Nez Perce Tribe

Species of Interest Listings
Asotin, Tucannon, and Lower Snake Subbasins
Version 2: Received 4/7/03

NOTE: This information was not reviewed nor approved by the Subbasin Planning Team. Discussion of Coho salmon in the Asotin was also not provided for public review.

Proposed Aquatic Species of Interest			
	Asotin	Tucannon	Lower Snake River
Pacific Lamprey	✓	✓	
White Sturgeon			✓
Coho Salmon	✓	✓	

Introduction

Historians have estimated that prior to the arrival of white settlers, the Columbia Basin's Native American population of 50,000 harvested 18 million pounds of salmon *(Oncorhycus spp.)* and steelhead *(Oncorhycus mykissi)* annually (Smith 1979). Of the basins Native American cultures the largest was the Plateau Culture that extended eastward of the Cascade Mountains in Oregon and Washington to the Bitteroot Mountains of Idaho and Montana and included the Flathead, *Nez Perce*, Spokane, Yakama, and other ethnic groups.

Since time immemorial, the Nez Perce Tribe as a *trans-humance*, (Pinkham, 2002), or seasonally migratory subsistence, culture has utilized the Asotin, Tucannon, and Lower Snake (ATLS) watersheds as a subsistence area. With the signing of the 1855 Treaty with the United States, the Nez Perce Tribe ceded control of vast territories but under Article III, ***reserved*** specific rights at ***usual and accustomed*** areas.

> "The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and

pasturing their horses and cattle upon open and unclaimed land", (Treaty with the Nez Perce Tribe, June 11, 1855).

The Nez Perce Tribe in order to perpetuate their culture has a direct responsibility, and high stake in the preservation of the cultural aspects (subsistence, ceremonial, and medicinal uses) of historically utilized species in these watersheds. As a co-manager of these assets, and with the understanding that there be only a selection of a minimal number, (3-4), of focal species, the Tribe has elected to propose inclusion of those culturally significant species that were not selected as focal species, as ***species of interest,*** for inclusion in the subbasin plan. In accordance with adaptive management principles, this inclusion provides a means to present species that may have either ecological and/or cultural significance but for which there is not enough empirical data for inclusion in the focal species category for planning purposes.

These selections are proposed as candidates on the grounds that they are culturally and /or ecologically significant, in accordance with the Northwest Power Conservation Council Subbasin Planning Guide, Technical Guide for Subbasin Planners, Developing the Products Section, Fish and Wildlife Species /Populations, pages 9-10, which include in order of priority,

a) designation as a Federal endangered or threatened species
b) ecological significance
c) **cultural** significance
d) local significance.

ASOTIN SUBBASIN

Species of Interest: Pacific Lamprey *(Lampetra tridentata*)

History:
Pacific lamprey (*Lampetra tridentata*) numbers have been in great decline since the installation of numerous dams and habitat degradation in the Columbia Basin. The Nez Perce Tribe regards Pacific lamprey as a highly valued resource harvested to this day as a subsistence food and is highly regarded for its cultural value.

The Asotin Subbasin historically had a large run of anadromous Pacific Lamprey (*Lampetra tridentata*). There are numerous oral recollections of fishing for the lamprey as an alternative subsistence food source by Native Americans.
The town of Asotin is derived from the Nez Perce word Heustiin that means place of eels, (Allen Slickpoo Sr., Nez Perce, Salmon and His People, Landeen, Pinkham 1999).

Asotin County resident Frank Schiebe, who was the dam operator at Headgate Dam from 1954 – 1960, on main Asotin Creek, recalls numerous lampreys could be seen maneuvering over the headgate dam. He also recalled that lampreys were also taken out of Asotin Creek for use as sturgeon bait by local fishermen, (pers. comm. F. Scheibe, 2004).

Life History:
The life cycle of the Pacific Lamprey is similar to that of salmonids. Pacific Lamprey reach the spawning grounds in mid-summer (Kan 1975; Beamish 1980) and generally spawn the following spring. Thus, adult lamprey spend approximately 1 year in freshwater. Spawning generally occurs in small tributary streams, where both sexes construct a crude redd (Scott and Crossman 1973), generally located in the center of the stream near the tailout of a pool, and immediately upstream of shoreline depositional areas (Beamish 1980). Mating is repeated several times in the redd, with each mating followed by actions that move substrate over newly laid eggs. Water temperatures of 10-15^{o}C have been measured in Clear Creek, a tributary of the John Day River, during spawning (Kan 1975). Adults die soon afterward and provide valuable nutrients to small tributaries where salmon fry rear (Kan 1975).

Eggs typically hatch into ammocoetes in less than 2 weeks; these newly hatched larvae, which are filter feeders, then drift downstream and bury themselves in silt, mud, or fine gravel along the margins and backwaters of streams and rivers (Scott and Crossman 1973; Hammond 1979). Ammocoetes generally spend 5-6 years in freshwater (Scott and Crossman 1973). In the fall of their last year, they metamorphose into macrophthalmia, which resemble the adult form. This transformation process is generally completed by early winter.

Downstream migration of macrophthalmia appears to be stimulated by and dependent on late winter and early spring floods (Hammond 1979). Because they are not strong swimmers, lampreys appear to be dependent on spring flows to carry them to the ocean (Kan 1975; Beamish 1980). The upstream, spawning migration of adults generally begins in early spring. Adult lamprey use the mainstem in returning to their spawning grounds, but do not feed during this period. They were once an important food source for sturgeon in the mainstem (Kan 1975).

Pacific lampreys appear to travel directly into the open ocean, rather than feed in the estuary of nearby coastal waters (Kan 1975; Beamish 1980), as do some other lamprey species.

Pacific lampreys rear in the ocean habitat for up to 3.5 years (Beamish 1980), and range in excess of 100 km offshore, often in areas of considerable depth (up to 800 m) (Kan 1975; Beamish 1980;). Adult lampreys in the ocean are parasitic on many fish species, including salmon. They attach themselves to fish and other animals and feed on blood and body fluids through a hole rasped in the flesh of the host (Wy-Kan-Ush-Mi Wa-Kish-Wit, (*Spirit of the Salmon*): The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes, Volume I, CRITFC 1996).

Evidence suggests that Pacific Lamprey was well integrated into the native freshwater fish community, and as such had positive effects on the system. It was in all probability, a big contributor to the nutrient supply in oligotrophic streams of the basin as adults died after spawning (Beamish 1980). We suspect that it was an important buffer for upstream migrating adult salmon from predation by marine mammals. Juvenile lampreys migrating downstream may have buffered salmonid juveniles from predation by predacious fishes and sea gulls (Close et al. 1995).

Pacific Lamprey ammocoetes provide Snake River basin white sturgeon *Acispenser transmontanus* populations with an important food source (Galbreath 1979), which potentially contributed to Snake River white sturgeon historical productivity, (Cochnauer, Claire 2001). Pfeiffer and Pletcher (1964) found that coho fry ate emergent larval lamprey (Close et al. 1995).

Need:

This is the proposed placeholder for Lamprey for the Asotin Subbasin. Since the completion of the hydropower system in the Columbia Basin, the numbers of Pacific lamprey have declined dramatically compared with historical levels of abundance and distribution.

Counts at Bonneville Dam have exceeded 300,000 lampreys in the past (Starke and Dalen 1995). These counts include only those fish that passed the counting station during the 18 hours of counting, i.e., they do not include lamprey that passed through navigation locks or at night. Counts of Pacific lamprey returning over lower Snake River dams were in the thousands in 1969, but declined to hundreds by 1978 (Hammond 1979) and numbered only 40 individuals total in 1993 (L. Basham, Fish Passage Center, Portland, personal communication 1994) (Wy-Kan-Ush-Mi Wa-Kish-Wit, (*Spirit of the Salmon*): The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes, Volume I, CRITFC 1996).

Currently there is no empirical data on the numbers of Pacific Lamprey that may still be returning to this watershed, they are considered functionally extirpated. Basic life history, distribution, and remaining population status are urgently needed to fully understand this species and to begin intensive management before populations decline to unrecoverable thresholds. Additional research is required to establish current numbers, limiting factors, available habitat and rehabilitation potential.

On going efforts to determine the current status of Pacific Lamprey have largely been focused from the mouth to the Lower and Mid Columbia regions with the exception of the Idaho Department of Fish and Game study in the Clearwater River Basin above the confluence of the Lower Snake River.

To enhance information sharing and to eliminate duplication of development of research methodology proposed efforts should adopt methods such as those that are currently being utilized by other Columbia River Intertribal Fish Commission tribes. The Nez Perce Tribe's goal relating to lamprey is to create a sustainable annual subsistence harvest and re-establish the lamprey's role in the Asotin subbasin.

Research Monitoring and Evaluation:

Proposed Research: Assess population status, limiting factors, habitat availability and rehabilitation potential for Pacific lamprey.

Goal: To define population status and rehabilitation potential of Pacific lamprey in the Asotin and Tucannon subbasins

Proposed M&E: Environmental and population status M&E. M&E sampling will include collection of life history, distribution, and abundance by life stage, and genetic and homing behavior attributes of Pacific lamprey ammocoetes and macrothalmia. Genetic analysis of ammocoetes

will be coordinated through ongoing programs (i.e. USGS lab at Cook WA). Homing behavior will include tagging of individuals (using methods consistent with ongoing programs) and subsequent evaluation upon recapture. Use data collected through habitat assessments and population surveys to identify potential restoration opportunities.

Coordination Potential: Coordinate with ongoing lamprey evaluation programs, if any, and potential program cooperators (i.e. WDFW, CRITFC, CTUIR, NPT). Ensure that smolt traps are adequately equipped to collect lamprey and that trap operators are informed as to data collection procedures.

Geographic Scope: Accessible anadromous waters in the Asotin Subbasin.

Species of Interest: Coho Salmon (*Oncorhynchus kisutch)*

The Nez Perce tribe regards coho salmon as a highly valued resource that was historically harvested as a subsistence food and is highly regarded for its cultural value.

Life History:
Coho salmon (*Oncorhynchus kisutch*) spawn in small coastal streams and the tributaries of larger rivers. They prefer areas of mid-velocity water with small to medium sized gravels. Because they use small streams with limited space, they must use many such streams to successfully reproduce. Stream gradients of 3% or less provide conditions favorable for coho salmon (Reeves et a. 1989).

Historically, coho salmon in the Snake River Basin spawned from mid-October to mid-December, fry emerged from the gravel in late spring (April), juveniles reared for approximately 18 months and emigrated to the ocean (Cramer and Witty 1998). Smolt emigration from the Grande Ronde began in late April to early May. Passage over Ice Harbor Dam peaked in early June and smolts reached the Columbia River estuary in mid-May to early-June (Cramer and Witty 1998). The majority of adults coho salmon returning to the Grande Ronde River had spent 15 months rearing in the ocean and returned to spawn at age 3 (Cramer and Witty 1998).

Data:
Coho salmon (*Oncorhynchus kisutch*) were considered to be extirpated in the Snake River basin in 1986 based on zero counts over the Snake River dams. There are no documented reports of coho salmon in Asotin Creek. However, historically, coho were abundant in the adjacent subbasins: the Clearwater and Grande Ronde. Nez Perce Tribal elders confirm the historical presence of coho salmon in the Clearwater River Subbasin (Paul Kucera, Director of Research,

Nez Perce Tribe, Personal Communication) and Schoning (1940, 1947) and Fulton (1968) also document that residents of the area caught coho salmon in the Clearwater River Subbasin (x miles downstream of Asotin Creek). In addition, the Grande Ronde subbasin was historically a major producer of coho salmon. Cramer and Witty (1998) estimated adult coho production exceeded 20,000 fish in the Grande Ronde subbasin (x miles upstream from Asotin Creek) prior to 1902.

Need:

The Nez Perce Tribe has a mission to recover and restore all populations, all species of anadromous and resident fish within the traditional lands of the Nez Perce Tribe.

To support this mission, the Nez Perce Tribe has developed a plan for reintroduction and restoration of coho salmon to the Snake River Basin which includes the Grande Ronde Subbasin (Grassel et al. 2004 DRAFT) and the Clearwater River Subbasin (NPT and FPI 2004). The Nez Perce Tribe has an ongoing coho salmon reintroduction program in the Clearwater River Subbasin and recently has completed a master plan (NPT and FPI 2004) which identifies Asotin Creek as a stream for potential supplementation using a rotating schedule of juvenile coho salmon releases aimed at determining which tributaries have potential to support natural production.

TUCANNON SUBBASIN

Species of Interest: Pacific Lamprey (*Lampetra tridentata*)

History:
Pacific lamprey (*Lampetra tridentata*) numbers have been in great decline since the installation of numerous dams and habitat degradation in the Columbia Basin. The Nez Perce Tribe regards Pacific lamprey as a highly valued resource harvested to this day as a subsistence food and is highly regarded for its cultural value.Pacific Lampreys historically were common in the Tucannon Subbasin (Mendel, 1997)

Life History:
The life cycle of the Pacific Lamprey is similar to that of salmonids. Pacific Lamprey reach the spawning grounds in mid-summer (Kan 1975; Beamish 1980) and generally spawn the following spring. Thus, adult lamprey spend approximately 1 year in freshwater. Spawning generally occurs in small tributary streams, where both sexes construct a crude redd (Scott and Crossman 1973), generally located in the center of the stream near the tailout of a pool, and immediately upstream of shoreline depositional areas (Beamish 1980). Mating is repeated several times in the redd, with each mating followed by actions that move substrate over newly laid eggs. Water temperatures of 10-15^{o}C have been measured in Clear Creek, a tributary of the John Day River, during spawning (Kan 1975). Adults die soon afterward and provide valuable nutrients to small tributaries where salmon fry rear (Kan 1975).

Eggs typically hatch into ammocoetes in less than 2 weeks; these newly hatched larvae, which are filter feeders, then drift downstream and bury themselves in silt, mud, or fine gravel along the margins and backwaters of streams and rivers (Scott and Crossman 1973; Hammond 1979). Ammocoetes generally spend 5-6 years in freshwater (Scott and Crossman 1973). In the fall of their last year, they metamorphose into macrophthalmia, which resemble the adult form. This transformation process is generally completed by early winter.

Downstream migration of macrophthalmia appears to be stimulated by and dependent on late winter and early spring floods (Hammond 1979). Because they are not strong swimmers, lampreys appear to be dependent on spring flows to

carry them to the ocean (Kan 1975; Beamish 1980). The upstream, spawning migration of adults generally begins in early spring. Adult lamprey use the mainstem in returning to their spawning grounds, but do not feed during this period. They were once an important food source for juvenile and adult sturgeon in the mainstem (Kan 1975).

Pacific lampreys appear to travel directly into the open ocean, rather than feed in the estuary of nearby coastal waters (Kan 1975; Beamish 1980), as do some other lamprey species.

Pacific lampreys rear in the ocean habitat for up to 3.5 years (Beamish 1980), and range in excess of 100 km offshore, often in areas of considerable depth (up to 800 m) (Kan 1975; Beamish 1980;). Adult lampreys in the ocean are parasitic on many fish species, including salmon. They attach themselves to fish and other animals and feed on blood and body fluids through a hole rasped in the flesh of the host (Wy-Kan-Ush-Mi Wa-Kish-Wit, (*Spirit of the Salmon*): The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes, Volume I, CRITFC 1996).

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Pacific Lamprey ammocoetes provide Snake River basin white sturgeon *Acispenser transmontanus* populations with an important food source (Galbreath 1979), which potentially contributed to Snake River white sturgeon historical productivity, (Cochnauer, Claire 2001). Pfeiffer and Pletcher (1964) found that coho fry ate emergent larval lamprey (Close et al. 1995).

Reference Data:
Pacific Lampreys historically were common in the Tucannon Subbasin (Mendel, 1997). In 1995, two Pacific Lamprey adults were captured at the smolt trap at RM 12.5. In 1997, Washington Department of Fish and Wildlife sampled 94 Pacific Lamprey ammocoetes, and one dead adult Pacific lamprey in smolt trap operations, (Jackson et al., 1997). Incidental observations or catch on the Tucannon River subbasin for 1998 were 130 larvae and 8 adults were captured in the rotary screw trap at RK 3 (Close, 1998).

Counts of this species of interest for the Tucannon Subbasin for the last few years have been relatively low as demonstrated by the numbers observed at the

smolt trap, (Gallinat, pers. comm. 2004). A summary of the numbers for the last four years are listed below:

Season	Lamprey Ammocoetes	Lamprey Macropthalmia	Lamprey Adults
99/00	626 (w/out eyes)	148 (w/eyes)	7
00/01	595 (w/out eyes)	195 (w/eyes)	13
01/02	203(w/out eyes)	44 (w/eyes)	1
02/03	307 (w/out eyes)	78 (w/eyes)	12

Need:
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Research Monitoring and Evaluation:

Proposed Research: Assess population status, limiting factors, habitat availability and rehabilitation potential for Pacific lamprey.

Goal: To define population status and rehabilitation potential of Pacific lamprey in the Asotin and Tucannon subbasins

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Coordination Potential: Coordinate with ongoing lamprey evaluation programs, if any, and potential program cooperators (i.e. WDFW, CRITFC, CTUIR, NPT). Ensure that smolt traps are adequately equipped to collect lamprey and that trap operators are informed as to data collection procedures.

Geographic Scope: Accessible anadromous waters in the Tucannon Subbasin.

Species of Interest: Coho Salmon (*Oncorhynchus kisutch)*

The Nez Perce tribe regards coho salmon as a highly valued resource that was historically harvested as a subsistence food and is highly regarded for its cultural value.

Life History:

Coho salmon (*Oncorhynchus kisutch*) spawn in small coastal streams and the tributaries of larger rivers. They prefer areas of mid-velocity water with small to medium sized gravels. Because they use small streams with limited space, they must use many such streams to successfully reproduce, which is why coho can be found in virtually every small coastal stream with a year-round flow.

Returning Coho salmon often gather at the mouths of streams and wait for the water flow to rise, such as after a rain storm, before heading upstream. The higher flows and deeper water enable the fish to pass obstacles, such as logs across the stream or beaver dams that would otherwise be impassable.

Coho salmon deposit their eggs in the gravel in the fall, emerge from the gravel the next spring, and in their second spring go to sea, about 18 months after being

deposited. Coho fry are usually found in the pools of small coastal streams and the tributaries of larger rivers.

Data:
Since 2000, coho salmon (*Oncorhynchus kisutch*) have been observed dispersing/straying into the Tucannon Subbasin from releases of juveniles in the Clearwater River subbasin (pers. comm. Milks, 2004). In 2002 there were 7 coho adults that were captured at the Tucannon Fish Weir. Five of these had coded wire tags (CWT's) (05 series) and are presumed to be pioneers of 2001/2002 brood stock Nez Perce Tribal Fisheries releases into the Clearwater River.

A summary of the numbers for the last four years are listed below:

Juvenile Smolt Trap

Season	Parr
99/00	33
00/01	32
01/02	408
02/03	135

Adult Weir

Season	Adults	CWT's/Series/Location	CWT's/Series/Location
99/00	None		
00/01	08	6 CWT's 612609 (Willard)	2 CWT's 612612 (Dworshak)
01/02	07	4 CWT's 054847 (Eagle Ck.)	2 CWT's None
		1 CWT 054338 (Willard)	
02/03	10	CWT's None	

Need:
Coho salmon were historically present in the Tucannon River and are now listed as extirpated (Jackson et al., 1997). Parkhurst (1950) noted that, according to local residents, the last run of silver (Coho) salmon entered the river in October 1929, although "a small number of these fish probably still appear. The Tucannon River Coho may have become extirpated by 1955 (Kelley *et al.* 1982), though Coho were still found within the Snake River system until at least 1986 (Wortman 1993). Edson (1960) reported that sporadic returns of up to 100 adults were still occurring after the Snake River Coho sport fishery had been closed during the 1950's. He thought the river could still support a sizeable run of Coho. Stray hatchery origin fish, suspected to have originated from smolt releases into the Clearwater River in Idaho, or elsewhere, have recently been observed spawning in the Tucannon River below RM 5.0 (Wargo *et al.* 1999)." (Gephart, Laura, Nordheim Debra, Bruegman, Terry, et al**.** 2001).

This is the proposed placeholder restoration of coho salmon for the Tucannon subbasin. Coho salmon were historically abundant in the Columbia and Snake River basins, including the Tucannon River subbasin.

The Nez Perce Tribe has an ongoing coho salmon reintroduction program for the Clearwater River Subbasin that identifies the Tucannon River as an alternative stream for potential supplementation using the rotating supplementation schedule proposed in the NPT Coho Master Plan, (Nez Perce Tribe, Coho Master Plan for the Clearwater River Basin, March 2004, DRAFT). Empirical data provides evidence that coho salmon from the Clearwater reintroduction program are already dispersing to this subbasin and natural production is occurring. It is important that we monitor and evaluate coho populations within the Tucannon River subbasin.

Research Monitoring and Evaluation:

Proposed Research: Investigate population status of Coho within Tucannon Subbasin.

Goal: To gather improved population status information on ESA listed Coho salmon (*Oncorhynchus kisutch*) in the Tucannon subbasin

Proposed M&E: Population status M&E. Begin effort to assess the current status of natural and hatchery-derived populations of coho salmon. Tier two and three data collection will identify tributary-specific life history characteristics, juvenile and adult migration patterns, juvenile rearing areas, adult holding areas, survival factors, smolt-to-adult survival, adult spawner abundance, distribution, timing and parentage, spawning success, and spawner-to-spawner ratios.

Coordination Potential: Coordinate with ongoing anadromous population status M&E programs (e.g. LSRCP, CTUIR, NPT Hatchery M&E, NPT Coho Reintroduction Program, USFS PACFISH/INFISH M&E), specifically those with established index sites and/or trend data.

Geographic Scope: Tucannon watershed.

Proposed Research: Profile anadromous salmonid genetics.

Goal: To more accurately define genetic stock structure and/or subpopulations of ESA-listed Coho salmon.

Proposed M&E: Population status monitoring. Collect relevant genetics data on coho salmon. Examine the genetic stock structure of coho in relation to broodstock introduced in nearby tributaries. Conduct genetic profiling to define coho sub-populations within the subbasin to determine geographic structure, gene flow, and genetic similarity.

Coordination Potential: Coordinate with ongoing genetics research efforts (e.g. USFWS, IDFG, NMFS, NPT Coho Reintroduction Program, etc.)

and/or other population status M&E programs (e.g. ISS, ISSS, LSRCP, NPT Hatchery M&E, USFS PACFISH/INFISH M&E).

Geographic Scope: Tucannon watershed

LOWER SNAKE SUBBASIN

Species of Interest: White Sturgeon (*Acipenser transmontanus*)

History:
Historically abundant populations of white sturgeon occupied the Columbia Basin, and millions of pounds were harvested commercially during the turn of the century (Craig and Hacker 1940; Galbreath 1985). Today the only population in the Columbia Basin that migrates to the ocean is downstream from Bonneville Dam. Dams have effectively trapped and separated the historical single population of white sturgeon into a number of separate reservoir populations, and thus created a number of functionally isolated non-anadromous populations upstream from Bonneville Dam (North et al. 1993). Remaining populations are thus considered to be landlocked or resident in the reservoirs upstream from Bonneville. They do not migrate to the ocean. Rather, they complete their life cycle in the mainstem Columbia and Snake rivers. Prior to hydroelectric development white sturgeon were semi-anadromous throughout much of the Columbia and Snake river basins, with the exception of the geographically isolated Kootenai River population (Northcote 1973).

Life History:
White sturgeon (*Acipenser transmontanus*) is a large, long-lived species, commonly reaching 70 years of age and weighing in excess of 1,000 pounds (Bajkov 1949; Scott and Crossman 1973; Beamesderfer et al. 1995).

White sturgeon spawn in areas of high water velocities (greater than 0.8 m/s) over areas of bedrock, rubble, and large boulders (Parsley et al. 1993). Historical spawning areas were probably located at the downstream end of falls, cascades, and rapids. Today these conditions are met in the tailrace areas immediately downstream from hydroelectric dams. Sturgeon begin spawning when water temperatures are 10-18^{o}C, with optimal temperatures between 13 and 15^{o}C. White sturgeon are broadcast spawners, and probably spawn in small groups

consisting of a single female and several males. Newly laid eggs are extremely adhesive, and drift to the river bottom where they adhere to bottom substrates. Hatching generally occurs within 7-12 days (Miller and Beckman 1993). Eggs can be killed if temperatures rise above 18^{o}C. Newly hatched white sturgeons have an internal yolk sac. These yolk sac larvae disperse by swimming vertically into the current and drifting downstream. The larvae metamorphose within a 25- to 30-day period, after which they grow rapidly. Females require an average of 23 years before they spawn, with males maturing earlier.

Because of their size (up to 4-5 meters total length) and longevity (> 100 years) white sturgeon is well adapted to thrive in large riverine systems such as the Snake River. These life history aspects may now be a hindrance to survival as riverine habitat is dwindles. Other unique life history characteristics include late maturation for females (15-30 years) and infrequent spawning by individual fish (once every 10 years), (IDFG, 2003).

Data:
The most recent available data is from the Hells Canyon reach, Lower Granite Dam up to the Hells Canyon Dam. The Hells Canyon reach of the Snake River supports one of the two most viable wild populations of white sturgeon in Idaho. (IDFG 2003). The current estimated population size for this reach is 4,171 (95% CI 3,585 – 5,682). The goal for this reach is a population that will support a sustainable annual harvest equivalent to 5kg/ha/yr (CBFWA 1997) (Everett 2003).

Need:
This is the proposed placeholder for the White Sturgeon for the Lower Snake subbasin. It has been demonstrated that White Sturgeon were quite common in the Columbia and Snake River basins. Since the development of the hydroelectric system, these anadromous fish have been isolated to river sections between dams.

The Lower Snake subbasin has a portion of the Snake River (Hells Canyon to Lower Granite dams) white sturgeon population. The IDFG, White Sturgeon Management Plan calls for continued sport catch and release fishing.
The Nez Perce Tribe's need is to within 7 years, halt the declining trends in salmon, sturgeon, and lamprey populations originating upstream of Bonneville Dam and to within 25 years, increase sturgeon and lamprey populations to naturally sustainable levels that also support tribal harvest opportunities. Current efforts to initially meet this need are being addressed by the Tribe through the reconvening of the Biological Risk Assessment Team (BRAT) to generate a new biological risk assessment and subsequent adaptive management plan (Everett 2003). This would address the critical uncertainties **(*needs*)** of the White sturgeon population life histories in the Lower Snake River subbasin.

Research Monitoring and Evaluation:

Proposed Research: Application and expansion of RM&E of recently completed 2003, Nez Perce Tribe, Project, Evaluate Potential Means of Rebuilding Sturgeon Populations in the Snake River Between Lower Granite and Hells Canyon Dams, 1) Identify potential mitigation actions to meet the project goal and 2) data needs to fully assess the risks associated with applied actions.

Goal: Identify means to restore and rebuild the Snake River white sturgeon (*Acipenser transmontanus*) population to support a sustainable annual subsistence harvests equivalent to 5kg/ha/yr.

Proposed M&E: 1) Fully assess the risks and uncertainties associate with potential mitigation actions; 2) Make recommendations to implement alternative mitigation actions designed to restore and rebuild the white sturgeon population to obtain a sustainable annual tribal subsistence harvest of 5kg/ha/yr; 3) develop an adaptive management plan for implementation, evaluation, and monitoring of effects of applied mitigation actions on the Snake River white sturgeon populations in the Lower Snake River subbasin.

Coordination Potential: Coordinate with ongoing genetics research efforts (e.g. USFWS, IDFG, NMFS, NPT Project, Evaluate Potential Means of Rebuilding Sturgeon Populations in the Snake River Between Lower Granite and Hells Canyon Dams) and/or other population status M&E programs (e.g. ISS, ISSS, LSRCP, NPT Hatchery M&E, USFS PACFISH/INFISH M&E).

Geographic Scope: Lower Snake Subbasin Watershed

References:

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Personal Communications:

Frank Schiebe, Washington Water and Power (WPP), Asotin Creek, Headgate Dam operator, personal communication 03/24/04.

Mike Gallinat, Washington Department of Fish and Wildlife, Snake River Laboratoy, Dayton, WA., personal communication 01/28/04.

Debbie Milks, Washington Department of Fish and Wildlife, Snake River Laboratory, Dayton, WA., personal communication 03/03/04.