



MISSOURI RIVER



FACT SHEET

Fisheries Resources

This Fact Sheet provides a brief overview of a specific topic important to the Master Water Control Manual Review and Update Study process. Information contained in this Fact Sheet is summarized from technical reports and the preliminary Revised Draft Environmental Impact Statement.

Summary

Over 156 native and introduced fish species live in the Missouri River. This includes the endangered pallid sturgeon, a native river species. Habitat and the mix of fish species differ considerably between the lake and river portions of the Mainstem Reservoir System. Alteration of natural seasonal flow patterns affects each of the five types of fish habitat evaluated for the 100-year study period. Alternative FW20 provides the least young-of-year fish production habitat, while alternative M66 provides the most compared to the CWCP. Alternative C44 provides the most coldwater fish habitat in the lakes, while alternatives C18 and M66 provide the least compared to the CWCP. The CWCP provides the least coldwater fish habitat in the river, while alternative C44 provides the most. Alternative FW20 provides the most warmwater fish and native fish habitat in the river, while alternative C44 has the least compared to the CWCP.

Existing Conditions

Over 156 fish species occur in the Missouri River. Fish are important as contributors to the ecosystem, as a food source, and for recreation. These fish species include a wide variety of native and numerous species that have been introduced into the Mainstem Reservoir System lakes and river reaches. The habitat classes available and, correspondingly, the species composition of the Missouri River differ considerably between the river and lake segments. The large reservoirs formed by the six dams on the river have greatly changed the character of the river and the fish it supports. Even the river reaches below the dams have changed, particularly in water quality and bottom characteristics. The increased diversity of habitat from the addition of these lakes and modified river reaches has led to an increased diversity of fisheries resources relative to natural conditions.

Lake Conditions

The six mainstem lakes of the Missouri River contain a diverse community of coldwater, coolwater, and warmwater fishes. The upper three lakes have been stocked with coldwater game and forage fish species to take advantage of the coldwater habitat that is retained through the summer and fall in the lower lake depths. These species include chinook salmon, brown trout, rainbow trout, lake trout, cisco, and rainbow smelt. The lower three lakes and warmer water areas of the upper three lakes include native and non-native species that have adapted to the lake habitat. These include walleye, sauger, smallmouth and largemouth bass, goldeye, carp channel catfish, shovelnose sturgeon, river carpsucker, white and black crappie, gizzard shad, and many forage species such as the emerald shiner.

Natural reproduction of the fish populations of the six mainstem lakes is limited by the availability of spawning and young-of-the-year rearing habitat. The coldwater species generally lack spawning habitat and, thus, are primarily supported by hatcheries. The only exception is lake trout in Fort Peck Lake, which, in addition to stocking, is supported by some natural reproduction in deeper waters along the face of the dam. Most of the warmwater and coolwater species spawn in shallow water of the lake margins, in the river above the lakes, or in tributary streams. In the upper three lakes, low water levels during droughts limit coldwater fish habitat and shallow spawning and rearing habitat of warmwater and coolwater species. In the lower three lakes, high inflow and outflow reduce lake productivity and cause fish to be flushed from the lakes. Native fish in the river reaches are naturally adapted to the high, warm, and muddy spring and early summer flows, and lower late summer and fall flows characteristic of the historic Missouri River. Cold, clear tailwaters of the upper three dams are more conducive to trout and salmon, but not the native paddlefish, sturgeon, and other fishes.



River Conditions

The most important sportfish in the river stretches are walleye, sauger, white bass, yellow perch, channel catfish, paddlefish, shovelnose sturgeon, and northern pike. The pallid sturgeon has been listed as an endangered species. Paddlefish populations have declined sharply and are being considered for listing as threatened or endangered status under the Endangered Species Act. Sturgeon chub and sicklefin chub are candidate species for listing.

Alteration of natural seasonal flow patterns in the Missouri River has impacted fish communities and populations. High spring flows have been nearly eliminated on some sections of the river and reduced on others. Many species are adapted to use increased backwater and overbank areas that naturally occurred during high spring flows, which provided high quality spawning, incubation, and rearing habitat. During their lifecycle most river fish depend on low-velocity, shallow-water habitat found in backwater and side channels during natural high flows. Backwater areas, other low-velocity habitats, and sandbars in the river channel have been reduced on the Missouri River. This has led to reduced deep pool habitat. Additionally, because the water now carries less sediment and is less muddy, conditions tend to favor sight feeders over those native species that are specially adapted to feeding in very muddy waters.

Comparison of the Alternatives

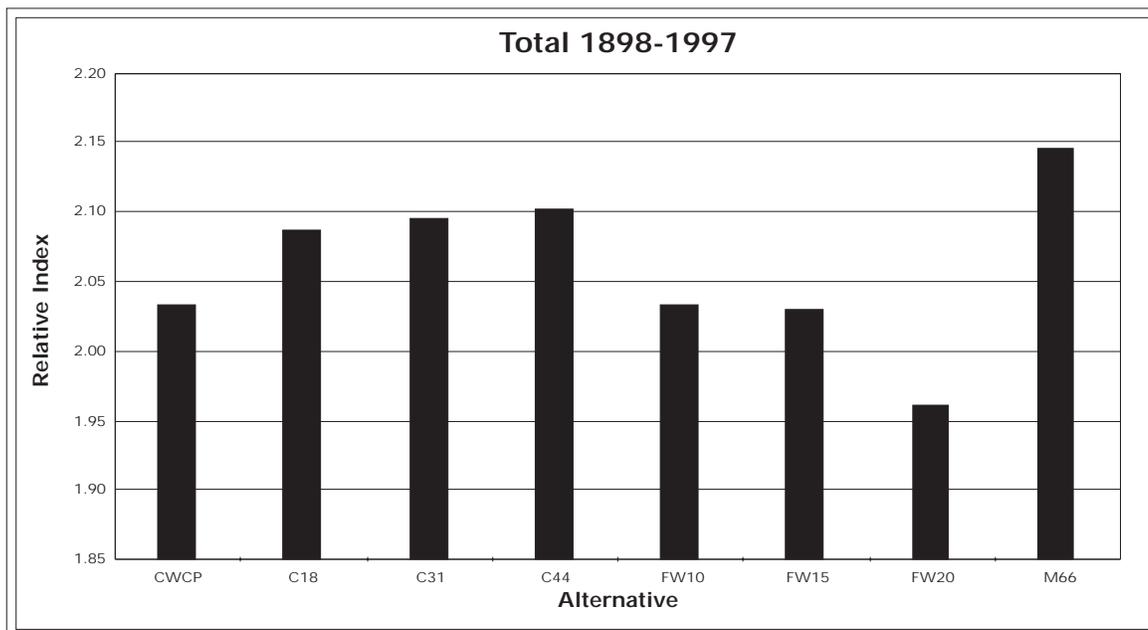
The analysis of the effects of the alternatives on fish resources was accomplished using the results of five models and related indices to provide a comprehensive measure of factors influencing fish populations and habitats. The models were used to evaluate each of the seven alternatives and the CWCP based on a

100-year study period. These five models predicted:

- Young fish production in the lakes
- Coldwater fish habitat in lakes
- Coldwater fish habitat in river reaches
- Warmwater fish habitat in river reaches
- Physical habitat for native river fish in river reaches

Young-of-year Fish Production

All but one of the alternatives has a greater index of young-of-the-year production than the CWCP. The production of individual species in each lake relates to changes in lake levels in spring, and annual inflows and outflows. Total average annual values presented are an average of a combination of the fish production indices computed for several species (e.g., walleye, yellow perch, northern pike, white crappie) combined with the relative magnitude of the individual indices for each lake. Young-of-year fish production values for alternative FW20 are the lowest of the eight alternatives. This is the only alternative with a negative impact on young-of-year fish production compared to the CWCP. Alternative M66, which provides an additional target flow at St. Louis, has the highest index of the alternatives, and therefore the greatest benefit to young-of-year fish production. Indexed values for young fish production increase for alternative C18 due to intrasystem regulation modification. Increasing conservation levels during a drought (alternatives C31 and C44) also seems to benefit young fish production when compared to alternative C18.



Total average annual values for young fish production in the mainstem lakes



Coldwater Fish Habitat in Lakes

Total average annual coldwater fish habitat (in million acre-feet (MAF)) for all of the alternatives, except C18 and M66, are greater than that of the CWCP. The minimum coldwater fish habitat (MAF) from July through October, based on suitability of water temperature and dissolved oxygen, was used as the index of habitat in the upper mainstem lakes. Increasing spring/summer releases and changing navigation service levels under alternatives FW10, FW15, and FW20 slightly increases coldwater fish habitat in the lakes compared to the CWCP.

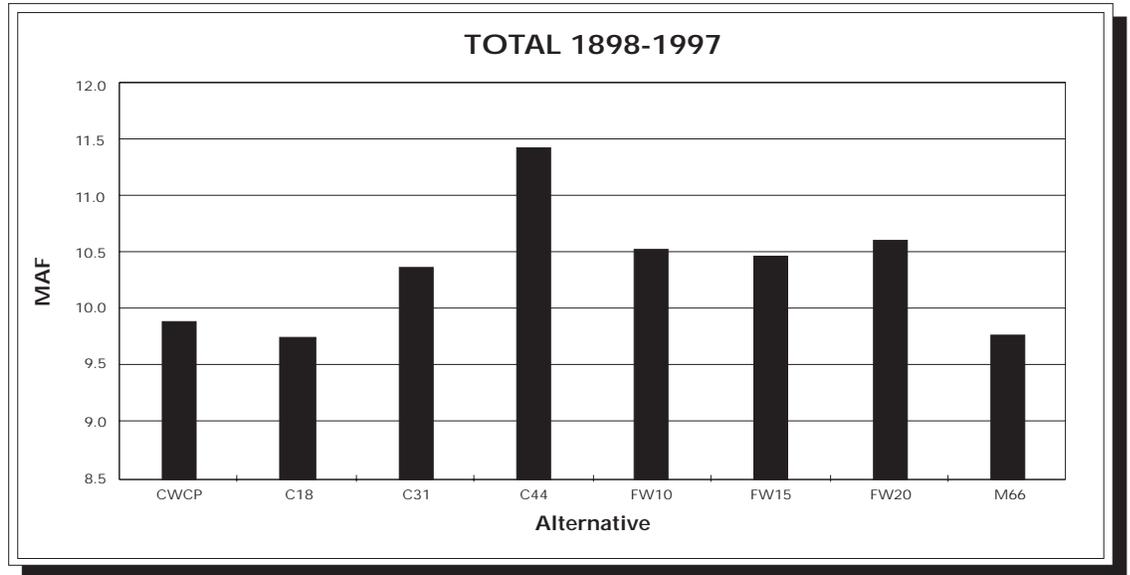
Increasing levels of conservation during a drought further increases the habitat, with alternative C44 having the highest value of all alternatives including the CWCP.

Coldwater Fish Habitat in the River

The CWCP has the lowest total average annual miles of suitable coldwater fish habitat of any of the alternatives. This may

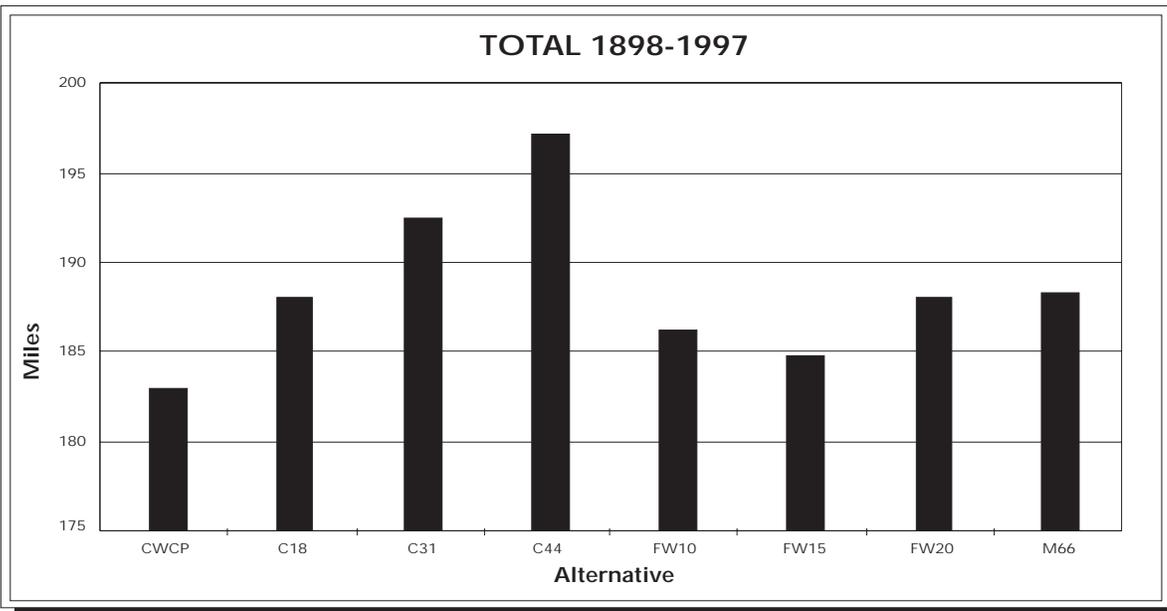
Total average annual miles for coldwater fish habitat in the river reaches

Total average annual million acre-feet for coldwater fish habitat in the Mainstem Reservoir System lakes



indicate that intrasystem regulation is effective in increasing the amount of coldwater river fish habitat, since intrasystem regulation was applied to all the alternatives except the CWCP. The coldwater fish habitat was estimated in river reaches downstream from Fort Peck Dam and Garrison Dam for the months of April through September. The amount of water released from the upstream dam and the water temperature were factors used to determine the amount of habitat and annual values. Increasing levels of conservation in a drought increases values, with C44

having the highest value of all the alternatives. The lowest coldwater river fish habitat provided under the seven alternatives other than CWCP, is alternative FW15. This may be due to higher spring and summer releases and lower navigation service levels.

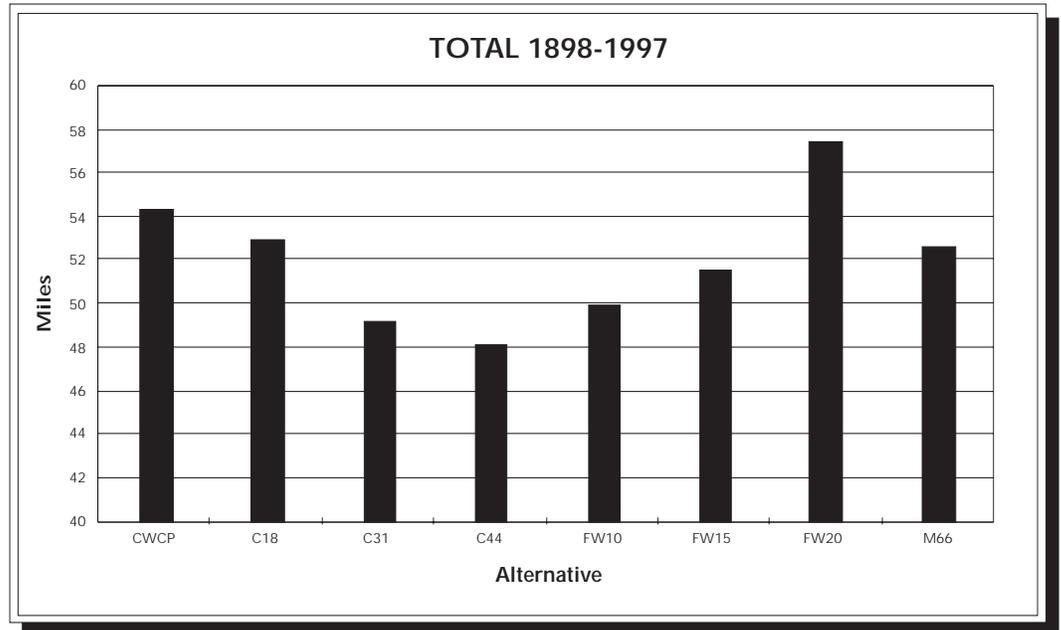




Warmwater Fish Habitat in River

The amount of warmwater fish habitat is generally lower for alternatives that have higher amounts of storage rather than higher releases. The index used for warmwater river habitat is the number of miles of river that have suitable water temperature during the spring and summer months for warmwater fish. The pattern of higher indices is the opposite of the effects expected for fish requiring coldwater river habitat because of opposite temperature needs of the two groups. Conservation alternatives, C18, C31, and C44, have progressively lower total average annual values and all provide less habitat than the CWCP. Increasing spring/summer flows and modifying lake levels to benefit fish and wildlife has a progressively beneficial effect on warmwater river fish habitat, with FW20 having the highest value of all the alternatives.

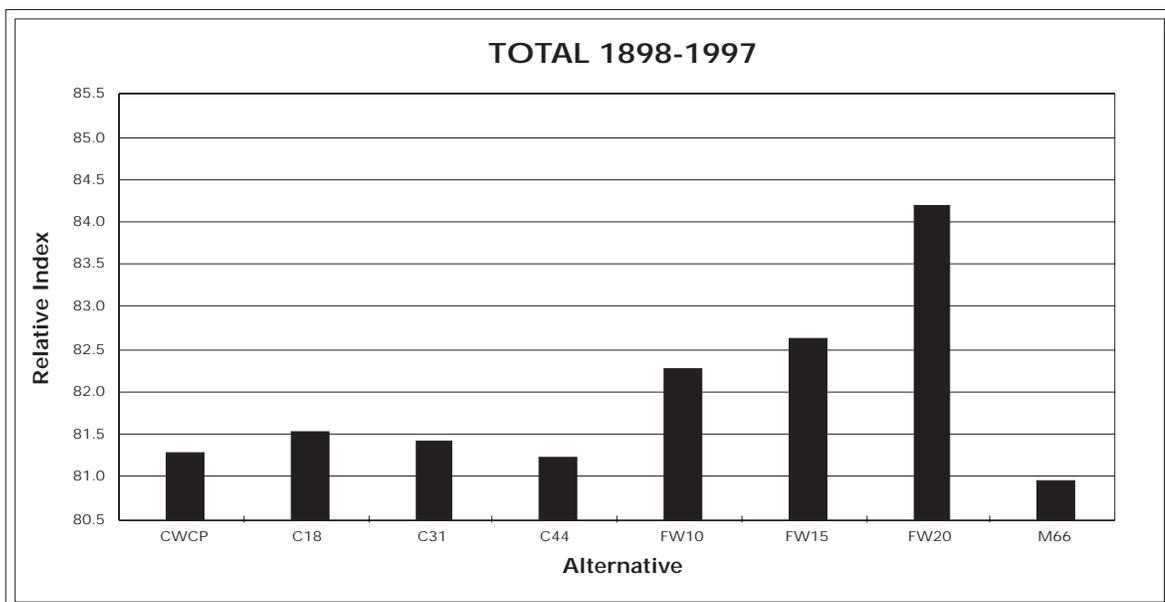
Total average annual miles for warmwater fish habitat in the river reaches



Physical Habitat for Native River Fish

Native river fish index values were higher for most alternatives than under the CWCP. Total average annual physical habitat

Total average annual physical habitat values for native river fish



values for native river fish were computed for the river reaches downstream from four of the dams and for five reaches of the Lower River downstream from Sioux City. An index value was computed based on a comparison of the alternatives depth and velocity values to that of natural river flow conditions. Those alternatives that most closely follow natural flow values have the highest index. In April, May, and June, the habitat value depends on the potential for overbank flooding in each reach. Conserva-

tion alternatives C18, C31, and C44 have progressively lower values, with all but C44 being higher than the CWCP. Increasing spring/summer releases and modifying service levels in the Lower River has a progressively beneficial impact on physical habitat, with FW20 having the highest value of all alternatives.