

**WHITE LAKE (MONTAGUE AND WHITEHALL, MI)
(MCSS DATABASE PROJECTS 05-38 AND 05-39)**

Site Description

White Lake is a 2,570-acre drowned river mouth located along the eastern shore of Lake Michigan. The lake is a Great Lakes AOC that includes the lake proper and a 0.25-mile zone around the lake. Direct industrial discharges, discharges from CSOs, and discharges of surface water runoff have all been identified as potential sources of contamination to the lake. Eight potential areas of sediment contamination concern have been identified within the lake, two of which are Tannery Bay (MCSS Dbase Project 05-38) and an area offshore from the now defunct Occidental Chemical Corporation (OCC) (formerly Hooker Chemical Company) property (MCSS Dbase Project 05-39). Ten-acre Tannery Bay is located along the southern shore in the eastern-most portion of White Lake and the water is 10 to 15 feet deep in areas where contaminated sediment exists. Sediment contamination associated with operations at the former OCC site is an approximate 1.6-acre area located along the northern shore of White Lake about 400 yards offshore of former OCC facility; the depth of the lake in this area ranges from 45 to 50 feet. The six remaining potential areas of sediment contamination concern are: (1) East Bay (Genesco) (the northeast end of Tannery Bay where contaminated sediment is known to remain); (2) South of Indian Bay; (3) Muskegon Chemical Company site (groundwater plume originally extending to the Lake has been isolated); (4) Montague-Whitehall; (5) NW Mill Pond Creek; and (6) South of Long Point. The last three were identified as areas of concern by the USACE in 2000. It is currently unlikely that any further investigations or remedial actions will take place at any of these six potential areas of concern.

Site History

For Tannery Bay, sediment contamination resulted from tannery wastes being discharged directly into the bay from the site when operations began in 1866 until about 1940. The now defunct Whitehall Leather Company took over operations in 1944 and began disposing of bails of cow hide into the bay for erosion control and discharging liquid tannery wastes containing heavy metals into a series of six lagoons, then to the lake. Direct discharges of tannery wastes to the bay ceased in 1976. The bay also contained an artificial island (referred to as "Hide Island") created from bales of hide scraps and wood cribbing that were deposited over time into the bay.

For OCC, nearby sediment became contaminated through historic discharges from a single outfall pipe originating from the defunct OCC facility that was located about one-quarter mile north of the lake shoreline. White Lake was listed as a Great Lakes AOC as a result of the leaching of organic solvent-contaminated groundwater from the OCC site.

Potentially Responsible Parties (PRPs)

For Tannery Bay and East Bay, the PRP is Genesco, Inc. (parent company of now defunct Whitehall Leather Co. that was the source of the contamination in Tannery Bay). For the OCC site, the PRP is Occidental Chemical Corporation (formerly Hooker Chemical Co.). For the Muskegon Chemical Company site, the PRPs are Muskegon Chemical Company and Koch Chemical Company. It is unclear whether PRPs have been identified for the remaining areas of sediment contamination concern.

Threats and Contaminants

For Tannery Bay, the primary COC was chromium, with lesser concentrations of arsenic, mercury, lead, nickel, and zinc. Chromium was the most elevated contaminant with concentrations in the upper 6 to 8 inches of sediment typically ranging from 2,000 to 4,000 ppm and in sediment greater than 12 inches deep typically greater than 5,000 ppm (with maximum levels in excess of 20,000 ppm). Reportedly, Tannery Bay sediment also contained significant quantities of leather scraps, dyes, and cow hair.

For OCC, the COCs included PCBs, hexachlorobenzene (HCB), heavy metals (arsenic, cadmium, chromium, lead, manganese, mercury, nickel, and zinc), oil and grease, chloroform, and mirex. The contaminated sediment covered one to two acres and was about two feet thick. Sediment samples in the vicinity of the OCC outfall were collected on six different occasions beginning in October 1997 and ending August 2001. HCB surface (0 to 0.5 ft) sediment concentrations above 0.45 ppm were found to extend about 400 feet southeast into the lake from the outfall. PCB concentrations above 2 ppm in surface sediments covered a similar area. The highest HCB and PCB concentrations, 110 ppm and 390 ppm, respectively, were found in the 0 to 0.5 ft interval. In general, the highest concentrations for both contaminants were typically found in the 0 to 0.5 ft and 1 to 1.5 ft depth intervals.

Selected Remedy

In 2001, the MDEQ and Genesco reached a compromise agreement to remove and dispose of 73,000 cy of contaminated sediment from about 4.7 acres of Tannery Bay at an estimated cost of \$6.7 million. The total removal volume and cost estimates were increased slightly to 78,000 cy and \$8 million, respectively, prior to remedy implementation. Non-native sediment was removed from the bay in 2002 from August to mid-November and in 2003 from mid-April to the end of July. The depth (top of sediment to design cut elevation) of non-native sediment targeted for removal varied from about five to eight feet, with removal in the area of Hide Island extending another eight feet in depth. Sediment removal was by both barge-mounted excavator and hydraulic cutterhead dredge. The final removal volume was 85,000 cy. Sediment disposal was in a local commercial Type II landfill.

For the OCC site, in 2003 a total of 10,500 cy of PCB and hexachlorobenzene-contaminated sediment was removed from the Lake using a barge-mounted crane equipped with a 4.5 cy Cable Arm Environmental bucket. Dredging took place within a 40-foot by 40-foot dredge cell with attached silt curtain that extended four feet below the water surface. A dip tank was used to rinse the bucket during each cycle to assist in controlling turbidity generation. Sediment was removed in one-foot lifts to control the removal of, and to maintain separation for disposal purposes of, the various layers of sediment to allow separate handling of materials regulated as TSCA and non-TSCA wastes. Material scows were transported from the dredging barge to the land-based facility. Offloading was by an excavator equipped with a 3 cy clamshell bucket into a large hopper equipped with a screen with 6-inch openings for the removal of oversized material. The screened material then discharged into a waiting three-axle 28 to 30 cy capacity dump truck. Each truck was filled to one-third to one-half capacity and transported the sediment to a transfer station that pumped the sediment into geotextile tubes for dewatering. The dewatered sediment was trucked to two separate landfills, TSCA-designated sediment to the EQ Landfill near Detroit and non-TSCA-designated sediment to a local municipal landfill.

Future Activities

According to the MDEQ, they are not aware of any additional areas of contaminated sediment that would require remediation within the White Lake Area of Concern and there are currently no further projects planned that would target contaminated sediments. A new marina is proposed for an area of the lake that is adjacent to the former Whitehall Leather Company property and to the north of Tannery Bay. Localized sediment will need to be removed as part of construction of the marina. The sediment will require sampling prior to removal to determine the method of dredging and disposal but MDEQ is unaware of whether samples have been collected to-date.

References

Personal Communication with Michael Alexander, MDEQ, on September 11, 2007 and Heather Hopkins, MDEQ, on December 21, 2007.

White Lake Area of Concern, U.S. Environmental Protection Agency, Great Lakes National Program Office Website, June 25, 2007, <http://www.epa.gov/glnpo/aoc/whtlake.html>.

White Lake Community Action Plan – Remedial Action Plan Update 2002, White Lake Public Advisory Council, 2005 Reprint, <http://www.epa.gov/glnpo/aoc/whtlake.html>.