The Effects of Dams on Rivers

Dams alter natural flows
Dams convert dynamic rivers into static pools upstream and steady, artificial flows downstream. Regulated outflows can create artificially low water conditions that strand or make fish and mussels vulnerable.

The Effects of Dams on Biology

Dams block fish migration
Fish migrate for various reasons... to spawn, to find food, to escape poor conditions, and more. Some migrate a few miles while others will migrate hundreds of miles. Dams block this natural, essential movement of the fish.

Fish that need to spawn in specific habitats (like smaller streams or riffle, rocky areas) are unable to successfully reproduce when dams block their spawning migrations. As a result, these fish populations decline or disappear.

Dams cause the loss of native fish & mussel species
Fragmentation of river systems (by dams) has been one of the most widely cited causes of total extinction or local extinction of native fish species. Recent MN DNR research found that on average, over one third of the fish species were missing above dams compared to what fish were found downstream. The fish species most commonly missing upstream of the dams were sensitive stream-dependent, and imperiled species.

Lake sturgeon have been dramatically impacted by dams. These long-living, riffle spawning fish almost disappeared from MN waters because dams blocked their long migrations to small steep streams.

MN mussels have also been impacted by dams. They require fish to reproduce so their populations can not thrive without migrating fish.

Reservoirs fill with sediment
Dams block the natural movement and sorting of sediment downstream. Because dams stop river flows, the reservoirs collect sediment as the water loses momentum and deposits the sediment. Sediment delivered to the reservoir buries the streambed and the bottom of the reservoir and eventually fills the reservoir. All of which are bad for the animals living in the stream, for recreationists, and for fish consumption.

Rivers erode below dams
Because sediment settles in the reservoir, none is carried over the dam to the river downstream. This ‘sediment hungry’ water is much more erosive causing erosion of the streambed and banks. Below most dams the stream bed is several feet, to as much as 25 feet, lower than the original stream bed and will continue to deepen with time.

The Dangers of Dams

Dams are dangerous drowning machines
Low-head dams are known as "drowning machines" because the water spilling over the dam creates a roller at the base of the dam. The roller can trap and drown swimmers, boaters, kayakers, even those wearing a life jacket or very strong swimmers.

Dam failure
After heavy or localized rainfall events rivers flood and sometimes dams fail. Just in the U.S., over 400 dams failed between 1985 and 1994. These failures have caused immense property and environmental damage and have taken thousands of lives.

As the nation’s dams grow older and as our population increases, the potential for deadly dam failures grows.

Reservoirs submerge & bury critical habitat
Dams create reservoirs that submerge the river valley. Sediment being delivered to the reservoir gradually buries the streambed and the river valley. Over time, reservoir fill with sediment and lose their capacity to hold water.

Dams are commonly built where rivers are steep so they can be built taller, hold more water, and generate more electricity. Steeper river reaches are critical to the river's community. Some native fish migrate in the spring to spawn in these steep reaches that are swift and rocky, which keeps the eggs clean and aerated. Lake sturgeon, for example, will migrate hundreds of miles to spawn in rapid small headwater streams.