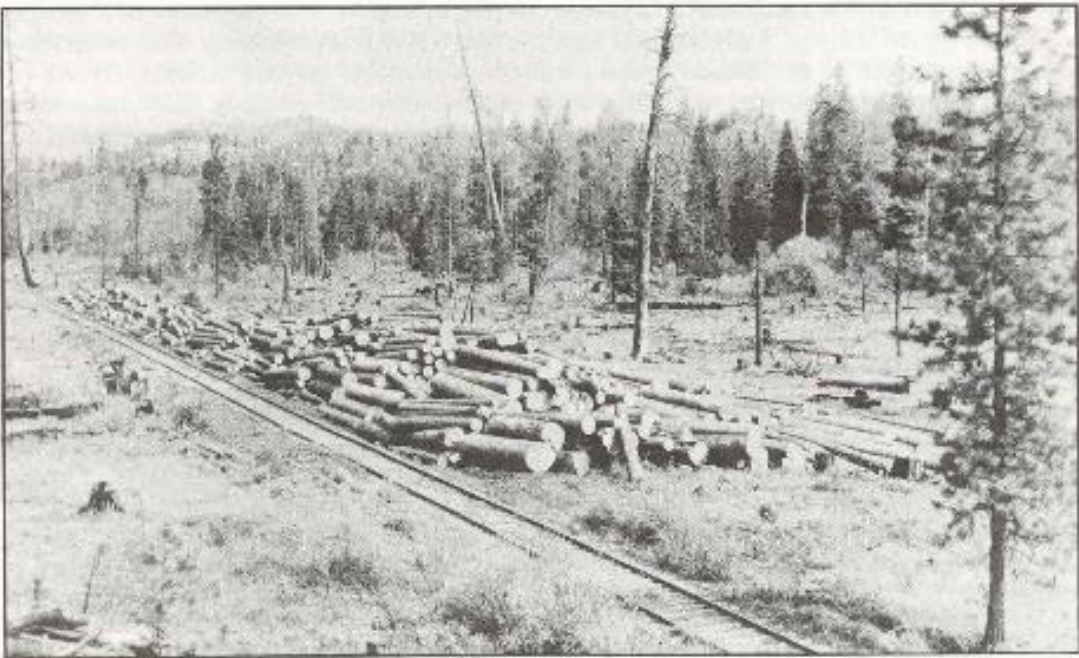




The shifting baseline...

Natural Log Jam in Middle Fork Teanaway River, circa 1900,
Ponderosa forest on East slope of Cascades, Washington

Source: Russell, I. C. 1909. Rivers of North America. G.P. Putnam's Sons, New York. 327pp.
Figure B, Plate XII, page 239. (Scan by T. Abbe)



Logs along the North Fork spur waiting to be reloaded onto rail cars. Mid 1920s. (Photograph courtesy of Jack Whitnall.)





2002

Photos by Jim Matthews

07/08/2002

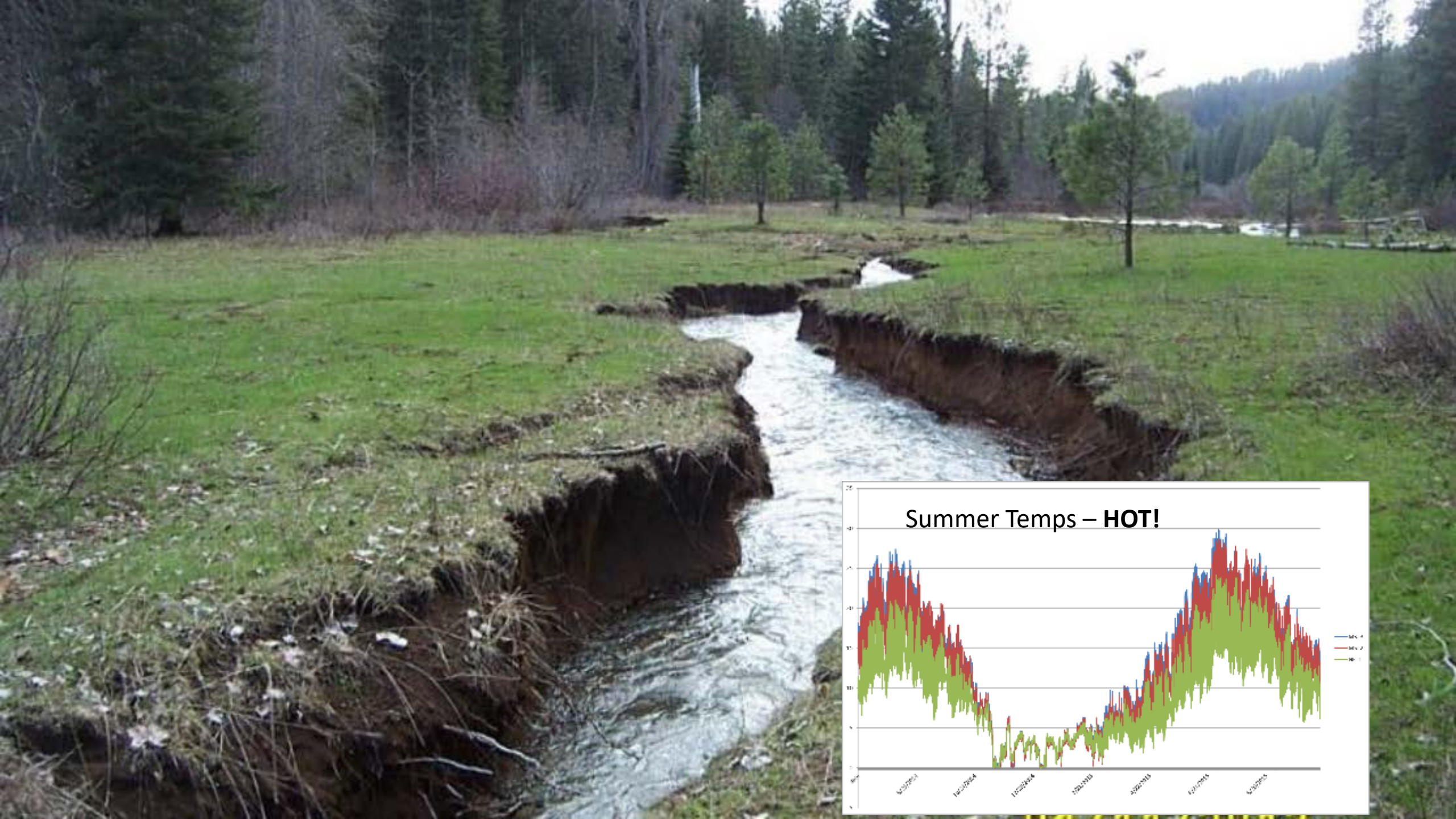


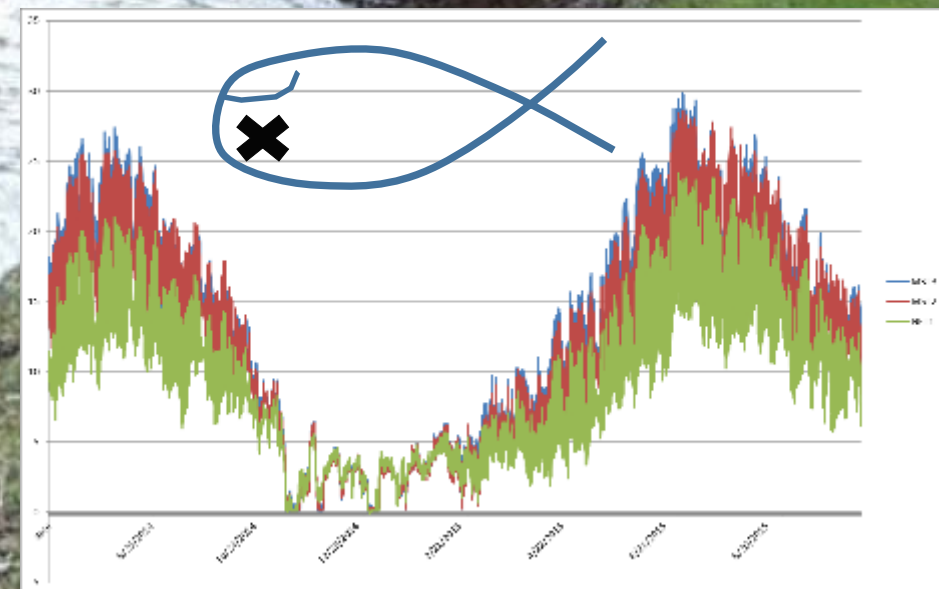
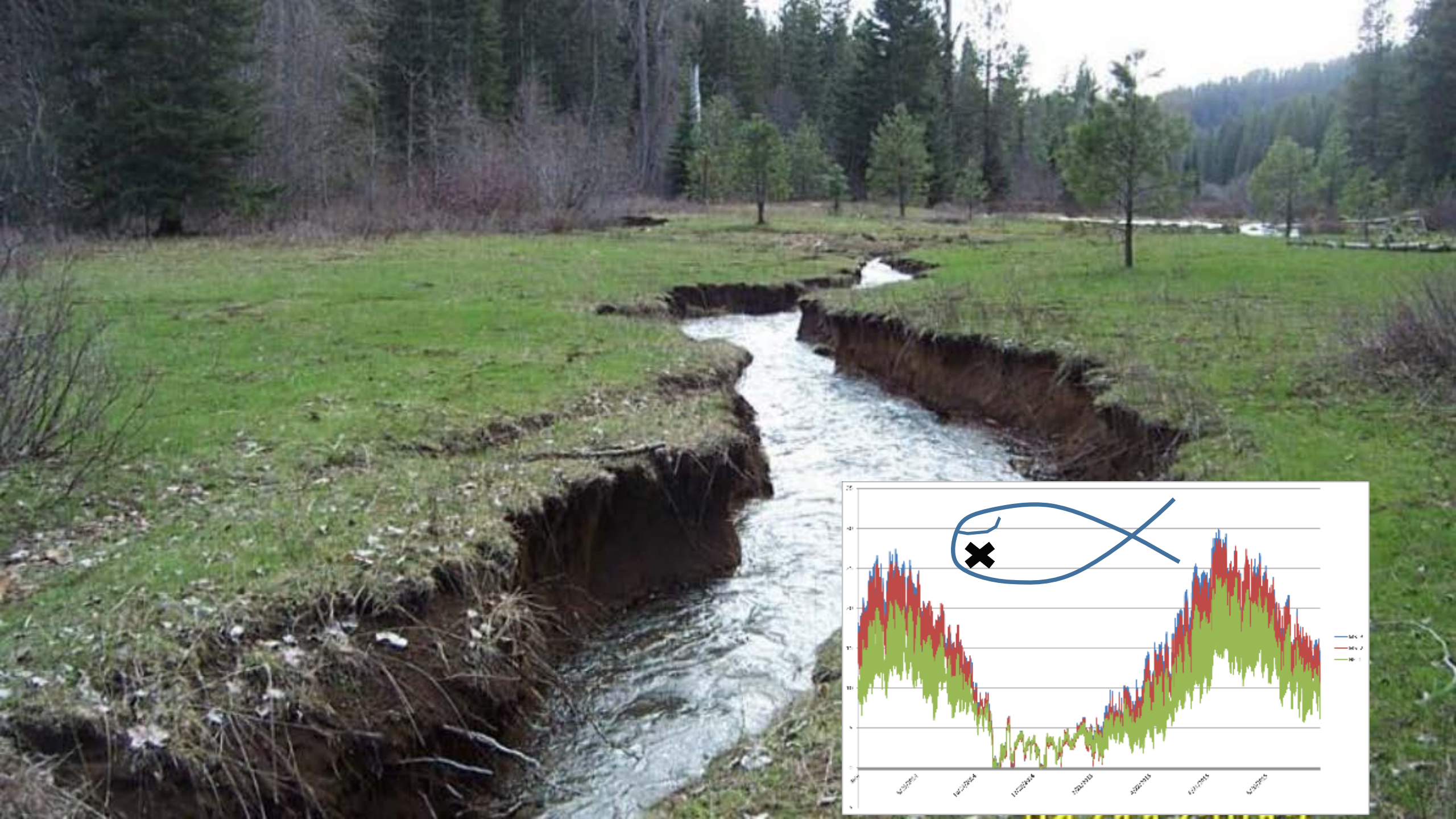
2008



2013

04 / 11 / 2013







We live in a “Fixer Upper”

What to do.....?



No pools!

No instream cover!

No flow complexity!



08.29.2007 23:24

STREAM HABITAT RESTORATION GUIDELINES

FINAL

Prepared for:
Washington State Aquatic Habitat Guidelines Program

2012





07.22.2008 14:58



09.13.2010 08:52



09.13.2010 15:41

Same site, after a ~100
year flood.



05.04.2012 15:59

Wood Replenishment: trees can
sometimes move during high
flows,,,

And that's a good thing!!!



05.01.2008 15:44

Same site after wood
replenishment and
subsequent high
flows.



03.30.2009 14:04

May 2011: Near the
flood Peak (est. 2500
cfs)



05.15.2011 14:12


After the
boomer...



05.16.2011 15:15

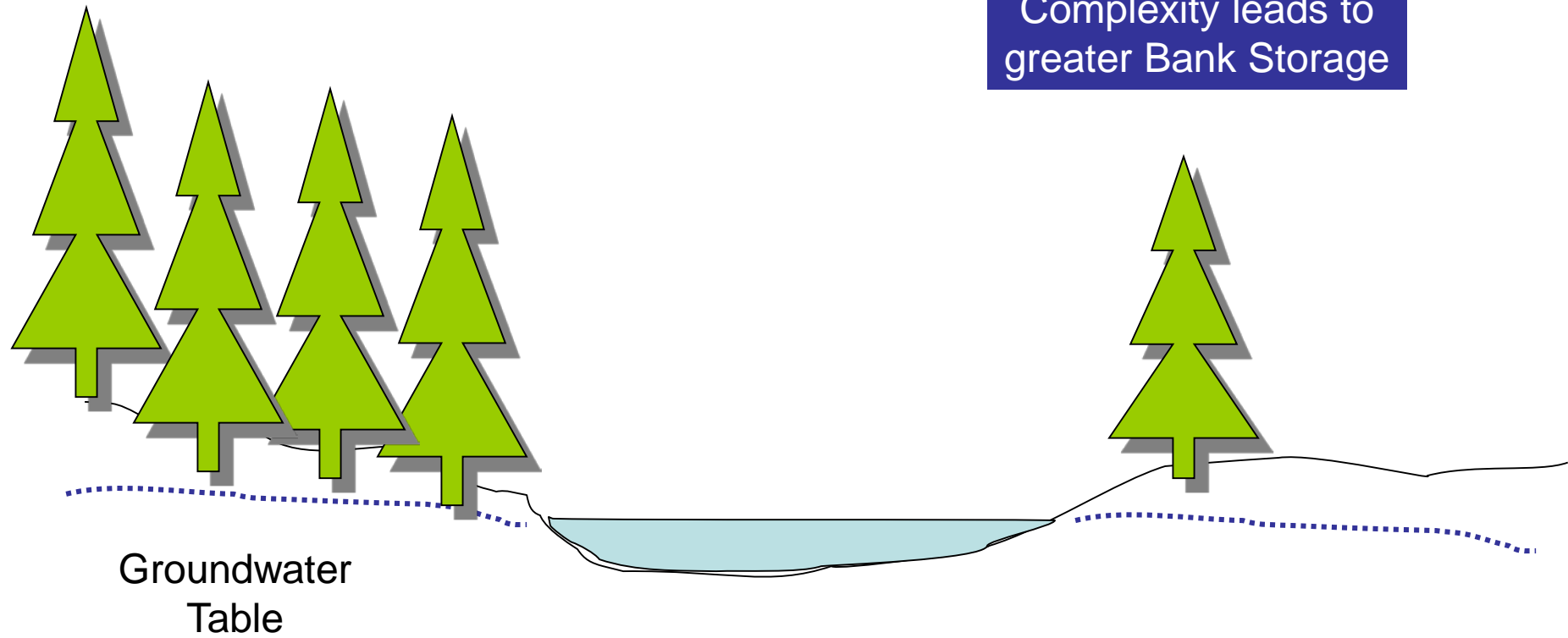
An underwater photograph of several fish swimming in clear, greenish water. A thought bubble is superimposed on the left side of the image, containing the text 'Benefits of Wood Replenishment'. The fish are of various species, including what appear to be snappers and a smaller, more colorful fish in the center.

**Benefits of
Wood
Replenishment**

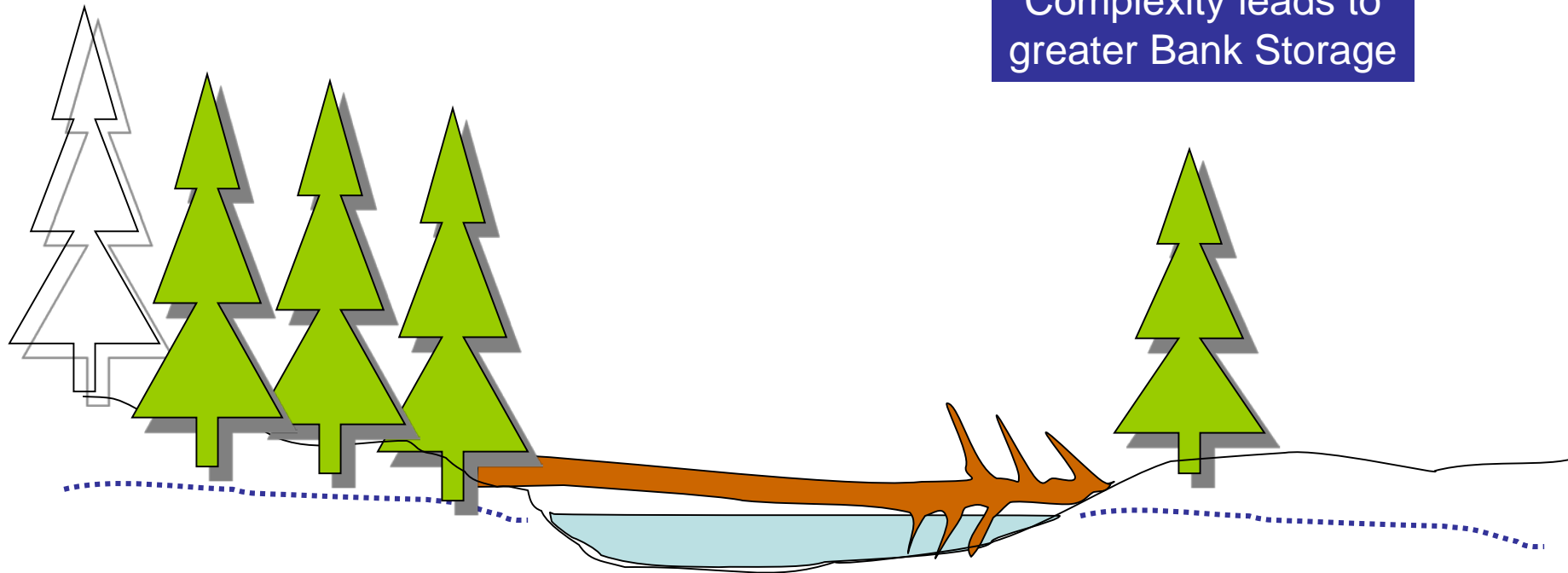
A photograph of a streambed in winter. The ground is covered with snow and dark, silty sediment. Several large, weathered logs are scattered across the scene, some partially buried in the sediment. In the background, a person wearing a dark jacket and pants is standing near a pile of logs. The surrounding area is filled with bare, snow-dusted branches and trees, indicating a cold environment.

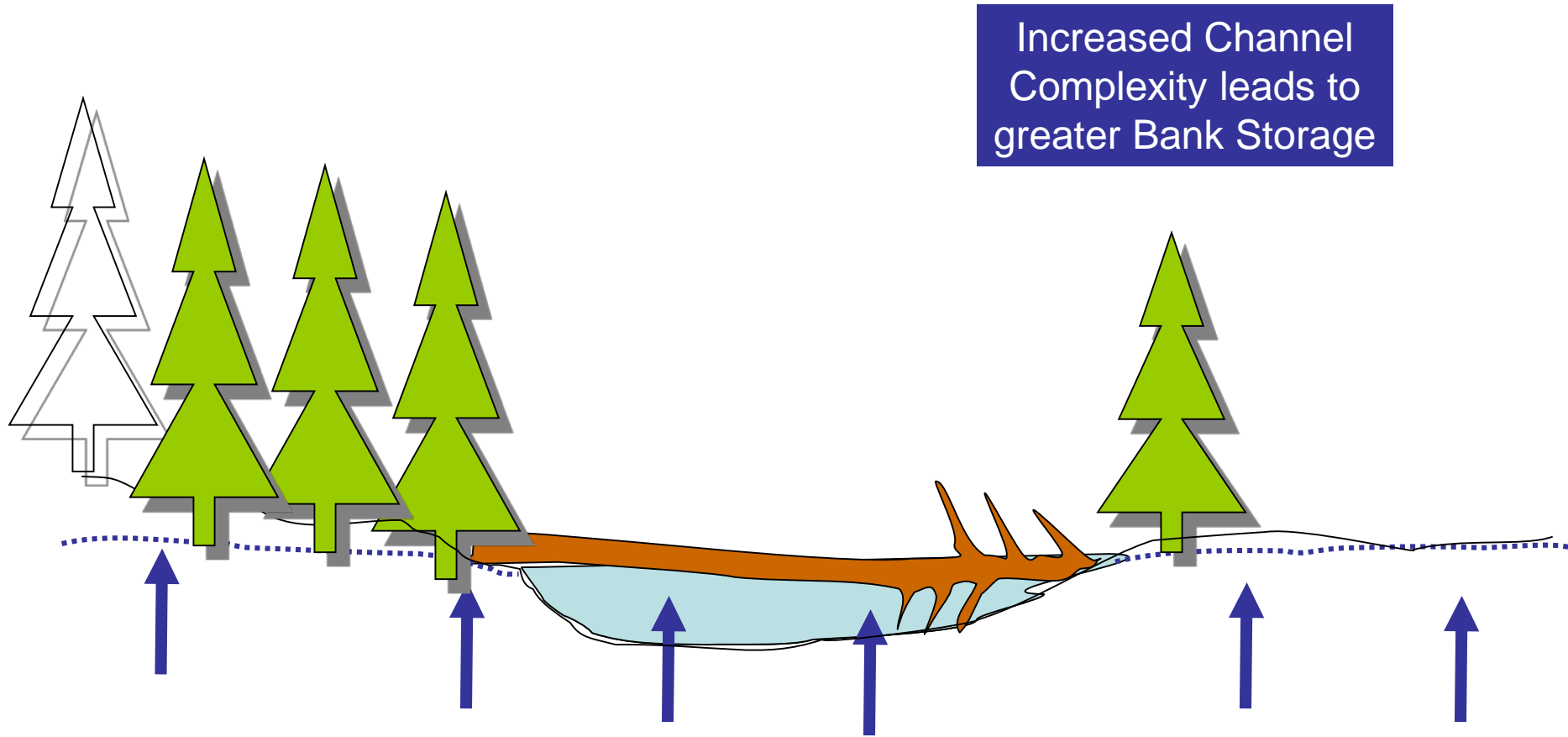
Floodplain reconnection
requires sediment. This
was deposited by the
stream, during a flood.

01.28.2009 14:50

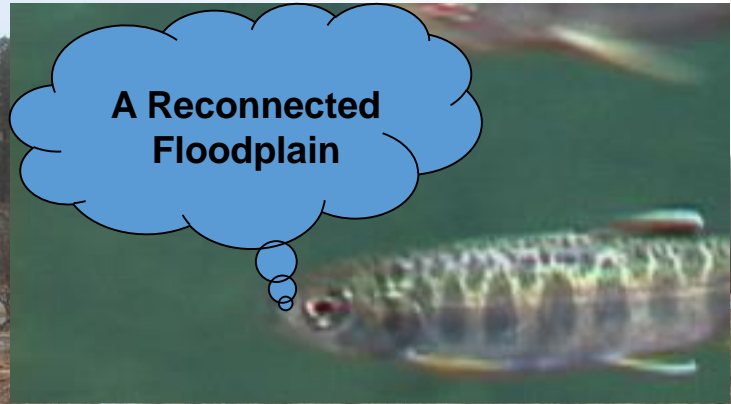


Increased Channel
Complexity leads to
greater Bank Storage





Surface and Groundwater Elevations
Increase!!!





03.31.2011 10:04









Restoring Floodplains at the Cosumnes River Preserve

Judah Grossman, Project Director
Rodd Kelsey, Lead Scientist

RESTORATION WEBINAR SERIES
SEPTEMBER 3, 2015



C.A. Jeffres, J.J. Opperman, & P.B. Moyle (*Environmental Biology of Fishes*, 2008)





**Reduces Flood
Damage Downstream**



01.18.2011

What about
Riparian
Response?





Native seedlings - YEE HA!

04_17_2012 13:28

Before Restoration (Dry)

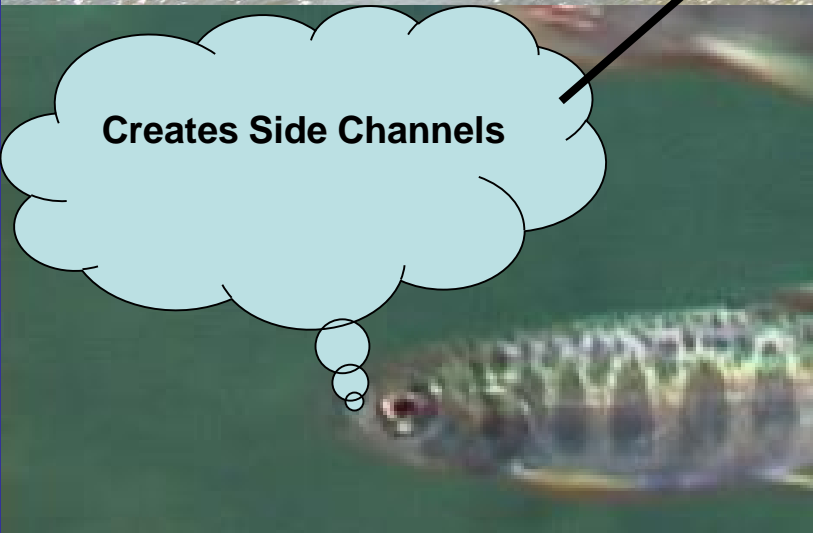
← snag

09.10.2010 12:00

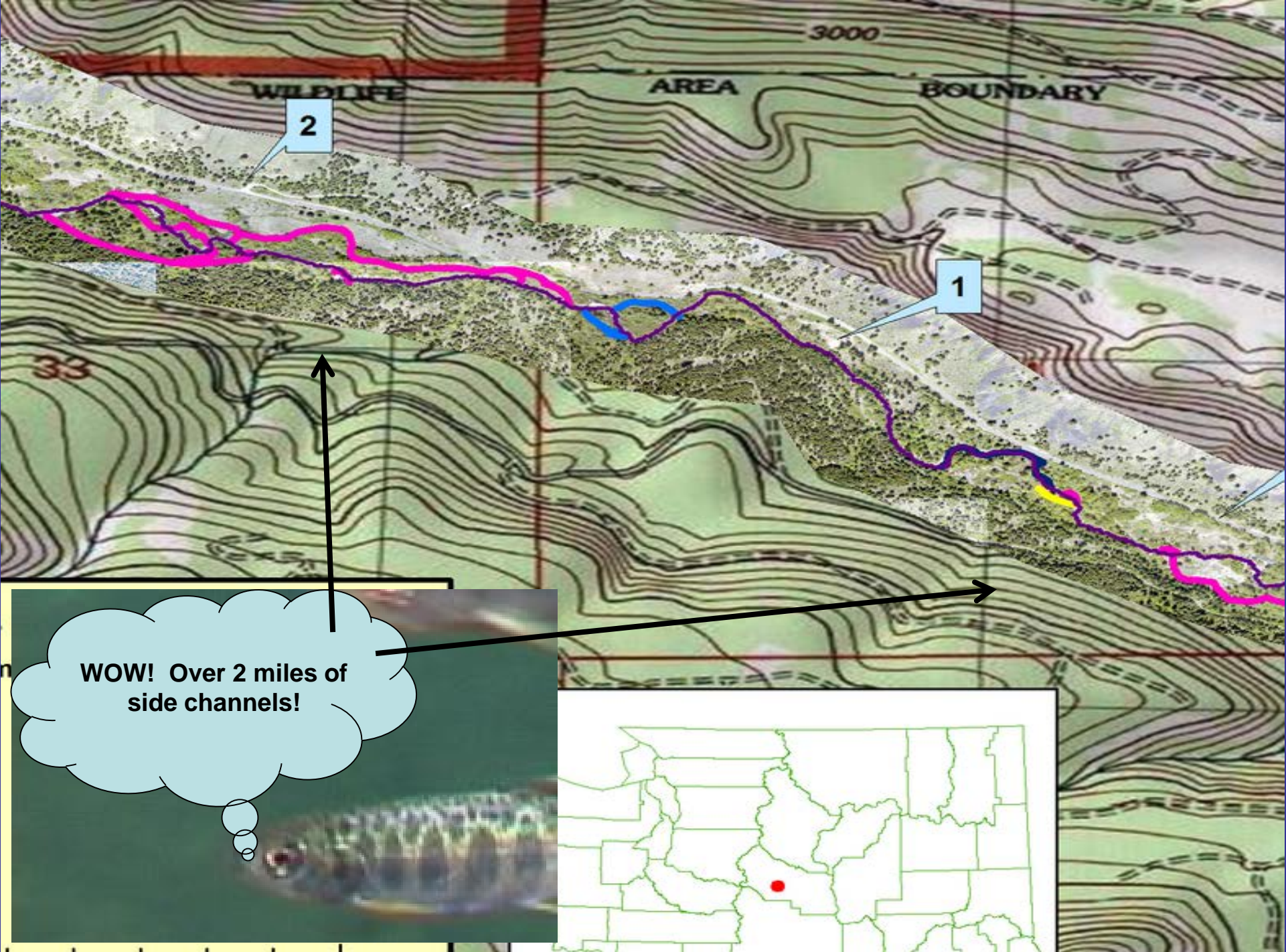


Three Years Later





Creates Side Channels



New Beaver Dam, on Side
Channel that formed after
Wood Replenishment

Habitat for fish and
wildlife





01.28.2009 15:32

Forest Health





10.02.2008 11:13



Woodland Fish & Wildlife

Wildlife-Friendly Fuels Reduction in Dry Forests of the Pacific Northwest

Nicole Strong, Assistant Professor (Practice), Oregon State University Extension,
Ken Bevis, Stewardship Wildlife Biologist, Washington Department of Natural Resources. Illustrations by **Gretchen Bracher**.

Reducing fuels, improving forest health and enhancing wildlife habitat are common management goals on our private dry forests. These goals don't have to contradict each other, if you follow some simple guidelines. The following publication will give you tips and ideas on how to make sure all of your goals are met.

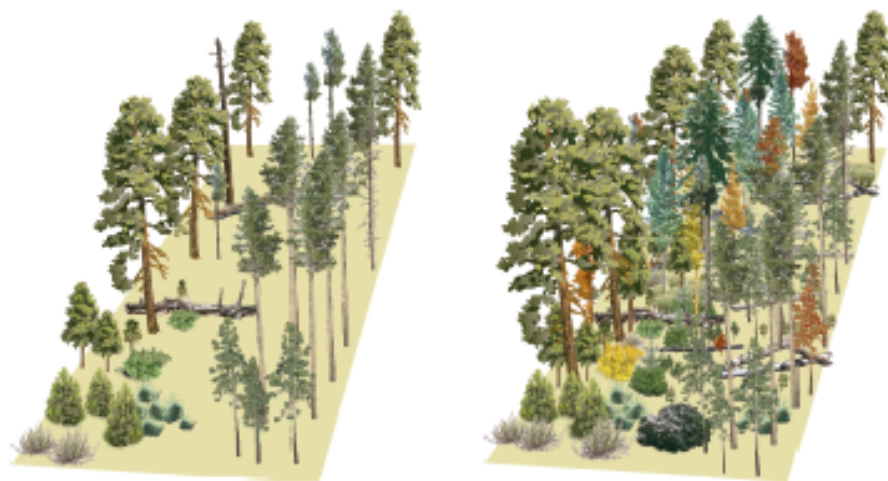
Introduction

Forests in the Pacific Northwest were historically shaped by fire. Whereas large landscape scale fires impacted west side forests only every few centuries, our dry forest ecosystems experienced fire as frequently as every 5-25 years. These frequent fires occurred at varying intensities, completely torching some areas,

lightly burning others, and even skipping some places altogether, creating a complex mosaic across the landscape (Figure 1).

Individual tree vigor was strong because fire reduced competition for water, sunlight, nutrients, and growing space. Historic stands contained large standing dead trees (snags) as well as some very large down logs that would not be consumed by

low intensity fires. Regeneration was often patchy, resulting in numerous openings and areas of dense young trees that might flush out in the next fire. Many shrub species would either re-sprout in clumps, or sprout from seed in the soil after a fire, creating a vigorous grass, forb, and shrub understory.



Figures 1 and 2. The figure on the left shows a historic forest that experienced regular low intensity fire. An individual tree here or there may have torched, but for the most part the fire stayed low. The figure on the right shows the same forest after decades of fire suppression. There is increased competition and reduced tree vigor, as well as increased risk for a high intensity fire. There is also reduced wildlife habitat value for some species in terms of forage and large healthy trees.



10 02 2008 11 13



Woodland Fish & Wildlife

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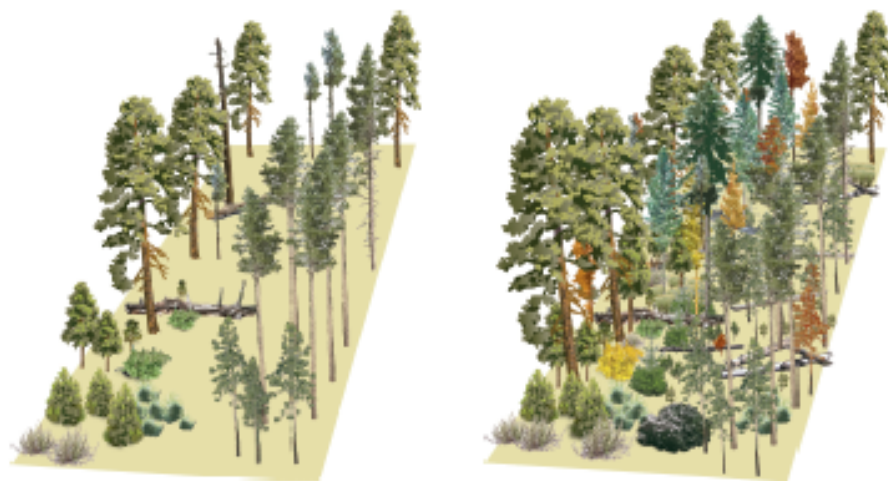
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“SLLOPPS”



10 02 2008 11 13

Spread the water out, SLOW IT DOWN,
Protect Infrastructure



05.15.2011 13:53



Need Water?

Functional
floodplains provide
Ecosystem Services

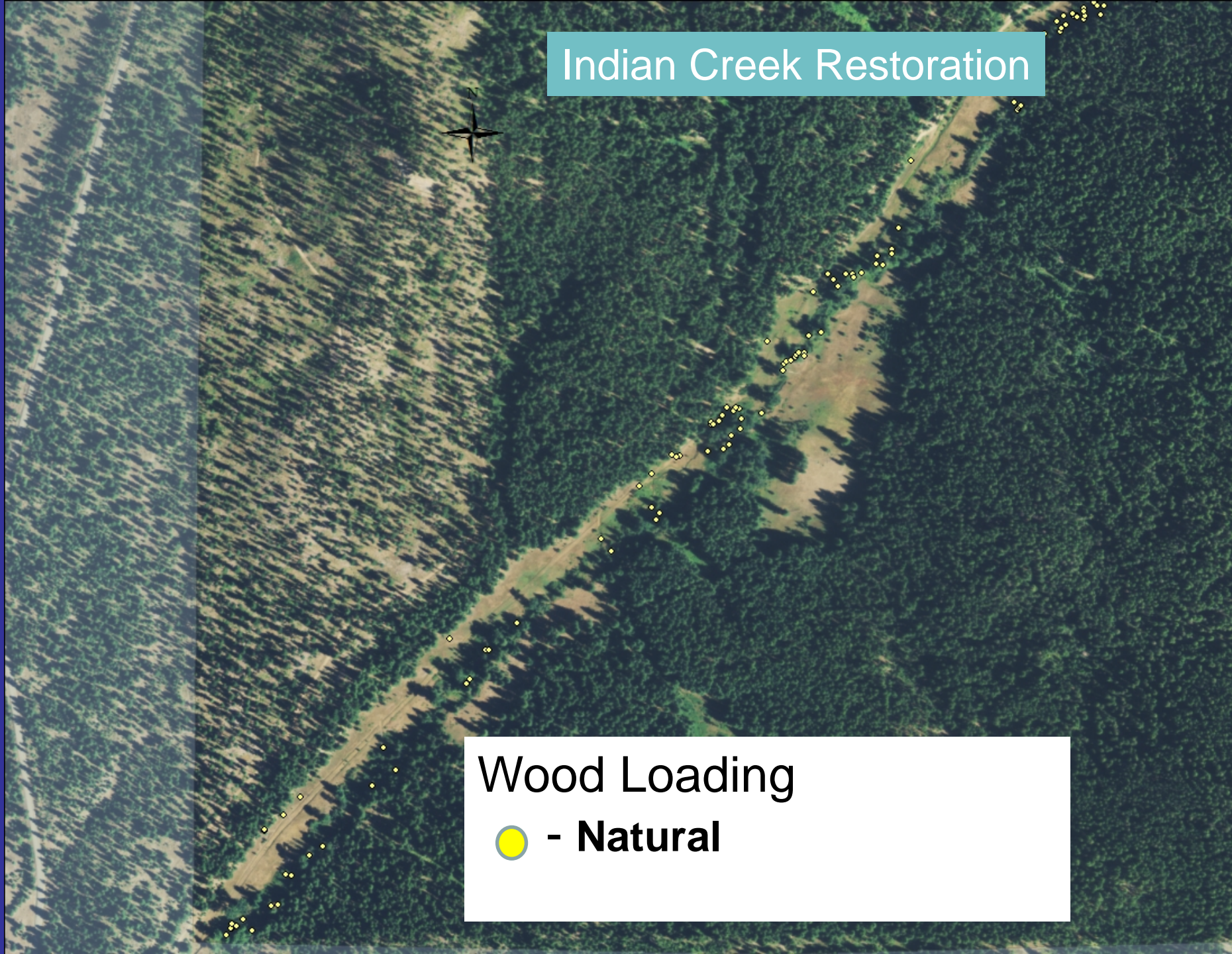


Indian Creek Restoration



Wood Loading

● - Natural



Indian Creek Restoration



Wood Loading



- **Natural**



- **Replenished wood**

South Fork Cowiche Aquatic and Floodplain Restoration



An aerial photograph showing a collapsed bridge over a river. The bridge's wooden structure is broken and partially submerged in the water. The surrounding area is covered in dense, dry vegetation and trees, suggesting a rural or wilderness setting. The image is used as a background for the quote.

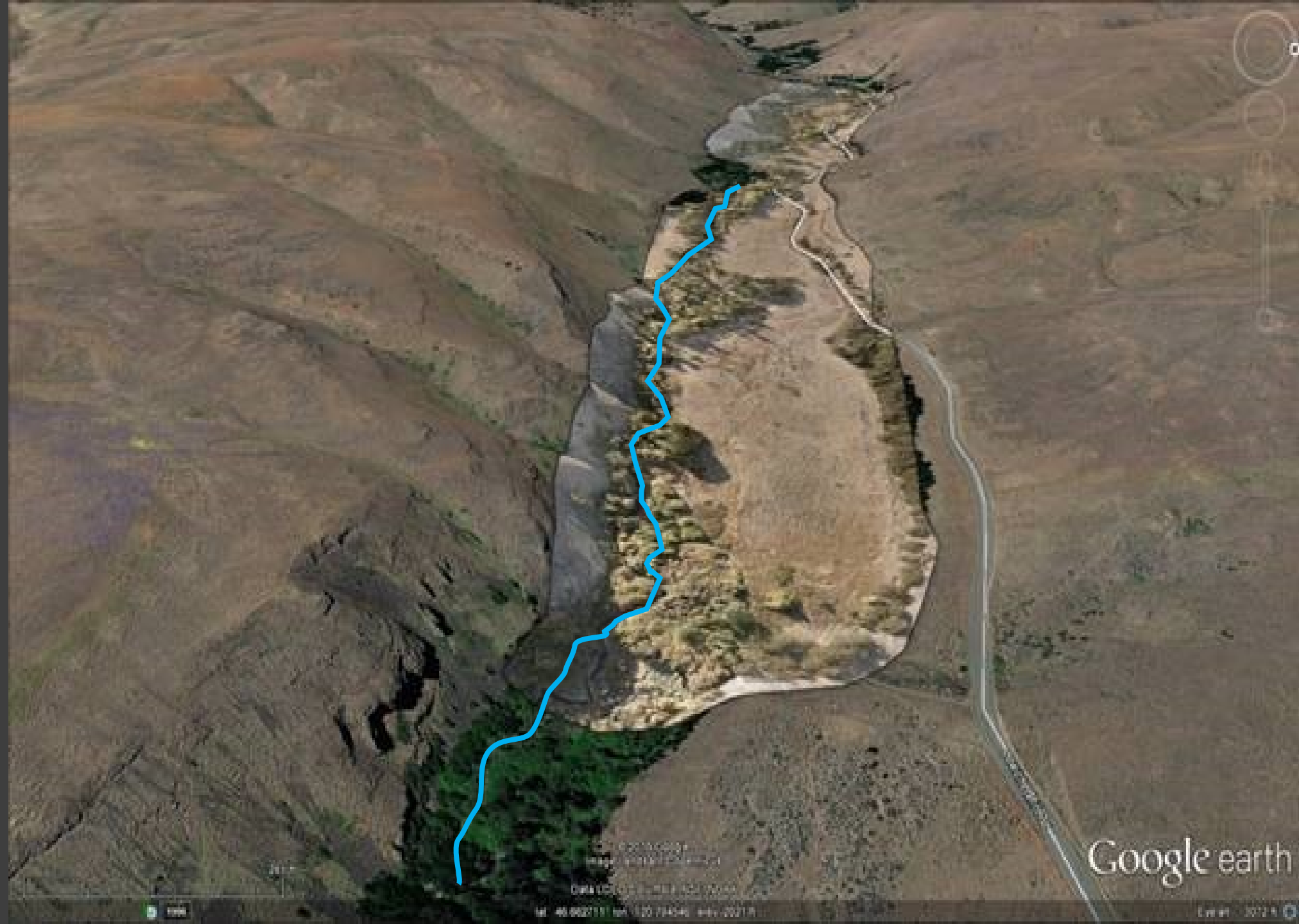
**“It’s amazing what
you can accomplish
when you don’t care
who gets the credit”**

– Harry S. Truman



Photo by Jason McCormick





Google earth

© 2012 Google
Data: 2012
lat: 40.802111 lon: 100.744540 alt: 2021.9

© 2012 Google

Before



After



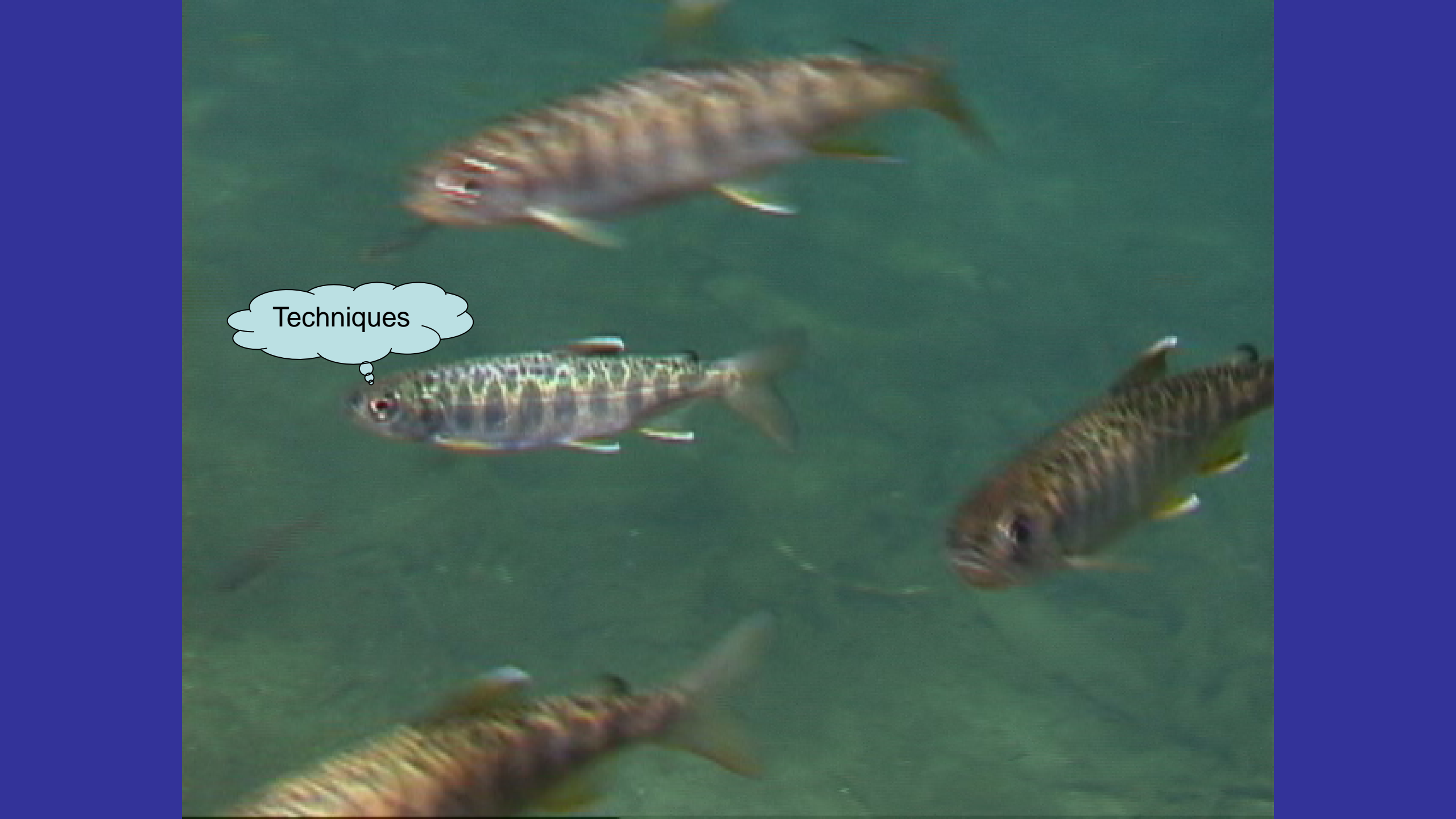
How About Here?







This engineered structure can be complimentary with wood replenishment.

An underwater photograph showing several fish swimming in clear, greenish water. A central fish is the focus, with a thought bubble above its head. The bubble contains the word "Techniques". Other fish are visible in the background and foreground, slightly out of focus. The entire image is framed by a solid blue border.

Techniques









“YGOOTWYPITT”

A Washington Conservation Corps member, using a "Griphoist"



04.13.2009 08:47

...can move really big trees...







Sixth graders can use it
(Wow again)



Technique #2: Utility Farm Tractor with a
“Skid Winch”



Technique #3:
Heavy Equipment



11/05/2012 10:29

Understory trees near the
restoration project,
transported a short distance
to the stream.



09.10.2010 15:20



... Heavy, flexible, full-length!

A satellite map of North America, showing the United States, Canada, and Mexico. The map is oriented with North at the top. The text "How Will Climate Change Affect Your Stream?" is overlaid in the center. The text "Data SIO, NOAA, U.S. Navy, NGA, GEBCO" is visible in the bottom right corner, and "Image Landsat" is visible in the bottom left corner. The Google logo is partially visible in the bottom right corner.

How Will Climate Change Affect Your Stream?

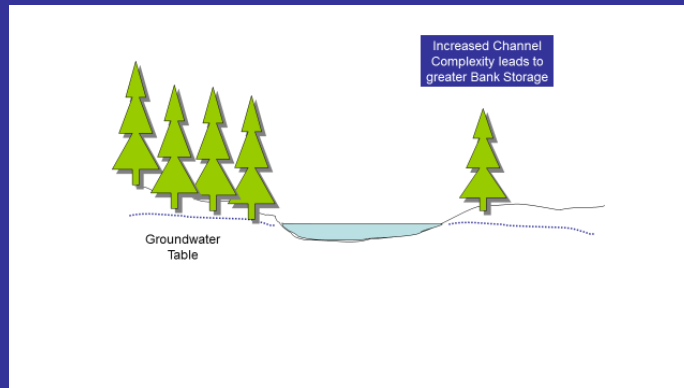
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Image Landsat

Google



4/20/12





Groundwater
Table



Acknowledgements:

- Mid Columbia Fish Enhancement Group
- WDFW
- Bonneville Power Administration
- Washington Conservation Corps
- USFWS, Mid Columbia Office
- Snake River Recovery Board
- Utah State University Fluvial Habitats Center,
- Asotin Intensively Monitored Watershed
- Yakama Nation

Thank You



Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Image Landsat

Google e