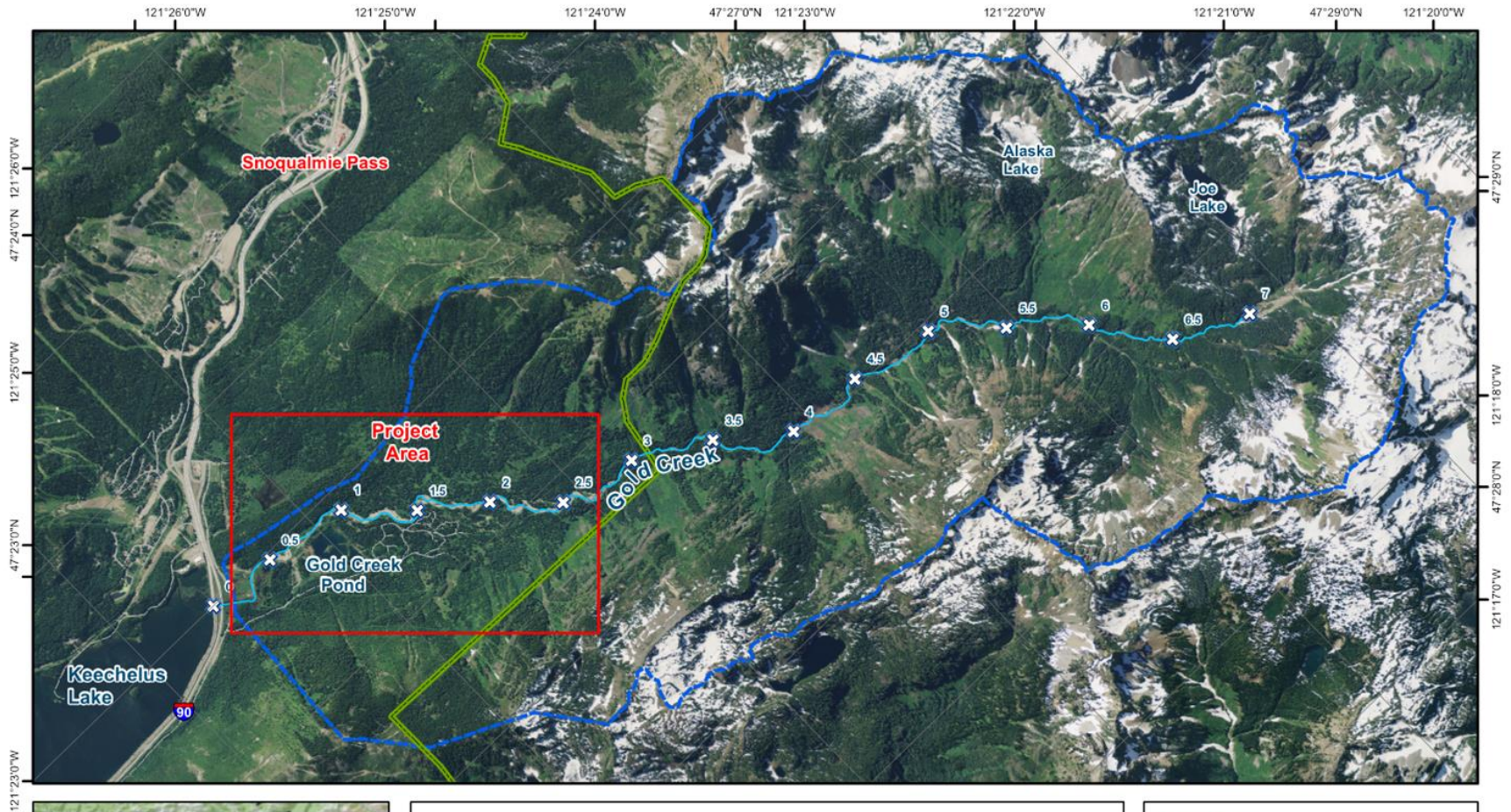




- Two Year Assessment Results
- Conceptual Designs
- Moving Forward

Gold Creek Habitat Assessment & Conceptual Design

Project Location



Legend

- River Miles
- Main Channel
- Roads
- Railroad
- Wilderness Boundary
- Watershed Boundary



Data sources:
 USDA National Agriculture Imagery Program
 USGS National Hydrography Dataset



**Gold Creek
 Project Site Area**

**Northeast of Snoqualmie Pass
 Kittitas County, Washington**



7/26/2013



8/26/2013



10/2/2013



The Problem

- Habitat Degradation
- Seasonal Dewatering

Project Goals

- Identify the causal mechanisms of habitat loss and seasonal dewatering
- Produce detailed *conceptual* design plans



Bull Trout – *Salvelinus confluentus*

Photo of stranded Bull Trout taken on 9/26/2013 in shallow riffle below Gold Creek Pond



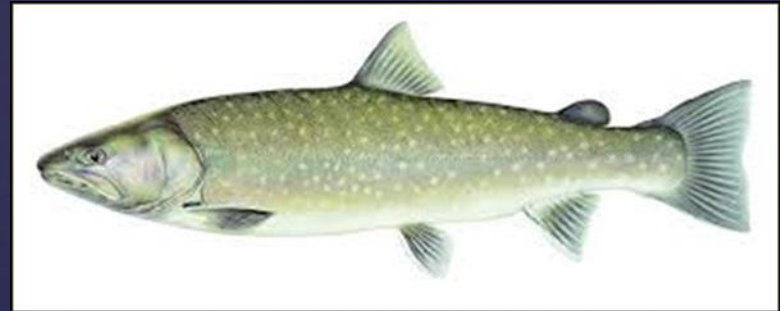
Bull Trout

Salvelinus Confluentus

One of only three known distinct populations left in the Upper Yakima Basin

The population is at high risk of extirpation

Gold Creek is the only tributary to Lake Keechelus that supports all life stages for Bull Trout



Why *Gold Creek* Restoration is Important

Project Status

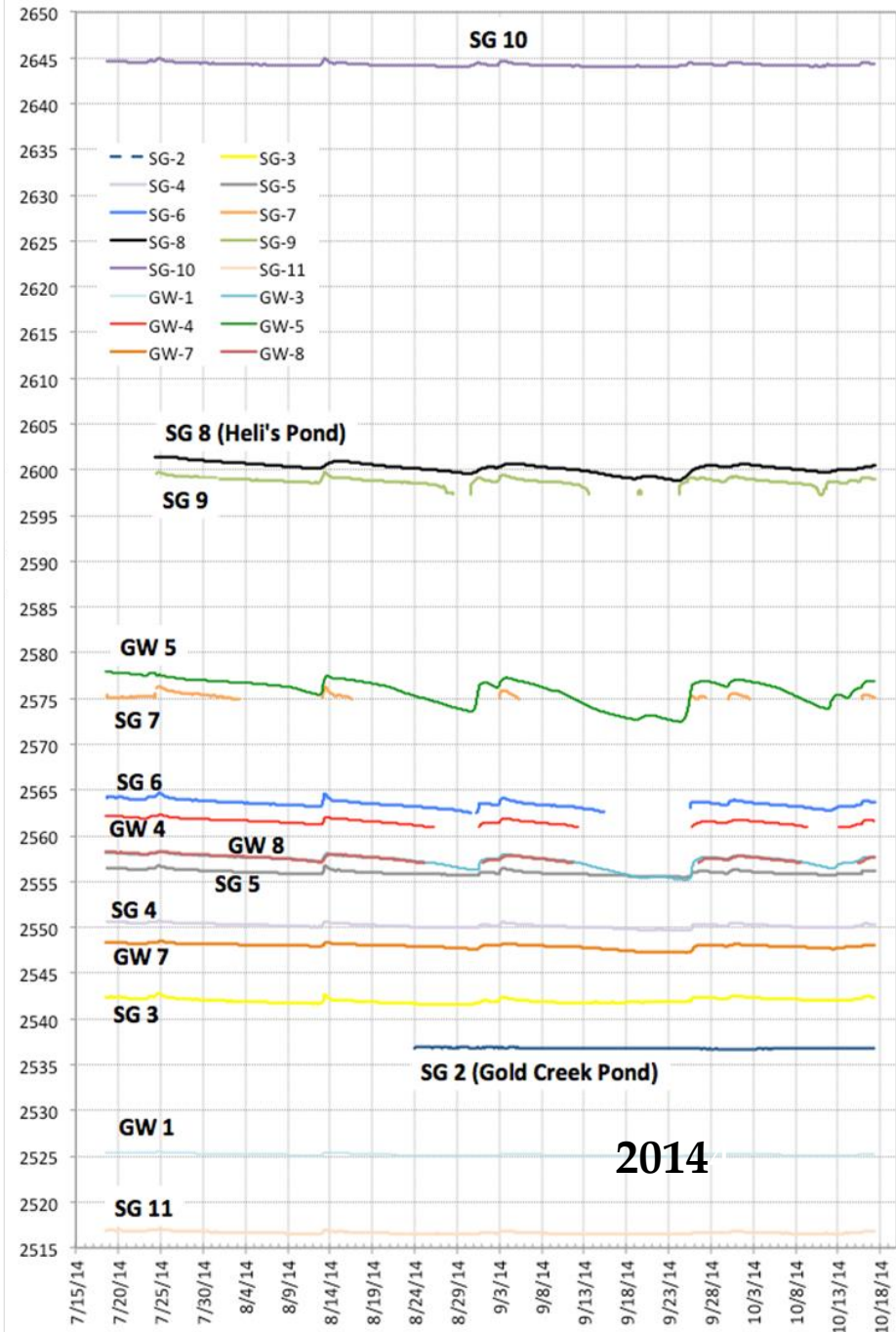
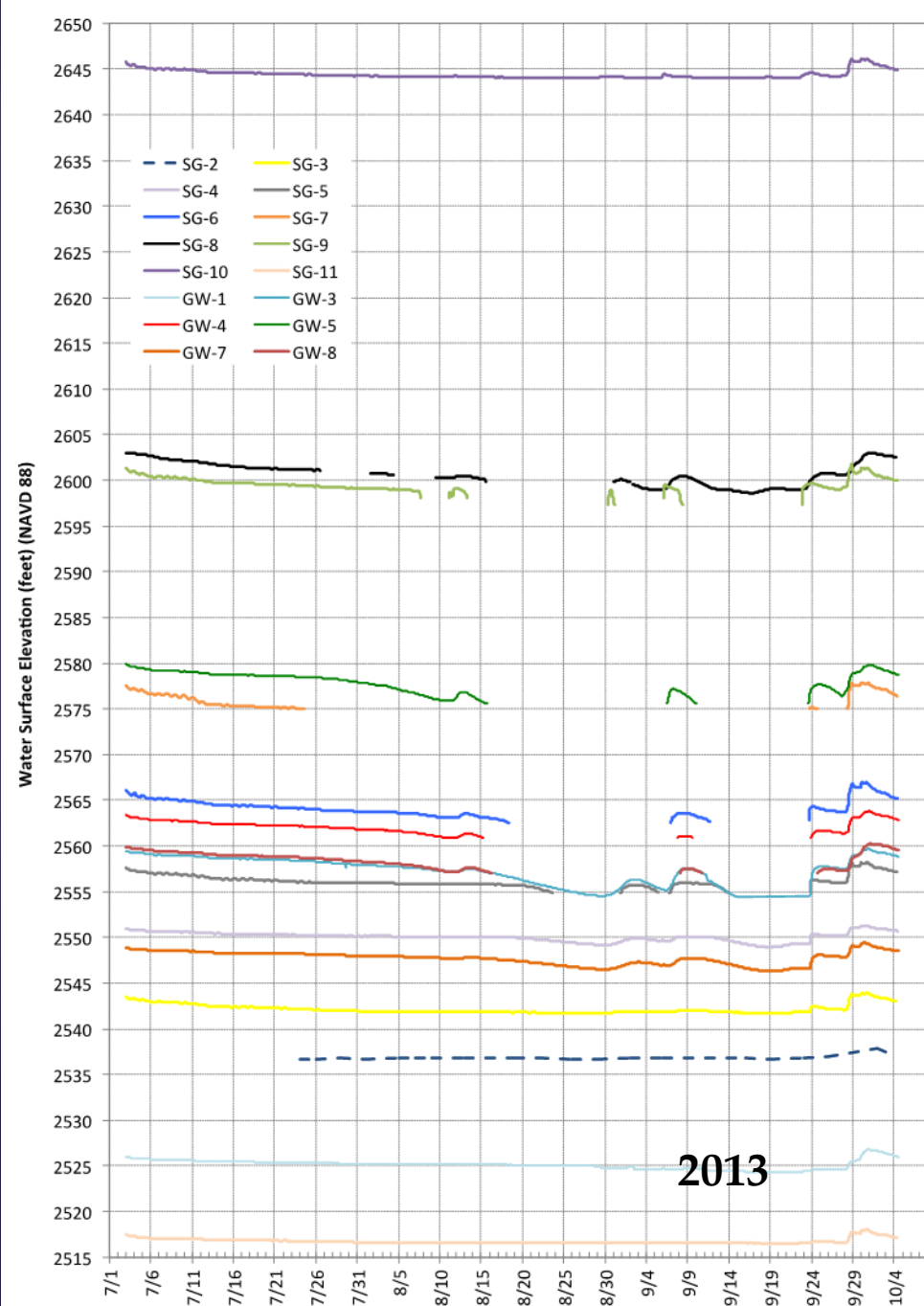


Tasks Completed in 2013 – 2015:

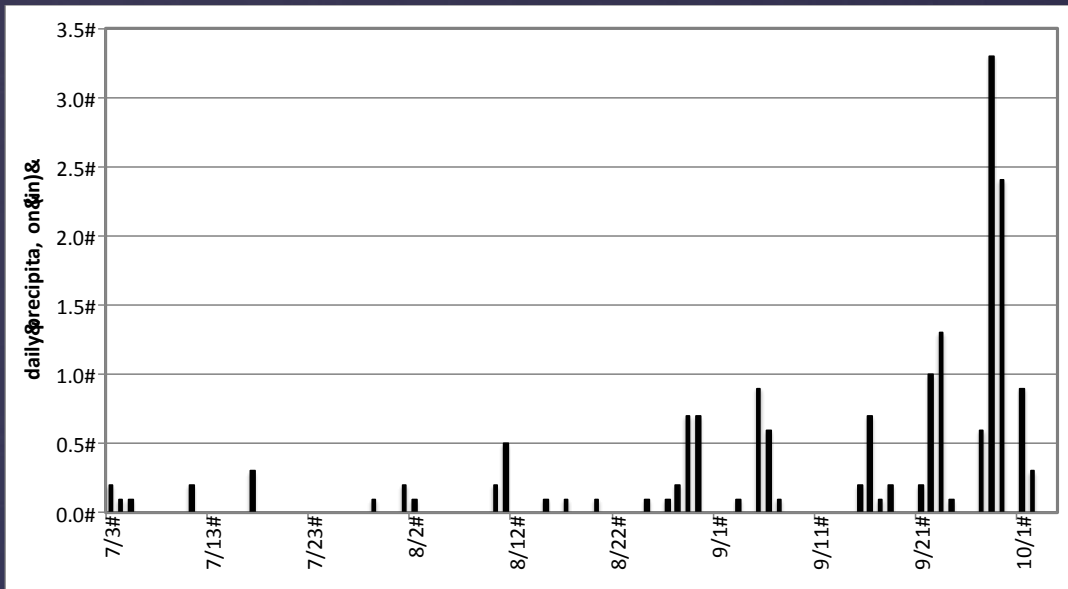
- Data Inventory and Gap Analysis
- 2013 & 2014 Hydrologic Assessments
- Habitat Assessment
- Geomorphic Assessment
- Conceptual Design
- Outreach
- Inclusion in USBOR DEIS for KDRPP & K to K Projects
- 2015 SRFB Proposal for Phase 1 Instream Habitat Restoration (RM 1 – 2.1)

2014 Hydrologic Monitoring



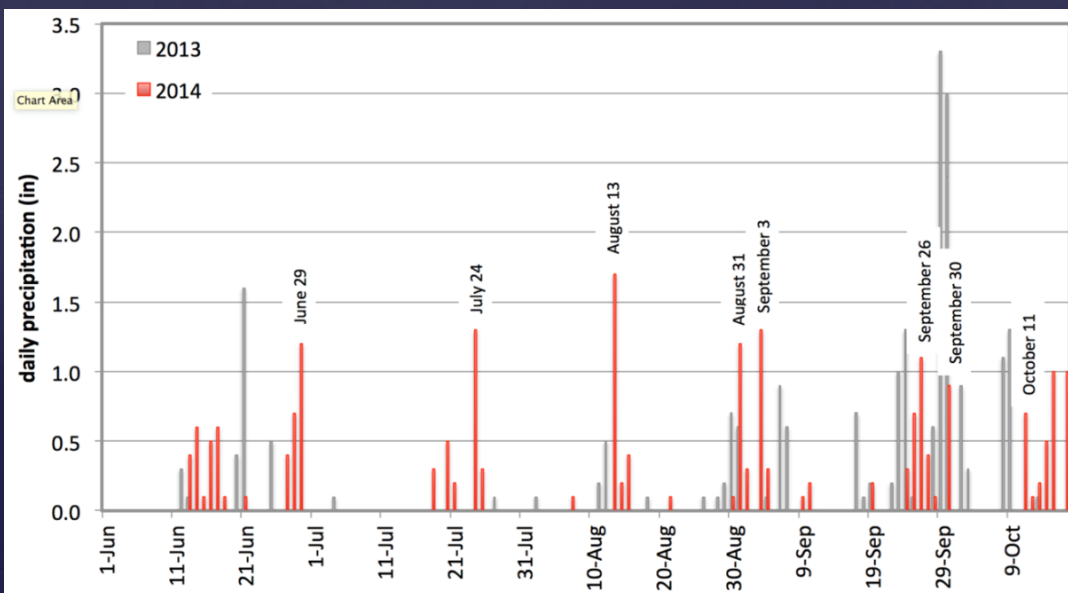


Rainfall



2013

- Extended period of little to no rainfall from July to Mid-September
- Extended period of seasonal dewatering



2014

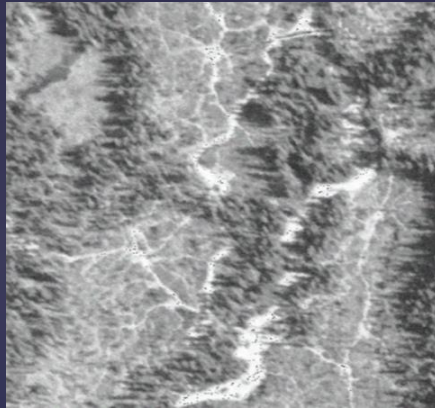
- Four rainfall events throughout the summer over 1"
- Four distinct dewatering events through this same period

Geomorphic Assessment

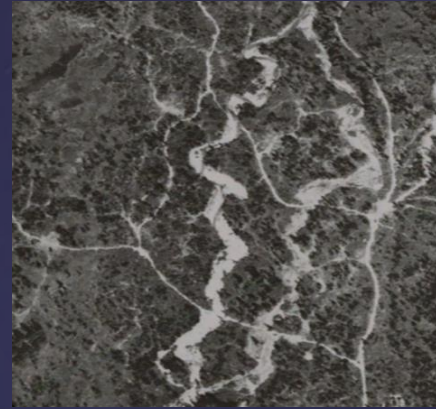
1944



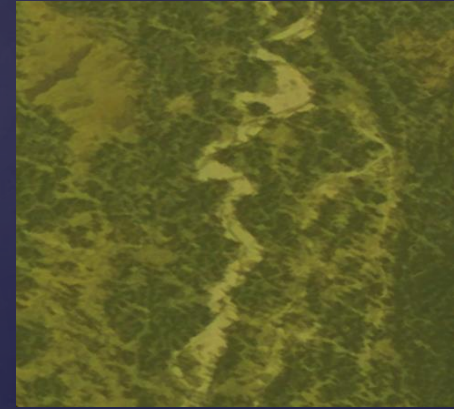
1957



1970



1985



Historic Disturbances

- Mining
- Lake Keechelus Dam & Reservoir Operations
- Logging
- Road Development
- Residential Development

2015



GEOMORPHIC ASSESSMENT

HISTORIC DISTURBANCES

- Accelerated widening following logging in the 1950's
- Average peak width in the 1990's
- Expansion greatest downstream of RM 1 and between RM 1.4 and 1.75
- Current trends suggest the riparian trees are starting to achieve key size (60 years after logging)

YEAR	AVERAGE ACTIVE CHANNEL WIDTH (FT)	AVERAGE INCREASE IN ACTIVE CHANNEL WIDTH SINCE 1944 (%)	MAXIMUM ACTIVE CHANNEL WIDTH MEASURED
1944	96	0	233
1954	104	7.8	253
1957	123	27	446
1970	179	86	403
1985	179	85	373
1991	183	90	339
1998	183	90	315
2003	169	75	282
2006	158	64	318
2011	181	88	332
2014	168	74	290



Stream discharge into creek bed (Q)

α

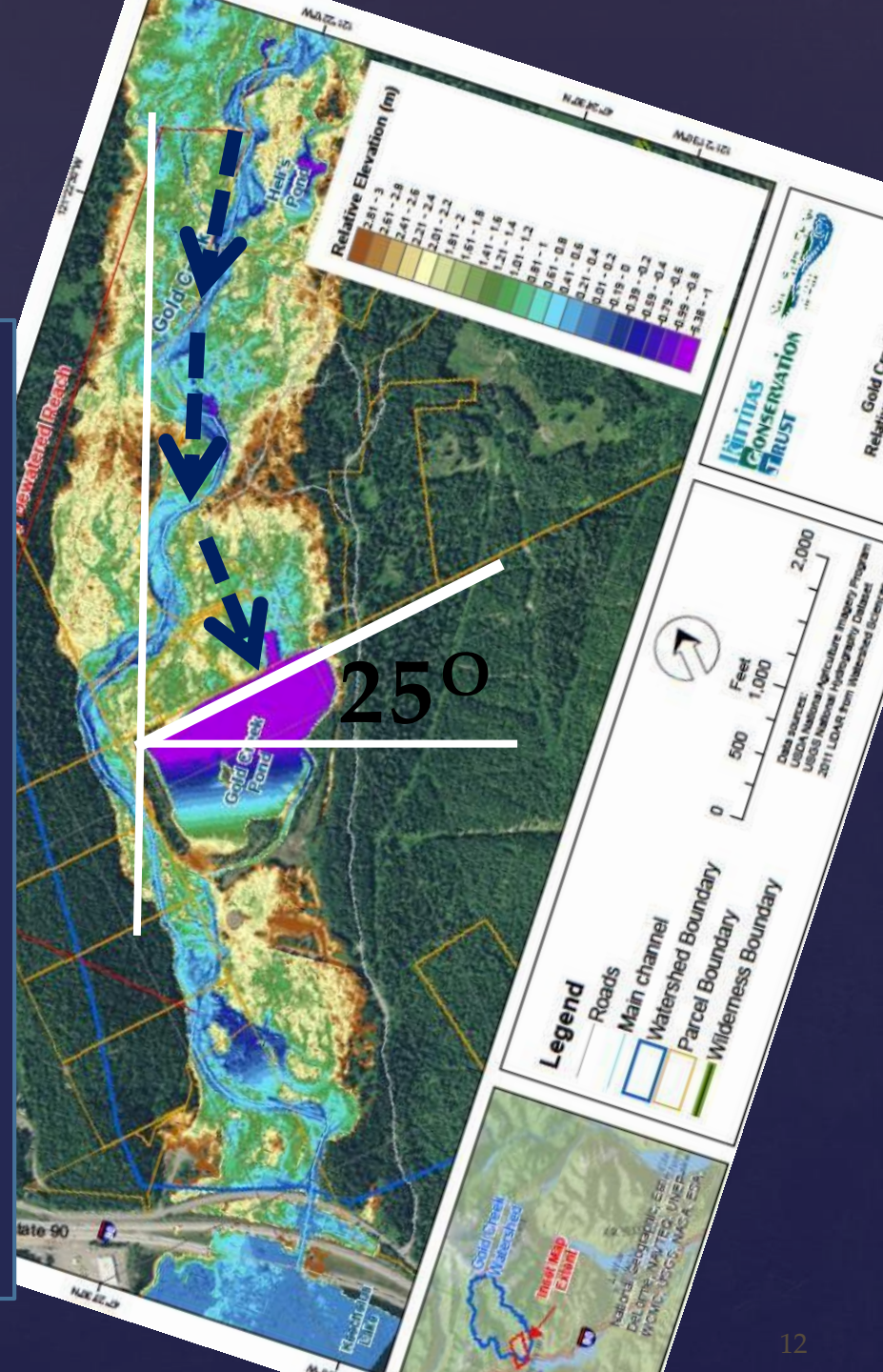
Surface area of creek bed (A)

↑ stream bed surface area

= ↑ infiltration into groundwater

GOLD CREEK POND

- Influence of Gold Creek Pond
 - Modifies groundwater gradient (estimated drop of 10' from historic levels)
 - Lower wse on eastern floodplain relative to western floodplain
 - Orientation of Pond relative to valley axis
 - WSE in Gold Creek Pond remains constant
 - Groundwater elevations level closer to the Pond than further upstream



INSTREAM RESTORATION

Restoration of forested floodplain

- Restoration of historic channel widths
- Roughened floodplain to confine flows and reduce infiltration area
- Target sub-reaches with most significant widening
- Use of large timber to provide bank strength





PHASE III

PHASE I

PHASE II

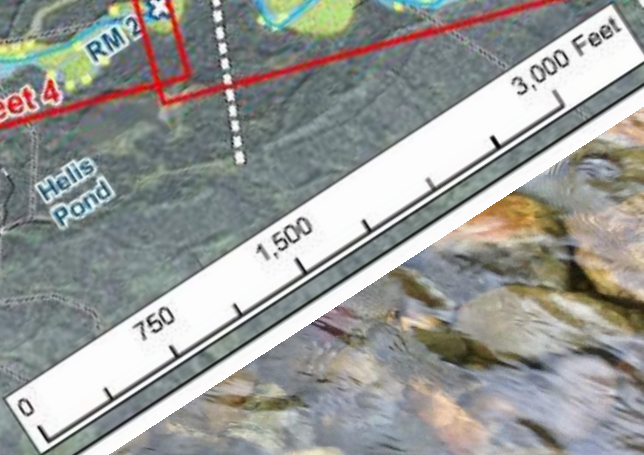
Sheet 1
RM 0.5

Sheet 2
RM 1
Gold Creek Pond

Sheet 3
RM 1.5
Gold Creek

Sheet 4
RM 2
Hells Pond

Sheet 5
RM 2.5



753449 1420856

754949 1421858 756449

757949 1422856

759449

90

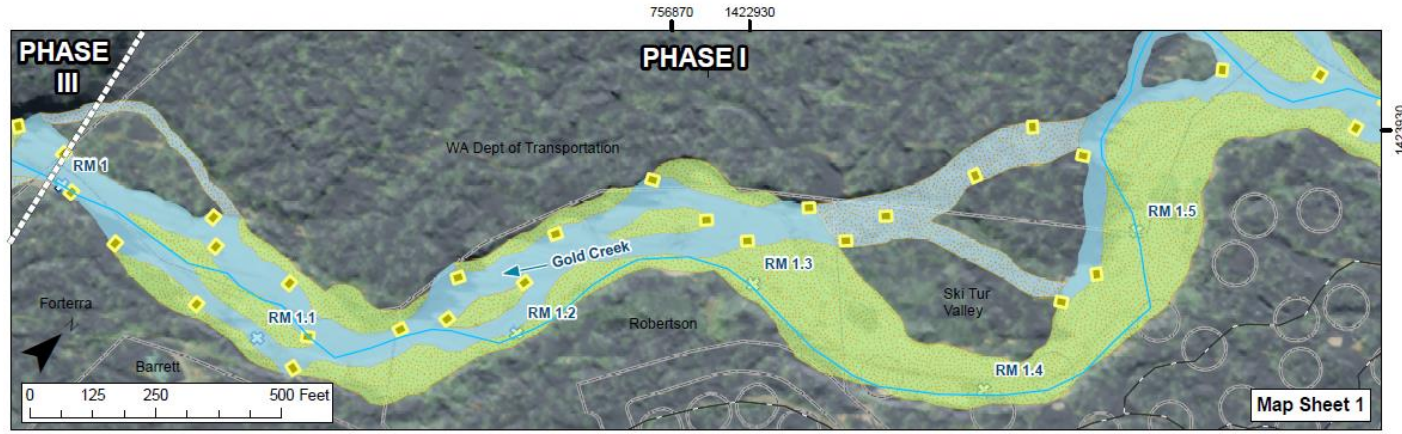
CORATION

Gold Creek Instream Habitat Design #15-1153

2015 SRFB
 Project Proposal
 PRISM #15-1153
 RM 1 – 2.1

Main Dewatered
 Reach

Minimizes
 Impact to Bull
 Trout



- Legend**
- River Mile
 - Gold Creek (2013)
 - Existing Roads
 - Parcel Boundary (approx)
 - Instream Restoration**
 - Channel
 - Channel Excavation
 - Roughened Floodplain
 - Engineered Wood Structure

This generalized concept is to portray basic plan for restoring this portion of Gold Creek valley within Gold Creek to pre-disturbance condition circa 1944. The project will restore critical instream habitat by emulating natural processes that once sustained habitat and stabilized the channel. The concept area will complement larger scale restoration within Gold Creek valley that include restoration of Gold Creek Pond. The concept presents major project elements to be addressed in restoration planning and the specific boundaries of project elements are anticipated to change based on stakeholder input.

Coordinate System
 Washington State Plane NAD 83 South (feet)

Data sources
 USDA National Agriculture Imagery Program 2013
 2012 LIDAR from Watershed Sciences, Inc.

**Gold Creek
 Instream Restoration
 Concept Design**

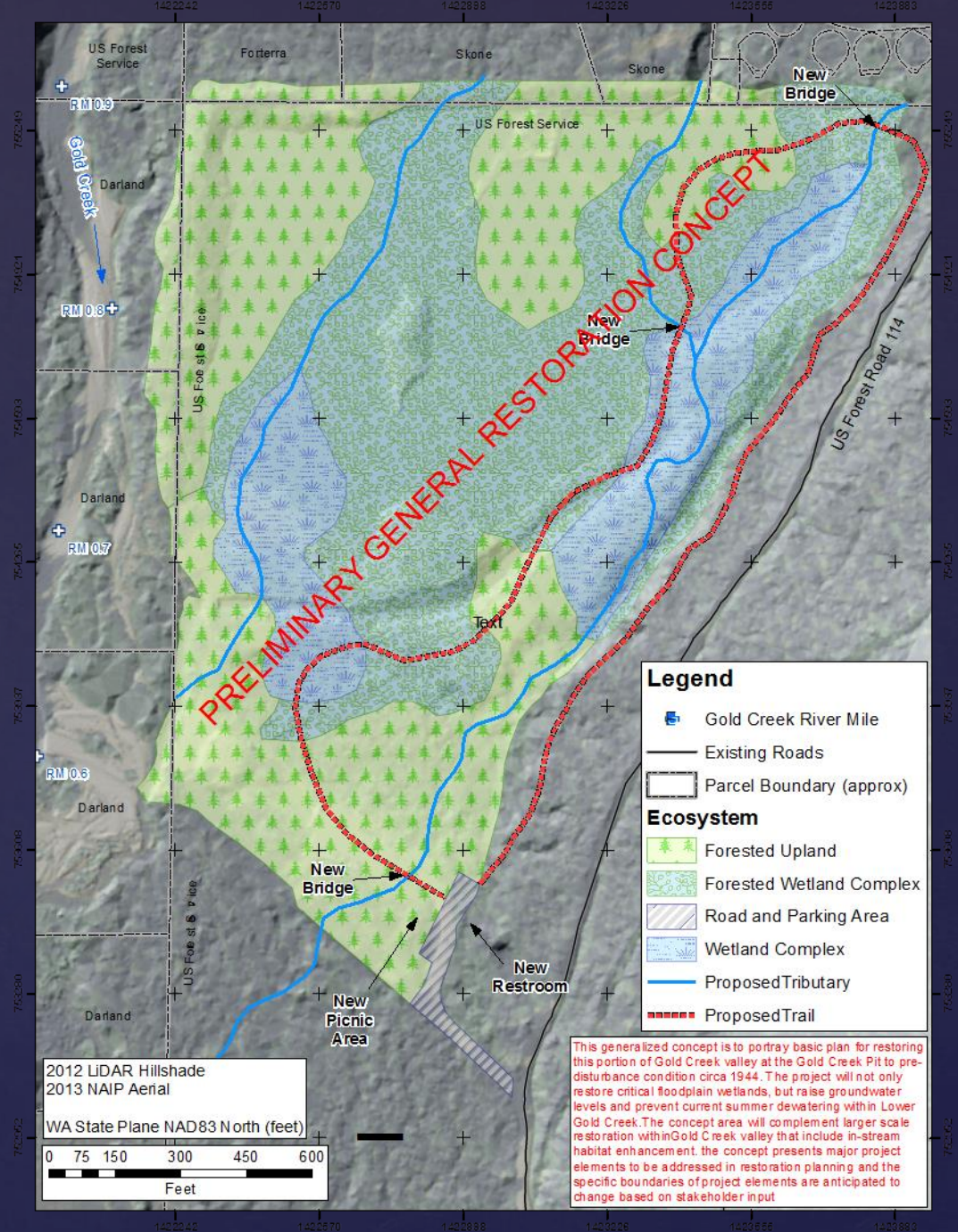
Northeast of Snoqualmie Pass
 Kittitas County, Washington



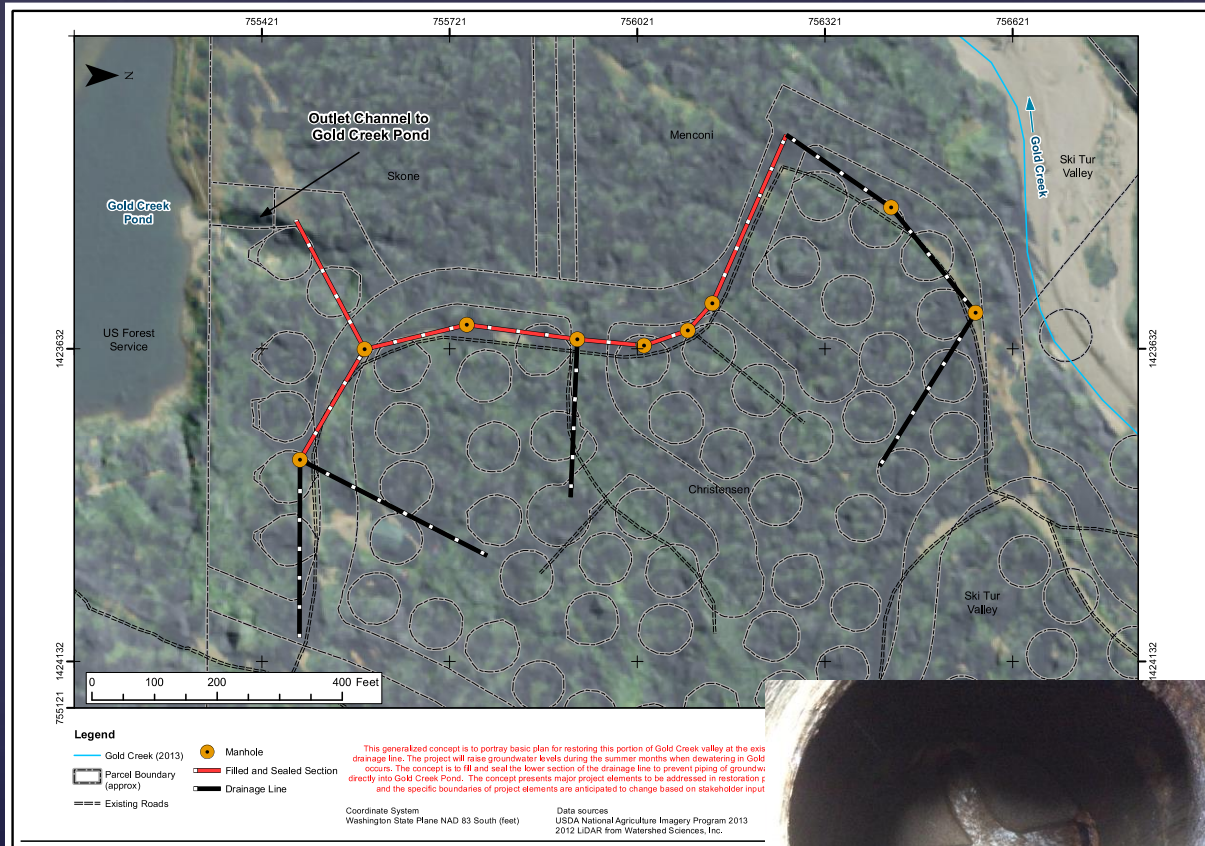
CONCEPT DESIGNS GOLD CREEK PIT RESTORATION

Restore Pre-Disturbance Condition

- Wetland mosaic
 - Forested wetlands
 - Emergent wetlands
 - Open water
- Upland Forests
- Tributary Re-Alignment



CONCEPT DESIGNS DRAINAGE LINE RESTORATION



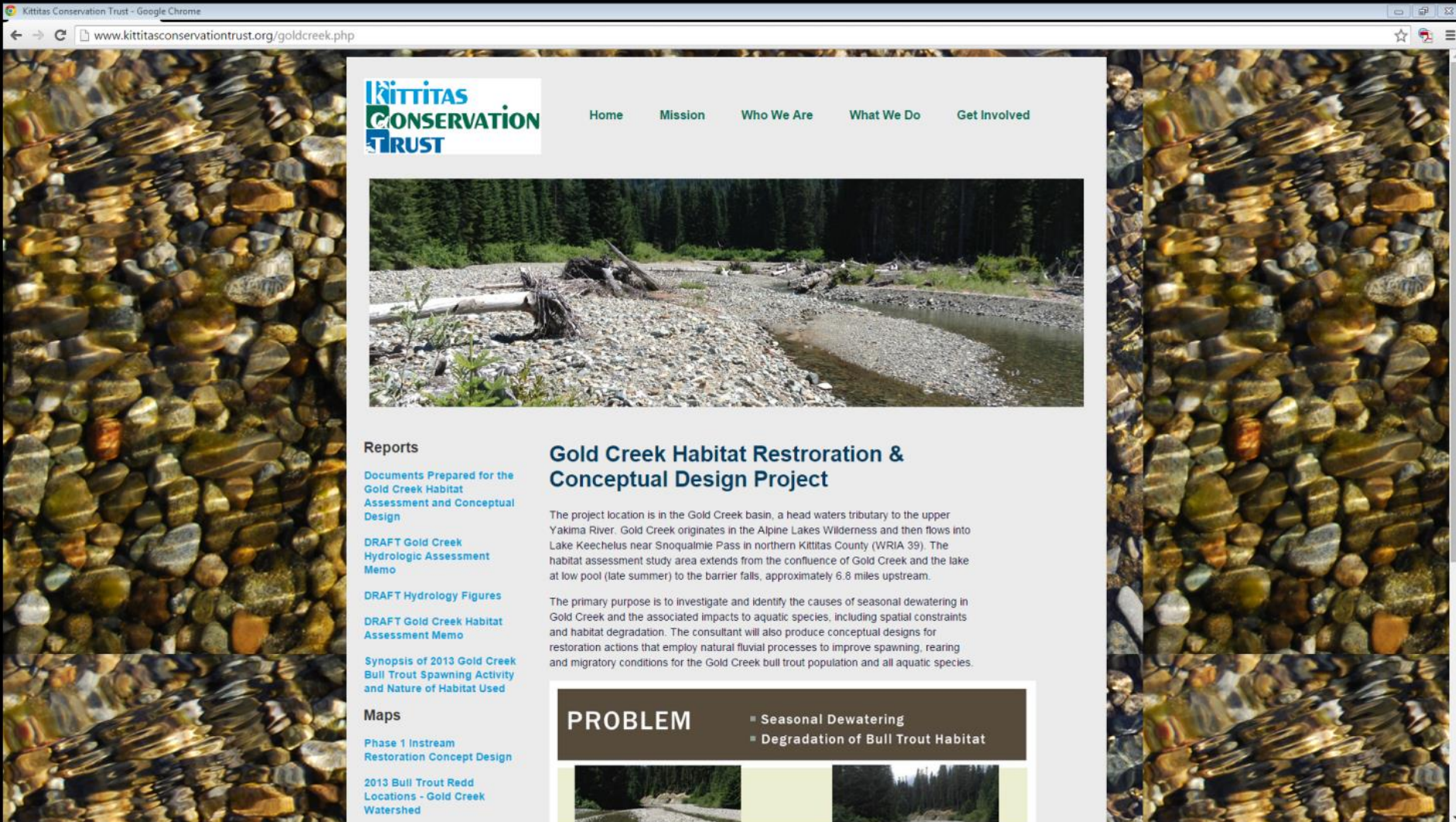
During dewatering, relative elevation along pipe changes

- Invert above groundwater table at upstream end
- Invert below groundwater table at downstream end (observed at manholes 1, 9, 8)



Documents can be found at:

kittitasconservationtrust.org



The screenshot shows a web browser window with the URL www.kittitasconservationtrust.org/goldcreek.php. The website features a navigation menu with links for Home, Mission, Who We Are, What We Do, and Get Involved. The main content area is titled "Gold Creek Habitat Restoration & Conceptual Design Project" and includes a list of reports and maps. The background of the page is a large image of a rocky stream bed with water flowing over the stones.

KITTITAS CONSERVATION TRUST

Home Mission Who We Are What We Do Get Involved

Gold Creek Habitat Restoration & Conceptual Design Project

The project location is in the Gold Creek basin, a head waters tributary to the upper Yakima River. Gold Creek originates in the Alpine Lakes Wilderness and then flows into Lake Keechelus near Snoqualmie Pass in northern Kittitas County (WRIA 39). The habitat assessment study area extends from the confluence of Gold Creek and the lake at low pool (late summer) to the barrier falls, approximately 6.8 miles upstream.

The primary purpose is to investigate and identify the causes of seasonal dewatering in Gold Creek and the associated impacts to aquatic species, including spatial constraints and habitat degradation. The consultant will also produce conceptual designs for restoration actions that employ natural fluvial processes to improve spawning, rearing and migratory conditions for the Gold Creek bull trout population and all aquatic species.

PROBLEM

- Seasonal Dewatering
- Degradation of Bull Trout Habitat

Reports

- [Documents Prepared for the Gold Creek Habitat Assessment and Conceptual Design](#)
- [DRAFT Gold Creek Hydrologic Assessment Memo](#)
- [DRAFT Hydrology Figures](#)
- [DRAFT Gold Creek Habitat Assessment Memo](#)
- [Synopsis of 2013 Gold Creek Bull Trout Spawning Activity and Nature of Habitat Used](#)

Maps

- [Phase 1 Instream Restoration Concept Design](#)
- [2013 Bull Trout Redd Locations - Gold Creek Watershed](#)