STRATEGY FOR RECOVERY

A core area represents the closest approximation of a biologically functioning unit. The combination of core habitat (*i.e.*, habitat that could supply all the necessary elements for the long-term security of bull trout including both spawning and rearing as well as foraging, migrating, and overwintering) and a core population (*i.e.*, bull trout inhabiting a core habitat) constitutes the basic core area upon which to gauge recovery within a recovery unit. Within a core area, many local populations may exist. Streams that could support a local population of bull trout in the future are designated as potential local populations (USFWS, *in litt*., 2000a, USFWS, *in litt.*, 2000b). The habitat may be suitable for bull trout in these areas, but a reproducing bull trout population has not been documented. Potential local populations may have threats such as water diversions or chemical contamination that, once alleviated, would allow bull trout to access the suitable habitat.

As outlined in detail in Chapter 1, the extent of historic and current migratory connectivity, with consideration of natural and manmade barriers, survey and movement data, and genetic analysis need to be considered when defining core areas. In this recovery unit all major river systems are connected, although not at all times of the year, therefore, the entire recovery unit is comprised of core areas that are connected to each other. Core areas require both habitat and bull trout to function, and the number (replication) and characteristics of local populations inhabiting a core area provide a relative indication of the likelihood of a core area to persist. A local population is a group of bull trout that spawn and also contain early/juvenile rearing within a particular stream or portion of a stream system.

Recovery Goals and Objectives

The goal of the bull trout recovery plan is to **ensure the long-term persistence of self-sustaining, complex interacting groups of bull trout distributed across the species native range, so that the species can be delisted**. To achieve this goal the following objectives have been identified for bull trout in the Salmon River Idaho Recovery Unit:

- Maintain the current distribution of bull trout and restore the distribution in previously occupied areas within the Salmon River Recovery Unit.

- Maintain stable or increasing trends in abundance of bull trout.

- Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.

- Conserve genetic diversity and provide opportunity for genetic exchange.

Rieman and McIntyre (1993) and Rieman and Allendorf (2001) evaluated the bull trout population numbers and habitat thresholds necessary for long-term viability of the species. They identified four elements, and the characteristics of those elements, to consider when evaluating the viability of bull trout populations. These four elements are (1) number of local populations; (2) adult abundance (defined as the number of spawning fish present in a core area in a given year); (3) productivity, or the reproductive rate of the population (as measured by population trend and variability); and (4) connectivity (as represented by the migratory life history form and functional habitat). For each element, the Salmon River Recovery Unit Team classified bull trout into relative risk categories based on the best available data and the professional judgment of the team.

These guidelines are likely to be revised in the future as more detailed information on bull trout population dynamics becomes available. Given the limited information on bull trout, the level of adult abundance, and number of local populations needed to spread extinction risk should be viewed as a best estimate. Based on the best data available, and professional judgement, each element was then evaluated under a potential recovered condition resulting in recovery criteria. Evaluation of these elements under a recovered condition assumed that actions identified within this chapter had been implemented.

This approach acknowledges that, even when recovered, the status of bull trout populations in some core areas may remain short of ideals described by

conservation biology theory. Some core areas under recovered conditions may be limited by natural attributes or patch size, and may always remain at a relatively high risk of extirpation. Limited data within the Salmon River Recovery Unit meant that the team relied heavily on the professional judgement of recovery team members.

Local Populations. Metapopulation theory is an important consideration in bull trout recovery. A metapopulation is an interacting network of local populations with varying frequencies of migration and gene flow among them (Meffe and Carroll 1994) (See Chapter 1). Multiple local populations distributed and interconnected throughout a watershed provide a mechanism for spreading risk from stochastic events. Distribution of local populations in such a manner is, in part, an indicator of a functioning core area. Based in part on guidance from Rieman and McIntyre (1993), bull trout core areas with less than 5 local populations are at increased risk; core areas with between 5 and 10 local populations are at intermediate risk; and core areas which have more than 10 interconnected local populations are at diminished risk.

For the Upper Salmon River Core Area, there are currently 18 known local populations; for the Pahsimeroi River Core Area, there are nine known local populations; there is one local population in the Lake Creek Core Area; there are six local populations in the Lemhi River Core Area; there are 20 local populations in the Middle Salmon River-Panther Core Area; one local population in the Opal Lake Core Area, there are 28 local populations in the Middle Fork Salmon River Core Area; nine local populations are found in the Middle Salmon River-Chamberlain Core Area; 27 local populations are found in the South Fork Salmon River Core area, and there are seven local populations in the Little Lower Salmon River Core Area. Based on the above guidance, bull trout in the Lake Creek and Opal Lake core areas are in the increased risk category. Four core areas are in the intermediate risk category including the Pahsimeroi River, Lemhi River, Middle Salmon River-Chamberlain and Little-Lower Salmon River. The remaining core areas including the Upper Salmon River, Middle Salmon River-Panther Creek, Middle Fork Salmon River and South Fork Salmon River are in the diminished risk category.

Adult Abundance. The recovered abundance levels in the Salmon River Recovery Unit were evaluated by considering theoretical estimates of effective population size, and the professional judgement of recovery team members. In general, effective population size is a theoretical concept that allows one to predict potential future losses of genetic variation within a population, due to small population sizes and genetic drift (See Chapter 1). For the purpose of recovery planning, effective population size is the number of adult bull trout that successfully spawn annually. Based on standardized theoretical equations (Crow and Kimura 1970), guidelines have been established for maintaining minimum effective population sizes for conservation purposes. Effective population sizes greater than 50 adults are necessary to prevent inbreeding depression and a potential decrease in viability or reproductive fitness of a population (Franklin 1980). In order to minimize the loss of genetic variation due to genetic drift, and maintain constant genetic variance within a population, an effective population size of at least 500 is recommended (Franklin 1980; Soule 1980; Lande 1988). Effective population sizes required to maintain long-term genetic variation that can serve as a reservoir for future adaptations in response to natural selection and changing environmental conditions are discussed in Chapter 1 of the recovery plan.

For bull trout, Rieman and Allendorf (2001) estimated that a minimum census number of 50 to 100 spawners per year was needed to minimize potential inbreeding effects within local populations. Furthermore, a census population size between 500 and 1,000 adults in a core area is needed to minimize the deleterious effects of genetic variation due to drift.

For the purposes of bull trout recovery planning, abundance levels were conservatively evaluated at the local population and core area levels. Local populations which contained less than 100 censussed spawning adults per year were classified at risk from inbreeding depression. Bull trout core areas which contained less that 1,000 censussed spawning adults per year were classified as at risk from genetic drift.

Adult abundance is estimated to be greater than 5,000 individuals in each of three core areas (Upper Salmon River, Middle Fork Salmon River, South Fork Salmon River) in the Salmon River Recovery Unit. Adult abundance is estimated to be between 500 and 5,000 adult fish in the Pahsimeroi River, the Middle Salmon River-Panther, Middle Salmon River-Chamberlain, and Little Lower Salmon River core areas; and around 1,000 adult fish in the Lemhi River Core Area. Adult abundance in the Lake Creek and Opal Lake core areas are estimated at less than 500 fish. Based on the guidance above, therefore, bull trout may be at risk from genetic drift in 2 out of the 10 core areas in this recovery unit.

Productivity. A stable or increasing population is a key criterion for recovery under the requirements of the Endangered Species Act. Measures of the trend of a population (the tendency to increase, decrease, or remain stable) include population growth rate or productivity. Estimates of population growth rate (*i.e.*, productivity over the entire life cycle) that indicate a population is consistently failing to replace itself, indicate increased extinction risk. Therefore, the reproductive rate should indicate the population is replacing itself, or growing.

Since estimates of the total population size are rarely available, the productivity or population growth rate is usually estimated from temporal trends in indices of abundance at a particular life stage. For example, redd counts are often used as an index of a spawning adult population. The direction and magnitude of a trend in the index can be used as a surrogate for the growth rate of the entire population. For instance, a downward trend in an abundance indicator may signal the need for increased protection, regardless of the actual size of the population. A population which is below recovered abundance levels but moving toward recovery would be expected to exhibit an increasing trend in the indicator.

The population growth rate is an indicator of extinction probability. The probability of going extinct cannot be measured directly; it can, however, be estimated as the consequence of the population growth rate and the variability in that rate. For a population to be considered viable, its natural productivity should be sufficient to replace itself from generation to generation. Evaluations of population

status will also have to take into account uncertainty in estimates of population growth rate or productivity. The growth rate must indicate a stable or increasing population for a period of time for the population to contribute to recovery.

The Little-Lower Salmon Core area was the only core area with population trend data from redd counts for at least ten years and this area was considered in the intermediate threat category for productivity. All of the other core areas in the Salmon River Recovery Unit did not contain productivity data for at least ten years, therefore they were considered in the increased threat category.

Connectivity. The presence of the migratory life history form within the Salmon River Recovery Unit was used as an indicator of the functional connectivity of the recovery unit and both core areas. If the migratory life form was absent, or if the migratory form is present but local populations lack connectivity, the core area was considered to be at increased risk. If the migratory life form persists in at least some local populations, with partial ability to connect with other local populations, the core area was judged to be at intermediate risk. Finally, if the migratory life form was present in all or nearly all local populations, and had the ability to connect with other local populations, the core area was considered to be at diminished risk.

Migratory bull trout are present in all or nearly all local populations in the Middle Fork Salmon River, Upper Salmon, South Fork Salmon River and Little-Lower Salmon River core areas; therefore these populations are considered to be at diminished risk. Migratory bull trout may persist in some local populations in the Lemhi River, Middle Salmon River-Panther, and Middle Salmon River-Chamberlain core areas which therefore are considered at an intermediate risk. Migratory forms are believed to be absent or extremely limited in the Pahsimeroi River Core Area local population which is considered to be at increasing risk. The Lake Creek and Opal Lake core areas contain only one local population each and each of these populations are believed to be migratory.

Recovery Criteria

Recovery criteria identified for the Salmon River Recovery Unit are as follows:

1. **Distribution criteria will be met when the total number of stable local populations has increased from 125 identified local populations to 133 local populations in 10 of the core areas within the Salmon River Recovery Unit.** Potential local populations that are essential for the recovery of bull trout were identified by biologists and the recovery unit teams as follows: Kinnikinic, Withington, Sandy, Agency, Hazard, Elkhorn, Upper Johnson and French creeks. The streams in these areas are essential because they contain core habitat or it is estimated based on professional judgement by local biologists, that the streams could contain core habitat when restored. These streams are located in core areas that may need more widespread distribution of local populations to allow for long-term persistence of bull trout in that core area. The remaining potential local populations where information is currently lacking on their ability to contribute to recovery include: Crooked, Camp/Phoebe, Bear, Porphyry, Sheep/South Fork Salmon river. These five potential local populations will be evaluated within 5 years to determine if the streams in these areas are essential for the recovery of bull trout.

2. **Abundance criteria will be met when the estimated abundance of adult bull trout in the Salmon River Recovery Unit is between 100 and 5,000 individuals in each of the 10 core areas, a total of 27,200 (Table 3).** The range of recovered abundance was derived using the best professional judgement of the Upper Salmon River and Lower Salmon River Recovery Unit teams (USFWS, *in litt.,* 2000a; and USFWS, *in litt.,* 2000b, USFWS, *in litt*., 2002c). The professional judgement of biologists is based on the estimations of productive capacity of identified local populations and core area populations, on consideration of current habitat conditions and potential habitat conditions after threats have been addressed. Work is underway to

develop a monitoring and evaluation approach or plan in an adaptive management context, that will provide feedback and allow periodic reassessment of current recovery targets for bull trout abundance in this recovery unit (USFWS, *in litt.*, 2001b).

The U.S. Fish and Wildlife Service estimated that 100 adult fish exist at this time in the Opal Lake and Lake Creek core areas based on research done on other small adfluvial bull trout populations in the Clark Fork Recovery Unit in Montana (USFWS 2002). Estimated abundance for recovery is estimated at current levels; however, this target will need to be revisited in the future once further research is conducted on bull trout populations in these core areas.

3. **For bull trout in the Salmon River Recovery Unit, trend criteria will be met when the overall bull trout population trend is accepted as stable in two core areas and increasing in six core areas, based on at least 15 years of monitoring data. Two core areas need additional information before trend criteria can be established. Where monitoring data does not currently exist, 25 years of monitoring data may be needed.** The Upper Salmon River, Pahsimeroi River, Lemhi River, Middle Salmon River-Panther, South Fork Salmon River and Little-Lower Salmon River core areas with the greatest amount of threats would need increasing trends. The core areas that have fewer threats that would need to maintain stable trends include the Middle Fork Salmon River and Middle Salmon River-Chamberlain. Insufficient data is available to establish trend criteria for the small populations in Lake Creek and Opal Lake core areas. For these two core areas, trends should remain stable until population monitoring and investigations of threats are completed within 5 years. At that time, the trend would be established based on new populations status information.

4. **Connectivity criteria will be met when migratory forms are present in all local populations with intact migratory corridors providing opportunity for genetic exchange and diversity.** Achieving criteria 1 through 3 above is expected to depend on restoring connectivity by eliminating barriers in bull

trout streams in all core areas. Completion of tasks 1.2.3 and 1.2.5 will identify the remaining unknown barriers in all core areas. A list of such barriers and/or combined actions that restore connectivity should be prepared in the first 5 years of implementation. Connectivity must be restored at the majority of these barriers consistent with tasks 1.2.4, 1.2.6, 1.2.8 and 1.2.9 and consistent with the protection of upstream populations of westslope cutthroat trout and other native fishes. Appendix B lists streams fragmented by small barriers that inhibit connectivity for bull trout. These specific streams will be reconnected to the mainstem rivers or other streams that allow for the migratory bull trout life history form to persist in the Pahsimeroi River, Lemhi River, Upper Salmon River, and Middle Salmon River-Panther core areas.

Recovery criteria for the Salmon River Recovery Unit were established to assess whether recovery actions have resulted in the recovery of bull trout. The Salmon River Recovery Unit Team expects that the recovery process will be dynamic and require refinements as more information becomes available over time. While removal of bull trout as a species under the Endangered Species Act (*i.e.*, delisting) can only occur for the entity that was listed (Columbia River Distinct Population Segment), the criteria listed above will be used to determine when the Salmon River Recovery Unit is fully contributing to recovery of the population segment.

Estimated Date of Recovery

Recovery units are the basis on which bull trout recovery will be gauged. Expected times necessary to achieve recovery will vary among recovery units due to differences in bull trout status, factors affecting bull trout, implementation and effectiveness of recovery tasks, and bull trout and habitat responses to recovery tasks.

At a minimum, three bull trout generations (15 years) are expected to pass before the highest priority and most effective tasks necessary to significantly reduce identified threats to bull trout can be achieved or the results of these tasks are demonstrated throughout the Salmon River Recovery Unit. We expect full recovery to occur in 25 years when we have addressed the threats and fully documented population distribution, abundance and trend in areas that currently have limited information.

Table 3. Broad Scale Summary of the Recovery Criteria for the Salmon River Recovery Unit.

Core Area in the Salmon River Recovery Unit	Target for Number local populations and (essential potential local populations)	Target for the minimum recovered abundance of adult-sized bull trout	Target for trend in abundance (estimated)	Target for streams to be reconnected
Upper Salmon River	18+ (1)	5,000	Increasing	See Appendix B
Pahsimeroi River	9	3,000	Increasing	See Appendix B
Lake Creek	1	100	Not known	See Appendix B
Lemhi River	6 + (3)	2,000	Increasing	See Appendix B
Middle Salmon River-Panther	20	3,000	Increasing	See Appendix B
Opal Lake	1	100	Not known	identify barriers
Middle Fork Salmon River	28	5,000	Stable	identify barriers
Middle Salmon River-Chamberlain	9	2,000	Stable	identify barriers
South Fork Salmon River	27 + (1)	5,000	Increasing	identify barriers
Little-Lower Salmon River	7 + (3)	2,000	Increasing	identify barriers
Total Numbers	125 + (8)	27,200		

Research needs relative to abundance and monitoring

Based on the best scientific information available, the teams have identified recovery criteria and actions necessary for recovery of bull trout within the recovery unit. However, the recovery unit teams recognize that uncertainties exist regarding bull trout population abundance, distribution, and actions needed. The recovery teams feel that if effective management and recovery are to occur, the recovery plan for the Salmon River will be viewed as a "living" document, which will be updated as new information becomes available. In addition, the recovery unit team has identified research needs which are essential within the recovery unit.

A primary research need is a complete understanding of the current and future role that the mainstem Snake River should play in the recovery of bull trout. It seems likely that fluvial bull trout in the Salmon basin historically migrated to the mainstem Snake River to overwinter and feed. Uncertainty regarding the current use of the mainstem Snake River by fluvial bull trout that also use habitats in the recovery unit has led the recovery team to identify use of the Snake River by bull trout as a research need. Given that bull trout have recently been found in the Snake River in the Hells Canyon Complex and downstream of the mouth of the Grand Ronde River, a better understanding of migration patterns between basins would greatly enhance the opportunities for recovery. The recovery team believes that migrational studies for the Salmon River Recovery Unit should be coordinated with the Hells Canyon Complex, the Imnaha, and the Grand Ronde Recovery Units to provide a more complete understanding of adult bull trout habitat requirements.

This recovery unit chapter is the first step in the planning process for bull trout recovery in the Salmon River Recovery Unit. Monitoring and evaluation of population levels and distribution will be an important component of any adaptive management approach as will the evaluation of recommended actions. The Service will take the lead in developing a comprehensive monitoring approach which will provide guidance and consistency in evaluating bull trout populations.

The teams will rely on adaptive management to better refine both abundance and distribution criteria. Adaptive management is a continuing process of planning,

monitoring, evaluating management actions, and research. Adaptive management will involve a broad spectrum of user groups and will provide the framework for decision making relative to recovery implementation and ultimately the possible revision of recovery criteria for this recovery unit.

Monitoring Strategy. Effective monitoring of all 125 local populations (Table 1) currently identified in this recovery unit is not practical, logistically feasible, or necessary. To do so, would require shifting a disproportionate share of available resources for bull trout recovery activities to monitoring, exclusively. Therefore, the suggested monitoring strategy reflects a level of effort that is considered both practical and effective to monitor the populations and quantify achievement of the recovery criteria. This does not mean, nor should it be interpreted to mean, that unmonitored populations are unnecessary or expendable. Protection and restoration efforts will continue to be applied to all local populations of bull trout throughout the Salmon River basin in order to protect important genetic diversity; maintain healthy, viable populations; and secure or improve the existing widespread distribution. The ultimate goal is to meet the criteria and recover bull trout in the Salmon River Recovery Unit to a level that makes them eligible to contribute to delisting as rapidly and efficiently as possible.

Within the recovery criteria and this monitoring strategy there are several terms which have not been previously defined, requiring some elaboration:

Population monitoring to accepted standards: Refers to redd counts, juvenile electrofishing estimates, snorkel surveys, net catches, or other distribution and abundance indices that are agreed to by U.S. Fish and Wildlife Service and the management agencies as adequate to establish presence/absence or trend of local bull trout populations. These standards may vary from population to population but should, at a minimum, meet the established protocols for presence/absence adopted by the Western Division of the American Fisheries Society (in development).

Sufficient regularity: Refers to the frequency with which monitoring must occur. In order to establish statistically definable trends, annual monitoring will normally be required. But, for local populations where threats are minimal and

habitat is remote (*e.g.*, wilderness areas), or where a sufficient baseline already exists, it may be sufficient to monitor every other or even every third year. These decisions should be made on a case-by-case basis.

Contemporary standards: Refers to the use of modern analytical tools to decipher trends in local bull trout population abundance. This is currently an area of considerable research focus and it is expected that population models and other tools will be developed in the next few years that will improve upon existing methods for identifying and interpreting population response. It is recommended that evaluation and interpretation of the direction and magnitude of population trends should be based upon the most commonly accepted and scientifically supportable methods available at the time the analysis occurs, and not necessarily upon those currently in use.

With those terms in mind, it is the stated intention of this recovery plan that population monitoring to accepted standards occur, with sufficient regularity in a portion of identified local populations acceptable for statistical analysis and agreed to by the Upper and Lower Salmon River recovery unit teams, to verify continued distribution and enable assessment of bull trout population status under contemporary standards. The local populations to be monitored will be identified within 1 year of the issuance of the final recovery plan. Monitoring must be spatially distributed within core areas and must be intensified from previous levels, with particular emphasis on waters that are subject to threats from habitat degradation and/or nonnative fish species. Currently, only one local population, Rapid River has more than 5 years of redd counts. Twin Creek in the Panther Creek local population, and the Horse Creek local population are being regularly monitored (*i.e.*, data existing for at least 3 of 5 latest years). Other monitoring may exist that is not available to the U.S. Fish and Wildlife Service at this time. Notable monitoring gaps currently occur throughout the recovery unit.

ACTIONS NEEDED

Recovery Measures Narrative

In this chapter and all other chapters of the bull trout recovery plan, the recovery measures narrative consists of a hierarchical listing of actions that follows a standard template. The first-tier entries are identical in all chapters and represent general recovery tasks under which specific (*e.g.*, third-tier) tasks appear when appropriate. Second-tier entries also represent general recovery tasks under which specific tasks appear. Second-tier tasks that do not include specific third-tier actions are usually programmatic activities that are applicable across the species' range; they appear in *italic type*. These tasks may or may not have third-tier tasks associated with them; see Chapter 1 for more explanation. Some second-tier tasks may not be sufficiently developed to apply to the recovery unit at this time; they appear in *a shaded italic type (as seen here)*. These tasks are included to preserve consistency in numbering tasks among recovery unit chapters and intended to assist in generating information during the comment period for the draft recovery plan, a period when additional tasks may be developed. Third-tier entries are tasks specific to the Salmon River Recovery Unit. They appear in the implementation schedule that follows this section and are identified by three numerals separated by periods.

The Salmon River Recovery Unit Chapter should be updated at least every 5 years as recovery tasks are accomplished, or revised as environmental conditions change, and monitoring results or additional information become available. The Upper and Lower Salmon River recovery unit teams should meet annually to review annual monitoring reports and summaries, and make recommendations to the U.S. Fish and Wildlife Service to revise the recovery plan.

1 Protect, restore, and maintain suitable habitat conditions for bull trout.

1.1 Maintain or improve water quality in bull trout core areas or potential core habitat.

1.1.1 Assess roads and identify problem areas. Conduct an intensive inventory to identify roads that could be decommissioned and/or rehabilitated to reduce erosion and sediment delivery to streams.

1.1.2 Reduce general sediment production. Stabilize roads, road stream crossings, and other known sources of fine sediment delivery. Implement recommendations from U.S. Forest Service and Bureau of Land Management Watershed Analysis and other plans that are geared to remediation of sediment production. Where problems roads have been identified, increase maintenance of extensive U.S. Forest Service, Bureau of Land Management, private, and State lands secondary road systems by remediation of sediment producing hotspots, and maintenance of bridges, culverts, and crossings in all core areas. Decommission surplus roads; especially those that are chronic sources of fine sediment and/or those located in areas of highly erodible or unstable geological formations. Remove culverts and/or bridges on closed roads that are no longer maintained and or remove the road. Paving or graveling portions of major roads to reduce sediment delivery may be appropriate, but must be considered on a case-by-case basis with other factors such as the impacts of increased ease of angler access. Address impacts made by all terrain vehicles on roads and trails.

Priority areas include: (The priority areas in *italics* are names of watersheds identified in the Inland West Watershed Initiative at the fifth or sixth field Hydrologic Unit Code level, Table I-3, Appendix I of the Salmon Subbasin Summary [Servheen 2001]. Creeks were also included below that are on the 1998 303(d) list of waterbodies for sediment, and these are listed in **bold letters** [Servheen 2001, Table C-1]).

Upper Salmon River Core Area: *Morgan watershed,* Salmon Headwaters, Yellowbelly Lake, Redfish Lake and **Valley**

(Stanley to Salmon River, **Challis**, **Garden**, **Thompson, Warm Springs,** Big Lake, Boulder, and Warm Springs creeks, **Yankee Fork River** (Yankee Fork and Jordan Creek roads), and mainstem East Fork Salmon River.

Pahsimeroi River Core Area: **Pahsimeroi River, Big, Morse, Patterson creek (Forest boundary to Pahsimeroi River)**.

Lemhi River Core Area: **Big Eightmile, Big Timber, Eighteenmile, Hawley, Little Eightmile Creeks (all from the U.S. Forest Service boundary downstream to the Lemhi River)**; **Bohannon, Geertson, Sandy, Wimpey, and Kenny creeks (all from the Bureau of Land Management boundary downstream to the Lemhi River)**.

Middle Salmon River-Panther Creek Core Area: ***Big Deer,*** **Hughes,** *McKim*, Upper Panther (*Musgrove), Moose, Hull, Hughes, Lick, and Moccasin creeks;* Upper Horse, Squaw, Pine, Opal (downstream of Opal Lake), Porphyry, Dahlonega creeks, and the mainstem Salmon River from North Fork to Corn Creek.

Middle Salmon River-Chamberlain Core Area: Warren (replace fords of Warren Creek and other actions), Upper Horse, *Wind, Big Mallard, Witsher, Upper Meadow, and Upper Crooked creeks.*

South Fork Salmon River Core Area: **South Fork Salmon River, Upper East Fork South for Salmon River**, **Secesh River (Lake Creek to Loon Creek)**, **Sugar**, Krassel-Indian, Curtis, **Johnson (Headwaters to mouth)**, and Cow-Oompaul creeks. Repair the Elk Summit road, Davis/Wiesel road, and Lick Creek road.

Little-Lower Salmon River Core Area: *Middle Little Salmon River*, Slate Creek, **Little Slate Creek**, John Day, *White Bird, Howard, Skookumchuck, and Goose Creeks.*

Middle Fork Salmon River Core Area: **Elkhorn (Headwaters to Salmon River),** and **Monumental (Headwaters to Fall Creek), Bear Valley**, (Bear Valley and Bearskin Roads), Elk, and Lower Camas Creeks (*Lower Silver Creek*),

1.1.3 Continue to conduct implementation and effectiveness monitoring of projects designed to reduce sediment delivery to streams. Conduct implementation monitoring of recovery-based projects to reduce sediment delivery to streams. Continue existing long-term monitoring of sediment deposition delivery to streams in areas that are utilized by bull trout (*e.g.*, core, shovel, sampling, pebble counts etc.). Devise new sampling schemes in areas where existing monitoring is incomplete or lacking. Federal, State, county, and individual citizen efforts should be coordinated so that duplication of effort is avoided. Monitoring results should be compiled in a commonly shared, geospatial database.

1.1.4 Increase use of State Best Management Practices and rules guiding land management on State and private lands. Compliance checking and monitoring may improve Best Management Practices implementation on State And private lands.

1.1.5 Review Best Management Practices/laws/rules/standards for land management practices when those practices provide inadequate protection to bull trout on State and private lands. Work with State and private landholders and interested parties to revise forestry, grazing and mining standards. Ensure that standards are protective of bull trout habitat needs. For example, utilize

standards and guidelines similar to those described in Inland Native Fish Strategy (INFSH), http://www.fs.fed.us/r6/fish/9506-infish.pdf. Appendix A pages A-1 to A-16, to improve existing and design new Best Management Practices. Current streamside protection zones for forestry Best Management Practices on private and State lands may not adequately protect stream temperature and reduce sediment delivered to the streams in all cases.

1 .1.6 Develop a long-term monitoring program to inventory sources and address acid mine drainage, heavy metals, and other pollutants delivered into streams, wetlands, ponds, springs, and groundwater associated with active, inactive, and orphaned mines. Existing programs need to be expanded and coordinated between responsible agencies and a comprehensive program adopted for each watershed area. Federal, State, county, Tribal, and individual citizens efforts should be coordinated so that duplication of effort is avoided. Monitoring results should be compiled in a commonly shared, geospatial database.

1.1.7 Clean up mine waste at active, inactive, and orphan sites. Control mining runoff from roads, dumps, processing facilities, and ponds by removing and stabilizing mine tailings and waste rock deposited in the stream channel and floodplains and restoring stream channel function. Implement remedial actions that are tied to monitoring plans implemented as a part of task 1.1.7. Continue existing cleanup programs. Other problem areas may exist in addition to the areas listed below, therefore recovery actions are not limited to these priority areas. Priority areas include the following:

Upper Salmon River Core Area: Upper Salmon River Headwaters, Yankee Fork, Slate Creek (Hoodo and Thompson

creek mines) and East Fork Salmon (Livingston Mine), Thompson Creek, Squaw Creek.

Lemhi River Core Area: Withington, Kirtly and Bohannon Creeks.

Pahsimeroi River Core Area: Patterson Creek (Historic Bluewing Mining District).

Middle Salmon-Panther Core Area: Blackbird Creek (Blackbird Mine), Napias (Bear Track Mine), Deer, Panther, and Big Deer Creeks.

Middle Fork Salmon Core Area: Bear Valley, Upper Monumental, Big, and Cabin creeks.

Middle Salmon River-Chamberlain Core Area: Warren, Falls, Lake, and Upper Crooked creeks.

South Fork Salmon River Core Area: East Fork South Fork Salmon River, and Sugar (Cinnibar Mine and Stibnite Mine), Meadow, and Blowout creeks.

Lower Salmon/Little Salmon Core Area: Upper Slate Creek and Mainstem Salmon River.

1.1.8 Continue to evaluate if a release of toxic material from the Thompson Mine tailings pond into the mainstem Salmon River and tributaries is possible. Continue existing studies by the Environmental Protection Agency to ensure that material from Thompson Creek Mine tailings ponds will not enter Thompson Creek or the Salmon River in the long-term or short-term in the event of a stochastic event. If an earthquake or watershed event

destabilizes the tailings pond dam, it would have catastrophic impact on bull trout in the Mainstem Salmon River corridor.

1.1.9 Assess and mitigate nonpoint thermal pollution. Assess and mitigate effects on bull trout from thermal increases (nonpoint sources) that negatively impact receiving waters and migratory corridors dowstream. Priority areas include the mainstem Salmon River from the headwaters to the North Fork, the Pahsimeroi and Lemhi rivers and their tributaries, and the Little Salmon River to its confluence with the Mainstem Salmon River.

1.1.10 Eliminate point and nonpoint source pollution from developed and dispersed recreation sites and the roads and trails that access these sites. Many problem areas in the mainstem rivers and areas adjacent to lakes have been addressed for anadromous fish and bull trout habitat concerns, however, problems may still exist. Priority areas include the Middle Fork Salmon River, mainstem Salmon River from the Sawtooth Valley to its confluence with the Snake River, Boulder Creek, and other sites. Dispersed and developed sites and their access roads/trails adjacent to spawning and early rearing streams need to be assessed for impacts, and projects implemented that remediate/improve water quality.

1.1.11 Minimize impacts from residential and summer home development in bull trout habitat. Private land development for recreational home and permanent residents is increasing in the Salmon River basin. Address impacts associated with this development including: chemical and nutrient pollutants, habitat degradation, direct habitat loss, and water diversions. Priority Areas are Stanley Basin, Secesh Meadows, mainstem Salmon River corridor from Alturas Lake to the North Fork, Warm Lake, Johnson Creek, Yellow Pine, Boulder Creek and Little Salmon River.

1.1.12 Evaluate water quality impacts and implement remediation in Williams Lake and its associated tributaries. Recommend remediation, implement remediation, and conduct effectiveness monitoring of projects. Examples of remediation that have been proposed include: reduce internally lake nutrient loading, reduce nutrient inputs into the lake, increase dissolved oxygen concentrations in the upper 20 meters of the lake to 6 milligrams/liter, prevent winter fish kills, decrease occurrence of blue-green algal blooms, protect riparian habitat concurrent with residential development and recreational use, lower mean phosphorus concentrations during summer in the epilimnion to below 20 ug/liter. A small, isolated local population of bull trout exists in this area.

1.2 Identify barriers or sites of entrainment for bull trout and implement tasks to provide passage and eliminate entrainment.

1.2.1 Evaluate bull trout entrainment at water diversions. Where the entrainment status is unknown, conduct evaluations to identify if problems exist. Compile information in a database that is useable by all public and private parties. (Much of this work is already underway for anadromous fish.)

1.2.2 Eliminate bull trout loss (entrainment) at water diversions. Screen water diversions and irrigation ditches to reduce entrainment losses and/or eliminate unneeded diversions in streams listed in Appendix B and at newly identified sites (task 1.2.1). Evaluate the potential for voluntary and cooperative placement of fish screens. (Much of this work is already underway where anadromous fish and bull trout distribution overlap). Eliminate unauthorized/unpermitted fish losses and water diversions.

1.2.3 Inventory water diversions and other man-made instream structures and identify those indirectly or directly inhibiting fish passage. Identify barriers in all watersheds where bull trout currently exist and in watersheds that bull trout could potentially occupy. Indirect barriers render stream conditions unsuitable for passage either by creating thermal barriers or other types of barriers at low flows. Passage at other barriers such as reservoirs/dams, small hydroelectric dams, mining stream alterations, fish acclimation facilities, and others should be evaluated. Compile data into a commonly shared, geospatial database. Areas to initially focus efforts include: the Lemhi River, Pahsimeroi River, Upper Salmon River and Middle Salmon River-Panther Creek core areas.

1.2.4 Provide fish passage at water diversion and other instream structures. Modify, consolidate or eliminate unneeded water diversions to reduce impediments to fish passage at sites identified in Appendix B and other sites identified during completion of task 1.2.3. Provide passage at other barriers such as reservoirs/dams, small hydroelectric dams, mining stream alterations, and fish acclimation facilities. Modify all structures to facilitate instream passage of all life stages of bull trout. Eliminate unauthorized/unpermitted bull trout losses due to instream structures. Begin immediate remediation in Geertson Creek in the Lemhi River Core Area where local biologists have concerns about bull trout in these local populations persisting.

1.2.5 Inventory culverts and identify those inhibiting fish passage. Identify culvert barriers in all watersheds where bull trout currently exist and in watersheds that are adjacent to occupied habitat. Include the inventory of culverts in areas that have been uninventoried for bull trout that may contain suitable habitat that is essential for the recovery of bull trout.

1.2.6 Eliminate culvert barriers. Design and construct new culverts or modify existing ones to allow passage of all life stages of bull trout. Bridges, or other appropriately designed structures are recommended at stream crossings in habitats which may be used by all life stages of bull trout.

1.2.7 Evaluate natural "semi-permanent" fish passage barriers and determine if removal may be needed, then implement if necessary. Natural dams, such as slides and debris piles, may be blocking the migration of bull trout into reaches of several streams. The removal of the barriers should be evaluated to determine the effects and to determine the potential to increase the amount of habitat accessible to bull trout. The effects of removing the barriers should include impacts to all native aquatic biota.

1.2.8. Monitor actions to restore connectivity of streams. Utilize established protocols or develop new ones that can be used by Federal, State, and private entities to evaluate the success of actions taken to restore stream connectivity. Develop a common geospatial database that can be used by all agencies to access information.

1.2.9 Improve instream flows. Restore connectivity and opportunities for migration and other life history stages by securing or improving instream flows and/or acquiring water rights cooperatively from private landowners. Conduct instream flow assessment to determine the instream flow needs for bull trout.

1.2.10 Eliminate unauthorized/unpermitted bull trout losses due to instream structures and water diversions. Work with landowners or other parties to enter into agreements that would eliminate unpermitted fish loss with proactive measures.

1.3 Identify impaired stream channel and riparian areas and implement tasks to restore their functions.

1.3.1 Identify riparian areas where livestock grazing is impacting bull trout habitats. Identify problem areas cooperatively with land management agencies or private landowners. Existing evaluation techniques for riparian function such as "Proper Functioning Condition" assessments may need to be combined with instream evaluations and other riparian condition evaluations to identify problem areas in all core areas.

1.3.2 Implement actions necessary to accelerate recovery of riparian vegetation and streambanks and reduce negative effects from historic and current livestock grazing in identified problem areas. Implement management practices that contribute to native riparian vegetation integrity and increase streambank/channel stability throughout the Salmon River Recovery Unit. Core areas, areas with local populations, and streams or stream reaches where problems are known are listed below. Ideally, high/mid-seral stage riparian types should compromise greater than 80 percent of the riparian area. Improvements would be accomplished through changing stocking rates, season of use, grazing systems, grazing utilization standards and their application, and possible reductions in animal unit months. An animal unit month is a unit of measure for the amount of forage a cow and a calf consume in 1 month. (Many grazing modifications and improvements have already been made since the listing of anadromous fish species; however, stricter utilization standards and more intense monitoring is needed in problem areas for bull trout. For example, utilization standards for woody species may need to be modified so that recovery of woody vegetation and streambanks occurs at a higher rate than currently exists in some areas.) Modifications of grazing are needed for lands adjacent to perennial and intermittent streams

and in spring areas that may not currently have bull trout, but that influence watershed integrity and bull trout habitat in mainstem rivers and tributaries, especially in headwater streams. The areas in which remediation of grazing impacts are considered high priority are listed below. In *italics* below are those sixth field watersheds (with the creeks named below) where grazing was listed as the first cause of geomorphic change (IWWI 2001). Priority areas in regular type were found in other documents.

Upper Salmon River Core Area: East Fork Salmon (*Horse Basin, Road, Herd, Lake, McDonald/Pine, and East Pass creeks*), Morgan Creek (*Lower, West Fork, and Headwaters Morgan, and Van Horn creeks*), Squaw, Challis (*Eddy Basin, Darling, Ellis, and Garden creek*s), Grandview, (*Lime, Antelope Flat, Willow Creek Summit, and Lone Pine creeks*), and Slate Creek, headwaters of the Salmon River, Big Lake, Boulder, Squaw, and Valley creeks, (*many sixth field Hydrologic Units*).

Pahsimeroi River Core Area: Big Creek, Upper, Middle, and Lower Pahsimeroi River creeks (*most of the sixth field Hydrologic Units*). Upper Tater, Lawson, Falls, Sulphur, Upper Goldberg, Poison Springs, Burnt, Grouse, Meadow, Donkey, Rock, Mahogany, and Ditch creeks, Upper Pahsimeroi River headwaters and State land on Big Gulch.

Lemhi River Core Area: Hayden (*East Fork, Bear Valley*), *Little Eightmile, Canyon, Reservoir, Upper Texas, and Little Timber creeks.*

Middle Salmon River-Chamberlain Core Area: None.

Middle Salmon - Panther Core Area: North Fork River, Red Rock (*Kirtley, Lower Carmen*), Twelve/Lake watershed (*Henry,*

Elk Bend subwatersheds), Hat Creek watershed (*Little, Lower and Upper Hat subwatersheds*), Napias (*Phelan*), Upper Panther watershed (Opal Creek dowstream of Opal Lake, Cabin, Fourth of July, and Prophyry creeks and Ed's Meadow), Deep-Moyer watershed (Headwaters of Little Deep and Moyer creeks), Napias watershed (Phelan, Moccasin, and Upper Napias creeks, and Sawpit Meadows)*, Sawpit, Warm Springs, Poison, McKim, and Cow watersheds*).

Middle Fork Salmon Core Area: Bear Valley Creek watershed (*Kelly-Thatcher, Cache, Upper Elk creeks*).

Lower Camus watershed (Silver, Furmare, Castle, and West Fork Camus creeks).

South Fork Salmon River Core Area: Upper Johnson Creek including headwaters.

Little-Lower Salmon River Core Area: Private lands along the Little Salmon River, tributary streams of the Little Salmon and Mainstem Salmon and the mainstem Little Salmon River upstream of the barrier at Stream kilometer 38.6 (Stream Mile 24).

1.3.3 <u>Conduct implementation and effectiveness monitoring of livestock grazing impacts on federally-managed lands</u>. Conduct site-specific monitoring that would differentiate the background baseline conditions from the habitat alteration resulting from grazing activities. This monitoring is to be conducted in conjunction with Interagency Implementation Team monitoring discussed below. This long-term monitoring should include gathering data on greenline, vegetation cross section, wood species presence and conditions, streambank stability, and/or photo points. Key areas chosen for monitoring should be

representative of what is happening on a larger scale as a result of land management activities. Annual reporting should disclose riparian conditions where livestock use has occurred and areas where grazing standards have not been met.

1.3.4. Revegetate denuded riparian areas. Restore native vegetation areas that have been denuded or where nonnative species dominate (*e.g.*, Kentucky bluegrass). Actions may include fencing of springs, seeps, and streams to exclude livestock, and planting woody shrubs. Areas should be prioritized with higher priority placed on areas with documented trampling, compaction, dredging or other habitat alteration.

1.3.5. Restore stream channels on private land and work with community groups/private citizens. Work with landowners to improve riparian habitat on private land through cooperative voluntary projects.

1.3.6. Improve instream habitat. Increase or improve instream habitat by restoring recruitment of large woody debris, pools, or other appropriate habitat, wherever the need is identified.

1.3.7 Minimize potential stream channel degradation from flood control actions. Ensure that, after a flood emergency, negative effects to bull trout from emergency flood control activities (*e.g.*, dredging, channel clearing, bank stabilization, bank barbs, and other structures or actions) are minimized. In addition, when planning proactive flood control actions such placement of dikes for other structures, include aquatic habitat needs in the project planning. Initial areas on which to focus include: the mainstem Salmon River, the Little-Lower Salmon River, the East Fork Salmon, and the South Fork Salmon River.

1.3.8. Maintain aquatic habitat conditions in current wilderness and roadless areas and/or areas with low road densities. Areas without roads or relatively low road densities typically have higher quality aquatic and riparian habitats than other areas. Existing high quality conditions of aquatic habitats should be maintained to benefit bull trout. Priority areas include, currently designated wilderness or roadless areas and roadless areas identified during land management planning.

1.3.9. Reduce campsite and other recreation impacts. Riparian vegetation should be restored by altering recreational activities in sites used for dispersed camping, boating/fishing access, developed campsites, summer home development, outfitter and guide facilities/camps, recreational suction dredging, and other activities. Encourage intense recreational use away from water bodies with bull trout while taking into account traditional uses of recreation sites by interested public. Revegetate sites with trampling damage. Work with community groups to recruit volunteers to help with habitat improvement projects.

1.3.10 Compensate for transportation corridor encroachment on streams. Avoid highway channel straightening, channel relocation, undersized bridges and railroad encroachment in stream channels for proposed highway projects. Final project designs will incorporate river morphology and river flow dynamics concepts and U.S. Fish and Wildlife Service assessment of fish habitat needs. Incorporation of innovative project design that allows for minimum floodplain and riparian habitat loss for streams adjacent to road construction projects. For example, avoid highway turnouts in areas that are needed for floodplain expansion of adjacent or tributary streams. When highway/railway improvement projects are planned where historical stream encroachments occurred, aim to mitigate for past impacts to streams. Initial areas to focus efforts include, the

Mainstem Salmon River corridor from Alturas Lake Creek to the North Fork (Highway 93), the Mainstem Salmon River downstream of Riggins (Highway 95), and along the Little Salmon River (Highway 95), and roads along Warren Creek, Pine and Indian creek.

1.3.11 Restore streams that are partially or completely dewatered. Streams identified in Appendix B and those identified in tasks above should be restored by working cooperatively with landowners and agencies. This task is meant to reduce significant threats from agriculture and fragmentation of bull trout habitat. This task is related to tasks 1.2.2, 1.2.3, 1.2.4, 1.2.9, 1.3.5, 1.3.6, and 6.6.4 above. This task is one of the most important issues for bull trout recovery in the Upper Salmon River, Lemhi River, Pahsimeroi River Middle Salmon River-Panther, and Little-Lower Salmon River core areas.

1.3.12 Prepare a management plan for the maintenance and reconstruction of Highway 95 for the Little Salmon, River kilometer 38.6 (River Mile 24) and mainstem Salmon River downstream to Whitebird. Include action plans that would address how to deal with landslides, floods, debris torrents, and other watershed events. Assure that actions to reconstruct or maintain the highway are compatible with and promote bull trout recovery. Designate disposal and quarry sites in advance of watershed events and protect/enhance riparian vegetation in the corridor.

1.3.13 Conduct watershed assessments in areas without completed assessments in the Salmon River Recovery Unit. The analysis should be conducted according to "Ecosystem Analysis at the Watershed Scale," (USFS, BLM, NPS, NMFS, EPA 1995). In general, a watershed assessment is not project-driven but undertaken to generate an information base and

recommendations for use in project planning. The recommendations of the watershed assessment are to be incorporated in project planning. Priority is to be placed on implementing actions that are targeted specifically for restoration of stream system functions.

1.4 *Operate dams to minimize negative effects on bull trout in reservoirs and downstream.*

1.5 Identify upland conditions negatively affecting bull trout habitats and implement tasks to restore appropriate functions.

1.5.1 Evaluate effects of wildfires and wildfire suppression on streams and restore where necessary. Look at impacts for the use of fire retardant, fire line construction, water withdrawal and other fire suppression efforts have on bull trout population. Mitigate for impacts where possible. Continue existing monitoring in the Middle Fork Salmon River and other areas. Focus upland and stream restoration where isolated bull trout populations are impacted by wildfire (*e.g.*, Germania Creek).

1.5.2 Restore upland vegetation in high livestock use areas. Target dry shrub plant communities that were impacted by current and historical grazing practices. Ensure that grazing practices implemented to improve riparian conditions allow for restoration of upland plant communities and soils.

2 Prevent and reduce negative effects of nonnative fishes and other nonnative taxa on bull trout.

2.1 *Develop, implement, and enforce public and private fish stocking policies to reduce stocking of nonnative fishes that affect bull trout.*

2.2. Evaluate enforcement of policies for preventing illegal transport and introduction of nonnative fishes.

2.2.1 Investigate the existence of brook trout or lake trout in ponds on private land. Work with Idaho Department of Fish and Game and private landowners to inventory their lands.

2.2.2 Prevent dispersal of nonnative fish species that compete with bull trout on private lands. If brook trout or other nonnative species are found, work with landowners to eliminate species to prevent them from becoming established elsewhere in the drainage.

2.2.3 Monitor any eradication activities. Monitoring would be conducted by established agency protocols, and the results of the monitoring would be compiled in a database that can be used by all entities.

2.3 *Provide information to the public about ecosystem concerns of illegal introductions of nonnative fishes.*

2.4 Evaluate biological, economic, and social effects of control of nonnative fishes.

2.4.1 Identify where bull trout and brook trout distribution overlap in all core areas. The first priority is to conduct investigations of local populations where brook trout presence is not listed in Appendix 1. The second priority is to inventory areas outside local populations or within potential local populations. Identify factors such as habitat quality that may be giving brook trout a competitive advantage over bull trout.

2.4.2 Evaluate bull trout and lake trout life history/populations in Warm Lake and Riordan Lake. These isolated bull trout populations may be impacted by the presence of lake trout.

2.4.3 Evaluate bull trout and introduced rainbow trout interactions in Williams Lake in the Lake Creek Core Area. Assess the status of the local population of bull trout and determine whether current and past fisheries management programs are impacting bull trout populations. Design fisheries management programs and research to benefit bull trout populations in this core area.

2.5 Implement control of nonnative fishes where found to be feasible and appropriate.

2.5.1 Reduce competition with brook trout where they are known to overlap with bull trout and there is a known species interaction that is adversely affecting bull trout in areas identified in 2.4.1. Evaluate opportunities for selectively or otherwise removing brook trout (*e.g.*, through liberalized angling and electrofishing) where a problem with competition with bull trout has been identified. Eradicate brook trout in selected areas identified in 2.4.1 (*e.g.*, Pahsimeroi River Core Area: Big Creek and Upper Pahsimeroi River).

2.5.2 Prevent brook trout from entering areas currently unoccupied by brook trout and bull trout, wherever possible. Evaluate the potential of liberalized brook trout harvest and eradication projects throughout the Salmon River Recovery Unit. Work with Idaho Department of Fish and Game to develop and implement programs.

2.6 Develop tasks to reduce negative effects of nonnative taxa on bull trout.

2.6.1 Continue to monitor for brook trout expansion. Monitor sites upstream and downstream of the current limit of brook trout distribution. Monitor eradication or other activities to reduce competition between bull trout and brook trout.

3 Establish fisheries management goals and objectives compatible with bull trout recovery and implement practices to achieve goals.

3.1 Develop or update and implement State and Tribal native fish management plans integrating adaptive research.

3.1.1 Develop a comprehensive fishery management plan for the Salmon River Recovery Unit that incorporates bull trout recovery considerations. This may be accomplished by expanding existing individual fisheries management plans prepared for anadromous fish by Idaho Department of Fish and Game in the Salmon River in cooperation with the Bonneville Power Administration.

3.1.2 Incorporate bull trout recovery needs into existing and future Tribal fisheries plans. Include the Shoshone Bannock, Nez Perce and other Native American Tribes with trust responsibilities in planning and implementation efforts for the Salmon River Recovery Unit.

3.2 Evaluate and prevent overharvest and incidental angling mortality of bull trout.

3.2.1 Evaluate the effects of fishing (*e.g.*, illegal harvest and hooking mortality) on bull trout in all core areas. Fishing may be negatively affecting bull trout through such factors as fish misidentification, mishandling, and noncompliance with regulations. Efforts should focus on areas in which mortality has been documented during the fishing seasons.

3.2.2 Continue providing information to the public about fishing regulations and bull trout identification. Expand the existing program to include the Salmon River basin. Display posters annually, particularly at angling access areas as is already being done on U.S. Forest Service managed lands. Produce information pamphlets and distribute using U.S. Forest Service, Idaho Department of Fish and Game, and Bureau of Land Management personnel and offices, local businesses, and tourism centers. Produce educational materials addressing fish identification and issues related to bull trout, and distribute to anglers.

3.2.3 Continue enforcement of current fishing regulations. Patrols should focus on identified staging (June to August) and wintering areas (November to March) for bull trout. Current fishing regulations prohibit the harvest of bull trout. However, incidental mortality of bull trout during the steelhead season in the Salmon River basin may be impacting fluvial bull trout that use large mainstem rivers during the winter and spring months.

3.2.4 Provide information to the public about fish ecology, fish management, and fish management issues. Current efforts to provide information to the public on bull trout and how bull trout are an important part of the aquatic ecosystem need additional effort. In areas with high recreation use opportunities exist to inform a broad spectrum of the public. In local communities education programs could be initiated in public schools and within the adult community.

3.3 Evaluate potential effects of introduced fishes and associated sport fisheries on bull trout recovery and implement tasks to minimize negative effects on bull trout.

3.3.1 Review anadromous fish stocking programs. Conduct investigations to determine where anadromous fish stocking programs are directly benefitting bull trout. Review annual fish stocking programs to assure those programs for anadromous fish described in the Salmon Subbasin Summary (Servheen 2001) (http://www/cbfwf.org/files/province/mtnsnake/salmon/salmon.htm pages 74 to 80, 83, 85, 90 and Appendix J) are not contributing fish diseases, introduction of exotic invertebrates or other problems that interfere with bull trout recovery. Develop research programs to address possible impacts/benefits to bull trout populations that overlap with existing anadromous hatchery programs. Provide summary reports that are easily accessible to all interested agencies and individuals. Assure that impacts to bull trout from fish propagation facilities are fully compensated for (*e.g.,* Stolle Meadows).

3.3.2 Investigate compliance with fishing regulations during the steelhead fishing season. Initiate new studies to document compliance with fishing regulations, especially during the fall, winter, and spring steelhead fishing seasons along the mainstem Salmon and Little Salmon rivers and their tributaries.

3.3.3 Investigate effects of resident fish stocking on bull trout, and implement actions to reduce adverse effects, if appropriate. Conduct research studies in areas with high resident fish stocking rates. For example, investigate the impacts of the Williams Lake fish stocking programs on the isolated adfluvial bull trout population in that drainage.

3.4 Evaluate the effects of existing and proposed sport fishing regulations on bull trout.

3.4.1 Investigate compliance with fishing regulations during the summer general fishing season. Continue existing studies concerning bull

trout identification during summer months currently conducted by Idaho Department of Fish and Game. Initiate new studies as needed.

4 Characterize, conserve, and monitor genetic diversity and gene flow among local populations of bull trout.

4.1 Incorporate conservation of genetic and phenotypic attributes of bull trout into recovery and management plans.

4.1.1 Collect samples for genetic analysis to contribute to establishing a program to understand the genetic baseline and monitor genetic changes throughout the range of bull trout (see Chapter 1). This analysis is needed throughout the range of the Salmon River Recovery Unit.

4.1.2 Manage local populations (number and life form) to maintain long-term viability. This task relates to all of the tasks and threats in this recovery plan. Agencies and individuals should ensure that management practices and polices allow for the long-term viability of unique characteristics of bull trout local populations.

4.1.3 Investigate the genetic composition of isolated bull trout populations in Opal and Williams lakes. These isolated bull trout populations may contain unique genetic compositions that would be needed for the long-term viability of bull trout in the Salmon River Recovery Unit. Their genetic structure and content should be compared to genetic data obtained by studies carried out under task 4.1.1 above.

4.2 Maintain existing opportunities for gene flow among bull trout populations.

4.2.1 During project planning, ensure new projects provide for connectivity within the Salmon River Recovery Unit. Work with Federal and State agencies on proactive measures to ensure that no new projects will disconnect streams that are currently linked with other bull trout individuals or local populations.

4.3 *Develop genetic management plans and guidelines for appropriate use of transplantation and artificial propagation.*

5 Conduct research and monitoring to implement and evaluate bull trout recovery activities, consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks.

5.1 Design and implement a standardized monitoring program to assess the effectiveness of recovery efforts affecting bull trout and their habitats.

5.1.1 Monitor and assess the biological responses to and changes in habitat from implementation of recovery tasks. Continue to conduct implementation and effectiveness monitoring prescribed by the Interagency Implementation Team and other rangewide and local monitoring throughout the Salmon River Recovery Unit.

5.1.2 Develop a map-based process to track recovery efforts and bull trout distribution and abundance in the Salmon River Recovery Unit. Develop the process and database and store information in a commonly shared database such as that managed by the Idaho Department of Fish and Game, Conservation Data Center. This database would require rigorous quality assurance/quality control protocols. This process has not yet been completed for the Salmon River Recovery Unit.

5.2 Conduct research evaluating relationships among bull trout distribution and abundance, bull trout habitat, and recovery tasks.

5.2.1 Determine distribution and abundance of, and habitat used by fluvial bull trout in the Salmon River Recovery Unit. Little information is available on fluvial bull trout movement in this recovery unit. Determine how far fluvial bull trout travel from spawning areas to wintering rearing areas within mainstem rivers. Track distances traveled during wintering and rearing in mainstem rivers. Conduct studies similar to those completed in the Rapid River and the East Fork of the South Fork Salmon River by Dave Hogan, Idaho Department of Fish and Game, Forest Service and University of Idaho (Hogen 2001). Studies have been proposed by Idaho Department of Fish and Game in the upper portion of the Salmon River basin that would partially accomplish this task. The lower portion of the basin is also in need of additional studies in addition to the work in Rapid River.

5.2.2 Map bull trout spawning habitat in all core areas within the Salmon River Recovery Unit. Develop a comprehensive map of primary bull trout spawning and rearing reaches for focusing habitat protection and recovery efforts.

5.2.3 Continue the implementation of existing bull trout population abundance studies. Conduct bull trout population abundance studies to accumulate successive years of data. Existing research may include: Rocky Mountain Research Station (Rapid River and John Day Creek), U.S. Forest Service (North Fork, Yankee Fork, and Cobalt Ranger districts). Continue to conduct general fish habitat assessment and monitoring as described on pages 160 to 173 of the Salmon Subbasin Summary (Servheen 2001).

5.2.4 Conduct presence/absence surveys in previously uninventoried areas, especially in wilderness areas in the Salmon River Recovery Unit. Areas of the Salmon River basin, particularly wilderness areas, have not yet been inventoried. Priority areas to survey include the headwater areas of the Sawtooth Wilderness, Frank

Church River of No Return Wilderness, Gospel Hump Wilderness, and priority areas designated by local biologists (*e.g.*, Idaho Department of Fish and Game, U.S. Forest Service and Bureau of Land Management biologists). Utilize a survey protocol that can assign confidence limits to survey results, such as the bull trout protocol developed by the American Fisheries Society, Western Division. Balance the need to have statistically significant survey results with the difficulty of accessing remote areas for the surveys.

5.2.5 Identify suitable unoccupied habitat in the Salmon River Recovery Unit. Identify streams that could support bull trout if threats were addressed.

5.2.6 Devise and implement a monitoring strategy to track abundance, distribution, and trends of bull trout in the Salmon River Recovery Unit. This is a key task to achieving recovery in the Salmon River Recovery Unit. The wilderness areas that may contain large populations of bull trout have few abundance studies. A systematic monitoring strategy to track recovery criteria 1, 2, and 3 is lacking in this recovery unit. Devise a strategy with guidance from this recovery plan and the overall recovery team (monitoring protocol team) that meets the logistical needs of conducting field work on streams in this large, mountainous area with terrain that is often difficult to access. Inventory work should be conducted in a coordinated manner across administrative units and should be coordinated among agencies.

5.3 Conduct evaluations of the adequacy and effectiveness of current and past Best Management Practices in maintaining or achieving habitat conditions conducive to bull trout recovery.

5.3.1 Evaluate the effectiveness of habitat management practices on State and private lands. Evaluate effectiveness of State Best

Management Practices/guidance in areas with State and private lands. The highest priority areas are the Lemhi, Pahsimeroi and Little Salmon /Lower Salmon core areas. Provide a forum to exchange information with other State, Federal, and local agencies and landowners.

5.4 Evaluate effects of diseases and parasites on bull trout, and develop and implement strategies to minimize negative effects.

5.5 Develop and conduct research and monitoring studies to improve information concerning the distribution and status of bull trout.

5.5.1 Continue to evaluate mountain lakes to identify potential bull trout habitat and distribution of fish stocked in lakes. Work with public agencies to inventory high mountain lakes in wilderness and nonwilderness areas. Share data collected during present and past surveys. The highest priority would be those areas planted in the early 1990's in the Little-Lower Salmon River core areas by Idaho Department of Fish and Game.

5.6 Identify evaluations needed to improve understanding of relationships among genetic characteristics, phenotypic traits, and local populations of bull trout.

6 Use all available conservation programs and regulations to protect and conserve bull trout and bull trout habitats.

6.1 Use partnerships and collaborative processes to protect, maintain, and restore functioning core areas for bull trout.

6.1.1 Coordinate bull trout recovery with listed anadromous fish species recovery in the Salmon River Recovery Unit. The Upper and Lower Salmon river recovery unit teams will coordinate the implementation of bull trout recovery actions with salmon and

steelhead measures to avoid duplication and maximize the use of available resources.

6.2 Use existing Federal authorities to conserve and restore bull trout.

6.2.1 Ensure adequate temperature protection for bull trout at all life stages under Idaho Water Quality Standards. The completion of regional temperature criteria would allow for an implementation schedule for the time of year the standards are applied, and ensure adequate protection for all bull trout life stages.

6.3 Evaluate enforcement of existing Federal, State, and Tribal habitat protection standards and regulations and evaluate their effectiveness for bull trout conservation.

6.3.1 Avoid adverse effects to spawning and early rearing bull trout from suction dredging. Work with the Idaho Department of Water Resources to evaluate enforcement of the stream channel protection program when issuance of stream channel alteration permits involve suction dredging. Work with the State on protective regulations for suction dredging especially in bull trout spawning and early rearing habitat. Ensure the channel integrity and other essential habitat is protected.

6.3.2 Evaluate compliance with current large scale and small scale mining regulations. Evaluate compliance with mining regulations and evaluate the effectiveness of existing mining regulations in protecting bull trout habitats and modify them to improve effectiveness as necessary.

7 Assess the implementation of bull trout recovery by recovery units, and revise recovery unit plans based on evaluations.

7.1 Convene annual meetings of each recovery unit team to review progress on recovery plan implementation.

7.2 Assess effectiveness of recovery efforts.

7.3 Revise scope of recovery as suggested by new information.

7.3.1 Periodically review progress toward recovery goals and assess recovery task priorities. Annually review progress toward population and adult abundance criteria and recommend changes, as needed, to the Salmon River Recovery Unit Chapter. In addition, review tasks, task priorities, completed tasks, budget, time-frames, particular successes, and feasibility within the Salmon River Recovery Unit.