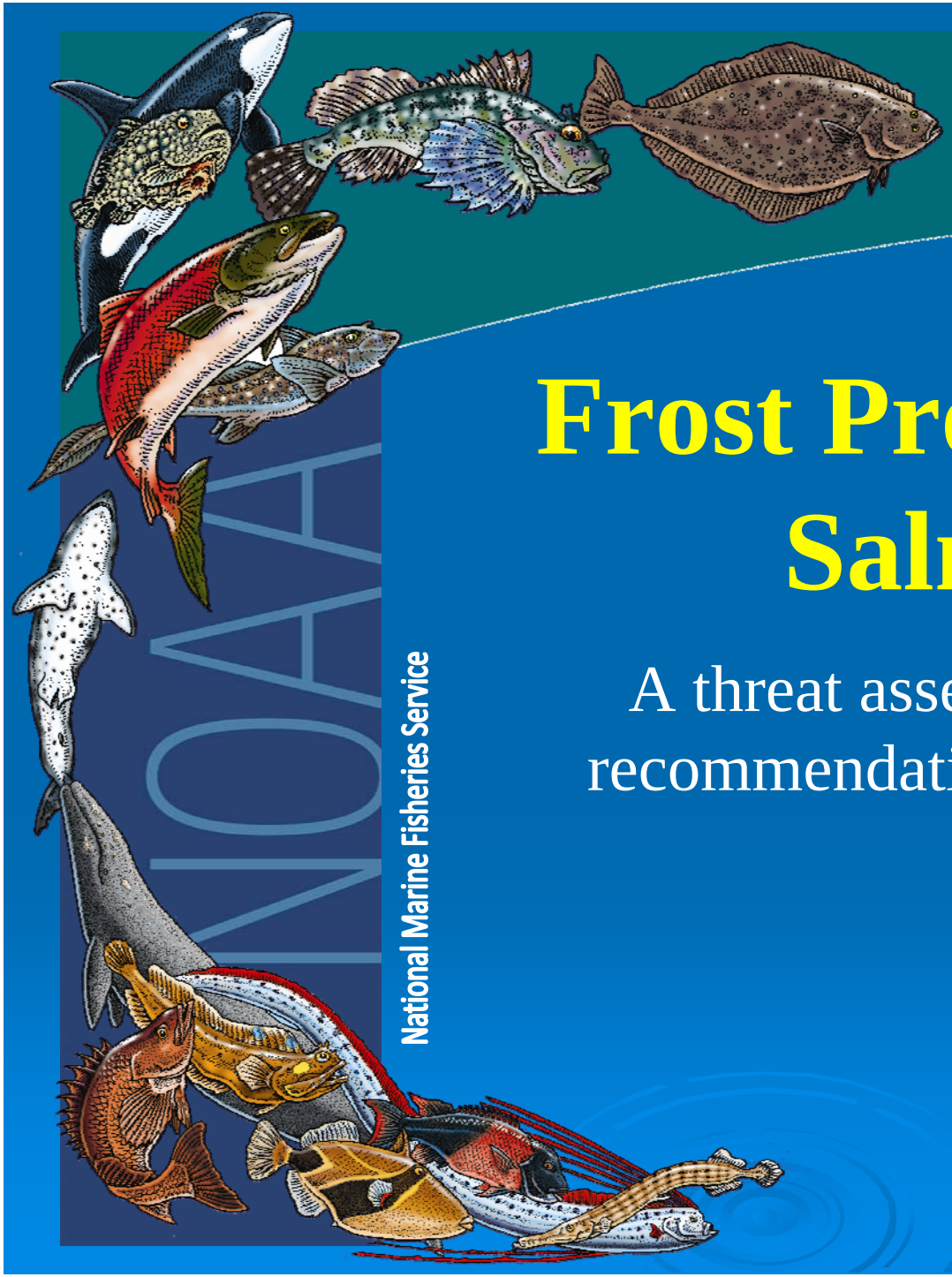


Science, Service, Stewardship

Frost Protection and Salmonids

A threat assessment review and recommendations for future action

Introduction

- Threat Assessment
- Case study on hydrologic impacts
- Proposal review
- Response to comments
- Recommendations

Case Study: Maacama Creek

- Review of:

Hydrologic Impacts of Small-Scale Instream Diversions for Frost and Heat Protection in the California Wine Country

By: M. Deitch, G.M. Kondolf, and A.M. Merenlender

Published in: River Research and Applications 25(2): 118-134 (2009)

Methods

- Monitored streamflow at several sites in Maacama Creek, a large tributary to the Russian River
- Including frost seasons 2004 and 2005
- Correlated streamflow with:
  - Presence of vineyards
  - Frost events

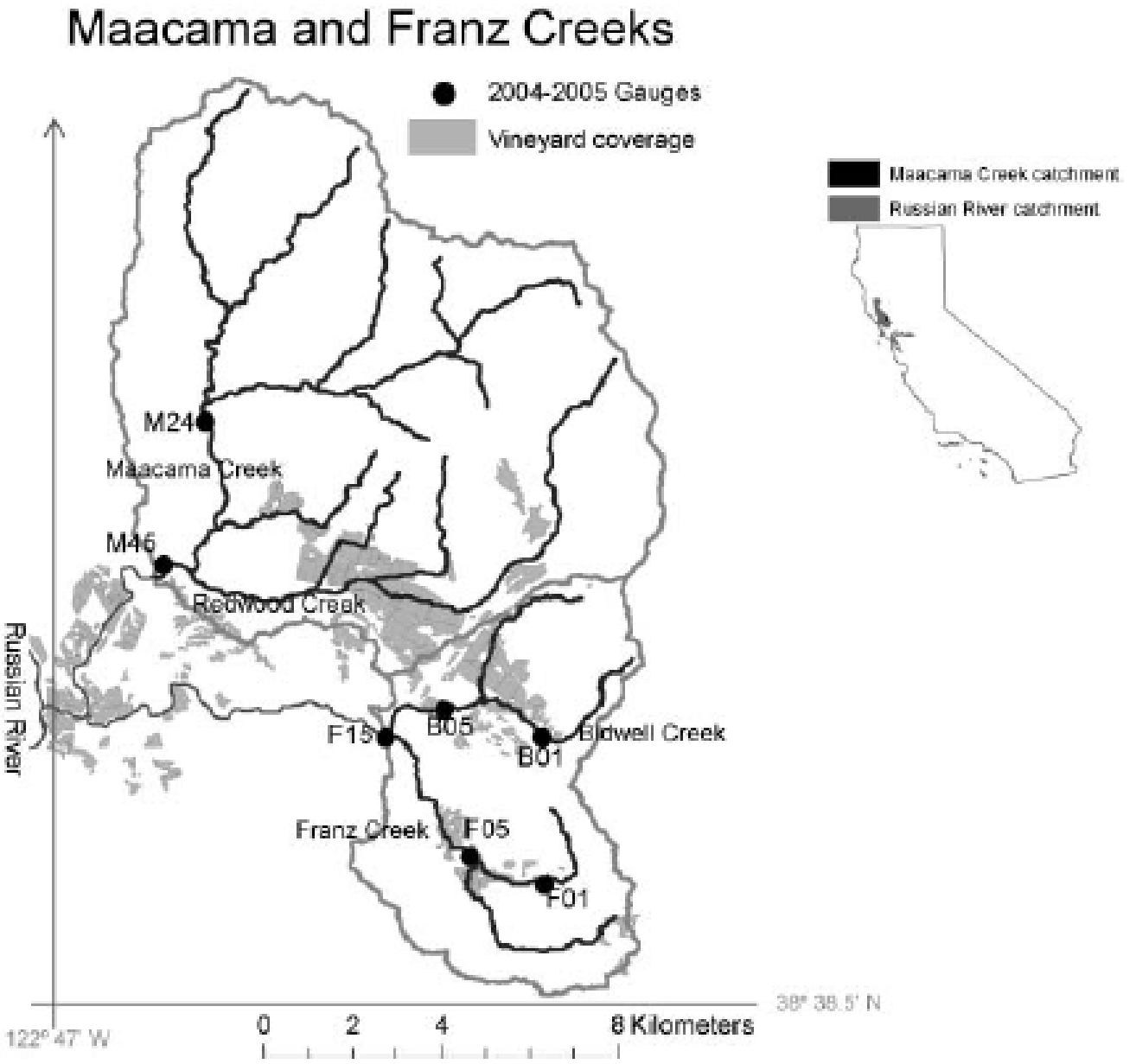
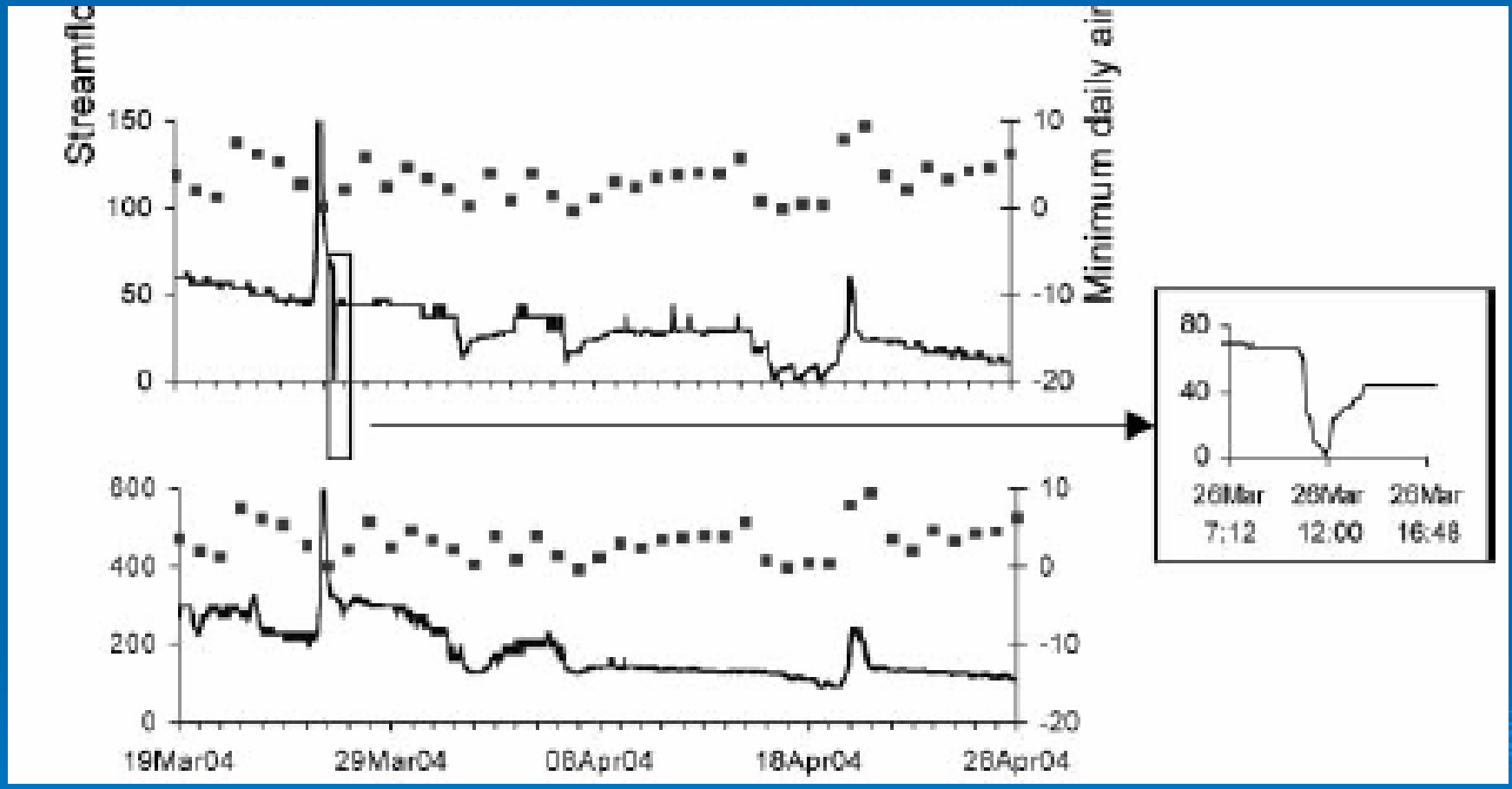


Figure 1. Maacama and Franz Creek channel networks, with gauges 45-Maacama (M45), 24-Maacama (M24), 15-Franz (F15), 05-Franz (F05), 05-Bidwell (B05), 01-Franz (F01) and 01-Bidwell (B01); and vineyards present in 2004

Results

- Acute streamflow reductions
  - Up to 97% surface flow reduction
  - Lasting from hours to days
  - Up to 3.7 million gallons (11.4af) extracted per event
- Only occurred when air temperatures approached freezing
- Occurred in all sites where vineyards present
- Did not occur in areas without vineyards


Streamflo
Minimum daily air
150
100
50
0
10
0
-10
-20
800
400
200
0
10
0
-10
-20
19Mar04
29Mar04
08Apr04
18Apr04
28Apr04
80
40
0
26Mar
7:12
28Mar
12:00
28Mar
16:48

Research Conclusions

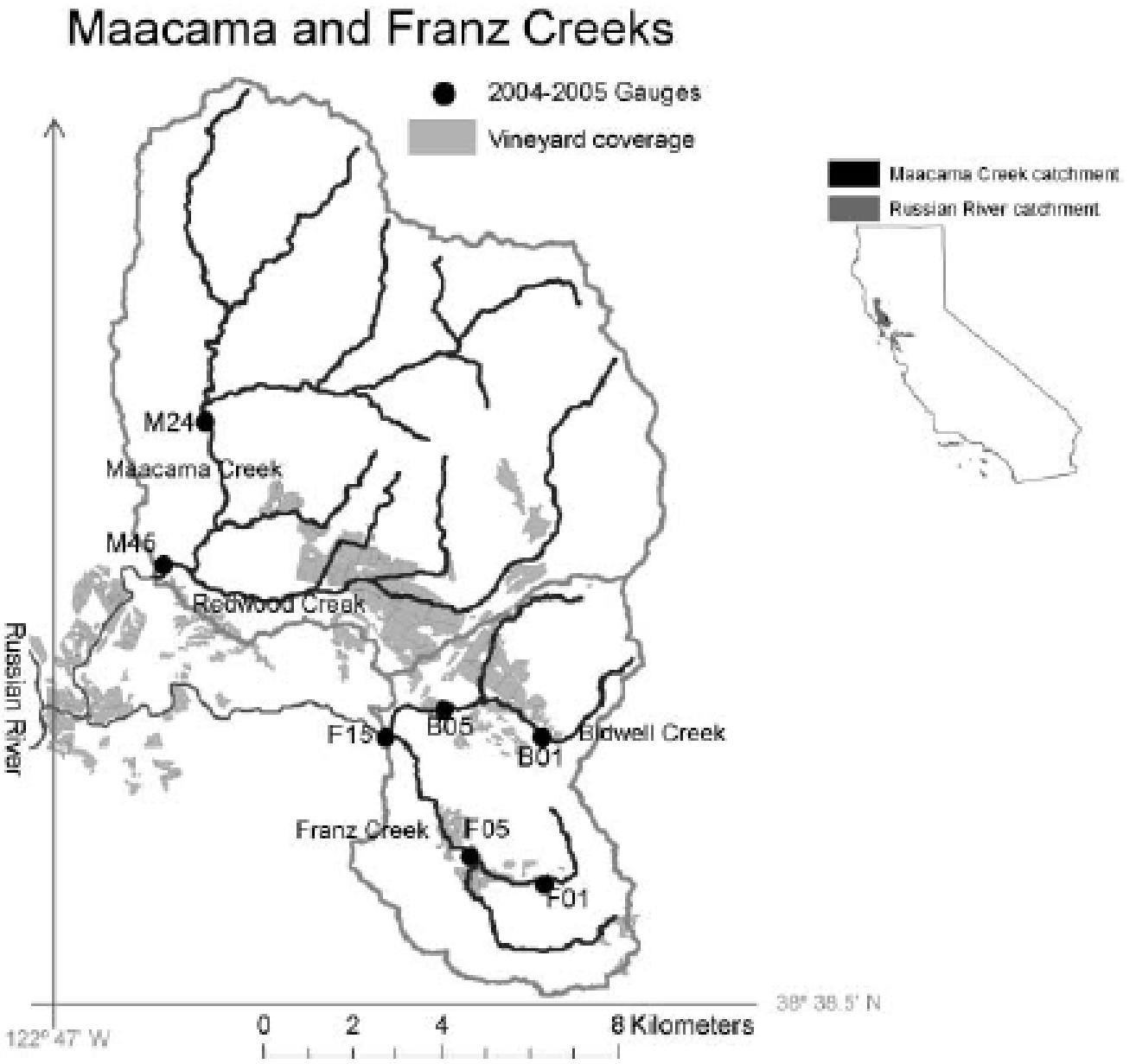
- "Natural catchment processes are insufficient to explain the irregular changes in streamflow in Franz and Maacama Creeks"
- "Small instream diversions…deplete streamflow over short durations"

Scope of Effect

- Geographic extent
  - Effects observed throughout watershed
  - Lowermost site drains 112km^2
- Frequency:
  - 6 events in 2004
  - 7 events in 2005

Cumulative Effects

- Streamflow in lower Maacama is normally twice the flow in upper Maacama
  - Indicating that Redwood Creek contributes significant flows to the lower site
- During frost events lower Maacama flow is approximately equal to the upper site
  - No vineyards above the upper site
  - Effective contribution of Redwood Creek (with 16% vineyards) is **zero flow**



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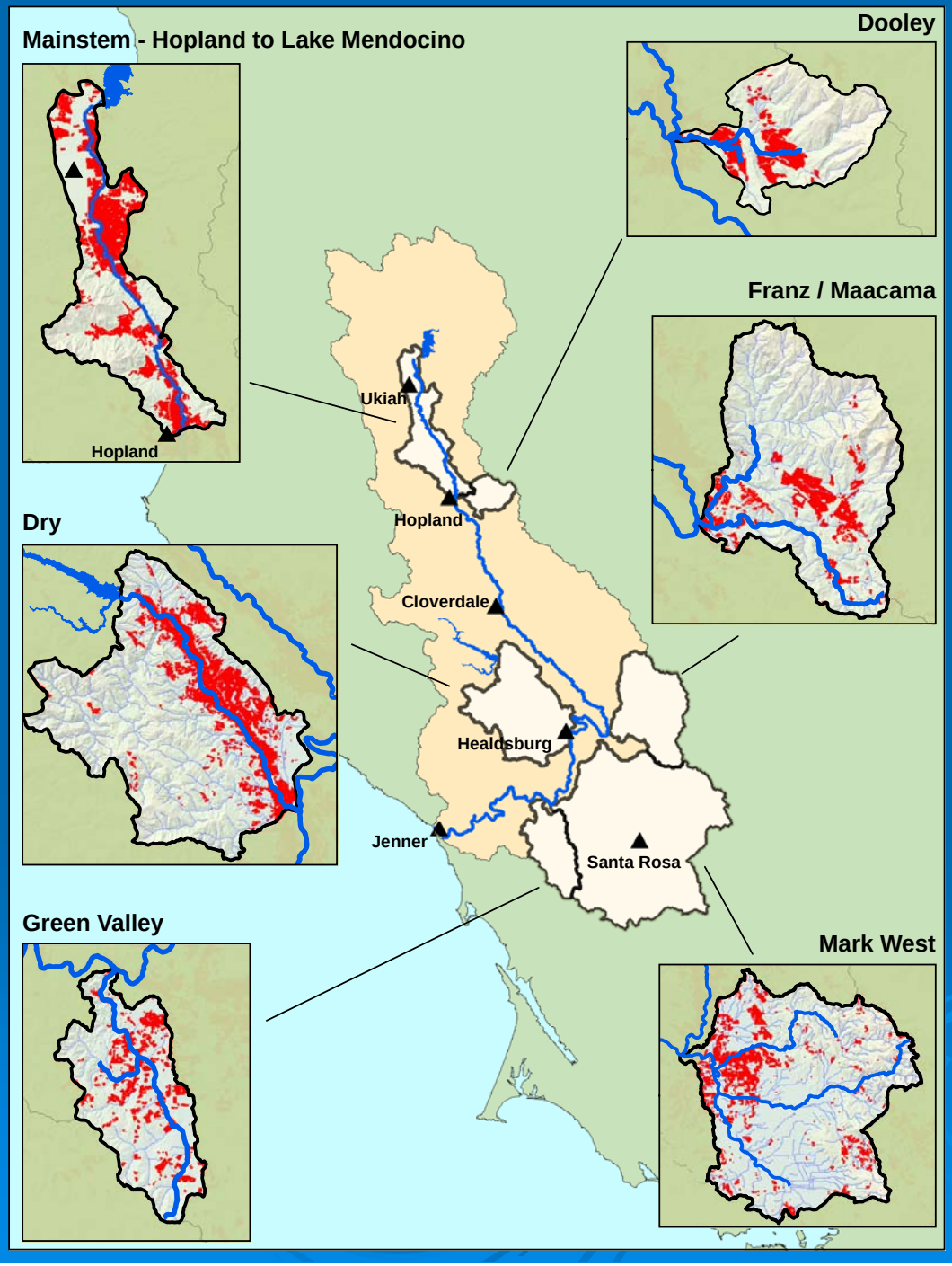
Water Demands

- Surface diversions potentially in excess of spring and summer flows in many parts of the Russian River (Merenlender et al. 2008)
- Existing diversions may reduce streamflow by 20% in 1/3 of Russian River streams (Deitch et al. 2008)
- High demand creates high potential for hydrologic impacts

Conclusions I

- Scientifically credible evidence of hydrologic impacts from frost withdrawals in one major Russian River tributary
  - Includes large-scale cumulative hydrologic effects
- Impacts consistently associated with vineyard development


Mainstem - Hopland to Lake Mendocino
Hopland
Dooley
Franz / Maacama
Ukiah
Hopland
Dry
Cloverdale
Healdsburg
Jenner
Santa Rosa
Green Valley
Mark West

Biological Response

- Widespread exposure of species to effects
  - Large portion of habitat co-occurs with vineyards
  - e.g. the entire Maacama drainage network is Critical Habitat for Threatened steelhead
- Stranding
  - Ramping rates
  - Complete habitat desiccation
- Secondary effects:
  - Predation
  - Reduced feeding/growth

Threat Assessment Summary

- Salmonids are killed by frost water diversions
- Salmonids are at risk in all major tributaries with frost protection activities
- The burden should be on water users to demonstrate their absence of impacts

Proposal Evaluations

- Progress to date
- Areas for improvement
- Overall effectiveness

Progress to date

- URSA Proposal
  - Compensatory release program
  - Off-channel pond construction
- Sonoma Resource Protection Group
  - Water use assessment
- Russian River Property Owner's Assoc.
  - Water use assessment
  - Streamflow monitoring
  - Transparency

Areas for Improvement

- Tangible actions
  - Not commensurate with the scope and magnitude of problem
  - particularly in tributaries
- Participation
- Land use planning
- Monitoring
- Transparency

Overall Effectiveness

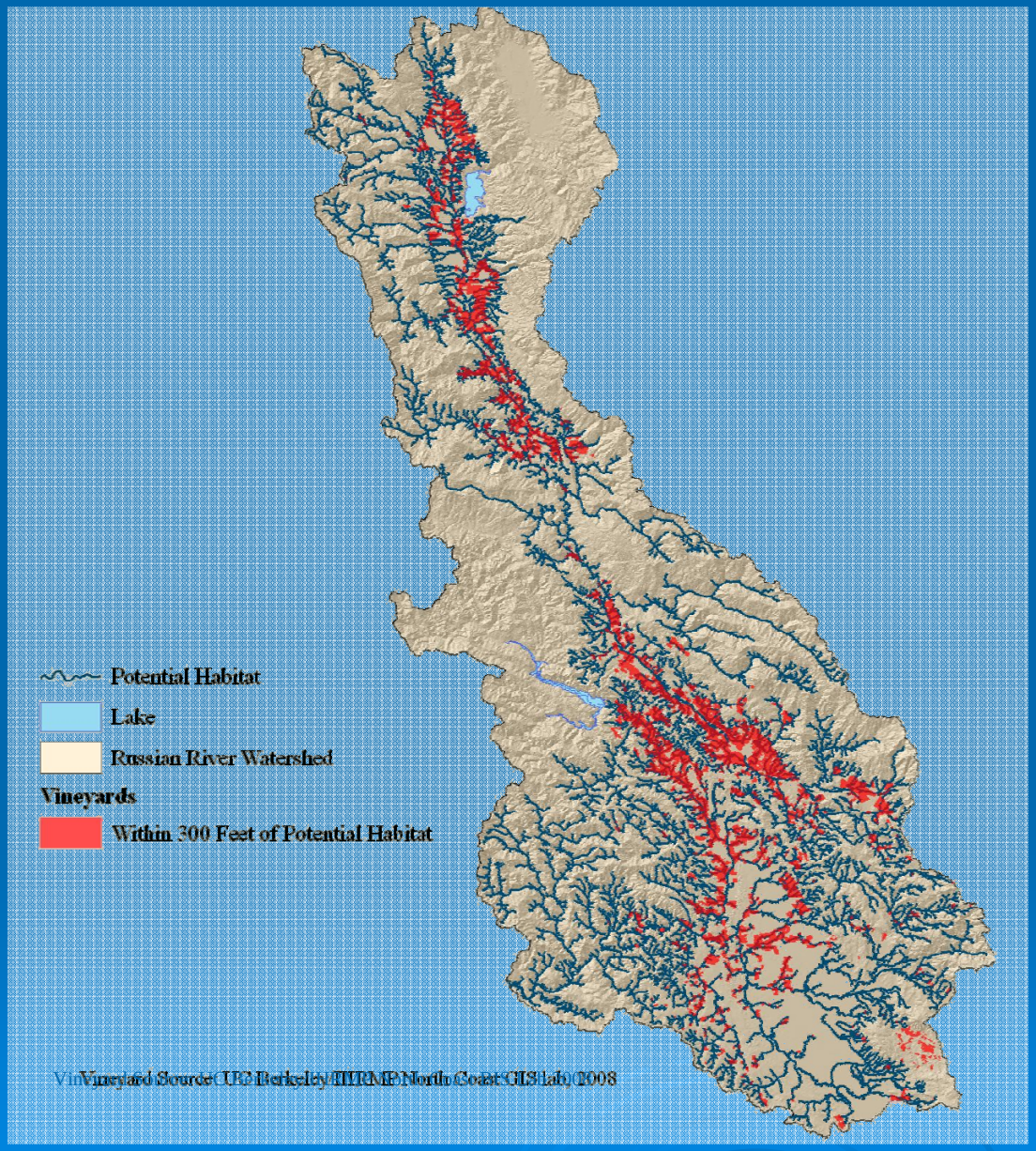
- Addressing impacts of this scale is a huge challenge.
- Each proposal contains some elements of a solution, but none cover everything
- We therefore conclude the proposals presented to us are not sufficient to ameliorate the threat that frost protection poses to salmonids in the Russian River.

Misconceptions I

- Regulation will ruin the local economy
  - Alternative methods do exist
  - Business and conservation of natural resources can co-exist
- Sharing data will hurt growers
  - Most take cases are prosecuted without data from the defendant
  - Data can exonerate you

Misconceptions II

- Threat is limited in frequency and scope
  - This view is not supported by the evidence
- Strandings would happen anyway
  - Stream desiccation and strandings do occur, but diversions make it worse
- Poor ocean conditions and drought obviate the need to protect freshwater habitat
  - Restoration of freshwater habitat will provide greater resilience to populations



Overlap between Vineyards and habitat

There are 60,640 acres of vineyard in the Russian River (Heaton 2008). **70%** are within 300 feet of salmonid habitat and **25%** of salmonid habitat is within 300 feet of a vineyard.

Misconceptions III

- Self governance is the best solution
  - No effective action was taken when the problem was first identified in 1997
- Existing regulation is sufficient
  - Regulations have not prevented impacts so far
  - ESA is a backstop to prevent extinction, not a water management tool

NMFS Authorities

- NMFS is the agency responsible for implementing the Federal Endangered Species Act as it applies to salmon and steelhead.
  - Also the Magnuson-Stevens Fishery Conservation and Management Act
- We achieve this via technical assistance, permitting, and enforcement.

Chronology I

- 1976: Direct diversion for frost protection is ruled to be an unreasonable use of water in the Napa Valley
- 1997: SWRCB Staff Report identifies frost management impacts to salmonids in the Russian River
- 2006: Researchers document hydrologic impacts in the Russian River
- 1999-2008: 30% – 40% increase in vineyard acreage

Chronology II

- 2008: Severe frost event with documented fish kills
- 2008: Frost Protection Task Force formed
- 2009: Additional fish kills associated with frost management
- 2009: Proposals submitted and SWRCB considers regulation

Recommendations I

- Salmonids in the Russian River watershed need immediate protection from high-rate water withdrawals
- Regulatory backdrop is needed to fully address the threat
- Develop a water allocation framework

Recommendations II

- Insist on water use accountability
  - Via comprehensive monitoring and reporting
  - And water budgeting
- Establish instream flow criteria
- Create mechanisms to enforce
- Build on FPTF proposals

Conclusion

- NMFS HCD will continue to provide technical support to:
  - SWRCB and the FPTF
  - OLE
  - Any stakeholders or interested parties
- NOAA's Office of Law Enforcement will continue with its enforcement duties