

# The Snyder Creek / Klickitat Mill Fish Passage Project



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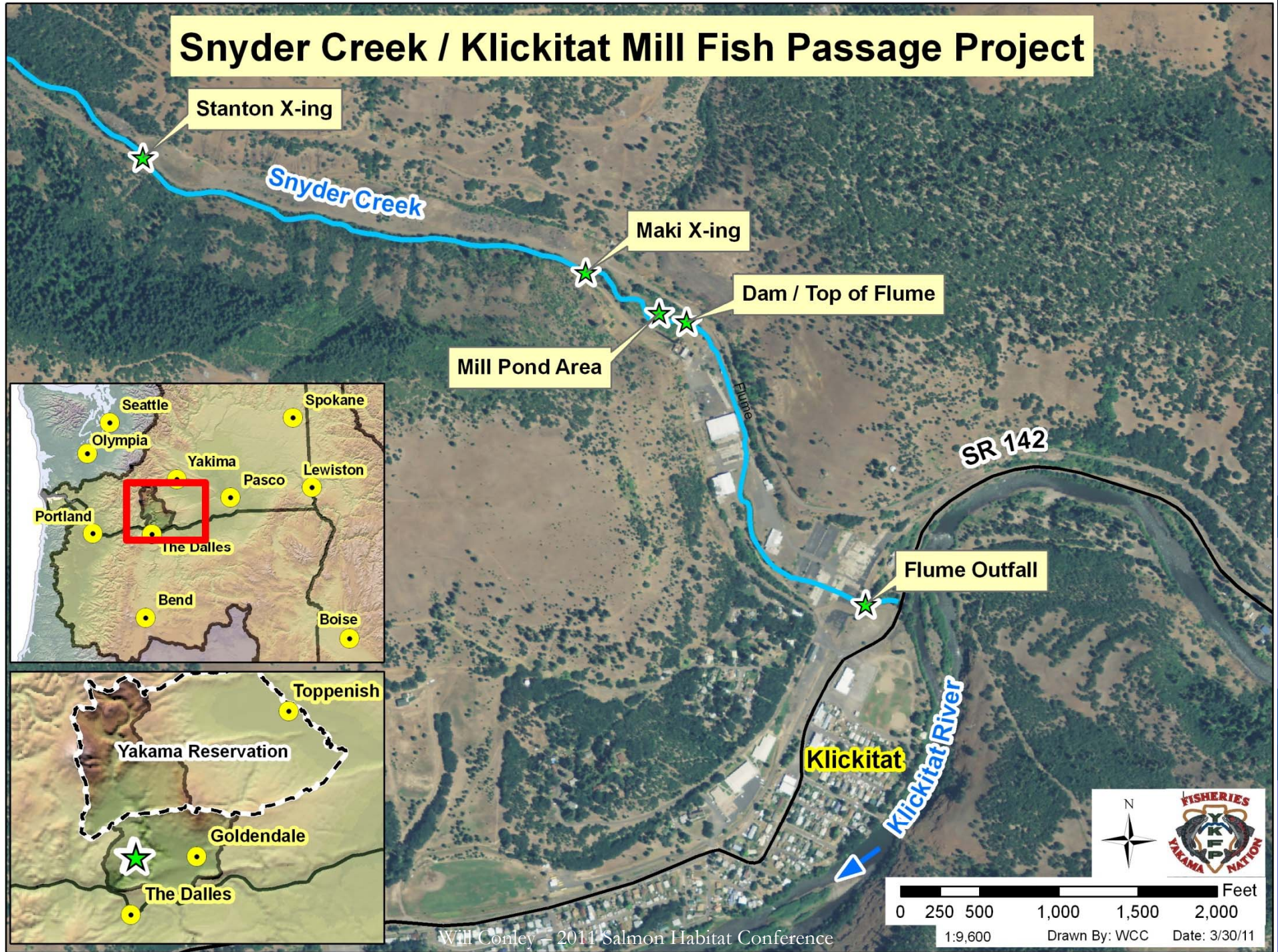
**Salmon Habitat Conference - April 26, 2011 - Grand Mound, WA**

# Introduction / Outline

A collaborative effort between Klickitat County (KC), Mid-Columbia Fisheries Enhancement Group (MCFEG), Washington Department of Fish and Wildlife (WDFW; project lead), and the Yakama Nation Fisheries Program (YNFP) constructed in 2002-2003 to restore salmonid passage to Snyder Creek, a Klickitat River tributary.

- Background
  - Location
  - Problem statement
- Project Development
  - Chronology
  - Goal
  - Treatments
- Results
- Challenges

# Snyder Creek / Klickitat Mill Fish Passage Project



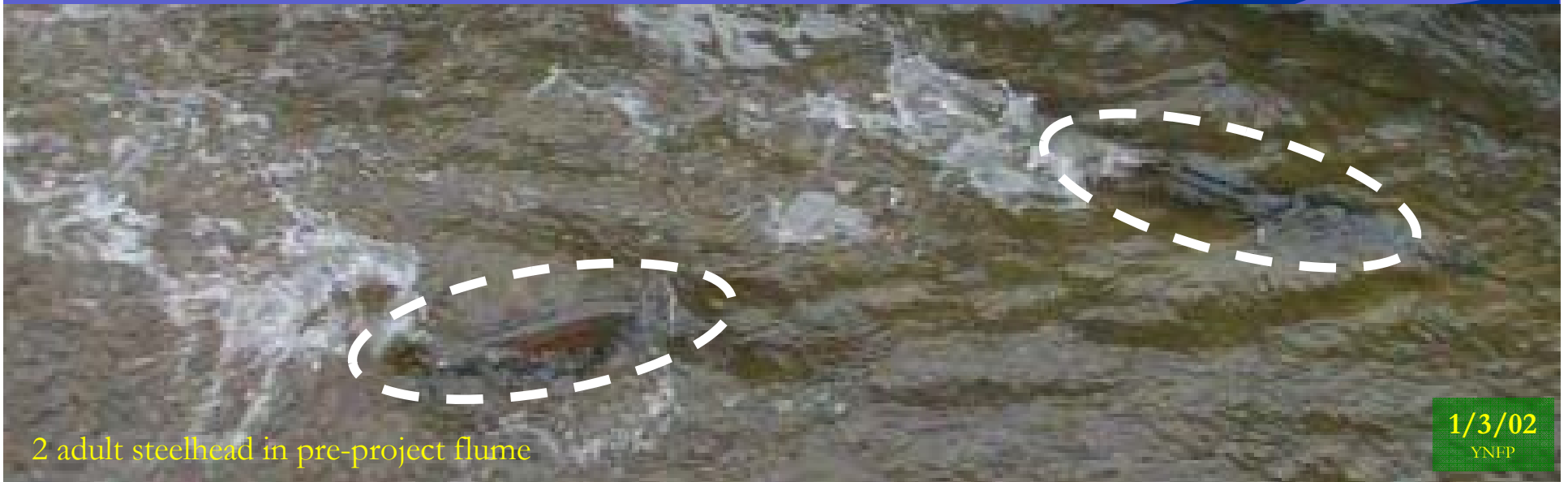
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# Problem

Suite of problems distributed over  $\sim 2/3$  mi. of stream  
blocked access to salmonid migration for 80-90 years

- $\sim 2.5$  Outfall drop from concrete flume
- $\sim 2400'$  Concrete flume (depth & velocity)
- Low-head dam
- 2 perched ( $\sim 2.5'$ ) road crossings



2 adult steelhead in pre-project flume

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# Project Chronology

- Early-1990s: Mill closes; parcels sold by Champion
- Spring 1997: Project Conception (YN, WDFW, NRCS)
- Late-1990s: survey (WDFW & NRCS) and preliminary design (WDFW)
- May 1999: 1st grant awarded (SRFB #99-1623, sponsored by Klickitat County)
- March 2000: 2nd grant awarded (SRFB #00-1208, initially sponsored by KC)
- Spring 2000: NRCS representative departs
- June 2000: new YN representative hired
- ~Oct 2000: new KC project coordinator assigned
- ~Jan 2001: new KC project coordinator assigned
- ~May 2001: new KC project coordinator hired
- Summer 2001: contaminant site investigation conducted
- ~2001: property owner defaults on taxes, Klickitat County takes possession
- July 2002: contaminant remediation conducted
- ~2002: property goes to auction...2 parcels acquired by private interests, KC retains other three parcels

# Project Chronology (cont'd)

- Fall 2002: new MCFEG project coordinator hired
- Fall 2002: WDFW steps-in to coordinate, design, and construct overall project
- Fall 2002: permitting initiated
- Dec 2002: draft Memorandum Of Agreement (MOA) distributed to parties
- Winter 2003: WDFW Engineering re-organization
- Feb 2003: WDOE issues final recommendations on contaminants
- Summer 2003: WDOE approves cleanup and “clears” site
- July 2003: MOA signed by all parties
- Aug 2003: Design finalized and Year-1 construction started
- Nov 2003: Construction suspended for winter; first round of revegetation
- Aug – Oct 2004: Construction completed
- Nov 2004: new MCFEG project coordinator hired
- March 2006: “stinger” revegetation by MCFEG & YNFP

# Objective / 1° Habitat Factor Addressed

Restore salmonid access to spawning & rearing habitat

## Targeted Species & Life History\*

- Tier 1: Steelhead (ESA Threatened)
  - Migration (2,300 ft.), Spawning & Rearing (3.9 miles)
- Tier 2: Rainbow & Cutthroat Trout
  - Migration
- Tier 3: Coho Salmon
  - Migration, Spawning & Rearing

\* Based on Klickitat Lead Entity Strategic Plan (did not exist at time of original grant proposals)

# Conceptual Design

- Backwater outfall drop from concrete flume
- Convert 2,410' concrete flume into a fishway
- Remove low-head dam at head of flume
- Excavate mill pond sediments and construct channel
- Replace undersized bridge (lower x-ing)
- Replace undersized culvert (upper x-ing)



# Treatment: Flume Outfall

- Pre-project drop ~2.5-3' vertical
- 10 log weirs constructed between SR 142 and outfall (STA 1+35 to 2+90)
- Completed in 2003



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# Treatment: Flume

- 2410' long concrete flume (12.4' to 48' wide)
- 123 concrete weirs constructed (STA 2+90 to 12+10 and STA 14+15 to 26+90)
- 9 concrete vaults installed in floor (~pools)
- 27 weirs and 5 vaults completed in 2003, remainder in 2004



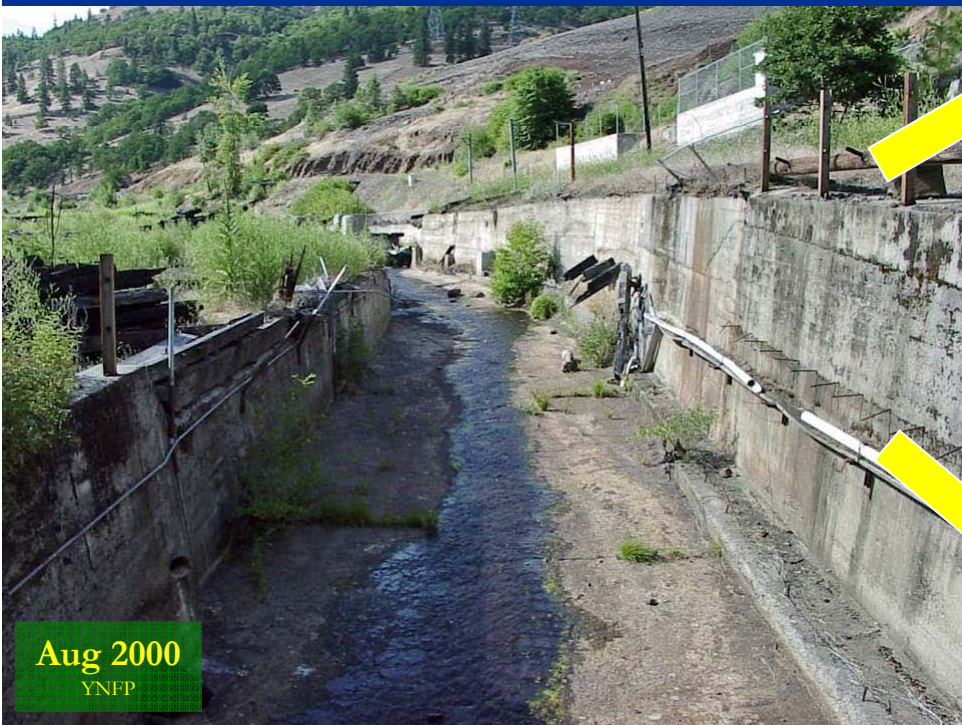
~March 1999  
WDFW

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- Average slope: 0.029
- Average weir drop: 0.2' – 0.3'
- Design velocity/depth: 2 fps at 2.1'
- High design flow: 63 cfs



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Aug 2000  
YNFP



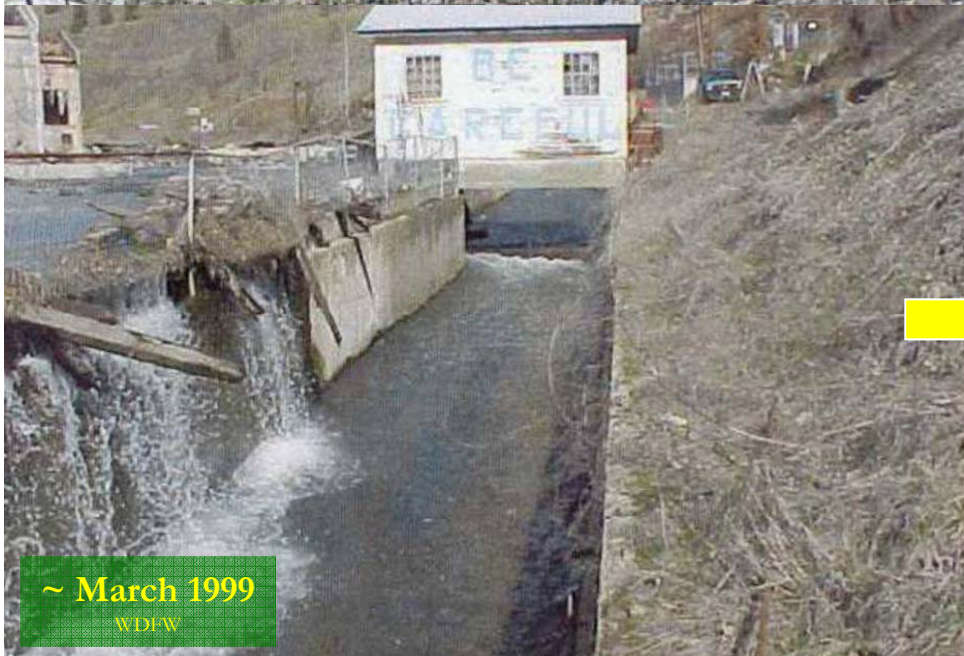
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~ March 1999  
WDFW



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~ March 1999  
WDFW



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# Treatment: Flume (cont'd)

- Half-round culvert removed from flume (cause of flooding during '96 floods)
- 400 l.f. earthen setback levee constructed to prevent over-“bank” flow from flooding Klickitat
- mid-channel bridge support removed (STA~14+50)



# Treatment: Flume (cont'd)

- Left flume wall removed (STA 12+00 to 16+50) and fill pulled-back
- Flume completely removed (STA 12+00 to 14+15) and 10 log-weirs installed
- Completed in 2003 (“Michelle Cramer Natural Area”)



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# Treatment: Dam

- Removal of concrete base (~56' W x 38' L)
- Removal of timber cribbing (150' W)
- Removal of misc. subgrade fill (mattresses, etc)
- Completed in 2003



# Treatment: Mill Pond

- Excavate pond sediments
  - ~4,000 cu-yds; ranging from 1' to 11' deep
  - End-haul surplus to levee and other upland disposal areas
- Construct 595 l.f. of stream channel (~STA 27+00 to 33+00)
- Earthwork completed in 2003; plantings in 2003 and 2006





# Treatment: Lower Crossing

- Remove undersized bridge
  - 20' span with mid-channel abutment
  - Concrete invert with perched (~2.5') outfall
- Install 70' full-span beam bridge
- Re-grade ~50' of channel (~STA 34+30 to STA 34+80)
- Completed in 2003



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# Treatment: Upper Crossing

- Remove undersized culvert
  - 128" x 83" x 57' pipe-arch
  - perched (~2.5') outfall
- Install 70' full-span beam bridge
- Re-grade ~85' of channel
- Completed in 2003



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# Stinger Revegetation (March 2006)



March 2006  
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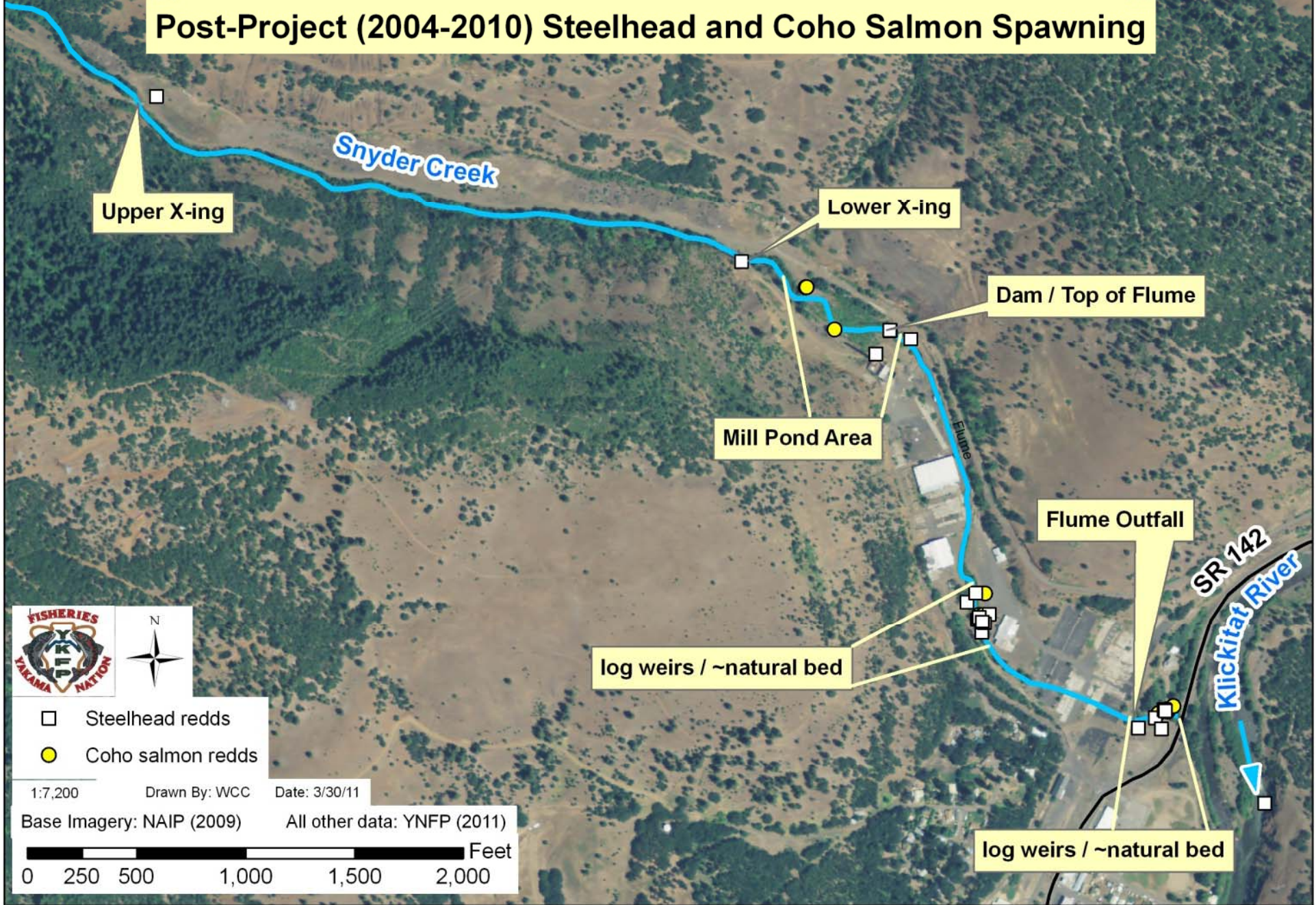
March 2006  
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# Snyder Creek / Klickitat Mill Fish Passage Project

## Post-Project (2004-2010) Steelhead and Coho Salmon Spawning



# Steelhead Spawning

		Pre-Project				Post- Project													
		2002		2003		2004		2005		2006		2007		2008		2009		2010	
REACH	MILES	Redds	Live	Redds	Live	Redds	Live	Redds	Live	Redds	Live	Redds	Live	Redds	Live	Redds	Live	Redds	Live
Upper falls - Lower falls	0.5	0	0	0	0	0	0	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Lower falls - upper bridge	1.9	0	0	0	0	0	0	ns	ns	0	0	0 <sup>B</sup>	0	ns	ns	ns	ns	0 <sup>C</sup>	0
Upper bridge - mouth	0.9	0	9 <sup>A</sup>	1	2	9	10	1	0	2	0	2	4	3	9	4	3	3	1

<sup>A</sup> 8 individuals observed in or below flume

<sup>B</sup> Survey extended 1.25 miles above upper bridge

<sup>C</sup> Survey extended 1.2 miles above upper bridge

# Challenges

## Lack of Continuity / Uncertainty

- Change in ownership / Multiple ownerships
  - At project conception: one, enthusiastic owner
  - <1 year before construction: 2 private & 1 government owners
- Personnel turnover
  - None of the original personnel still involved upon construction
  - Klickitat County – 4 different representatives
  - MCFEG – 3 different representatives
  - WDFW – 2 different representatives, 2 different design leads
  - Yakama Nation – 2 different representatives
- Status of contaminants
  - unknown until 2 years after initial funding acquired
  - Cleanup completed <6 mos. before Year-1 funding expired

# Challenges (cont'd)

## Human Factor

- Use of outside experts helpful
  - Can reinforce what some local technical folks are already saying, but others may not want to hear
- Over-eagerness by some parties
  - Project of this scope would have benefitted from discrete feasibility and/or design phase(s)
  - Enthusiasm to get volunteers involved by one party actually violated the MOA
- Under-eagerness by other parties
  - One party took over 6 months to provide draft MOA comments

# Challenges (cont'd)

## Habitat / Biology

- Stranding of juvenile salmonids (mainly coho)
- False attraction spawning by coho salmon in a seasonal subreach
  - Not appropriate for geomorphic setting (alluvial fan of Klickitat R tributary)
- Electro-fishing beavers can be an exhilarating experience





# Challenges (cont'd)

## Vandalism / Tweekers

Bolts removed in preparation of guardrail theft



Trash thrown into flume



~May 2006  
YNFP

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# Acknowledgements

★ Greg Johnson, WDFW ★

## WDFW

- Michelle Cramer
- Pat Powers
- Bill Weiler
- Mike Barber
- Owen Loshbough

## Mid-Columbia F.E.G.

- Liz Kinne
- Margaret Neuman

## Funding

- SRFB (via KC & WDFW; Projects #99-1623 (\$100k) & #00-1208 (\$300k))
- BPA (via YN's Klickitat Watershed Enhancement Project; \$98k)
- USFWS (via RFEG \$80k)
- WDFW (\$44k+)
- Fish America (via RFEG~\$6k)

## Yakama Nation

- Bill Sharp

## IAC/RCO

- Barb McIntosh

## Klickitat County

- Dave McClure

## USFWS

- Cheri Anderson

## Private Landowners



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