Section 3
Canyon Ferry Reservoir

The species composition of the Canyon Ferry Reservoir/Missouri River system is typical of large river and reservoir fisheries in the intermountain region (Table 5). Fisheries of the Missouri River downstream from Toston Dam, Canyon Ferry Reservoir, and associated tributaries are managed as an ecological system. Many 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.

Fisheries management of the upper Missouri River reservoir system has changed following expansion of the walleye population in Canyon Ferry. Walleye have effected recruitment of wild reproducing and stocked species not only in Canyon Ferry, but also in the river above Canyon Ferry as well as the reservoir and river sections downstream. Active walleye management is necessary to manipulate walleye abundance in Canyon Ferry, as well as maintain multi-species fisheries throughout the entire upper Missouri River reservoir system.

Management History

The rainbow trout population in Canyon Ferry Reservoir is maintained through annual stocking of hatchery fish. Annual stocking is required because natural recruitment is not sufficient to meet current demand by the fishing public. The most probable reason for inadequate natural reproduction for rainbow trout in Canyon Ferry Reservoir is limited spawning and rearing habitat. Tributaries to the reservoir, as well as tributaries to the Missouri River, have been degraded as a result of land use practices both public and private. The discovery of whirling disease in the Missouri River and some associated tributaries in the 1990s has created an additional factor that can limit successful natural reproduction of rainbow trout.

Since the filling of the reservoir in 1955, the rainbow trout fishery in Canyon Ferry has been maintained by stocking between 250,000 and 1.2 million fish, mostly fingerlings each year. Exceptions to this range in stocking rates occurred twice. In 1980, 2.0 million fingerlings were planted into the reservoir, with 1.0 million of these fish coming from a private hatchery donation. In 1992, a portion of Creston National Fish Hatchery was available for a one-year increase in stocking density at Canyon Ferry resulting in nearly 1.5 million fingerlings stocked. For the period between 1981 and 1998, the stocking allocation at Canyon Ferry Reservoir averaged about 1.0 pounds of rainbow trout per acre, which was typically represented by stocking about 400,000 yearling fish per year. Following expansion of the walleye population, predation on stocked rainbow reduced survival of fingerling rainbow plants. Rainbow stocking problems were further complicated by the discovery of polychlorinated biphenyls (PCBs) at Big Spring State Trout Hatchery in 2004, resulting in the shutdown of that facility during raceway treatment. The current hatchery allocation calls for 300,000 8-inch rainbow trout planted in spring and fall, which represents about 1.7 pounds of rainbow trout per acre. Stocking of 8-inch fish increased hatchery costs 7-fold due to increased hatchery space necessary to grow larger fish, increased food, and transportation costs to haul additional loads of fish.

In past years, FWP has adjusted the stocking of Canyon Ferry Reservoir several times in an 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 that the fish were distributed. Beginning in the early 1980s, FWP 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. Evaluation of stocking techniques indicated that stocking yearling rainbow trout (5-7 inches in length) during spring plankton bloom (May) yielded the most consistent survival of hatchery fish. Following walleye population expansion, it was found that stocking larger sized fish in the spring and fall is necessary to avoid predation. Stocking in the fall also takes advantage of lower energy demands of walleye during cooler water temperatures, reduces the potential for avian predation, and maximizes use of hatchery space for production.

Table 5. Fish Species in Canyon Ferry Reservoir/Missouri River System Including Native Status, First Stocking Date (In Drainage), Population Trend and Relative Abundance as of 2008.

Species	Native	First Stocking Date	Population Trend	Relative Abundance (Based on historic field monitoring.)
Game Fish Species				
Rainbow trout	No	1928	Stable	Abundant
Mountain whitefish	Yes	N/A	Decreasing	Common
Walleye	No	N/A	Stable	Abundant
Brown trout	No	1931	Decreasing	Common
Burbot	Yes	N/A	Stable	Common
Brook trout	No	1934	Unknown	Rare
Black crappie	No	N/A	Unknown	Rare
Cutthroat trout	Yes	N/A	Unknown	Rare
Northern pike	No	N/A	Increasing	Rare
Smallmouth bass	No	N/A	Unknown	Rare
Largemouth bass	No	N/A	Unknown	Rare
Yellow perch	No	1938	Decreasing	Abundant
Nongame Fish Species				
Common carp	No	Unknown	Stable	Abundant
Longnose dace	Yes	N/A	Unknown	Abundant
Longnose sucker	Yes	N/A	Decreasing	Abundant
White sucker	Yes	N/A	Decreasing	Abundant
Mottled sculpin	Yes	N/A	Unknown	Abundant
Fathead minnow	Yes	N/A	Unknown	Common
Stonecat	Yes	N/A	Unknown	Common
Utah chub	No	N/A	Decreasing	Common
Bluegill	No	N/A	Unknown	Rare
Flathead chub	Yes	N/A	Unknown	Rare
Mountain sucker	Yes	N/A	Unknown	Rare

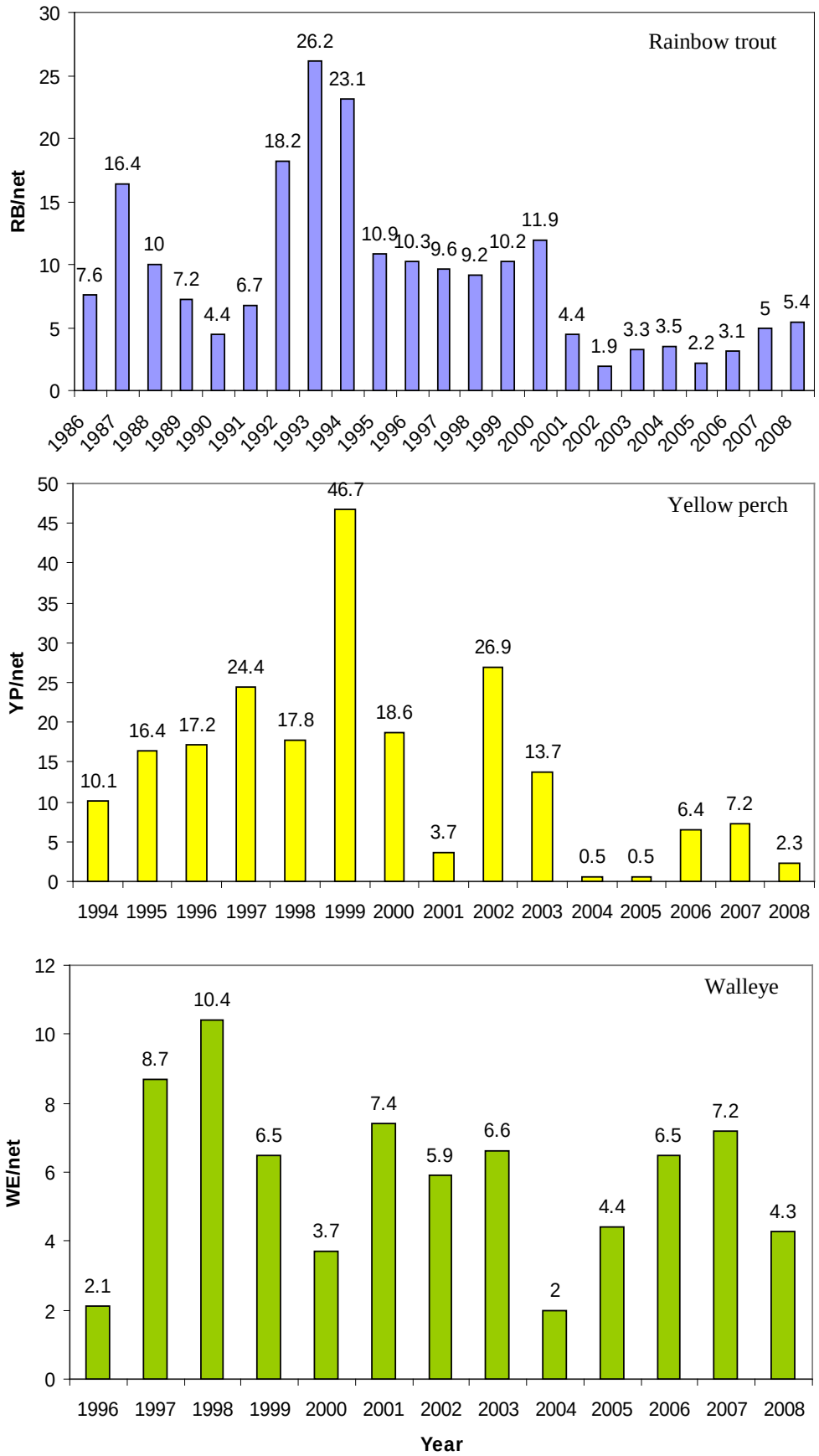

Figure 5. Canyon Ferry Reservoir Fish Population Trends for Rainbow Trout, Yellow Perch, and Walleye from Standardized Gillnetting Series.

Over the last 40 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 1960s (0.08 rainbow/hour), and again in the 1980s (0.08 – 0.14 rainbow/hour). These fluctuations appear to be closely associated with the varying success of the Department's stocking program for the reservoir. After a significant increase in rainbow trout abundance during the mid 1990s from increased stocking rates of yearling fish, the rainbow trout population trend remained relatively stable at approximately 10 rainbow trout per net throughout the late-1990s (Figure 5). By 2000, large year classes of walleye produced in 1996 and 1997 were large enough to effectively prey upon stocked rainbow fingerlings, and rainbow numbers declined in subsequent years. Stocking larger sized, 8-inch fish in the spring and fall has increased rainbow recruitment, resulting in an upward trend in recent years. The current population level maintains annual angler catch rates of 0.15 to 0.50 fish per hour (Figure 6).

Past management efforts have focused on rehabilitating degraded tributaries entering the Canyon Ferry/Missouri River system to enhance spawning habitat and increase recruitment of juvenile trout into the fishery. Sizeable spawning runs of wild strain rainbow trout have developed in various tributaries in the system, but contributions of juvenile trout from this increased spawning activity produces less than 10 percent of the Canyon Ferry rainbow trout fishery. Efforts to benefit the wild fishery will continue.

The brown trout population in Canyon Ferry Reservoir has remained at a relatively low level since the reservoir first filled in 1955. Results from sinking gill nets set periodically since 1955 indicate that brown trout numbers were highest immediately after the reservoir first filled, then remained relatively stable from 1958 through 1988. The brown trout population declined significantly between 1988 and the mid-1990s as a result of drought and spawning competition with stocked wild strain rainbow trout. Spawning habitat enhancements resulted in little improvement, and brown trout abundance is currently at an all time low level.

Yellow perch have been one of the most abundant species of fish in Canyon Ferry Reservoir for the past fifty years. However, the perch population has fluctuated extensively over time. These fluctuations are probably related to poor spawning and rearing habitat and variable spring weather conditions, which are believed to influence yellow perch spawning and rearing success on an annual basis. Yellow perch are a vulnerable prey species that is selected by walleye over other prey species, further influencing the variable nature of perch populations. Trends in yellow perch abundance in Canyon Ferry Reservoir have been periodically monitored since 1955 using a sinking gill net series set in June and August. Catch of perch per net pre-walleye declined from a high of 79 per net in 1964 to a low of 10 per net in 1994. Following walleye expansion in the late 1990s, catch of yellow perch per net has varied from a high of 47 per net in 1999 to a low of 0.5 per net in 2004 and 2005 (Figure 5).

Yellow perch population trends are also being monitored with summer beach seining data and a roving creel census that began in 1985. The beach seining series was initiated in 1991 to provide an index of annual perch production. Reliability of this tool for assessing annual production of perch is variable but it indicates that perch production can vary significantly from year to year and highlights years when yellow perch contribute to higher levels of forage availability. However, the relationship between annual production of yellow perch (measured by beach seine catches) and size of the adult population (measured by gillnet sets) shows little correlation.

Based on the roving creel census the number of anglers fishing on Canyon Ferry Reservoir during the summer specifically seeking to catch yellow perch has been steadily declining, with an average of 0.1%

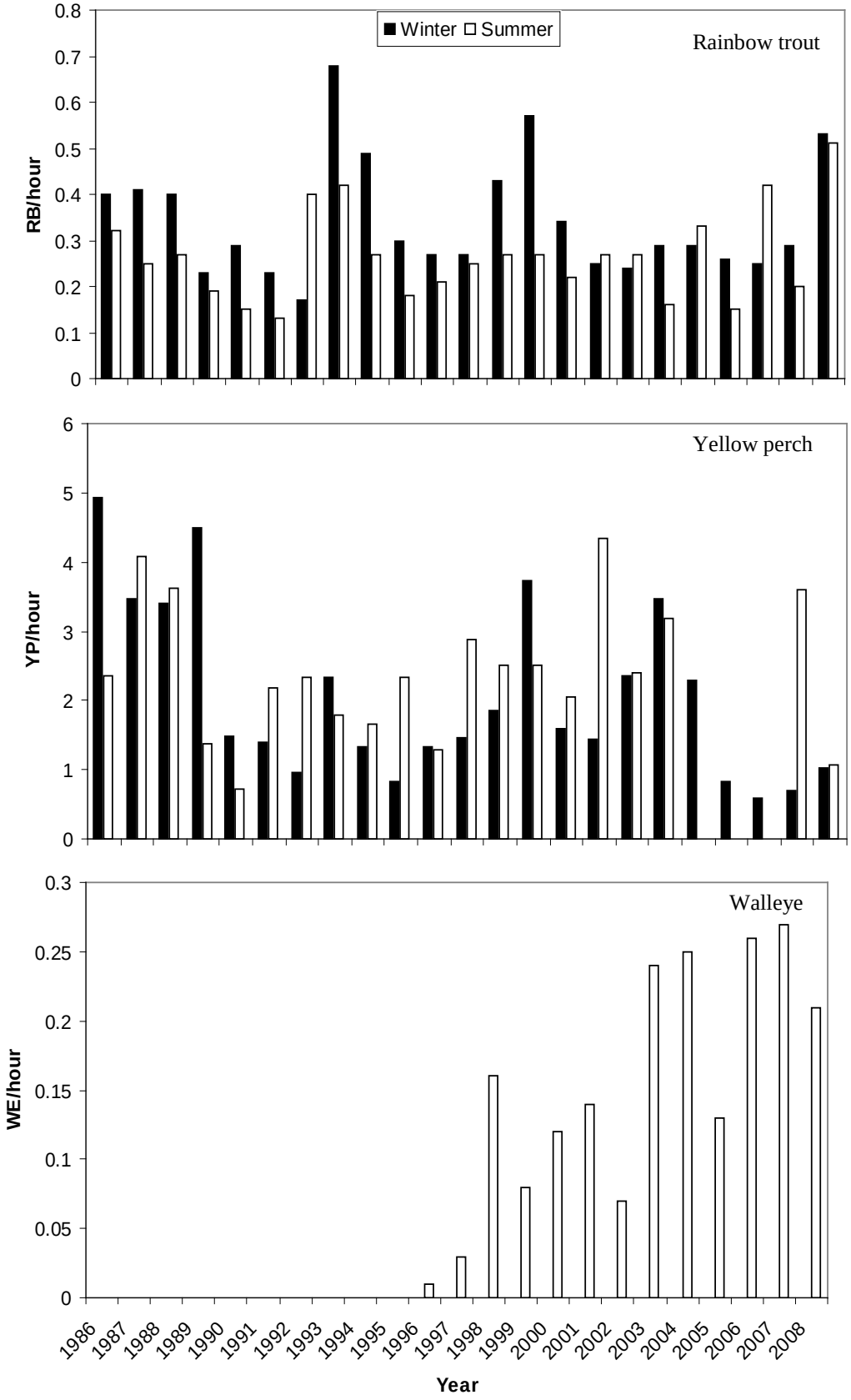

Figure 6. Canyon Ferry Reservoir Angler Catch Rates for Rainbow Trout, Yellow Perch, and Walleye.

of all anglers targeting only perch from 2004-2008. However, fishing for yellow perch is more popular during the winter. During the winter of 2008, 37% of all anglers were specifically seeking to catch yellow perch. Winter angler catch rates for yellow perch can be high, with an average of 2 fish per hour from 1986-1996 (Figure 6). Winter catch rates have been lower in recent years, averaging 1.6 fish per hour (2000-2008). Winter angler catch rates for yellow perch have remained comparatively low since 2005, and were at record low of 0.6 fish per hour in 2006 (Figure 6).

Yellow perch is now classified as a game fish in Montana and they are being managed as such in many waters. In 2005, the yellow perch daily and possession bag limits were reduced from 50 to 15 in order to counteract record low abundance in the reservoir. Additional ongoing management efforts included methods to reduce the impacts of reservoir operations on fishery resources and enhancing spawning and rearing success by providing additional lake bottom structure. For the past decade, thousands of recycled Christmas tree structures have been placed in the reservoir with the aid of several community and sportsman's groups. Yellow perch have been documented using the structures as spawning habitat, however it is difficult to determine if the structures positively influence perch abundance.

Walleye were not observed in Canyon Ferry biological sampling from 1955 through 1988. The first walleye was captured in 1989 during fall netting efforts to monitor rainbow trout. From 1989 to present, walleye have been captured in various monitoring net series annually. Walleye population trends in Canyon Ferry are based on four monitoring systems developed to assess fish populations: 1) sinking gill net series conducted periodically since 1955 (June and August sampling); 2) floating gill net series set annually since 1986 (May and October); 3) fall walleye gill netting series initiated in 1996 (September); and 4) roving creel census conducted since 1986.

The walleye population initially entered a phase of extremely rapid population growth that is characteristic of newly developing populations (McMahon 1992). In 1998 fall gill net catch of walleye reached record high 10.4 walleye per net, however continued exponential growth characteristic of new populations were not realized. Relative abundance of walleye declined after the 1998 peak and since has fluctuated between 2.0 (2004) and 7.4 (2001) walleye per fall gillnet (Figure 5). Since 2000, fall relative abundance has averaged 5.3 walleye per fall sinking gillnet. The current composition of the walleye population consists of smaller-sized, young walleye with 84% of walleye captured in fall gillnets in 2008 between 10-14.9-inches total length.

Forage diversity and supply is critical for sustaining quality walleye populations. Consequently, intensive walleye diet analyses has been conducted since 1994. Yellow perch and suckers comprised most of the walleye diet when the population first developed in Canyon Ferry. Yellow perch are still a significant component of the walleye diet, with perch comprising 49% of the diet since 1994. Suckers currently contribute little to the walleye diet, comprising only 0.3% of the diet in 2008. Low frequency of suckers in the walleye diet is largely a function of lower sucker densities. Salmonids (trout) can also comprise a large percentage of the walleye diet, with trout comprising over 70% of the diet in some years. Since 1994 salmonids average nearly 20% of the walleye diet. Food habits vary seasonally and other prey items are of significance through different periods of the year.

A risk assessment entitled "Potential Impacts of the Introduction of Walleye to the Fishery of Canyon Ferry Reservoir and Adjacent Waters" concluded that the possibility of increasing fishing opportunities with the introduction of a species such as walleye is offset by the potential impacts on other fish species (McMahon 1992). This assessment, along with numerous other sources of expertise, experience, and input, provided the basis for management efforts centered on walleye management. The primary

concerns at Canyon Ferry are that walleye reproductive potential is very high, and there is tremendous potential for creating a high-density walleye population that could deplete prey species, including sport fish such as yellow perch and trout. Walleye densities did not grow to proportions anticipated when the population first expanded in the late-1990s, but the reproductive potential in Canyon Ferry is still very high. Also, determination of walleye densities that can be maintained without permanently depressing the prey populations is still being studied. Due to the variable nature of walleye spawning, it is only a matter of time before another extraordinary year class, such as that produced in 1996, occurs.

Results of intensive walleye sampling conducted since 1994 confirm concerns expressed in the 1992 risk assessment. A small spawning population in 1996 produced a very strong year class of fish that resulted in a well-established walleye fishery at Canyon Ferry. In 1997, the reservoir was drawn down to near record low levels that reduced the quality of walleye spawning habitat at the only documented spawning site. Concurrently, FWP conducted an effort to remove mature walleye from spawning areas. Approximately 40 million walleye eggs were intercepted from 175 females prior to spawning. Despite this effort, walleye produced 4.0 yearlings per net in the fall 1998 netting series, compared with 6.27 yearlings per net in the 1997 fall netting series. Following failed walleye removal efforts in 1997, FWP recognized that walleye were going to be a significant component of the fishery and developed strategies to incorporate walleye into the multi-species fishery.

In addition to monitoring traditional game fish species, FWP gillnetting and beach seining efforts also track populations of other species present in the system. Monitoring will be an increasingly important component of data collection as the fish community continues to adjust to the changing walleye population. Monitoring abundance of white suckers, for example, will assist efforts to evaluate the forage fish availability for walleye. White suckers have decreased significantly since the mid-1950s when the reservoir was filled, remained relatively stable through the early 1990s, and have declined significantly since 1996. Examining sucker abundance in conjunction with other species (both predators and prey) will provide important information for future management of the Canyon Ferry-Missouri River system.

Continued monitoring of relative abundance of selected fish species as well as angler use is critical in identifying and maintaining management goals. Improvements in angler technology coupled with changes in angler pressure can influence the amount of fish harvest in the system. For primary species actively managed in Canyon Ferry, management “triggers” have been implemented to adjust management strategies with changing fish populations and resulting changes in angler trends.

Canyon Ferry Reservoir Management Goals and Limiting Factors

The goal for managing the upper Missouri River reservoir system fishery is to maintain a cost effective multi-species fishery that maintains the current level of angler use during both the open water and ice fishing seasons. Management of the multi-species fishery will attempt to maintain desirable sport species (i.e., rainbow trout, yellow perch, brown trout, walleye, and burbot) as well as maintain populations of non-game species (e.g., suckers, dace, sculpins).

To achieve this goal for the system, management strategies must be developed to enhance reproduction and survival of all potential species that will be influenced by walleye predation.

Determining all of the limiting factors that regulate fisheries in complex systems like the Canyon Ferry-Missouri River system is difficult to accurately assess. However, there are some basic limitations that are

known to exist for each of the major sport fish species in Canyon Ferry Reservoir. Perch populations tend to be limited by reproductive and rearing success, while trout populations are limited by number and size of fish stocked and recruitment of stocked fish. In contrast, walleye reproductive potential is extremely high in Canyon Ferry and may ultimately be limited by available forage, other predators (e.g. Northern pike), and other environmental variables (i.e., spring spawning conditions). A depleted forage base will ultimately result in reduced growth and productivity of not only walleye, but also other fish in the system as well. Other factors currently or potentially limiting sport fish species in Canyon Ferry Reservoir include but are not limited to:

- Available spawning and rearing tributaries are insufficient to adequately supply juvenile brown and rainbow trout for the reservoir, and hatchery allocation constraints and costs limit the number of fish available for stocking. The limited spawning habitat of rainbow trout and brown trout further impacts their poor reproductive success, and predation by walleye further reduces recruitment of successfully reared fish.

- Walleye diet studies indicate a high preference for yellow perch, suckers, and trout. At current yellow perch and sucker population levels and reproductive capability, it is unknown if these species can adequately provide a sustainable forage base for the walleye population. Predation of stocked trout could impede the cost-effectiveness of fish stocking and hinder recruitment to the sport fishery.

- Yellow perch spawning and rearing success is variable and density of the adult population appears to be limited by recruitment. A relatively small spawning stock of perch are capable of producing large age classes of perch, however lack of suitable nursery and cover habitats leave juvenile perch vulnerable to predation and limiting recruitment of entire age classes. Heavy predation has the potential to permanently suppress the yellow perch population and may jeopardize the ability to manage the yellow perch sport fishery.

- Development of a low dissolved oxygen plume in the deep water at the base of Canyon Ferry Dam occurs in the summer months. Deep areas, greater than 60-80 feet, at the north end of the lake may not be suitable for some fish species because of low dissolved oxygen levels during the summer months.

- Whirling disease has been found in the Missouri River between Toston Dam and Canyon Ferry Reservoir and in some of the associated tributaries. This disease is caused by a parasite that affects the cartilage of young trout and leads to physical deformities that reduce their ability to feed and avoid predators. As this disease progresses in the system it could potentially reduce reproductive success of rainbow trout and wild fish recruitment.

- Reservoir operations that result in average annual fluctuations of 12 feet limits establishment of shoreline vegetation to serve as spawning and rearing habitat for yellow perch or other species with similar spawning requirements.

- Extended surface spills during spring run-off may result in fish loss/transport out of Canyon Ferry. Losses of walleye and rainbow trout have been documented and may be significant.

- Localized depletions of fish may occur during intensive fishing periods (e.g. concentrated areas of yellow perch anglers during high-use periods in the winter) limiting recruitment and survival in distinct subpopulations in the reservoir.

- Expansion of the northern pike population could increase predation on an already limited forage base.

Canyon Ferry Reservoir Management Goals by Species

In order to manage a fish community that includes multiple sport fish species, it is important to recognize that the goal for each species is affected by the success of management strategies for other species in the system and not all fish species can be maximized simultaneously. This plan emphasizes management for trout and walleye while recognizing the importance of yellow perch as a sport fish and a forage species.

Yellow Perch

Goals and Objectives:

Continue to recognize the importance of yellow perch and apply management strategies to improve the current population to enhance the sport fishery and identify importance as a forage species.

- Achieve and maintain a three-year running average gillnet catch of 10 yellow perch per net in the summer sinking gillnet series.

- Maintain a three-year running average winter angler catch rate of 2.0 yellow perch per hour.

Rationale:

Yellow perch are the preferred prey item for most predator species in Canyon Ferry Reservoir; predation losses have increased significantly with walleye population expansion. Increasing the abundance of yellow perch is difficult and achieving a level of 10 per net will require successful implementation of a variety of management actions including spawning/rearing habitat enhancement, conservative angler harvest regulations, and active management of walleye through angler harvest. Cost-effective spawning/rearing habitat enhancement projects such as building juniper or Christmas tree reefs have been implemented since the early 90s, with larger scale efforts beginning in 1998 and continuing to present.

Strategies:

- Continue conservative harvest regulations to prevent over-harvest by anglers. Evaluate and implement further regulation changes if needed. In 2005, yellow perch daily and possession bag limits were dropped to 15 fish.

- Continue adequate data collection to determine if strategies are effective and the goal is being met.

  - If three-year average catch for perch in summer sinking gillnets falls below 3 perch per net, implement more conservative perch management strategies, such as further reductions in angler harvest, increased predator suppression, and/or additional habitat manipulations and improvements.

  - If three-year average catch for perch in summer sinking gillnets increases above 15 perch per net, recommend increasing angler harvest limits.

  - If these triggers are exceeded within three years following plan implementation, consider deferring management action to better determine effectiveness of strategies outlined in this plan.

- Continue to construct spawning/rearing habitat in Canyon Ferry as long as the project remains cost-effective.

- Within the two years of implementing the plan, determine the feasibility of proposed enhancement opportunities (e.g., waterfowl ponds as rearing areas, net pens, use of other artificial habitat).

- Continue the Christmas tree habitat enhancement project. Evaluate success of structures in other locations. Maintain relationship with City of Helena to continue supply of Christmas trees.

- Work with reservoir managers and water users to identify opportunities to modify reservoir levels and improve shoreline spawning habitat.

- Implement research to identify critical spawning habitats and nursery areas using telemetry within the first two years of the plan.

- Determine other funding sources and options for habitat enhancement projects (e.g., Walleyes Unlimited, Non Government Organization).

- Consider the feasibility and effectiveness of stocking perch to supplement perch population.

- Report measurable progress annually through public meetings and annual reports.

Rainbow Trout

Goals and Objectives:

Rely on rainbow trout to continue providing angling opportunity at approximately the current level of angler catch.

- Maintain a three-year running average gill net catch of 5-6 rainbow trout per net in the fall floating gillnet series.

- Maintain a three-year running average summer angler catch rate of 0.25 rainbow trout per hour.

Rationale:

The 2001-2009 Upper Missouri River Reservoir Fisheries Management Plan established higher objectives for rainbow trout abundance in Canyon Ferry (10 rainbow per gill net), but it was not feasible to sustain the fishery at that level, as the hatcheries could not supply the request for fish necessary to maintain 10 rainbow trout per gillnet. These objectives were only met in 2000. At present stocking levels and with current minimal levels of natural recruitment to the reservoir, it is reasonable to expect that a relatively stable fishery with good angler catch rates can be maintained at approximately 5-6 rainbow trout per gill net set. Since 2006, spring and fall stocking of 8-inch Eagle Lake and Arlee strain rainbow trout have seen increases in overall rainbow abundance and angler harvest. Stocking of larger sized rainbow trout is necessary to avoid predation by walleye. Stocking in the spring and fall also allows for efficient use of hatchery raceways, plus fall stocking takes advantage of lower energy demands by walleye due to lower water temperatures.

Strategies:

- Continue annual planting of approximately 150,000 age one, 8-inch Eagle Lake rainbow trout in the spring and approximately 50,000 age 0, 8-inch Eagle Lake and approximately 100,000 age 0, 8-inch Arlee rainbow trout in the fall.

- Continue annual monitoring and data collection to evaluate if management goals are being met.
  - If three-year average catch for rainbow in fall floating gillnets falls below 5 rainbow trout per net and/or angler catch rates decline substantially, recommend changes to the stocking plan (e.g., timing and location of fish plants, different rainbow strains, size at stocking) and implement if deemed cost-effective. Determine what limiting factor is reducing rainbow trout recruitment (e.g., hatchery or strain issues, increased predation by walleye).
  - If three-year average catch for rainbow trout in fall floating gillnets falls below 3 rainbow trout per net, consider more active management actions such as lowering angler harvest limits and/or implement predator suppression measures based on biological justification if predation is identified as the primary factor limiting recruitment.
- Continue to improve trout spawning tributaries in the system to increase wild trout abundance.
- Maintain restricted harvest regulations and closures associated with spawning areas.
- Consider stocking additional rainbow trout when additional hatchery fish are available. Do not stock if surplus fish will interfere with rainbow trout strain or season of stocking evaluations.
- Work with Wildlife Bureau of FWP and U.S. Fish and Wildlife Service (USFWS) to better quantify effects of pelicans and cormorants on stocked rainbow trout recruitment.

Walleye

Goals and Objectives:

Rely on walleye to maintain a self-sustaining sport fishery to enhance the summer fishery and provide an additional component to the winter fishery.

- Maintain a three-year running average of 5 walleye per net in the fall walleye gillnetting series.
- Evaluate criteria for determining appropriate walleye density consistent with the availability of forage.

Rationale:

Based on extensive studies since 1990, including a risk assessment for a walleye introduction in Canyon Ferry (McMahon 1992), maintaining the long-term quality of the walleye fishery is difficult because of high walleye reproductive success relative to available forage supply. Management of other desirable fish species in the reservoir will be difficult without active walleye management. Maintaining walleye at a level that sustains a balanced fish community is necessary to reaching multi-species goals. Failure to adequately control walleye population growth will result in further depletion of the food supply including sport fish species such as yellow perch, trout, and burbot. Substantial reductions in the population levels of yellow perch and rainbow trout are inconsistent with the goal of managing for a multi-species fishery in Canyon Ferry Reservoir. Angler harvest is the most cost-effective tool for walleye management; however other strategies may need to be explored if the walleye population reaches full reproductive potential. Data suggests that liberal fishing regulations likely play a role in size distribution of the walleye population, with high rates of exploitation limiting the number of larger fish in the population. However, due to known forage limitations in the reservoir, adjustments to limits may be necessary to maintain walleye population numbers compatible with forage abundance. Strategies for managing the

walleye population to sustain the desired trout and yellow perch fisheries by using more aggressive tools are based on "triggers" to initiate progressive management actions.

Strategies:

- Adjust angler harvest regulations to manage walleye population abundance and reduce predation on other desirable species. This is the most cost-effective and selective management tool available at Canyon Ferry to manage the walleye population. Regulations from the 2000-2009 Management Plan were designed to require few fish to be released, even by the most successful anglers, and the daily limit not likely to be exceeded. Limits below those set in the 2000-2009 Management Plan may increase numbers of desirable sized walleye, however limits above standard regulations for the Central Fishing District for walleye (5 daily and 10 in possession) are necessary to maintain a suitable forage base and preserve populations of other species. Modified angler bag and size limits may be used as management tools to improve desirable size groups (i.e., slot limits, bag limits, closures, among other tools).

  - Initially reduce the walleye daily bag limit to a number within a range of 10-16 fish per day with a range of no more than 3-5 fish of those may be of a size greater than a minimum length not less than 14 inches or greater than 18 inches, only one of those which may be greater than 28-inches.

  - If management triggers are exceeded, other regulations outside of the ranges listed above may be proposed.

- If needed, implement more aggressive management to control walleye population growth or manage population size structure. Triggers for modifying management actions will be based on annual fall monitoring of walleye (15 sinking gillnets set in September), summer netting for yellow perch (33 sinking gillnets set in June and August), and fall monitoring for rainbow trout (18 floating gillnets set in October). Additional aggressive management techniques may be implemented if, based on a three-year running average, any of the following criteria are reached:

  1. Walleye density increases above 7 fish per net.
  2. Yellow perch density decreases below 3 per net.
  3. Rainbow trout density decreases below 3 per net and walleye predation determined the primary factor limiting rainbow trout recruitment.

  - If these triggers are exceeded within three years following plan implementation, consider deferring management action to better determine effectiveness of strategies outlined in this plan.

  Upon reaching the targets listed above and within the adaptive management framework more aggressive actions may be implemented following public discussion. The following actions may be considered through a Montana Environmental Protection Act (MEPA) analysis and/or public review process:

  - Increase angler bag limits for walleye. This would likely be the first action implemented to reduce walleye densities.

  - Consider use of gill nets or trap nets to remove walleye during periods when fish are concentrated in specific areas (e.g., spawning period, fall).

- Allow spear fishing by submerged swimmers or through the ice to increase harvest. Consider imposing a maximum size restriction to prevent targeting the biggest fish and to retain a trophy component in the fishery.

- Evaluate walleye derbies/tournaments as a tool for aggressively harvesting fish.

- Authorize commercial harvest of walleye. In anticipation of the necessity to establish a commercial walleye operation on Canyon Ferry Reservoir, FWP must request authorization from the Montana Legislature to allow the taking and sale of walleye (87-4-601, Montana Code Annotated (MCA)) and subsequently revise the Administrative Rules of Montana governing commercial fishing (12.7.101, Administrative Rules of Montana (ARM)).

- Use electrofishing to remove walleye from the Missouri River during spring spawning.

■ If it is determined that the walleye population is over-harvested and more conservative limits are necessary to support a viable walleye population, walleye daily and possession limits will be modified and derbies/tournaments will be evaluated to protect walleye. Decisions will be based on fall monitoring showing a decline in walleye to below 3 per fall gillnet net based on a three year running average.

- Should three-year average walleye catch decline below 3 per gillnet while perch and rainbow abundance are below management goals (10 perch per summer gillnet and 5-6 rainbow per fall gillnet), changes to walleye limits will be recommended only after impacts to perch and rainbow populations are determined.

- Should three-year average walleye catch decline below 3 per gillnet while yellow perch and/or rainbow trout abundance are below management triggers (3 per summer gillnet for yellow perch and 3 per fall gillnet for rainbow trout) adjustments to walleye limit will not be made.

■ Continue adequate data collection to determine if strategies are effective and goals are being met.

- Report measurable progress annually through public meetings and annual reports.

- Conduct additional monitoring and research as needed (e.g., supplemental netting, tagging studies, 3-inch mesh gillnets). Explore sampling methods that reduce mortalities.

■ Recognize the importance for anglers to have multiple size classes of walleyes represented in the population. If more than 30% of fish are not above 16-inches, than changes to regulations will be recommended to maintain more, larger sized fish. Regulation changes will be dependent upon walleye abundance relative to management goals and triggers for walleye, other fish, and forage availability.

Brown Trout

Goals and Objectives:

Increase the number of brown trout residing in the reservoir as an additional component to the sport fishery.

- Increase the current catch of 0.2 brown trout per net to a three-year running average of 1.0 brown trout per net in the summer sinking gillnet series.

Rationale:

The decreased abundance of brown trout observed in the past 10 years is largely attributable to drought conditions in the river and primary spawning tributaries throughout the early 2000s. Other factors such as drought impact from 1985 through the late 1990s, whirling disease, turbine installation at Toston Dam in 1989, and increased competition with the wild strains of rainbow trout introduced in the late 1980s are also potentially responsible for the decline observed in recent years.

Strategies and Management Alternatives:

- Maintain restrictive regulations to protect the spawning brown trout population.
  - Implement catch and release only regulations for Canyon Ferry. Children age 14 and under can possess one brown trout.
  - Recommend allowing harvest if brown trout abundance increases above management goals.
- Continue ongoing efforts to enhance spawning and rearing habitat for brown trout.
  - Continue work with landowners and irrigators to reduce dewatering of critical streams during brown trout spawning (fall).
- Continue work with Department of Natural Resource and Conservation (DNRC) to mitigate impacts of hydropower on Toston Dam.
- Continue to evaluate brown trout limiting factors and develop new solutions.

Burbot (Ling)

Goals and Objectives:

Rely on burbot to compliment the winter sport fishery by maintaining the current level of burbot in the reservoir.

- Increase efforts to monitor the burbot population in Canyon Ferry Reservoir.
- Maintain a three-year running average gill net catch of 0.40 burbot per net in the summer sinking gillnet series.
- Provide brood and/or foundation stock for re-introductions to other waters for conservation and sport fishing considerations.

Rationale:

Burbot is the most popular native sport fish in Canyon Ferry Reservoir. Burbot are sought by anglers primarily in the ice-fishing season and provide little to the summer fishery. Unlike other upper Missouri River reservoirs, burbot abundance and angler catch rates in Canyon Ferry have declined in recent years. Little is known about the population dynamics and limiting factors that regulate the burbot population.

Strategies:

- Improve data collection to better understand burbot population dynamics.

- Maintain current angler harvest regulations unless monitoring justifies adjustments to bag limits.

Forage Fish

Goals and Objectives:

Manage and enhance the forage base to support a productive multi-species fishery that includes walleye, trout, and yellow perch.

- Increase white sucker gill net catch to 15 per net or higher.

- Increase yellow perch gill net catch to 10 per net or higher.

- Maintain mid-summer zooplankton density of 20 per liter and maintain current zooplankton species composition.

Rationale:

Additional fish species (forage fish species and sport fish species) introduced into Canyon Ferry Reservoir will compound an already rapidly changing system and may result in irreversible effects on the fish communities of Canyon Ferry, Hauser, and Holter reservoirs, and the Missouri River below Holter Dam. Sucker species and yellow perch are expected to continue providing the bulk of the walleye diet. Yellow perch are particularly important to the fish community because of their significant value as both a sport fish and a forage fish for walleye. One of the primary concerns of introducing new forage species would be the impact on the plankton community, which currently provides the bulk of the rainbow trout and yellow perch diet and are vital for survival of naturally produced walleye fry. Changes to the zooplankton community composition following introduction of a forage species could potentially limit recruitment of juvenile fish, especially yellow perch and walleye. There is also potential that walleye would not utilize a new species stocked as forage. Maintenance of at least 20 organisms per liter of cladocerans and copepods during mid-summer plankton sampling (average June, July, and August) will ensure that the yellow perch, rainbow trout and juvenile walleye food supply is maintained at current levels. Zooplankton species composition is also a vital component to a functional food web; in Canyon Ferry *Daphnia sp*. are essential to growth and survival of all juvenile fishes in the reservoir.

Strategies:

- Prevent depletion of the available forage by managing the walleye population at a sustainable level of no more than 7 fish per gillnet on a three-year running average. Consider active management measures if walleye abundance increases above 7 fish per gillnet and/or sucker abundance decreases below 5 per net or yellow perch abundance decreases below 3 per net on a three-year running average.

  - Active management measures may include increasing walleye bag limits, species specific netting, or commercial fishing. See Walleye discussion for adaptive management strategies.

- Explore opportunities to improve the forage base in Canyon Ferry.

  - Give priority to increase current forage species to support a multi-species fishery. Informal evaluation of forage introductions has shown that risks associated with a new species introduction

outweigh any potential benefits. Consequently, no new species will be evaluated or considered for introduction into the management plan area. Introducing a new forage species would also be contrary to the FWP Illegal and Unauthorized Introduction of Aquatic Wildlife Policy. See Appendix C for additional discussion on forage introductions and Appendix D for the Unauthorized Aquatic Wildlife Policy.

- During the course of this 10-year management plan, FWP will work to prevent the unauthorized introduction of new fish species to protect the resident fish community. Implementation measures would include development of a public education program, surveillance, and strict enforcement of State laws and policies prohibiting introduction of unauthorized species.

Northern Pike

Goals and Objectives:

Monitor and suppress the northern pike population in the river and reservoir, and evaluate impacts to other species.

Rationale:

Canyon Ferry and the Missouri River between Toston and Canyon Ferry have long held a low-level northern pike population. In recent years, an abundance of northern pike have been discovered in the impoundment upstream of Toston Dam and reports of smaller-sized pike caught by anglers in Canyon Ferry Reservoir became more numerous. In 2008, reproduction of northern pike in the reservoir was documented through the capture of young of the year pike during summer beach seining. Northern pike are highly piscivorous fish and the current forage base in Canyon Ferry is likely not adequate to support an additional voracious predator.

Strategies:

- Eliminate all angler bag limits for northern pike in the upper Missouri River reservoir system.
- Identify critical spawning habitats in the river and reservoir and determine if habitat manipulations can suppress pike numbers and emigration through the system.
- Explore and implement other opportunities or techniques to suppress northern pike numbers.
- Determine impacts of northern pike to existing forage.
- Additional management methods may be necessary to reduce pike populations (e.g., spearing, commercial fishing, required harvest during tournaments) following public review and MEPA process.

Other Canyon Ferry Reservoir Fisheries Management Issues

Reservoir Operations

Goals and Objectives:

Work cooperatively with BOR to incorporate fisheries management and angler access concerns into the management of Canyon Ferry Reservoir.

Rationale:

Reservoir operations have a significant impact on fish populations residing in Canyon Ferry Reservoir by influencing the quality of shoreline habitat, flushing losses over and through the dam, and recreational access to the lake.

Strategies:

- Continue participation with the reservoir operations steering committee to focus efforts on optimizing reservoir operations for the fisheries resources. The reservoir operations steering committee, comprised of FWP, PPL Montana, BOR, irrigators, marina operators, guides and outfitters, and sportsmen, meet annually to review water supply forecasts, proposed dam operations and operational guidelines in an effort to minimize impacts of dam operations on fish, wildlife and recreational resources.

- Work with reservoir steering committee and BOR to manipulate reservoir operations to provide better fish habitat.

  - Manage reservoir levels to better promote shoreline vegetation development.

Derbies/Tournaments

Any regional, district-wide or statewide policies, restrictions or regulations governing tournaments which may be developed during the plan period and which geographically include Canyon Ferry will supersede restrictions listed here unless less restrictive.

Rationale:

Fishing tournaments can impact fish populations and conflict with non-tournament angling and recreational opportunity.

Strategies:

- Regulation of fishing tournaments on Canyon Ferry Reservoir will be based on management strategies for individual fish species. Generally, this will require a conservative approach to harvesting native fishes (burbot or ling) and sport fish species (trout and perch) that are subject to predation by walleye. Management strategies direct a liberal approach to harvesting walleye unless monitoring shows a significant decline in walleye. If walleye decline below the goal of 3 per gillnet for a three-year average, tournaments may be restricted or denied to minimize handling mortality. Conversely, if walleye monitoring shows a three-year average exceeding 7 per gillnet, it may be necessary to encourage or require selective harvest of fish taken to support management objectives.

- Harvest-oriented and/or catch and release tournament sponsors may be required to accommodate data collection or fish tagging by the department. Important data can be generated from the tagging or sampling of fish caught in tournaments that would be beneficial to management of the fishery in Canyon Ferry.

- Regulation of tournaments will account for the need to distribute tournaments evenly throughout the year and provide for angling opportunities on the reservoir free from tournaments. A maximum of 12 tournaments per year of any type (open water angling, ice fishing, bowfishing, etc.) will be permitted. More than one tournament will not be permitted for the same day and tournaments will not be approved for consecutive weekends in order to minimize the potential for conflicts. Applications will be considered on a first come basis until all available slots are filled. Applications must be received

by July 1 for ice derbies and November 1 for open water of the year preceding the proposed tournament. Applications received earlier than May 1 for ice fishing and September 1 for open water will be returned to the applicant for resubmittal.

Rainbow Trout

Harvest from competitive fishing events is not consistent with the management strategy to maintain conservative regulations relating to rainbow trout harvest and support year around angler harvest.

- Maintain the past and current management strategy of not allowing competitive fishing derbies for rainbow trout in Canyon Ferry.

Yellow Perch

Perch are highly sought after by anglers as a sport fish in both the ice and open water, but also are the primary forage fish for all piscivorous (fish-eating) fish species in the reservoir.

- Maintain the past and current management strategy of allowing one competitive fishing event during January.

- Based on the conservative perch harvest limits adopted by the FWP Commission, it may be necessary to modify the structure of events (such as team fishing events) to ensure compliance with the daily harvest limit of 15 fish.

Walleye

Tournaments would potentially attract new or additional anglers to the reservoir to assist efforts to promote angler harvest of walleye, which is consistent with strategies to manage walleye numbers.

- Authorize up to three tournaments in a calendar year but no more than one tournament per month to provide a balance with existing users of the lake that are not interested in competitive fishing events and who would be negatively impacted by tournament activities.

- All applications (catch and release or harvest oriented) will receive the same consideration. Preference will be given to tournaments held previously (first come basis).

- Fish mortality for catch and release tournaments is a concern during the summer months when water temperatures exceed 65 degrees. Logistics for handling and transporting fish will be addressed as necessary to minimize mortality.

Burbot (Ling)

Burbot population trends are not well understood and additional harvest caused by a competitive fishing derby may cause unforeseen impacts to the fishery. Burbot are a long-lived and slow growing native species.

- Allow up to two derbies (restricted to angling only) per year. Structure these events to allow for competitive fishing for large and/or the largest fish and not to include competitive fishing for the most fish or most total weight of fish.

Carp

Carp are a non-native fish, which probably contribute very little to the community of native and/or preferred sport fish in the reservoir. No biological concerns are raised by these events and there is currently no need to restrict the number of carp derbies.

- No restriction on number of events other than the total number of events allowed on Canyon Ferry Reservoir, but derbies must be compatible with management objectives.

- Derbies for young anglers should avoid competitive events by structuring the derbies to reward participation rather than for catching the largest or most fish.

- Adult competitive carp events can and should emphasize biggest fish, most fish and/or most weight. Harvest is recommended but not required.

Use of Live Fish as Bait

Goals and Objectives:

Prevent introduction of new fish species into the Upper Missouri River Reservoir system from the use of live fish as bait.

Rationale:

The use of live fish as bait poses significant risks for introducing new fish species to the system. An inadvertent introduction could significantly impact the existing fish communities in Canyon Ferry Reservoir and downstream waters. There is increased interest in fishing with live fish as bait as the walleye fishery continues to develop, particularly during seasons when catch rates are low (i.e., ice-fishing).

Strategies:

- Continue to prohibit the possession or use of live fish as bait unless investigations demonstrate the potential for allowing native bait fish species to be used safely.

- Initiate education efforts regarding the risks associated with use of live baitfish and the importance of preventing inadvertent introductions of new species.

- Educate anglers regarding effective bait alternatives that are commercially available that pose no threat of inadvertent species introductions.

Habitat

Goals and Objectives:

Aggressively protect and enhance fish habitat as a management tool.

Rationale:

Habitat quality for sport fish species and forage species is an important factor in determining the quality and sustainability of the fish community in the Canyon Ferry/Missouri River system. Habitat complexity is critical for providing balance in predator/prey relationships, particularly in western reservoirs where habitat diversity is minimized by fluctuating lake water levels and associated poor development of submergent and emergent vegetation. Continued enhancement of spawning habitat for salmonids provides diversity of recruitment sources to the system.

Strategies:

- Efforts to expand yellow perch spawning and rearing habitat may enhance habitat diversity for this important sport fish and forage species. Implementation will focus on using natural materials, limiting costs, and monitoring effectiveness.

- Enhancement projects for salmonids will focus on providing fishing opportunities and spawning areas in the Missouri River and associated tributaries to enhance trout fishing opportunities in locations where walleye are less abundant.

- Enhancement of tributary habitat and improved water quality will be used to mitigate effects of whirling disease and drought on trout populations in the system.

- Other habitat concerns will be addressed by working with BOR on lake level issues, working with DNRC on Toston Dam operation and Broadwater Power Project mitigation, reviewing 310 and 124 permitting, private pond licensing, and implementation and monitoring of instream flow reservations on the Missouri River and associated tributaries.

Disease and Aquatic Nuisance Species

Goals and Objectives:

Prevent new diseases and exotic aquatic plant and wildlife species from entering the Canyon Ferry/Missouri River system and limit the expansion of current disease agents.

Rationale:

The outbreak of disease has potential to impact all fish species and hatchery egg sources in the Canyon Ferry/Missouri River system. Introductions of invasive aquatic species (e.g., Zebra mussels, Eurasian watermilfoil, New Zealand mudsnail, asian carp) have the potential to out-compete desirable flora and fauna in the reservoir system and can negatively impact recreation and water use as well as fish populations. Illegally moving live fish to or from the reservoir for introduction into other systems is a threat to the Missouri River system as well as water bodies throughout Montana.

Strategies:

- Reduce the risk of introducing disease agents to the system by disease testing hatchery fish and egg sources.

- Initiate education efforts to reduce spread of disease and invasive species.

- Continue regulating private ponds near Canyon Ferry.

- Continue monitoring of existing diseases such as whirling disease.

- Continue work with Aquatic Nuisance Species Coordinator to conduct boat-check and boat washing stations during periods of exceptionally high angler use.

- Continue work with Enforcement personnel to insure live fish are not transported into or out of the reservoir system.

Piscivorous Birds

Goals and Objectives

Work with FWP Wildlife Bureau and the U.S. Fish and Wildlife Service to determine the impacts of pelicans and cormorants to Canyon Ferry fish populations. Consider active bird management strategies if research shows significant impacts to fish populations.

Rationale:

Numbers of American pelicans on Canyon Ferry have grown exponentially from record-low population levels of the early 1990s. Double crested cormorant numbers steadily increased through the late-1990s and have currently stabilized near 500 nesting pairs on the Canyon Ferry Wildlife Management Area. Both pelicans and cormorants are piscivorous (fish eating) birds. FWP observations of pelican and

cormorant diet while fledgling birds were still on the nest (typically mid-June) found pelican diet comprised primarily carp and crayfish, while cormorants showed a preference for trout. These observations only provide a snapshot of what comprises the bird's diet—additional study is necessary to determine seasonal variation in bird diets and to better assess total fish consumption by pelicans and cormorants.

Strategies:

- Determine the cost and feasibility of a Graduate study to assess seasonal diet and composition for pelicans and cormorants.
  - Evaluate the economic impact of consumption of stocked rainbow trout by cormorants.
  - Evaluate the impact of pelicans and cormorants to sport and native fish populations.
  - Evaluate the potential need for population control measures of pelicans and/or cormorants.
- Any proposal to implement population management measures will require an Environmental Assessment and provide opportunity for public comment. No management action will be taken without thorough research and evaluation of bird and fish interactions.

Access

Goals and Objectives

Identify areas and strategies to improve fishing, boating, and camping opportunities on Canyon Ferry Reservoir. Maintain or improve access for shore anglers and kid's fishing.

Rationale:

Maintaining quality access to the reservoir is essential to maintaining Canyon Ferry as one of the most heavily fished waters in the state. Shoreline development in some areas of the reservoir may lead to additional conflict between homeowners and anglers. Other areas of the reservoir have limited boat-launching facilities, which can lead to increased bank erosion from boats launching from beaches.

Strategies:

- Inquire with BOR about installing an additional boat ramp on the east shore (i.e., Duck Creek, Confederate Bay) to reduce bank erosion due to boats launching from the beach and for safety of boats during wind and storm events.
- Educate anglers and landowners about what areas are legally accessible by anglers and recreators.

Flushing Losses at Canyon Ferry Dam

Goals and Objectives:

Evaluate annual and seasonal flushing rates of fish out of Canyon Ferry Reservoir. Determine feasibility of screening Canyon Ferry Dam to reduce flushing losses.

Rationale:

Flushing loss of fish out of Canyon Ferry Reservoir can be significant, especially during high water years. Skaar and Humphrey (1996) documented that flushing losses of hatchery rainbow trout was correlated with high runoff. Flushing loss can effect recruitment of stocked fish, but appears to have little overall effect to perch and walleye abundance in Canyon Ferry. Flushing loss from Canyon Ferry have

significant impacts to fish populations downstream of Canyon Ferry. Flushing flows typically occur in the spring, when pelagic walleye fry are readily flushed over Canyon Ferry Dam. Adult walleye are also susceptible to flushing, with walleye tagged in Canyon Ferry captured in Hauser Reservoir and below Hauser Dam. Record high levels of walleye abundance in Hauser and Holter Reservoirs are largely attributable to flushing from Canyon Ferry Dam. In the Missouri River below Holter Dam, walleye abundance increases following years with flushing flows. Achieving balance between predator and prey species in downstream waters will be difficult unless walleye flushing issues can be addressed.

Strategies:

- Evaluate entrainment and flushing rates of fish out of Canyon Ferry Dam. Determine timing and magnitude of flushing losses.

- Determine feasibility of reducing fish flushing losses out of Canyon Ferry Reservoir.

  - Evaluate screening devices on Canyon Ferry Dam that would reduce flushing losses.

  - Investigate other technologies that may be effectively employed on Canyon Ferry Dam to reduce fish flushing losses and entrainment to downstream waters.