

Frost Protection Diversions in Mendocino and Sonoma Counties

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**Chinook, Coho, Steelhead
Life History Stages and Timing
California Coastal Watersheds**

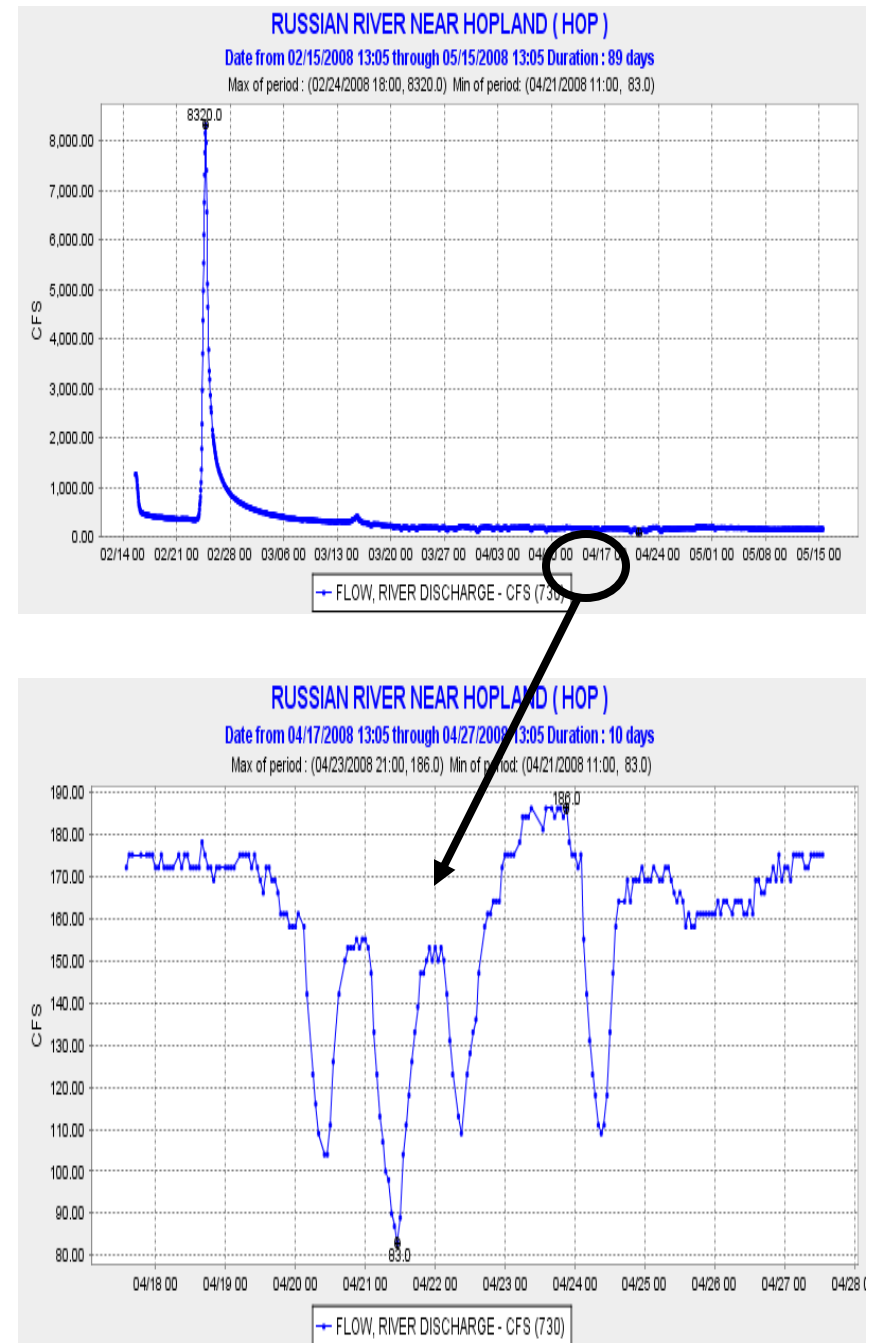
Juvenile Rearing												
Out-Migration												
Emergence/ Fry												
Egg Incubation												
Spawning												
Adult Migration												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.



Risks of FP diversion

- Stranding of fish in edgewater habitats
 - Rapid changes in flow
 - Absence of natural cues
- Entrapment
 - Decreased cover
 - Increased susceptibility to predation
- Possible interference with late end of spawning season

- Natural floods act as an environmental cue that triggers a set of behaviors in salmonids to not only use floodplain habitat but also retreat from the floodplain as flow subsides.
- Frost protection diversions have occurred instantaneously without a proximate cause to trigger a behavior.





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Upper Russian Stewardship Alliance

WATER MANAGEMENT AND CONSERVATION FOR FROST CONTROL IN THE
UPPER RUSSIAN RIVER, MENDOCINO COUNTY



UPPER RUSSIAN RIVER STEWARDSHIP ALLIANCE
SEPTEMBER 2009

- ❑ Water-demand monitoring
- ❑ Releases from Coyote Valley Dam
- ❑ USGS gauge at Talmage Road
- ❑ Enhanced forecasting
- ❑ Telemetric water meters
- ❑ Off-stream storage
- ❑ Conservation BMPs
- ❑ Future recycled water use

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Summary of recommended changes:

- further development of BMPs
- determination of bypass flows necessary to avoid take
- regulatory compliance
- monitoring of diversions and bypass flows



Salmon Coalition Sonoma County Frost Protection Plan

- ❑ Near Term Land Based Best Management Practices (BMPs)
- ❑ Stream flow gauging
- ❑ Development of stream specific water budgets
- ❑ Landowner-lead self governance structure



Sonoma County Frost Protection Resources Protection Group

Goals and Approach

- Alternative sources of water
 - Wells
 - Off-stream storage
- Reduction of demand



Sonoma County Frost Protection Resources Protection Group

Conservation Actions prior to 2010 season:

- ❑ BMPs
- ❑ Participant BMP Plans
- ❑ Cooperative management for RR Mainstem
- ❑ Tributary Frost Protection Assessments
- ❑ Frost Event Notification

Conservation Actions following 2010 season:

- ❑ Develop Tributary Diversion Schedules if warranted
- ❑ Streamflow monitoring



Sonoma County Frost Protection Resources Protection Group

Areas to be developed:

- Avoid take of listed species
- Regulatory compliance
 - ESA / CESA
 - F&GC 1600
 - F&GC 5937
- Focus on maintaining bypass flows based on fish needs
- Greater detail in the Governance Structure
- Availability of Program data



Elements of a Sound Tributary Plan

- ❑ Conservation measures (reduction of demand)
- ❑ Bypass flows should be based on maintaining fish in good condition
- ❑ coordinated diversion (temporal distribution)
- ❑ Regulatory compliance
- ❑ Monitoring, reporting, verification
- ❑ Corrective Action, Enforcement, Compliance
- ❑ Oversight and Governance



Bypass Flows

- Fish habitat suitability studies
- Frost protection diversion management
- Stream gauging

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