2008

Missouri River Recovery Program: Shallow Water Habitat Program

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Historic Missouri River

Historically, the Missouri River was a shallow, shifting river well known for muddy waters and rapidly changing channel conditions. The dynamic river provided a wide range of depth, velocity and sediment conditions. Within this environment, the amount of shallow water habitat was quite prevalent, with estimated amounts of more than 100 acres per mile. Shallow water habitat is an aquatic area less than five feet deep where the river flows slowly – less than two feet per second.

Over the years, the U.S. Army Corps of Engineers has been charged by Congress to remove snags, protect banks, construct navigation channels and build flood risk management structures (levees and dams) on the Missouri River to provide social and economic benefits to the nation. The Bank Stabilization and Navigation Program often relied on deposition of river sediments within constructed dike fields to train the river to a single channel. The resulting channel is at a fixed location and is both faster and deeper flowing than the historical river. While the ongoing operation of these projects continues to provide significant economic benefits, these activities have also diminished many natural features of the river's historical condition, including river flow variation, habitat diversity, sediment loads, water temperatures and floodplain connectivity. Compared to the historical abundance of shallow water habitat, the river in the late 1990s was estimated to provide less than five acres per mile of shallow water habitat within the lower 750 miles of the Missouri River.

Biological Opinion

The transformation of the Missouri River into a shorter, swifter main channel reduced habitat diversity and increased water clarity. The new river has lost its dynamic nature and ability to carve the landscape. Species such as the pallid sturgeon were well suited for the highly turbid conditions found in the historical Missouri River, but the clearer Missouri River today favors sight-feeding species such as smallmouth bass.

In 2000, and amended in 2003, the U.S. Fish and Wildlife Service released a Biological Opinion (BiOp) to protect and recover the populations of three threatened and endangered species on the Missouri River, including the pallid sturgeon. One element of the reasonable and prudent alternatives outlined in the 2003 Biological Opinion requires the restoration of 20 percent of the shallow water habitat that existed in the historical river. To meet this requirement, which only applies to the lower 752 miles of the river downstream of Gavins Point Dam, 20 to 30 acres of shallow water habitat per river mile must be in place by 2020. According to the BiOp, the river in its target condition would contain between 12,000 and 19,500 more

(continued on back page)
acres of shallow water habitat than it did in 2003. For comparison, the area of a single football field is slightly larger than one acre. The amount and location of shallow water habitat varies with river flow levels. To track performance against the BiOp acreage performance standards, shallow water habitat is measured at river levels equal to the average August flow.

**SEDIMENT IN THE MISSOURI RIVER**

Prior to the 1950s, the Missouri River carried more than 320 million tons of suspended sediment per year at Hermann, Missouri. The construction of dams, channel structures and levees allowed easier river navigation and controlled flooding but drastically decreased the amount of sediment flowing in the river. Today, the Missouri River near Hermann carries only 20 to 25 percent of its original sediment volume.

The drop in river sediment levels has degraded habitat for several species. One of these species, the endangered pallid sturgeon, relies on areas of turbid, slow-moving, shallow water to live and reproduce. In addition to restoring habitat for the pallid sturgeon and other species, reintroducing sediment into the river will restore other natural river functions and may help to reduce the impact of infrastructure issues in some areas related to degradation or lowering of the river channel.

Creation of shallow water habitat, whether performed by implementing the natural dynamic river processes or using mechanical methods, requires the removal of historically deposited sediments. Prior to project construction, sediment samples are collected and tested for potential water quality impacts. Ongoing studies continue to evaluate impacts of introducing sediment into the river and altering the current sediment load.

**RECOVERY EFFORTS**

The BiOp specifies that shallow water habitat can be restored by one or a combination of the following techniques:

- widening the river channel
- restoring chutes and side channels
- controlling the amount of water released from dams at certain times of the year (flow management)

To balance habitat restoration with the river’s other uses, the Corps has restored shallow water habitat using construction methods, rather than manipulating river flow levels. The Corps has completed numerous construction activities to modify existing dike structures and construct adjacent channel habitat, including chutes and backwater areas. The table below shows the BiOp performance standards for restoring shallow water habitat. The acres stated in the performance standards correspond to the maximum goal of 30 acres per mile. BiOp compliance may be reached at the lower target of 20 acres per mile, which corresponds to a total acreage of 12,035.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>ACRES OF SHALLOW WATER HABITAT CREATED</th>
<th>PERCENT COMPLETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>3,500</td>
<td>18</td>
</tr>
<tr>
<td>2010</td>
<td>5,870</td>
<td>30</td>
</tr>
<tr>
<td>2015</td>
<td>11,739</td>
<td>60</td>
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<td>2020</td>
<td>19,565</td>
<td>100</td>
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