

# An Overview of the Klickitat Watershed Enhancement Project



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# Presentation Outline

- Background, Goals, and Priorities
- Assessment Project Example
- Enhancement and Restoration Project Examples
- Partners and Examples of Cooperative Projects
- Other KWEF Functions
- Summary

# KWEP - Background

The Klickitat Watershed Enhancement Project (KWEP) enhances and restores watershed health in the Klickitat River subbasin.

Project actions target stream reaches and watersheds that support steelhead (*Oncorhynchus mykiss*; ESA- listed as “Threatened”) and/or spring Chinook (*O. tshawytscha*).

KWEP is:

- The principal project addressing salmonid habitat conservation and restoration in the Klickitat subbasin
- Implemented by the Yakama Nation Fisheries Program (YNFP)
- Funded by Bonneville Power Administration and matching grants
- Addresses Yakima-Klickitat Fisheries Project (YKFP) goals
- Addresses Columbia Basin Fish & Wildlife Program habitat goals

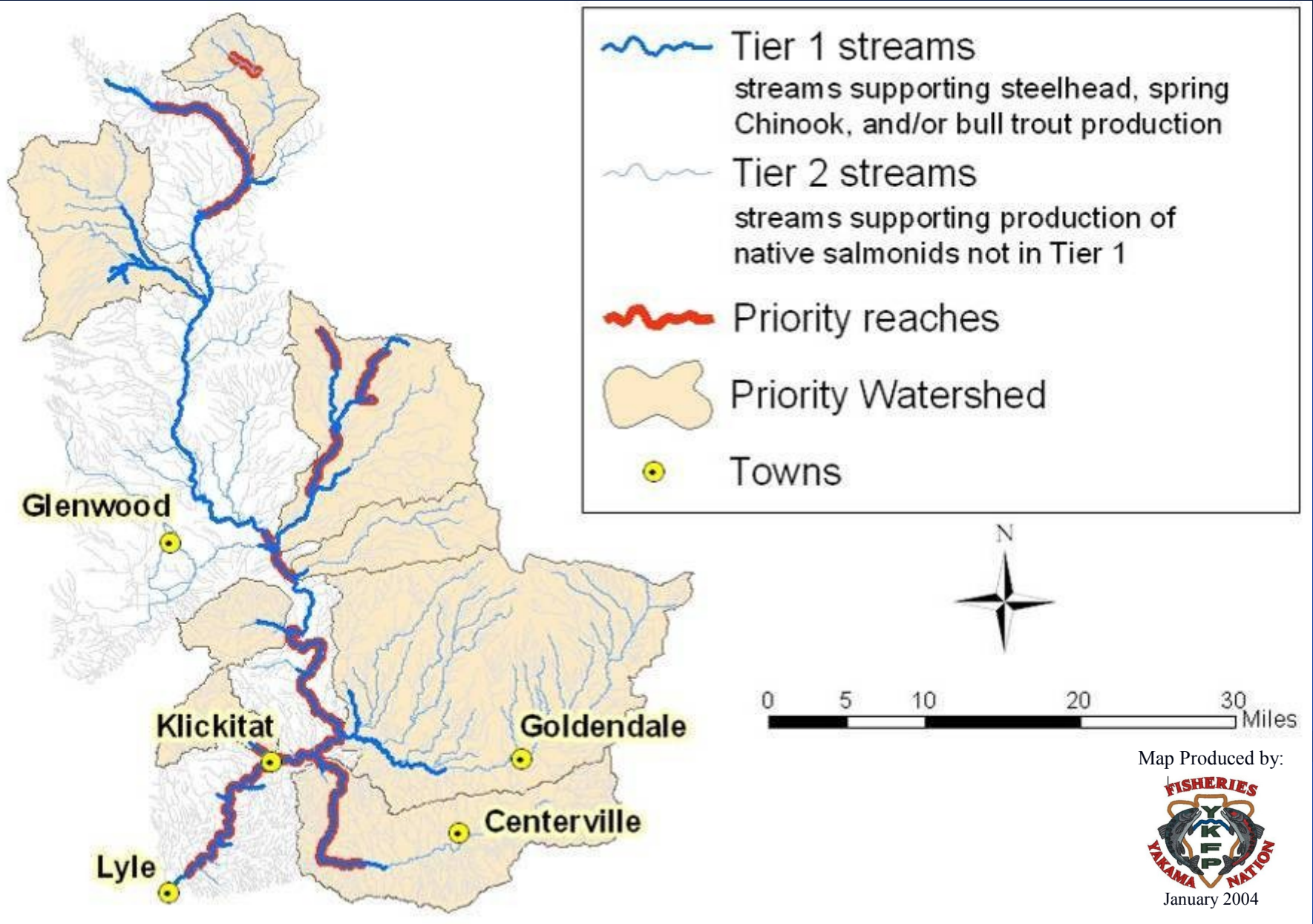
# KWEP - Goal

The overall goal of KWEP is to restore watershed health to aid recovery of native salmonid stocks in the Klickitat subbasin.

Three-pronged approach:

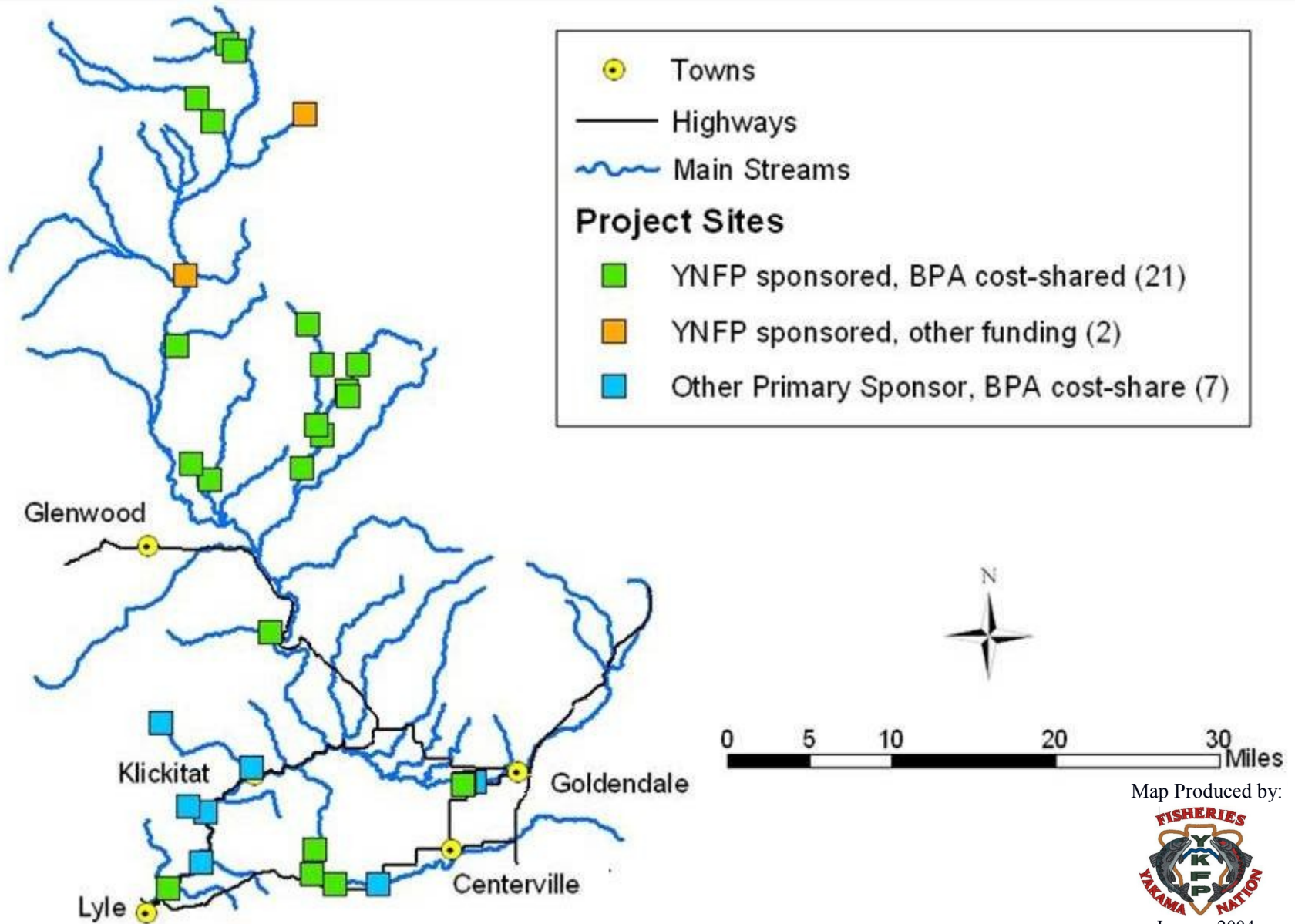
- Assess watershed and habitat conditions to prioritize sites for restoration activities.
- Protect, restore, and enhance priority watersheds and reaches
- Monitor to assess watershed conditions and effectiveness of restoration activities.

# KWEP – Geographic Priorities



# YKFP Project Sites

(mostly KWEP)



Map Produced by:



January 2004

# White Creek Roads Project

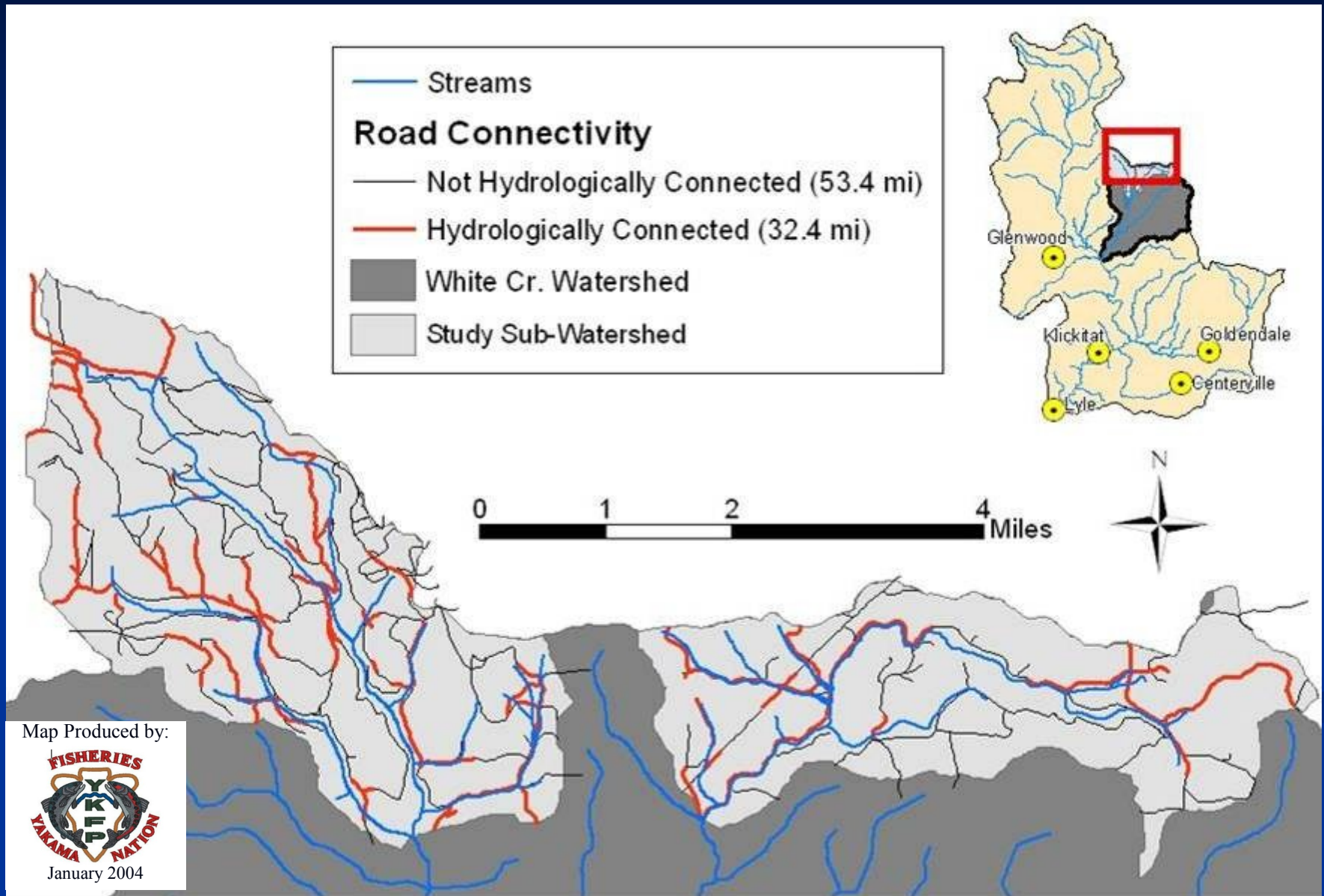
## Phase 1 - Assessment

- GIS analysis to prioritize subwatersheds for field inventory
- **field inventory** of 70 miles of road in two priority subwatersheds
- **Hydrologic modeling** of existing and unroaded conditions
  - 13% average increase (5.5% - 31.8%) in discharge for a 2.5-year storm
  - 6.0% average increase (0.6% - 16.0%) in discharge for a 100-year storm

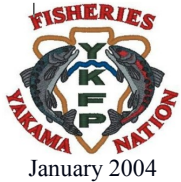
## Phase 2 - Assessment

- **Field inventory** of additional 44.4 miles of road
- **Assessment and prioritization** of individual road segments
- **Sensitivity analysis** of the GIS method developed for pre-screening road segments for treatment
- Development of treatment **prescriptions**

# White Creek Roads Project: Phase 1 Priorities



Map Produced by:





# White Creek Roads Project: Treatment

- First phase of drainage treatments was completed on the top ten priority groups in November 2005
- 94 waterbars constructed along 7.81 miles of road
- 8 ineffective tank traps enhanced to eliminate vehicular access to another 2.77 miles of road



# Surveyors Creek Fish Passage Enhancement



7/6/00

## Before:

- Two 6' CMPs
- 1.27' outlet drop
- 0.9' hydraulic drop at inlet
- Serious upstream instability and debris plugging

## After:

- Installed 26' span box arch
- native bed material on natural (1.4%) slope
- passes sediment & debris (26" diam x 14' long observed)



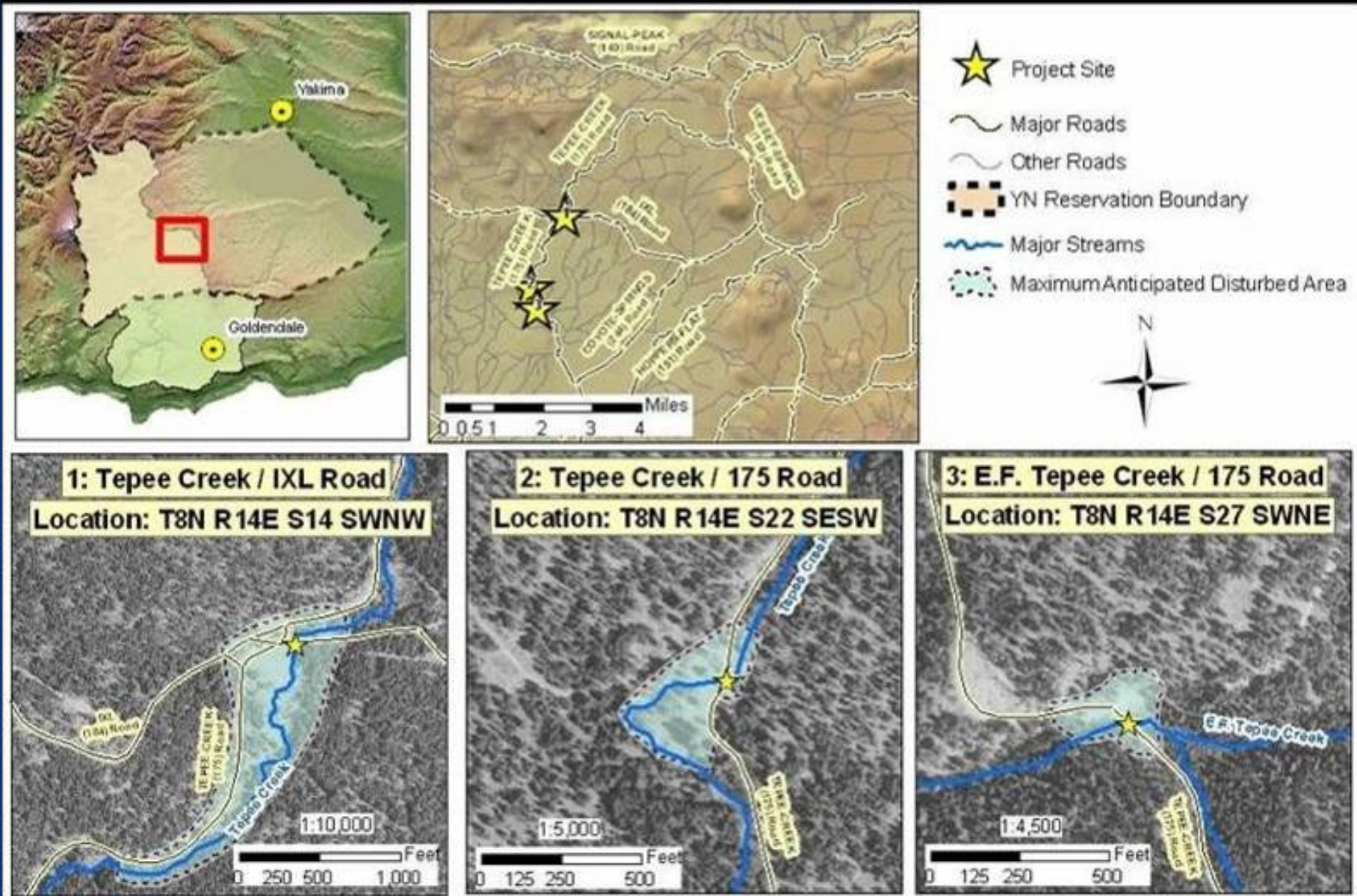
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# Surveyors Creek Fish Passage Enhancement

- Restored upstream access to 8.7 miles of stream
- Re-aligned creek to add 80' of channel length
- Old culverts left in-situ for floodplain relief
- Old outlet pool left connected to channel
- Resident trout moved into reach within 24-hrs of activation



# Tepee Creek Fish Passage Enhancement Project



# Tepee Creek Fish Passage Enhancement Project:

Tepee Creek / 175 Road

4/28/04



## Before:

- Two 7.8' pipe arches
- 1.6' outlet drop
- Debris plugging history at inlet

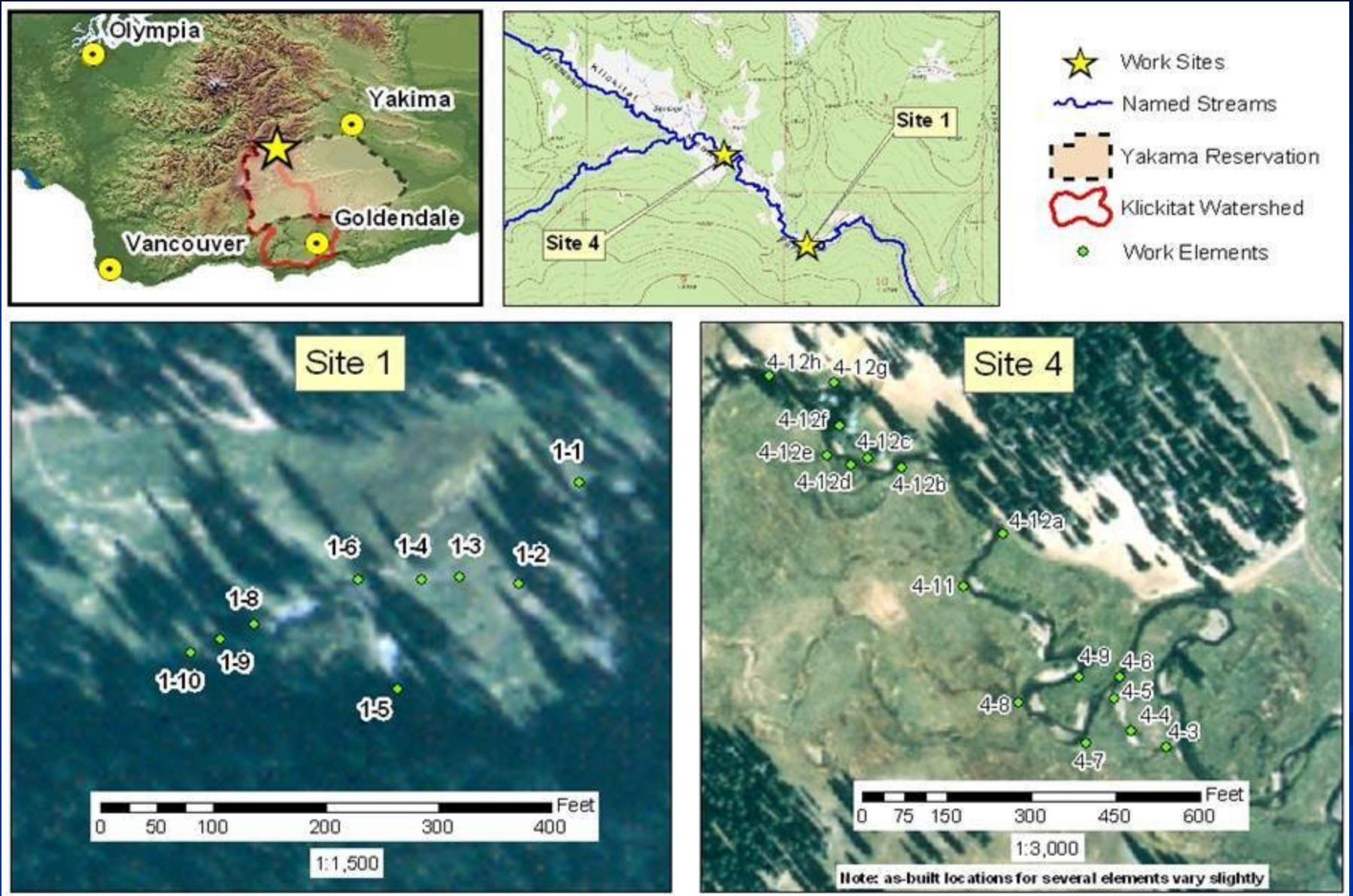
11/19/07



## After:

- 40' span bridge
- Native bed material on natural (3%) slope
- Access restored to 2.5 miles of habitat

# Klickitat Meadows (Diamond Fork) Restoration



# Klickitat Meadows (Diamond Fork) Restoration



2 work sites:

- “Site 1” - 9 elements along roughly 700’ of stream including treatment of a 5’ floodplain headcut
- “Site 4” - 16 elements along roughly 2200’ of stream including reactivation of a 680’ meander
- Closed and rehabilitated 4000’ of illegal jeep trail
- Completed in 2004

# Klickitat Meadows (Diamond Fork) Restoration

## Site 4 - Element 5



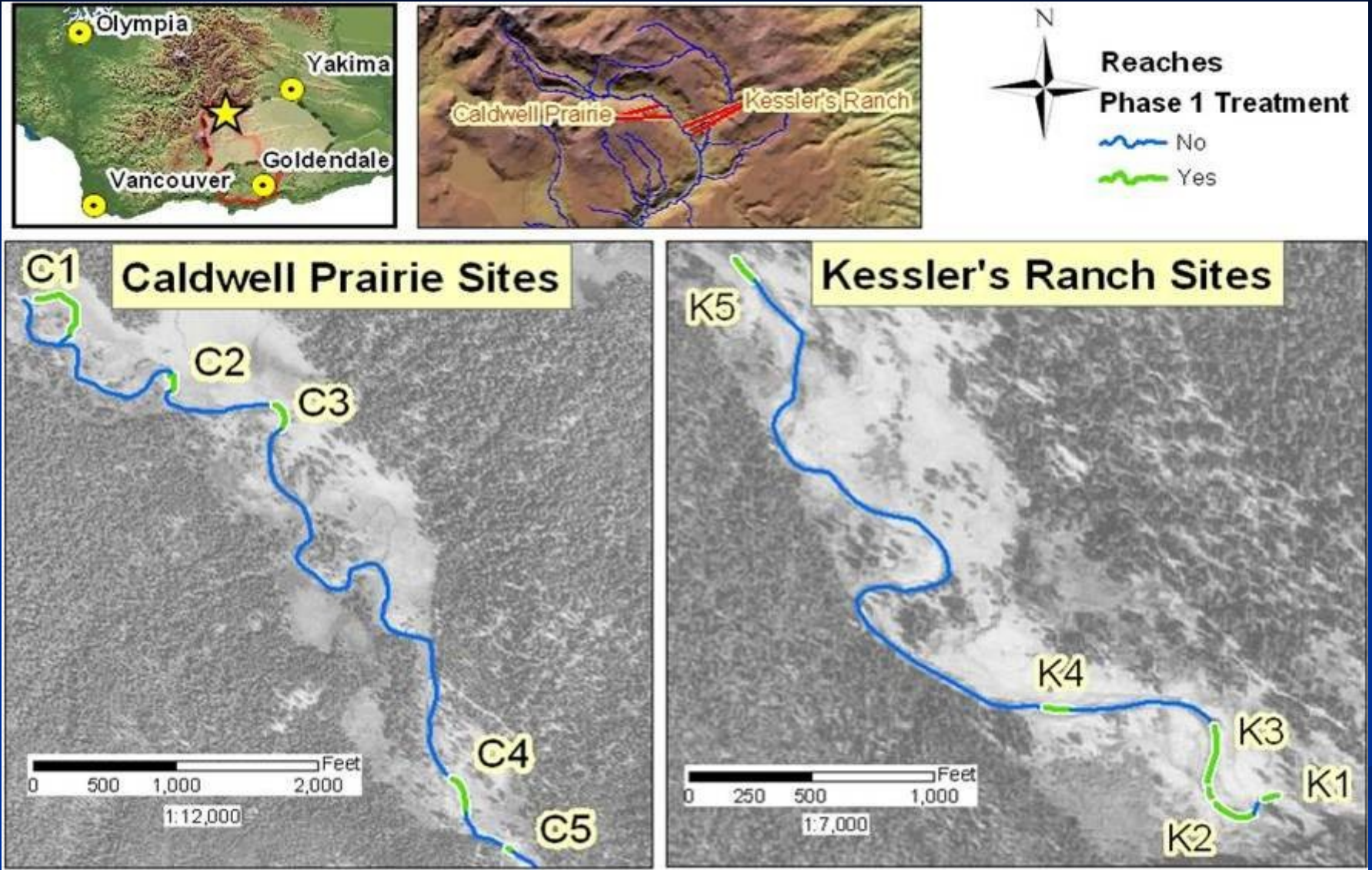


# Klickitat Meadows (Diamond Fork) Restoration

## Site 4 - Element 12a



# Klickitat River Meadows Restoration



- LWD treatments at 10 sites along 2100' (cumulative)

## Site C2

Completed: ~8/12/04

Photo: 8/12/04



8/25/04



## Site C3

Completed: ~8/17/04

Photo: 11/13/03



7/22/05



Site C5

Completed: 7/21/04

Photo: 7/21/04



Site K3

Completed: ~8/6/04

Photo: 12/14/04



Site K1

Completed: 8/4/04

Photo: 8/9/04



Site K1

Completed: 8/4/04

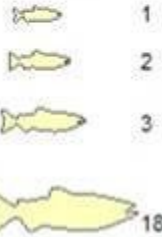
Photo: 8/9/04



# Klickitat River Meadows Restoration Project:

Lower Kessler's Ranch Unit  
Constructed 2004  
Yakama Nation Fisheries

# of Adult Chinook Observed

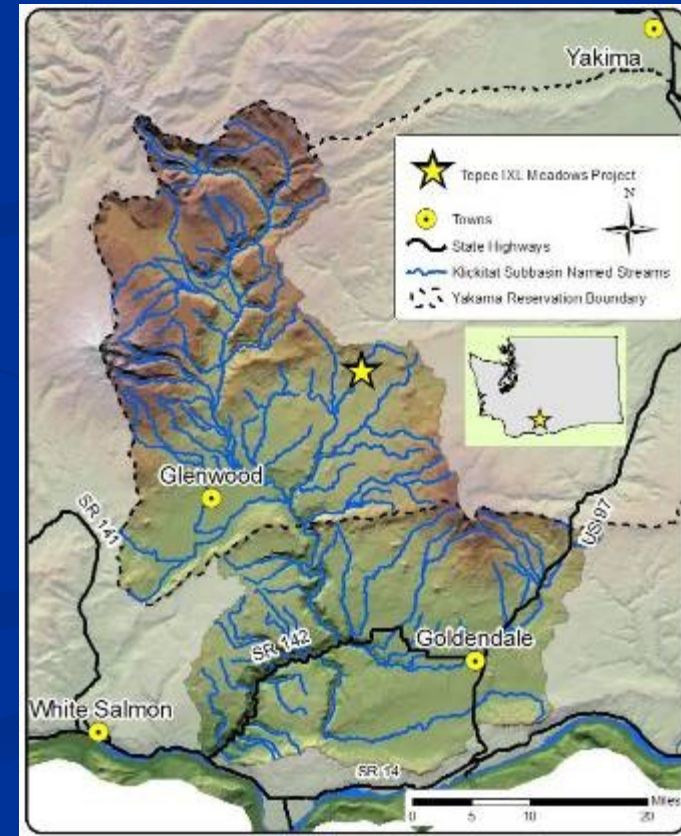


“N” prefix denotes natural LWD accumulations

“K” prefix denotes jams constructed in late-July and early August 2004

# Tepee Creek – IXL Meadows Restoration Project

- 1990' of channel reconstructed to raise bed elevation 3'-4'
- Removed 2 culverts and related fill from an abandoned cross-valley road alignment
- 28 LWD jams constructed
- Several dozen floodplain LWD placements
- 3 ac. of revegetation and weed control
- Started Oct. 2006; completed Aug. 2007



# Tepee Creek – IXL Meadows Restoration Project

STA 20+10



# Tepee Creek – IXL Meadows Restoration Project

8/25/04



**STA 6+60**

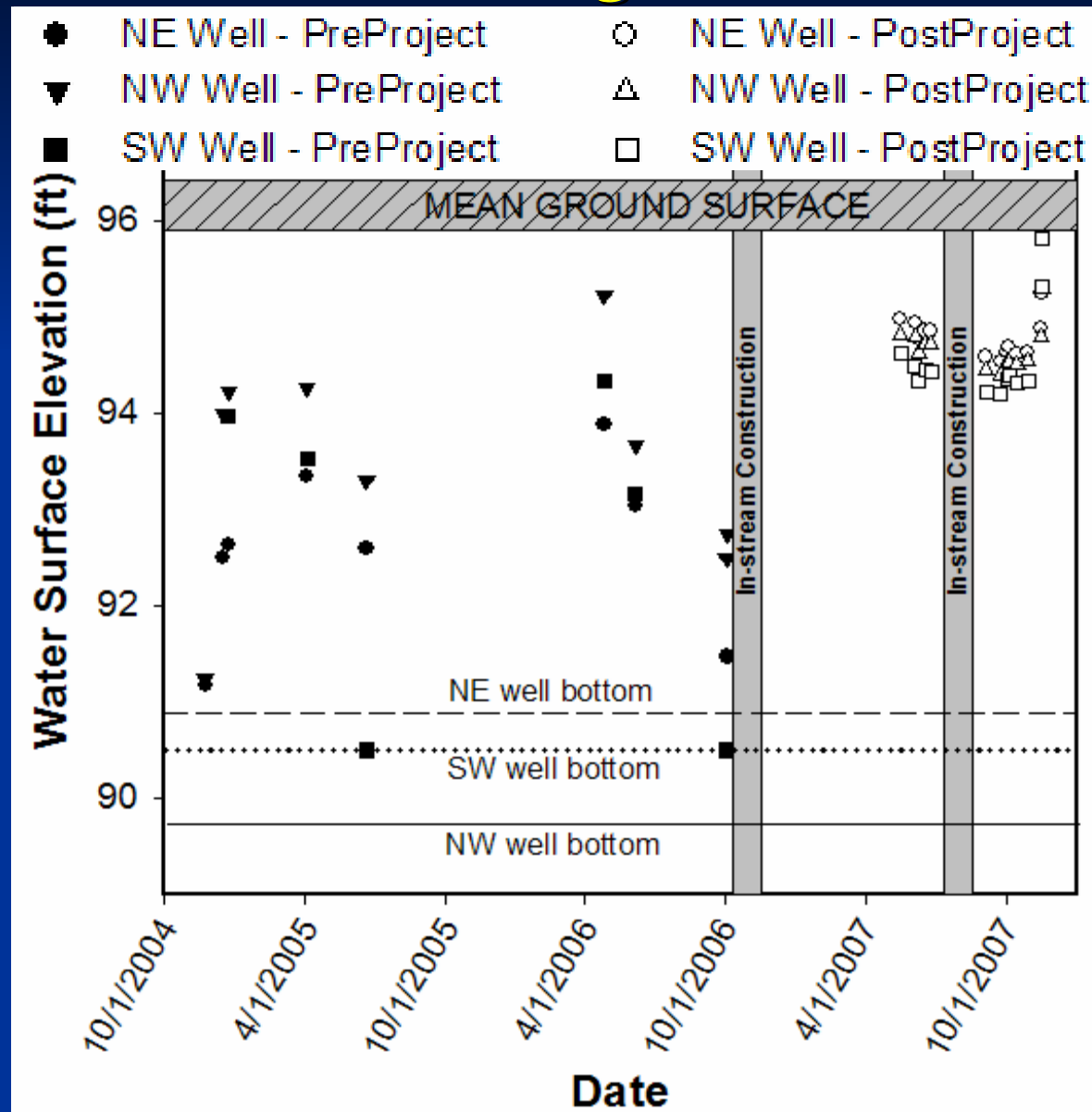
Elevation of constructed bank toe  
/ channel invert

8/7/07

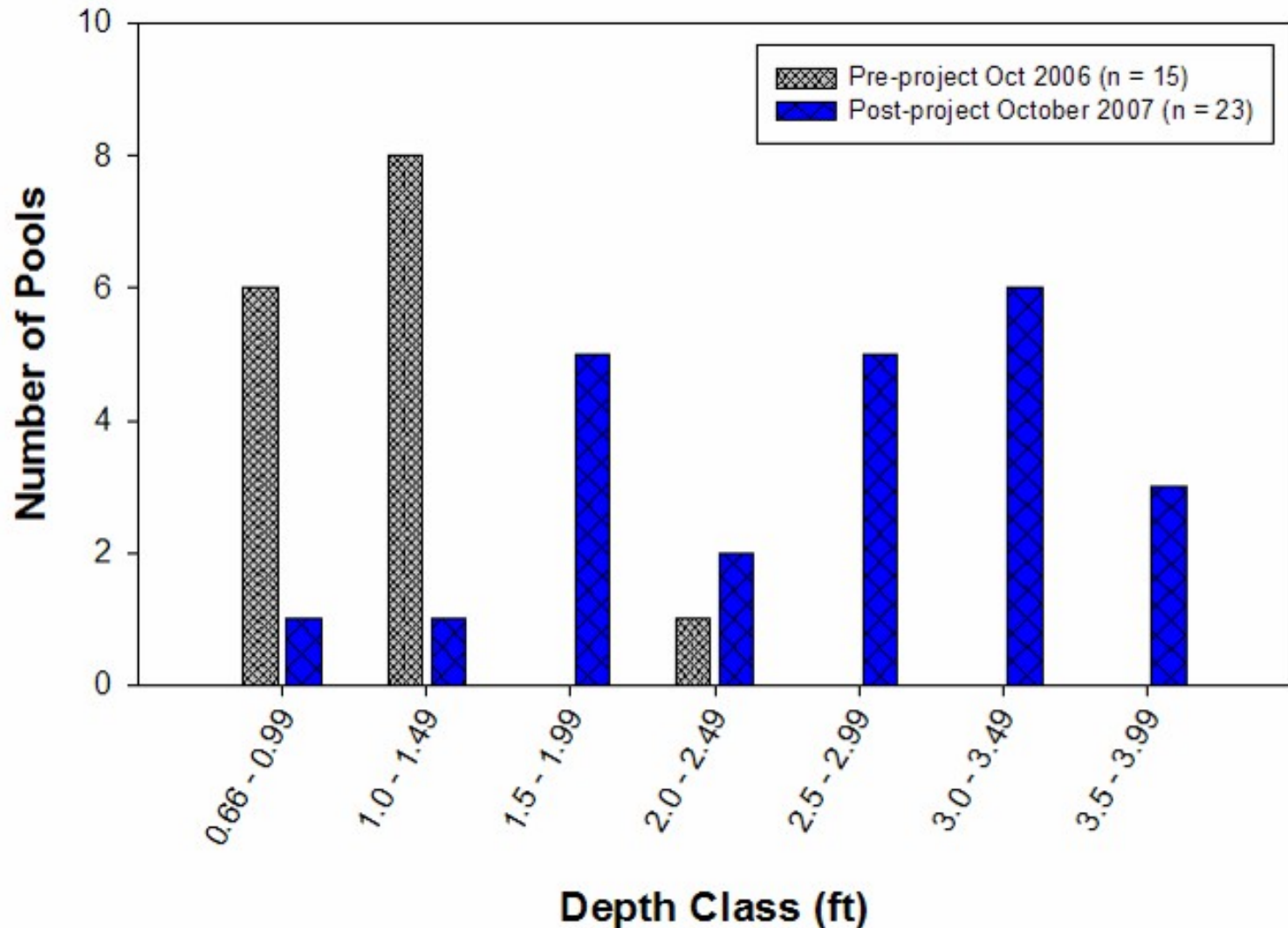




# Tepee Creek – IXL Meadows: Monitoring Wells



# Tepee Creek – IXL Meadows: Residual Pool depths



# Tepee Creek – IXL Meadows: Steelhead Spawning



# Tepee Creek – IXL Meadows:

## Results (through first year)

- Groundwater: 3 - 4' increase in summer water table
- High Flow Access: at bankfull or lower flows to four side channels totaling 835 lineal feet
- Pools: increased from 15 to 23 (65%); greater depths
- Wetlands: ~3100 ft<sup>2</sup> of emergent wetland created
- Riparian Vegetation: Rapid recovery, particularly of salvaged plant materials
- Spawning: Two steelhead redds observed
- Rearing: 2x – 3x increase in juvenile *O. mykiss* abundance
- Macroinvertebrates: Rapid colonization by multiple species of caddisflies and mayflies

# Partners: A Key Part of KWEF's Success

- Mid-Columbia Regional Fisheries Enhancement Group
- Columbia Land Trust
- Washington Department of Natural Resources
- Yakama Forest Products
- BIA Forestry and BIA Range
- Washington Department of Fish & Wildlife
- Underwood Conservation District
- Central & Eastern Klickitat County Conservation Districts
- Yakama Nation Water Program
- Washington State Parks & Recreation
- Klickitat County
- private individuals

# KWEP Partnerships: Klickitat Mill Project

1/3/02



1/22/04



1/3/02



1/22/04



# KWEP Partnerships: Klickitat Mill Project



4/9/02

## Before:

- 2600' concrete flume
- Typical winter discharges sheetflow <4" deep
- 4' outfall drop
- Dam at head of flume

## After:

- concrete weirs poured to create fishway
- Dam removed
- Outfall drop backwatered
- Access restored to 2.5 miles of habitat



1/29/04

# Cooperative Accomplishments

KWEP has partnered on over 10 projects resulting in:

- conservation of over 1050 acres and 4 miles of fish-bearing streams and side channels
- correction of 5 fish passage barriers restoring access to 3.3 miles of habitat
- enhancement of over 3400' of stream
- installation of at least 9,000 plantings along 3,000' of stream
- design and development of relational databases to manage habitat, temperature, and sediment data
- implementation of no-till agricultural practices on several hundred acres of farmland
- two livestock water developments



# Active and Upcoming Projects

- replacement of 3 passage barriers that will restore access to over 5 miles of habitat
- treatment of over 2000 feet of road to restore access to 0.5 miles of side channels
- install over 7000 plantings along 5 riparian acres
- enhance over 3500 feet of active channel

# Monitoring and Data Management

KWEP works interactively with YKFP projects:

- Data, Management, and Habitat Project (BPA # 198812035)
- Monitoring and Evaluation Project (BPA #199506335)

Data collection & relational database development:

- Habitat data – 78 sites on 39 streams
- Water Temperature – 37 sites on 23 streams
- Sediment – 12 sites on 5 streams

GIS data acquisition and creation

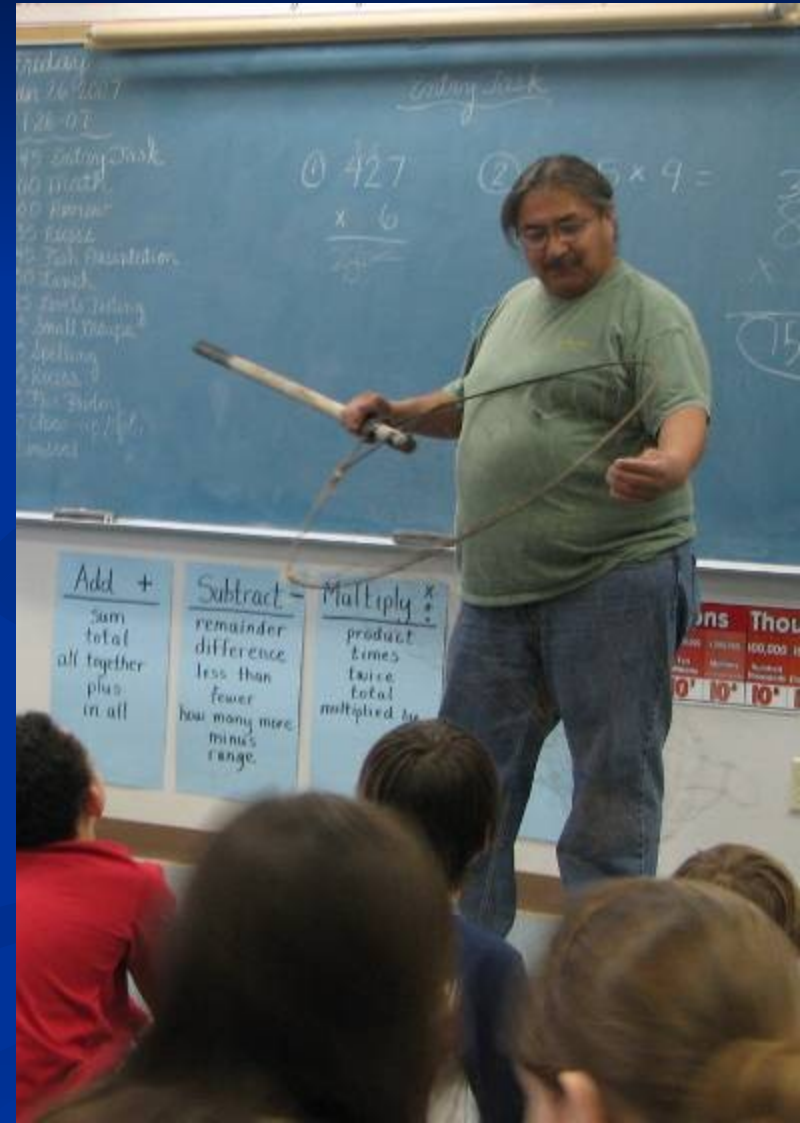
# Technical Support

KWEP staff have provided technical support to:

- Private landowners
- Conservation Districts
- Tribal Programs
- Subbasin Planning (Northwest Power Council)
- Recovery Planning (NOAA Fisheries)
- Strategic Planning (WA Salmon Recovery Funding Board)
- Watershed Planning (WA Department of Ecology)

# Outreach, Education, and Information Dissemination

- Professional meetings
  - River Restoration Northwest
  - American Water Resources Assoc.
  - American Fisheries Society
- Local elementary schools
  - Dallesport Elementary
  - Klickitat Elementary
  - Goldendale Elementary
- Stakeholder education
  - White Salmon River Festival



# KWEP Accomplishments

Since 2000, KWEP has completed over 18 solo projects:

- Fish barriers: 3 replaced restoring access to over 11.5 miles of habitat
- Instream enhancement: over 7400' of stream including construction of 57 LWD jams and structures
- Revegetation: over 15,000 plantings installed along 8,000' of stream
- Livestock fencing: over 10000' of stream
- Wetlands: Creation of more than 3500 square-feet of wetland
- Side Channels: Restoration of high-flow access to over 800 lineal feet
- Road treatments: drainage improvements on 10.5 miles of forest roads
- Morphologic and Habitat Assessment: over 74 miles of stream
- Road Assessment: over 145 miles of road and railroad

# Acknowledgements

Ralph Kiona, Watershed Technician

## Funding and Materials:

- Bonneville Power Administration
- WA Salmon Recovery Funding Board
- Columbia River Inter-Tribal Fish Commission
- Mid-Columbia Regional Fisheries Enhancement Group
- Bureau of Indian Affairs – Watershed Program
- Yakama Nation

# For More Information

[http://www.ykfp.org/klickitat/KWEP\\_sites.htm](http://www.ykfp.org/klickitat/KWEP_sites.htm)

(currently under development)

