

# Figure 5A. Mud Lake Alternatives Analysis - Habitat Ranking

## Habitat Quality Ranking

Ranking Key: 4 → 1  
 Lowest Score → Highest Score (Best)

Ranking Category	Ranked Causeway Design Alternatives			
	Alt 1	Alt 2 & ALT 3	Alt2 V2 & Alt3 V2	Alt 4
Migratory Waterfowl, Wading, & Breeding Bird Habitat (average of 3 metrics)	4	3	1	2
Plant Community Quality - Emergent Marsh	4	2	3	1
Plant Community Quality - Submerge & Floating Leaved	3	1	2	4
Fish Habitat Restoration	4	2	2	1
Benthic Macroinvertebrate Habitat	4	2	3	1
Hydrologic Connectivity	4	2	3	1
Non-Native Plant Management (invasive species)	4	2	3	1

## Top Ranked

### ALT 4

- Best wading bird habitat
- Greatest area of emergent marsh
- Most deep water fish habitat
- Greatest diversity of benthic macroinvertebrate habitat
- Most improvement in hydrologic connectivity
- Highest potential for removal and control of invasive species

### Alt 2 & Alt 3

- Greatest area of submerge and floating leaved plant communities
- Best migratory waterfowl habitat

### Alt 2 V2 & Alt 3 V2

- Best breeding bird habitat

## Ranking Criteria

On 3/1/2019 the Habitat Restoration Technical Team completed a ranking exercise using EPA-MED modeled data, where values were scored for each of the habitat category listed below. As part of the exercise the team assigned qualitative weights to the habitat metrics for use in evaluating the ranks when combining the metrics. Weights were based on a combination of factors that included their relationship to habitat components identified in past Mud Lake design concepts and the relative importance of the metric as a driver for achieving beneficial outcomes across all the measured values and habitat metrics.



Breeding Bird Habitat

Breeding birds need safe places for building nests, incubating eggs and their young birds to develop.

- Increased length of edge
- Increased area of emergent vegetation for feeding fledglings



Wading Bird Habitat

Wading birds rely heavily on natural shorelines and wetland habitats including emergent marshes and wooded swamps. Wading birds consume fish, aquatic and terrestrial invertebrates, amphibians, reptiles, and crustaceans found in these shorelines and wetland areas.

- Increased length of shoreline
- Increased area of submergent vegetation (approx. 0-2').
- Soft natural shoreline (as opposed to rip rap)
- Continuous habitat connection



Migratory Bird Habitat

Birds migrating need places to stop and re-fuel along the way that are relatively free from predators and have abundant, diverse food supplies to enable them to complete their long journeys.

- Increased area of submerged vegetation as food source



Emergent Marsh

Emergent marsh is a shallow-water wetland characterized by emerging vegetation. This community type occurs in areas up to 4 feet deep on gently sloping bottoms of sand, gravel or silt. Emergent plants serve as spawning habitat for fish and amphibians, shelter for a wide range of species, and as nesting habitat for birds.

- Increased areas of emergent vegetation
- Connection with estuarine hydrologic process



Submerged & Floating-Leaved Plant Community

Submerged and floating plants provide essential habitat for fish and aquatic wildlife. Every species of fish relies on submerged aquatic plant species for either food, spawning habitat, or shelter. In addition waterfowl feed on submerged or floating plants directly or eat the fish, macroinvertebrates, and crustaceans that live among the plants.

- Increased area of submerged and floating leaf vegetation



Fish Habitat Restoration Opportunity

Fish need a range of habitat types. Each species of fish feeds on different food sources and goes through different year cycles of habitat use. Fish find cover from aerial predators in deeper water. In the heat of the summer fish seek the cooler conditions in deep water habitats. Deep water away from the river's main channel also provides winter refuge habitat for fish.

- Increased area of deep water



Benthic Macroinvertebrates

Benthic or aquatic macroinvertebrates are organisms without backbones that live in the sediment and on the bottoms of lakes rivers and streams. Examples of benthic macroinvertebrates include immature forms of beetles, mayflies, caddisflies, stoneflies, and dragonflies. They are vitally important at the base of the aquatic food web.

- Increased area of submerged aquatic vegetation
- Increased area of novel habitat (beta-diversity)
- Total water



Hydrology

In estuaries, water flow and the natural movement of sediments are important for maintaining high-quality shallow water habitats. The natural rise and fall of water levels due to seiche results in higher plant diversity in estuarine wetlands compared to inland wetlands.

- Restoration of estuarine hydrology



Non-Native Plant Management

Non-native cattails are prolific and can quickly dominate wetland plant communities. Monotypic stands of cattails reduce overall habitat value and reduce the local plant diversity.

- Increased water depth to flood out non-native cattail

Why Important

Criteria Measured