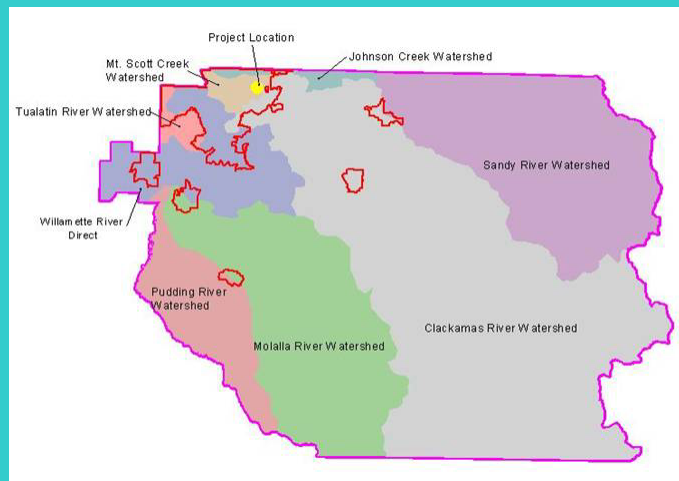




## Dam Removal in the North Clackamas Urban Area



## Project Location





### *Project History, 1960- 1996*

1960: Dam constructed to provide stock watering pond and irrigation for surrounding agricultural production  
1980's: Land conversion to urban residential, pond used for stormwater detention  
1993: Sanitary Sewer construction through the pond, sediment accumulation problem became evident  
1996: Damage to earthen dam from flood event raised concerns about dam failure

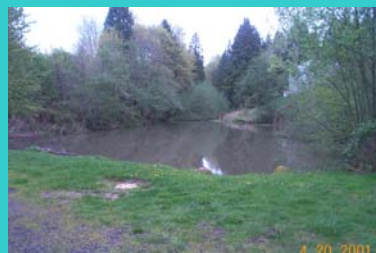


### *Project History, 1996 - Present*

2001: Local governments and the community partner to address growing concerns over the dam; Water Environment Services offers to develop a project to remove the dam and restore the creek

2002: Dam Removed and Stream Channel Constructed

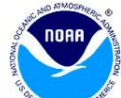
February, 2003: 900 trees planted to establish 70-100 foot riparian zones along project area





## *Project Goals*

1. Reduce solar heating effect on pond surface by removing the reservoir upstream of the dam, thereby reducing water temperatures.
2. Remove a barrier to fish passage for all lifestages of fish by removing the dam structure.
3. Remove the potential for sedimentation of downstream stream channel by removing 3000 cubic yards of fine sediment from the reservoir.
4. Establish a streamside riparian zone along newly created stream channel



## *Design and Permitting Process*

### **Preliminary Design Alternative Analysis:**

5 Options Presented, one selected for final design development

**Public Outreach/Meetings:** Two public meetings were held to explain the project to the community, landscape architects drew up sketches of the preliminary design.

### **Analyses Completed:**

Wetland Delineation  
Topographic Survey  
Geomorphology Study  
Hydraulic Study  
Geologic Survey  
Soil Sampling  
Biological Assessment

### **Partnerships:**

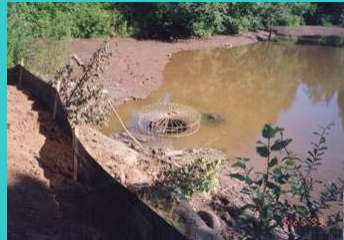
ODFW  
USFWS  
NOAA Community Based  
Restoration Program



## *Sediment Accumulation*

Approximately 3000 cubic yards of fine sediment accumulated upstream of the dam.

“Glory hole” outlet plugs frequently with debris, overflow channel was primary outlet for the pond.



## *Excavation*

Sediment plan was to excavate a channel from the approximate centerline of the pond, and to place the excavated material in the surrounding uplands to create 3:1 bank slopes and riparian area. No sediment was hauled off the project site.



## *Channel Design*

### **Reference Reaches (RR) Downstream and Upstream:**

#### **Streamtype:**

RR1: high gradient channel, large substrate  
RR 2: low gradient, cobble dominated substrate

#### **Channel Grade:**

RR1: 2-8% (avg. 3%)  
RR2: 1/2 - 1%

#### **Stream Habitat/Substrate:**

RR1: Rapids, Cascade over Boulder,  
Side Channels  
RR2: Lateral Pools, Riffles,  
Side Channels

#### **Channel Design:**

Grade: average 4.5%  
Cross Section Width: 20 feet (6-8-6)  
Materials: LWD, Boulder, Cobble,  
gravel of various sizes



## *Channel Design*



*Channel Design*



*Channel Design*

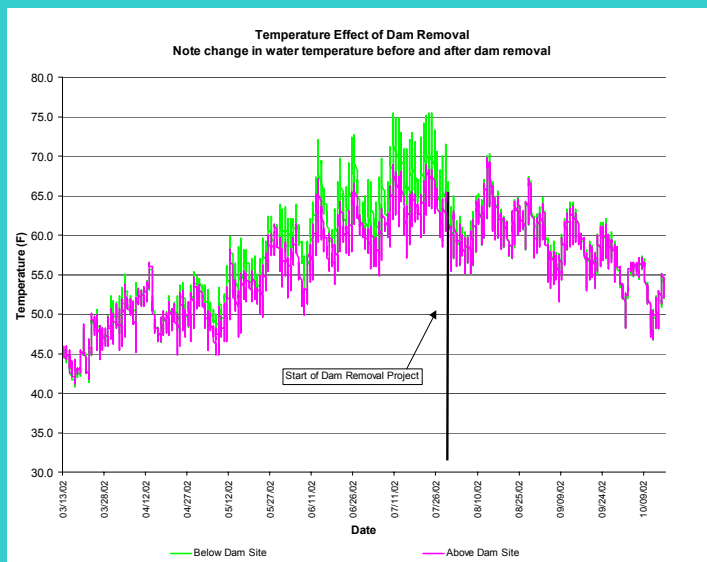




## Solar Heating Effect



## Solar Heating Effect Temperature Sensor Data



*High Flow Event 1/31/03*



*Volunteer Tree Planting Event 2/1/03*





*Questions?*

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Special Thanks  
to our project partners,  
consultants and contractors:

Matthew Kimble, NOAA  
Alison Ward, NOAA  
Jim Grimes, ODFW  
Cathy Daw, City of Happy Valley  
Andrew Jansky, KPFF  
Peter Martins, KPFF  
Erin Stucky, Jones and Stokes  
Brant Construction

