

FACTS

City of Big Rapids Dam Removal Project

Location

Muskegon River valley of northwestern Mecosta County, Michigan.
City of Big Rapids, T15N, R10W, Sec 11

River

The Muskegon river discharges to Lake Michigan and is one of the largest streams in the Great Lakes basin. Complete information regarding the Muskegon river is available from the MDNR Fisheries Division in a document titled "[Muskegon River Watershed Assessment](#)". Average discharge of the river during a 60 year period measured downstream from Big Rapids near Newago is about 1900 cubic feet per second (cfs) (USGS). Flows range from 650 cfs (90% exceedance) to 2850 cfs (10% exceedance) (FERC). Check USGS gage station for flow and stage information.

The dam impounds water for about 1.3 miles above the dam.
Stream gradient is very high (for Michigan) at about 4.5 feet per mile (USGS).
Historic rapids were about 1.9 miles long (Fargo Engineering 1914).
Dam removal will open up 118.81 miles, one of the longest free-flowing reaches of river in Michigan.

Dam Structure

A stone-filled timber crib dam was built at this location 1866. It failed in 1912. A second concrete reinforced structure over the old dam was in place by 1916 with a 17 foot head. It was used for power production and when retired, sold to various owners, finally to the City of Big Rapids. It was partially removed in 1966 under contract to the City. Remaining dam sill is about 4.4 feet and about 250 feet wide (MDNR).

Aquatic Species

Site specific fishery assessment has not been done but will be attempted prior to dam removal. The river above Big Rapids supports moderate populations of self-sustaining smallmouth bass and stocked walleye. This area may also support resident rainbow or brown trout and a section several miles above Big Rapids is stocked with a limited number of brown trout. This area may be suitable habitat for introduction of muskellunge. Sampling of the river in 1989 above the impoundment produced 9 species of gamefish in a 1000 foot stretch, including smallmouth bass as well as green sunfish, sucker, darters, burbot, shiners, chub, logperch, (MDNR). Downstream dams on the Muskegon currently prevent movement of salmonids and other migrating fishes into this reach. No information is currently available regarding freshwater mussels.

Recreation

River frontage is 65% public ownership, including Ferris State University (west) and City park (east) with connection to the White Pines Trail, a State Park that links the Grand Rapids area north to Cadillac. Recreational use should be substantially improved in this reach for canoe and kayak use and for fishing. The structure is a public safety hazard for river users and several individuals have been hurt or drowned near the structure.

Sediment Management

Sediment previously accumulated behind the dam is in various layers of sand, woodchips, gravel and clay. These layers reflect the changing depth of the impoundment over the years and seasonal ice cover. Good gravel, cobbles and boulders are evident and probably reflect the original river bottom. The dam is not considered to be impounding sediments currently as river bed profile indicates that sediment is moving through and over the dam remnant (USGS).

Studies indicate that up to 80,000 cubic yards (cy) of accumulated sediment may be mobilized without the structure in place. The contract for dam removal includes preemptive dredging and off site disposal of 17,000 cy of material. The contract also includes primary and secondary sediment traps. Material accumulated in the traps will be pumped and disposed for up to 1 year after the dam removal. Sediment will be disposed on City property near the water treatment plant.

A rock 'cofferdam' was placed several years ago about 1000' downstream of the dam remnant to protect City water supply intake. This structure will serve as secondary sediment trap and will be breached upon final site cleanup (one year after dam removal). The water main will also be removed at that time.