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November 27, 2012

DECISION MEMORANDUM

TO: Council Members

FROM: Mark Fritsch, project implementation manager

SUBJECT: Step 2 review of the *Kootenai River White Sturgeon Aquaculture Conservation Facility*, Project #1988-064-00, a BiOp project.

PROPOSED ACTION: The Fish and Wildlife Committee recommends that the Council approve proceeding to Step 3 and implementation of this project. This recommendation is conditioned on Bonneville Power Administration and the Tribe providing to the Council the final costs, not to exceed \$16.6 million, and confirmation of base upgrades and new facilities associated with the Kootenai River Native Fish Conservation Aquaculture Program, and confirm the out-year costs associated with O&M and M&E prior to construction. This accounting will also include confirmation of cost share and in-kind contributions.

SIGNIFICANCE: On August 9, 2012, the Kootenai Tribe of Idaho (Tribe) submitted Step 2 documents to the Council, as part of the Three-Step Review Process and the previous Council recommendation, for the *Kootenai River White Sturgeon Aquaculture Conservation Facility*, Project #1988-064-00. In addition, this project addresses the needs as directed in the 2006 USFWS Biological Opinion regarding the effects of Libby Dam operations on the Kootenai River white sturgeon.

In August 2009 the Tribe submitted a Master Plan (Step 1) to the Council that presented a proposal that addressed the needs of two native species, Kootenai River white sturgeon (*Acipenser transmontanus*) and burbot (*Lota lota maculosa*), associated with the Tribe's Kootenai River Native Fish Conservation Aquaculture Program. The Master Plan proposed to implement critical upgrades to the existing Tribal Sturgeon Hatchery near Bonners Ferry, Idaho for the ongoing Kootenai sturgeon program, and construct a new hatchery

(approximately 10 miles upstream) at the confluence of the Moyie and Kootenai rivers to address critical needs associated with the current sturgeon program and to assist in the reestablishment of a native burbot population.

The purpose of the Kootenai sturgeon program is to prevent extinction of this endangered population, preserve the existing gene pool, and continue rebuilding a healthy age class structure using conservation aquaculture techniques with wild native broodstock. This is an expansion of existing Kootenai sturgeon aquaculture efforts to build on the demonstrated success of the program over the last 24 years. This program has made substantial contributions to the preservation of genetic diversity of the remnant populations. Hatchery upgrades and expansion have been determined to be essential in forestalling extinction of the listed Kootenai white sturgeon population due to continuing natural recruitment failure and uncertain prospects for restoration of successful natural recruitment in the near future.

The purpose of the Tribe's burbot program is to reintroduce burbot into the lower Kootenai River and begin rebuilding the population using genetically similar stock from within the subbasin¹. Development of burbot conservation aquaculture facilities is necessary for reintroduction and restoration of this species.

Both efforts are being implemented concurrent to ecosystem-scale nutrient and habitat improvement programs².

BUDGETARY/ECONOMIC IMPACTS

The program costs presented in the Step 2 documents are consistent with Council's Three-Step Review Process. It is important to note that these preliminary costs are a planning baseline from which to refine costs as the project progresses through the final (Step 3) design phase. Costs reflected in the Step 2 documents provide extensive details regarding the base components of the proposed facilities, and also includes alternate components (e.g., crew quarters, visitor center, outdoor earthen ponds and amphitheater) that will be further analyzed as planning and design proceeds through Step 3. In addition, the alternate components are currently under Tribal policy review and are contingent on available funding.

The Tribe is proposing to modify facilities at the Tribal Sturgeon Hatchery and construct a new facility at the Twin Rivers Hatchery site. Cost estimates for facility planning and design, construction, acquisition of capital equipment, environmental compliance, operations and maintenance and research, monitoring, and evaluation are presented for each of the hatchery

¹ Moyie Lake in British Columbia.

² Project #1994-049-00, Kootenai River Ecosystem Restoration, and Project #2002-002-00, Kootenai River Habitat Restoration Program.

facilities. A summary of key project expenditures and a summary of future costs projected from Fiscal Year 2010 through FY 2022 (see Attachment 1) are provided at the end of this document.

An important aspect of expected costs for the proposed programs involves shared facilities and functions at the Tribal Sturgeon Hatchery and the proposed new facility at the Twin Rivers Hatchery site. Some of the proposed facilities, as well as staffing and equipment, will be shared between the Kootenai sturgeon and burbot programs. Planning estimates presented in the Step 2 documents suggest that the future operational cost of these programs will be at least 30 percent lower with shared facilities and functions than if two separate, parallel programs were developed and operated. Efficiencies could also be realized in related monitoring and evaluation activities.

Key Expenditures by Program Area

The summary of key expenditures by program area provides an overview of costs for the current and future programs for both sturgeon and burbot as presented in the Step 2 documents (see Attachment 1). The estimated onetime costs by program area are as follows:

- Conceptual Planning & Design Step 1 - \$590,000
- Preliminary Planning & Design Step 2 - \$1,626,387
- Final Planning & Design Step 3 - \$1,357,631
- Construction - \$16,630,934
- Capital Equipment - \$565,466
- Environmental Compliance Step 2 (Permitting, EA, Other) - \$176,483

In addition, the Tribe used Tribal funds to purchase property at the confluence of the Kootenai and Moyie rivers in late 2008. A portion of this site will be used for the proposed Twin Rivers Hatchery. The approximate purchase price for this land was \$2 million.

Designs and planning associated with Step 3 are approximately \$1.36 million. The Tribe has procured a general contractor for pre-construction services and put in place a modified design/build approach as they transition between Step 2 (preliminary design) and Step 3 final design. This approach will support both early confirmation and reduction of potential risks that may impact construction budgets and Bonneville Power Administration's request to complete the majority of construction expenditures during Fiscal Year 2013.

The total estimated preliminary construction cost for both the new and modification of existing facilities outlined in the Step 2 documents is \$16,630,934. This figure includes upgrades associated with the Tribal Sturgeon hatchery and construction of the new Twin Rivers Hatchery. The construction cost estimate includes construction, construction management and inspection. The budget estimate includes standard contingencies for the preliminary design stage. The Tribe utilized both their engineers and construction estimators to provide the budget estimates in the Step 2 document.

The current Fiscal Year 2012 project budget is \$2,379,000 (a nine month budget from May 1, 2012 through January 31, 2012). This budget includes Operations and Maintenance (O&M), Monitoring and Evaluation (M&E), research, planning, engineering and environmental

compliance costs for the new facilities. From this total, O&M costs are estimated at \$1,000,000, and M&E costs are estimated to be \$500,000.

Future cost estimates for O&M, in Fiscal Year 2014, when both the Tribal Sturgeon and Twin River's Hatcheries are operating involving shared facilities, equipment and operational functions for both sturgeon and burbot programs are estimated to be about \$2,000,000 annually. Related M&E expenses are estimated to be \$790,000 annually (see Attachment 1).

Estimated ten-year costs to operate the sturgeon and burbot programs at the Tribal Sturgeon Hatchery and Twin Rivers Hatchery from Fiscal Year 2014 through Fiscal Year 2022 are also presented in Attachment 1. These costs are escalated at 3 percent annually. This estimated cost summary assumes planning and implementation of remodeled and new facilities for both the burbot and sturgeon programs would occur in 2013 through 2014. As previously noted, consistent with Step 2 of the Council's step process, cost estimates at this stage are preliminary. The Tribe will be refining and confirm these estimates during the Step 3 planning and design. The 10 year estimated cost summary is designed to be a planning tool and will be updated as costs are refined.

BACKGROUND

The Kootenai Subbasin is an international watershed located primarily in the Province of British Columbia, Canada, with smaller portions of the subbasin in the states of Montana and Idaho.

From headwaters in southeastern British Columbia the Kootenai River flows southward into northwestern Montana where Libby Dam, forming Lake Koocanusa, impounds it. Downstream from Libby Dam, the river flows into Idaho, and then turns north, entering British Columbia and Kootenay Lake. The river exits the West Arm of Kootenay Lake at the town of Nelson and flows westward to its confluence with the Columbia River at Castlegar, British Columbia.

During the last century, the Kootenai subbasin has been modified by agriculture, logging, mining, flood control, and other land uses. The agricultural development in the basin has altered the physical habitat conditions in the lower Kootenai River floodplain by conversion of wetland and riparian habitats to farmland.

When Libby Dam became operational in 1972, it reduced annual peak flows by half, thus significantly disrupting the natural hydrograph and thermograph. These modifications resulted in unnatural flow fluctuations in the Kootenai River and its floodplain, which no longer provide suitable habitat to support all life stages of many native aquatic and riparian species. In addition, the lake behind Libby Dam acts as a nutrient and sediment sink for the river downstream.

In developing the Kootenai River Subbasin Plan, the Kootenai Subbasin Technical Team selected bull trout, westslope cutthroat trout, Columbia River redband trout, kokanee, burbot, and Kootenai River white sturgeon as focal fish species in the subbasin because of their population status and ecological and cultural significance.

White Sturgeon

Kootenai River white sturgeon have been declining for at least 50 years. The Kootenai sturgeon population was listed as endangered on September 6, 1994 under the Endangered Species Act (ESA) and a recovery plan was completed in 1999. Only 1,000 adults were estimated to remain in 2007 from a population ten times that size just 20 years ago. Significant recruitment of young sturgeon has not been observed since the early 1970s and consistent annual recruitment has not been seen since the 1950s. The remaining wild population consists of large, old fish that are declining by about 4% per year as fish die naturally and are not replaced. Future prospects of these remaining fish are highly uncertain as they reach very advanced ages. Numbers have already reached critical low levels where genetic and demographic risks are acute. Without intervention, functional extinction would occur well before the last wild fish dies.

Natural recruitment has failed because habitat changes have rendered current conditions unsuitable for successful incubation and early rearing. Natural spawning has been confirmed almost every year based on collection of several thousand eggs and developing embryos under a range of environmental conditions. Viability of fertilized eggs and larvae has been confirmed by successful hatchery production using wild broodstock. However, at least two recruitment bottlenecks occur. Embryo incubation survival is very low due to unsuitable substrate in existing spawning habitats, and early rearing survival appears to be limited by physical habitats and biological ecosystems that are substantially altered from historical conditions. Wild juveniles are only occasionally observed in intensive sampling with gillnets (0 to 11 wild juveniles caught per year).

Habitat changes responsible for recruitment failure appear to include the additive effects of pre- and post-Libby Dam factors. Libby Dam began regulating flows in the Kootenai River in 1972. Subsequent dam operations reversed the natural annual hydrograph by storing the spring freshet for flood control purposes and releasing water during winter months for power production. Downstream habitat changes resulting from flow regulation are complex and include changes in habitat-forming processes, reductions in flood frequency, longitudinal shifts in river transition zones, warmer downstream water temperatures during the winter, and cooler temperatures during the spring and summer months³. Dam operations have been significantly modified in an attempt to provide more normative downstream flow and temperature patterns but these changes have not produced conditions adequate for significant natural recruitment.

The Tribe and the USFWS Kootenai White Sturgeon Recovery Team have recognized that prospects for achieving long-term recovery of a naturally self-sustaining population remain uncertain and that the ultimate success of recovery efforts requires restoration of habitats and an ecosystem capable of sustaining a natural population. Meanwhile, given the continued failure of measures to restore natural recruitment, the Tribe and Recovery Team have determined that the

³ Since the early 1990s, Libby Dam operations have been modified to help restore Kootenai sturgeon and burbot migration, spawning, and recruitment. These changes included ceasing spring power peaking operations (load following), creating more normative spring flows and temperatures for Kootenai sturgeon, and more normative winter flows and temperatures for burbot. Daily load-following has largely been eliminated from winter and spring operational strategies since the early 1990s, primarily due to the ESA listing of Kootenai sturgeon and bull trout, and associated ramping rates specified in USFWS Libby Dam Biological Opinion. However, weekly load shaping still occurs during the winter months (i.e., varying flow during the week to generate power during high-demand periods) and follows established ramping rates.

conservation aquaculture program represents the sole demonstrated effective alternative for forestalling extinction of Kootenai sturgeon.

Burbot

The burbot is the only true freshwater species in the cod family. Burbot inhabit cold rivers and lakes throughout their distribution and exhibit fluvial or adfluvial life histories. They occupy many major rivers and lakes within the Columbia Basin, although in Idaho, burbot are native only to the Kootenai River and its tributaries. They are also native to the Kootenai River in Montana and the Kootenay Lake in British Columbia. The lower Kootenai River adfluvial burbot population spends a portion of its life in the South Arm of Kootenay Lake then migrates up the Kootenai River during winter to spawn in the mainstem river or tributary streams in British Columbia or Idaho.

The historical abundance of burbot in the Kootenai subbasin was never quantified but this fish was clearly abundant in the lake and lower river. Burbot historically provided a critical winter fishery for the Kootenai Tribe and many non-tribal anglers. Native Americans traditionally targeted burbot during the winter spawning period as a source of fresh meat when other food resources were limited.

Recreational burbot fisheries were historically very popular throughout the subbasin. A significant winter burbot fishery persisted into the 1950s and 1960s in the Idaho portion of the Kootenai River. In addition, a productive burbot fishery also occurred in the West Arm of Kootenay Lake during late spring and early summer in the 1960s and 1970s. Fisheries were curtailed as population declines became apparent over the last 30 years, but these actions were not successful in restoring the populations. No evidence of successful spawning or recruitment of Kootenai burbot in Idaho has been found since the Idaho Department of Fish and Game began intensive monitoring efforts in 1993.

Burbot are functionally extinct in the riverine portion of the Kootenai subbasin in Idaho and extirpated in the West Arm of Kootenay Lake. Extensive recent sampling captured very few adult or juvenile burbot in Kootenay Lake and the Kootenai River. Recent population estimates indicates that only 50 fish remain in the lower Kootenai population.

As with Kootenai sturgeon, no single factor appears responsible for the collapse of burbot in the subbasin. Rather, a combination of historical overharvest, habitat alteration and loss, and ecosystem degradation, contributing to recruitment failure, appears to be the cause. Related factors include increased winter flow, elevated winter water temperature, environmental degradation, floodplain loss, changes in primary and secondary productivity, Kootenay Lake flood control practices, and the altered composition of the ecological community.

Native burbot in the Kootenai River in Idaho are Red Listed in B.C., and are a designated by the State as a Species of Special Concern in Idaho. In Montana, burbot are listed as a Species of Special Concern. Kootenai burbot were proposed for Federal listing under the ESA in 2000 but USFWS determined that this population was not eligible for listing because it did not meet the defining criteria of a Distinct Population Segment. However, Kootenai burbot are clearly an important cultural, ecological, and fishery resource in the Kootenai Basin.

I. History and objectives of the Kootenai River Aquaculture Conservation Facility

White Sturgeon

In response to the Council's 1987 Columbia River Basin Fish and Wildlife Program, Bonneville funded the construction of the Kootenai Tribe of Idaho Experimental White Sturgeon Facility, which began operations in the spring of 1991. The low-capital facility was originally constructed to determine whether gametes from wild sturgeon in the Kootenai River were viable and artificial propagation was feasible using existing water sources of the Kootenai River. Initial experimental culture efforts between 1991 and 1996 demonstrated gamete viability and aquaculture feasibility by successfully fertilizing, incubating, hatching, and rearing sturgeon embryos and juveniles.

The 1996 USFWS draft Recovery Plan called for the full implementation of a conservation aquaculture program in order to replace failing natural recruitment and prevent near-term extinction. The existing facility and equipment were inadequate to meet conservation needs consistent with the Recovery Plan and a breeding plan to preserve genetic variability of the white sturgeon in the Kootenai River.

A series of upgrades to the existing hatchery were reviewed, approved, and implemented in 1998, 1999 and 2007/2008 to meet project and U. S. Fish and Wildlife Service (USFWS) recovery plan objectives⁴. Monitoring of initial hatchery releases documented significant survival in the wild but also found that survival was highly correlated to size at release. At the same time, a series of experimental flow measures were implemented at Libby Dam in an attempt to restore natural recruitment. All such attempts to date have failed - current dam operations are not meeting the needs for natural recruitment. It is now apparent that the next generation of sturgeon is entirely dependent on the hatchery program production.

Where the scale of the current aquaculture program was previously designed to provide a short-term bridge to the expected restoration of natural recruitment, continuing recruitment failures have led to a reconsideration and expansion of the program objectives.

The revised program objectives for the near-term include the following.

- Prevent demographic extinction by replacing failed natural recruitment.
- Establish an increasing trend and broad distribution of ages and sizes in the wild population in order to ensure future sustainability.
- Preserve native genetic and life history diversity by capturing and spawning significant numbers of representative broodstock.
- Provide contingencies for uncertain future availability of wild broodstock and prospects for restoring natural recruitment.

⁴ The Recovery Plan adopted by the U. S. Fish and Wildlife Service in 1999 identified a long-term goal of downlisting and delisting Kootenai white sturgeon when the population becomes self-sustaining. Short-term objectives included reestablishing natural recruitment and preventing extinction through conservation aquaculture.

- Inform recovery strategies by using hatchery fish to identify limiting life stages and habitat capacity.

Revised program objectives for the long term include the following.

- Avoid annual spawning stock limitation where too few fish might be available to capitalize on favorable natural spawning conditions in any year (or to continue to provide hatchery broodstock).
- Minimize, to the extent possible, the time interval between the functional extinction of remaining wild adults and maturation of the first hatchery generation.
- Maintain an effective population size in the wild adequate to avoid genetic bottlenecks that risk loss of diversity or inbreeding depression in the next generation.
- Avoid significant detrimental impacts of hatchery fish on natural production due to competition, predation, or disease magnification.
- Avoid hatchery selection or domestication that might reduce future fitness or viability.

Burbot

Recent research on burbot aquaculture requirements has demonstrated the potential feasibility in burbot conservation and recovery efforts. A collaborative project was initiated in 2003 by the Tribe, British Columbia Ministry of Environment (BC MoE) and the University of Idaho Aquaculture Research Institute (UI-ARI) to evaluate the feasibility and develop effective methods for captive propagation of burbot for a conservation aquaculture program. The first wild broodstock for this project were collected in 2003 from Duncan Reservoir in British Columbia and were provided to the Tribe by the BC MoE. These fish were successfully acclimated and spawned in 2004 at the UI-ARI facility, leading up to the Tribe's first small-scale experimental releases into the wild in Idaho and British Columbia in the fall of 2009.

In recent years, burbot production has been expanded at the UI-ARI. Improvements in culture techniques continue to be made and fish are being produced for ongoing research projects. However, existing facilities at the UI-ARI are not adequate to move to the next phase of the burbot conservation and restoration effort.

The goal for the Tribe's burbot program is to reestablish a native burbot population in the lower Kootenai River. The Tribe's proposed program would reintroduce burbot into the lower Kootenai River and begin rebuilding the population using genetically similar stock from within the subbasin (from Moyie Lake in British Columbia). It is also possible that native broodstock from the remnant lower Kootenai population could be incorporated into the program.

The Tribe has developed a step-wise experimental burbot program that includes four phases. Success in each phase is required to move the program forward to a subsequent phase. Each phase and the associated production goals are described below.

- Phase 1 (Developmental Aquaculture Feasibility Analysis) was initiated in 2001 and has been completed. The objective of this phase was to develop reliable, successful culture

methods and systems. The work demonstrated the feasibility of burbot culture at a significant scale and laid the groundwork for the next phase.

- Phase 2 (Developmental Post-release Pilot Study) involves annual releases of limited numbers of juvenile burbot to evaluate distribution, movements, habitat use, food habitats, and effective sampling methods by life stage. This phase was initiated with the first experimental release of 247 burbot into the Kootenai River October and November of 2009 and is on schedule to continue through 2013.
- Phase 3 (Adaptive Experimental Evaluation) steps up hatchery production and monitoring efforts to determine how well hatchery-produced burbot survive, grow, and mature in sufficient numbers to reestablish a significant population in the Kootenai system. This phase involves a population-scale monitoring effort to address in-river questions and critical uncertainties. Phase 3 is distinguished from Phase 2 by the scale and intensity of production and monitoring efforts. Phase 2 involves limited research and monitoring of small-scale pilot-level releases to provide qualitative assessments of behavior and biology of hatchery-reared fish. The Twin Rivers facility is needed in Phase 3 to produce sufficient fish for a statistically robust evaluation.
- Phase 4 (Population Rebuilding) would implement a full-scale restoration program designed to meet population and use objectives established in Phase 3.

II. Kootenai River Native Fish Conservation Aquaculture Program

The Tribe is proposing several base improvements to the existing Tribal Sturgeon Hatchery to address the need for additional rearing capacity. The Tribe is also proposing to develop a new aquaculture facility, the Twin Rivers Hatchery, to further expand the capabilities of the sturgeon program, maximize program flexibility, and to support implementation of the new burbot aquaculture program.

The Kootenai sturgeon conservation aquaculture program involves broodstock collection and handling, spawning and fertilization, incubation and hatch, and marking and release. The Tribe will continue to use the existing Tribal Sturgeon Hatchery for these purposes, to the extent space will allow. Upgrades at the Tribal Sturgeon Hatchery include the following.

- Adding weather protection and de-icing systems to the sediment pond to allow year-round operation of the sediment pond and drum filter
- Adding mechanical means to transfer broodstock from the dock on the Kootenai River to holding tanks (large broodstock are currently carried on stretchers up a steep bank to holding tanks several hundred feet away)
- Adding a new spawning room (broodstock holding tanks are currently in a separate building from the spawning room, so adult sturgeon must be moved manually between buildings during spawning activities)
- Developing additional feed, vehicle, and boat storage areas
- Upgrading buildings for safety, efficiency and sanitation

The proposed Twin Rivers Hatchery aims to optimize efficiency and cost effectiveness by providing shared aquaculture facilities for the Kootenai sturgeon and burbot programs, as well as design elements that meet the specific needs of each species. Most infrastructure and physical operations for the Kootenai sturgeon and burbot programs will be combined (e.g., power supply, support facilities, water sources, and water and temperature treatment). The proposed new facilities at the Twin Rivers Hatchery will include the following.

- Wells for one source of the hatchery water supply
- River water intakes, one on the Moyie River and one on the Kootenai River
- Influent and effluent water settling basins
- Utilities, including roads, parking lots, piping, sanitary drain field, electrical power, telephone and stormwater drainage
- Water filtration, heating and cooling capabilities
- Adult fish holding/spawning in round tanks with adequate cover to hold sturgeon and burbot
- Incubators for sturgeon and burbot eggs
- Start tanks where post-hatch sturgeon and burbot that have volitionally moved out of the incubators will be fed and closely monitored for disease as they grow to a size acceptable for transfer out of the start tank room
- Circular indoor rearing tanks for grow-out of sturgeon (6-foot- and 8-footdiameter tanks) and burbot (4-foot-diameter tanks)
- Administrative and biological support facilities
- A building for vehicle and boat storage and maintenance
- Two employee residences

The Twin Rivers Hatchery will also include facilities to rear rainbow trout to provide live feed for both Kootenai sturgeon and burbot broodstock. The hatchery will also include facilities to culture live feed for larval burbot (i.e., brine shrimp and other small aquatic animals) from 10 days to 50 days post-hatch or until they are mature enough to be transitioned to a commercial dry feed.

For sturgeon, the Tribe will use the Twin Rivers Hatchery to conduct the following.

- Expand Kootenai conservation aquaculture program to incorporate an increased number of natural broodstock while they are still available.
- Increase rearing capacity in order to reduce rearing density.
- Allow fish to imprint and home to waters farther upstream where potentially suitable habitat exists
- Allow for greater segregation and size grading of fish families
- Accommodate basic aquaculture research needs

For burbot, the Twin Rivers Hatchery operations will involve broodstock collection and handling, spawning and fertilization, incubation and hatching, rearing, marking, and release. The Tribe will use the hatchery to conduct the following.

- Hold and handle broodstock obtained from Moyie Lake or the Kootenai River/Lake in addition to field collection of gametes
- Incubate burbot eggs, with the capacity for periodic anti-fungal egg treatment, as needed
- Rear burbot indoors to 6-month old juveniles and/or ageAge-1+ sub-adults
- Conduct experimental larval or extended burbot rearing in outdoor tanks, ponds, or greenhouses
- Mark and release burbot in the summer and fall
- Accommodate basic aquaculture research needs

III. Major Project Review (The Three-Step Process)

On August 13, 2009, the Kootenai Tribe of Idaho submitted to the Council as part of the 3 Step Review Process a master plan for the *Kootenai River White Sturgeon Aquaculture Conservation Facility*, Project #1988-064-00.

On October 14, 2009 the ISRP provided their preliminary review (ISRP Document 2009-40). The ISRP requested additional information (i.e., "response request") and requested that the response be presented in a revised master plan.

On June 25, 2010 the Council received the requested revised master plan titled *Kootenai River Native Fish Conservation Aquaculture Master Plan* and on August 9, 2010 the ISRP provided their final review (ISRP Document 2009-40). The ISRP found that the revised master plan met requirements for proceeding to Step 2 (Qualified) for the Kootenai white sturgeon component of the master plan and that the master plan fully met requirements for proceeding to Step 2 for the burbot component.

The ISRP qualified the white sturgeon recommendation to include the following additional information/detail in the Step 2 document.

- establish quantitative benchmarks (i.e. estimated population size, survival rates, adequate number of families, and age structure) and a decision pathway to adjust production goals based on monitoring data of hatchery fish in the wild,
- refine the monitoring program to collect the necessary data to determine if benchmarks are being met or exceeded, and
- provide additional details regarding the rationale and justification as to the need for additional hatchery capacity.

On October 14, 2010 the Council approved the Master Plan (Step 1) associated with the *Kootenai River White Sturgeon Aquaculture Conservation Facility*, Project #1988-064-00. The specific language of the recommendation is as follows.

- The Council approved the Kootenai River Native Fish Conservation Aquaculture Master Plan to proceed to step two level activities.

- The Council calls for additional information to be developed that fully addresses the issues raised by the independent peer review for consideration during the Step 2 review.

On August 9, 2012, the Tribe submitted Step 2 documents and on September 28, 2012 the ISRP provided their review (ISRP document 2012-15).

ANALYSIS

The ISRP found that the Tribe has fully addressed science review criteria associated with the white sturgeon and burbot programs for the *Kootenai River White Sturgeon Aquaculture Conservation Facility*, Project #1988-064-00. The ISRP stated that the Tribe did a “*very good job*” in addressing the technical aspects and for incorporating concepts from other reports (i.e., ISAB food web report), previous ISRP recommendations (e.g., system capacity), and for designing a program that recognizes the uncertainties associated with these particular production programs. As part of the review they provided additional input and comments on the responses received as part of the Step 2 documents. These comments are complimentary and are intended to strengthen the program as it proceeds to implementation.

Kootenai River white sturgeon were listed as endangered under the ESA in 1994. The USFWS Final Recovery Plan for Kootenai River white sturgeon, published in 1999, calls for implementation of conservation aquaculture to prevent extinction and provide recruitment. The Libby Dam BiOp also specifically acknowledges the need for continued operation of the Tribe’s sturgeon aquaculture program in Reasonable and Prudent Action Component 4, and directs the action agencies (Bonneville and the U.S. Army Corps of Engineers) to provide funding to expand adult holding and spawning capability at the Tribal Sturgeon Hatchery.

The next 20 years will be a critical period for the future of sturgeon in the Kootenai River. There will be a significant bottleneck in spawner numbers as the wild population declines but hatchery fish are not yet mature. The conservation aquaculture program will be essential for bridging the population across this period.

Kootenai River burbot seem to be functionally extinct, and the Tribe has developed a step-wise four-phased experimental program that would reintroduce burbot into the lower Kootenai River and begin rebuilding the population using genetically similar stock from within the subbasin.

Upgrades to the existing Tribal Sturgeon Hatchery include adding weather protection and de-icing systems to the sediment pond to allow year-round operation of the sediment pond and drum filter, adding mechanical means to transfer broodstock from the dock on the Kootenai River to holding tanks (large broodstock are currently carried on stretchers up a steep bank to holding tanks several hundred feet away), adding a new spawning room (broodstock holding tanks are currently in a separate building from the spawning room, so adult sturgeon must be moved manually between buildings during spawning activities), developing additional feed, vehicle, and boat storage areas, and upgrading buildings for safety and sanitation.

The new Twin Rivers Hatchery will allow for expansion of the Kootenai sturgeon program to incorporate an increased number of natural broodstock while they are still available, increase rearing capacity in order to reduce rearing density, allow fish to imprint and home to waters

farther upstream where suitable spawning habitat currently exists, allow for greater segregation and size grading of fish families, and support aquaculture research needs. The new facility is needed because there is no room for expansion of the program at the existing Tribal Hatchery Facility. Additionally, the combined use of the two facilities will significantly enhance program flexibility and provide additional fail-safe back up.

The Twin Rivers Hatchery will also house the Tribe's burbot conservation aquaculture program. Burbot operations at Twin Rivers Hatchery will include broodstock collection and handling, spawning and fertilization, incubation and hatching, rearing, marking, and release. The new facility will also accommodate burbot aquaculture research needs.

The Tribe is requesting that the Council expedite the Step 3 review in order to meet a construction start in early spring of 2013 (Fiscal Year 2013). The Tribe has procured a general contractor for pre-construction services and is pursuing a modified design/build approach as part of Step 3 in an effort to create efficiencies, reduce costs and to initiate construction in 2013. The Tribe will use this approach to support both early confirmation and reduction of potential risks that may impact construction budgets and schedules and Bonneville's request to complete the majority of construction during Fiscal Year 2013.

As outlined in the budget and economic section of this decision document the preliminary construction cost estimate, including alternate components is \$16,600,000. The Tribe conducted a formal work session in September 2012 where their planning team identified \$600,000 to \$800,000 of potential cost reductions in the preliminary construction estimates provided in the Step 2 document. The Tribe has directed their design engineers to work with their construction contractor to address these reductions as they proceed with final designs and confirm cost estimates. The Tribe will ensure that final construction costs fall with-in the overall construction cost estimates provided in the Step 2 document. The Tribe will also continue to refine O&M and M&E costs shown in the out-years.

Though science review aspects of the step review process are complete, budget effects will need to be confirmed by Tribe and Bonneville, and confirmed by Council prior to the initiation of construction. The Tribe is planning that this confirmation can be accomplished by February of 2013.

At the November 2012 Fish and Wildlife Committee meeting the Council staff presented a proposed action based on the complete and favorable science review of the step review elements. Council staff recommended that the Fish and Wildlife Committee support this project to proceed with final planning, designs, and implementation of the upgrades to the existing Tribal Sturgeon Hatchery and the proposed Twin Rivers Hatchery. The Council staff also suggested that this recommendation be conditioned on Bonneville and the Tribe providing to the Council the final costs and confirmation of base upgrades and new facilities associated with the Kootenai River Native Fish Conservation Aquaculture Program, and confirm the out-year costs associated with O&M and M&E prior to construction. In addition, this accounting will include confirmation of cost share and in-kind contributions for the *Kootenai River White Sturgeon Aquaculture Conservation Facility*, Project #1988-064-00.

The Fish and Wildlife Committee expressed some concern about providing a recommendation prior to having a better determination of the total costs and detail regarding the modifications needed for the existing hatchery and the accounting of the facilities to be constructed at the new hatchery.

Based on the staff presentation and discussion the Fish and Wildlife Committee recommends that the Council approve proceeding to Step 3 and implementation of this project. This recommendation is conditioned on Bonneville Power Administration and the Tribe providing to the Council the final costs, not to exceed \$16.6 million, and confirmation of base upgrades and new facilities associated with the Kootenai River Native Fish Conservation Aquaculture Program, and confirm the out-year costs associated with O&M and M&E prior to construction. This accounting will also include confirmation of cost share and in-kind contributions.

Attachment 1: Summary of Step Expenditures and Ten Year Summary of Future Costs to Fiscal Year 2022.

Program Area	Fiscal Year					
	2010	2011	2012	2013	2014	2015 - 2022
Planning and Design						
Step 1: Conceptual Engineering, Planning ⁵	\$590,000					
Step 2: Preliminary Engineering, Planning & Environmental Compliance ⁶		\$1,138,471	\$487,916			
Step 3: Final Engineering, Planning ⁷			\$1,221,868	\$135,763		
Construction						
Existing Tribal Hatchery Estimated Construction Costs ⁸				\$905,490		
Twin Rivers Estimated Construction Costs ⁹				\$10,811,093	\$3,603,698	
Estimated Tribal Sturgeon Hatchery and Twin Rivers Estimated Construction Costs (Alternate Components) ¹⁰					\$1,310,653	
Capital Equipment						
Capital Equipment ¹¹				\$565,466		
Environmental Compliance						
Environmental Compliance ¹²	\$17,648	\$35,297	\$105,890	\$17,648		

⁵ Shows expenditure for FY 2007, 2008, 2009, 2010 and 2011.

⁶ Shows estimated expenditure Shows expenditure for FY 2010 - FY 2012 (This is an estimated figure from the total project budget for Project # 1988-064-00)

⁷ Shows estimated expenditure from a projected FY 2011 budget (This is an estimated figure from the total project budget for Project # 1988-064-00)

⁸ Existing Site Estimated Construction Costs (escalated from 2012 dollars to mid-2013 dollars)

⁹ Twin Rivers Estimated Construction Costs (escalated from 2012 dollars to mid-2013 dollars)

¹⁰ Twin Rivers Estimated Construction Costs, Alternate Components (budget shown was escalated from 2012 dollars to mid-2013 dollars)

¹¹ Capital Equipment, estimated lump sum for equipment items not shown in construction estimate (escalated from 2010 to 2014 dollars)

¹² Environmental Compliance Costs (assumes 10% of expenses in FY 2010, 20% of expenses in FY 2011, 60% in 2012 and 10% in FY 2013)

Program Area	Fiscal Year					
	2010	2011	2012	2013	2014	2015 - 2022
Land Purchases, Leases and Easements						
Land Purchases ¹³	\$2,000,000					
Operations and Maintenance¹⁴						
Sturgeon Program (Existing Tribal Hatchery) ¹⁵	\$1,338,692	\$1,378,853	\$1,420,218	\$1,462,825		
Sturgeon & Burbot Program (Existing Tribal hatchery & Twin Rivers) ¹⁶					\$2,090,207	\$2,152,913 - \$2,495,816
Monitoring and Evaluation						
Monitoring and Evaluation Program ¹⁷	\$701,886	\$722,943	\$744,631	\$766,970	\$789,979	\$813,679 - \$943,276
Total Estimated Capital Costs	\$1,807,648	\$1,173,767	\$1,815,674	\$12,435,460	\$4,914,350	
Total Estimated Expense Costs	\$2,040,578	\$2,101,796	\$2,164,850	\$2,229,795	\$2,880,186	\$2,966,592 - \$3,439,093
Total Estimated Costs	\$3,848,227	\$3,275,563	\$3,980,523	\$14,665,255	\$7,794,536	\$2,966,592 - \$3,439,093

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¹³ Land Purchases, Leases and Easements, Tribe's purchase of the Twin Rivers site in 2008 (shown in 2010 for reference only)

¹⁴ O&M costs escalated at 3% annually. Increased costs for expanded production is assumed to start in FY 2012

¹⁵ Sturgeon and Burbot Program (Existing Tribal Sturgeon Hatchery program; operations sharing with new site starts in FY 2014)

¹⁶ Sturgeon and Burbot Program (Existing Tribal Sturgeon Hatchery; Twin Rivers Hatchery starts in 2014)

¹⁷ Monitoring and evaluation program (costs escalated at 3% annually, increased costs for expanded production is assumed to start in FY 2012)



Kootenai River Native Fish Conservation Aquaculture Program

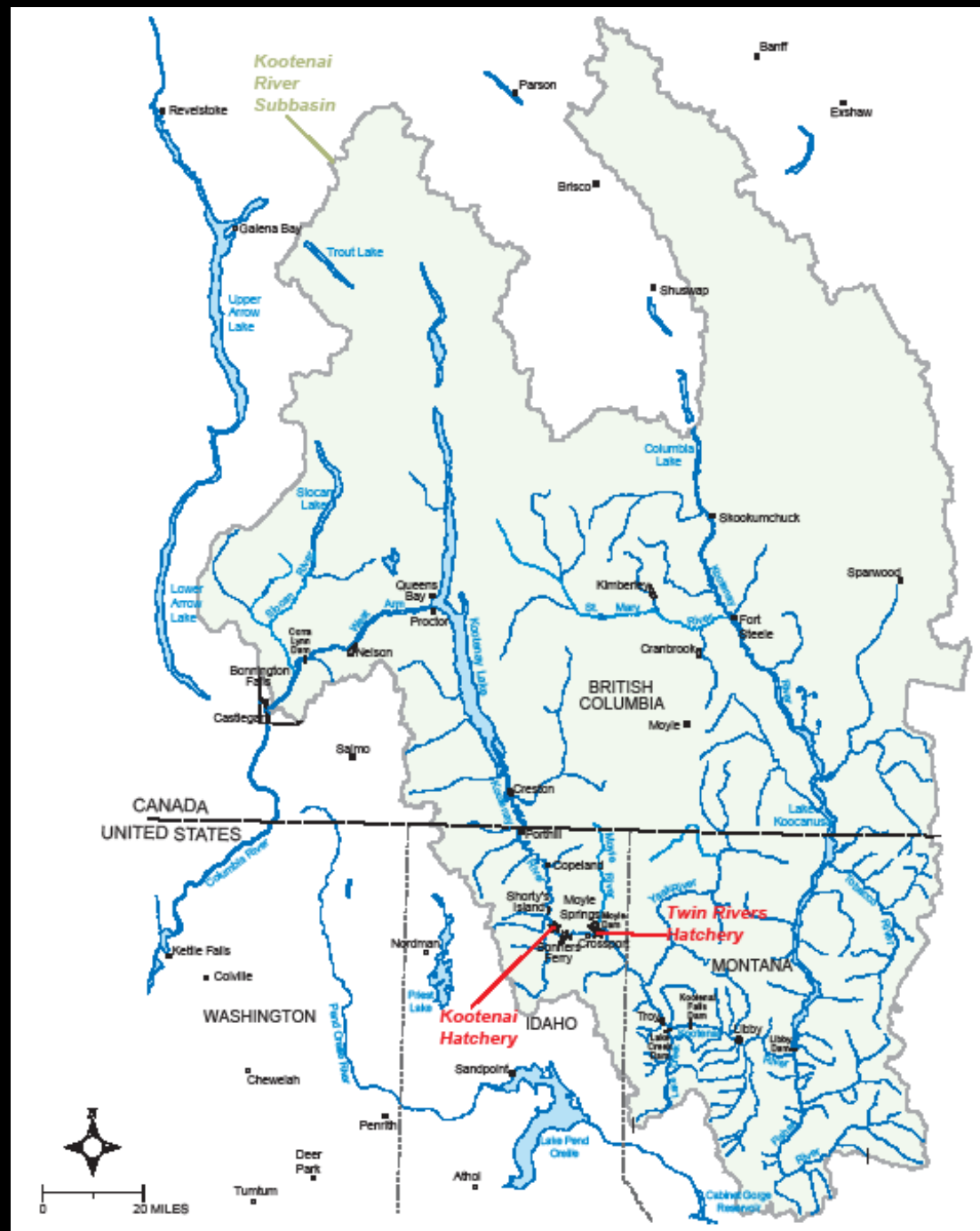
Presentation to Northwest Power &
Conservation Council

December 4, 2012

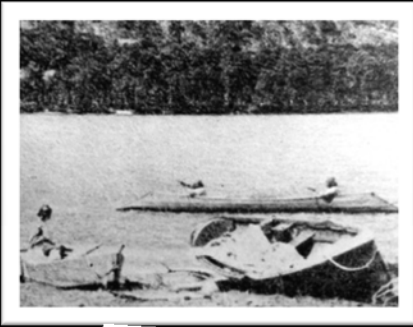
Kootenai Tribe of Idaho

Kootenai River Subbasin

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



Program Context – Sturgeon



- **Kootenai River white sturgeon vital to the Kootenai Tribe**
- Important component of Kootenai River food web
- **Listed as Endangered in 1994**
- Long decline with current wild population of about 1,000 aging individuals
- **Virtually no natural recruitment for last 50 years**

Program Evolution – Sturgeon



- 1988 Tribe proposes experimental sturgeon studies & aquaculture program
- 1989 experimental facility constructed
- 1991 first successful production
- 2000 first large-scale release
- 2003 - 2007 program goals revised; need for expanded & enhanced production, & improved facilities identified
- 2007 NPCC 3-step process initiated
- 1991-2012 continued refinement of sturgeon conservation aquaculture program

Program Successes – Sturgeon

Over 300 wild white sturgeon adults spawned



Over 200 sturgeon families produced

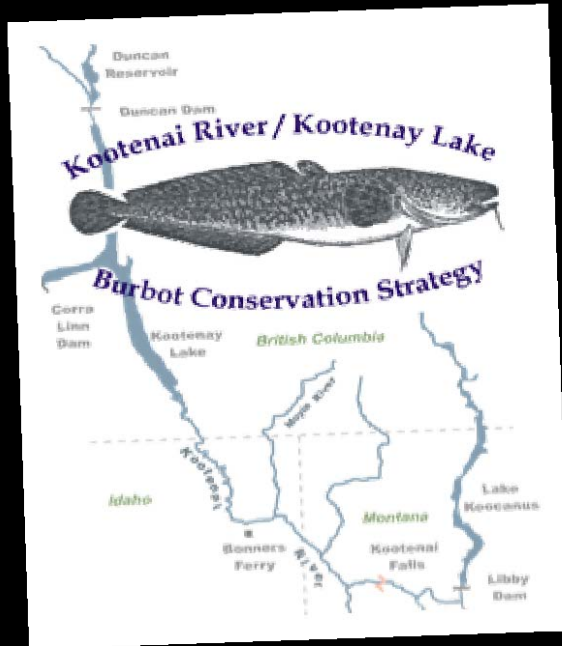


Over 200,000 juvenile sturgeon released



Survival rates are very good - rebuilding the population

Burbot Program Context



- Kootenai River burbot culturally significant to the Tribe and important recreational fishery
- Important component of Kootenai River food web
- **Functionally Extinct**
- KVRI Burbot Conservation Strategy and Multilateral MOU completed in 2005

Program Evolution – Burbot

- No precedent for burbot aquaculture
- Four phase restoration plan
- Phase 1 development of successful techniques for spawning, incubation & rearing
- Phase 2 experimental releases & research to evaluate distribution, movement, habitat use, food habitats and sampling methods by life stage
- Moving to Phase 3 (hatchery used to reestablish population) and Phase 4 (self-sustaining population)



Program Successes – Burbot



In coordination with co-managers/partners (IDFG, BC MoE, U of I, USFWS)

- Developed reliable & successful aquaculture techniques for spawning, incubation & rearing (2004-2008)
- Experimental releases conducted (2009-2013)
- Burbot successfully dispersing throughout habitat
- Developing effective sampling methods in coordination with IDFG
- Learning about habitat use and food habitats and applying information to design of habitat restoration projects

Kootenai River Native Fish & Conservation Aquaculture Program – Purpose

- Program developed to meet Tribal restoration objectives to restore lost subsistence resources and uses near and long term population objectives (Trust obligations of Federal government)
- Addresses Libby Dam BiOp RPA Component 4, Sturgeon Recovery Plan objectives (Endangered Species Act), and Burbot Conservation Strategy MOU
- Consistent with Northwest Power and Conservation Council Fish & Wildlife Program, addresses Kootenai Subbasin Plan Objectives (Northwest Power Act)

Revised Program Objectives – Sturgeon

- **Near-term**

- Prevent extinction
- **Establish broad distribution of ages and sizes in wild population**
- Preserve native genetic and life history diversity (more broodstock)
- **Provide contingencies for uncertain future**



- **Long-term**

- Avoid annual spawning stock limitation
- **Minimize time interval between functional extinction of wild fish & maturation of 1st hatchery generation**
- Maintain effective population size in wild to avoid genetic bottlenecks
- **Avoid detrimental impacts of hatchery fish on natural production**
- Avoid hatchery selection or domestication

Program Objectives – Burbot

- **Near-term**

- Produce and stock burbot to sustain minimum population of 2,500-9,500 adults in Kootenai River and South Arm of Kootenay Lake

- **Long-term**

- Produce and stock burbot to sustain minimum population of 17,500 adults in Kootenai River and South Arm of Kootenay Lake
- **Restore consistent natural recruitment in at least 3 spawning areas**

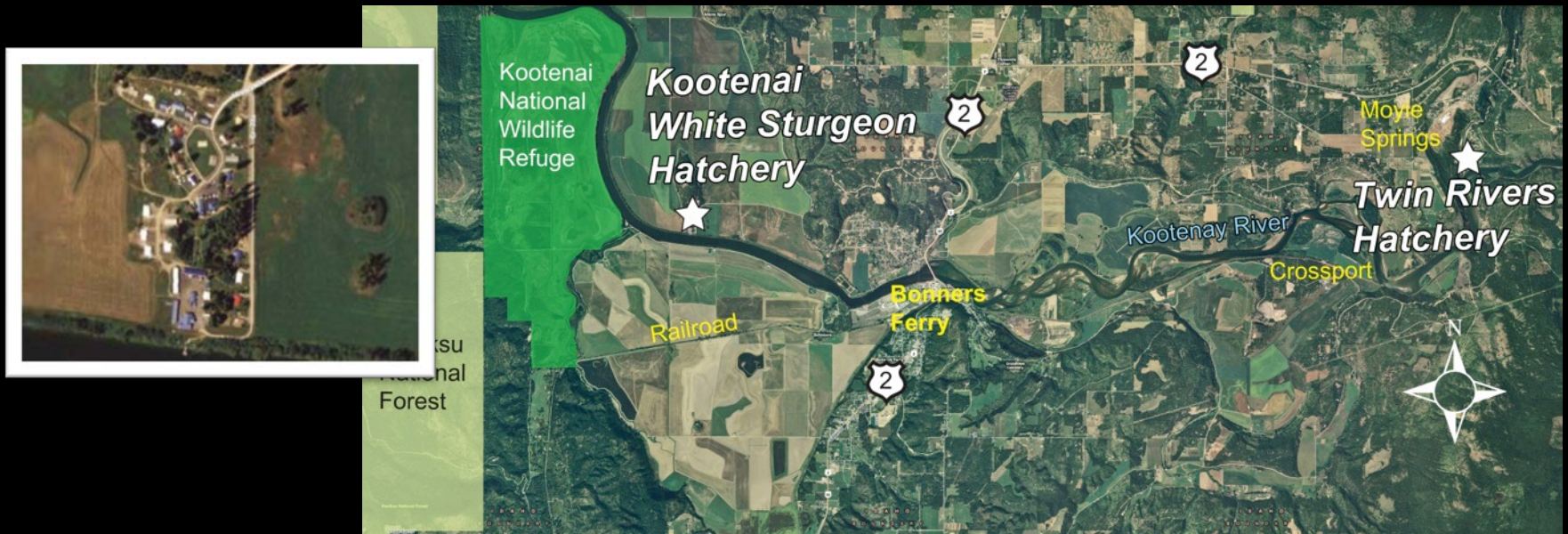


Need for Facility Upgrades & New Facility

- **Upgrades to Existing Tribal Sturgeon Hatchery**
 - Improved sturgeon broodstock handling
 - **Safety and efficiency enhancements and program flexibility**
 - Additional storage
- **New Twin Rivers Facility**
 - There is no space to expand at Tribal Sturgeon Hatchery
 - **Expansion of sturgeon program to meet both near- and long-term objectives:**
 - Collect more wild broodstock while they are still available
 - **Increase rearing capacity for Age 1+ fish at temperatures and densities that optimize survival**
 - Improve fish health (reduce density-related disease)
 - **Allow for segregation and size grading of families**

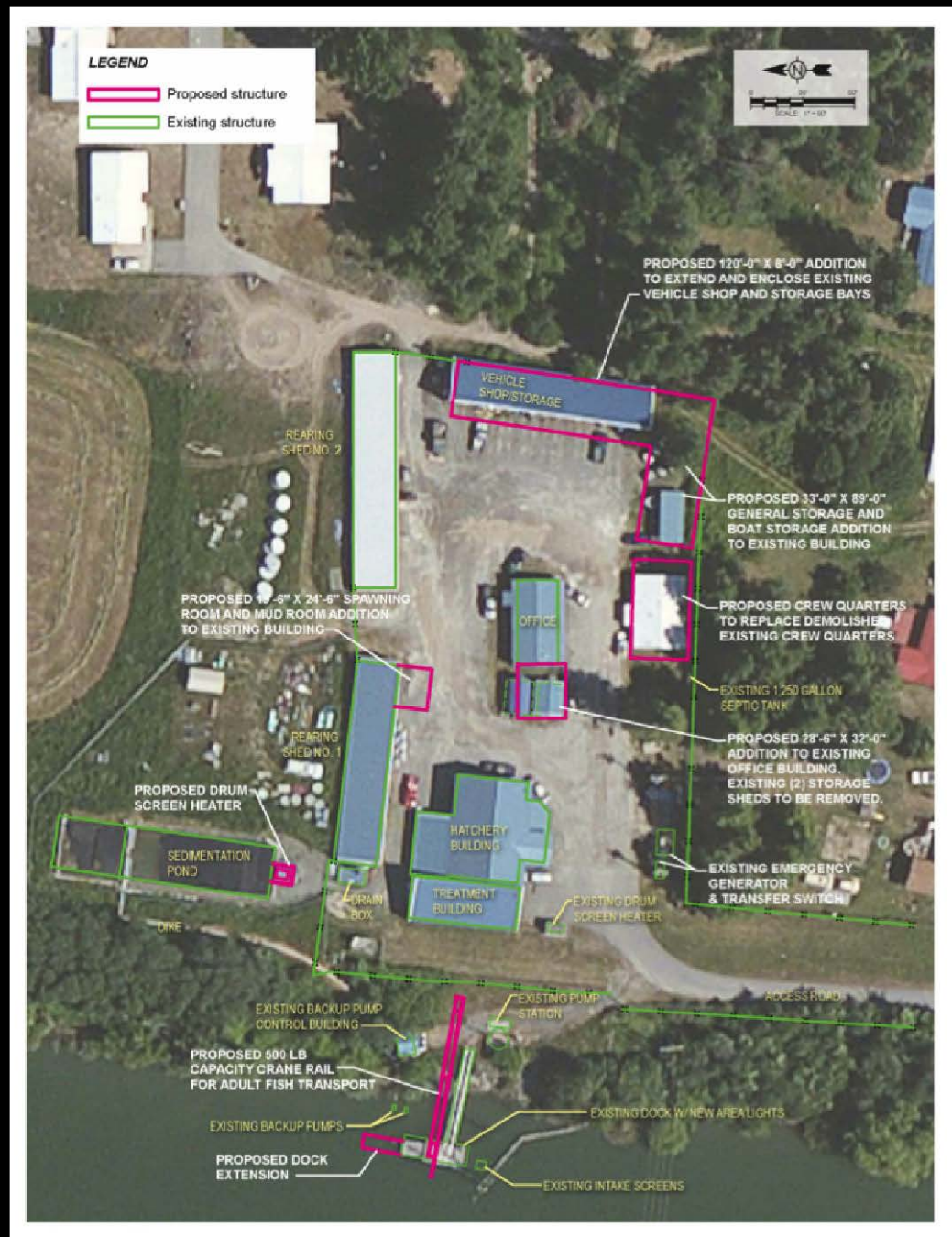
• **New Twin Rivers Facility Need (continued)**

- Imprinting and homing of sturgeon at second site farther upstream
- **Support future operational flexibility for sturgeon program and improved overall quality of culture conditions**
- Address Libby Dam BiOp RPA Component 4
- **Implement the Tribe's burbot aquaculture program per the Burbot Conservation Strategy MOU**



Kootenai Tribal Hatchery Upgrades

- Sediment pond weather protection and de-icing systems
- Mechanical methods to transfer broodstock from dock to holding tanks
- New spawning room
- Additional storage for food, boats, etc.
- Building upgrades for safety and sanitation



Twin Rivers Hatchery Site (New Facility)



Twin Rivers Hatchery

- Three water sources (wells, Moyie River & Kootenai River)
- Influent & effluent water settling basins
- Utilities, roads, etc.
- Water filtration & heating & cooling capabilities
- Adult fish holding/spawning for sturgeon & burbot
- Incubators for sturgeon & burbot eggs
- Start tanks for sturgeon & burbot
- Circular indoor rearing tanks for grow-out of sturgeon & burbot
- Administrative & biological support facilities
- Building for vehicle & boat storage & maintenance
- Two employee residences



Council Process – Major Project Review

- **August 2009 Tribe submitted Step 1 Master Plan**
- October 2009 ISRP requested revised Master Plan
- **June 2010 Tribe submitted revised Master Plan and responses to ISRP requests for additional information**
- October 2010 NPCC approved Step 1 Master Plan with request that Tribe address additional issues raised in second ISRP Step 1 review
- **August 2012 Tribe submitted Step 2 Master Plan**
- September 2012 ISRP provided positive review, stating that Tribe did a “very good job” in addressing ISRP concerns and comments

A scenic landscape featuring a wide river in the foreground, reflecting the surrounding environment. The river is flanked by lush green and yellowing trees, indicating an autumn setting. In the background, large, forested mountains rise under a clear blue sky. The word "Questions?" is overlaid in white text on the left side of the image, with a faint, mirrored version of the text visible in the water's reflection.

Questions?