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
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

- 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

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

**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.

**2013 - 2014**
Restore one mile of habitat in Dry Creek

**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

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

**Biological Opinion:** Projects Required in Dry Creek Valley

<table>
<thead>
<tr>
<th>Year</th>
<th>Project Description</th>
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<tbody>
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12 Year Dry Creek Habitat Restoration and Monitoring Requirements

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?

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

### 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**

**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
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
Private Landowner Cooperation

Construction

Russian River Instream Flow and Restoration
Dry Creek Habitat Enhancements

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