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Snake River Sockeye Salmon Sawtooth Valley Project 1992 Juvenile and Adult Trapping Program

Final
Environmental Assessment

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**SNAKE RIVER SOCKEYE SALMON
SAWTOOTH VALLEY PROJECT**

1992 JUVENILE AND ADULT TRAPPING PROGRAM

**FINAL
ENVIRONMENTAL ASSESSMENT**

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MASTER

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EXECUTIVE SUMMARY

Sockeye salmon (Oncorhynchus nerka) runs in the Snake River Basin have severely declined. Redfish Lake near Stanley, Idaho is the only lake in the drainage known to still support a run. In 1989, two adults were observed returning to this lake and in 1990, none returned. In the summer of 1991, only four adults returned. If no action is taken, the Snake River sockeye salmon will probably cease to exist. On November 20, 1991, the National Marine Fisheries Service (NMFS) declared the Snake River sockeye salmon "endangered" (effective December 20, 1991), pursuant to the Endangered Species Act (ESA) of 1973.

In 1991, in response to a request from the Idaho Department of Fish and Game and the Shoshone-Bannock Tribes, the Bonneville Power Administration (BPA) funded efforts to conserve and begin rebuilding the Snake River sockeye salmon run. The initial efforts were focused on Redfish Lake in the Sawtooth Valley of southcentral Idaho. The 1991 measures involved:

- Trapping some of the juvenile outmigrants (O. nerka) from Redfish Lake and rearing them in the Eagle Fish Health Facility (Idaho Department of Fish and Game) near Boise, Idaho;
- Upgrading of the Eagle Facility where the outmigrants are being reared; and
- Trapping adult Snake River sockeye salmon returning to Redfish Lake and holding and spawning them at the Sawtooth Hatchery near Stanley, Idaho.

These measures were described in a Special Environmental Assessment of BPA Proposal to Fund Activities Designed to Save Snake River Sockeye Salmon - #12 (May 1991).

BPA proposes to continue funding in 1992 the trapping of juvenile outmigrants and returning adults. The trapping program would be very similar to that conducted in 1991 and would occur in the spring and late summer of 1992. NMFS proposes to issue permits for the "taking" of O. nerka, pursuant to section 10 of the ESA.

This Environmental Assessment (EA) evaluates the potential environmental effects of the proposed actions for 1992. It has been prepared to meet the requirements of the National Environmental Policy Act (NEPA) of 1969 and section 7 of the ESA of 1973.

Throughout this document, the term O. nerka is often used in place of either sockeye salmon or kokanee salmon. Both sockeye salmon and kokanee salmon are forms of O. nerka. Sockeye salmon generally migrate to the ocean while kokanee salmon generally do not. As juveniles, it is difficult if not impossible to distinguish sockeye salmon from kokanee salmon. Ongoing genetics research by the University of Idaho and the NMFS is looking for a reliable method to distinguish the two forms of O. nerka. Therefore, in the EA, where there is doubt as to whether the fish are sockeye salmon or kokanee salmon, the term O. nerka is used.

1.0 INTRODUCTION

1.1 PROPOSED ACTION

The Bonneville Power Administration (BPA), U.S. Department of Energy, proposes to continue funding a program initiated in 1991 by the Shoshone-Bannock Tribes (SBT) and the Idaho Department of Fish and Game (IDFG) to conserve and begin rebuilding the Snake River sockeye salmon (Oncorhynchus nerka) run in lakes of the Sawtooth Valley (Figure 1-1). Pursuant to section 10 of the Endangered Species Act of 1973 (ESA), the National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration, U.S. Department of Commerce, proposes to issue permits for the "taking" of O. nerka that would occur as the program is implemented. Proposed conservation and rebuilding measures in 1992 include:

- Trapping O. nerka migrating out of Redfish Lake and Alturas Lake, and transporting them to the Eagle Fish Health Facility near Boise, Idaho for rearing until maturity.
- Trapping, holding, and spawning adult sockeye salmon returning to Redfish Lake in 1992 and rearing their progeny to maturity.

1.2 NEED FOR ACTION

Redfish Lake is believed to be the only lake in the Snake River Basin (Figure 1-1) that currently has migratory sockeye salmon. Historically, sockeye salmon were found in various areas throughout the basin, including all five major lakes (Redfish, Pettit, Stanley, Yellow Belly, and Alturas Lakes) of the Sawtooth Valley (Bjornn et al. 1968). Sockeye were also found in the Payette and Grande Ronde subbasins. In 1955, 4,361 sockeye salmon returned to Redfish Lake (Bjornn et al. 1968). However, only two adults were observed in 1989, none were observed in 1990, and four adults returned in the late summer of 1991 (Figure 1-2).

The decline in sockeye salmon returns to Redfish Lake and the Snake River Basin has been attributed to many factors including hydropower development, irrigation water withdrawal and diversion, droughts, land management practices, and commercial harvest. Table 1-1 summarizes some of the major events that have affected sockeye salmon in the Sawtooth Valley. If no action is taken, the Snake River sockeye salmon would likely become extinct. Therefore, actions taken in spring 1991 to conserve and begin rebuilding the run need to continue in order to try to save the run. BPA along with the SBT, IDFG, NMFS, and others is committed to improving Snake River sockeye salmon survival and making progress toward reversing their decline.

2.0 BACKGROUND

2.1 LISTING OF SPECIES

In response to the decline in annual Snake River sockeye salmon returns, the SBT of the Fort Hall Indian Reservation petitioned NMFS in 1990 to list all sockeye salmon in the Snake River Basin as endangered under the ESA of 1973. In April 1991, after reviewing the biological status of the species, NMFS

Figure i-1. Sawtooth Valley project area

Figure 1-2. Number of Snake River sockeye salmon returning to Redfish Lake weir (1954-66), passing Ice Harbor Dam (1966-74), and passing Lower Granite Dam (1975-91).

Table 1-1. Major events (1894 to 1991) concerning Snake River sockeye salmon.

Year	Major Event
1894 & 1895	Evermann visits lakes in headwaters of Salmon River and reports (in 1895 and 1896) that these lakes appear to be important spawning and rearing areas for Columbia River salmon.
1910 - 1934	Sunbeam Dam (now removed) on Salmon River impedes or blocks upstream migration of adults to Sawtooth Valley lakes. Whether or not total blockage occurred is uncertain.
1914	Diversion on Alturas Creek impedes or blocks adults from reaching Alturas Lake. Later diversions completely dewater the streambed during critical migratory periods.
1938	Bonneville Dam completed.
1953	McNary Dam completed.
1954	Migration block is installed on Stanley Lake outlet to prevent non-game fish from entering the lake.
1954	Temporary adult trap is operated on Redfish Lake Creek.
1955 - 1966	Permanent adult and outmigrant trap is operated on Redfish Lake Creek. Results are reported in Bjornn et al. (1968).
1957	The Dalles Dam completed.
1961 - 1963	Migration barriers are installed at Pettit and Yellow Belly lakes to prevent non-game fish from entering the lakes from downstream areas.
1961 - 1975	Ice Harbor (1961), John Day (1968), Little Goose (1970), and Lower Granite (1975) dams are completed.
1985 - 1987	IDFG operates a temporary weir (for counting adults) on Redfish Lake Creek.
1990	No returning adult sockeye salmon or evidence of spawning observed in Redfish Lake.
April 1991	S Snake River sockeye salmon is proposed by NMFS for listing as "endangered" under Endangered Species Act.
April 1991	855 outmigrants are trapped at Redfish Lake Creek trap; they are now being reared at Eagle Fish Hatchery near Boise.
August 1991	Four adults (3 males and 1 female) are trapped at Redfish Lake Creek trap, held at Sawtooth Hatchery, and spawned (about 1,978 eggs were fertilized and reached the stage where eyes appeared, i.e., "eyed-up").
December 20, 1991	NMFS lists Snake River sockeye salmon as endangered.

proposed listing the Snake River sockeye salmon as "endangered" (Waples, et. al 1991). Subsequently, the species was formally listed as an endangered species, effective December 20, 1991 (FEDERAL REGISTER 50 CFR Part 22, Volume 26, No. 224, November 20, 1991).

2.2 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) PROCESS

1991 Actions

Efforts under this program to conserve and rebuild the sockeye salmon run in Redfish Lake were initiated in April 1991 as described in a Special Environmental Assessment (EA) of BPA Proposal to Fund Activities Designed to Save Snake River Sockeye Salmon - #12 (May 1991). This EA was developed under emergency provisions of NEPA, so that conservation and rebuilding efforts could begin as soon as possible.

In the EA, BPA proposed to fund activities through a joint plan designed and implemented by the SBT and IDFG. The EA focused only on 1991 activities which included:

- Trapping some of the juvenile outmigrants (O. nerka) from Redfish Lake and rearing them in the IDFG Eagle Fish Health Facility near Boise, Idaho.
- Upgrading of the Eagle Facility where the outmigrants are being reared.
- Trapping adult sockeye salmon returning to Redfish Lake and holding and spawning them at the Sawtooth Hatchery near Stanley, Idaho.

1992 Actions

This EA addresses the potential environmental effects of the actions proposed for 1992. It has been prepared to meet the requirements of NEPA, and subsequent regulations issued by the Council on Environmental Quality (40 CFR 1500-1508), and Section 7 of the ESA.

Longer-Term Actions

BPA anticipates that the current actions to conserve and rebuild the Snake River sockeye salmon runs will continue. However, these actions are not in place of other fishery management practices that IDFG may take, or Columbia River Basin actions being addressed in different forums (see Section 2.3). Other measures proposed for implementation include:

- Continuation of trapping and rearing juvenile O. nerka migrating out of Redfish and Alturas lakes during April, May, and June.
- Continuation of trapping, holding, and spawning of adult sockeye salmon returning to Redfish Lake.
- Release of juvenile sockeye salmon derived from a captive broodstock program back into Sawtooth Valley lakes.

- Removal or modification of barriers in Sawtooth Valley that block upstream migration of anadromous fish (fish that swim upstream to spawn in freshwater after maturing in the ocean).
- Fertilization of Redfish Lake and other selected Sawtooth Valley nursery lakes to improve productivity for sockeye salmon.
- Continuation of research to determine the relationship between sockeye salmon and kokanee salmon.

An Environmental Impact Statement (EIS) is being prepared to assess the potential environmental impacts of these proposed measures. A draft EIS is expected to be available for public review in spring 1992.

2.3 RELATED ACTIONS

During scoping for this EA and the EIS, many public comments were directed at impacts to Snake River sockeye salmon that may occur from activities outside of the Sawtooth Valley. Major concerns were expressed about downstream and upstream passage around dams in the lower Snake and Columbia Rivers and harvest in the Columbia River. These impacts are not addressed in this document but are being addressed in other documents as follows:

- **Columbia River System Operation Review EIS**

Lead Agencies: Bonneville Power Administration
U.S. Army Corps of Engineers
U.S. Bureau of Reclamation

Study Area: Entire Columbia River Basin, including areas in Canada

Scope of Evaluations: Will establish a set of guidelines for operating the Columbia River system that takes into account impacts on all river users.

- **Columbia River Flow Measures 1992 Options Analysis EIS**

Lead Agency: U.S. Army Corps of Engineers
Cooperating Agencies: Bonneville Power Administration
U.S. Bureau of Reclamation

Study Area: Lower Snake and Columbia Rivers

Scope of Evaluations: Actions intended to improve survival of both juvenile and adult salmon and steelhead migrating through the dams.

- **Columbia River Basin Fish And Wildlife Program**

Lead: Northwest Power Planning Council

Study Area: Entire Columbia River System

Scope of Evaluations: Near-term and long-term planning and implementation of measures to rebuild salmon and steelhead runs in the system.

2.4 PROJECT AREA

The lakes and streams in the Sawtooth Valley form the headwaters of the Salmon River, a major tributary to the Snake River (Figure 1-1). Located within the Sawtooth National Recreation Area (SNRA) in south-central Idaho, most of the land in the valley is higher than 6,500 feet above sea level. The SNRA contains five major road-accessible lakes (Alturas, Pettit, Yellow Belly, Redfish, and Stanley) and numerous other lakes and streams. The SNRA (750,000 acres), managed by the U.S. Forest Service, is heavily used in the summer for fishing, boating, hiking, and camping. In the winter, the SNRA is utilized for cross-country skiing, snowmobiling, and other activities.

2.5 FISH RESOURCES

Trout and salmon contribute to recreational fisheries within the Snake River Basin and recreational and commercial fisheries downstream in the Columbia River. Native resident species include rainbow trout (O. mykiss), cutthroat trout (O. clarki), bull trout (Salvelinus confluentus), and kokanee salmon (O. nerka). Non-native species include brook trout (S. fontinalis) and lake trout (S. namaycush). Kokanee salmon live in Redfish, Alturas, Pettit, and Stanley Lakes. Lake trout are found only in Stanley Lake. All lakes in the Sawtooth Valley, except Yellow Belly Lake, are stocked with hatchery-reared "put-and-take" rainbow trout. Rainbow trout are also the major resident trout species found downstream of the lakes.

Anadromous species in the Sawtooth Valley include sockeye salmon, spring/summer chinook salmon (O. tshawytscha), and steelhead (the anadromous form of rainbow trout). Most anadromous stocks are found in Sawtooth Valley streams and the mainstem Salmon River. No spring/summer chinook salmon spawners have been observed in Fishhook Creek, the major O. nerka spawning tributary of Redfish Lake. The other major tributary to Redfish Lake has limited spawning habitat. During the 1991 outmigrant trapping, a few juvenile chinook salmon and no steelhead outmigrants were captured. This would suggest that few spring/summer chinook salmon or steelhead spawn in tributaries to Redfish Lake.

In the 1950s and 1960s, Stanley, Pettit, and Yellow Belly Lakes were chemically treated to remove nongame fish species. Yellow Belly Lake was chemically treated again in 1990 to reduce brook trout populations. It was then stocked with westslope cutthroat trout. Migration barriers at the outlets of Stanley, Pettit, and Yellow Belly Lakes prevent all fish species from entering the lakes. There is also an irrigation diversion on Alturas Lake Creek that blocks upstream migrating fish from entering Alturas Lake.

Other native cool-water species, such as suckers, squawfish, redbside shiners, and sculpins, are found in Sawtooth Valley lakes. There is little or no recreational or commercial interest in these species.

2.6 LIFE CYCLE OF O. NERKA IN REDFISH LAKE

O. nerka

Oncorhynchus nerka is the scientific name of the species involved in the Sawtooth Valley Project. The species has two different patterns of residence

life history. The anadromous form of the species, which is referred to as "sockeye," migrates to the ocean after varying lengths of freshwater residence in a lake and then returns as an adult just prior to spawning. In contrast, the second form, referred to as "kokanee" remains in freshwater throughout its entire life.

Sockeye Salmon

Following 1 to 2 years of rearing in Redfish Lake, juvenile sockeye salmon (about 9 grams) generally migrate downstream (in April and May) about 900 miles (1,448 km) through the Salmon, Lower Snake, and Columbia Rivers to the Pacific Ocean (Figure 2-1). After spending about 2 years in the ocean, sockeye salmon, now 3- to 8-pound adults (1.4 to 3.6 kilograms), migrate upstream in June through October and return to spawn in Redfish Lake. They typically spawn in October or November along gravel beaches on the northeastern shoreline of the lake (Figure 2-2). It is also possible that a small percentage of the juvenile sockeye salmon could remain in Redfish Lake, grow to adults, and spawn in the lake without ever going to the ocean.

Kokanee Salmon

Kokanee salmon are indistinguishable from sockeye salmon as juveniles. However, since they generally spend their entire life in freshwater (e.g., Redfish Lake), they mature at a small size between 7 to 10 inches in length. Numerous kokanee salmon spawn in Fishhook Creek (Figure 2-2) in August and September.

Both time of spawning and spawning location isolate kokanee salmon from the present sockeye salmon population, and consequently there is little opportunity for the two forms to mix. Some kokanee salmon may migrate out of the lake and return as adults that would appear indistinguishable from the sockeye salmon. However, preliminary results from protein electrophoresis work undertaken by NMFS show that the 1991 Redfish Lake outmigrants were genetically different from Fishhook Creek spawning kokanee salmon sampled in 1990.

2.7 RESULTS OF 1991 TRAPPING PROGRAM

The 1991 juvenile trapping program resulted in the capture of 861 O. nerka migrating out of Redfish Lake. Approximately 20 percent of all outmigrants were captured; the remainder continued on their natural downstream migration toward the Pacific Ocean. To determine the efficiency of the trap, 45 of the trapped fish were tagged and released upstream of the trap. The number of tagged fish recaptured resulted in an estimated trap efficiency of 20 percent. The trapped fish were then transported to the Eagle Facility where they were placed into separate tanks located in a secured area.

As of February 1992, about 750 juveniles were being reared at the Eagle Facility. They are feeding well. A few juveniles have died (about 12 percent) during the capture, transport, and early rearing periods. The juveniles that died are being used for genetic and disease research.

In 1991, four returning sockeye salmon adults (three males and one female) were trapped in Redfish Lake Creek, held in the Sawtooth Hatchery, and

LIFE CYCLE SNAKE RIVER SOCKEYE SALMON

Bonneville Power Administration

Figure 2-1. Snake River sockeye salmon life cycle

Figure 2-2. Redfish Lake, showing sockeye salmon spawning areas, tributary stream, and Redfish Creek trapping site

spawned. A total of 1,978 eggs "eyed-up". The eggs were separated into two equal groups. One group is being reared to maturity at the Eagle Facility. The other is being reared to maturity at the NMFS Northwest Fisheries Science Center in Seattle, Washington.

2.8 TECHNICAL PLANNING

In June 1991, BPA formed a Technical Oversight Committee to review the Snake River sockeye salmon conservation and rebuilding efforts and provide technical recommendations. This committee has met monthly since July 1991. Its members include scientists from BPA, IDFG, SBT, NMFS, University of Idaho, U.S. Forest Service, U. S. Army Corps of Engineers, and the Pacific Northwest Utilities Conference Committee. The meetings are open to the public.

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 PROPOSED ACTION

Juvenile Outmigrant Trapping

In 1989, only two adult sockeye salmon were observed passing over Lower Granite Dam (Figure 1-2), and in 1990, no sockeye salmon were observed entering Redfish Lake to spawn. This could mean that few sockeye salmon juveniles, descendants of these adults, will be migrating out of Redfish Lake in 1992.

Redfish Lake O. nerka migrating downstream would be trapped at a previously used site approximately one-half mile below Redfish Lake (Figure 2-2). Outmigrants would be collected from about April 20 through June 10, when sockeye salmon normally migrate (Bjornn et al. 1968).

A Krey-Meehin inclined-screen trap was used to collect fish leaving Redfish Lake in 1991. This design has been used successfully in other Idaho streams by IDFG to collect outmigrating salmon (Kiefer and Forster 1989). This trap requires little maintenance but needs high water velocities to work effectively. In 1991, adequate water velocities were only available in a small area of the creek; therefore, about 20% of the outmigrants were trapped. Additional problems with the 1991 trap design included mechanical injury to fish when water velocity increased between collection times. Also, a bull trout entered the trap and may have killed some outmigrants.

To overcome the 1991 problems, a different outmigrant trap design is being considered for 1992. The new design would prevent large debris and predatory fish from entering the traps. The traps would be installed at the 1991 adult trapping site on Redfish Lake Creek. This site has lower average water velocities and, thus, mechanical injury to fish during trapping should be reduced. Existing steel I-beams in the stream bottom would allow the installation of up to nine separate traps, if needed. The current proposal is to install four traps to capture 50 percent or more of the outmigrating O. nerka.

Fish moving downstream enter the mouth of the trap and are guided by a fine mesh screen into a holding box. Fish would be collected twice a day from the trap's holding box and transported to the Sawtooth Hatchery. Once per week,

or more frequently if necessary, all fish would be transferred from the Sawtooth Hatchery to the Eagle Facility, which is about 160 miles (3.5 hours) from the trapping site. At Eagle, the fish would be marked with Passive Integrated Transponder (PIT) tags, placed in holding tanks at the hatchery, and reared until they are adults. The tags would make it possible to identify individual fish which can be useful for genetic studies or tracking the health of each fish. Although use of PIT tags can be fatal to some of the juveniles, test results show that most fish readily survive the tagging with no major effects. In 1991, 759 Redfish Lake outmigrants were tagged and there were only four tagging-related deaths (about 0.5 percent mortality).

To determine the efficiency of the juvenile trap, some of the fish would be marked with a PIT tag and released upstream for recapture. By using the ratio of marked fish released to marked fish recaptured, the efficiency of the trap can be estimated. By knowing the number of fish trapped and the efficiency of the trap, an estimate can be made of the total number of outmigrants.

Alturas Lake O. nerka would be collected in a trap at the Sawtooth Hatchery. These fish would be kept separate from the Redfish Lake juveniles, transported to the Eagle Facility, reared, and tested for comparisons with Redfish Lake sockeye salmon.

Options were considered for outmigrant trapping and rearing, including the following:

- **Location of Juvenile Trapping Site**

The Redfish Lake outmigrant trap site would be moved in 1992 to the same site as the 1991 adult trap. There are permanent structures in place at this site, which should increase the efficiency of the trapping operations. Also, the water velocity is lower at this site, which should reduce the potential for injuries or deaths of outmigrants. Continuing to trap at the 1991 site would be less effective.

The trapping site at the Sawtooth Hatchery for juvenile outmigrants from Alturas Lake is an established location that has been used successfully in the past. Moving this site would require additional stream disturbance. There is no proposal to move this site.

- **Location of Juvenile Rearing Sites**

The Eagle Facility is the proposed site for rearing the 1992 outmigrants. The Facility is also being used to rear the 1991 outmigrants and one-half of the young produced from the 1991 trapping of four adults returning to Redfish Lake. It is a secure facility, with excellent artesian well water supplies, and is relatively isolated. The site for rearing the other half of the young from the 1991 adult trapping effort is the NMFS Northwest Fisheries Science Center in Seattle, Washington.

The Sawtooth Hatchery was considered as a rearing site, but was rejected because the facility is dedicated to the rearing of spring/summer chinook salmon and has less suitable water temperatures

for sockeye salmon rearing. Because there are more juveniles than adults, and they would be reared for several years, a facility with space dedicated to rearing of juvenile sockeye salmon is necessary.

Adult Trapping

Adult sockeye salmon returning to Redfish Lake would be trapped approximately one-half mile downstream of the lake outlet. The trap would be operated during the period when adult sockeye salmon return to Redfish Lake (historically, July 1 through September 30; Bjornn et al. 1968). The adults would be held for spawning at the Sawtooth Hatchery.

The adult trap would consist of an aluminum picket fence placed perpendicular to the stream flow. It would block the entire stream. An opening in the center of the fence would allow fish to enter a holding box. The weir portion of the trap would be fitted with a cover to reduce stress on the fish. IDFG staff would be present at the trap site to provide security. The trap would be checked at least twice a day.

Sockeye salmon that enter the trap would be removed and transported immediately to the Sawtooth Hatchery. Upon arrival, they would be isolated from other species by placing them in a separate raceway inside the hatchery building. The adult sockeye salmon would be held in the hatchery until they are ready to spawn. The progeny could be separated into two groups (as was done in 1991) to lessen any risks associated with incubating and rearing a limited number of fish at one location.

Returning adult Snake River sockeye salmon may be trapped at Lower Granite Dam and at the Sawtooth weir below the Sawtooth Hatchery. Any adult Snake River sockeye salmon trapped at these locations would also be transported to the Sawtooth Hatchery. Final plans for trapping and spawning adults and rearing their progeny in 1992 depend on several factors including:

- Technical Oversight Committee recommendations
- Number of fish that could be trapped, as estimated from dam counts
- Results of the 1991 sockeye salmon spawning and rearing activities

Various options were considered for the adult trapping program including the following:

- **Location of Adult Trapping Site**

Trapping adults at other areas in Redfish Lake Creek. The proposed location is a site that has been used successfully in the past. Therefore, it would require less disturbance to develop than a new site.

- **Location of Adult Holding Site**

Holding adults at other facilities. This option was dismissed because so few adult fish are expected. The Sawtooth Hatchery is close and has adequate facilities. Transporting fish over longer distances could result in unnecessary stress or death.

Holding pens in the lake. This option was dismissed because holding pens in Redfish Lake would require maintenance and monitoring late in the summer season. The lake has very high recreational use during the summer which could unnecessarily stress the adults. Also, since holding pens would be less secure than the Sawtooth Hatchery, there would be an increased risk of loss of, or vandalism to, adult fish with their use. With the anticipated low number of adult returns, there appears to be no overriding advantage to this option.

3.2 NO ACTION

With this alternative, no action would be taken to implement the 1992 juvenile and adult trapping program in the Sawtooth Valley. Juvenile fish would not be trapped but would be allowed to migrate to the ocean. Any adults returning to Redfish Lake would not be trapped but would be allowed to spawn naturally in the lake.

4.0 POTENTIAL ENVIRONMENTAL EFFECTS

This EA looks at the potential environmental effects of the proposed action and alternatives on Snake River sockeye salmon and other fishery resources of the Sawtooth Valley. Measurable effects on wildlife, air quality, recreation, water quality, socioeconomics, cultural, and other resources are not anticipated.

4.1 PROPOSED ACTION

Potential Effects of Juvenile Trapping

Although the actions proposed for 1992 are aimed at continuing the sockeye salmon conservation and rebuilding program started in spring 1991, there are some potential risks. Trapping of juveniles increases the chances of death during collection, handling, and rearing. Because there are so few fish remaining, the potential causes of death must be considered. However, the expected number of deaths should be small compared to deaths in the natural environment (i.e., no action alternative).

Approximately 12 percent of the outmigrants trapped during 1991 have died as of February 1992. Of this 12 percent, most died in the trap or shortly thereafter. The trap proposed for use in 1992 is being redesigned to reduce physical damage to fish. Some additional deaths may be expected during rearing, but, absent some catastrophic event, this number would likely be small.

When juveniles are moved from the Sawtooth Hatchery to the Eagle Facility, fish could be lost if the transport truck were involved in an accident. To avoid such losses, the fish would be moved on a weekly basis during the trapping period so that only a portion of the trapped fish would be in transit at any given time.

Potential Effects of Adult Trapping

There are also risks to adults during trapping and transport. Even though four adults trapped in 1991 survived to spawn, there could be some deaths in

the future due to these activities. Monitoring of the trap twice a day and the short transport distance to the Sawtooth Hatchery would minimize stress and injury to the fish. At the hatchery, adult fish would be kept together, independent of the chinook salmon stocks. This would reduce risks due to stress and transmission of disease.

Trapping, spawning, and rearing of Snake River sockeye salmon (i.e., captive broodstock) over several generations in a hatchery environment could affect their genetic makeup, causing their future adaptations to the natural environment to be more difficult. However, there is no plan to make the captive broodstock program permanent. This should help to minimize chances for adverse effects from the juvenile and adult trapping program on the genetic makeup of Snake River sockeye salmon. The captive broodstock program is vital to the success of IDFG and SBT efforts to conserve and begin rebuilding the Snake River sockeye salmon run.

Cumulative Impacts

The purpose of the proposed action in 1992 is to continue with the conservation and rebuilding program begun in spring 1991. Therefore, the anticipated long-term cumulative impact should be a larger Snake River sockeye salmon run in the Sawtooth Valley. Production goals would depend, in part, on results of these initial efforts. The cumulative impact of implementing the proposed action along with other actions within the Columbia and Snake River basins, pursuant to the Northwest Power Planning Council's Fish and Wildlife Program, is estimated to be increased annual production of salmon and steelhead.

Potential Effects on Threatened and Endangered Species

The United States Fish and Wildlife Service (USFWS) has indicated that one listed endangered species, the grey wolf (Canis lupus irrematus), may be present in the project area (letter of November 6, 1991 - Reference Number FWS-1/4/92-SP-49). In addition, the Snake River spring/summer chinook salmon, which has been proposed for listing by NMFS as "threatened," and the Snake River sockeye salmon (O. nerka), which has been listed by NMFS as "endangered," are both present in the project area.

A literature search, site visit by staff biologists, and interviews with agency biologists have all helped to determine use of the project area by these species and the potential effect of the proposed action on them. The information gathered would help NMFS and USFWS determine whether there is any potential for the Snake River sockeye salmon juvenile and adult trapping program in 1992 (the subject of this EA) to adversely affect listed species or critical habitat, or jeopardize the continued existence of proposed species or destroy or adversely modify proposed critical habitat.

The following subsections discuss the potential effects of the proposed action on listed species and species proposed for listing. Snake River sockeye salmon are not specifically addressed in this section because they are the subject of this EA.

Grey Wolf

USFWS records indicate that the grey wolf may occur in the project vicinity. However, the endangered species officer contacted believes no negative impacts would occur to this species due to project activities (personal communication, Rich Howard, USFWS, Boise, Idaho, November 1991). Therefore, no further impact analyses will be made.

Spring/Summer Chinook Salmon

Spring chinook salmon in the Snake River typically spawn earlier and higher in the watershed than summer chinook salmon. However, because the two races have some overlap in migration timing and may occupy the same region of a river during the spawning period, gene flow between these races cannot be ruled out. For this reason, they could not be classed as two separate races for possible listing under the ESA (Matthews and Waples 1991), but have been proposed for "threatened" status as one race. The final ruling by NMFS on whether or not to list spring/summer chinook salmon under ESA has not yet been made.

Total chinook salmon production from the Snake River Basin before 1850 has been conservatively estimated at 1.4 million, based on habitat. Other estimating methods suggest that the runs could have been twice this size. By the mid-1900s, historical abundance of spring and summer chinook salmon from the Snake River had been reduced by 95 percent. In the last 30 to 40 years, abundance has decreased another ten-fold; current populations of nonhatchery or native fish are only 0.5 percent of historical levels (Matthews and Waples 1991). Snake River native spring/summer chinook salmon spawning declined from 13,000 redds (spawning nests) in 1957 to 620 redds in 1980. The number of redds increased to a peak of 3,395 in 1988 but in 1989, only 1,008 redds were counted and in 1990, 1,224 redds were found (Matthew and Waples 1991).

Most Snake River spring/summer chinook salmon migrate above Lower Granite Dam to spawn in small, high-elevation streams (Matthews and Waples 1991). There are five major spawning and rearing basins for this race, including three large river basins (Clearwater, Grande Ronde, and Salmon), and two smaller basins (Tucannon and Imnaha).

The primary spawning and rearing areas of spring/summer chinook salmon in the Sawtooth Valley are below all the lake outlets. A few spring/summer chinook salmon may spawn in the upper portion of Redfish Lake Creek above the trapping area. Although spring/summer chinook salmon can travel through the lake to spawn in the tributaries, few apparently do. Spawning surveys of Fishhook Creek for kokanee salmon have not noted spring/summer chinook salmon spawning (personal communication, Virgil Moore, IDFG, November 1991). The other major tributary at the head of the lake has very limited spawning area. In 1991, a few spring/summer chinook salmon outmigrants were collected in the sockeye salmon traps, but the number was small. This indicates few spring/summer chinook salmon use this region of the creek for spawning and rearing.

Many adult chinook salmon (typically 200 to 900) are trapped at the Sawtooth Hatchery weir on the mainstem Salmon River and are manually passed above the weir on their way to upstream spawning areas (Kiefer and Forster 1990a,b). Annually, several thousand juvenile chinook salmon outmigrants (8,000 to

22,000 in 1989 and 1988, respectively) pass downstream through the juvenile trap site at the weir. About 6 to 8 percent of these juveniles are trapped, marked, and released below the weir as part of a fish population monitoring program (Kiefer and Forster 1990a,b).

The proposed 1992 Snake River sockeye salmon juvenile and adult trapping program should have minimal effect on chinook salmon. The Redfish Lake Creek trap would occupy a very small portion of the stream and would not measurably reduce spawning or rearing area. Any chinook salmon adults that may enter the trap incidentally would be allowed to pass upstream. This should result in less than 1 day delay and should result in no injury to the fish. In the spring, chinook salmon outmigrants would also be passed through the trap. Some outmigrant deaths may occur, but the numbers should be small (less than 4 percent) based on 1991 sockeye salmon trapping results and the 1992 improved trap design.

The Sawtooth Hatchery trap would be operated independently of the 1992 juvenile and adult trapping program. Any *O. nerka* outmigrants that are trapped would be held for rearing and no additional chinook salmon would be trapped and held as a result of this project. Therefore, the juvenile and adult trapping program should have minimal adverse effects on spring/summer chinook salmon.

4.2 NO ACTION ALTERNATIVE

If actions to trap juvenile and adult sockeye salmon in 1992 (similar to those begun in spring 1991) are not taken, it is likely that Snake River sockeye salmon numbers will remain extremely low or the run may become extinct. Agency and Tribal biologists agree that this is not a reasonable alternative.

5.0 COMPLIANCE WITH ENVIRONMENTAL PROTECTION STATUTES, REGULATIONS, AND REQUIREMENTS

Consistent with the requirements of NEPA, and subsequent regulations issued by the Council on Environmental Quality (40 CFR 1500), this assessment includes a review of project compliance with relevant statutes and executive orders listed below:

- **Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq., Public Law 97-304.**

ESA Section 10 permits will be required before implementing the 1992 Juvenile and Adult Trapping Program. BPA has consulted with USFWS and NMFS pursuant to Section 7 of the ESA.

- **Forest Service Special Use Permit**

The Forest Service has jurisdiction over activities within the SNRA. Therefore, the installation and operation of the trapping facilities on Redfish Lake Creek would require a special-use permit from the Forest Service.

- **Fish and Wildlife Coordination Act of 1956, as amended 16 U.S.C. 661 et seq.** The actions proposed in this EA would be coordinated with Federal and State resource agencies and with Indian Tribes.

There would be no action required under the following regulations as a result of implementation of the 1992 Juvenile and Adult Trapping Program:

Cultural Resource Legislation, Executive Order 11593; Archeological and Historical Preservation Act of 1974, 16 U.S.C. 469 et seq., Public Law 92-291.

Floodplains and Wetlands, Executive Orders 11988 and 11990 and DOE implementation guidelines (10 CFR 1022)

Farmland Protection Policy Act (7 U.S.C. 4201, et seq.)

Recreational Resources; Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq.

Effects on the Waters of the United States; Rivers and Harbors Act, 33 U.S.C. 401 et seq., Federal Water Pollution Control Act. See 404 as amended.

Clean Air Act, as amended, 42 U.S.C. 7609 et seq.

Clean Water Act, as amended 33 U.S.C. 1251 et seq.

Safe Drinking Water Act

Resource Conservation and Recovery Act (1976), 42 U.S.C. 6901 et seq.

Noise Control Act

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

Toxic Substances Control Act, 15 U.S.C. 2601 et seq.

Energy Conservation Policy, 42 U.S.C. 8241 et seq.

6.0 PERSONS AND AGENCIES CONSULTED

Shoshone-Bannock Tribes

Idaho Department of Fish and Game

Graham Gall, Ph.D. - Heller, Ehrman, White, and McAuliffe (Representing the Pacific Northwest Utilities Conference Committee - PNUCC)

National Marine Fisheries Service

Ernie Brannon, Ph.D., - University of Idaho

U.S. Fish and Wildlife Service

U.S. Forest Service (Twin Falls, ID)

7.0 COORDINATION

The draft EA was sent to the State of Idaho and the interested public for review and comment on February 7, 1992. The comment period closed on March 13, 1992. BPA received nine comment letters. Comments were considered and, as appropriate, incorporated into the Final EA.

8.0 LITERATURE CITED

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Kiefer, R.B. and K.A. Forster. 1990a. Intensive evaluation and monitoring of chinook salmon and steelhead trout production, Crooked River and Upper Salmon River sites. Annual Progress report 1988. Bonneville Power Administration.

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APPENDIX

National Marine Fisheries Service Biological Opinion on 1992 Juvenile and Adult Trapping Program

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1335 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

APR 8 1992

MEMORANDUM FOR: The Record

FROM:

William W. Fox, Jr.
William W. Fox, Jr.

SUBJECT:

ESA Section 7 Consultation on the Application of
the Idaho Department of Fish and Game for
Scientific Research and Enhancement Permit

Federal Agencies: National Marine Fisheries Service (NMFS) and
Bonneville Power Administration (BPA)

Activity: Idaho Department of Fish and Game's (IDFG) 1992
Juvenile and Adult Trapping Program

Consultation Conducted by: NMFS Northwest Region

Background:

On February 27, 1992, the IDFG applied for a scientific research and enhancement permit to take endangered Snake River sockeye salmon (*Oncorhynchus nerka*) to conduct the Juvenile and Adult Trapping Program, which is part of the Sawtooth Valley Project funded by BPA. Additional information pertaining to the program was provided in February by BPA in a draft Environmental Assessment, "Snake River Sockeye Salmon Sawtooth Valley Project, 1992 Juvenile and Adult Trapping Program" (Sawtooth Valley Project). The Sawtooth Valley Project includes actions by IDFG and NMFS to: 1) trap *O. nerka* migrating out of Redfish Lake and Alturas Lake, and transport them to the Eagle Health Facility near Boise, Idaho for rearing until maturity; and 2) trap, hold, and spawn adult sockeye salmon returning to Redfish Lake in 1992 and rear their progeny to maturity.

Proposed Activities:

(1) BPA proposes to fund the Sawtooth Valley Project, including both NMFS and IDFG activities. BPA's funding of and NMFS' issuance of a permit to IDFG authorizing actions in the Sawtooth Valley Project are addressed in this biological opinion. A separate biological opinion on NMFS' portion of the Sawtooth Valley Project will be prepared.

(2) IDFG requests to continue the smolt trapping program that was initiated in 1991 by IDFG and the Shoshone-Bannock Tribes in coordination with NMFS. The program would continue to capture smolts for captive, freshwater brood rearing in order to preserve

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES

options for future Snake River sockeye salmon production. As in 1991, adults returning to Redfish Lake would be trapped, spawned, and the eggs reared for further captive brood development.

The proposed IDFG program consists of three main components; Adult Capture and Maintenance, Juvenile Capture and Maintenance, and Juvenile Tag and Release. There are an additional five ancillary programs; Stock Identification, Cryopreservation of Gametes, Pathology, Release Strategies, and Individual Identification.

The Adult Capture and Maintenance component would involve the capture of Redfish Lake sockeye salmon adults, with the goal of capturing the entire return. This includes all adult sockeye salmon taken at Redfish Lake Creek trap and any adult sockeye salmon taken at the Sawtooth Fish Hatchery (SFH) weir. All trapped fish would be measured, enumerated, and a maximum of twenty adults retained for the captive brood stock program. There is a high probability that fewer than 20 adults will return in 1992. Once 20 adults have been collected, males or females would be released into Redfish Lake and replaced with newly collected males or females so that equal numbers of both sexes would comprise the captive brood stock. Captured adults would be immediately moved to SFH, acclimated, and then placed in propagation tanks. The fish would be spawned and the eggs would remain at SFH until they reach the eyed stage. A portion (approximately 50 percent) of the eyed eggs would be transferred to NMFS Northwest Fisheries Science Center in Seattle, Washington, for rearing. The remaining eggs would be moved to IDFG's Eagle Hatchery for rearing.

The adult trap located on Redfish Lake Creek (the primary trapping site) would operate from July 1 through October 31. The adult trap located at the Sawtooth Hatchery weir (the secondary trap, which is located on the mainstem Salmon River, 3.5 km upstream from the confluence of Redfish Lake Creek) would operate between June 15 and October 31. The traps would be attended by IDFG staff 24 hours per day.

The Juvenile Capture and Maintenance component would involve the collection of smolts outmigrating from Redfish Lake, with the goal of collecting at least one-half of the outmigrants. Initially, all captured smolts would be held at SFH. A total of 450 smolts would be retained and transferred to IDFG Eagle Hatchery for the captive broodstock program. The remainder of the smolts would be released downstream of the collection site on Redfish Lake Creek. The juvenile trap is located at the same site as the Redfish Lake Creek adult trap and would be operated from April 1 to June 15 (trap assembly would actually start on April 8 and finish and begin trapping on April 15, (personal

communication with IDFG)). IDFG personnel will visit the trap three times a day (and more frequently as needed) for debris removal, maintenance and smolt collection.

The Juvenile Tag and Release component would involve the collection of up to 50 smolts at the Redfish trap; these smolts would be injected with a Passive Integrated Transponder (PIT tag) and released above the trap so that a percentage could be recaptured in order to make smolt trap collection efficiency and abundance estimates. Those released after brood selection (see Juvenile Capture and Maintenance) would also be PIT tagged (i.e. all smolts caught in the smolt capture program would be PIT tagged). This program has the same time frame as the juvenile trapping program.

The five ancillary programs are: 1) Identification of Kokanee/Sockeye - Electrophoretic analysis, DNA "fingerprint" analysis, and otolith microchemistry analysis, to provide stock identification of sockeye and kokanee outmigrants; 2) Cryopreservation of gametes - Cryopreservation of adult male Redfish Lake sockeye salmon milt; 3) Pathology - Monitoring of the health of existing captive broodstock and any additional individuals obtained in 1992; 4) Release strategies - Review of pertinent literature and ongoing baseline limnological studies being conducted to determine if and when fertilization of the receiving waters should be considered as part of the recovery process; and 5) Individual identification - The use of PIT tags, coded wire tags (CWT) and cold branding would be used individually or in combination to identify all sockeye in this program (1992 Juvenile and Adult Trapping Program).

Listed Species and Critical Habitat:

Snake River sockeye salmon (O. nerka) is the endangered species proposed for directed take. Both juveniles and adults would be captured. There may be an incidental take of Snake River spring/summer chinook salmon (O. tshawytscha), currently a species proposed for listing under the ESA. Critical habitat for Snake River sockeye salmon and Snake River spring/summer chinook salmon has yet not been designated or proposed.

Assessment of Impacts:

Considerable risk is present throughout all phases of the Sawtooth Valley project, 1992 Juvenile and Adult Trapping Program. Capturing nearly all the individuals of the Snake River sockeye salmon population that are returning to or outmigrating from Redfish Lake and removing them from their natural environment presents the risk of jeopardizing the species through: human error, alteration of genetic integrity, mechanical

failure of equipment, vandalism, stress, disease, etc. However, these risks must be weighed against the critically low numbers of returning adult Snake River sockeye salmon and the poor rate of survival from juvenile to adult in the natural environment as it exists today.

In the Adult Capture and Maintenance program, loss of adults and their progeny could occur during trapping and handling, and possibly as a result of diseases or mechanical failure within the hatchery. No adult losses occurred in this program in 1991.

The Juvenile Capture and Maintenance program has the potential for loss of smolts in all phases of trapping, handling and transportation. Last year 6.7% of the captured smolts died while in the trap. This year, modifications and relocation of the smolt trap(s) will likely reduce that mortality. Additional significant mortalities (3.2%) occurred from bacterial gill disease and 0.9% from handling. Modifications to rearing protocol and tank design should reduce these losses.

NMFS is concerned by the question of whether the outmigrants are, sockeye salmon, kokanee, or a mixture of the two forms. If the outmigrants are a mixture of sockeye salmon and kokanee, and if the adults are bred at random, some fraction of the offspring would be sockeye/kokanee hybrids. Because such hybrids may exhibit altered behavioral, migrational, reproductive and physiological traits, they may have lower viability than pure sockeye salmon as anadromous fish. Backcross hybrid/sockeye matings involving hybrids that do survive to maturity may reduce fitness of the general sockeye salmon population. In addition, if a substantial fraction of the outmigrants are kokanee, sockeye/kokanee matings would be more frequent than sockeye/sockeye matings, thus further reducing the already critically low number of pure Redfish Lake sockeye salmon.

The problems raised by hybridization of the two forms can be avoided if individual outmigrants can be identified as either kokanee or sockeye. Currently, a number of approaches are being evaluated as solutions to this problem. At this point, there is no guarantee of success, so NMFS must consider the possibility that, at maturity, spawning of the outmigrants could occur without knowing the genetic origin of individual fish. Disposition of the progeny of such spawnings is somewhat problematical, although release in one of the other Stanley Basin lakes is a possibility. In this regard, NMFS is requiring IDFG, in conjunction with NMFS Coastal Zone and Estuarine Studies Division, to develop a decision tree to direct events concerning spawning and release of progeny.

The rationale implied by IDFG for keeping all of the fish trapped early in the outmigration for possible use in the captive brood program is not clear nor compelling. The figure of 450 fish appears to be based on logistical considerations (e.g., rearing capacity) rather than on genetic or demographic considerations. If IDFG is correct in their presumption that the 1992 outmigration will be smaller than in 1991 because only 2-year old fish from the few adults returning in 1989 will be outmigrating, then the 1992 fish will be largely genetically redundant because a large number of progeny from the same parents are already in the captive brood program (the 1991 outmigrants).

NMFS recommends that trapping of outmigrants be conducted in such a way as to provide adequate coverage of the entire outmigration period, and that only a portion of the outmigrants (not to exceed one half during any collection period or 450 overall) be retained at SFH for use in the captive rearing program and the other one half of the daily collection be PIT tagged and released within 24 hours of capture.

The rationale for limiting the take to one half the daily collection is to minimize interrupting the normal migratory behavior of the smolts by collecting and holding them in order to obtain the numeric goal and then releasing a portion of the early smolts only when equal numbers of later migrating smolts are captured. Migratory information obtained from PIT tagged smolts, whose release was delayed, would not provide a true representation of the migratory behavior and would be of limited use for real time management decisions and for developing management plans to aid in the recovery of Snake River sockeye salmon.

In the Juvenile Tag and Release program, all fish captured in the smolt trap(s) would be PIT tagged and/or coded wire tagged (CWT). The action of PIT tagging could cause physical trauma which may affect fish survival. In 1991, 4 of the 759 (0.5%) captured smolts that were PIT tagged died. Disease transmission is possible between fish during both types of tagging operations.

The use of CWT tagging on the smolt outmigrants may provide very little beneficial information due to the limited number of expected outmigrants and the low survival rate from juvenile to adult. Because of the possibility of a very limited return of data NMFS recommends that outmigrants not be tagged with CWT's.

Some risk also exists in the five ancillary programs. Programs 1,2,3 (Identification of Stocks, Cryopreservation of Gametes and Pathology) would not remove live fish from the populations, i.e., naturally occurring mortalities would be used to provide biological material for each of the programs (except for sperm

collection). Program 5 has a low potential to be a vector for bacterial kidney disease (already detected in some smolts, with one mortality due to the disease).

Conclusion:

NMFS has determined that based on the available information: 1) BPA funding of the actions and 2) NMFS issuing a permit to IDFG authorizing the proposed actions are not likely to jeopardize the continued existence of listed or proposed Snake River salmon.

The actions proposed in the permit application are justified because the alternative of no action could contribute to extinction of the species. Snake River sockeye salmon population levels have declined to only 4 fish (3 males and 1 female) returning to Redfish Lake (the only known active spawning grounds of the last remaining population of Snake River sockeye salmon) in 1991. In 1990, no Snake River sockeye salmon returned to Redfish Lake. The critically low numbers of returning adult Snake River sockeye salmon and poor juvenile-adult survival rate in today's natural environment, justify the need to conduct the proposed juvenile and adult sockeye trapping program.

An emergency situation exists because Snake River sockeye salmon face a greater risk if they remain in the wild than if they are temporarily moved into a controlled hatchery environment. The alternative of no action could result in extinction of the species. The outmigration of Snake River sockeye salmon smolts will begin in early to mid April, and the permit must be issued prior to this time. The PIT tagged smolts that are allowed to migrate in-river will provide much needed information about migration through the Snake/Columbia River hydropower system. In addition, the real time data provided by these PIT tagged fish will be used, in conjunction with other data, to determine system wide operational decisions to more effectively utilize the limited water supplies for river flow augmentation in 1992.

Reinitiation of Consultation:

Consultation must be reinitiated if the amount or extent of taking specified in the incidental take statement is exceeded, new information reveals effects of the action that may affect listed species in a way not previously considered, the identified action is modified in a way that causes an effect to listed species that was not considered, or a new species or critical habitat is designated that may be affected by the action.

Incidental Take Statement:

The permit application is for the directed take of Snake River sockeye salmon as part of a research and enhancement program related to improving the chances of survival of Snake River sockeye salmon.

Incidental take of Snake River spring/summer chinook salmon, which are proposed as threatened, may occur. Last year three juvenile outmigrant spring/summer chinook were trapped at the Redfish Lake Creek trap. Spring/summer chinook salmon and sockeye salmon are present in the Salmon River subbasin at the same time, and because the trapping methodologies are nonspecific, adult and juvenile spring/summer chinook salmon could enter the traps. NMFS sets an incidental mortality level for spring/summer chinook salmon at 10 juveniles and three (3) adults.

At this time, there are no other trapping methodologies that would prevent the take of spring/summer chinook salmon. Therefore, the following terms and conditions are established: (1) the applicant must continuously monitor and submit bi-weekly reports to NMFS on the numbers of adults and juvenile spring/summer chinook salmon handled and the number of mortalities; and (2) the spring/summer chinook salmon should be released from the traps as soon as possible, with minimal handling.

Conservation Recommendations:

1) When juveniles or adults are being transported from Redfish Lake Creek trap to SFH, an auxiliary water supply should be carried on the transport truck. Should an accident occur in which the containers holding the fish rupture or develop a leak, the addition of the auxiliary water may prevent the loss of fish.

2) Trapping of outmigrants should be conducted in such a way as to provide adequate coverage of the entire outmigration period. Furthermore, only a portion of the outmigrants (not to exceed one half during any collection period or 450 overall) should be retained at Sawtooth Hatchery for use in the captive rearing program. The other one half of the daily collection should be PIT tagged and released within 24 hours of capture.

3) IDFG, in conjunction with NMFS Coastal Zone and Estuarine Studies Division, should develop a decision tree to direct the spawning of the captured outmigrants and the subsequent release of their progeny should no viable solution to the problem of differentiation between sockeye and kokanee be found.

- 4) Due to the possibility of a very limited return of data, outmigrants should not be tagged with CWT's.
- 5) IDFG should establish a protocol (that includes emergency situations) with a direct line of communication for concurrence with NMFS, in the event of unpredictable incidents.
- 6) Additional security at the trapping sites, in the form of locking lids on the traps, should be added.

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