



Biological Opinion

Dry Creek Habitat Enhancements

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Dry Creek Watershed

- Warm Springs Dam to Russian River 14 miles long
- Summer Flow (SCWA) 90-130 cfs
- Winter Flood Flows (USACE) 1,000-6,000 cfs
- Coho, Steelhead, Chinook Spawning/Rearing Habitat
- Warm Springs Hatchery
 - Coho Recovery Program

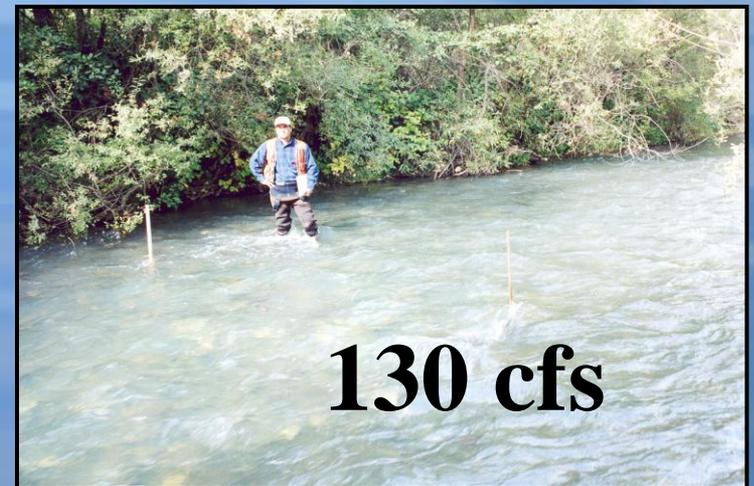


Dry Creek Habitat Conditions



- 2001 Multi-Agency Flow Habitat Study at 47, 90, 130 cfs
- Good Water Quality (Cold 12° C)
- High Water Velocity = Poor Habitat Quality for Coho and Steelhead

- SCWA/USACE Dam Operations Simplify Habitat
- Lack of Structural Complexity (Woody Debris and Boulders)
- Fish Need Diverse Conditions and Slower Water for Optimal Growth and Survival



130 cfs



Options to Improve Dry Creek Critical Habitat

1. Dramatically Reduce Flows from Warm Springs Dam
 - Water Supply for 600,000 people
 - No Structural Habitat Improvement
2. Bypass Flows in Pipeline Around Dry Creek
 - Very High Cost \$
 - Long Time (15 years) to Complete
3. Modify Stream Channel to Accommodate Current Water Supply Releases AND Enhance Fish Habitat
 - Implement More Quickly
 - Multiple Benefits (Water Supply, Summer and Winter Habitat Enhancement, and Stream Bank Protection)

12 Year Dry Creek Habitat Restoration and Monitoring Requirements

Biological Opinion: Projects Required in Dry Creek Valley



- Multiple Phases
- Multiple Goals
 - 5 Tributary Projects
 - 6 Total Miles of Restoration
 - 8 Sites (Upper, Middle, Lower)
 - Summer and Winter Habitat
 - Bank Stabilization
 - Flow Preservation

12 Year Dry Creek Habitat Restoration and Monitoring Requirements

Biological Opinion: Projects Required in Dry Creek Valley

2008 - 2011

Conduct two studies, one to assess naturalizing Dry Creek and one to evaluate the feasibility of a pipeline from Warm Springs Dam to the Russian River.
Build five restoration projects on tributaries of Dry Creek.

Monitoring



Year 3 (2011)

- Extensive Dry Creek Restoration Planning Study
- Pipeline Feasibility Study
- Biological Monitoring
- Increased Coho Hatchery Releases (10,000 smolts/year)
- Five Tributary Fish Passage and Habitat Projects Completed

12 Year Dry Creek Habitat Restoration and Monitoring Requirements

Biological Opinion: Projects Required in Dry Creek Valley

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Build five restoration projects on tributaries of Dry Creek.

Monitoring



2013 - 2014

Restore one mile of habitat in Dry Creek

Monitoring



Year 6(2014)

- Landowner Agreements
- Total 1 Mile of Mainstem Habitat Restoration (multiple sites)
- Creation of Pools, Backwaters, Low Velocity Habitats, Boulder Clusters
- Bank Stabilization and Protection
- Physical and Biological Monitoring

12 Year Dry Creek Habitat Restoration and Monitoring Requirements

Biological Opinion: Projects Required in Dry Creek Valley

2008 - 2011

Conduct two studies, one to assess naturalizing Dry Creek and one to evaluate the feasibility of a pipeline from Warm Springs Dam to the Russian River.
Build five restoration projects on tributaries of Dry Creek.

Monitoring



2013 - 2014

Restore one mile of habitat in Dry Creek

Monitoring



2015 - 2017

Restore two additional miles of habitat in Dry Creek.

Monitoring



Year 9 (2017)

- 2 Additional Miles of Mainstem Dry Creek Restoration (3 Total Miles)
- Lower, Middle, and Upper Dry Creek Sites
- Physical and Biological Monitoring



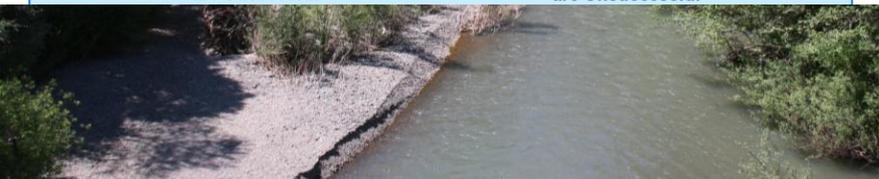
12 Year Dry Creek Habitat Restoration and Monitoring Requirements

Biological Opinion: Projects Required in Dry Creek Valley



Year 10 (2018)

- Are 3 Miles of Restored Habitat Meeting Objectives?
- Are Created Low Velocity Habitats Performing as Anticipated and Improving Fish Population?
- YES = Restore 3 Additional Miles of Habitat by 2020
- NO = Pursue Pipeline Alternative



What Defines Restoration Success?

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Monitoring

2013 - 2014

Restore one mile of habitat in Dry Creek

Monitoring

2015 - 2017

Restore two additional miles of habitat in Dry Creek.

Monitoring

2018

Evaluate the success of restoration projects.

If Projects
are Successful

2018 - 2020
Restore three additional
miles of Dry Creek
habitat for a total of
six miles.

If Projects
are Unsuccessful

Reassess idea of a
pipeline bypassing
Dry Creek

- NMFS / DFG / SCWA Adaptive Management Plan
- Physical Habitat Criteria
- Fish Population Response



Restoration Examples



- Kelly Creek, Oregon



Restoration Examples



- Clackamas River, Oregon
- 4,400 ft Long Side Channel

How Will We Know Restoration is Working?

Long Term Monitoring





Restoration Partnerships



Multi-Agency Planning

Local, State and Federal Funding



Monitoring



Construction

Private Landowner Cooperation



Russian River Project Biological Opinion

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