

## Cuyahoga River Bulkhead Habitats

In 1985, the Lower Cuyahoga River was designated as 1 of 43 polluted Areas of Concern (AOCs). Contributing to this designation is the lower 5.6 miles of the Cuyahoga River Federal Navigation Channel. The Federal Navigation Channel is located within the City of Cleveland and is the outlet of the 813 square miles Cuyahoga River Watershed.

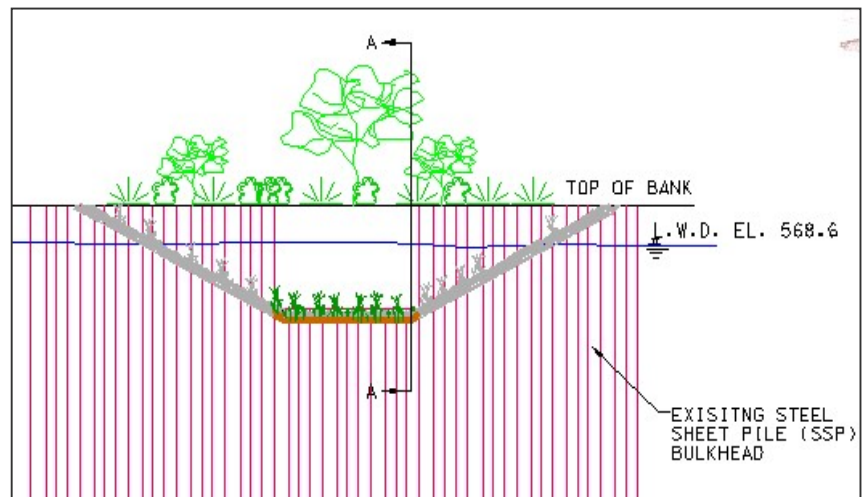


The shape, size and lack of habitat cover in the Navigation Channel are the primary factors in causing an unhealthy stream environment. The armored shoreline along the Cuyahoga River offers both poor protection and habitat for larval fish. As the Cuyahoga River enters the Navigation Channel the river depth changes from 6 feet to an average maintained depth of 23 feet. This change in depth causes: flow to drop from 4.5 mi/hr to .024 mi/hr, extends the resident time of pollutants, increases water temperatures and decreases oxygen levels. This type of environment has led to the beneficial use impairment on fish and wildlife populations.

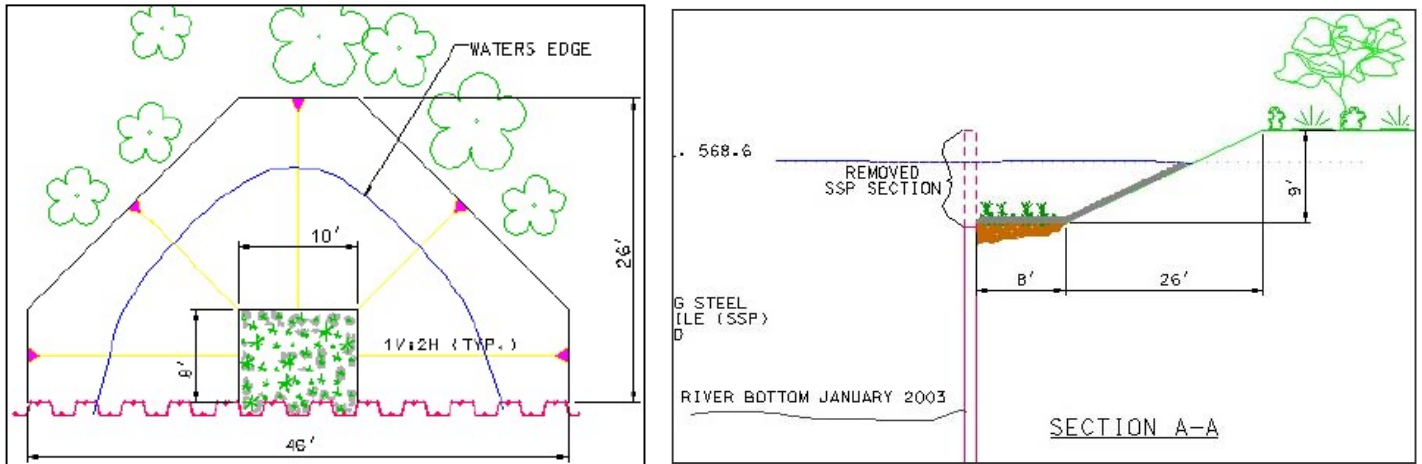
### Remedial Actions: Cuyahoga River Bulkhead Habitats

To improve environmental conditions in the Federal Navigation Channel, the Cuyahoga River Remedial Action Plan (RAP), Army Corps of Engineers and Ohio EPA worked together to develop the concept of *Bulkhead Habitats*. Prototype Bulkhead Habitats, as shown below, are wetland pockets. These wetland pockets will function as an important refuge for larval fish in the hostile Navigation Channel during their migration toward Lake Erie.

Bulkhead Habitats can be cut into and tucked back behind existing bulkheads or bulkheads in need of repair. These unique habitats can be strategically placed safely throughout the Navigation Channel while maintaining current commerce traffic. Constructing Bulkhead Habitats will help restore riparian and wetland habitats in an Area of Concern, which is critical to improving and meeting Ohio's Water Quality Standards.



## Bulkhead Habitats

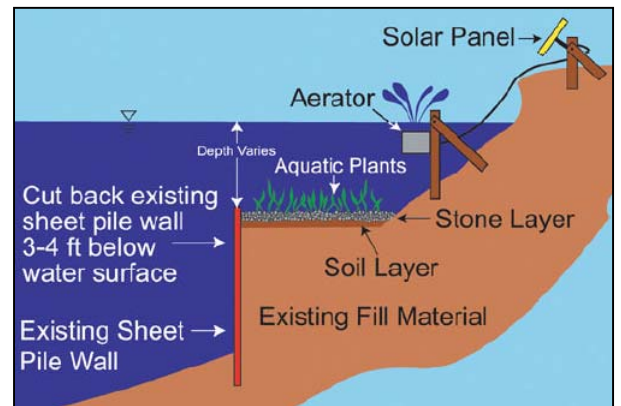


This conceptual design is applicable along the river where existing wooden or SSP bulkheads are located. The design would be most effective in areas where the structures are in a state of disrepair or, the land immediately landward of the structures is not commercially developed.

## Bulkhead Habitats Eligible for Mitigation Credits

Through authorization from Ohio EPA, the Bulkhead Habitats are eligible as mitigation sites. The Cuyahoga River RAP is accepting mitigation money from developers in need of credits to offset wetland losses or private entities wanting to develop wetland mitigation banks. This process helps streamline the wetland mitigation procedures and keeps wetlands within the Cuyahoga River Watershed.

For more information please contact the Cuyahoga River RAP at 216-241-2414 x307 and visit our website at [www.CuyahogaRiverRAP.org](http://www.CuyahogaRiverRAP.org) and read the Bulkhead Habitat Report.



(See attached Bulkhead Habitat Design Criteria)

## Cuyahoga River Remedial Action Plan & Cuyahoga – American Heritage River Initiative

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### **Design Criteria for Navigation Channel Fish Habitat Areas**

Based on initial meetings with fisheries biologists and RAP stakeholders, below is a list of design elements to be considered in the evaluation of the potential effectiveness of a constructed fish habitat area.

1. No, or limited, protrusions into the water body; construction should be designed to be behind the line of the bulkhead.
2. Located along bank and constructed so that physical structures would:
  - a. Not gather and accumulate passing floating debris.
  - b. Have the ability to avoid damage from ice scour.
  - c. Have the ability to absorb or dissipate propeller wash, especially bow and stern thrusters, without damage.
3. Easily accessible –in and out- (at least theoretically) by swimming fish. Minimum opening through a solid bulkhead of at least: 4 ft.
4. Optimal minimum linear length of at least 25ft. along shore to provide reasonable accessibility to swimming fish – smaller sized structures will provide some benefit, larger ones will provide more benefit.
5. Vertical dimension of any opening cut through a solid bulkhead to be 6 ft. below water surface, and
  - a. Tall enough to provide water access, to accommodate projected fluctuations in water level
  - b. To be of certain size and spacing to exclude adult carp, if possible.
6. A minimum surface area of at least: 300 sq. ft. to support adequate vegetation to function as a fish refuge (smaller areas will provide some benefit, larger areas will provide more benefit).
7. Soil depth of 12 - 24” to provide an adequate root zone for habitat plants.
8. Variable habitat depths:
  - a. Ranging in depth from 12” to 24” for larval fish, Minimum Bottom Surface Plane (mbsp) 100 sq. ft.
  - b. Deeper habitat from 12” to 72” for predator fish, (mbsp of 200 sq. Ft) with some bottom structure,
  - c. Provide these depths as lake levels fluctuate (suggests a sloped bottom structure)
9. Adequate underwater riverside bottom and slope stabilization to keep the structure from:
  - a. Being destabilized by boat wakes or prop wash.
  - b. Slumping into the river channel (suggests proper slope gradient and/ or rock stabilized ledges.
10. Provides plants and structures to benefit habitat for birds and other terrestrial life.
11. Emphasis on design that replicates, to the extent possible, natural habitat with native aquatic plants should be utilized in all projects.
12. Minimal on-going maintenance requirements, (i.e. set it and forget it)
13. Accessible for maintenance, if needed.
14. Located, where possible, in conjunction with related green space / trail elements from the lower river and flats area.