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Fish and Wildlife Service

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JUN 2 1 2011

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Subject: Biological Opinion for the Kootenai River Habitat Restoration Project, Phase 1, Braided Reach 1
FWS Reference: 14420-2011-F-0181 (501.2900)

Dear Mr. Barco and Ms. Reinhart:

This letter transmits the biological opinion for the Kootenai River Habitat Restoration Project, Phase 1, Braided Reach 1, located on the Kootenai River in accordance with section 7 of the Endangered Species Act of 1973, as amended.

This biological opinion includes a determination that implementation of the proposed restoration project is not likely to jeopardize the continued existence of the Kootenai River white sturgeon (*Acipenser transmontanus*; Kootenai sturgeon), nor is the proposed restoration project likely to adversely modify Kootenai sturgeon critical habitat. We have provided an incidental take statement to exempt the potential incidental take of Kootenai sturgeon that may occur as a result of implementing this restoration project. However, we have determined that no reasonable and prudent measures nor terms and conditions are necessary, in addition to those measures incorporated into the project's description, to further minimize such incidental take of Kootenai sturgeon.

Also included in this opinion is the Service's concurrence with the Bonneville Power Administration's determination of "may affect, not likely to adversely affect" bull trout (*Salvelinus confluentus*) and bull trout critical habitat.

If you have questions regarding this opinion, please contact Jason Flory in the Northern Idaho Field Office at (509) 893-8003.

Sincerely,

Russell R. Holder

FOR Brian T. Kelly
State Supervisor

Enclosure

Final Biological Opinion for Kootenai River Habitat Restoration Project, Phase I, Braided Reach I, Idaho

FWS Ref. No: 14420-2011-F-0181

Prepared by:

U.S. Fish and Wildlife Service
Northern Idaho Field Office
Spokane, Washington

June 21, 2011

Supervisor: Russell R. Holder

Date: 6/21/11

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BACKGROUND AND INFORMAL CONSULTATION

Introduction

The Fish and Wildlife Service (Service) has prepared this Biological Opinion (Opinion) of the effects of the Kootenai River Habitat Restoration Project, Phase 1, Braided Reach 1 (Project) on bull trout (*Salvelinus confluentus*) and Kootenai River white sturgeon (*Acipenser transmontanus*). In a letter dated January 7, 2011, and received on January 11, 2011, the Bonneville Power Association (BPA) requested formal consultation with the Service under section 7 of the Endangered Species Act (ESA) of 1973, as amended, for the proposed implementation of the Project. On June 3, 2011, the Service received a letter from the Corps of Engineers, dated May 28, 2011, requesting they be added to the consultation with the BPA. In a June 6, 2011, email the BPA added the U.S. Army Corps of Engineers (Corps) and their issuance of a Clean Water Act Permit to the consultation, with BPA remaining the lead agency for the Project. The BPA determined that implementation of the Project may affect and is likely to adversely affect Kootenai River white sturgeon (Kootenai sturgeon), and bull trout. As described in this Opinion, and based on the biological assessment (BA) developed by BPA and other information, the Service has concluded that the Project, as proposed, is not likely to jeopardize the continued existence of Kootenai sturgeon. A complete administrative record of this consultation is on file in this office.

On May 5, 2011, BPA amended their BA in an email to the Service. In that email, BPA determined that Project implementation is not likely to adversely affect bull trout. BPA also determined that implementation of the project is not likely to adversely modify or destroy critical habitat for Kootenai sturgeon or bull trout. In this document, the Service is providing concurrence with those determinations.

Consultation History

On January 11, 2011, the Service received BPA's letter requesting formal consultation on implementation of the Project.

On April 14, 2011, BPA sent an email to the Service clarifying the proposed action.

On May 5, 2011, BPA sent an email to the Service modifying the BA to change the determination of effect on bull trout to "may affect, not likely to adversely affect".

On June 3, 2011, the Service received the Corps' letter requesting addition to BPA's consultation.

On June 6, 2011, the Service received the BPA's email requesting addition to the consultation of the Corps and their issuance of a Clean Water Act permit for the Project.

I. Description of the Proposed Action

A. Purpose

The purpose of the Project is to address significant bank erosion in Braided Reach 1 on the Kootenai River that is contributing to sediment loading and degradation of Kootenai sturgeon spawning habitat downstream. Reducing erosion by installing bank structures and vegetation will also benefit aquatic habitat by increasing overhanging bank cover, shade and channel margin complexity that would improve habitat for other listed species, such as bull trout, and species preyed upon by bull trout. These actions are needed to improve ecosystem function in the Kootenai River, and in particular to aid Kootenai sturgeon recruitment. Recruitment is thought to be very near zero due to a combination of factors, one of which is siltation of rocky substrate downstream in existing and potential spawning areas.

B. Action Area

The proposed project is on the Kootenai River in Boundary County, Idaho (Figure 1), in Township 62 North, Range 2 East, Sections 21 and 28 (Phase 1a) and Sections 19 and 20 (Phase 1b), B.M. The Phase 1 action area is referred to as Braided Reach 1 of the Kootenai River and includes two distinct sites: Phase 1a (between river mile (RM) 158 and 159) and Phase 1b (between RM 156 and 157) (Figure 1). Braided Reach 1 extends nearly four river miles (RM 160.9 to RM 156.2) from the Moyie River confluence downstream to the upstream extent of the backwater influence from Kootenay Lake.

The action area includes all areas to be affected directly or indirectly by the proposed federal action and not merely the immediate area involved in the action (50 CFR 402-02). For specific construction-related impacts, the action area is defined as a 0.5-mile radius around each Phase 1 construction site. For the purposes of evaluating potential increased turbidity due to instream work, the action area encompasses each project site and reaches downstream to the end of Braided Reach 1.

The action area also includes lands within Boundary County, Idaho associated with the effects of material sourcing, an interrelated and interdependent action. The action area for material sourcing includes lands within Boundary County, Idaho that are located outside management areas for grizzly bear, woodland caribou, and Canada lynx, and outside Canada lynx designated critical habitat.

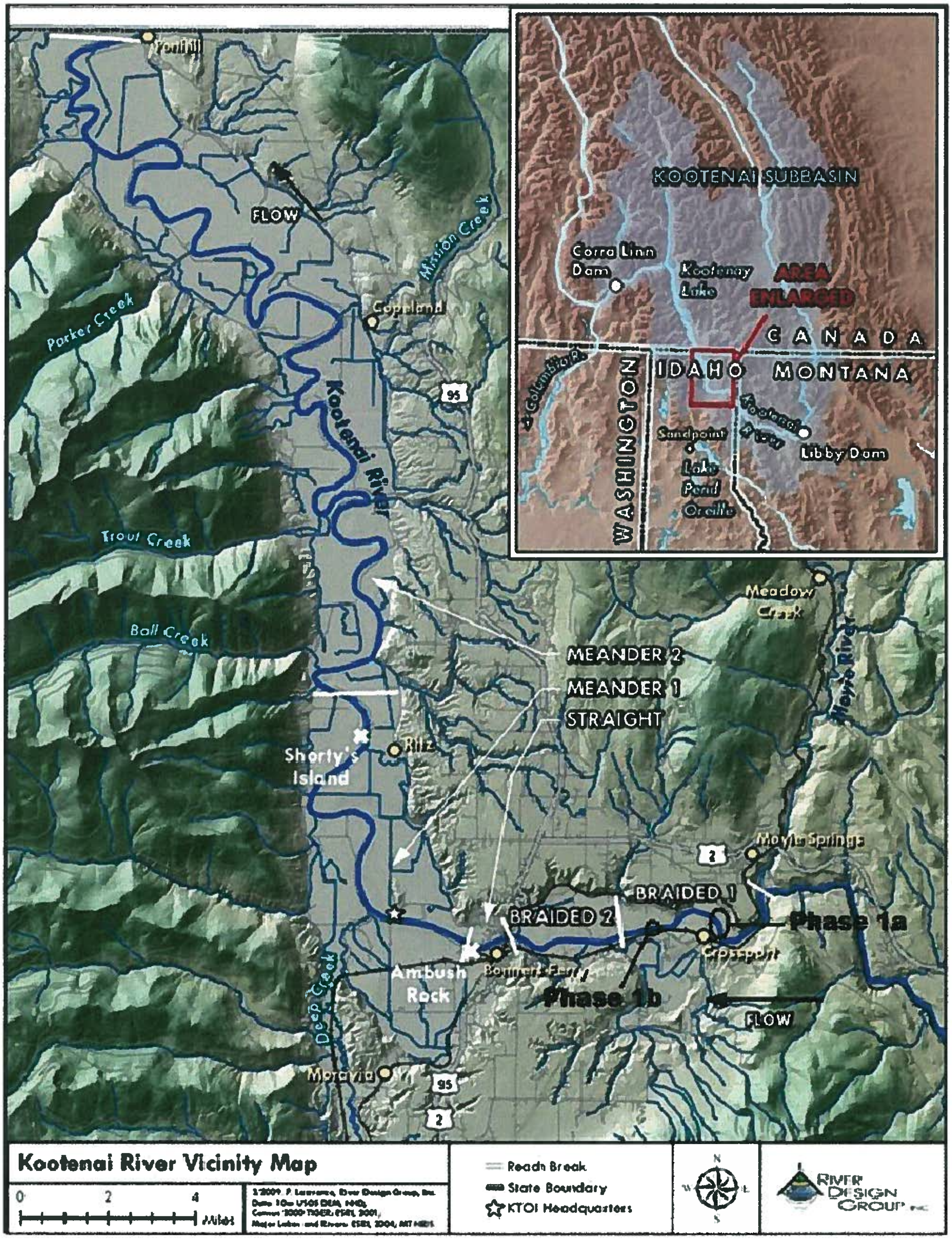

Figure 1. Phase 1 Project Area.

C. Project Sites

Phase 1 consists of treatments at two project sites, Phase 1a (between RM 158 and 159) and Phase 1b (between RM 156 and 157). Phase 1a is on the right (looking downstream) bank of the mainstem Kootenai River and side channel on the right side of the river. Phase 1a also includes work on the mainstem Kootenai River left bank adjacent to a developing island/side channel feature. Phase 1b is on the right bank of the mainstem Kootenai River downstream of Phase 1a.

Phase 1a will involve treatments of: 1) a 1,900 foot side channel, 2) 1,050 feet along an exposed gravel bar adjacent to a steep eroding bank, and 3) an 800-foot-long Kootenai River mainstem river bank segment that includes a developing island/small side channel area. Measures will include streambank restoration, floodplain construction and habitat improvement using bioengineering techniques and large wood placement. Right bank treatments will be divided into lower elevation and upper elevation bank treatments. In general, lower elevation bank restoration treatments will address the riparian area below the water surface elevation when it is at about 30,000 cubic feet per second (cfs), and upper elevation bank restoration treatments will address the upland area above this level.

Phase 1b will address eroding streambank along 800 feet of steep eroding bank along the mainstem Kootenai River by constructing vegetated floodplain surfaces between engineered large wood structures. Measures will include large wood structures installed along a section of eroding bank.

D. Phase 1a

Construction Sequence

Construction typically will proceed from upstream to downstream at each site following the general sequence identified below.

1. Mobilize equipment
2. Construct access and site improvements
3. Deliver and stage materials
4. Implement dewatering plan and Best Management Practices (BMPs)
5. Construct lower bank restoration treatments
6. Construct upper bank restoration treatments
7. Construct floodplain surfaces with backfill
8. Install side channel bank structures
9. Place growth media and construct microtopography
10. Install plants and transplant shrubs/trees
11. Install the riparian fence
12. Reclaim the site and seed disturbed areas
13. Demobilize equipment
14. Complete any additional site restoration activities

Phase 1a right bank projects will be initiated by improving access roads and staging areas. These activities include widening segments of the access roads, improving roadway subgrade, and grading limited areas for material and equipment staging and maintenance. The two Phase 1a right bank project components (right side channel and mainstem right bank) may be implemented concurrently.

Construction will be initiated by excavating foundations for the lower bank treatments, including floodplain construction adjacent to the toe of the right bank. Material removed during foundation preparations will be temporarily staged in an upland area and will be used to backfill the large wood installations or used for floodplain construction. Following installation of the lower bank treatments, upper bank construction will be initiated. Bank re-grading will result in surplus material that may be used to backfill the floodplain surfaces along the right bank or within the side channel. Following backfill and construction of floodplain surfaces in the side channel, side channel bank structures will be installed and surface treatments applied. Roughness elements, microtopography and planting will be incorporated into reconstructed floodplain areas.

Concurrent to the large wood structure installation, bank shaping will occur at some locations with excavated material stockpiled and used for bio-engineering treatments and vegetated soil lifts. Upon completion of lower elevation bank treatments, construction of upper elevation bank treatments will occur. Within the side channel, the contractor will be directed to implement project elements adjacent to Hideaway Islands, and then work towards the right bank line. After all of the instream elements are complete, a transition will be made to the upper elevation bank components, allowing the contractor to work their way out of the channel. Upper elevation floodplain vegetation planting and site restoration activities will be performed after earthwork is complete, followed by installation of livestock exclusion fencing. All work is expected to take approximately 30 days.

Phase 1a left side channel project will be initiated by improving the final segment of the access road and establishing a contractor mobilization area. This will include coordinating with Burlington Northern Santa Fe (BNSF) about railroad crossings, preparing areas for material and equipment staging and maintenance, and installing water quality protection measures. Construction will follow, beginning with foundation excavation for the constructed floodplain and engineered large wood structures. Spoil developed during the foundation preparation will be used for fill at this site. Surfaces that are disturbed and compacted during access improvements, materials delivery, and site work may require some restoration. Riparian fencing will not be a component of the left side channel treatments. All work is expected to take approximately 30 days.

Site Access

Phase 1a right bank project area will be accessed from State Highway 95-2, then proceeding south along the two-lane District 2 – County Road 60 to its culmination. From this point, a 1.5-lane unimproved access road traverses a high bluff above the Kootenai River. The road winds down to the floodplain of the Kootenai River and transitions from primarily a rock bed to a dirt road across the broad floodplain. The upper elevation segment of road may require minor widening at one to three bends to facilitate construction equipment access. Blasting and heavy ripping will likely be required at these sites. The earthen bed of the lower elevation segment will require placement of appropriate subgrade material to facilitate heavy equipment access. This lower elevation segment crosses open grazing land with few limitations on equipment access or staging. Access to both the side channel and mainstem bank worksites will be created by excavating an equipment path from the floodplain to the side channel bed. This will be established from the right bank property at the inlet to the side channel, facilitating machinery access and material delivery to both treatment sites. Much of the targeted streambed is exposed under low flow conditions and will allow equipment to operate along the stream banks and portions of the side channel in dry conditions. All work within the side channel will be conducted within the ordinary high water mark.

Access to the Phase 1a left bank site will be from State Highway 95-2, proceeding south along District 15 – County Road 24. Approximately 0.5 miles before the Dobson Creek - Katka Creek turnoff, a field access road turns to the north and crosses the BNSF railroad tracks. Although construction vehicles must be trucked across the tracks, no improvements will be required at the BNSF crossing.

A level hard-packed access road parallels the railway line for about 0.5 miles. Near its eastern terminus, two narrow vehicle tracks turn north, and provide informal access to the river. These tracks will be improved to provide direct access to the cobble floodplain at the Phase 1a project site. Grading will be required to moderate the contours of the initial 500-foot segment of road. The access route transitions to the elevated cobble bar that runs continuously along the bank line to the project area. This bar is fully exposed during the low flow conditions expected at the time of construction. Alternatively, rather than driving on the cobbles, the initial segment of road may be improved on the floodplain upland (a reed-canary grass community) up to the work sites.

Equipment

The contractor will select equipment suited to efficiently accomplish each work element. Heavy equipment expected to be used is listed by major work element in Table 1. While some machinery will be shared among the three work sites, due to the compressed construction schedule, the contractor will mobilize three construction teams that will be aided by this assortment of equipment. The BA lists BMPs that will be implemented to minimize the risk of introducing toxic substances to the river as a result of heavy equipment use, including but not limited to:

- A spill containment and control plan will be prepared, and will contain notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment;

- Spill containment kits will be stored at each work site and the construction crews will be trained in proper use;

- Prior to mobilizing to the project site, all equipment shall be washed to minimize the introduction of foreign materials and fluids to the project site. All equipment shall be free of oil, hydraulic fluid, and diesel fuel leaks.

- Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a designated area at least 150 feet or more from any stream or wetland.

- All vehicles operated within 150 feet of any stream or wetland must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request.

A complete list of BMPs can be found in section 4.3.2 of the BA.

Table 1. Heavy equipment to be used at each work site.

Access Improvements	Work Area Isolation and Erosion Control	Construction
Dozer	Excavator	Dozer
Excavator	Front End Loader	Excavator
Grader	Bobcat	Front End Loader
Front End Loader	Dump Truck	Skidder
Compactor		Bobcat
Dump Truck		Dump Truck

Staging

At the Phase 1a right bank site, equipment and materials will be staged on an upland terrace feature above the ordinary high water mark at the project site. This area is currently a marginal pasture with little shrub or tree cover and provides ample space for equipment and materials to be stockpiled. Equipment fueling and maintenance areas will be located in this general area, several hundred feet from the river.

At the left bank site, equipment and materials will be staged adjacent to the project site on the floodplain above the ordinary high water mark. Materials may also be staged on the elevated cobble bar within the side channel (during low flows). Equipment fueling and maintenance will occur at an upland location where the currently unimproved access road diverges from the road paralleling the BNSF tracks. BMPs will be followed to minimize risk of contaminants entering the watershed. They include, but are not limited to:

- Prior to mobilizing to the project site, all equipment shall be washed to minimize the introduction of foreign materials and fluids to the project site. All equipment shall be free of oil, hydraulic fluid, and diesel fuel leaks.

- Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a designated area at least 150 feet or more from any stream or wetland.

- All vehicles operated within 150 feet of any stream or wetland must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request.

- All equipment operated instream must be cleaned before beginning operations below the bankfull elevation to remove all external oil, grease and dirt.

- All power equipment within 150 feet of the water shall be inspected daily for fluid leaks and repaired. The contractor must prepare daily inspection reports.

The BMPs listed in section 4.3.2 of the BA related to staging areas will be implemented to minimize temporary impacts to upland areas.

Materials

Construction materials, including trees, rock, alluvium, rebar and bioengineering fabrics, will be stockpiled in delineated sites at each project area. Materials will be contained in as small an area as practicable to limit disturbance. Stockpile locations will be restored following project completion. All surplus materials, including rock chips, sticks, bioengineering remnants, etc., will be disposed of off-site at a location approved for such purposes by Boundary County regulations.

Trees with rootwads and limbs that are intact (to the extent possible) will be used for habitat structures. Types to be used include western red cedar (*Thuja plicata*), spruce (*Picea spp.*), pine (*Pinus spp.*), or Douglas fir (*Pseudotsuga menziesii*). Other wood species may be substituted upon approval of the project inspector prior to installation.

Key members in the large wood structures will be pinned using a minimum of 1-inch-diameter rebar that completely passes through the adjoining wood member. Exposed rebar will be cut flush with the large wood. Rock for ballasting the wood structures will be angular to sub-round in shape, dense, sound and free from cracks, seams and other defects.

Selected trees with large and numerous limbs will be placed in the log structures in accordance with design drawings. Proposed trees with rootwads will be approved by the project inspector prior to installation. The placement of trees with rootwads will begin at the lowest level next to the streambed and progress upward and oriented as designed. Voids between tree stems will be filled with smaller trees, large limbs and excavated cobble and ballast with large boulders. Ballast will be placed in stable orientations on large wood elements.

Re-vegetation will use native woody plant materials or woody plant materials adapted to the site and as specified in the project re-vegetation plan and drawings. The plant material will be free from disease and harmful insects.

Dewatering—Right Bank

Instream construction will occur during the late August - September low flow period when much of the treatment areas are naturally dewatered. Dewatering is expected to be unnecessary for upland activities that extend into October, including upland site work, restoration and re-vegetation. The upstream half of the Phase 1a main channel right bank component will be completely dry for shaping and modification. The downstream half of the site will be under two to three feet of water flowing into the entrance of the side channel. The constructed floodplain elements extend into the side channel approximately 75 feet from the toe of slope and will require foundation excavations below the water for scour countermeasures. To isolate the right bank and side channel work areas from flowing water, a cofferdam or silt curtain will be placed along the waterward edge of the work area. In addition, pumping or ditching infiltrated water out of the work area may be required. Pumped and/or ditched water will be directed to a settling basin for sediment treatment and will not be discharged directly into the Kootenai River or the side channel. Construction and dewatering BMP's described in Section 4.3.2.5 of the BA will be followed.

The side channel will be dewatered by constructing a bulk bag cofferdam across the inlet to prevent surface inflow from entering the side channel. Groundwater seepage and residual pools can be managed by pumping or sandbagging to direct flow through the site. Although most fish in the side channel are expected to volitionally exit via the downstream channel opening after the upper elevation cofferdam is placed, fisheries biologists will salvage fish from residual pools before construction commences. A floating sediment curtain, settling basin or other turbidity BMPs will be required at the downstream end of the side channel work area. Construction and dewatering BMPs described in Section 4.3.2.5 of the BA will be followed.

Dewatering—Left Bank

Dewatering and work area isolation will not be necessary to install the left bank/side channel treatments. The inlet to the left side channel will be completely exposed during construction and dewatering will not be required. The downstream location will be implemented in shallow water within the Kootenai River; BMPs described in Section 4.3.2.4 of the BA will be implemented to manage construction-related turbidity. Construction of the large wood structures will require that foundation excavation be performed and these excavations may be sidecast to provide a temporary cofferdam to manage surface water flow. Localized dewatering with trash pumps may be required to place some large wood structures. Construction and dewatering BMPs described in Section 4.3.2.4 of the BA will be followed.

Main Channel Right Bank Restoration

Lower Elevation Large Wood Placement: The lower elevation bank will be restored by constructing a wood reinforced low bank line approximately 50 feet from the existing, eroded bank line toe. The area between the wood placement and the existing bank line will be filled with material generated during wood foundation preparation and spoil from bank line shaping. In addition to longitudinal large wood placement, perpendicular large wood will be placed at three locations to reduce flow velocity against the right bank at flows greater than 20,000 cfs.

Lower Elevation Floodplain and Microtopography Creation: The area between an existing gravel bar and the right bank will be backfilled up to the modeled 20,000 cfs water surface elevation using excavated bank material and additional large wood as summarized below. Backfill material will be generated during foundation preparation for large wood installations and from bank regrading. Lower elevation bank floodplain microtopography will be created through passive restoration (natural accumulation of sediment that is a physical response to the placement of large wood described above), and the active creation of complex floodplain surfaces by placing and shaping excavated upper elevation bank materials.

In lower elevation bank areas where excavated material is available as a result of upper elevation bank treatment re-grading, floodplain surfaces will be created using backfilled material. These surfaces will be constructed to include micro-topography, and woody debris will be scattered throughout.

Upper Elevation Bank Restoration: Upper bank restoration treatments address the right bank area above the 30,000 cfs water surface elevation from the toe of the existing bank up to the top of the bank. Three re-grading methods will be applied to banks within the Phase 1a project area, each designed to be applied to distinct slope categories and associated flood plains. They are:

> <u>*Upper Elevation Bank Treatment 1:*</u> This treatment will be applied where bank slopes are currently 1.5:1 to 3:1 and cannot be re-graded to a lesser slope due to constraints such as the presence of healthy, mature vegetation, private land ownership, or existing infrastructure. Coir (coconut fiber) fascines will be installed along the toe of the slope to prevent undercutting and erosion. Fascines will be constructed of 16- to 20-inch high-density coir logs anchored into the slope toe with either cables attached to aluminum duckbill earth anchors, or wooden stakes and twine. A shallow trench will be excavated prior to coir log placement and logs will be positioned horizontally along the slope toe, with approximately half of their diameter exposed. If any excavation of the slope is performed, the excavated material will be placed at the toe of the slope, establishing a transition between the slope and lower elevation bank restoration treatments, such as vegetated soil lifts. This excavated material will be graded to establish surface roughness and microtopographic variation.
>
> <u>*Upper Elevation Bank Restoration Treatment 2:*</u> Upper elevation bank restoration treatment 2 will be applied where bank slopes are currently between 1.5:1 and 3:1, or where it is possible to regrade steeper slopes to this lesser gradient. Slope toes will be stabilized by installing 16- to 20-inch diameter anchored coir logs. Additionally, 12-inch diameter low density coir logs will be anchored at 10-foot spacing along the slope length, effectively shortening the length. Compost and seed will be placed over the entire surface of the slope, and covered in biodegradable coir fabric to provide nutrients, moisture and slope stability in the short term so seeds can establish. Containerized shrub and tree species will be planted through the coir fabric in order to establish woody species that have sufficient root mass to provide long-term slope stability. Planting methods for installed trees and shrubs will mirror techniques described in the re-vegetation section below.

If excavation is required, excavated material will be used in two ways. In areas where lower elevation bank treatments consist of engineered large wood structures, excavated material will be used to create microtopography floodplain surfaces (described above). This material will be graded to create surface roughness, with large woody debris scattered throughout to encourage sediment deposition and natural recruitment of vegetation. Alternatively, the material will be used for vegetated soil lift treatments described for the right side channel restoration at the Phase 1a site.

Upper Elevation Bank Restoration Treatment 3: The restoration approach for 3:1 (or more gradual) slopes focuses on re-vegetation and creating microtopographic variation to support a long-term riparian vegetation community. Excavated soil from re-grading will be used as described above.

Upper Elevation Bank Re-vegetation: Re-vegetation treatments along the upper elevation bank will focus on establishing a diverse mix of riparian shrub and tree species. The goal is to establish riparian shrub, mature cottonwood and mixed conifer forest restoration cover types. Table 2 provides a list of species that are currently being grown in nurseries for installation in Phase 1a project areas. These species were identified as suitable for re-vegetation based on the physical and geomorphological conditions of the Phase 1a upper elevation right bank area. Detailed planting specifications will be developed as part of final design to ensure proper installation to maximize success. Installed plants will additionally require treatments in order to address weed competition and browse pressures. Weed competition will be reduced by installing brush blankets and browse pressure will be addressed by installing browse protectors.

Table 2. Riparian shrub and coniferous tree species to be planted as part of Phase 1a upper elevation right bank re-vegetation.

Species	Common Name
Trees	
Pinus ponderosa	ponderosa pine
Populus tremuloides	quaking aspen
Populus trichocarpa	black cottonwood
Betula papyrifera	paper birch
Pseudotsuga menziesii	Douglas-fir
Pinus contorta	lodgepole pine
Shrubs	
Salix exigua	sandbar willow
Salix bebbiana	Bebb willow
Crataegus douglasii	black hawthorne
Alnus incana (tenuifolia)	mountain alder
Cornus sericea	red-osier dogwood
Rosa woodsii	Wood's rose
Symphoricarpos occidentalis	snowberry
Amelanchier alnifolia	western serviceberry
Prunus virginiana	chokecherry

Upper Elevation Riparian Fencing: Fencing will be installed to support restoration treatment goals by eliminating browse pressure from nearby livestock, and preventing the over-compaction of floodplain materials that result from constant livestock traffic. Browse exclosure fencing will be constructed at a height that prohibits entry by cattle, and will be left intact for a minimum of five years to allow establishment of healthy riparian vegetation. Fence posts will consist of 10.5-foot long, four inch diameter untreated wooden posts installed vertically at least two feet into the ground along the perimeter of the planted area. Posts will be spaced 15 feet apart and closer in areas with uneven ground. Fence material will consist of sturdy plastic mesh fencing material at least 7.5 feet in height.

Right Side Channel Restoration

Large Wood Placement: Engineered large wood structures will be constructed primarily along the outer bends of the side channel alignment in order to induce turbulence, create lateral scour pools and dissipate or redirect flow energy on an outer meander bend. Engineered large wood structures will also be used along the margins of the side channel entrance to control the inlet capacity by reducing its effective geometry. Engineered large wood structures consist of tiers or decks of logs buried in the toe of the bank and projecting into the channel. Large wood structures will be constructed by excavating a foundation to an elevation of maximum scour depth. Logs will then be placed and alternating decks of logs will be racked successively until the structure is constructed to its finished grade. Logs will be pinned and ballasted to counteract the forces of drag and buoyancy.

Side channel large wood structures will be approximately 50 feet long (parallel to the bank line) and approximately 30 feet wide. The structure will project laterally up to 20 feet into the 80-foot-wide side channel; the remainder of the structure will be buried in the bank. Each structure will consist of 40 logs, half of which will include a minimum 6-foot-diameter rootwad. Logs will be 30 to 35 feet long, 10 to 27 inches in diameter, and will be placed in four to six decks.
Vegetated Soil Lifts: Vegetated soil lifts will be constructed along outer meander bends of the right bank in this side channel. Vegetated soil lifts will be constructed on a stable toe or bench of imported cobble or logs, and will be constructed by wrapping soil within two layers of biodegradable coconut fiber (coir) fabric. The face of each soil lift layer will be reinforced with a biodegradable coir log or other suitable material to help maintain the lift shape, keep fine soil particles from filtering out through the lift face, and maintain surface tension. To aid the process of natural vegetation recruitment, dormant willow, alder, and dogwood cuttings will be placed beneath, and between, each soil lift layer. Soil lifts will be tied into existing channel structures where feasible.

Floodplain Construction and Microtopography Treatment: The area between the newly constructed side channel banks and the existing side channel banks will be backfilled up to a range of elevations corresponding to the modeled 20,000 to 30,000 cfs water surface elevations. It will be filled with excavated bank material and additional large wood as previously discussed for floodplain and microtopography treatments. Backfill will be generated during bank structure foundation preparation and bank regrading.

Wood will be placed and microtopography established on constructed floodplain surfaces in the side channel to create roughness elements that promote the storage of fine sediments. As these depositional surfaces form, natural processes (geomorphic disturbance, overflow events) will create a diverse surface that will have the appropriate elevation and substrate composition to promote the capture and germination of native riparian seeds.

Re-vegetation: Re-vegetation approaches along the right bank of the right side channel will include natural recruitment of cottonwoods and willows from seed, and installed plantings. In depositional areas that lie adjacent to engineered large wood structures, re-vegetation will result from natural recruitment on surfaces linked to microtopography and wood placement. Beneath vegetated soil lift structures, depositional surfaces may be re-vegetated with containerized plantings of riparian shrub species.

On lower elevation bank restoration areas adjacent to vegetated soil lifts, containerized plants will be installed to establish a riparian shrub zone that is more resilient to geomorphological disturbances and overflow events. Re-vegetation efforts along the left bank of the right side channel will consist primarily of passive treatments designed to encourage the establishment of native cottonwoods, willows and other riparian shrubs from seed. These efforts are directly linked to wood placement and microtopography treatments. Wood placement along the lower elevation bank area will establish roughness elements that promote the accumulation and deposition of sediments. As these depositional surfaces form, natural processes (geomorphic disturbance, overflow events) will create a diverse surface with the appropriate elevation and substrate composition to promote the capture and germination of native riparian seeds.

Left Bank Side Channel Restoration

The Phase 1a restoration plan for the Kootenai River left bank includes 800 feet of restoration treatments upstream and downstream of a developing floodplain island that is threatened by enlargement of a small side channel. Treatments will consist of large wood placement, construction and placement of engineered wood structures, and re-vegetation.

Large Wood Placement: Treatments will consist of engineered wood structures placed at the side channel inlet, limiting flow between the left bank and the island that has formed in the main channel. Structures will be designed to allow flows greater than 20,000 cfs into the side channel, which will reduce stress on vegetation developing on the island. Currently the river flows through the side channel at flows higher than 5,000 cfs. Under the restored condition, flows greater than 20,000 cfs will overtop the large wood at the upstream end and flow between the left bank and the island. Flows less than 20,000 cfs will remain in the main Kootenai River channel; however, water will enter the side channel from the open downstream end, thus creating a non-flowing backwater habitat. The large wood structures will be porous to allow interstitial flow and seepage into the side channel at very low velocities, reducing scour and enhancing deposition of fine sediments.

Engineered wood structures will be constructed by excavating foundations to an elevation of maximum scour depth. Base members will be placed and alternating decks of large wood will be racked successively until the structure reaches design finish grade. At this site, member size will vary from 6- to 24-inches-diameter and 20 to 35 feet long. Large wood will be placed at a density of approximately one to two pieces per linear foot, resulting in a structure width (perpendicular to flow) of approximately 25 feet and height of 5 to 7 feet (some of which will be buried). Large wood will be anchored in a matrix of native alluvium, imported alluvium and brush in order to counteract buoyancy and drag forces.

Re-vegetation: Re-vegetation in the left side channel will be passive treatments designed to encourage native cottonwoods, willows and other riparian shrubs to establish from seed. Wood placed at the side channel entrance will promote deposition at the upper end of the side channel, increasing the area with the appropriate elevation and substrate to recruit riparian vegetation.

E. Phase 1b

The Phase 1b project is designed to address the eroding streambank by constructing vegetated floodplain surfaces between engineered large wood structures along 800 feet of steep eroding bank.

Construction Sequence

Construction sequencing at the Phase 1b site will follow the same methods as described in for Phase 1a above.

Site Access

Access to the Phase 1b project area will be from State Highway 95-2, exiting to the District 2 – County Road 60 south as far as the Trans-Canada gas line crossing. From this intersection, turn west toward the river along a single lane, unpaved private road, crossing pasture lands to the river.

Access to the bottom of the bank line and the stream channel will be established by excavating a short access road from the high terrace field to the channel bed. An old cattle watering access will be used to limit bank shaping for heavy equipment access. This approach will enable machinery to access the upstream components of Phase 1b (engineered large wood structures) and the downstream components (bio-engineering treatments). Because construction will occur during low flows, much of the streambed will be exposed, allowing equipment to operate along the streambank and within the channel in dry conditions. Materials can either be brought to the channel through the improved bank access route or end-dumped from the top of the bank.

Equipment

Phase 1b construction will use the same equipment and procedures as described for Phase 1a above. BMPs to minimize the risk of pollution are described in Section 4.3.2 of the BA.

Staging

Equipment and material staging areas will be in the pasture adjacent to the project site. This area is currently in seasonal pasture and provides ample space for equipment and material staging well away from the river. BMPs related to staging areas are described in Section 4.3.2.1 of the BA.

Materials

Construction materials required for Phase 1b will be the same as described for Phase 1a above.

Dewatering

Dewatering and isolating the Phase 1b work area will be necessary, although reduced in extent by conducting the work in late August to September when flows are low and much of the area is naturally dewatered. The lower bank restoration treatments extend into the channel approximately 25 to 100 feet from the toe of the right bank and will require foundation excavations below water for scour countermeasures. Dewatering methods for foundation work may include installing a cofferdam or silt curtain waterward of the lower bank work site to isolate the right bank work area from flowing water. Pumping or ditching may be required to remove infiltrated water from the work area; it will be directed to a settling basin for sediment treatment prior to release back into the Kootenai River or the side channel. Construction and dewatering BMP's described in Section 4.3.2.5 of the BA will be followed.

Restoration Treatments

Restoration treatments will be implemented at one site on the right bank of the Kootenai River that will be similar to the treatments previously described for Phase 1a Main Channel Right Bank Restoration above. Measures will include large wood structures installed along a section of eroding bank. The structures will extend laterally into the channel, creating a velocity and shear concentration zone further out in the channel that will create pool habitat and complexity. The structures will be installed as described for Phase 1a Main Channel Right Bank Restoration above, including installation of vegetated soil lifts, upper elevation bank treatments, and treatments 1 and 2 for grading, microtopography creation, revegetation, and fencing.

The Phase 1b project includes installing large wood complexes and bioengineering treatments along 800 feet of severely eroding bank, re-grading and revegetating steep banks along the side channels, and installing a riparian buffer fence to exclude livestock from grazing riparian vegetation within a minimum 50-foot riparian buffer.

II. Analytical Framework for the Jeopardy Determination

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this BO relies on four components: (1) the *Status of the Species*, which evaluates the Kootenai sturgeon range-wide conditions, the factors responsible for those conditions, and their survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the conditions of the Kootenai sturgeon in the action area, the factors responsible for those conditions, and the relationship of the action area to the survival and recovery of the Kootenai sturgeon; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the Kootenai sturgeon; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the Kootenai sturgeon.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the Kootenai sturgeon current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the Kootenai sturgeon in the wild.

Adverse Modification Determination

This Opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this Opinion relies on four components:

1. The *Status of Critical Habitat*, which evaluates the rangewide condition of designated critical habitat for Kootenai sturgeon in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall.

2. The *Environmental Baseline*, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area.

3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units.

4. *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on Kootenai sturgeon critical habitat are evaluated in the context of the rangewide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat rangewide will remain functional (or will retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for Kootenai sturgeon.

The analysis in this Opinion places an emphasis on using the intended rangewide recovery function of Kootenai sturgeon critical habitat and the role of the action area relative to that intended function as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

III. Informal Consultation

BPA has requested the Service's concurrence with their determination that project implementation "may affect, not likely to adversely affect" bull trout and bull trout critical habitat.

The Kootenai River is one of 22 designated bull trout recovery units in the Columbia River basin. The Kootenai River/Kootenay Lake core area contains all bull trout life history strategies: adfluvial (lake dwelling), fluvial (river dwelling), and resident (smaller tributary dwelling).

The Project involves dewatering up to 445,365 square feet of side channel and riverine habitat in August and September, when Kootenai River flows are at their lowest. Work areas will be isolated using bulk bags (filled with material from upland sources), floating silt curtains, and coffer dams. Pumps will also be used to dewater work areas. As work areas are dewatered, and before dewatering pumps are activated, fish will be removed by seining and/or electrofishing. Fish will be transported downstream of the work zone and released as soon as possible after collection.

After dewatering, treatment will begin on 4,550 lineal feet of side channel and river bank habitat in the braided reach of the Kootenai River, at two sites between RM 158 and 159, and RM 156 and 157. Initial Project activities (mobilizing equipment, constructing access, staging materials) will begin in July 2011 and are expected to take approximately 30 days to complete. Dewatering and in-water work activities will take place during the late August – September (2011) low flow period when much of the treatment areas are naturally dewatered. Subsequent upland activities (re-vegetation, fencing) will occur into October 2011.

Field data indicate that adult bull trout utilize the Idaho portion of the mainstem Kootenai River as a migratory corridor to and from spawning tributaries and Kootenay Lake and the lower Kootenai River, but in very low densities. Telemetry data shows that during the non-migratory and spawning periods, bull trout that are present are likely to be in deep holes of the lower river. Bull trout spawning has not been documented in the mainstem Kootenai River. Migrations to upstream spawning tributaries occur June through September, and out-migrations following spawning occur November through December. However, the works sites are currently in a degraded condition (actively eroding banks, little riparian vegetation, low channel complexity, lack of cover). Also, the work will occur when river flows are at their lowest and water temperatures in the side channels will be higher than those in the adjacent mainstem (due to lack of riparian vegetation and shallow water). Additionally, bull trout in fluvial systems are known to prefer deep, slow water habitats with cover (i.e. pools in the thalweg) over shallower, degraded areas with little to no cover (Al-Chokhachy and Budy, 2007, pg. 1073). For these reasons, it is unlikely that bull trout will be in the area of the work site during project implementation. Therefore, due to the low density of bull trout in the Kootenai River, degraded habitat conditions within the side channel, and bull trout's preference to use for deeper water habitats with cooler water, the potential effects to bull trout from dewatering 445,365 square feet of riverine and side channel habitat, as well as subsequent treatment of 4,550 lineal feet of side channel and riverine habitat, are discountable. Treatment of the side channel and river bank habitat will also increase turbidity within bull trout critical habitat. However, due to the implementation of BMP's specifically designed to minimize turbidity (i.e. silt curtains and limiting in-water work to periods of low river stages), effects to bull trout critical habitat from treatment of 4,550 feet of side channel and river bank habitat are expected to be temporary and insignificant. Long term, the overall net effect of the Project will be to improve the quality of bull trout habitat.

Additionally, dewatering portions of designated bull trout critical habitat will have direct effects to critical habitat in the form of temporary total loss of PCEs in the dewatered areas. However, due to the implementation of BMP's specifically designed to minimize effects to bull trout critical habitat (i.e. limiting in-water work to periods of low river stages, re-introducing water into dewatered areas in a controlled manner), effects to bull trout critical habitat from dewatering up to 445,365 square feet of side channel and riverine habitat are expected to be temporary and insignificant. The temporary loss of the PCEs functionality will be of no biological consequence because bull trout are unlikely to use the habitat during the time it is dewatered. When bull trout are potentially more likely to use the side channel (e.g., spring) the critical habitat functionality of the side channel will have been restored (i.e., water will have been returned to the channel). Additionally, as stated previously, the overall net effect of the Project will be to improve the quality of bull trout habitat.

Conclusion

We have reviewed the information provided and concur with your finding that implementation of the proposed project "may affect, but is not likely to adversely affect" bull trout and bull trout critical habitat. Concurrence by the Service is contingent upon implementation of the project and conservation measures as described in the BA.

This concludes informal consultation pursuant to section 7(a)(2) of the Act. This project should be re-analyzed if new information reveals that effects of the action may affect listed species or critical habitat in a manner, or to an extent not considered in this consultation; if the project is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; and/or if a new species is listed or critical habitat is designated that may be affected by this project. Effects to these species will not be analyzed further in this biological opinion.

BIOLOGICAL OPINION

IV. Status of the Species

A. Listing Status

On June 11, 1992, the Service received a petition from the Idaho Conservation League, North Idaho Audubon, and the Boundary Backpackers to list the Kootenai sturgeon as threatened or endangered under the Act. The petition cited lack of natural flows affecting juvenile recruitment as the primary threat to the continued existence of the wild Kootenai sturgeon population. Pursuant to section 4(b)(A) of the Act, the Service determined that the petition presented substantial information indicating that the requested action may be warranted, and published this finding in the Federal Register on April 14, 1993 (58 FR 19401).

A proposed rule to list the Kootenai sturgeon as endangered was published on July 7, 1993 (58 FR 36379), with a final rule following on September 6, 1994 (59 FR 45989).

B. Reasons for Listing

The Kootenai sturgeon is threatened by habitat modifications in the form of a significantly altered annual hydrograph. Significant levels of natural recruitment ceased after 1974, which coincides with commencement of Libby Dam operations. Other potential threats to the Kootenai sturgeon include removal of side-channel habitats; changes in water chemistry, including elevated heavy metal concentration; and a loss of nutrient inputs from flooding. Paragamian (2002, pg. 375) reported that "Reduced productivity because of [a] nutrient sink effect in Lake Koocanusa, river regulation, the lack of flushing flows, power peaking and changes in river temperature may have led to changes in fish community structure." Changes in the fish community structure may have favored an increase in fish species that prey on Kootenai sturgeon eggs and free-embryos. Changes in the hydrograph, particularly from Libby Dam and the Corra Linn Dam (in Canada), have altered Kootenai sturgeon spawning, egg incubation, and rearing habitats, and reduced overall biological productivity of the Kootenai River. These indirect factors may be adversely affecting the free-swimming life stages of the Kootenai sturgeon.

C. Species Description

Kootenai sturgeon are included in the family Acipenseridae, which consists of 4 genera and 24 species of sturgeon. Eight species of sturgeon occur in North America with Kootenai sturgeon being one of the five species in the genus *Acipenser*. Kootenai sturgeon are a member of the species *Acipenser transmontanus*.

White sturgeon were first described by Richardson in 1863 from a single specimen collected in the Columbia River near Fort Vancouver, Washington (Scott and Crossman 1973, as cited in NWPCC, 2005, pg. 371). White sturgeon are distinguished from other *Acipenser* by the specific arrangement and number of scutes (bony plates) along the body (Scott and Crossman 1973, as cited in NWPCC, 2005, pg. 371). The largest white sturgeon on record, weighing approximately 1,500 pounds was taken from the Snake River near Weiser, Idaho in 1898 (Simpson and Wallace

1982, pg. 51). The largest white sturgeon reported among Kootenai sturgeon was a 159 kilogram (350-pound) individual, estimated at 85 to 90 years of age, captured in Kootenay Lake during September 1995 (RL&L 1999, pg. 8). White sturgeon are generally long-lived, with females living from 34 to 70 years (PSMFC 1992, pg. 19).

D. Life History

As noted in the Kootenai Sturgeon Recovery Plan (Service 1999, pg. 4), Kootenai sturgeon are considered opportunistic feeders. Partridge (1983, pgs. 23-28) found Kootenai sturgeon more than 70 centimeters (28 inches) in length feeding on a variety of prey items including clams, snails, aquatic insects, and fish. Andrusak (pers. comm., 1993) noted that kokanee (*Oncorhynchus nerka*) in Kootenay Lake, prior to a dramatic population crash beginning in the mid-1970's, were once considered an important prey item for adult Kootenai sturgeon.

Historically (prior to effects from Corra Linn Dam, Grohman Narrows, river diking, and Libby Dam construction and operation), spawning areas for Kootenai sturgeon were not specifically known. Kootenai sturgeon monitoring programs conducted from 1990 through 1995 revealed that during that period, sturgeon spawned within an 11.2 RM reach of the Kootenai River, from Bonners Ferry downstream to below Shorty's Island. Through 2005, the known extent of the Kootenai sturgeon's spawning area remained unchanged. Most spawning is currently occurring below Bonners Ferry over sandy substrates. As river flow and stage increase, Kootenai sturgeon spawning tends to occur further upstream, near the gravel substrates which now occur at and above Bonners Ferry (Paragamian et al. 1997, pg. 30). Reproductively active Kootenai sturgeon respond to increased river depth and flows by ascending the Kootenai River. Although about a third of Kootenai sturgeon in spawning condition migrate upstream to the Bonners Ferry area annually, few remain there to spawn. Kootenai sturgeon have spawned in water ranging in temperature from 37.3 to 55.4° F. However, most Kootenai sturgeon spawn when the water temperature is near 50° F (Paragamian et al. 1997, pg. 30).

The size or age at first maturity for Kootenai sturgeon in the wild is quite variable (PSMFC 1992, pg. 11). In the Kootenai River system, females have been estimated (based upon age-length relationships) to mature at age 30 and males at age 28 (Paragamian et al. 2005, pg. 525). Only a portion of Kootenai sturgeon are reproductive or spawn each year, with the spawning frequency for females estimated at 4 to 6 years (Paragamian et al. 2005, pg. 525). Spawning occurs when the physical environment permits egg development and cues ovulation. Kootenai sturgeon spawn during the period of historical peak flows, from May through July (Apperson and Anders 1991, pg. 50; Marcuson 1994, pg. 18). Spawning at near peak flows with high water velocities disperses and prevents clumping of the adhesive, demersal (sinking) eggs.

Following fertilization, eggs adhere to the rocky riverbed substrate and hatch after a relatively brief incubation period of 8 to 15 days, depending on water temperature (Brannon et al. 1985, pgs. 58-64). Here they are afforded cover from predation by high near-substrate water velocities and ambient water turbidity, which preclude efficient foraging by potential predators.

Upon hatching the embryos become "free-embryos" (that life stage after hatching through active foraging larvae with continued dependence upon yolk materials for energy). Free-embryos initially undergo limited downstream redistribution(s) by swimming up into the water column and are then passively redistributed downstream by the current. This redistribution phase may last from one to six days depending on water velocity (Brannon et al. 1985, pgs. 58-64; Kynard and Parker 2005, pg. 3). The inter-gravel spaces in the substrate provide shelter and cover during the free-embryo "hiding phase".

As the yolk sac is depleted, free-embryos begin to increase feeding, and ultimately become free-swimming larvae, entirely dependent upon forage for food and energy. At this point the larval Kootenai sturgeon are no longer highly dependent upon rocky substrate or high water velocity for survival (Brannon et al. 1985, pgs. 58-64; Kynard and Parker, 2005, pg. 3). The timing of these developmental events is dependent upon water temperature. With water temperatures typical of the Kootenai River, free-embryo Kootenai sturgeon may require more than seven days post-hatching to develop a mouth and be able to ingest forage. At 11 or more days, Kootenai sturgeon free-embryos would be expected to have consumed much of the energy from yolk materials, and they become increasingly dependent upon active foraging.

The duration of the passive redistribution of post-hatching free-embryos, and consequently the linear extent of redistribution, depends upon near substrate water velocity, with greater linear dispersion anticipated under lower water velocity conditions (Brannon et al. 1985, pgs. 58-64). Working with Kootenai sturgeon, Kynard and Parker (2005, pg. 3) found that under some circumstances this dispersal phase may last for up to 6 days. This prolonged dispersal phase would increase the risk of predation on the embryo and diminish energy reserves. Juvenile and adult rearing occurs in the Kootenai River and in Kootenay Lake.

E. Population Dynamics and Viability

Paragamian et al. (2005, pg. 518) indicated that "the wild population now consists of an aging cohort of large, old fish" and cited Jolly-Seber population estimates that indicated Kootenai sturgeon had declined from approximately 7,000 adults in the late 1970s to 760 in 2000. Their results also showed that at the estimated "mortality rate of 9 percent per year, fewer than 500 adults remained in 2005 and there may be fewer than 50 remaining by 2030."

However, in recent years field crews have not noticed an increased difficulty in capturing unmarked sturgeon, as would be expected with such a small population with what should be a high proportion of marked/tagged fish. In 2008, the Kootenai Tribe of Idaho contracted with Cramer Fish Sciences (CFS) to review the mark-recapture data and evaluate existing population estimates and mortality rates. In July 2009, Ray Beamesderfer from CFS presented the Kootenai River White Sturgeon Recovery Team a draft report and a presentation of preliminary results of the review (Beamesderfer et al., 2009, entire). The review indicated that due to differences in capture probabilities between sturgeon in Kootenay Lake and sturgeon in the Kootenai River, earlier population estimates were biased and as a result, underestimated the adult population and overestimated the mortality rate. The draft report estimated the existing adult Kootenai sturgeon population to be approximately 1,000 fish, with a 95% confidence interval of 800 to 1,400. The draft report also estimated the annual rate of decline to be 4% (Beamesderfer et al. 2009, pg 2).

Service staff reviewed the draft report from CFS and submitted their comments in August 2009. In August 2010, CFS issued a second draft in response (Beamesderfer et al., 2010, entire). In general, the Service agrees with the draft report that recapture biases have skewed previous population estimates and that there are likely more adult Kootenai sturgeon than previously estimated. However, due to choices of models, issues regarding tag loss, and other questions, the Service feels the revised estimate is not yet robust enough to be cited as "best available science". Service staff is currently working with CFS staff on the report.

Based on data from the period 1992 through 2001, it is estimated that currently an average of only about 10 juvenile sturgeon currently may be naturally reproduced in the Kootenai River annually (Paragamian et al. 2005, pg. 524). This suggests that high levels of mortality are now occurring in habitats used for egg incubation and free-embryo development, which are unlikely to sustain a wild population of the Kootenai sturgeon. Natural reproduction at this level cannot be expected to provide any population level benefits, nor would reproduction at this level (20 juveniles per thousand sturgeon per year) have been adequate to sustain the population of 6,000 to 8,000 sturgeon that existed in 1980. The last year of significant natural recruitment was 1974.

F. Distribution

The Kootenai sturgeon is one of 18 land-locked populations of white sturgeon known to occur in western North America (Service 1999, pg. 3). Kootenai sturgeon occur in Idaho, Montana, and British Columbia and are restricted to approximately 167.7 RM of the Kootenai River extending from Kootenai Falls, Montana (31 RM below Libby Dam, Montana), downstream through Kootenay Lake to Corra Linn Dam, which was built on Bonnington Falls at the outflow from Kootenay Lake in British Columbia (RM 16.3). Approximately 45 percent of the species' range is located within British Columbia.

Bonnington Falls in British Columbia, a natural barrier downstream from Kootenay Lake, has isolated the Kootenai sturgeon since the last glacial advance roughly 10,000 years ago (Apperson 1992, pg. 2). Apperson and Anders (1990, pgs. 35-37; 1991, pgs. 48-49) found that at least 36 percent (7 of 19) of the Kootenai sturgeon tracked during 1989 over-wintered in Kootenay Lake. Adult Kootenai sturgeon forage in and migrate freely throughout the Kootenai River downstream of Kootenai Falls at RM 193.9. Juvenile Kootenai sturgeon also forage in and migrate freely throughout the lower Kootenai River downstream of Kootenai Falls and within Kootenay Lake. Apperson and Anders (1990, pgs. 35-37; 1991, pgs. 48-49) observed that Kootenai sturgeon no longer commonly occur upstream of Bonners Ferry, Idaho. However, there are no structural barriers preventing Kootenai sturgeon from ascending the Kootenai River up to Kootenai Falls, and this portion of the range remains occupied as documented by Ireland (2005, pg. 1), Stephens et al. (2010, pgs. 14-16), and Stephens and Sylvester (2011, pgs. 21-34).

G. Consulted on Effects

Consulted-on effects are those effects that have been analyzed through section 7 consultation as reported in a biological opinion. These effects are an important component of objectively characterizing the current condition of the species. To assess consulted-on effects to Kootenai sturgeon, we analyzed all of the biological opinions received by the Region 1 and Region 6 Service Offices, from the time of listing until January 2011.

The Service issued jeopardy opinions on the effects of Libby Dam operations on Kootenai sturgeon in 1995, 2000, and 2006 (the 1995 and 2000 opinions included the effects of the Federal Columbia Power System (FCRPS), and are referred to as the "FCRPS Opinions"). In 2008, in response to litigation over the 2006 jeopardy opinion, a settlement agreement was signed between the Center for Biological Diversity, the Service, the Corps, the State of Montana, and the Kootenai Tribe of Idaho. In December 2008, in compliance with the terms of the settlement agreement, the Service clarified the Reasonable and Prudent Alternative (RPA) from the 2006 jeopardy opinion (2008 Clarification).

The RPA from the 2006 jeopardy opinion directed the action agencies (the Corps and BPA) to implement pilot habitat projects in the braided and meander reaches of the Kootenai River. The 2008 Clarification directed the action agencies to "cooperate in good faith with and support the Kootenai Tribe of Idaho's good-faith efforts to implement the Kootenai River Restoration Project Master Plan, including developing a funding strategy to implement the Plan". Although the proposed action being consulted on in this opinion is the first phase in the implementation of the Kootenai River Restoration Project, the effects from implementation of Phase I were not analyzed in the 2006 jeopardy opinion or the 2008 Clarification.

H. Conservation Needs

Based on the best scientific information currently available, the habitat needs for successful spawning and recruitment of Kootenai sturgeon are described below.

Water Velocity

High "localized" water velocity is one of the common factors of known sites where white sturgeon spawn and successfully recruit in the Columbia River Basin. Mean water velocities exceeding 3.3 feet/second (f/s) are important to spawning site selection. These water velocities provide: cover from predation; normal free-embryo behavior and redistribution; and shelter (living space) for eggs and free-embryos through the duration of the incubation period.

Water Depth

The best information currently available indicates that water depth is a factor affecting both migratory behavior and spawning site selection among Kootenai sturgeon.

Rocky Substrate

Rocky substrate and associated inter-gravel spaces provide both structural shelter and cover for egg attachment, embryo incubation, and normal free-embryo incubation and behavior involving downstream redistribution by the current.

Water Temperature/Quality

Suitable water and substrate quality are necessary for the viability of early life stages of Kootenai sturgeon, including both incubating eggs and free-embryos, and for normal breeding behavior. Lower than normal water temperatures in the spawning reach may affect spawning behavior, location, and timing. Preferred spawning temperature for the Kootenai sturgeon is near 50 °F, and sudden drops of 3.5 to 5.5 °F cause males to become reproductively inactive, at least temporarily. Water temperatures also affect the duration of incubation of both embryos (eggs) and free-embryos.

V. Critical Habitat

On September 6, 2001, the Service issued a final rule designating critical habitat for the Kootenai sturgeon (66 FR 46548). The critical habitat designation extends from ordinary high water line to ordinary high water line on the right and left banks, respectively, along approximately 11.2 miles of the mainstem Kootenai River from RM 141.4 to RM 152.6 in Boundary County, Idaho, Unit 2, Figure 2. On February 10, 2006, the Service issued an interim rule designating the braided reach (RM 152.6 to RM 159.7) as critical habitat (71 FR 6383), Unit 2, Figure 2. On June 9, 2008, the Service issued a final rule designating the braided reach as critical habitat (73 FR 39506). Both the meander and the braided reach are located entirely within Boundary County, Idaho, respectively downstream and upstream of Bonners Ferry. A total of 18.3 RM is designated as critical habitat for Kootenai sturgeon.

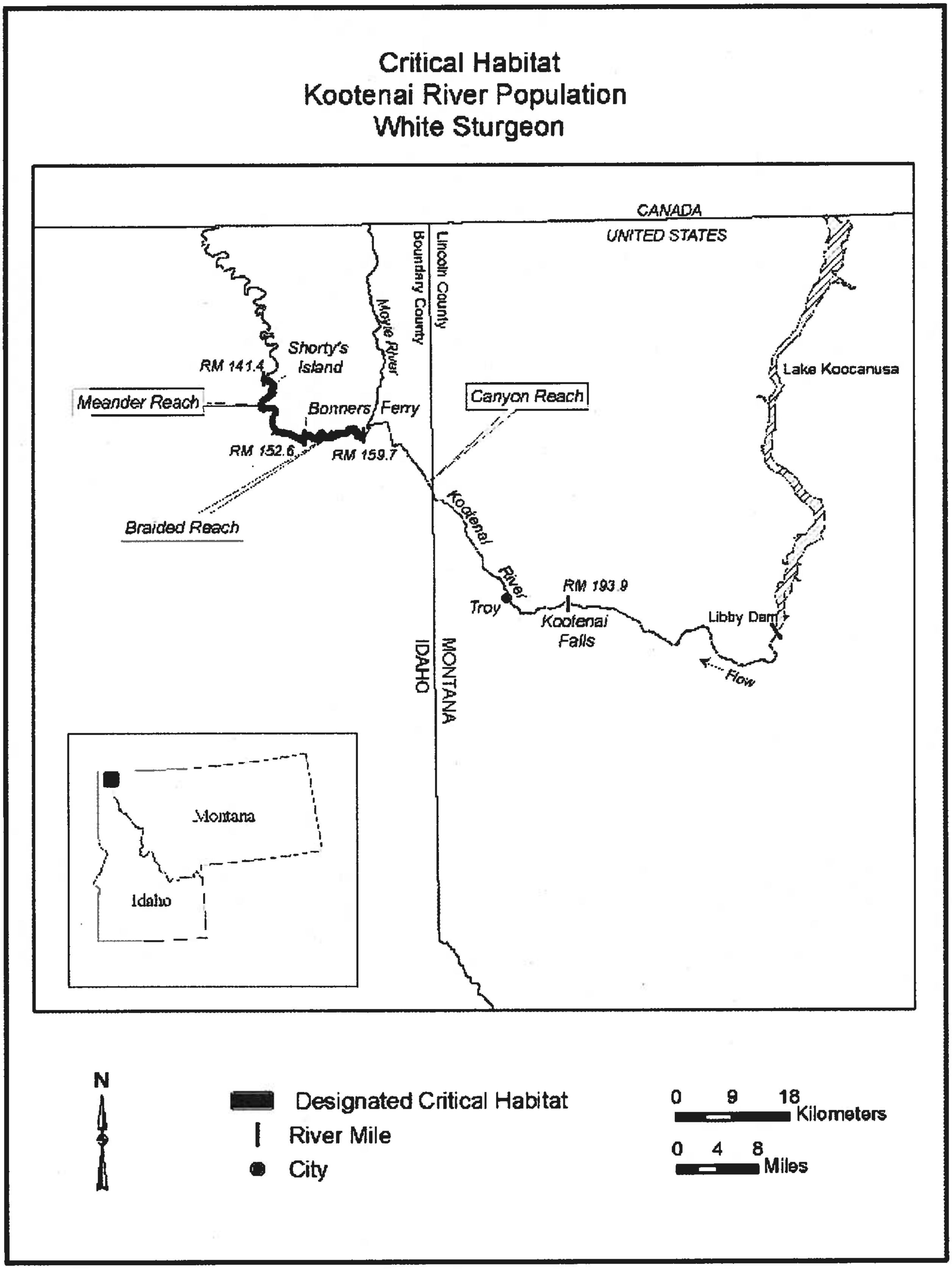

Figure 2. Geographic reaches within Kootenai sturgeon critical habitat.

A. Primary Constituent Elements

Four PCEs are defined for Kootenai sturgeon critical habitat (73 FR 39506). These PCEs are specifically focused on adult migration, spawning site selection, and survival of embryos and free-embryos, the latter two of which are the life stages now identified as limiting the reproduction and numbers of the Kootenai sturgeon. The PCEs are defined as follows:

1. A flow regime, during the spawning season of May through June, that approximates natural variable conditions and is capable of producing depths of 23 feet (ft) (7 meters (m)) or greater when natural conditions (for example, weather patterns, water year) allow. The depths must occur at multiple sites throughout, but not uniformly within, the Kootenai River designated critical habitat.

2. A flow regime, during the spawning season of May through June, that approximates natural variable conditions and is capable of producing mean water column velocities of 3.3 feet/second (ft/s) (1.0 meters/second) or greater when natural conditions (for example, weather patterns, water year) allow. The velocities must occur at multiple sites throughout, but not uniformly within, the Kootenai River designated critical habitat.

3. During the spawning season of May through June, water temperatures between 47.3 and 53.6 °F (8.5 and 12 °C), with no more than a 3.6 °F (2.1 °C) fluctuation in temperature within a 24-hour period, as measured at Bonners Ferry.

4. Submerged rocky substrates in approximately 5 continuous river miles (8 river kilometers) to provide for natural free embryo redistribution behavior and downstream movement.

5. A flow regime that limits sediment deposition and maintains appropriate rocky substrate and inter-gravel spaces for sturgeon egg adhesion, incubation, escape cover, and free embryo development. Note: the flow regime described above under PCEs 1 and 2 should be sufficient to achieve these conditions.

B. Current Condition of Critical Habitat

Meander Reach

The meander reach is characterized by sandy substrate, a low water-surface gradient, a series of deep holes, and water velocities which rarely reach 3.3 ft/s. The morphology of the meander reach has changed relatively little over time (Barton 2004, pg. 1). Significant changes to this reach caused by the construction and operation of Libby Dam include: (1) a decrease in suspended sediment; (2) the initiation of cyclical aggradation and degradation of the sand riverbed in the center of the channel; and (3) a reduction in water velocities (Barton 2004, pg. 1).

The upstream-most segment of the meander reach (approximately 0.6 RM in length) has rocky substrate and water velocities in excess of 3.3 ft/s under present river operations (Berenbrock 2005, pg. 7). However, due to a reduction of average peak flows by over 50 percent caused by flood control operations of Libby Dam and the reduction of the average elevation of Kootenay Lake by approximately 7.2 ft (and the resultant backwater effect), the PCE for water depth is infrequently achieved in this reach of the Kootenai River (Berenbrock 2005, pg. 7). A deep hole (49.9 ft) that is frequented by sturgeon in spawning condition exists near Ambush Rock at approximately RM 151.9 (Barton et al. 2005, pg. 36).

Braided Reach

The braided reach of the Kootenai River was selected for designation because it contains: (1) sites with seasonal availability of adequate water velocity in excess of 3.3 ft/s; and (2) rocky substrate necessary for normal spawning, embryo attachment and incubation, and normal free embryo dispersal, incubation and development. Within this reach, the valley broadens, and the river forms an intermediate-gradient braided reach as it courses through multiple shallow channels over gravel and cobbles (Barton 2004, pg. 7).

Similar to the 0.6 RM upstream-most segment of the meander reach, the lower end of the braided reach has also become shallower during the sturgeon reproductive period for the same reasons discussed above. Additionally, a loss of energy and bed load accumulation has resulted in a large portion of the middle of the braided reach becoming wider and shallower (Barton 2005, pg. 18). The loss of depth in this area of the braided reach is the most significant habitat change in this portion of designated critical habitat that contains rocky substrate during the migration and spawning period.

The net result of the changes described above (reduced depth in the upper end of the meander reach and the lower end of the braided reach) may adversely affect Kootenai sturgeon spawning behavior in two ways: 1) Kootenai sturgeon may generally avoid spawning in areas at and upstream of Bonners Ferry that have suitable rocky substrates and flow conditions necessary for egg attachment and incubation and embryo dispersal and development; and 2) Kootenai sturgeon may instead spawn at an array of sites further downstream that have unsuitable sandy substrates and low water velocity. While suitable water depth is still achieved under current operations at the downstream end of the braided reach, significant special management is needed to adequately address the PCEs for substrate and water velocity in this area.

VI. Environmental Baseline

A. Status of the Species within the Action Area

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area which have undergone section 7 consultations and the impacts of State and private actions which are contemporaneous with the consultation in progress.

Paragamian et al. (2005, pg. 518) indicated that "the wild population now consists of an aging cohort of large, old fish" and cited Jolly-Seber population estimates that indicated Kootenai sturgeon have declined from approximately 7,000 adults in the late 1970s to 760 in 2000. Their results also showed that at the estimated "mortality rate of 9 percent per year, fewer than 500 adults remained in 2005 and there may be fewer than 50 remaining by 2030."

However, in recent years field crews have not noticed an increased difficulty in capturing unmarked sturgeon, as would be expected with such a small population with what should be a high proportion of marked/tagged fish. In 2008, the Kootenai Tribe of Idaho contracted with Cramer Fish Sciences (CFS) to review the mark-recapture data and evaluate existing population estimates and mortality rates. In July 2009, Ray Beamesderfer from CFS presented the KRWSRT a draft report and a presentation of preliminary results of the review (Beamesderfer et al., 2009, entire). The review indicated that due to differences in capture probabilities between sturgeon in Kootenay Lake and sturgeon in the Kootenai River, earlier population estimates were biased and as a result, underestimated the adult population and overestimated the mortality rate. The draft report estimated the existing adult Kootenai sturgeon population to be approximately 1,000 fish, with a 95% confidence interval of 800 to 1,400. The draft report also estimated the annual rate of decline to be 4% (Beamesderfer et al., 2009, pg. 2).

Service staff reviewed the draft report from CFS and submitted their comments in August 2009. In August 2010, CFS issued a second draft in response (Beamesderfer et al., 2010, entire). Service staff in the Vancouver Fisheries Office and the Northern Idaho Field Office reviewed the second draft and submitted their comments in January 2011. In general, the Service agrees with the draft report that recapture biases have skewed previous population estimates and that there are likely more adult Kootenai sturgeon than previously estimated. However, due to choices of models, issues regarding tag loss, and other questions, the Service feels the revised estimate is not yet robust enough to be cited as "best available science". Service staff is currently working with CFS staff on the report.

Based on data from the period 1992 through 2001, it is estimated that currently an average of only about 10 juvenile sturgeon currently may be naturally reproduced in the Kootenai River annually (Paragamian et al. 2005, pg. 524). This suggests that high levels of mortality, unlikely to sustain a wild population of the Kootenai sturgeon, are now occurring in habitats used for egg incubation and free-embryo development. Natural reproduction at this level cannot be expected to provide any population level benefits, nor would reproduction at this level (20 juveniles per thousand sturgeon per year) have been adequate to sustain the population of 6,000 to 8,000 sturgeon that existed in 1980. The last year of significant natural recruitment was 1974.

B. Factors Affecting the Species in the Action Area

Libby Dam: Construction

Libby Dam was authorized for hydropower, flood control, and other benefits by Public Law 516, Flood Control Act of May 17, 1950, substantially in accordance with the report of the Chief of Engineers dated June 28, 1949 (Chief's Report) as contained in the House Document No. 531, 81st Congress, 2nd session. The Corps began construction of Libby Dam in 1966 and completed construction in 1973. Commercial power generation began in 1975. Libby Dam is 422 ft tall and has three types of outlets: (1) three sluiceways; five penstock intakes, three of which are currently inoperable; and (3) a gated spillway. The crest of Libby Dam is 3,055 ft long, and the widths at the crest and base are 54 ft and 310 ft, respectively. A selective withdrawal system was installed on Libby Dam in 1972 to control water temperatures in the dam discharge by selecting various water strata in the reservoir forebay.

Koocanusa Reservoir (known also as Lake Koocanusa or Libby Reservoir) is a 90-mile-long storage reservoir (42 miles extend into Canada) with a surface area of 46,500 acres at full pool. The reservoir has a usable storage of approximately 4,930,000 acre-feet and gross storage of 5,890,000 acre-feet.

The authorized purpose of Libby Dam is to provide power, flood control, and navigation and other benefits. With the five units currently installed, the electrical generation capacity is 525,000 kilowatts. The maximum discharge with all 5 units in operations is about 26,000 cfs. The surface elevation of Koocanusa Reservoir ranges from 2,287 feet to 2,459 feet at full pool. The spillway crest elevation is 2,405 feet.

Operations

Presently, Libby Dam operations are dictated by a combination of power production, flood control, recreation, and special operations for the recovery of ESA-listed species, including the Kootenai sturgeon, bull trout, and salmon in the mid-and lower Columbia River.

The Corps currently manages Libby Dam operations not to volitionally exceed 1,764 mean sea level at Bonners Ferry, the flood stage designated by the National Weather Service (USACE 1999, pgs. 19-20). In accordance with the National Marine Fisheries Service (NMFS) biological opinion, the Corps manages Libby Dam to refill Lake Koocanusa to elevation 2459 feet (full pool) by July 1, when possible (NMFS 2000, pg. 3-2).

The Service's 1995 FCRPS biological opinion recommended a flow regime that approached average annual pre-dam conditions, and would result in a pattern more closely resembling the pre-dam hydrograph (Figure 3) (Service 1995, pgs. 6-10). The Service's 2000 FCRPS opinion and 2006 opinion on Libby Dam continued this recommendation. However, the actual volume of these augmented freshets has been relatively insignificant when compared to the magnitude of the natural pre-dam freshet.

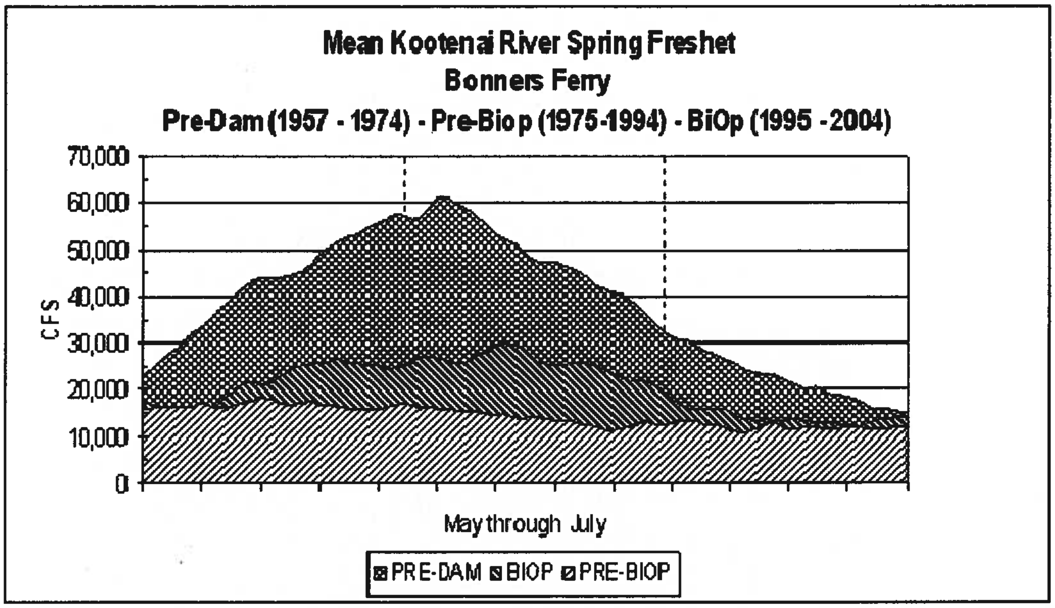

Figure 3 Mean seasonal (May through July) hydrograph (calculated; Bonners Ferry) for pre-dam (1957 – 1974), pre-biological opinion (BiOp) (1975-1994), and BiOp (1995-2004).

The Service's 2000 FCRPS biological opinion and 2006 opinion on Libby Dam included RPA's that recommended the implementation of Variable-Flow Flood Control (VARQ) operations at Libby Dam. In 2002, VARQ operations at Libby Dam began and continued on an "interim" basis until the completion of an Environmental Impact Statement (EIS) in April, 2006, and the signing of a Record of Decision (ROD) to implement VARQ operations in June, 2008.

The Service's 2006 opinion on Libby Dam also recommended that Libby Dam operations provide for minimum tiered volumes of water, based on the seasonal water supply, for augmentation of Kootenai River flows during periods of sturgeon spawning and early life stage development. Figure 4 shows the sturgeon volume tiers for different seasonal water supply forecasts (WSF). Less volume is dedicated for sturgeon flow augmentation in years of lower water supply. Measurement of sturgeon volumes excludes the 4,000 cfs minimum flow releases from the dam.

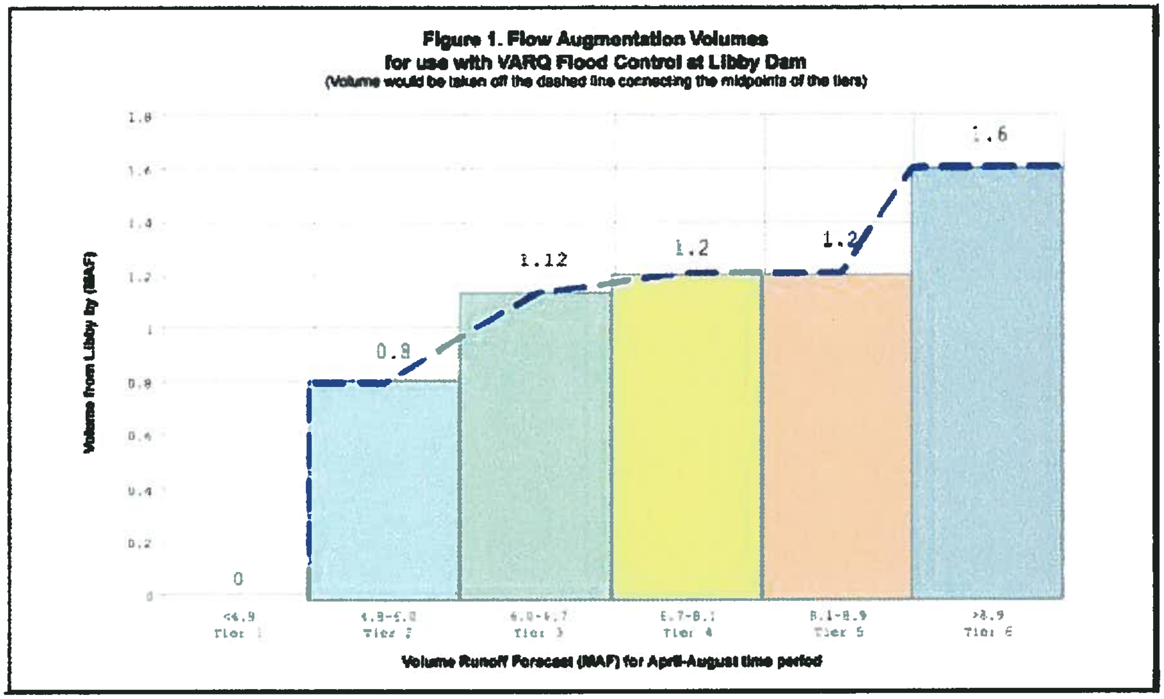

Figure 4 The “tiered” flow strategy for Kootenai sturgeon flow augmentation.

Northwest Power and Conservation Council Proposed Libby Operational Changes

In its 2000 Columbia River Basin Fish and Wildlife Program, the first revision of the program since 1995, the Northwest Power and Conservation Council (Council) committed to revise the 1995 program’s recommendations regarding mainstem Columbia and Snake River dam operations in a separate rulemaking. That rulemaking commenced in 2001. On April 8, 2003, the Council adopted the new mainstem amendments which included operations of these projects. These amendments are advisory and call for the following at Libby Dam:

- Continue to implement the VARQ flood control operations and implement Integrated Rule Curve operations as recommended by Montana Fish, Wildlife & Parks.

- With regard to operations to benefit Kootenai sturgeon, the Council recommended a refinement to operations in the 2000 FCRPS biological opinion that specify a “tiered” strategy for flow augmentation from Libby Dam to simulate a natural spring freshet.

- Refill should be a high priority for spring operations so that the reservoirs have the maximum amount of water available during the summer.

- Implement an experiment to evaluate the following interim summer operation:
    - Summer drafting limits at Libby Dam should be 10 feet from full pool by the end of September in all years except during droughts when the draft could be increased to 20 feet.

- Draft Koocanusa Reservoir as stable or "flat" weekly average outflows from July through September, resulting in reduced drafting compared to the NMFS FCRPS biological opinion.

Kootenay Lake and Backwater Effect

Corra Linn Dam located downstream on the Kootenay River, the outlet of Kootenay Lake, in British Columbia, controls lake level for much of the year with the notable exception occurring during periods of high flows, such as during the peak spring runoff season. During the spring freshet, Grohman Narrows (RM 23), a natural constriction upstream from the dam near Nelson, British Columbia regulates flows out of the lake. Kootenay Lake levels are managed in accordance with the International Joint Commission (IJC) Order of 1938 that regulates allowable maximum lake elevations throughout the year. During certain high flow periods when Grohman Narrows determines the lake elevation, Corra Linn Dam passes inflow in order to maximize the flows through Grohman Narrows. Regulation of lake inflows by Libby Dam and Duncan Dam (on the Duncan River flowing into the north arm of the lake) maintains Kootenay Lake levels generally lower during the spring compared to pre-dam conditions.

Historically, during spring freshets, water from Kootenay Lake backed up as far as Bonners Ferry and at times further upstream (Barton 2004, pg. 4). However, since hydropower and flood control operations began at Corra Linn and Libby Dams, the extent of this "backwater effect" has been reduced an average of over 7 feet during the spring freshet (i.e. water from Kootenay Lake currently extends further downstream than historically) (Barton 2004, pg. 5).

Other Factors Affecting Species Environment within the Action Area

Beginning in the early 1900's to 1961, in order to provide a measure of protection from spring floods, a series of dikes were constructed along the Kootenai River (below Libby Dam) and its tributaries. Other factors affecting the Kootenai sturgeon within the action area include floodplain development, contaminant runoff from mining activities, over-harvest, municipal water use, livestock grazing, and timber harvest (NPCC 2005, pg. 110).

VII. Effects of the Proposed Action

"Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline. Regulations implementing section 7(a)(2) of the ESA require the Service to consider the effects of activities that are interrelated or interdependent with the proposed Federal action (50 CFR 402.02). Interrelated actions are those that are part of the larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consultation. Both interrelated and interdependent activities are assessed by applying the "but for" test which asks whether any action and its resulting impact would occur "but for" the proposed action.

A. Direct and Indirect Effects

Direct effects are defined as the direct or immediate effects of the action on the species or its habitat. Direct effects result from the agency action, including the effects of interrelated and interdependent actions. Indirect effects are caused by or result from the agency action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the immediate footprint of the area, but would occur within the action area as defined.

The Project involves dewatering up to 445,365 square feet of side channel and riverine habitat in August and September, when Kootenai River flows are at their lowest. Work areas will be isolated using bulk bags (filled with material from upland sources), floating silt curtains, and coffer dams. Pumps will also be used to dewater work areas. As work areas are dewatered, and before dewatering pumps are activated, fish will be removed by seining and/or electrofishing. Fish will be transported downstream of the work zone and released as soon as possible after collection. Field survey data indicates that Kootenai sturgeon utilize the Idaho portion of the mainstem Kootenai River year-round. Adult Kootenai sturgeon typically inhabit the lower Kootenai River and Kootenay Lake, except during the pre-spawning and spawning periods, typically between mid-May and late June (Paragamian et al. 2001, p. 22; Paragamian et al. 2002, p. 608). Juvenile and sub-adult Kootenai sturgeon have been repeatedly documented to occur throughout the Kootenai River from Kootenai Falls downstream to Kootenay Lake, including within side channel habitats (Rust and Wakkinen 2009, pg. 7; Stephens and Sylvester 2011, pgs. 21-34). Given this data, it is likely that juvenile and/or sub-adult Kootenai sturgeon will be in the project area during project implementation.

As the work areas are dewatered, Kootenai sturgeon present in the work area would be forced to retreat to deeper habitat in the main channel, potentially increasing energy expenditure. However, these effects are expected to be insignificant because the side channels are preferred habitats of warm water predatory fish (e.g. bass), the side channels have very little cover for juvenile sturgeon to hide, and the dewatering will occur during the summer months, when productivity is at its highest and sturgeon are at their bio-energetic peak". Some Kootenai sturgeon—especially juveniles—may not evacuate the work sites as they are dewatered, and will subsequently require capture, handling, and relocation. These activities would cause stress, injury, or possible mortality to some Kootenai sturgeon. These effects to Kootenai sturgeon from dewatering of side channel and riverine habitat will be adverse.

Based on survey data from the Service and IDFG, Kootenai sturgeon are expected to be present in the action area. The work window for the project is well after the spawning period for Kootenai sturgeon, thus adult Kootenai sturgeon are not expected to be in the area during project implementation. Therefore, no effects to spawning and recruitment activities are anticipated. Juvenile and sub-adult Kootenai sturgeon have been documented in the Idaho portion of the Kootenai River, including side channel habitats. Although the majority of juvenile and sub-adult Kootenai sturgeon are captured downstream of the project site, data suggests that the numbers of juveniles and sub-adults in the Bonners Ferry area of the Kootenai River are increasing (Rust and Wakkinen, 2009, pg. 17; Rust and Wakkinen 2008, pg. 16). In the 2009 field season, IDFG crews captured 74 juvenile Kootenai sturgeon in the Bonners Ferry area, downstream of the project area (Rust and Wakkinen, 2009, pg. 17). Sampling did not take place in the project area.

Assuming similar numbers exist in the project area, and given the small size of the project area relative to the surrounding available habitat, as many as 10 juvenile and sub-adult Kootenai sturgeon could be in the project area during implementation. As work sites are dewatered, these Kootenai sturgeon would either be displaced to nearby mainstem habitats, or remain in the areas and require physical removal. However, because of the poor quality of the habitats they will be dispersed from, effects to Kootenai sturgeon from displacement are expected to be minimal. Additionally, trained fisheries biologists will be conducting the fish salvage operations as work sites are dewatered, and the last of the water will be pumped out using pumps fitted with screens meeting National Marine Fisheries Service salmonid fry criteria. Thus high levels of injuries or mortalities are not expected to occur and the majority of Kootenai sturgeon are expected to be released in good condition.

Additionally, dewatering portions of designated Kootenai sturgeon critical habitat will have direct effects to critical habitat in the form of total loss of PCEs in the dewatered areas during a time when Kootenai sturgeon want to be in the area. Therefore, effects to Kootenai sturgeon critical habitat from dewatering up to 445,365 square feet of side channel and riverine habitat will be adverse in the short-term. Long-term, however, the intent of the Project is to begin restoring Kootenai sturgeon habitat, which may result in beneficial effects to the population.

After dewatering and any remaining Kooetnai sturgeon have been removed, 4,550 feet of side channel and river bank habitat will be treated. Activities associated with these treatments may have the following direct effects on Kootenai sturgeon: 1) mortality through contact with the in-water construction equipment, 2) displacement of, and stress to, Kootenai sturgeon due to increased turbidity during construction, and 3) harassment of Kootenai sturgeon from construction activities (e.g. noise). However, due to implementation of BMPs designed to minimize the effects of equipment use, turbidity, and noise (e.g. silt curtains, dewatering prior to equipment use, 150 ft. buffers between staging areas and the river), the effects to Kootenai sturgeon from treatment of 4,550 feet of side channel and river bank habitat are expected to be minimal.

Treatment of 4,550 feet of side channel and river bank habitat may also have the direct effects on Kootenai sturgeon critical habitat, primarily in the form of increased turbidity during construction and in-water work. However, due to implementation of BMP's designed to minimize the effects of turbidity (e.g. silt curtains, dewatering prior to equipment use, 150 ft. buffers between staging areas and the river), and the small size of the treatment area relative to overall Kootenai sturgeon critical habitat (the lineal feet of side channel and river bank habitats to be treated represent less than 0.047% of designated critical habitat), the effects to Kootenai sturgeon critical habitat from treatment of 4,550 feet of side channel and river bank habitat are expected to be minimal.

As water is returned to the work sites, a pulse of sediment may be temporarily introduced into the river. This may have effects to Kootenai sturgeon and critical habitat in the form of an increase in turbidity. However, due to implementation of BMPs specifically designed to minimize the amount of introduced sediment during re-watering (e.g. reintroducing water in a controlled manner, limiting flow rates during re-watering to no more than 3 ft/s) and the relatively small size of the work sites compared the available habitat, effects to Kootenai sturgeon and critical habitat from re-watering work sites are expected to be temporary and minimal.

No indirect effects to Kootenai sturgeon and critical habitat from the Project are anticipated.

B. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

As the human population in the State of Idaho continues to grow, residential growth and demand for dispersed and developed recreation is likely to occur. This trend is likely to result in increasing habitat degradation from riparian road construction, levee building, bank armoring, and campsite development on private lands. These activities tend to remove riparian vegetation, disconnect rivers from their floodplains, interrupt groundwater-surface water interactions, reduce stream shade (and increase stream temperature), reduce off-channel rearing habitat, and reduce the opportunity for large woody debris recruitment. Each subsequent action by itself may have only a small incremental effect, but taken together they may have a substantive effect that would further degrade the watershed's environmental baseline and undermine the improvements in habitat conditions necessary for listed species to survive and recover. Watershed assessments and other education programs may reduce these adverse effects by continuing to raise public awareness about the potentially detrimental effects of residential development and recreation on sturgeon habitats and by presenting ways in which a growing human population and healthy fish populations can co-exist.

The Service is not aware of any other future actions that are reasonably certain to occur in the action area that are likely to contribute to cumulative effects on Kootenai sturgeon. For this description of cumulative effects, the Service assumes that future non-Federal activities in the area of the proposed action will continue into the immediate future at present or increased intensities. Accordingly, these actions will contribute to maintenance of at risk and not properly functioning habitat indicators.

C. Conclusion

The Service has reviewed the current status of the Kootenai sturgeon, the environmental baseline, the effects of the Project, and cumulative effects. Based on this review, it is the Service's biological opinion that although adverse effects to Kootenai sturgeon and Kootenai sturgeon critical habitat are expected to occur, implementation of the Project as proposed is not likely to jeopardize the continued existence of the Kootenai River distinct population segment of the white sturgeon, nor is it likely to adversely modify Kootenai sturgeon critical habitat. This conclusion is based upon the following analysis.

Monitoring data indicates that Kootenai sturgeon are likely to be in the action area during project implementation. Direct effects to Kootenai sturgeon that may occur during in-water work include mortality from dewatering-related activities and construction; displacement of, and stress to, Kootenai sturgeon due to increased turbidity during construction; and harassment from construction activities (e.g. noise).

Up to 445,365 square feet will be dewatered during project implementation. As the work areas are dewatered, fisheries biologists will capture (via electrofishing and seining) and remove all fish from the work area. The last of the water will be pumped out using pumps fitted with screens meeting National Marine Fisheries Service salmonid fry criteria. Fish will be transported downstream of the work zone and released as soon as possible after collection. A summary report of any fish salvage effort will be prepared that, at a minimum, includes a summary of methods, enumeration by species of fish encountered, and description of their ultimate disposition. The adverse effects to Kootenai sturgeon from these activities are expected to be minimal, and the adverse effects to Kootenai sturgeon critical habitat are expected to be temporary and minimal for the following reasons:

1) The project area is small relative to the overall available habitat.

2) The Project includes best management practices designed to minimize effects to Kootenai sturgeon and critical habitat.

3) The project area is currently highly degraded and not quality Kootenai sturgeon habitat (thus few Kootenai sturgeon are expected to be present).

4) The overall net effect of the Project will be positive for Kootenai sturgeon and critical habitat.

After dewatering, 4,550 feet of side channel and riverbank habitat will be treated. However, due to the small size of the project area relative to the overall available habitat, and the current degraded condition of the areas, the effects from side channel and riverbank treatment are expected to be temporary. Also, measures will be taken to minimize effects to Kootenai sturgeon that may be in the vicinity of the treatment sites. These measures include using erosion control measures such as silt fences, stormwater management, and staging all fuel storage and fueling activities at least 150 feet from the stream. The above measures will also ensure that effects to Kootenai sturgeon critical habitat are temporary.

VII. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA, and Federal regulations pursuant to section 4(d) of the ESA, prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary upon the agency, and must also be undertaken by the Bonneville Power Administration (BPA) so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. BPA has a continuing duty to regulate the activity covered by this incidental take statement. If BPA (1) fails to assume and implement the terms and conditions; (2) fails to require any entity or individual, contracted to implement the action or any part of the action, to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, grant, or contract document; and/or (3) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, BPA must report the progress of implementing the action and mitigation measures to the Service as specified in the incidental take statement [50 CFR, Part 402.14(i)(3)].

A. Amount or Extent of Take

Based on survey data from the Service and IDFG, Kootenai sturgeon are expected to be present in the action area. The work window for the project is well after the spawning period for Kootenai sturgeon, thus adult Kootenai sturgeon are not expected to be in the area during project implementation. Juvenile and sub-adult Kootenai sturgeon have been documented in the Idaho portion of the Kootenai River, including side channel habitats. Although the majority of juvenile and sub-adult Kootenai sturgeon are captured downstream of the project site, data suggests that the numbers of juveniles and sub-adults in the Bonners Ferry area of the Kootenai River are increasing (Rust and Wakkinen, 2009, pg. 17; Rust and Wakkinen 2008, pg. 16). In the 2009 field season, IDFG crews captured 74 juvenile Kootenai sturgeon in the Bonners Ferry area, downstream of the project area (Rust and Wakkinen, 2009, pg. 17). Sampling did not take place in the project area. Assuming similar numbers exist in the project area, and given the small size of the project area relative to the surrounding available habitat, it is expected that as many as 10 juvenile and/or sub-adult Kootenai sturgeon may be in the project area. As the areas are dewatered, some of these fish are expected to evacuate the area of their own volition while others will remain and require capture, handling, and release. An evaluation of a large-scale fish salvage operation in British Columbia showed that for the majority of species (salmonids, sculpins, whitefish, and sucker species), mortality rates of less than 1% were the norm for juveniles (red sided shiners were an exception at ~20%) (Higgens and Bradford, 1996, pg. 670). Given that trained fisheries biologists will be conducting the fish salvage activities, and the smaller scale of the Phase 1 project compared to the above large-scale study, direct mortality from fish salvage activities is expected to be no more than 10% (1 sturgeon).

The Service estimates that implementation of the Project will take, in the form of harass and capture, 10 juvenile or sub-adult Kootenai sturgeon, as well as take, in the form of mortality, 1 juvenile or sub-adult Kootenai sturgeon.

B. Effect of Take

In the accompanying biological opinion, the Service determined that this level of incidental take is not likely to result in jeopardy to Kootenai sturgeon.

VIII. Reasonable and Prudent Measures (RPMs)

No reasonable and prudent measures are necessary. The Project will be implemented as described in the BA, including all conservation measures and best management practices.

IX. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, BPA must implement the Project as described in the BA, including all conservation measures and best management practices.

X. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service believes that no conservation measures are necessary.

Upon locating dead, injured, or sick Kootenai sturgeon during implementation of the Project, notification must be made within 24 hours to the Service's Division of Law Enforcement Special Agent (address: 1387 S. Vinnell Way, Suite 341 Boise, ID 83709-1657; telephone: 208-378-5333). Instructions for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured fish to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. In conjunction with the care of sick or injured Kootenai sturgeon, or the preservation of biological materials from a dead fish, the action agencies have the responsibility to ensure that information relative to the date, time, and location of the fish when found, and possible cause of injury or death of each fish be recorded and provided to the Service. Dead, injured, or sick Kootenai sturgeon should also be reported to the Service's North Idaho Field Office (telephone: 509-891-6839).

During project implementation, the action agencies shall notify the Service within 72 hours at (509) 891-6839, of any emergency or unanticipated situations related to implementation of the Project that may be detrimental to Kootenai sturgeon or its habitat that are not considered in this biological opinion. In the event of habitat modifications, the Service recommends the restoration of the affected habitat to pre-emergency conditions in a timely manner. Emergency or unanticipated situations shall be documented and brought to the immediate attention of the Service at the telephone number listed above to determine if reinitiation of consultation is warranted.

XI. Reinitiation Notice

This concludes formal consultation for the potential effects of the proposed Kootenai River Ecosystem Restoration Project, Phase I on Kootenai sturgeon and Kootenai sturgeon critical habitat. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if:

1. The amount or extent of incidental take is exceeded.
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion.
3. The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion.
4. A new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

XII. Literature Cited

Al-Chokhachy, R. and P. Budy. 2007. Summer Microhabitat Use of Fluvial Bull Trout in Eastern Oregon Streams. North American Journal of Fisheries Management. 27:1068–1081.

Apperson, K. 1992. Kootenai River white sturgeon investigations and experimental culture. Annual Progress Report. FY 1991. Prepared for the Bonneville Power Administration. Portland, OR.

Apperson, K. A. and P. J. Anders. 1990. Kootenai River white sturgeon investigations and experimental culture. Annual Progress Report FY89. Idaho Department of Fish and Game. Prepared for the U.S. Department of Energy, Bonneville Power Administration. Project No. 88-65. Portland, OR.

Apperson, K. A. and P. J. Anders. 1991. Kootenai River white sturgeon investigations and experimental culture. Annual Progress Report FY90. Idaho Department of Fish and Game. Prepared for the U.S. Department of Energy, Bonneville Power Administration. Project No. 88-65. Portland, OR.

Barton, G.J. 2004a. Characterization of channel substrate, and changes in suspended-sediment transport and channel geometry in white sturgeon spawning habitat in the Kootenai River near Bonners Ferry, Idaho, following the closure of Libby Dam. U.S. Geological Survey. Water Resources-Investigations Report 03-4324. 24pp.

Barton, G.J., R.R. McDonald, J.M. Nelson, and R.L. Dinehart. 2005. Simulation of flow and sediment mobility using a multidimensional flow model for the white sturgeon critical-habitat reach, Kootenai River near Bonners Ferry, Idaho. U.S. Geological Survey. Scientific Investigations Report 2005. 126pp.

Beamesderfer R. C., S. C. Ireland, C. Justice, M. D. Neufeld, V. L. Paragamian, and P. J. Rust. 2009. Kootenai Sturgeon Population Status Update. Draft Report. August 2009.

Beamesderfer R. C., S. C. Ireland, C. Justice, M. D. Neufeld, V. L. Paragamian, and P. J. Rust. 2010. Kootenai Sturgeon Population Status Update. Draft Report. August 2010.

Berenbrock, C. 2005. Simulation of hydraulic characteristics in the white sturgeon spawning habitat of the Kootenai River near Bonners Ferry, Idaho. U.S. Geological Survey. Scientific Investigations Report 2005-5110. 29pp.

Brannon, E., S. Brewer, A. Setter, M. Miller, F. Utter, and W. Hershberger. 1985. Columbia River white sturgeon (*Acipenser transmontanus*) early life history and genetics study. Bonneville Power Administration. Contract No. DE-A184BP18952, Project No, 83-316. 68pp.

Higgins, P. S. and Bradford, M. J. 1996. Evaluation of a Large-Scale Fish Salvage to Reduce the Impacts of Controlled Flow Reduction in a Regulated River. North American Journal of Fisheries Management, 16:3, 666 — 673.

Kynard, B., and E. Parker. 2005. Preliminary Report to the Idaho Fish & Game Department, Moscow, ID, 3 pp.

Marcuson, P. 1994. Kootenai River White Sturgeon Investigations. Annual Progress Report FY1993. Idaho Department of Fish and Game. Prepared for US Department of Energy, Bonneville Power Administration. Project No. 88-65. Portland, OR.

National Marine Fisheries Service. 2000. 2000c. Draft biological opinion: Operation of the Federal Columbia River Power System. Northwest Region, Portland, OR.

Pacific States Marine Fisheries Commission. 1992. (Hanson, D.L., editor). White Sturgeon Management Framework Plan. 200 pp.

Paragamian, V. 2002. Changes in species composition of the fish community in a reach of the Kootenai River, Idaho, after construction of Libby Dam. Journal of Freshwater Ecology 17(3):375-383.

Paragamian, V. l., G. Kurse, and V. D. Wakkinen. 1997. Kootenai River white strugeon investigation. Idaho Dept. Fish and Game. Bonneville Power administration, Annual Progress report, Project 88-65, Boise. In Paragamian, V. l., G. Kurse, and V. D. Wakkinen. 2001. Spawning Habitat of Kootenai River White Stur4geon, Post-Libby Dam. North American Journal of Fisheries Management 21:22-33.

Paragamian, V. L., G. Kruse, and V. Wakkinen. 2001. Spawning habitat of Kootenai River white sturgeon, post-Libby Dam. North American Journal of Fisheries Management 21:22-33.

Paragamian,V.L., V.D. Wakkinen, and G. Kruse. 2002. Spawning locations and movement of Kootenai River white sturgeon. Journal of Applied Ichthyology 8:608-616.

Paragamian, V.L., R.C. Beamesderfer, and S.C. Ireland. 2005. Status, population dynamics, and future prospects of the endangered Kootenai River white sturgeon population with and without hatchery intervention. Transactions of the American Fisheries Society 134:518-532.

Partridge, F. 1983. Kootenai River fisheries investigations in Idaho. Idaho Department of Fish and Game, Completion Report. Boise ID.

R.L. & L. Environmental Services Ltd. 1999. Movements of White Sturgeon in Kootenay Lake 1994-1997. 66 p.

Rust, P., and V. Wakkinen. 2008. Kootenai River White Sturgeon Spawning and Recruitment Evaluation. Annual Progress Report. IDFG Report #08-16. 50 p.

Rust, P., and V. Wakkinen. 2009. Kootenai River White Sturgeon Spawning and Recruitment Evaluation. Annual Progress Report. Document ID #P118503. 50 p.

Scott, W.B. and E. J. Crossman. 1973. Freshwater Fishes of Canada. Bulletin 184. Fisheries Research Board of Canada. In: Kootenai Subbasin Plan. Northwest Power and Conservation Council. 2005.

Simpson, J.C. and R.L. Wallace. 1978. Fishes of Idaho. University of Idaho Press, Moscow.

Stephens, B., R. Sylvester, and B. Phillips. 2010. Kootenai River White Sturgeon (Acipenser transmontanus): 2009 Investigations in Montana. Montana Fish, Wildlife, and Parks. 26 pp.

Stephens, B. and R. Sylvester. 2011. Kootenai River White Sturgeon (Acipenser transmontanus): 2010 Investigations in Montana. Montana Fish, Wildlife, and Parks. 38 pp.

U.S. Army Corps of Engineers. 1999. Columbia River Treaty Flood Control Operating plan. Portland, Oregon. Pgs. 19-20.

U.S. Fish and Wildlife Service. 1995. Biological Opinion on the Federal Columbia River Power System. 20 p.

U. S. Fish and Wildlife Service. 1999. Recovery Plan for the Kootenai River Population of the White Sturgeon. FWS Region 1 Portland, OR.

U.S. Fish and Wildlife Service. 2000. Biological Opinion on the Federal Columbia River Power System. 95p.

U.S. Fish and Wildlife Service. 2006. Biological Opinion Regarding the Effects of Libby Dam Operations on the Kootenai River White Sturgeon, Bull Trout, and Kootenai Sturgeon Critical Habitat. 153p.

A. Personal Communications and other Citations

Andrusak, H. 1993. Telephone conversation record between Steve Duke and Harvey Andrasuk involving kokanee as sturgeon prey. 1p.

Barton, G.J. 2005. Kootenai River braided reach morphology and implications on enhancing white sturgeon spawning habitat. U.S. Geological Survey. Power Point Presentation. 20pp.

Ireland, S. 2005. Letter to Dr. Robert Hallock , U.S. Fish and Wildlife Service, Requesting authorization to release up to 5,500 white sturgeon juveniles into the Kootenai River within Montana. Kootenai Tribe of Idaho, Bonners Ferry. 4pp.