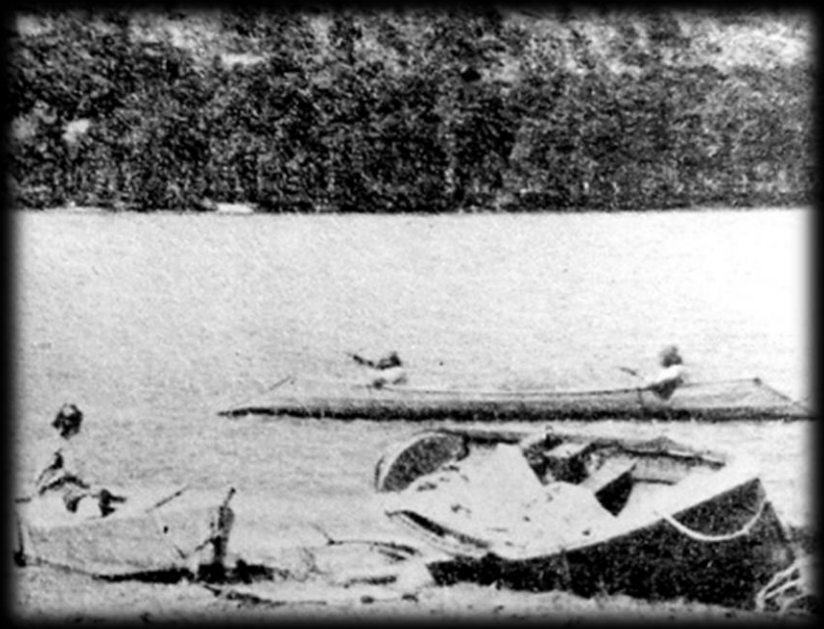
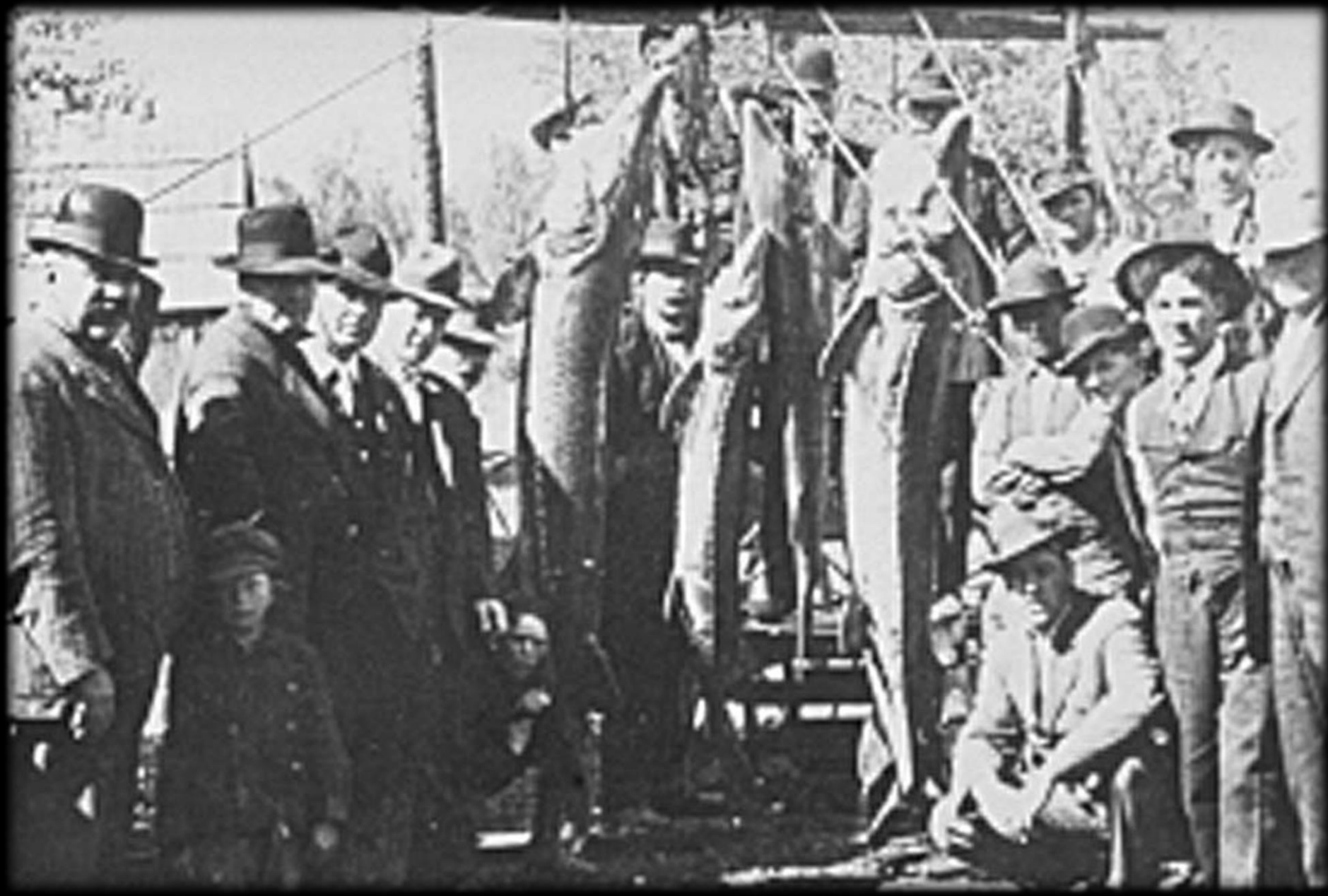
Kootenai River Habitat Restoration Program

Kootenai Tribe of Idaho - January 27, 2014

Presentation for Kootenai Valley Resource Initiative

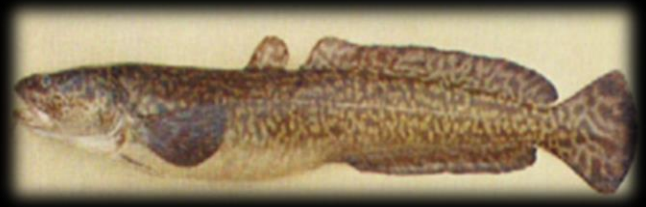




Decline of native species

Kootenai River
White Sturgeon
ENDANGERED

Burbot
PETITIONED



Bull trout
THREATENED

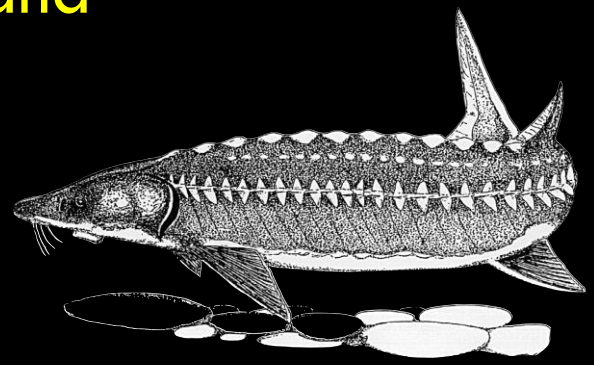
West Slope
Cutthroat
PETITIONED

South Arm Kokanee
FUNCTIONALLY EXTINCT

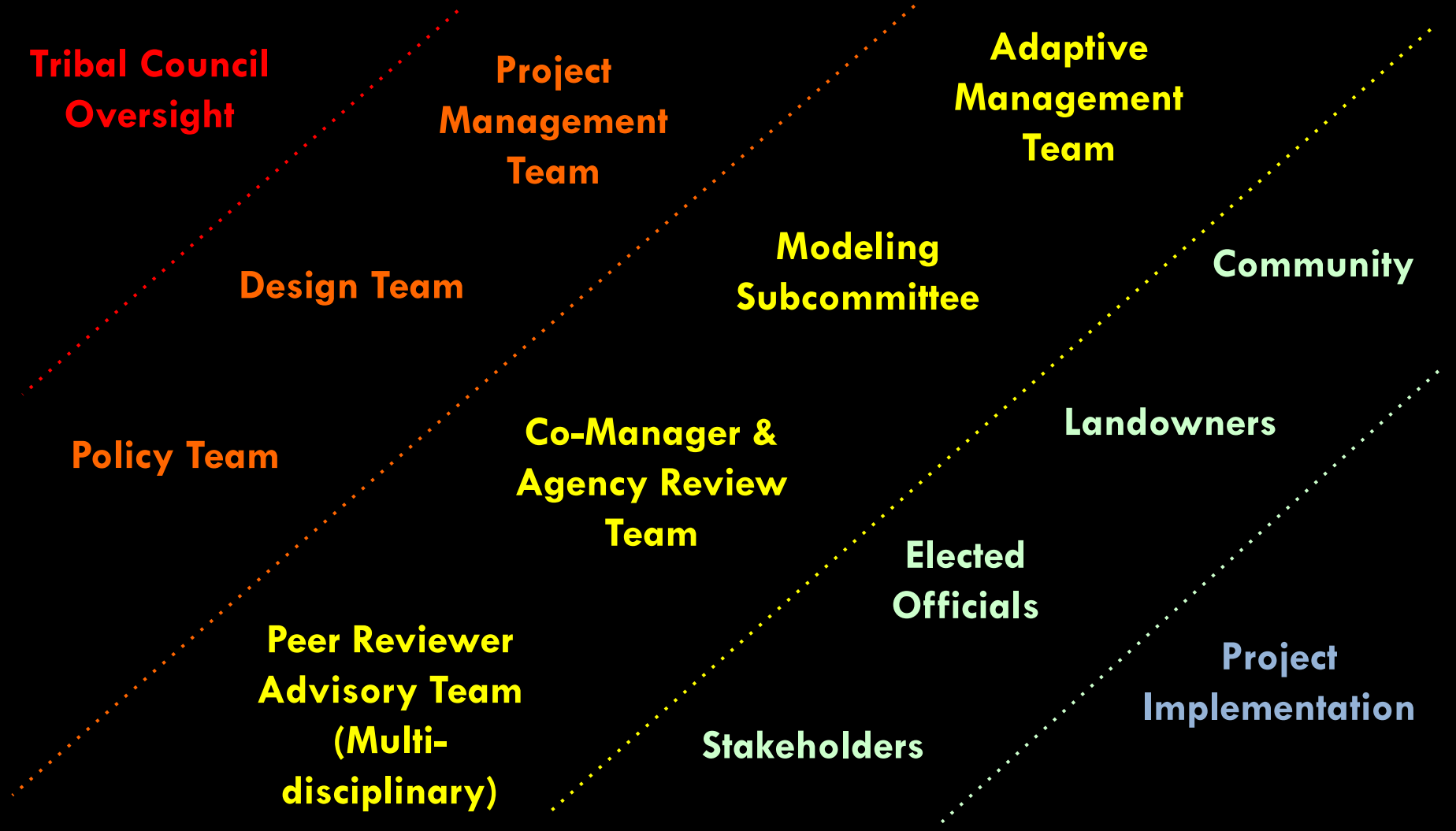
Columbia River Redband Trout

What is the Kootenai River Habitat Restoration Program?

- Program consisting of multiple Kootenai River habitat restoration projects
- Projects are designed to restore and enhance aquatic habitat conditions for Kootenai River white sturgeon (and other native fish too)
- Projects work together to restore habitat in ways that are consistent with current land uses and river operations
- Addresses Libby Dam BiOp RPA



Oversight, review & coordination
From concept to construction



2011-2013
Six KRHRP Projects on the Ground

Major Types of Treatments Implemented 2011-2013

1. ***Pool forming structures & pool creation or enhancement*** to encourage Kootenai sturgeon to migrate to upstream habitat & to provide holding habitat for sturgeon & other native fish

2. ***In river & bank structures*** to create more diverse & complex habitats for sturgeon & other native fish

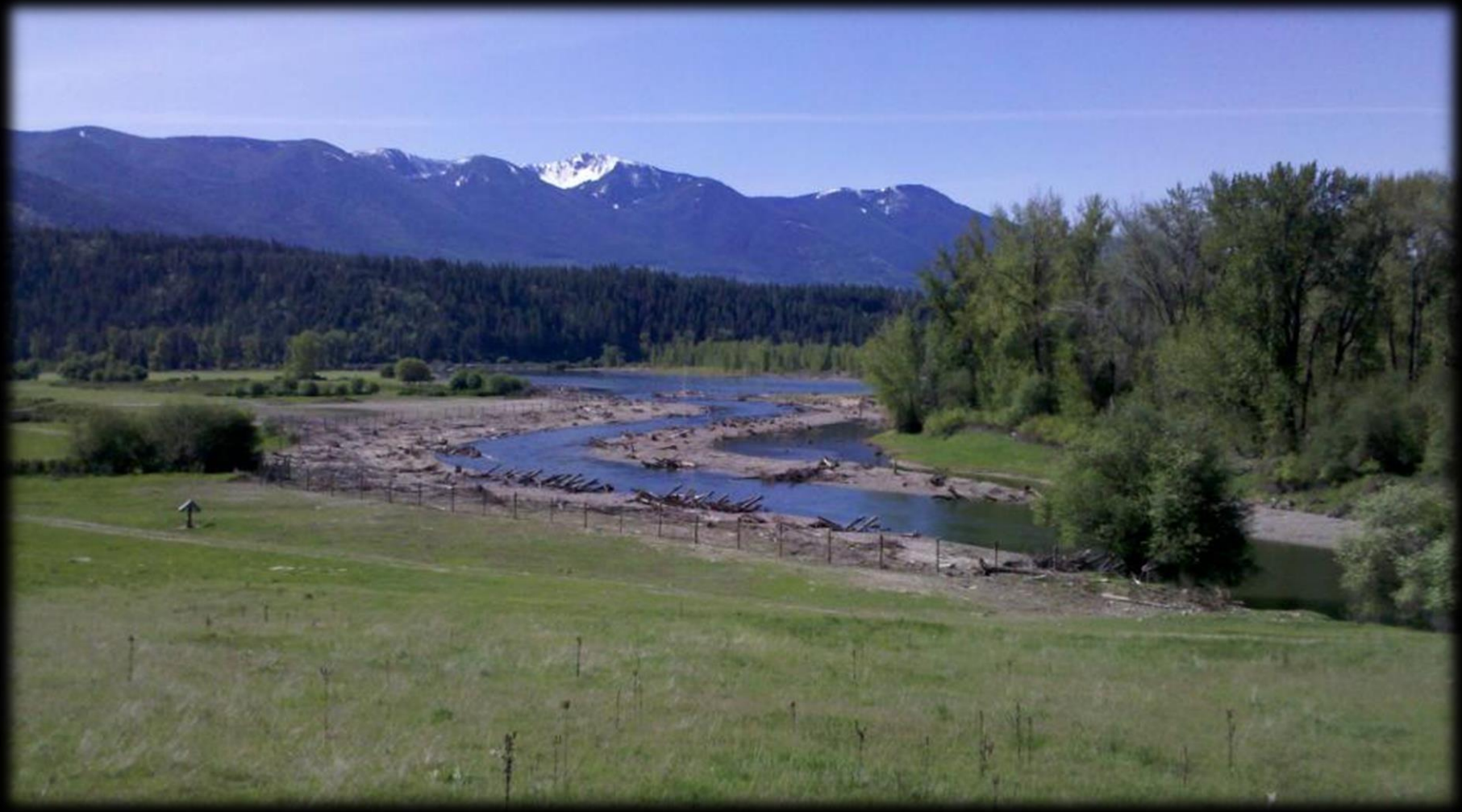
3. ***Side channel reconnection & floodplain creation or enhancement*** to enhance the food web & provide habitat for juvenile Kootenai sturgeon & other native fish

4. ***Riparian enhancement*** (& riparian buffer fencing) to enhance the food web & provide cover for native fish

2011 Project
Phase 1A Pre-project conditions

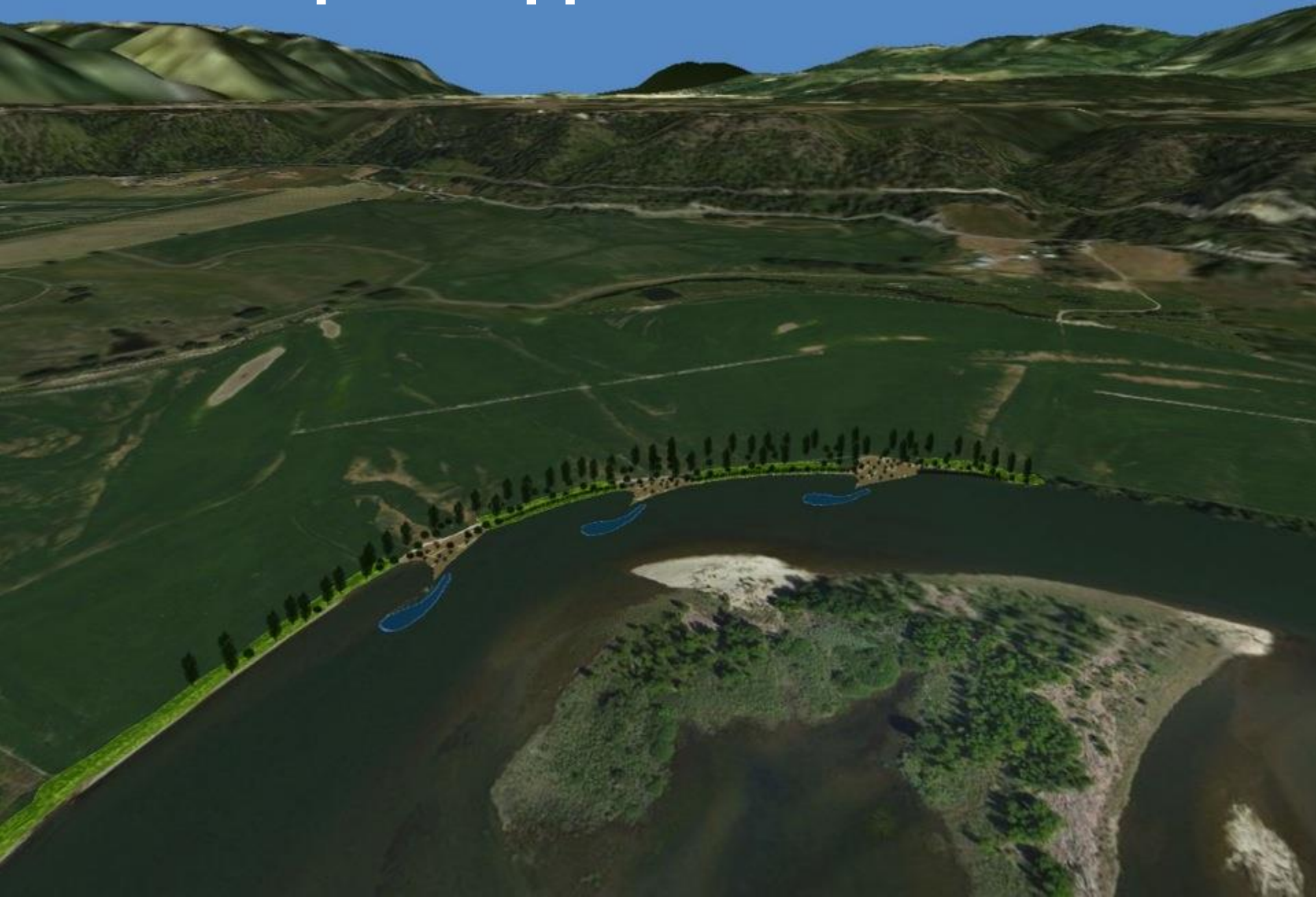

2011
1A Project during construction

1A Project Site after construction



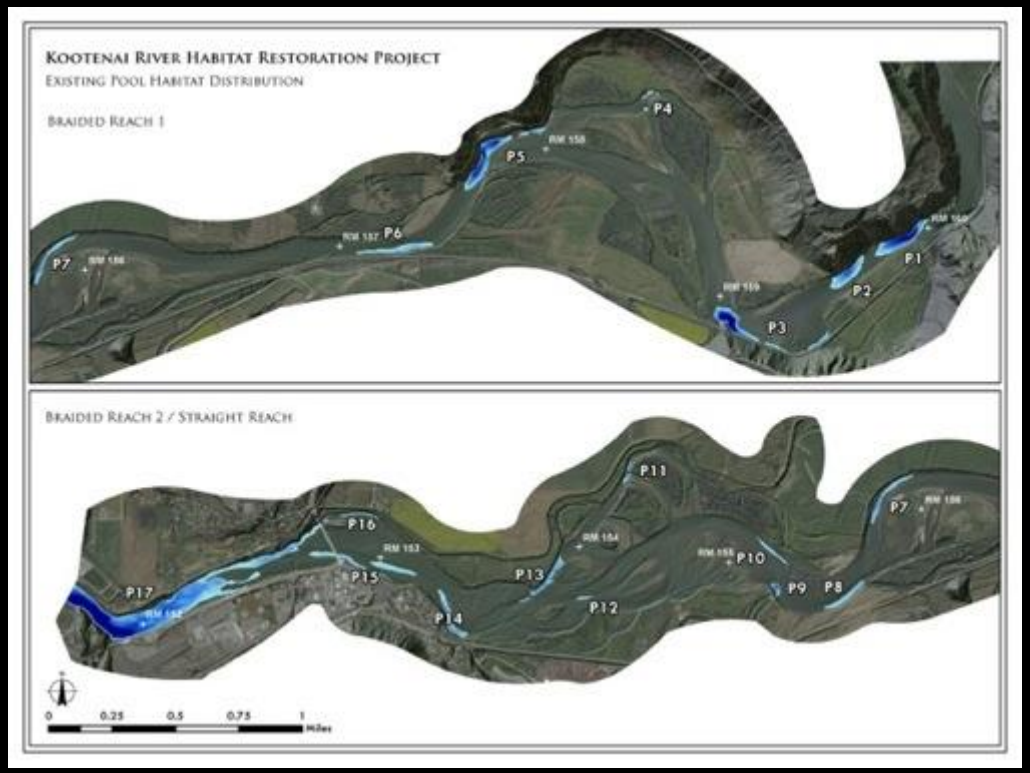
2012 Project
Upper Meander pre-project conditions

2012 Project – Upper Meander



A sturgeon “pool ladder”

- Upper Meander project plus other projects contribute to development of a “pool ladder” to encourage upstream sturgeon migration (and habitat for other native species)



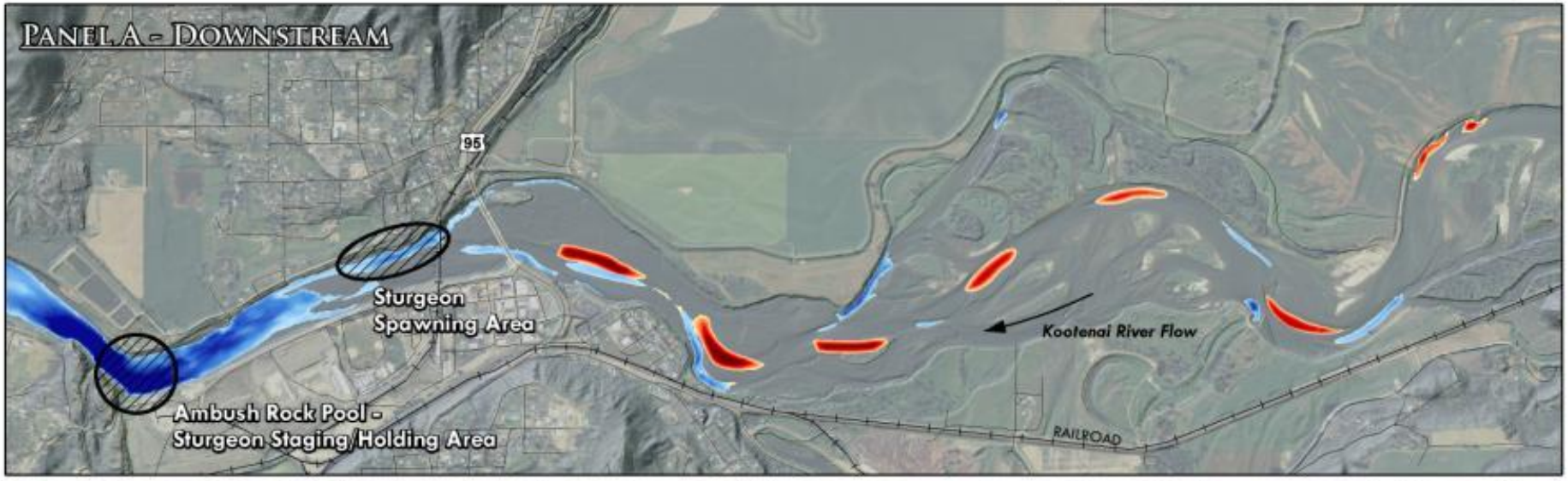
Kootenai River Habitat Restoration Program

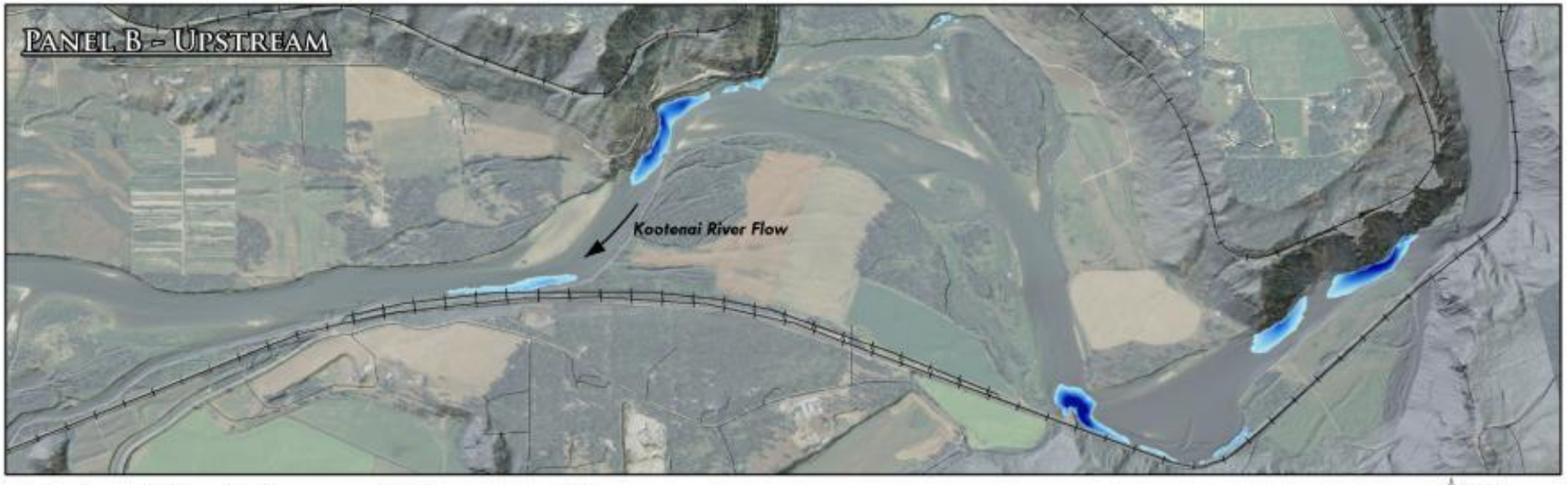
Pool Ladder Concept

Existing Pool

Proposed/
Constructed Pool

Map Panel Index





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

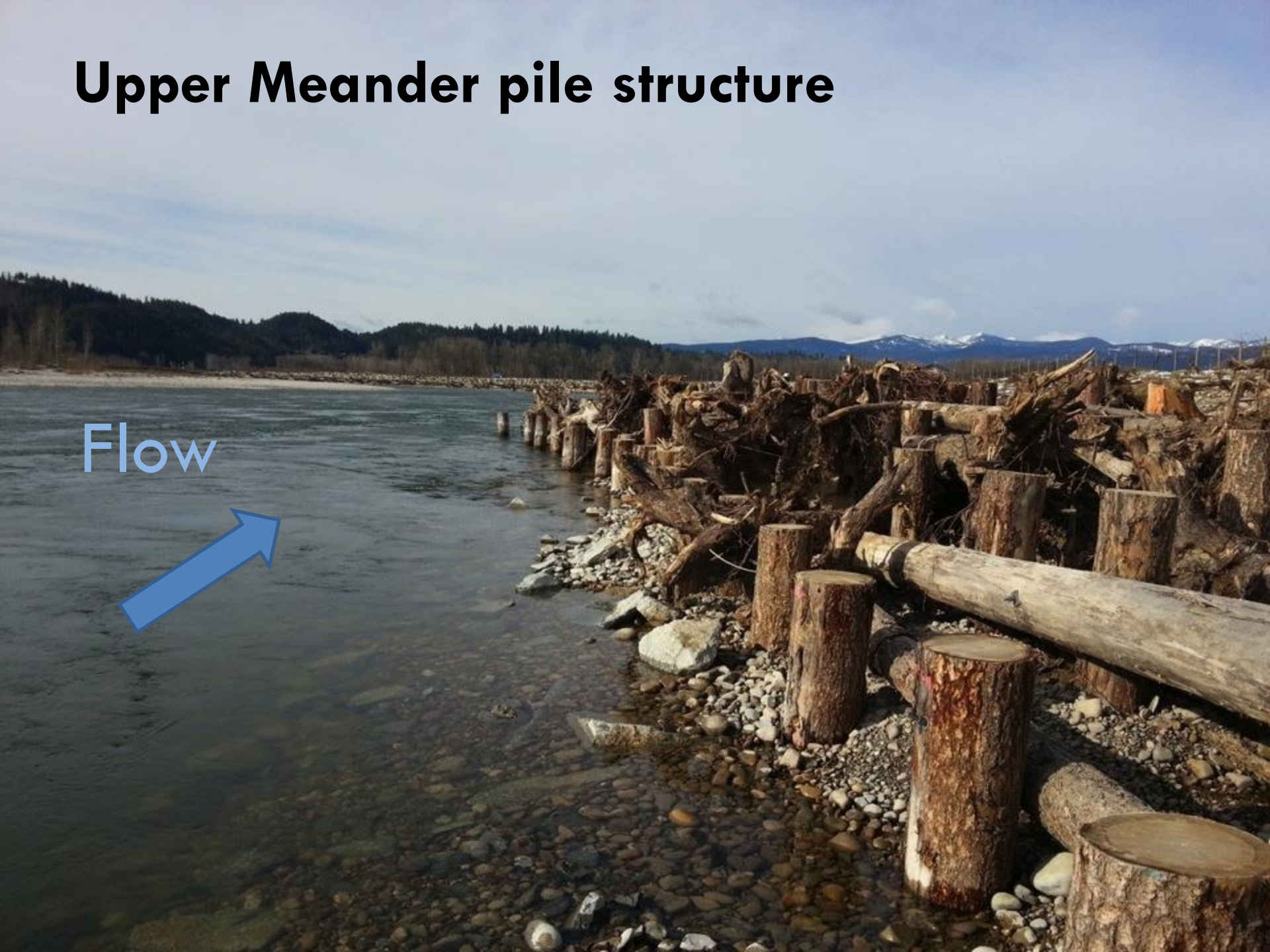
1 Mile

River Design Group, Inc.

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

2012 Project
Upper Meander construction

Upper Meander pile structure



Physical Monitoring Instrumentation


2012 Project
North Side Channels
pre-project conditions

2012 Project
North Side Channel during construction


2012 Construction
North Side Channels

2013 Project
Middle Meander pre-project condition

2013 Project
Middle Meander pre-project condition


Middle Meander
Construction of “Mega Pool”

Middle Meander - Construction

Middle Meander - Construction

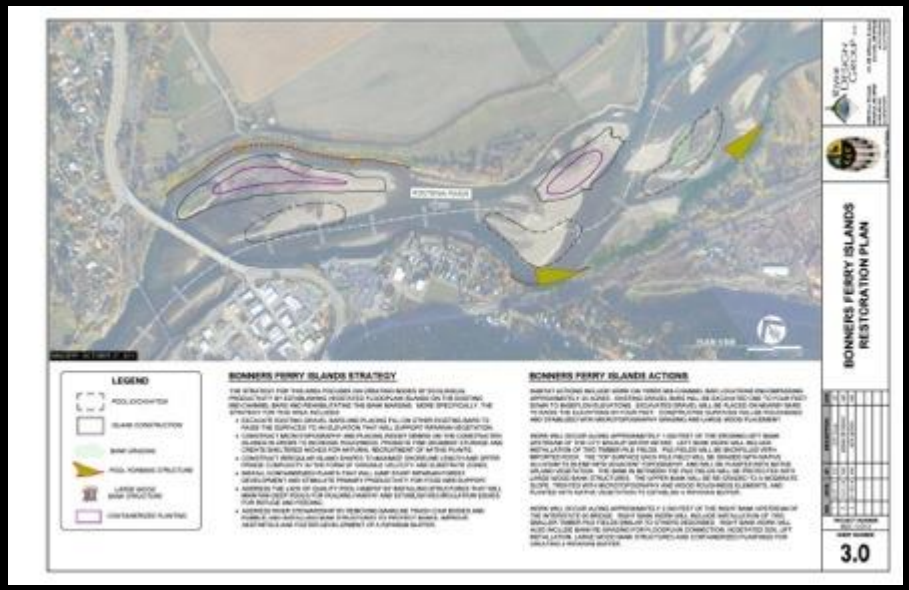
Middle Meander – December 2013

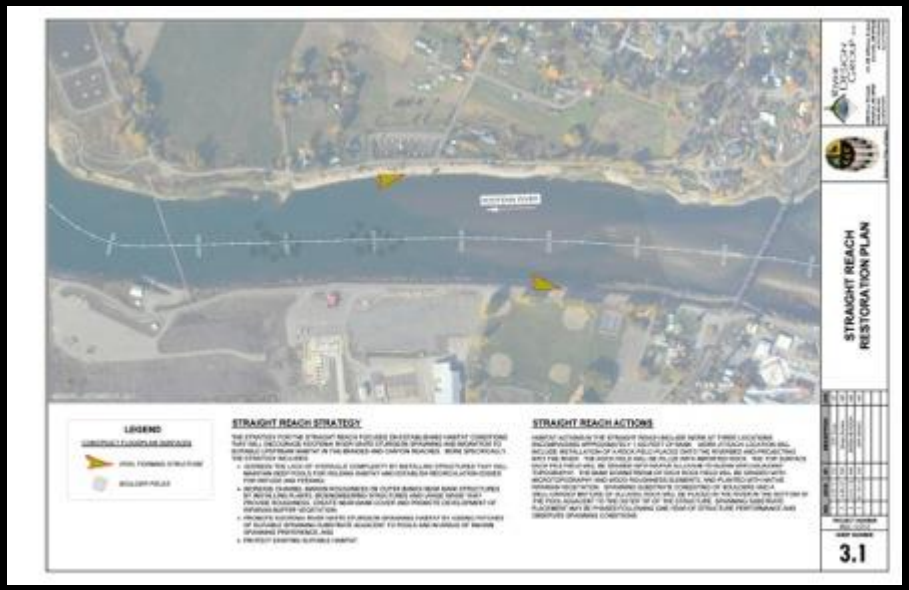
2014 KRHRP Project

- 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

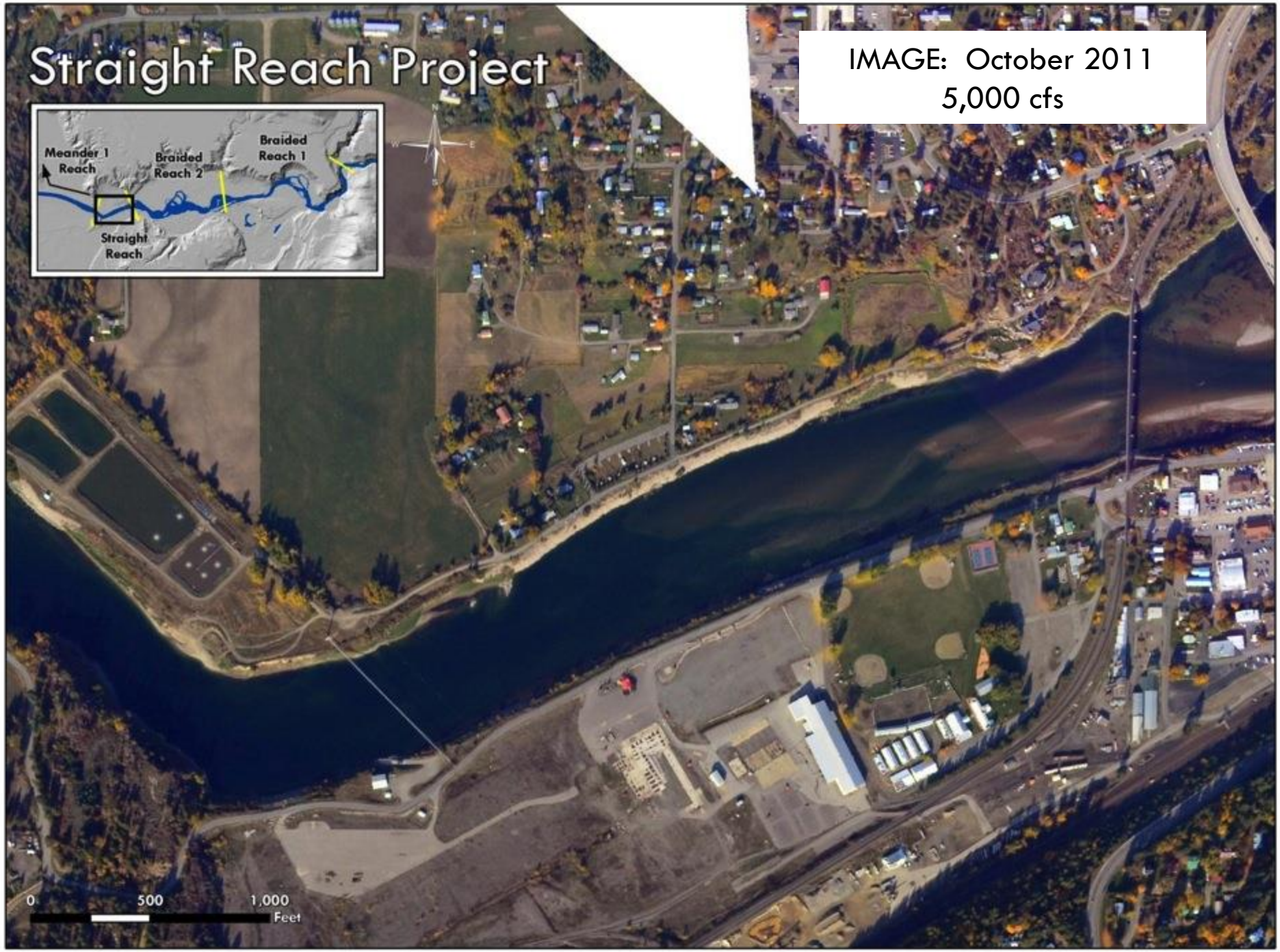
2015 & 2016 Projects

- Bonners Ferry Islands & Straight Reach projects
- Will be staged over 2 years (pending approval through environmental compliance & permitting processes)
- Bonneville Power Administration holding EA scoping meeting February 26, 2014






Bonners Ferry Islands Project
Meander 1 Reach
Braided Reach 2
Braided Reach 1
Straight Reach
Bonners Ferry Islands
IMAGE: October 2011
5,000 cfs
0
500
1,000
Feet

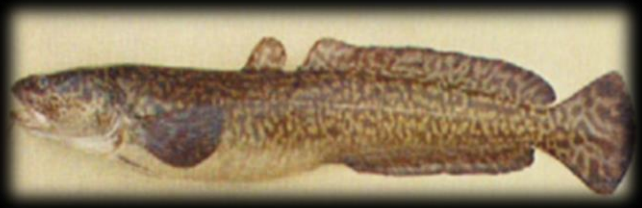

Straight Reach Project
IMAGE: October 2011
5,000 cfs
Meander 1 Reach
Braided Reach 2
Braided Reach 1
Straight Reach
0
500
1,000
Feet

Primary Biological Objectives

- 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

- Add ***rocky substrate*** to support Kootenai sturgeon egg attachment & early life stage survival (Straight Reach)



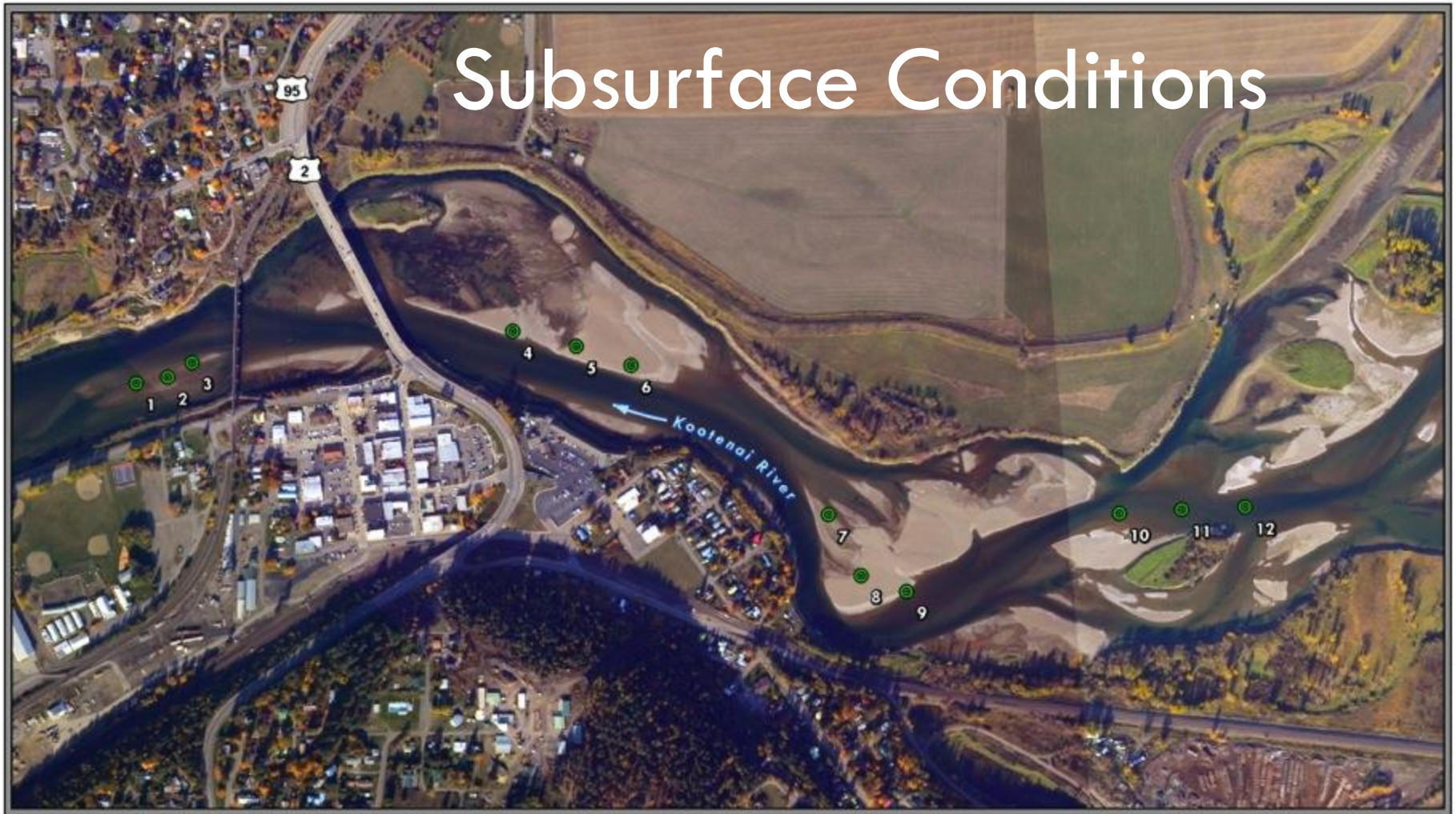
- Many additional biological benefits to other species including burbot & salmonids

Assessing & Addressing Technical Risk

Design performance summary identifying the ability of design scenarios to manage technical risk

Risk Element	Potential Consequence	Risk Mitigation Strategy	Risk Assessment Method	Design Performance
Flood Risk	Project increases flood elevations causing damage to structures	Coordinate with USACE water managers for model inputs and risk tolerances	Hydraulic Modeling: Evaluate project effects based on the CRT model used by USACE for assessing Libby Dam management scenarios.	Slight increase in water surface elevations from project. Refine design to comply with regulations
Sediment transport	Project causes deposition or scour resulting in channel instability	Coordinate with Modeling Subgroup and PRAT advisors to establish modeling scenarios and review results	Evaluate morphologic changes using 2D bed evolution model	Slow morphological changes. Test threshold scenarios. To be confirmed with bed evolution model for refined design
Bank erosion	Project increases bank erosion	Design bank treatments to withstand anticipated range of hydraulics	Evaluate project effects using 2D hydraulic model	Bank conditions improved on restored banks. Bank conditions maintained on non-restored banks.
Utilities and infrastructure	Project alters hydraulic conditions at utilities or infrastructure	Coordinate with owners to review risks and mitigation strategies	Evaluate project effects using models described above	Results demonstrate insignificant change to bridge hydraulics.

Subsurface Conditions



Boring ID	Bed Elevation (ft)	Desired Boring Elevation (ft)	Desired Boring Depth (ft)	Water Depth at 10,000 cfs (ft)	Latitude	Longitude
1	1747.80	1730	17.80	1.39	48.698044	-116.31807
2	1747.65	1730	17.65	1.66	48.698125	-116.31734
3	1748.45	1730	18.45	1.09	48.69835	-116.31679
4	1750.48	1730	20.48	0.36	48.698779	-116.30944
5	1751.98	1730	21.98	0.00	48.698542	-116.30799
6	1751.70	1730	21.70	0.00	48.698244	-116.30673
7	1750.71	1730	20.71	1.04	48.695958	-116.30225
8	1753.65	1730	23.65	0.00	48.695025	-116.30151
9	1750.84	1730	20.84	1.48	48.694781	-116.30047
10	1750.85	1730	20.85	2.95	48.695932	-116.29559
11	1748.69	1730	18.69	5.32	48.695977	-116.29416
12	1747.91	1730	17.91	6.24	48.69601	-116.2927

Kootenai River Habitat Restoration Project

Bonners Ferry Islands Boring Locations

River Design Group, Inc.

0 500 1,000 2,000 Feet

N W E S

1:9,000
1 inch = 750 feet

08.21.2013
Imagery: Kootenai Tribe of Idaho
Acquisition date: October 27, 2011.

Kootenai River Habitat Restoration Project

Straight Reach

Existing Condition, 31,780 cfs (06.03.2010)

Bottom Velocity (fps) - at 0.5 meters above bed

0-2.5 | 2.5 - 2.6 | 2.61 - 2.7 | 2.71 - 2.8 | 2.81 - 2.9 | 2.91 - 3 | 3.01 - 3.1 | 3.11 - 3.2 | 3.21 - 3.3 | 3.31 - 3.4 | 3.41 - 3.5 | 3.5 - 8.3

Riverbed Geology

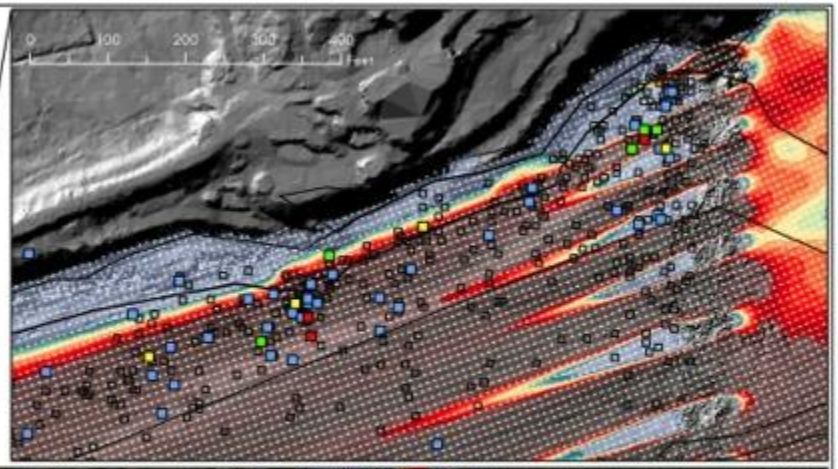
- Fine - Very Coarse — Generally fine to coarse gravel
- Very Fine - Coarse — Generally fine to medium gravel
- Embedded — 65-100% embedded

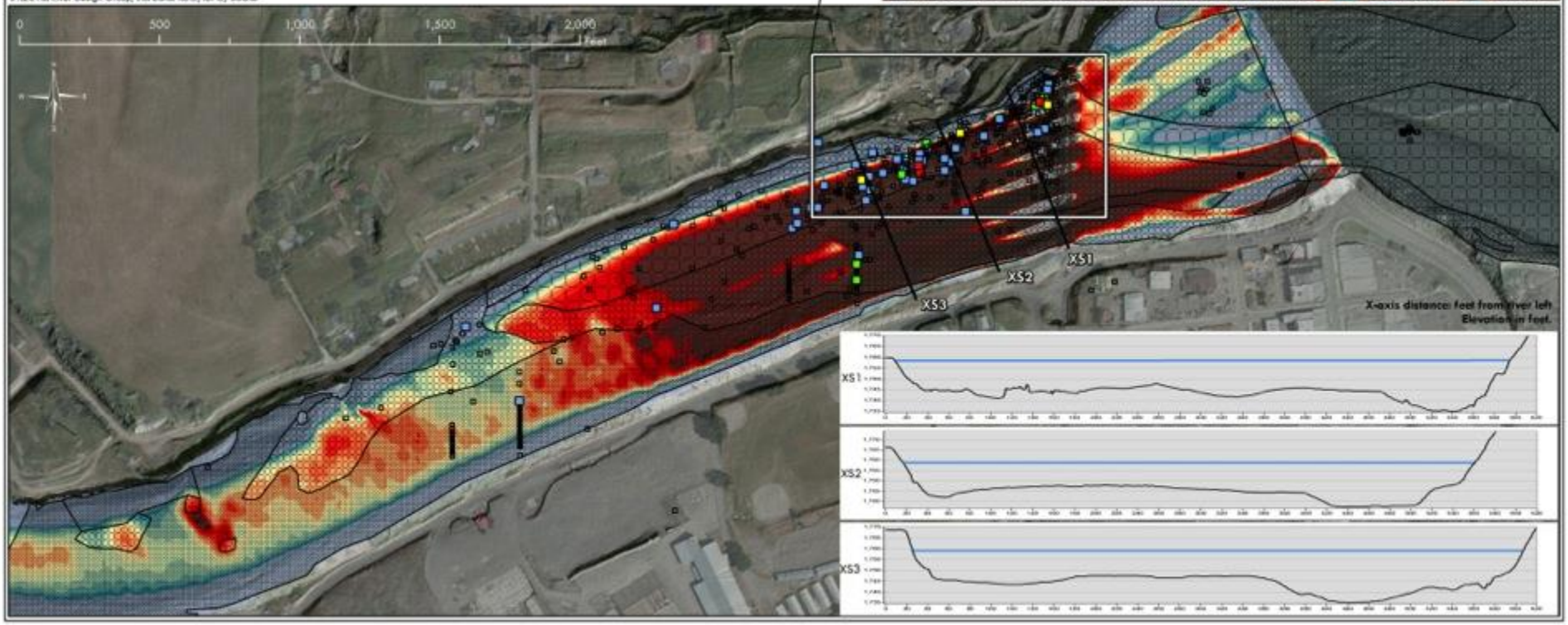
Retrieved Egg Mat Location

Number of Eggs Found (2007-2013)

- 0 (not colored)
- 1-5
- 6-10
- 11-15
- 16-31

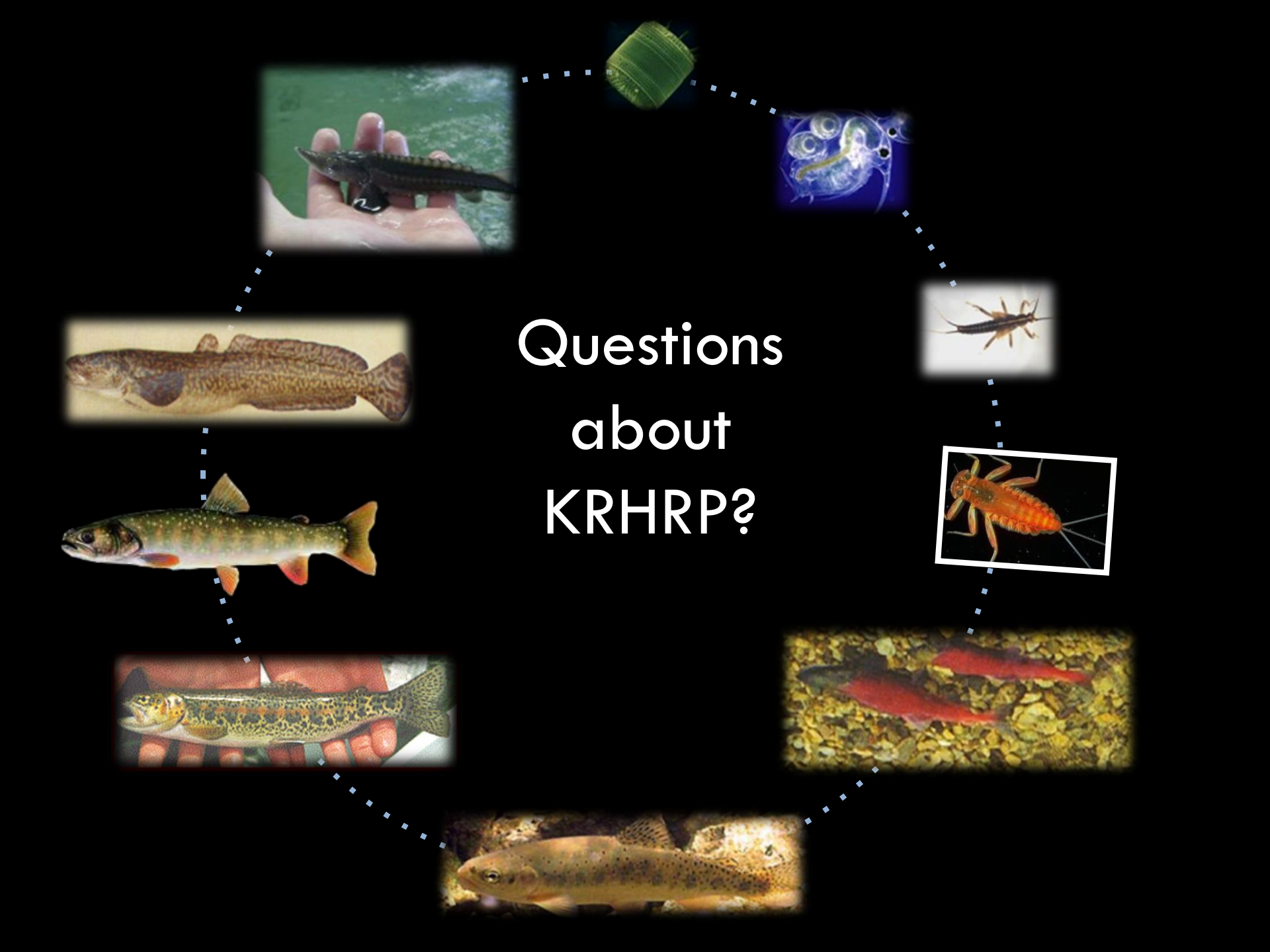
River Design Group, Inc. | USGS





Next Steps Bonners Ferry Islands & Straight Reach Projects

- Continued coordination with landowners, infrastructure owners, City, County, community, BNSF, IDT, UP, etc.
- Continued flood risk coordination and compliance
- Support BPA in completion of EA
- Additional modeling and feasibility analysis to refine designs
- Complete final designs
- Staged implementation 2015 & 2016


Questions
about
KRHRP?

Kootenai River Native Fish Conservation Aquaculture Program - Construction Update

Kootenai Tribe of Idaho - January 27, 2014

Presentation for Kootenai Valley Resource Initiative

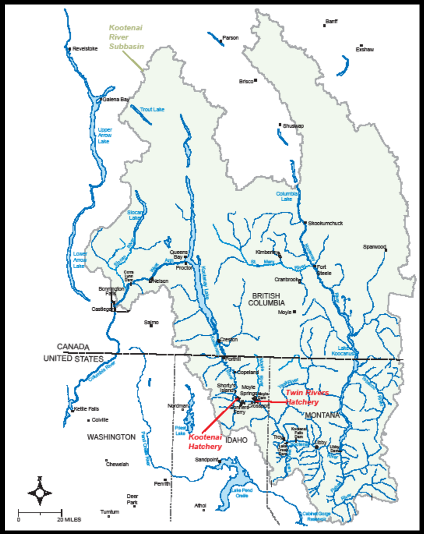
Kootenai River Native Fish Conservation Aquaculture Program

- Includes Kootenai River white sturgeon & burbot aquaculture at the Tribal Facility & new Twin Rivers facility
- KVRI Burbot Subcommittee and Burbot Conservation Strategy

Kootenai River Native Fish Conservation Aquaculture Program

- Kootenai Tribe completed the Northwest Power & Conservation Council's Three Step planning process for new & expanded hatchery projects in March 2013
- BPA issued the environmental assessment (EA) & finding of no significant impact (FONSI) May 15, 2013

- Kootenai Tribe & BPA signed a Memorandum of Understanding for the Hatchery Program in May 28, 2013
- Two general construction contractors selected (Goodfellow Brothers and BF Builders) & construction began June 1, 2013
- Completion scheduled for fall 2014

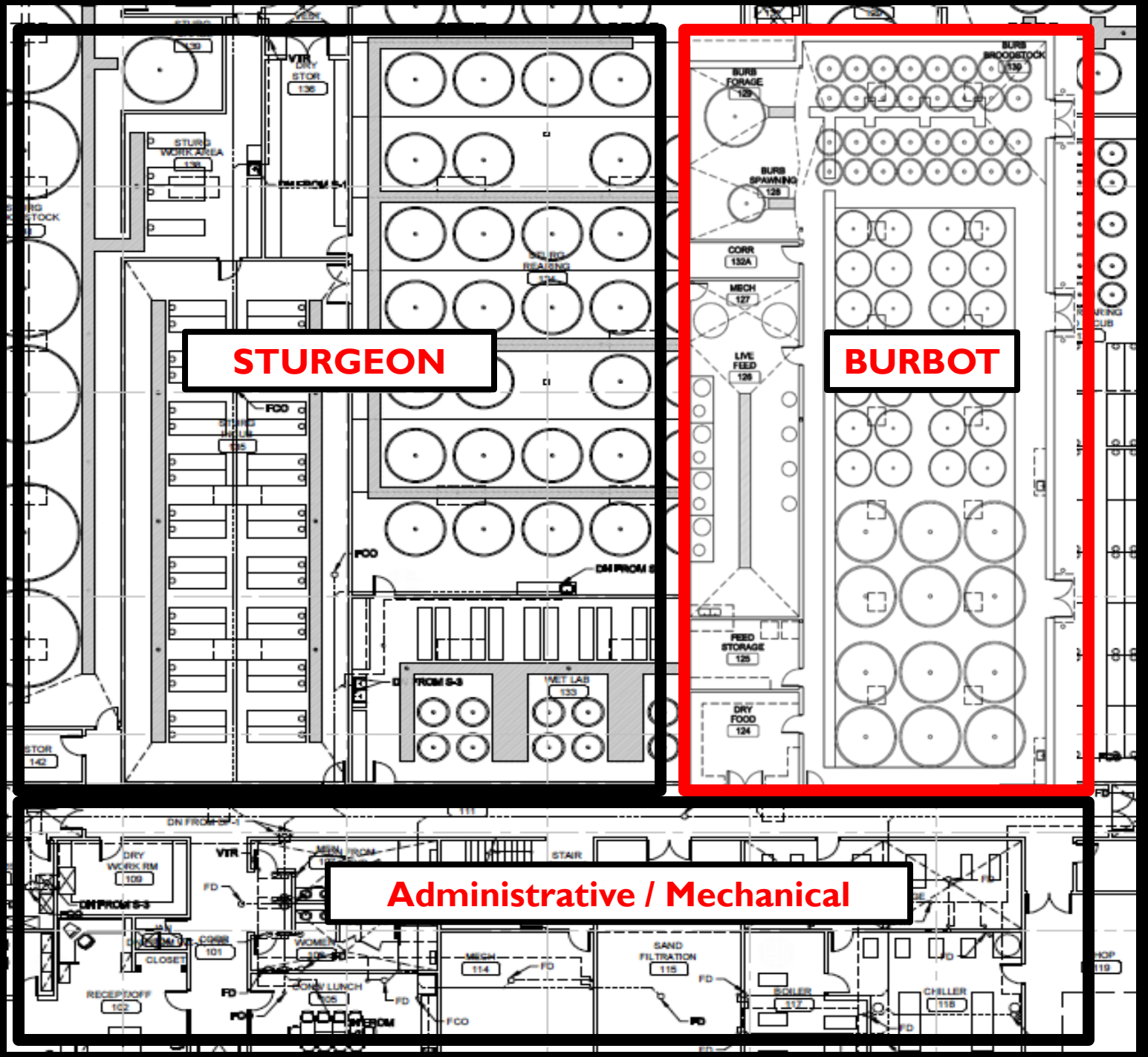


CANADA
UNITED STATES
BRITISH COLUMBIA
WASHINGTON
IDAHO
MONTANA

Kootenai National Wildlife Refuge
Kootenai White Sturgeon Hatchery
Moyie Springs
Twin Rivers Hatchery
Kootenay River
Crossport
Bonners Ferry
Railroad
Kaniksu National Forest
2
2
2
N

Twin Rivers Hatchery Site

Twin Rivers Hatchery


STURGEON
BURBOT
Administrative / Mechanical
BURB BROODSTOCK 130
BURB FORAGE 129
BURB SPAWNING 128
CORR 132A
MECH 127
LIVE FEED 126
FEED STORAGE 125
DRY FOOD 124
STURG WORK AREA 138
DRY STOR 136
STURG REARING 134
STURG HOLDING 135
WET LAB 133
STOR 142
DRY WORK RM 109
VTR
STAIR
CORR 101
CLOSET
RECEPT/OFF 102
WOMEN 106
MECH 114
SAND FILTRATION 115
BOILER 117
CHILLER 118
SHOP 119


08 22 2013


09 26 2013


11 07 2013


01 02 2014

Trench for electrical – August 2013


09 05 2013

Kootenai Intake – October 2013

Kootenai Intake Trenching – Oct 2013

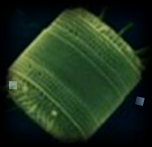
Kootenai Intake Trenching – Oct 2013

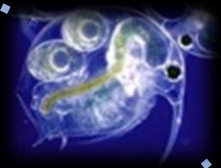
Kootenai Intake Screens– Oct 2013

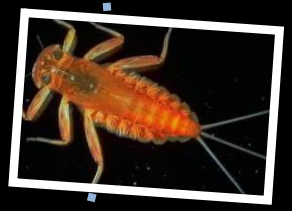
Kootenai Intake Piping – Dec 2013

Moyie Pump Station –Dec 2013

Moyie Water Intake – Dec 2013







Questions about the Hatchery?

The Kootenai Tribe wishes to thank the many partners and friends who helped with planning, coordination, design, permitting, funding and construction of the KRHRP projects and the Hatchery Upgrades and Construction.

The Tribe also wishes to thank the individual landowners who made it possible to access the project sites and who allowed work to occur on their properties or helped provide materials.

And KVRI and the community of Bonners Ferry!

Without all of you – none of this would have been possible.

Thank you all ! ! !

Burbot MOU Expires in 2015