



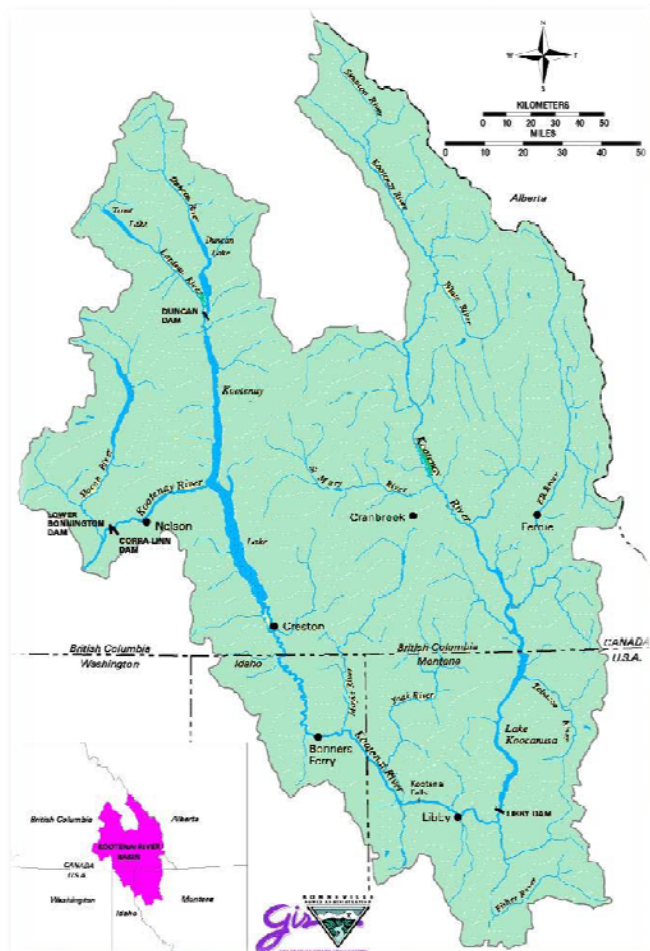
Kootenai River Native Fish Conservation Aquaculture Master Plan

Prepared by Kootenai Tribe of Idaho

Funded by Bonneville Power Administration through Northwest Power and Conservation Council's Fish and Wildlife Program

Kootenai River Subbasin

- 9 million acres
- 2 Countries
- 2 States, 1 Province
- Multiple jurisdictions
- Multiple endangered species



The past: Kootenai River watershed

- Prior to European settlement the Kootenai River watershed, with its riparian forest and wetland complexes, was one of the most productive in Pacific Northwest

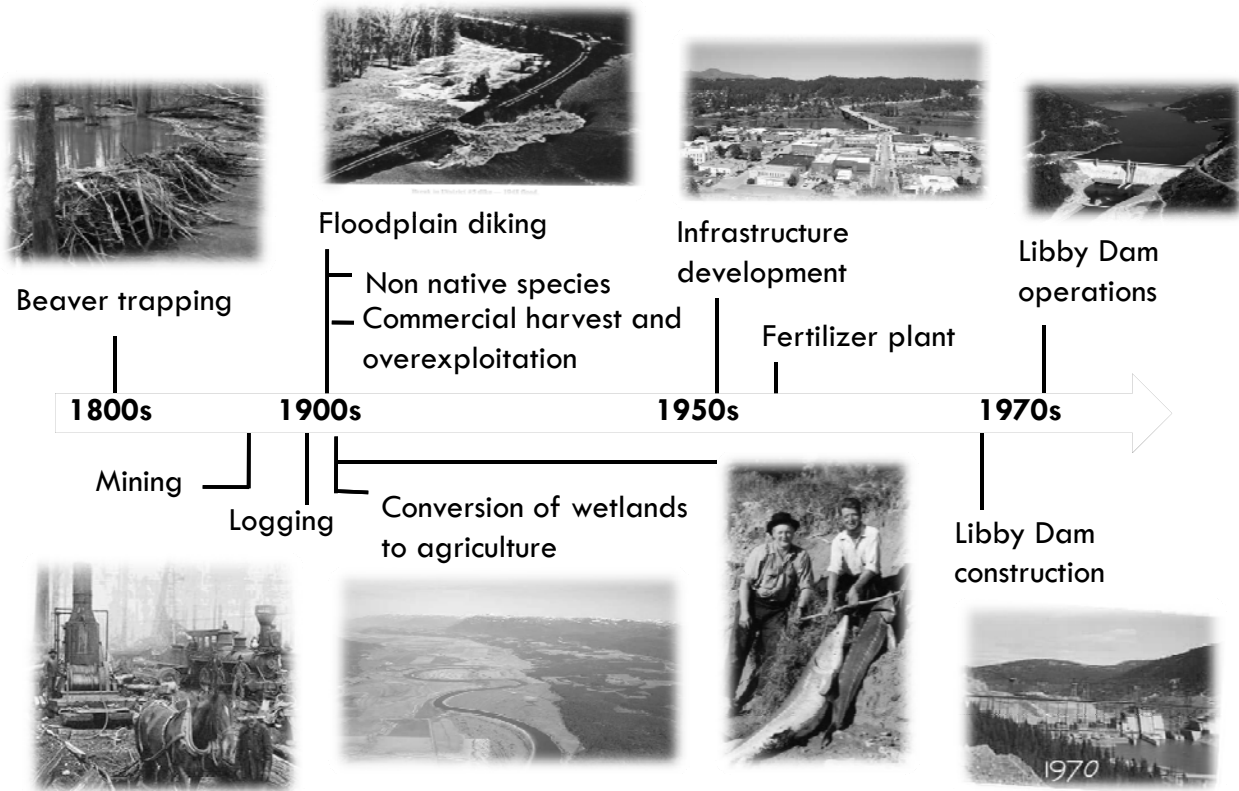


The past: Kootenai Tribe



WĪKŪWĪTĪTĪTĪ AND HIS WIFE
Mr. & Mrs. Artemesia Iron Paddle
He was the oldest member of
the Western Tribe of Idaho
to receive an allotment.
By 1890 he was 103 years old.

The past: anthropogenic impacts

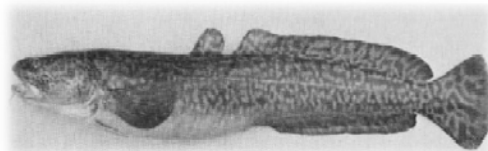


The present

**Kootenai River
white Sturgeon
ENDANGERED**



**Burbot
PETITIONED**



**West Slope
Cutthroat
PETITIONED**



**Bull trout
THREATENED**



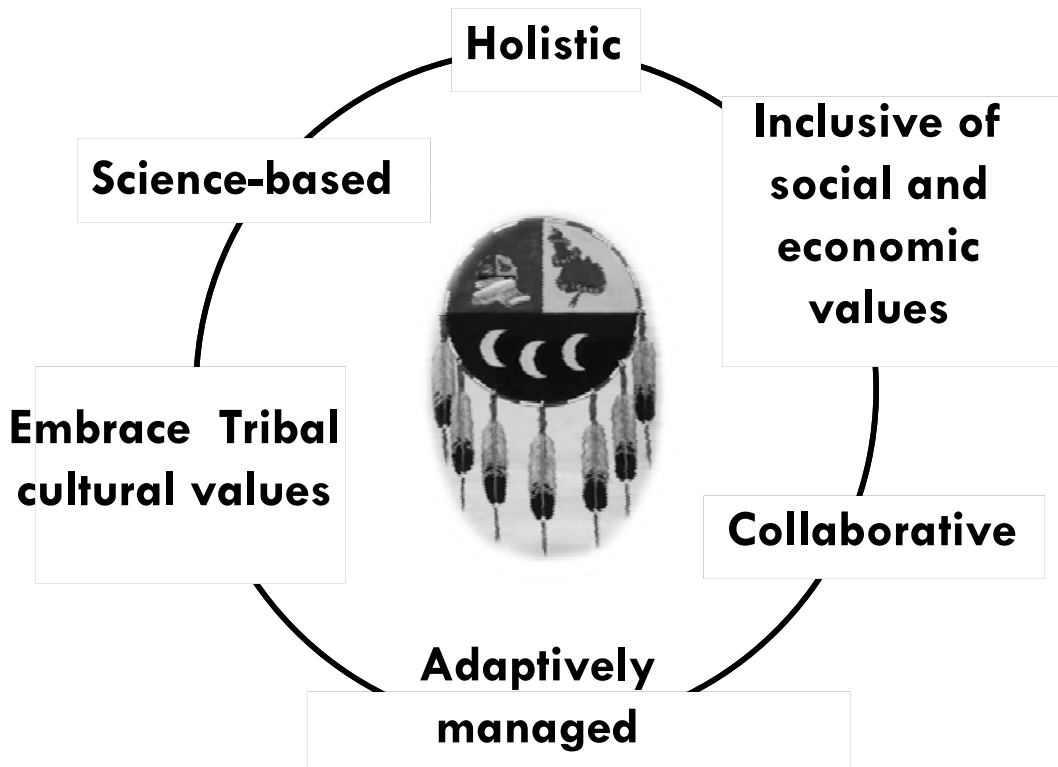
**South Arm Kokanee
FUNCTIONALLY EXTINCT**

The future: a vision

Kootenai River and its floodplain as a healthy ecosystem with clean, connected terrestrial and aquatic habitats, which fully support traditional Tribal uses and other important societal uses.



The approach: the Tribe's view



The approach: Tribal initiatives

HISTORICAL ECOSYSTEM DEGRADATIONS

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

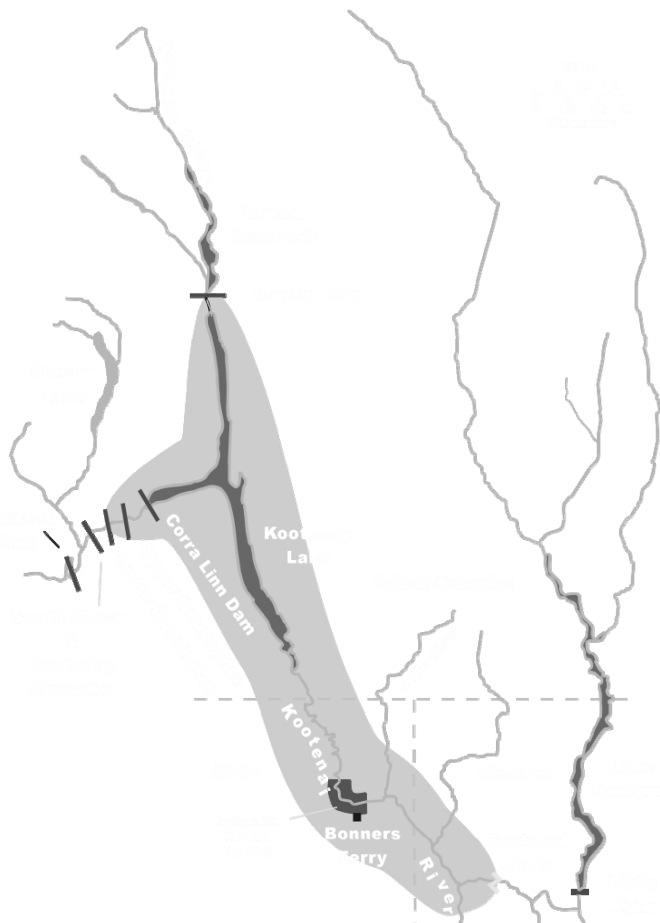


TRIBAL RESTORATION INITIATIVES

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

Kootenai River white sturgeon

- Separated from Columbia River population 10,000 years ago
- Transboundary population
- Adapted to specific local headwater conditions



Kootenai River white sturgeon

Response to development has been failure to complete life cycle

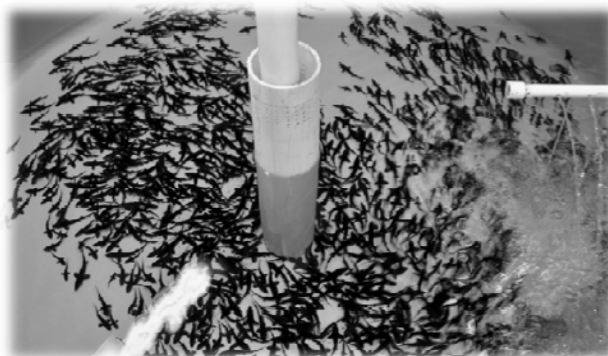
- egg suffocation/incomplete incubation
- predation
- larval food limitation/starvation
- over-wintering energy deficiency



Result:

Aging population and virtual lack of recruitment for over five decades

Conservation aquaculture



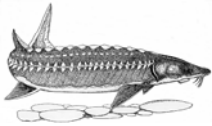
Sturgeon goals:

- Prevent extinction
- Restore healthy age class structure
- Enhance demographic and genetic viability for persistence of the population

Conservation aquaculture

1988

- **1988: Tribe proposes sturgeon studies and experimental aquaculture program**
- **1989: Experimental aquaculture facility construction begins**
- **1990: First Kootenai sturgeon spawned**
- **1991: First successful production**
- **1992: First hatchery release into the wild**
- **1993: Breeding plan developed**
- **1994: Kootenai sturgeon ESA listed**
- **1996: USFWS Recovery Plan – conservation aquaculture listed as a priority action**



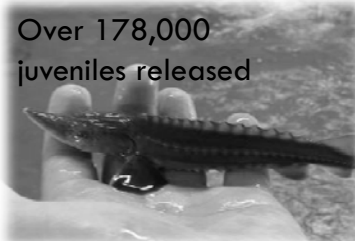
1996

Conservation aquaculture

173 families produced

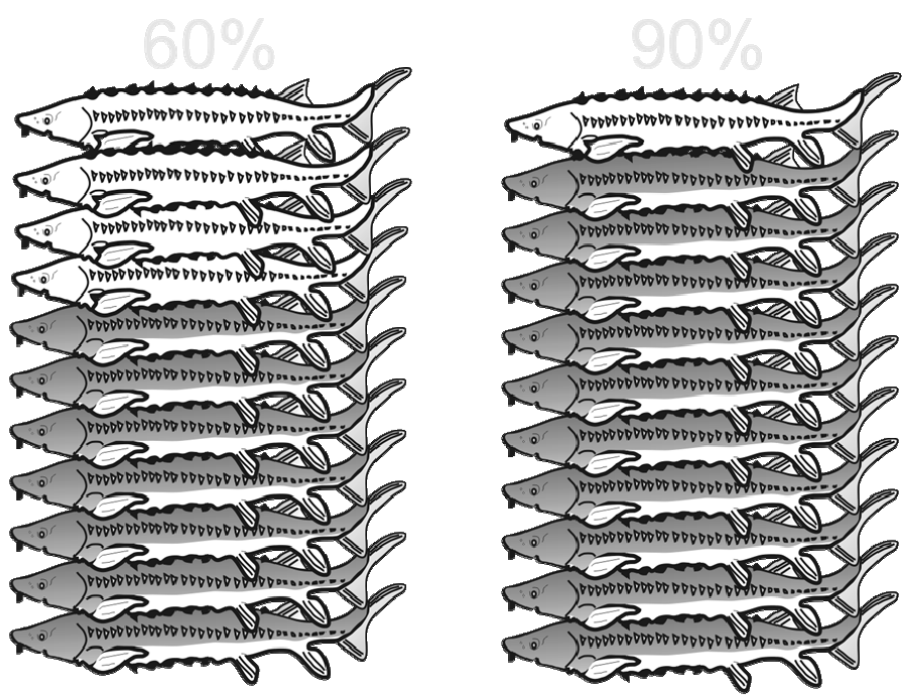


275 wild white sturgeon adults spawned

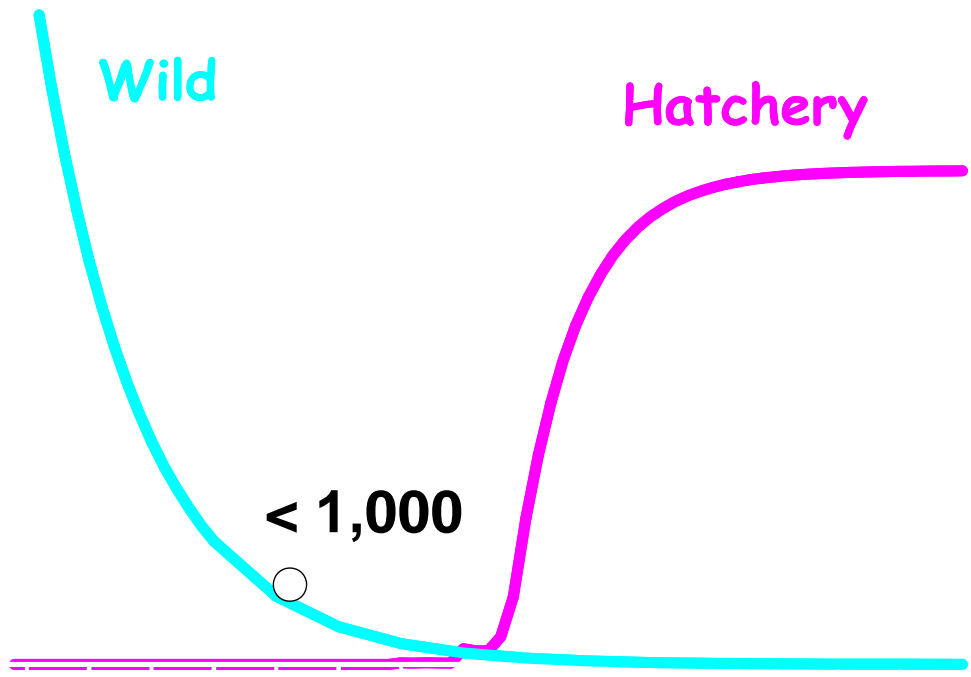


Over 178,000 juveniles released

Conservation aquaculture – survival rates



Kootenai River white sturgeon



Conservation aquaculture

2010



- Address system capacity and potential productivity/habitat issues
- Revise and adjust stocking goals and brood stock numbers based on population demographics
- Address potential imprinting with upstream rearing site – spread the risk
- Implement critical upgrades to existing facility and construct new facility
- Use NPPC hatchery planning process and science review to guide implementation

Future

Burbot

Freshwater Cod, a.k.a. ling, eelpout, lawyer, loche, methy

Circumpolar distribution (cold and temperate waters of the Northern Hemisphere)

Spawns in winter under the ice

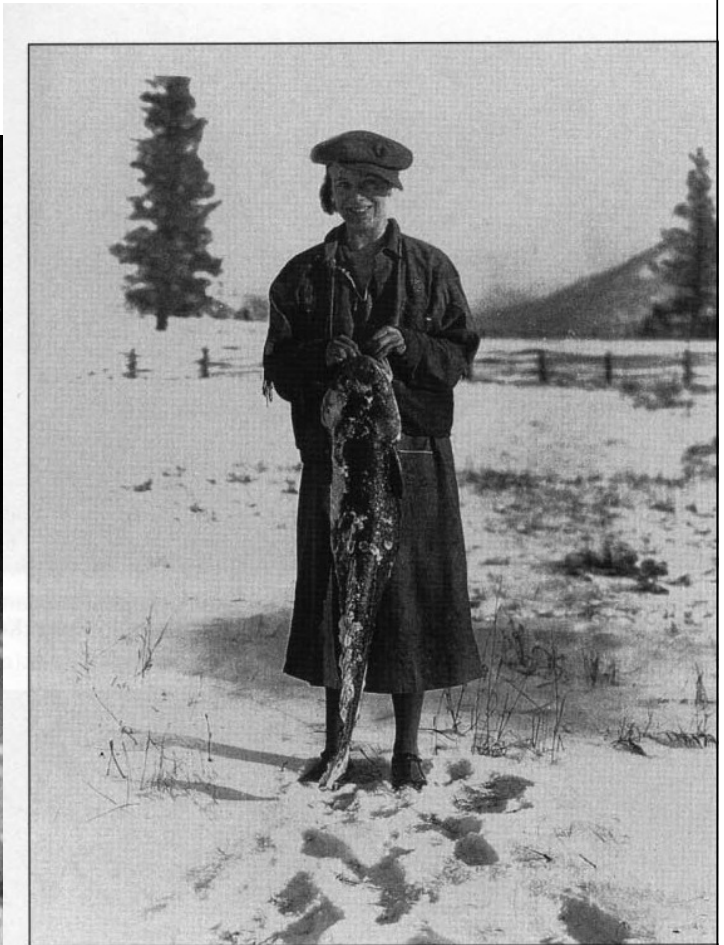
Voracious predator and night feeder

Large, long lived species

Photo by Ernest Keeley



Photo by Ernest Keeley





British Columbia Ministry of Environment



IDFG documents
population decline –
By 2003 the Lower
Kootenai population is
estimated to be <50
fish



Excerpt from Letter to USFWS from Kootenai Tribal Council, November 2001

“... the Tribe proposes, to develop, with the Service and additional committed stakeholders, an integrated and innovative approach to recovery of lower Kootenai River burbot.”

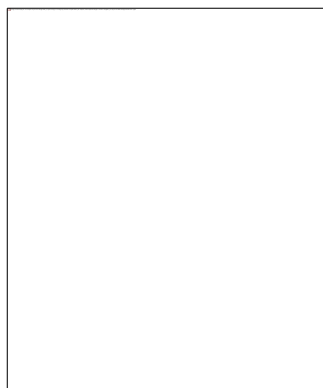


Photo by Ernest Keeley

Burbot conservation strategy

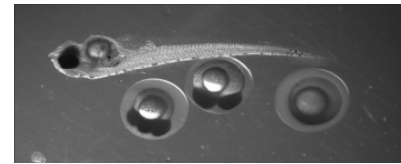
Goal - reestablish a native burbot population in the lower Kootenai River

- conservation aquaculture
- habitat restoration
- alternative hydro operations plan
- monitoring and evaluation
- education and outreach



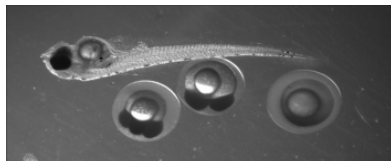
Development of aquaculture methods for burbot

- Initiated in 2003 as collaboration between the Tribe, U of I, BC MoE, IDFG, and USFWS
- Basic culture methods have now been established and documented for spawning, egg incubation, larval rearing, juvenile grow out
- Supports early hypothesis that culture for conservation purposes is feasible
- Disease susceptibility studies have provided information needed for approval of experimental releases



Development of aquaculture methods for burbot

- Continue critical uncertainties research (i.e. disease susceptibility etc)
- Continue small scale extensive rearing experiments in local ponds
- Monitor experimental releases of hatchery produced burbot
- Build experimental facility and ponds to provide increased numbers of burbot for release and subsequent monitoring



Kootenai River native fish conservation aquaculture master plan – step 1

- Organized to combine information for both sturgeon and burbot into one plan to streamline review and reduce redundancy
- Independent facilities are proposed due to distinct biological requirements
- Certain aspects of each program can reflect efficiencies through shared components when possible (i.e. staff, facilities, M&E)



Kootenai River native fish conservation aquaculture master plan – sturgeon

- Upgrades to existing hatchery to improve fish culture practices (includes water supply tempering, transport, etc)
- Development of additional upstream facility to increase brood stock holding, egg incubation and juvenile rearing and to allow sturgeon to imprint and rear on waters upstream of Bonners Ferry
- Addresses Tribal Restoration Objectives, Subbasin Plan Objectives, and 2006 USFWS Biological Opinion RPA Component 4



Kootenai River native fish conservation aquaculture master plan – burbot

- Develop experimental aquaculture facility to address need for rehabilitation of the burbot population in the Kootenai (using phased research approach)
- Addresses Tribal Restoration Objectives, Subbasin Plan Objectives, and Burbot Conservation Strategy Objectives -Memorandum of Understanding signed by 16 agencies and entities



Kootenai River native fish conservation aquaculture master plan – step 1



Sturgeon Production Target:

- Produce up to 1,500 Age 1 Kootenai sturgeon per family (for release of up to 40 families annually)

- ***Sturgeon Population Target:***

- 8,000 to 10,000 adults with healthy age class structure

Burbot Production and Population Target:

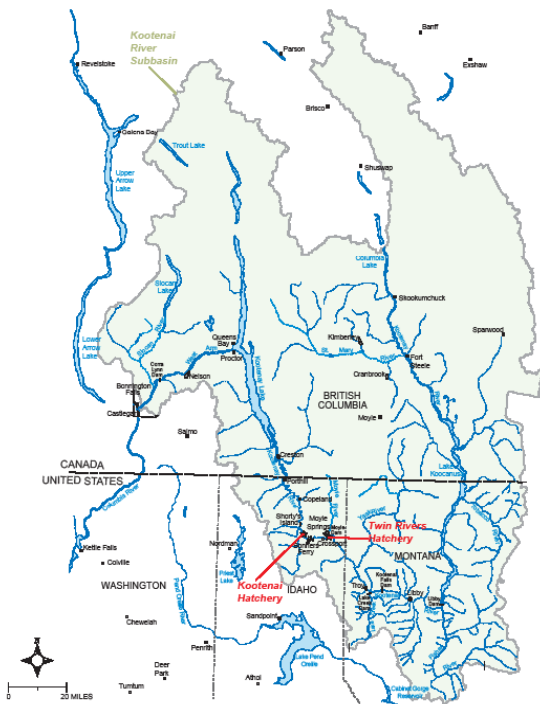


- Produce and stock burbot at rates and frequencies to sustain a target population of 2,500 to 9,500 adults in three different spawning areas with healthy age class structure

Kootenai River native fish conservation aquaculture master plan – conceptual design

- development of bioengineering criteria for each life stage of each cultured species
- development of annual water budgets for all aspects of sturgeon, burbot and live feed fish culture
- water supply and site analysis
- conceptual design of upgrades to existing facility
- conceptual design of Twin Rivers facility
- conceptual design of sturgeon spawning channel, remote incubation, and burbot rearing ponds





Program areas and major milestones

- Planning and Design Step 1 – 2008 through 2010
- Planning and Design Step 2 (and Environmental Compliance) – 2010 through 2011
- Planning and Design Step 3 (Final Design) – 2011 through 2012
- Construction and Capital Equipment - 2012 through 2013
- Annual Expanded Operations and Maintenance – 2013 and beyond
- Annual Expanded Monitoring and Evaluation – 2013 and beyond



Key expenditures by program area

- Planning & Design Step 1 - \$490,000 (estimated cost to date)
- Planning & Design Step 2 - \$1,047,000
- Planning & Design Step 3 - \$1,017,000
- Construction (Base & Separable Components) \$15,251,000
- Capital Equipment \$424,000
- Environmental Compliance Step 2 (Permitting, EA, etc.) \$165,000



Aquaculture master plan – ISRP review

- August 2009 – Master Plan submitted to NPPC and ISRP
- October 2009 - ISRP provided preliminary review requesting additional information and a revised Master Plan (ISRP 2009-40)
- June 2010 - the Kootenai Tribe responded the preliminary review by revising the Master Plan based on the ISRP's comments and providing a point by point response to the ISRP's comments



ISRP comments and recommendation

The ISRP was appreciative of the extensive detail provided in the response document and the revised Master Plan and found that the revised Master Plan meets requirements for proceeding to Step 2 (Qualified) for the Kootenai white sturgeon component of the master plan and meets requirements for proceeding to Step 2 for the burbot component (ISRP Document 2010-27)



Additional information requested in step 2 for sturgeon

- establish quantitative benchmarks and a decision pathway to adjust production goals
- refine the monitoring program to collect the necessary data to determine if benchmarks are being met or exceeded
- provide additional details regarding the rationale and justification as to the need for additional hatchery capacity



Additional ISRP comment about burbot component of master plan

The ISRP appreciated the detailed burbot Hatchery and Genetic Management Plan (HGMP) and the phased program design based on the research aspects regarding burbot habitat requirements and limiting factors, as so little is known of their life history in the subbasin and elsewhere



The future

Successful restoration will depend on the timely implementation of the **conservation aquaculture program** as well as the timely implementation of **ecosystem scale habitat improvements**

