Case Study

Water Control

Lake Tecumseh Weir | Virginia Beach, VA | September 2010

Project Partners:

Contractor: Early Marine Construction

Engineer: CMI Limited Co.

Owner: U.S. Fish and Wildlife Service

Max Depth:
24 ft 7.31 m

Length:
120 ft 36.58 m

Products:
ShoreGuard®
SG-325, SG-625

Background

Lake Tecumseh is a shallow 261-acre lake next to the Atlantic Ocean in Virginia Beach, Virginia. It is connected to Back Bay estuary, which feeds into the ocean via the Asheville Bridge Canal. The U.S. Fish and Wildlife Service chose to focus their resources on improving these bodies of water to ensure local species would thrive. For decades, wave action within the shallow lake stirred bottom sediments, eroding shorelines and causing water level fluctuation. Sediments traveled from the lake into the neighboring estuary compromising aquatic vegetation, local fish species and bird habitats.

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Why CMI

U.S. Fish and Wildlife Service needed a product with superior UV protection and is impervious to severe rodent damage. Steel and treated wood were not an option as these traditional materials would rust and/or leech chemicals into the waterway. Concrete was also dismissed as the saltwater would breakdown the structure before the desired design life was reached. ShoreGuard® vinyl sheet piling was chosen as the ideal material to address the design requirements for both structures. Vinyl's lightweight nature requires less equipment, increases installation speed and reduces the environmental impact of construction. ShoreGuard's proven performance in hundreds of past projects involving the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers helped streamline the plan approval process. ShoreGuard's advanced manufacturing process, XCR Technology, offered many additional benefits over other materials.

Performance

The Lake Tecumseh weir extends 1.0 ft above sea level exposing the structure fall through spring but submerging it during summer months when high tide reaches 1.5 ft. Prior to the project, studies indicated that over 2,000 tons of sediment were discharged annually from the lake. U.S. Fish and Wildlife Service studies show that the spillway reduces 90% of the sediment from reaching Back Bay estuary. The stable water levels have helped to repopulate fish and aquatic vegetation species as well as attract wading birds and waterfowl. Boating activities are now possible on Lake Tecumseh another 190 days each year.

Installation

Engineers set out to design two separate structures. First, they designed a weir to control water level fluctuations and sediment transfer constructed of two walls anchored together. The 40 ft long weir would anchor another 15 ft into the bank on each side to protect against seepage and erosion. The second structure would help to rehabilitate the earthen berm that had suffered from severe erosion over the years. To protect the area's natural habitat, a preparation area for equipment and materials was set up a half a mile from the installation site. The contractor's steel barge transported supplies, crew and machinery back and forth as needed. The two 40 ft walls, anchored to each other were constructed using 24 ft long SG-625 sheet piling installed by an excavator using vibratory plate compactor. The weir wall transitioned into the berm support, also constructed with ShoreGuard sheet piling. For this section of the project, 8 ft long SG-325 panels were driven 6 ft into the earthen dam and help prevent further erosion.