

Michigan Dam Removal Case Studies
MDNR Fisheries Division

Completed Dam Removals (alphabetical listing)

Bangor Dam Removed: unknown

South Branch Black River, Van Buren County;
Earthen dam built in 1975 and owned by the Village of Bangor. All stoplogs were removed and no impoundment currently exists.

Big Rapids Dam Removed in 2001

Muskegon River; Mecosta County;
Big Rapids Dam on Muskegon River, Mecosta County was rebuilt in 1914 and owned by the City of Big Rapids. In 1966, a portion of this 17-foot hydropower dam operated by Consumers Power was improperly removed, causing a massive release of sediment downstream. A remnant portion of the dam 5-feet in height was left in place. This remnant dam posed a safety hazard and contributed to several drowning deaths. An effort led by the City of Big Rapids, Michigan Department of Natural Resources, Michigan Department of Environmental Quality, U.S. Geological Survey, Great Lakes Protection Fund, National Fish and Wildlife Foundation, and the Great Lakes Fishery Trust led to the removal of Big Rapids Dam in 2000 and 2001. The removal of this dam involved pre-emptive sediment removal (uncontaminated), downstream sediment traps and stabilization of remnant impoundment sediments in place. Additionally, numerous studies of stream morphology, sediment transport, habitat and fish/benthic populations were conducted to assess before and after conditions. Total actual cost of removal was **\$1.2 million**.

Camp Six Creek Dam Removed prior to 1994

Camp Six Creek, Iron County near Kingsford; MDNR owned low-head earthen dam built in 1964.

Camp Six Wildlife Dam Removed prior to 1994

Located on tributary to Tahquamenon, Luce County near Dollarville;. MDNR owned dam.

Charlotte City dam Removed 2006

Battle Creek River, Eaton County. Built 1903 with head of 8' and length of 50' this was an earthen dam built for recreational use (lake level control). The City of Charlotte drew down the dam in 2003. The City, MDNR and the local conservation district developed plans to remove the concrete spillway and restore the stream channel using local funds and grant funding from MDNR. This was accomplished to improve water quality, reduce erosion and provide fisheries habitat for warmwater species (pike and smallmouth bass). Cost estimate: \$180,100.

Copemish Dam Removed in 2003

First Creek, tributary to Bear Creek, Manistee County;

Built in 1950, an earthen dam with head of about 8'. Owned by Village of Copemish. Partial removal conducted in 2000, including paired culverts, concrete dam and road crossing (used as snowmobile trail). Complete spillway removal was done in 2003 by Road Commission in conjunction with road crossing replacement funded by dedicated program of the USDA Forest Service. Funding was also contributed by the Bear Creek Watershed Council and Conservation Resource Alliance. Project was done to restore fish passage. Removal cost: **\$50,000**

Dimondale dam Grand River, Eaton County Removed 2006

Built 1880, Head 5', Length 300'

Type: Earthen dam Purpose: former grist mill dam, current recreational use (park). Lansing Board of Water and Light transferred ownership to the village by 2000. There are two structures, the large dam known as Wilson dam and a smaller dam on the mill race, both of which substantially failed (1995) and were removed. A "W" weir was constructed in the main channel and U weir in the mill race which will have flow at high water but will generally be dry. The weirs prevent migration of accumulated sediments but still provide fish and recreational passage. Public use of the park and river will also be improved. This is a cooperative project between the Lansing Board of Power and Light, the Village of Dimondale, MDNR and the contractor, MacKenzie Co of Grand Ledge who is contributing materials at cost.

Cost estimate: \$442,400

Elm River Tower Dam Removed prior to 1994

Tributary to Shawmut Creek, Houghton County;
MDNR owned low-head earthen dam built in 1964.

Elm Street Dam Removed July 2005

Battle Creek River, Calhoun Co. Dam was built approx 1909 with head of 3'-4' and length 100'. This sheet pile, low head dam maintained water level for cooling water intake for Consumers Energy. Since it no longer served its original purpose, the owner agreed to work with MDNR and the Calhoun County Conservation District toward removal to restore fish passage and improve water quality and stream habitat in the vicinity. Cost: \$124,500:

Fibron Trout Pond Dam Removed August 2000

Anguilm Creek, Mackinac County near Trout Lake;
MDNR Fisheries Division owned low-head earthen dam built in 1964. Removed by MDNR Fisheries Division Construction Crew.

Glover Dam Removed 1998

Kimmerlee Creek/Pokagon Creek/Dowagiac River, Cass County near Cassopolis;. Old mill dam converted to power production in 1967 by private owner. Impoundment had been dewatered for several years, leaving 6' head and 5 acre impoundment area full of silt. Dam and property sold in 1997 and new owner decided to remove the dam due to liability and to improve aesthetics of the stream. Fisheries Division awarded Inland Fisheries Grant of \$3160 to cover 50% of the estimated cost. Cost overruns occurred

and were covered by the owner. Total final cost approximately **\$12,000**. Series of short drops and pools was constructed in lieu of the existing steep drop and sediments were stabilized in place with riprap. Sediment trap and sediment removal immediately above the dam were also provided.

Grayling Dam Partial removal: 2005

AuSable River; Crawford County. Original dam built in 1880s, current built 1933, Head 5' Length 17.5' Type: sheet pile. Completed first modification Original purpose to float logs to mill, current structure was built with a road crossing. Partial removal entailed lowering the dam head one foot and construction of ramp for fish passage, construction and maintenance of a sand/sediment trap. Funded through Federal Aid in Sport Fish Restoration Act funds, FWS fish passage grants, MDNR Inland Fisheries Grant and local funding. The partial removal was conducted to promote healthy stream ecosystem function by restoring free movement of aquatic organisms and restoring water quality to nearly pre-dam conditions while managing instream sediments. The action would also retain a local point of interest that is important to the community. Additional slow removal of head will be conducted once sediment stabilizes in the impoundment. The Au Sable is a top quality, coldwater trout stream. Total cost: \$325,000,

Hersey Dam, Hersey River, Osceola County Removed Sept 2006

Built: 1858 Type: Owner: Village of Hersey

This was a dilapidated structure that threatened an adjacent road crossing of the river. The project was funded from USFWS, National Fish and Wildlife Foundation, Wege Foundation and numerous other small grants and in-kind services and coordinated by the Muskegon River Watershed Assembly. It was primarily done to restore this high quality cold water trout stream. No preemptive sediment removal was performed and the river was restored to its old channel and the spillway abandoned and removed. Total cost: \$274,600

Haley Dam Removed in summer 2003

DNR owned dam in the Lake Hudson Recreation area. The dam served no purpose and it was removed to eliminate maintenance costs and to improve fishing. Cost of removal was \$45,000 from State budgeted (capitol outlay) funds and performed by the DNR (construction crew from Allegan State Game Area).

Homestead Dam Removed 1974

Partial dam removal, sill remains

Betsie River, Benzie County,

MDNR owned dam built in 1914 for hydropower generation this was an earthen dam and concrete structure with 27' head. A 6' obstruction remains, presenting a partial fish barrier and a 20" lamprey barrier has been installed on the sill. Partial removal cost about **\$131,000**, this structure is still regulated by the dam safety part of NREPA.

Kimberly-Clark Dam Removed 2004

N. Br. Spars Creek, Dickinson County Built 1965, Head 2', Length 200'

Earthen dam, built for recreational use (trout pond). Part of Sturgeon R system.

MDNR owned low-head earthen dam, removal done by MDNR Fisheries Division Construction Crew.

Marquette City Dam #1 Removed 2004

Dead River; Marquette County,

Removal is ordered in the Marquette Board of Light and Power FERC License to restore fish passage. The Marquette County Conservation District received FEMA grant to remove the dam (2003) and worked with the Board of Light and Power to complete removal. Removal cost estimated at **\$200,000**.

Mill Pond (Harris) Dam Removed in 2002

Chippewa River, Isabella County

This 15-foot by 110-foot concrete dam, owned by the City of Mt. Pleasant, was removed in an effort to eliminate safety concerns and restore riverine habitat. Stream restoration involved creation of a series of five pinch point rock weirs and plunge pools that retained the impounded water levels and minimized the mobilization of sediments. The impoundment had largely been drawn down and the accumulated sediments stabilized prior to this dam removal. Removal of the dam also opened 71 miles of habitat for steelhead, bluegills, and other resident fish. This **\$721,000** removal was funded by the Michigan Natural Resources Trust Fund and City funds derived from Tribal gambling revenues. Contact Greg Baderschneider, Director of Parks, City of Mount Pleasant (989) 779-5331. Engineering by Wilcox Assoc. (Jim Tiffany).

Mitchell Dam Removed 1991 est

Bear River, Emmet County; Removal date estimated about 1991 (based on plans). Retired hydroelectric dam owned by the City of Petoskey

Mud Creek Dam Removed July 1997

Mud Creek, Gogebic County near Ironwood;

MDNR owned low-head earthen dam built in 1964. Removed by MDNR Fisheries Division Construction Crew.

Newaygo Dam Removed in 1969

Muskegon River, Newaygo County near City of Newaygo. Built early 1900's. Head of 18' and 300' wide. Consumers Power operated the dam for hydropower then gave it to the DNR in 1967. The DNR proceeded with dam removal under contract (**\$84,000**) with special appropriations made for that purpose to restore fish passage. Sediment released as a result affected downstream property owners.

Old Frederic Lumbermill Dam

Listed as removed in AuSable River Assessment (MDNR Fisheries Division Special Report Number 26, March 2001). No other information available.

Outwood Sub Dam Removed in 1990's

Tributary to River Rouge, Oakland County near Southfield;

Privately owned low-head earthen dam that was either washed out or removed.

Plainwell Dam Number 2 Removed 1980 est

Kalamazoo River, Allegan County; Partially removed (to the sill)
Retired hydro built in 1865 and owned by Plainwell Paper. The dam was partially removed around 1980. No significant impoundment remains, but a small head difference still exists.

Potagannissing Dam Removed 2006

Potagannissing River, Chippewa County (Drummond Island) this state owned dam (MDNR, Wildlife Division) was removed to improve fish passage, primarily northern pike. The dam was 75' long and had a head of 6' and was regulated by MDEQ under Part 315. Approximately 4' of head of the dam was removed and a series of three rock weirs were built below the dam to construct rapids that will allow all fish species to have unimpeded fish passage. DEQ, dam safety engineered the plan with assistance from DNR, Fisheries. Total costs of the dam removal and construction of the rock weirs was \$36,000.00. This project was funded by USFWS Fish Passage Program and private donations through the Drummond Island Sportsmen's Club. This cost estimate does not include the cost for engineering and surveying.

Randall Dam Removed 2002

Coldwater River, Union City, Branch County.
Randall Dam, owned by the Village of Union City and built in 1912, was 85 feet long with 12 feet of head. The dam was originally used to divert water to a mill. Recent safety inspections showed dam was in disrepair. Since the dam was no longer serving a purpose, the decision was made to remove the dam. Removal costs (**\$78,000**) were much less than estimated costs to repair (repair costs exceeded \$200,000). The City paid for engineering by Lawson Fisher Associates and dam removal.

Salling Dam Removed in 1991

AuSable River; Crawford County near City of Grayling;
Salling Dam was a retired hydropower dam, built in 1914. The dam head was originally 17' and a hydropower generating facility with 14' head. At the time of removal, the head was approximately 9'. Like many others, this was an earthen embankment dam impounding about 55 acres originally. The dam was deemed unsafe and ordered removed under the States emergency dam safety authority. A spillway was added with 9' head prior to dam removal to allow water level control and impoundment area was reduced to 28 acres. DNR entered into a consent agreement with the owners to allow DNR to remove the dam (in lieu of taking ownership). During drawdown, stream conditions (D.O., turbidity and flow) were monitored by USGS and a large sediment trap was constructed within the impoundment to catch the sand particles farther up the impoundment. Significant flocculant, organic sediment was present at the dam and was sent downstream during the drawdown, which lasted about 5 months. The exposed areas were seeded by hand, boat and air during the summer. Late season rains contributed to temporary erosion problems. Repair costs estimated at \$400,000 (included needed fish way and underspill); dam removal project cost **\$130,000** and

included contributions from TU, Fly Fishers Assoc, Mich. Habitat Foundation, Recreational Bond funds and Game and Fish funds.

Silver Lead Creek Dam Removed in 1997

Silver Lead Creek-tributary to West Branch of the Chocoy River; Marquette County; This dam was located on the KI Sawyer Air Force Base. The Marquette County Soil and Water Conservation District removed 70' earthen dam in 1997 as part of a watershed restoration project. Removal was funded by a 319 grant and cost **\$10,000**. A nearby smaller concrete dam remnant also removed by DNR Fisheries with 319 grant, included sediment basin. Cost **\$5,000**.

Sixmile Creek Pond Dam Removed July 1993

Sixmile Creek, Baraga County, near Baraga; MDNR owned low-head earthen dam built in 1965. Removed by MDNR Fisheries Division Construction Crew.

Smyrna Dam Removed 1973

Flat River, Ionia County near town of Smyrna; Built 1908, about 80' wide. Owned by the Smyrna milling company, the dam was sold to Consumers Power, then to Otisco Township in 1956. The Township deeded the dam to DNR in 1971 under the condition that it be removed at state expense and **\$40,000** was appropriated for this purpose. The dam was a public safety hazard (4 people drown there) and the state wanted to provide fish passage. Also there was 16 acres of adjacent land available for public recreational access. The impoundment had been drained and very little sediment was still present behind the dam.

Stronach Dam Removed December 2003

Pine River; Manistee Co. Staged removal over several years. Stronach Dam, built in 1912, is the only dam on the Pine River, Manistee County, and is located approximately 3 miles upstream of the Manistee River and Pine River confluence. The Pine River near Stronach Dam carries a high annual bedload of sand due to its steep, sandy banks and logging operations that took place in the late 1800's. This sand contributed to the filling of the original reservoir and the decommissioning of Stronach Dam by 1953. Stronach Dam, on the Pine River, Manistee County, Michigan, once used to generate hydroelectric power, is an example of an aging structure for which it made economic sense to remove. Creative negotiating led to the removal of Stronach Dam as part of an alternative licensing agreement for Consumers Energy's Tippy Dam hydroelectric project on the Manistee River. A staged removal process began in 1996 to allow the Pine River to gradually restore its channel in the areas upstream of the dam while causing the least amount of downstream environmental impact. No sediment removal undertaken since there is a downstream dam and impoundment with adequate capacity to hold sediment moved downstream. Passage restored November 2002. Since 1998, Dr. Dan Hayes at Michigan State University has led research efforts on the environmental impacts of Stronach Dam on the Pine River before and after removal. This research will be used to provide guidance for similar efforts across the nation. Estimated removal cost is **\$750,000**.

Sturgeon Dam Removal 2005

Surgeon River; Dickinson County; Built in 1919, head 53' Length 217'

Type: Concrete arch dam Purpose: retired hydroelectric project

During FERC relicensing proceedings, Wisconsin Electric Energies, federal and state resource agencies, and nongovernmental organizations accepted the removal of Sturgeon Dam as part of the Wilderness Shores Settlement Agreement signed in 2001. The removal also serves as partial mitigation for the continued operation of other We Energies hydroelectric projects on the Upper Menominee River system. The Sturgeon Dam removal plan called for the dam to be removed in three stages over a period of 4-5 years. The staged removal of Sturgeon Dam began in 2003 and was complete by 2005. The initial stages were so successful in returning the river to its former channel that the schedule was accelerated. Staged removal allowed the 248-acre reservoir and associated sediment to stabilize, thereby reducing fish and wildlife impacts. There are numerous benefits associated with the removal of Sturgeon Dam, including the restoration of over 1.5 miles of the Sturgeon River and improved water quality. Removal cost is approximately \$2 million.

Tannery Creek Dam Removed 2004

Tannery Creek, Emmet Co. This dam occurred on a golf course in Petosky and the owner approached Tip of the Mitt Watershed Council, who assisted in removing the dam. Since it was a sea lamprey barrier, a weir was placed in a downstream culvert. The owner financed 50% of the removal cost with a community foundation grant, FWS grant and CWA Sec. 319 support to the Watershed Council covering the remainder, total cost about \$35,000.

Third Creek Trout Pond Dam Removed prior to 1998

Third Creek, Luce County;, MDNR owned low-head earthen dam built in 1961. Removed by MDNR Fisheries Division Construction Crew.

Village of L'Anse Dam Removed 1998

Falls River; Baraga County;

This dam was removed using Lake Superior Basin Trust funds at cost of **\$130,000** in 1998.

Wacousta Dam Removed 1966 est

Looking Glass River, Clinton County; Built in 1860 by the Wacousta Milling Company. An earthen, stone, wood and concrete structure with about 4.5' head was removed by the owner at unknown costs.

Wager Dam Removed 1984

Grand River, Ionia County near town of Lyons;

Built 1896, about 10' head and 250' long. From 1930's to 1976 operated as hydropower by Consumers Power. Powerhouse and dam to sill were removed, leaving 3' head dam remnant in the stream, date unknown but prior to 1976. In 1984, DNR allocated **\$17,000** to remove about 50' of the remaining structure to allow fish passage. Removal was

conducted by DNR with private owner approval, by dragline. No sediment management was conducted since very little sediment was present behind the sill.

Wasman Dam Removed 1999

Tributary to Paw Paw River, Van Buren County; Dam failed prior to 1998
Privately owned dam built in 1860.

Waszkiewicz Dam

Grey Creek, Alcona County; Removal date unknown
Private owner. Limited information available.

Watts Lake Dam Removed 1990's

Watts Lake Outlet, Lapeer County; MDNR owned low-head earthen dam built in 1965.

City of Williamston Removed 1998

Cedar River, Ingham County;
Removed old low head dam and created off channel pond and kayak route using Natural Resources Trust funds for recreational development. Cost **\$800,000** by Gove Associates, P.E.

Upcoming dam removals (2008)

Rice Creek Dam Rice Creek, trib to the Kalamazoo River, Calhoun Co.

Built 1835, Head 10' Length 500'

Type: Earthen dam Purpose: recreation, former mill pond.

The City of Marshall owns this dam and is working with the Calhoun Conservation District, TU and MDNR to remove the structure. It would open up spawning areas to the headwaters of Rice Creek, a designated trout stream. It will also improve stream habitat and provide improved aesthetics and safer recreational use of the adjacent Ketchum park. Estimated cost: \$203,000

Plainwell dam, Kalamazoo River, Allegan Co.

This is an MDNR owned dam and retired hydropower dam that is in very poor condition. The MDNR has sought to remove the dam for many years but has been prevented from doing so pending agreement on disposition of the accumulated PCB contaminated sediments. EPA and responsible parties reached agreement in 2007 to removed a significant portion of the sediments and to remove the powerhouse portion of the dam and abandon the spillway. Project cost is unknown and imbedded in the sediment removal and disposal but is estimated to be \$750,000 to \$1 M. The dam removal will restore the river to its historic channel and is expected to be complete by the end of 2008.