Idaho Soil Conservation Commission's Upper Salmon Basin Watershed Project
Response to ISRP Comments

At the request of the State of Idaho, the Idaho Soil Conservation Commission's Upper Salmon Basin Watershed Project (USBWP) proposal has been reduced to operations only within the political boundary of the Lemhi Soil and Water Conservation District (LSWCD). This reduction is reflected in the budget supplied to the NPCC, at the State of Idaho's request. Therefore, the response to the ISRP comments will only reflect work accomplished or monitoring results within the LSWCD boundaries.

The ISRP requested a response on the following comments.

1. The proposal reports tasks accomplished, but a response is needed on project monitoring and evaluation and reporting on habitat conditions and/or fish responses.
2. Also needed is reporting on how far along they are to meeting their long-term goals and how much has been accomplished.
3. How much needs to be done?
4. Please provide a summary with synthesized quantitative data describing habitat changes resulting from project activities, and fish population responses.
5. Previous proposal committed to develop a more unified monitoring and evaluation program.

These comments will be addressed individually in the following information.

1) The proposal reports tasks accomplished, but a response is needed on project monitoring and evaluation and reporting on results on habitat condition and/or fish response.

Monitoring and Evaluation Background

Over the last century, anadromous fish runs throughout the Columbia River Basin have declined dramatically. Many factors have contributed to the decline of the region's salmon and steelhead runs. These factors generally fall into one of four categories: hatcheries, hydropower facilities, harvest, and habitat. Generally, there is some agreement that fish runs can be rebuilt by using a comprehensive strategy that addresses all factors. The main focus in the Upper Salmon River Basin is fisheries habitat.

In 1994 the Upper Salmon Basin Watershed Project (USBWP) Technical Team identified areas most important for spawning and rearing of anadromous fish in the Lemhi, Pahsimeroi, and East Fork Rivers. Planning was completed in 1995 with the publication of The Model Watershed Plan (SCC 1995). This plan outlines the priority areas within each watershed with habitat goals and objectives for the mainstem stream reaches of the Lemhi, Pasimeroi, and East Fork Salmon Rivers. Since the early 1990's, the limiting factors of spawning, rearing, and migration habitat have been actively addressed. While there are a number of short-term measures that will enhance production from the returning adults, it will take years to make significant habitat improvements that maximize potential production levels. Actions such as improving riparian conditions for rearing, protection of spawning beds, and screening of ditches and other enhancement must be viewed within the context of habitat for the anadromous fish which survive

to adulthood and return to the Upper Salmon River system. Ocean conditions, commercial harvest, the effects of hydropower generation, predators, and natural mortality initially impact adult anadromous fish returns before they reach the Salmon River Basin. The Salmon Subbasin Plan Biological Problem Statements for Aquatic Species states:

> Problem 1: Out-of-basin factors limit adult returns (as measured by Smolt-to-Adult Returns) in the Salmon River subbasin.

The USBWP Advisory Committee "decided that the short-term evaluation of the project's success should be based on habitat improvements, not on the numbers of returning fish (ISCC 1995)." To help guide project activities, the Advisory Committee decided that efforts should focus on restoring habitat to levels that would support salmon numbers present in the 1960's (ISCC 1995). These numbers were extrapolated from Idaho Department of Fish and Game chinook redd count data from the target drainages.

Watershed	**1960-1965 Average Chinook Redds**
Lemhi	1,200 Redds
Pahsimeroi	700 Redds
East Fork Salmon	775 Redds

Table from Model Watershed Plan, ISCC 1995

Habitat inventories indicate there is sufficient quantity of spawning and rearing habitat within the watershed to support the desired level of salmon recovery (Trapani 1994). However, there are opportunities to improve the quality of this habitat. Riparian vegetative cover, stream flows, physical barriers to adult and juvenile fish migration, sediment levels within spawning gravels, and juvenile rearing areas were initially identified in the *Model Watershed Plan* (ISCC 1995) as factors limiting anadromous fish production. To address these problems, habitat goals were established for the Lemhi, Pahsimeroi, and East Fork of the Salmon River Watersheds. From January 2003 through August 2005, the USBWP Tech Team formed a multi-agency subcommittee to formulate a document to create a prioritized list of streams within watersheds to guide fish screening and habitat improvement efforts on privately owned lands in the Upper Salmon Basin. This document sought to go beyond the original priority mainstem reaches included in the *MWP* Plan (ISCC 1995) and includes the remaining mainstem and tributary reaches. The resulting document is called the *Screening and Habitat Improvement Prioritization for the Upper Salmon Subbasin* or *SHIPUSS* (USBWP 2005).

The complex nature of these watersheds makes plan monitoring and evaluation a key but difficult task. Ideally, the simplest form of monitoring would be to measure the number of returning adult fish or number of chinook salmon redds. Currently, the Idaho Department of Fish and Game conducts annual aerial chinook redd counts. This approach would suffice if all factors affecting the fish populations were within the watershed. The Salmon Subbasin Management Plan {SSMP} makes clear that out-of-subbasin factors such as estuarine and ocean conditions, mainstem hydroelectric corridor conditions, and downriver and ocean fisheries are the primary factors limiting recruitment of anadromous salmonid spawners to the Salmon Subbasin (p.22). To achieve the extensive stock rebuilding called for in the *SSMP*, it will be necessary to improve both out-of-basin an in-subbasin conditions (NPPC 2004). However, since

most factors are outside the Salmon River Basin, a different monitoring and evaluation approach was needed (ISCC 1995).

Scope of Monitoring and Evaluation

Project monitoring in the Upper Salmon River Basin takes place within the context of several constraints similar to those noted by Harris (2005). First, projects are funded and approved based on proposals that are primarily landowner initiated with assistance by USBWP staff and other collaborating agencies. The inference of this is that many different types of projects are completed in many different locations, therefore, monitoring activities must be responsive to opportunities that present themselves rather than based on purely scientific or management considerations. Second, most projects occur on private lands and are under contract for 15 years. This establishes the duration of monitoring, since private landowners cannot be expected to allow unlimited access. Third, there are limited opportunities for pre-treatment site monitoring. For example; riparian enhancement projects require photo documentation and baseline measurements during vegetative expression, but proposal initiation of the project in fall or winter may preclude adequate pre-treatment monitoring and conflict with funding timelines. However, monitoring the same site immediately after or during implementation may be an adequate baseline for riparian enhancement projects.

The main scope of the USBWP monitoring program is the evaluation of physical and environmental changes resulting from fisheries habitat project implementation. The USBWP Monitoring Plan (Bradbury 2006) does not include changes in fish and invertebrate populations, though the implications from peer reviewed literature would suggest that these types of habitat improvements will lead to improved habitat conditions and therefore confer benefits to improved fisheries survival. Similar to the questions posed in Harris (2005), this monitoring program seeks to answer two main questions:

1) Are fish habitat enhancement projects being implemented as proposed?
2) Are properly installed enhancement projects having the intended beneficial effects on the habitat?

The answers to these questions imply three activities: (1) pre-implementation monitoring, (2) implementation monitoring to determine if the treatment/project was installed according to design, and (3) performance or post-treatment monitoring, to determine if project is maintained and having the intended effect (Harris 2005).

The products from monitoring can be used to inform Soil and Water Conservation Districts, interested scientists, and other participants in the USBWP. There are basically four broad categories of projects that are monitored; including instream habitat enhancement projects, fish passage projects, riparian management projects, and upland habitat improvement projects.

Project Descriptions. Projects following the USBWP process were designed to be creative and flexible in their approach to fisheries habitat enhancement. The following project descriptions were adapted for the Upper Salmon Basin from *Monitoring Fish Habitat Restoration Projects* (Harris et.al. 2002). There are numerous types of fish habitat enhancement

projects that proceed through the USBWP process, a majority of which fall under the following four categories of project descriptions:

1) Instream habitat enhancement projects are intended to create better conditions for one or more fish life stages, e.g., spawning or rearing habitat. These projects may vary in complexity from the simple placement of logs and rocks in a stream to complete channel reconstruction of a degraded stream reach, or they may be implemented with simple designs and hand placement of intricate engineering detail and large equipment. These types of projects may be combined with *Streambank stabilization projects*, which refers to instream work designed to prevent erosion. Streambank stabilization projects require consultation with the Army Corp of Engineers and require plantings and generally incorporate fish habitat enhancement features. An example are rock bank barbs with willow plantings to deflect streamflow away from a streambank to reduce erosion and create pool habitat. Another example is an irrigation diversion dam replacement or consolidation project which creates a more permanent diversion point, thereby reducing maintenance with heavy equipment and reducing instream disturbances.

2) Fish passage projects provide access to habitat or safe and timely passage of migrating fish through critical stream reaches or prevent fish from entering manmade facilities. Two examples of a preventative project are a fish screen near the diversion point of an irrigation ditch or a barrier to prevent fish movement into the return ditch of an irrigation system. Other projects may remove man-made fish passage barriers. *Streamflow management projects* are anticipated to benefit both fish and riparian communities through improving streamflow through a particular stream reach, often at a critical time of year when a particular life stage of fish is present. Streamflow management may include negotiation of water use agreements with irrigators. These types of projects include, but are not limited to, projects that modify an existing irrigation system to increase efficiency and reduce the amount of water being diverted from the stream. This may include an upgraded controllable headgate to effectively control diversion rates or a sprinkler system where appropriate. Also, experimental fish flushes have been agreed upon where irrigators voluntarily relinquish a portion of irrigation water for a period of time to allow waiting fish to continue upstream to natal spawning areas.

3) Riparian management projects seek to relieve stresses on streambanks and riparian vegetation through adjusting land management practices. An example is the use of fencing to reduce livestock impacts in the riparian area. This may include fencing to exclude grazing access or using cross fencing to create pastures that can be utilized in a planned grazing strategy. Riparian grazing plans may limit the number, timing and duration of grazing in the riparian area. Also included are *riparian vegetation management projects* that control vegetation (e.g., removing non-native plants) or plant vegetation (e.g., riparian willow plantings). Most have the common goal of jump-starting the ecological functions of riparian communities.

4) Upland habitat improvement projects are aimed at reducing sediment introduction into streams. Examples are gully repair, upland vegetation rehabilitation, or mitigation of impacts from confined animal feeding operation projects.

Types of Monitoring. Fisheries habitat projects are designed and implemented with particular goals and objectives for restoring, improving, enhancing and maintaining stream habitat conditions. Through monitoring and evaluation of fisheries habitat projects, changes in environmental variables can be tracked over a period of time. Monitoring involves documenting specific conditions that may or may not have been objectives of a project. Evaluation provides information regarding the performance of particular prescriptions (Flosi et.al. 1998). The USBWP Monitoring Plan focuses on assessing effects of particular projects on particular environmental variables.

Pre-Implementation Monitoring. Pre-implementation monitoring provides baseline information before a project occurs (Harris et al. 2002).

Implementation Monitoring. Implementation monitoring is used to determine whether or not a project was completed as planned. If a project is not implemented as planned, the USBWP can work with landowners, contractors, or SWCD's to insure implementation is suitably completed.

Performance Monitoring. Performance monitoring is used to determine if the implemented project is being maintained and having the intended effect (Harris 2005). If the project is having desirable or undesirable effects, it may be revealed through performance monitoring.

Methods of Monitoring and Evaluation

Project Documentation. All projects that go through the USBWP process begin with a project proposal. These project proposals provide the basic information for the project including the location, objective, description of the work planned, biological benefits, photographs, and a site map of the project. If the project is approved for funding, a staff member will establish pre-project photopoints as per photopoint protocol in the Upper Salmon Basin Watershed Project Monitoring Plan (Bradbury 2006).

Logistics. Almost all of these projects are located on private land and require the notification and permission of private landowners. Irrigation water diversion points located on public lands but provide water to private agricultural lands require courtesy calls to the ditch company or private individuals who use the ditch system (protocols are included in the USBWP Monitoring Plan). A monitoring provision is included in each SWCD landowner cost-share contract and invites the participation of the private landowner during monitoring activities.

Monitoring scale. The focus of this monitoring program is the project site. The project type is considered the treatment.

Temporal scale. Monitoring duration is based on the length of the landowner contract with the SWCD, which is usually 15 years.

Qualitative Monitoring: Each of the four project types has an associated datasheet and checklist. All projects are evaluated with the appropriate form. The checklist portion of the form consists

of ten yes or no questions pertaining to desirable or undesirable environmental responses to the project.

Quantitative Monitoring: Quantitative monitoring occurs on a subset of riparian enhancement projects. The selection of quantitatively monitored projects is based on coordination with other agencies within the USBWP Technical Team. Project locations are chosen based on other quantitative data collection in the area such as snorkeling surveys, redd counts, temperature monitoring, flow recordings etc. collected by collaborating agencies.

Study Design.
Project Selection. Each year projects are selected for the annual monitoring schedule based on the number of years since implementation. Proposed projects also are selected for baseline or pre-implementation monitoring. Proposed projects may be eliminated from the schedule depending on other issues affecting their progression towards implementation. All project monitoring begins with pre-project monitoring, at the minimum the establishment of photopoints. Riparian enhancement projects are monitored either immediately after installation or the following summer after implementation, depending on the time of year the project is completed. Follow-up monitoring occurs every five years thereafter, unless a significant environmental event occurs in the area. Instream habitat enhancement projects and fish passage projects are monitored immediately after installation and after the next high water event. Subsequent performance monitoring is scheduled every five years.
Pre-project Implementation Monitoring. Baseline information is gathered for all project types. Much of this information is captured in the proposal and project planning processes. Pre-project information gathering includes establishment of photo points and GPS information for the purpose of fence routes, pipeline routes, and general project location. Instream enhancement projects may need additional quantitative information concerning length of eroding bank, height of eroding bank, stream width, and other information that may be pertinent to permitting by the Army Corps of Engineers for instream work. Fish passage projects may include additional quantitative data such as ditch length, ditch width, stream flow, stream width, stream depth, and slope. The NRCS or US Bureau of Reclamation may assist with gathering this information during survey and design of the project as necessary for engineering support.

Riparian management projects necessitate that the initial proposal routes of any fencing be GPS'd for length. Acres are calculated behind the fence and four to six photopoints along the fence line and streambank are established. All projects will be assessed with a riparian area checklist and ocular vegetation survey. Additional quantitative information that may be gathered include greenlines (Winward 2000), channel cross sections (Harrelson et. al. 1992), sediment characterization (Harrelson et. al. 1992), vegetation plot transects (Interagency 1999), and woody species regeneration (Winward 2000).

An ocular vegetation survey is collected at each project site to assess plant species present. Plants are listed by name and categorized as grasses, sedges, rushes or forbs or shrubs and trees. The presence of noxious weeds are noted in the comments and an estimation of abundance is given for each plant identified (Hankins & Launchbaugh undated).

Implementation Monitoring. All projects are inspected during and after implementation by project planners or engineers. Each project is assigned a final project inspector. Projects are inspected throughout construction to confirm materials delivery and validate amount of materials used. Projects are inspected for adherence to original design and take into consideration necessary change orders. Photos are taken during and after implementation from photopoint sites. Instream habitat enhancement projects will document the number of structures installed, structure composition, treatment length, and intended function. Stream flow measurements, stream width, stream depth, and sediment characterization may also be compiled. Fish passage projects will include photos of all installed structures, such as headgates, sprinkler systems, pumps, and pipeline installation. Additional quantitative data may include water velocities over fish passage structures and streamflow measurements. Riparian management projects require a final project inspection that includes counting all installed materials and a GPS line recording location and length of any fencing installed. This type of activity can take place immediately after implementation without regard to the season of the year. However, projects that are chosen to receive additional quantitative monitoring may necessitate waiting for spring or summer to establish photopoints or monitoring sites. Additional quantitative data may include greenlines, woody species regeneration (Winward 2000), channel cross-sections (Harrelson et.al. 1994), sediment characterization sections (Harrelson et.al. 1994), or ground cover transects (Interagency 1999). If projects are determined to be incomplete or not completed to designs, landowners, contractors, and SWCD's will meet to determine the best course of action.

Performance Monitoring. Performance monitoring consists of post-project implementation site visits to determine if a project is being maintained and having the intended effect. If the project is having a desirable or undesirable effect, it should be revealed through performance monitoring. Each project type has a project form to record pertinent qualitative and quantitative data. Projects that recorded additional quantitative data during implementation monitoring will continue to collect the same quantitative data throughout the monitoring time period. Most projects will be monitored every five years after implementation unless a significant environmental event occurs in the area to warrant additional attention. An additional source of information to determine project performance is to contact the landowner or irrigator, since landowners or irrigators are responsible for the operation and maintenance of these projects. This type of daily observation is invaluable because the landowner is able to observe the project within a variety of conditions. Client interviews will be conducted with landowners at the time of each monitoring event with the client interview form.

Data Management for Monitoring and Evaluation

A series of checklists have been developed to facilitate uniform and consistent data collection. For each project type there is an associated datasheet and checklist. All projects implemented through the USBWP process are evaluated with the appropriate project type form. The checklist portion of the form consists of yes or no questions pertaining to desirable or undesirable environmental responses to the project (Harris et. al 2002).

Field Data Collection. Field data collection forms and protocols are in the Appendices of the USBWP Monitoring Plan.

Data Entry. The USBWP monitoring technician enters form data into Microsoft Excel spreadsheets and organizes digital photos in an electronic photomonitoring book and hardcopy photomonitoring book.

Quality Control/ Quality Assurance. The USBWP Monitoring plan establishes the protocols and procedures for quality control and assurance.

Analysis. Analysis has not yet been determined.

Reporting

Final Implementation Inspection. If inspection is conducted by USBWP staff, the sponsoring SWCD will receive reports validating delivery of materials, final counts of installed materials, and completion date of projects.

Annual Project Completion Report. Each year a project completion form is completed for each project implemented in that fiscal year. The purpose of this report is to inform sponsors and funding agencies of the results of project implementation and completion. These reports will include the location of the project, name of sponsor, name and organization of project inspector, objectives of project, "as-built" project description, design drawings, and the name of the contractor(s). These reports are compiled into a review of completed projects report and submitted to the sponsoring SWCD and the BPA contracting officer.

Annual Effectiveness Monitoring Report. Each year a summary report of all projects monitored as part of the effectiveness monitoring schedule will be compiled. Sponsoring SWCD's receive a binder including all photopoints and past year comparison photos.

Landowner Reports. Each landowner will receive a copy of the project maps with photopoint locations, a copy of the project checklist, and a copy of comparison photos of project.

Presentations. Results and accomplishments will be presented via powerpoint presentations to the USBWP Advisory Committee, SWCD's, and the USBWP Technical Team.

2) Also needed is reporting on how far along they are to meeting their long-term goals and how much have they accomplished.

Long-Term Goals.

The original Model Watershed Plan (Idaho Soil Conservation Commission 1995) list the following as the goals of the Upper Salmon Basin Watershed Project.

- Provide for the safe and timely passage of migrating fish through critical reaches of the watershed.
- Protect spawning areas by ensuring that spawning gravels are managed to prevent habitat losses.
- Protect and manage juvenile fish rearing areas.
- Protect and enhance water quality to ensure maximum survival of juvenile fish.
- Protect and enhance instream and riparian environments to maximize fish production and escapement.
- Minimize losses of migrating fish caused by irrigation diversions.

- Ensure that any resources invested achieve maximum returns in terms of multiple-use benefits.
- Coordinate all salmon recovery activities to minimize duplication of efforts and maximize use of limited resources.
- Achieve measurable progress towards a holistic resource management approach that addresses water management, water conservation, fish habitat protection, and fish migration.
- Develop an effective and responsive resource management program (i.e., agriculture, timber, mining, fish, wildlife) for the watershed.
- Develop or adapt a holistic watershed management approach for fish habitat protection, enhancement, and restoration.

Additionally, the following Habitat Goals and Priorities for the Lemhi River watershed are listed in the Model Watershed Plan. Only the high priority actions are listed here.

- Increase instream flows during critical fish migration periods.
- Reduce the number of physical barriers hindering fish migration.
- Establish riparian vegetation along critical areas to provide cover and reduce temperatures.
- Reduce sediment levels within spawning gravels.

Accomplishments:
Projects implemented toward the completion of these goals include irrigation diversion modification to facilitate passage and riparian grazing management.
In the Lemhi River and Mid-Salmon Panther watersheds the USBWP has implemented 16 passage improvement projects. In the Lemhi River watershed, there have been a total of 28.7 miles of stream treated with riparian fencing or grazing systems. This equates to approximately 14% of the total private stream miles in the Lemhi River watershed. In the Mid-Salmon Panther watershed, only approximately 3% of the private lands have been treated with riparian fencing or grazing systems.

3) How much needs to be done?

In the Lemhi River and Mid-Salmon Panther watersheds, the Salmon Subbasin Plan sites several actions that need to take place. These actions were not necessarily identified in the original Model Watershed Plan.

1. Hydrograph rehabilitation
2. Tributary reconnections; currently only 7% of tributaries are connected
3. Improve irrigation efficiency below irrigation diversion L-7
4. Improve riparian function
5. Maintain and enhance the riparian corridor along the upper ten miles of the Hayden Creek –Leadore reach of the Lemhi River
6. Establish riparian vegetation along critical areas in Big Springs Creek near Leadore
7. Improve migration at water diversions in Hayden Creek, a major tributary to the Lemhi River
8. Improve conveyance in Hayden Creek diversions
9. Irrigation diversion modification to improve migration basin wide

4) Please provide a summary with synthesized quantitative data describing habitat changes resulting from project activities, and fish population responses.

The original Model Watershed Plan (1995) proposed that monitoring be conducted on three different levels. The first level of monitoring and evaluation would be very basic, focusing on projects, which have been implemented, and whether projects were implemented as planned. This type of monitoring has been on-going since the inception of the program. Many improvements have been made as outlined in Appendix A.

The second level measures the effects on specific habitat parameters to evaluate individual actions, as well as cumulative effects of different actions. To measure changes in these habitat parameters, reference sites will be established in key watershed reaches. Detailed habitat inventories will then be conducted at these sites to establish baseline data and monitor future changes. Individual actions designed to meet a specific watershed need will be monitored to assess effectiveness. For example, if an action proposes a pasture management system to enhance riparian vegetation, changes in plant cover will be monitored to evaluate this action. This level of monitoring has taken longer to implement, and the USBWP has established a reference site in the upper Lemhi on Big Springs Creek. Two years (2003 and 2005) of intensive data have been gathered and summarized in a draft report. More sites are planned in other watersheds.

A third level of monitoring is conducted by the Idaho Department of Fish and Game on in-basin changes in fish productivity. This is accomplished by a screw trap for counting juvenile fish which is installed on the Lemhi River (near diversion L-40). Survival rates can be calculated between different life history stages that occur within the watershed (e.g., egg-to-fry, egg-to-Parr, egg-to-Smolt, etc.). The egg-to-Parr survival rate is an important indicator of fish productivity and egg numbers can be estimated by using redd counts. Parr numbers can then be monitored using population density counts usually obtained by snorkeling or by electrofishing. These are rough estimates however, because of fish movements and the difficulty of snorkeling the river during different flows. Redd counts and parr monitoring data is shared with other agencies at Upper Salmon Basin Watershed Project Technical Team meetings.

Many of the high priority actions identified in the *Model Watershed Plan* (ISCC 1995) are completed and reported in the *Model Watershed Project Report of Projects 1993-2000: Lemhi River, Pahsimeroi River, and East Fork of the Salmon River, Idaho* (Loucks 2000). The USBWP office currently assists the Lemhi SWCD with an average of five BPA funded projects per year. USBWP staff conducts onsite project monitoring, analyzes data, and writes reports. The Upper Salmon River Basin Monitoring Plan (Bradbury 2006) provides a course of direction and a set of protocols applicable for monitoring fish habitat projects coordinated through USBWP. As of March 2006, there are a total of 57 projects on the USBWP monitoring schedule. At the current staffing level, the USBWP can adequately (including data management and reporting) monitor approximately 10 projects per year including pre-project monitoring and implementation monitoring of current projects and follow-up monitoring of completed projects. There are 47 BPA projects under contract with the Lemhi SWCD that are currently tracked and monitored on a regularly scheduled basis. Four BoR/BPA projects, four US Fish and Wildlife Service Partners for Wildlife Projects, three Pacific Coast Salmon Recovery Fund Projects, and three other fisheries habitat projects are also included on the USBWP monitoring schedule.

Most projects between 1995 and 1999 were on ten-year contracts and will drop off the monitoring schedule over the next few years. Projects implemented between 2000 and 2005 are on 15-year contracts and will be on the monitoring schedule significantly longer.

In 2005, nineteen projects were monitored with 16 being BPA funded projects. In 2005, new data collection forms were field tested for usability and effectiveness, as the initial forms had proved cumbersome to use and failed to address issues encountered in the field. These forms were modified and improved (see attached Project Monitoring Report for 2005). Table 1 indicates the total number of stream miles of mainstem river and tributaries for each watershed in Lemhi County and the number of stream miles treated by riparian fencing or grazing systems. About 51% of the mainstem Salmon River borders private land on at least one streambank. About 99% of the mainstem Lemhi River borders private land on at least one streambank.

Watershed	Stream	Stream Miles Treated	Total Stream Miles per Watershed	Private Stream Miles
Lemhi	Lemhi River Mainstem	20.8	57	56.9
Lemhi	Lemhi River Tributaries	7.9	1,273	150.4
Middle Salmon-Panther	Salmon River Mainstem	4.4	131	66.9
Middle Salmon-Panther	Salmon River Tributaries	0	1,827	73.7

Table 1. Total stream miles and stream miles treated by riparian fencing or grazing systems on private land.

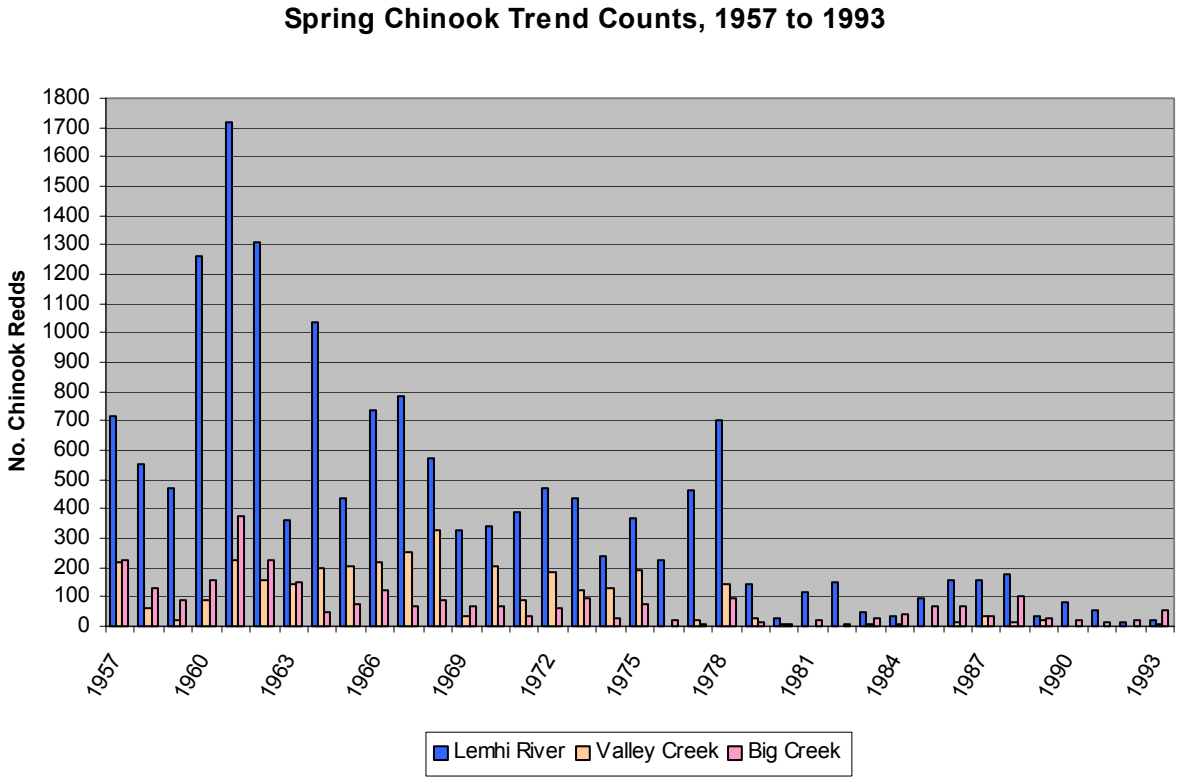
Future monitoring improvements.

A planned improvement for 2006, is to adapt and improve the client interview process. People who operate and maintain these projects on a daily basis are an invaluable source of information as to the daily functionality and effectiveness of projects. In addition, the staff plans to add close up photographs of plot frames at project sites to detail disturbances and ground cover. High amounts of rodent activity has been noted behind exclusion fences, consisting of tilling up large areas of soil. This is usually followed by annual weeds pioneering these disturbed areas. It is unknown whether or not this is a problem for revegetation of the riparian area in the long term. Hence, the USBWP is working with the University of Idaho Cooperative Extension to develop monitoring protocols to track the effects of this rodent activity. This has created a shift to develop riparian grazing systems using flash grazing to quickly clear decadent vegetation which hides rodents. The USBWP is working with Natural Resources Conservation Service to develop riparian pastures systems and grazing plans and Cooperative Extension to develop monitoring strategies for these grazing systems.

Chinook Population Trends

Several efforts have been undertaken over the years to enhance the anadromous fishery. Idaho Department of Fish and Game and National Marine Fisheries Service started a program to screen irrigation diversions in 1958. Despite their efforts, the Lemhi River anadromous fishery and all other runs in the Salmon Watershed collapsed through the 1970s and 1980s as depicted in Graph 1. However, a basin wide run of 2,000-4,000 fish was not uncommon into the 1960s. Graph 1 describes summer Chinook redd counts in three selected streams with three different types of land management. The Lemhi River is 99% private, Valley Creek is 56% private with

management by the Sawtooth National Recreation Area (SNRA), and Big Creek is 100% managed by the U.S. Forest Service as a wilderness area (Table 2). Loucks (2000) further describes the history of irrigated agriculture, local hydropower development, fish hatchery/stocking programs, channel alteration, and mining within the Lemhi watershed.

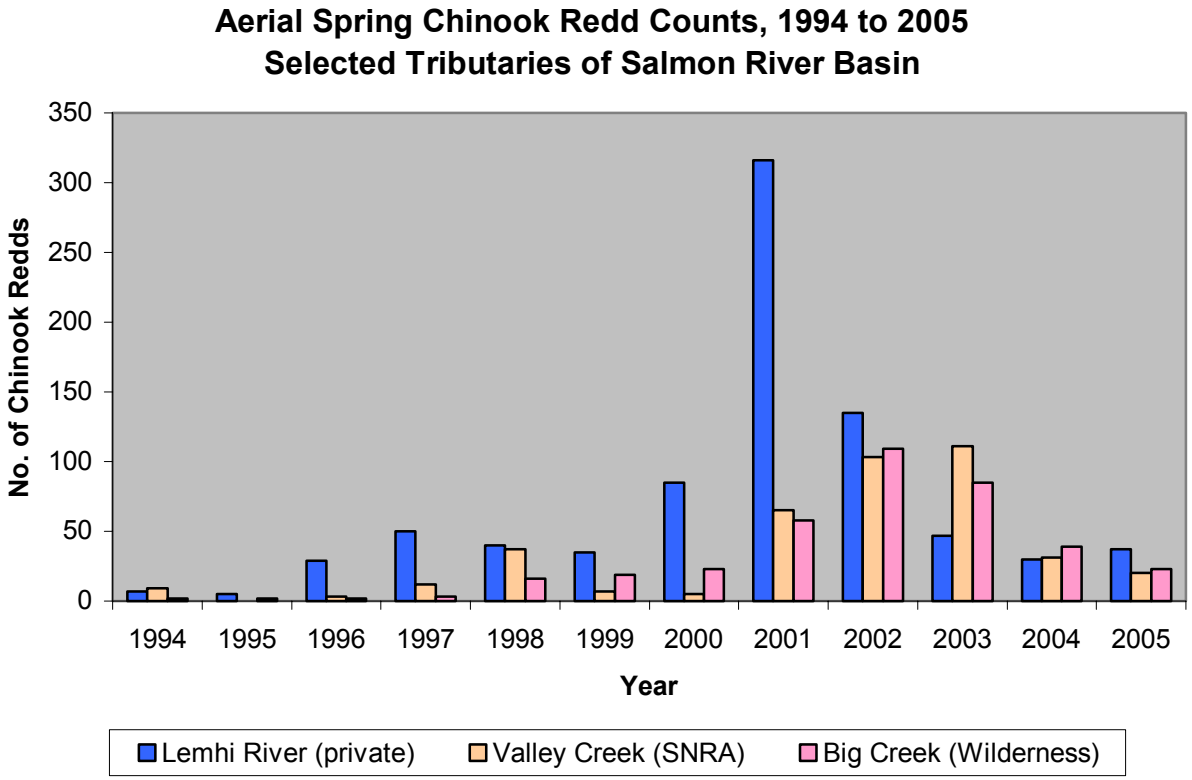


Graph 1. Lemhi spring chinook population trend compared to Salmon River wild trend areas, 1957 to 1993.

Each redd represents about 2.3 salmon. The correlation between the Lemhi runs (1957-2000) and the Snake River Wild Trend Areas (SR Wild Trend Areas) is 0.80. This means that only about 20% of the annual variation in runs within the watershed is explained by events in the watershed and random effects. Eighty percent is explained by events outside the Salmon River Basin (Loucks 2000).

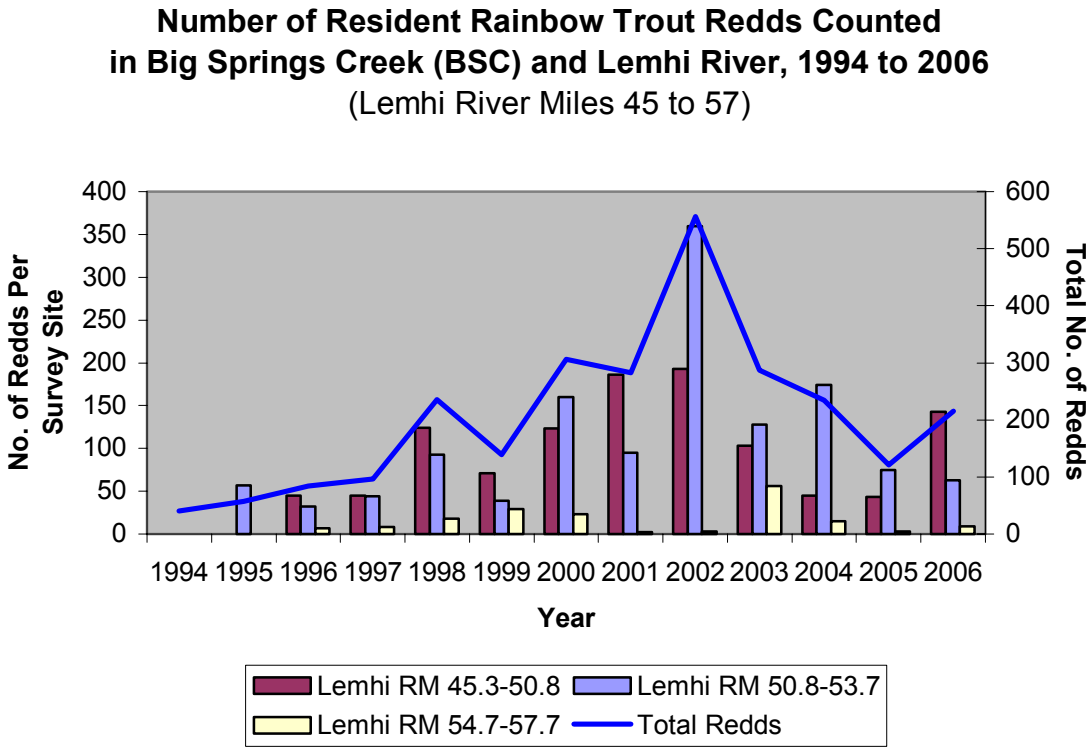
Stream Name	Watershed	Private Stream Miles	Mainstem Stream Miles	Drainage Area Square Miles	Drainage Area Acres
Lemhi River	Lemhi	56.9	57	1,255	803,204
Valley Creek	Upper Salmon	14	25	145	92,830
Big Creek	Upper Middle Fork Salmon	0	46	595	381,133

Table 2. Drainage area, private stream miles, and mainstem stream miles of selected watersheds.



Both graphs 1 and 2 indicated that similar decreases have occurred basin wide in the Upper Salmon River. Similar annual increases and decreases in Chinook salmon redd counts indicate a common factor affecting adult returns independent of location or management.

Graph 3 shows the number of resident rainbow trout redds counted in Big Springs Creek and the Lemhi River from 1994 to 2006. The reach from Lemhi River mile 45 to 57 is the primary spawning area for chinook salmon. Approximately, twelve BPA funded projects have been implemented in this area since 1994. The IDFG (pers. com. T. Curet) presumes that increases in the number of resident rainbow redds, as shown in graph 3, are correlated with implementation of the BPA funded fisheries habitat improvement projects. Since, it is difficult to make conclusions about salmon populations due to out-of-basin effects, resident rainbow populations may be the most direct indicator of the effects of habitat projects on fisheries.



Graph 3. Resident rainbow trout redds counted in Big Springs Creek and Lemhi River between Lemhi River miles 45 and 57, 1994 to 2006.

5) Previous proposal committed to develop a more unified monitoring and evaluation program.

Two proposals were submitted in 2002 for FY2003 through 2006, project number 1992020603, Upper Salmon Basin Watershed Project Administration/Implementation Support and project number 199401700, Holistic Restoration of Critical Habitat on Non-federal Lands in the Lemhi Watershed, Idaho. The following monitoring and evaluation objectives where stated:
Objective 1. Refine the USBWP's monitoring program.
Objective 2. Implement the monitoring program.
Objective 3. Evaluate monitoring data to allow adaptive management of the USBWP program.
Results: Please refer to Appendix A, A History of Improvements to Monitoring Activities, for a complete timeline and evolution of the Upper Salmon Basin Watershed Projects monitoring program.

REFERENCES

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APPENDIX A.

A History of Improvements to Monitoring Activities

In 1994 a stream habitat inventory was coordinated by the MWP staff and completed by an interagency team of biologists and natural resource specialists for the Lemhi, Pahsimeroi, and East Fork Salmon Rivers. This information helped to guide the initial planning efforts by the watershed coordinator and Advisory Committee. This information was published in the *1994 Stream Habitat Inventory Report: Lemhi, Pahsimeroi, and the East Fork Salmon River, ID* (Trapani, 2002). Also in 1994, at the request of the Lemhi SWCD, a water quality sampling program was undertaken on the Lemhi River through a cooperative agreement between BPA and SCC, with BoR agreeing to fund water quality laboratory analysis. This program continues to the present with the SCC providing water quality personnel and the Lemhi SWCD funding the sampling. This program is a separate program from the USBWP; however, interagency collaboration allows for data sharing through the USBWP Tech Team.

The initial planning component of the project was completed in 1995 with the publication of *The Model Watershed Plan* (SCC 1995). This plan summarizes the structure and function of the MWP and outlines the priority areas within each watershed with habitat goals and objectives for each stream reach

From 1995 to 1998, the BoR contracted with WD74 to collect hydrologic data for thorough monitoring of groundwater levels in over 80 existing irrigation and domestic wells. The results are reported in *A Spreadsheet Notebook Method to Calculate Rate and Volume of Stream Depletion by Wells in the Lemhi River Valley Upstream from Lemhi, Idaho* (Spinazola 1998, Lemhi River Basin Study - BoR).

A cooperative undertaking between BoR and USGS in 1997 began seepage measurements during and after the irrigation season along a 60-mile reach of the Lemhi River. These measurements were used to determine seepage from seasonally distributed gains and losses in the Lemhi River. This resulted in a report entitled *Surface-Water/Ground-Water Relations in the Lemhi River Basin, East-Central Idaho* (Donato 1998).

In March 1997, the MWP began to facilitate meetings with agencies such as IDFG, DEQ, SBT, USFS, and BLM that collected stream temperature data within the Upper Salmon River Basin. The result was a document entitled *Upper Salmon River Basin Interagency Water Temperature Monitoring Protocol* (1997). This document standardized data collection procedures and graphing methods. Moreover, data logger locations were mapped across agency boundaries.

The MWP Project Planner started in May 1997. The intent of this position was to have a field person to assist landowners/irrigators in developing on-the-ground plans for fish habitat and enhancement projects on private lands.

From 1997 through 1999, the MWP project planner began to compile and organize existing photopoint data and retake known photopoints of previous projects. The planner also began to collect and summarize existing monitoring protocols and information. In addition, a Trimble GeoExplorer Global Positioning System (GPS) and ArcView 3.1 were purchased in 1999. For the first time, the MWP could use GPS data and GIS maps to plan new projects and monitor completed projects.

In 1999, the MWP began developing a webpage to share its success and began work on a a project implementation database to track completed projects. The MWP planner met with the

Grand Rhonde Model Watershed Project staff and transferred the information exchange into a database for the MWP. The ability to hire talented high school and college student interns has greatly facilitated the ability of the project to develop these technologies. Currently, USBWP office performs the role of tracking anadromous fisheries enhancement projects on private land throughout the Salmon Basin.

In 2000, the MWP project planner began developing a data dictionary for the Trimble GPS unit to aid in monitoring data collection.

In 2000, the Tech Team began assisting the MWP project planner in developing a monitoring program that the MWP could use to support the SWCD's. The Tech Team also began developing Project Proposal Forms to facilitate information sharing and project ranking. A Tech Team subcommittee revised these forms in 2002 to create a more user-friendly form.

In 2000, the MWP Advisory Committee requested a summary report of the actions outlined in the MWP Plan (1995). The result was a publication entitled, *Model Watershed Project Report of Projects 1993-2000: Lemhi River, Pahsimeroi River, and East Fork of the Salmon River, Idaho* (Loucks 2000).

In May 2001, a *Draft Salmon Subbasin Summary* (Servheen et. al. 2001) was completed. The information in this document drew heavily on members of the USBWP Tech Team and their ability to work together and share fisheries information.

In 2002, the project implementation database was converted from Corel Paradox to Microsoft Access, this created a user-friendly database that most staff members could use.

By 2002 the Tech Team had developed a sufficiently usable project form and developed a questionnaire style ranking process. In April 2002, the Tech Team began to request project proposals and use the new project prioritization/ranking process.

In 2003, the office began to update from ArcView 3.1 to ArcMap 8.3.

From January 2003 through August 2005, the USBWP Tech Team formed a multi-agency subcommittee to formulate a document to create a prioritized list of streams within watersheds to guide fish screening and habitat improvement efforts on privately owned lands in the Upper Salmon Basin. This document sought to go beyond the original priority mainstem reaches included in the MWP Plan (1995) and includes the remaining mainstem and tributary reaches. The resulting document is called the *Screening and Habitat Improvement Prioritization for the Upper Salmon Subbasin* (SHIPUSS, 2005).

With the assistance of the Tech Team, the USBWP produced the first draft of the "Upper Salmon Basin Watershed Project Monitoring Plan for Projects" in the fall of 2003. This carried through to the hiring of a field-monitoring intern to conduct all monitoring in the summers of 2004 and 2005. Edits and updates to the plan are currently being made based on the results of the field monitoring and comments from BPA.

In 2004, the monitoring intern helped to develop a computer based database of digitized project photos to facilitate the retrieval and printing of monitoring photos.

From 2003 through November 2005, the USBWP Tech Team formed a multi-agency subcommittee to formulate the *Upper Salmon River Recommended Instream Work Windows and Fish Periodicity (2005)*. The group produced this document to aid in Endangered Species Act consultations and facilitate agreement on timing of instream work based on local knowledge and data on fish life history.

From 2004 through 2005, a college student was hire as a monitoring intern to assist staff in implementing the monitoring program and providing feedback for the practical

implementation of the program. The intern monitored ____ projects throughout the Upper Salmon River Basin and assisted in completing individual reports on projects.

In 2005, the USBWP office conducted a training workshop in Microsoft Access database software for all staff. The purpose was to get the entire staff up to speed on the use of Access for project data entry and the use of queries and reporting of project information.

In 2006, funding for a monitoring intern was discontinued.

In 2006, the project database was updated to accept monitoring data and track the dates of site visits. Previously, monitoring data was tracked on Microsoft Excel Spreadsheets. There are plans to revamp the database in 2007 to accept all the monitoring data associated with individual projects.

In 2006, the Lemhi Soil and Water Conservation District sponsored a riparian monitoring workshop with the USBWP and the University of Idaho Cooperative Extension, which was attended by all USBWP staff.

In 2006, the Lemhi Soil and Water Conservation District worked with USBWP to arrange a tour of exclusion fencing projects to observe effects of fencing on Lemhi River riparian areas.

The USBWP Technical Team regularly invites agencies conducting monitoring activities in target watersheds to report on the types of monitoring they are conducting, years of data, and any preliminary or final results or trends. In 2006, the Sawtooth National Recreation Area, Shoshone-Bannock Tribes, Idaho Department of Fish and Game, and Idaho Department of Water Resources have made presentations to the USBWP Technical Team.