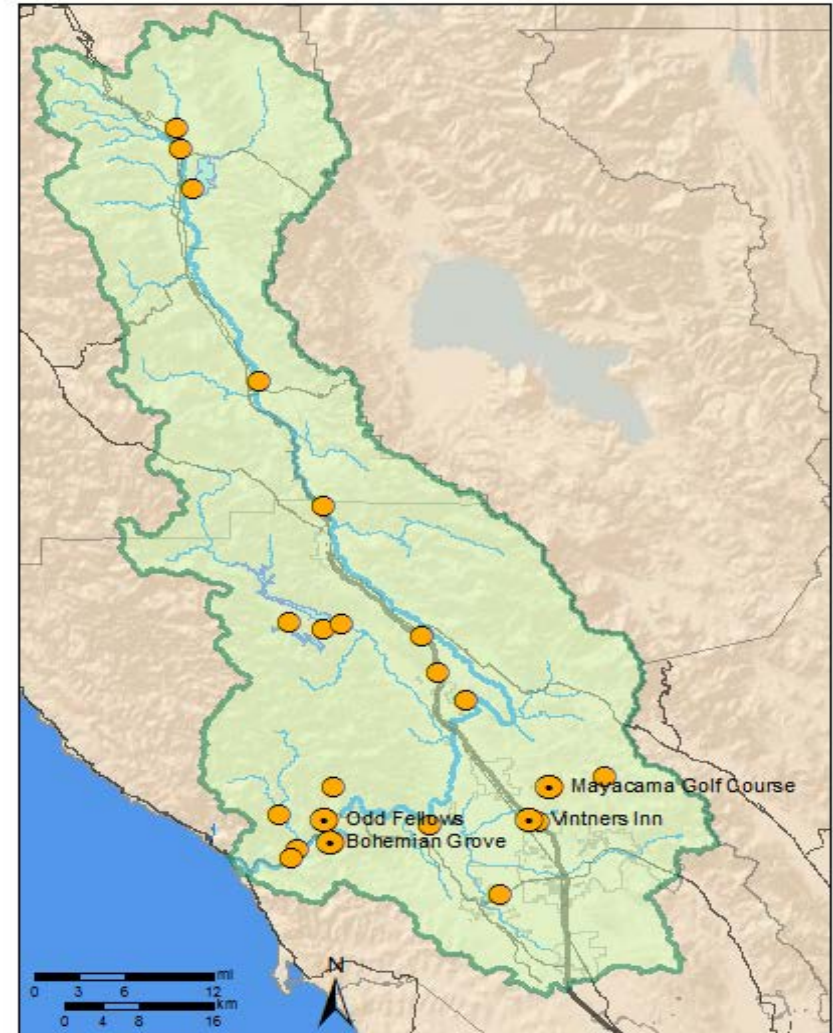


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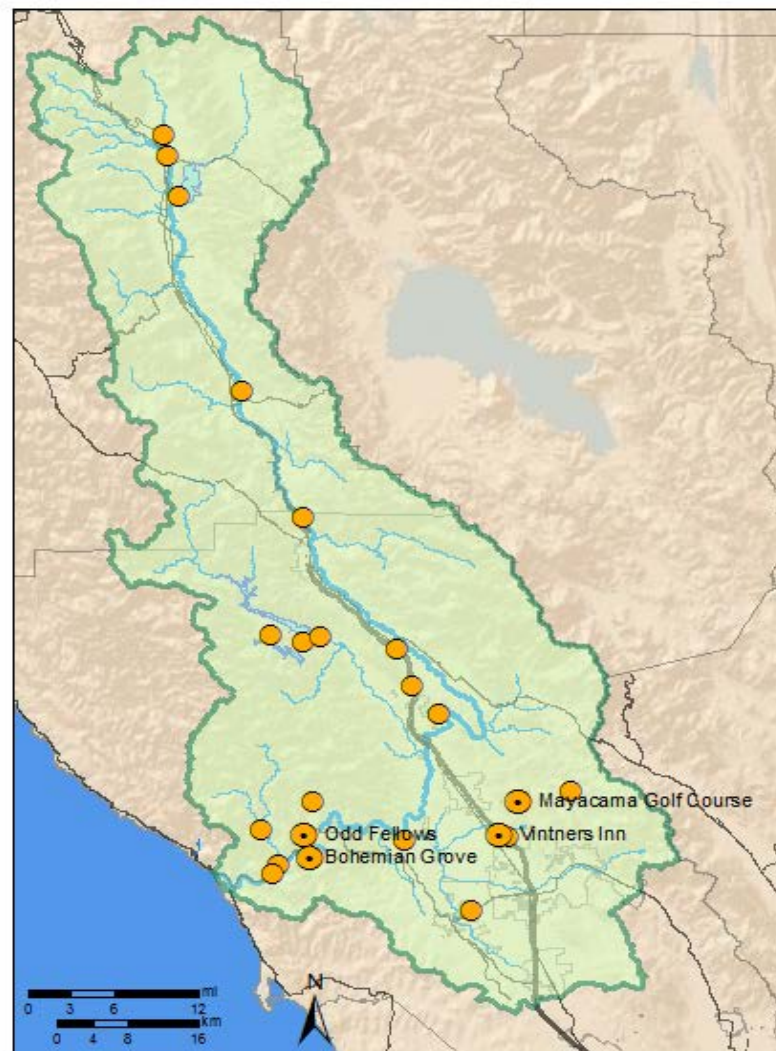
Private Domestic Wastewater Treatment Facilities

- 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

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

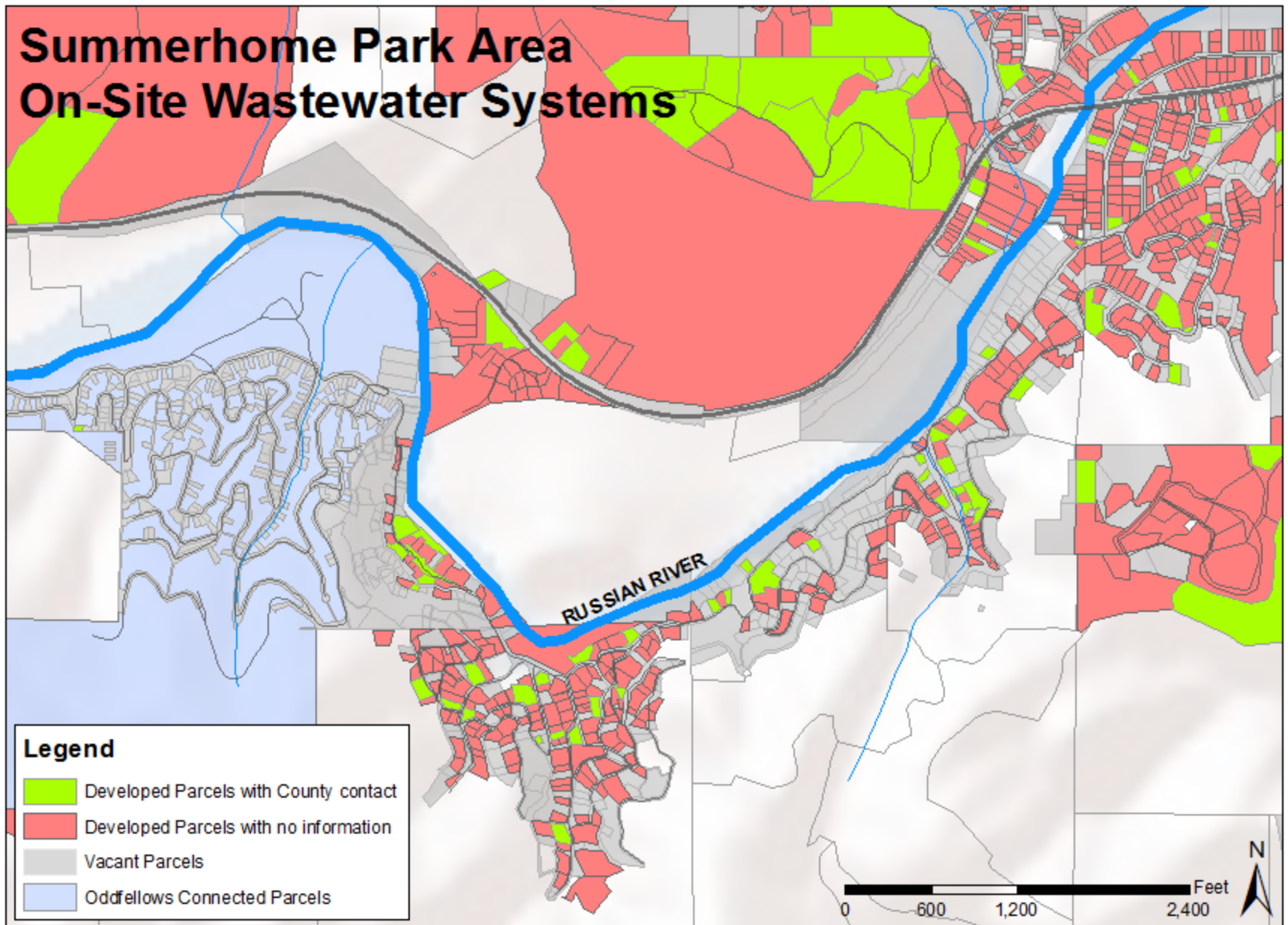
- Residential Systems (<1,500 gpd)
 - Regulated by County under Basin Plan Policy
 - Single and Multiple Family residences
 - Vacation Rentals
 - Small Commercial Facilities



Private Domestic Wastewater Treatment Facilities

- 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

Conducted by Aquatic Ecosystems Analysis Laboratory

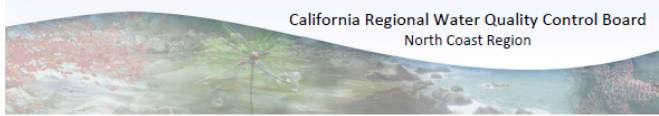
Preliminary Findings for Indicator Bacteria:

- 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/



California Regional Water Quality Control Board
North Coast Region

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/.

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

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

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

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

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

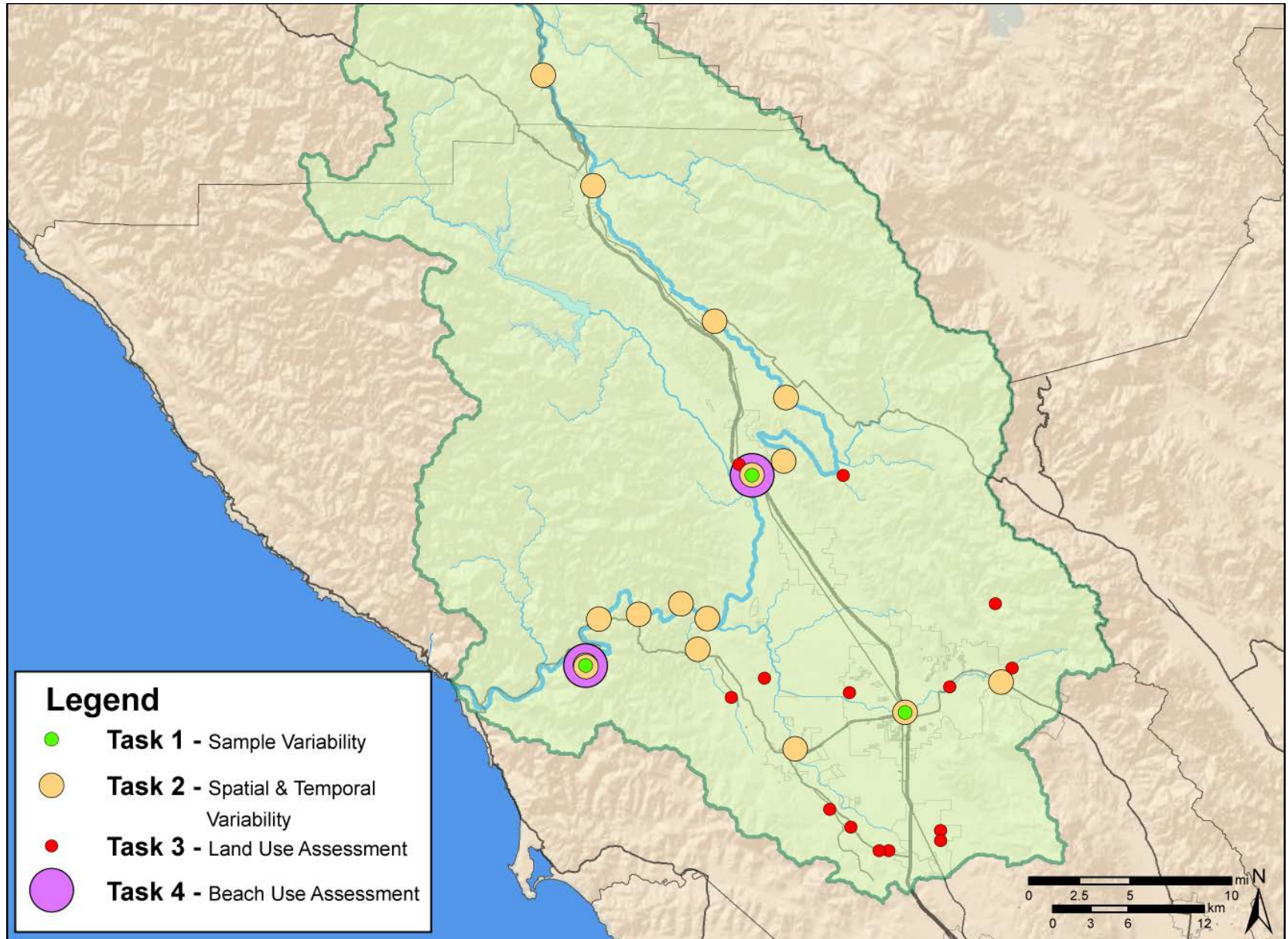
Task 3: Land Use Assessment

- 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

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

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

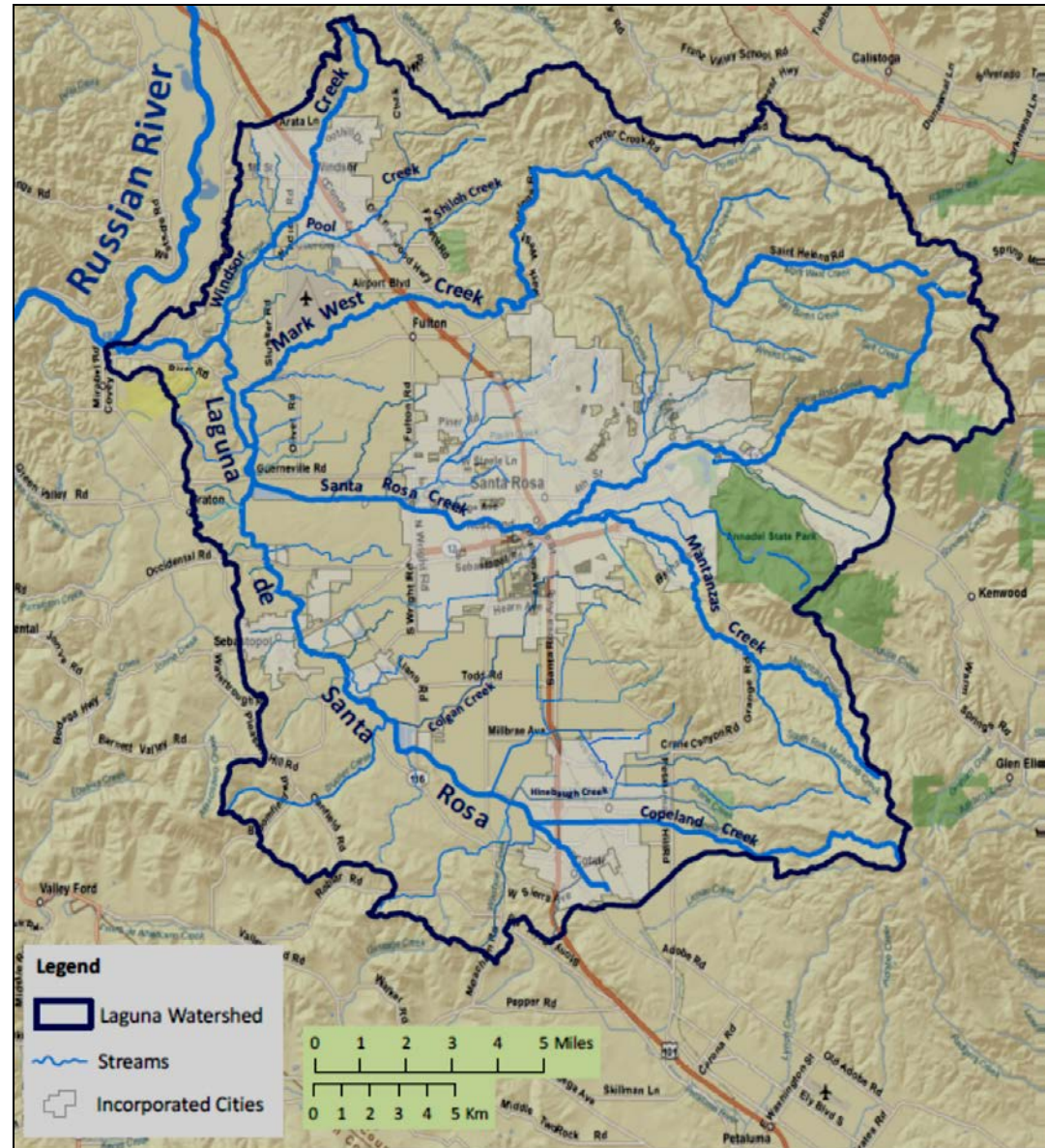
Includes

Waterbodies:

- Laguna de Santa Rosa
- Windsor Creek
- Mark West Creek
- Santa Rosa Creek
- Blucher Creek
- Copeland Creek

Impairments:

- Nitrogen
- Phosphorus
- Dissolved Oxygen
- Temperature
- Sediment





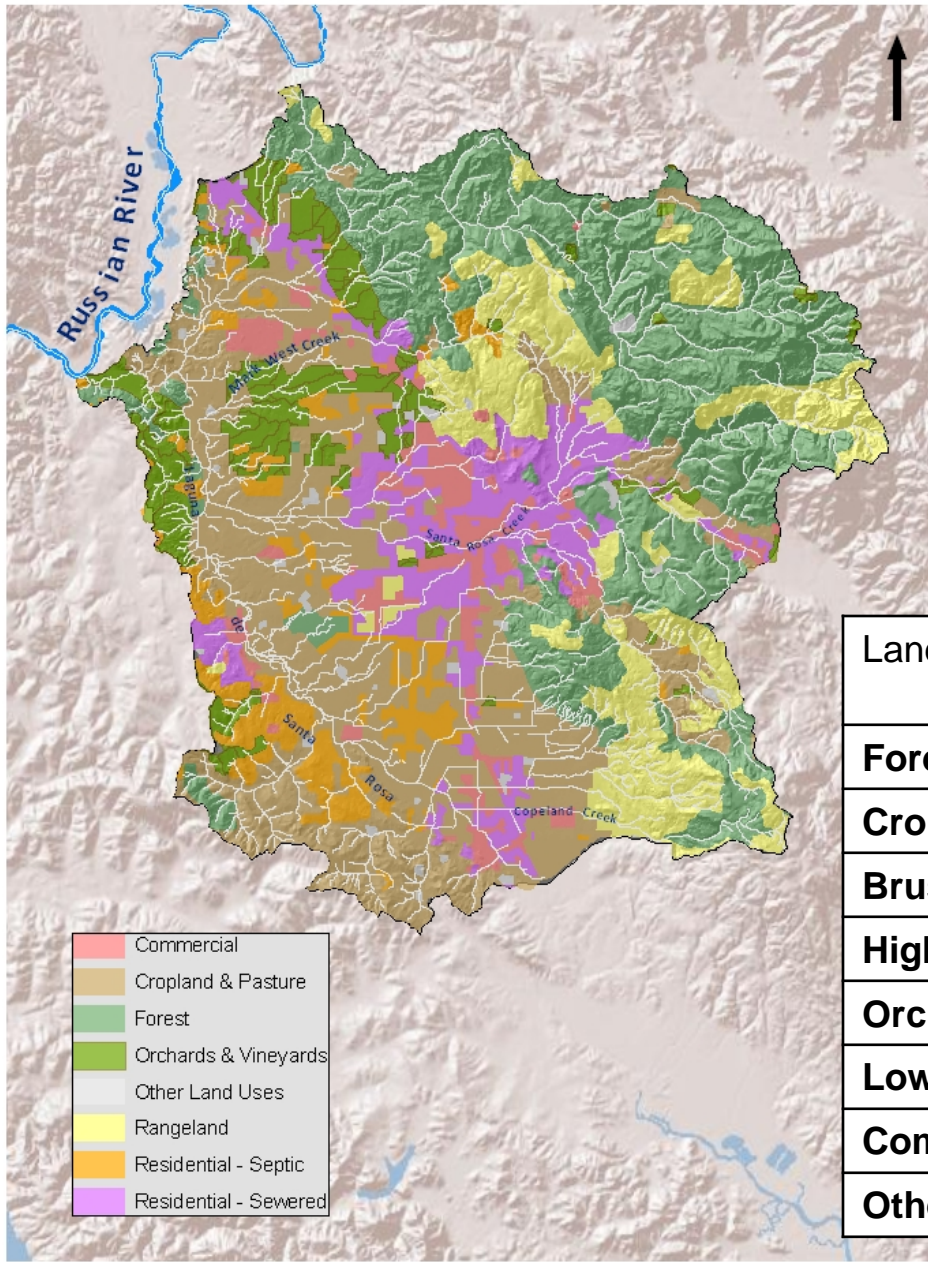
Laguna TMDLs

Nutrient Source Analysis

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

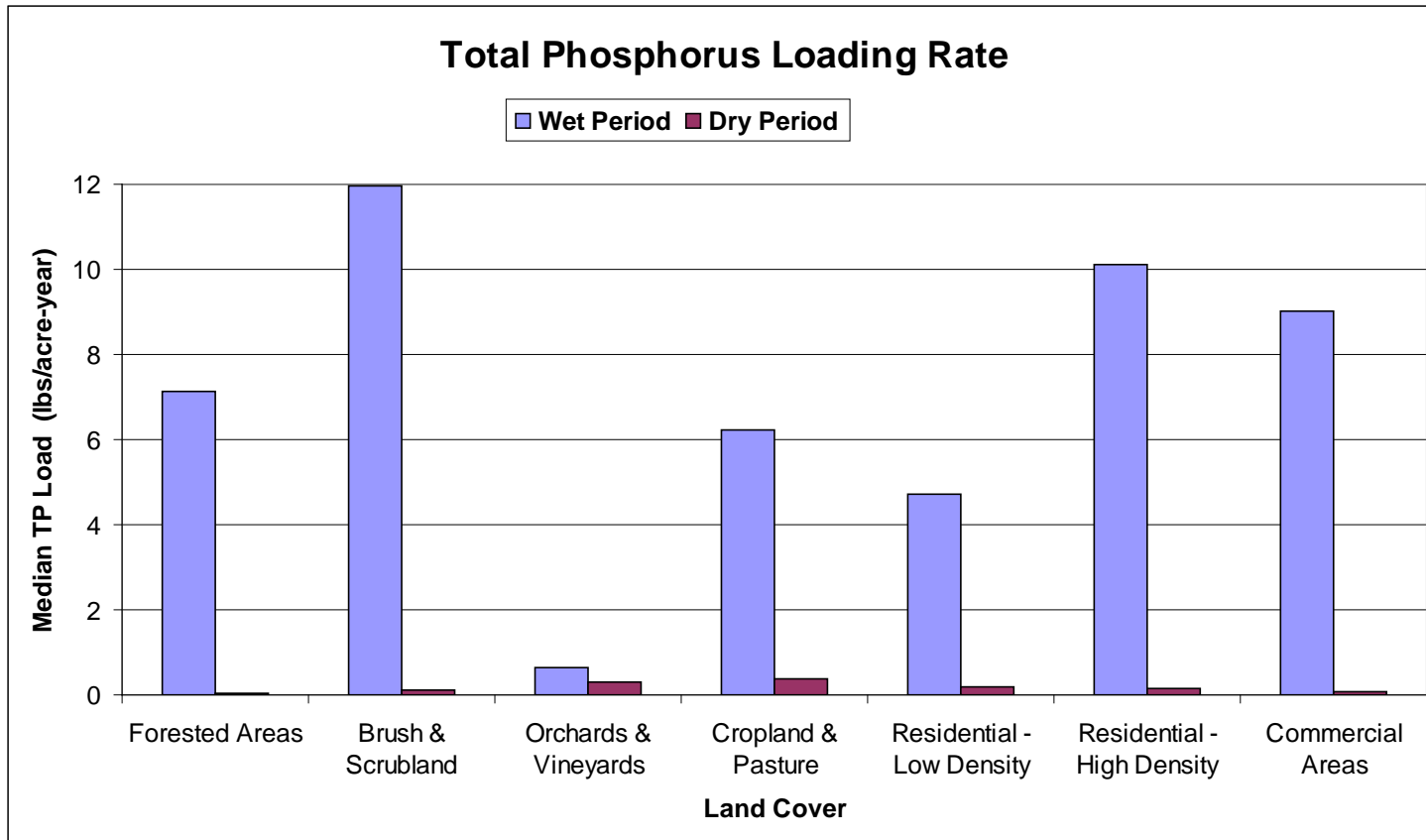
Current Land Cover Areas



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

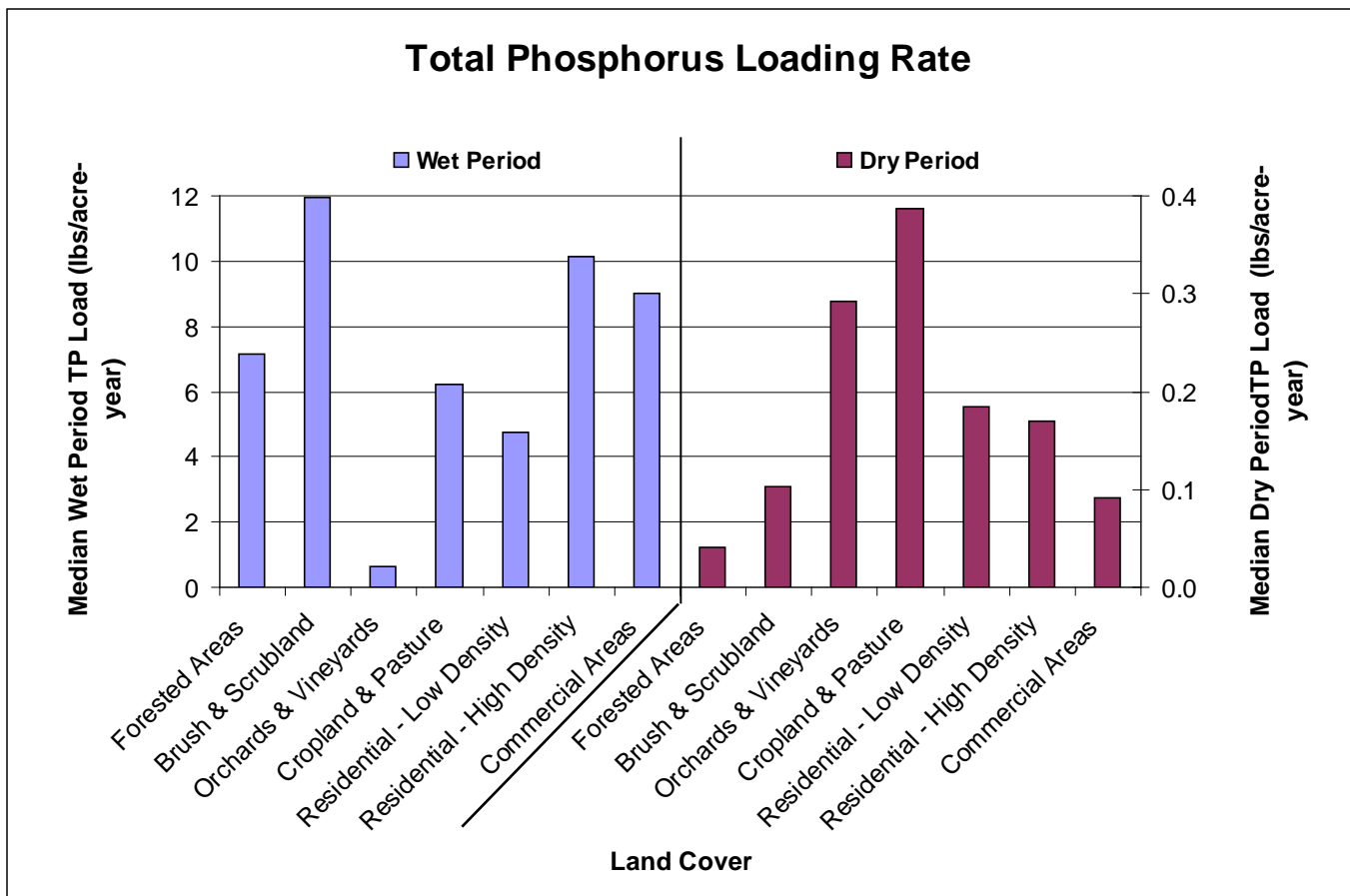
Laguna TMDLs

Nutrient Source Analysis



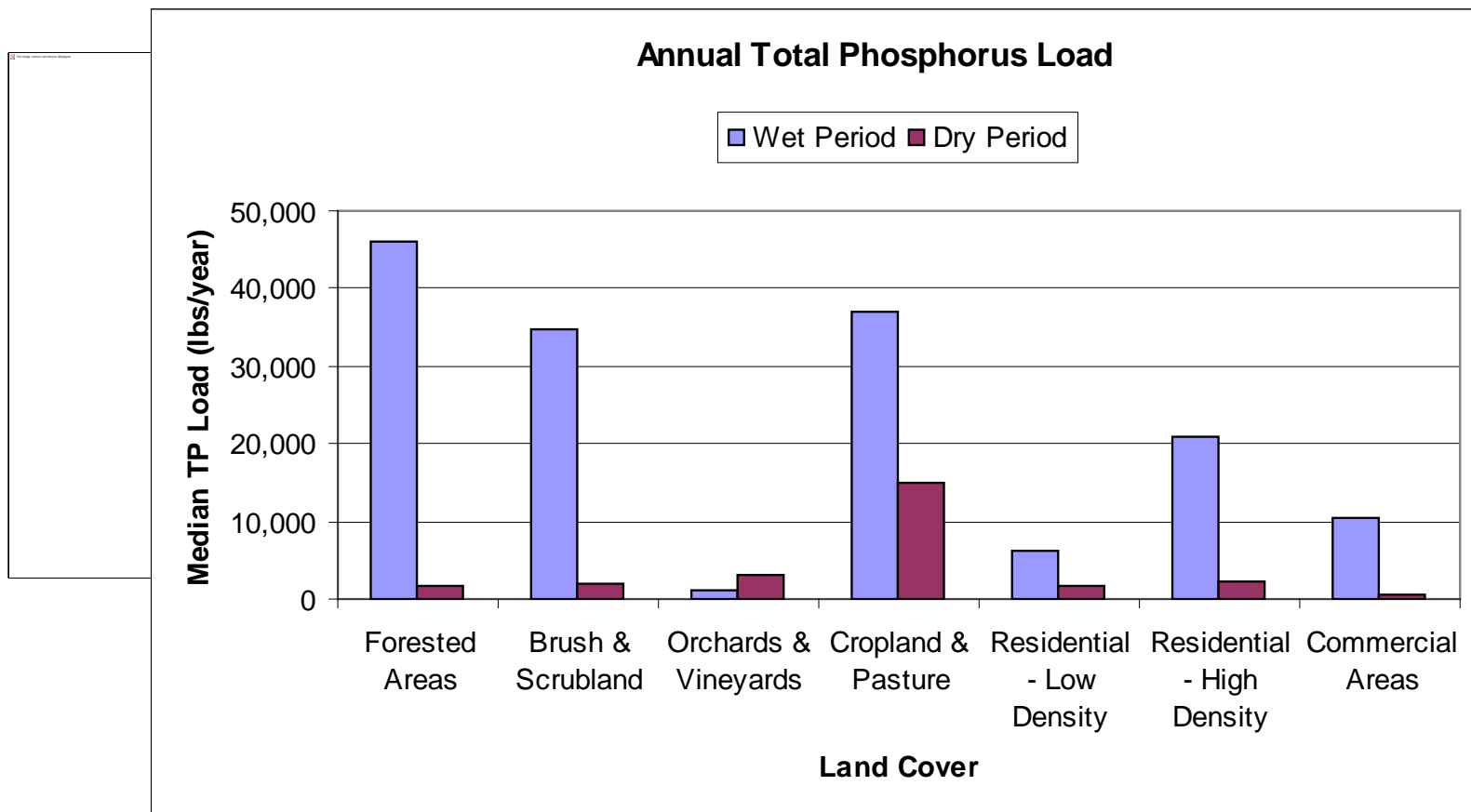
Laguna TMDLs

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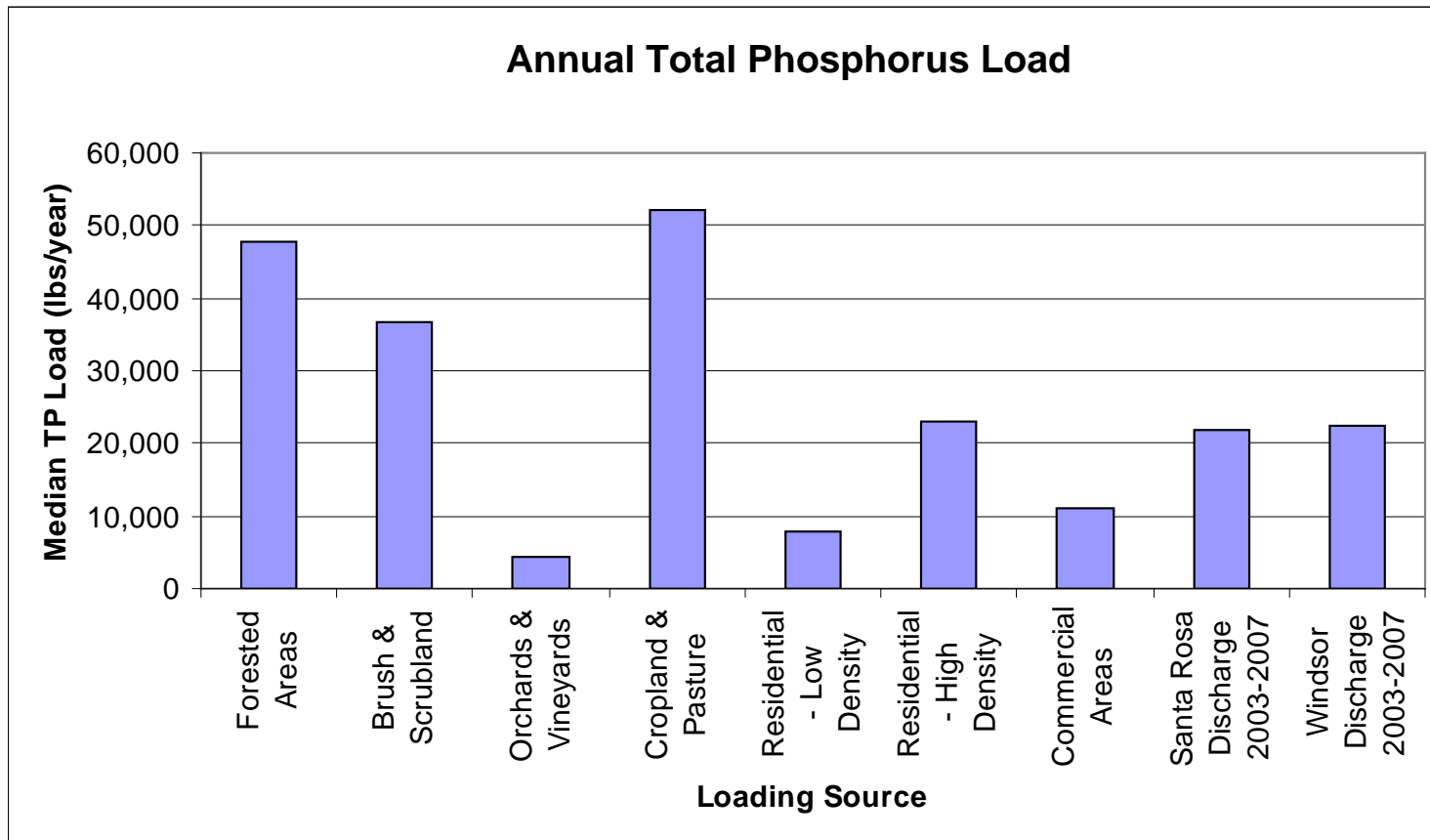
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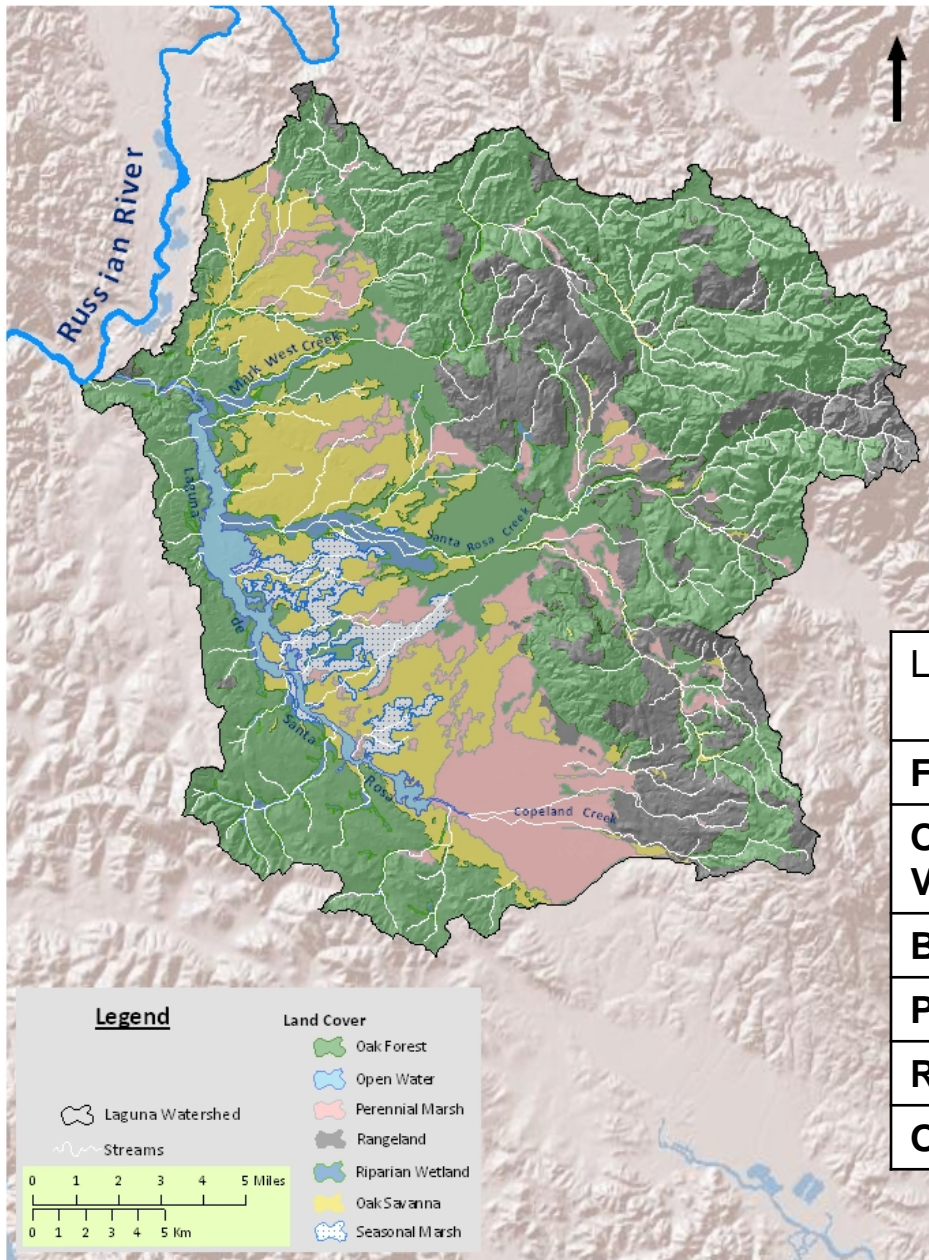


Laguna TMDLs

Nutrient Source Analysis



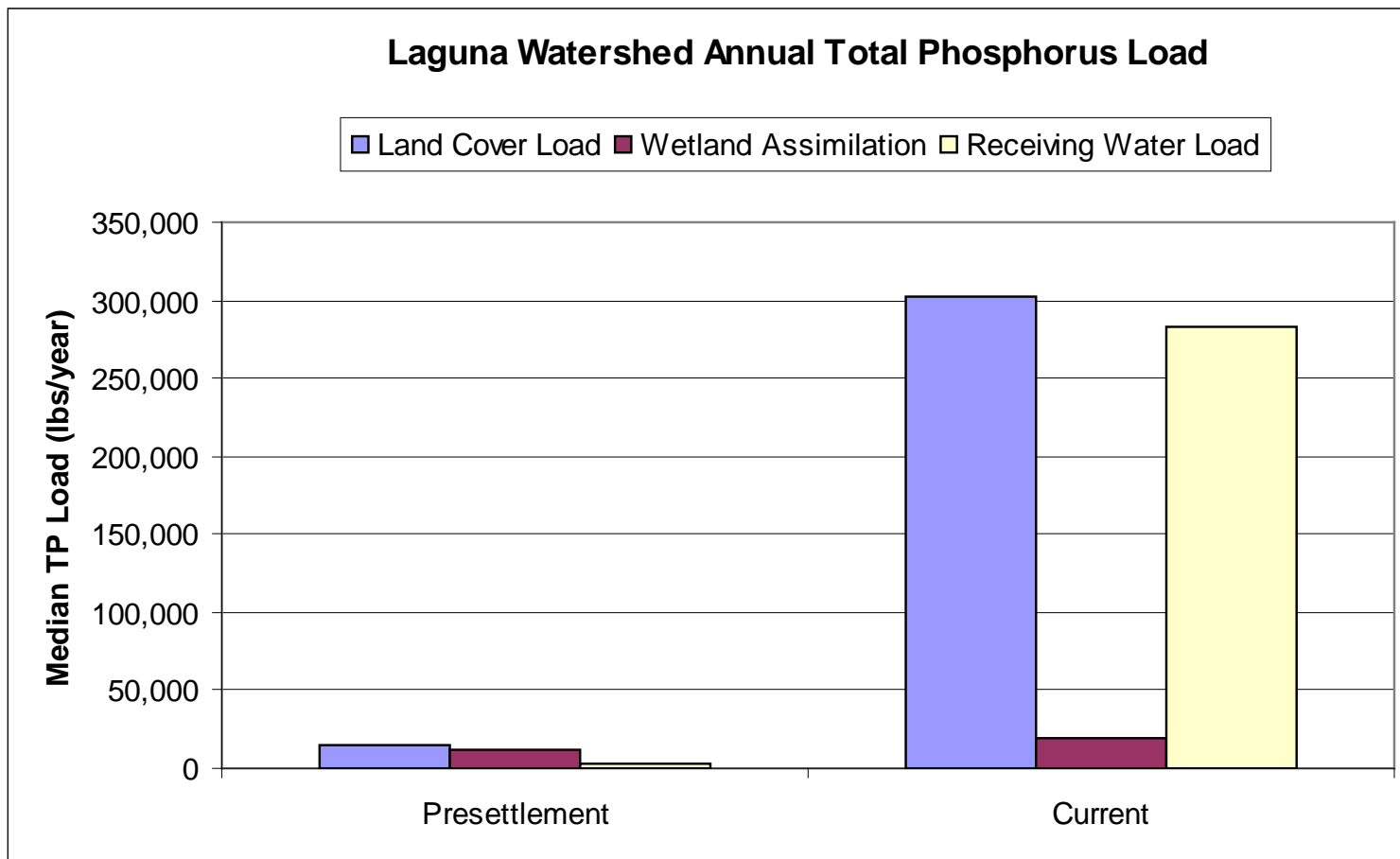
Pre-settlement Land Cover Areas



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

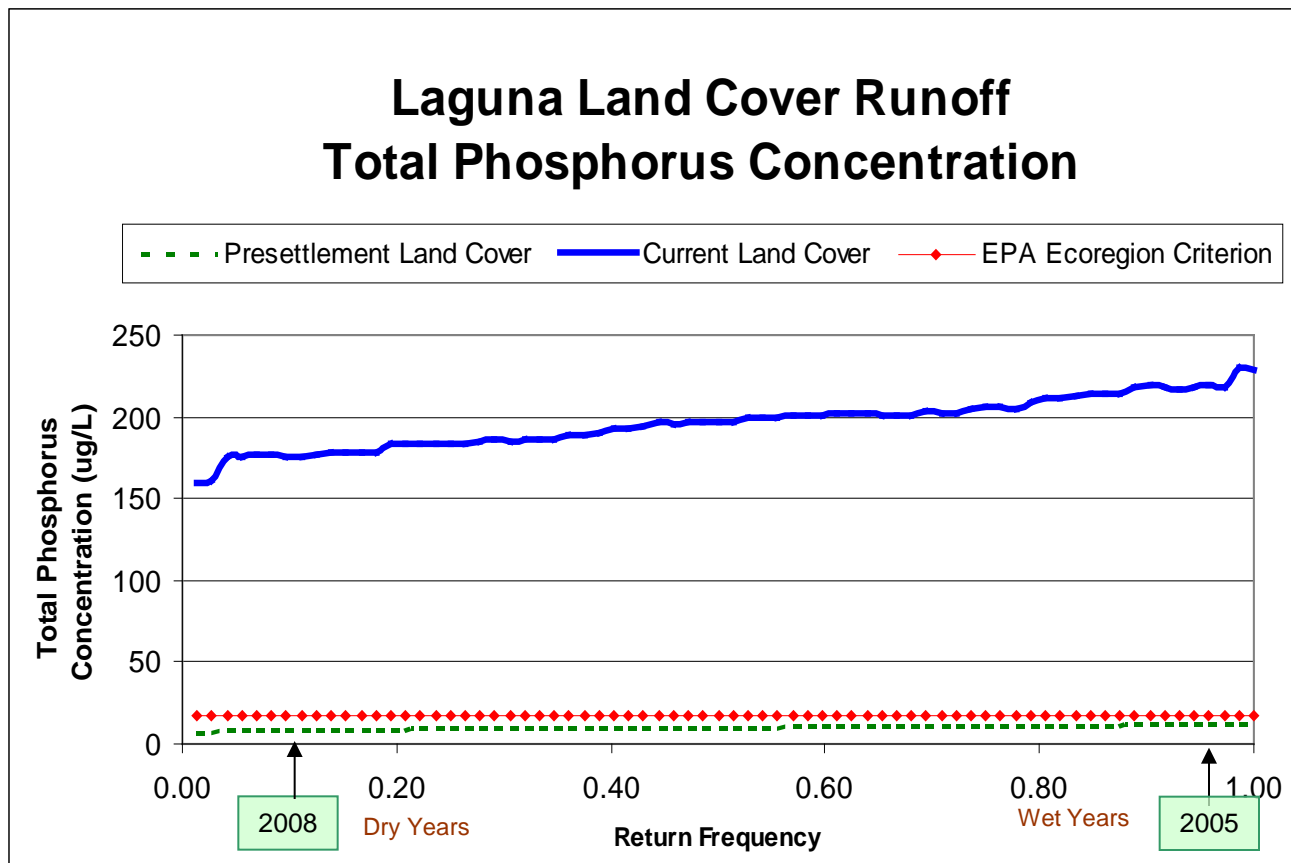
Laguna TMDLs

Nutrient Source Analysis



Laguna TMDLs

Nutrient Source Analysis



Laguna TMDLs

Next Steps



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
- Goals
 - Communicate with and inform stakeholders
 - Solicit and receive useful input
 - Community support





Laguna TMDLs Schedule

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

- 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/tmdl/

Mailing List:

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

The screenshot shows the homepage of the California Environmental Protection Agency's North Coast Regional Water Quality Control Board. The page features a navigation menu at the top with links for Home, About Us, Public Notices, Board Info, Board Decisions, Water Issues, Publications and Press, and Press Room. A welcome message is displayed for the current user, SCHWARZENEGGER. The main content area is titled 'California North Coast Region' and includes a list of topics such as Contact Us, Hot Topics, Basin Plans, TMDLs, Blue-Green Algae, Education and Outreach, Enforcement, Strategic Plan 2008 Update, Surface Water Monitoring, Water Rights, Water Quality Certifications, and Watershed Management. There is also an 'ANNOUNCEMENTS' section with several news items and an 'IMPORTANT INFORMATION' section with various icons and links.

rfitzgerald@waterboards.ca.gov

jshort@waterboards.ca.gov

creed@waterboards.ca.gov

sbutkus@waterboards.ca.gov