

# Restoring the Kootenai: A Tribal Approach to Restoration of a Large River in Idaho

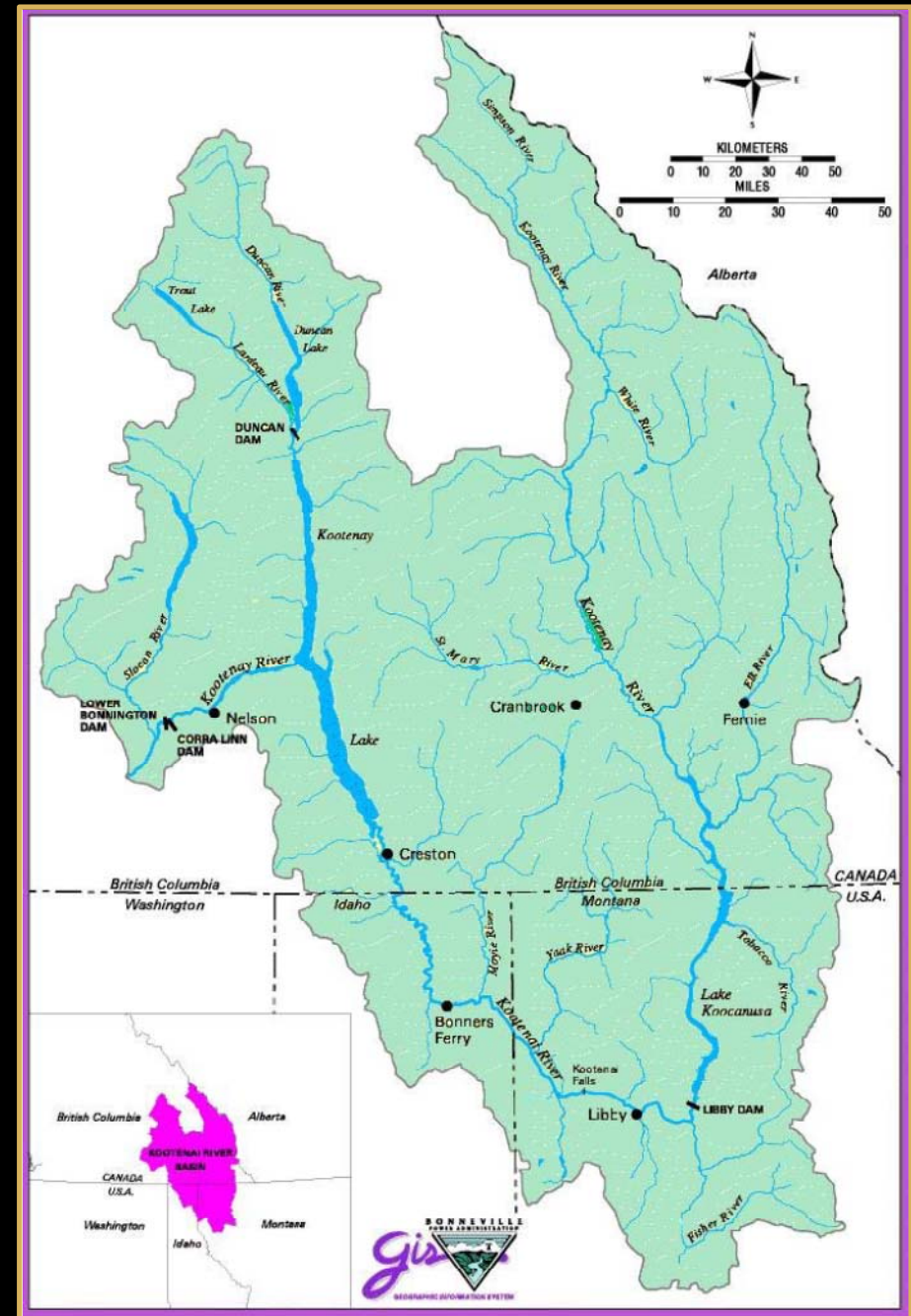
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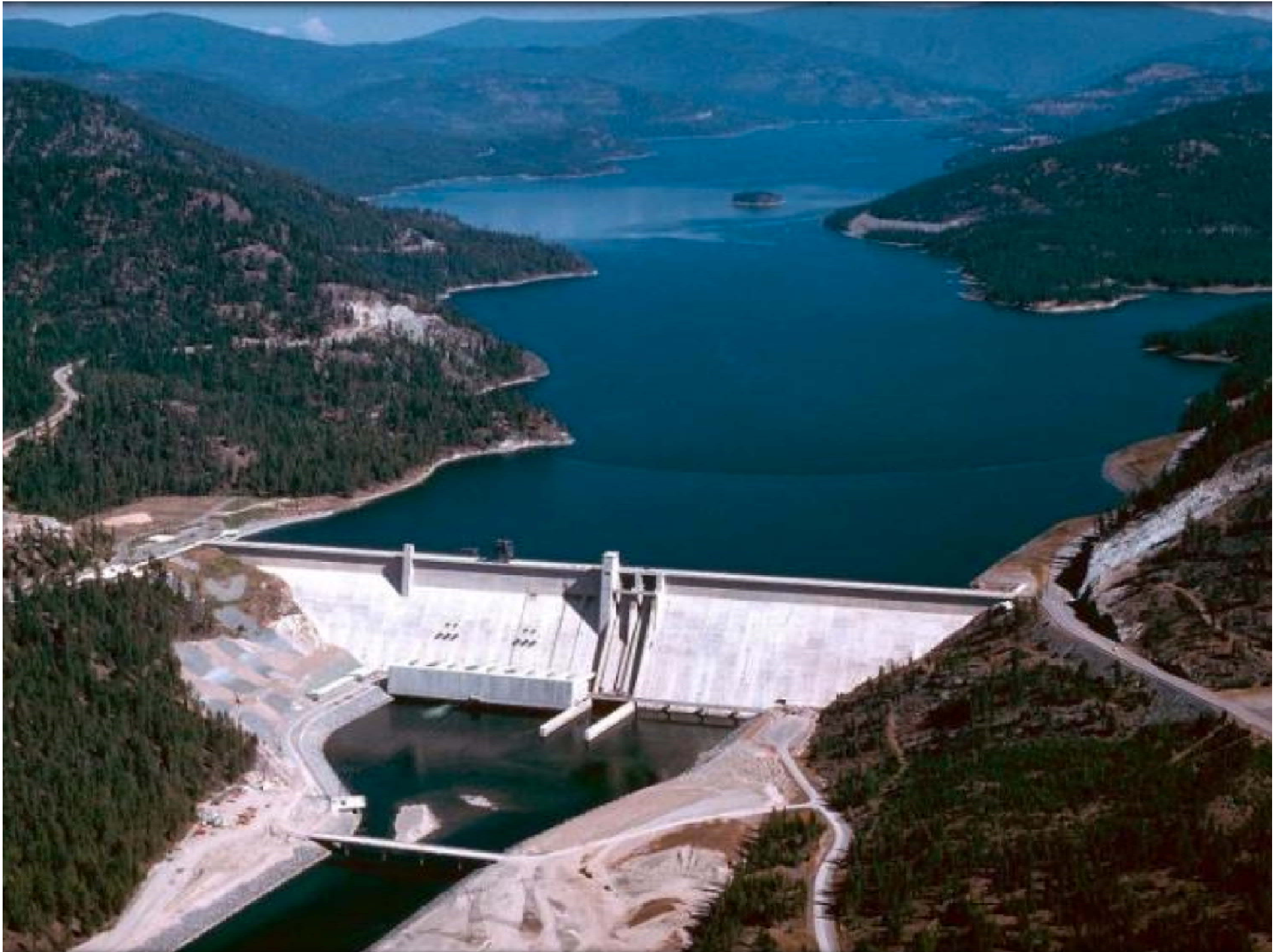
Presentation to Technical Management Team, Portland, OR  
May 6, 2015  
Susan Ireland, Kootenai Tribe of Idaho

# Kootenai River Subbasin

- 9 million acres (19,420 square miles)
- 485 miles long
- 2<sup>nd</sup> largest tributary to Columbia River in terms of runoff volume
- 3<sup>rd</sup> largest in terms of drainage area
- Ktunaxa Nation
- 2 Countries
- 2 States, 1 Province
- Transboundary Species
- Hydropower
- Resource based economy







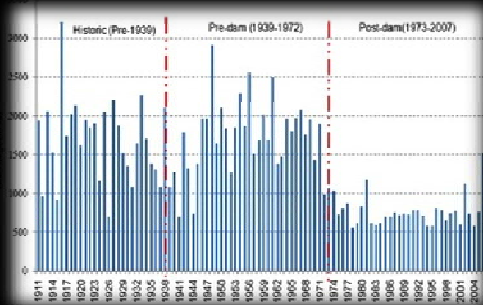
# Examples of Limiting Factors

**Altered flow** (Spring 1/2 of historical; Winter increase 300%, lack of flushing flows)

**Nutrients trapped** (reduced primary productivity)

**Loss of side channel, wetlands, and floodplains & connectivity**

**Bank erosion & land loss**



**Altered thermal regime** (warmer winter, cooler summer temps)

**Altered sediment transport, deposition, scour**

**River response to altered hydraulics** (morphology, depth, velocity)

**Elimination and modification of critical fish & wildlife habitats**



# Decline of native fish species

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**Kootenai River  
white Sturgeon  
ENDANGERED**



**Burbot  
PETITIONED**



**Bull trout  
THREATENED**

**West Slope  
Cutthroat  
PETITIONED**



**South Arm Kokanee  
FUNCTIONALLY EXTINCT**



**Columbia River Redband Trout  
SPECIES OF CONCERN**

# The approach: Tribal initiatives

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## HISTORICAL ECOSYSTEM CHANGES

Beaver trapping  
Conversion of floodplain  
Diking  
Logging  
Mining  
Infrastructure  
development  
Non-native species  
Commercial harvest  
Libby Dam



## RESTORATION INITIATIVES

- Conservation aquaculture
- Burbot conservation strategy
- Nutrient restoration & biomonitoring
- *Kootenai River habitat restoration (mainstem and floodplain reconnection)*
- Wetlands & riparian conservation strategy
- Critical uncertainties research
- Operational loss assessment
- Albeni Falls wildlife mitigation

# What is the Kootenai River Habitat Restoration Program?

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- Multiple projects implemented in 55 mile stretch of Kootenai River over 10 to 12 year timeframe
- Projects incorporate reach-specific targeted restoration treatments designed to restore or enhance habitat attributes needed by Kootenai sturgeon & other native fish
- Projects designed to achieve specific biological objectives using ecosystem-based approach
- Individual projects work together to provide critical habitat attributes within existing constraints (river flows, infrastructure, etc.)



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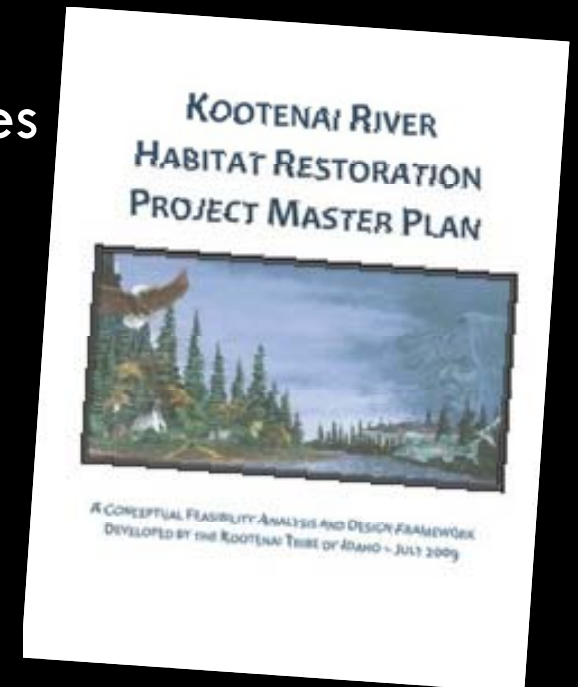




# Importance of the Master Plan

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1. **Overarching framework for large-scale restoration**
2. Focus on dynamic river processes & ecosystem functions instead of prescriptive approach to single life stage of one species restoration actions
3. **Synthesis of available data & analysis**
4. Limiting factors described for each river reach
  - Morphology
  - Aquatic habitat
  - Riparian habitat
  - Existing constraints, management & stewardship
5. **Toolbox of restoration treatments to address limiting factors**



# Major Types of Treatments

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1. **Pool forming structures & pool creation or enhancement** to encourage Kootenai sturgeon to migrate to upstream habitat & to provide holding habitat for sturgeon, burbot & other native fish
2. **In river & bank structures and islands** to create more diverse & complex habitats
3. **Side channel reconnection & floodplain creation or enhancement** to enhance the food web & provide habitat for juvenile Kootenai sturgeon, burbot & other native fish
4. **Riparian enhancement** (& riparian buffer fencing) to enhance the food web & provide cover for native fish



# 1A Project - 2011

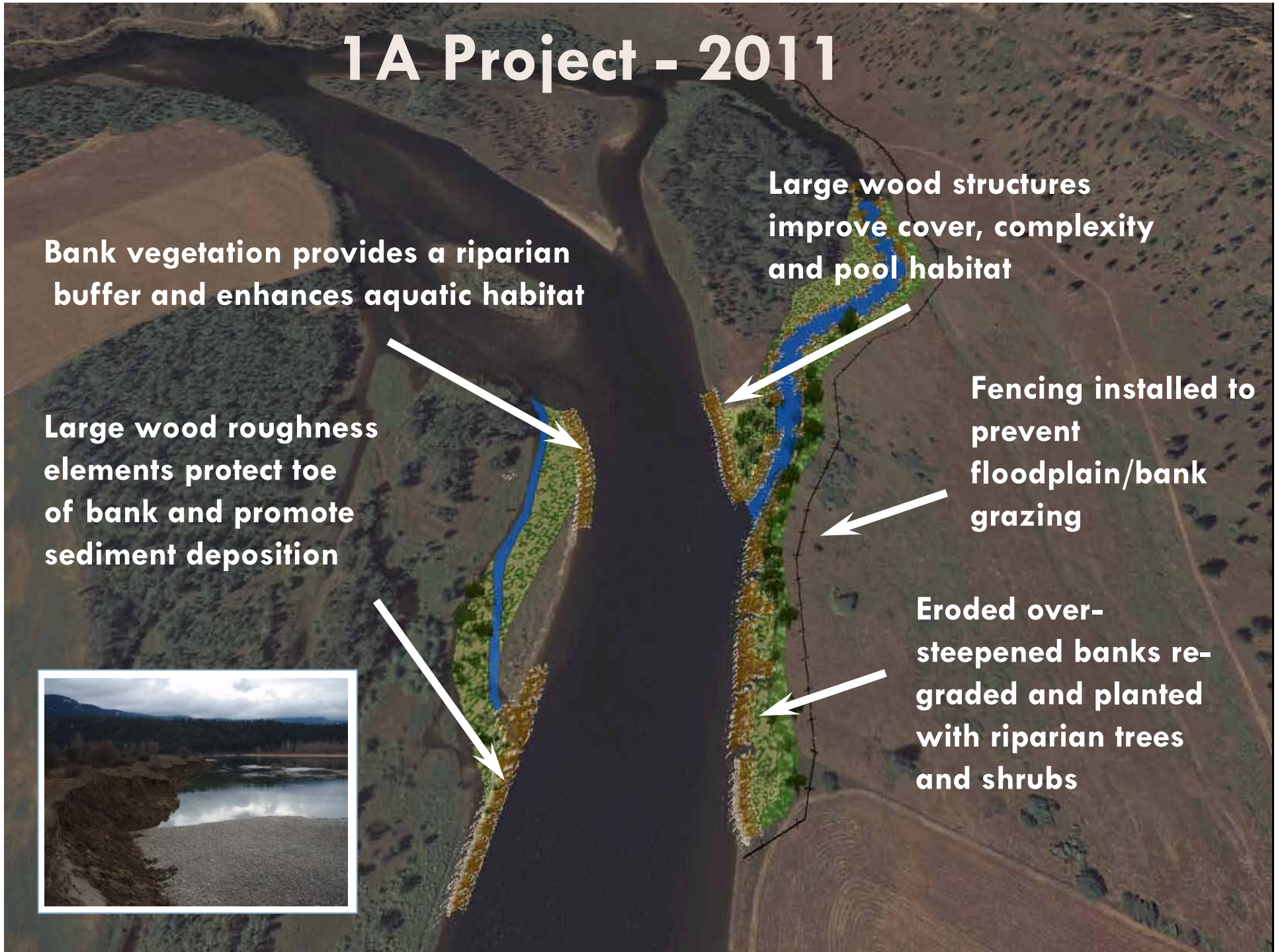
Bank vegetation provides a riparian buffer and enhances aquatic habitat

Large wood roughness elements protect toe of bank and promote sediment deposition

Large wood structures improve cover, complexity and pool habitat

Fencing installed to prevent floodplain/bank grazing

Eroded over-steepened banks re-graded and planted with riparian trees and shrubs





# 2011 – Phase 1





# 2011- Phase 1





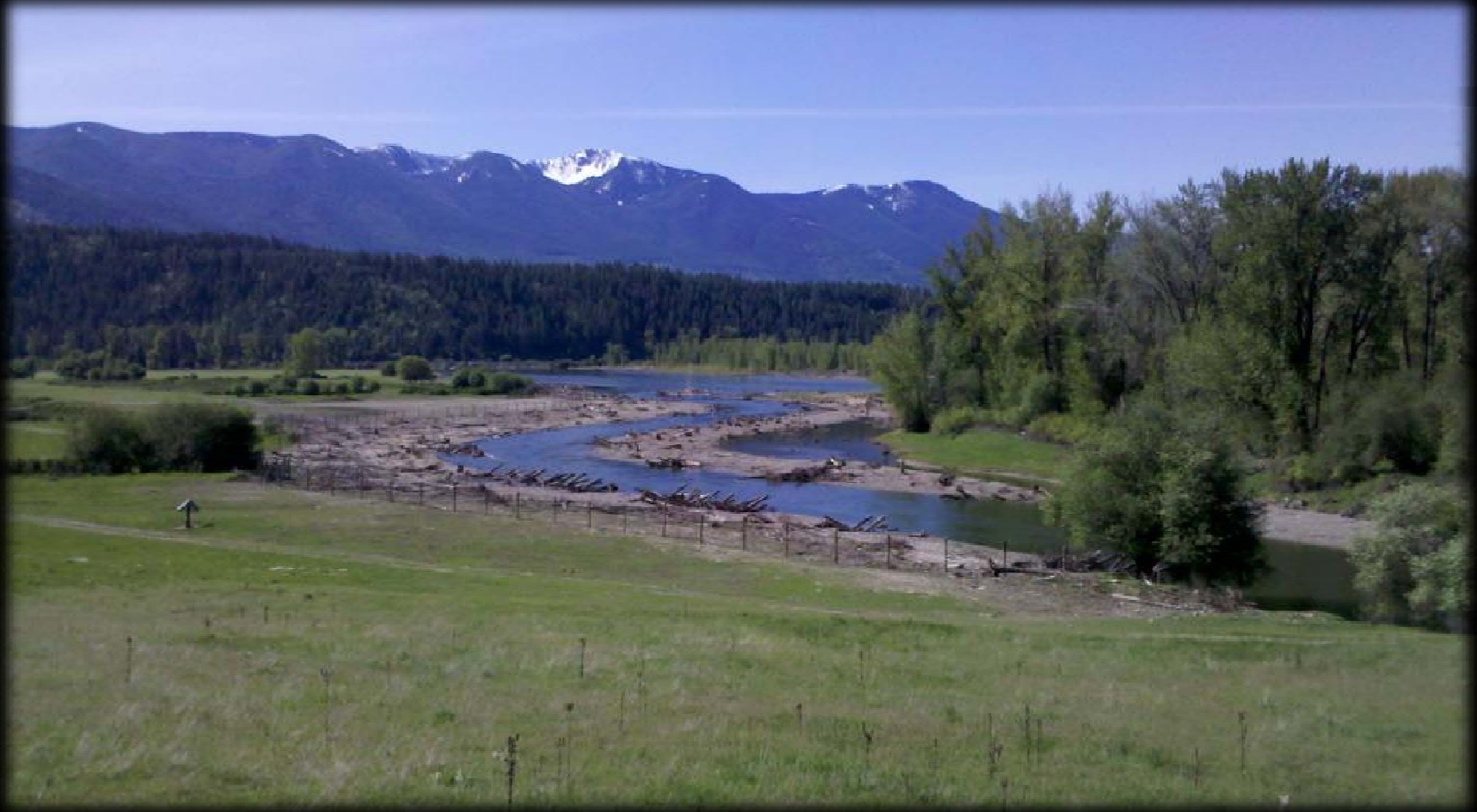
# 2011 – Phase 1





2011 – Phase 1



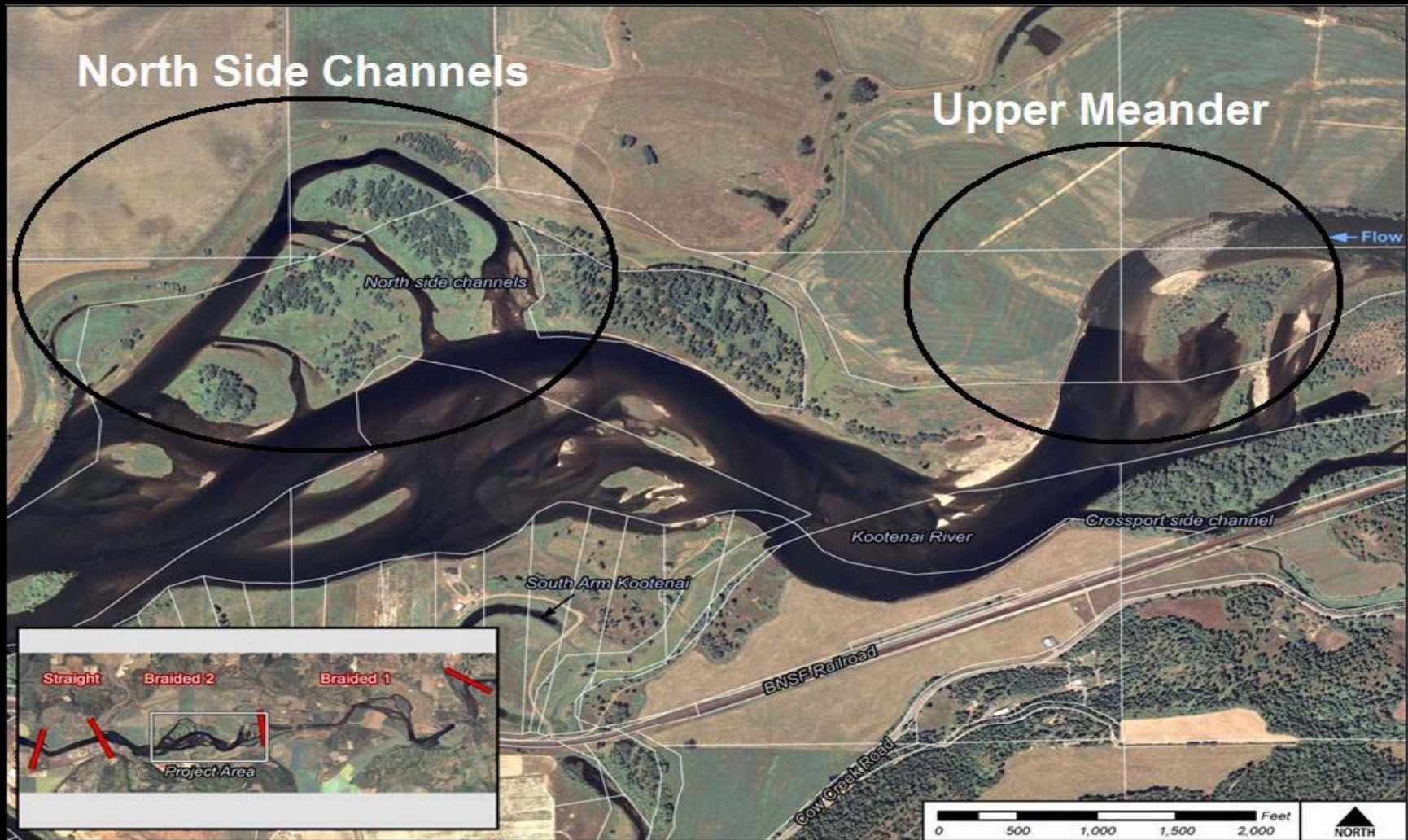


**TMT approved lower flows during construction:**

- **Supported effective dewatering**
- **Allowed construction to occur in one season**
- **Supported cost-effective and safe project implementation**



# 2012 Projects: Upper Meander & North Side Channels





# North Side Channels Project Area – Existing condition

## Limiting Factors

- Lack of aquatic habitat complexity
- Lack of vegetation recruitment/diversity
- Invasive weeds
- Grazing



# 2012 - North Side Channels Project Concept



- Improve hydraulic complexity
- **Address reed canarygrass**
- Plant native trees & shrubs
- **Create topographic diversity**
- Add large woody debris
- **Improve fish habitat and food chain**





09/27/2012



An aerial photograph showing a construction site for a river project. The river is partially dewatered, with several yellow excavators working in the exposed areas. The surrounding landscape is a mix of green grass and trees. A semi-transparent text box is overlaid on the lower-left portion of the image.

**TMT approved lower flows during construction:**

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**09/27/2012**









# Kokanee in a Constructed Side Channel





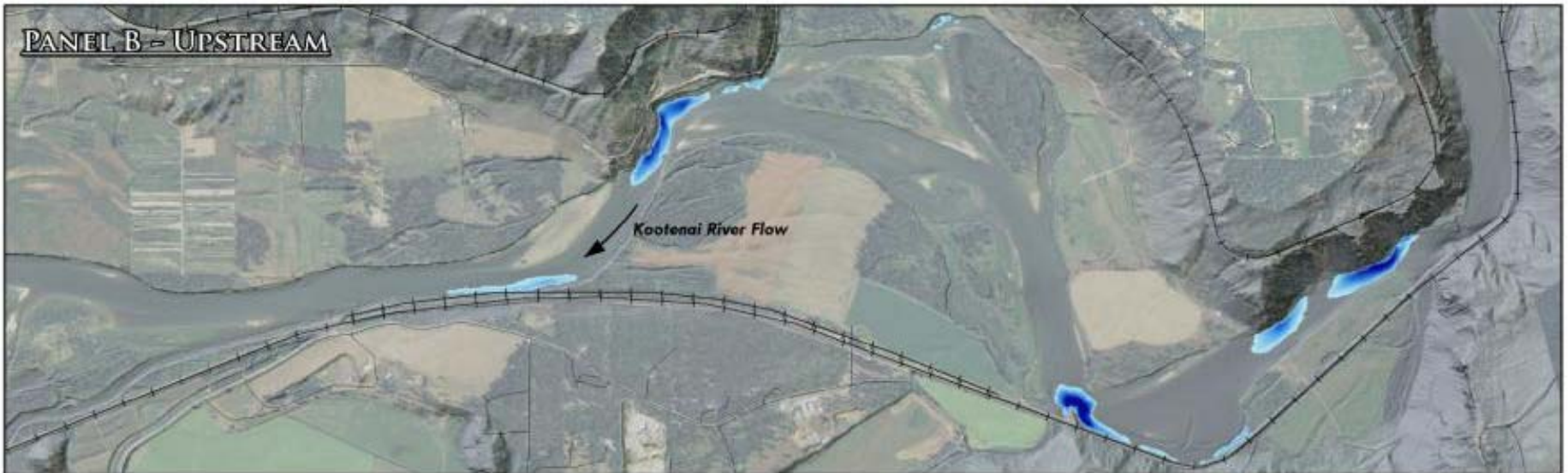
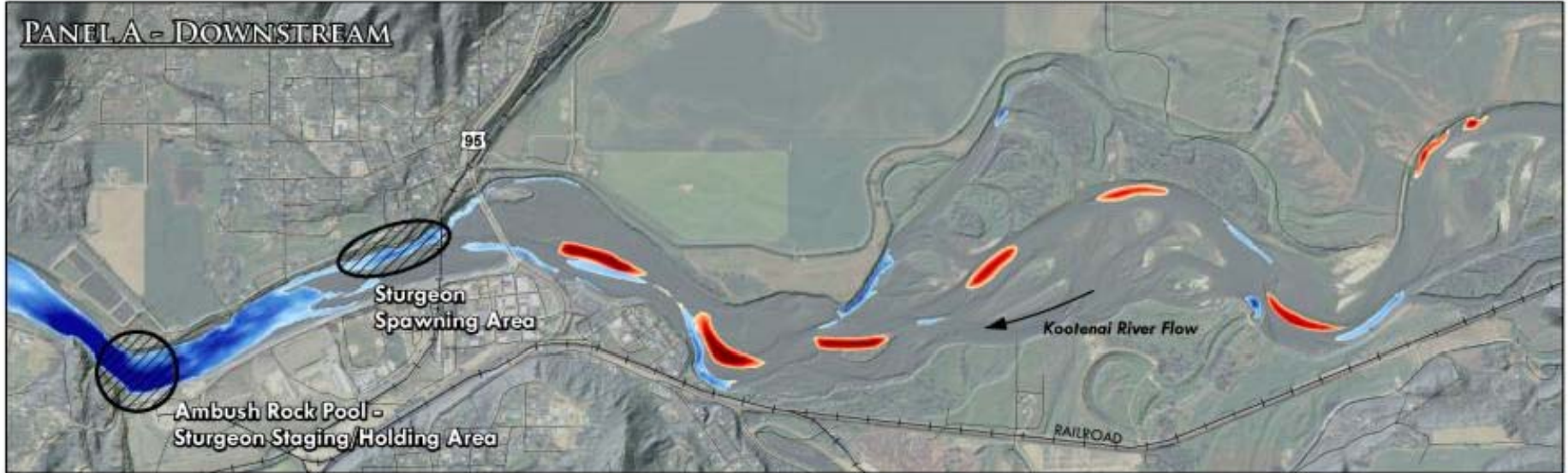


# KOOTENAI RIVER HABITAT RESTORATION PROGRAM

## POOL LADDER CONCEPT

-  Existing Pool
-  Proposed/  
Constructed Pool

### MAP PANEL INDEX



0 1,000 2,000 4,000 6,000 Feet  
1 Mile



10.31.2013, River Design Group, Inc.  
Data: 2011 NMAP Imagery; Boundary County Infrastructure; RDG Model Results.



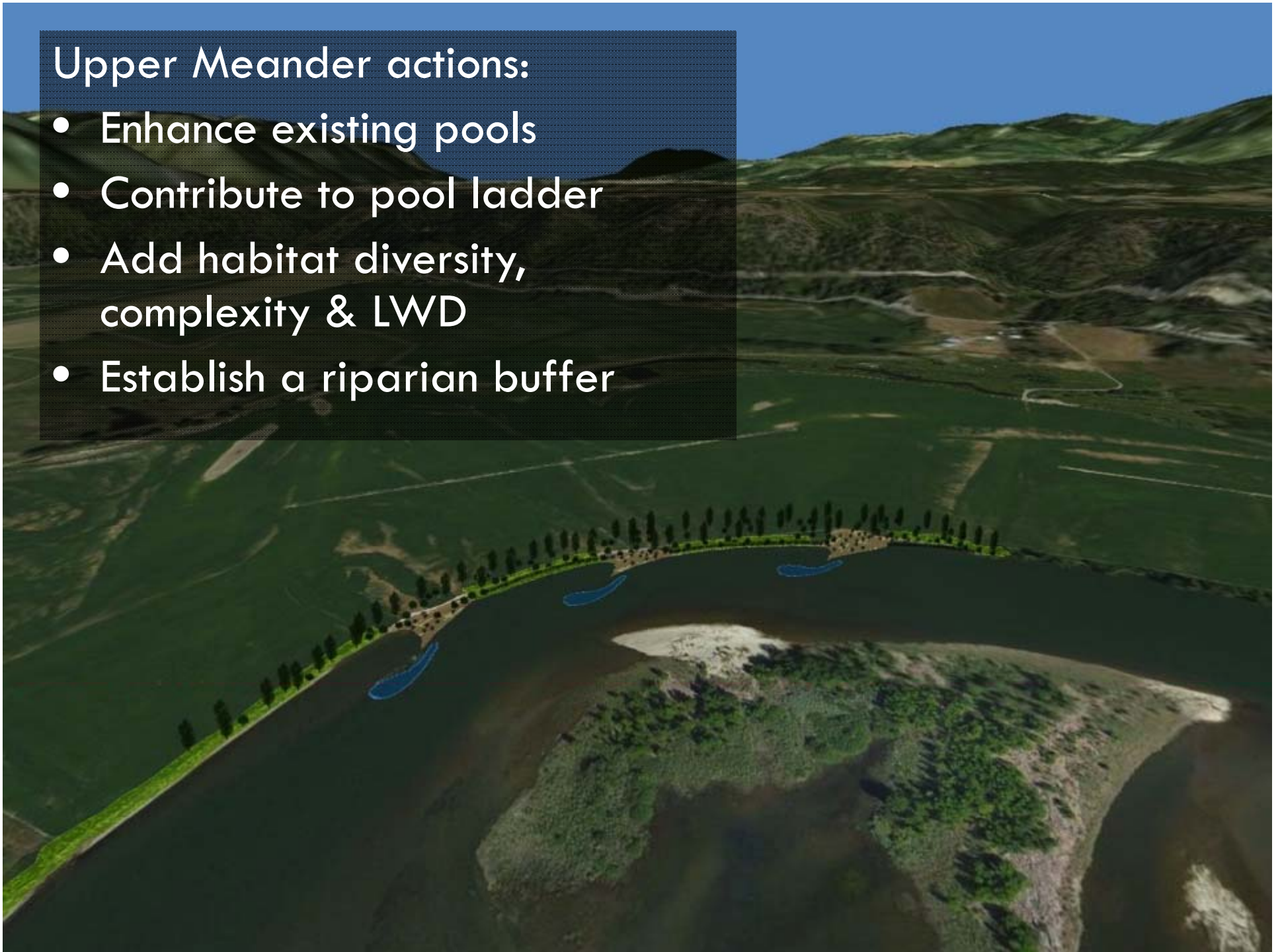
# 2012 Project Upper Meander pre-project conditions



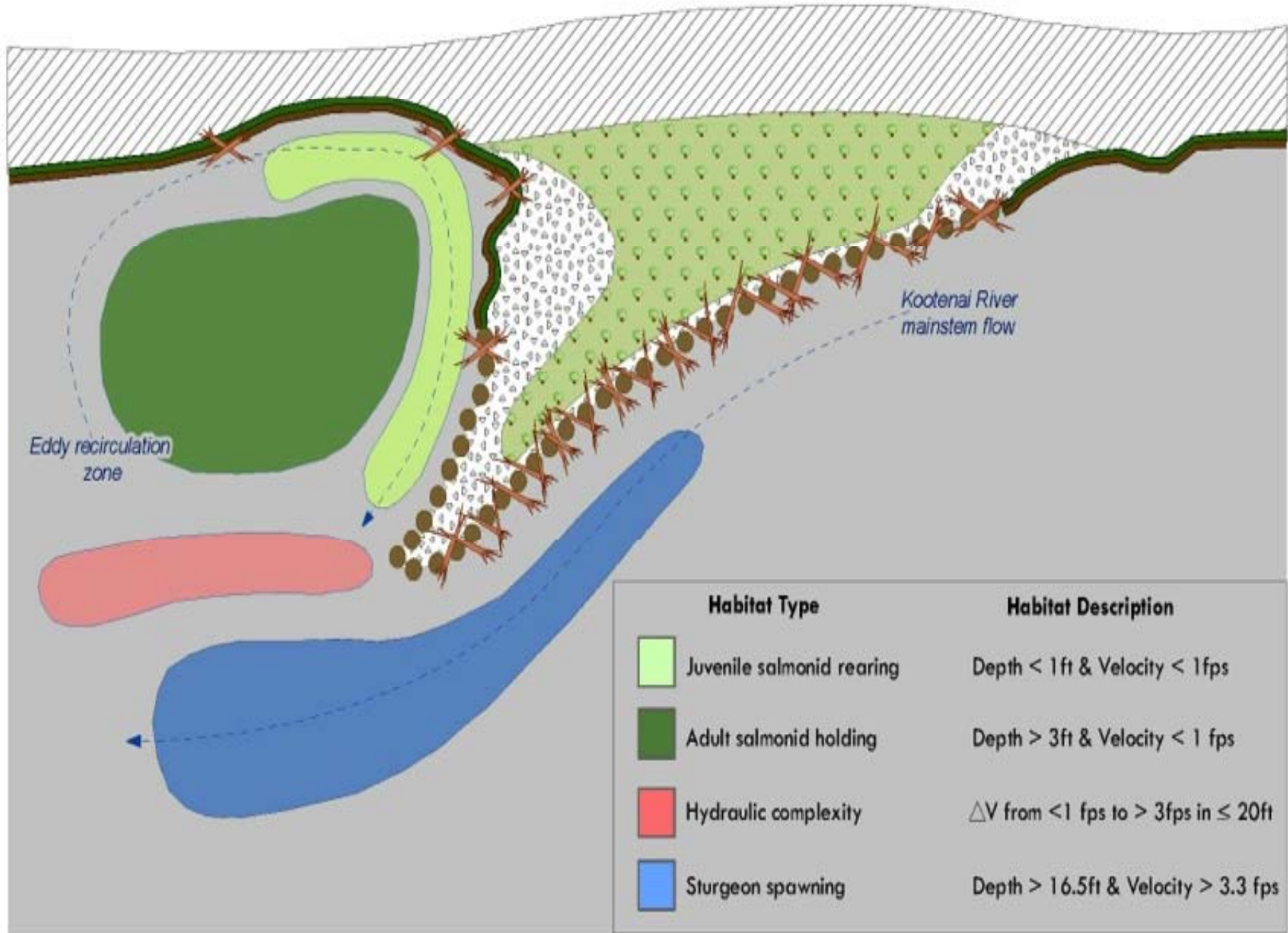


## Upper Meander actions:

- Enhance existing pools
- Contribute to pool ladder
- Add habitat diversity, complexity & LWD
- Establish a riparian buffer







# 2012 Project Upper Meander construction



10/24/2012



**TMT approved lower flows during construction:**

- **Supported construction and pile driving of spur dikes**
- **Supported placement of large wood structures**
- **Allowed for construction to be completed in one season in a safe and cost effective manner**



09/27/2012

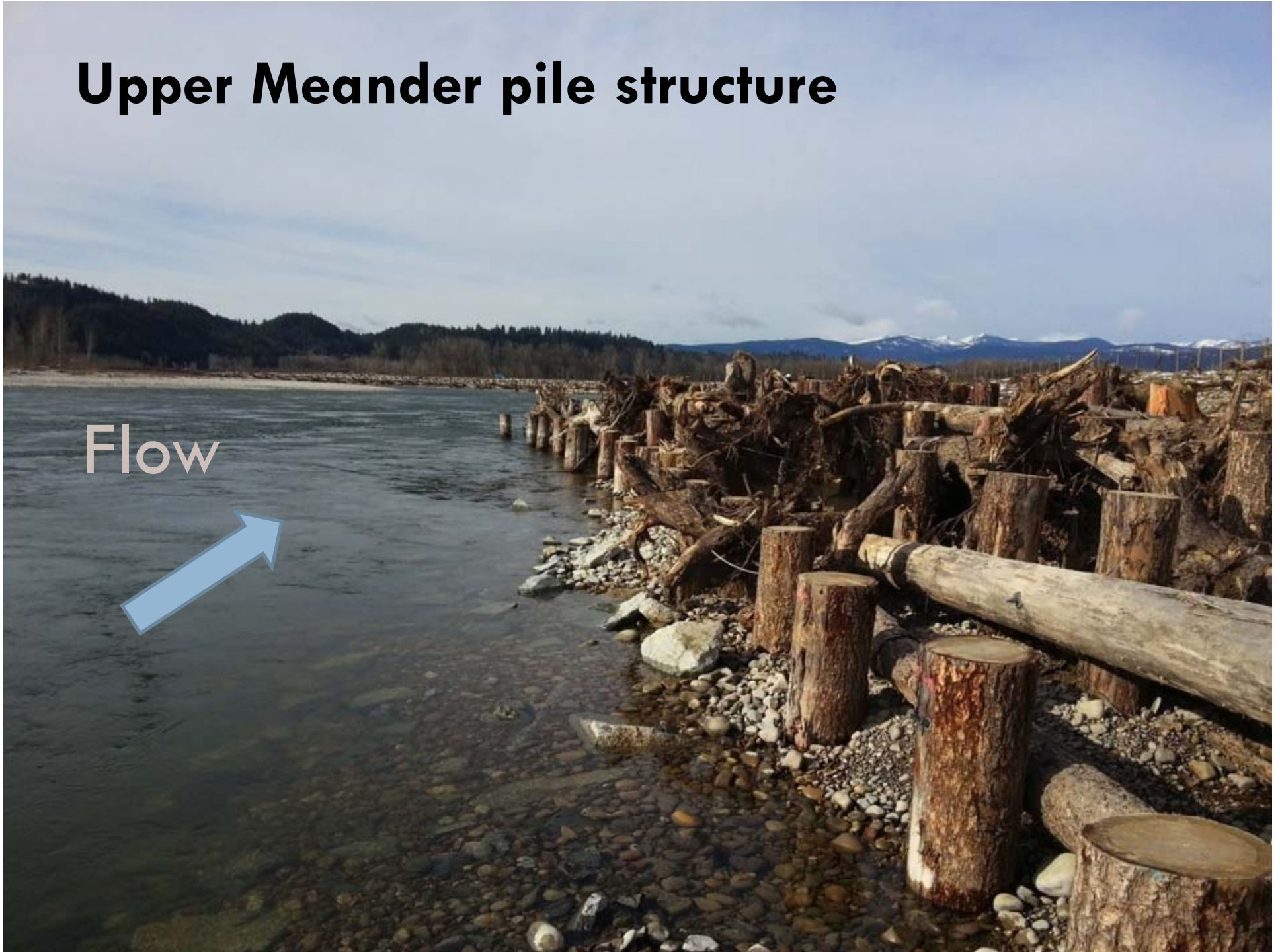






# Upper Meander pile structure

Flow







# Physical Monitoring Instrumentation



# 2013 Project Middle Meander pre-project condition

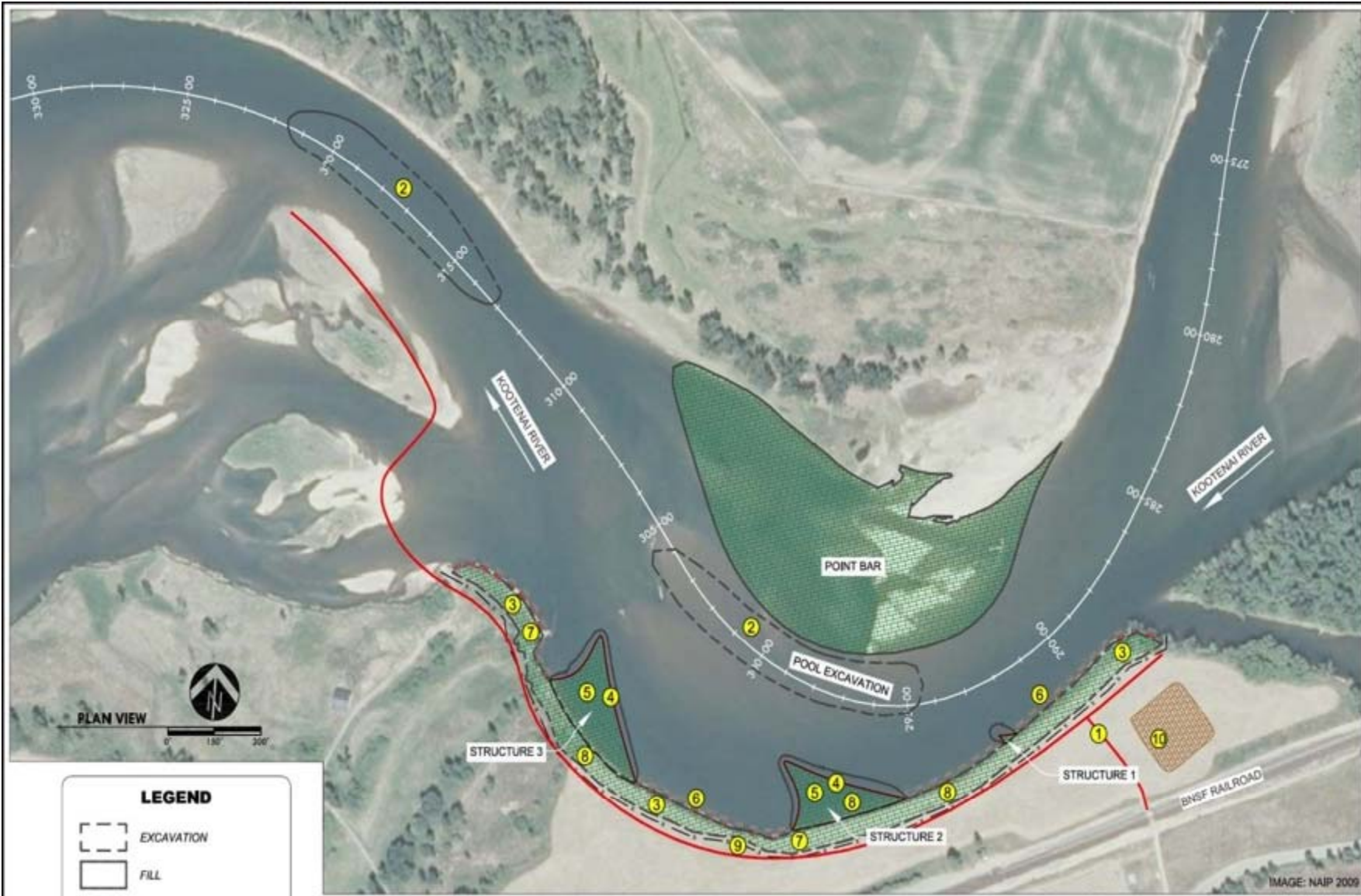




# 2013 Project Middle Meander pre-project condition







**LEGEND**

- EXCAVATION
- FILL
- FLOODPLAIN ROUGHNESS TREATMENT
- DESIGNATED STAGING AREA
- PLANTING AREA
- LARGE WOOD BANK STRUCTURE
- RIPARIAN EXCLOSURE FENCE

- CONSTRUCTION NOTES**
- 1 PROJECT SITE ACCESS, STAGING AND CONSTRUCTION SEQUENCING TO BE PERFORMED ACCORDING TO DRAWING 4.0.
  - 2 EXCAVATE POOL PER DRAWING 6.0 - 6.3.
  - 3 EXCAVATE AND GRADE RIVERBANK TO 4:1 SLOPE PER DRAWINGS 6.0 - 6.3.
  - 4 INSTALL PILES 3 FT OC PER PILE SCHEDULE AND PER DRAWINGS 8.2 - 8.5.
  - 5 BACKFILL INTERIOR OF PILES AND STRUCTURE WITH SALVAGED RIPRAP, LARGE LOGS AND EXCAVATED RIVERBANK MATERIAL PER DRAWINGS 8.2 - 8.5.
  - 6 CONSTRUCT LARGE WOOD BANK STRUCTURES PER DRAWING 8.0.
  - 7 ESTABLISH ROUGHNESS ON CONSTRUCTED SURFACES WITH MICROTOPOGRAPHY GRADING AND WOOD PLACEMENT PER DRAWING 8.1.
  - 8 INSTALL CONTAINERIZED PLANTS, SEED AND WEED MATS ON CONSTRUCTED SURFACES PER DRAWING 9.0, 9.1, 9.2.
  - 9 INSTALL RIPARIAN EXCLOSURE FENCE PER DRAWING 9.0.
  - 10 PROJECT SITE RECLAMATION TO BE PERFORMED ACCORDING TO DRAWING 10.0.



**Kootenai River Habitat Restoration Project**  
**Middle Meander Restoration Design**  
**Restoration Plan**

NO.	DATE	BY	DESCRIPTION	CHK
1	11/29/12	MM	30% Design	MD
2	03/04/13	MM	UPDATE FOR PERMITS	MD
3	04/16/13	MM	REVISIONS	MD

preliminary

-not for construction-

PROJECT NUMBER  
RDG-13-010

SHEET NUMBER  
**3.0**



# Middle Meander - Construction

**TMT approved lower flows during construction:**

- **Supported construction and pile driving of spur dikes**
- **Supported excavation of mega-pool and point bar enhancement**
- **Allowed for placement of large wood structures**
- **Allowed for construction to be completed in one season in a safe and cost effective manner.**







# MIDDLE MEANDER 2013



2014



# 2014 Substrate Enhancement Project

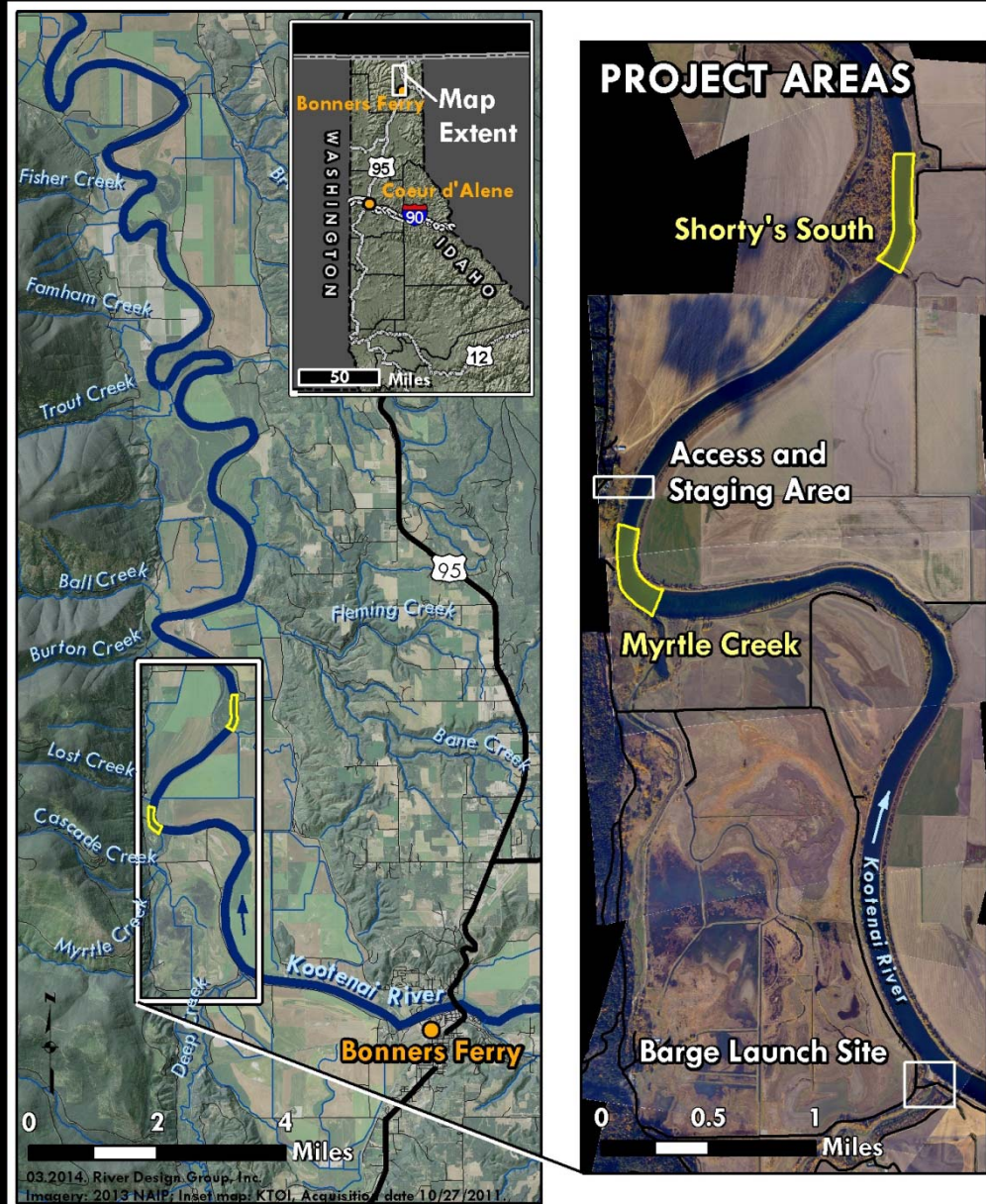
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- **Spawning Rock enhancement at 2 sites in Meander Reach - Shorty's & Myrtle Creek**
- Biological objective - to provide rocky substrate to support sturgeon spawning & early life stage survival
- **Worked with IDFG and others to identify & refine best location**
- Construction August to November 2014





# 2014 Substrate Enhancement Project



- Two sites, one-acre patch at each site
- Use barges for transporting & placing rock
- Use GPS & sonar to achieve accurate placement below water





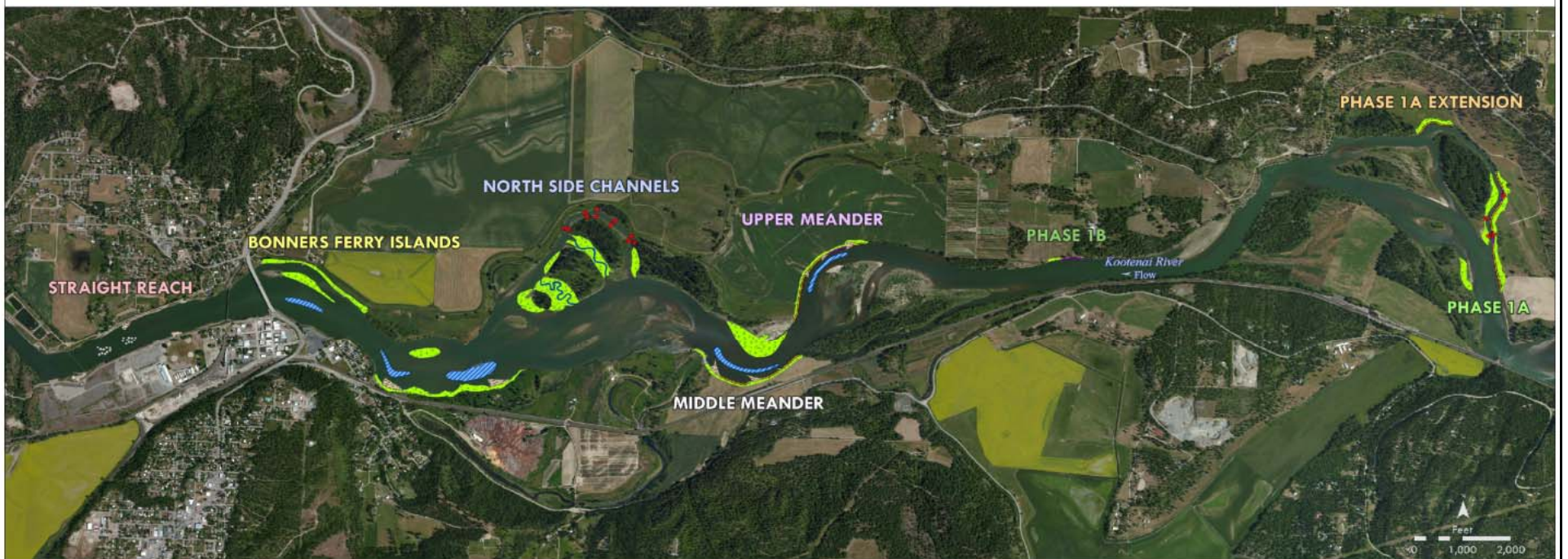
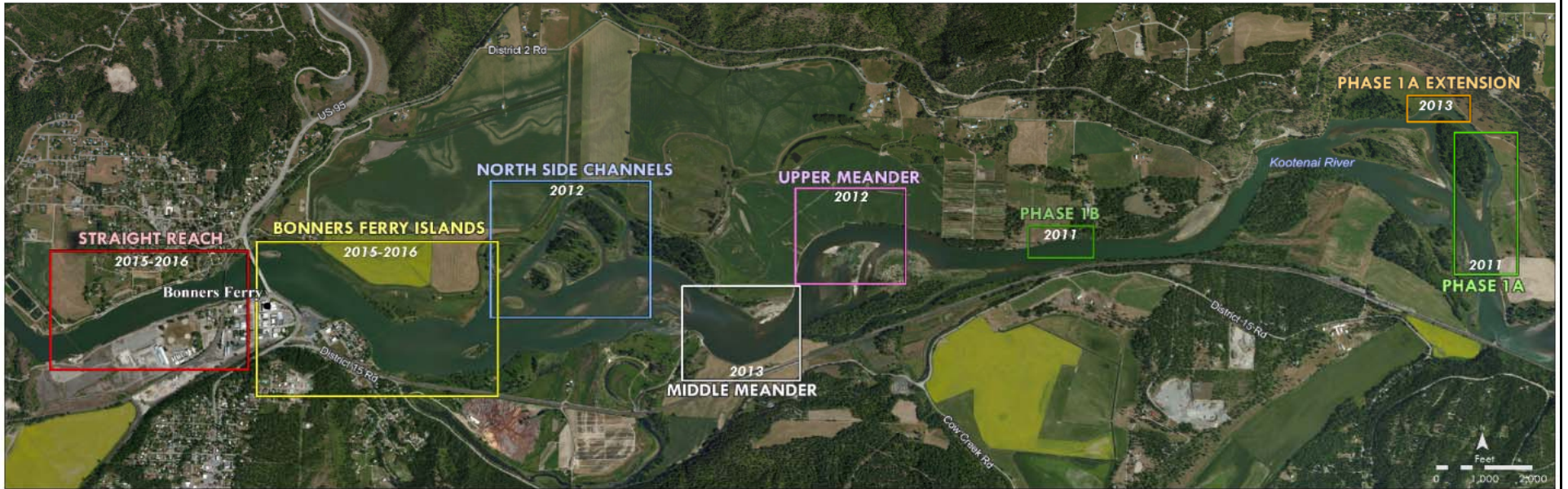












**Kootenai River Habitat Restoration Program**

*Completed and Proposed Projects: 2011 - 2016*

[www.restoringthekootenai.org](http://www.restoringthekootenai.org)

**Restoration Treatments**

- Floodplain grading and revegetation
- Floodplain surface enhancement
- Flow redirection structure

- Spawning substrate placement
- Side channel realignment
- Pool enhancement

- Large wood bank structure
- Vegetated soil lift
- Large wood habitat structure



# Bonners Ferry Islands Project



IMAGE: October 2011  
5,000 cfs





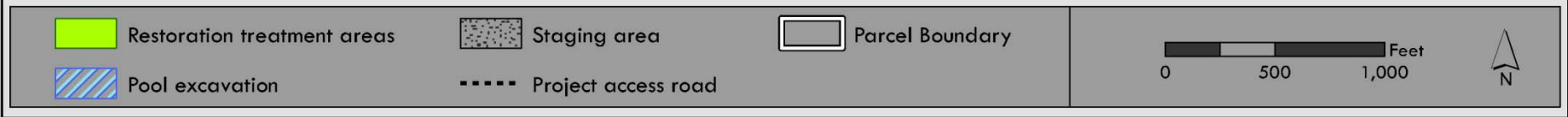
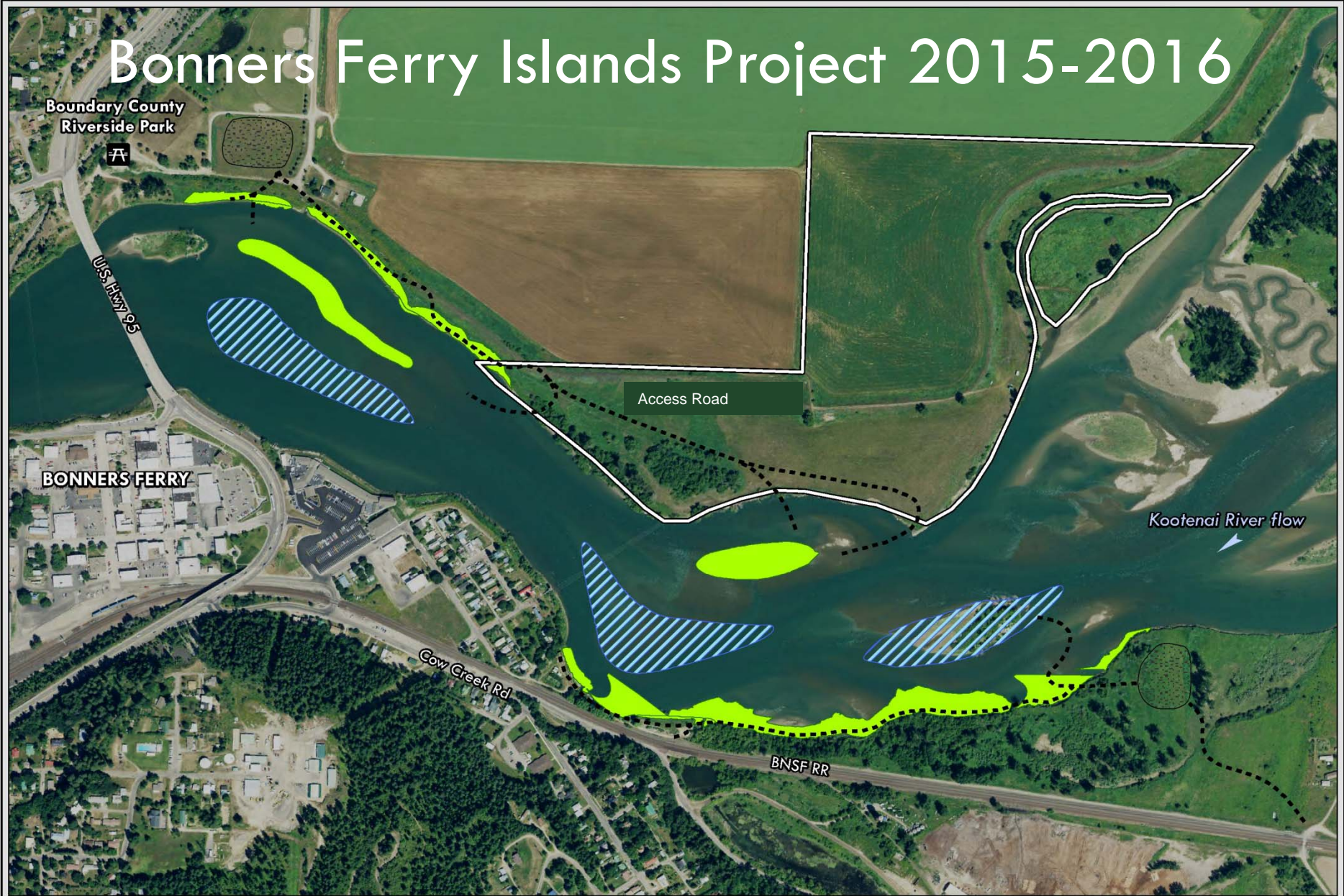
# Primary Biological Objectives

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- Increase the number of large deep pools to aid/encourage sturgeon to migrate upstream to higher quality spawning habitat
- Increase the area of vegetated floodplain surfaces that provide food web support
- Increase distribution and abundance of large deep pools to support burbot foraging and migration



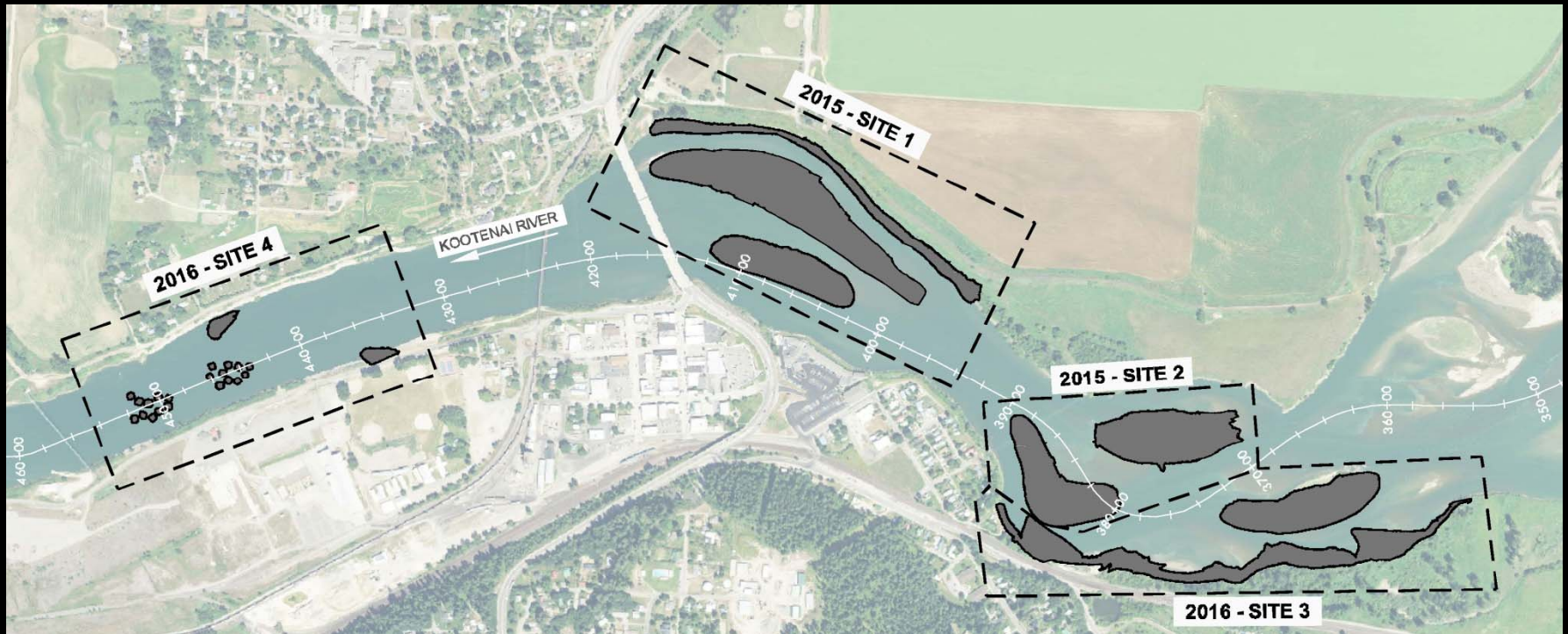
# Bonnerr's Ferry Islands Project 2015-2016





# Construction Phasing 2015-2016

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**TMT approval of lower flows for construction in 2015 will facilitate:**

- Excavation of 2 pools
- Construction of 2 islands
- Bank grading and placement of large wood structures
- Safe and cost effective construction within short work window

**SYSTEM OPERATIONAL REQUEST: 2015-XX**

**FROM:** Kootenai Tribe of Idaho; Sue Ireland, Fish and Wildlife Department Director

**DATE:** April XX, 2015

**SUBJECT:** September / October 2015 Libby Dam Outflow for Kootenai River Habitat Restoration Project, Bonners Ferry Island Project

**SPECIFICATIONS:**

Release 6,000 cfs or less from Libby Dam during September and October, 2015.

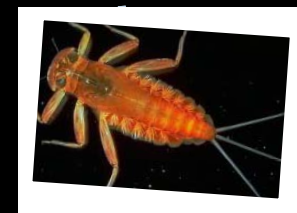
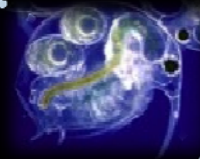
Provide gradually declining discharge to the target flow following ramping rate guidelines in the 2006 USFWS BiOp for bull trout and white sturgeon.

**JUSTIFICATION:**

Low flows in the Kootenai River in September and October are requested to allow the Kootenai Tribe of Idaho's contractor to implement in-water work associated with the Bonners Ferry Island Project during September and October, 2015. The project objectives include construction of two islands on existing mid-channel bars (increased elevation of 5-8 feet, ~18 total acres), excavation of three deep pools (20-30 feet deep, ~5 total acres), construction of two large and two smaller pool-forming structures, and bank grading and revegetation (~3,400 feet on south bank and ~2,500 feet on north bank). This project will be implemented over two construction seasons in 2015 and 2016. The 2015 work will include the island construction, excavation of two pools, and bank grading and revegetation on the north bank of the river.

The proposed operation will ensure Action Agency compliance with the USFWS Biological Opinion regarding the Effects of Libby Dam Operations on the Kootenai River White Sturgeon, Bull Trout, and Kootenai Sturgeon Critical Habitat (1901F0279R) as clarified (2008). Action 2.1 under RPA Component 2 (Management of Sturgeon Habitat) calls for Action Agency cooperation in implementing the Kootenai Tribe of Idaho's Kootenai River Restoration Project Master Plan.





The Kootenai Tribe acknowledges and thanks all the partners and friends that have been a part of making the restoration efforts a success!