FISH HABITAT PROTECTION AND RESTORATION ACTIVITIES IN ADDITION TO THE RIVER RESTORATION PROGRAM

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December 1994

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INTRODUCTION

Protection and restoration of aquatic habitats is identified in the Department's strategic plan as a priority item. Goal A indicates that it is the objective of the Fishery Division to: "protect existing aquatic habitats and improve degraded stream systems for the welfare of healthy fish populations and other wildlife species and for public enjoyment and use." Consequently, a variety of activities are undertaken by the Fisheries Division to protect, enhance or restore aquatic habitats. Activities include inspections of proposed projects that fall under the jurisdiction of our two major stream protection laws, applications to the Board of Natural Resources and Conservation to reserve instream flow for fisheries, procurement of leases to enhance streamflow, procurement of funding for and development and oversight of projects designed to enhance or restore aquatic habitats, and educational efforts to encourage voluntary protection of habitat. Area and regional biologists are most familiar with the conditions of local aquatic habitats and virtually all of them participate in habitat protection and enhancement efforts. The Fishery Division presently commits the equivalent of nearly 18 FTE's to projects and other habitat protection activities described herein. This effort is furthered by individuals working for outside agencies or companies and by the work of volunteer organizations and landowners.

Financial resources and manpower that support the Department's habitat protection and enhancement efforts originate from many sources including:

(1) other state and federal agencies;
(2) local interest groups;
(3) utilities in the process of licensing or relicensing dams;
(4) private property owners;
(5) corporations, and
(6) foundations.

This report summarizes the various habitat protection and restoration activities that have been or will be undertaken by the Fisheries Division over and above the River Restoration Program. In recent years several million dollars have or will be dedicated to this effort. The River Restoration Program, which is funded by license dollars specifically earmarked for habitat improvement projects, is summarized in a separate document.

STREAM PROTECTION AND ENHANCEMENT ACTIVITIES

Stream Protection Act (124 Law)

Agencies of federal, state, county, or local government that are planning construction projects which will affect the bed or banks of streams are required under the Stream Protection Act to obtain a permit from Montana Fish, Wildlife & Parks. The Department reviews project plans, inspects project sites, and conditions permits to minimize or eliminate impacts to fish habitat. Projects proposed by entities of local government are reviewed and permitted by regional office personnel; projects sponsored by the Montana Department of Transportation are reviewed by local biologists, as well as the Stream Protection Act Coordinator in Helena. During fiscal years 1993 and 1994, the Department reviewed and permitted 133 state highway projects and 490 projects applied for by other government agencies. The majority of these projects were roading or bridging projects adjacent to or crossing streams. Conditions stipulated in the permits authorizing these projects protected fishery habitat in many miles of rivers and streams located throughout Montana. We estimate that the Fishery Division's statewide effort to implement this program is the equivalent of approximately 2 FTE's.

Natural Streambed and Land Preservation Act (310 Law)

Entities from the private sector, including private individuals, corporations, firms, partnerships, associations, and other legal entities that propose projects which will alter the bed or banks of streams are required to obtain a 310 permit from the local Conservation District. These permits include stipulations that minimize or eliminate impacts to fishery habitat caused by the projects. Most permit applications are for stream crossings, irrigation diversions, or bank stabilization projects.

The majority of permits issued (approximately 70%) are preceded by an inspection of the project site. This inspection team routinely includes the project applicant, representatives of the Conservation District, and the local Fishery Division biologist (or a contractor hired to represent the Department). The Department biologist (or designated representative) is an important member of the inspection team because he or she is familiar with measures necessary to protect streams and avoid damage to fish habitat. Virtually all of our area and regional biologists review 310 projects, perform inspections, and attend Conservation District meetings. Additionally, the Department's effort in this area of responsibility is

supplemented by contractors in several regions where the numbers of projects requiring permits is unusually high. Over the last few years, the Conservation Districts have received and reviewed an average of nearly 1400 project applications per year, of which approximately 70% required joint inspections with Department personnel. We estimate that the annual Fishery Division effort to sustain this program requires the equivalent of 4 FTE's of manpower.

Instream Flow Reservations Program

Instream flow is a fundamental component of fish habitat in rivers and streams. The Department's instream flow program is managed by the Fishery Division. During the last two years the Department has secured instream flow reservations on 250 streams in the upper Missouri Basin (above Fort Peck Dam). A flow reservation for 18 streams in the lower Missouri Basin (downstream of Fort Peck Dam) is pending final approval by the Board of Natural Resources and Conservation. Assuming that the latter is approved, these reservations together will help protect streamflows in approximately 6,542 miles of rivers and streams in the Missouri River Basin. The Department allocates approximately 1.0 FTE annually to the instream flow reservation program. In addition, regional biologists collect data and provide expert testimony as needed to support individual reservation applications.

Water Leasing Program

The Department administers a water leasing program under the authority provided by 85-2-436, 437 MCA. Three leases have been implemented to date including one on Blanchard Creek in the Blackfoot River Basin and two on Mill Creek in the Yellowstone River Basin. In addition, the FWP is working to complete leases on Tin Cup Creek in the Bitterroot River Basin, Cedar Creek in the Yellowstone River Basin, and Hells Canyon Creek in the Jefferson River Basin. Improved streamflow resulting from these leases has or will enhance spawning and recruitment of fish to several larger rivers. The Department allocates approximately 0.75 FTE annually to the Water Leasing Program.

Irrigation Diversion Demonstration Projects

Each year the Department allocates approximately $5,000 to finance innovative diversion practices to serve as demonstration projects or for educational efforts that facilitate a better understanding of the habitat requirements of fish. Over the last two years, the Department

has been involved in several demonstration projects to improve fishery habitat associated with irrigation diversions: (1) The Mile High and Broadwater Conservation Districts were granted $2,000 each to utilize portable irrigation diversion structures that were developed as an alternative to bulldozing. Structures consist of 4x8' steel plates anchored with a flange to prevent undercutting; water level is controlled by removable boards. These structures are easily installed and removed annually with a front-end loader and prevent the need to bulldoze and berm the streambed. (2) A demonstration project was completed (project cost, $4,000) on the Weingart Ditch -- a diversion from the Jefferson River. Bank barbs were used to improve fish habitat by stabilizing eroding streambanks and improving condition of river gravels in the project area. (3) The Old Hale Ditch Company was awarded $5,000 to design and construct a diversion structure on the Jefferson River that will minimize impacts to fish habitat caused by the existing diversion. The Department allocates approximately 0.05 FTE annually to manage this program.

Stream and Lake Enhancement Projects

Funds allocated to the Stream and Lake Enhancement Program ($8,000/yr) are used partially to enhance public understanding of the effects of various land management activities on fish habitat in lakes and streams and partially for projects. The program recently supported publication of a Stream Habitat Management Handbook and various landowner educational brochures. Additional funds are used to support stream mechanics workshops for local Conservation Districts. Funds recently allocated to projects include: (1) aerial photographs taken of the Madison and West Gallatin Rivers to identify habitat problems; (2) $2,000 given to the Malta Walleye Unlimited Chapter to implement spawning habitat improvements in Nelson Reservoir and; (3) $1,800 spent to complete a preliminary design for a fish habitat improvement project in the Brewery Flats area of Big Spring Creek near Lewistown. The Fishery Division allocates approximately 0.05 FTE annually to administer this program.

Hungry Horse Dam Relicensing Mitigation

The Hungry Horse Dam Relicensing Mitigation Plan was established in 1991 to restore aquatic habitat lost by the construction and operation of Hungry Horse Dam. The goal of the plan is to replace lost production of westslope cutthroat, bull trout, and kokanee salmon in the Flathead River and Lake System. The plan includes three components of habitat protection and restoration. The first encompasses projects which directly modify habitat in the Flathead River and its tributaries including riparian fencing to reduce sediment loading and bank instability, construction of spawning channels, cooperative

programs with the U.S. Forest Service to reduce sediment input from logged areas and roadways, and channel reconstruction in unstable or dewatered reaches. Recent projects have included a sediment control project on Big Creek (USFS) and stream habitat stabilization and enhancement projects on Taylor's Outflow, Palladin Spring Creek, and Mill Creek in the Flathead Valley. Feasibility studies for reconstruction of Hay Creek (North Fork tributary) and East Swift Creek (Whitefish Drainage) will be complete in winter 1994. Many private landowners have participated in these projects.

The second component is to improve fish passage for spawning. Projects include reconstruction of stream reaches which seasonally dewater, removal of road culverts which create barriers, and construction of fish ladders into once unavailable habitat. These are cooperative projects with the U.S. Bureau of Reclamation, U.S. Forest Service, Department of State Lands, Soil Conservation Service, and numerous private landowners. Efforts are currently focused on tributaries to Hungry Horse that were blocked by poorly installed road culverts in 1952. Approximately 16 percent of available habitat above full pool will be reclaimed for spawning and rearing. This work will begin in 1995 and is scheduled for completion in 1997.

The third component involves habitat improvements and management of lakes. Many lakes have suffered illegal fish introductions. Undesirable species are removed by chemical treatment; preferred species are then restocked. Lion and Rogers lakes were recently successfully rehabilitated. Structures to improve spawning and rearing habitat for warmwater fish species have also been installed.

Funding from the Bonneville Power Administration provides roughly $190,000 annually and 5.0 FTE's whose duties include habitat protection and restoration.

Thompson Falls Dam Mitigation

Montana Power Company is modifying Thompson Falls Dam from a run-of-the-river to a power peaking facility. As partial mitigation, in 1988 MPC and FWP entered into an agreement to establish a trust fund to purchase and release 10,000 acre-feet of water annually from Painted Rocks Reservoir. This water is used to enhance flows in the Bitterroot River during the low flow period.

Noxon Rapids and Cabinet Gorge Reservoir Mitigation

1. Reservoir Drawdown Agreement. In 1985, FWP and Washington Water Power

(WWP) entered into an agreement to limit the drawdown of Noxon Rapids Reservoir to no more than 4 feet in the summer and 10 feet annually; ramping rates are also included in the agreement to prevent rapid drawdown. The reservoir had previously been drafted as much as 35 feet which was extremely damaging to the fishery in the reservoir. The FWP allocates approximately 0.01 FTE to this project.

2. Bass Habitat Improvement. WWP, USFS, FWP, and Clark Fork BASS Anglers cooperated from 1989 through 1993 to place several hundred artificial habitat structures in Noxon Rapids to provide feeding, resting, and security cover for bass. The FWP allocated approximately 0.02 FTE toward completion of this effort.

3. Bull River Channel Stabilization. WWP, USFS, and FWP cooperated in 1993 to stabilize lateral channel erosion in a section of the Bull River heavily used by spawning bull and brown trout. The FWP allocated approximately 0.01 FTE toward completion of this project.

4. Little Beaver Creek Habitat Enhancement. WWP, USFS, FWP, and five private landowners are cooperating on a plan to remove beaver dams, stabilize the stream channel, and reestablish the fishery in Little Beaver Creek. The FWP has allocated approximately 0.01 FTE toward completion of this project.

Bigfork Dam Fish Mitigation

FWP worked with Pacific Power and Light to modify Bigfork Dam to mitigate fisheries impacts. Fish screens have been designed to minimize fish entrainment at the intake to the penstock; construction will begin soon. A fish ladder on the dam was also permanently closed to prevent non-native lake trout and lake whitefish from Flathead Lake from invading the Swan Drainage. The FWP allocated approximately 0.01 FTE toward completion of this effort.

Hungry Horse and Libby Reservoir Integrated Rule Curves

Integrated Rule Curves (IRC's) have been developed to regulate reservoir levels above Hungry Horse and Libby dams. These curves attempt to optimize reservoir management to balance needs for power generation, flood control, and fisheries habitat above and below the dams. The IRC's are one of four alternatives under consideration in the Columbia Basin System Operation Review to coordinate dam management. The FWP allocated approximately 0.2 FTE toward completion of this effort.

Hungry Horse Dam Selective Withdrawal

Since its construction Hungry Horse Dam has discharged unusually cold water (39°F) from the bottom of the reservoir. Water is so cold that it impacts fisheries and aquatic insects in 47 miles of the Flathead River. FWP worked with the Bureau of Reclamation and Bonneville Power Administration to develop a selective withdrawal system for reservoir releases than will mix surface and bottom waters and return river water temperatures to near normal. Congress appropriated funding last year to modify the withdrawal system and construction has begun. The system will be partially operable in summer 1995 and fully operative in 1996. The FWP has allocated approximately 0.1 FTE towards completion of this effort.

Missouri River Hydropower Relicensing Mitigation

Montana Power Company is in the process of relicensing its nine mainstem Missouri River hydroelectric facilities. Part of the relicensing process requires the power company to mitigate for damage to fishery resources caused by power development. In their initial relicensing applications to the Federal Energy Regulatory Commission, Montana Power is proposing to provide $150,000 annually to be used for fishery enhancement of the river/reservoir complex between Hebgen Lake and Morony Dam. Negotiations with the power company for mitigation funds are still ongoing; final licensing remains several years away. An advisory committee will be established to guide usage of these funds.

Milltown Dam Hydropower Relicensing Mitigation

Montana Power Company recently relicensed its Milltown Dam facility. The company has committed to providing $68,500 annually (adjusted for inflation) to mitigate for fishery losses caused by the dam. Three projects have been initiated to date, including:

1. A radio telemetry study to track the movement, habitat use, and spawning site selection of bull trout. This study began in the summer of 1994 and is expected to continue for about four years. Fourteen bull trout are carrying transmitters and their movements are being monitored. Costs to date include $51,000 for radio telemetry equipment and training. Matching funds of $25,000 were provided from a National Fish and Wildlife Foundation grant. This project is intended to identify critical habitat areas for bull trout which can be enhanced or protected as needed.

2. A project to restore Turah Spring Creek has been initiated. The project includes reconstruction of about 0.8 miles of spring creek channel that is degraded by livestock grazing and removal of car bodies, tires, old machinery and railroad ties from the creek. Turah Spring Creek is a tributary to the Clark Fork River; restoration will provide spawning and rearing habitat for Clark Fork River fish, and ultimately will improve recruitment to the Clark Fork River. This project is nearly complete (except for revegetation). Total cost of the project is approximately $25,000.

3. Primont Spring Creek enters the Clark Fork River about five miles downstream from Missoula. The creek has been degraded by an improperly placed culvert, livestock trampling, and sedimentation. This project will improve spawning and rearing habitat for Clark Fork River fish and will also benefit waterfowl. The project is still in the planning stages -- budget is estimated at $35,000.

The Fishery Division has committed approximately 1.0 FTE to the completion of these projects; Montana Power Company has committed an additional 0.5 FTE toward this project.

ARCO Fish Kill Mitigation

As part of their settlement with the State of Montana for a fish kill that occurred in the Clark Fork River during 1989, ARCO provided Montana Fish, Wildlife and Parks with $250,000 for fishery enhancement in the Clark Fork Basin. Seven restoration or enhancement projects are in various stages of planning or implementation, including:

1. Racetrack Creek is an important tributary to the Clark Fork River located upstream from Deer Lodge. In 1993, approximately 0.5 miles of Racetrack Creek was fenced to limit livestock access and improve fish habitat. Riparian vegetation has improved markedly since completion of the project. Total project cost was $2,800.

2. Many segments of the Clark Fork River have been damaged by grazing practices. In May 1994, approximately 0.3 mile of Clark Fork River bank in the vicinity of Beavertail Hill was fenced to exclude livestock and improve riparian vegetation and fish habitat. Total project cost was $1,300.

3. Rock Creek is a major tributary to the Clark Fork River near Clinton. In August 1994, a riparian fence to exclude livestock was constructed along 1.1 miles of Rock Creek to allow recovery of riparian vegetation and improve fish habitat. ARCO funds ($1,116) were supplemented with funds from a local Trout Unlimited Chapter

and the ASCS. Total project cost was approximately $3,000.

4. Gold Creek is an important spawning tributary to the Clark Fork River in the Drummond area. This project will improve riparian habitat along an important reach by moving a livestock operation away form the creek and fencing and revegetating the riparian area. Approximately $100,000 of ARCO funds will be used; additional monies are being provided from the River Restoration Program.

5. Cottonwood Creek is a tributary to the Clark Fork River in the Deer Lodge area. This project involved fencing of the riparian area to exclude livestock and enhance riparian vegetation and construction of a nature trail on the Grant Kohrs ranch. The site is used as an educational model of riparian management on a working cattle ranch. The area is open to self-guided tours and is used frequently by local teachers. Total cost of the project was $14,629.

6. Cottonwood Creek, a tributary to the Clark Fork River in the Deer Lodge area, is presently cut-off from the Clark Fork River by an irrigation ditch that intercepts the entire flow. This project will change the point of diversion from lower Cottonwood Creek to the Clark Fork River and will allow Cottonwood Creek to reach the river. Additional habitat restoration measures are also planned. This project is still in the planning stages -- budget is estimated at $30,000-$40,000.

7. Portions of the Clark Fork River upstream from Deer Lodge are partially dewatered. This project will move the point of entry of an irrigation return flow 500 yards upstream from the existing return and improve streamflow over this reach. This project is in the early stages of planning and there is no estimated budget at this time.

The Fishery Division has committed approximately 0.4 FTE toward planning and completion of these projects to date.

Elk Creek Channel Restoration

Elk Creek is a tributary to the Blackfoot River in the Potomac area. This project, developed in cooperation with the Garnet Resource Area of the Bureau of Land Management, was initiated to restore 3000 feet of stream channel and improve surface flow in a reach that was damaged by placer mining. This project was recently completed at a cost of approximately $73,000; funds were provided through a Reclamation and Development Grant from DNRC. FWP committed 0.05 FTE toward completion of this project and the BLM committed 0.2 FTE.

Lake Como Restoration

Lake Como is a reservoir on Rock Creek in the Darby area. Lake Como Dam is in the process of being renovated to prevent leakage and improve stability of the structure. The Bitterroot Irrigation District, which manages the dam agreed to incorporate increased storage into the renovation plan and to allow the additional water to be allocated to benefit fisheries and recreation in the Bitterroot River and the reservoir. The renovation work is in progress and is scheduled to be completed by spring 1995. The Department of Fish, Wildlife and Parks has committed $400,000 to this project and the local community has allocated an additional $25,000 to support this effort. The Department has committed approximately 0.1 FTE toward completion of this project.

Big Blackfoot River Basin Projects

Fishery Division staff have worked with the Big Blackfoot River Chapter of Trout Unlimited and other agencies to secure funds for a variety of projects in the Blackfoot River Basin. These include:

1. Dick Creek Channel Restoration Project: Dick Creek, a tributary to Monture Creek is within the historical range of bull trout. Approximately 1 mile of the Dick Creek channel was dredged and channelized several decades ago and has subsequently become over-widened and extremely shallow. A livestock feedlot adjacent to the stream and an old timber and earthen bridge that had partially collapsed in the channel were removed. Three thousand feet of new channel and 3,000 feet of impaired channel were restored. Several hundred logs were placed in the channel to provide fish habitat and woody shrubs were planted to improve bank stability. Wetlands enhancement measures were also incorporated. This was a cooperative project with the Big Blackfoot Chapter of Trout Unlimited, USFWS, Ducks Unlimited, FWP and the private property owners. Both the Department and the USFWS committed approximately 0.1 FTE to this project. Total project cost was approximately $87,000. All project funding was external.

2. Monture Creek, one of three critical spawning streams for fluvial bull trout from the Blackfoot River, lacked high quality pool cover in it's lower reach because of damage to streambanks caused by grazing and removal of large woody debris from the stream. This project involved riparian fencing and reestablishment of instream habitat using woody debris and native rock. The Department committed approximately 0.1 FTE to the completion of this project. Total project cost was approximately $28,000. All project funding was external.

3. Chamberlin Creek is a tributary to the Blackfoot River. Access to Chamberlin Creek for spawning was denied for several decades by a combination of irrigation dewatering, channel alterations and poorly designed diversion structures. A fish habitat inventory completed in 1991 identified lack of pools in the lower reaches and poorly designed irrigation structures as limiting fish production. Six hundred feet of stream channel was restored and 1,500 feet enhanced with pool structures. A dam was removed from the channel, wetlands were enhanced, a diversion structure was modified to prevent fish losses in the ditch, one diversion was abandoned, and a feedlot was removed form the channel. This was a cooperative project with the Big Blackfoot Chapter of Trout Unlimited, USFWS, FWP, and the private property owners. The Department committed approximately 0.3 FTE to completion of this project. Total project cost was approximately $42,000. All project funding was external.

4. Monture Creek, a tributary to the Blackfoot River near Ovando, has been damaged by past grazing practices. This project was designed to improve bull trout spawning habitat and included off-site water development, erosion control measures, and riparian fencing. This was a cooperative project with the Big Blackfoot Chapter of Trout Unlimited, USFWs, FWP, and the private property owners. The Department committed approximately 0.2 FTE toward completion of this project. total project cost was approximately $29,000. All project funding was external.

5. Elk Creek is a tributary to the Blackfoot River near Potomac. In the late 1940's the lower mile of Elk Creek was moved from the valley bottom to a hillside. Over the years the new channel has eroded severely -- downcutting as much as 15 feet in some locations. This project will return the stream to its original location and will restore approximately 8,000 feet of channel. Activities include riparian fencing, revegetation of streamside areas, off-stream water development, erosion control, improved grazing management, and instream habitat improvement measures. This project is being completed in cooperation with the Big Blackfoot Chapter of Trout Unlimited, EPA, and private property owners. The Department has committed about 0.1 FTE to the completion of this project. Total project cost is estimated at $155,000; all funding sources are external.

6. Pearson Creek is a tributary to the Blackfoot River near Ovando. Several decades ago Pearson Creek was moved from its original channel to facilitate irrigation practices. This project includes returning the stream to its original channel and incorporating additional fish habitat improvement measures; work is scheduled to be completed by December, 1994. This project is being completed in cooperation with the Big Blackfoot Chapter of Trout Unlimited, USFWS, and private landowners. The Department has committed approximately 0.1 FTE to this project. Total project cost is $30,000; all funding is external.

7. Warren Creek is a tributary to the Blackfoot River near Ovando. Warren Creek has

been impacted by a variety of activities including irrigation practices, grazing practices, and road construction. This project, which is nearly complete, has improved fish habitat by replacement of culverts with bridges, improvement to irrigation diversion structures so as not to impede fish migration, relocation of a streamside feedlot, riparian fencing and improved grazing management. This project is being completed in cooperation with the Big Blackfoot Chapter of Trout Unlimited, private landowners in the area and the River Restoration Program. The Department has committed approximately 0.1 FTE to this project; total project cost is estimated at $19,400.

8. Dry Creek is a tributary to Rock Creek which is a tributary to the North Fork Blackfoot River near Ovando. A variety of land use activities have impacted fish habitat in Dry Creek including timber harvest, grazing, and irrigation management. This project is being designed to restore fish habitat on Dry Creek. Landowner cooperators are presently being sought and project planning is in the early stages. Funding to complete this project has not been solidified, however, Trout Unlimited and the USFWS have committed $10,000 each. The Department has committed approximately 0.1 FTE toward completion of this project.

9. There are several locations along the mainstem Blackfoot River and in some of the tributaries where bull trout and other species are being lost into irrigation diversions. Some initial work has been completed to estimate losses and to identify structural solutions; several landowners have informed the Department that fish are present in their ditches and have expressed an interest in participating. Some funding is available from the USFWS ($10,000) and additional funding sources are being sought. The Department has committed approximately 0.1 FTE toward completion of this project.

Bad Canyon Creek Migration Barrier

Bad Canyon Creek is a tributary to the Stillwater River located near Nye. The headwaters support a small population of genetically pure Yellowstone cutthroat trout that were co-habiting the reach with brown trout. A migration barrier was constructed to isolate the cutthroat population and all brown trout were removed from the reach. Further, during 1993 and 1994 additional Yellowstone cutthroat were stocked in the headwater area from a donor stream. This project was completed in cooperation with the USFS, and the BLM. Cost of this project was approximately $5,000. The Department committed approximately 0.1 FTE toward completion of this project.

Yellowstone River Spawning Channels

Spawning habitat appears to be limited in the Yellowstone River near Big Timber. Several Spring Creeks which enter the Yellowstone in the Big Timber area have been identified as potential sites for enhancing spawning habitat. This project is in the early stages of planning and funding has not yet been secured. This is a cooperative project with the Soil Conservation Service. The Department has committed approximately 0.1 FTE toward completion of this project.

Cave Lake Spawning Enhancement

Cave Lake, located in the Crazy Mountains north of Big Timber, is one of the few waters in Montana that supports a population of golden trout. Spawning habitat for this population was enhanced by removing a migration barrier near the outlet to the lake and adding clean spawning gravels to the outlet stream. This project was completed cooperatively with the USFS. The agencies committed approximately 0.05 FTE toward completion of this project.

Otter Creek Enhancement

Otter Creek is a tributary to the Yellowstone River in the Big Timber area. The Montana Department of Health and Environment Sciences in cooperation with the ASCS and our Department is conducting a watershed enhancement project to improve water quality and fish habitat in Otter Creek. This project includes culvert replacements to improve fish passage, bank stabilization, revegetation, and other erosion control measures. The Department is monitoring the response of fish populations to these improvements. Total project cost is estimated at $365,000; all project funding is external. Approximately 0.05 FTE has been committed to this effort.

Deep Creek Spawning Enhancements

Deep Creek is a tributary to the Missouri River near Townsend. For many years, an irrigation canal intercepted Deep Creek and blocked the upstream migration of spawning

trout from the Missouri river and Canyon Ferry Reservoir. Portions of the stream also suffer from dewatering and sediment loading. This project involved installation of a large siphon that routes water from the canal under Deep Creek thereby removing the migration barrier. Additionally, an agreement was reached with a private landowner to release additional water into the lower three miles of Deep Creek during a season when it was previously dewatered. Finally, sediment loading has been reduced by a riparian fencing project and improved irrigation practices. Since the migration barrier was removed biologists have observed a minimum of 2,000 spawning rainbow trout per year in Deep Creek. Some of these fish are utilizing spawning habitat as far as 20 miles upstream from the former migration barrier. This has been a cooperative effort with the Department of Health and Environmental Sciences and private landowners in the area. The EPA has provided additional funding to develop a watershed plan and further address sediment loading. Total cost of this project was approximately $237,000. The Department committed approximately 0.3 FTE towards this effort; all funding sources were external.

Confederate Creek Spawning Enhancements

Confederate Creek is a tributary to Canyon Ferry Reservoir near Townsend. Habitat in the stream was damaged from previous placer mining activities. Spawning habitat has been enhanced in the lower most 1500' of stream by adding spawning size gravels and modifying the channel so that it retains gravel. Since completion of the project, significant spawning activities have been observed in the lower reaches of Confederate Creek. This was a cooperative project with DNRC as part of the mitigation for Toston Dam. Cost of the project was approximately $44,000. The Department committed approximately 0.05 FTE toward completion of this project.

Dry Creek Flow Enhancement

Dry Creek, a tributary to the Missouri River near Townsend, has been historically dewatered due to irrigation withdrawals. In 1991, FWP's local biologist was able to work with local landowners to provide flow releases needed to maintain incubating eggs from spawning fish that had migrated up Deep Creek from the Missouri River. Since flows have been enhanced, Dry Creek has produced on average of nearly 8,000 rainbow trout fry per year. These releases were the result of the voluntary good will of the landowners. The Department has future plans to improve one of the diversion gates so that flows can be more easily regulated.

Crow Creek Spawning Enhancement

Crow Creek is a tributary to the Missouri River near Toston. A 2,000 foot channel is used to convey excess water from the Crow Creek Pump Unit into Crow Creek. This canal has been historically dewatered during the summer. In 1994, an agreement was reached with irrigators on the Broadwater Missouri Canal to voluntarily release flows to the channel during the previously dewatered period. Additionally, a pilot project was conducted to test whether spawning channel development in the canal would enhance spawning and recruitment. A short segment of spawning channel (about 70 feet) was constructed during 1994 and was immediately utilized by spawning rainbow trout from the Missouri River. The channel was also heavily utilized for rearing by young of-the-year brown trout from the Missouri. Spawning channel improvements are planned for the entire canal during 1995, riparian fencing along the canal is also planned. Funding for the pilot project was provided from a local community interest group; River Restoration funds and local funds will also be sought to complete this project. It is estimated that the project will cost approximately $7,000. The Department has committed approximately 0.05 FTE toward completion of this project.

White's Gulch Enhancement

White's Gulch is a tributary to Canyon Ferry Reservoir near Townsend. The upper reaches of White's Gulch support a small genetically pure population of westslope cutthroat trout. Much of White's Gulch, including the upper reach, was severely impacted by placer mining near the turn of the century. This project is being conducted to restore the upper reaches of White's Gulch and enhance habitat for westslope cutthroat trout. A migration barrier will also be constructed to protect the genetic integrity of this remnant cutthroat population. Construction of these improvements is anticipated to begin in 1995. This is a cooperative project between the Department, the Helena National Forest and the Broadwater Conservation District. Funding is being provided from the Resource Indemnity Trust Program and the USFS. Total cost of the project is approximately $296,000. The Department has committed approximately 0.1 FTE toward completion of this project.

Wade Lake Spawning Enhancement

Wade Lake, located south of Ennis and near the Idaho border, is fed by a spring. Although the spring provides constant temperature water year-round, there were only a few suitable spawning areas in the spring channel as it enters Wade Lake. This project involved filling

in portions of the lake near the stream outlet and constructing a 600' spawning channel. The project was completed in 1991 at a cost of $115,000 using funding provided from the federal Sikes Act. The Department allocated approximately 0.1 FTE toward completion of this project.

Cartersville Diversion Dam Fish Passage

The Cartersville Diversion Dam on the Yellowstone River near Forsyth is a partial barrier to fish passage and limits fish populations in upstream areas. Shovelnose sturgeon, although common downstream, are completely absent upstream of the diversion dam. Sauger abundance upstream of the dam is only 10-15 percent of the downstream abundance. Other species may be affected also. The Department in 1994 hired a contractor to determine feasible methods for building fish passage at the diversion dam; $5,000 has been spent to date on the feasibility analysis. Total design and construction costs are not yet known. The Department has allocated approximately 0.2 to this effort; additional FTE usage is anticipated.

Tongue River Enhancement Projects

The Tongue River Reservoir has been operated at a low water storage level since 1979 because of concern that the spillway could fail. This operation has decreased spring flows in the Tongue River and reduced the availability of important spawning habitat to migratory sauger from the Yellowstone River. Loss of fish into irrigation diversions is an additional problem. The Department intends to address both of these problems using enhancement dollars originating from the Tongue River Dam rehabilitation project. These projects are in the planning stages. Available funding, costs, and FTE commitment have not been determined.

Stanton Creek Fish Passage

Stanton Creek, a tributary to the Middle Fork of the Flathead River, historically provided spawning habitat for westslope cutthroat and bull trout. The upper reach of the stream was blocked to fish migration in 1960 by a highway culvert. A railroad trestle immediately downstream of the highway bridge was recently reconstructed and includes an open bottom arch culvert with a fish passage weir. Additionally, a design has been completed for a fish

weir in the highway culvert. FWP is negotiating with BN and the Montana Department of Transportation to establish a construction fund to modify the highway culvert to permit fish passage. The Department has allocated approximately 0.05 FTE towards completion of this effort.

Lake Mary Ronan Tributary Enhancement

Lake Mary Ronan, the third most popular fishing lake in Region One, supports a self-sustaining rainbow trout population. However, rainbow trout spawning tributaries have been impacted by grazing. River Restoration funds have been used to partially rehabilitate these streams. In addition, Plum Creek Timber Company, the Lake Mary Ronaners, and FWP have contributed materials and resources to construct and maintain fencelines, manage cattle grazing and revegetate streambanks. The FWP has allocated approximately 0.06 FTE toward completion of this effort.

Bass Habitat Enhancement - Small Lakes

The FWP has worked cooperatively with several bass clubs and USFS to install bass habitat structures in area lakes to enhance security, spawning, resting, and feeding habitat. A variety of structures have been utilized including Christmas trees, wood pallets, and logs. Structures have been placed in Echo, Abbott, Peterson, Horseshoe, Halfmoon, and Murphy lakes. The FWP has allocated approximately 0.04 FTE toward completion of this effort.