SNIPETOWN SUCTION DREDGING

BIOLOGICAL ASSESSMENT

FOR

BULL TROUT
SALVELINUS CONFLUENTUS

AND

WHITE STURGEON
ACIPENSER TRANSMONTANUS

Three Rivers Ranger District
Kootenai National Forest

May 2005

FISHERIES BIOLOGICAL ASSESSMENT

KOOTENAI NATIONAL FOREST, REGION 1, MONTANA

Project Name: Snipetown Suction Dredge **Preparer:** J. Boyd

Ranger District: Three Rivers Ranger District

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The following Biological Assessment (BA) is designed to satisfy the requirements of the Forest Service and U.S. Fish and Wildlife Service (FWS). This BA consists of 15 parts:

1. Project Description
2. Watershed Description
3. Species Descriptions and Habitat Requirements
4. Forest Plan Standards
5. Environmental Baseline - Species Indicators and Habitat Indicators
6. Status of INFISH Riparian Management Objectives
7. Direct, Indirect, and Cumulative Effects
8. Potential Effects to Species Indicators and Habitat Indicators
9. Matrix Checklist
10. Compliance with INFISH
11. White sturgeon documentation
12. Potential Measures for Removing, Avoiding, or Compensating for Adverse Effects
13. References Cited
14. Summary and Signature
15. Maps and Correspondence with Fish & Wildlife Service

Project Description

The proposed federal action involves National Forest Lands in the Yaak River drainage on the Three Rivers Ranger District in Lincoln County, Montana, T. 33N., R. 33W, Sec. 19. The Plan of Operation (POO) for the Snipetown Suction Dredging (project area maps attached) is on file at the District. Operations will occur from July 15 to September 15 in accordance with the conditions stipulated in Suction Dredge - General Discharge Permit (SD-GDP) No. MT-G370000.

There will be no on-site camping permitted behind roads closed by gate or earthen barrier. Operators will operate approximately 60 days per season using up to a 4 inch diameter nozzle operated by a diver. Stream bottom gravels would be suctioned up and passed down a sluice box and back into the stream channel. Effluent from the suction dredge would be discharged directly back into the stream. Typically, collected fine materials are further separated at a later time away from the stream. No more than 10 cubic yards of material would be processed each year. The streambanks would not be disturbed.

Watershed Description

Lower Yaak River

The Yaak River is a 5th order tributary of the Kootenai River, originating in Montana and British Columbia and flowing in a southwesterly direction, entering the Kootenai River about 8 miles northwest of Troy, Montana. Elevations in the drainage range from 1,850 feet to 7,705 feet. Average annual precipitation ranges from 20 to 95 inches, but is between 25 and 65 inches in most areas. The area is moderately influenced by rain-on-snow events generally at elevations below 4,500 feet.

The lower 11 miles of the Yaak River are accessible to bull trout in the Kootenai River. Montana Fish, Wildlife and Parks have documented Bull trout below Yaak Falls. However, MFWP found no bull trout redds or suitable spawning areas below Yaak Falls in 1992 (MBTSG 1996). Since there is no spawning activity in the lower Yaak River it is believed that the lower Yaak River does not support a subpopulation of bull trout. The nearest known subpopulations inhabit O'Brien and Callahan Creeks, approximately 10 river miles upstream of the Yaak River (USDA 2000).

Species Descriptions and Habitat Requirements

Bull trout (*Salvelinus confluentus)* are present in the Yaak River within the project area. Bull trout, listed as Threatened under the Endangered Species Act, are the only listed fish species present in the Yaak River watershed. Historically, bull trout were not likely widely distributed throughout the Yaak River drainage below the natural migration barrier at Yaak Falls.

Bull trout spawn in the Kootenai River tributaries, Callahan and O'Brien Creeks in early to mid-October depending on flows. There has been no documented spawning in the Yaak River (MFWP, personal communication). The spawning population consists of large, 5-10 pound, migratory fish that enter the system immediately prior to spawning. These fish build redds and spawn within a couple of days after entering the watershed and then return to the Kootenai River. The Kootenai River is the primary rearing habitat for this fluvial population.

The following discussion of bull trout habitat requirements in Montana is taken from Montana Bull Trout Scientific Group (MBTSG) 1998. The majority of migratory bull trout spawning in Montana occurs in a small percentage of the total stream habitat available. Spawning takes place between late August and early November, principally in third and fourth order streams. Spawning adults use low gradient areas (< 2%) of gravel/cobble substrate with water depths between 0.1 and 0.6 m and velocities from 0.1 to 0.6 m/s. Proximity of cover for the adult fish before and during spawning is an important habitat component. Spawning tends to be concentrated in reaches influenced by groundwater where temperature and flow conditions may be more stable. The relationship between groundwater exchange and migratory bull trout spawning requires more investigation. Spawning habitat requirements of resident bull trout are poorly documented.

Successful incubation of bull trout embryos requires water temperatures below 8C, less than 35-40% of sediments smaller than 6.35 mm in diameter, and high gravel permeability. Eggs are deposited as deep as 25.0 cm below the streambed surface and the incubation period varies depending on water temperature. Spawning adults alter streambed characteristics during redd construction to improve survival of embryos, but conditions in redds often degrade during the incubation period. Mortality of eggs or fry can be caused by scouring during high flows, freezing during low flows, superimposition of redds, or deposition of fine sediments or organic materials. A significant inverse relationship exists between the percentage of fine sediment in the incubation environment and bull trout survival to emergence. Entombment appeared to be the largest mortality factor in incubation studies in the Flathead drainage. Groundwater influence plays a large role in embryo development and survival by mitigating mortality factors.

Rearing habitat requirements for juvenile bull trout include cold summer water temperatures (15C) provided by sufficient surface and groundwater flows. Warmer temperatures are associated with lower bull trout densities and can increase the risk of invasion by other species that could displace, compete with, or prey on juvenile bull trout. Juvenile bull trout are generally benthic foragers, rarely stray from cover, and they prefer complex forms of cover. High sediment levels and embeddedness can result in decreased rearing densities. Unembedded cobble/rubble substrate is preferred for cover and feeding and also provides invertebrate production. Highly variable stream flow, reduction in large woody debris, bedload movement, and other forms of channel instability can limit the distribution and abundance of juvenile bull trout. Habitat characteristics that are important for juvenile bull trout of migratory populations

are also important for stream resident subadults and adults. However, stream resident adults are more strongly associated with deep pool habitats than are migratory juveniles.

Both migratory and stream-resident bull trout move in response to developmental and seasonal habitat requirements. Migratory individuals can move great distances (up to 250 km) among lakes, rivers, and tributary streams in response to spawning, rearing, and adult habitat needs. Stream-resident bull trout migrate within tributary stream networks for spawning purposes, as well as in response to changes in seasonal habitat requirements and conditions. Open migratory corridors, both within and among tributary streams, larger rivers, and lake systems are critical for maintaining bull trout populations.

Forest Plan Standards, Regulatory Framework and Other Direction

The Kootenai Forest Plan was amended on August 30, 1995 by the Inland Native Fish Strategy (INFISH) (USDA Forest Service 1995). This interim strategy was designed to provide additional protection for existing populations of native trout, outside the range of anadromous fish, on 22 National Forests in the Pacific Northwest, Northern and Intermountain Regions. Implementing this strategy was deemed necessary as these species were at risk due to habitat degradation, introduction of exotic species, loss of migratory forms and over-fishing. As part of this strategy, the Regional Foresters designated a network of priority watersheds. Priority watersheds are drainages that still contain excellent habitat or assemblages of native fish, provide for metapopulation objectives, or are watersheds that have excellent potential for restoration. The priority watersheds on the Kootenai National Forest include Rock Creek, Vermilion River, Bull River, lower Yaak River, Wigwam River, West Fisher River, Phillips/Sophie Creeks, Pipe Creek, Libby Creek, Lake Creek, Silver Butte Creek, Quartz Creek, O'Brien Creek, Grave Creek and Callahan Creek.

INFISH also established Riparian Management Objectives (RMOs) and Riparian Habitat Conservation Areas (RHCA). RMOs are habitat parameters that describe good fish habitat. Where site-specific data is available, these RMOs can be adjusted to better describe local stream conditions. These RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of riparian goals is measured. RHCAs are portions of watersheds where riparian dependent resources receive primary emphasis. The RHCAs are defined for four categories of stream or waterbody dependent on flow conditions and presence of fish. The RHCAs are areas within specific management activities are subject to standards and guidelines in INFISH in addition to existing standards and guidelines in the Kootenai Forest Plan.

Clean Water Act: As required by the Clean Water Act, every two years the State of Montana publishes a list of streams and portions of streams where the state has identified water quality concerns (303(d) list). In 1994 and 1996 the East Fork Yaak River and North Fork Yaak River were listed on the 303(d) list due to flow alteration, other habitat alteration, siltation, and suspended solids. The state removed these two streams from subsequent lists because of a lack of credible scientific data to support the listing.

The Environmental Protection Agency (EPA) and the Kootenai NF are currently developing a total maximum daily load (TMDL) for the Yaak River basin (Yaak TMDL). As part of this process, streams are reviewed for possible impairment, and a water quality restoration plan is developed for those that are found to be impaired. The water quality conditions of East Fork Yaak and North Fork Yaak are currently being assessed. Other streams that were never on the 303(d) list, but have had heavy management are being assessed as well. The determination of whether any of these streams are impaired under the Clean Water Act is expected within the next several months.

Environmental Baseline - Species Indicators and Habitat Indicators

Species Indicators: The following descriptions correspond to the four species indicators listed on the USFWS matrix for bull trout, KNF-2670-BT3 (USFWS 1998). Existing conditions for each habitat indicator are described and rated at a single scale - the CRB 6th code HUC 170101030305, which contains the entire lower Yaak River drainage.

1) *Subpopulation Size:* **Functioning at Risk**. Only the lower 11 miles of the Yaak River below Yaak Falls are accessible to bull trout in the Kootenai River and no bull trout historically occurred above Yaak Falls. Montana Fish, Wildlife and Parks (MFWP) documented Bull trout below Yaak Falls in 1987 (USFS 1995). However, MFWP found no bull trout redds below Yaak Falls in 1992 (MBTSG 1996). The lower Yaak River does not appear to support a subpopulation of bull trout.

2) *Growth and Survival:* **Functioning at Risk**. Information on the growth and survival of bull trout in the lower Yaak River is not available. During 1992, Montana Fish, Wildlife and Parks conducted redd counts in several other tributaries to the Kootenai River below Kootenai Falls, including Callahan, Ruby, and Star creeks and the Yaak River. Field crews found no redds in the Yaak River from its junction with the Kootenai River to Yaak Falls, a barrier falls located approximately 11 miles upstream. The channel through this area is high gradient and comprised of large substrate. The Yaak River is a large system with discharges of 100-200 cfs during July through October. Because of the substrate composition and the size of the stream, redds may be hard to detect. Low numbers of smaller sized bull trout were present during electrofishing surveys downstream from Yaak Falls. Extensive sampling conducted upstream from Yaak Falls has failed to document the presence of bull trout.

3) *Life History Diversity and Connectivity:* **Functioning at Risk**. The Yaak River is about 10 river miles from O'Brien Creek where the nearest known subpopulation of bull trout spawns and rears (MBTSG 1996). The lower Yaak is connected to the Kootenai River even at low flows. As such it provides rearing habitat to bull trout.

4) *Persistence and Genetic Integrity:* **Functioning at Risk**. It is not known if there is connectivity between the bull trout that use the lower Yaak River and those that spawn and rear in O'Brien Creek. Little is known about the subpopulations in Idaho and Canada that may be interconnected with bull trout in O'Brien Creek and the lower Yaak River. Brook trout occur throughout the lower Kootenai River drainage and threaten the persistence and genetic integrity of bull trout in all habitats connected to the lower Kootenai River. The probability of hybridization or displacement by competition is imminent, although few documented cases are known to have occurred.

Habitat Indicators: The following descriptions correspond to the 19 habitat indicators listed on the USFWS matrix for bull trout, KNF-2670-BT3 (USFWS 1998). Existing conditions for each habitat indicator are described and rated at a single scale - the CRB 6th code HUC 170101030305, which contains the entire lower Yaak River drainage.

1) Temperature: **Functioning at Unacceptable Risk**. Mean daily temperatures in the lower Yaak River at the USGS gaging station were above 15°C for 60 consecutive days between July 21 and September 18, 1998. Minimum daily temperatures were below 15°C for only 9 of those days and temperatures reached a maximum of 24.8°C during this time period. A long stretch of the Yaak River does flow through naturally open meadows at low gradients, so it is not known to what extent riparian area changes have affected stream temperature.

2) *Sediment:* **Functioning Appropriately.** Substrate composition is dominated by larger material in the cobble to boulder size class. The percentage of smaller materials is probably similar to that found in other streams in the Kootenai system. Those streams are typically low in fine sediments, even in managed systems.

3) *Nutrients and Contaminants:* **Functioning at Risk**. Many mining camps were established in the Yaak River drainage in the 1890s after the discovery of gold. The largest mining camp in the Yaak River drainage, associated with a patented placer gold claim, developed into the town of Sylvanite which was located about six river miles upstream of Yaak Falls. The town of Sylvanite had two quartz mills in operation in the late 1890s. The forest fires in 1910 destroyed much of Sylvanite and only small-scale mining continued after the fires of 1910. It is not known to what degree mining contaminated water quality, but there are currently no active mines in the Yaak River drainage.

4) *Physical Barriers:* **Functioning Appropriately**. The amount of habitat that bull trout can access in the Yaak River is naturally low because of a natural waterfall barrier within 11 miles of the confluence of the Kootenai River.

5) *Substrate:* **Functioning Appropriately**. Embeddedness is likely not an issue in the lower Yaak due to the large substrate.

6) *Large Woody Debris:* **Functioning at Risk**. Large woody debris is not common in the lower Yaak River. This is due in part to the size of the stream and the discharge. Flows are such that they flush LWD out of the system and into the Kootenai River.

7) *Pool Frequency:* **Functioning at Risk**. Pools are not common in the lower Yaak as a function of stream size.

8) *Pool Quality:* **Functioning Appropriately**. Pools that are present in the lower Yaak River are large and provide good cover for fish. Depth and water turbulence are primary cover available in those pools.

9) *Off-channel Habitat:* **Functioning at Risk.** Aerial photos and topographic maps were reviewed to determine the baseline of this parameter. Some backwaters and off-channel areas exist but most of the length of the lower Yaak River is structurally controlled and confined. Part of the length of the lower Yaak River flows through a canyon; the remainder flows through a V-shaped valley.

10) *Prime Habitat (refugia):* **Functioning at Risk**. It is not known to what extent deep pools or groundwater contribute to refugia in the lower Yaak River. Few off-channel refugia naturally exist in the lower Yaak River because of the structurally controlled nature of the drainage. There are three major (third-order) tributaries that enter the lower Yaak River, Kilbrennan, Arbo, and Ferrel creeks. There is a natural waterfall and bedrock chute barrier within 0.1 miles of the mouth of Kilbrennan Creek, which prohibits fish passage. Ferrel and Arbo Creeks have steep sections near their confluences with the Yaak River, but it is not known if they are fish passage barriers. Ferrel and Arbo creeks may provide refugia.

11) *Pool width/depth ratio:* **Functioning Appropriately**. Pools in the lower Yaak River are deep which provides a desired width to depth ratio.

12) *Streambank conditions:* **Functioning Appropriately.** Stream banks are stable throughout the length of the lower Yaak River.

13) *Floodplain connectivity:* **Functioning Appropriately**. Aerial photos and topographic maps were reviewed to determine the baseline of this parameter. Because much of the lower Yaak River is structurally controlled and confined, the floodplain is naturally limited. Floodplain connectivity appears to be generally functioning as it did historically.

14) *Peak and Base Flows:* **Functioning at Risk.** There is some evidence of altered peak flow. The equivalent clearcut area is 16.8% for the Yaak River drainage within the Three Rivers Ranger District.

15) *Drainage Network:* **Functioning at Risk.** There is likely a minor increase in the drainage network caused by ditches along roads. The existing road density in the Yaak River drainage is functioning at risk and roads often intercept water and directly route it to streams.

16) *Road Network:* **Functioning at Risk.** The existing road density in the Yaak River drainage within the Three Rivers Ranger District is 2.6 mi/mi^2. Some roads are parallel to streams and within RHCAs.

17) *Disturbance History:* **Functioning at Unacceptable Risk.** The current equivalent clearcut area is 16.8% for the Yaak River drainage. Some riparian harvest has occurred.

18) *RHCAs:* **Functioning at Risk**. There has been some loss of connectivity or function of riparian conservation areas from past riparian harvest, natural fires, and the clearing of private land.

19) *Disturbance Regime:* **Functioning at Risk**. Catastrophic fires have occurred in this watershed in 1889 and 1910. The fires of 1889 and 1910 burned about 33% and 18% of the Yaak River drainage, respectively. Fire suppression has probably increased the potential for severe fires. Because slopes are generally moderate and soils are generally stable, debris torrents are localized events that occur in several minor parts of the watershed. Altered peak flows may have altered the effects from floods in the drainage. Resiliency of habitat to recover from environmental disturbances is thought to be moderate.

Integration of Species and Habitat Conditions: **Functioning at Risk.** The lower Yaak does not currently support a subpopulation of bull trout and it is not known if it ever did historically. Currently, the main habitat condition potentially affecting bull trout appears to be temperature. Historic temperatures are not known, so it is not clear how much temperatures have changed. Because of the long, low gradient section of the Yaak River that flows through open meadows, temperatures are not expected to improve. Given the high stream temperatures, limited spawning habitat and limited population information, the Bull Trout that exist in the Yaak River are considered to be functioning at risk.

Status of INFISH Riparian Management Objectives

Habitat Feature	Interim INFISH RMO	Existing Condition
Pool Frequency	Varies by channel width	unknown
Water Temperature	< 15°C adult habitat, < 9°C	up to 24°C
Large Woody Debris (Forested)	> 20 pieces per mile	unknown
Bank Stability (non-forested)	> 80 percent stable	unknown
Lower Bank Angle (non-forested)	> 75 percent of banks < 90° angle	unknown
Width/Depth Ratio	< 10	unknown

Direct, Indirect, and Cumulative Effects

Direct effects to bull trout in the Yaak River from the proposed action include potential physical harm and harassment of individuals as well as potential habitat degradation. The primary concern is impinging juvenile fish in the dredge. The survivability for juvenile salmonids is extremely high when entrained by suction dredges. One test using 36 juvenile and adult rainbow and brook trout entrained intentionally demonstrated 100 percent survival (Harvey and Lisle 1998).

Effects to the available food supply would be very short term. Insects show a high survival rate with several studies documenting less than one percent mortality for entrained organisms (Harvey and Lisle 1998). Recovery of disturbed habitat is very quick with recolonization by invertebrates and periphyton occurring within four to six weeks (Harvey and Lisle 1998). Recovery is enhanced by the absence of silt on substrate surfaces. Molluscs are generally the last invertebrates to recolonize disturbed sites.

A secondary potential affect would be to spawning success. Suction dredge tailings are attractive to spawning fish as the gravels are loose, well sorted and generally located at the head of riffles. These characteristics are attractive to spawning salmonids; however, the tailings are also highly unstable and susceptible to movement at high flows, which greatly reduces survival of any eggs or embryos within the tailings (Harvey and Lisle 1998).

Dredging can reduce the frequency of large woody debris and large sized rocks. Operators can either physically remove, or through operations, destabilize channel materials holding larger material in place only to have them moved during high flows. This further decreases pool frequency, habitat complexity, and channel stability. Bedrock outcrops control the stream at the proposed dredging site with shallow gravels deposited behind these features. Currently the bedrock holds the smaller substrate in place while maintaining the depth and size of the pools located directly downstream. The proposed dredging will remove substrate from behind these bedrock features. As a result the tailings will most likely be directly deposited downstream of the dredging operation. The tailings will then be mobilized with the next high flow event and deposited downstream of the proposed project area.

Woody debris is non-existent and not likely to accumulate at the proposed dredge site. This is due to the large size of the stream and the high energy/confined bedrock canyon. Woody debris is usually flushed through the proposed project area to the Kootenai River.

Fine sediments mobilized by the proposed dredging activities can alter stream processes and conditions, including primary production of algae and other periphyton, density of aquatic insects, and fish reproduction. At low flows, pools tend to accumulate sediment transported as bedload. Thus, pools can be filled by sediment mobilized by upstream dredging. These fine sediments reduce both the frequency and quality of available pool habitat.

Aquatic insects and fish are adversely affected by increased sediment via their respiration and feeding processes. The very fine sediment particles suspended in the water column can get caught up in their breathing and eating tissues. Sands and fines typically settle out within close proximity of the dredging activities, which has direct effects downstream of the activity. There is also the potential to increase the embeddedness of cobbles directly downstream of the activity thereby reducing the availability of interstitial habitat.

The duration of exposure for bull trout to suspended sediments should be short term as a result of the proposed project. Mixing with fresh water will occur shortly below the disturbance site, and this water should meet State Water Quality standards (Perkinson 1993).

Behavioral responses of stream biota to noises and vibrations generated by dredging have not been quantified. The response is very broad. Sculpin close to active dredges appear to behave normally, and juvenile salmonids have been observed feeding on entrained organisms at dredge outfalls.

The lifting and sorting of the streambed can also mobilize elements such as mercury and other potentially toxic materials already in the stream channel. This would cause a minor increase in dissolved and suspended heavy metals downstream from the dredge, but it will be short term and adds nothing to the existing stream load for these constituents due to their existing presence in the stream.

Operation of mechanized equipment instream can also result in unintentional spills of oils, grease, or fuel. These spills would adversely effect all aquatic life due to the toxicity of petroleum products.

Cumulative effects include the continuing dispersed recreation and camping in the vicinity of the suction dredging as well as a potential for increased activity due to curiosity. It is reasonable to assume there might be increased fishing associated with this additional use. There is also potential for additional nutrients and contaminants to enter the stream as well as a reduction in some streamside woody debris to firewood cutting due to increased human activity.

CURRENT AND FORESEEABLE ACTIONS

Additional ongoing activities within the Yaak River drainage considered in the cumulative effects analysis for this project include the following:

Timber Harvest:
The most recent large timber sale project scheduled in the Yaak River watershed is the Northeast Yaak Project. This project is currently a draft EIS with a decision planned for June 2005. The project is located in the East Fork Yaak River, 40 miles up stream of the proposed project. The preferred alternative includes; 1730 acres of intermediate harvest, 264 acres of regeneration harvest, 358 acres of natural fuels reduction, and 286 acres of precommercial thinning. The roadwork included in this alternative consists of; 1 mile of temporary road construction, 17 miles of decommissioning, 11 miles of storage, and 74 miles of road considered for BMP's. The Northeast Yaak Project was a No Effect determination for Bull Trout. There will be no cumulative effects to Bull Trout and their habitat due to the distance between the Northeast Yaak Project and the proposed Snipetown project.
The Garver Timber Sale (June 2003), in the West Fork Yaak area, is 34 river miles above the proposed project area. It authorizes approximately 328 acres of mechanical fuels treatments, 1508 acres of intermediate harvest, 236 acres of stand replacement harvest, and 818 acres of ecosystem burning to improve conditions for fire-dependent tree species reduce fuels.

Road Construction & Maintenance:
Road construction in the Yaak River drainage occurred primarily in association with access to timber harvest. In the 1950s the main arterial roads to the upper ends of the drainages were constructed to access spruce salvage logging. Most of the remaining road construction occurred in the 1970s and 1980s in association with lodgepole pine salvage. Road maintenance is ongoing in the Yaak drainage; however there are no FS system roads in the proposed project area.

Fire Suppression Activities:
As currently outlined in the 2004 Kootenai N. F. Fire Management Plan, fire suppression efforts will be made to suppress any and all fires that may occur within the project area.

Weed Control:
Spraying to control weeds is ongoing within the Yaak River watershed under the Kootenai National Forest Herbicide Weed Control Plan Environmental Assessment and associated Decision Notice and Finding of No Significant Effect, 1/97.

Recreation, Outfitter and Guide Permits, and Firewood Cutting:
Recreational activities in the Yaak River drainage such as sightseeing, hiking, kayaking, camping, and fishing, are ongoing and expected to increase over the next 10 years.

Actions on Private Lands:
Continued development of private land is expected in the Yaak River watershed. Development is expected to include commercial timber harvest, land clearing, home construction, road construction, septic field installation, water well drilling, livestock grazing, and riprap of migrating stream banks. These actions are not occurring within the proposed suction dredge area but are within the Yaak River watershed. The nearest private holdings are located above Yaak Falls, roughly two miles upstream of the furthest extent of bull trout and more than three miles above the proposed project site. The cumulative effects to bull trout and their habitat would be insignificant given the distance between potential bull trout habitat and private lands.

POTENTIAL EFFECTS TO SPECIES INDICATORS AND HABITAT INDICATORS

Species Indicators:

1) *Subpopulation Size:* Maintain. There would be no effect to the subpopulation as a result of this project. The area provides rearing habitat for juvenile bull trout, and is not quality spawning habitat.Though there is the potential for take associated with this project, the number of individuals lost from the subpopulation would be inconsequential.

2) *Growth & Survival:* Degrade. There is the potential to reduce aquatic macroinvertebrate densities as well as interstitial habitat which in turn would reduce foraging and shelter opportunities for juvenile bull trout. This would possibly result in reduced growth rates as well as increased exposure to predation for some individuals.

3) *Life History Diversity & Isolation:* Maintain. This project would not affect the present diversity or isolation for this sub-population.

4) *Persistence and Genetic Integrity:* Maintain. This project would have no effect on the persistence or genetic integrity.

Habitat Indicators:

1) *Temperature:* Maintain. The proposed action would have no effect on stream temperature.

2) *Sediment:* Degrade. The proposed suction dredging would redistribute instream sediments within the active channel. Silt and clay particles would likely be carried well out of the project area. Sand and fines would be redistributed directly downstream of the dredging activity. Potentially they could be concentrated into a smaller area. There would be no addition of sediment from outside the active channel since there would be no dredging of bank materials.

3) *Chemical Contamination / Nutrients:* Degrade. There would be the potential for gasoline and oil to enter the creek from maintenance, fueling or mechanical failure.

4) *Physical Barriers:* Maintain. The proposed activities will have no effect on habitat access. No stream crossings are proposed.

5) *Substrate Embeddedness:* Degrade. There is the potential for sand and fines to be concentrated. This would increase cobble embeddedness and reduce interstitial habitats. The potential for unstable spawning areas to be formed would be greatly reduced by dispersing tailings as the operation proceeded.

6) *Large Woody Debris:* Maintain. Woody debris is non-existent and not likely to accumulate at the proposed dredge site. This is due to the large size of the stream and the high energy/confined bedrock canyon. Woody debris is usually flushed through the proposed project area to the Kootenai River.

7) *Pool Frequency & Quality:* Degrade. It is probable that some of the fines disturbed by the dredging will reach pools downstream of the project and reduce their quality, e.g., increased embeddedness, reduced volume. It is doubtful this reduction would be measurable.

8) *Large Pools:* Degrade. It is probable that some of the fines disturbed by the dredging will reach pools downstream of the project and reduce their volume. It is doubtful this reduction would be measurable.

9) *Off-Channel Habitat:* Maintain. There are no areas of off-channel habitat in the vicinity of the claim. This project would not affect off-channel areas downstream.

10) *Refugia:* Maintain. There is no habitat within the proposed project area or directly downstream that would be considered refugia.

11) *Wetted Width/Max Depth Ratio:* Maintain. This parameter would not be affected as the thalweg will be maintained and the banks will be undisturbed.

12) *Streambank Condition:* Maintain. Streambanks will not be disturbed for dredging.

13) *Floopplain Connectivity:* Maintain. There will be no activity outside the active channel.

14) *Change in Peak/Base Flows:* Maintain. There would be no peak flow increase associated with this project nor would this project affect base flow. According to the USGS gaging station data the mean peak discharge is 6780 cubic feet per second (CFS). The average base flow for the month of September is 162 CFS.

15) *Drainage network Increase:* Maintain. There will be no change to the existing road drainage associated with this project.

16) *Road Density & Location:* Maintain. This project would use existing roads accessing existing dispersed recreational sites.

17) *Disturbance History: Maintain.* There is no harvest associated with this project.

18) *Riparian Conservation Area:* Maintain. The project would have no effect on the RHCA.

19) *Disturbance Regime:* Maintain. The scale of this project would not affect the natural disturbance regime for this watershed.

Integration of Species and Habitat Conditions: Maintain. This project will not measurably degrade the available habitat within the Yaak River watershed. The stability of the system will not change as a result of this project. The redistribution of an indeterminate amount of sediment in the stream system would result in the immeasurable degradation of various habitat indicators but is not expected to degrade function for any of the indicators. The proposed project does present a very small possibility that one or more individual bull trout within this subpopulation may be injured or killed by impinging juvenile fish in the dredge.

Compliance with INFISH

Conditions in the Yaak River do not currently meet default RMOs established by INFISH. The proposed project is consistent with INFISH and would not retard the attainment of RMOs.

Effects Matrix Checklist

Diagnostic/Pathways: Indicators	Population and Environmental Baseline	Major Effects of the Action(s)	Minor Effects of the Action(s)	INFISH compliance	Comments
	FA, FAR, FUR	Restore, Maintain, Degrade	Restore, Maintain, Degrade		
Subpopulation Characteristics:					
Subpopulation Size	FAR	Maintain	Maintain		
Growth & Survival	FAR	Maintain	Degrade		
Life History Diversity & Isolation	FAR	Maintain	Maintain		
Persistence and Genetic Integrity	FAR	Maintain	Maintain		
Water Quality:					
Temperature	FUR	Maintain	Maintain	Yes	
Sediment	FA	Maintain	Degrade	Yes	
Chemical Contamination / Nutrients	FAR	Maintain	Degrade	Yes	
Habitat Access:					
Physical Barriers	FA	Maintain	Maintain	Yes	
Habitat Elements:					
Substrate Embeddedness	FA	Maintain	Degrade		
Large Woody Debris	FAR	Maintain	Degrade	Yes	
Pool Frequency	FAR	Maintain	Degrade	Yes	
Pool Quality	FA	Maintain	Degrade		
Off-Channel Habitat	FAR	Maintain	Maintain		
Refugia	FAR	Maintain	Maintain		
Channel Condition & Dynamics:					
Wetted Width/Max Depth Ratio	FA	Maintain	Maintain	Yes	
Streambank Condition	FA	Maintain	Maintain	Yes	
Floodplain Connectivity	FA	Maintain	Maintain		
Flow & Hydrology:					
Change in Peak/Base Flows	FAR	Maintain	Maintain		
Drainage network Increase	FAR	Maintain	Maintain	Yes	
Watershed Conditions:					
Road Density & Location	FAR	Maintain	Maintain	Yes	
Disturbance History	FUR	Maintain	Maintain		
Riparian Conservation Area	FAR	Maintain	Maintain	Yes	
Disturbance Regime	FAR	Maintain	Maintain		
Integration of Species & Habitat Condition	FAR	Maintain	Maintain	Yes	

Major effects - change one level from baseline condition e.g. FA to FAR. **Minor effects** - Indicates action may result in an incremental or cumulative effect, but does not result in a functional change to the system (no change in functional level).

Statement of Findings

Based on the effects analysis above, the proposed activity **MAY EFFECT** and is **LIKELY TO ADVERSLY AFFECT** bull trout of the Yaak River. This is due to the fact that subadults and/or fry have the potential to be entrained and impinged by the suction dredge, and that these effects cannot be eliminated.

WHITE STURGEON

White sturgeon migrate freely throughout the Kootenai River from Cora Linn Dam, Canada, upstream to Kootenai Falls, Montana but are uncommon upstream of Bonners Ferry, Idaho (Andrusak 1980; Graham 1981; Apperson and Anders 1991). There are no published reports of sturgeon using lateral tributaries in Idaho or Montana (Partridge 1983); however, accounts by local residents suggest that sturgeon may occur, if not actually rear, in several lateral tributaries of the Kootenai River. The Yaak River below Yaak Falls is considered to be potential habitat for white sturgeon. Approximately 45 percent of the known potential habitat on the Kootenai National Forest is under joint State/Federal management. The remainder is managed by private and corporate landowners.

There were an estimated 1,469 adult white sturgeon (95% C.I. = 740 to 2,197) in Kootenay Lake, British Columbia, and the Kootenai River downstream of Bonners Ferry, Idaho in 1995 (Paragamian et al. 1997). This equates to an average of 18 fish per mile of river below Bonners Ferry. Above Bonners Ferry, Graham (1981) estimated a total of only 1 to 5 individuals. A census by the Montana Fish, Wildlife and Parks resulted in the capture of only one individual.

This stock of fish will be considered for downlisting to threatened status after 10 years only if natural reproduction occurs in three different years; the estimated population is stable or increasing; enough captive-reared juveniles are added to the population for 10 consecutive years that 24 to 120 juveniles survive to maturity; and a long-term Kootenai River Flow strategy is implemented that ensures natural reproduction. Delisting of this population is estimated to take at least 21 more years.

In December 2000, the U.S. Fish and Wildlife Service issued a biological opinion stating that Libby Dam is the primary factor affecting the Kootenai River white sturgeon. The USFWS also designated 11.2 miles of river below Bonners Ferry, ID as critical habitat. The most recent population estimate from the Idaho Department of Fish and Game indicates there are approximately 600 adult sturgeon in the population. Natural reproduction has been confirmed in the Kootenai River. Currently the majority of juvenile fish in the population are hatchery-reared fish (USDA Forest Service 2002)

Sturgeon require boulder and cobble (three to five inch diameter) substrates and high water velocities (three to seven ft/sec) for spawning. These appear to be the two most critical spawning elements known to date. White sturgeon spawn during spring peak flows when velocities are high and turbidity is elevated. The fertilized eggs sink to the bottom, and then hatch within a few weeks. The newly hatched sac-fry briefly drift with the current before retreating into the substrate for up to a month. The juveniles eventually emerge from the substrate and begin a free-roaming life. Older white sturgeon are relatively sedentary in the deepest locations of the Kootenai River drainage, often selecting low velocity waters greater than twenty feet deep. They are opportunistic feeders, and subsist on insects, clams, snails and fish. Kokanee from Kootenay Lake were once an important prey item prior to the collapse of the salmon fishery in the mid-1970s.

Operation of Libby Dam is considered the primary cause for decline of the white sturgeon (Holton 1980; Apperson and Anders 1991). Changes in the annual hydrograph (magnitude and timing of flows) eliminates the spring (May to July) high flows required for successful reproduction, and produces large daily/weekly fluctuations in discharge that impact habitat as well as increase mortality risk. Operation of the dam has also modified the annual thermal regime that sturgeon likely use as cues for spawning. Reduction of juvenile rearing habitat in Idaho due to agricultural diking and bank stabilization may also be

adversely affecting juveniles because sloughs and side channels are important rearing and foraging habitat for young sturgeon and their prey (Partridge 1983).

Mining (copper) pollution and other chemical pollutants (lead, zinc, vermiculite, PCB's and organochlorides) are suspected to be potential threats to sturgeon reproduction (Partridge 1983; Apperson 1992). Evidence of declining Kootenai River and Kootenay Lake productivity (Daley et.al. 1981) due to pollution abatement and dam operations has led to speculation that population recovery will be inhibited as a result. The degree of threat that water quality represents is unknown.

Non-point source pollution from forest management activities has not been identified as a factor in the decline of the Kootenai River stock of white sturgeon. However, the direct and indirect effects of timber harvest and related actions can influence the magnitude and timing of peak stream flows (Harr 1981). Forestry and related actions can also affect stream temperatures and nutrient and sediment loads (Scrivener 1982; Furniss et.al. 1991). Depending on the magnitude of cumulative actions and the proximity of activities to potentially affected habitat, a host of other physical characteristics of the environment may also be affected. Forestry and related activities rarely result in chemical pollution, but could indirectly remobilize materials stored in stream substrate by altering peak flows. Research on juvenile Kootenai River white sturgeon has not demonstrated a relationship between forestry and white sturgeon populations. The primary threats to the species are related to operation of Libby Dam.

Description of the Population Within the Project Area

The nearest potential habitat is 11miles below the project area in the Kootenai River. No White Sturgeon have been documented in the project area.

Analysis of Direct, Indirect and Cumulative Effects

Based on the nature of proposed activities, sediment production would be not be measurable at the point of effect in the Kootenai River. Prior to the construction of Libby Dam, the Kootenai River peaked between 40,000 and 70,000 cubic feet per second (cfs). Currently, peak flows during spring runoff average between 9,000 and 24,000 cfs. This combined with the sediment trap created by the dam has also significantly reduced the amount of sediment transported downstream.

The proposed project, together with related actions, reasonably foreseeable activities, and other projects spatially associated with the proposed project would result in an insignificant direct, indirect or cumulative effect to the sturgeon.

Statement of Findings

Based on the effects analysis above, all proposed activities would have **NO EFFECT** on the white sturgeon. Any effects would be diluted to the point of not being measurable at the point of effect for white sturgeon.

Potential Measures for Removing, Avoiding, or Compensating for Adverse Effects

The following requirements were put in place to reduce the potential negative effects of the proposed action. These will reduce the potential for take as well as habitat degradation during suction dredge operation as well as reducing potential long term impacts.

1) The proposed activity will occur only during the period from July 15 to September 15. This is outside the principle spawning period for both spring and fall spawners and would protect bull trout alevin.

2) Streambank dredging, or channel dredging that undermines the adjacent streambank will not be permitted. The majority of fine sediments along a stream are in the streambanks, thus this measure eliminates 60-75% of the potential sedimentation risk (Perkinson 1993).

3) The thalweg (fastest/deepest portion of the channel) will be maintained in its present location. This measure protects against thalweg migration and the resulting indirect increase in bank erosion and sedimentation due to changes in channel hydraulics.

4) Channel structures too large to be moved by hand, e.g., logs, boulder, will be left undisturbed. These habitat components provide structure represent the primary hiding areas for older fish. Maintaining these components avoids long-term effects on fish production.

5) Bedrock will not be broken from the stream bottom and adjacent banks by pry bars, jacks or any other means

6) In some instances, if dredging activity collects mercury, then dredging may cease at the immediate site. This will occur at the discretion of the Forest Service, if mercury is being accumulated at a level which cannot be efficiently collected.

7) During dredging activities the operator should lightly disturb the streambed before processing the gravel. This can be done by wading or overturning surface cobbles. Bull trout and sculpins will be in shallow water riffles, while other species will cluster in pool habitats. This measure will avoid accidental suctioning of older juvenile fish, and minimize the potential for take of very small fish that tend to hide in the stream bottom and along stream edges.

8) All tailings will be hydraulically redistributed to avoid the accumulation of unstable spawning gravels.

9) The permittee will provide to the Three Rivers Ranger District copies of the monitoring reports required under their SD-GDP-370283.

10) Each disturbed site will be inspected by Forest Service personnel after the total dredging activity has been completed for the field season. A determination will then be made as to the whether dredging can be permitted at a given site in subsequent years on the basis of substrate condition and channel alignment.

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Summary and Signature

Listed Fish Species	Determination of Effects	Potential for Incidental Take?
Bull Trout	LAA	Yes
White Sturgeon	NE	NO

Possible determination of effects on listed fish species:

NE = No Effect

NLAA = May Affect - Not Likely to Adversely Affect

LAA = May Affect - Likely to Adversely Affect

Prepared by: Josh Boyd Date: 5/16/05

Josh Boyd, Hydrological Technician May 16, 2005

Reviewed by: Date: 5/16/05

John W. Carlson, Forest Fish Biologist May 16, 2005

Maps and Correspondence with Fish & Wildlife Service (Attached to the BA)

Exhibit A

Sanders-POO for Snipetown mining claim - suction dredging
Section 19, T33N, R33W, P.M. MT.