CUYAHOGA COUNTY PLANNING COMMISSION

Green Bulkheads for Cuyahoga River Navigation Channel

Cleveland, Ohio

Preparing larval fish habitat structures for installation

"Biomimicry," a design approach that turns to natural models for guidance and inspiration, is applied to return ecological function to a major shipping channel.

Cleveland's Cuyahoga River Navigation Channel is an important and thriving passageway for maritime commerce, but it is a daunting corridor for "transient" fish. For these fish, the ability to migrate upriver to spawn as adults and downriver to return to Lake Erie as juveniles is critical to their survival. Bustling with barge traffic, subject to frequent ice and storm flows, and lined by bulkheads for five miles, the Cuyahoga River Navigation Channel offers little to no habitat. Since 2006, the Buffalo District of the U.S. Army Corps of Engineers has been developing, testing and implementing innovative bulkheads and technologies to create habitat for larval fish while maintaining the channel for navigation. Building on the lessons learned through that process, the Cuyahoga County Planning Commission (CCPC) initiated an effort to explore options for retrofitting bulkheads so they provide both navigational and ecological function.

Working with the CCPC, Biohabitats is leading a design team to develop a retrofit solution guided primarily by models found in nature. This approach involves the use of "Biomimicry Thinking," a design process that begins with scoping: identifying the desired function, defining the context within which the design must fit, and integrating "Life's Principles," deep patterns found among thriving species. A discovery phase follows, in which biological models for achieving the desired function are identified. This leads to creative concept and design development, and, ultimately, evaluation.

Biohabitats began by conducting a workshop to introduce the biomimetic design process to all team members and to an advisory panel made up of local experts in shipping, biology, and the Cuyahoga River itself. Following the workshop, the team began the scoping phase by identifying species of transient fish at risk and studying their migration needs and challenges in the channel. Simultaneously, analyses of shipping traffic (including temporal distribution) and river conditions were performed.

The design team, which included biomimicry experts Karen Allen and Barry Patterson, Ocean & Coastal Consultants, Ecocean, and fisheries biologist Dr. Jeffrey Miner, began the creative phase with a concept design charrette with the advisory panel. Biohabitats led the design, permitting, fabrication, and in-situ testing of the prototype.

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