

Russian River Frost Program

- Collaborative program of winegrape growers, Sonoma County Farm Bureau, Mendocino County Farm Bureau, Russian River Flood Control and Water Conservation Improvement District and California Land Stewardship Institute to manage the diversion and use of water for frost protection

Overview of Program

- Upper Russian River Stewardship Alliance (URSA)
 - Implementation plan for Upper Russian River Watershed within Mendocino County
 - Hopland and Ukiah area Growing Regions
- Middle Russian River Stewardship Alliance (MRSA)
 - Implementation plan for Middle Russian River Watershed within Sonoma County (Cloverdale to Hacienda Bridge)
 - Alexander Valley, Dry Creek Valley, Knights Valley, and Russian River Valley Growing Regions

Background

- April 2008 stranding events
- NMFS forms Frost Protection Task Force
- NMFS' February 19, 2009 letter
- At April 2009 SWRCB Workshop, Chair Hoppin challenged stakeholders to develop a plan by Fall
- Since April 2009, the two stranding incidents have been addressed

Upper Russian River Stranding Incident Has Been Successfully Addressed

- Worst case scenario: on April 20, 2008, an 83 cfs instantaneous reduction in flow occurred at Hopland USGS gage following severe advective frost
- Upper Russian River Stewardship Alliance (URSA) quickly responded to prevent 2008 flow fluctuation from recurring
 - Pumping Coordination Protocol between Sonoma County Water Agency and Russian River Flood Control District completed Fall 2008
 - Funding for new USGS gage at Talmage, installed in August 2009
 - Enhanced phone-in frost forecasting system
 - Installation of telemetric meters for RRFC customers
 - Funding commitments to construct new offstream storage ponds that will reduce direct diversion demand by 87 cfs

Felta Creek Stranding Incident Has Been Successfully Addressed

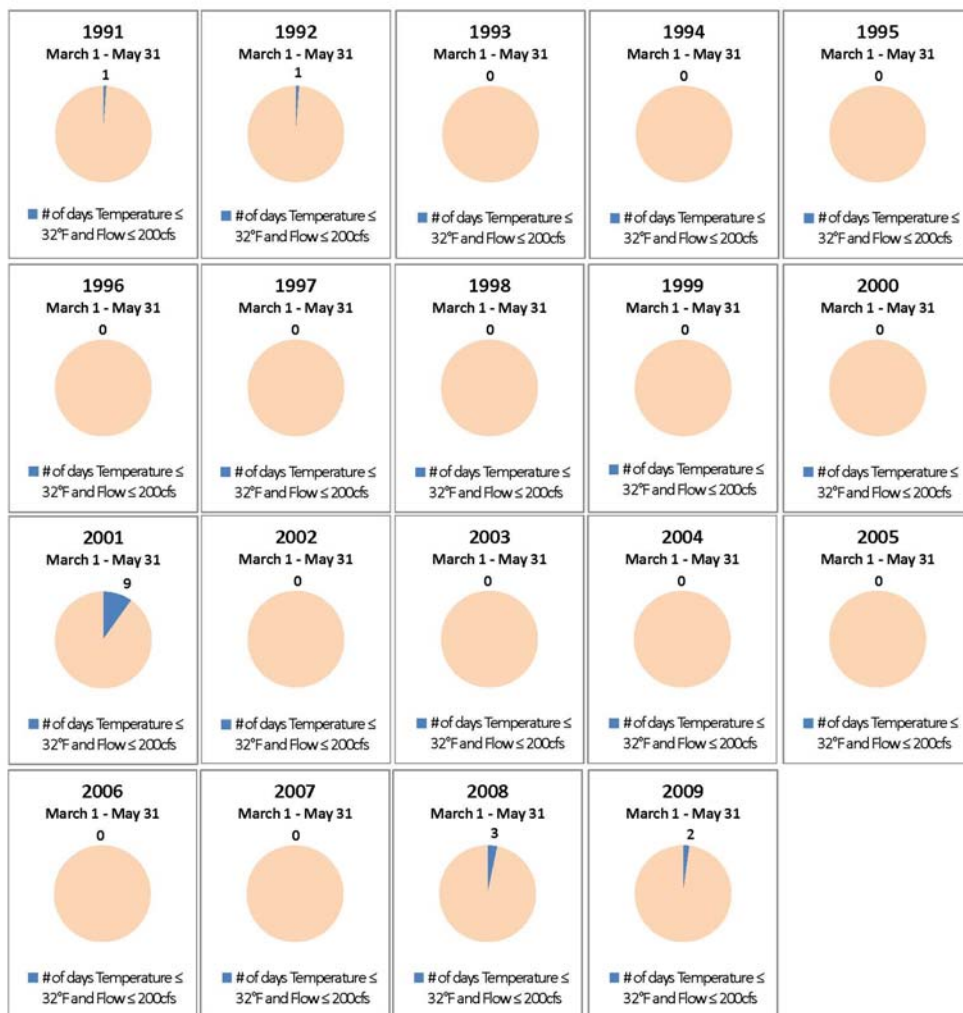
- Direct diversion for frost protection of 4 acres of vineyard in upper Felta Creek allegedly contributed to dewatering of lower Felta Creek at confluence with Mill Creek
- Diverter has replaced instream frost pump with an offstream pond recharged by a groundwater well
- Funding provided by Northern California Wine Country Agricultural Water Conservation and Water Quality Improvement Program
- Technical assistance provided by California Land Stewardship Institute

2008 Frost Event Was Extreme and Rare

- 2008 frost season (March 15-May 15) was worst in over 30 years; freezing temperatures occurred on 20 nights in late March and early April
- March 2008 was driest March on record with no rainfall
- Average March-April flow at Hopland is 976 cfs for period of record
- Flow on April 21, 2008 was only 168 cfs

Number of Days Flow on Russian River near Hopland ≤ 200 cfs
and Air Temperature at Sanel Valley $\leq 32^{\circ}\text{F}$

11/9/2009



Notes:

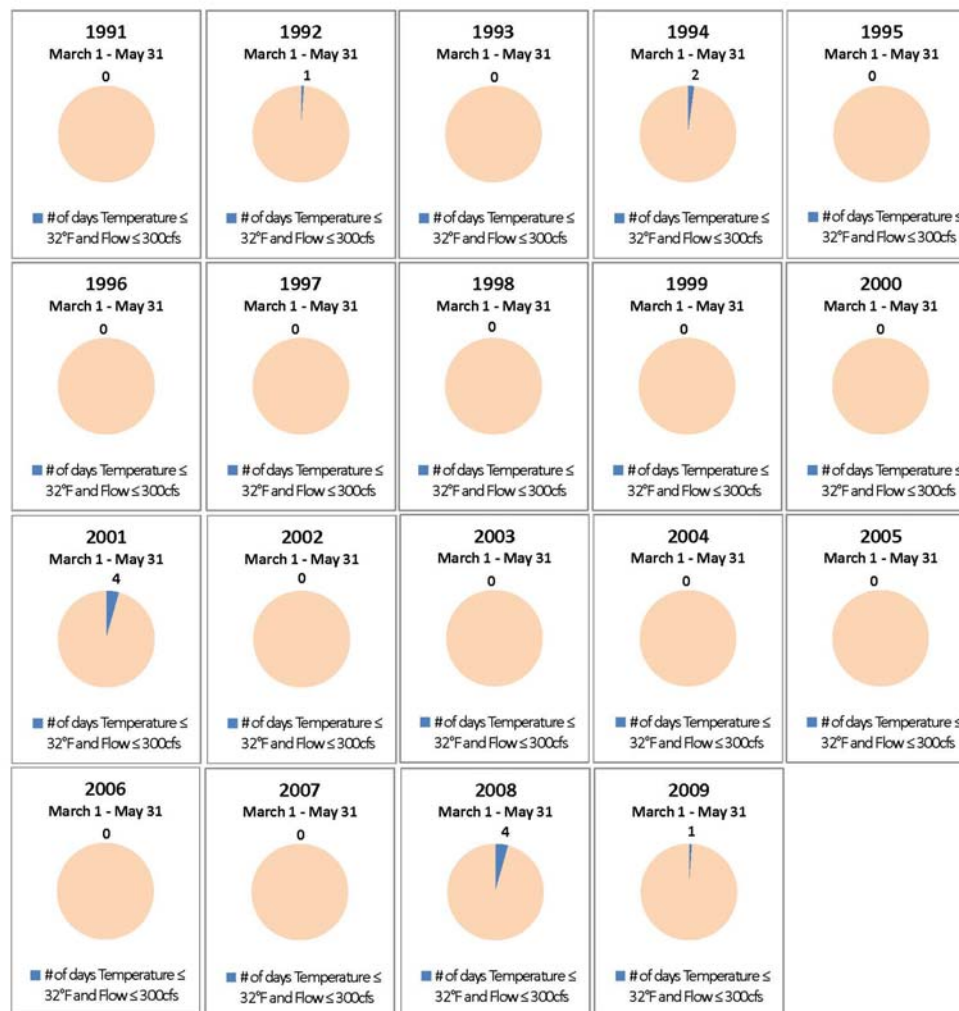
Flow data for USGS 11462500 Russian River near Hopland per U.S. Geological Survey.

Air temperature data for Station #106 Sanel Valley FS per California Irrigation Management Information System (CIMIS).

- Occurrence of both low flows (200 cfs or less at Hopland) and frost (32°F or less) is very rare
 - 5 of last 19 years
 - 16 days in aggregate

**Number of Days Flow on Russian River near Healdsburg \leq 300 cfs
and Air Temperature at Windsor \leq 32°F**

11/9/2009



Notes:

Flow data for USGS 11464000 Russian River near Healdsburg per U.S. Geological Survey.

Air temperature data for Station #103 Windsor per California Irrigation Management Information System (CIMIS).

We Will Not be Surprised by Another 2008 'Perfect Storm'

- The severe frost and drought in 2008 was a perfect storm
- Conditions contributing to 2008 problem have been identified and appropriate conservation actions are being implemented
- No evidence to suggest strandings occur elsewhere in the watershed
- We are analyzing frost protection in other watersheds to determine what actions are appropriate
- Growers are coordinating with Sonoma County Water Agency to improve low stream flow conditions

Effectiveness Monitoring and Independent Science are Foundations of the Program

- Watershed based approach to monitoring will be directed by independent Science Advisory Group
- Non-frost diversion factors will also be examined
- QA/QC of data
- Science Advisory Group will include independent scientists not affiliated with growers, NMFS, DFG or SWRCB

Resource Management, not Regulation, is the Solution

- Implementation of conservation actions
- Fostering working relationships between growers and regulatory agencies
- Flexibility to respond to new data and to adaptively manage conservation actions

Introduction to the Plans

- Today is a demonstration of much greater organization than was presented in April of this year
 - Frost Protection Task Force started to address upper Russian River problem
 - Middle Russian River users included later
- “Different” problems, but the same goal – to keep water available for the fish

Resource Sharing-Best Solutions

- Watershed Assessments-Conservation Actions-Program Analysis
 - Backbone of the Frost Program
 - A more comprehensive approach can be taken by joining the two areas in this effort
 - Processes, systems, and expertise can be shared
 - Science based, practical problem-solving approach
- County Farm Bureaus provide sustainable structure and communication

Long-Term Commitment

- We have achieved short-term goals and are moving forward to implement long-term goals
- Protection of listed species and use of water for frost protection are not incompatible if properly managed
- This is a solution driven program, not politics

Long Term Commitment (cont.)

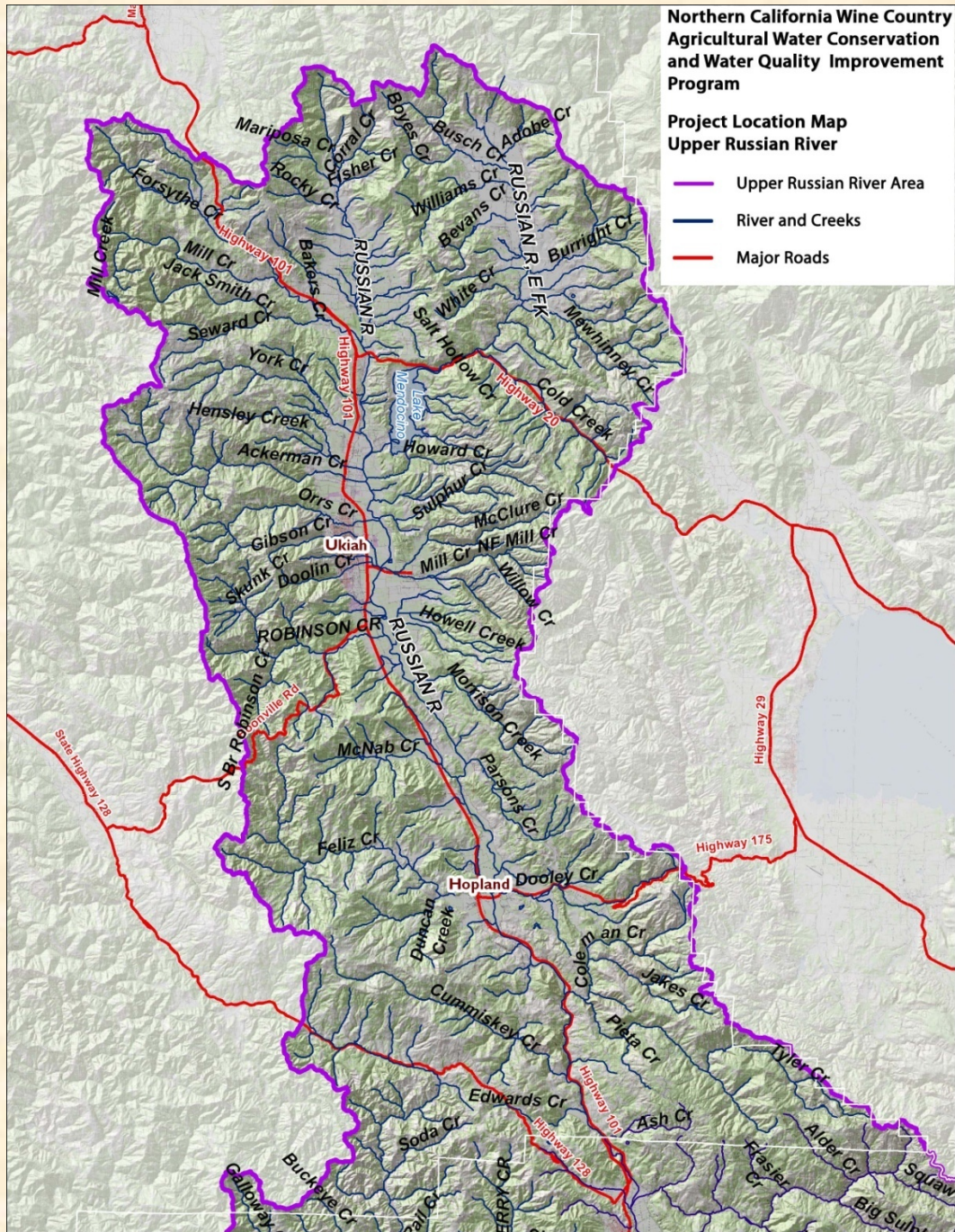
- Participation in the Frost Program is voluntary
 - Program designed first to help save the listed species, secondly to engage growers, organize our efforts, and sustain our movement
 - We are well aware that our ability to farm is in jeopardy, so participation is mandatory for those that wish to continue

Solve the Problem

- No Happy Farmers, No Happy Regulators, Happy Fish
 - A non-regulatory approach is more flexible for the different watersheds and diversions
 - Resources can be focused on solving the problem, not in fighting regulation
 - Regulation is already there
 - You have provided the motivation, we now have the momentum

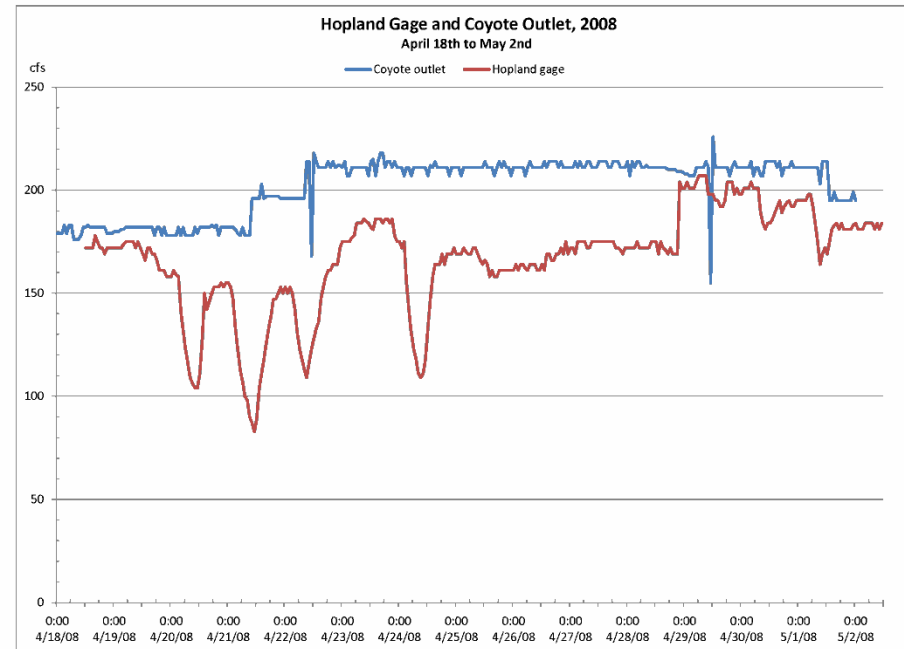
Upper Russian River Frost Plan

- Plan prepared by the Upper Russian River Stewardship Alliance (URSA)



Frost Protection 2008

- **Baseline Conditions**
 - Low Base Flows
 - High Demand
- **Additional Factors**
 - Remote operation
 - No forecasting
 - Telemetry Lag time
- **Impacts**
 - Rate of change of instream flows led to stranding of juvenile steelhead in mainstem

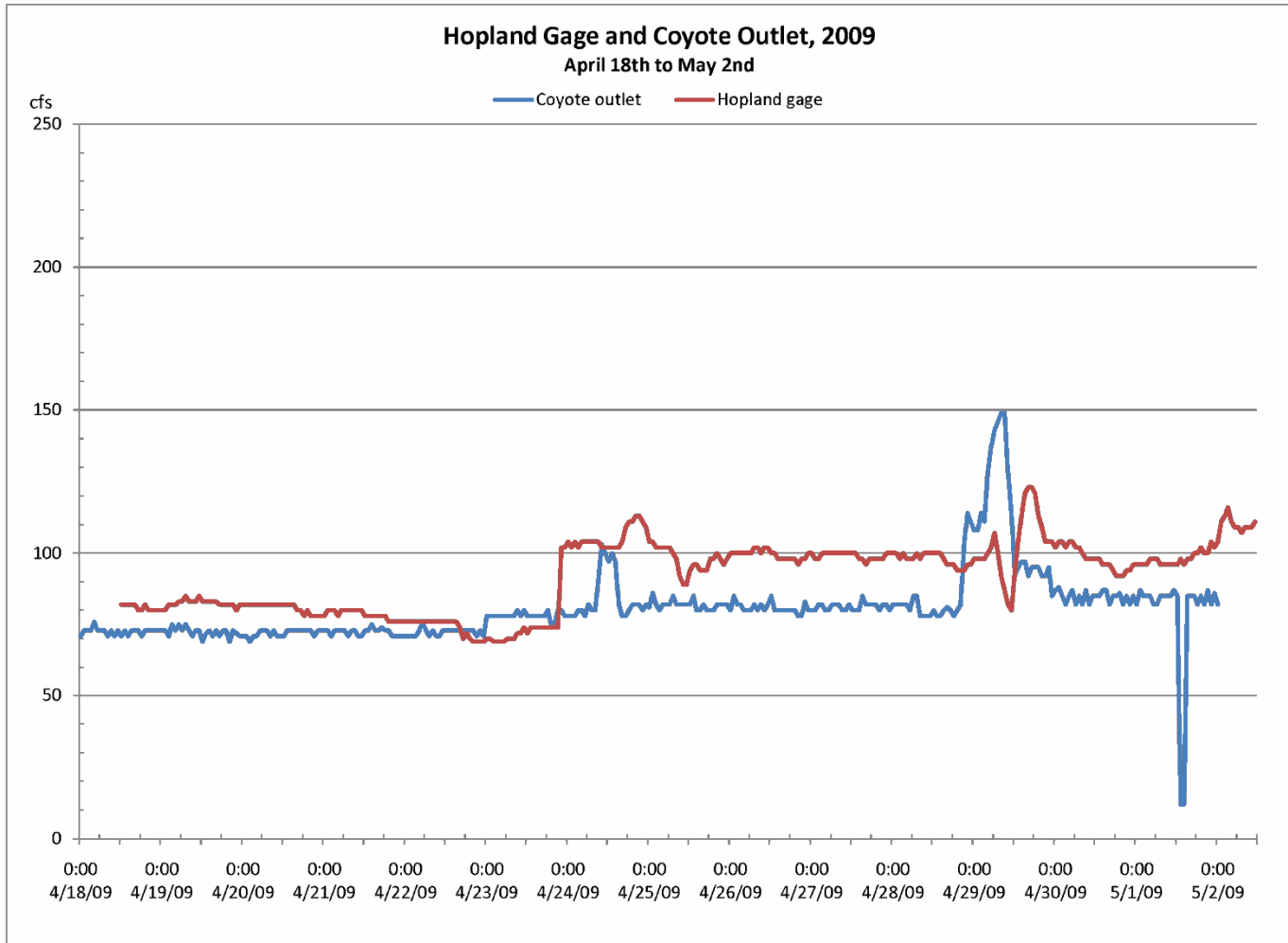


Management of Frost Demand

- Infrastructure, Tools and Data
- Goals from April of 2009
 - Short term
 - Draft Protocol
 - Near term
 - Additional Gage
 - Frost forecasting
 - Interactive meters
 - Long term
 - Offstream storage
 - Recycled Water

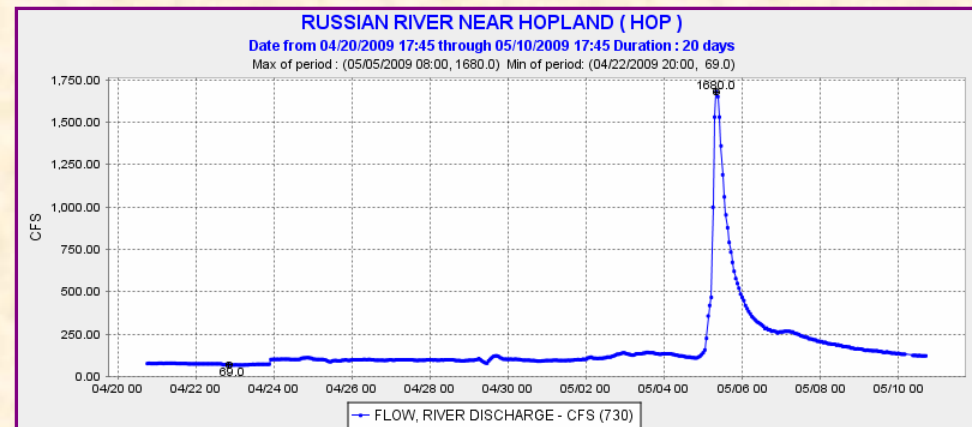
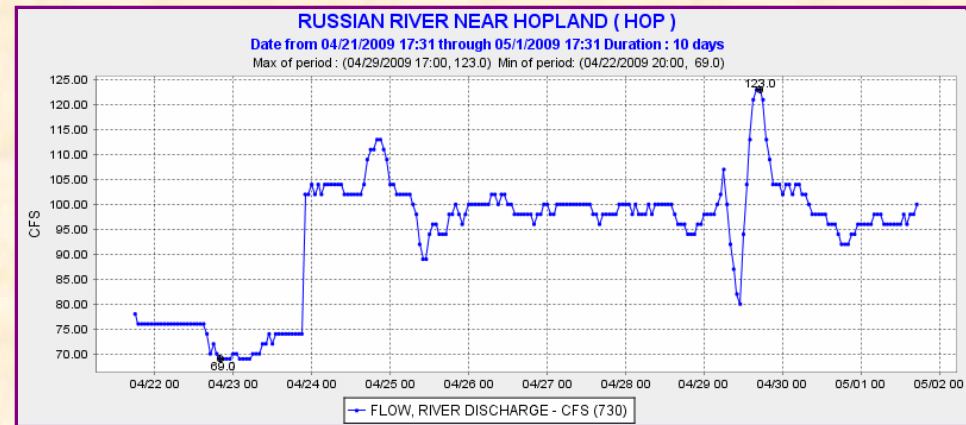


Short-Term – Draft Protocol



Protocol in Perspective

- Frost pumping is dwarfed by subsequent storm



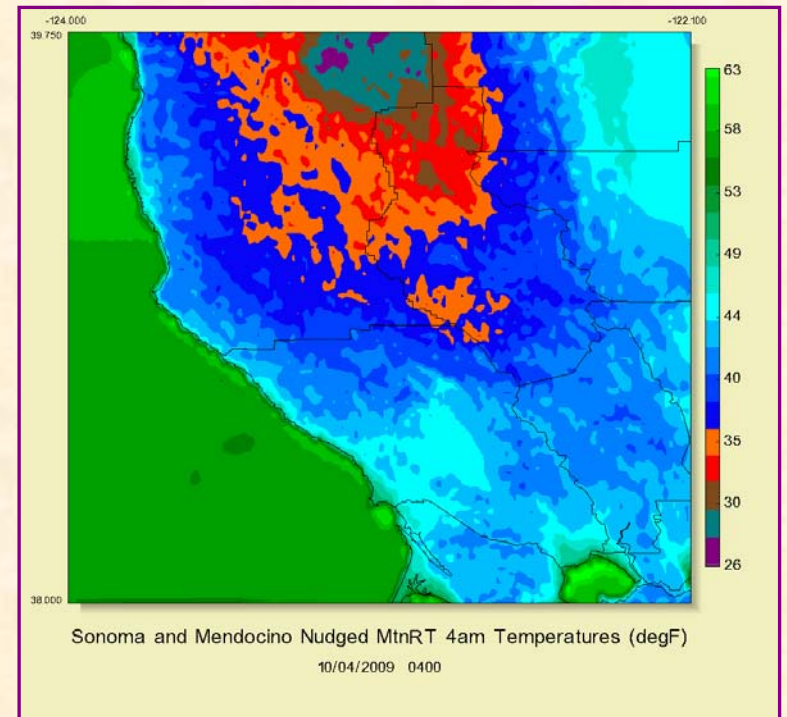
Near Term-Additional Gage

- USGS Talmage Gage
 - Completed Aug. 09
 - 2 hour vs. 8 hour lag
 - \$28K construction
 - \$23K/year maintenance
 - Cost shared by RRFC, SCWA, and RVCWD



Near Term-Frost Forecasting

- Enhanced forecasting
 - Reprogramming complete
 - Improved Mountain RT
 - Amended to include frost release information
 - Completes RRFC, SCWA, Ag feedback loop



Near Term-Interactive meters

- “Smart” meters
 - Telemetry will verify onset of frost protection
 - Cell signal direct to SCWA operations
 - Charlie Sawyer
 - La Ribera



Long Term-Offstream Storage

- Fetzer Blue Heron
 - Existing pond
 - 34 acres of vineyard
 - \$47K
 - 3.8 cfs



Long Term-Offstream Storage

- Diana Fetzer/Dolan
 - Existing pond
 - 40 acres of vineyard
 - \$20K
 - 4.4 cfs



Long Term-Offstream Storage

- Charlie Sawyer
 - New construction
 - 45 acres of vineyard
 - \$80K
 - 8 af
 - 5.5 cfs
 - Partial AWEPP funding



Long Term-Offstream Storage

- Beckstoffer
 - 2 ponds
 - New construction
 - 300 acres of vineyard
 - \$800K
 - 130 af
 - 36 cfs



Long Term-Offstream Storage

- La Ribera
 - New Construction
 - Fall of 2009
 - 110 acres of vineyard
 - \$400K
 - 50 af
 - 13.4 cfs
 - Partial AWEPP funding



Long Term-Offstream Storage

- Fetzer Sun Dial
 - New construction
 - 88 acres of vineyard
 - \$529K
 - 33.5 af
 - 10.8 cfs



Long Term-Offstream Storage

- Fetzer Los Cerros
 - New Construction
 - 44 acres of vineyard
 - \$334k
 - 20 af
 - 5.4 cfs



Offstream Storage Summary

Ranch	Acres*	Cost	Demand Reduction (cfs)	Status
Fetzer Blue Heron	34	\$47,000	3.8	Complete
Fetzer/Dolan	40	\$20,000	4.4	Complete
Sawyer	45	\$80,000	5.5	Complete
La Ribera	110	\$400,000	13.4	Complete
Beckstoffer	150	\$400,000	18	Complete
Fetzer Sun Dial	88	\$529,000	10.8	Complete
Fetzer Los Cerros	44	\$334,000	5.4	Complete
Beckstoffer	150	\$400,000	18	2010
Haiku	60	\$250,000	7.3	2010
Total	721	\$2,460,000	86.6	

* Acres now protected using offstream storage.

Refilling Offstream Storage

- Rate of Diversion permanently reduced
 - Water rights modifications
 - Alteration of infrastructure
- System designed for slow even demand



Recycled Water

- New storage
 - Facilitates distribution system
 - City of Ukiah 4,000 afy
 - Tertiary
 - Need planning \$
- Compliments goals of AB 2121



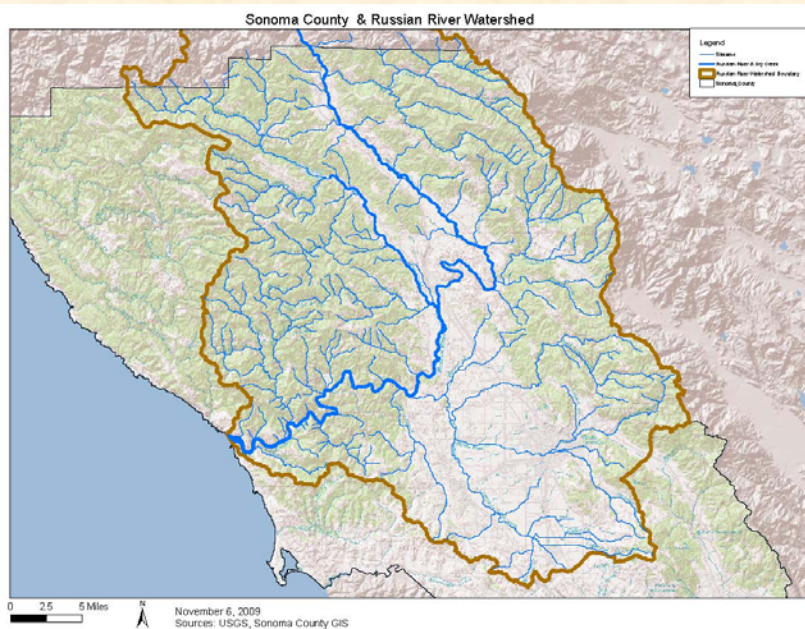
URSA

Conservation Action Summary

- Draft protocol implemented
- New USGS gage installed and on-line
- Frost forecasting improved
- Telemetric meters in development
- Reduction in peak demand of 86.6 cfs from construction of new storage
- Implementation of frost water conservation BMPs

Middle Russian River Frost Plan

- Plan prepared by the Middle Russian River Stewardship Alliance (MRSA)



MRSA Organization

- Sonoma County Farm Bureau Frost Subcommittee
- Participating Growers
 - To date, participating vineyards own over 9,600 acres in critical area
 - Growers from major growing regions and frost diversion tributaries
 - Alexander Valley, Dry Creek, Knights Valley (Maacama Creek watershed), and Russian River Valley (Green Valley Creek and Mark West Creek)
- Sonoma County Winegrape Commission
- UC Cooperative Extension

MRSA Plan

- Sonoma County Farm Bureau Frost Subcommittee
 - Subcommittee will include grower representatives from main stem and the tributaries subject to frost impacts
 - Committee expansion will include four to five growers from each identified tributary
 - Subcommittee will communicate with Mendocino County Farm Bureau for program coordination

Focus of MRSA Plan

- Manage the diversion and use of water for frost in 13 watersheds listed by NOAA
 - Frost diversions do not have an acute effect on mainstem Russian River and Dry Creek flow
 - Substantial accretion of flow to mainstem during frost season
 - Only problem identified in Sonoma County—direct diversion on Felta Creek—has been successfully addressed
- Promote collaboration among conservation organizations, resource agencies and water users
- Focus on conservation efforts
- Utilize independent, peer reviewed science

MRSA Plan

- Frost Program provide Outreach to Growers
 - Educates grower community on ESA issues
 - Provides technical and regulatory guidance
 - Promotes participation through education and information dissemination



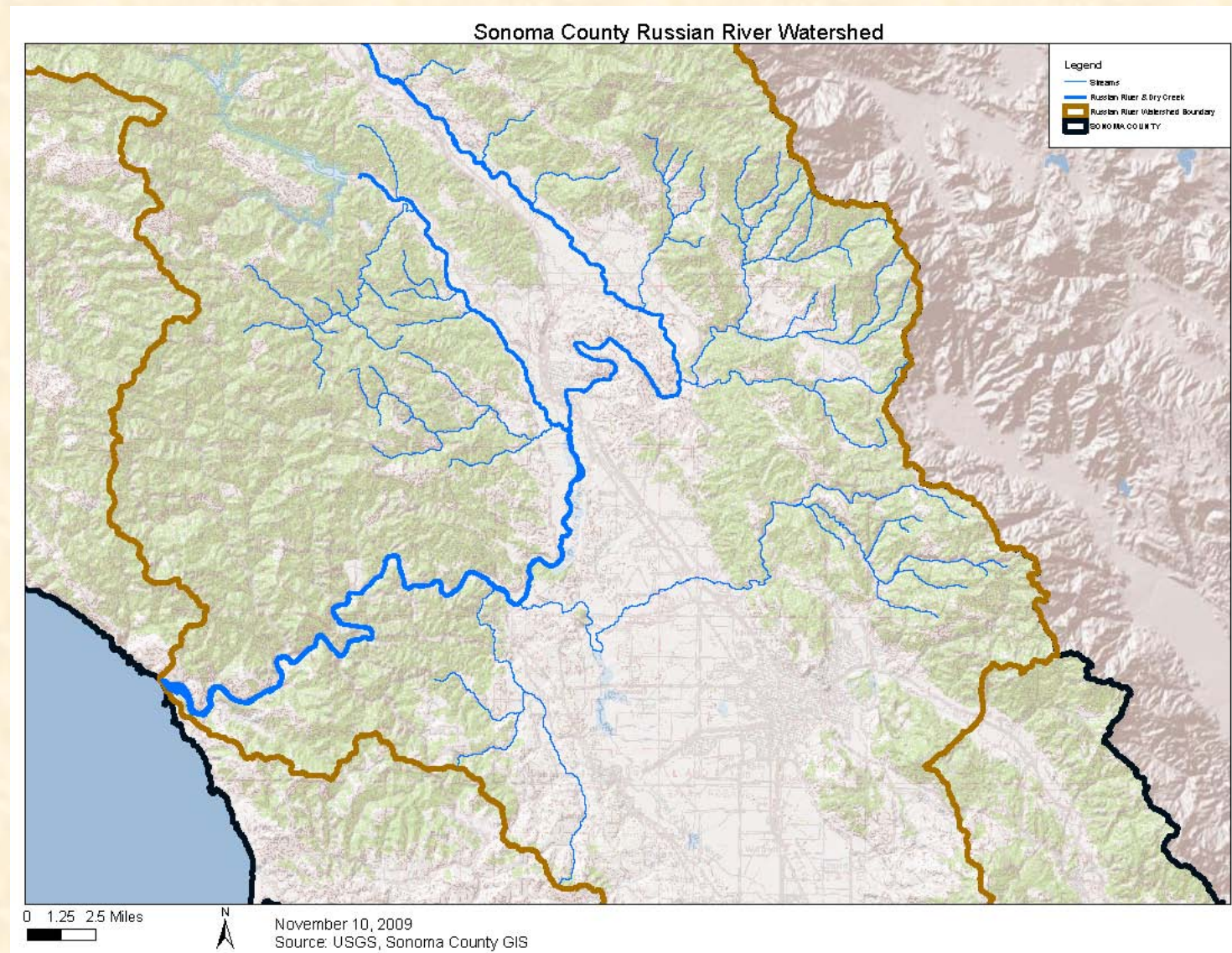


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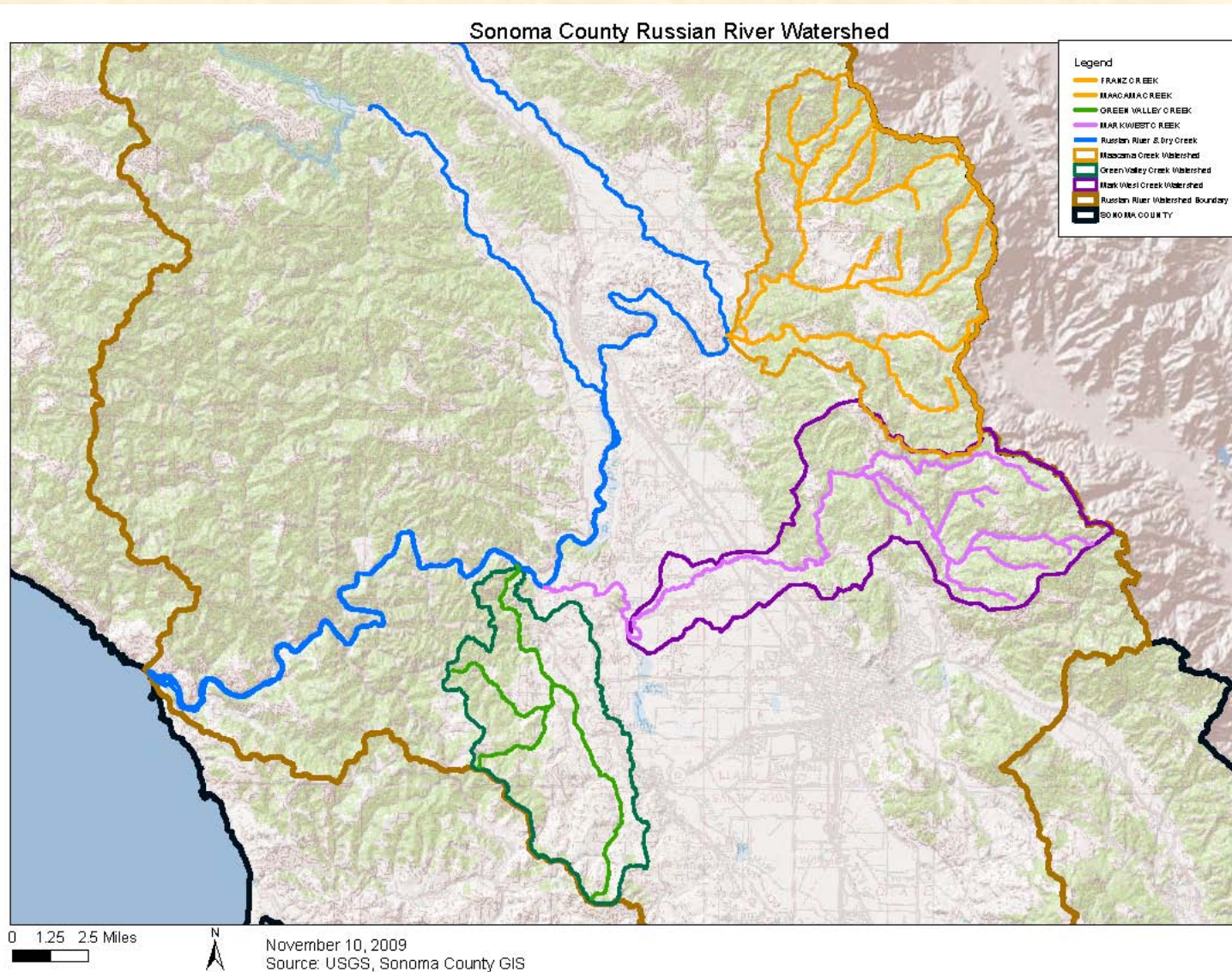
Tributary Frost Diversion Assessments

- 13 watersheds
 - Gill, Crocker, Miller, Gird, Sausal, Maacama, Redwood, Franz, Mark West, Green Valley, Wine, Grape, Crane, and Mill creeks
- Significant frost protection takes place in only 3 watersheds
 - Green Valley, Mark West and Maacama (includes Redwood and Franz creeks)
- Identify surface water diversions and work with Science Advisory Group to assess effects
- Identify conservation actions to reduce effects on streamflow
 - implement water conservation BMPs, install new or deepen existing wells, construct offstream storage, and coordinate diversions if beneficial
- Crocker Creek and Gill Creek assessments complete

Assessments to be Prepared for 13 Key Tribes



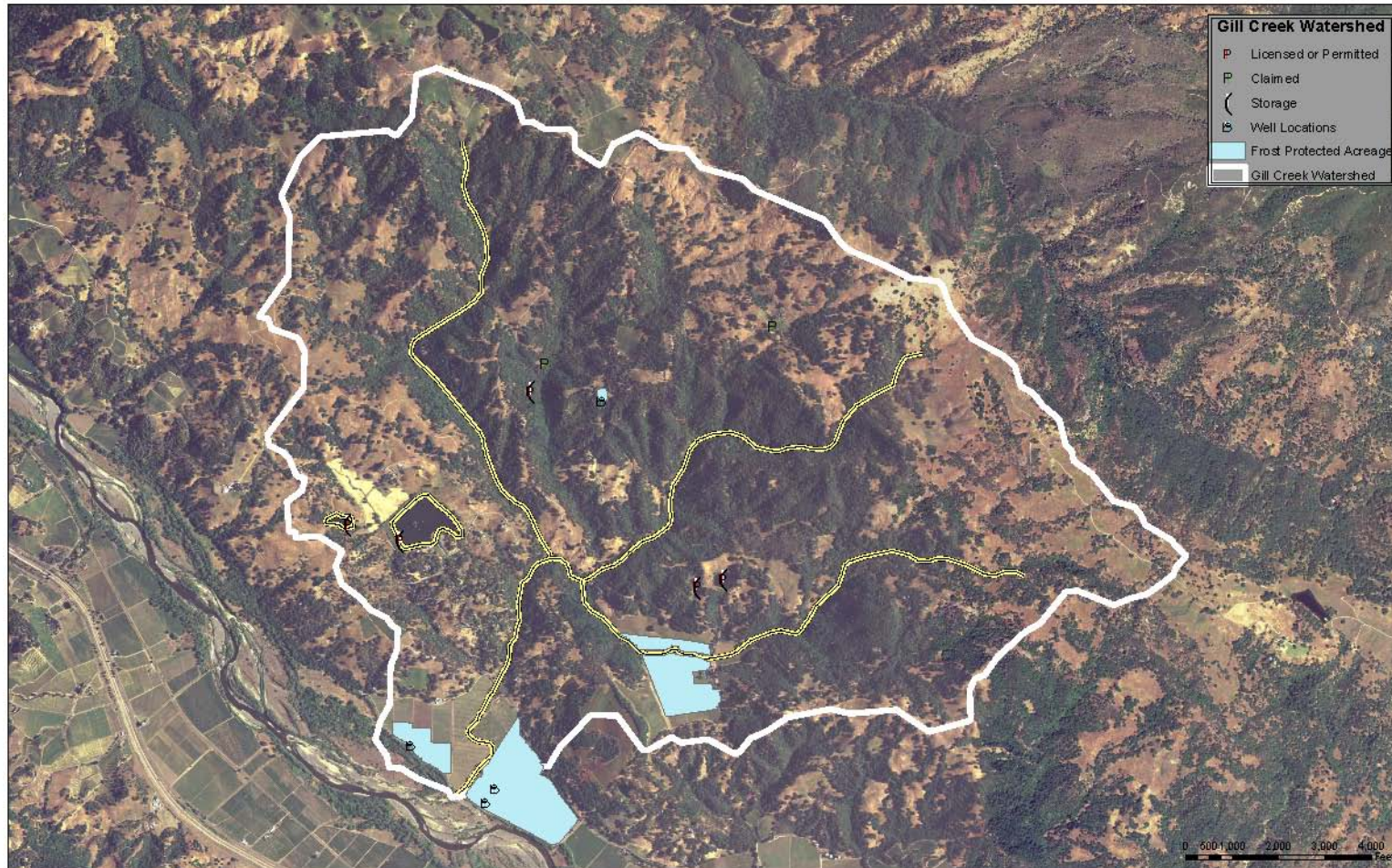
Only Three Tributaries with Significant Frost Protection



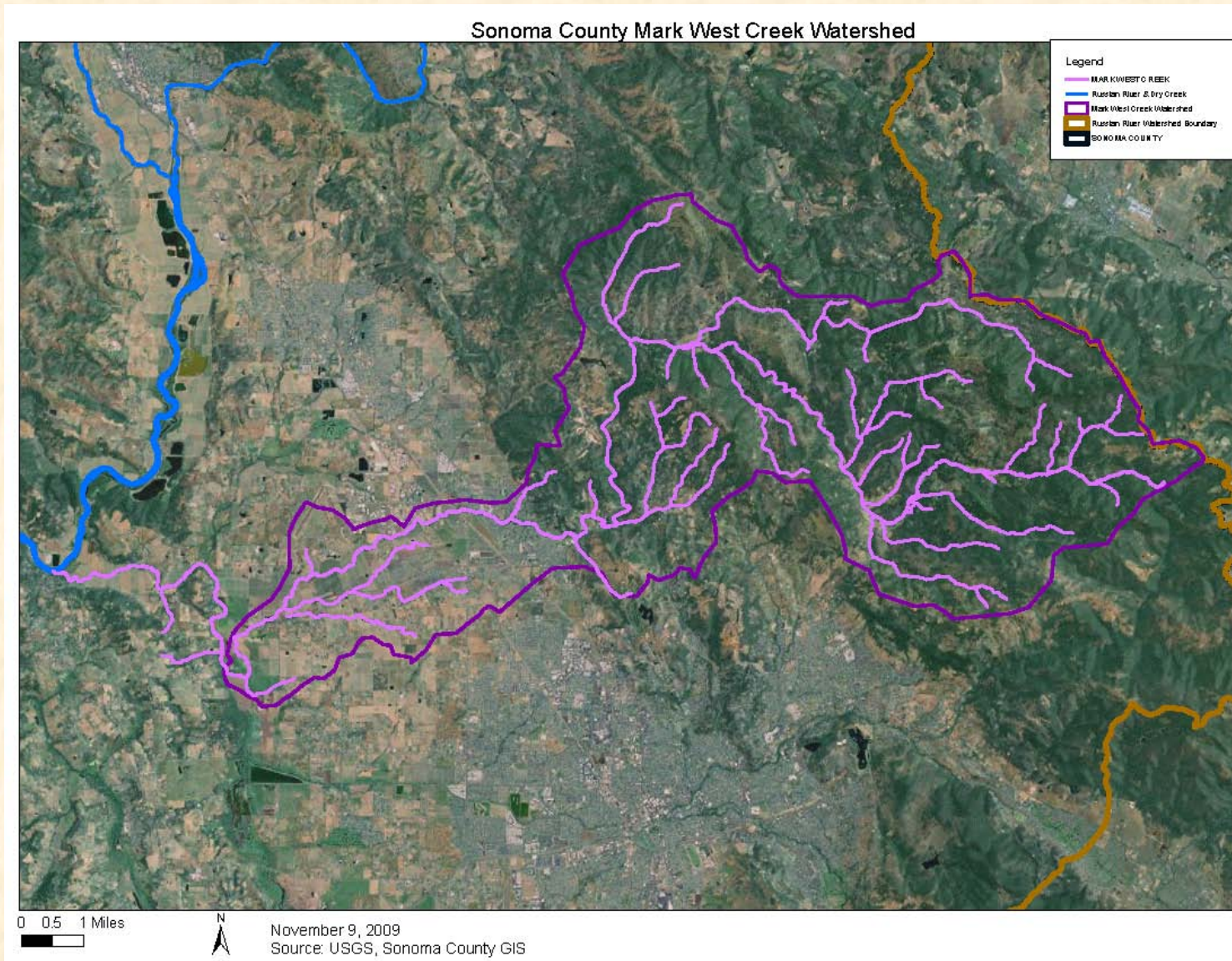
Elements of Tributary Assessments

- Identify all vineyards employing any form of frost protection
- Identify vineyards using water for frost control and sources of water
- For direct diversions, identify:
 - Number of acres protected by overhead sprinklers and microsprinklers
 - Specific source(s) of water
 - Maximum potential instantaneous demand
 - Reduction in demand from implementation of applicable BMPs
 - Longer-term conservation strategies for reducing diversion demand
- Identify tributary-wide instantaneous direct demand with and without conservation measures
- Assess whether further conservation actions are required

Example Tributary Frost Diversion Assessment: Gill Creek



Mark West Creek



Role of Monitoring and Independent Science

- Science Advisory Group will identify where monitoring and data collection shall be focused
- Monitor streams with significant direct diversions for frost

Agricultural Water Enhancement Program (AWEP)

Northern California Wine Country Agricultural Water Conservation and Water Quality Improvement Program – application by Ca. Land Stewardship Institute (CLSI) in March 2009 covers all of Russian River watershed

\$5.7 million awarded to the Natural Resources Conservation Service (NRCS) for construction of off-stream ponds and water infrastructure for 2009-2014

50% cost-share for construction; the landowner provides the remaining funding

CLSI is the cooperator with NRCS and is responsible for

- landowner outreach
- setting project priorities
- project identification
- implementation of BMPs
- water conservation and quality certifications through the FFF program
- development and implementation of watershed monitoring
- establishing an independent Science Advisory Group
- working with NRCS on all aspects of the program

AWEP Funding in 2009

Between the end of July and August 21, 2009:

- Landowners in the Upper Russian River applied for AWEP funding for 11 different projects for a total value of \$1.8 million (NRCS 50% cost of \$900,000).
- Landowners in Sonoma County applied for 5 different projects for a total value of \$368,000 and 2 were funded including one at Felta Creek which will allow the landowner to stop diverting creek water entirely
- All the projects were for water management and conservation improvements primarily off stream ponds



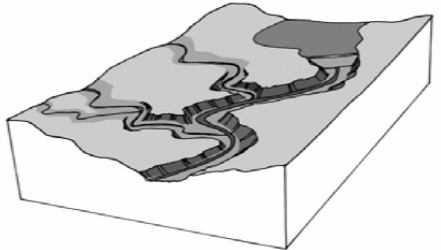
AWEP Conservation Actions 2010

- Initiate outreach and sign-ups for AWEP projects including off-stream ponds, wells, and other water projects
- Review of mainstem gaging data and Coyote Dam releases for effectiveness of off-stream storage in reducing instantaneous drawdown.
- Engineering and Construction for ponds for off-stream storage, wells, etc
- Complete annual Fish Friendly Farming program enrollment for non-point source, habitat, and frost water conservation implementation of BMPs
- Seek funding for measurement of efficiency of water conservation practices
- Science Advisory Group reviews monitoring and adjust/revise program
- Establish watershed based monitoring program
- Coordinate changes to water rights permits to allow for storage of frost water
- Begin study of recycled water engineering feasibility

Beneficial Management Practices (BMPs) for Frost Water Conservation and Demand Reduction

Program developed by CLSI includes:

- Inventory and mapping of vineyards and existing frost control system
- Calculate total water demand for site and determine type of frost zone
- Quantify water savings and cost of application of BMPs:
 - Mow of cover crops and application of anti-bacterial materials
 - Improve on-site temperature monitoring for later water turn on
 - Revise pipes/valves to apply water only on grape varieties with bud break
 - Recollect water using subsurface drains and sump
 - Revise sprinkler type
 - Change to non-water measures, effective in mild/moderate frost zones
 - Review sites with direct diversion, may need storage
 - BMPs are inclusive of list developed by Frost task force
- BMPs validation through FFF certification by agencies will be offered

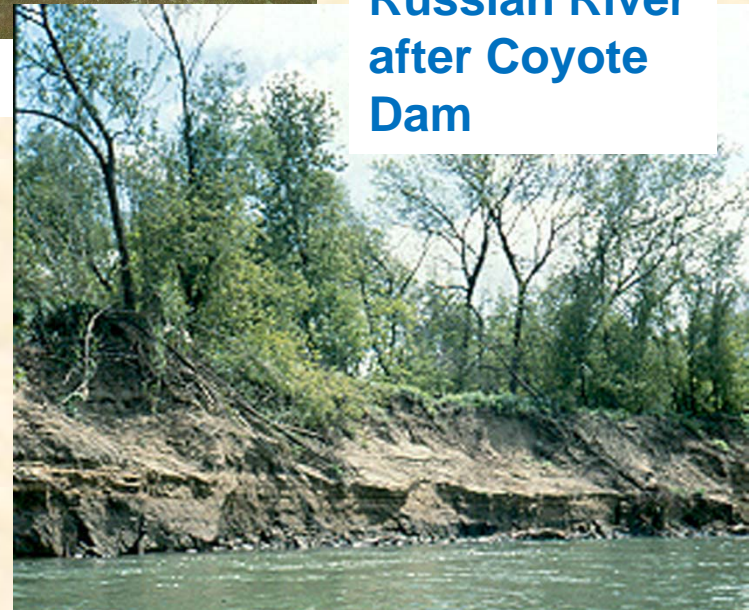


Russian River before Coyote Dam

The Russian River has changed a great deal in the past 70 years. Stream flow and fish habitat are affected by many factors other than frost diversions.

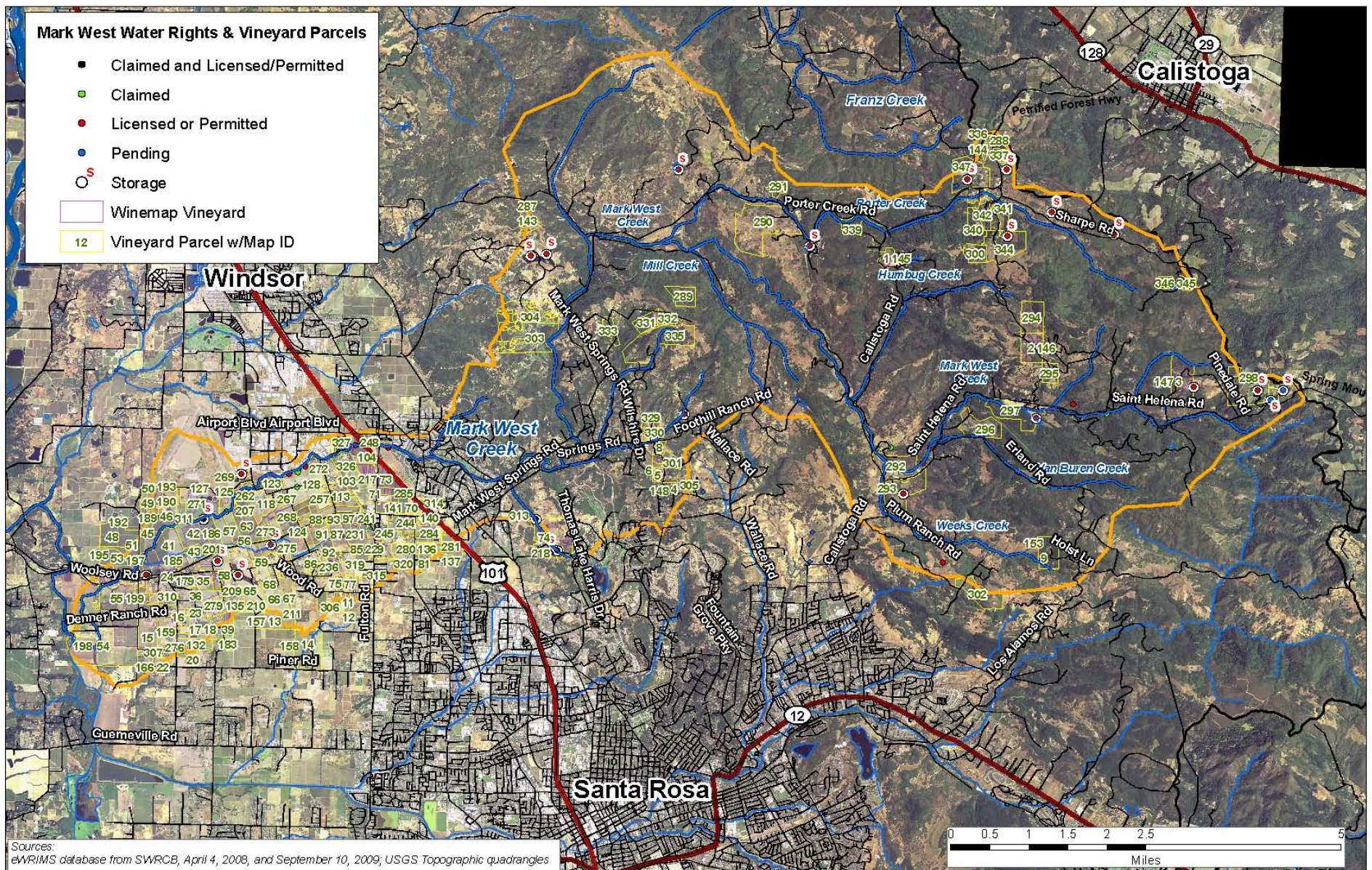
A watershed based approach is required accompanied by independent scientific review

Russian River after Coyote Dam



Science Advisory Group – Objective Independent Review

- 5-10 members – independent scientists to maintain objectivity
- Strong scientific background in fluvial geomorphology, geology, hydrology, aquatic ecology and fisheries required
- Prefer professionals with experience in multidisciplinary teams addressing river/fish issues
- Dr. Mathias Kondolf, chair



This map of vineyards, streams and water rights depicts the complexity of each tributary watershed and why a well designed watershed based science program is needed to determine needed changes.

Effective Monitoring Using a Watershed Approach

Science Advisory Group will

- Work with URSA and MRSA to define watershed based monitoring program
 - Upper Russian system will focus on interactions of highly impacted mainstem river with tributaries with and without frost diversions
 - MRSA will focus on 3 tributary watersheds
 - Both programs will include surface and subsurface monitoring to evaluate stream flow, diversion and water management options
- Develop conceptual models of stream flow processes for different areas of Russian River watershed.
- Use an integrated approach - reliable and accurate monitoring data and analysis includes all factors affecting stream flow
- Assure all monitoring has acceptable levels of accuracy, precision, completeness, comparability and representativeness similar to the QAPP requirements of the State Water Board

Continuing the Dialogue with the Resource Agencies

- URSA and MRSA will meet quarterly with representatives from the Resource Agencies (CDFG, NMFS, SWRCB) from the Frost Protection Task Force to discuss implementation actions and the findings of the Science Advisory Group.
- It is the intention of both URSA and MRSA to form a collaborative working relationship with the agencies to implement needed changes to water infrastructure and improve stream flows to sustain both the fishery and agriculture.

