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Managing Water in the West

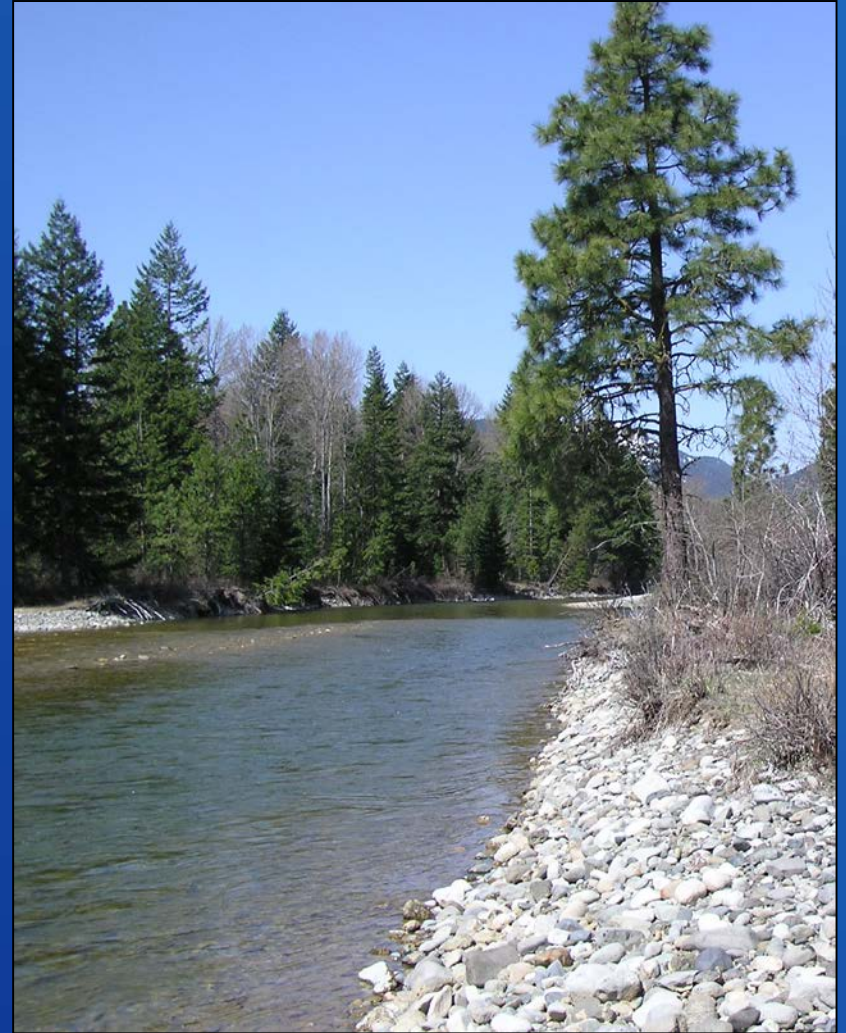
Proposed Lower Cle Elum Geomorphic, Sediment Transport and Macroinvertebrate Study



U.S. Department of the Interior
Bureau of Reclamation

Presentation Outline

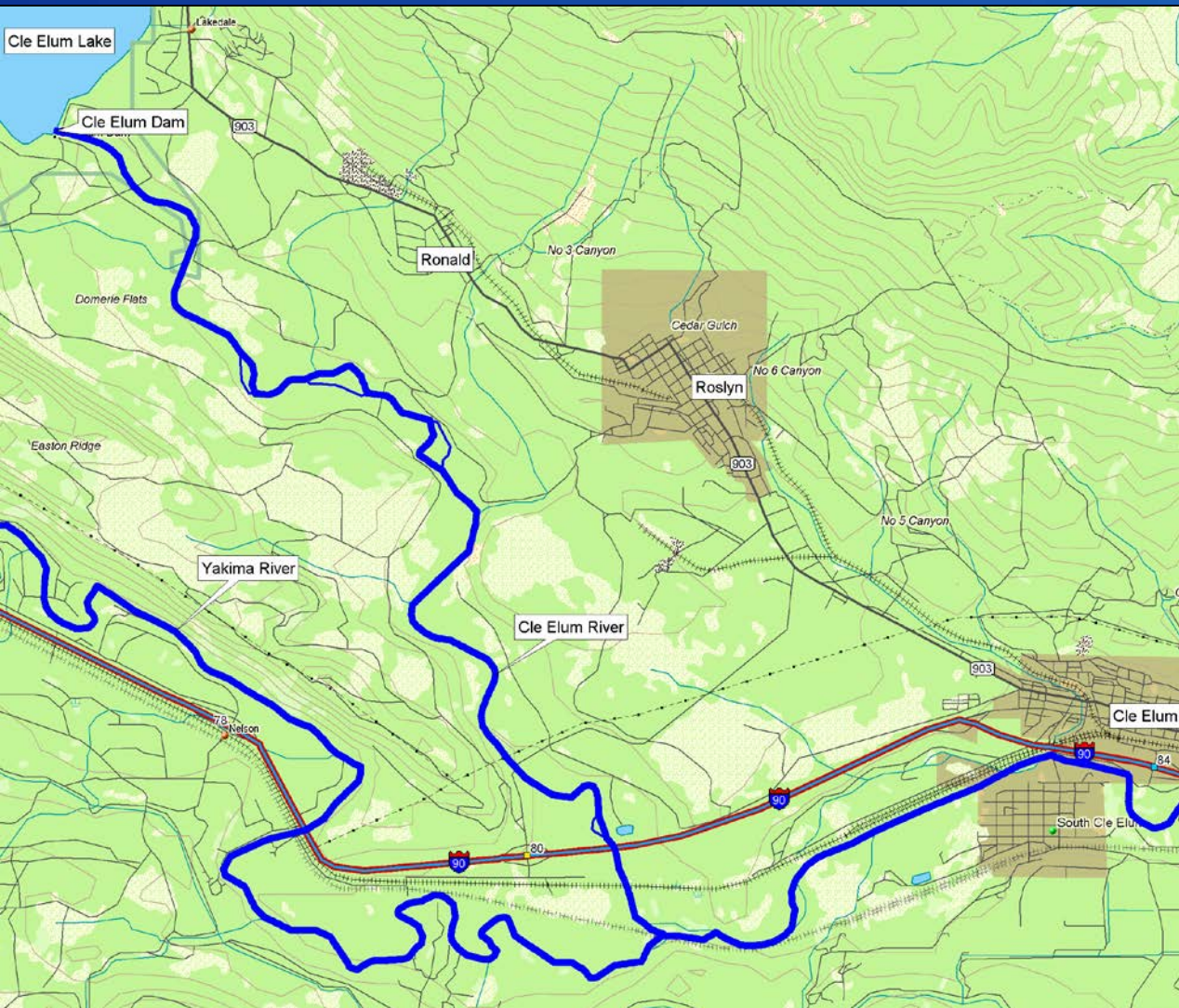
- Introduction
- Hypotheses
- Study Purpose/Objective
- Scope of Proposed Work
- Study Components
 - Sediment Transport Analysis
 - Geomorphic Analysis
 - Salmonids
 - Macroinvertebrates
 - Large Woody Debris Analysis
- Schedule
- Study partners are Jeanne Klawon and Dave Raff (with Mark Nelson and Brian Bledsoe)



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Introduction

Study reach includes the lower Cle Elum R. from the Cle Elum Dam to the mouth



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Introduction

- This study has been requested by the Yakama Nation
- A meeting and site visit took place April 24th and 25th, 2006 to discuss the study and form a study plan
 - YN – Scott Nicolai, Kelly Larimer, Hank Frasier
 - WDFW – Brent Renfrow, William Meyer
 - KCT – David Gerth
 - Reclamation (TSC) – Rob Hildale, Jeanne Klawon
- Observations from the site visit
 - Some evidence of regulation is apparent
 - The lower Cle Elum R. appears to be a relatively healthy system considering the 70+ years of regulation
 - Many of the geomorphic mechanisms operating in the upper river are operating in the lower river, although to a lesser extent

Hypotheses

- Following the meeting some broad hypotheses were put forward
 - 1.) Altering the hydrograph during wet years (periodic flooding) will further facilitate geomorphic processes
 - Maintain existing habitat
 - Reactivate or create new areas of suitable salmonid and macroinvertebrate habitat
 - Likely to increase the recruitment of large woody debris
 - Increase habitat diversity
 - 2.) Altering the current hydrograph on an annual basis to more replicate normative flows will benefit salmonid and macroinvertebrate habitat
 - 4.) The introduction of large woody debris may also increase the habitat diversity

Study Purpose/Objective

- To design a flow hydrograph on an annual and semi-annual basis that will optimize the maintenance and development of sustainable salmonid habitat on the lower Cle Elum River



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Scope of Proposed Work

- Combine input from five individual but related research areas to arrive at a common objective
 - To enhance geomorphic processes through which improvement in populations of salmonids and macroinvertebrates is expected
 - Research areas are:
 - Geomorphology
 - Sediment transport
 - Salmonids
 - Macroinvertebrates
 - Large woody debris
- The primary deliverable from this study will be a recommendation for shaping the annual hydrograph and recommended releases during wet water years to create periodic flooding
 - Design for placement of large woody debris

Study Components

- Salmonids
 - Gather existing data and related literature to provide the location and density of current and historical fish populations
 - Determine the optimal hydrograph that will accommodate all life cycles of salmonids
- Sediment Transport
 - Analyze sediment transport conditions required to perform geomorphic work
 - Flow rate
 - Duration

Study Components

- Geomorphic analysis
 - Provide further information on the physical processes and environments that are dominant on the river
 - Physical features will reflect habitat types available for various species
 - Reveal where improvement can be made
 - Provide knowledge of the historical changes the river has undergone
 - Identifying natural and anthropogenic changes



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Study Components

- Macroinvertebrates
 - Study will focus on populations as a whole rather than specific species
 - Goal is to have a properly functioning macroinvertebrate population over as much of the river as possible
 - The study will relate the macroinvertebrate population to hydraulic characteristics using GeoTools
 - GeoTools is a comprehensive package of tools designed to rapidly and easily analyze changes in the instream flow environment through the assessment of sediment transport, bed shear, stream power, and the overall effective discharge
 - The macroinvertebrate portion of this study is part of a larger ongoing study by David Raff (Reclamation) and Brian Bledsoe (Colo. St. Univ.). Mark Nelson (Reclamation) is also involved

Study Components

- Large woody debris
 - Contract with a consultant to view the lower Cle Elum R. and provide an assessment based on current conditions and possible future conditions
 - Design the structures recommended by the consultant
 - We may focus much of the placement in side channels, where scour processes in the vicinity of the large woody debris will create pools that can hold ground water throughout the year



Schedule

- This is a wishful schedule, as there is no funding for this project at the moment
 - This summer:
 - Collect survey data, additional macroinvertebrate data
 - Gather historical data; aerial photography, salmonid surveys
 - Contract with consultant to assess large woody debris
 - This fall:
 - Collect additional survey data as needed (side channels)
 - Collect more macroinvertebrate data
 - Assess large woody debris placement
 - This winter:
 - Analyze data to develop recommended hydrographs
 - Next Spring:
 - Write report and deliver the product to Yakama Nation

Questions?

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