MONTANA FISH, WILDLIFE & PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE:	Montana	PROJECT TITLE:	Lower Clark Fork River
PROJECT NO.:	3150 and 31005	STUDY TITLE:	Watershed Restoration, Habitat Restoration Monitoring, and Habitat Protection
JOB NO.:		JOB TITLE:	Northwest Montana Tributaries

PROJECT PERIOD: JULY 1, 2002 THROUGH JUNE 30, 2004

ABSTRACT

The Bull River watershed was identified as a target watershed for acquiring habitat and conservation easements due to important fish and wildlife habitat values and increasing development pressures. The efforts to acquire habitat in that drainage that were begun in 2001 have continued in 2002 and 2003. Work was continued to complete the funding of the acquisition of the Genesis property (716 acres) that was acquired in 2002, and to acquire a portion of the adjacent Plum Creek Timber Company (Plum Creek) property (1,164 acres)

Montana Fish, Wildlife and Parks is involved in watershed restoration in several tributaries to the Lower Clark Fork River drainage through the Montana Tributary Habitat Acquisition and Enhancement Program (Appendix B) and as a technical advisor to watershed councils. The goal of the watershed restoration is to reduce sediment sources to the stream, restore healthy functioning stream channels, and to enhance fish habitat. Watershed restoration has been ongoing in drainages to the Lower Clark Fork River and continued from 2002 to 2004 by conducting watershed assessments in the Prospect and Pilgrim creek drainages and restoration projects in the East and South forks of the Bull River, Snake, Jungle and Whitepine creeks.

A Lower Clark Fork Habitat Problem Assessment was begun in 2003 to provide a framework to develop and prioritize habitat restoration to help restore bull trout and westslope cutthroat trout at the Lower Clark Fork watershed scale. This assessment is necessary to prioritize and implement projects in a holistic manner across the Lower Clark Fork River drainage to ensure habitat improvement projects accomplish their intended objective of helping to restore bull trout and westslope cutthroat trout over time.

A multiple year Restoration Monitoring study that began in cooperation with Avista Corp. in 2001 was continued in 2002, and modified somewhat, but continued in 2003. Monitoring fish populations is important to determine if restoration is producing the desired results. The

abundance of fish pre-restoration at various sites was monitored in the South Fork Bull River in 2002 and post-restoration in the East Fork Bull River in 2002 and 2003. In addition, the abundance of fish post-restoration in the Elk Creek drainage was monitored in 2002 and in the Jungle Creek drainage in 2003. The abundance of fish was also monitored in a reach of Prospect Creek in 2002 and drainage-wide in 2003 to serve as baseline information prior to the continuation of extensive restoration occurring in this watershed. In addition, the abundance of juvenile trout outmigrating from the Bull River drainage in 2002 and the Prospect Creek drainage in 2003 was monitored to serve as the third year of baseline data on outmigration from each of the drainages. A report summarizing the first two years of this study (2001 and 2002) was completed in 2003.

The abundance of native salmonids continued to be monitored in the Rock Creek, Graves Creek, Fishtrap Creek, West Fork Thompson River, and Vermilion River drainages in 2003. However, the approach to the native salmonid abundance monitoring changed in 2003 in order to better monitor key bull trout and westslope cutthroat trout drainages in the Lower Clark Fork River drainage in cooperation with other on-going programs. As part of this native salmonid abundance monitoring, bull trout redd numbers continued to be monitored in Prospect Creek, the Bull River, East Fork Bull River, and South Fork Bull River in 2002 and 2003. In addition, the abundance of bull trout redds was monitored in Rock Creek in 2002. Brown trout redd numbers also continued to be monitored in the Bull River and Prospect Creek drainages in 2002 and 2003.

BACKGROUND

Management of native species is currently emphasized in the tributaries to Cabinet Gorge and Noxon Rapids reservoirs (Lower Clark Fork River drainage). Management is guided by several plans: the Bull Trout Restoration Plan (Montana Bull Trout Restoration Team 2000), Westslope Cutthroat Trout Conservation Agreement (MFWP 1999), Native Salmonid Restoration Plan (Kleinschmidt and Pratt 1998), and Clark Fork Settlement Agreement (Avista 1999).

Tributaries with key spawning and rearing habitat for bull trout and westslope cutthroat trout are important to all of the current guiding plans. Core areas identified for bull trout in the Lower Clark Fork River drainage include Bull River, Rock Creek, Vermilion River, Graves Creek, Prospect Creek, Fishtrap Creek, and the West Fork Thompson River drainages. In addition, all genetically pure populations of westslope cutthroat trout, which occur in many drainages in the Lower Clark Fork River, are important.

The Native Salmonid Restoration Plan is a plan to recover native salmonids in the Lower Clark Fork system from Thompson Falls Dam downstream to Lake Pend Oreille developed as part of the relicensing process for Cabinet Gorge and Noxon Rapids dams. It provides a step-wise approach for restoration efforts. This includes examining issues influencing availability of native fish stocks suitable for passage at Cabinet Gorge and Noxon Rapids dams. These issues include genetics, pathogens, introduced or exotic fish species distribution and control, native fish abundance, and tributary and mainstem habitat evaluation, protection, and enhancement.

The Clark Fork Settlement Agreement (Settlement Agreement) provides protection, mitigation, and enhancement measures to mitigate for the effects of Cabinet Gorge and Noxon Rapids dams owned and operated by Avista Corp. (Avista). This includes mitigating for the effects of power

peaking and reservoir operational impacts of the Cabinet Gorge and Noxon Rapids dams to native salmonids and recreational fisheries and increasing the viability of native salmonid populations by providing fish passage between tributaries upstream of Cabinet Gorge, Noxon Rapids, and Lake Pend Oreille. This also involves increasing the viability of bull trout populations by reducing poaching, accidental harvest, and habitat loss, assisting local landowner groups to protect and improve the Lower Clark Fork River watershed, and maintaining and improving water quality in the vicinity of the dams.

Montana Fish, Wildlife and Parks (MFWP) implements (with some Avista funding) one protection, mitigation and enhancement measure of the Settlement Agreement, the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B). The purpose of this program is to offset the impacts of the power peaking operation of the Cabinet Gorge and Noxon Rapids Projects to native salmonids and recreational fisheries in Montana. This program is a multiple component effort that includes the restoration and enhancement of Clark Fork River tributary watersheds, support of recreational fishery monitoring and management, and evaluation and implementation of recreational fishery enhancement projects. Two components of this program are related to the tributaries in the Lower Clark River drainage: Tributary Habitat Acquisition and Enhancement and Fish Resource Monitoring, Enhancement, and Management.

A goal of the Tributary Habitat Acquisition and Enhancement program is to restore and secure the long-term population viability of native salmonids affected by Cabinet Gorge and Noxon Rapids dams. Critical habitats need to be restored and protected if the native salmonid populations using these habitats are to be restored and maintained. Acquiring riparian properties or conservation easements on riparian areas near spawning and rearing sites will protect riparian buffers and high quality tributary habitat to help restore and protect migratory salmonid populations. The Bull River watershed was identified in 2001 as a target watershed for acquiring habitat and conservation easements due to important fish and wildlife habitat values and increasing development pressures (Katzman and Saffel 2001a). Two acquisitions have occurred and a third acquisition has been pursued since the project was begun.

MFWP is involved in watershed restoration in several tributaries to the Lower Clark Fork River drainage as the implementer of the Montana Tributary Habitat Acquisition and Enhancement Program (Appendix B) and as a technical advisor to watershed councils. The goal of the watershed restoration is to reduce sediment sources to the stream, restore healthy functioning stream channels, and to enhance fish habitat. Watershed councils exist in several watershed in the Lower Clark Fork River drainage including Bull River, Prospect Creek, Pilgrim Creek, Whitepine Creek, Trout Creek, Elk Creek, and Rock Creek. A Lower Clark Fork Watershed Group also formed in cooperation with many entities in 2003 to bring together the seven existing watershed councils in the Lower Clark Fork in a consolidated team effort to conduct watershed restoration. This group will facilitate information sharing, acquisition of outside funding, and assessing restoration priorities on a Lower Clark Fork River drainage scale. MFWP contributes to the watershed councils and Lower Clark Fork Watershed Group as part of their technical advisory committees. Because the first step prior to performing watershed restoration is to perform watershed assessments to describe habitat conditions and identify habitat enhancement priorities, assessments were conducted in two drainages. In addition, watershed restoration has

been ongoing in drainages to the Lower Clark Fork River and continued from 2002 to 2004 in several drainages.

The Montana Tributary Habitat Acquisition and Enhancement Program involves using mitigation funding supplied annually for 45 years from Avista to acquire tributary habitat and conduct watershed restoration in the Lower Clark Fork River drainage. In order to ensure land acquisition and habitat improvement projects accomplish their intended objectives of helping to restore bull trout and westslope cutthroat trout, a Lower Clark Fork habitat problem assessment was begun in 2003. This assessment will provide a framework to develop and prioritize habitat restoration to help restore bull trout and westslope cutthroat trout at the Lower Clark Fork watershed scale. Although several documents currently guide habitat restoration for bull trout and westslope cutthroat trout and are important and helpful, none give specific guidance to identify and prioritize habitat restoration for recovering both bull trout and westslope cutthroat trout within the Lower Clark Fork River drainage.

Monitoring fish populations is important to determine if on-going restoration is producing the desired results. Monitoring took place in similar drainages in 2002 as 2001. However, monitoring was revised in 2003 to better monitor both habitat restoration and native salmonids in the Lower Clark Fork River drainage.

OBJECTIVES AND DEGREE OF ATTAINMENT

Activity 1 – Survey and Inventory

Objectives: 1) To survey and monitor the characteristics, status and trends of fish populations and angler use and harvest in selected streams and lakes, and 2) to identify opportunities to improve aquatic habitats along with native and sport fish production.

Activity 2 – Fish Population Management

Fisheries Management
Desired Outcomes: 1) Aquatic ecosystems that support self-sustaining populations of native species, and 2) abundant, fishable populations of sport fish species – native and non-native.
Performance Measures: 1) Size, status, and trends of fish populations through population surveys and inventories, and 2) status of species of special concern, and threatened/endangered species.

Habitat
Desired Outcomes: 1) An increase in high-quality aquatic ecosystems (water quality, water quantity, and physical features) that support fish populations, and 2) an informed public that supports and participates in efforts to restore and protect the state's aquatic habitat
Performance Measures: 1) Inventories of riparian health, bank and channel integrity, long-term effectiveness of various habitat treatments, and the responses of fish populations to changes in habitat, and 2) public participation in efforts to restore and protect habitat through partnerships and watershed groups.

Bull River Habitat Acquisition and Conservation Easement Project

Objectives and Degree of Attainment

The Bull River Habitat Acquisition and Conservation Easement project (Katzman and Saffel 2001a) was continued from 2002 to 2004. Its objective to acquire land and conservation easements to protect bull trout and westslope cutthroat trout habitat in the Bull River drainage meets the fish population management desired outcome #1.

Between 2002 and 2004, funding was pursued for two properties in the Bull River drainage, the Genesis and Plum Creek properties. The Genesis property (716 acres) was purchased in 2002 with the assistance of several funding partners. The property contains important fish, wildlife, river, riparian, and wetland habitat. Funding partners included Avista, The Conservation Fund, North American Wetland Conservation Act Small Grants Program, and Genesis Incorporated. The Conservation Fund supplied funding on a short-term basis for the acquisition and needs to be repaid for their interest in the Genesis property. A large parcel owned by Plum Creek Timber Company (1,164 acres) was also pursued in 2003 and 2004. The Plum Creek property is adjacent to the Genesis property and contains important wetland and wildlife habitat.

Several grant proposals were written in cooperation with other organizations including Avista between 2002 and 2004 to submit to various funding entities to help repay The Conservation Fund for their interest in the Genesis property and to help fund the acquisition of the Plum Creek property. In 2003, a $1,000,000 grant from the U.S. Fish and Wildlife Service Habitat Conservation Plan (HCP) Land Acquisition program was obtained to help use toward acquisition of a portion of the Plum Creek property. MFWP in cooperation with Avista has also applied for approximately $3.6 million in funding from the HCP program this year to complete the purchase of the Plum Creek property and finish repaying The Conservation Fund for their investment in the Genesis property.

Procedures

The majority of the land along the mainstem Bull River and some of the land along the lower portions of its tributaries is in private ownership. Much of the private land in the Bull River drainage has been subdivided. There are over 200 landowners in the Bull River drainage with about 85 of those with land bordering the Bull River or one of its tributaries. Eleven of the landowners with land bordering the Bull River or one of its tributaries have parcels greater than 80 acres and four of those currently have or are working toward conservation easements on their property, two others were purchased by Avista and funding partners and will be protected, and one other was purchased by a conservation buyer and will be protected. Of the remaining properties bordering the Bull River or one of its tributaries only 13 others have parcels greater than 30 acres and two of these currently have a conservation easement. Securing remaining riparian habitat before it is further subdivided is important to the ability of the program to obtain its goals. The parcels greater than 80 acres with land bordering the Bull River or one of its tributaries without conservation easements or other protection are highest in priority for the program. Of the remaining properties bordering the Bull River or one of its tributaries the 11 parcels greater than 30 acres without conservation easements are next highest in priority. Parcels bordering the Bull River or one of its tributaries adjacent to protected land are also high in priority for acquisition or conservation easements. Generally, parcels bordering long sections of

the Bull River or one of its tributaries and that have a high percentage in wetland rank high in priority. Factors that are considered in prioritization include amount of protection of the stream channel, stream banks, spawning and rearing habitat, connectivity, and bank and channel cover.

Findings

A U.S. Fish and Wildlife Service HCP grant ($1,000,000) was obtained to begin to fund the acquisition of the Plum Creek property (1,164 acres). MFWP in cooperation with Avista has also applied for approximately $3.6 million in funding from the HCP program this year to complete the purchase of the Plum Creek property and finish repaying The Conservation Fund for their investment in the Genesis property.

The Genesis property (716 acres) was the largest private parcel remaining that bordered the Bull River. It is located in the upper watershed just downstream from the confluence of the North, Middle, and South forks of the Bull River. The Genesis property has more than a mile of the Bull River flowing through it, a majority of three first-order tributary drainages, and a large wetland complex on it. This acquisition protects the stream channel, banks, channel cover, potential spawning and rearing habitat, and a migratory corridor for bull trout and westslope cutthroat trout. The property contains little development (two cabins) and is bordered by U.S. Forest Service land on three sides.

The Plum Creek property (1,164 acres) is adjacent to the Genesis property on the north and includes a gentle divide between the Bull River and Lake Creek drainages. It includes a large wetland complex that forms a headwaters of the Bull River in the Bull River drainage, as well as three-quarters of a mile of Ross Creek, a wetland near the mouth of Ross Creek, and about a half mile of Bull Lake shoreline in the Lake Creek drainage. The property contains no development and is bordered by U.S. Forest Service land on one side, borders the Genesis property on another side, and partially borders Bull Lake on another side.

These lands are of critical importance to the recovery of two species listed as "threatened" under the Endangered Species Act, grizzly bear and bull trout, and to the maintenance of habitat for westslope cutthroat trout, a species of special concern in the State of Montana. Grizzly bears utilize the project area for spring foraging habitat. In addition, the project lands provide a travel corridor for this species between the East and West Cabinet Mountains, linking two small, fragile populations. Both the Bull River and Lake Creek drainages have been identified as core bull trout habitat by the State of Montana and critical bull trout habitat by the U.S. Fish and Wildlife Service. Both also contain important populations of westslope cutthroat trout. Springs located in the project area likely provide 30 to 40 percent of the water in the Bull River at low flow, a critical period for the survival of bull trout and westslope cutthroat trout. These springs likely cool the river in the summer and lower stream temperatures are vital for the persistence of both bull trout and westslope cutthroat trout. The project lands also encompass over a mile of the Bull River, a known migratory corridor and potential spawning and rearing habitat for bull trout and westslope cutthroat trout. In addition, the project lands border about three-quarters of a mile of Ross Creek, which is inhabited by westslope cutthroat trout and may be used seasonally by bull trout. The lands also provide important winter range for moose, elk, and deer. Up to 135 elk have been observed wintering on the project area and adjacent lands along with moose and deer. In addition, kokanee use the southern shore of Bull Lake along one project property border for spawning. Although kokanee are not native to the Lake Creek drainage, they may be an

important food source for bull trout in Bull Lake. The lands also provide habitat for many other aquatic and terrestrial species. The property contains important habitat for black bear, fur-bearers (i.e., fisher), reptiles, amphibians, and various bird species including bald eagles, waterfowl, and neo-tropical songbirds, along with other aquatic and terrestrial species. Canada lynx, gray wolves, and wolverines may also use the lands. The land acquisitions being worked on would also ensure that public access for recreational use in the project area would be maintained in perpetuity.

Conclusions

With the Plum Creek acquisition being worked on in the Bull River drainage, seven of the eleven remaining parcels greater than 80 acres that border the Bull River or one of its tributaries are protected through acquisition or conservation easements or in the process of being acquired for protection.

Two other landowners with property greater than 80 acres in size that border the Bull River or one of its tributaries are interested in conservation easements and one is interested in selling to our program. We are pursuing these acquisitions and conservation easements as funds and opportunities allow. However, much has already been accomplished in protecting tributary habitat in the Bull River drainage.

Recommendations

It is recommended to continue pursuing land protection opportunities in the Bull River drainage.

Watershed Councils, Assessments, and Restoration

Objectives and Degree of Attainment

Two watershed assessments and three restoration projects were accomplished in 2002 and 2003 with funding from several sources. The goal of the watershed restoration was to reduce sediment sources to the stream, restore healthy functioning stream channels, and to enhance fish habitat. The restoration was intended to increase fish abundance, especially that of native salmonids including bull trout and westslope cutthroat trout. It was also conducted in cooperation with stakeholders and landowners in the context of watershed councils to promote an informed public that makes good decisions about their watershed to promote healthy streams and fisheries. This meets survey and inventory objective #2 and fish population management fish management and habitat desired outcomes #1 and #2 and habitat performance measure #2. Watershed assessments (funded by Avista (Appendix B), the Montana Department of Environmental Quality, and U.S. Forest Service) were conducted with stakeholders and landowners in the Prospect and Pilgrim creek watersheds in 2002 and 2003 (River Design Group 2004a, b). Restoration projects were prioritized and some were implemented in cooperation with several funding partners (including Avista (Appendix B), Future Fisheries Improvement Program, National Fish and Wildlife Federation, Sanders County Resource Advisory Council, U.S. Forest Service, Plum Creek Timber Company, and private landowners) in the Bull River, Whitepine Creek, and Thompson River drainages in 2002 and 2003.

Procedures

Watershed restoration is prioritized for funding through a collaborative process with Avista's mitigation program. Those proposals submitted for Appendix B habitat restoration funding are ranked based upon their potential to help restore native salmonids especially bull trout and westslope cutthroat trout in the Lower Clark Fork River drainage. Watershed restoration projects funded with Appendix B funding are implemented by MFWP.

Each watershed council has a coordinator and technical advisory committee (TAC) with members from MFWP, the U.S. Forest Service, Avista Corp. and the Natural Resource Conservation Service among others. The coordinator and TAC assist the local landowners and stakeholders with obtaining funding, hiring consultants, assembling and administering contracts, giving technical guidance, prioritizing, and implementing watershed assessments and restoration. Assessments were watershed-scale and generally characterized the existing stream channel stability and riparian condition, evaluated sediment production from upland sources, and provided site-specific recommendations for improving water quality, channel stability, and fish habitat conditions. Restoration projects were generally prioritized by their potential to help restore native fish, channel stability, and watershed health.

Findings

Habitat assessments and enhancement work were accomplished in several drainages in 2002 and 2003. Several changes in the channel and numerous structure failures of previous year's restoration work caused by high flows in the spring of 2002 prompted the Prospect Creek Watershed Council in cooperation with MFWP and Avista to reassess the current conditions in Prospect Creek. Prospect Creek is core habitat for bull trout and important habitat for westslope cutthroat trout. An aerial photo analysis of the entire watershed was initiated in 2002. The analysis was the first step in the reassessing the status of Prospect Creek including reassessing the impacts the highway and utility corridor have had on the watershed. A watershed assessment of the entire Prospect Creek drainage was then begun in 2003 by several cooperating agencies, including the Prospect Creek Watershed Council, MFWP, Avista (Appendix B), the Montana Department of Environmental Quality, and U.S. Forest Service, to continue to reassess the Prospect Creek drainage and develop a Total Dissolved Maximum Daily Load (TMDL) for the drainage. The watershed assessment completed in 2004, characterized the existing stream channel stability and riparian condition, evaluated sediment production from in-stream and upland sources, and provided site-specific recommendations for improving water quality, channel stability, and fish habitat conditions.

Landowners in the Pilgrim Creek watershed formed a watershed council and initiated watershed planning and restoration of Pilgrim Creek in 2002. A watershed assessment of the Pilgrim Creek drainage was begun in 2003 by several cooperating agencies including the Pilgrim Creek Watershed Council, MFWP, Avista (Appendix B), the U.S. Forest Service, and Department of Natural Resource Conservation. The watershed assessment completed in 2004 provided an overview of aquatic habitat conditions throughout the watershed, identified in-stream and upland sediment sources, and outlined future restoration priorities. Pilgrim Creek has very few bull trout remaining and some westslope cutthroat trout inhabiting the drainage.

A watershed restoration project took place in Snake Creek, a tributary to the East Fork Bull River, in cooperation with the Bull River Watershed Council, MFWP, Avista (Appendix B), and the U.S. Forest Service in 2002. The project consisted of removing two undersized culverts and the associated road prism in the Snake Creek floodplain, and restoring the channel and floodplain in the affected area. This removed the risk of the undersized culverts plugging and washing out, which is likely at such crossings. The project prevented aggraded bedload and road fill material, a potential significant source of fine sediment, from entering Snake Creek and the East Fork Bull River and affecting core bull trout and westslope cutthroat trout spawning and rearing habitat.

Another restoration project took place in Jungle Creek, a tributary to Fishtrap Creek in cooperation with MFWP, Avista (Appendix B), and Plum Creek in 2002. The project involved replacing an undersized culvert that was a fish passage barrier in a core bull trout watershed. A few juvenile and/or resident bull trout were sampled in upper Jungle Creek prior to the culvert replacement, but the culvert was thought to be a barrier at least some fish movement. The new culvert was sized for a 100-year flood event and was partially buried in the substrate to allow fish passage over a natural channel bottom. To hold the substrate in place and provide grade control in the stream above and below the culvert, baffles were installed in the culvert and are expected to fill with substrate after the first bankfull flow event. This new culvert re-established connectivity for bull trout and other fish in about five miles of Jungle Creek.

In the East Fork Bull River, a cedar revegetation project was completed in 2002 in cooperation with the Bull River Watershed Council, MFWP, Avista (Appendix B), and the private landowner. The East Fork Bull River is core bull trout and important spawning and rearing habitat for westslope cutthroat trout. The project involved constructing 21 fenced enclosures that protected about 880 square meters of plantings from browse and installing weed cloth within the enclosures to prevent reed canary grass from competing with the new plantings. One thousand shrubs and cedar were planted within the enclosures and shade protection cloth was placed on the southern aspect of each structure to help promote the cedar growth. In addition, 150 plants were placed in other areas outside the structures. This new riparian vegetation will provide future stream shading and bank strength in the area of the channel restoration that took place in 2001. The project in 2001 involved restoring a braided section of the East Fork Bull River by rechanneling 365 m of the river. In 2003, minor repairs were conducted on the channel restoration project that was completed in 2001. The repairs that involved reinforcing some of the rootwad structures.

Three restoration projects took place in Whitepine Creek in 2002 in cooperation with the Whitepine Creek Watershed Council, MFWP, Avista (Appendix B), the Environmental Protection Agency "319" program, and Future Fisheries Improvement program. Whitepine Creek is used by a few bull trout and has a population of westslope cutthroat trout. One of the projects involved reactivating approximately 366 m of old channel of Whitepine Creek that had aggraded during a large flood event leading to the formation of an unstable avulsion channel. The avulsion channel was perched at an elevation above the low point in the valley and the stream continually attempted to reach its equilibrium by downcutting to a lower elevation, which led to the formation of a series of headcuts. In addition, the avulsion channel threatened to capture a private pond located in the floodplain. The project restored the channel to its former location and returned it to a natural, stable form away from the private pond. Minor repairs were completed on the project in 2003. The repairs included adjusting several arms on log cross vanes which were altered during high flows and backfilling two log cross vanes with cobble to help

avoid future repairs. Two other smaller projects completed in Whitepine Creek in 2002 involved stabilizing a chute cut-off and an eroding terrace.

A channel restoration project was completed in the South Fork Bull River in cooperation with the Bull River Watershed Council, MFWP, Avista (Appendix B), U.S. Forest Service, Sanders County Resource Advisory Committee, Future Fisheries Improvement Program, and National Fish and Wildlife Foundation in 2003. The project involved rebuilding about 120 m of new channel and reconnecting 300 m of old channel to restore the South Fork Bull River where it had been negatively affected by a large landslide. The 335-m long landslide that likely resulted from concentration of water on skid trails and roads during a rain-on-snow event occurred in 1990. Material from the slide resulted in temporarily blocking the upper South Fork Bull River, causing the channel to braid and begin to headcut through the area. The project restored the channel dimensions and fish habitat in the area affected by the slide and removed a chronic sediment source to the bull trout spawning area downstream.

Conclusions

Much has been accomplished with the seven active watershed councils and multiple funding partners.

Recommendations

Watershed restoration needs to be continued using the best available science and working as much as possible with the top-down watershed approach.

Lower Clark Fork Habitat Problem Assessment

Objectives and Degree of Attainment

The goal of the Lower Clark Fork habitat problem assessment is to provide a framework to develop and prioritize habitat restoration within the Avista program to help restore bull trout and westslope cutthroat trout at the Lower Clark Fork watershed scale (defined as the Clark Fork River drainage in Montana downstream of Thompson Falls dam) (Lower Clark Fork). This meets the fish population management and habitat desired outcome #1. The geographical information systems analysis portion of the habitat problem assessment was completed in 2004. This involved individual assessments for each major tributary in the Lower Clark Fork that would have historically been important to bull trout and westslope cutthroat trout including over 40 sub-watersheds. The individual assessments involved a number of parameters to help determine the status of the habitat of each watershed. These parameters included parameters describing the physical nature of the watershed, effects of past watershed scale disturbance, fish distribution, channel condition, watershed restoration needs, and land protection opportunities. A consultant was hired in April 2004 to complete the remainder of the assessment.

Procedures

Geographical information systems (GIS) was used to characterize over 40 sub-watersheds and describe habitat restoration needs and land protection opportunities (Katzman and Liermann

2003). The sub-watershed chosen for analysis were historically or are currently important to bull trout and westslope cutthroat trout. The watershed size, hydrology, geology, and precipitation regime of each sub-watershed was summarized. The GIS analysis also included land ownership, road density, number of road crossings per stream length, amount of road within the riparian area of streams, amount of road on sensitive or unstable land types, percent of watershed where timber harvest occurred by decade, largest fire of the past 100 years and percent watershed burned, and length and location of known Rosgen channel types. In addition, water temperature information, exotic species distribution, and fish barriers were mapped. A GIS analysis of the subdivision of private land by drainage was also conducted to help prioritize land protection opportunities (i.e., conservation easements, land acquisition). The following was summarized: the number of parcels of private land, number greater than 80 acres bordering a stream or its tributaries, and general location of these large parcels compared to key spawning and rearing habitat in each sub-watershed.

The consultant will work with MFWP and other collaborators to determine methods for ranking each sub-watershed's potential for producing bull trout and westslope cutthroat trout and threats that limit this ability to reach potential are needed. In addition, key reaches within the sub-watershed will be ranked to determine order of priority for habitat restoration or land protection at a Lower Clark Fork scale.

Findings

The GIS portion of the Lower Clark Fork Habitat Problem Assessment was completed in 2004. In addition, a consultant was hired to complete the remainder of the assessment.

Conclusions and Recommendations

The Lower Clark Fork Habitat Problem Assessment is in the process of being completed. Conclusions of the assessment will be part of a future report.

Restoration and Native Salmonid Monitoring

Objectives and Degree of Attainment

Monitoring in 2002, was focused in four drainages in cooperation with Avista and the U.S. Fish and Wildlife Service as it was in 2001 (Katzman and Saffel 2001b). Three of the drainages, Prospect Creek, Bull River, and Rock Creek, are considered core habitat for bull trout by the Montana Bull Trout Scientific Group because they provide critical spawning and rearing habitat for bull trout. These drainages also provide important habitat for westslope cutthroat trout. These drainages have been targeted for watershed restoration because of the potential benefits the restoration could have for native salmonids and because they also have active watershed councils in place to assist in planning and implementing the restoration.

The fourth drainage where monitoring was focused in 2002 was Elk Creek. In the Elk Creek drainage, restoration was initiated prior to work associated with the Settlement Agreement as a result of a proactive watershed council. MFWP also stocked westslope cutthroat trout in Elk Creek recently in an effort to enhance their abundance in the drainage. Monitoring was initiated

for this drainage in 1997 in order to quantify any increases in native species (westslope cutthroat trout) due to these actions and was continued in 2002.

The Restoration Monitoring study plan met the survey and inventory objective #1 and fish population management fish management performance measures #1 and #2 and habitat performance measure #1 and had the following objectives/tasks in 2002:

> Task 1: Monitor the abundance of fish pre- and post- restoration in the Prospect Creek, East Fork Bull River, South Fork Bull River, Rock Creek, and Elk Creek drainages.
>
> Task 2: Monitor the numbers of redds of bull trout and brown trout and other trout if appropriate (e.g., brook trout) in Prospect Creek, Bull River, East Fork Bull River, South Fork Bull River and Rock Creek.
>
> Task 3: Monitor the abundance of juvenile bull trout, westslope cutthroat trout, and other trout outmigrating from Prospect Creek and Bull River drainages.

Restoration monitoring was continued in 2003, however, the objectives of the restoration monitoring were revised (Liermann and Katzman 2003a). The plan was revised to better determine if habitat restoration is benefiting fish populations, especially native salmonid populations. The original study plan used a before/after and to some extent a control/impact design. However, "control" sections that had the same habitat potential (i.e., Rosgen channel types) and fish communities and yet maintained independence from restored sites were not always available. The "control" sites selected were useful in comparing how factors such as drought and the general trend of fish populations may be affecting the interpretations of the before/after comparisons within restored reaches though. In addition, monitoring the results of restoration on a reach scale can give misleading results; it is better to monitor results of restoration on a drainage-wide scale. Not all drainages needed drainage-wide restoration, so despite the shortcomings of the monitoring technique, the before/after and to some extent the control/impact design was maintained in the East and South forks of the Bull River. Extensive restoration is planned for the Prospect Creek drainage though, so a drainage-wide monitoring plan was implemented.

Channel alterations and subsequent physical habitat alterations due high flow events can influence the distribution and abundance of fishes on a local scale within a watershed. While these types of areas should generally be avoided when selecting long-term monitoring sections, some channel types are more sensitive to disturbance than others. For example, upstream disturbances or bank alteration can substantially alter Rosgen C channel types (Rosgen 1996) possibly causing significant changes in the fish populations of this section of stream. Thus, it is important to attempt to document changes in channel dimensions within monitoring sections to determine if these changes may be influencing fish densities and distribution. Therefore, the physical habitat of monitoring sections was measured to determine their baseline channel and habitat condition.

Elk Creek was not monitored in 2003 because five years of post-restoration monitoring had all ready occurred there. Rock Creek continued to be monitored, but not under the restoration monitoring program, because no restoration is planned there in the near future due to the

litigation associated with a mine proposal. The revised objectives also include continuing to monitor bull and brown trout redds in all drainages monitored in 2002 except Rock Creek. Although bull trout inhabit Rock Creek, no redds were found there by three different people, three different years. This is likely because of the lack of migratory bull trout using the drainage, the difficulty identifying resident-sized bull trout redds, and the predominantly large substrate in the creek. Because three years of baseline data on the outmigration of juvenile trout had been collected in the Bull River, continued monitoring of outmigration was not part of the revised restoration monitoring plan either. The revised restoration monitoring objectives did include monitoring stream channel dimensions within the restoration project area for a majority of restoration projects completed.

The revised Restoration Monitoring study plan had the following objectives/tasks that meet the survey and inventory objective #1 and fish population management fish management performance measures #1 and #2 and habitat performance measure #1:

> Task 1: Monitor fish abundance pre-, during, and post-restoration on a basin-wide scale in the Prospect Creek drainage to determine the effect habitat restoration has on fish abundance in this drainage.
>
> Task 2: Monitor fish abundance pre- and post-restoration on a smaller project level scale in drainages other than Prospect Creek (i.e., East and South forks of the Bull River, Jungle Creek).
>
> Task 3: Monitor stream channel dimensions within the restoration project area for a majority of restoration projects completed.

In addition, a Native Salmonid Abundance Monitoring study plan (Liermann and Katzman 2003b) was initiated in cooperation with Avista in 2003. This project as described above will complement an existing sampling program conducted by Avista at a drainage-wide scale about every six years. This study will focus on a higher frequency of sampling on an abbreviated spatial scale. This will involve monitoring two sections in each of the drainages with native salmonid strongholds annually. In cooperation with the current drainage-wide monitoring, native salmonid populations should be adequately monitored and efforts put forth as part of the mitigation program can be assessed. In addition, redd surveys will be conducted to continue to monitor adult bull trout and brown trout escapement within key drainages and the physical habitat of the long-term monitoring sections will be measured and monitored.

The Native Salmonid Abundance Monitoring study plan has the following objectives/tasks that meet the survey and inventory objective #1 and fish population management fish management performance measures #1 and #2 and habitat performance measure #1:

> Task 1: Monitor the abundance of juvenile salmonids, with an emphasis on bull trout and westslope cutthroat trout within drainages key to the long-term persistence of bull trout and westslope cutthroat trout, in the Lower Clark Fork drainage (i.e., Vermilion and West Fork Thompson rivers, and Rock, Graves, and Fishtrap creeks)(Note: other key native salmonid drainages (Bull River and Prospect Creek) were monitored as part of the restoration monitoring project).

Task 2: Monitor adult bull trout and brown trout escapement within drainages key to the long-term persistence of bull trout and westslope cutthroat trout in the Lower Clark Fork drainage (i.e., Bull, Vermilion, and West Fork Thompson rivers drainages, and the Fishtrap, Prospect, and Graves creek drainages).

Task 3: Monitor the physical habitat present in the long-term monitoring sections to ensure comparable data throughout time.

Procedures

Restoration Monitoring - 2002

Task 1: Monitor the abundance of fish pre- and post- restoration in the Prospect Creek, East Fork Bull River, South Fork Bull River, Rock Creek, and Elk Creek drainages.

Depletion removals were conducted using backpack electrofishing equipment in Prospect Creek, the East and South Forks of the Bull River, Rock Creek, and Elk Creek in July and August 2002. Sampling, in general, followed a before/after and to some extent a control/impact design. The intent was to have control sites upstream of the restoration work and an impact site within the area to be restored. Ideally the control sites would be independent from the impact site and from each other, and would have similar habitat potential to the areas to be restored (i.e., would be similar Rosgen channel types). However, generally control sites that fully met these criteria were not available in the study streams. Sections that were chosen as "controls" were evenly spaced, and were located at approximately 1.6-kilometer intervals and at least 1.6 kilometers from the area to be restored in an effort to obtain independent data. However, "control" sections were not always in areas with similar habitat potential as the areas to be restored. They were however, generally in areas where native fish (i.e., bull trout and/or westslope cutthroat trout) were expected to dominate. Therefore, these "control" sections can be used as an indicator of how factors such as drought and the general trend of the populations of native species in each drainage may be affecting the interpretation of the before/after fisheries abundance data obtained in the impact sections. See methods section in attached report for details (Liermann et al. 2003).

Task 2: Monitor the numbers of redds of bull trout and brown trout and other trout if appropriate (i.e., brook trout) in Prospect Creek, Bull River, East Fork Bull River, South Fork Bull River and Rock Creek.

Redd surveys were completed in late September and early October to monitor bull trout spawning and in November and December to monitor brown trout spawning. See methods section in attached report for details (Liermann et al. 2003).

Task 3: Monitor the abundance of juvenile bull trout, westslope cutthroat trout, and other trout outmigrating from Prospect Creek and Bull River drainages.

The status of outmigrating juvenile bull trout, westslope cutthroat, and other trout was monitored using a rotary screw trap in spring positioned near the mouths of the drainages. See methods section in attached report for details (Liermann et al. 2003).

Restoration Monitoring - 2003

Task 1: Monitor fish abundance pre-, during, and post-restoration on a basin-wide scale in the Prospect Creek drainage to determine the effect habitat restoration has on fish abundance in this drainage.

The three electrofishing sections sampled to monitor upper Prospect Creek since 1999 continued to be monitored with the revised study plan. These sections were all above a seasonally dry section of Prospect Creek where the fish community is primarily native salmonids and the channel type is Rosgen type B. Habitat restoration likely will not occur in this section of Prospect Creek, however watershed level restoration may affect fish densities in these sections higher in the drainage. Three electrofishing monitoring sections were monitored in lower Prospect Creek below the seasonally dry section. The fish community in lower Prospect Creek is a mixed native and non-native fish species assemblage and the channel type is Rosgen type C and D. Habitat restoration has all ready occurred in lower Prospect Creek, but substantial failure of a large percentage of the previous work (85-90%) has occurred and thus, significantly more restoration needed. Thus, initially, monitoring data collected in lower Prospect Creek will serve as a baseline with which to compare effects of future restoration to the fish populations.

Task 2: Monitor fish abundance pre- and post-restoration on a smaller project level scale in drainages other than Prospect Creek (i.e., East and South forks of the Bull River, Jungle Creek).

Monitoring was conducted on a smaller project level scale in the East and South Forks of the Bull River and Jungle Creek in 2003. This involved sampling within the section that was restored and two sites above the restored section where native salmonids dominate in the East Fork Bull River. In the South Fork Bull River, restoration took place in 2003, so the monitoring involved collecting data at two sites above the restored section. In Jungle Creek, monitoring involved collecting data at two sites upstream of the new culvert.

Task 3: Monitor stream channel dimensions within the restoration project area for a majority of restoration projects completed.

Stream channel dimensions within the restoration project in Whitepine Creek and the South Fork Bull River were monitored in 2003.

Native Salmonid Abundance Monitoring - 2003

Task 1: Monitor the abundance of juvenile salmonids, with an emphasis on bull trout and westslope cutthroat trout within drainages key to the long-term persistence of bull trout and westslope cutthroat trout, in the Lower Clark Fork drainage (i.e., Vermilion and West Fork Thompson rivers, and Rock, Graves, and Fishtrap creeks)(Note: other key native salmonid drainages (Bull River and Prospect Creek) were monitored as part of the restoration monitoring project).

> Depletion removals were conducted using a backpack electrofisher and/or mobile anode boat-mounted electrofishing unit in the West Fork Thompson and Vermilion rivers, and Rock, Graves, and Fishtrap creeks in July and August 2003. Electrofishing sections were selected based upon Rosgen channel type, native salmonid densities, and past survey work in the watersheds. See methods section in attached report for details (Liermann et al. 2003).

Task 2: Monitor adult bull trout and brown trout escapement within drainages key to the long-term persistence of bull trout and westslope cutthroat trout in the Lower Clark Fork drainage (i.e., Bull, Vermilion, and West Fork Thompson rivers drainages, and the Fishtrap, Prospect, and Graves creek drainages).

> Redd surveys were completed in late September and early October to monitor bull trout spawning and in November and December to monitor brown trout spawning.

Task 3: Monitor the physical habitat present in the long-term monitoring sections to ensure comparable data throughout time.

> Fish habitat monitoring was completed within electrofishing sections located in Prospect, Vermilion, and Graves creek drainages by measuring channel cross-sections and longitudinal profiles and developing long-term photo-points in August 2003.

<u>Findings</u>

Restoration Monitoring– 2002

The abundance of fish pre-restoration in the South Fork Bull River, and post-restoration in the East Fork Bull River and Elk Creek drainage was monitored in 2002. The abundance of fish in a reach of Rock and Prospect creeks was also monitored in 2002. Bull trout redd numbers were monitored in Prospect Creek, Bull River, East Fork Bull River, South Fork Bull River, and Rock Creek in 2002. Brown trout redd numbers were monitored in the Bull River and Prospect Creek drainages in 2002. The abundance of juvenile trout outmigrating from the Bull River drainage was monitored in 2002. A comprehensive report for the 2001 and 2002 data (Liermann et al. 2003) is attached to this report.

Restoration Monitoring – 2003

The abundance of fish was monitored throughout the Prospect Creek drainage and in portions of the Jungle Creek and the East Fork Bull River post-restoration, and pre-restoration in the South Fork Bull River in 2003. Stream channel dimensions were also monitored in the Whitepine Creek and East Fork Bull River restoration project areas in 2002, and some of the Prospect Creek monitoring sections and the South Fork Bull River restoration project area in 2003.

Native Salmonid Abundance Monitoring - 2003

The abundance of fish was monitored in the Vermilion and West Fork Thompson river drainages, and Rock, Graves, and Fishtrap creek drainages. Bull trout redd surveys were conducted in cooperation with Avista in the East Fork Bull, Vermilion, West Fork Thompson river drainages, and Four Lakes, Fishtrap, Beatrice, West Fork Fishtrap, Prospect, Clear, Dry, Twenty-four Mile, Graves and Thorne creek drainages). Brown trout redd surveys were conducted in cooperation with Avista in the East and South forks of the Bull and Bull river drainages, and in the Prospect Creek drainage. The physical habitat present in the long-term monitoring sections in the Vermilion River and Graves creek drainages were also determined in 2003.

Conclusions

Restoration and Native Salmonid Abundance Monitoring

Restoration and, therefore, the monitoring of restoration is in its early stages of implementation in the Lower Clark Fork River drainage. An initial analysis of the effectiveness of the restoration is discussed below (see attached report for details (Liermann et al. 2003)).

Densities of most salmonids in the restored section of the East Fork Bull River decreased compared to baseline data collected in 2000 and 2001 (Liermann et al. 2003). However, stream flow was diverted out of the channel for eight weeks while the restoration project was completed and fish were captured and moved downstream of the project before the temporary diversion to prevent stranding. The water diversion and fish removal mimics a reach scale disturbance, which may require several years for repopulation of the restored section of stream.

Monitoring of five sections in the Elk Creek drainage was conducted annually since 1997. Analysis of this data indicates that westslope cutthroat trout densities improved in the drainage since 1997, except for a substantial decline from 2001 to 2002. Brook trout responded similarly since 1997, but their densities either increased or remained similar through 2002. Two possible factors may have led to improved westslope cutthroat trout densities in Elk Creek. In 1999 and 2000, 61,000 age-0 westslope cutthroat trout were stocked and habitat restoration was conducted in the drainage in 1997 and 1998. The stocking of westslope cutthroat trout was intended to improve westslope cutthroat trout densities and "swamp out" brook trout, reducing their abundance. Habitat restoration was aimed at improving fish habitat and thus, fish densities. The data suggests that initially habitat restoration did improve westslope cutthroat trout densities. However, substantial increases in westslope cutthroat trout abundance were also observed after westslope cutthroat trout were stocked in 2000 and 2001 suggesting stocking also initially improved their densities. Unfortunately, due to the overlap in the timing of the stocking and

restoration projects, it is not possible to determine which factor improved westslope cutthroat trout densities. The abundance of westslope cutthroat trout decreased from 2001 to 2002. Possible reasons for this decline include completion of the westslope cutthroat trout "swamping" project and the failure of several habitat restoration projects. Brook trout densities increased from 1997 to 2002, suggesting the habitat restoration benefited their populations. While it is unknown how effective habitat restoration was at improving westslope cutthroat trout densities, the data does suggest that the stocking project was largely ineffective.

Bull trout redd numbers increased from 2001 to 2002 in the East and South Forks of the Bull River and Prospect Creek drainages. The increases in the East and South forks of the Bull River were due at least in part to the transport of bull trout above Cabinet Gorge Dam conducted by Avista and the U.S. Fish and Wildlife Service. Bull trout were transported over Cabinet Gorge Dam for the first time in almost 50 years in 2001. In 2001, a total of 8 radio-tagged bull trout that had been transported around the dam were in the East Fork Bull River during spawning and in 2002, this number increased to 16. Four radio-tagged bull trout that had been transported around the dam were believed to have spawned in the South Fork Bull River in 2002.

Brown trout redd numbers observed in the Bull River were the highest observed in recent years in 2002. Redd numbers observed in December in lower Prospect Creek were fairly similar in 2001 and 2002.

The rotary screw trap in the lower mainstem Bull River captured primarily brown trout and few bull or westslope cutthroat trout in 2002. These results were similar to those observed during trapping in 2000 and 2001.

Restoration and Native Salmonid Abundance Monitoring - 2003

It is too early to draw conclusions from this revised monitoring project; only the first year of the revised study was completed in 2003. A progress report on the first year of the revised work will be completed in 2004 and will be included in a future Fisheries Division Progress Report.

Recommendations

It was recognized that the restoration monitoring project in 2002 had limitations and there was a need to monitor native salmonid populations more frequently to assess population changes. These limitations included the control/impact design not functioning well in several of the drainages, a failure to assess restoration on a basin-wide scale, and the assessment of restoration in drainages where large-scale changes are not expected considering minimal amounts of restoration was proposed for the drainages. The revised restoration monitoring project in 2003 addressed these issues and was combined with a native salmonid abundance monitoring project to better monitor changes in native salmonid populations.

A need to standardize the timing and location of redd surveys in the Bull River and Prospect Creek was also recognized. This would facilitate more comparable and accurate data to monitor the status of the bull and brown trout populations.

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