Appendix 80

HATCHERY AND GENETIC MANAGEMENT PLAN RESIDENT FISH EDITION (HGMP-RF)

Sekokini Springs Natural rearing Facility
Hungry Horse Mitigation Program

Montana Fish, Wildlife & Parks
Sekokini Springs Natural Fish Rearing Facility

Species: Westslope Cutthroat Trout

Wild Genetically Pure Westslope Cutthroat Trout

Agency / Operator:
Montana Fish, Wildlife & Parks

Montana Fish, Wildlife & Parks

Watershed and Region: Flathead Subbasin,
Mountain-Columbia Province

Watershed and Region:
Flathead River Watershed
Mountain Columbia Ecological Province

Date Submitted:

May 2004

Date Last Updated:

March 2004

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Sekokini Springs Natural Rearing Facility – Westslope Cutthroat Trout Restoration

1.2) Species and population (or strain) under propagation, ESA\ population status.

State common and scientific names.

Westslope Cutthroat Trout, *Oncorhynchus clarki lewisi*

1.3) Responsible organization and individuals

Indicate lead contact and on-site operations staff lead.

Name (and title): Brian Marotz, Fisheries Program Manager
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Agency or Tribe: Montana Fish, Wildlife, & Parks
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

Confederated Salish and Kootenai Tribes, US Bureau of Reclamation, US Forest Service, US Fish and Wildlife Service.

1.4) Funding source, staffing level, and annual hatchery program operational costs.

This project is part of the Hungry Horse Fisheries Mitigation Program funded by Bonneville Power Administration (BPA). BPA contributions to date include $ 72,000 to purchase the improvements (a private trout farm) on land owned by the US Forest Service, $57,000 for a gravity water routing system and spring caps to protect the small hatching facility against disease contamination and $26,000 to replace the building's exterior and insulate the interior. This HGMP will be appended to the Master Plan for the facility being finalized by FishPro, a subsidiary of HDR Consulting, for Montana Fish, Wildlife & Parks (MFWP), BPA and US Bureau of Reclamation (BoR)

Prior to assuming the special use permit, BPA funded the USFWS Creston National Fish

Hatchery to experimentally hatch and rear westslope cutthroat trout at the site to assess the water source. MFWP contributed services to conduct a fish disease inventory at the site and determined the water source to be free of all reportable fish pathogens. The BoR Technical Assistance Program provided additional funding (at approximately $50,000/yr) during the design / planning phase. The BoR funded a high-resolution topographical map of the site and details of proposed improvements and contributed a $70,000 grant for a water conservation exhibit on the proposed interpretive trail at the site.

Fish have been removed from the facility pending completion of the spring caps and water routing system. The single Fish Culturist position was funded at 0.5 FTE until repairs were completed. The staff position is currently vacant pending completion of the 3-step APR process. Ultimately, MFWP recommends a two person staff. Annual operation is estimated at $200,000.

1.5) Location(s) of hatchery and associated facilities.

The Sekokini Springs site is located in Flathead County, Montana, about 10 miles northeast of Columbia Falls, Montana (T.31 N., R. 19 W., Sec. 17, Hungry Horse, Montana 7.5 minute Quadrangle; the location has been recorded in the state GIS data base). The physical address is 5625 Blankenship Road, Columbia Falls, MT 59912 (Mail should be directed to 490 North Meridian, Kalispell, MT 59901). The site is located approximately 1 km downstream of the confluence of the North and Middle Forks, near Blankenship Bridge. The Forest Service lease involves 11.4 acres on terraced land overlooking the Flathead River.

1.6) Type of program(s).

Sekokini Springs is part of an **Integrated Recovery Program** for westslope cutthroat trout within the Flathead River Watershed, Montana. This artificial production facility is integrated with habitat restoration, fish passage improvements, modified dam operations, water temperature control via selective withdrawal at Hungry horse Dam and offsite mitigation in closed basin lakes within the watershed. This project will also coordinate with Montana's Rose Creek Facility, scheduled for completion in September 2004. The new Rose Creek facility will provide additional capacity for hatching and rearing of progeny from wild westslope cutthroat trout conserved at Sekokini Springs.

1.7) Purpose (Goal) of program(s).

The goal of this program is the restoration of westslope cutthroat trout in the Flathead Watershed by conserving genetically diverse indigenous stocks.

The goal of the Hungry Horse **Mitigation** Program is to mitigate fisheries losses attributable to the construction and operation of Hungry Horse Dam. Council approved fisheries losses include

65,000 juvenile westslope cutthroat trout annually, to be restored using a combination of habitat restoration, dam operation changes, harvest management and experimental hatchery techniques. **The Sekokini Springs site will be used in the restoration of westslope cutthroat in the Flathead Drainage by preserving and replicating pure genetic stocks from donor populations within the Flathead Watershed.** Wild juveniles from endemic donor populations will be raised in restored natural habitat at the site to preserve behavioral traits and provide gametes for reestablishing F1 progeny in selected areas where the species has been impacted or extirpated. The site will also conserve remnant populations that are threatened by nonnative species or environmental damage. Rescued fish will be protected at the site and raised to create a donor population for reintroduction to their aboriginal habitat after the threats have been eliminated.

1.8) Justification for the program.

Sekokini Springs will be part of an **integrated recovery program** for westslope cutthroat trout. Native populations of westslope cutthroat trout in the Flathead system have declined due to loss of spawning and rearing habitat, genetic introgression / hybridization and through negative interaction with nonnative fish species. Seventy-eight miles of high quality, low gradient spawning and rearing habitat were lost due to inundation when Hungry Horse Reservoir filled (FWP and CSKT 1991). Habitat degradation and fish passage barriers have eliminated nearly 60 percent of the habitat once available to native westslope cutthroat and bull trout (Fraley et al. 1989). The Hungry Horse Mitigation program is striving to offset these habitat losses by protecting remaining habitat and by restoring and reconnecting damaged habitats. In certain areas, there is a need to reestablish pure populations of westslope cutthroat trout in the restored habitat.

Nonnative species or environmental damage in some locations threatens remnant populations of genetically pure cutthroat and there is a need to conserve the genetic diversity of the species. Genetic inventories of existing stocks of westslope cutthroat trout have revealed that hybridized/introgressed populations in headwater lakes are escaping downstream and threatening pure populations of westslope cutthroat trout. Lake rehabilitation has been initiated to remove this threat to pure native stocks. BPA is currently drafting an Environmental Impact Statement (DEIS) for removing nonnative fish species and genetically introgressed cutthroat trout from lakes in the South Fork Flathead River headwaters upstream of Hungry Horse Dam. A source of genetically compatible fish is needed to replace these populations. Currently, the state's M012 brood stock is scheduled for infusion of wild stocks to continue the excellent record of maintaining the genetically pure source of westslope cutthroat trout. Sekokini Springs has been used to facilitate this stock maintenance and can be used develop additional local strains for species recovery in Flathead River tributaries. The hatchery portion of the Hungry Horse Mitigation program has been redirected to experimental culture of native species as directed by the Hungry Horse Mitigation Plan (MFWP and CSKT 1991) and Implementation Plan (1993). The Northwest Power Planning Council (NPPC) approved the plans and amended their

Columbia Basin Fish and Wildlife Program (Measure 10.3A, NPPC 1994).

The for this project, the restoration of WCT is historic ranges of the Flathead River Subbasin using genetically pure indigenous stocks, is consistent with the Westslope Cutthroat Trout Conservation Agreement [1999, Memorandum of Understanding (MOU)], which states the following:

> *The management goal for westslope cutthroat trout in Montana is to ensure the long-term, self-sustaining persistence of the subspecies within each of the five major river drainages they historically inhabited in Montana (Clark Fork, Kootenai, Flathead, upper Missouri, and Saskatchewan), and to maintain the genetic diversity and life history strategies represented by the remaining local populations.*

The goal of the MOU is to ensure that population aggregates persist, with at least one of the local populations remaining viable for a period of more than 10 years (2-3 generations of fish). Once a population becomes viable, monitoring at a frequency of at least once every 10 years must be done to document its persistence. According to the Conservation Agreement, each tributary that supports WCT, regardless of length, is considered a population.

The Sekokini Springs site has potential to become a primary focus of our native westslope cutthroat trout recovery program in the Flathead Watershed. To assess the potential for the Sekokini Springs facility to successfully rear WCT, experimental trials were conducted with the MO12 stock of WCT in 1997-1999 and 2001. The results of the experimental rearing of WCT successfully demonstrated, over several seasons, that an experimental conservation rearing program at Sekokini Springs could occur. The site offers a unique combination of natural habitat for onsite restoration work and a small trout rearing facility. Four natural springs of varying water temperatures and the isolated setting provide an opportunity for small scale, experimental rearing of native species under natural habitat conditions. Sekokini Springs can provide an isolation facility (separate effluent management) to hold wild fish until they can be tested for fish pathogens and genetic purity. Individual genetic strains of pure westslope cutthroat trout can be protected and replicated for reintroduction to aboriginal habitats. Experimentation on fish imprinting will be used to initiate wild runs. Where successful, adults returning to their natal waters will be recaptured to assess the effectiveness of various imprinting strategies (e.g. eyed eggs as compared to fingerling imprinting). In the future, it may become possible to obtain gametes from newly created alternative sources (as opposed to remnant donor populations) for hatchery assisted recovery actions elsewhere in the Flathead watershed.

The Sekokini Springs facility will be used to establish varying sources of genetic material to restore populations with different genetic complements than the state's captive MO12 broodstock held at Washoe Park Hatchery in Anaconda, MT. Westslope cutthroat trout at Sekokini Springs will be reared in naturalized habitat to avoid domestication. A variety of rearing techniques will be used including: native substrate, floating cover, submerged structures, and natural feed supplementation in rearing ponds utilized to rear donor fish and F1 juveniles that are as similar to their wild counterparts as possible. The Sekokini Springs facility would be innovative by incorporating natural rearing environments, to the extent possible, and enhancing WCT populations through rearing of multiple unique genetic populations over time.

1.9) List of program "Performance Standards".

Example: " (1) Conserve the genetic and life history diversity of Upper Columbia River spring chinook populations through a 12 year duration captive broodstock program; (2) Augment, restore and create viable naturally spawning populations using supplementation and reintroduction strategies; (3) Provide fish to satisfy legally mandated harvest in a manner which minimizes the risk of adverse effects to listed wild populations; (4)....".

(3) Reintroduce pure populations where hybridized/introgressed populations have been removed; (4) Provide harvest in closed-basin lakes to offset lost angling opportunity due to harvest restrictions or fishing bans designed to minimize adverse effects to wild populations; (5) By 2007, create an interpretive area for public education on the benefits of native species and their recovery.

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

1.10.1) "Performance Indicators" addressing benefits.

(1) By 2007, conserve the genetic and life history diversity of at least one westslope cutthroat trout population in the Flathead Subbasin by replicating the donor stock held in natural habitat at Sekokini Springs.

Pre- and post-treatment inventories of the genetic makeup of the targeted fish populations will be used to measure trends in genetic purity. A genetically pure population is one in which 100 percent of tested individuals, through genetic analysis, show no evidence of hybridization or introgression with other species or subspecies. Depending on the goals for each site, genetic sampling may involve protein electrophoresis, paired interspersed nuclear DNA element – PCR (or PINE marker) method or various mitochondrial DNA marker techniques, to differentiate westslope cutthroat trout from rainbow, Yellowstone cutthroat or introgressed forms. Samples are analyzed by the Montana Wild Trout and Salmon Laboratory at the University of Montana, Missoula or suitable laboratory.

The diversity of life history strategies is related to total available habitat. For instance, assuring access to historic habitat by fluvial or adfluvial spawners, or by protecting resident forms by isolating headwater populations above barriers. The Hungry Horse mitigation program is assessing recruitment from and genetic integrity of fluvial and adfluvial trout in selected index streams (primary spawning streams and habitat enhancement sites. Experiments use PIT tags and remote detectors, migrant trapping, radio telemetry and microelemental signatures in fish scales to assess spawning success and determine the natal stream of origin of individual fish.

(2) Restore and initiate viable, naturally spawning populations using reintroduction strategies by 2013.

Successful restoration of wild spawning runs of genetically pure westslope cutthroat trout in tributaries to the Flathead River can be assessed by migrant trapping, redd surveys, population estimation and genetic inventory, before and after habitat restoration or reconnection. In earlier mitigation projects, runs of native fish had been extirpated prior to habitat restoration or fish passage improvements. Assessment of experimental imprint plants of marked eyed eggs or fry has shown that fish survive and rear in test streams through emigration (smolt stage). After such treatments, redd surveys revealed that a spawning run had been reestablished. Our goal is to assess whether imprint plants of eggs and/or fry return to spawn as adults. Unfortunately, the origin of the spawning adults could not be determined using marking technology available at the time (e.g. tags or tetracycline marking did not persist through adult returns or was only detectable through lethal methods and thus counter-productive). We are now assessing tools to determine spawner origin and to assess the effectiveness of various techniques for establishing runs. Non-lethal sampling techniques such as microprobe spectrometry of the protein matrix in scales has yielded promising results (Wells et al. 2003; Muhlfeld et al. – In review). Experiments using batch marking to cold-mark otoliths in trout fry are ongoing, but require lethal sampling (otolith removal) to assess the presence of a mark.

(3) Reintroduce pure populations where hybridized/introgressed populations have been removed.

The westslope cutthroat population in the Flathead subbasin will benefit by increasing the number of wild, genetically pure spawning populations and by reducing the threat to pure populations from nonnative species and hybridized/introgressed populations. The success of chemical rehabilitation is assessed through pre- and post-treatment inventory using gill nets, electrofishing and/or U/W visual inspection. Late fall treatment of closed-basin lakes has produced total eradication of the target fish species in several case studies. Pure populations are reintroduced and monitored as described in 4 below.

(4) Provide harvest in closed-basin lakes to offset lost angling opportunity due to harvest restrictions or fishing bans designed to minimize adverse effects to wild populations.

Offsite lakes receiving yearlings and spawners from the facility will provide opportunities for harvest, partially offsetting restrictive regulations elsewhere in the Flathead River system. The offsite lakes program is monitored through periodic gill net surveys, angler interviews and the annual statewide angler creel census. Stocking rates are established to a large degree by trial and error, then refined to optimize post-stocking survival and growth.

Gill netting provides data on species relative abundance, growth rates and fish condition factor. Angler surveys are qualitative indicators of catch rates, angler satisfaction and rough estimates of harvest. Although rigorous quantitative analyses of CPUE, survival and total harvest are possible, the number of lakes involved makes this level of monitoring economically impractical. Remaining wild populations of westslope cutthroat trout are benefited by providing alternative opportunities for angler harvest. Natural westslope cutthroat trout populations in most Montana rivers are protected by mandatory catch and release regulations.

(5) By 2007, create an interpretive area for public education on the benefits of native species and their recovery.

This aspect could be measured in terms of visitor days, school groups instructed or patron satisfaction indices. Our goal is to inform the public about the need to protect aboriginal stocks or reestablish native trout where they have been extirpated. The site will also present the relation between habitat restoration and artificial culture techniques.

1.10.2) "Performance Indicators" addressing risks.

Onsite and offsite mitigation projects will use the Sekokini Springs facility as a source of genetically compatible westslope cutthroat trout to expand the existing range of the species where native populations have been extirpated or to conserve threatened populations. Our goal is to protect aboriginal stocks or, where natives were extirpated, replicate nearest neighbor stocks, or to replace nonnative, hybridized or introgressed populations. Since genetic inventories have documented problem areas, our strategy is to reduce or eliminate existing risks to the integrity of pure native stocks.

Removing gametes or fish from a donor population presents a risk to that population. Given this, we propose to capture wild juveniles or partially spawn adults to collect gametes for rearing at Sekokini Springs. Removal of juveniles is less likely to disrupt natural reproduction in the donor population. Capture of juveniles can be accomplished before or after spawning adults are present in the stream, thus eliminating risk to the spawning population. Incremental removal of a subset of the rearing population over time during each of three to five years will provide a random selection from the available genetic material, while protecting the remaining wild juveniles. Numbers to be removed can be based on a percentage of the juvenile population. We propose to take no more than 25 percent of the estimated juvenile population in a given year. Our fish health specialist will allow transport of juveniles (as opposed to gametes or eyed eggs) to an isolation facility at Sekokini Springs from sources having a long history of reportable pathogen negative status. Subsequent fish health testing will be accomplished in the isolation facility before juvenile fish are released into the rearing habitat. Individuals to be reared at the facility will be individually marked and non-lethally inventoried for genetic purity. Only genetically pure populations will be used to produce family crosses of F1 progeny. This strategy was designed to reduce the risk to the donor population, disease transmission to the rearing habitat and protection/conservation of genetically pure stocks for restoration actions.

Alternatively, wild gametes may be collected from adult spawners throughout the spawning run. Allowing for escapement of a percentage of the wild population and techniques that partially spawn adults before releasing them to continue to spawn naturally can reduce risk to the spawning population. If only a few adults can be safely removed from the donor population, collections can be made over a series of years to assure that the resulting progeny represent the genetic diversity in the original population. In captivity, wild juveniles can be reared to maturity and spawned to produce F1 progeny. Differing age at maturity will allow cross-fertilization between year classes. Donor populations will be monitored to assure that gamete or juvenile collections do not impact the wild populations.

1.11) Expected size of program.

1.11.1) Proposed annual broodstock need (maximum number of fish).

Sekokini Springs will not be a traditional broodstock facility. Instead, gametes from wild spawners or juveniles will be held until maturity to provide a source of F1 gametes or fry for use in imprint planting experiments. Once a spawning run is established in the restored or reopened habitat, the captive population will be released into a closed-basin lake to provide a recreational fishery and to make space available for another experimental stock. The number of fish to be reared at Sekokini Springs will vary depending on annual needs for specific genetic stocks and the genetic makeup of each stock. The facility master plan proposes out-door rearing of up to four isolated genetic stocks. Rearing in nearly natural habitat is intended to maintain wild behavioral traits.

We anticipate that up to 1,000 individual juveniles will be removed from a given donor population each year (based on a percentage of the population estimated through electrofishing estimates, not to exceed 25 percent of the donor population). Sixty individuals from each lot will be sacrificed from each lot for disease testing before the fish are moved from the isolation facility (a separate water source) to the natural outdoor rearing habitat. Fish will be reared to maturity to produce approximately 300 spawning adults within each of the four rearing ponds. Progeny from crosses will be held separately through the fry stage and released to targeted recovery streams at a density not to exceed the density of wild trout in a comparable stream by stream order, gradient and flow range.

1.11.2) Proposed annual production and fish release levels (maximum number) by

life stage and location.

Production Stage Criteria	Parameter	Number
Number of juveniles to collect per population	1,000	
Juvenile survival to spawn	67%	
Fish health sampling	60	
Number of juveniles surviving to spawn	630	
Ratio of males to females	1:1	
Number of females	315	
% spawn at age 3	55%	173
% spawn at age 4	35%	110
% spawn at age 5	10%	32
Fecundity per female		
age 3	500	86,500
age 4	1,000	110,000
age 5	1,200	38,400
Number of green eggs produced	234,900	
Green to eyed egg survival	65%	
Total eyed egg production per population	152,685	
Eyed egg distribution by Stocking Program		
RSI's	25%	38,171
Artificial Redds	20%	30,537
Smolt Release	55%	83,977
Number of eyed eggs surviving to fry		
RSI's	60%	22,903
Artificial Redds	10%	3,054
Smolt Release Program	75%	62,983
Number of fry surviving to 4 inch smolt for release	85%	53,535
Assumptions: Production for each population will occur over 3 years assuming fish will mature between age 3 and 5. Fecundity based on MO12 for age 3 and 4 (Sweeney 2003 pers. comm.), age 5 estimated. Ratio males to females based on MO12 (Sweeney 2003 pers. comm..). Age at maturity estimated based on combination of MO12 observations and wild population information (Gresswell 1988). Survival to spawn based on MO12 (Sweeney 2003 pers. comm.). Egg, fry and smolt survival based on MO12 (Sweeney 2003 pers. comm.).		

1.12) Current program performance, including estimated survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Provide data (e.g., CPUE, condition factors) available for the most recent twelve years), or for the number of years of available and dependable information. Indicate program goals for these parameters

Experimental hatching and rearing began in 1997 and was completed by 2001. Approximately 90,000 eyed eggs (M012 westslope cutthroat stock) were transferred from Washoe Park State Fish Hatchery in Anaconda, Montana, hatched and reared at Sekokini Springs. Fish were reared with automatic feeders and minimal attention, remotely from Creston Hatchery. The growth and condition of juveniles at the Sekokini facility was encouraging (the fish were robust and had all their fins). Fish outplanted to Rogers Lake were observed to look like wild trout, with rapid growth and vibrant color. Survival was high enough that stocking rates were cut by 25 percent the following year. No data are available from other closed-basin lakes.

1.13) Date program started (years in operation), or is expected to start.

Experimental culture began in 1997. Fish were removed from the site in 1998 and the facility was not operated again until 2001. In 2000, three water sources were isolated for disease prevention by capping the spring sources and removing the original "head pond" at the site. Water was collected for on-demand, gravity feed to a valve box in the small hatchery building. Water temperatures in the various springs can be mixed to achieve a target temperature in the facility. In 2001, MFWP installed 14 rearing troughs and plumbing in the hatchery building. The facility was tested in January 2002 when MFWP began rearing 21,000 M012 westslope cutthroat in the facility. After this initial test, fish were removed from the site and the facility is remains vacant pending the 3-step APR review. In the future, we plan to begin experiments with wild fish from nearest neighbor donor populations.

1.14) Expected duration of program.

The program combines experimental artificial propagation for restoring westslope cutthroat and an interpretive center. Artificial propagation will address the needs of specific recovery actions and experiments directed at cutthroat restoration. When a particular restored stock is secure and self sustaining in the wild, the stock will be removed from the facility to make room for other needs. It is uncertain how many years it will take to restore wild, self sustaining populations in a given recovery area, however, we anticipate about 10 years per stock. Surplus fish will be released in closed-basin lakes to provide angling opportunity. Captive stocks (of approximately 200 fish per restored stream reach) will be retained for public education and viewing as part of the proposed interpretive trail exhibits.

1.15) Watersheds targeted by program.

Flathead River Drainage (HUC 17010208) including the main stem Flathead River downstream of the North and Middle Forks, Recovery actions will be carried out in the portion of the Flathead Watershed upstream of Flathead Lake, headwater lakes and closed-basin lakes within the watershed.

1.16) Indicate alternative actions considered for attaining program goals, and reasons

why those actions are not being proposed.

Two alternative sites were considered for meeting the program needs:

- Use of the Washoe Park Trout Hatchery - State's MO12 captive broodstock
- Develop the Sekokini Springs site (Proposed Alternative)

Use of the Washoe Park Trout Hatchery - State's MO12 Captive Broodstock

With recent improvements, including a new hatchery building and a new public education center consisting of an aquarium with a "living stream," the Washoe Hatchery is one of the leading aquaculture educational facilities in the state. Additionally, the hatchery has variable water temps in its spring water supply and is the only facility in the state that has 2 wells with different water temperatures. One spring is 56° F (13.3°C) and the other is 45° F (7.2° C), with the capability of mixing the two water sources to get a wide range of temperatures. With the exception of a natural-rearing environment, the Washoe Park Trout Hatchery meets the screening criteria for the proposed program. Although natural rearing techniques are not currently utilized at the existing facility, it is likely that facilities could be modified, if necessary, to meet screening objectives.

The genetic composition of captive WCT broodstock (MO12) reared at the Washoe Park Trout Hatchery was established with the first spawn of captive WCT in 1983/84 (MFWP 2003). The parental stock included 4,600 genetically pure WCT collected from 12 streams in the South Fork Flathead and 2 tributary streams to the Clark Fork River. On-going genetic testing of the MO12 stock confirms that it is genetically variable and has no introgression. While genetic diversity is ideal, the MO12 stock was not been infused with wild gametes until 2003 and the existing strain is primarily a captive broodstock derivative.

Leary et al (1998) suggest that MO12 broodstock could be used to supplement populations throughout the state if wild gametes are introduced into the broodstock. Because live fish cannot be transported into Montana state hatcheries, gametes or milt are the preferred options for infusion of new genetic material (M. Sweeney, MFWP, personal communication, March 4, 2003). In 2003, MFWP collected milt from wild males in Quintonkon and Deep Creeks (South Fork Flathead River) for infusion into the Montana captive broodstock (MO12) held at Washoe Park Trout Hatchery. Wild males were temporarily held in isolation (separate water source) at Sekokini Springs. Although these source populations have a history of pathogen-free status through disease testing, all male fish were sacrificed for additional disease testing after milt has been collected. This milt collection strategy will occur in various years throughout the life of the Sekokini Springs project, when comanagers determine there is a need for additional infusion of wild genes into the state's existing broodstock.

Although it is true that geneticists have designated the MO12 broodstock as suitable for use in WCT restoration throughout Montana, especially in waters previously planted with MO12s, geneticists also recognize the value of replicating genetically distinct WCT populations to preserve diversity across the historic range. As identified in the Conservation Agreement (MFWP 1999a) each tributary that supports WCT regardless of length constitutes a population, and all genetically pure populations are to be protected. Exclusive use of the MO12 stock will not achieve this objective.

Use Sekokini Springs site

Facilities at Sekokini Springs can be modified for use as an experimental isolation WCT rearing facility to establish varying sources of genetic material to restore populations with different genetic complements than the MO12 stock. Modification of the existing facilities would make it possible to meet the goals of this project, including assisting with the conservation of WCT. The production goal for the Sekokini Springs Natural Rearing Facility is to provide genetically pure WCT following the nearest neighbor concept for stocking of underseeded, recovered or newly opened habitat. These stocks would be reared to avoid domestication using a variety of rearing techniques including: native substrate, floating cover, submerged structures, and natural feed supplementation in rearing ponds utilized to rear donor fish and F1 juveniles that are as similar to their wild counterparts as possible. The Sekokini Springs facility would be innovative by incorporating natural rearing environments, to the extent possible, and enhancing WCT populations through rearing of multiple unique genetic populations over time.

Alternatives for collecting fish or gametes from donor populations included:

- collecting milt from wild males for infusion into the state's M012 brood stock;
- collection of eggs and milt from wild spawners and
- collection of juveniles from wild populations.

Each alternative has pros and cons. Alternatives a) and b) are beneficial because gametes can be treated for disease before being brought to Sekokini Springs. The isolation facility will allow additional testing before fish are released to outdoor habitat at the site. Alternative a) is the least time intensive strategy of the two, however the M012 stock contains donor populations from outside the Flathead subbasin (Clark Fork River drainage) and therefore does not constitute a Flathead stock, so has been ruled out. Alternative b) is time intensive and because males and females ripen at different times, fish or gametes must be held to assure that family crosses are representative of the donor population. Multiple-year crosses will be required to assure that progeny represent the genetic diversity of the donor population. Also, these alternatives require capturing and handling spawners during the run over several years (3 to 5 years), causing additional stress on the donor population. At this time, we are favoring alternative c), although greater care must be taken in the isolation facility to guard against disease transmission to the rearing habitat. We believe that the risk of disease contamination can be reduced to acceptable levels by holding progeny in the isolation facility until additional disease screening (60 fish sacrificed from each lot) reveals that fish can be safely released to the rearing facility.

SECTION 2. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

2.1) Describe alignment of the hatchery program with other hatchery plans and policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

Our strategy is consistent with the NWPPC plan, although because we intend to use captive wild fish to produce F1 progeny under wild rearing conditions, we plan to preserve up to four isolated nearest-neighbor stocks to preserve wild behavioral traits as well as genetic integrity.

Currently, the MFWP, in association with various tribal, state and federal agencies, maintains WCT broodstock and rearing facilities throughout the state. The present broodstock was founded in 1983 from fish collected from the South Fork Flathead River tributaries above Hungry Horse Dam. These stocks were found to be genetically pure and are raised in several hatcheries throughout the state. These facilities include the Flathead Lake Salmon Hatchery, Murray Springs Trout Hatchery, Jocko River Trout Hatchery and the Washoe Park Trout Hatchery. Stocking efforts aim to reintroduce WCT stocks to degraded river systems that have been rehabilitated or that were previously blocked to fish passage by man made barriers.

2.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates. *Indicate whether this HGMP is consistent with these plans and commitments, and explain any discrepancies.*

Experimental culture of native westslope cutthroat is the next step in the decision path outlined in the Hungry Horse Mitigation Implementation plan approved by NWPPC in 1993. This HGMP provides additional detail for our proposed actions at Sekokini Springs and will be appended to the Master Plan being finalized by MFWP and BoR. Actions for the restoration of westslope cutthroat trout under the Hungry Horse Mitigation Program are consistent with the Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat trout in Montana (May 1999) recently signed by MFWP, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI Forest Service, and the Flathead Lake Co-management Plan developed by MFWP and CSKT.

2.3) Relationship to harvest objectives.

The state of Montana has implemented a mandatory catch and release regulation for westslope cutthroat in the contiguous Flathead River system. Wild runs established in Flathead River tributaries will be protected by the mandatory “catch and release” regulation. Surplus cutthroat from the facility will be planted in closed-basin lakes to provide angler harvest as part of Montana’s Family Fishing program.

Approximately 50,000 RBT and 60,000 cutthroat trout are reared at CNFH annually to provide subsistence and recreational fisheries for tribal and non-tribal anglers in closed-basin lakes on the Flathead Indian Reservation. Approximately 20,000 WCT were propagated at CNFH in 1999 and 35,000 in 2000 for release in closed-basin lakes in State-managed waters. Nearly all of the offsite lakes planted under this program do not support natural reproduction. Where natural reproduction is possible, the primary objective is to create genetic reserves for isolated populations of native stocks. In these cases, habitat restoration is performed to enhance fish passage and natural reproduction in the closed system. This hatchery production does not supply fish to waters scheduled for native species restoration. The closed-basin lakes that are planted through this program provide alternative fisheries to meet public demands for harvest and partially offset fishing bans or reduced limits enacted for native species recovery. This program may indirectly benefit native species recovery by redirecting harvest away from sensitive recovery areas in the contiguous Flathead watershed.

2.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

This program has experimentally reared M012 westslope cutthroat trout from Montana’s captive brood stock for only three years during the last twelve years. Fish were released into a closed-basin lake, Rogers Lake to provide angling opportunities. Based on observation and intermittent surveys of angler satisfaction, closed-basin lakes have provided high rates of hatchery to creel survival. Harvest estimates are not available. Offsite lakes receiving yearlings and spawners from the Sekokini Springs facility will provide opportunities for harvest, partially offsetting restrictive regulations elsewhere in the Flathead River system.

The westslope cutthroat population in the Flathead subbasin will benefit by increasing the number of wild, genetically pure spawning populations and by reducing the threat to pure populations from nonnative species and hybridized/introgressed populations.

Public awareness of the importance of native fish species conservation and hydropower mitigation will benefit recovery actions through increased public support for the program.

2.4) Relationship to habitat protection and purposes of artificial production.

Habitat reconstruction at the Sekokini Springs site will benefit natural rearing of captive wild stocks. In the future, the site could be reconnected to the Flathead River to provide for natural reproduction by wild spawners. At this time, if wild spawners from the Flathead River were allowed to access the site, there is a risk that hybridized adults could colonize and spawn in the restored habitat. We will therefore isolate the facility by installing fish barrier to stop migrations to and from the site.

The Hungry Horse Mitigation and Implementation Plans list individual streams to be targeted for habitat enhancement and fish passage improvements. Although our primary objective of the habitat component of the Mitigation program is to encourage natural recolonization and recruitment, suitable stocks are not always available to reoccupy the treatment sites. Where appropriate, we will use Sekokini Springs to provide pure westslope cutthroat for restoration activities elsewhere in the watershed. Experimental imprint planting of eyed eggs or fry will be used to initiate spawning runs in restored or reconnected habitats. Experimentation will be used to assess the effectiveness and cost of various techniques for restoring wild spawning runs (e.g. RSIs, inprint fry plants and release timing). Documentation of the results of these experiments will expand our knowledge of cutthroat restoration techniques.

2.5) Ecological interactions.

Describe all species that could (1) negatively impact program; (2) be negatively impacted by program; (3) positively impact program; and (4) be positively impacted by program.

1) Species like mink, otters, kingfishers, herons, grizzly bears and other picivorous birds and mammals will likely prey on captive wild stocks at the site. It is unknown at this time whether predation will negatively impact the program. Hybridization with rainbow trout could occur if rainbow trout or hybridized adults are allowed to invade the site. A weir trap will be installed in the outlet to the Flathead River to allow capture and analysis of attempting to enter the site.

2) The program could negatively impact donor populations and care must be taken to avoid this possibility. We favor removing a percentage of juveniles from donor populations and subsequent population monitoring to avoid detaining and handling adult spawners.

3) Restoration of habitat at the site should positively impact aquatic wildlife and plants.

4) Terrestrial wildlife could be positively impacted by habitat restoration and weed control at the site.

SECTION 3. WATER SOURCE

3.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

The water source is comprised of four springs of varying water temperatures (Figure 3.1). Three springs originate up hill from the hatching building and the forth enters the stream/pond system on a bench above the Flathead River. Geologic studies conducted in support of the proposed project indicate that the general trend of both surface and groundwater flows appears to be from the kettle lakes located northeast of the site at elevations 3,265 to 3,256 feet (ft), towards the Flathead River located along the southwest side of the subject property at 3,100 ft in elevation. The on-site springs daylight at an approximate elevation of 3,200 ft. The springs fluctuate in flow and temperature similar to a wild stream. The total output of the upper three springs is approximately 4 cfs during spring runoff and declines toward a minimum flow of .8 cfs during winter. The lower spring flows roughly .6 cfs and has not been fully captured. A spring cap would undoubtedly increase water available from the source. No pumping will be necessary to operate the system. Water quality in the four springs is ideal for fish rearing. Prior to capping the springs, nitrogen saturation was seasonally as high as 104% and the temperature in the warmest spring reaches 66 degrees Fahrenheit during mid summer. No elevated nitrogen has been detected since the springs were capped. If elevated nitrogen saturation is detected, packed columns or degassing towers may be necessary to decrease nitrogen saturation to an ideal level.

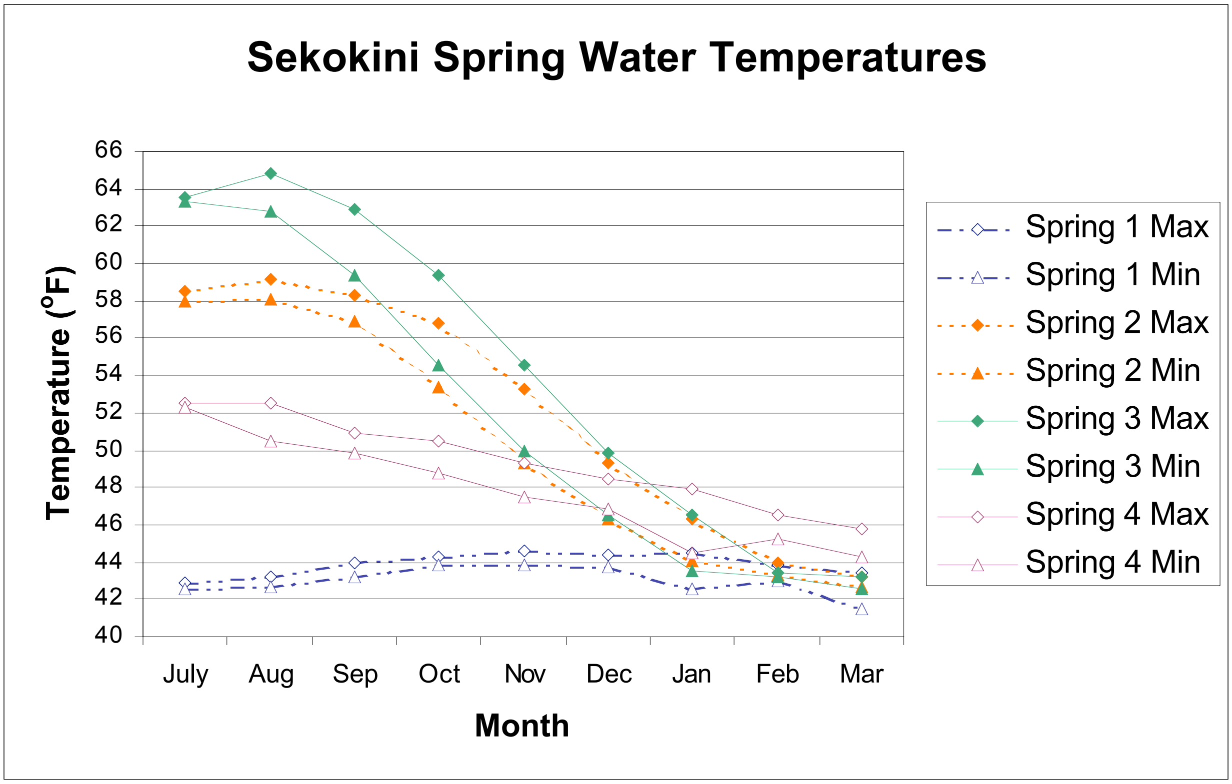

Figure 3.1. Sekokini Springs Maximum and Minimum Mean Daily Water Temperature Data by Month – July 23, 1997 and March 31, 1998.

We recently capped a cold water spring (originally used for a domestic water supply at the site) for gravity feed to the hatching building. Three springs were capped and plumbed to the small hatchery building to allow mixing of water at varying temperatures to achieve temperature control. Return flows from the isolation room will flow separately from other waters at the site and percolate into the ground. Return flows from the indoor rearing area will be routed through a vegetated stream channel before rejoining the stream in the natural rearing habitat. Existing ponds and stream segments will be reconstructed to provide rearing habitat and fish viewing opportunities (viewing windows) along the interpretive trail.

3.2) Indicate any appropriate risk aversion measures that will be applied to minimize the likelihood for the take of listed species as a result of hatchery water withdrawal, screening, or effluent discharge.

There are no listed fish species in the water source.

SECTION 4. FACILITIES

For each item, provide descriptions of the hatchery facilities that are to be included in this plan (see "Guidelines for Providing Responses" Item E), including dimensions of trapping, holding *incubation, and rearing facilities. Indicate the fish life stage held or reared in each. Also describe any instance where operation of the hatchery facilities, or new construction, results in adverse effects to habitat for listed species (habitat effects must be considered even if critical habitat is not designated).*

4.1) Broodstock collection, holding, and spawning facilities .

The Sekokini Springs site will not be operated as a traditional brood stock facility. Wild gametes or juveniles will be collected from wild donor populations through migrant trapping, electrofishing or seining. Fish will be held to maturity to obtain F1 progeny. Fish products brought to the site will first be held in an isolation room attached to the small hatchery building until the stock has been certified by the State Fish Health Specialist and the genetic complement can be ascertained by the Genetics Lab. This room has a separate water source and return flows will enter a subsurface drain, separated from the surface flow at the site. All hatchery equipment in the isolation room will be kept separate from equipment used in the main building. Juveniles or fertilized eggs collected from wild donor populations will be reared to maturity in the natural rearing habitat at the site. During the final growth phase, adult fish from up to four genetic strains will be isolated in four earthen ponds. The ponds will be plumbed to allow independent manipulation of the water surface elevation. Pond morphometry will be designed to allow crowding of adults into a portion of the pond with a smooth bottom and no cover for ease of capture via seine net. Adults will be spawned in family groups on a platform adjacent to the ponds. The spawning platform will be equipped with a live car, table and separate containers for each lot.

4.2) Fish transportation equipment (description of pen, tank truck, or container used).

Insulated fiberglass transportation tank in a one ton truck.

4.3) Incubation facilities.

Standard incubation trays that allow for egg lot segregation will be utilized. Eggs from up to four females may be held in one tray. These trays would be fed by a combination of water from Springs 1 – 3, depending upon the temperature desired for incubation. Spring 1, the coldest spring with an average temperature around 43° F (6.1°C), will be chilled with ice for otolith marking to aid in the identification of individuals for program Monitoring and Evaluation (M&E) activities. Water from spring 1 will be blended with warmer water from springs 2 and 3 to achieve desired water temperatures. Discharge of incubation water would be piped out of the incubation room, through chlorination/dechlorination facilities, and discharged into living stream.

4.4) Rearing facilities.

Presently, early rearing can occur in 14 rectangular fiberglass tanks in the hatchery building. Fingerlings will be transferred to reconstructed earthen ponds and associated stream habitat.

4.5) Acclimation/release facilities.

The reconstructed habitat at the site is intended to acclimate fish to wild conditions. Progeny will be released using experimental techniques (e.g. eyed eggs will be reared in RSIs or fingerling will be imprint planted).

4.6) Describe operational difficulties or disasters that led to significant fish mortality.

Significant fish mortality did not occur during experimental rearing tests. The water source is a gravity fed system, so it is not likely that the water flow will be interrupted. Summer water temperatures may be rise above optimal is the third cold spring source dries up. We anticipate that under normal operation, fish will be transported to the outdoor rearing areas before the spring sources warm above optimal rearing temperatures. Water temperatures in the pond/stream habitat on the lower bench can be controlled using cold water from the fourth spring. We anticipate a low probability of water temperature related mortality.

The possible introduction of fish diseases would be a disaster. The natural habitat at the site would be nearly impossible to purify if it were to be contaminated. That is why the isolation facility in the hatchery building will have a separate water source and fish brought to the site will first be disease tested in the wild, then checked again in the isolation facility before any fish can be moved to the outdoor rearing habitat.

4.7) Indicate available back-up systems, and risk aversion that minimize the likelihood for the take of listed species that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

(e.g. "The hatchery will be staffed full-time, and equipped with a low-water alarm system to help prevent catastrophic fish loss resulting from water system failure.").

There are no listed fish species in the water source at Sekokini Springs. The site has artesian springs that flow via gravity throughout the water course. No pumping will be necessary. Three spring sources have been capped to prevent the potential for disease transmission from the water source. The site was previously tested for fish diseases by the State Fish Health Specialist and found to be reportable pathogen negative.

Fish reared at the site will originate only from donor populations within in the same subbasin and will be isolated for disease testing before being released into the outdoor rearing habitat at the site.

4.8) Indicate needed back-up systems and risk aversion measures that minimize the likelihood for the take of listed species that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

No listed aquatic species are in the springs or on the grounds. Needed systems include but are not limited to: low and high water alarm systems, on site housing for full-time staffing, water control for the isolation facility, and wetland reconstruction for treatment of effluent (low fish densities may make this superfluous given the nature of the stream/pond complex).

SECTION 5. BROODSTOCK ORIGIN AND IDENTITY

5.1) Source.

List all original and current sources of broodstock for the program. Be specific (e.g., natural spawners from Bear Creek, fish returning to the Loon Creek Hatchery trap, etc.).

Initial experimental rearing used Montana's M012 brood stock which originate from the Washoe Park State Hatchery in Anaconda, MT. The M012 brood stock was originally founded from pure westslope cutthroat trout primarily from the South Fork Flathead River, although some parental stocks were collected in the Clark Fork drainage. Future plans are to use only wild Flathead stocks.

5.2) Supporting information.

5.2.1) History.

Provide a brief narrative history of the broodstock sources. For listed natural populations, specify its status relative to critical and viable population thresholds (use section 10.2.2 if appropriate). For existing hatchery stocks, include information on how and when they were founded, sources of broodstock since founding, and any purposeful or inadvertent selection applied that changed characteristics of the founding broodstock.

5.2.2) Annual size.

Provide estimates of the proportion of the natural population that will be collected for broodstock. Specify number of each sex, or total number and sex ratio, if known. For broodstocks originating from natural populations, explain how their use will affect their population status relative to critical and viable thresholds.

Sekokini Springs will not be a production facility. We plan to rear up to 1,000 fish from each donor population to maturity. The number of progeny to be reared for restoration efforts will depend on site-specific need and is unknown at this time. The intent is to experimentally rear small numbers of fish in nearly natural habitat for use in restoration activities. Based on past experience, we estimate that individual lots will not exceed 150,000 individual eye eggs or fingerlings.

5.2.3) Past and proposed level of natural fish in broodstock.

If using an existing hatchery stock, include specific information on how many natural fish were incorporated into the broodstock annually.

100% of the fish reared at Sekokini Springs will be wild, genetically pure westslope cutthroat trout and F1 progeny.

5.2.4) Genetic or ecological differences.

Describe any known genotypic, phenotypic, or behavioral differences between current or proposed hatchery stocks and natural stocks in the target area.

Genetic research has shown that individual tributary streams exhibit greater genetic differences than can be detected between the primary subbasins within the Flathead Watershed. Our intent is to use genetically pure "nearest neighbor" donor populations in restoration activities where pure westslope cutthroat have been extirpated. Existing literature indicates that there are three life history strategies represented in the wild population: resident, fluvial and adfluvial. However, recent radio telemetry results show that individual fish, at various times during their development, may use more than one of these perceived life history strategies. Research has so far been able to correlate genetic differences with these life history strategies. Nor can we differentiate non-migratory juvenile resident forms from migratory juvenile fluvial and adfluvial forms. The safest way to assure that migratory forms are utilized for replication at Sekokini Springs is to trap emigrating juveniles during the migration period in June and July, or to collect gametes from migratory adults. Research continues to examine the effectiveness of these collection strategies.

5.2.5) Describe traits or characteristics for which broodstock was chosen.

Although Sekokini Springs will not be utilized as a traditional boodstock facility, progeny from genetically pure wild westslope cutthroat trout from populations with documented disease free status will be reared to maturity at the site.

5.2.6) ESA-Listing status

Proposed, not warranted.

5.3) Indicate risk aversion measures that will be applied to minimize the likelihood for

adverse genetic or ecological effects that may occur as a result of using the broodstock source.
(e.g. "*The risk of among population genetic diversity loss will be reduced by selecting the indigenous chinook salmon population for use as broodstock in the supplementation program*.").

Using indigenous stocks of Westslope Cutthroat will reduce the likelihood for adverse genetic or ecological effects. Donor populations will be incrementally collected over several years to assure that the replicated population represents the original donor population.

SECTION 6. BROODSTOCK COLLECTION

6.1) Life-history stage to be collected (eggs, juveniles, adults).

Juvenile wild fish or gametes from wild adults.

6.2) Collection or sampling design.

Include information on the location, time, and method of capture (e.g. weir trap, beach seine, etc.) Describe measures to reduce sources of bias that could lead to a non-representative sample of the desired broodstock source.

Juveniles will be randomly selected from tributary donor populations through electrofishing or downstream trapping. Removal of juveniles is less likely to disrupt natural reproduction in the donor population. Capture of juveniles can be accomplished before or after spawning adults are present in the stream, thus eliminating risk to the spawning population. Incremental removal of a subset of the rearing population will provide a random selection from the available genetic material, while protecting the remaining wild juveniles. Numbers to be removed can be based on a percentage of the juvenile population. Our fish health specialist will allow transport of juveniles (as opposed to gametes or eyed eggs) to an isolation facility at Sekokini Springs from sources having a long history of disease free status. Subsequent disease testing can be accomplished before juvenile fish are released into the rearing habitat. Individuals to be reared at the facility will be individually marked and non-lethally inventoried for genetic purity. Individuals will be marked and non-lethally sampled for genetic inventory and migrant class information. Only genetically pure populations will be used to produce family crosses of F1 progeny. This strategy was designed to reduce the risk to the donor population, disease transmission to the rearing habitat and protection/conservation of genetically pure stocks for restoration actions.

Alternatively, wild gametes may be collected from adult spawners throughout the spawning run. Allowing for escapement of a percentage of the wild population and techniques that partially spawn adults before releasing them to continue to spawn naturally can reduce risk to the spawning population. If only a few adults can be safely removed from the donor population, collections can be made over a series of years to assure that the resulting progeny represent the genetic diversity in the original population. In captivity, juveniles can be reared to maturity and allow cross fertilization between year classes. The donor population can be monitored to assure that gamete collection does not impact the wild stock.

6.3) Identity.

Describe method for identifying (a) target population if more than one population may be present; and (b) hatchery origin fish from naturally spawned fish.

Lethal sampling/marking techniques:

Fry from RSIs will be otolith-marked using cold water treatments. This is a batch mark that can be coded to individual RSIs (or stream reach) by varying the timing of cold treatments during otolith growth. Otoliths must be removed from recaptured fish to determine their origin.

Imprint plants may be marked with tetracycline or coded wire implants. Tetracycline marks can be detected for approximately three years by viewing bones under UV light. Marks may be lost when fingerlings reside in sunlit stream margins or as the fish mature. Coded wire tags may be expelled from the fish over time and lost. The wire must be removed to identify individual codes.

Non-lethal techniques:

Batch marking may use fluorescent pigments, fin clips or coded wire tags. Fluorescent tags may not be detectable in returning adults. Wire tags can be detected non-lethally as batch marks, but this technique is not suitable for individual tags unless they are extracted. Adipose fin clips may be used in combination with other marks.

We will also experiment with microprobe ablation spectrometry techniques in combination with stream-specific water chemistry to identify the source of smolts and adults.

6.4) Proposed number to be collected:

6.4.1) Program goal (assuming 1:1 sex ratio for adults):

This will be determined based on the experimental design in each application. All study tributaries will be trapped to determine the source of returning adults.

6.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for

most recent years available:

No brood stock have been collected.

Year	Adults Females	Males	Jacks	Eggs	Juveniles
1988					
1989					
1990					
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998					
1999					

Data source:

6.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Describe procedures for remaining within programmed broodstock collection or allowable upstream hatchery fish escapement levels, including culling.

Surplus fish will be released into closed-basin lakes to provide a fishery.

6.6) Fish transportation and holding methods.

Describe procedures for the transportation (if necessary) and holding of fish, especially if captured unripe or as juveniles. Include length of time in transit and care before and during transit and holding, including application of anesthetics, salves, and antibiotics.

Juveniles collected will be transported to the isolation facility at Sekokini Springs. Individually marked fish will be sampled for disease and genetic status. If disease test is negative, fish will be reared in restored habitat at the site.

6.7) Describe fish health maintenance and sanitation procedures applied.

Fish Health Management

1. Transfer of live fish from the wild to Sekokini Springs

Prior to transferring any live fish to Sekokini Springs from a wild fish population, fish from the wild population must be health tested. The inspection may consist of testing cutthroat trout from the specific population planned for transfer, or other salmonid fish from the same water. The inspection must be conducted as close to the date of transfer as possible, but no more than 24 months prior to the transfer. Samples shall consist of lethal and non-lethal samples depending upon availability of suitable fish for testing. A fish health testing plan will be developed and approved by the FWP Fish Health Coordinator, and reviewed and approved by the FWP Fish Health Committee, when appropriate.

2. Transfer of eggs from wild populations to Sekokini Springs

Eggs may be transported to Sekokini Springs only after the parent stock has been health tested and determined to be free of salmonid pathogens. Health testing may consist of a combination of lethal sampling of adults, other salmonids in the water from which eggs are taken and non-lethal sampling, including ovarian and seminal fluid testing for virus. All eggs collected for transfer to Sekokini Springs should be collected using procedures outlined in the FWP wild egg collection policy. Eggs must be disinfected in iodophor prior to being placed in incubators at Sekokini Springs.

3. Stocking fish from Sekokini Springs

Sixty fish from each individual lot of fish at Sekokini Springs must be health tested for salmonid pathogens prior to being stocked from the facility. The FWP Fish Health Coordinator shall be responsible for determining sampling protocol and time of inspection. In addition, a fish health inspection of all fish at the facility must be conducted annually prior to stocking any fish from Sekokini Springs. This inspection shall include fish from hatchery troughs and outside ponds. Fish selected for sampling shall be agreed upon by the FWP Fish Health Coordinator and the Sekokini Springs facility manager.

4. Care of fish at Sekokini Springs

All individual lots of cutthroat trout fish or eggs must be kept isolated from other fish lots at Sekokini Springs. Each lot must have its own set of hatchery equipment, including nets, brushes and other routine handling equipment. Every effort must be taken to prevent accidental contamination or mixing of fish from one lot to another.

Equipment used at the hatchery must be disinfected with chlorine, iodophor or other approved disinfectant between uses.

Fish health must be monitored by a fish culturist on site. All fish health problems or unusual symptoms or mortality must be reported to the FWP Fish Health Coordinator immediately.

Every effort shall be made to ensure that no pathogens are introduced to Sekokini Springs with fish or eggs from wild fish populations, and every effort shall be made to keep fish healthy at Sekokini Springs. Fish health management shall follow Montana laws, ARM rules and FWP policy.

6.8) Disposition of carcasses.

Include information for spawned and unspawned carcasses, sale or other disposal methods, and use for stream reseeding.

Not applicable

6.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed species resulting from the broodstock collection program.

(e.g. "The risk of fish disease amplification will be minimized by following Co-manager Fish Health Policy sanitation and fish health maintenance and monitoring guidelines").

We have chosen to collect juveniles to avoid impacting the spawning population. Up to 25 percent of the juveniles in the donor tributary population will be collected to create the captive stock. This will be repeated for three years to provide for family crosses among the year classes sampled. Rearing juveniles will allow for individual analysis of genetic material, and crosses will be made accordingly to assure that the donor population is replicated.

SECTION 7. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

7.1) Selection method.

Specify how spawners are chosen (e.g. randomly over whole run, randomly from ripe fish on a certain day, selectively chosen, or prioritized based on hatchery or natural origin).

Our preferred option is to collect juveniles incrementally over several years to avoid inadvertently impacting the donor population. If gametes are used from wild spawners, adults will be captured randomly during the migration period. Adults will be partially spawned and released to spawn naturally.

7.2) Fertilization.

Describe spawning protocols applied, including the fertilization scheme used (such as equal sex ratios and 1:1 individual matings; equal sex ratios and pooled gametes; or factorial matings). Explain any fish health and sanitation procedures used for disease prevention.

7.3) Cryopreserved gametes.

If used, describe number of donors, year of collection, number of times donors were used in the past, and expected and observed viability.

Cryopreservation may be necessary if male and female wild adults do not become ripe simultaneously.

7.4) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.
(*e.g. "A factorial mating scheme will be applied to reduce the risk of loss of within population genetic diversity for the small chum salmon population that is the subject of this supplementation program"*.).

SECTION 8. INCUBATION AND REARING -

8.1) Incubation:

8.1.1) Number of eggs taken/received and survival rate at stages of egg development.
Provide data for the most recent twelve years (1988-99), or for years dependable data are available.

Experimental culture occurred only two years at the site. There are presently no fish at Sekokini Springs pending completion of the spring caps and plumbing upgrades.

Year	# Eyed Eggs from Washoe Park SFH	% to hatch
1997	80,200	81.8
1998	81,153	58.2

8.1.2) Loading densities applied during incubation.
Provide egg size data, standard incubator flows, standard loading per Heath tray (or other incubation density parameters).

Year	Egg size #/oz	Flow rate gpm	# Eggs/tray
1997	372	4.0	13,370
1998	381	4.0	13,525

8.1.3) Incubation conditions.
Describe monitoring methods, temperature regimes, minimum dissolved oxygen criteria (influent/effluent), and silt management procedures (if applicable), and any other parameters monitored.

In 1997, eggs were incubated in a Heath Tray stack placed in an outdoor location at the site to make use of a constant 52F temperature spring for water source. Oxygen was near saturation level. The trays were protected by a chain link fence and a quonset style tent covering.

In 1998, eggs were incubated in similar trays located in main facility and were supplied with constant 56F temperature spring water piped into building. Oxygen levels were more than sufficient, but higher incubation temperature proved to be detrimental to egg survival.

8.1.4) Ponding.

Describe procedures (e.g., dates of ponding, volitional, forced).

Westslope cutthroat fry are removed from incubator trays 5 days before swimup and placed in fiberglass troughs (10'x1'x.5') receiving 8 gpm from same water source. After fish are on feed for 2 weeks, they are moved to hatchery rearing tanks (10'x2.5'x2'). Time period-late July.

8.1.5) Fish health maintenance and monitoring.

Describe fungus control methods, disease monitoring and treatment procedures, incidence of yolk-sac malformation, and egg mortality removal methods.

Dead eggs and/or fry, and egg shells are removed daily from incubator trays with suction bulbs, before, during, and after hatching takes place. No chemicals were used to date.

8.1.6) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to fish during incubation.

(*e.g. "Eggs will be incubated using well water only to minimize the risk of catastrophic loss due to siltation."*)

There would be no adverse genetic or ecological effects to environment caused by loss of incubating Westslope cutthroat trout eggs. Fish will be reared initially in the hatchery building, then released to outdoor habitat in spring water. The spring source has a natural annual flow and thermal regime, similar to a wild mountain stream.

8.2) <u>Rearing</u>:

8.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-

99), or for years dependable data are available..

Westslope cutthroat trout survival

Year	% fry to fingerling	% fingerling to release
1997-1998	60.7	80.9
1998-1999	74.1	68.6

8.2.2) Density and loading criteria (goals and actual levels).
Include density targets (lbs fish/gpm, lbs fish/ft3 rearing volume, etc).

The rearing facility has not been completed. Densities are expected to mimic natural waters.

8.2.3) Fish rearing conditions
(Describe monitoring methods, temperature regimes, minimum dissolved oxygen, carbon dioxide, total gas pressure criteria (influent/effluent if available), and standard pond management procedures applied to rear fish).

Water temperature and dissolved gasses will be monitored with meters at points throughout the water course. Existing conditions mimic a natural hydrography and thermal regime. Three springs above the hatching building were capped and plumbed to allow water temperatures to be optimized by mixing flows of varying temperatures. The fourth cold water spring, entering the system on the bench below the building, may be used to regulate water temperatures in the pond / stream habitat in the future. The final design of the water system can be amended if water temperatures become atmospherically heated as the proposed stream flows toward the Flathead River. The BoR Technical Assistance Program has provided initial designs for the flowage. We expect that vegetative shading can maintain cool temperatures in the habitat during summer.

8.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Sample counts (#/lb) were made when fish were moved to other rearing units, or hauled off the facility for stocking. Condition factors were not measured directly in most cases. Lengths are estimated from standard species condition factor charts. Monthly temperature units (T.U.) growth data from 2 year classes of Westslope cutthroat indicate an average of 67 T.U.'s per inch growth. (1 T.U. = 1 degree F above freezing for 30 days)

8.2.5) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Our goal is to maintain habitat for natural invertebrate production. The existing stream / pond complex produced mayflies, caddis and Diptera. Improving the currently degraded habitat will improve productivity. A working example of a "living stream" design (MK Nature Center, Boise, Idaho) revealed that supplementary feeding was required only once per week to maintain fish in the exhibits. We also plan to experiment with natural prey items to be reared in the restored wetland (also natural water treatment) to be located immediately above the rearing ponds.

8.2.6) Fish health monitoring, disease treatment, and sanitation procedures.

8.2.7) Indicate the use of "natural" rearing methods as applied in the program.

Fish will be transferred from the building as fingerlings and raised in low densities in "natural" rearing habitat at the site. Spring caps were designed so that all water that is not used within the building overflows into a restored creek channel in the "living stream" exhibit. Additional spring seeps join the channel enroute downstream. Return flows from the building will return to the stream via a buried pipe at a lower elevation and appear as a natural spring along the stream bank. Based on stream gradient, the stream type transitions from Rosgen type E to C to B to A and again B before entering a wetland immediately above the four earthen rearing ponds. Discharge from the ponds will flow through a proposed E channel that traverses the lower bench before entering a proposed A channel to the Flathead River. The four ponds will be designed to restrict fish movement, so that fish within each pond can be maintained as separate lots. Each pond will contain a short stream reach in the inflow, woody debris for overhead cover and a pool. The design will allow independent control of the surface elevation in each pond. Water stage can be lowered to crowd fish into an area that contains a smooth bottom, so that fish can be easily captured. Fish will be reared in the stream reaches to provide viewing opportunities.

8.2.8) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to fish under propagation.
(*e.g. "Fish will be reared to sub-yearling to minimize the risk of domestication effects that may be imparted through rearing to yearling size.")*

Wild fish will be reared to maturity in natural habitat to provide a source of F1 progeny. Progeny will be outplanted as eyed eggs or imprint fry to restored or reconnected habitats within the Flahthead subbasin. The goal is to initiate wild rearing and spawning runs.

Collection of juveniles and gametes from the donor population will occur throughout the emigration or spawning period, over several years, to provide family crosses between yearclasses. Progeny will be genetically compared with the donor population to guard against inadvertent grading. Wild fish will only be used to replicate F1 offspring for use in recovery actions elsewhere within the Flathead Watershed. No captive hatchery broodstock will be maintained.

SECTION 9. RELEASE

Describe fish release levels, and release practices applied through the hatchery program. *Specify any management goals (e.g. number, size or age at release, population uniformity, residualization controls) that the hatchery is operating under for the hatchery stock in the appropriate sections below.*

Our goal is to experimentally determine the most cost-effective way to initiate self sustaining spawning runs of westslope cutthroat trout in restored or reconnected tributary habitat. We will compare eyed egg RSIs, and imprint plants (fry & fingerlings) from juvenile rearing through adult returns. Surplus fish will be planted in restored headwater lakes and closed-basin lakes to provide angling opportunity.

9.1) Proposed fish release levels. *(Use standardized life stage definitions by species presented in **Attachment 2**. "Location" is watershed planted (e.g. "Elwha River").)*

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs	Numbers to be estimated based on area of receiving habitat	2-3 mm	May	Restored or reconnected tributary habitat
Unfed Fry	none			
Fry	Numbers to be estimated based on area of receiving habitat	10-20mm	Late May Early June	Restored or reconnected tributary habitat or onsite lakes
Fingerling	Numbers to be estimated based on area of receiving habitat	25-40mm	June	Restored or reconnected tributary habitat or onsite lakes

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Yearling	50,000 (as available)	75-130mm	June-July	Restored offsite and onsite lakes

9.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse: *(include name and watershed code (e.g. WRIA) number)*
Abbott Creek, Taylors Outflow, Elliot Spring Pond/Creek, Unnamed Tributary (across Flathead River from Sekokini Springs and sites to be determined.

Release point: (*river kilometer location, or latitude/longitude*)

RSIs and throughout fry rearing habitats in each stream

Major watershed: (e.g. "Skagit River")

Flathead River

Basin or Region: *(e.g. "Puget Sound")*

Mountain Columbia

9.3) Actual numbers and sizes of fish released by age class through the program.

For existing programs, provide fish release number and size data for the past 12 years, if available. Use standardized life stage definitions by species presented in ***Attachment 2****. Cite the data source for this information.*

Experimentally reared fish were released as yearlings to closed basin lakes in 1998 and 1999. No further releases have occurred since. Records stored in fish lot history files kept at Creston National Fish Hatchery.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988								
1989								

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1990								
1991								
1992								
1993								
1994								
1995								
1996								
1997								
1998					47696	3.69”		
1999					19487	4.41”		
Average								

Data source:

9.4) Actual dates of release and description of release protocols.

Provide the recent five year release date ranges by life stage produced (mo/day/yr). Also indicate the rationale for choosing release dates, how fish are released (volitionally, forced, volitionally then forced) and any culling procedures applied for non-migrants.

During the 2-year experimental cutthroat trout rearing program, fingerling fish were stocked when receiving waters reached a suitable temperature, (50-55F) generally mid-May to mid-June. Fish were transported to the lakes via tank truck. Future methods to be determined.

9.5) Fish transportation procedures, if applicable.

Describe fish transportation procedures for off-station release. Include length of time in transit, fish loading densities, and temperature control and oxygenation methods.

Transportation in an insulated fiberglass tank in a one ton truck or helicopter . Oxygen will be added to the tank through air stones and densities will be set at a low number.

9.6) Acclimation procedures (*methods applied and length of time*).

Temperature will be similar to that of the release site.

9.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

All fish from the hatchery stock will be marked using fin clips, otolith cold marking, or fluorescent pigments.

9.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Surplus will be released in closed-basin lakes as part of the Family Fishing Initiative

9.9) Fish health certification procedures applied pre-release.

Certification by State Fish Health Specialist.

9.10) Emergency release procedures in response to flooding or water system failure.

Natural flow variation of this type has not been observed or recorded in this gravity-flow artesian spring source. If flows do become low, we anticipate that fish will move to pools.

9.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed species resulting from fish releases.
(*e.g. "All yearling coho salmon will be released in early June in the lower mainstem of the Green River to minimize the likelihood for interaction, and adverse ecological effects, to listed natural chinook salmon juveniles, which rear in up-river areas and migrate seaward as sub-yearling smolts predominately in May").*

Not Applicable.

SECTION 10. PROGRAM EFFECTS ON ALL ESA-LISTED, PROPOSED, AND CANDIDATE SPECIES (FISH AND WILDLIFE)

10.1) List all ESA permits or authorizations in hand for the hatchery program.

No listed species involved.

10.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

10.2.1) Description of ESA-listed, proposed, and candidate species affected by the program.
Include information describing: adult age class structure, sex ratio, size range, migrational timing, spawning range, and spawn timing; and juvenile life history strategy, including smolt emigration timing. Emphasize spatial and temporal distribution relative to hatchery fish release locations and weir sites N/A

- Identify the ESA-listed population(s) that will be directly affected by the program. *(Includes listed fish used in supplementation programs or other programs that involve integration of a listed natural population. Identify the natural population targeted for integration).*
*** To obtain a list of listed species in your area, please refer to Attachment ?? for the phone number and address of the nearest state ecological field office.***
N/A

- Identify the ESA-listed population(s) that may be incidentally affected by the program.
(Includes ESA-listed fish in target hatchery fish release, adult return, and broodstock collection areas). N/A

10.2.2) Status of ESA-listed species affected by the program. N/A

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds (*see definitions in "Attachment 1").*

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data. *(Include estimates of juvenile habitat seeding relative to capacity or natural fish densities, if available).*

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

10.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed species in the target area, and provide estimated annual levels of take *(see*

"Attachment 1" for definition of "take"). **Provide the rationale for deriving the estimate.**

- Describe hatchery activities that may lead to the take of listed species in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.
(*e.g. "Broodstock collection directed at sockeye salmon has a "high" potential to take listed spring chinook salmon, through migrational delay, capture, handling, and upstream release, during trap operation at Tumwater Falls Dam between July 1 and October 15. Trapping and handling devices and methods may lead to injury to listed fish through descaling, delayed migration and spawning, or delayed mortality as a result of injury or increased susceptibility to predation*").

- **Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish**.

- **Provide projected annual take levels for listed species by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).**
*Complete the appended "take table" (**Table 1**) for this purpose. Provide a range of potential take numbers to account for alternate or "worst case" scenarios.*

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.
(*e.g. "The number of days that steelhead are trapped at Priest Rapids Dam will be reduced if the total mortality of handled fish is projected inseason to exceed the 1988-99 maximum observed level of 100 fish."*)

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

This section describes how "Performance Indicators" listed in Section 1.10 will be monitored. Results of "Performance Indicator" monitoring will be evaluated annually and used to adaptively manage the hatchery program, as needed, to meet "Performance Standards".

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to appropriate "Performance Indicator" identified for the program.

Successful restoration of wild spawning runs in tributaries to the Flathead River can be assessed by migrant trapping, redd surveys and population estimation before and after habitat restoration or reconnection. Upstream spawning migrations into restored and reconnected streams will be sampled using trap weirs. Spawners will be examined for marks (described earlier) to determine their natal stream or origin. Unmarked fish will be sampled non-lethally for genetic purity. All non-native species (e.g. rainbow trout) or apparently hybridized or introgressed individuals will be held for transport to a closed-basin "put and take" children's fishing pond. Spawning will be assessed through standard redd counts. Progeny will be assessed using 150 m electrofishing reaches and standard population estimates.

Experimental imprint plants of marked eyed eggs or fry will be assessed using various marks determined by the longevity of the marks and the intent of the assessment. Short term marks (e.g. tetracycline, temporary fin clips or fluorescent pigments) will be used to assess rearing survival in the natal tributary and emigration rates. Migrant class can be determined using growth checks on scales, or through known intervals between the time of marking and subsequent emigration. Long term marks must be used to assess the origin of returning adults. Condition factor and incremental growth from scales and/or otoliths will be used to describe the health of individual fish relative to other treatments or control groups.

We will experiment with microprobe ablation and mass spectrometry techniques combined with stream-specific water chemistry to "finger print" fish and their origin. An understanding of the origin of wild fish and F1 progeny from Sekokini Springs can help us assess the effectiveness of various techniques for reestablishing self-sustaining runs.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Monitoring activities are currently funded by the Hungry Horse Mitigation Program. All the actions except the microprobe technology described above are currently used by the ongoing program. We are currently testing a new technique to "finger print" the origin of fish using the non-lethal laser ablation and analysis of material from fish scales. If successful, we will apply this technique to identify the source of genetically pure cutthroat (focus protection measures in these streams) and introgressed individuals (focus mitigation efforts to reduce sources of genetic introgression).

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed species resulting from monitoring and evaluation activities.

(*e.g. "The Wenatchee River smolt trap will be continuously monitored, and checked every eight hours, to minimize the duration of holding and risk of harm to listed spring chinook and steelhead that may be incidentally captured during the sockeye smolt emigration period.)"*

Trap weirs have been designed to provide low velocity holding areas to avoid injuring fish. Unless absolutely necessary, downstream traps will be used to avoid delaying or obstructing upstream migrations. We will continue to explore non-lethal sampling techniques. Of course, disease sampling, otolith extraction and protein electrophoresis techniques will require sacrificing a subsample of fish in each lot to verify non-lethal samples. Where lethal sampling must be used, we will monitor wild or donor stocks for damage.

SECTION 12. RESEARCH

*Provide the following information for any research programs conducted in **direct association with the hatchery program described in this HGMP. Provide sufficient detail to allow for the independent assessment of the effects of the research program on listed fish**. Attach a copy of any formal research proposal addressing activities covered in this section. Include estimated take levels for the research program with take levels provided for the associated hatchery program in **Table 1**.*

12.1) Objective or purpose.

Indicate why the research is needed, its benefit or effect on listed natural fish populations, and broad significance of the proposed project.

Self-supporting migratory fish populations need to be established in areas of habitat or access improvement. This can be accomplished through imprint planting of genetically appropriate eyed eggs or fry. The facility will play necessary role in experimentation to determine the most cost-effective way to restore wild spawning runs where native cutthroat have been extirpated.

Lake rehabilitations and other offsite work is ongoing on the Hungry Horse Mitigation Program to create genetic reserves for native fish, expand the range of native fisheries, and eliminate source populations for further illegal introductions. A source of pure westslope cutthroat trout is needed to replace non-native species or introgressed populations.

There is a need for increased public outreach and education on the need to protect native species and their required habitat. The working experimental culture facility, habitat restoration project and interpretive trail will serve as an education tool.

12.2) Cooperating and funding agencies.

Funding for this project provided by the BPA through the Hungry Horse Fisheries Mitigation Plan.

USFWS has and will continue to cooperate on the experimental culture program by providing technical assistance and services.

The BoR Technical Assistance Program has contributed to the design phase and has provided funding for the interpretive trail exhibits.

The US Forest Service owns the land at the site and cooperated on high resolution topographic mapping of the site and the sensitive plant inventory. The Service is also contributing to NEPA documents and amendments to the Special Use Permit that is provided with no annual fee.

The Boy Scouts of America has offered to assist with trails and bridges.

Trout Unlimited plans to provide monetary assistance and volunteer labor as the Master Plan is implemented.

12.3) Principle investigator or project supervisor and staff.

Brian Marotz, Fisheries Program Officer
John Wachsmuth, Project Technician
Montana Fish, Wildlife & Parks
Kalispell, MT 59901

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

No stocks currently at the facility pending improvements to plumbing.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

See above.

12.6) Dates or time period in which research activity occurs.

We plan to have the site functioning within five years. Phase I: Cap springs, improve plumbing and repair office 2000; Phase II: Finalize Master Plan and restore the stream reach where the original head pond was. Construct stream pond complex and first viewing area 2002-2003; Phase III: construct fish ladder (A2 channel to reconnect source to the Flathead River) and fish trap weir 2003; Phase IV: construct interpretive trail system and exhibits 2004; Phase V: complete visitor facilities 2005. This schedule is tentative pending amendments to the Special Use Permit and cost-share funding.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

Potential donor populations were sampled for genetic compliment and reportable fish pathogens. Juveniles and fertilized eggs will be transported to Sekokini Springs in an insulated hatchery tank with oxygenation.

12.8) Expected type and effects of take and potential for injury or mortality.

No listed fish will be transferred to the site.

12.9) Level of take of listed species: number or range of individuals handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

NA

12.10) Alternative methods to achieve project objectives.

The Sekokini Springs site was selected because of the natural habitat available for outdoor rearing. Traditional hatcheries do not provide this condition.

In the past, projects of this type utilized the states M012 brood stock. This source was founded using wild fish from the Flathead and Clark Fork drainages, so is not identical to the wild populations throughout the Flathead Watershed. We have developed this plan to create sources of "nearest neighbor" stocks that are genetically compatible with local wild populations. There is no other source of pure westslope cutthroat trout reared under natural conditions.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

There are no listed fish species at the site.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for

adverse ecological effects, injury, or mortality to listed species as a result of the proposed research activities.
(*e.g. "Listed coastal cutthroat trout sampled for the predation study will be collected in compliance with NMFS Electrofishing Guidelines to minimize the risk of injury or immediate mortality.")*.

NA

SECTION 13. ATTACHMENTS AND CITATIONS

Include all references cited in the HGMP. In particular, indicate hatchery databases used to provide data for each section. Include electronic links to the hatchery databases used (if feasible), or to the staff person responsible for maintaining the hatchery database referenced (indicate email address). Attach or cite (where commonly available) relevant reports that describe the hatchery operation and impacts on the listed species or its critical habitat. Include any EISs, EAs, Biological Assessments, benefit/risk assessments, or other analysis or plans that provide pertinent background information to facilitate evaluation of the HGMP.

Fraley, J.J., B. Marotz, J. Decker-Hess, W. Beattie, and R. Zubik. 1989. Mitigation, compensation, and future protection for fish populations affected by hydropower development in the upper Columbia system, Montana, USA. Regulated Rivers: Research and Management 3:3-18.

Montana Department of Fish, Wildlife, and Parks and Confederated Salish and Kootenai Tribes. 1991. Fisheries mitigation plan for losses attributable to the construction and operation of Hungry Horse Dam. Montana Department of Fish, Wildlife, and Parks and Confederated Salish and Kootenai Tribe, Kalispell and Pablo, Montana. 71 pp.

Montana Department of Fish, Wildlife, and Parks and Confederated Salish and Kootenai Tribes. 1993. Hungry Horse Dam fisheries mitigation implementation plan. Montana Department of Fish, Wildlife, and Parks and Confederated Salish and Kootenai Tribe, Kalispell and Pablo, Montana. 43 pp.

Rosgen, D. L. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

Council. 1994. Northwest Power Planning Council Fish and Wildlife Program. Document 94-55.

Cite for PINE

Cite for mitichondrial DNA

EA to acquire.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by______________________________ Date:_____________