

Impact of Upper Mississippi River Lock and Dam 3 on the Migratory Movements of Chippewa River Paddlefish

Project Need/Justification:

Navigation locks and dams on the Upper Mississippi River (UMR) impede the movement of native migratory fish species like the paddlefish. One of the largest paddlefish populations in the upper midwest resides in Wisconsin's lower Chippewa River throughout most of the year. However, seasonal migratory movements of paddlefish from this drainage to the nearby lower St. Croix River (another UMR tributary) are hindered by Lock and Dam 3 on the UMR. The US Army Corps of Engineers has recently been considering the construction of a fish passageway at Lock and Dam 3. Therefore, current information on the movements of migratory fish (e.g., paddlefish) near this vicinity is needed to facilitate additional planning for enhanced fish passage here.

Project Description:

a. Recovery/Restoration/Management Benefits

Opportunities for paddlefish to swim past UMR Lock and Dam 3 are limited by the existing design and operation of this aid to navigation. Consequently, opportunities for natural gene flow among paddlefish that typically reside in nearby tributaries located upstream (i.e., the lower St. Croix River) and downstream (i.e., the lower Chippewa River) of Lock and Dam 3 have been substantially reduced since this facility commenced operations in 1938. The diminished geographic range of these fish may ultimately result in a genetic bottleneck that could reduce the size and compromise the health of paddlefish populations in this portion of the UMR basin. If an appropriate fish passageway was installed at Lock and Dam 3 to enhance opportunities for unimpeded interaction among nearby paddlefish populations that have been fragmented from one another for decades, these fish should respond with enhanced vigor and growth due to greater access to suitable spawning, overwintering, feeding, and rearing habitats. In addition, this proposed management action may eventually improve the state-listed "threatened species" status of paddlefish in both Wisconsin and Minnesota by decreasing the fragmentation of paddlefish habitats and populations in these adjoining states.

b. Project Methodology and Results

The locations of eight feral paddlefish (including 4 males, 3 females, and 1 of unknown gender) that had previously been captured, radio-tagged, and released in the lower Chippewa River were determined periodically during FY99 using standard radio-telemetry methods and global positioning system technologies. Manual telemetry observations were made during daylight voyages in appropriately equipped boats or fixed-wing aircraft. With the cooperation of public and private landowners, automated telemetry observations were also made intermittently throughout the day and night at two fixed sites along the banks of the lower Chippewa River.

The paddlefish remained near the Chippewa River tagging site during most of the fall and winter in the vicinity of a deep (9-m) hole located about 40 km upstream of the UMR confluence. A female fish was the first to leave the overwintering site early in the spring (March 31) at a time when the discharge nearly doubled over a 24-h period to 12,000 cfs. About one week later, the two remaining females and one male abruptly left this site within a 12-h period as the discharge

exceeded 20,000 cfs. Three of the remaining fish stayed here until the second week of April, when the daily mean water temperature was still <10 C, and the final fish did not depart here until the third week of May, when the daily mean water temperature was 16C.

Telemetry observations made from the air during and shortly after the estimated peak spawning period in early May indicated none of the radio-tagged paddlefish had moved upstream of the Chippewa River overwintering site. Rather, these observations suggested that the majority of the fish had traveled >40 km downstream, departing the narrow and scoured channels of the Chippewa River for the broad and aggraded navigation pools of the UMR. Telemetry overflights of Pool 4 during May located two of the paddlefish (both males) at upstream sites in Lake Pepin (a vast and deep natural impoundment) that were as much as 25 km from the Chippewa River confluence. The occurrence of these planktivorous Chippewa River paddlefish in Lake Pepin after spawning had presumably concluded is noteworthy as it coincides with the reported annual peak abundance of zooplankton here. No other radio-tagged paddlefish were observed upstream of this location (i.e., within 29 km of Lock & Dam 3) in either the UMR or lower St. Croix River, nor downstream of the Chippewa River confluence in UMR Pools 4, 5, and 5A.

Automated telemetry observations at the Chippewa River overwintering site indicated that four of the eight radio-tagged paddlefish (including three of the four known males) returned here from the UMR over a 4-week period during the late-spring and early-summer and have remained here throughout the summer. Meanwhile, the whereabouts of the four remaining paddlefish (including the three known females) is currently unknown. However, due to several physical characteristics that make Lake Pepin a unique river environment (e.g., its large surface area, great depth, and abundance of unconsolidated sediments) and the apparently long battery-life of the radio transmitters that were implanted in the fish, we suspect that most of the paddlefish that were not located during telemetry overflights were suspended in the deeper portions of Lake Pepin.

In related FY99 activities, gill netting efforts resulted in the capture, tagging (binary coded microwires and jaw bands), and release of 33 paddlefish in the lower Chippewa River. From 1995 to date, a total of 247 paddlefish have been tagged in the Chippewa River with 94 of these individuals also recaptured here on at least one occasion. The remains of 5 paddlefish tagged in the Chippewa River have also been recovered from several upstream locations in UMR Pool 4 (Lake Pepin). Based on these results, an initial conservative population estimate suggests that the adult paddlefish population in the lower Chippewa River totals about 470.

c. Evaluation/Monitoring

Radio telemetry data of Chippewa River paddlefish movements from several years in the recent past are being analyzed by staff of the US Geological Survey's Upper Midwest Environmental Science Center and the US Fish and Wildlife Service's La Crosse Fishery Resources Office with a joint manuscript in preparation. Additional analysis of the mark-recapture data will permit a more robust population estimate and provide sound baseline data from which the status of the Chippewa River paddlefish population can be evaluated in the future.

Completion date: September 30, 1999

Budget:

The total cost of the project was \$51,000. The US Fish and Wildlife Service provided \$40,000. The US Army Corps of Engineers, the National Park Service, the Minnesota and Wisconsin Departments of Natural Resources, the US Geological Survey, and a private landowner each provided in-kind services.

Habitat and Fish and Wildlife Benefits:

<u># of River Miles</u>	<u>Dam/Land Ownership</u>
86	Private
11	FWS
26	Federal (non-FWS)
5	Tribal
32	State
160	Total

Information provided by this project and a willingness on the part of the US Army Corps of Engineers in early FY99 to consider reconstructing a portion of the Lock and Dam 3 spillway to facilitate improved fish passage demonstrated the initial eagerness of some river resource managers to restore the physical connectivity of a 160-mile reach of the lower Chippewa, upper Mississippi, and lower St. Croix Rivers to benefit migratory, large-river fishes like paddlefish and lake sturgeon. After a more thorough review of the potential environmental impacts of such a proposed project however, the US Fish and Wildlife Service and the states of Wisconsin and Minnesota have recently expressed opposition to a fish passageway here because it would (1) be placed in an important spring staging area for walleye, (2) be placed on a diverse mussel bed with state-listed species, and (3) hinder the passage of fish into adjacent backwaters. Therefore, this structural fish passage option is no longer under consideration in current plans for the rehabilitation of Lock and Dam 3.

b. Species of Management Concern that will Benefit

A total of 24 fish species found in the Chippewa, Mississippi, and St. Croix watersheds are migratory but are currently hindered by UMR navigation dams. This list includes the paddlefish and lake sturgeon which are both national and international species of concern. Lock and Dam 3 with its associated spillway represents the only physical barrier impeding the movement of fish such as these between the lower Chippewa and lower St. Croix Rivers. Data collected from this project will help to provide some of the information needed to develop additional plans for fish passage here, should it be considered as an acceptable alternative in the future.