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Plans by the U. S. Army Corps of Engineers to channel the Missouri River from Sioux City to Yankton are of great concern to the ecologists interested in this section of the river. The channelization of the last remaining relatively natural stretch of the Missouri River below the main stem reservoirs could prove to be ecologically disastrous. At the present time too little is known in the form of scientifically proven facts of the likely effects on fish and other organisms inhabiting the river. The populations of certain species of fish far downstream from and in the section to be channelized are very likely dependent on this section of the river for maintenance of their present population levels. Other species could be eliminated from the river. The manner in which these species will be affected is direct reduction or elimination of habitat types necessary in some period of their life cycle. These habitat types are small chutes which are not subjected to the strong current of the main stream, gravel bars, riffles and rapids. In addition all species listed herein and most others which also inhabit the river will be detrimentally affected by the significant reduction in surface area of the river resulting from channelization. The fish which are most likely to be seriously affected are:

Lake sturgeon - Acipenser fulvescens - Listed as "rare" in the Red Book and "rare" in the State Fish and Wildlife Plan. This fish is a shallow riffle spawner.

Pallid sturgeon - S. albus - Listed as "status unknown" in the Red Book, "rare" in the State Plan. Habitat is firm sandy bottom in moderately strong current. Spawning occurs over rocky bottom in swift current.

Shovel-nose sturgeon - Scaphirhynchus platorynchus - Habitat is firm sandy bottom in moderately strong current.

Paddlefish - Polyodon spathula - Spawns over gravel bars in swift current.

Goldeye - Hiodon alosiodes - Spawns in shallow flowing water over rocky or gravelly bottoms.

Blue sucker - Cycleptus elongatus - Adults inhabit strong current with bottom of bedrock or rubble. Juveniles frequent the broader less turbulent riffles. Spawning occurs over riffles.

Redhorse - Moxostoma spp. - Flowing water with spawning occurring over gravel bottom.

Blue catfish - Ictalurus furcatus - Inhabits swiftly flowing chutes, rapids and pools over good current. Occurs primarily in the unchannelized section of the river although occasional individuals are taken downstream.

Flathead catfish - Pylodictis olivaris - Most drastic effects probably result in water surface area reduction. Reduced nursery areas probably play a factor.

Burbot - Lota lota - Spawning takes place over gravelly or sandy bottoms.

White crappie - Pomoxis annularis - Spawning takes place in chutes and backwater areas. Adults inhabit these same areas.

Bluegill - Lepomis macrochirus - Spawning takes place in chutes and backwater areas. Adults inhabit these same areas.

Sauger - Stizostedion canadense - Spawning takes place over gravelly or rocky riffles.

Walleye - S. vitreum - Spawning takes place over gravelly or rocky riffles.

The flathead catfish populations in the Missouri River have received extensive study by Larry Morris. He has found that the populations of this species in the unaltered river is approximately double that found in the channelized river (Larry Morris, D-J Job Completion Report, F-4-R-12, Job 23, Nebraska, 1966).

The effects on fish-food organisms have been documented in a report by Larry Morris, Ralph Langemeier, Tom Russell and Arthur Witt (D-J Job Completion Report, F-4-R-2, Job 8, Nebraska, 1966).

In their conclusions regarding effects of main stemimpoundments and channelization on the limnology of the Missouri River the following two paragraphs are pertinent.

> "Channelization, however, is not beneficial to the aquatic environment. Although the estimated standing crop of benthos, on a unit-area basis, was practically identical in both sections of the river, the benthic habitat had been reduced by two-thirds as a result of channelization. This was a net loss of aquatic environment. Moreover, most of this loss resulted from the elimination of chutes and associated sloughs. These areas, in addition to being consistently good producers of benthic organisms, were also fish spawning and nursery sites as shown by the large number of fry in the drift samples from the chute in the unchanneled river.
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> "Channelization of the river reduced the variety of aquatic habitat by destroying key organism-producing-areas and by reducing the amount of edge. The homogeneity of the channelized river is apparent. The detrimental effects of channelization could have been lessened by preventing the destruction of chutes and sloughs which are so important in producing aquatic organisms. Important, too, is the preservation of brush piles which serve as substrate for members of the <u>aufwuchs</u> community which in turn serve as food for fishes."

They have also stated that "in the channelized river the average standing crop of drift was 8 grams per acre-foot while in the unaltered river the average standing crop was 68 grams per acre-foot." The only

conclusion which can be reached is that there is much less food in the channelized section of the river as opposed to the unchannelized section. The consequences for fish are apparent. I believe it is apparent in these statements resulting from an intensive and extensive study of the limnology of the Missouri River that the channelization of this last remaining stretch of river should be very carefully considered before it is approved and funded.

Further, as I now understand the Corps' plan, the surface area of the river would not be immediately reduced as it has been in the other channelized areas, but would remain for a time essentially the same as at present. This would result because of a slow rate of siltation in the backwater areas. However, it is projected that silting will destroy these backwater areas over a period of 50 years. Thus in 50 years time the section of the river between Sioux City and Yankton would in appearance be very similar to those portions of the river already channelized with the aquatic habitat being reduced to approximately one-third of its present surface area. This in itself represents a very significant loss. I can only conclude that the channelization of this section of river should <u>not</u> be undertaken until the ecological effects of doing so are reasonably well documented. Then ways of averting the serious damages likely to occur could be worked out, if this is practical or possible.