CANYON FERRY RESERVOIR/MISSOURI RIVER

FISHERIES MANAGEMENT PLAN

1993 - 1998

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EXECUTIVE SUMMARY

Since the mid-1980's, the Department of Fish, Wildlife and Parks has recognized that the fishing public desires to have greater participation in the development of management decisions involving the states fisheries resources. This plan addresses the management of the fisheries in the Missouri River/Canyon Ferry Reservoir system. Toston Dam, located 23 miles above Canyon Ferry Reservoir, defines the upstream boundary of the management area and Canyon Ferry Dam defines the downstream boundary. The management plan includes both the river and reservoir fisheries because fish populations are interconnected within the system. The Missouri River/Canyon Ferry system was chosen for a management plan because: 1) it is one of the heaviest fished areas in the state; 2) there has been general dissatisfaction with the recent declining trend in the sport fisheries; and 3) there has been increasing public interest to introduce a new species of fish, especially walleye, into Canyon Ferry Reservoir. Public involvement was a key element in the development of this fisheries plan.

This fisheries management plan contains an outline of the public involvement process, a description of the physical characteristics of the Missouri River/Canyon Ferry Reservoir system, a description of the fisheries found in the system and a summary of past and present management activities undertaken by the Department. Finally, the plan recommends a series of actions to take over the next five years to improve the quality of fishing in the system and to meet public demand.

The overall goal of this management plan is to protect and enhance the resident fish species and their aquatic habitat within the Missouri River/Canyon Ferry system. Specific management goals and the criteria for measuring stated goals are as follows:

<u>Management direction for rainbow trout</u>:

Canyon Ferry Reservoir - Increase the rainbow trout population in the reservoir and increase the number of wild, naturally reproduced rainbow trout that are propagated in the Missouri River and other tributaries.

Criteria 1. Attempt to increase the present rainbow trout numbers from an average of 4-6 per gill net set in 1991 to 20 per gill net set by 1998.

Criteria 2. Attempt to increase rainbow trout catch per angler hour from the 1991 level of 0.11 to 0.30 rainbow per angler hour by 1998.

Criteria 3. Attempt to increase the contribution of wild rainbow trout to the reservoir population from the 1991 level of 5% to 10% by 1998.

Missouri River - Increase the resident rainbow trout population residing in the section of river between the reservoir and Toston Dam and establish a migratory population that resides in the reservoir and moves into the Missouri River and its tributaries to spawn.

Criteria 1. Increase resident rainbow trout numbers from the 1991 level (which are too low to make mark-recapture estimates) to 300 rainbow trout per mile by 1998.

Criteria 2. Attempt to increase the number of countable redds (fish nests) in the Missouri River and its tributaries to 1000 by 1998.

Management direction for brown trout:

Canyon Ferry Reservoir - Increase the number of brown trout residing in the reservoir.

Criteria 1. Attempt to increase brown trout numbers in the reservoir from the 1991 level of an average of 2 per gill net set to 3 per gill net set by 1998.

Missouri River - Increase the resident brown trout population in the section of Missouri River between Toston Dam and the reservoir and increase the number of brown trout that reside in the reservoir and then migrate into the Missouri River and its tributaries to spawn.

Criteria 1. Attempt to increase the number of brown trout greater than 10 inches from the 1991 level of 78 fish per mile to 300 per mile by 1998.

Criteria 2. Attempt to increase the angler catch rate from the 1991 level of 0.07 brown trout per angler hour to 0.25 brown trout per angler hour by 1998.

Management direction for yellow perch:

Canyon Ferry Reservoir - At the present time, the Department has little ability to manipulate the yellow perch population (numbers or size of fish) in the reservoir. Management direction for yellow perch will be to obtain a better understanding of population dynamics for yellow perch in the reservoir and improve techniques for monitoring population trends.

Management recommendation for new species introductions:

Canyon Ferry Reservoir and Missouri River - No new species of fish will be introduced into the Missouri River/Canyon Ferry system over the term of this management plan. The Department will take actions to prevent the illegal introduction of new fish species to protect resident sport fish species, as well as, sport fish species located in downstream waters.

INTRODUCTION

Background

The Missouri River/Canyon Ferry Reservoir system provides a variety of fishing and recreational opportunities. Canyon Ferry Reservoir historically has been one of the most heavily fished bodies of water in the state having nearly 100,000 angler days of use each year. The Missouri River from the reservoir to Toston Dam receives over 8,000 days of use annually. A 1989 study by the Department of Fish, Wildlife and Parks found that fishing on Canyon Ferry Reservoir had a 6.5 million dollar net economic value to the state.

Since the mid-1980's, the Department of Fish, Wildlife and Parks has recognized that the fishing public desires to have greater participation in the development of management decisions involving the state's fisheries resources. As a result of this recognized need, the Department has initiated an agenda to develop five year fisheries management plans for most of the major bodies of water in the state. These plans are being developed with extensive public involvement and are being used by the Department to provide direction for fisheries management.

The Missouri River/Canyon Ferry Reservoir system was chosen for a fisheries management plan for the following reasons: 1) it is one of the heaviest fished bodies of water in the state; 2) there is a general angler dissatisfaction with the declining trend in the rainbow trout and yellow perch fishery in the reservoir since the mid-1980's, which has resulted in a declining fishing pressure; and 3) there is an increasing public interest to introduce new fish species, especially walleye, into Canyon Ferry Reservoir. This draft fisheries management plan has been developed in response to the changes in the fishery and to the changes in anglers interests and viewpoints.

The plan presented here addresses management of the fisheries in the Missouri River/Canyon Ferry Reservoir system by the Montana Department of Fish, Wildlife and Parks. Toston Dam, located 23 miles above Canyon Ferry Reservoir, defines the upstream boundary of the management area. Canyon Ferry Dam defines the downstream boundary. This management plan includes both the reservoir and river fisheries because fish populations are interconnected within the system.

This document contains an outline of the public involvement process, a description of the physical characteristics of the Missouri River/Canyon Ferry Reservoir system, a description of the fisheries in the system and a summary of past and present management activities undertaken by the Department. Finally, the plan recommends a series of actions the Department is recommending to take over the next five years to improve the quality of fishing in the system and to meet public demand.

Public Involvement in Plan Development

The major emphasis placed on development of this fisheries plan was public involvement. Steps taken by the Department to involve the public in the development of this management plan are as follows: 1) public scoping meetings; 2) formation of an advisory committee; 3) a walleye/trout workshop; 4) public opinion questionnaire; 5) public review of draft plan, including an opinion questionnaire; 6) a final fisheries management plan approved by the Fish, Wildlife and Parks Commission.

1). Scoping meetings. The planning process for the Missouri River/Canyon Ferry Reservoir system was initiated in the fall of 1990 when the Department held a series of in-house meetings to discuss the development of the plan and to identify major issues of concern. In December, 1990, a series of well advertised public meetings were held in Helena, Butte and Bozeman to identify issues and problems with the management of the fisheries in the river/reservoir system. Approximately 64 people attended these meetings and numerous comments were received and recorded. In addition, about 100 written comments were received following these scoping meetings. A summary of public comments resulting from these public meetings is presented in Appendix A. An earlier series of public scoping meetings were held in 1988 to identify issues and problems with the management of the fisheries in the entire reservoir complex of Canyon Ferry, Hauser and Holter. Public comments received from these meetings are presented in Appendix B.

2). Advisory Committee. Following the public scoping meetings, the Department organized an advisory committee comprised of one representative from each of the local angler/sportsman groups, participating government agencies, reservoir concessionaires, as well as several citizen-at-large representatives. The purpose of this group was to review: 1) the planning process to determine the most effective ways for gathering public input; 2) a public opinion questionnaire to insure that it addressed all issues in a fair and equitable manner; and 3) the draft management plan to insure it was comprehensive, responsive to the public need and understandable to the general public. A list of the advisory committee members is presented in Appendix C.

3). Walleye/trout interaction workshop. To further clarify the issue of introducing walleye into Canyon Ferry Reservoir, the Department, with assistance of the Advisory Committee, organized a workshop addressing fisheries management in waters that contain coexisting walleye and salmonid populations (Appendix D). The Department sought out professionals from outside Montana with experience on the subject of walleye/salmonid management and invited four experts to come to Helena to participate in a public workshop addressing walleye/trout interactions. This workshop, held in March, 1991, was well attended by the general public. The entire workshop was videotaped and the 8 hour video or an edited 40 minute version is available for public review upon request.

4). Public Opinion Questionnaire. To better identify the desires of the public, a public opinion questionnaire addressing the major issues brought up during the public scoping meetings was developed by the Department with the assistance of the Advisory Committee. This questionnaire was sent to approximately 4,800 individuals during June, 1991. Questionnaires were distributed to members of angler and general sportsman groups (Walleye Unlimited, Trout Unlimited, Prickly Pear Sportsmen, Gallatin Sportsman, Skyline Sportsman); to people who attended the scoping meetings or to people who sent in written comments; to anglers fishing Canyon Ferry Reservoir whose names were obtained from a recent creel census; and to any individual requesting one. A total of 1,830 completed questionnaires were returned to the Department. Results of the questionnaire were used to help select the recommended management actions presented in this document. Text of the questionnaire and associated results are presented in Appendix E.

5). Public review of the Draft Plan. The draft plan, after review by the Advisory Committee, was released to the general public for review and comment. The plan was distributed through a series of public meetings in Butte, Bozeman, Helena and Townsend and copies were available on request at the Region 3 and 8 headquarters. In addition to releasing the draft for public review, the Department distributed a brief questionnaire to a random sample of 300 individuals who has returned the original public opinion questionnaire. Results of this short questionnaire were used to help ascertain the level of public acceptance to the recommended management actions listed in the final plan. Questionnaire results are presented in Appendix F.

6). The Final Plan. The draft plan was submitted to the Fish, Wildlife and Parks Commission for review in early October, 1992. The final management plan was approved by the Commission at their public meeting held in Helena on October 16, 1992.

PHYSICAL CHARACTERISTICS OF THE MANAGEMENT AREA

Physical Characteristics

Canyon Ferry Reservoir is the first major impoundment located on the Missouri River in west central Montana (Figure 1). The dam is owned and operated by the Bureau of Reclamation, United States Department of Interior to provide for electrical power, flood control, municipal water, irrigation and recreation. Construction of the dam was completed in 1954 and the reservoir filled for the first time in 1955. It has a surface area of 35,200 acres at full pool with an approximate length of 25 miles and widths ranging from 1.0 to 4.5 miles. The average depth is 58 feet, with a maximum depth of 160 feet near the dam. The usable capacity of Canyon Ferry Reservoir is 2,043,000 acre feet and dead storage capacity is 8,000 acre feet for a total storage of 2,051,000 acre feet at full pool (elevation 3,797 ft).

Lands immediately surrounding the reservoir are owned by the Bureau of Reclamation, but are managed by the Montana Department of Fish, Wildlife and Parks through a memorandum of understanding with the Bureau of Reclamation. Toston Dam, the upstream boundary of the management plan, is located on the Missouri River about 23 miles upstream from the reservoir. It is a low head diversion dam owned and operated by the Montana Department of Natural Resources and Conservation to provide water for irrigation and, more recently, for electrical power. Toston Dam acts as a barrier to fish migrating upstream from the Missouri River/Canyon Ferry Reservoir system.

Flow Regime and Reservoir Filling Pattern

The Missouri River upstream of Canyon Ferry Reservoir has an average annual flow of 5,400 cfs. The flow regime of the Missouri is typical of rivers in this region in that peak runoff usually occurs in May and June, with flows decreasing throughout the summer. The lowest flows typically occur in late summer when the river is drawn down for irrigation and in mid-winter when flows are naturally low. The highest flow ever recorded on the Missouri River at Toston is 32,000 cfs which occurred June 6, 1948. The lowest flow ever recorded was 450 cfs which occurred on July 31, 1989 and was the result of drought conditions and associated high irrigation demands. Although daily flow variations due to occasional problems with electrical generation may be significant at Toston Dam, the impoundment has little storage capacity.

Based on the last 10 years of record, Canyon Ferry Reservoir is typically drawn down to it's minimum level in March, and then is refilled during the March - June period. The annual drawdown over the last 10 years has averaged 12 feet. A reservoir operations steering committee, comprised of Mt Dept FWP, Montana Power Company, Bureau of Reclamation, irrigators and sportsmen have formulated operational guidelines for Canyon Ferry Reservoir to optimize recreational values and minimize impacts to fish and wildlife. This committee meets annually to review operational guidelines.

Temperature regime

Water temperature data have been collected from Canyon Ferry in the upper, middle and lower portions of the reservoir since 1986. Typically surface temperatures are in the low 40's F in early April, increasing to 59°F around June 15, peaking at about 73°F in August and decreasing to below 50°F by late October. Water in the upper reservoir tends to remain mixed throughout the year due to shallow depths and exposure to wind action. In mid-reservoir, water tends to form a weak thermal structure beginning in May and ending in August. This means that the deeper portions of the reservoir are significantly cooler than the surface waters, and that there is little mixing of the two layers. The boundary between the surface water and deeper waters usually occur at depths ranging from 35 to 50 feet. Water in the lower reservoir tends to form a weak thermal structure from July through August at depths ranging from 50 to 60 feet. During mid-summer, oxygen levels in deeper portions of the reservoir are likely insufficient for the survival of most gamefish.

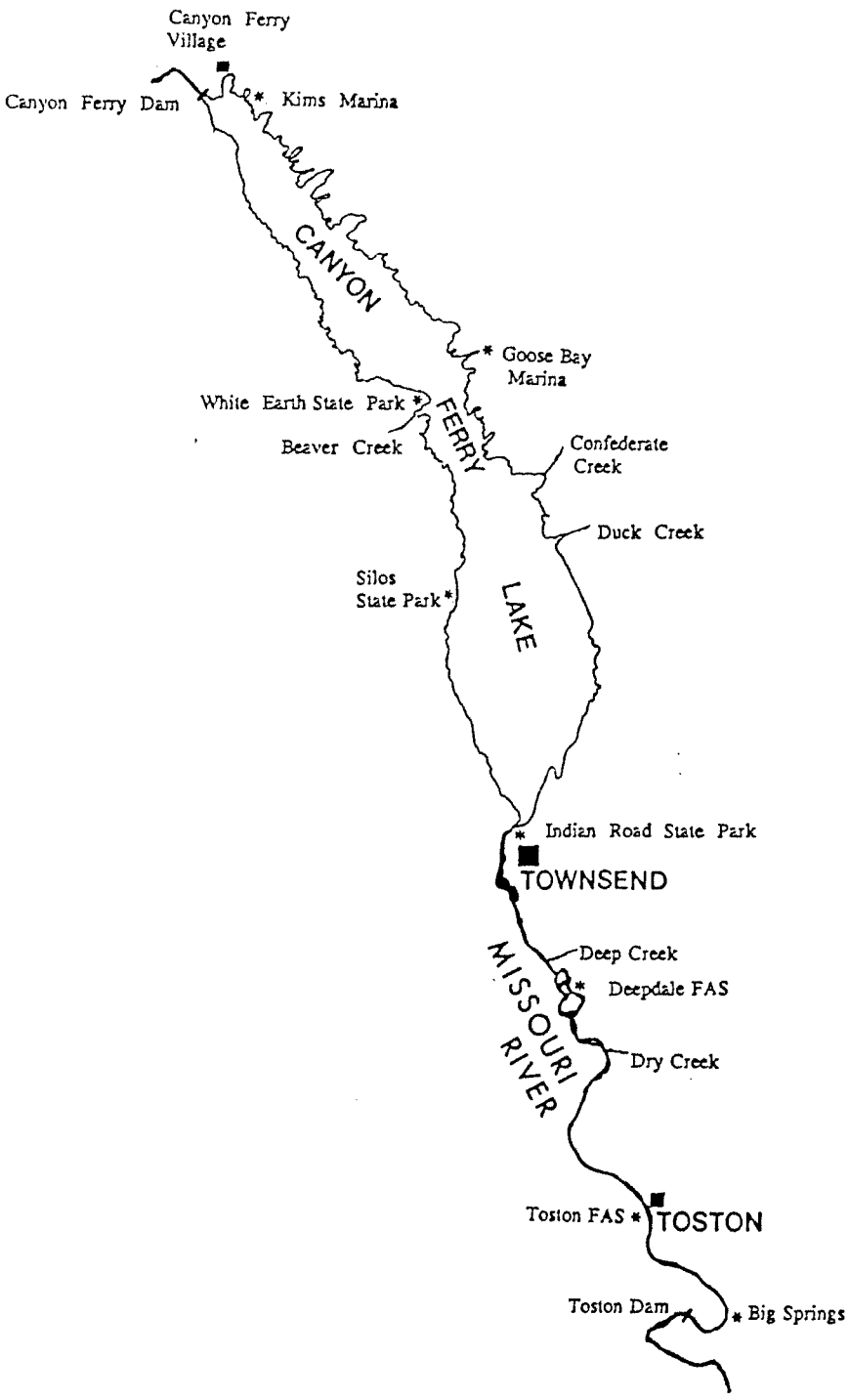

Figure 1. Map of management area.

From 1978-89, water temperature in the Missouri River at Toston Dam averaged about 39° F in March, increased to an average of 60° F in June, peaked at an average of 68° F in July and August, and decreased through the fall. The daily maximum temperature in July and August often reach in the high 70's F with minimums averaging in the high 50's or low 60's F. Oxygen levels in the river are adequate for fish survival.

DESCRIPTION OF THE EXISTING FISHERY

Introduction

The species composition of the Canyon Ferry Reservoir/Missouri River system is typical of large river and reservoir fisheries in the intermountain region (Table 1). The sport fishery is primarily comprised of rainbow trout, brown trout, yellow perch, mountain whitefish and burbot (ling). Non-game species in this system are abundant, but not particularly diverse since the non-game fishery is composed of four primary species: carp, longnose sucker, white sucker, and Utah chub. Other non-game species are present in the system, but not abundant.

Other game fish species in the system are not abundant enough to provide significant sport fishing opportunities. These species are: kokanee, largemouth bass, northern pike and walleye. The presence of northern pike and walleye are products of recent illegal introductions.

Anglers primarily seek brown and rainbow trout in the Missouri River with lesser emphasis on mountain whitefish. Mountain whitefish are often harvested by anglers seeking trout, except some are targeted specifically during the winter fishing season. In Canyon Ferry Reservoir, anglers seek a combination of trout and yellow perch. Yellow perch are particularily popular during the winter ice fishing season. The burbot population appears to be increasing in Canyon Ferry Reservoir, and there appears to be a corresponding increase in angler interest in this species. Yellow perch, brown trout, burbot, and mountain whitefish sustain populations through natural reproduction. Rainbow trout in Canyon Ferry Reservoir are primarily sustained through stocking.

Fisheries of the Missouri River, Canyon Ferry Reservoir, and associated tributaries will be managed as an ecological system. Since many game fish species in the system do not complete their entire life cycle within any single component of the system, management considerations for any portion of the system (river, reservoir, or tributaries) must be considered in the context of the entire system. Life history patterns and associated habitat requirements for rainbow trout, brown trout, yellow perch and burbot, in addition to the five fish species considered for introduction into the system can be found in Appendix G.

Table 1. Fish species present in the Canyon Ferry Reservoir/Missouri River system as of 1992.

SPORT SPECIES		NON-GAME SPECIES	
Species	Relative Abundance	Species	Relative Abundance
Rainbow trout	Abundant	White sucker	Abundant
Yellow perch	Abundant	Longnose sucker	Abundant
Brown trout	Common	Carp	Abundant
Burbot	Common	Utah chub	Abundant
Mountain whitefish	Common	Longnose dace	Common
Cutthroat trout	Rare	Mottled sculpin	Common
Brook trout	Rare	Fathead minnow	Common
Kokanee	Rare	Flathead minnow	Rare
Largemouth bass	Rare	Mountain sucker	Rare
Black crappie	Rare	Stonecat	Rare
Northern pike	Rare		
Walleye	Rare		

Note: Northern pike and walleye are present as a result of illegal introduction.

RAINBOW TROUT

Life History

Male rainbow trout usually become sexually mature at 2 to 3 years of age while females mature at 3 to 4 years of age. Spawning usually occurs during April and May with eggs hatching in June. To spawn successfully, rainbow trout require a continual flow of clean water and relatively sediment free gravel. Egg nests, called redds, are built into the gravel beds by the female with the eggs being deposited into the interstices of the gravel. Successful incubation and hatching are dependent upon clean gravel and a good intergravel water current to keep the egg nests supplied with an adequate oxygen supply. Rainbow fry emerging from the redds either rear in the tributaries and river or migrate almost immediately down to the reservoir where they begin to feed and grow. Rainbow trout in the reservoir typically reside in the open water areas and feed primarily on zooplankton, supplementing their diet with midges, terrestrial insects and fish. Rainbow trout residing in the tributaries or Missouri River feed primarily on aquatic insects.

Rainbow trout residing in the tributaries or Missouri River grow more slowly than their counterparts residing in the reservoir. Hatchery rainbow trout, stocked as 4 inch fingerlings in the spring, grow approximately 9 additional inches their first year in the reservoir and about 5 additional inches during their second year. Rainbow trout in Canyon Ferry Reservoir reach a plateau in growth at about 20 inches in length during their third year in the reservoir. This apparent plateau in growth is likely due to the fact that rainbow trout residing in the reservoir feed primarily on zooplankton and, as a result, become less efficient in obtaining these small food items as they grow larger.

The rainbow trout population in Canyon Ferry Reservoir is maintained through annual stocking of hatchery fish. Annual stocking of hatchery trout is required because natural recruitment is not sufficient to meet current demand by the fishing public. The reasons behind poor natural reproduction for rainbow trout in Canyon Ferry Reservoir are apparently twofold. First, spawning habitat is limited. Tributaries to the reservoir, as well as tributaries to the Missouri River, have been degraded by dewatering due to irrigation withdrawal and through increased sedimentation as a result of various land use practices. A second reason for poor natural reproduction may be due to the domesticated strain of rainbow trout stocked in the past. Biologists speculate that spawning in the small tributaries and the Missouri River has been less than successful due to the historic use of the Arlee rainbow trout in the Department's stocking program for Canyon Ferry. This strain of rainbow is generally incapable of reproducing in the wild. A majority of the hatchery rainbow trout stocked into Canyon Ferry prior to 1990 were Arlee rainbow.

Abundance and Size

Since the filling of the reservoir in 1955, the rainbow trout fishery in Canyon Ferry has been maintained by stocking between 350,000 and 1.2 million 4 inch fingerlings each year. An exception to this range in stocking rates occurred in 1980 when 2 million fingerlings were planted into the reservoir, with 1 million of these fish coming from a private hatchery donation. For the twelve year period between 1981 and 1992, an average of 815,000 hatchery rainbow has been annually stocked into Canyon Ferry Reservoir (see Figure 2).

Over the last 30 years there have been significant fluctuations in the number of rainbow trout in Canyon Ferry Reservoir. These fluctuations in numbers have affected fishing success over the years. The Department measured poor fishing success (catch rates) in the mid 1960's (0.08 rainbow/hr. during May-June, 1965), in the early 1980's (0.08 rainbow/hr.), and more recently during 1989-91 (0.14 rainbow/hr.). These fluctuations appear to be closely associated with varying success of the Department's stocking program for the reservoir.

Trends in rainbow trout abundance have been monitored in Canyon Ferry Reservoir since 1986 using floating gill nets and a roving creel census. Average catch of rainbow trout per gill net declined between 1986 and 1989, reflecting the instability of the population (Figure 3). From 1989 through the spring of 1992, the average catch per gill net remained

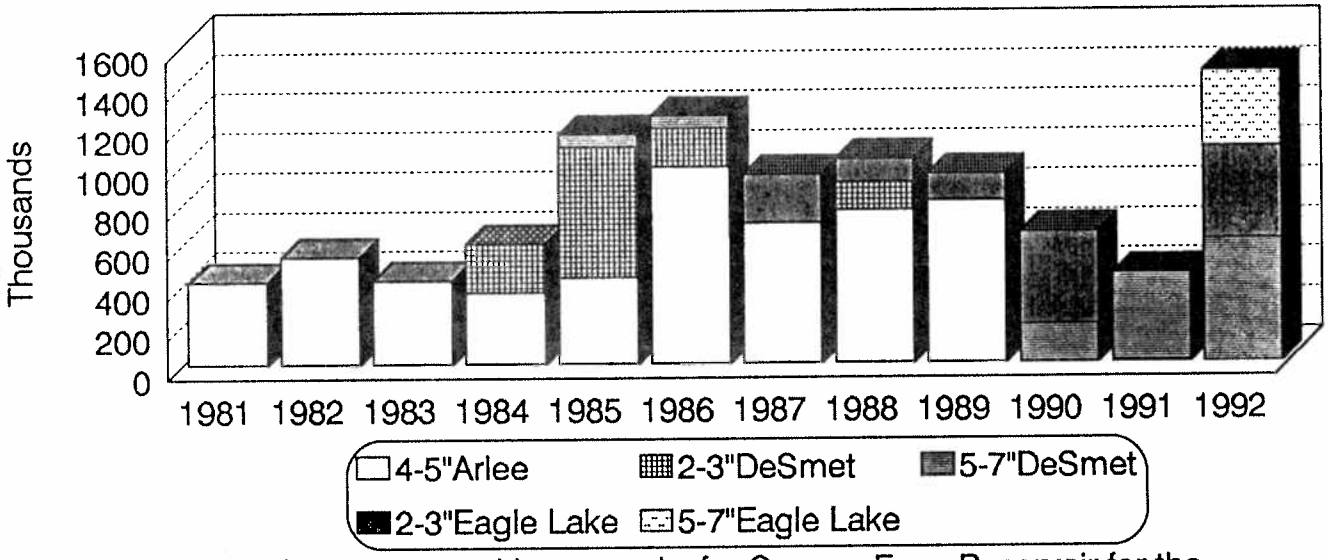

Figure 2. Rainbow trout stocking records for Canyon Ferry Reservoir for the 1981-92 period.

at relatively low levels. In the fall of 1992, however, the average catch per gill net substantially increased. Apparently, stocking efforts for 1992 proved successful. Approximately 95% of all rainbow trout gill netted from Canyon Ferry Reservoir since 1986 were of hatchery origin, indicating a lack of natural reproduction in the system. Rainbow trout collected in gill nets since 1986 have averaged about 15.3 inches in length and have ranged from 5.9 to 22.4 inches in length.

Based on a 1991 creel census, 75% of all anglers fishing on Canyon Ferry were specifically seeking to catch rainbow trout during the summer. During the winter, 56% of all anglers sought to catch rainbow trout or a combination of rainbow trout and yellow perch (Figure 4). Average catch rates by anglers have mimicked gill net results, as they have declined from 0.28 rainbow trout caught per hour in 1986 to 0.11 per hour in 1991, and then substantially increased to 0.34 per hour in 1992 (Figure 5). Fishing success for rainbow trout is closely correlated with the varying success of the Department's hatchery plants.

Similar to gill net results, creel census data show that approximately 95% of all rainbow trout harvested by anglers from Canyon Ferry are of hatchery origin. Since the rainbow population in Canyon Ferry has been historically dominated by the shorter lived strain of hatchery fish (Arlee strain), an unsuccessful plant during any one year tends to significantly reduce the population level the following year, resulting in poor fishing success.

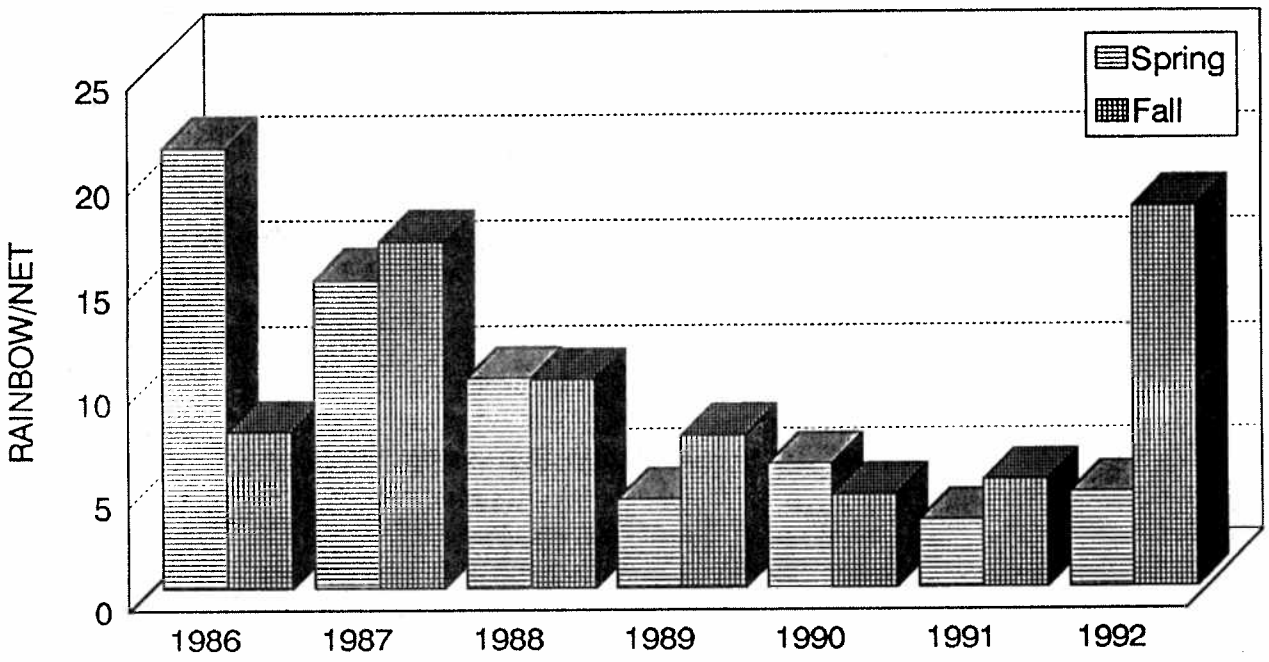

Figure 3. Average number of rainbow trout per floating gill net set in Canyon Ferry Reservoir.

Anglers keep about 95% of all rainbow trout caught in the reservoir. Average size of rainbow trout harvested from Canyon Ferry has steadily increased from 14.9 inches in length in 1986 to 19.0 inches in length in 1991, reflecting a shift in the rainbow population toward an older age structure rather than an improvement in growth rates. Older fish are comprising a greater percentage of the rainbow population due to the poor survival of hatchery fish in the past several years.

Rainbow trout densities in the Toston section of Missouri River, located between Toston Dam and Canyon Ferry Reservoir, have been too low to successfully complete mark and recapture population estimates. This river population consists of a resident segment as well as a migrant segment originating from the reservoir. Based on a 1991 creel census conducted on the section of river from Toston Dam to 2.5 miles downstream, about 160 rainbow trout were harvested by anglers in a three month period during the fall. The number of rainbow harvested in 1991 was about half the number harvested during a similar creel census conducted in 1985. Harvested rainbow in 1985 averaged 17.5 inches in length. In 1991, harvested rainbow averaged 16.0 inches in length. Anglers kept about 64% of all rainbow caught in this section of river during the fall of 1991. Less than 5% of the rainbow harvested in 1991 were hatchery fish of reservoir origin.

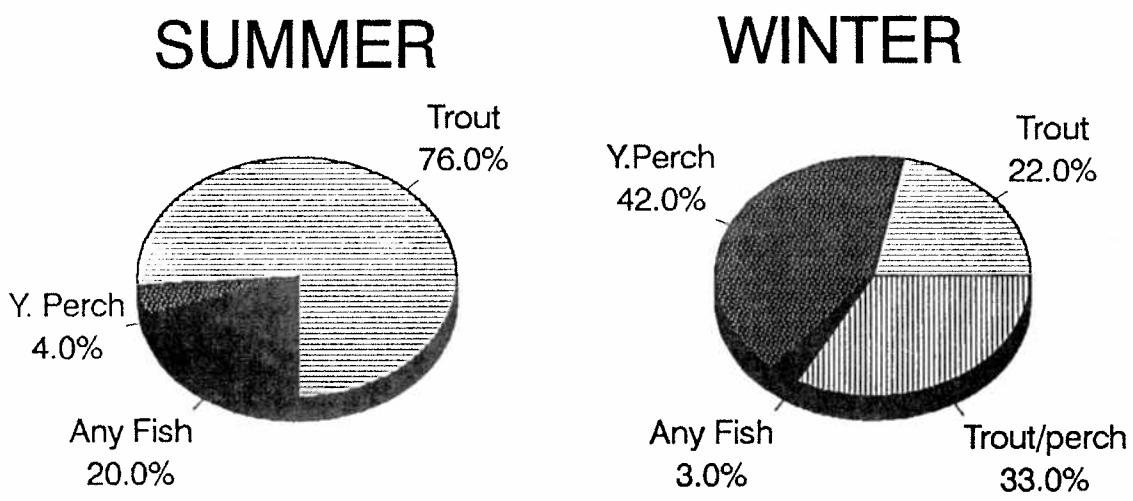

Figure 4. A comparison of fish species anglers seek to catch in Canyon Ferry Reservoir between the summer and winter seasons.

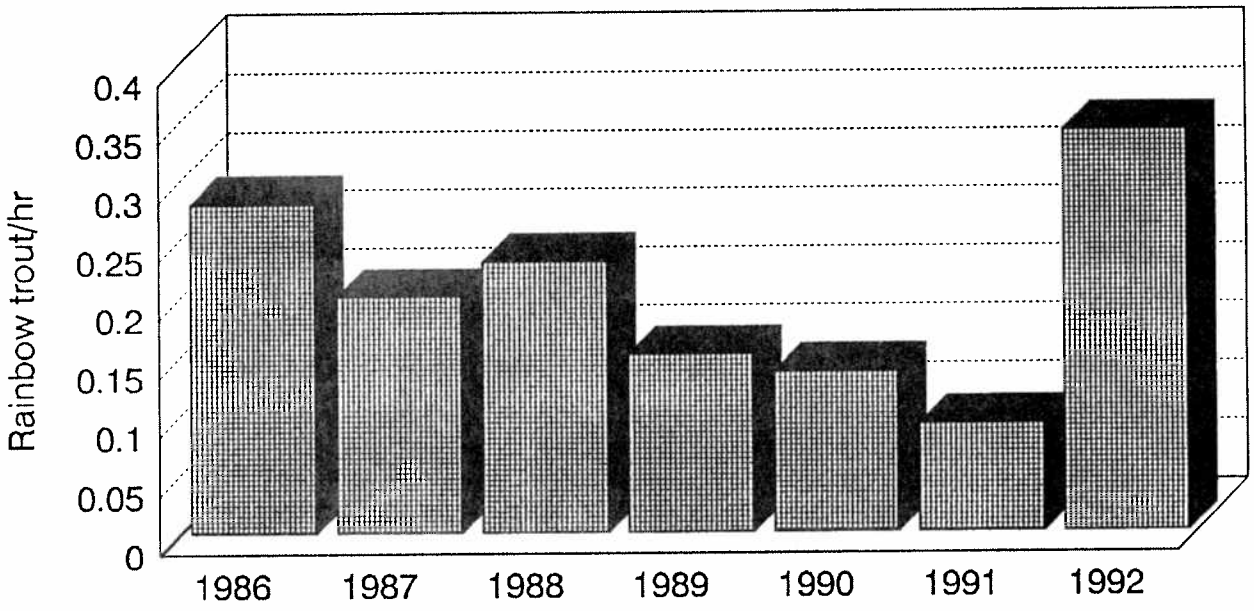

Figure 5. The number of rainbow trout caught per angler hour in Canyon Ferry Reservoir during the summer period (mid-April to mid-Nov) for the 1986-92 period.

A creel census was conducted in the channels section of the Missouri River located immediately upstream from Canyon Ferry Reservoir for a one month period during the spring of 1988. An estimated 280 rainbow trout, averaging 17.1 inches in length, were harvested during this period. A majority of these rainbow were determined to be hatchery fish that had been originally stocked into Canyon Ferry Reservoir. These data indicate hatchery rainbow trout stocked in Canyon Ferry Reservoir have a major influence on the river fishery, and this influence is more pronounced in the segment of river near the reservoir.

Past and Present Management Activities

In past years, the Department has adjusted the stocking program for Canyon Ferry Reservoir several times in attempt to enhance the rainbow population. These adjustments have included changing the number and size of fish stocked as well as adjusting the season of the year when the fish were distributed. Beginning in the early 1980's, the department began experimenting with different strains of rainbow trout and with different methods of dispersing them into the reservoir in an attempt to improve the fishery. For the most part, past efforts have not consistently improved the rainbow trout fishery.

Prior to 1990, the Arlee strain of rainbow trout was the primary strain of trout stocked into Canyon Ferry Reservoir (see Figure 2). The Arlee strain is a "domesticated" strain of fish that is relatively short lived and generally does not reproduce in the wild. Due to the Arlee's short life span (average of about 2.5 years), its poor ability to reproduce in the wild, and the continued instability of the lake rainbow population, the Department dropped the Arlee strain from the stocking program for Canyon Ferry in 1990 and began to stock two new strains of rainbow. These two new rainbow strains, the Desmet and the Eagle Lake, are considered "wild" strains of fish because they have not been genetically manipulated in the hatchery system and, as a result, spawn in the spring and are capable of reproducing naturally. In addition to their ability to reproduce in the wild, these new strains were selected because of their longer life span.

The life span for Desmet and Eagle Lake rainbow is about 6 to 7 years. These longer lived wild strains may provide more stability to the fishery because five or six age classes would be present in the reservoir instead of just two or three as with the Arlee strain. As a result, an unsuccessful plant of trout into the reservoir for whatever reason will have less impact on population abundance because four or five other age classes will be present to dampen the loss of the one unsuccessful hatchery plant.

The Toston section of Missouri River has been managed for wild trout since 1973 and no substantive plants of hatchery fish have been made into the river since that time. Although past management endeavors have been minimal, increased monitoring and enhancement efforts were begun in 1991.

In the late 1970's and early 1980's, a fall run of hatchery rainbow trout (Arlee rainbow strain) moved from Canyon Ferry Reservoir into the lower portions of the Missouri River below Townsend. This movement began in mid-September and continued through November. The fall "run" declined significantly by the late 1980's for reasons that remain unknown. Efforts to restablish this "fall" run have been unsuccessful and since the fall spawning strain (Arlee rainbow) has been dropped from the stocking program, there is little chance this fishery will restablish. However, the stocking emphasis of wild rainbow trout strains is expected to enhance the spring (April - May) spawning population in the Missouri River.

Ongoing management efforts at Canyon Ferry Reservoir continue to address the impacts of reservoir operations on fishery resources. Operation of Canyon Ferry Dam can have significant impact on the fishery, wildlife and recreational resources of the reservoir. A steering committee comprised of the Department, Bureau of Reclamation, Montana Power Company, affected irrigators, and sportsmen meet annually to review the upcoming water year and proposed dam operations as well as to evaluate formulated operational guidelines.

Recent management efforts have focused on rehabilitating degraded tributaries entering both the reservoir and Missouri River to enhance spawning habitat. Two recently completed projects are intended to mitigate for losses of juvenile brown trout resulting from the Toston Dam power plant retrofit. These projects will also benefit rainbow reproduction.

Fishing is open the entire year on Canyon Ferry Reservoir and on the Toston section of the Missouri River. Prior to 1990, the daily and possession limit for trout in Canyon Ferry was 10 pounds and one fish, not to exceed 10 fish. In 1990, the weight limit was dropped and the current limit for trout on the reservoir is 10 fish. Prior to 1983, daily and possession limits for trout on the Missouri River were 10 pounds and one fish, not to exceed 10 fish. In 1983, the Department implemented a more restrictive limit of 5 fish with only one of which can exceed 18.0 inches in length. This 5 fish limit with only 1 over 18 inches remains in place today.

BROWN TROUT

Life History

Brown trout were first introduced to Montana waters in 1889 with little stocking since 1956, when natural reproduction appeared to be adequate to maintain most stream and lake dwelling populations. Brown trout typically become sexually mature in 2 to 3 years as males and 3 to 4 years as females. The length of spawning fish in the Missouri River ranges from about 16.0 to 26.0 inches. Fecundity of brown trout in the system ranges from approximately 1,500 to 2,500 eggs per female. Most spawning occurs during the October

through December period. Although migration of spawning fish into the Missouri River primarily occurs in late summer/early fall, some migrants appear in the river as early as June. Timing of migrations back to the reservoir is largely unknown, but based on a limited number of tag returns from fishermen in 1991-92, it appears that some individuals return to the reservoir soon after spawning while others remain in the Missouri River for several weeks or months after spawning.

Eggs typically hatch in the early spring and fry emerge from the gravel during April/May. Some juvenile brown trout will emigrate from tributaries soon after emergence from spawning nests (redds), but an unknown percentage will continue to rear in tributary streams and migrate to the river/reservoir at an older age. Juvenile brown trout that rear in the mainstem Missouri River rely extensively on structural cover (e.g. debris jams and rock outcrops) along shoreline areas.

The diet of adult brown trout in the reservoir is primarily composed of fish. Salmonids (trout) comprise the most common fish species eaten, and yellow perch are the second most common prey item. Daphnia and crayfish are also found in the diet of brown trout. The primary food items for fish residing in the Missouri River are fish, aquatic insects, and crayfish, but the relative importance of these food items is not known.

It appears that two distinct populations have developed in this portion of the Missouri River/Canyon Ferry system. One population completes their entire life cycle within the Missouri River and its tributaries, while the other population depends on the Missouri River and its tributaries for reproduction, spending the remainder of their life cycle in Canyon Ferry Reservoir. Brown trout that rear in the reservoir tend to become larger than those that reside in the Missouri River.

Brown trout comprise a small percentage of the Canyon Ferry Reservoir fishery, and are present in low to moderate numbers in the Missouri River. Both populations in the system appear to be limited by their ability to successfully reproduce. Relatively low production of juvenile brown trout appears to result from limited availability of quality spawning and rearing habitat. Reduced stream flows also contribute to poor production of juvenile brown trout, as when flows are low, rearing habitat is exposed. An additional source of juvenile and adult trout in the system may originate from the Missouri River drainage upstream from Toston Dam. The relative contribution of brown trout that "drift" from upstream reaches, however, is not known.

Abundance and Size

The brown trout population in Canyon Ferry Reservoir has remained at a relatively low level since the reservoir was filled in 1955. Bottom gill net sets have been monitored periodically since 1955. Results from 17 gill nets set during the month of June between 1955 and 1988 indicate that numbers of brown trout were highest in the reservoir

immediately after the reservoir was first filled, but have not changed significantly in Canyon Ferry Reservoir in the subsequent 30 years (1958 - 1988) (Figure 6).

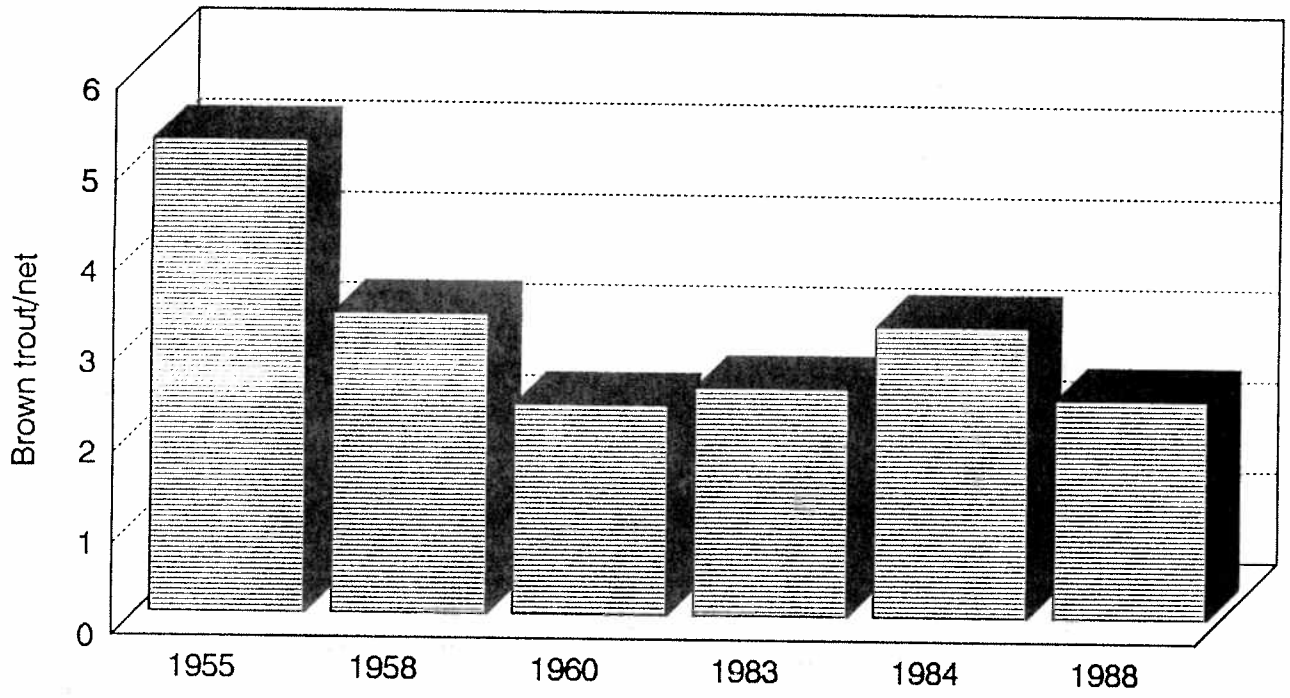

Figure 6. Number of brown trout captured per bottom set gill net in Canyon Ferry Reservoir during June for the 1955 -88 period.

The size range of brown trout has also remained relatively similar in Canyon Ferry Reservoir throughout its history. When the reservoir was approximately 5-years old (1960), brown trout captured in 17 sinking gill nets ranged from 10.7 to 24.1 inches in length. In 1988, brown trout lengths ranged from 9.4 to 25.3 inches at similar netting locations.

The condition factor (a measure of plumpness that relates the weight of the fish for a given length) of brown trout in Canyon Ferry appears to be lower than that observed at downstream reservoirs (Hauser and Holter). The reason for these differences remain unknown, although fish condition can vary as a result of differences in population structure, food availability, and living environment (e.g. water temperature).

Brown trout abundance was monitored in the Toston Section (7.3 miles) of the Missouri River during six occasions between 1979 and 1991. This population estimate is conducted during the spring to minimize the influence of brown trout spawning migrations from Canyon Ferry Reservoir. As a result, the population estimate primarily reflects changes in the resident brown trout population.

Brown trout population estimates in the Toston Section indicate a steady decline in fish abundance from 1979 to 1991 (Figure 7). The decrease in abundance is particularly evident for brown trout between 10.0 and 17.9 inches in length, where numbers have decreased from a high of 284 per mile in 1979 to a low of only 18 per mile in 1991. The density of "large" brown trout ($\geq$ 18.0 inches) has remained relatively constant throughout the period, with the exception of 1991 when numbers increased to about 60 per mile. This apparent increase, however, is probably due to the later May-June sampling in 1991 when some reservoir spawners have already moved into the river. Previous estimates were conducted during March/April.

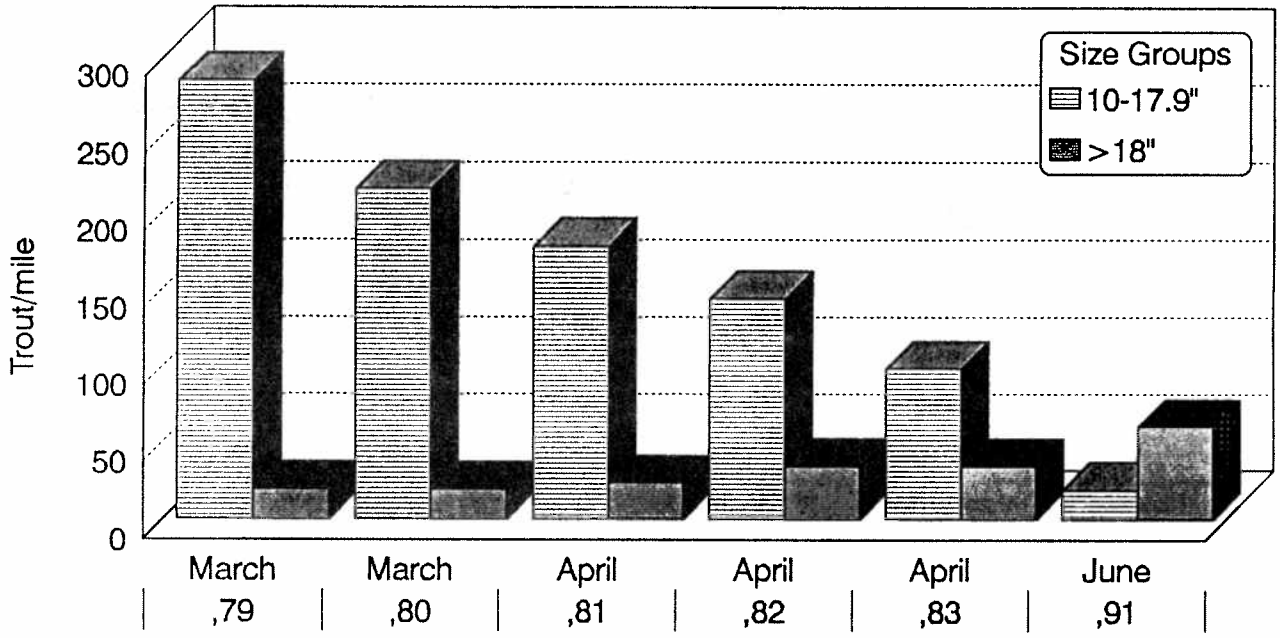

Figure 7. Brown trout population estimates in the Toston section of the Missouri River, 1979-91.

The decrease in brown trout numbers in the Missouri River is not confined to resident populations sampled in the spring. Although there is no means to estimate the size of the fall spawning run, it appears that the number of brown trout migrating into the river during the fall has decreased in recent years. The decline in brown trout numbers during the fall also appears to translate into reduced angling pressure and catch rates.

A fall creel census (approximately from late September through November) was conducted during 1985, 1986 and 1991 to determine fishing pressure, catch rates, and overall harvest of trout in a 2.5 mile reach of the Missouri River downstream of Toston Dam. Fishing pressure, catch rates, and total harvest of brown trout were substantially less in 1991 than in 1985 or 1986, indicating a decline in the brown trout population in this segment of river (Table 2).

Table 2. Fishing pressure estimates, catch rates, total harvest, and size distribution of harvested brown trout in the Missouri River downstream of Toston Dam during the fall of 1985, 1986, and 1991.

	1985	1986	1991
Est. Fishing Pressure (angler hours)	3861	4655	1809
Catch Rates (fish per hour)	0.31	0.28	0.07
Estimated Total Harvest	735	625	66
Average Length (inches)	17.7	17.0	18.9
Length Range (inches)	9.7 - 27.5	8.4 - 24.1	14.2 - 23.2

Since the fall fishery is generally based on the opportunity to catch trophy-sized brown trout, fish condition, in addition to length, is an important consideration. Fish condition provides an indication of the relative health of the living environment for brown trout and other species. Results from comparing brown trout condition factors in the Missouri River below Toston Dam and below Hauser Dam show the same pattern as comparisons of condition in Holter and Canyon Ferry Reservoirs. Fall condition factor for fish between 17.5 and 24.9 inches in length were higher in the spawning population below Hauser Dam in 1990 (38.38) than those below Toston Dam in 1991 (33.93).

There are several potential reasons for the declining brown trout population in the Missouri River below Toston Dam. One possibility for the observed decrease in numbers is the general trend of below normal precipitation and low streamflow conditions in the Missouri Basin between 1985 and 1991. Comparisons of maximum, mean, and minimum annual flows at Toston between 1977 and 1991 indicate that spring runoff and base flows have been significantly reduced since 1985. Relatively low spring runoff and mean annual flows influence the migration or drift of juvenile fish from tributary streams and/or upstream sources. Below normal flows also reduce the rate that sediments are flushed from the stream bottom. As sediments accumulate reproductive success usually declines.

Annual minimum flows have a significant influence on the availability of habitat for juvenile and adult fish. The Department recommended a stream flow of 2,400 cfs to maintain fish habitat in the mainstem Missouri River. Due to water depletions in the system, this minimum recommended flow level is not generally maintained throughout any given year. Between 1977 and 1991, flows were consistently maintained above 2,400 cfs during only one year (1984), and between 1985 and 1991, observed flows have been significantly less than the recommended minimum. In recent years, flows have not been adequate to maintain quality fish habitat in the Missouri River. In addition, low flows are often accompanied by elevated water temperatures which frequently exceed 70 degrees F, and occasionally exceed 80 degrees F, during July and August. Below normal streamflows and

associated high water temperatures do not, however, account for the decline in brown trout densities between 1979 and 1983. Although reasons for the decline are not clear, population data suggests the problem is associated with juvenile production, even during high to moderate flow years.

Past and Present Management Activities

Brown trout have been managed as a self-sustaining population in the Missouri River below Toston Dam since the late-1950's. Past management activities have primarily focused on habitat protection, operation of Canyon Ferry Reservoir, and regulation of fish harvest. In 1983, MDFWP implemented more restrictive harvest regulations in the Missouri River initiating a daily and possession limit of 5 fish, only one of which may exceed 18.0 inches in length. Prior to 1983, daily possession limits for trout were 10 pounds and one fish, not to exceed 10 fish.

Recent management efforts have focused on rehabilitating tributaries to the Canyon Ferry/Missouri River system to enhance production of juvenile trout. Tributaries provide the preferred spawning and rearing habitat for trout, but virtually all tributaries in the system are impacted by a combination of dewatering, habitat degradation, and barriers to fish passage. Efforts to correct these problems were implemented on two streams during 1991, and additional opportunities are currently being identified. The collection of brown trout eggs from the Missouri River and hatchery rearing of juveniles began in 1991. This project will continue for four consecutive years (1991 through 1994) with a goal of reintroducing a minimum of 100,000 brown trout fry to the Missouri River and selected tributaries each year. Projects implemented in 1991 were funded from mitigation dollars relating to the retrofit of Toston Dam. Mitigation funds are available because installation of the power plant at Toston Dam is expected to result in fish losses.

YELLOW PERCH

Life History

Yellow perch are not native to Montana, but were introduced into the upper Missouri River as early as 1904 or before. Yellow perch generally become sexually mature at two to three years of age. Perch are prolific and tend to reproduce under a wide range of environmental conditions. Yellow perch in Canyon Ferry Reservoir usually spawn during late April or early May when water temperatures approach 50°F. Females lay ribbons of egg masses, called skeins, over a variety of substrate types. Perch prefer to spawn in shallow water on submerged vegetation or other underwater structures along the shoreline of the reservoir. Eggs hatch in 10 to 20 days and fry tend to move into shallow shoreline areas containing aquatic vegetation for protection from predators and to feed and grow.

Spawning success appears to be closely related to spring weather conditions and/or low reservoir levels. Strong spring winds and high wave action can cause significant mortality to the eggs and newly hatched fry. Mortality can be attributed to the displacement of both the egg skeins and young fry by wind and wave action. In addition, low reservoir levels prevent the submergence of shoreline vegetation, resulting is less submerged vegetation for spawning habitat and for hiding cover for juvenile perch.

Yellow perch tend to travel in schools in the reservoir and individuals within a school tend to be of similar size. Zooplankton is the most important food item in the diet of perch. Young of the year and yearling perch feed almost exclusively on zooplankton, while older age groups supplement their diet with aquatic invertebrates and small fish. Some of the larger perch in Canyon Ferry tend to feed almost exclusively on small fish or crayfish.

Growth for yellow perch in Canyon Ferry Reservoir is relatively slow, reaching 3 inches in length during their first year, 5 inches during their second and 7 inches during their third year in the reservoir. Individuals reaching 11 inches in length are probably approaching 8 to 10 years of age.

Abundance and Size

Yellow perch are likely the most abundant species of fish in Canyon Ferry Reservoir. However, the perch population has fluctuated substantially over the years. Biologists speculate that these fluctuations are related to both variable spring weather conditions and to low and/or receding reservoir water levels during spawning. Trends in yellow perch abundance in Canyon Ferry Reservoir have been periodically monitored since 1955 using sinking gill nets. Catch of perch per net has fluctuated over the years, reflecting the instability of the population (Figure 8).

Population trends are also being monitored using summer beach seining data and through a roving creel census begun in 1985. Although beach seining work was only recently begun in 1987, data indicate a two to seven fold increase in young of the year abundance by 1991. It remains to be seen if this increase in abundance of young yellow perch will be translated into better perch fishing in the future, as it takes 3 to 4 years for these young-of-the-year perch to reach a catchable size.

Based on the 1991 roving creel census, only 5% of all anglers fishing on Canyon Ferry Reservoir during the summer were specifically seeking to catch yellow perch. However, fishing for perch is much more popular during the winter. During the winter of 1991, 41% of all anglers were specifically seeking to catch yellow perch and an additional 38% were seeking to catch either trout or perch. Reflecting observed fluctuations in population abundance, winter catch rates for yellow perch have declined from 3.68 perch caught per angler hour in 1986 to 0.66 perch caught per angler hour in 1992 (Figure 9).

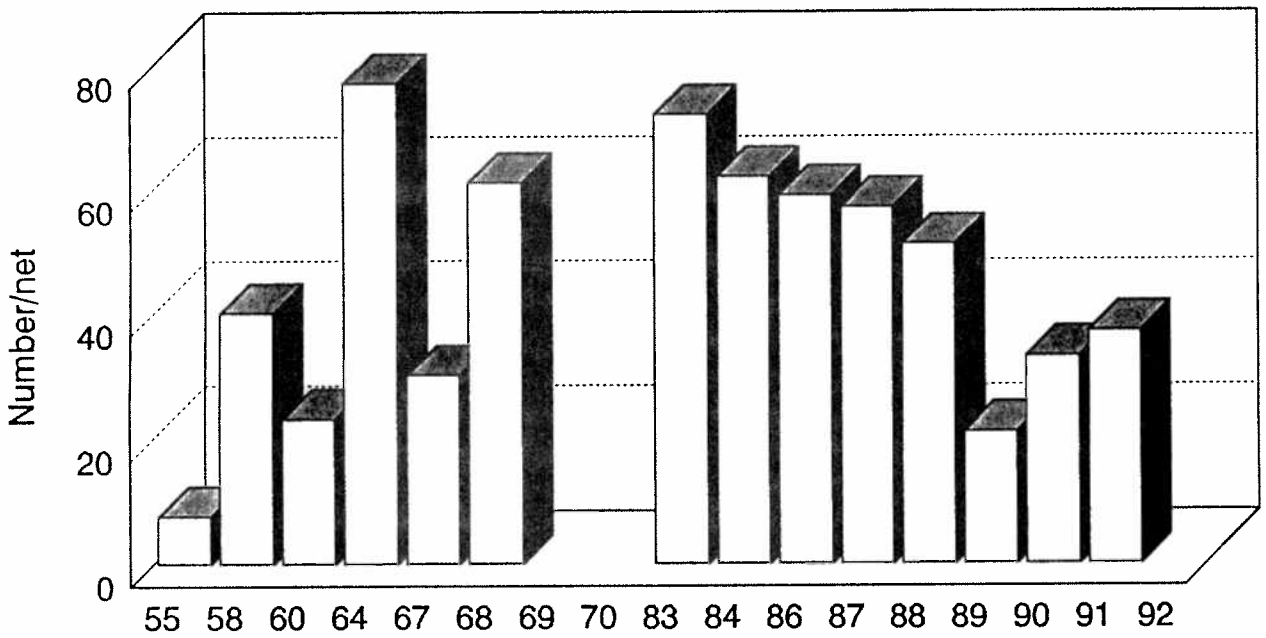

Figure 8. Average number of yellow perch caught in bottom set gill nets in Canyon Ferry Reservoir for the 1955-91 period.

Anglers keep about 80% of all perch caught during the summer and about 95% of all perch caught during the winter. The average size of yellow perch harvested from Canyon Ferry during the winter has steadily increased from 8.2 inches in length in 1986 to 10.2 inches in length in 1991. Apparently, this change in average size has been due to poor natural reproduction and/or poor survival of juveniles in the recent past, resulting in a population comprised of older fish. Adverse spring weather patterns and/or low reservoir levels in past years may have caused this poor natural reproduction.

Past and Present Management Activities

Yellow perch is not classified as a game fish in Montana. As a result, there are no creel limits for perch in Canyon Ferry Reservoir. Past management efforts have focused on encouraging increased interest and use by anglers for this prolific species of fish. Ongoing management efforts continue to address minimizing the impacts of reservoir operations on fishery resources. Recent efforts have focused on developing and utilizing better techniques for monitoring population trends of yellow perch residing in Canyon Ferry Reservoir.

In 1992, MDFWP assisted sportsmen in providing additional structural habitat for perch spawning and rearing in Canyon Ferry Reservoir. Juniper trees were anchored to the lake bottom on the south end of the reservoir. This effort will continue for an additional three years and represents the local interest in restoring the perch population in the reservoir.

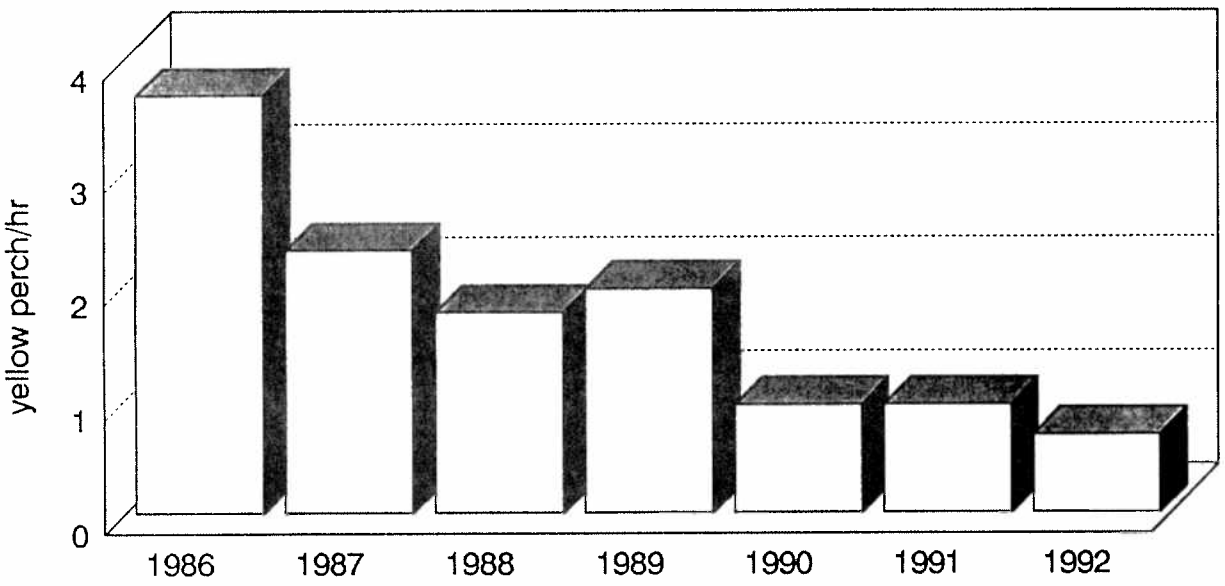

Figure 9. The number of yellow perch caught per angler hour in Canyon Ferry Reservoir for the winter periods of 1986-92.

FISHERIES MANAGEMENT CONCERNS

Rainbow Trout

1. The rainbow population in the reservoir has been unstable in past years.

2. Reservoir operations can have a significant impact on the rainbow population. Substantial drawdowns of the reservoir level may impede spawning migrations and may reduce food availability. Spills of water through the radial gates of the dam may flush young rainbow trout out of the reservoir.

3. The current state hatchery system is incapable of stocking enough fish into the reservoir to meet public fishing demand.

4. Spawning habitat is limited due to degradation of the tributaries.

5. Juvenile and adult rainbow trout may be lost through irrigation structures.

6. Spawning adults are vulnerable to fishing pressure and poaching in the tributaries.

7. Rainbow populations in the river and reservoir are interconnected.

8. Population densities of rainbow trout in the Toston section of the Missouri River are lower than in similar rivers.

9. High summer water temperatures in the river may have a detrimental impact on resident populations.

10. Unstable river flows due to difficulties in operating the automated flow releases from the Toston Dam power retrofit have the potential to adversely affect rearing habitat.

11. Recruitment of rainbow trout from sources located upstream from Toston Dam may be reduced due to entrainment into the hydroelectric plant.

12. Illegal introductions of new species of fish with the ability to reproduce successfully would likely have a detrimental impact on the rainbow population in the reservoir and the river.

Brown Trout

1. The brown trout population is low in the Missouri River and Canyon Ferry Reservoir, and has been declining since at least 1979.

2. Spawning habitat is limited due to degradation of habitat, dewatering, and fish passage barriers in tributaries.

3. Spawning adults are vulnerable to fishing pressure and poaching in tributaries and specific areas of the Missouri River.

4. Brown trout populations in the river and reservoir are interconnected.

5. Low stream flows and associated high summer water temperatures in the river have a detrimental impact on resident fish populations.

6. Unstable river flows due to difficulties in operating the automated flow releases from the Toston Dam power retrofit have the potential to adversely affect brown trout spawning and rearing habitat.

7. Recruitment of brown trout from sources located upstream from Toston Dam may be reduced due to entrainment into the new hydroelectric plant.

8. Juvenile and adult brown trout may be lost to irrigation ditches.

9. Illegal introductions of new species of fish with the ability to reproduce successfully would likely have a detrimental impact on the brown trout population in the reservoir and the river.

Yellow Perch

1. The yellow perch population exhibits wide fluctuations in abundance from year to year. Spawning success appears to be dependent on spring weather patterns and/or reservoir levels.

2. Reservoir operations can have a significant impact on the perch population. Perch require a stable to slowly rising water level in the spring to spawn successfully.

3. Past monitoring efforts have been relatively ineffective in measuring changes in population abundance and in predicting population trends.

4. Illegal introductions of new species of fish with the ability to successfully reproduce would likely have a detrimental impact on the perch population. Adverse impacts may be due to predation, competition for food and/or transfer of disease.

5. Predation by an increasing burbot (ling) population may impact the yellow perch population.

FISHERIES MANAGEMENT DIRECTION

This section includes management goals, goal criteria and management strategies for rainbow trout, brown trout, and yellow perch. Management of other sport fish species, such as mountain whitefish and burbot are not discussed because of either a lack of biological information or public interest. In order to evaluate progress in management of rainbow trout, brown trout, and yellow perch in the Missouri River/Canyon Ferry Reservoir system, goals are stated in measurable terms where possible. Failure to reach these goals within the management timeframe will result in some modifications of the management strategies, but will not necessarily involve modification of the goal statements.

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RAINBOW TROUT

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MANAGEMENT GOALS

Canyon Ferry Reservoir

GOAL I. Increase the rainbow trout population in the reservoir.

CRITERIA 1. Attempt to increase rainbow trout numbers from an average of 4-6 per gill net set in 1991 to 20 per gill net set by 1998.

CRITERIA 2. Attempt to increase rainbow trout catch per angler hour from the 1991 level of 0.11 to 0.30 per hour by 1998.

GOAL II. Increase the number of wild, naturally reproduced rainbow trout propagated in the Missouri River and other tributaries.

CRITERIA 1. Attempt to increase the contribution of wild rainbow trout to the reservoir population from the 1991 level of 5% to 10% by 1998.

Missouri River

GOAL III. Increase the resident rainbow trout population residing in the section of river between the reservoir and Toston Dam.

CRITERIA 1. Increase resident rainbow trout numbers from the 1991 level (which are too low to make mark-recapture estimates) to 300 rainbow trout per mile by 1998.

GOAL IV. Establish a migratory population of rainbow trout that reside in the reservoir and move into the Missouri River and its tributaries to spawn during the spring.

CRITERIA 1. Attempt to increase the number of countable redds in the Missouri River and its tributaries to 1000 by 1998.

MANAGEMENT STRATEGIES

1. Continue stocking longer lived wild strains of rainbow trout into the reservoir to expand the number of age classes in the population and to increase the likelihood that a spring spawning run will be established in the river and/or its tributaries. A greater number of age classes in the population should provide for more fish in the reservoir and provide greater stability to the fishery.

2. If possible, increase the number of rainbow trout allocated for Canyon Ferry Reservoir to make the stocking rate (pounds of fish stocked per year) commensurate with other large reservoirs in the state.

3. Stock all rainbow trout into Canyon Ferry Reservoir between May 1 and June 30 to maximize the chances of survival of newly planted hatchery fish. Surface water temperatures should be between 48 F and 62 F. Past fisheries research has revealed that hatchery rainbow stocked in late summer or fall exhibit poor survival.

4. Experiment with new dispersal techniques and timing of stocking for hatchery rainbow trout to maximize the chance of survival in the reservoir.

5. Actively participate with the reservoir operations steering committee to focus efforts on minimizing the impacts of reservoir operations on the fisheries resources. The reservoir operations steering committee, comprised of Montana Department of Fish, Wildlife and Parks; Montana Power Company; Bureau of Reclamation; irrigators and sportsmen meet annually to review water supply forecasts, proposed dam operations and operations guidelines.

6. Actively pursue rehabilitation of degraded tributaries by identifying and removing barriers to migration; by improving spawning habitat through development of cooperative streambank restoration projects with adjacent landowners and conservation organizations (seek funding through the River Restoration Act and other sources); and by improving instream flows through the use of the water leasing program or through cooperative agreements with consumptive users.

7. Protect habitat in the tributaries by continuing to protect water reservations for instream flows and by continuing to participate in the streambed preservation laws.

8. Attempt to imprint wild strains of hatchery rainbow trout into selected tributaries to the river by incubating eggs in stream gravel to encourage the development of a spawning run in the river.

9. Work closely with the Montana Department of Natural Resources and Conservation to stabilize flow releases from Toston Dam.

10. Actively encourage the establishment of more effective riverside development standards as governed by Broadwater County or the Broadwater County Conservation District.

11. Maintain current enforcement levels but, as determined needed by MDFWP, focus enforcement efforts during the spring spawning season to protect potentially vulnerable rainbow spawners from poaching.

12. If need is determined by MDFWP, implement restrictive fishing regulations on the section of Missouri River located between Toston Dam and Canyon Ferry Reservoir (seasonal closures, area closures, reduced creel or size limits) to protect rainbow spawners from over-harvest.

13. If need is determined by MDFWP, implement reduced creel limits on Canyon Ferry Reservoir to better distribute harvest among anglers.

14. Provide educational materials to the public on the dangers to the existing fisheries, as well as the legal consequences and personal liability, of illegally introducing new species of fish into Canyon Ferry Reservoir. Continue to distribute pamphlets and make news releases on the subject, as well as present pertinent information to sportsmen groups and conservation organizations.

15. Should illegally introduced species become established in Canyon Ferry Reservoir or the Missouri River, take immediate action to determine the status of the population and evaluate the possible consequences to existing fisheries. As determined necessary by MDFWP, utilize removal methods or reservoir level manipulations to moderate impacts of illegally introduced fish species on resident populations. Unfortunately, remedial actions would be costly and would likely not be very effective.

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BROWN TROUT

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MANAGEMENT GOALS

Canyon Ferry Reservoir

GOAL V. Increase the number of brown trout residing in Canyon Ferry Reservoir.

CRITERIA 1. Attempt to increase brown trout numbers from the 1991 level of an average of two per gill net set to three by 1998, a 50% increase.

Missouri River

GOAL VI. Increase the resident brown trout population in the Missouri River between Toston Dam and Canyon Ferry Reservoir.

CRITERIA 1. Attempt to increase the number of brown trout greater than 10 inches from the 1991 level of 78 fish per mile to 300 per mile by 1998.

GOAL VII. Increase the size of the population of brown trout that reside in Canyon Ferry Reservoir and then migrates into the Missouri River and its tributaries to spawn in the fall.

CRITERIA 1. Attempt to increase the angler catch rate of brown trout from the 1991 rate of 0.07 brown trout per hour to 0.25 brown trout per hour by 1998.

MANAGEMENT STRATEGIES

1. Pursue rehabilitation of degraded tributaries by identifying and removing barriers to migration; improving spawning habitat through development of cooperative streambank restoration projects with adjacent landowners, conservation organizations, Water Quality Bureau, and Conservation Districts; improving instream flows through the use of the water leasing program and/or through cooperative agreements with consumptive water users.

2. Protect habitat in tributaries by continuing to protect water reservations for instream flows and by continuing to participate in the streambed preservation laws.

3. Attempt to imprint brown trout into selected tributaries to encourage the development of spawning runs.

4. Work with the Montana Department of Natural Resources and Conservation to stabilize flow releases from Toston Dam.

5. Maintain current enforcement levels but, as determined needed by MDFWP, focus enforcement efforts during the spawning seasons to protect potentially vulnerable spawners from over-harvest and poaching.

6. As determined needed by MDFWP, implement restrictive fishing regulations on the Missouri River between Toston Dam and Canyon Ferry Reservoir (seasonal closures, area closures, reduced creel or size limits, etc.) to protect grown trout from over-harvest.

7. Provide educational materials to the public on the dangers to existing fisheries, as well as the legal consequences and personal liability, of illegally introducing new species of fish into the system. Continue to distribute pamphlets and new releases on the subject, as well as present pertinent information to sportsmen groups and conservation organizations.

8. Should illegally introduced species become established in the system, take immediate action to determine the status of the population and evaluate the possible consequences to existing fisheries. As determined necessary by MDFWP, utilize removal methods or reservoir level manipulations to moderate impacts of illegally introduced fish species on resident populations. Unfortunately, any remedial action would be costly and would likely not be very effective.

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YELLOW PERCH

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MANAGEMENT GOALS

Canyon Ferry Reservoir

GOAL VVI. Obtain a better understanding of population dynamics for yellow perch in Canyon Ferry Reservoir and improve techniques for monitoring population trends.

CRITERIA 1. At this time the Department has little ability to manipulate yellow perch populations in terms of number of fish or size of fish.

MANAGEMENT STRATEGIES

1. Actively participate with the reservoir operations steering committee to focus efforts on minimizing the impacts of reservoir operations on the fisheries resources. The reservoir operations steering committee, comprised of the Montana Department of Fish, Wildlife and Parks; Montana Power Company; Bureau of Reclamation; irrigators and sportsmen meet annually to review water supply forecasts, proposed dam operations and operational guidelines in attempt to minimize impacts of dam operations on fish, wildlife and recreational resources.

2. Focus efforts on developing an indices of abundance for yellow perch by annually sampling young of the year perch with beach seines at permanent locations. Continue to monitor adult abundance by annually setting sinking gill nets at permanent stations and by conducting a roving creel census during the winter ice fishery.

3. Provide educational materials to the public on the dangers to the existing fisheries, as well as the legal consequences and personal liability, of illegally introducing new fish species into Canyon Ferry Reservoir. Continue to distribute pamphlets and make news releases on the subject, as well as present pertinent information to sportsmen groups and conservation organizations.

4. Continue assisting local sportsmen in efforts in efforts to increase available structural habitat for spawning and rearing of yellow perch.

5. Should illegally introduced fish species become established in Canyon Ferry Reservoir, take immediate action to determine the status of the population and evaluate the possible consequences to existing fisheries. As determined needed by MDFWP, utilize removal methods or reservoir level manipulations to moderate impacts of illegally introduced fish species on resident populations. Unfortunately, any remedial action would be costly and would likely not be very effective.

POTENTIAL FOR INTRODUCTION OF NEW FISH SPECIES

Background

Based on initial public meetings (scoping meetings) held to identify the issues and problems associated with the management of Canyon Ferry Reservoir, considerable public interest was expressed to introduce new fish species, especially walleye, into Canyon Ferry Reservoir. New fish species that attracted the greatest public interest included smallmouth bass, largemouth bass, chinook salmon, kokanee, northern pike and walleye (Appendix A).

Reasons for public interest in introducing a new species of fish into Canyon Ferry appeared to be twofold. First, the fishing public has been generally dissatisfied with the steady decline since 1986 of the rainbow trout and yellow perch fisheries in Canyon Ferry Reservoir. Second, interest in fishing for walleye has greatly expanded across the United States since the late 1970's. In Montana, the formation of Walleyes Unlimited clubs began in the early 1980's and interest in fishing for walleye and for expanding their range has grown rapidly ever since.

To further clarify the issue of new species introductions into Canyon Ferry Reservoir and to ascertain the potential threats that may exist for resident fisheries and aquatic resources should new introductions be undertaken, the Department took four separate steps in the planning process:

1). The Department reviewed the 1989 report written by Dr. Peter Colby and Chris Hunter which provided an environmental assessment of the introduction of walleye beyond their current range in Montana (Colby and Hunter 1989).

2). The Department sought out professionals from outside Montana with experience on the subject of walleye/salmonid management and invited four experts to come to Helena and participate in a workshop addressing walleye/trout interactions. This workshop (Appendix D), held in March, 1991, was videotaped and is available for public review upon request.

3). In association with a public opinion questionnaire developed for the overall management planning process, several questions were included to determine the level of public support for each proposed introduction based on the potential degree of risk that each of the candidate species may pose on existing sport fish and their associated food items.

4). The Department contracted with two fisheries biologists to review the literature and compile documents to evaluate proposed species introductions. These documents summarize the potential for self-sustaining, fishable populations; the potential interaction with existing species; and the potential for population expansion beyond the boundaries of Canyon Ferry Reservoir. The two completed documents are titled "Potential Impacts of the Introduction of Walleye to the Fishery of Canyon Ferry Reservoir and Adjacent Waters" by T.E. McMahon (1992) and "Canyon Ferry Reservoir Environmental Assessment: The Potential Impacts of Introduction of Five Non-native Species by G. Thomas (1992) and are available on request from MDFWP. A condensed summary of the results from the two reports are presented in the form of a matrix in Appendix G. Management concerns for each of the candidate species listed below are referenced to this matrix table by column letter (species of fish) and by row number (potential life history and habitat needs).

MANAGEMENT CONCERNS

Smallmouth bass

1. Successful spawning and juvenile abundance would be erratic due to limited spawning substrate and variable spring weather patterns (see matrix boxes E.1. and E.2.).

2. The potential for a fishable population appears to be low in both the reservoir and the river (see matrix box E.10.).

3. There is little public interest in introducing smallmouth bass into Canyon Ferry Reservoir or the Missouri River (see matrix box E.11.).

Largemouth bass

1. Successful spawning and juvenile abundance would be low due to the lack of shallow, vegetated areas for spawning in both the reservoir and river (see matrix boxes F.1. and F.2.).

2. Adult habitat would be confined to shallow vegetated portions of the reservoir and weedy backwater areas of the river. This type of habitat appears to be limited in abundance (see matrix box F.4.).

3. The potential for a fishable population appears to be low in both the reservoir and the river (see matrix box F.10.).

4. There is little public interest in introducing largemouth bass into Canyon Ferry Reservoir or the Missouri River (see matrix box F.11.)

Chinook salmon

1. Spawning habitat would be confined solely to the river and tributaries and successful spawning would be expected to be low, if present trout spawning habitat is not improved (see matrix box G.1.).

2. The potential for downstream movement into Hauser and Holter reservoirs is high and, as a result, there is a high risk that chinook salmon could adversely impact kokanee populations residing in the two downstream reservoirs due to predation (see matrix box G.8.).

3. The potential for a fishable population appears to be low. Adult fish would likely not reach "trophy size" (see matrix box G.10.).

4. There is little public interest in introducing chinook salmon into Canyon Ferry Reservoir (see matrix box G.11.).

Kokanee

1. Spawning habitat would be confined primarily to the river and tributaries and successful spawning would be expected to be low if present spawning habitat is not improved (see matrix box H.1.).

2. The potential for a self-sustaining fishable population appears to be low (see matrix box H.10.).

3. There is little public interest in introducing kokanee into Canyon Ferry Reservoir (see matrix box H.11.).

Northern pike

1. Spawning habitat would be confined to the shallow vegetated areas of the river and reservoir. This type of habitat appears to be limited in abundance except in years when reservoir levels are very high (see matrix box I.1.).

2. Adult habitat would normally be confined to shallow weedy areas in the reservoir and vegetated backwater areas in the river. This type of habitat appears to be limited in abundance (see matrix box I.4.).

3. Northern pike would prey on resident fish populations, including trout and yellow perch. In years when the northern pike were relatively abundant in the reservoir, increased predation could adversely impact existing fisheries (see matrix box I.6.).

4. The potential for downstream movement into Hauser and Holter reservoirs and the Missouri River is high and, as a result there is a high risk that northern pike could adversely impact sport fish populations in downstream waters through predation (see matrix box I.8.).

5. The potential for a self-sustaining fishable population would likely be very erratic (see matrix box I.10.).

6. There is almost no public interest in introducing northern pike into Canyon Ferry Reservoir or the Missouri River (see matrix box I.11.).

Walleye

1. The forage base (fish) in Canyon Ferry Reservoir for an adult walleye population is moderate. Over the long term (4 to 10 years), the forage base in Canyon Ferry Reservoir for an adult walleye population would likely be depleted and, as a result, walleye abundance and/or growth rates would decline (see matrix box J.5.).

2. A walleye population in Canyon Ferry would likely not be compatible with the resident rainbow trout and yellow perch fisheries because of increased predation on these two species. A mixed rainbow trout/ walleye fishery would require stocking larger hatchery rainbow trout (8 to 13 inch) to reduce predation loss. This would result in a significantly higher public cost for management (see matrix box J.6.).

3. The potential for downstream movement into Hauser and Holter reservoirs and the Missouri River is high. As a result, there is a risk that walleye populations in these reservoirs would be greatly increased which could adversely impact sport fish populations in downstream waters through predation (see matrix box J.8.).

4. The potential for upstream movement in the Missouri River is high, as a result there is a risk that the recovery efforts for brown and rainbow trout would be adversely affected (see mattrix box J.7.).

5. The potential for a self-sustaining, fishable population would likely be erratic. A walleye fishery would likely decline over time (4 to 10 years) as the forage supply is reduced due to walleye predation (see matrix box J.10.).

6. Although there was moderate public interest in introducing walleye into Canyon Ferry Reservoir (27% of questionnaire respondents favored the introduction of walleye). Approximately 77% of all respondents opposed introduction of walleye into the reservoir if it was determined that the proposed introduction would create a high risk to the existing rainbow trout and yellow perch fisheries (see matrix box J.11.).

MANAGEMENT RECOMMENDATION

Canyon Ferry Reservoir and Missouri River

Recommendation: No new species of fish will be introduced into Canyon Ferry Reservoir/Missouri River. Should illegally introduced species become established in Canyon Ferry Reservoir or the Missouri River, MDFWP will take immediate action to determine the status of the population and evaluate the possible consequences to existing fisheries. As determined necessary by MDFWP, utilize removal methods or reservoir level manipulations to minimize impacts of illegally introduced fish species on resident populations.

APPENDIX A

SUMMARY OF 1990 PUBLIC SCOPING MEETINGS

I. Missouri River - Canyon Ferry to Toston Dam

A. General management

1. Manage lake and river as a unit
2. Enhance brown trout population
3. Improve rainbow trout runs (fall and spring).
4. Provide trophy fishing.

B. Stocking

1. Stock rainbow trout fry in river.
2. Plant "wild" brown trout.

C. Habitat

1. Enhance spawning habitat
2. Improve Toston Dam operation.
3. Improve flow levels.

D. Regulations

1. Protect spawning brown trout
2. Restrict harvest regulations

E. Other species introductions

1. Consider effects of lake management on river.

F. Past management

1. Fishing continues to decline.

G. Miscellaneous

1. Consider effects of drought.
2. Consider economics.

II. Canyon Ferry Reservoir

A. General management goals

1. Diversify fishery.
2. Focus on "wild" trout strains.
3. Enhance brown trout populations.
4. Provide a more stable perch fishery.
5. Return to past fishing quality.
6. Maintain current fishing quality and species composition.
7. Provide trophy fishing opportunities
8. Manage for self-sustaining species in general.
9. Set specific management goals (fish/hour, fish/net, etc.)

B. Stocking

1. Increase stocking rate.
2. Modify stocking procedure,
3. Stock brown trout.
4. Build hatchery specifically for Canyon Ferry Reservoir.
5. Continue experimentation with rainbow trout strains.
6. Stock sterile walleye.

C. Habitat

1. Improve water quality.
2. Enhance tributary spawning habitat.
3. Manage reservoir levels.
4. Protect stream banks (fencing, etc.).
5. Reduce fish loss over dam.

D. Regulations

1. Lower trout limit.
2. Set limits on perch.
3. Reduce number of fishing rods during winter.

E. Walleye introduction

1. Plant walleye.
2. Plant walleye, only if compatible with existing fishery.
3. Further study before planting walleye.
4. Do not plant walleye.
5. Consider walleye effects above and below Canyon Ferry.
6. Consider changes in fishing method (shore vs. boat, etc.).

F. Other species introduction

1. Provide more forage.
2. Other species suggested: chinook, largemouth bass, smallmouth bass, lake trout, tiger muskie, coho, striped bass, kokanee, and catfish.
3. No new introductions.
4. Concern about effects of kokanee.

G. Past management

1. Quit studies.
2. Assessment of past management ranged from effective to poor.

H. Miscellaneous

1. Control rough fish.
2. Reduce number of biologists.
3. No user fees.
4. Improve facilities.
5. Consider economics.
6. Pelican control.
7. Increase number of biologists.
8. Add user fee for trophy fishing, consider fixed income.

APPENDIX B

SUMMARY OF COMMENTS FROM 1988 PUBLIC SCOPING MEETINGS

I. Missouri River from Toston Dam to Canyon Ferry Reservoir

A. Fish Management

1. Use a catch and release regulation to increase fish populations in the lake.
2. Continue to allow for the harvest of spawners in the river.
3. Develop a trophy regulation for brown trout using a slot limit.
4. Diversify fishing by developing a warm/coolwater fishery such as bass.
5. Spawners coming from Canyon Ferry desperately need the protection of special regulations (slot limit). Preserve the area and maintain as a trophy fishery.
6. Keep the river as it is. No other restrictions are required.
7. Make a special regulation to allow artificial lures only.
8. A straight number limit on fish is needed.
9. Don't allow fly fishing and commercial rafting take precedence over the local bait fishermen.

B. Habitat Management

1. Improve water quality by reducing sediment input and by purchasing water rights.
2. Investigate other potential spawning tributaries for enhancement of spawning habitat.
3. Investigate acquisition/protection of the riparian zone.
4. Continue development of the spawning channel.
5. Spawning habitat should be improved for both rainbow trout and brown trout.
6. Restrict motor boats to protect and enhance spawning activity.

C. Social conflicts

1. Address angler conflicts caused by the creation of the spawning channel.

D. Access

1. Improve portage around Toston Dam and other dams.

II. Canyon Ferry Reservoir

A. Fish Management

1. Increase diversity of fish species in the reservoir.
2. Do not allow introductions of non-trout.
3. Caution should be used toward species introductions to avoid harm to trout population.
4. Diversify the fishery by introducing non-trout species with emphasis on walleye.
5. Emphasize natural reproduction.
6. Increase use and harvest.
7. Encourage brown trout population.
8. Use caution with the introduction of exotic species.
9. Plant more brown trout from Willow Creek Reservoir.
10. Control carp.
11. Introductions of walleye would be detrimental to trout populations.
12. Do not jeopardize the trout fishery by introducing non-trout.
13. More fish should be planted in Canyon Ferry to improve the overall catch rate with a goal of making it the number one fishing lake in the state.
14. The catch rate for trout is too low and needs to be improved.
15. Likes Canyon Ferry just the way it is and feels no changes should be made. If pike are introduced trout fishing will deteriorate.
16. Continue the experiment with eagle lake strain to determine their potential.
17. Help brown trout numbers until spawning areas can be developed.
18. Study forage fish potential for brown trout and eagle lake rainbow trout.
19. Finfish study on perch.
20. Use a number limit instead of a pound limit.
21. Provide for trophy trout fishing.
22. Walleye should be expanded to Canyon Ferry because they reproduce, cost less, and they eat less than brown trout and other large planted fish.
23. Stock smallmouth bass and king salmon.

B. Habitat management

1. Investigate spawning enhancement opportunities in reservoir/river tributaries.
2. Continue development of the spawning channel.
3. Concerned with humans interfering with rainbow trout spawning in Magpie Creek (clubbing, stabbing).

C. Social conflict

1. Determine effects of the fishery on economic basis.
2. Zone lake for different types of recreational activities.

D. Access

1. Improve boat access and handicap access.
2. Put a concrete boat ramp at Chinamen's Gulch.
3. The state should continue to maintain the campgrounds.

III. General

A. Rivers

1. Do not let fly fishing and commercial rafting take precedence over the local fishermen.
2. Any regulations governing water use on our waterways is an infringement on our water rights. Leave things as they are. Do not assign new government employees to such a task.
3. Appreciate efforts to maintain good fishing with a substantial number of trophy trout.
4. Do not discriminate against bait fishing by not allowing them on the river.
5. Would like to have current limits and restrictions remain the same.
6. No restrictions on boats.
7. Maintain wild runs in the rivers.

B. Reservoirs

1. Hire more enforcement personnel to check fish limits, boat ramps, lake and stream exits, and cabin owners for unattended poles.
2. Maintaining the rainbow trout fishery should be a major priority on the three reservoirs. Introducing new species should be done with extreme caution and only after studying the potential competition with trout and after appropriate public comment. Concerned with largemouth bass plants into Lake Helena.
3. Very much against adding species of fish into our waters unless they were here originally.
4. Restrict the use of fish spawn of any kind or nature except during ice fishing.
5. Make it illegal to tie up a boat within 20 - 25 feet either side of a boat ramp except for loading and unloading purposes.
6. Advocate and advertise catch and release fishing in all waters for trout under 15" in length.
7. Would like to see more access areas for the general public.
8. Consider closing a reservoir once in a while after planting.
9. Outlaw cowbells and such on all waters that are planted every year.
10. Provide at lease one handicap spot at each of your boat access sites.
11. Perch are super. Planted trout are great to catch but what do most people do with them, cost is high and they have a short life span. Brown trout are good but hard to catch. Bass are fun to catch but bad to eat. Walleye are the answer.
12. Allow fishermen to use more than one rod while trolling from a boat. Barbless hooks

could be required.
13. Out-of-staters catch way beyond their limits.
14. Night fishing should be stopped.

C. General

1. Educate public on fish habitat, fishing etiquette, what the sportsmen can do to enhance fishing and recreation and fish identification.
2. Maintain high quality of fishing throughout entire season.
3. Identify and protect critical fish habitat.
4. Provide safe viewing areas for eagles.
5. Provide additional handicap access.
6. Don't favor artificial over bait.
7. Goal should include diversifying fish species in the entire reservoir complex. Specifically, start stocking walleye in addition to trout in the reservoirs and plant a forage fish to maintain large populations of both fish.
8. Change regulations to allow local sportsmen's groups to assist the Department in establishing a diversified fishery (purchase/transport of fingerlings).
9. Emphasize diversified fishing opportunities.
10. Dog leash laws need to be enforced.
11. Fourteen day camping limit needs to be enforced.

APPENDIX C

CANYON FERRY RESERVOIR FISHERIES ADVISORY GROUP MEMBERS*

Name	Affiliation
Orville Johnson	Yacht Basin Marina
Pete Schendel	U.S. Bureau of Reclamation
Gerald M. Reller	Goose Bay Marina
Paul Updike	Townsend Chamber of Commerce
Kit Johnson	self
John Arnold	Walleyes Unlimited
Michael McNeilly	Speaker of the House Hal Harper
Fred Easy	Prickly Pear Sportsmen Assoc
Edgar Fisher	Canyon Ferry Recreation Assoc.
Pete Test	self
Dave Cole	Missouri R. Chapter Trout Unlimited
Bill Holdorf	Skyline Sportsmen Assoc.
Tony Schoonen	Skyline Sportsmen Assoc.
Chuck Smith	Walleyes Unlimited
Ted Zimmerman	self
Don Locke	self
Ray Doig	Broadwater County Commission
Jack Sautter	self
Jack Schilla	self
Hal Price	Trout Unlimited
Art Keeler	self
Jim Ellis	Lewis and Clark County
Joel Shouse	consultant
Will Garvin	Walleyes Unlimited
Mark Albers	U.S. Bureau of Reclamation
George Schiller	Prickly Pear Sportsmen Assoc.
Don Johnson	Canyon Ferry Recreation Assoc.
Larry Robertson	Broadwater Stream and Lake Develop. Comm.
Rep. Hal Harper	self
Rep. Ed Grady	self
Frank Cooper	Pat Barnes Chapter Trout Unlimited
Linda Stohl Anderson	Lewis and Clark County Commission
Helena Chamber of Commerce	
Last Chance Audubon Society	
Townsend Chamber of Commerce	
Bruce Perry	Kim's Marina

Joan Anderson	Broadwater Rod and Gun Club
Rep. Francis Koehnke	self
William Patrick	Skyline Sportsmen Assoc.
M.E. Quenemoen	Gallatin Wildlife Assoc.
Buddy Drake	Madison/Gallatin Trout Unlimited

*Includes everyone who attended one or more Advisory Group meetings, as well as people who were invited but did not attend

APPENDIX D

WALLEYE/TROUT WORKSHOP

On March 2, 1991, the Montana Department of Fish, Wildlife, and Parks sponsored a workshop to discuss the interactions between walleye and trout. The purpose of the workshop was to try to learn more about what might happen to the trout fishery if walleye were introduced into Canyon Ferry Reservoir. Several fishery scientists from other states were invited to come to Helena to present their experiences with managing walleye/trout waters. In addition, several Montana experts were on hand to discuss the current distribution of walleye in Montana, the plans for a Canyon Ferry Fishery Management Plan, and the water quality of Canyon Ferry Reservoir.

The workshop was held at Carroll College in Helena and was free and open to the public. Approximately 94 people attended the all day event. The agenda was as follows:

9:00	Welcome and opening remarks - Bernie Kuntz, Montana Department of Fish, Wildlife, and Parks
9:15 - 10:30	Panel Brad Sheperd, Montana Department of Fish, Wildlife, and Parks - Walleye distribution in Montana - the Department program. Dick Vincent, Montana Department of Fish, Wildlife, and Parks - Canyon Ferry Fisheries Management Plan Abe Horpestad, Montana Department of Health and Environmental Sciences. Water quality of Canyon Ferry past and present.
10:30 - 10:45	Break
10:45 - 11:30	Dr. David Bennett, University of Idaho, Factors influencing the success of walleye introductions.
11:30 - 1:00	Questions, discussion, then lunch
1:00 - 3:00	Panel Jack McMillan, Wyoming Game and Fish Department, Introduction of walleye into the North Platte River/Reservoir Daryl Ellison, Nebraska Game and Parks Department, Walleye/trout interactions - Lake McConaughy, Nebraska. Tony Nigro, Oregon Department of Fish and Wildlife, Walleye/Salmonid interaction in the Columbia River system.
3:00 - 3:15	Break
3:15 - 5:00	Questions and discussion

APPENDIX E

CANYON FERRY RESERVOIR/MISSOURI RIVER FISHERIES MANAGEMENT QUESTIONNAIRE

ALTERNATIVES FOR THE MANAGEMENT OF CANYON FERRY RESERVOIR

(Questionnaire addressing the Canyon Ferry Reservoir Fisheries Management Plan)

GENERAL QUESTIONS

1. How many fishing trips to Canyon Ferry Reservoir do you make in a year? (Please check only one).

   ___ None
   ___ Less than 3 trips
   ___ Between 3 and 10 trips
   ___ More than 10 trips

2. Compared to other lakes you choose to fish, how often do you fish at Canyon Ferry Reservoir? (Please check only one).

   ___ Frequently
   ___ Often
   ___ Sometimes
   ___ Never

3. The Management Plan addresses the fishery from Canyon Ferry Dam to Toston Dam. Where do you fish in this system? (Please check only one).

   ___ Only the Reservoir
   ___ Only the Missouri River between the reservoir and Toston Dam
   ___ Both areas
   ___ None of the above

4. If you fish the Missouri River between Canyon Ferry Reservoir and Toston Dam which stretch do you most like to fish. (Please check only one).

   ___ "The Channels" between Canyon Ferry Reservoir and the Townsend Bridge
   ___ Missouri River between Townsend and Toston
   ___ Missouri River between Toston and Toston Dam
   ___ I don't fish the Missouri River between the reservoir and Toston Dam.

5. When fishing in Canyon Ferry Reservoir, how often do you fish from the shore, boat or ice. (Please check only one in each category).

	Shore	Boat	Ice
Almost always	___	___	___
Most of the time	___	___	___
Some of the time	___	___	___
Almost never	___	___	___
Never	___	___	

6. What species of fish do you most often seek to catch in Canyon Ferry Reservoir? (Please check only one).

___ Rainbow trout
___ Brown trout
___ Yellow perch
___ Other (Please specify _____)
___ No preference

7. Currently, the Department manages for brown trout and rainbow trout in Canyon Ferry Reservoir. Yellow perch also provides a good fishery. If Canyon Ferry could be managed to provide good fishing for any of the following species, which species would you prefer to catch. **(Please check only one)**.

___ Rainbow trout
___ Brown Trout
___ Yellow Perch
___ Walleye
___ Kokanee
___ Bass
___ Chinook
___ Other (Please specify _____)

8. What size of rainbow or brown trout do you consider to be a trophy sized fish. (Please check only one for each species).

	Rainbow Trout	Brown Trout
18 inches	___	___
20 inches	___	___
22 inches	___	___
24 inches	___	___

26 inches	___	___
greater than 26 inches	___	___
No preference	___	___

9. The following is a list of possible problems that may apply to Canyon Ferry Reservoir. Please check the ones, if any, that you feel are major problems with Canyon Ferry Reservoir.

___ Diversity of fishing opportunities is poor
___ There are too few fish in Canyon Ferry Reservoir
___ The rainbow trout that are caught are too small
___ The brown trout that are caught are too small
___ The yellow perch fishery is poor
___ The rainbow trout fishery is poor
___ The brown trout fishery is poor
___ There are too many rough fish
___ Fishing regulations are too restrictive
___ Fishing regulations are too permissive
___ Enforcement of fishing regulations is inadequate
___ There are too many anglers
___ There are too many boats
___ There are too many other non-fishing recreationists
___ Water quality is poor
___ Spawning habitat is poor
___ Water level fluctuations are too great
___ There are too many fisheries studies and biologists
___ Other (specify _____)

10. The following is a list of possible problems that may apply to the Missouri River between Canyon Ferry Reservoir and Toston Dam. Please check the ones, if any, that you feel are major problems with this reach of the Missouri River.

___ Diversity of fishing opportunities is poor
___ There are too few fish in this stretch of the Missouri River
___ The rainbow trout fishery is poor
___ The brown trout fishery is poor
___ The rainbow trout that are caught are too small
___ The brown trout that are caught are too small
___ There are too many rough fish
___ Fishing regulations are too restrictive
___ Fishing regulations are too permissive
___ Enforcement of fishing regulations is inadequate
___ There are too many anglers
___ There are too many boats

___ There are too many other non-fishing recreationists
___ Fishing access is inadequate
___ There is too much fishing access
___ Water quality is poor
___ Spawning habitat is poor
___ Water level fluctuations are too great
___ There are too many fisheries studies and biologists
___ Other (specify _____)

RAINBOW TROUT MANAGEMENT

11. Imagine that the Department could manage the **rainbow fishery** in Canyon Ferry Reservoir to provide you a quality of fishing similar to any of the following reservoirs. Which on of the following reservoirs provides you a rainbow fishery that you would want Canyon Ferry Reservoir to most resemble? (Please check only one).

___ Hebgen Lake
___ Cooney Reservoir
___ Holter Lake
___ Clark Canyon Reservoir
___ Harrison Lake (Willow Lake)
___ Ackley Lake
___ Tiber Reservoir
___ Sutherland Lake
___ Martinsdale Reservoir
___ Bear Lake
___ Flathead Lake
___ Other (specify) _____
___ I like the existing rainbow fishery in Canyon Ferry Reservoir
___ I'm not interested in fishing for rainbow trout in Canyon Ferry Reservoir.

12. Would you be satisfied if on your next fishing trip to Canyon Ferry Reservoir you caught ___ rainbow trout per day?

___ Yes ___ No

13. Would you be satisifed if on your next fishing trip to Canyon Ferry Reserovir the rainbow trout you caught averaged ___ inches in length?

___ Yes ___ No ___ I'm not interested in fishing for rainbow trout.

14. Fishing success for rainbow trout on Canyon Ferry Reservoir has fluctuated greatly over the years. Fluctuations in the rainbow population appear to be associated with inconsistent survival of our hatchery plants. From results of an extensive creel census, we know that about 90% of the rainbow harvested from the reservoir are of hatchery origin. Prior to 1990, the Arlee strain of rainbow trout ("domesticated") was the primary strain of trout stocked in the reservoir. Because of the Arlee's short-lived nature (about 2.5 years) and inability to reproduce in the wild, an unsuccessful plant during any one year will significantly reduce the population level the following year. Since 1987, there has been a steady decline in the rainbow

fishery in Canyon Ferry Reservoir. Reasons for this poor survival are not readily understood. The Department may need to take several of the following actions to enhance and stabilize the rainbow fishery in the reservoir. Please indicate whether you support, oppose, or are not sure about the following possible actions.

Support	Oppose	Not Sure	
___	___	___	Stock "wild" strains (Desmet and Eagle Lake) of rainbow into the reservoir. These strains tend to live longer than the "domestic" (Arlee) strain and are capable of reproducing in the wild.
___	___	___	Stock a combination of "wild" and "domestic" strains of rainbow trout into the reservoir.
___	___	___	Experiment with stocking new strains of rainbow trout into the reservoir
___	___	___	Enhance rainbow trout spawning habitat.
___	___	___	Decrease the daily limits for rainbow trout.
___	___	___	Use restrictive regulations to protect spawning rainbow trout.
___	___	___	Consider restricting the harvest on larger fish to protect spawning-sized fish.

15. Presently, the size of rainbow trout harvested from Canyon Ferry Reservoir ranges from about 12 to 23 inches. The maximum size of these fish is currently limited because of a diet composed primarily of zooplankton. There is some interest to provide more opportunity to catch a trophy-sized rainbow. The Department may need to take several of the following actions to provide this opportunity. Please indicate whether you support, oppose, or are not sure about the following possible actions.

Support	Oppose	Not Sure	
___	___	___	Introduce a fish-eating strain of rainbow trout into the reservoir that would use the present forage base. This strategy would require an Environmental Assessment prior to any action taken by the Department.
___	___	___	Plant surplus rainbow brood stock into the reservoir.

___	___	___	Stock sterile rainbow trout into the reservoir. Sterile rainbow may expend more energy in growth rather than reproduction, thus producing a larger fish in a shorter time.
___	___	___	Use restrictive regulations to protect trophy-sized fish. This action would be used in conjunction with any of the above strategies.

16. Currently, the rainbow spawning run into the Missouri River and its tributaries above Canyon Ferry Reservoir is limited. This spawning run has been limited due to a number of reasons. Possible reasons include past management of the rainbow fishery in the reservoir using a "domestic" strain with limited reproductive potential as well as deteriorated spawning habitat. The Department may need to take several of the following actions to enhance the rainbow fishery in the Missouri River. Please indicate whether you support, oppose, or are not sure about the following possible actions.

Support	Oppose	Not Sure	
___	___	___	Stock "wild" strains (Desmet and Eagle Lake) of rainbow into the reservoir because they tend to live longer than the "domestic" strain and are capable of reproducing in the wild.
___	___	___	Enhance rainbow trout spawning habitat.
___	___	___	Use restrictive regulations to protect spawning rainbow trout.
___	___	___	Use rainbow trout eggs obtained from spawing runs to enhance the fishery in the river and the reservoir.

BROWN TROUT MANAGEMENT

17. Brown trout populations are maintained through natural reproduction in Canyon Ferry Reservoir and the Missouri River. The Department is currently attempting to enhance the brown trout population in the system by restoring spawning habitat and by rearing brown trout hatched from eggs obtained from spawning runs. These strategies may require the Department to take several actions to protect spawning brown trout. Protection of spawning runs may increase the likelihood that enhancement efforts would be successful. Please indicate whether you support, oppose, or are not sure about the following possible actions.

Support	Oppose	Not Sure	
___	___	___	Decrease the daily limits for brown trout on the river and the reservoir.

___	___	___	Use seasonal closures to protect spawning brown trout.
___	___	___	Use area closures to protect spawning brown trout.
___	___	___	Use size limits to protect spawning brown trout.
___	___	___	Increase enforcement to insure compliance with regulations.

YELLOW PERCH MANAGEMENT

19. How important is it to you to have the opportunity to catch yellow perch in Canyon Ferry Reservoir?

___ Very important
___ Important
___ Not very important
___ Not important

20. Fishing for yellow perch in Canyon Ferry Reservoir has become very popular, especially during the winter ice fishery. However, yellow perch populations in Canyon Ferry Reservoir have tended to fluctuate over the years for reasons that are not well understood. Typically, perch populations are cyclic in nature as a result of changing environmental conditons. Perch are very profilic and, under appropriate conditions, are capable of increasing their numbers rapidly. The size of yellow perch, however, tends to decrease as the population increases in numbers. In the past several years, there has been a noticeable decline in the perch population in the reservoir. This decline is probably associated with varying environmental conditions such as spring weather patterns and fluctuating reservoir levels. The Department may need to take several of the following actions to enhance and stabilize the yellow perch fishery in the reservoir. Please indicate whether you support, oppose, or are not sure about the following possible actions.

Support	**Oppose**	**Not sure**	
___	___	___	Classify yellow perch as a game fish to allow the Department to set fishing limits if needed.
___	___	___	Encourage the maintenance of stable reservoir levels during the spring spawning season.
___	___	___	Improve spawning habitat by installing artificial structures in the reservoir.

INTRODUCTION OF NEW FISH SPECIES

WALLEYE

21. The desire to introduce walleye into Canyon Ferry Reservoir appears to remain highly polarized among the fishing public. The primary concern over the introduction of walleye into Canyon Ferry Reservoir is due to the walleye's potential adverse effects on other sport fish species in the reservoir, as well as in downstream bodies of water (i.e. Hauser, Holter and the Missouri River). Results from the walleye/trout workshop indicated that there is a very good chance that walleye would become self-sustaining in Canyon Ferry Reservoir. However, the quality of this potential walleye fishery would depend on the forage base in the reservoir and the level of reproduction. Results also indicated that the walleye fishery may be less than satisfactory. Walleye introductions would likely be irreversible because of the high probability of walleye being able to reproduce in Canyon Ferry Reservoir. At this time, it is unknown what population level would be reached. As observed in other waters, walleye is a predatory species that is capable of adversely impacting other fish populations where they reside. Risk of adverse impacts on other sport fish species would be greater at higher walleye population levels. An Environmental Assessment would need to be completed to determine the potential risks of introduction of walleye into Canyon Ferry Reservoir. Please indicate whether you support, oppose, or are not sure about the following possible scenarios.

Support	**Oppose**	**Not Sure**	
—	—	—	Would you favor introduction of walleye into Canyon Ferry Reservoir if there was a **risk of eliminating** the existing rainbow, brown, and yellow perch fisheries?
—	—	—	Would you favor introduction of walleye into Canyon Ferry Reservoir if there was a **risk of diminishing** the existing rainbow, brown, and yellow perch fisheries?
—	—	—	Would you favor introduction of walleye into Canyon Ferry Reservoir if it were **unlikely** that the existing rainbow, brown, and yellow perch fisheries would be harmed?
—	—	—	I **do not favor** introduction of walleye into Canyon Ferry Reservoir under any circumstances.
—	—	—	I **favor** introduction of walleye into Canyon Ferry Reservoir regardless of the risk to other fisheries in the system.

KOKANEE, BASS, CHINOOK, AND NORTHERN PIKE

22. In addition to walleye, these species were listed as potential candidates for introduction to Canyon Ferry Reservoir during initial scoping meetings with the public. An Environmental Assessment must be conducted prior to introducing any of these fish species. Due to the complex interactions that result when any new species is introduced to a water body, there is an unknown degree of risk that each of these species may pose on existing sport fish (rainbow trout, brown trout, yellow perch) and their food items (plankton, forage fish, macroinvertebrates) in Canyon Ferry Reservoir. It is not feasible to discuss the full range of benefits and risks associated with each proposed species in this questionnaire.

    Your response will help the Department determine the amount of public support each introduction may have depending on the potential degree of risk (ranging from low to high) that each may pose to the water body. For example, you may want an introduction regardless of its effects on existing fisheries (in this case you support introduction for both high and low risk entries). If you would like to see an introduction, but are not willing to trade existing fisheries for it, you would support low risk entry and oppose high risk entry. Please indicate whether you support, oppose, or are not sure about the following species introductions.

22a. Would you support the introduction of **KOKANEE**, considering the following degree of risk to existing sport fish and food items?

Support	**Oppose**	**Not Sure**	
___	___	___	If there were a **high** risk of degrading existing fishery?
___	___	___	If there were a **low** risk of degrading existing fishery?

22b. Would you support the introduction of **BASS**, considering the following degree of risk to existing sport fish and food items?

Support	**Oppose**	**Not Sure**	
___	___	___	If there were a **high** risk of degrading existing fishery?
___	___	___	If there were a **low** risk of degrading existing fishery?

22c. Would you support the introduction of **CHINOOK**, considering the following degree of risk to existing sport fish and food items?

Support	Oppose	Not Sure	
___	___	___	If there were a **high** risk of degrading existing fishery?
___	___	___	If there were a **low** risk of degrading existing fishery?

22d. Would you support the introduction of **NORTHERN PIKE**, considering the following degree of risk to existing sport fish and food items?

Support	Oppose	Not Sure	
___	___	___	If there were a **high** risk of degrading existing fishery?
___	___	___	If there were a **low** risk of degrading existing fishery?

COMMERCIAL FISHERY

Commercial fishing businesses are required to obtain an annual perrmit from the Department. Some people feel that the removal of suckers and carp from Canyon Ferry Reservoir would improve sport fishing opportunities. Others feel that commercial fishing for rough fish may adversely affect sport fish populations and interfere with recreation. The Department has little information on what affect commercial fishing will have on either rough fish of sport fish populations. Please indicate whether you support, oppose, or are not sure about the following possible Department actions.

Support	Oppose	Not sure	
___	___	___	Deny permission to all commercial operations seeking to fish for suckers and carp on Canyon Ferry Reservoir eventhough the effects on the sport fishery are unknown.
___	___	___	Allow commercial fishing for suckers and carp to take place on Canyon Ferry Reservoir and monitor the effects on the sport fisheries. Modify the permit if adverse effects are identified.

FINAL COMMENTS

Do you have any additional comments on fishing on Canyon Ferry Reservoir?

RESULTS OF QUESTIONNAIRE SURVEY

In June, 1991 (?), a questionnaire was mailed out to ___ people asking their opinions on the fisheries management of Canyon Ferry Reservoir. The results of that survey is as follows.

QUESTION 1: How many fishing trips to Canyon Ferry Reservoir or to the Missouri River do you make in a year?

How Often Do You Fish These Waters? (Canyon Ferry/Upper Missouri River)

Never	22.3%
< 3 Days	23.4%
3-10 Days	34.7%
> 10 Days	19.6%

QUESTION 3: The Management Plan addresses the fishery from Canyon Ferry Dam to Toston Dam. Where do you fish in this system?

Where Fished

Canyon Ferry	54%	727
Missouri	9%	122
Both	37%	508

QUESTION 4: If you fish the Missouri River between Canyon Ferry Reservoir and Toston Dam which stretch do you most like to fish?

Missouri River, Where Fished

Toston Dam	34%	217
Townsend-Toston	34%	214
Channels	32%	207

QUESTION 5: When fishing in Canyon Ferry Reservoir, how often do you fish from the shore or boat?

Where Fished? Boat or Shore

Boat	61%
Shore	39%

QUESTION 6: Which time of the year do you prefer to fish Canyon Ferry Reservoir?

Preferred Season, When Fished

Summer	59%	796
No Pref.	22%	298
Winter	19%	250

QUESTION 7: What species do you most often seek to catch in Canyon Ferry Reservoir?

What Species Do You Seek Now? (Summer)

	Rainbow Trout	Brown Trout	Yellow Perch	No Pref/Other
Walleye Unlimited	36.9%	12.1%	18.4%	32.6
Trout Unlimited	53.2	19.6	2.8	24.4
General Anglers	60.1	17.9	7.8	14.2
All Anglers	54.9	17.4	8.2	19.5

What Species Do You Seek Now? (Winter)

	Rainbow Trout	Brown Trout	Yellow Perch	No Pref/Other
Walleye Unlimited	9.9%	4.6%	39.9%	45.6%
Trout Unlimited	20.6	6.6	18.5	54.3
General Anglers	19.1	6.4	21.4	53.1
All Anglers	18.0	6.2	23.6	52.2

QUESTION 8: Currently, the Department manages for brown trout and rainbow trout in Canyon Ferry Reservoir. Yellow perch also provides a good fishery. If Canyon Ferry could be managed to provide good fishing for any of the following species, which species would you prefer to catch.

Species Preferred Summer-Future

	Rainbow Trout	Brown Trout	Yellow Perch	Walleye
Walleye Unlimited	15.4%	8.1%	6.1%	49.9%
Trout Unlimited	52.6	21.9	2.4	8.8
General Anglers	42.0	15.1	4.8	16.8
All Anglers	40.3	15.6	4.5	20.2

	Kokanee	Other
Walleye Unlimited	4.7%	15.8
Trout Unlimited	5.1	9.2
General Anglers	9.2	12.1
All Anglers	7.5	11.9

Species Preferred Winter-Future

	Rainbow Trout	Brown Trout	Yellow Perch	Walleye	Other
Walleye Unlimited	13.0 %	6.1%	29.1%	39.3%	12.5%
Trout Unlimited	38.9	15.0	25.2	8.3	12.6
General Anglers	30.5	10.1	26.7	14.4	18.3
All Anglers	29.0	10.5	26.9	17.9	15.7

QUESTION 9: What size of rainbow trout, brown trout, and walleye do you consider to ba trophy size fish?

What Is A Trophy Size Fish

Size of Fish (Inches)	Rainbow Trout	Brown Trout	Walleye
18	6.3%	4.3%	9.3
20	13.0	8.8	8.8
22	18.0	14.4	11.4
24	31.2	27.2	21.8
26	11.3	16.2	12.7
28	20.2	29.1	36.0

QUESTION 10: How do you feel about these Canyon Ferry fisheries issues?

Issue	% Satisfactory	% Unsatisfactory	% No opinion
Size of rainbow trout	67.7	11.8	23.5
Size of brown trout	52.4	13.7	33.9
Size of yellow perch	36.0	17.4	46.6
Diversity of fishing	41.4	20.8	37.8
Rainbow trout numbers	32.9	31.5	35.6
Brown trout numbers	26.7	31.3	42.0
Yellow perch numbers	32.0	16.0	52.0
Enforcement of regulations	48.4	15.5	36.1
Number of anglers	54.2	6.6	39.2
Number of boats	51.0	7.9	41.1
Number of non-anglers	41.6	6.0	52.4

QUESTION 11: How do you feel about these Missouri River fisheries issues?

Issue	% Satisfactory	% Unsatisfactory	% No opinion
Size of rainbow trout	36.0	9.1	54.9
Size of brown trout	33.6	9.3	57.1
Rainbow trout numbers	22.2	17.3	60.5
Brown trout numbers	22.3	17.3	60.4
Diversity of fishing	22.8	15.5	61.7
Enforcement of regulations	28.2	10.3	61.5
Number of fishermen	32.8	4.2	63.0
Number of non-fishermen	27.9	3.0	69.1
Fishing access	29.2	13.7	57.1
Water quality	31.9	8.4	59.7
Amount of trout spawning sites	15.8	18.1	66.1
Water releases from Toston Dam	18.1	10.3	71.6

QUESTION 12: Which Montana reservoir do you feel has the best rainbow trout fishery?

	% Saying Yes
Hebgen	15.7
Holter	15.3
Canyon Ferry	13.9
None	11.7
Georgetown	10.6

Harrison	9.3
Clark Canyon	8.6
Hauser	7.1
Martinsdale	2.7
Other	2.1
Tiber	1.7
Cooney	1.4

QUESTIONS 13 AND 14: The present creel limits on Canyon Ferry Reservoir are 10 trout. The creel limit on the Missouri River between Canyon Ferry Reservoir and Toston Dam are 5 trout, of which only one can exceed 18 inches. Do you feel these regulations are about right, too restrictive, or too liberal?

Creel Limits

Canyon Ferry Reservoir 10 Trout Limit		Upper Missouri River 5 Trout, 1 over 18"	
Too Liberal	45.1%	Too Liberal	21.1%
Too Restrictive	0.4%	Too Restrictive	14.7%
About Right	54.5%	About Right	64.2%

QUESTION 15A. The number and size of fish that anglers catch varies from trip to trip. Would you be satisfied if on your next fishing trip to Canyon Ferry Reservoir you caught ____ rainbow trout per day?

What Number/Day Rainbow Is Satisfactory

Rainbow/Day	
0	20.8%
1	20.9
2	33.8
3	53.4
4	65.3
5	79.2
6	90.1
7	85.7
8	90.7
9	96.2
10	95.3

QUESTION 15B. Would you be satisfied if on your next fishing trip to Canyon Ferry Reservoir the rainbow trout you caught averaged ____ inches in length?

What Size Of Rainbow Is Acceptable
Percentage Acceptable

Inches	Yes
12	31.0
13	34.6
14	64.1
15	77.3
16	89.2
17	88.9
18	88.2
19	94.7
20	96.1
21	98.4
22	95.9
23	98.3
24	95.6

QUESTION 16: How do you feel about the following fisheries management strategies relating to rainbow trout.

	SUPPORT	OPPOSE	NOT SURE
Continue to stock wild rainbow strains	79.9%	3.3%	16.9%
Stock a combination of wild and domestic strains	49.9	18.0	32.1
Stock a new rainbow trout strains	51.6	12.0	36.4
Enhance rainbow trout spawning habitat	79.5	3.0	17.6
Use restrictive regulations to protect spawners	67.8	9.1	23.1
Restrict harvest on large rainbow spawners	51.1	20.8	28.1

QUESTION 17: Which actions do you support to try to provide for a trophy sized rainbow trout in Canyon Ferry?

	SUPPORT	OPPOSE	NO OPINION
Introduce a fish eating strain of rainbow	43.2%	16.1%	40.7%
Use a restrictive regulation to protect trophy sized rainbow trout	45.5%	26.1%	28.4%

QUESTION 18: Which of the following actions would you support to enhance the Missouri River rainbow trout fishery?

	SUPPORT	OPPOSE	NO OPINION
Continue to stock wild strains to build spawning runs	83.1%	2.2%	14.7%
Enhance rainbow trout spawning habitat	82.4	2.4	15.2
Use restrictive regulations to protect spawners	66.4	10.4	23.2
Use wild rainbow trout eggs to establish runs	75.7	2.0	22.3

QUESTION 19: Which of the following actions would you support to enhance the Canyon Ferry Reservoir and Missouri River brown trout fisheries?

	SUPPORT	OPPOSE	NO OPINION
Decrease daily brown trout limits	49.7%	18.6%	31.7%
Use seasonal closures to protect spawning brown trout	64.5	12.5	23.0
Close certain spawning areas	67.7	9.8	22.5
Increase enforcement	56.5	17.0	26.5
Imprint juvenile brown trout into spawning tributaries	64.1	10.7	25.2

QUESTION 20: How important is it to have the opportunity to catch yellow perch in Canyon Ferry?

Importance of Yellow Perch Fishery

Important	41%
Not Important	59%

In January, 1992, postcards were mailed out with 2 supplemental questions regarding yellow perch management. The results of this additional survey was as follows:

SUPPLEMENTAL QUESTION 1: The number of yellow perch per day varies from year to year. Would you be satisfied with your next fishing trip to Canyon Ferry if you caught ___ yellow perch?

What Numbers/Day Yellow Perch Acceptable

Number/day	Percent Saying Yes
5	27.9%
10	42.9
15	69.1
20	82.1
25	87.1
30	83.0
35	94.5

SUPPLEMENTAL QUESTION 2: Would you be satisfied if the average size of yellow perch was ___ inches in length?

What Size Of Yellow Perch Is Acceptable

Average Size (in")	Percent Saying Yes
6	4.0 %
7	62.3
8	79.3
9	67.9
10	95.3
11	93.1
12	96.6

QUESTION 22: asked whether people would support the introduction of walleye, kokanee, bass, chinook, northern pike, kamloops rainbow, or a forage fish in Canyon Ferry. The following figure shows the results for all respondents. The remaining figures show the results broken down by user group.

Do You Support A New Species Introduction?

	High Risk		Low Risk	
	Support	No Opinion	Support	No Opinion
Walleye	19.3%	15.0%	47.6%	20.9%
Bass	13.4%	16.1%	36.3%	21.8%
N. Pike	7.2%	11.1%	18.9%	16.2%
Chinook	13.6%	19.8%	40.4%	23.8%
Kokanee	12.6%	20.4%	43.3%	23.7%
Kamloops	18.9%	24.4%	47.7%	26.2%
Forage Fish	11.5%	19.4%	34.0%	24.8%

QUESTION 22a: Would you support the introduction of **walleye**, considering the degree of risk to existing brown trout, rainbow trout, and yellow perch fisheries? Walleye are fish eaters and may feed on existing sport fish.

Would You Support Walleye Introduction

	High Risk		Low Risk	
	Support	**No Opinion**	**Support**	**No Opinion**
Walleye Unlimited	58.3%	15.8%	79.1%	15.8%
Trout Unlimited	6.1%	85.3%	30.2%	17.9%
General Anglers	20.8%	25.6%	32.6%	46.4%
All Anglers	**19.3%**	**15.0%**	**47.6%**	**20.9%**

QUESTION 22b: Would you support the introduction of **kokanee**, considering the degree of risk to existing sport fish and food items? Kokanee feed on plankton and may directly compete with existing sport fish for food. They may also compete with brown trout on spawning areas.

Would You Support Kokanee Introduction

	High Risk		Low Risk	
	Support	**No Opinion**	**Support**	**No Opinion**
Walleye Unlimited	17.6%	21.2%	46.0%	21.6%
Trout Unlimited	5.7%	17.4%	34.9%	20.4%
General Anglers	14.2%	23.0%	46.3%	25.7%
All Anglers	**12.6%**	**20.4%**	**43.3%**	**23.7%**

QUESTION 22c: Would you support the introduction of **bass**, considering the following degree of risk to existing sport fish and food items? Bass are fisheaters and could possibly prey on existing sport fish.

Would You Support Bass Introduction

	High Risk		Low Risk	
	Support	**No Opinion**	**Support**	**No Opinion**
Walleye Unlimited	34.9%	21.9%	52.9%	19.8%
Trout Unlimited	4.1%	9.1%	29.3%	16.8%
General Anglers	11.5%	17.6%	34.9%	24.6%
All Anglers	**13.4%**	**16.1%**	**36.3%**	**21.8%**

QUESTION 22d: Would you support the introduction of **chinook**, considering the degree of risk to existing sport fish and food items? At smaller sizes chinook eat plankton which is the food for rainbow trout, brown trout, and yellow perch. At larger sizes, they are fish eaters. Because of these characteristics chinook could possibly adversely effect existing sport fish.

Would You Support Chinook Introduction

	High Risk		Low Risk	
	Support	**No Opinion**	**Support**	**No Opinion**
Walleye Unlimited	21.2%	23.7%	45.0%	21.6%
Trout Unlimited	7.9%	14.3%	35.4%	17.5%
General Anglers	13.9%	21.1%	41.4%	27.2%
All Anglers	**13.6%**	**19.8%**	**40.4%**	**23.8%**

QUESTION 22e: Would you support the introduction of **northern pike**, considering the degree of risk to existing sport fish and food items? Northern pike are a fish eater and would probably prey on all existing sport fish. Because of these characteristics, northern pike could adversely effect sport fish.

Would You Support Northern Pike Introduction

	High Risk		Low Risk	
	Support	**No Opinion**	**Support**	**No Opinion**
Walleye Unlimited	17.6%	14.8%	29.9%	18.4%
Trout Unlimited	2.7%	6.6%	12.0%	10.2%
General Anglers	6.3%	12.0%	18.9%	18.2%
All Anglers	**7.2%**	**11.1%**	**18.9%**	**16.2%**

QUESTION 22f: Would you support the introduction of **kamloops** rainbow, considering the following degree of risk to existing sport fish and food items? Larger sized kamloops eat other fish including other game fish species. Juvenile kamloops feed on plankton which is the food base for rainbow trout, brown trout, and yellow perch. Because of these characteristics, kamloops rainbow could possibly adversely effect existing sport fish.

Would You Support kamloops Introduction

	High Risk		Low Risk	
	Support	**No Opinion**	**Support**	**No Opinion**
Walleye Unlimited	23.4%	30.9%	46.4%	27.7%
Trout Unlimited	16.6%	22.0%	52.6%	23.6%
General Anglers	18.7%	23.7%	46.0%	27.0%
All Anglers	**18.9%**	**24.4%**	**47.7%**	**26.2%**

QUESTION 22g: Would you support the introduction of a **forage fish**, considering the degree of risk to existing sport fish and food items? Forage fish are generally smaller fish which large predatory fish use as food. Forage fish eat plankton, the main food base for existing rainbow trout, brown trout, and yellow perch. This could severely impact these sport fish. Because of these characteristics, new forage fish could possibly effect existing sport fish.

Would You Support Forage Fish Introduction

	High Risk		Low Risk	
	Support	**No Opinion**	**Support**	**No Opinion**
Walleye Unlimited	35.3%	26.6%	56.1%	26.3%
Trout Unlimited	3.4%	15.7%	29.9%	19.1%
General Anglers	8.4%	19.0%	29.7%	26.9%
All Anglers	**11.5%**	**19.4%**	**34.0%**	**24.8%**

QUESTION 23: Would you allow commercial fishing on Canyon Ferry Reservoir for suckers and carp, if effects on game fish are monitored and the permit was modified if adverse effects were noted?

Support	71.5%
Oppose	28.5%

Response to the survey was excellent. The following shows the percentage of surveys that were returned.

Questionnaire Return Rate/Percent Rate

	Sent	Returned	% Returned
Walleye Unlimited	747	288	38.6
Trout Unlimited	1330	487	36.6
General Anglers	2761	1058	38.3
Total Anglers	**4838**	**1831**	**37.9**

APPENDIX F

FISHERIES MANAGEMENT PLAN QUESTIONNAIRE AND RESULTS
FISHERIES MANAGEMENT GOALS AND CRITERIA

RAINBOW TROUT

Canyon Ferry Reservoir

		Support	Oppose	No Opinion
GOAL I -	Increase numbers in the reservoir.	86%	9%	5%
GOAL II -	Increase the number of naturally reproduced rainbow propagated in the tributaries to the reservoir.	92%	2%	6%
GOAL III -	Increase the resident numbers in the Missouri River.	88%	3%	9%
GOAL IV -	Establish a migratory population that reside in reservoir and move into tributaries to spawn in the spring.	91%	3%	6%

YELLOW PERCH

		Support	Oppose	No Opinion
GOAL VIII -	Obtain a better understanding of population dynamics in the reservoir and improve techniques for monitoring population trends.	70%	4%	26%

NEW FISH SPECIES INTRODUCTION

RECOMMENDATION -	No new species of fish will be introduced into Canyon Ferry Reservoir or the Missouri River during the five year plan period.	72%	19%	9%

BROWN TROUT

		Support	Oppose	No Opinion
GOAL V -	Increase the numbers residing in the reservoir.	80%	8%	12%
GOAL VI -	Increase the resident population in the Missouri River.	78%	6%	16%
GOAL VII -	Increase the number that reside in the reservoir and then migrate into the Missouri River and Tributaries to spawn.	75%	8%	17%

QUESTIONNAIRES

Total Sent	300
Total Return	196
% Return	65.3

APPENDIX G - SPECIES MATRIX

	A. RAINBOW TROUT	B. BROWN TROUT
POTENTIAL FOR SPAWNING SUCCESS	Do not spawn in reservoirs. Successful spawning is low in the tribs and river. Naturally reproduced rainbow < 10% of the fishery.	Do not spawn in reservoirs. Successful spawning is low in the tributaries and the Missouri R. Naturally produced brown trout < 1% of the fishery.
REARING OF JUVENILES ---------- PHYSICAL HABITAT	Appears moderate to good in both river and reservoir. Limited spawning results in low juvenile abundance.	Same as for rainbow trout.
FOOD HABITS	Fry subsist primarily on zooplankton and small aquatic and terrestrial insects which are abundant during the rearing period.	Same as for rainbow trout.
ADULTS ---------- PHYSICAL HABITAT	Good to excellent in the reservoir. Limited in the river due to high summer water temperatures.	Good to excellent in the reservoir. Moderate to good in the river depending on summer flow depletions.
FOOD HABITS	Food supply - zooplankton - is good in reservoir.	Forage - fish, aquatic, and terrestrial insects- is adequate at expected population levels
EFFECTS ON EXISTING FISHERY	Expected population level may result in moderate competition with existing zooplankton eaters (e.g. yellow perch). Increased densities of "wild" strains of rainbow trout may interfere with brown trout spawning beds during spring spawning.	High potential for spawning runs. Moderate to high potential for resident population in the Missouri River.
MOVEMENT UPSTREAM INTO MISSOURI RIVER	High potential for spawning runs. Moderate potential for resident population in Missouri River.	High potential for spawning runs. Moderate to high potential for resident pops. in Missouri R.
MOVEMENT DOWNSTREAM	High potential for movement.	High potential for movement.
HATCHERY LIMITATIONS	Present state hatchery operations cannot meet current demand.	Present hatchery operations cannot meet current demand.
FISHERIES POTENTIAL	Unstable depending on success of hatchery plants.	Likely to have low population densities in the reservoir due to the large number of fish required to establish a fishery in a large reservoir. Improved reproduction would significantly improve river population.
PUBLIC OPINION (QUESTIONNAIRE)		

	C. YELLOW PERCH	D. BURBOT
1. POTENTIAL FOR SPAWNING SUCCESS	Successful spawning is variable depending on spring water temperature and reservoir levels.	Current population is self-sustaining at a low population level. Factors influencing spawning success are unknown.
2.REARING OF JUVENILES ---------- PHYSICAL HABITAT	Physical habitat in the reservoir for juveniles is moderate, losses due to flushing during high water years may cause erratic abundance of young.	unknown.
3. FOOD HABITS	Fry subsist on plankton, which is abundant during the rearing period.	Burbot feed on a wide range of aquatic organisms, including fish. Food supply is not likely limiting at current population levels.
4. ADULTS ---------- PHYSICAL HABITAT	Physical habitat in the reservoir is moderate to good.	Physical habitat quality in the river and reservoir is unknown.
5. FOOD HABITS	Adult perch feed primarily on plankton and fish, forge is adequate at expected population levels.	Adults feed primarily on fish and crayfish. Food supply is not likely limiting at current population levels.
6. EFFECTS ON EXISTING FISHERY	Expected population levels may result in moderate competition with existing zooplankton eaters (e.g. rainbow trout).	Burbot compete with other existing fish eaters, such as brown trout and yellow perch. Expected population level may result in moderate levels of predation on trout and yellow perch.
7. MOVEMENT UPSTREAM INTO MISSOURI RIVER	Low potential for resident population in river.	Low numbers of burbot currently reside in the Missouri R. above Canyon Ferry and juveniles are found in tributaries of the reservoir. Life history patterns in the system are unknown.
8. MOVEMENT DOWNSTREAM	High potential for movement.	Unknown.
9. HATCHERY LIMITATIONS	Hatchery propagation is very limited.	Hatchery burbot are not available.
10. FISHERIES POTENTIAL	Unstable depending on reproductive success.	Population densities are low but appear to be increasing in the reservoir.
11. PUBLIC OPINION (QUESTIONNAIRE)		

	E. SMALLMOUTH BASS	F. LARGEMOUTH BASS
1. POTENTIAL FOR SPAWNING SUCCESS	Successful spawning would be erratic in river & reservoir due to periodic cold spring water temperatures & limited spawning substrate	Successful spawning would be low due to the lack of shallow, vegetated areas in both the river & reservoir.
2. REARING OF JUVENILES ---------- PHYSICAL HABITAT	Juvenile abundance would be erratic due to variable spring weather patterns. Limited spawning habitat will typically result in low juvenile abundance in most years.	Juvenile abundance would be erratic due to unstable spring weather patterns. Limited spawning would typically result in low juvenile abundance in all years.
3. FOOD HABITS	Fry subsist on zooplankton, which is abundant during the rearing period.	Same as smallmouth bass.
4.ADULTS ---------- PHYSICAL HABITAT	Adults would be confined around rocky, shallow portions of the reservoir and to slow velocity areas in the river. Adult habitat appears to be limited in the reservoir.	Adults would be restricted to shallow, weedy portions of the lake - which are limited. Growth rates would be slow due to cooler than optimal water temperatures. Adults would not be found in river, except weedy, backwater areas.
5. FOOD HABITS	Adults feed on fish and crayfish. Crayfish abundance in reservoir is unknown.	Adults feed on fish and crayfish. Crayfish abundance in reservoir is unknown.
6. EFFECTS ON EXISTING FISHERY	Spawning, juvenile, and adult habitat appears limited, which results in low population densities. These low numbers would probably result in a low level of competition and predation on existing fisheries.	Spawning, juvenile, and adult habitat appears to be limited, resulting in low population densities. These low numbers would probably result in a low level of competition and predation on existing fishery. Not usually a river fish.
7. MOVEMENT UPSTREAM INTO MISSOURI RIVER	Potential for small resident population in river.	Low potential for resident population level in river.
8.MOVEMENT DOWNSTREAM	Moderate potential for movement.	Moderate potential for movement.
9. HATCHERY LIMITATIONS	Present in-state hatchery operations cannot meet current demand.	Not a limitation.
10. FISHERIES POTENTIAL	Likely to have low population densities concentrated in localized areas of the river and reservoir catch rates are expected to be low.	Likely to have low population densities concentrated in localized areas in the reservoir. Catch rates and growth rates are expected to be low.
PUBLIC OPINION (QUESTIONNAIRE)	84% Opposed to introductions if risks were high to existing fishery. 54% Opposed introduction if risks were low to existing fishery. 1.7% Desired species in summer 0.4% Desires species in winter.	Same as smallmouth bass as large and smallmouth bass were not surveyed separately in the survey.

	G. CHINOOK SALMON	H. KOKANEE
1. POTENTIAL FOR SPAWNING SUCCESS	Do not spawn in reservoirs. Successful spawning should be low in river based on known low spawning success of existing salmonids.	Successful spawning would be low in reservoir due to lack of spawning areas. Successful spawning should be low in river based on known low spawning success of existing salmonids.
2. REARING OF JUVENILES ---------- PHYSICAL HABITAT	Habitat appears to be moderate to good in both river & reservoir. Limited spawning would likely result in low juvenile numbers.	Rearing habitat appears to be moderate to good. Limited spawning habitat would likely result in low juvenile abundance.
3. FOOD HABITS	Fry subsist on insects and zooplankton. Availability appears to be good during the rearing period.	Fry subsist on zooplankton which is abundant during the rearing period.
4.ADULTS ---------- PHYSICAL HABITAT	Summer habitat would be limited to deeper waters in the northern portion of the reservoir where oxygen may be low. Water temperatures higher than desired in the remainder of the reservoir.	Summer habitat would be limited to deeper waters in the northern portion of the reservoir where oxygen may be low. Water temps higher than desired in the remainder of the reservoir.
5. FOOD HABITS	Adults feed on open water fish such as kokanee, cisco, smelt, and rainbow trout. Forage would be limited.	Adults feed on zooplankton and its availability is good in the reservoir.
6. EFFECTS ON EXISTING FISHERY	Expected low population densities would result in low levels of competition with or predation on existing fish populations. They would likely compete with brown trout for spawning sites.	Expected low population levels would result in minor competition with existing zooplankton eaters such as rainbow trout and yellow perch. Would compete with spawning brown trout.
7. MOVEMENT UPSTREAM INTO MISSOURI RIVER	Low potential for resident populations. High potential for spawning runs.	High potential for spawning runs in river. Low potential for resident populations in the river.
8.MOVEMENT DOWNSTREAM	High potential with high risk to existing fishery.	High potential for movement.
9. HATCHERY LIMITATIONS	Disease-free eggs are difficult to obtain.	Present state hatchery operations cannot meet current demand. Out of state sources of disease free eggs are scarce.
10. FISHERIES POTENTIAL	Population densities would be low which would result in low catch rates. Fish would likely not reach "trophy" size.	Population densities without stocking would be low resulting in low catch rates.
PUBLIC OPINION (QUESTIONNAIRE)	83% Opposed to fish if risks were high to existing fishery. 47% Opposed fish if risks were low to existing fishery. 2 - 3% Desired species in winter and summer.	84% Opposed to fish if risk were high to existing fishery. 43% Opposed to fish if risk were low to existing fishery. 4% Desired this species in summer and winter.

	I. NORTHERN PIKE	J. WALLEYE
1. POTENTIAL FOR SPAWNING SUCCESS	Successful spawning would be low due to the shallow vegetated areas in the river & reservoir. During high water years there is the potential for substantial spawning success.	Successful spawning is highly probable in both the river & reservoir due to abundant habitat. Weather conditions will influence spawning success.
2. REARING OF JUVENILES ---------- PHYSICAL HABITAT	Rearing habitat is limited due to lack of shallow, vegetated areas in both river and reservoir. Limited rearing would usually result in low population densities except during some high water years.	Physical habitat in the reservoir for juveniles is good to excellent. Losses due to flushing during high water years could cause erratic abundance of young.
3. FOOD HABITS	Fry < 3" subsist on zooplankton which is abundant during the rearing period. Larger fry eat small fish - supply unknown.	Fry subsist on zooplankton, which is abundant during the rearing period.

	I. NORTHERN PIKE	J. WALLEYE
1. POTENTIAL FOR SPAWNING SUCCESS	Successful spawning would be low due to the shallow vegetated areas in the river & reservoir. During high water years there is the potential for substantial spawning success.	Successful spawning is highly probable in both the river & reservoir due to abundant habitat. Weather conditions will influence spawning success.
4.ADULTS ---------- PHYSICAL HABITAT	Adults would normally be restricted to shallow, weedy areas in the reservoir & backwater areas in the river. Adult habitat appears to be limited in the river and the reservoir.	Physical habitat in reservoir is good to excellent for adults.
5. FOOD HABITS	Primary food is fish. When pike numbers low, forage is adequate, but present forage would not support lg. numbers of pike.	Fish is forage. Availability in 1st 4 - 10 yrs would be moderate. In long term walleye would deplete forage base resulting in a poor walleye population.
6. EFFECTS ON EXISTING FISHERY	Would compete with existing fish eaters e.g. brown trout, yellow perch, burbot in both river & reservoir. In yrs of high abundance there would be heavy predation on existing fisheries.	Would compete with existing fish eaters. Would not be compatible with yellow perch and rainbow fishery. Mixed rainbow/walleye fishery would require stocking of 8-13" rainbow at significantly higher cost.
7. MOVEMENT UPSTREAM INTO MISSOURI RIVER	Moderate potential for spawning runs in river & high potential for resident pops. in river.	High potential for spawning runs and moderate potential for summer residency in the river.
8.MOVEMENT DOWNSTREAM	High potential for movement.	High potential for movement.
9. HATCHERY LIMITATIONS	Unknown.	Present state hatchery operations cannot meet current demand.
10. FISHERIES POTENTIAL	Population densities would be erratic resulting in a boom & bust fishery.	Likely a boom/bust type fishery. The anticipated numbers and sizes harvested would decline as forage supply became limited.
PUBLIC OPINION (QUESTIONNAIRE)	92% Opposed to fish if risks were high to existing fishery. 77% Opposed fish if risks were low to existing fishery. <1% Desired species in winter & summer.	77% Opposed to fish if risk were high to existing fishery. 44% Opposed to fish if risk were low to existing fishery. 27% Desired this fish in summer. 20% Desired this fish in winter.