Steve

Montana Department of Fish, Wildlife & Parks

Date: June 13, 1988

Jerry J. Blackard
Chief, Division of Federal Aid
U.S. Fish & Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225

Dear Jerry:

Enclosed for your review and approval is (are) the following document(s):

___ Application for Federal Assistance (AFA)

___ Amendment #_____ to AFA

___ Environmental Assessment

X Project Agreement (PA) F-46-R Statewide Fisheries Investigations

___ Amendment #_____ to PA

___ Performance Report

___ Final Report for Research Project

___ "5 year" Evaluation

___ Other (describe)

Please note errata and addendum sheet.

If you have any questions or need additional information, please contact me at 406 444-4756 or Steve McMullin at 444-5686.

Thank you for your assistance.

Sincerely,

Bobbi Balaz

Bobbi Balaz
Federal Aid Coordinator

Enclosure

BB/bl
210/15

OMB Approval No. 1018-0049 Expires 8/31/85

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Division of Federal Aid

PROJECT AGREEMENT

DOCUMENT CONTROL

ORGANIZATION CODE	DOCUMENT NUMBER

STATE: MONTANA

PROJECT NO.	SEGMENT NO.
F-46-R	2

PROJECT TITLE
STATEWIDE FISHERIES INVESTIGATIONS

AGREEMENT PERIOD
From: July 1, 1988
To: June 30, 1989

PROJECT COST DISTRIBUTION

	Total Cost	State Share	Federal Share
XX Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777k) 50 CFR Part 80	1,403,008	350,752	1,052,256
☐ Federal Aid in Wildlife Restoration Act (16 U.S.C. 669-669i) 50 CFR Part 80			
☐ Other (specify) _____			
TOTAL	1,403,008	350,752	1,052,256

OTHER PROJECT PROVISIONS

Total includes indirect costs at the negotiated rate of 16.6 percent.

(Total direct cost = $1,203,266)

The State grees to execute the project in accordance with the Acts checked above, and the pertinent rules and regulations of the Secretary of the Interior contained in Title 50 of the Code of Federal Regulations; the U.S. Fish and Wildlife Service Federal Aid Manual; and the previously approved Application for Federal Assistance to the extent encompassed by this Agreement, including the Assurances attached thereto.

STATE AGENCY (Name and Address)
Montana Department of Fish, Wildlife and Parks
1420 East Sixth Avenue
Helena, Montana 59620

SIGNATURE	TITLE	DATE
Roberta J. Balay	Federal Aid Coordinator	June 13, 1988

SPECIAL PROJECT CONDITIONS

APPROVED FOR THE SECRETARY OF THE INTERIOR

SIGNATURE	TITLE	DATE

Form 3-1552
(Revised Mar. 1983)

1984 778-278

STATEWIDE FISHERIES INVESTIGATIONS
MONTANA PROJECT F-46-R-2: FY 1989

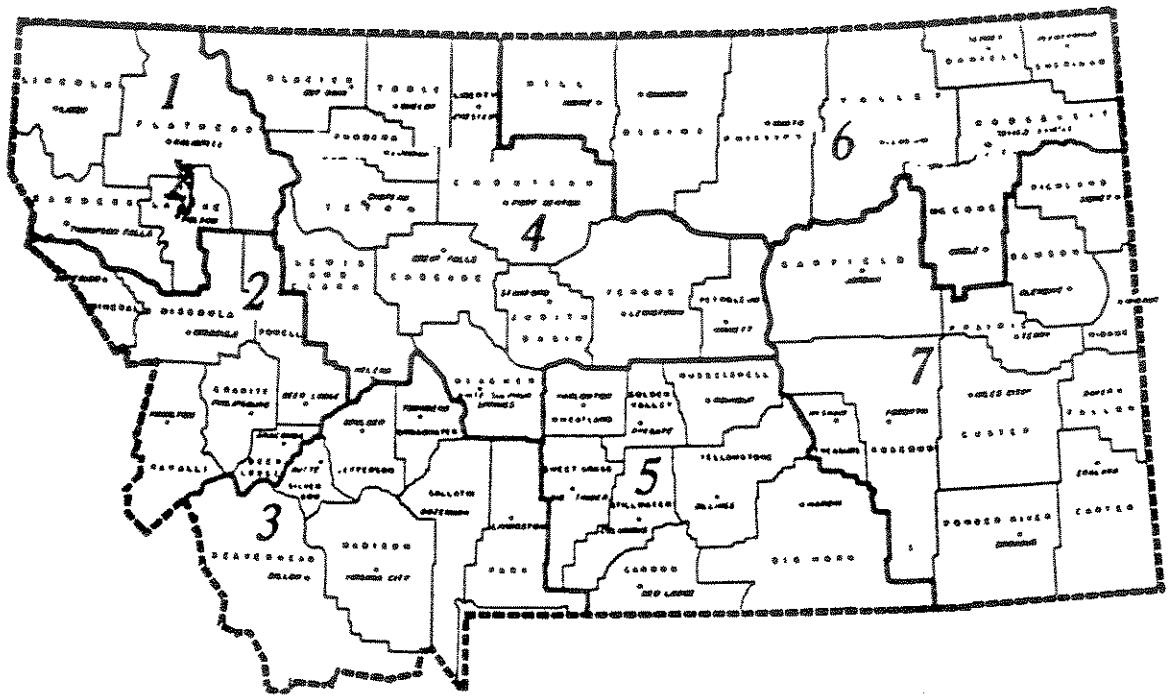
JOB #	REGION	JOB TITLE	COST
I-a	1	Northwest coldwater streams	$ 78,954
b	2	West central coldwater streams	25,[illegible]
c	2	Upper Clark Fork trout restoration	44,[illegible]
d	2	Lower Clark Fork fishery	61,[illegible]
e	3	Southwest coldwater streams	41,[illegible]
f	3	Southwest major rivers	110,[illegible]
g	4	North central coldwater streams	70,[illegible]
h	5	Upper Bighorn River	35,[illegible]
i	5	Mid-Yellowstone drainage	54,[illegible]
II-a	1	Northwest coldwater lakes	80,[illegible]
b	2	West central coldwater lakes	20,[illegible]
c	3	Southwest coldwater lakes	19,771
d	3	Southwest major reservoirs	47,36[illegible]
e	4	North central coldwater lakes	24,918
f	4	Mid-Missouri reservoirs	75,871
III-a	4	North Central warmwater streams	8,260
b	7	Southeast warmwater streams	23,291
c	7	Yellowstone River paddlefish	20,253
IV-a	1	Northwest warmwater lakes	14,594
b	4	North Central warmwater lakes	24,316
c	6	Fort Peck Reservoir	57,627
d	7	Southeastern warmwater lakes	22,842
e	7	Tongue River Reservoir	6,073
V-a	1	Flathead Lake/River system	60,694
b	5	South Central coldwater ecosystem	27,432
c	5	South Central warmwater ecosystem	22,936
d	6	Northeast coldwater ecosystem	11,196
e	6	Northeast warmwater ecosystem	44,242
VI-a	8	Stream protection coordination	39,417
b	8	Stream habitat preservation (deleted)	-
c	8	Angler preference and bioeconomics	24,444
TOTAL DIRECT COSTS			$ 1,203,266

Notes:
1. Total direct costs are shown. 75% is federal; 25% is state.
2. Regional locations include:

R-1 Kalispell	R-5 Billings
R-2 Missoula	R-6 Glasgow
R-3 Bozeman	R-7 Miles City
R-4 Great Falls	R-8 Helena

a:rf46r2 6/13/88

DEPARTMENT OF FISH, WILDLIFE & PARKS
Administrative Regions



STATE HEADQUARTERS
1420 E. 6th Avenue
Helena, MT 59620

REGIONAL OFFICES

Region 1
P.O. Box 67
Kalispell, MT 59903

Region 2
3201 Spurgin Rd.
Missoula, MT 59801

Region 3
8695 Huffine Lane
Bozeman, MT 59715

Region 4
P.O. Box 6609
Great Falls, MT 59406

Region 5
1125 Lake Elmo Drive
Billings, MT 59101

Region 6
Rural Route 1-4210
Glasgow, MT 59230

Region 7
Rural Route 1, Box 2004
Miles City, MT 59301

STATEWIDE FISHERIES INVESTIGATIONS
FEDERAL AID PROJECT
F-46-R-2
July 1, 1988 - June 30, 1989

REGION 1

Job I-a

Study Title: Survey and Inventory of Coldwater Streams
Job Title: Northwest Montana Coldwater Streams Investigations
Project No. 3111

Jim Vashro, Joe Huston, Bob Domrose, Scott Rumsey, Gary Anderson, Betty Johnson

Job II-a

Study Title: Survey and Inventory of Coldwater Lakes
Job Title: Northwest Montana Coldwater Lakes Investigations
Project No. 3121

Jim Vashro, Joe Huston, Bob Domrose, Scott Rumsey, Gary Anderson, Betty Johnson

Job IV-a

Study Title: Survey and Inventory of Warmwater Lakes
Job Title: Northwest Montana Warmwater Lakes Investigations
Project No. 3151

Jim Vashro, Joe Huston, Bob Domrose, Scott Rumsey, Gary Anderson, Betty Johnson

Job V-a

Study Title: Survey and Inventory of Coldwater and Warmwater Ecosystems
Job Title: Flathead Lake-River System Study
Project No. 3131

Jim Vashro, Delano Hanzel, Scott Rumsey, Betty Johnson

STATEWIDE FISHERIES INVESTIGATIONS
FEDERAL AID PROJECT
F-46-R-2
July 1, 1988 - June 30, 1989

REGION 2

Job I-b

Study Title: Survey and Inventory of Coldwater Streams
Job Title: West Central Montana Coldwater Stream Investigations
Project No. 3211

Don Peters, Wayne Hadley, Dennis Workman

Job I-c

Study Title: Survey and Inventory of Coldwater Streams
Job Title: Upper Clark Fork River Study
Project No. 3212

Don Peters, Wayne Hadley

Job I-d

Study Title: Survey and Inventory of Coldwater Streams
Job Title: Lower Clark Fork River Fishery Investigation
Project No. 3213

Dennis Workman, Rod Berg, Don Peters

Job II-b

Study Title: Survey and Inventory of Coldwater Lakes
Job Title: West Central Montana Coldwater Lakes Investigations
Project No. 3221

Don Peters, Wayne Hadley, Dennis Workman

STATEWIDE FISHERIES INVESTIGATIONS
FEDERAL AID PROJECT
F-46-R-2
July 1, 1988 - June 30, 1989

REGION 3

Job I-e

Study Title: Survey and Inventory of Coldwater Streams
Job Title: Southwest Montana Coldwater Stream Investigations
Project No. 3311

Jerry Wells, Dick Vincent, Bruce Rehwinkel, Chris Clancy, Dick Oswald, Jeff Bagdanov

Job I-f

Study Title: Survey and Inventory of Coldwater Streams
Job Title: Southwest Montana Major River Fisheries Investigations:
Madison River, Yellowstone River, Big Hole River, Beaverhead River, Gallatin River, Jefferson River, Missouri River,
Project No. 3312

Jerry Wells, Dick Vincent, Bruce Rehwinkel, Chris Clancy, Dick Oswald, Jeff Bagdanov

Job II-c

Study Title: Survey and Inventory of Coldwater Lakes
Job Title: Southwest Montana Coldwater Lakes Investigations
Project No. 3321

Jerry Wells, Dick Vincent, Bruce Rehwinkel, Chris Clancy, Dick Oswald

Job II-d

Study Title: Survey and Inventory of Coldwater Lakes
Job Title: Southwest Montana Major Reservoir Investigations:
Clark Canyon, Hebgen, Willow Creek, Canyon Ferry
Project No. 3322

Jerry Wells, Dick Vincent, Bruce Rehwinkel, Dick Oswald

STATEWIDE FISHERIES INVESTIGATIONS
FEDERAL AID PROJECT
F-46-R-2
July 1, 1988 - June 30, 1989

REGION 4

Job I-g

Study Title: Survey and Inventory of Coldwater Streams
Job Title: Northcentral Montana Trout Stream Investigations
Project No. 3411

Al Wipperman, Bill Hill, Steve Leathe

Job II-e

Study Title: Survey and Inventory of Coldwater Lakes
Job Title: North Central Montana Coldwater Lakes Investigations
Project No. 3421

Al Wipperman, Bill Hill, Steve Leathe

Job II-f

Study Title: Survey and Inventory of Coldwater Lakes
Job Title: Mid-Missouri Reservoirs Study
Project No. 3422

Mark Lere, Al Wipperman, Jerry Wells

Job III-a

Study Title: Survey and Inventory of Warmwater Streams
Job Title: North Central Montana Warmwater Stream Investigations
Project No. 3441

Al Wipperman, Bill Hill, Steve Leathe

Job IV-b

Study Title: Survey and Inventory of Warmwater Lakes
Job Title: North Central Montana Warmwater Lakes Investigations
Project No. 3451

Al Wipperman, Bill Hill, Steve Leathe

STATEWIDE FISHERIES INVESTIGATIONS
FEDERAL AID PROJECT
F-46-R-2
July 1, 1988 - June 30, 1989

REGION 5

Job I-h

Study Title: Survey and Inventory of Coldwater Streams
Job Title: Upper Bighorn River Investigations
Project No. 3511

Jim Darling, Wade Fredenberg

Job I-i

Study Title: Survey and Inventory of Coldwater Streams
Job Title: Mid-Yellowstone Drainage Investigations
Project No. 3512

Jim Darling, Michiel Poore

Job V-b

Study Title: Survey and Inventory of Coldwater and Warmwater Ecosystems
Job Title: South Central Montana Coldwater Ecosystems Investigations
Project No. 3531

Jim Darling, Wade Fredenberg, Michiel Poore, Michael Vaughn

Job V-c

Study Title: Survey and Inventory of Coldwater and Warmwater Ecosystems
Job Title: South Central Montana Warmwater Fisheries Investigations
Project No. 3561

Jim Darling, Wade Fredenberg, Michiel Poore, Michael Vaughn

STATEWIDE FISHERIES INVESTIGATIONS
FEDERAL AID PROJECT
F-46-R-2
July 1, 1988 - June 30, 1989

REGION 6

Job IV-c

Study Title: Survey and Inventory of Warmwater Lakes
Job Title: Fort Peck Reservoir Study
Project No. 3651

Bob Needham, Bill Wiedenheft, Dan Welsh

Job V-d

Study Title: Survey and Inventory of Coldwater and Warmwater Ecosystems
Job Title: Northeast Montana Coldwater Ecosystems Investigations
Project No. 3631

Bob Needham, Kent Gilge, Dan Welsh

Job V-e

Study Title: Survey and Inventory of Coldwater and Warmwater Ecosystems
Job Title: Northeast Montana Warmwater Ecosystem Investigations
Project No. 3661

Bob Needham, Kent Gilge, Dan Welsh

STATEWIDE FISHERIES INVESTIGATIONS
FEDERAL AID PROJECT
F-46-R-2
July 1, 1988 - June 30, 1989

REGION 7

Job III-b

Study Title: Survey and Inventory of Warmwater Streams
Job Title: Southeast Montana Warmwater Stream Investigations
Project No. 3741

Phil Stewart, Vic Riggs

Job III-c

Study Title: Survey and Inventory of Warmwater Streams
Job Title: Yellowstone River Paddlefish Investigations
Project No. 3742

Phil Stewart, Vic Riggs

Job IV-d

Study Title: Survey and Inventory of Warmwater Lakes
Job Title: Southeast Montana Warmwater Lakes Investigations
Project No. 3751

Phil Stewart, Vic Riggs

Job IV-e

Study Title: Survey and Inventory of Warmwater Lakes
Job Title: Tongue River Reservoir Investigations
Project No. 3752

Phil Stewart, Vic Riggs

STATEWIDE FISHERIES INVESTIGATIONS
FEDERAL AID PROJECT
F-46-R-2
July 1, 1988 - June 30, 1989

REGION 8

Job VI-a

Study Title: Statewide Surveys and Inventories
Job Title: Stream Protection Coordinator
Project No. 3812

Vacant

Job VI-b

Study Title: Statewide Surveys and Inventories
Job Title: Stream Habitat Preservation
Project No. 3811

Vacant

F-38-R-3

**These two projects have been combined under this project number

F-38-R-3**

Study Title: Water Reservations
Job Title: Missouri River Basin
Project No. 3848
Job I-a, Mark Lere

FW-2-R-17**

Study Title: Planning Inventory, Fisheries
Job Title: Middle Missouri River Basin Instream Flow Studies
Project No. 3834
Job I-b, Bill Gardner

F-39-D-3

Job Title: Improvement of Fish Rearing Facilities at Washoe Park Trout Hatchery
Project No. 78983

Thurston Dotson, Mark Hamilton

F-40-D-3

Job Title: Expansion and Improvement of Miles City Fish Hatchery for Production and Stocking of Warm/Cool Water Sport Fish
Project No. 78982

Thurston Dotson, Bud Butterfield

F-41-D-3

Job Title: Improvement of Fish Rearing Facilities at Big Springs State Fish Hatchery
Project No. 78984

Thurston Dotson, Jack Boyce

Job VI-c

Job Title: Assessing the Value and Quality of Fishing and Hunting in Montana
Project No. 3808

Rob Brooks

State: Montana Project No: F-46-R-2

Project Title: Statewide Fisheries Investigations

ERRATA AND ADDENDUM TO JOB DESCRIPTIONS

The following changes should be made to Job Descriptions for FY89:

Job I-a. Objective 10. "To increase angler compliance with existing laws." This objective did not appear in the AFA or the FY88 Job Description. Since it is a state funded objective, its inclusion this year is inconsequential.

Job I-f. Missouri River Objective 3. Wording should be changed to: "Restore the fall run of rainbow trout out of Canyon Ferry Reservoir to 1978 levels and provide 12,000 hours of use with a harvest of $\geq$ 8,000 rainbow trout."

Job II-b. Objective 2 on the FY88 Job Description was deleted: "Expand opportunities to catch rainbow trout in excess of 3 pounds in Brown's Lake." Winterkills have occurred in Brown's Lake each of the last few years. Because there is currently little or no opportunity to manage this lake for large trout, the objective should be deleted.

Job II-d. Clark Canyon Objectives 3 and 4. The wording of these two objectives was changed slightly from the AFA and FY88 Job Description, although the intent is the same. They should read:

"3. Maintain successful stocking program of Arlee rainbow trout to attain densities reflected by an average spring sample of 4.0 per 125' surface gill net set. Maintain growth rates that produce 15 inch rainbow trout at age I+."

"4. Establish the wild, spring spawning DeSmet strain of rainbow trout to augment the planting program of Arlee rainbow and provide a longer lived, reproducing segment to the rainbow fishery".

Job IV-a. Objective 2 from the AFA and FY88 Job Description was omitted. It should be reinserted as follows: "2. Identify populations with surplus fish that can be used for transplants".

Job V-a. River Segment Objective 7 was omitted. It should be reinserted as follows: "7. Provide river access sites 4-6 hours (floating time) apart. Secure public access on currently used private ground". This is a state funded objective.

Job V-c. The dates in Objective 1 were omitted. They should be reinserted as follows: " ...Bureau of Reclamation during the April 15-May 31 period".

June 10, 1988

JOB DESCRIPTION

State Montana

Project No.: F-46-R-2 (3111)
Job No. I-a

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Coldwater Streams
Job Title: Northwest Montana Coldwater Stream Investigations

Job Objectives:

1. To maintain, within legal limits, instream flows sufficient to maintain or enhance fish populations at existing levels.
2. To maintain streambanks and channels in present or improved condition.
3. To maintain water quality at or above present levels as measured by the state Water Quality Bureau and the U.S. Geological Service.
4. Maintain aquatic habitat and associated fish populations at or above present levels.
5. To maintain fish populations and harvest at acceptable levels to provide 163,300 angler days of use by 1992 and a catch rate of 0.5 fish/hour or greater.
6. To maintain a population of 1,300 rainbow trout per mile with 5 percent larger than 14 inches in the Kootenai.
7. To maintain or expand populations of species of special concern (westslope cutthroat trout, bull trout, and inland rainbow trout).
8. To secure public access on currently used sites on private ground. Provide floating accesses 4-6 hours apart on major streams.
9. To communicate and coordinate management strategies and problems with the public and other resource agencies to maintain fish population at or above present levels.
10. To increase angler compliance with existing laws.

Procedures:

Objectives 1, 2, 3, 8, and 10 will be achieved entirely through state funding.

Minimum instream flows to maintain trout habitat will be maintained in Ashley Creek through flow releases from Ashley Lake. Coordination will continue with the Army Corps of Engineers to maintain minimum flow releases from Libby Dam. In addition, MDFWP water rights will be protected by review of water use permit applications.

Streambanks and channels will be protected by review of proposed projects through administration of the Stream Protection Act and participation in the Natural Streambed and Land Preservation Act and the Army Corps of Engineers 404 permit program. Water quality will be maintained through the Water Quality Bureau and the review of Montana Department of Environmental Science water discharge applications.

Aquatic habitat will be maintained through coordination with other agencies and private concerns. Timber sale plans, mining operation plans, and subdivision plats plus others will be reviewed. Fish redd counts in four Swan River tributaries and gravel core samples will be used to monitor fishery impacts.

Standard electrofishing methods (Vincent 1971), snorkeling (Zubik and Fraley 1987) population techniques, and redd counts (Sheparc and Graham 1983) will be used to monitor fish species, distribution and population structure. The Alley Springs Rapids-Pipe Creek section and Jennings Rapids sections on the Kootenai River, two sections on the Middle Fork Flathead River, and one section on the Thompson River, and two sections on the Swan River will be monitored to evaluate the effectiveness of various regulations in increasing the opportunity to catch larger trout to meet angler demands. Ex-officio patrols will be coordinated with the enforcement division and special regulation brochures to increase understanding and compliance with fishing regulations.

As use increases, additional fishing access sites will have to be identified and procured. An access inventory for the Clark Fork River will be coordinated with the Forest Service to identify needs.

Location of work: Flathead, Lake, Sanders, Lincoln, and portions of Missoula and Powell counties.

Technical personnel:		
	James Vashro	80 man days
	Joe Huston	79 man days
	Bob Domrose	90 man days
	Scott Rumsey	79 man days
	Gary Anderson	79 man days
	Betty Johnson	79 man days
	EPP Biologist, unknown	34 man days
	TOTAL	534 man days

Job duration: July 1, 1988 through June 30, 1989.

Report period: July 1, 1988 through August 31, 1989

Cost: Total: $78,954 Federal share: 75 % State share: 25 %

Principal Investigator: Bob Domrose, Fisheries Biologist

BIBLIOGRAPHY

Shepard,B. and P. Graham. 1983. Fish resource monitoring program for the upper Flathead Basin. Montana Dept. of Fish, Wildlife and Parks, Kalispell, MT, USA. Sponsored by Environmental Protection Agency.

Vincent. E. R. 1971. River electrofishing and fish population estimates. Prog. Fish. Cult. 33(3):163-167.

Zubik, R. J. and J. J. Fraley. 1987. Comparison of snorkel and mark-recapture estimates for trout populations in large streams. Montana Dept. of Fish, Wildlife and Parks, Kalispell, MT, USA. In press. The North American Journal of Fisheries Management.

JOB DESCRIPTION

State Montana

Project No. F-46-R-2 (3121)
Job No. II-a

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Coldwater Lakes
Job Title: Northwest Montana Coldwater lakes Investigations

Job Objectives:

1. Manage lake and reservoir water levels to minimize impacts on fish populations.
2. Maintain water quality at present levels as measured by the Water Quality Bureau.
3. Maintain aquatic habitat at a level capable of sustaining existing populations.
4. Increase the opportunity to catch larger trout (14" at 0.5 fish/hour) in specified lakes.
5. Provide lake fisheries to sustain an increase of 32,600 angler days by 1992 through natural reporduction and hatchery plants. Provide kokanee fisheries for 12-14" fish at a catch rate of 1 fish/hour.
6. Provide a variety of trout sizes and species for angling and to predate on stunted salmon.
7. Manage regulations and stocking to protect or expand species of special concern.
8. Develop management plans to adapt to the introduction of Mysis and other unwanted species.
9. Coordinate with other agencies to maintain fisheries and water quality at or above present levels.
10. Encourage public participation in understanding the problems and strategies of resource management.
11. Attempt to acquire sites and provide facilities on all lakes and reservoirs capable of sustaining more than 300 mandays of fishing per year on a priority basis at the rate of one lake per year.

Procedures:

Objectives 1, 2, 3, 7, 9, and 11 will be funded entirely with state funding.

Lake habitat and water quality will be maintained or improved by enforcement of the Lakeshore Protection Act, the Army Corps 404 permit system, and existing water quality laws. Fishery resources will be protected during other land or water developments by coordinating with the appropriate public or private entity. Standard fishery sampling will be done to determine resource impacts.

Fish species, distribution, abundance and population structures will be determined using netting, electrofishing, creel census and electrophoresis. Notellum, Frank, Timber, Foy, Metcalf, Spencer, Bootjack, and Little Bitterroot lakes will be monitored to determine effectiveness of large trout

regulations and planting various strains of rainbow trout. Other lakes will be sampled as necessary to determine best management practices such as fish planting rates, species planted or time of planting. Natural reproduction will be supplemented in Ashley and Little Bitterroot lakes. Brown trout will be planted in Noxon Rapids and Cabinet Gorge reservoirs. Technical assistance will be provided Washington Water Power company's efforts to evaluate benthic, planktonic, and fisheries reactions to stabliized water levels in Noxon Rapids Reservoir.

Management plans will be started for Hungry Horse Reservoir and completed for Swan Lake. Food habits of fish living in lakes containing Mysis will be determined. Spot creel census information to determine angler use and success will be collected. Changes in fishing regulations and management strategies will be made as necessary. Development of access into selected lakes with empnasis on lakes surrounded by Champion International properties will be empnasized.

Coordination will continue with Corps of Engineers, Bureau of Reclamation, Bonneville Power Administration, Montana Power Company, and Washington Water Power Company to minimize effects of reservoir operation on fishery resources. Flow releases from Ashley Lake will be managed by the Department to minimize impacts on the lake fishery, downstream creek fishery and meet pollution dilution requirements downstream. Various sportsman and civic groups meetings will be attended and management explained.

Location of work: Flathead, Lake, Sanders, Lincoln, and Missoula counties

Technical personnel:		
	James Vashro	66 man days
	Robert Domrose	120 man days
	Delano Hanzel	26 man days
	Scott Rumsey	79 man days
	Gary Anderson	105 man days
	Joe Huston	131 man days
	Betty Johnson	79 man days
	EPP Biologist, unknown	31 man days
	EPP Biologist, unknown	26 man days
	TOTAL	674 man days

Job duration: July 1, 1988 through June 30, 1989.

Report period: July 1, 1988 through August 31, 1989.

Cost: Total: $80,488 Federal share: 75 % State share 25 %

Principal Investigator: Joe Huston, Fishery Biologist Supervisor

JOB DESCRIPTION

State Montana

Project No. F-46-R-2 (3131)
Job No. V-a

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Colwater and Warmwater Ecosystems
Job Title: Flathead Lake-River System Study

Lake Segment Objectives

1. Influence management of water levels in the lake to minimize impacts on fish populations.
2. Maintain water quality at present levels as measured by the WQB.
3. Maintain aquatic habitat at a level capable of sustaining existing fish populations.
4. Maintain trout and salmon populations at present levels in face of projected increases of 35,000 mandays by 1992. Utilize hatchery plants if necessary.
5. Maintain the opportunity to catch large bull trout (>8 lb.) and lake trout (>15 lb.) at a catch rate of 0.1 fish/hour.
6. Manage for a 12-14" kokanee and a catch rate of 1 fish/hour.
7. Develop management strategies to compensate for the introduction of Mysis.
8. Encourage public participation in resource issues and decisions.
9. Provide public access to popular use areas and develop more low water boat ramps.

River Segment Objectives

1. Maintain, within legal limits, instream flows sufficient to maintain or enhance existing fish populations.
2. Maintain spawning and incubation flow discharges from Hungry Horse Dam as calculated by Special Projects studies.
3. Maintain streambanks and channels in present or improved condition.
4. Maintain water quality at or above present levels as measured by WQB and USGS.
5. Maintain fish habitat at or above present levels.
6. Maintain fish populations that will provide use and harvest at present levels.
8. Increase public awareness of the unique nature and problems of the adfluvial fisheries.
9. Increase compliance with existing angling regulations.

Procedures:

Lake Segment

Objectives 1, 2, 3, and 9 will be funded entirely with state funding.

Lake level management would be influenced through the operation of Hungry Horse and Kerr dams as negotiated under the Northwest Power Act and with Montana Power Company as a result of studies funded by the Bonneville Power Administration.

Lake habitat and water quality will be maintained by participation in administration of the Lakeshore Protection Act, the Army Corps of Engineers 404 permit program, and the Water Quality Bureau MPDES permit program. The Department will coordinate with other agencies such as the U. S. Forest Service and the Confederated Salish and Kootenai Tribe in land and water use planning such as timber sales and lakeshore development to ensure fisheries values are protected or mitigated. The Department is currently working on a fisheries co-management plan with the Confederated Salish and Kootenai Tribe which controls the south half of Flathead Lake. Fish sampling will be used to monitor for fishery impacts. Fish kills will be investigated for causes and fish tissue samples will be collected as needed for heavy metals or pesticide analysis.

Fishing use and harvest will be monitored with a combination of netting, acoustics, and creel census. Specific fisheries such as the winter and river fisheries will be creeled if budgets permit. Acoustics and trawling will be used to establish kokanee abundance indices. Length and otolith or scale samples will also be collected to establish age and growth patterns for each age class. Shoreline spawning will be monitored by visual surveys.

Natural kokanee recruitment will be augmented with hatchery plants to maintain a desired size (12-14") and catch rate (1 fish/hour). The effects of Mysis on kokanee will be monitored through abundance indices, growth estimates, and zooplankton sampling. Late release strategies for kokanee fry to overcome Mysis competition will be evaluated by marking and monitoring different hatchery plants.

Trout species will be monitored by gillnetting and spot creel checks. Movements and catch and release mortality will be measured through a cooperative angler tagging program. Age, growth, and food habits of trout will be monitored to determine any impacts from Mysis. Species of special concern will be protected through habitat protection, adjustment of

regulations, and preventing the introduction of non-native species that would hybridize or compete.

Ex-officio patrols will be coordinated with enforcement patrols and special regulation brochures will be prepared to increase angler understanding and compliance with fishing regulations.

The fish division will identify priority sites for acquisition or development with special attention to developing more low water boat launching sites.

River Segment

Objectives 1, 3, and 9 will be funded entirely with state funding.

Minimum instream flows will be maintained by reviewing and commenting on water use applications to ensure that "Murphy Rights" flows are maintained. Flow discharges from Hungry Horse Dam will be secured through the Northwest Power Act. Water quality will be maintained through review of Water Quality Bureau MPDES water discharge applications and field reviews of the 3(a) turbidity variance permits. Water quality will also be reviewed through coordination and review of land and water use plans of agencies such as the U. S. Forest Service. This same coordination will also protect aquatic habitat along with participation in the administration of the Natural Streambed and Land Preservation Act, Stream Protection Act, and the Army Corps 404 permit program. Impacts from land and water development will be monitored through redd counts and electrofishing population estimates in spawning tributaries.

Bull trout spawning escapement will be enumerated by redd counts on Whale, Trail, Coal, and Big creeks while the abundance of juvenile cutthroat and bull trout populations will be monitored with electro-fishing in Coal and Morrison creeks. Movements and catch and release mortality on bull and cutthroat trout will be measured through a cooperative angler tagging program. Regulations will be altered as necessary to maintain or enhance existing populations.

Ex-officio patrols will be coordinated with enforcement patrols to increase understanding and compliance with fishing regulations.

Fisheries personnel will attend coordination meetings with sportsmen and other resource agencies to build understanding and support for fish management programs.

Location: The project area is located in Flathead and Lake counties in northwest Montana. The area includes all portions of Flathead Lake and Flathead River drainage above Kerr Dam that are used by adfluvial fish stocks from Flathead Lake.

Principal Fish Species Involved:kokanee, bull trout, cutthroat trout and lake trout

Technical Personnel:	Jim Vashro	91 man days
	Delano Hanzel	236 man days
	Bob Domrose	26 man days
	Joe Huston	26 man days
	Scott Rumsey	52 man days
	EPP Biologist, unknown	13 man days
	Gary Anderson	52 man days
	Betty Johnson	79 man days
	TOTAL	550 man days

Job duration: July 1, 1988 through June 30, 1989
Report period: July 1, 1988 through June 30, 1989

Cost: Total: $60,694 Federal share: 75% State share: 25%

Principal Investigator: Delano A. Hanzel, Fisheries Biologist

JD3131.88
5/4/88

JOB DESCRIPTION

State Montana

Project No. F-46-R-2 (3151)
Job No. IV-a

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Warmwater Lakes
Job Title: Northwest Montana Warmwater Lake Investigations

Job Objectives:

1. Establish and maintain fishable populations (catch rate = 0.25 fish/hour of bass in Noxon and Cabinet Gorge reservoirs.
2. Attempt to acquire and develop access sites on all lakes and reservoirs with the potential for more than 500 mandays of fishing annually. First priority should be given to lake Blaine and those lakes with adjoining Champion International or Plum Creek Timberlands property.
3. Minimize the impacts of land and water use on fisheries.
4. Define the impacts of fishermen use on specified fisheries and provide an increased opportunity to catch large bass (>12-14") and northern pike(>28").
5. Address the demand for new species introductions. Define the parameters of interspecific competition, participate in a walleye introduction EIS, halt the illegal spread of northern pike.
6. Enhance fish populations through the placement of artificial habitat.
7. Define the mechanisms of predator/prey relationships in area lakes. Reduce competition with gamefish and reduce overabundant populations of nongamefish.
8. Encourage increased public knowledge and participation in resource decisions.

Procedures:

Objectives 2, 3, and 4 will be funded entirely through state funding.

Primary emphasis will be on survey and inventory of existing populations and angler use with netting, electrofishing, and spot creel checks. Additional fishing opportunities to meet increasing demand will be provided by planting or transplanting fish into suitable new waters. An EA will be prepared on the introduction of smallmouth bass in the Flathead drainage. Food habit surveys and abundance indices will be used to define the interaction between largemouth bass, smallmouth bass, and northern pike as well as the competition for common forage fish in Noxon Reservoir. Smallmouth bass and burbot will continue to be transplanted into Noxon and Cabinet Gorge reservoirs in an attempt to create fishable populations.

The illegal introduction of northern pike and other species or the presence of overabundant nongame fish populations will be controlled through water

level manipulation, chemical renabilitation, or the introduction of predators as appropriate.

The Department will survey Echo, Swan, and Whitefish lakes as well as conduct a literature search to determine the potential for increasing the opportunity to catch larger northern pike and bass in those lakes through a change in fishing regulations.

Water quality and aquatic habitat will be protected or enhanced by participation in the administration of the Lakeshore Protection Act, the Army Corps of Engineers 404 permit program, and MPDES water discharge applications. The Department will provide supervision in a baseline study by Washington Water Power to minimize impacts of water level fluctuations on Noxon and Cabinet Gorge reservoirs. The Department will coordinate with other agencies in land and water use planning in projects such as timber sales and subdivision proposals to ensure that fisheries values are protected or mitigated. Habitat loss will be mitigated by enlisting the aid of Washington Water Power, the Western Montana Bassmasters, and other groups to place habitat enhancement structures. Fish sampling will be used to monitor for fishery impacts.

Fishing access will be secured by prioritizing lakes and purchasing sites as land and money is available. Attempts will be made to secure and develop access on all lakes with the potential for more than 500 mandays of fishing on a priority basis. Emphasis will be given to Lake Blaine and those lakes in the Happy's Inn area west of Kalispell where current public access is across private lands owned by Champion International or Plum Creek Timberlands. As the demand for warmwater fishing increases, attempts will be made to more fully inform the public about the problems facing warmwater fishing through participation in public meeting and personal contacts. The public will be more fully involved in management decisions through the publication and review of a management plan for Swan Lake.

Work location: All of Flathead, Lake, Lincoln, and Sanders counties.

Technical personnel:

Jim Vashro	26 man days
Joe Huston	26 man days
Bob Domrose	26 man days
Scott Rumsey	52 man days
Gary Anderson	26 man days
Betty Johnson	26 man days
TOTAL	182 man days

Job duration: July 1, 1988 through June 30, 1989.

Report period: July 1, 1988 through June 30, 1989.

Cost: Total: $14,594 Federal share: 75% State share: 25%

Principal Investigator: Scott Rumsey, Fisheries Biologist

JOB DESCRIPTION

State Montana

Project No. F-46-R-2 (3211)

Job No. I-b

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Coldwater Streams
Job Title: West Central Montana Coldwater Stream Investigations

JOB OBJECTIVES:

1. Ensure within legal and hydrologic constraints that flows in trout streams do not fall below 1975-1985 averages.
2. Maintain existing trout populations at or above the current densities in 5 to 10 test streams.
3. Maintain 100% of the region's stream banks and channels in their present or better condition.
4. Maintain water quality at current or improved conditions as reported in the 1986 Montana 305(b) Water Quality Report to the U. S. Environmental Protection Agency.
5. Maintain fish populations and habitat in streams affected by resource development at levels at least as good as current status.
6. Implement the Bitterroot River/Painted Rocks water management plan and provide minimum instream flows at Bell Crossing consistent with the plan and water availability.
7. Maintain genetically pure WsCt populations with population structures at least as diverse as presently exist.
8. Develop a voluntary catch and release program for westslope cutthroat trout in rivers and streams to maintain genetically pure populations at least at current levels wherever they exist.
9. Maintain bull trout populations at least at current levels.
10. Increase the number of trout over 14 inches long in the Rock Creek population to at least 200 per mile.
11. Determine if a problem exists between floating and walking anglers on Rock Creek.
12. Maintain the combined number of wild rainbow and brown trout 14 inches and larger in the Darby section of the Bitterroot River at 100 per mile and in the Tucker Section at 160 per mile. Maintain rainbow standing crop of 300, of all sizes, in the Poker Joe section downstream from Stevensville.
13. Determine extent of fry loss to irrigation ditches in key spawning tributaries in the Bitterroot. Determine time period during which ditches pose the greatest threat to migrating fry.
14. Increase the number of rainbows 12 inches and larger in the Johnsrud section of the Blackfoot River to at least 300 per mile.
15. Maintain trout populations at least at current levels in the Blackfoot River upstream from Johnsrud Park.
16. To develop in cooperation with the U.S. Forest Service a five-year management plan for Rock Creek.

PROCEDURES:

Objective numbers 8, 11 and 13 are state funded.

Minimum instream flow rights have been acquired on Class One streams in the region to protect the fisheries. These water rights will be protected by reviewing applications for new water rights and formally objecting to those that pose a threat to our rights. Instream flow protection for the Clark Fork River and its major tributaries above Milltown has been applied for. This application will be defended in Board of Natural Resources hearings and whatever rights are granted for that reach of river will be defended in the same manner as described above. Data needed for application for instream flow reservations on the Clark Fork basin downstream from Milltown will be collected over the course of this project period. Adequate minimum flows will be determined using the wetted perimeter method of Nelson (1984,Guidelines For Using The Wetted Perimeter (WETP) Computer Program of the Montana Department of Fish, Wildlife and Parks).

Trout densities and population characteristics will be monitored using standard electrofishing techniques. Population estimates will be made using methods described by Vincent, 1971 (Progressive Fish Culturist 33.(3):163-169). Fry traps will be used to assess fry losses to irrigation ditches in the Bitterroot tributaries. We will work with irrigators to reduce losses where they are considered to be significant.

Stream stability and riparian habitat will be protected by reviewing construction projects which could potentially alter the bed and/or banks of streams and making recommendations to minimize and repair damage done or to mitigate losses.

Protection for species of special concern will be considered through such alternative approaches as special fishing regulations, habitat improvement and control of fisherman access into remote areas. Inventory of species distribution and population characteristics will be done using standard electrofishing techniques. Genetic purity will be tested using starch gel electrophoresis.

Montana Pollutant Discharge Elimination System (MPDES) permit applications will be reviewed and recommendations will be made to protect fishery values. In addition, assistance will be provided to the Montana Water Quality Bureau in identifying and eliminating nonpoint sources of pollution to state waters.

The study of the relationship of trout to habitat and the effects of forest development activities on trout populations will be continued in conjunction with the U.S. Forest Service on Rock Creek. These relationships will be studied through detailed measurements of trout population densities, trout behavior, seasonal movements and detailed measurements of stream habitat.

LOCATION OF WORK:

The project is located in the Clark Fork River drainage area in west central Montana. It includes Mineral, Missoula, Ravalli, Powell, Granite, Deer Lodge and part of Lewis and Clark Counties.

PROJECT PERSONNEL AND MAN DAYS

Don Peters Fisheries Biologist 244

Wayne Hadley Fisheries Biologist 99
Dennis Workman Fisheries Manager 92

JOB DURATION
July 1, 1988 to June 30, 1989

COST: $25,507 Federal Share: 75% State Share: 25%

JOB DESCRIPTION

State Montana

Project No. F-46-R-2 (3212)

Job No. I-c

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Coldwater Streams
Job Title: Upper Clark Fork River Study

JOB OBJECTIVES:

1. Maintain instream flows at present conditions.
2. Determine why trout numbers are low and why the juvenile segment is absent from the trout population.
3. Use data collected in fish population studies and studies conducted by other agencies to direct cleanup efforts for maximum benefits to the river fishery.
4. Work with other agencies to see that data are collected which will supplement fisheries data.
5. Encourage citizen participation in river cleanup.

PROCEDURES:

Objective numbers 4 and 5 are state funded.

Standard electrofishing techniques will be used to get population density estimates. Ocular surveys will be used to locate potential spawning areas. Plastic T tags will be used to determine the extent and direction of trout movement within the system and to help determine age and growth characteristics of the populations. Traps and electrofishing will be used to determine the importance of tributary streams to the main river fishery.

LOCATION OF WORK:

The project is located in the Clark Fork River Basin upstream from the confluence of the Blackfoot River. It includes portions of Missoula, Granite, Powell, Deer Lodge and Silver Bow counties.

TECHNICAL PERSONNEL AND MAN-DAYS:

Don Peters Fisheries Biologist 20
Wayne Hadley Fisheries Biologist 166
Dennis Workman Fisheries Manager 91

JOB DURATION:

July 1, 1988 to June 30, 1989

PRINCIPLE INVESTIGATORS:

Wayne Hadley and Don Peters

COST: $44,842 Federal Share: 75% State Share: 25%

3,7,8,9 State funded

JOB DESCRIPTION

State: Montana

Project No. F-46-R-2 (3213)

Project Number: 3213

Job No. I-d

Job Title: Lower Clark Fork River Fishery Investigation

Period: July 1, 1988 - June 30, 1989

Project Description: Survey and inventory the lower Clark Fork River and its tributaries between Milltown Dam and Plains to determine fish population status and migration patterns and identify limiting factors.

Objectives:

1. Determine species distribution and abundance and relative condition of fish populations in the Clark Fork River and its tributaries.

2. Measure physical trout habitat parameters in the Clark Fork River and its tributaries and evaluate correlations with trout population characteristics.

3. Maintain trout populations and habitat conditions in the lower Clark Fork River and its major tributaries at levels at least as good as present status.

4. Monitor spawning migrations of rainbow, cutthroat, brown and bull trout in tributaries of the Clark Fork River.

5. Monitor outmigrations of juvenile trout from tributaries to the main stem of the Clark Fork River and determine the relative importance of various tributaries in providing recruitment to the trout population in the main river.

6. Evaluate whether recruitment is a limiting factor for trout populations in the Clark Fork River and identify factors which may contribute to the scarcity of a brown trout fishery in the Clark Fork River below Missoula.

7. Correlate parameters identified in water quality studies conducted by DFWP and other agencies with relative abundance of the fishery in the Clark Fork River.

8. Maintain water quality at or above 1984-86 average levels as measured at Montana Department of Health and Environmental Sciences water quality monitoring stations.

9. Determine and maintain adequate instream flow levels in the Clark Fork River and its major tributaries.

10. Define fish movement patterns and relative angler harvest and maintain a trout fishery on the lower Clark Fork River of at least 40,000 man-days per year with an average catch rate of 0.2 fish per hour.

Procedures:

Trout population characteristics including density, species composition, movement, age structure, growth rates, and size distribution will be determined using standard electrofishing techniques described by Vincent (1971, Prog. Fish. Cult. 33(3): 163-169). Individually numbered tags will be used to mark fish for future identification, to determine movements and spawning migration patterns, and to evaluate relative angler harvest rates.

Trout habitat parameters in the Clark Fork river will be measured using hydraulic simulation models as suggested by Don Chapman (Don Chapman Consultants, Boise, ID). Correlations with trout population characteristics will be evaluated using species preference curves.

Stream bank and channel stability and riparian habitat will be protected by reviewing projects through MDFWP participation in administration of the Stream Protection Act and Natural Streambed and Land Preservation Act of 1975.

Spawning migrations of trout in tributaries will be monitored by electrofishing and frame trapping. Outmigrations of juvenile trout from tributaries will be monitored with fry nets. Juvenile brown trout saturation plants will be made in the Huson section to evaluate whether recruitment is a limiting factor for trout populations in the Clark Fork River.

Montana Pollutant Discharge Elimination Systems (MPDES) permit applications will be reviewed and recommendations will be made to protect fishery values. In addition, assistance will be provided to the Montana Water Quality Bureau in identifying and eliminating nonpoint sources of pollution in the lower Clark Fork River drainage. Intergravel concentrations of dissolved oxygen and phthalate esters will be monitored at three stations on the Clark fork River during the brown trout spawning period to determine whether trout egg survival could be impaired.

Minimum Instream flows that will provide adequate trout habitat conditions will be determined using the wetted perimeter method (Nelson 1980; Evaluation of four instream flow methods applied to four trout rivers in southwest Montana). Minimum instream flows will be protected through MDFWP review of new water use permit applications.

Spot creel surveys will be utilized to determine angler catch rates and relative vulnerability of various trout species to overharvest. Fishing regulations will be adjusted as necessary to maintain desired fish population levels.

Location of Work:

The project area includes the lower Clark Fork River drainage from Milltown Dam to Plains. It includes portions of Missoula, Mineral and Sanders Counties. Work will concentrate on the lower Clark Fork River and its major tributaries.

Technical Personnel and Man-Days:

Rod Berg, Fisheries Biologist IV	:	365 man-days
Unassigned, Fisheries Fieldworker I	:	214 man-days
Unassigned, Fisheries Fieldworker I	:	31 man-days
Unassigned, Fisheries Fieldworker II	:	245 man-days
Dennis Workman, Fisheries Manager	:	91 man-days

Job Duration:

July 1, 1988 to June 30, 1989

Principle Investigator:

Rod Berg

Cost: $61,940 Federal Share: 75% State Share: 25%

JOB DESCRIPTION

Project No. F-46-R-2 (3221)

State Montana

Job No. II-b

Project Title: Statewide fisheries Investigations
Study Title: Survey and Inventory of Coldwater Lakes
Job Title : West Central Montana Coldwater Lake Investigations

JOB OBJECTIVES:

1. Develop an average size rainbow trout in the Georgetown Lake winter creel to 14 inches.
2. Develop a current mountain lake data base on all mountain lakes in Region 2
3. Develop mountain lake management plans for ecological units emphasizing wild trout.
4. Increase trout populations to produce overnight gill net catches of 5 fish per net and a mean size of 12 inches.
5. Increase yellow perch mean size to 9 inches.
6. Increase size of kokanee in the creel to 10 inches or greater in the Georgetown Lake winter fishery.

PROCEDURES:

Objective numbers 2,4 and 5 are state funded.

Maintenance of rainbow trout to an average size of 14 inches and a catch rate of 1 fish per hour in the winter creel at Georgetown and Brown's lake will be accomplished with a change in our planting program and the implementation of creel limits that provide for better survival of large size class fish. The success of the program will be monitored through a limited winter creel census. The primary change in our planting program will be the introduction of strains of rainbow trout that will more fully utilize the forage available.

Kokanee salmon are also expected to increase in size to 10 inches in the winter creel as result of introduction of the Kamloops and Eagle Lake strains of rainbow trout in Georgetown lake and the continuance of unlimited creel limits.

Mountain lakes represent a relatively large but highly dispersed lake resource in this area. We feel that by surveying 10 to 20 mountain lakes per year that over the next five year period that we will have enough recent information to develop useful lake management plans based upon the logical ecological units.

Large populations of stunted yellow perch in approximately 3,400 surface acres of the areas lakes need some level of control which we are going to try to accomplish with a piscivorous strain of rainbow trout. The piscivorous strain will require special

protection from fisherman initially to insure that adequate numbers and size are attained to develop control of yellow perch recruitment. Upsata Lake will be closed to fishing and Placid Lake proposed for special regulations to attain protection of the newly planted piscivorous strain. Control of yellow perch recruitment should allow for improved growth of the yellow perch remaining as well as improved salmonid growth and survival. Changes in relative abundance and size will be monitored with spring gill net catches.

LOCATION OF WORK:

The project area is located in west central Montana, including the counties of: Silver Bow, Deer Lodge, Granite, Powell, Lewis and Clark, and Missoula.

PERSONNEL AND MAN HOURS

Wayne Hadley Fisheries Biologist 100
Don Peters Fisheries Biologist 101
Dennis Workman Fisheries Manager 91

JOB DURATION:

July 1, 1988 to June 30, 1989

COST: $25,122 Federal Share: 75% State Share: 25%

State: Montana

Project Number: F-46-R-2 (3311)
Job Number: I-e

Project Title: Cold Water Streams Investigations
Job Title: Southwest Montana Trout Stream Investigations

Job Objectives:

1. Insure within hydrologic constraints that flows do not fall below levels identified in the Yellowstone Reservation and the Upper-Missouri Reservation Application.

2. Maintain existing populations of native Yellowstone and westslope cutthroat at present or increasing levels.

3. Maintain fish populations and habitat in streams affected by resource development activity at levels no worse than present condition.

4. Redistribute cattle in upper Ruby allotments to promote recovery and stabilization of streambanks and riparian zones (state project).

5. Document response of Bison Creek trout population to removal of granitic sands (state project).

6. Collect baseline fisheries data on Deep Creek to assist in determining impacts of highway construction (state project).

7. Maintain at least 95% of the region's streambanks and channels in their present or improved condition.

8. Maintain water quality levels as near to baseline as possible.

9. Maintain wild trout fishery in the East Gallatin River that supports 20,000 angler days of use annually.

10. Maintain densities of at least 1000 age II and older brown trout per mile in Ruby River downstream from Ruby Dam supporting 7500 angler days of use annually.

11. Maintain densities of at least 2500 age I and older brown trout per mile in Poindexter Spring Creek.

12. Improve habitat conditions in spring creeks of the region.

13. Maximize potential of unique small streams capable of producing large trout by utilizing special regulations on selected reaches subject to intense fishing pressure.

14. Gather population data on reaches of the upper Ruby and Red Rock Rivers.

15. Gather population and habitat condition data on small streams as need arises.

Procedures:

Minimum instream flows that will provide adequate trout habitat conditions have been determined by the wetted perimeter method (Nelson 1980). These flows have been quantified in both the Yellowstone Reservation and the upper Missouri Reservation application. Existing water rights belonging to FWP and the reservations will be protected through FWP review of new water use permit applications. Streambanks and channels will be protected from poorly designed projects through FWP participation in administration of the Stream Protection Act and Natural Land and Streambank Protection Act of 1975.

Water discharge permits issued by EPA and the Montana WQB will be reviewed and comments offered. Timber sales, grazing allotment plans, EA's and EIS's will be reviewed to insure adequate protection, mitigation and compensation of fisheries resources. FWP personnel will work closely with Forest Service and EPA personnel to document response of fish population in Bison Creek to highway construction and mitigation. FWP personnel will work closely with Forest Service personnel and grazing permittees in upper Ruby to facilitate changes in grazing system.

Trout population densities will be monitored using electrofishing methods described by Vincent (1971) in sections of the Ruby and E. Gallatin Rivers and Bison and Poindexter Spring Creek. Other streams will be sampled depending on expanded funding.

Location of work:	Southwestern Montana.
Technical Personnel:	**Jerry Wells, Regional Fisheries Mgr.** Dick Vincent, FIsh & Wildlife Biologist IV Bruce Rehwinkel, Fish & Wildlife Biologist III Chris Clancy, Fish & Wildlife Biologist III Dick Oswald, Fish & Wildlife Biologist III **Jeff Bagdanov, Fisheries Field Worker II**
Total Man-days Required:	419
Job Duration:	**July 1, 1988 through June 30, 1989**
Report Period:	**July 1, 1988 through June 30, 1989**

Cost: $41,604 Federal Share: 75% State Share: 25%

Principal Investigator: Jerry Wells, Regional Fisheries Mgr.

JOB DESCRIPTION

State: Montana

Project Number: F-46-R-2 (3312)
Job Number: I-f

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Cold Water Streams
Job Title: Southwest Montana Major River Fisheries Investigations

Job Objectives: Madison River

1. Maintain a minimum flow $\geq$ 700 cfs at the Kirby gage below Quake Lake and $\geq$ 1100 cfs downstream from Ennis Dam.

2. Maintain wild trout population $\geq$ 3000 age II and older trout/mile below Ennis Dam and determine effects of water temperatures on catch rates.

3. Maintain channel and streambanks in present or improved conditions.

4. Maintain aesthetic quality of upper Madison River fishing experience (state project).

5. Maintain densities of wild trout $\geq$ 13 at 1200/mile between Quake Lake and McAtee Bridge (catch-and-release section).

6. Maintain densities of wild trout $\geq$ 13" at $\geq$ 1200/mile between Varney Bridge and Ennis Lake with the opportunity of catching large size ($\geq$ 18"+) brown trout.

7. Attempt to disperse angler use in the Quake Lake to Ennis Lake reach. Continue to provide spatial segregation for bank and boat anglers, where possible (state project).

8. Will interview fishermen to determine barbed and barbless hook use; review and summarize hooking scar information from past shocking data; review and collect summer mortality data in 1989.

Job Objectives: Yellowstone River

1. Reduce magnitude of irrigation season dewatering in spawning tributaries during cutthroat trout spawning and incubation periods.

2. Maintain channel and streambanks in present

or improved condition.

3. Maintain water quality and aesthetics of river.

4. Maintain a catch rate of 0.5 fish/hr. with trout population densities $\geq$1000 fish greater than 9"/mile and 50 cutthroat trout over 12"/mile.

5. Increase cutthroat trout numbers in Yellowstone River.

6. Provide increased opportunity to catch large trout in a reach of the Yellowstone River.

7. Acquire a suitable fishing access site between Hwy. 89 and Springdale (state project).

Job Objectives: Big Hole River

1. Insure, within hydrologic constraints, that flow do not fall below minimum of 300 cfs in reach 1, 200 cfs in reach 2 and 100 cfs in reach 3 of the Big Hole River.

2. Maintain channel and streambanks of the Big Hole River in present or improved state of stability.

3. Maintain instream sediment levels and flow regime at average current levels.

4. Maintain fluvial grayling populations at a minimum of 40 age II and older fish per mile upstream from Pintlar Creek.

5. Maintain brown trout populations in lower river (Glen Access to mouth) at densities $\geq$1000 age II and older fish/mile with limited numbers of rainbow trout.

6. Maintain brown trout populations in lower, mid-river (Divide to Glen Access) at densities $\geq$750 age II and older fish/mile and rainbow trout densities $\geq$1000 age I and older fish/mile.

7. Maintain rainbow trout populations in upper mid-river (Pintlar Creek to Divide) at densities $\geq$1300 age I and older fish/mi. and brown trout densities at $\geq$200 age II and older fish/mile with limited numbers of fluvial grayling and brook trout.

8. Maintain native, fluvial grayling populations at a minimum of 40 age II and older/mi. in upper river (Headwaters to Pintlar Creek) and densities of age II and older brook trout at ≥400 per mile.

9. Maintain numbers of large, brown trout (≥18") at densities ≥100/mile and large rainbow trout (≥15") at densities ≥100/mile in special regulation section (Divide to Melrose).

10. Collect information on fishing pressure, harvest, catch rates, angler attitudes and preferences to assist in responsible management.

11. Provide increase user access to Big Hole River between the notch and Pennington Bridge (state project).

12. Provide increased acreage of public land in Big Hole River Corridor.

13. Keep Big Hole River management current with angler needs and expanding recreational demand.

14. Mitigate or eliminate deleterious effects of planned developments on the fishery of the Big Hole River including water quality and quantity and aesthetic values.

Job Objectives: Beaverhead River

1. Within hydrologic constraints, seek to obtain minimum non-irrigation season releases of 250 cfs from Clark Canyon Dam and maintain minimum flows of 150 cfs in the river downstream from Barretts. Maintain stable, spawning season flow releases.

2. Eliminate gas bubble trauma in Beaverhead River trout populations.

3. Insure that operation of proposed hydroelectric generator does not alter flow regimes or temperatures of discharges and utilize hydro generation to eliminate gas supersaturation problems.

4. Maintain densities of ≥250 brown trout 18" and larger/mile and ≥150 rainbow trout 18" and larger/mile above Henneberry. Maintain densities of ≥1000 age II and older brown trout and ≥600 age I and older rainbow trout per mile above Henneberry.

5. Collect population information for lower Beaverhead River (downstream from Barretts) to assist in management decisions (state project).

6. Maintain or increase numbers of rainbow trout in river upstream from Barretts.

7. Collect information on fishing pressure, harvest, catch rates, angler preferences and attitudes to assist in managing for high quality angling experience (1991).

8. Increase angler use of Beaverhead River downstream from Barretts in an effort to decrease use of upper river (state project).

9. Keep Beaverhead River management current with angler needs and expanding recreational demand.

10. Maintain channel and streambanks in present or improved state of stability.

Job Objectives: Gallatin River

1. Maintain channel and streambanks in present or improved stability.

2. Mitigate and reduce irrigation season dewatering in Gallatin River.

3. Decrease magnitude of sediment and turbidity from Taylor Fork and Sage Creek.

4. Maintain wild trout populations of $\geq$2500 age II and older fish per mile upstream from Gallatin Gateway.

5. Determine potential of establishing large trout management area between mouth of canyon and Gallatin Gateway (state project).

Job Objectives: Jefferson River

1. Insure, within hydrologic constraints, that flows do not drop below 550 cfs at the Three Forks gage.

2. Maintain channel and streambanks in present improved state of stability.

3. Increase numbers of rainbow trout to $\geq$200 age I and older/mile.

4. Maintain densities of ≥450 age II and older brown trout/mile from mouth to Boulder River and ≥600 age II and older brown trout/mile between the Boulder River and the head of the river.

5. Increase recreational use of Jefferson River (state project).

6. Acquire additional access sites at Kountz Bridge and Waterloo Bridge.

7. Elevate public awareness of values of fishery (state project).

Job Objectives: Missouri River

1. Insure, within hydrologic constraints, that flows do not fall below 1500 cfs above Canyon Ferry Reservoir.

2. Maintain channel and streambanks of the Missouri River in present or improved state of stability.

3. Enhance run of rainbow and brown trout out of Canyon Ferry Reservoir.

4. Increase reproduction of brown and rainbow trout (state project).

Procedures: There are 57 job objectives in this project with work being attempted on each, except Number 7 under Beaverhead River. However, objectives 4, 7 and 10 for the Madison River; 1, 3 and 7 for the Yellowstone River; 10, 11, 12 and 13 for the Big Hole River; 5, 8 and 9 for the Beaverhead River; 3 and 5 for Gallatin River; 5, 6 and 7 for Jefferson River; and 4 for Missouri River are State Funded.

Montana Power Co. and East Bench Irrigation Unit compliance with flow targets in Madison and Beaverhead Rivers will be monitored at appropriate gaging stations. Efforts will continue to quantify effects of flow regimes on trout populations in Madison, Beaverhead, and Big Hole Rivers. The reservation of flow document will be filed for the upper Missouri drainage in 1989 and obligations of Yellowstone reservation honored. Technical and informational support will be offered USBR regarding its efforts to solve the gas

supersaturation problem in the upper Beaverhead River. Efforts will continue to monitor the effects of Ennis Dam on elevated water temperatures in the Madison River and technical and logistical support will be given to MSU researchers investigating effects of Ennis Dam on catch rates in Madison River downstream.

Wild trout and grayling population densities will be estimated using electrofishing methods described by Vincent (1971). Angling regulations will be evaluated and adjusted to achieve management objectives. Contingent on program expansion funding by the Montana Legislature, comprehensive creel census and fishermen preference surveys will be conducted on the Big Hole and Beaverhead Rivers for one year. Increased angler contacts will be made annually to increase information flow to fishermen and evaluate fishermen success and preference on all rivers.

Five year management plans for the Big Hole, Beaverhead and Madison Rivers will be formulated with the assistance of the angling public.

Location of Work: Madison, Gallatin, Jefferson, Missouri, Yellowstone, Big Hole and Beaverhead Rivers.

Technical Personnel:
Jerry Wells, Regional Fisheries Manager
Dick Vincent, Fish & Wildlife Biologist IV
Bruce Rehwinkel, Fish & Wildlife Biologist III
Chris Clancy, Fish & Wildlife Biologist III
Dick Oswald, Fish & Wildlife Biologist III
Jeff Bagdanov, Fisheries Field Worker II

Total Man-days Required: 1229

Job Duration: July 1, 1988 through June 30, 1989

Report Period: July 1, 1988 through June 20, 1980

Cost: $110,697 Federal Share: 75% State Share: 25%

Principal Investigator: Jerry Wells, Regional Fisheries Mgr.

State: Montana

Project Number: F-46-R-2 (3321)
Job Number: II-c

Project Title: Southwest Montana Cold Water Lake Investigations
Job Title: Lakes and Reservoirs

Job Objectives:

1. Increase late summer and fall reservoir pool in Ruby Reservoir (post-irrigation levels) to provide greater amount of aquatic habitat.

2. Insure that land uses do not adversely affect lake water quality or tributary stream spawning habitat.

3. Collect necessary information to properly manage mountain lake fisheries as time and funding allows (state project).

4. Maintain catch rates at an acceptable level for mountain lake cutthroat fisheries.

5. Maintain wild rainbow trout fishery in Hidden Lake sustaining 1000 angler days/yr. with catch rates of $\geq$0.5 fish/hr. Maintain densities reflected in average sample of $\geq$20 fish per 125' floating gill net set.

6. Maintain fishery of Elk Lake sustaining 4000 angler days/yr. With catch rates of 0.5 fish/hr. Maintain densities reflected in average sample of $\geq$8 cutthroat per 125' gill net set with opportunity to catch trophy grayling.

7. Maintain wild rainbow and brown trout fishery in Ruby Reservoir sustaining 4000 angler days/yr. with catch rates of 0.5 fish/hr. and rainbow densities reflected in average samples of $\geq$8 fish per 125' gill net set.

8. Develop a consistent rainbow trout fishery with opportunities to catch edible size yellow perch in Dailey Lake.

9. Introduce Eagle Lake strain rainbow trout to Haypress Lake and establish population as a brood source for further introductions (state project).

10. Manage Culver Pond as a trophy brook trout fishery with the opportunity of catching brook trout $\geq$14".

11. Manage the McDonald Pond as a trophy rainbow trout fishery, with the opportunity of catching rainbow trout $\geq$18".

12. Provide opportunity for catching trophy size cutthroat trout in selected mountain lakes of the region.

Procedures: Fish populations will be sampled using 125' experimental mesh gill nets. Stocking rates and frequency for McBride cutthroat in high mountain lakes will be adjusted based on information collected by regional biologists. Spot creel checks will be conducted by regional personnel to evaluate catch rates and planting success.

Elk Lake management will include annual gill net sampling, stocking of yearling cutthroat trout and evaluation of regulations on a biennial basis. Culver and McDonald Pond will be monitored annually utilizing gill nets to evaluate success of trophy regulations. Haypress Lake will be monitored annually to evaluate success of Eagle Lake rainbow introduction and capability as brood lake.

Efforts to influence and improve water management of reservoirs are ongoing.

Location of work: Lakes and reservoirs of southwestern Montana.

Technical Personnel:
Jerry Wells, Regional Fisheries Manager
Dick Vincent, Fish & Wildlife Biologist IV
Bruce Rehwinkel, Fish & Wildlife Biologist III
Chris Clancy, Fish & Wildlife Biologist III
Dick Oswald, Fish & Wildlife Biologist III

Total man-days required: 176

Job Duration: July 1, 1988 through June 30, 1989

Report Period: July 1, 1988 through June 30, 1989

Cost: $19,771 Federal Share: 75% State Share: 25%

Principal Investigator: Jerry Wells, Regional Fisheries Mgr.

State: Montana

Project Number: F-46-R-2 (3322)
Job Number: II-d

Project Title: Southwest Montana Fisheries Investigations
Job Title: Major Reservoir Fisheries Investigations

Job Objectives: Clark Canyon Reservoir

1. Maintain shoreline in a state of minimal development to satisfy access needs of recreationists and maintain shoreline integrity and water quality.

2. Maintain wild brown trout populations at densities reflected by an average sample of $\geq$2.0 adult brown trout per surface 125' gill net set.

3. Maintain successful stocking program of Arlee rainbow until significant wild recruitment is achieved.

4. Establish wild, spring spawning DeSmet strain of rainbow trout to provide a longer lived, reproducing rainbow fishery.

5. Evaluate the comparative success of the DeSmet and Arlee strains of rainbow regarding catchability, longevity, survival, growth and recruitment to the Clark Canyon fishery.

6. Maintain fishery for large (20"-25") wild burbot sustaining a catch rate of 0.25 fish/hr.

Job Objectives: Hebgen Reservoir

1. Maintain shoreline in a state of minimal development while providing sufficient access for anglers. Protect spawning streams from impacts of development.

2. Establish wild, self-sustaining rainbow population at densities reflected in a sample of $\geq$10 adults per 125' surface gill net set in spring of year.

3. Maintain wild brown trout populations at densities reflected in a sample of $\geq$18 adults per 125' bottom gill net set in spring of year. Maintain averages of 16" in creel with opportunity of catching large, trophy brown trout ($\geq$3 pounds).

4. Collect the information necessary to

accurately assess fishing pressure, catch rates and harvest (state project).

5. Provide rainbow trout to anglers without jeopardizing the establishment of self-sustaining populations.

Job Objectives: Willow Creek Reservoir

1. Attempt to reduce magnitude of reservoir drawdown in fall of year.

2. Determine time of out-migration of rainbow trout fry from spawning streams (stage project).

3. Maintain a spawning run of at least 2500 adult wild rainbow trout in Willow Creek as the state brood stock of DeSmet rainbow.

Job Objectives: Canyon Ferry Reservoir

1. Maintain densities of rainbow trout reflected in average samples of $\geq$15 yearling and older rainbow per 125' surface gill net set in the spring.

2. Identify spawning areas successfully used by trout in reservoir system tributaries (state project).

3. Provide a consistent rainbow fishery with an annual average catch rate of $\geq$0.3 fish/hr.

4. Provide an average winter catch rate of at least 2.0 yellow perch per hour with an average size of 8.5" and an annual harvest of 300,000.

5. Minimize incidence, magnitude and duration of reservoir spill through radial gates at dam to minimize escapement of trout.

Procedures: Clark Canyon Reservoir will be sampled annually with floating gill nets to determine survival of rainbow plants and magnitude of natural reproduction. Spawning runs of wild (DeSmet) rainbow and brown trout will be monitored annually in the Red Rock River using electrofishing techniques to assess magnitude of runs.

Hebgen Reservoir will be sampled annually with gill nets to assess introductions of rainbow and cutthroat trout and the resident brown trout population. Spawning runs of rainbow and

cutthroat trout will be monitored in S. Fork Madison River, Grayling, Duck and Red Canyon Creeks using electrofishing and trapping techniques. Recruitment will be monitored using fry traps.

Willow Creek Reservoir will be sampled annually with floating gill nets to determine year class strengths of wild, rainbow trout. The spawning trap on Willow Creek will be maintained annually and the magnitude of the run determined. Eggs necessary to meet state requirements will be taken at the trap.

Canyon Ferry Reservoir will be sampled annually with gill nets to assess survival of rainbow trout plants and year class strengths of yellow perch. Catch rates and year class composition of harvested rainbow trout will be determined by creel census. Spawning runs of rainbow (spring and fall) will be monitored in the Missouri River, Confederate and Duck Creeks using electrofishing techniques. Mass marking techniques will be utilized to evaluate survival, harvest, and longevity of planted strains of rainbow trout.

Location of Work: The work will be conducted on Clark Canyon, Canyon Ferry, Hebgen and Willow Creek Reservoirs.

Technical Personnel:
Jerry Wells, Regional Fisheries Manager
Dick Vincent, Fish & Wildlife Biologist IV
Bruce Rehwinkel, Fish & Wildlife Biologist III
Dick Oswald, Fish & Wildlife Biologist III
Jeff Bagdanov, Fisheries Field Worker II

Total Man-days Required: 459

Job Duration: July 1, 1988 through June 30, 1989

Report Period: July 1, 1988 through June 30, 1989

Cost: $47,366 Federal Share: 75% State Share: 25%

Principal Investigator: Jerry Wells, Regional Fisheries Mgr.

JOB DESCRIPTION

State: Montana Project No. F-46-R-2 (3411)

Project Title: Statewide Fisheries Investigations
Coldwater Streams Investigations Job No: I-g

Study Title: Survey and Inventory of Coldwater Streams

Job Title: Northcentral Montana Trout Stream Investigations

Objectives:

1. To establish viable trout fisheries in Marias River below Tiber Dam and in the Sun River below Division Dam for recreational fishing.

2. To ensure within hydrologic constraints, that flows in streams supporting trout populations do not fall below 1976-86 averages.

3. To maintain summer survival flow of at least 50 cfs in the Smith River at Camp Baker.

4. To maintain streambanks and channels in as natural a condition as possible.

5. To maintain undisturbed riparian zones where they currently exist on Smith and Missouri Rivers.

6. To maintain water quality at or above 1975-85 average levels as monitored at USGS stations.

7. To maintain habitat and species of special concern at present levels or better in streams affected by resource development activities.

8. To ensure that mid-Missouri reservoir operations maintain a minimum flow of 4100 cfs 8 years out 10 in the Missouri River from Holter Dam to Ulm.

9. To evaluate contribution and influence of hatchery rainbow trout flushed from upstream reservoirs on wild trout fishery in Missouri River downstream of Holter Dam.

10. To increase rainbow and brown trout spawning habitat in three tributaries to the Missouri River from Holter Dam to Cascade.

11. To maintain trout populations at or above 1984 levels in Tresch Section and 1978 levels in Burleigh Section of Big Spring Creek near Lewistown.

12. To provide 80,000 angler-days annually and average catch rate of 0.4 trout/hour in Missouri River between Holter Dam and Cascade.

13. To evaluate special slot-limit for trout on Smith River and modify regulations to balance angler harvest with population structure if warranted.

14. To maintain trout populations in Regional streams at present levels or higher.

15. To allow harvest of one trout over 12" in USFS streams along Rocky Mountain Front if compatible with stream fishery resources.

16. To obtain at least two fishing access sites on the Sun River between the towns of Augusta and Sun River, and on the lower Dearborn River and on the upper Smith River.

Procedures:

Work will be conducted on all or portions of the above objectives except number 11, where trout population monitoring will be conducted every other year and will next be done in the fall of 1988. Also, objectives 4, 5, 7, 10, 15 and 16 will be done under state funding.

Minimum instream flows for streams in the Smith, Dearborn, and upper Sun, Marias and Teton River drainages will be determined using Montana's wetted perimeter method. These recommendations will be included in the MDFWP application as part of the Missouri River Water Reservation proceeding. Flow recommendations for the Sun and Marias Rivers will be determined through cooperation with an ongoing research project on those waters. Stream banks and channels will be protected from poorly designed projects through MDFWP participation in administration of the Stream Protection Act and the Natural Streambed and Land Preservation Act of 1975. Protection of key riparian zones will be attempted by cooperating with ongoing efforts by Parks Division and Montana Land Reliance.

Trout populations will be monitored in the spring and fall in two sections (Craig and Cascade) of the Missouri River to evaluate impacts of reservoir operations, increased angler use, influx of hatchery rainbow trout from upstream reservoirs, and tributary enhancement efforts. Due to extensive and documented spawning movements, spring estimates (April - May) will focus on brown trout populations while fall estimates (September - October) will concentrate on rainbow trout populations. Boat-mounted boom electrofishing apparatus and standard mark recapture techniques will be employed. Use of key tributaries by spawning fish will be evaluated by trapping and/or electrofishing combined with fish tagging. Spawning habitat will be enhanced by removal of beaver dams which obstruct upstream migration of adult trout. Hatchery rainbow will be identified by fin clips, fluorescent spray marks, tetracycline marks, and combinations thereof. Creel

census interviews will be used to determine angler preferences, catch rates, size and species contribution, and contribution of hatchery rainbow to catch. Creel census may also be used to determine harvest levels on spawning fish concentrated near tributary mouths. A comprehensive five year management plan will be prepared for the Missouri River from Holter Dam to the town of Cascade.

Trout population levels in three sections of the Smith River (Eagle Creek, Mid-Canyon and Deep Creek sections) will be determined in September through the use of mobile electrofishing gear and standard mark-recapture population estimation techniques. Harvest levels will be estimated through the use of voluntary creel survey cards and user surveys conducted by Parks Division personnel stationed at Eden Bridge.

Trout population monitoring on other streams will be accomplished using above mentioned techniques along with backpack shocking, snorkeling and hook and line sampling. Periodic creel surveys will be conducted on streams as needed to determine catch rates and composition. River and stream front property for sale on selected waters will be evaluated for fishing access purchase.

Location of Work:

The project area is located in Northcentral Montana including the counties of Cascade, Chouteau, Fergus, Glacier, Judith Basin, Liberty, Meagher, Petroleum, Pondera, Teton, Toole and the major portion of Lewis and Clark.

Principal Fish Species Involved:

Rainbow trout, brown trout, cutthroat trout, brook trout, arctic grayling and mountain whitefish.

Technical Personnel: Fisheries Manager, Steve Leathe, Bill Hill

Total Man-Days Required: 598

Job Duration: July 1, 1988 through June 30, 1989

Cost: $70,385 Federal Share: 75% State Share 25%

Principal Investigator: Region 4 Fishery Manager.

JOB DESCRIPTION

State: Montana Project Number: F-46-R-2 (3421)

Project Title: Statewide Fisheries Investigations Job No: II-e

Study Title: Survey and Inventory of Coldwater Lakes

Job Title: North Central Montana Coldwater Lakes Investigations

Objectives:

1. To recommend acceptable water levels in irrigation reservoirs, within hydrologic constraints, for maintaining fishery values of last 10 years.

2. To establish self-sustaining trout fishery in Smith River Reservoir that will support 5,000 angler days annually with a catch rate of 0.4 fish per hour.

3. To provide longer-lived, larger trout with adequate growth rates in Willow Creek, Bair, Ackley, East Fork Dam and Newlan Creek Reservoirs for 50,000 angler days annually.

4. To provide 10,000 angler days fishing in Bean Lake for 1 to 3 pound rainbow trout.

5. To provide 28,000 angler days per year for 11 to 20 inch trout in Martinsdale and Eureka Reservoirs and Fitzpatrick Lake.

6. To reduce rough fish populations for maintenance of 11 to 20 inch trout in 5 lakes and ponds.

7. To maintain (within hydrologic constraints) viable trout fisheries in 60 ponds and small reservoirs.

8. To improve the kokanee fishery in Pishkun Reservoir to satisfy 5,000 angler days annually.

9. To provide 1,000 angler days of fishing for mature salmon in the Helena Valley Regulating Reservoir.

10. To maintain current level of fishing opportunity on Bean, Ackley and Fitzpatrick Lakes and Newlan Creek Reservoir.

Procedures:

Work will be conducted towards achievement of all the listed objectives, however, objectives 1,6,10, and a portion of 7 will be conducted with state funding.

Fish in lakes and reservoirs will be sampled with experimental nets and unscheduled creel census will be conducted on many of the waters. Fin clipping (adipose or pelvic) will be done to identify various strains of rainbow trout where more than one strain is stocked in a water. Tetracycline marking will also be applied to some lots of fish. Strains of rainbow under evaluation include: Arlee, DeSmet, Eagle Lake, Arlee-Eagle Lake cross (AXE) and McConaughy. Age determinations will be made through fish scale and otolith analysis. Information obtained from net sampling will be useful for formulating management decisions.

Tributary streams to five reservoirs will be investigated for spawning potential and initial groundwork will be laid out for monitoring spawning activity and fry/fingerling recruitment. This work will be done in conjunction with evaluating several strains of trout currently being stocked in five reservoirs.

Contacts with private irrigation companies, State Water Board and Bureau of Reclamation will continue for water conservation for maintenance of desirable fish populations. Participation in water use planning with project sponsors will be conducted to increase their awareness of fishery needs.

Farm ponds will continue to be evaluated for fishery benefits by monitoring water levels, adjusting stocking rates and angler satisfaction. New ponds will be added to the management program as they become available. Limited sampling with experimental gill nets will be conducted on ponds where problems may exist, such as rough fish infestation, winterkill, over stocking, etc. A mailing list of anglers who fish ponds regularly will be prepared. Questionnaires will be mailed to those fisherman to determine number of ponds fished, catch rates, size of fish and overall angler opinion on the management program.

Location of Work:

The area covered by this job will include the following counties in Region Four: Cascade, Choteau, Fergus, Glacier, Judith Basin, Liberty, Meagher, Petroleum, Pondera, Teton, Toole, and a major portion of Lewis and Clark.

Principal Fish Species Involved:

Rainbow trout, brown trout, cutthroat trout, kokanee

Technical Personnel: Bill Hill, Steve Leathe.
Total Man-days Required: 207
Job Duration: July 1, 1988 through June 30, 1989.
Cost: $24,918 Federal Share: 75% State Share: 25%
Principal Investigator: Region 4 Fishery Manager

JOB DESCRIPTION

STATE: Montana

PROJECT NUMBER: F-46-R-2 (3422)
JOB NUMBER: II-f

JOB TITLE: Mid-Missouri Reservoirs Study

JOB OBJECTIVES:

To develop management plans for Canyon Ferry Reservoir, Hauser Reservoir, Holter Reservoir and the Missouri River to enhance fish populations and the sport fishery of this ecosystem. Factors limiting the sport fishery in the reservoir-river system will be determined. Based on this information, recommendations on reservoir-river management, strain and species introductions and regulations can be made to improve the fishery to a level commensurate with reservoir-river productivity.

SPECIFIC OBJECTIVES ARE:

1. To maintain densities of rainbow trout in Canyon Ferry and Holter Reservoirs and densities of rainbow trout and/or kokanee in Hauser Reservoir based on an index of abundance of 15 yearling or older fish captured per 125 feet experimental surface gill net set during the spring.

2. Quantify downstream escapement of hatchery reared rainbow trout from the three reservoirs.

3. Monitor distribution and food supply of sport fishes in the three reservoirs.

4. Identify extent of natural reproduction occurring in the reservoir complex and identify areas where reproduction could be enhanced.

5. Provide for a stable salmonid fisheries with an average catch rate of 0.30 fish/hour in Canyon Ferry Reservoir and 0.40 fish/hour in Hauser and Holter Reservoirs.

6. Provide for an average winter catch rate of 2.0 yellow perch/hour with an average size of 8.5 inches and an annual harvest of 300,000 in Canyon Ferry Reservoir.

7. Determine status of walleye populations in Hauser and Holter Reservoirs.

8. Maintain requested instream flows in the Missouri River and minimize the loss of fish over mid-Missouri River dams during spill periods.

9. Develop a comprehensive five year management plan for the mid-Missouri Reservoir complex.

PROCEDURES:

Work will be conducted on all of the above objectives. All hatchery rainbow trout planted in the reservoir complex will be marked for future identification to provide for an evaluation of performance of rainbow trout strains, a determination of downstream escapement, and an assessment of the extent of natural reproduction occurring in the complex. Standard fishery sampling techniques will be used on the reservoirs including, but not limited to: experimental gill nets, beach seines, shoreline electrofishing. An index to monitor abundance of fish populations in the reservoirs will continue to be refined. Zooplankton will be monitored using a conical plankton net and water column stratification will monitored with a hydrographic thermometer. Partial summer and winter creel census will be used to determine angler opinions and success.

Reservoir tributaries utilized by migrant spawners will be sampled by back-pack electrofishing equipment. Emigration fry traps will be utilized to quantify tributary recruitment. Wetted perimeter methodology will be used to quantify instream flow recommendations on major tributaries to the reservoir complex.

Development and refinement of a long range fisheries research plan for the study area will continue. Public meetings will be held to identify fisheries management issues and potential management goals in order to develop a comprehensive management plan for the reservoir complex. A draft plan will be developed addressing issues identified at public scoping meetings and will be distributed for public comment. A final five year management plan will be derived addressing comments received from the draft plan.

LOCATION OF WORK:

The project area is located in west central Montana and includes Broadwater, Lewis and Clark and Cascade counties. The reach of Missouri River involved in this project starts at Toston Dam and flows north for approximately 140 miles to the city of Great Falls. The three reservoirs located in this reach are Canyon Ferry, Hauser and Holter.

PRINCIPAL FISH SPECIES INVOLVED:

Rainbow trout, brown trout, kokanee, yellow perch, walleye.

TECHNICAL PERSONNEL:

Mark Lere, Fisheries and Wildlife Biologist III
Al Wipperman, Regional Fisheries Manager, R-4
Jerry Wells, Regional Fisheries Manager, R-3

TOTAL MAN DAYS: 910

JOB DURATION: July 1, 1988 - June 30, 1989

REPORT PERIOD: July 1, 1988 - June 30, 1989

COST: $75,871 Federal Share: 75% State Share: 25%

PRINCIPAL INVESTIGATOR: Mark Lere, Fisheries and Wildlife Biologist III

JOB DESCRIPTION

State: Montana Project Number F-46-R-2 (3441)

Project Title: Statewide Fisheries Investigations Job No: III-a

Study Title: Survey and Inventory of Warmwater Streams Investigations

Job Title: Northcentral Montana Warm Water Stream Investigations

Objectives:

1. To maintain a minimum flow of 500 cfs in the Marias River for habitat enhancement.

2. To ensure, within hydrologic constraints, that flows in streams supporting cool/warm water gamefish do not fall below past ten year averages.

3. To maintain the Regions streambanks and channels in their present or improved condition.

4. Maintain water quality at or above 1983 levels as measured at USGS water quality monitoring stations.

5. To assess existing sauger, walleye and freshwater drum populations to determine population densities in the Missouri River between Morony Dam and Marias River.

6. To maintain sauger populations in the Missouri River to provide 10,000 angler days use annually.

7. To determine angler use and harvest of fish species and maintain at least the existing quality of fishery in the lower Marias River.

8. To increase and diversify angling opportunity in the upper 50 miles of the Marias River and 10 miles of Cut Bank Creek.

9. To determine walleye distribution and angler harvest in Missouri River between Holter Dam dand Great Falls.

10. To evaluate need and develop fishing access sites on Missouri River downstream from Morony Dam.

11. To acquire public fishing access site on lower Marias River.

Approach:

Work will begin towards achievement of all the listed objectives, except number 7, where a comprehensive creel census is planned to begin on the Marias River in Fiscal Year 1990. Also, objectives 3, 8, 10 and 11 will be conducted under state funding.

Flow releases from Tiber Reservoir will play an important role in maintaining warm water fish habitat in the lower Marias River. An advisory board comprising personnel from the Bureau of Reclamation, Sportsman's clubs, County Commissioners, Landowners and Department of Fish, Wildlife and Parks is being formed to evaluate plans for water manipulation to compromise everyone's needs. It is hopeful more flexibility can be built into Tiber Reservoir water management to enhance warm water fishery resources in the lower Marias River.

Minimum instream flows that will provide adequate cool/warm water conditions will be determined by the wetted perimeter method developed by the Department. The main portion of this objective will be done under the Middle Missouri Instream Flow Study, with assistance from regional staff.

Stream banks and channels will be protected from poorly designed projects through Department participation in administration of the Stream Protection Act. A Department representative will serve on an advisory technical committee to assist the Bureau of Land Management in riparian habitat management programs developed for the Middle Missouri River Basin.

Fish populations will be monitored using techniques described by Vincent (1971, Progressive Fish Culturist. 33(3):163-169) in the Missouri River and Marias River. Population densities may have to be monitored by electrofishing catch per unit effort, trap netting or seining. Captured fish will be tagged with T-tags or cinch up tags to help determine survival, growth, movement and angler harvest. Informative programs through sportsman's clubs and news media will increase to inform sportsmen of availability of sport species, especially if information gathered reveal underutilization of fish stocks present.

The upper 40 miles of the Marias River and lower 15 miles of Cut Bank Creek support low numbers of gamefish. Burbot, channel catfish, mountain whitefish and trout are found in very low numbers, however an adequate supply of forage species is present. Introductions of sauger and or smallmouth bass will be made if fish are available from hatcheries. If adequate numbers of sauger can be captured from the Missouri or lower Marias River, it may be feasible to initiate introductions by transplanting adult fish.

Location of Work:

The project area is located in North Central Montana, including the counties of Cascade, Choteau, Fergus, Glacier, Liberty, Petroleum, Pondera, Teton, Toole and a portion of Lewis and Clark.

Principal Fish Species Involved:

Sauger, walleye, shovelnose sturgeon, channel catfish, smallmouth bass, burbot, northern pike and freshwater drum.

Technical Personnel: Steve Leathe, Bill Hill

Total Man-Days Required: 52

Job Duration: July 1, 1988 through June 30, 1989.

Cost: $6,263 Federal Share: 75% State Share: 25%

Principal Investigator: Region 4 Fishery Manager

JOB DESCRIPTION

State: Montana Project Number: F-46-R-2 (3451)

Project Title: Statewide Fisheries Investigations Job No: IV-b

Study Title: Survey and Inventory of Warmwater Lakes

Job Title: North Central Montana Warmwater Lakes Investigations

Objectives:

1. To find a source of walleye eggs that can be used to satisfy management demand.
2. To improve spawning habitat to maintain natural sport fish and forage fish populations.
3. To enhance over winter survival in Split Rock Lake for yellow perch and northern pike.
4. To provide 2000 angler days use for yellow perch and 3 to 6 pound northern pike in Pishkun Reservoir.
5. To provide a walleye fishery in Bynum and Morony Reservoirs to provide 6,000 angler days for two pound fish.
6. To provide 25,000 angler days for 2-4 pound walleye and 4-8 pound northern pike in Tiber Reservoir and Lake Frances.
7. To maintain current population level of walleye in Holter and Hauser Reservoirs.
8. To develop a largemouth or smallmouth bass fishery in Lake Helena to provide 1,000 angler days of use.
9. To develop fishable populations of largemouth bass, crappie and yellow perch in 20 farm ponds to provide 5,000 angler days use.
10. To maintain forage fish species to sustain game fish populations.
11. To evaluate need for new introductions of forage fish.
12. To involve sportsman groups and general fishing public in management and planning process.

Procedures:
Work will be conducted towards achievement of all the listed objectives, however, objectives 2, 3, 7, 8, 11 and 12 will be done

under State funding. Fish populations will be sampled with 125 x 6 foot experimental gill nets with 25 foot sections of 3/4, 1, 1 1/4, 1 1/2 and 2-inch square mesh; 300 x 8-foot gill nets with 100-foot sections of 2 1/2, 3 and 3 1/2 inch square mesh; 3 x 4-foot frame trap nets (1/4-inch mesh) and 4 x 6-foot frame trap nets (1/2 and 1-inch mesh) and a 100 x 10-foot seine (1/4 inch mesh). Captured fish will be measured to the nearest tenth of an inch and weighed to the nearest hundreth of a pound. Scale samples will be collected from fish for age and growth studies.

Trap nets will be employed to capture walleye and northern pike in Lake Frances, Tiber and Pishkun Reservoirs. Captured fish will be tagged with T-tags and cinch up tags to help determine survival, growth, movement and angler harvest. Gill nets will be employed to sample fish populations in the fall in Lake Frances, Tiber, Pishkun, Bynum and Petrolia Reservoirs to determine year class strength, species composition and growth of game and sport fish. Some stomach samples will be collected for food habit analysis. Periodic forage fish seining will be conducted in designated areas and results will be correlated with habitat conditions in large reservoirs.

Largemouth bass and crappie will be seined from a private farm pond and transferred to public managed farm ponds and small reservoirs. This practice will continue until the warm water hatchery in Miles City is placed into production. Success of transferring and stocking bass and crappie in small ponds and reservoirs will be evaluated by employing seines or trap nets to sample populations. Interested anglers will be asked to participate in a voluntary creel program to report their catches from small ponds and reservoirs.

Morony Reservoir will be sampled with gill nets and trap nets to determine success of walleye introductions since 1985. Since this reservoir has rapid discharge to storage ratio, walleye are raised to fingerlings before being released in the reservoir. It is hopeful that the fingerling plants will be less likely to flush from the reservoir.

Location of Work:

The project area is located in North-Central Montana and will include the following counties: Cascade, Chouteau, Fergus, Judith Basin, Liberty, Petroleum, Pondera, Teton, Toole and a portion of Lewis and Clark.

Principal Fish Species Involved:

Walleye, northern pike, largemouth and smallmouth bass, black and white crappie, yellow perch, spottail shiner.

Technical Personnel: Fisheries Manager, Bill Hill, Steve Leathe

Total Man-Days Required: 186

Project Duration: July 1, 1988 through June 30, 1989

Cost: $24,316 Federal Share: 75% State Share: 25%

Principal Investigator: Region 4 Fisheries Manager

JOB DESCRIPTION

State: Montana

Project No. F-46-R-2 (3511)
Job No. I-h

Project Title: Statewide Fisheries Investigations

Study Title: Survey and Inventory of Cold-water Streams

Job Title: Upper Bighorn River Investigations

Job Objectives. The purposes of this study are:

1. To maintain a year around minimum flow in the upper Bighorn River of at least 2,000 cfs in eight out of 10 years and at least 2,500 cfs in five out of 10 years.

2. To eliminate gas bubble trauma as a significant cause of trout mortality.

3. To maintain average population densities of 5,000 to 7,000 age one and older brown trout and at least 500 18-inch and longer brown trout per mile in the Bighorn River upstream of Bighorn Fishing Access Site (FAS), and to maintain 1,500 to 2,500 age one and older brown trout per mile between Bighorn FAS and Two Leggins FAS.

4. To maintain average population densities of at least 1,000 age one and older rainbow trout and 150 18-inch and longer rainbow trout per mile in the Bighorn River upstream of Bighorn FAS, and to maintain at least 500 age one and older rainbow trout per mile between Bighorn FAS and Two Leggins FAS.

5. To redistribute angler use to achieve use levels of no more than 3,000 angler-days per month above Bighorn FAS and at least 10,000 angler days annually between Bighorn and Two Leggins FAS.

6. To make at least 750 creel census contacts per year to assess angler success and opinions.

Progress on all objectives is expected during FY 89.

The upper Bighorn River is one of Montana's most productive and heavily used stream trout fisheries. Although trout population densities are high, there are several habitat problems affecting Bighorn trout populations. Brown trout population density is closely related to river flow levels. Flows are occasionally inadequate to maintain brown trout populations at desired levels. Gas supersaturation causes a chronic gas bubble trauma problem in brown and rainbow trout in the uppermost few miles of the river. Rainbow trout populations are limited, in part, by problems associated with the Soap Creek Irrigation Project (Soap Creek is a tributary of the upper Bighorn that supports a rainbow trout spawning run).

Rapidly increasing angling use of the upper Bighorn has emphasized several fisheries management problems. Anglers prefer to have the Bighorn managed to maximize the opportunity to catch large trout. However, quality of the angling experience has declined as fishing pressure has increased. Angler use nearly doubled during the summer peak use period between 1985 and 1986. Use is concentrated on the uppermost 12 miles of the river. Use on the rest of the river is much lower, due in part to difficult access. High intensity use of the upper Bighorn River could negatively impact fish populations. Frequent monitoring of fish populations, angler use, harvest, angler opinions and compliance with regulations will be necessary to attain fisheries management objectives.

Procedures.

Investigations pertaining to objectives 5 and 6 will be carried out under state funding.

U.S. Bureau of Reclamation (USBR) compliance with recommended flow targets will be monitored at a U.S.G.S. gauge located downstream of Yellowtail Afterbay Dam. Minimum flow targets will be refined and reviewed with the USBR at annual coordination meetings. Technical and informational support will be offered to the USBR regarding its efforts to solve the gas supersaturation problem by installing a power plant and bypass system in Yellowtail Afterbay Dam. Technical and logistical assistance will be given to researchers from the Montana Cooperative Fisheries Research Unit working on a study of the effects of gas supersaturation on the fish population of the Bighorn River.

Brown and rainbow trout population densities will be estimated biannually (or annually if population trends remain consistent) in sections above and below Bighorn FAS using electrofishing methods described by Vincent (1971, Prog. Fish. Cult. 33(3):163-169). Angling regulations will be evaluated and adjusted as necessary to maintain desired population densities and size structure. A comprehensive creel census and angler preference and opinion survey will be conducted during one calendar year (1990). A model will be developed at that time to estimate fishing pressure from car counters located at fishing access sites. Spot creel checks will be conducted during peak use periods during the remainder of the study. Contingent upon approval of a new position by the Montana Legislature or procurement of private funding, a river ranger will be hired in FY 1990 to conduct the creel census and subsequent spot creel checks as well as improve information flow to anglers. The five-year fisheries management plan currently in effect will be revised and reissued in 1992.

Location of Work. This portion of the project will be carried out on the Bighorn River between the Afterbay Dam and the Town of Hardin, entirely in Big Horn County.

Principal Fish Species Involved. Rainbow trout and brown trout.

Technical Personnel.

Names: James Darling, Regional Fisheries Manager
Wade Fredenberg, Project Biologist
Michael Vaughn, Fisheries Fieldworker III

Total Man-days required: 393

Job Duration: July 1, 1988 - June 30, 1989

Cost: $35,681 Federal Share: 75% State Share: 25%

Principal Investigator: Wade Fredenberg, Project Biologist

JOB DESCRIPTION

State: Montana

Project No. F-46-R-2 (3512)
Job No. I-i

Project Title: Statewide Fisheries Investigations

Study Title: Survey and Inventory of Cold-water Streams

Job Title: Mid-Yellowstone Drainage Investigations

Job Objectives. The purpose of this study are:

1.) To maintain the reaches streambanks and channels in their present or improved condition.

2.) To ensure, within hydrologic constraints, that flows in streams supporting fisheries do not fall below minimums identified during the Yellowstone River instream reservation process.

3.) To maintain water quality at or above 1975-85 average levels as measured at U. S. Geological Survey water quality monitoring stations.

4.) To maintain fish populations and habitat in streams affected by resource development activity at levels at least as good as present status.

5.) To reduce impacts on river stability and fish habitat caused by yearly maintenance at headgate structures.

6.) To maintain a minimum of 123,000 angler days per year within the mid-Yellowstone drainage.

7.) To redistribute fishing pressure and minimize overcrowding through the purchase of additional access sites in key areas. (These areas include Rock Creek between Roberts and Joliet; Yellowstone River at Big Timber, between Columbus and Reedpoint and between Columbus and Laurel; and on the East and West Rosebud drainages.)

8.) To maintain riparian and floodplain areas in their natural condition.

9.) To complete cutthroat trout inventory in one drainage of the mid-Yellowstone reach each year beginning in 1989.

10.) To complete inventory of cutthroat trout in the three forks of the Boulder drainage, east fork 1990, west fork 1991 and Main Boulder 1992.

11.) To increase public awareness of the diversity of opportunities and hazards of water-based recreation on mid-Yellowstone.

12.) To improve level of understanding among anglers regarding management policies and options, and encourage their participation in the decision-making process.

13.) To protect and maintain rainbow spawning areas in the upper Stillwater River in their present condition.

14.) To maintain cutthroat population numbers in Meatrack Creek at or above 1984 levels.

Objective 10 is scheduled to be addressed at a later date. Work pertaining to all other objectives will be accomplished in FY 89.

The mid-Yellowstone River between Springdale and the mouth of the Bighorn River represents a transition zone between headwater salmonid populations and cool/warm-water species characteristic of eastern Montana. Trout are the primary species of interest above Billings with burbot, sauger and catfish entering the fishery from that point downstream.

Major tributaries which enter the mid-Yellowstone reach include the Boulder, Stillwater and Clarks Fork rivers. High quality of the fishery resource, scenic beauty and close proximity to Billings are all factors which result in the mid-Yellowstone and its tributaries receiving nearly 75% of the stream fishing pressure in Region 5.

A variety of habitat problems affect trout streams throughout this region, including seasonal water supply shortages; poorly designed channel and streambank alterations; poorly designed and operated irrigation projects; resource development activities such as timber harvest, grazing, agriculture and mining; degradation of water quality by pollution from point and nonpoint sources; and subdivision and second home developments. The primary factor regulating fish populations throughout the reach is magnitude, timing and duration of stream flows.

The fishery resource of the mid-Yellowstone as a whole is underutilized. Fishing pressure is unevenly distributed with some areas of overcrowding and possible overharvest. Additional access areas are needed in key areas to more evenly distribute fishing pressure. Lack of information on fish abundance, distribution and population dynamics hampers management. Also lacking is information on harvest, fishing pressure and angler's opinions and preferences. Information on range and distribution of Yellowstone cutthroat trout, a species of special concern found in a number of drainage headwaters, is incomplete.

Procedures.

Objectives 6, 9, 10 and 11 will be investigated under state funding.

Streambanks and channels will be protected from poorly designed projects through Montana Department of Fish, Wildlife and Parks' participation in administration of the Stream Protection Act and Natural Streambed and Land Preservation Act of 1975. Information on the latest technology available on design and operation of maintenance-free permanent irrigation headgate structures will be made available to local Conservation District Boards and Soil

Conservation Service personnel for dispersal to irrigators. MDFWP will assist in sponsoring at least one stream dynamics workshop for riparian landowners. MDFWP will participate in land and water use planning projects and encourage beneficial floodplain management practices. Input will be submitted to county commissioners through the county planning process on proposed subdivisions which have the potential to impact riparian and floodplain habitats.

Minimum instream flows determined in the Yellowstone River instream reservation process will be protected through MDFWP review of new water use permit applications. Water discharge permits issued by EPA and the Montana Department of Health and Environmental Sciences will be reviewed and comments offered. Timber sale plans, grazing allotment management plans, environmental assessments and environmental impact statements will also be reviewed to ensure adequate protection, mitigation and compensation for fisheries resources. MDFWP personnel will assist the Big Timber Ranger District of the Gallatin National Forest with their water quality and turbidity monitoring of grazing impacts upon cutthroat trout populations in Meatrack Creek and review the results yearly. MDFWP will assist the Stillwater Mining Company with their sediment monitoring program of rainbow trout spawning areas and review the results on a yearly basis. Numbers of spawning rainbow trout using these areas will be counted during the peak of spawning and compared to numbers counted in previous years.

Trout population density will be monitored using electrofishing methods described by Vincent (1971, Prog. Fish. Cult. 33(3):163-169) in sections of the Yellowstone River, Rock Creek, the Stillwater River, Rosebud Creek and the Boulder River. Inventory electrofishing will be used on portions of the mid-Yellowstone River to gather qualitative information about fish populations.

The final draft of the Stillwater management plan will be completed and implementation of the preferred management alternatives will be made. Fisheries information gathered on the Yellowstone River from 1987 through 1989 will be assembled, analyzed and consolidated into a comprehensive mid-Yellowstone management plan by 1989. Regulations will be adjusted as necessary to maintain desired fish population levels consistent with planning objectives. Public understanding, involvement and participation in the management planning process will be maximized through contacts via rod and gun clubs, service clubs and information releases through the news media. A floater's guide to the mid-Yellowstone River will be developed in cooperation with the Parks and Con-Ed Divisions. In an effort to improve access and better distribute fishing pressure, acquisition of additional access sites will be pursued at three locations along the main stem Yellowstone River, one location on Rock Creek, and on both the East and West Rosebud drainages.

Location of Work. The mid-Yellowstone River drainage is located in Sweet Grass, Stillwater, Carbon and Yellowstone counties of south central Montana.

Principal Fish Species Involved. Major game fish species are cutthroat, rainbow and brown trout; mountain whitefish, and burbot.

Technical Personnel.

Names: James Darling, Regional Fisheries Manager
Michiel Poore, Fisheries Biologist

Total man-days required = 642

Job duration: July 1, 1988 - June 30, 1989

Cost: $54,500 Federal Share: 75% State Share: 25%

Principal investigator: Michiel Poore, Project Biologist

JOB DESCRIPTION

State: Montana

Project No. F-46-R-2 (3531)
Job No. V-b

Project Title: Statewide Fisheries Investigations

Study Title: Survey and Inventory of Cold-water and Warm-water Ecosystems

Job Title: South Central Montana Cold-water Fisheries Investigations

Job Objectives. The purposes of this study are:

1. To ensure, within hydrologic constraints, that flows in streams supporting trout fisheries do not fall below 1975-85 averages.
2. To maintain of the region's streambanks and channels in their present or improved condition.
3. To maintain water quality at or above current levels as measured at U.S.G.S. water quality monitoring stations.
4. To maintain fish populations and habitat in streams affected by resource development activity at levels at least as good as present status.
5. To maintain a trout fishery of at least 4,200 angler-days per year with a catch rate of 0.5 fish per hour on the upper Musselshell River.
6. To acquire a fishing access site on the Musselshell River between Selkirk Fishing Access Site (FAS) and Harlowton.
7. Maintain 27,000 angler-days per year trout fishing in Cooney Reservoir while the walleye population develops.
8. Establish naturally reproducing populations of Yellowstone cutthroat trout in East and West Rosebud and Emerald lakes.
9. Maintain acceptable (0.25 fish/hr.) fisheries in lakes and reservoirs where natural reproduction is inadequate.
10. Increase use of Yellowtail Afterbay to 10,000 or more angler-days/year and Lodge Grass Storage Reservoir to at least 5,000 angler-days/year.
11. Maintain approximately 40,000 angler-days per year in Absaroka-Beartooth Wilderness lakes.
12. Make at least 1,000 angler contacts per year on major cold-water lakes and reservoirs.

Work will be accomplished relating to all objectives during FY 89.

Trout streams in south central Montana outside of the Bighorn and Yellowstone River drainages support fisheries of varying intensity for several species, including Yellowstone cutthroat trout, a Montana species of special concern. A variety of habitat problems affect trout streams in the region, including seasonal water supply shortages, poorly designed channel and streambank alterations, degradation of water quality by pollution from point and nonpoint sources and resource development activities such as timber harvest, grazing and mining.

Angling use on the upper Musselshell River is expected in increase as a result of a recent change in regulations opening the river to year-round trout fishing. Additional access to the Musselshell is needed. Close monitoring of the Musselshell's trout populations will be required.

Lakes and reservoirs in the region are also affected by habitat problems. Increased management effort may be required to maintain the high-use trout fishery that Cooney Reservoir currently supports while developing a newly-introduced walleye population in the lake. Natural reproduction is inadequate to support existing trout fisheries in most lakes and reservoirs (outside of the Absaroka-Beartooth Wilderness) in the region. Annual planting is required to maintain fisheries at desired levels.

Demand for lake fishing opportunities in south central Montana is high. Few nonwilderness lake fishing opportunities are available in the state's most densely populated region. Use of existing resources sometimes exceeds capacity and intensive management is required. Use of the Absaroka-Beartooth Wilderness is expected to exceed carrying capacity by the early 1990's. Strategies for allocating angler use of lakes in the wilderness must be developed in coordination with the Custer National Forest. Angler involvement in developing management strategies has been inadequate and needs to be increased.

Procedures.

Objectives 5, 6, 9, 10, 11 and 12 will be investigated under state funding.

Instream flow recommendations for the upper Musselshell River and key tributaries will be included in the Department of Fish, Wildlife and Parks' (MDFWP) application under the Missouri River Basin Water Reservation to be filed in 1989. Existing MDFWP water rights and the Missouri River Basin Reservation will be protected through MDFWP review of new water use permit applications.

Streambanks and channels will be protected from poorly designed projects through MDFWP participation in administration of the Stream Protection Act and Natural Streambed and Land Preservation Act of 1975. A MDFWP representative will serve on the technical advisory capacity to the conservation districts and DNRC in exploring innovative bank protection techniques along the Musselshell River.

Water discharge permits issued by EPA and the Montana Department of Health and Environmental Sciences will be reviewed and comments offered. Timber sale plans, grazing allotment management plans, and environmental

impact statements will also be reviewed to ensure adequate protection, mitigation and compensation of fisheries resources. MDFWP personnel will assist the Beartooth Ranger District of the Custer National Forest in developing an action plan to protect the native population of Yellowstone cutthroat trout in Crooked Creek.

Trout population density in streams will be monitored using electrofishing methods described by Vincent (1971, Prog. Fish. Cult. 33(3):163-169) including a section of the upper Musselshell River. Other electrofishing surveys will be conducted to address specific needs using standard methods. Spot creel checks will be utilized to determine catch rates and angler satisfaction with regulations. Regulations will be adjusted as necessary to help achieve desired fish population levels. In an effort to improve access to the upper Musselshell River, riverfront property that becomes available for sale will be investigated for potential as fishing access sites.

Lake and reservoir trout populations will be monitored through standardized gill net sets. Angler success will be assessed through spot creel checks by fisheries and enforcement personnel. Stocking rates and strategies will be adjusted as necessary to maintain desired angler catch rates.

Fishing access site acquisition and development for streams and lakes throughout the region will be prioritized in coordination with Parks division personnel. High intensity recreational use of Cooney Reservoir requires intensive management of fishery resources and recreational facilities. Information and education efforts will be directed towards encouraging use of other lake and reservoir resources especially Yellowtail Afterbay and Lodge Grass Storage Reservoir. A warden creel census will be continued to increase angler contacts and expand the region's fishery data base. Additional angler use information will be gathered by designing and implementing a trailhead creel census for the Absaroka-Beartooth Wilderness in cooperation with the Custer National Forest.

Location of Work. Work will occur in all eleven counties of south central Montana that comprise Fisheries Administrative Region 5.

Principal Fish Species Involved. Major game species include rainbow, brown, brook, cutthroat, and golden trout.

Technical Personnel.

Names: James Darling, Regional Fisheries Manager
Michiel Poore, Project Biologist
Wade Fredenberg, Project Biologist
Michael Vaughn, Fisheries Fieldworker III

Total Estimated man-days: 283

Job Duration: July 1, 1988 - June 30, 1989

Cost: $27,432 Federal Share: 75% State Share: 25%

Principal Coinvestigators: Michiel Poore, Project Biologist
Wade Fredenberg, Project Biologist

JOB DESCRIPTION

State: Montana Project Number: F-46-R-2 (3561)

Job No. V-c

Project Title: Statewide Fisheries Investigations

Job Title: Survey and Inventory of Cold-water and Warm-water Ecsystems

Study Title: South Central Montana Warm-Water Fisheries Investigations

Job Objectives. The purposes of this study are:

1.) To provide optimum conditions for walleye forage production on Bighorn Lake by implementing water-level control guidelines in cooperation with the Bureau of Reclamation.

2.) To optimize water-level conditions in area irrigation reservoirs in order to enhance production of warm and cool-water species by formalizing and adopting water-level controls prior to the irrigation season on Lake Elmo, and other waters.

3.) To improve habitat conditions for warm and cool-water species in area bass ponds by installing artificial habitat and enhancing natural cover.

4.) To at least maintain the existing flow conditions in the Musselshell River by analyzing instream flow needs, and participating in the reservation process and pursuing other options which may supplement existing flows.

5.) To maintain streambanks and channels in their present or improved conditions by administering existing laws.

6.) To maintain water quality at or above current levels as measured at U. S. Geological Survey water quality monitoring stations.

7.) To develop at least 30 producing bass ponds in the region that are open to public use, supporting at least 15,000 man-days of angling per year by 1992.

8.) To acquire two new access sites on the Yellowstone River downstream from Billings.

9.) To develop plans for construction of at least two new public fishing ponds in the region by 1992.

10.) To intensify management of existing urban area pond fisheries (Lake Elmo, Josephine, Arapooish, Chief Joseph, Broadview) by developing artificial reef projects, fishing docks, etc. to maximize the productivity of these fisheries.

11.) To convert marginal trout fisheries such as Glaston and Lebo lakes into productive warm and cool-water fisheries, and diversify the existing trout fishery at Cooney Reservoir by developing a two-story fishery supporting both walleye and trout.

12.) To broaden and diversify existing warm and cool-water fishing opportunities by developing a yellow perch fishery in the area and exploring potential for new species introduction.

13.) To monitor developing warm and cool-water fisheries and make recommendations to enhance the forage base where necessary.

14.) To create a smallmouth bass fishery in the lower Bighorn River capable of supporting 10,000 angler days of use per year.

15.) To develop a walleye egg source in Bighorn Lake or Cooney Reservoir.

16.) To develop contingency plans for walleye and bass fingerling production ponds in the region.

17.) To determine the amount of fishing effort expended and success rates for warm and cool-water species in the region's mixed-species fisheries by utilizing existing warden and parks division contacts in the field and supplementing with fisheries division follow-up where necessary.

18.) To increase public awareness of the availability of warm and cool-water fishing opportunity and the resource that provides them.

Objectives 3, 9, 10, 12 and 16 will not be addressed in-depth during the FY 89 project period. Work pertaining to all other objectives will be accomplished.

The number of quality warm and cool-water pond and reservoir fisheries in south central Montana is low. There has been increasing public demand for improvements and expansion of warm and cool-water management programs in this area the past 5 years. Currently, the demand for bass, walleye and panfish fisheries exceeds the supply in reservoirs and ponds.

The existing warm and cool-water stream resource is adequate, but monitoring has been inadequate, resulting in a poor data base from which to make management recommendations. Improvements in monitoring will allow better assessment of the impacts of dewatering and water quality problems on this resource base. In addition, there is a need to obtain better information on the impacts of fisherman use on the resource.

Demand for these resources has resulted in the initiation of several programs to increase opportunity. Introductions of walleye to Cooney Reservoir, white crappie to Bighorn Lake and Lebo Lake, smallmouth bass to the lower Musselshell and Bighorn River, and largemouth bass to about 30 area ponds has occurred, and monitoring and follow-up on these efforts is a key to producing the desired objectives. Habitat protection and improved information and education, along with expanded monitoring, should allow a fuller utilization of existing warm and cool-water resources. Emphasis will also be placed on better communication with the users of these resources through increased creel census and collection of angler opinion information.

Procedures.

Objectives 2, 8, 9, 12, 15, 16, 17 and 18 will be investigated under state funding.

Spawning, recruitment, and early life history studies of walleye in Bighorn Lake will be conducted by a combination of electrofishing, tagging, and sampling of spawning and larval fish. These studies will culminate in water-level management recommendations to be implemented by the U. S. Bu-Rec. Meetings with other reservoir regulatory groups will be pursued to achieve voluntary management of water levels once biological data are available from seining, electrofishing, and netting to make sound management recommendations. Habitat preservation on streams will be accomplished through administration of the Stream Protection Act, Natural Streambed and Land Preservation Act, and Water Quality Act. All are existing laws of the State of Montana. Appropriate input will be given to the U. S. Army Corps of Engineers on 404 projects.

Increased cool and warm-water pond fishing opportunities will be created by recruiting private landowners to allow public fishing in exchange for state stocking and management of bass ponds. Success in establishing fisheries will produce expansion of this program, but results are largely subject to maintenance of water levels, primarily as a result of hydrologic conditions. Intensive management of existing public bass ponds by developing habitat through artificial reefs and providing fishing docks is required to meet heavy use. Special regulations may be warranted, especially in urban settings. A regular monitoring program of stocked ponds will consist of netting and electrofishing to evaluate stocking success and identify limiting factors. Ponds will be stocked on a 3-year program with follow-up sampling to assess natural reproduction.

Glaston and Lebo lakes are larger area reservoirs with very limited trout fisheries. Both have potential to become productive cool or warm-water fisheries, and public access is adequate to support substantial use. Emphasis will be placed on developing those fisheries by either new species introduction or enhancement techniques with a goal of establishing viable fisheries within 5 years.

Cooney Reservoir offers an existing heavily used trout fishery. Walleye stocking in 1984-1986 has established a base level population which will require extensive monitoring by net and electrofishing to evaluate the progress toward maintaining a two-story fishery. Potential to sustain or increase existing use with a pure walleye fishery is poor. Cooney may have potential to develop a much-needed yellow perch fishery in the region.

Smallmouth bass were introduced to the lower Bighorn River in 1986. If continued introductions of 100,000 fish per year occur as planned, a monitoring program will be instituted to evaluate success of this program. Monitoring will consist of electrofishing and seining surveys to assess distribution, growth rates, and abundance. Incorporated into the program will be the evaluation of impacts smallmouth bass may have on existing species.

The Yellowstone and Musselshell rivers provide the bulk of warm and cool-water fishing opportunities in the region at present. The present data base is inadequate to evaluate the impacts of angling use on the species in these

streams. Baseline monitoring of fish populations by electrofishing and tagging studies is necessary to better quantify the existing resource and evaluate limiting factors. Access site acquisition on the Yellowstone downstream from Billings will increase use of this resource.

Finally, the overall cool and warm-water fishery program must be effectively communicated to the public. Research efforts and new programs must be publicized. Selective distribution of information can be effective in channeling use to resources that can accommodate it. Warm-water species, their habits, habitat requirements, and desirable sport qualities need to be more publicly known and accepted. We will actively seek opportunities to publicize the resource through television spots, newspaper interviews, and radio. Public support will aid in enhancing the warm and cool-water resource base in the region.

Location of Work. Work will occur in all eleven counties of south central Montana that comprise Fisheries Administrative Region 5.

Principal Fish Species Involved. Major game fish species include largemouth and smallmouth bass, walleye, sauger, channel catfish, yellow perch, black and white crappie, and burbot.

Technical Personnel.

Names: James Darling, Regional Fisheries Manager
Wade Fredenberg, Fisheries and Wildlife Biologist III
Michael Vaughn, Fisheries Fieldworker III

Total estimated man-days: 250

Job Duration: July 1, 1988 - June 30, 1989

Cost: $22,936 Federal Share: 75% State Share: 25%

Principal Investigator: Wade Fredenberg, Project Biologist

JOB DESCRIPTION

STATE: Montana PROJECT NUMBER: F-46-R-2(3651)
JOB NO. IV-c

PROJECT TITLE: Statewide Fisheries Investigations

STUDY TITLE: Survey and Inventory of Warmwater Lakes

JOB TITLE: Fort Peck Reservoir Study

Job Objectives:

(1) To acquire a greater and consistent walleye egg supply for artificial propagation of fry and fingerlings.

(2) To determine success of walleye fry versus fingerling plants to develop future stocking guidelines.

(3) To determine abundance of walleye in spring spawning runs in the Missouri River upstream from Fort Peck Reservoir and assess impacts of river spawning attributable to Yellowstone River walleye stocking.

(4) To encourage reservoir management practices to benefit the fishery as outlined in the water level management plan by coordinating needs with the COE and other states on the Natural Resources Committee.

(5) To improve aquatic habitat and spawning substrate by utilizing artificial structures.

(6) To determine effects of reservoir water levels on abundance, distribution, and reproduction of key sport and forage fish.

(7) To determine abundance and trends of spring spawning populations of walleye and northern pike.

(8) To determine the rate of harvest for key species and angler preference for various species management.

(9) To determine status of cisco and spottail shiners as to abundance, distribution, spawning success, and utilization by predators.

(10) To determine which designated access sites will provide the most benefit to fishermen.

(11) To obtain greater public involvement by attending 10 public/sportsmens club meetings and providing 5 news releases per year.

(12) To collect and tabulate commercial fish harvest, prepare commercial regulations, and conduct field inspections to determine compliance and catch of non-target species.

Work will be performed on all of the above objectives during the 1988-89 Job Duration. However, work on Objective 8 will be limited to partial lake trout creel census in spring and fall; to fully implement this objective, expanded funding will be required.

Approach and Procedure:

Job Objectives 1, 4, 5, 10, 11, and 12 will be funded entirely by state funding.

Greater and more reliable walleye egg sources will be pursued by intensifying egg-take from the Big Dry Arm of Fort Peck Reservoir, acquisition from other states, and aiding egg-take in other waters in the region. Walleye fingerlings will be reared at the Miles City hatchery and subimpoundments adjacent to the reservoir. Annual water level management recommendations will be coordinated through the Natural Resources Committee of the Missouri River Basin States and the Reservoir Control Center, COE. Annual surveys consisting of spring trapping, summer gill netting, and summer/fall beach seining will be conducted to determine relative abundance, distribution, reproduction, and stocking success for key sport and forage species. Spring and fall creel census data will be acquired at the Fort Peck Marina to evaluate lake trout growth and catch rates. Walleye abundance in the Missouri River above the reservoir will be determined by electrofishing. The commercial fishery will be administered by preparing annual regulations, tabulating total catch data and conducting on-site field inspections of nets.

Location of Work: Fort Peck Reservoir, NE Montana Region 6

Technical Personnel:

Robert Needham, Regional Fisheries Manager
William Wiedenheft, Fish and Wildlife Biologist III
Daniel Welsh, Fisheries Fieldworker III
Unassigned, Fisheries Fieldworker I
Unassigned, Laborer I

Total Man-days Required: 615

Job Duration: July 1, 1988 through June 30, 1989

Cost: $57,627 Federal share 75% State share 25%

Principal Investigator:

William Wiedenheft, Fish and Wildlife Biologist III

JOB DESCRIPTION

STATE: Montana PROJECT NUMBER: F-46-R-2 (3631)
JOB NO: V-d

PROJECT TITLE: Statewide Fisheries Investigation

STUDY TITLE: Survey and Inventory of Coldwater and Warmwater Ecosystems

JOB TITLE: Northeast Montana Coldwater Ecosystems Investigations

Job Objectives: (Streams)

(1) To ensure within hydrologic constraints that stream flows supporting trout fisheries do not fall below 1975-85 averages.

(2) To maintain all of the region's streambanks and channels in their present or improved condition.

(3) To maintain water quality at or above 1975-85 average levels.

(4) To maintain fish populations and habitat in streams at present levels.

(5) To maintain at least 6,000 angler days per year and a trout catch of 0.5 fish per hour.

(6) To develop fishing access site acquisition and development plan for the region.

(7) To establish cooperative watershed management plans with federal agencies.

(8) To obtain greater public involvement by attending approximately 20 public/sportsmen's club meetings and initiating 2 news releases per year.

Work will be performed on all of the above objectives during the 1988-89 Job Duration. However, one strategy for accomplishing Objective 5 involves evaluation of Beaver Creek flows and this will not be addressed until FY90.

Job Objectives: (Lakes)

(1) To maintain 70,000 angler days per year and provide catch rates of 0.5 fish per hour or greater.

(2) To maintain acceptable trout fishing in waters with nongame and/or predator species.

(3) To increase the number and distribution of public fishing waters by acquiring 2 reservoirs every 5 years.

(4) To obtain public input for management decisions by attending 20 sportsmen's club meetings and providing 3 news releases per year.

(5) To develop fishing access site acquisition and development plan for the region.

Work will be performed on all the above objectives during the 1988-89 Job Duration; however, one strategy for accomplishing Objective 1 involves evaluation of a 5-fish limit on Faber Reservoir and Bear Paw Lake and this will not be conducted unless expanded funding is received.

Approach and Procedures:

Job Objectives 2, 6, 7, and 8 (streams) and 4 and 5 (lakes) will be funded entirely by state funding.

Minimum instream flows will be determined by the wetted perimeter method and recommendations will be included in the Department's application under the Missouri River Basin Reservation. Stream habitat will be protected by administering the Stream Protection Act and Natural Streambed and Land Preservation Act; and water discharge permits, grazing allotment plans, and environmental impact statements will be reviewed.

The trout population in Beaver Creek will be determined by electrofishing. "Opening Day" creel census will be conducted on Beaver Creek to evaluate harvest, pressure, and existing regulations. Trout reservoir populations and stocking rates will be evaluated by gill netting.

Selected strains of rainbow trout will be evaluated in several reservoirs by gill-net sampling. Beach seining, gill-netting, trapping, and electrofishing will be utilized to evaluate populations where rough fish and/or predator species co-exist with trout.

Information will be presented to sportsmen's groups and the news media to explain management programs and obtain public input.

Location of Work: NE Montana, Region 6

Technical Personnel:

Robert G. Needham, Regional Fisheries Manager
Kent W. Gilge, Fisheries and Wildlife Biologist III
Unassigned, Fisheries Fieldworker I

Total Man-days: 118

Job Duration: July 1, 1988 through June 30, 1989

Cost: $11,196 Federal share 75% State share 25%

Principal Investigators:

Kent W. Gilge, Fisheries and Wildlife Biologist III
Robert G. Needham, Regional Fisheries Manager

JOB DESCRIPTION

STATE: Montana PROJECT NUMBER: F-46-R-2 (3661)
JOB NO: V-e

PROJECT TITLE: Statewide Fisheries Investigations

STUDY TITLE: Survey and Inventory of Coldwater and Warmwater Ecosystems

JOB TITLE: Northeast Montana Warmwater Ecosystem Investigations

Job Objectives: (Streams)

(1) To ensure within hydrologic constraints, that streamflows do not fall below 1975-85 averages.

(2) To maintain all of the region's streambanks and channels in their present or improved condition.

(3) To develop seasonal flow recommendations to improve flows for walleye spawning in the Milk River.

(4) To ensure that the Fort Peck tailwater/dredge cut fish population is adequately protected from development related to hydropower expansion.

(5) To acquire maximum spring flows within hydrologic constraints through the International Joint Commission agreement.

(6) To maintain paddlefish populations and angler catch rates at existing levels.

(7) To acquire public fishing access through lease or purchase and develop a fishing access site acquisition and development plan for the region.

Work will be performed on all of the above objectives during the 1988-89 Job Duration. However, Objective 3 will not include channel/riffle or WETP measurements and quantification of walleye spawning success.

Job Objectives: (Lakes)

(1) To collect 20-30 million walleye eggs for fry and fingerling stocking from the Miles City hatchery.

(2) To develop 2 new fishing reservoirs and maintain 10 existing fisheries per year.

(3) To acquire public fishing access through lease or purchase and develop a fishing access site acquisition and development plan for the region.

(4) To acquire suitable water level and minimum pool for Fresno and Nelson Reservoir.

(5) To maintain a variety of species combinations distributed geographically throughout the region in 45 small reservoirs.

(6) To provide 10,000 angler days and catch of 0.25 walleye per hour at Nelson Reservoir.

(7) To maintain a population balance of predators versus perch and crappie.

(8) To maintain or improve forage base for predator species in numerous reservoirs throughout the region.

Work will be performed on all of the above objectives during the 1988-89 Job Duration with the exception of Objective 6 which depends on creel census work not scheduled until 1991. Objective 7 is contingent on acquiring tiger musky for new introductions.

Approach and Procedures:

Job Objectives 2, 5, and 7 (streams) and 1, 3, and 5 (lakes) will be funded entirely by state funding.

Minimum instream flows will be determined by the wetted perimeter method and recommendations will be included in the Department's application under the Missouri River Basin Reservation. Existing water rights will be protected by reviewing new water use permit applications. Stream banks and channels will be protected by administering the Stream Protection and Land Preservation Acts. Additional stream habitat protection will involve review of water discharge permits, grazing plans, environment assessments, and environmental impact statements.

Walleye will be collected by electrofishing and trapping to acquire eggs. A variety of sport and forage fish will be secured for stocking new waters or to balance predator-prey populations. Reservoirs and streams will be sampled to monitor population levels, diversity, and reproductive success.

Paddlefish tag returns will be monitored to evaluate harvest rates.

New fishing access sites will be investigated for possible lease or purchase.

Location of Work: NE Montana, Region 6

Technical Personnel:

Robert G. Needham, Regional Fisheries Manager
Kent W. Gilge, Fisheries and Wildlife Biologist III
Daniel M. Welsh, Fisheries Fieldworker III
Unassigned, Fisheries Fieldworker I
Unassigned, Laborer I

Total Man-days Required: 432

Job Duration: July 1, 1988 through June 30, 1989

Cost: $44,242 Federal share 75% State share 25%

Principal Investigators:

Robert G. Needham, Regional Fisheries Manager
Kent W. Gilge, Fisheries and Wildlife Biologist III

JOB DESCRIPTION

State: Montana Project No.: F-46-R-2 (3741)

Job No.: III-b

Project Title: Statewide Fisheries Investigations

Study Title: Survey and Inventory of Warm Water Streams

Job Title: Southeast Montana Warm Water Stream Investigations

Study Objectives. The objectives of this study are (1) to determine effect of Yellowstone River low-head diversion dams on game fish distribution and abundance; provide for additional angler days for warm water species at upstream points, (2) to understand the significance to game fish of Yellowstone River non-game fish species, (3) to obtain a minium flow on the Tongue River downstream of the T&Y diversion of 525 cfs for the period April 1 - May 10, (4) to ensure that legally mandated instream flows are met, (5) to collect up to 50 million walleye eggs each year with average survival to hatching of 60%, (6) to maintain existing water quality and bank-channel condition. Work will be done toward all of these objectives in fiscal year 1987-88 with the exception of objective #2. Work under objectives #4 and #6 will be funded with state money only.

Procedures. Diversion dam effects will be determined by making population estimates or determining relative numbers at key locations and by fish tagging downstream of diversion dams. Improved spring Tongue River flows will be obtained by cooperation with the Montana Department of Natural Resources and, if necessary, purchase of water. Water use applications will be monitored to insure that legally mandated instream flows are met. Maintenance of existing bank-channel conditions and water quality will be accomplished through participation in SB310, stream protection act, Corp of Engineers projects, and by monitoring of state water discharge permits. Natural and synthetic fish hormone materials will be tested for efficacy in inducing female walleye ripening and egg collection. Length and weight of walleye spawners will be monitored. In general, efforts will be expanded in collecting walleye eggs.

Location of Work. Work will be largely centered on the Yellowstone, Tongue and Powder Rivers in southeastern Montana.

Principal Fish Species Involved. Important fish species are walleye, sauger, northern pike, shovelnose sturgeon and smallmouth bass.

Technical Personnel

Phillip A. Stewart, Regional Fisheries Manager
Victor Riggs, Fisheries Fieldworker II

Total Man-Days Required: 265 man-days

Job Duration: July 1, 1988 - June 30, 1989

Cost $23,291 Federal Share: 75% State Share: 25%

Principal Investigator: Phillip A. Stewart, Regional Fisheries Manager

JOB DESCRIPTION

State: Montana **Project No.:** F-46-R-2 (3742)

Job No.: III-c

Project Title: Statewide Fisheries Investigations

Study Title: Survey and Inventory of Warm Water Streams

Job Title: Yellowstone River Paddlefish Investigations

Study Objectives: The objectives of this study are (1) to prevent overharvest of the paddlefish population during the spawning migration; limit harvest to 5,000 or fewer fish most years at Intake, (2) to determine acceptable angler harvest, (3) to locate and preserve paddlefish spawning habitat. Work will be done toward all of these objectives in fiscal year 1987-88. Work under objective #3 will be funded with state money only.

Procedures: Paddlefish harvest will be monitored through creel census and pressure counts. Fish size and sex ratio in the spawning population will be measured from the angler catch. Fish tagging and later return from anglers will indicate relative harvest. Spawning aggregations and determination of flows required for moving upstream of Intake will be determined using low power electrofishing. Regulations will be adjusted as data collected indicates a need.

Location of Work: Paddlefish work will be done on the Yellowstone River from the Cartersville diversion at Forsyth to the North Dakota border.

Principal Fish Species Involved. Paddlefish are the only fish species involved.

Technical Personnel

Phillip A. Stewart, Regional Fisheries Manager
Victor Riggs, Fisheries Fieldworker II

Total man-Days Required: 195 man-days

Job Duration: July 1, 1988 - June 30, 1989

Cost: $20,253 Federal Share: 75% State Share: 25%

Principal Investigator: Phillip A. Stewart, Regional Fisheries Manager

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JOB DESCRIPTION

State: Montana

Project No. F-46-R-2 (3751)

Job No. IV-d

Project Title: Statewide Fisheries Investigations

Study Title: Survey and Inventory of Warm Water Lakes

Job Title: Southeast Montana Warm Water Lake Investigations

Study Objectives: The objectives of this study are (1) to maintain sport fishing for suitable species in the 84 small reservoirs presently under management, and in new reservoirs added, (2) to add 40 new reservoirs to the number of ponds supplying public fishing, (3) to keep the angling public informed of pond fishing opportunities. Work will be done toward all of these objectives in fiscal year 1987-88. Work under objective #3 will be funded with only state money.

Procedures. A fish planting program will be developed to utilize increased production from the Miles City Hatchery, presently undergoing renovation and enlargement. Fish stocking rates will be evaluated to efficiently utilize hatchery fish. Fish species and sizes unavailable or available in insufficient numbers from the hatchery will be transplanted from the wild.

New ponds will be sampled for suitability for sport fish production in response to landowners requests to plant fish. All suitable ponds will be planted as fish are available. Fish populations in previously planted ponds will be sampled at intervals of one to four years, depending on the individual pond. Management will be adjusted on the basis of sampling results. Rotenone will be utilized for eliminating undesireable fish populations.

Location of Work. Small reservoir management will be carried out in the 12 southeastern counties comprising Fisheries Administrative Region 7.

Principal Fish Species Involved. Major game species include rainbow trout, largemouth bass, smallmouth bass, northern pike, yellow perch, bluegill and crappie.

Technical Personnel

Phillip A. Stewart, Regional Fisheries Manager
Victor Riggs, Fisheries Fieldworker II

Total Man-Days Required: 247 man-days

Job Duration: July 1, 1988 June 30, 1989

Cost: $22,842 Federal Share: 75% State Share: 25%

Principal Investigator: Phillip A. Stewart, Regional Fisheries Manager

JOB DESCRIPTION

State: Montana Project No.: F-46-R-2 (3752)

Job No. IV-e

Project Title: Statewide Fisheries Investigations

Study Title: Survey and Inventory of Warm Water Lakes

Job Title: Tongue River Reservoir Investigations

Study Objectives. The objectives of this job are (1) to increase the average size of crappie so that 10 percent of crappie in mid-summer gill net catches are at least 250 mm total length, (2) to increase mid-summer gill net catches of walleye to an average of at least 2.0 walleye per overnight experimental gill net set, (3) to increase mid-summer gill net catches of northern pike to an average of at least 2.0 northern pike per experimental gill net set. Work will be done toward all of these objectives in fiscal year 1987-88. Work under objective #3 will be funded with state money only.

Procedures. Walleye abundance will be increased by planting 30,000 fingerlings annually. The problem of low overwinter survival of young walleye will be addressed through negotiations with the Montana Department of Natural Resources to obtain a minimum fall-winter reservoir level of 25,000 acre-feet. Success of these procedures will be evaluated by shore seining and gill-netting. Annual planting of 30,000 northern pike fingerlings will be used to increase the abundance of this species. Over abundance and poor growth of crappie will be improved by increasing the abundance of walleye and northern pike. Gill net sampling of crappie will be used for evaluation.

Location of Work. Tongue River Reservoir is located in southern Big Horn County, near the Wyoming border.

Principal Fish Species Involved. Major game species are walleye, northern pike, black and white crappie and smallmouth bass.

Technical Personnel.

Phillip A. Stewart, Regional Fisheries Manager
Victor Riggs, Fisheries Fieldworker II

Total Man-days Required: 65 Man-days

Job Duration: July 1, 1988-June 30, 1989

Cost: $4,073 Federal Share: 75% State Share: 25%

Principal Investigator: Phillip A. Stewart, Regional Fisheries Manager

JOB DESCRIPTION

STATE: MONTANA

PROJECT NUMBER: F-46-R-2 (3812)
JOB NUMBER: VI-a

PROJECT TITLE: Statewide Fisheries Investigations
STUDY TITLE: Statewide Surveys and Inventories
JOB TITLE: Stream Protection Coordinator

Job Objectives:

1. To coordinate administration of the Stream Protection Act (SPA) and the Natural Streambed and Land Preservation Act (310) to ensure the preservation of Montana streams in their natural, existing state.

2. To provide recommendations as provided by Sec. 404 of the Clean Water Act to avoid impacts to wetlands contiguous to streams or in project corridors.

3. To assist with interagency coordination with other state and federal agencies, agricultural, corporate and other private entities in an effort to promote stream habitat management.

Objectives 3 will be accomplished with state funding.

Procedures:

State, county, municipal and political subdivisions are required to provide SPA notices to the Department of Fish, Wildlife and Parks (DFWP) at least 60 days prior to construction for projects which may affect stream beds or stream banks. Irrigation district projects and emergencies are exempt from the act.

This department provides notification forms to applicants for completion and return to the department. Plans are reviewed by Helena and regional staff to determine if any adverse impacts to fish or wildlife will occur. Recommendations are made to the applicant to eliminate or reduce the adverse impacts. The act provides for an arbitration procedure if an agreement cannot be reached.

Memos of understanding have been entered into with several federal agencies to comply with the intent of the act. In addition, water quality standards of the Montana Department of Health and Environmental Sciences provide that we screen construction projects for the potential exceedence of the water quality standard for turbidity, and then so advise that agency. Other agencies cooperate to varying degrees under informal agreements.

A private individual, corporation, firm, partnership, association, or other legal entity not covered under the Stream Protection Act must, before altering or modifying the bed or banks of a stream,

obtain a 310 permit from the local Conservation District Board of Supervisors. Fisheries personnel are required as part of the permitting process to review plans and make recommendations for reducing or eliminating impacts to the streambed or banks and thereby protect fish habitat. The permitting process normally includes on-site inspections and takes less than 60 days to process. If a dispute occurs, there is a provision for arbitration or further litigation.

The project leader will maintain guidelines to provide consistent statewide approach to administration and recommendations for 310 projects. Division activities will be coordinated on all arbitration proceedings dealing with disagreements and violations. Technical assistance will be provided to fisheries personnel when unusual, difficult or hard to solve hydrologic problems occur. Training will be provided for new fisheries biologists assigned to stream protection duties.

Approximately 80 percent of job time will be utilized on cold water streams and 20 percent on warm or cool water streams.

Fish population data are usually available from the department's Fisheries Division, and are supplied by regional offices. When adequate data are not available, requests are made to the appropriate region to obtain such data.

Engineering consultation service will be obtained under a contract with a private hydrologist for engineering expertise.

Location of work: Statewide

Principal fish species involved: Rainbow trout, brown trout, brook trout, cutthroat trout, bull trout, mountain whitefish, walleye, sauger, channel catfish, and paddlefish.

Technical personnel: To be named

Total man-days required: 262

Job duration: July 1, 1988 - June 30, 1989

Cost: $39,417 Federal Share 75%, State Share 25%

Principal Investigator: To be named
Stream Protection Coordinator
Fisheries Division

JOB DESCRIPTION

STATE: Montana Project No. F-46-R-2 (3808)
Job No. VI-c

JOB TITLE: Assessing the Value and Quality of Fishing and Hunting in Montana

OBJECTIVES:

To develop economic values for sport fishing and hunting in Montana and assess factors contributing to the quality of cold and warm water fishing and hunting (big game and birds). This information will be used in federal, state, and department level planning.

PROCEDURES:

Workshops will be conducted for federal agency personnel, department administrators, department managers, and field personnel to present results and demonstrate how this information can be utilized.

A mail use and preference survey will be sent out to deer and upland game bird hunters to collect detailed socio-economic data for estimating net economic value. In addition, this survey will provide information for classifying users. The data will be used to predict changes in use and value as resource setting and management programs change.

Data collected from lake and reservoir preference survey will be completed by early fall 1988. Analysis of the economic data will provide net economic values by water using the Contingent Valuation Method. In addition, the attribute and preference information will be used to provide profiles of lake anglers and define angler subgroups. This survey will also estimate changes in use and value based on alternative management programs.

LOCATION OF WORK:

Statewide

WORK SCHEDULE:

All Year

NAME OF TECHNICAL PERSONNEL AND MAN-DAYS REQUIRED:

Robert Brooks, Economics, 260 days

JOB DURATION:

July 1, 1988 - June 30, 1989

Cost: $24,444 Federal Share: 75% State Share: 25%