Slackwater Navigation Projects

Jerry L. Rasmussen
U.S. Fish & Wildlife Service
P.O. Box 774
Bettendorf, IA 52722-0774

Slackwater navigation projects present unique environmental problems for riverine fisheries. Water in these slackwater pools is actually somewhat tilted into the watershed, creating a river-like environment immediately below the dams, a lake-like environment immediately above, and a tremendous diversity of habitats in between, created by many partially submerged islands (Figure 1). These projects suffer from erosion immediately below the dams, sedimentation immediately above, and dredging in mid-pool reaches to maintain the navigation channel.

Figure 1. Aerial view of Upper Mississippi River slackwater navigation project habitat.

The bedload naturally carried by the river, plus materials eroded below the dams is carried downstream into the pools where it begins settling out. Rock closing dikes, wing dams, and river flow produce a sorting effect on sediments (Figure 2), with the coarser grains of sand staying in the main channel and the finer grains of silt being transported into the backwaters. Along with these silts go all the major pollutants and heavy metals with an affinity to attach themselves to clay particles. These contaminated, and sometimes toxic, silts are thus being deposited right in the middle of prime fish and wildlife habitats where aquatic organisms are attracted to live and feed.

The sands that remain in the navigation channel occasionally block navigation traffic. But these are promptly removed by U.S. Army Corps of Engineers (Corps) channel maintenance dredges and pumped downstream into the main channel (thalweg) or side cast to nearby shorelines, or oftentimes in the past into sensi-

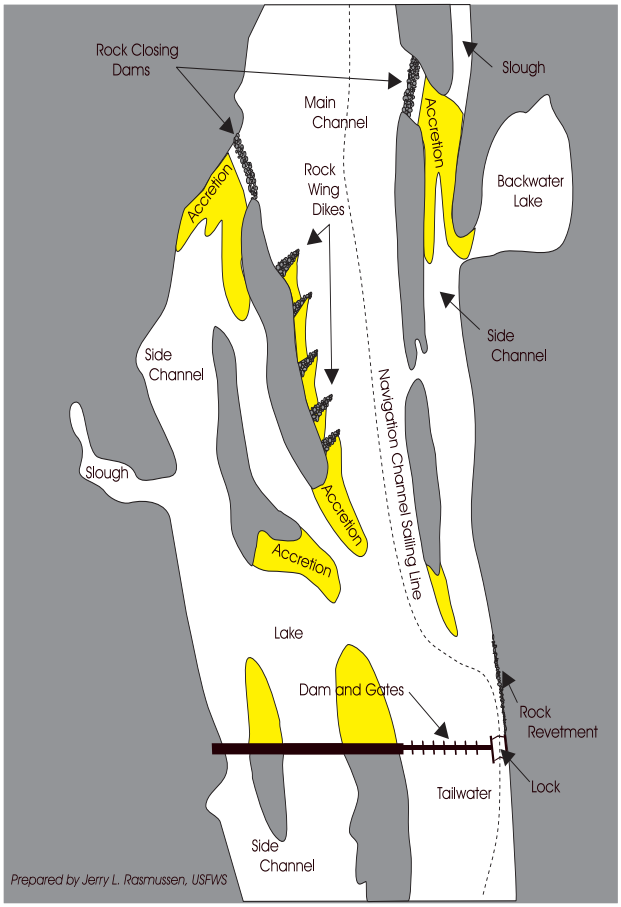

Figure 2. Dredging, wing dikes, and closing dams cause accretion of sediments in off channel habitats of slackwater navigation projects.

Figure 3. Adult lake sturgeon washed ashore in Upper Mississippi River navigation Pool 15, the apparent victim of injury by a large boat

tive backwater areas, destroying fish and wildlife habitats.

As backwaters are lost, fish are forced into the main channel and right into the path of towboat traffic. The huge nine-foot diameter towboat props can pull even large adult fish such as lake sturgeon (Figure 3) and paddlefish into their blades; to say nothing of the impact on smaller fish and fish larvae and eggs that are entrained in their propwash and destroyed by the sharp currents and shear forces.

In narrower river reaches these huge towboat props essentially process all the water in the main channel, even pulling some water and small fish out of nearby backwaters, acting like huge blenders. The concentric white lines shown in Figure 4, reaching all the way to the channel bottom, simulate the shear and shock waves produced by towboat prop wash. It's easy to see how small bottom dwelling fish are dislodged and carried right into the props of these huge boats.

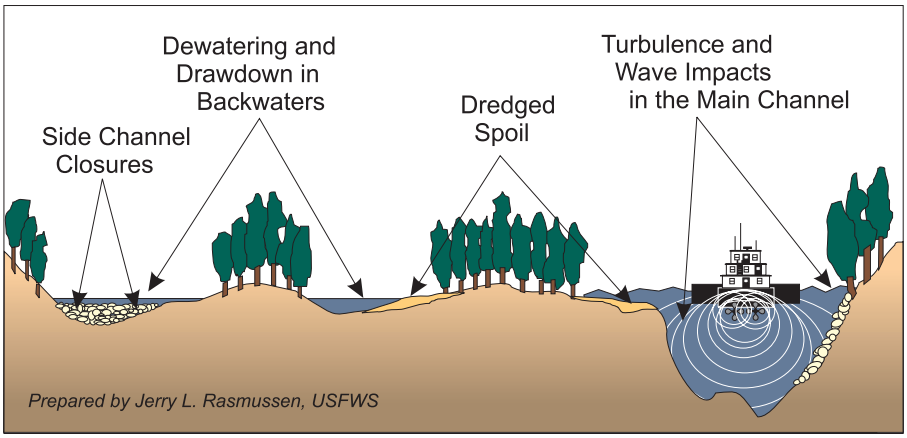

Figure 4. Commercial towboats significantly impact main channel and backwater fisheries habitats in narrow reaches of slackwater navigation projects.

Backwater sedimentation and dredged spoil disposal in slackwater navigation projects eventually reach the point such as they have on the Upper Mississippi River where the need for fish refuges and more active fish management becomes more and more apparent as the projects age.

Jerry L. Rasmussen, March 3, 1999