

PIERCE COUNTY ISLAND – SECTION 204 HABITAT RESTORATION PROJECT

DRAFT OBJECTIVES AND CRITERIA

(Criteria based on those identified in the UMRR HREP Design Handbook 2012 except where denoted with *, which are primarily from Pool 8 Phase III Objective Criteria)

1. Aquatic Vegetation:

- OBJECTIVE: Increase the health, diversity, and acreage of emergent and floating leafed aquatic vegetation
 - CRITERIA (June – September):
 - Water Depth: <0.6 meters
 - Water Velocities: 0.0 m/sec preferred, <0.1 m/sec over portions of the area
 - Substrate: Wide range, but not highly organic/flocculent or pure sand
 - Wind Fetch: < 500 meters (Based on minimizing resuspension in water depths < 1 foot)
 - TSS: mean growing season TSS < 30 mg/L*
 - Secchi: mean growing season Secchi depth >50 cm*
- OBJECTIVE: Increase the health, diversity, and acreage of submerged aquatic vegetation
 - CRITERIA (June – September):
 - Increase area with water depths >2 meters to reduce resuspension of sediment.
 - Water Velocities: June-September velocity 10 cm/sec or less (higher upper limit is suggested to give Vallisneria and edge to compete with coontail and elodea).
 - Substrate: Silt/clay for most species, except Vallisneria americana and Heteranthera dubia which prosper on 'sand with silt' substrate best
 - Wind Fetch: < 500 meters*
 - TSS: mean growing season TSS < 30 mg/L*
 - Secchi: mean growing season Secchi depth >50 cm*
 - OBJECTIVE: Decrease the percent presence of aquatic/terrestrial invasive species. Species documented include reed canary grass (*Phalaris arundinacea*), black locust (*Robinia pseudoacacia*), honeysuckle (*Lonicera X bella*), garlic mustard (*Alliaria petiolata*) and purple loosestrife (*Lythrum salicaria*).
 - CRITERIA:
 - Invasive (herbaceous) < 5%
 - Invasive (woody) < 5%

2. Bird Habitat

- OBJECTIVE: Improve or maintain the quantity and quality of habitat for migratory bird species
 - CRITERIA: Shorebird Migratory Habitat*
 - Water Depth: < 0.33 m Aug – Sept.
 - Water Velocities: < 0.05 m/sec
 - Wind Fetch: < 800 meters

- Other Desirable Features: shoreline and shallow water sparsely vegetated, very gradual slope (1V:50H), sand bars, mud flats (See island design of feature from Pool 8 Phase III, Stage 3A)
- OBJECTIVE: Improve or maintain quality of existing backwater waterfowl habitat
 - CRITERIA: Dabbling Duck Fall Migration
 - Water Depth:
 - $d < 0.33$, 15 – 25% of area
 - $0.33 < d < 2$, 40 – 50% of area
 - Water Velocities: < 0.15 m/sec
 - Wind Fetch: < 800 meters
 - Other Desirable Features: sand bars, mud flats, loafing structure, visual barrier, thermal protection
 - CRITERIA: Diving Duck Fall Migration:
 - Water Depth: $1.5 < d < 5$, 40 – 70% of area
 - Water Velocities: < 0.15 m/sec
 - Wind Fetch: < 1600 meters
 - Other Desirable Features: visual barrier
 - CRITERIA: Dike management for water level management, Pierce County Island closed area
 - Rehabilitate $> 6,000$ feet of dike at 4 feet above normal pool
 - Rehabilitate levee to a consistent elevation to prevent uncontrollable flooding and influx of sediments.

3. Shoreline

- OBJECTIVE: Increase available nesting and resting habitat for birds and shoreline species
 - CRITERIA: Dabbling Duck Nesting
 - 0.1 to 5 acres. in size, 0.5 to 2.5 acres preferred
 - At or above 10 yr. flood elevation (5 yr. minimum)
 - 700 feet or more from permanent shoreline
 - Adjacent to brood cover, "hemi" marsh or emergents interspersed with submergents
 - Free of mammalian predators - small (.5 to 1 acre) islands are best in this regard
 - No trees or other perches higher than 4 feet
- OBJECTIVE: Maintain or enhance the quantity of shoreline habitat including floodplain forest and marsh habitat along shorelines

4. Floodplain Forest

- OBJECTIVE: Sustain and Improve the overall health, diversity, and high scenic quality through the extent of the floodplain forest through timber stand improvement totaling ≥ 170 acres (134 acres in Catherine Pass Unit and 36 acres in the Waucouta Bay unit).
 - CRITERIA:
 - Retain overstory canopy cover to prevent infestation of reed canary grass $> 70\%$
 - Tree stocking $> 50\%$
 - Retain snags for cavity nesting species $\geq 3/$ acres
 - Retain and/or stock ≥ 5 mast trees per acre including swamp white oak (*Quercus bicolor*), red oak (*Quercus rubra*) and hickory (*Carya ovata*).

- Retain super canopy cottonwoods (*Populus deltoids*) as potential bald eagle nesting trees > 1 acre

5. Grassland

- OBJECTIVE: Maintain and improve the quality of ≥ 10 acres of grassland for nesting birds, invertebrates, and reptiles
 - CRITERIA:
 - Spring prescribed fire every 5-7 years.

6. Fish Habitat

- OBJECTIVE: Improve or maintain the quantity and quality of habitat for riverine aquatic species
 - CRITERIA: Riverine Fisheries Habitat*
 - Continuous flowing channel (bordered by islands) of at least 1,000 m
 - Areas of Scour, Eddies and varying velocities
 - Variety of substrates (and, silt, clay gravel cobble, etc.).
 - Connectivity with other channels.
- OBJECTIVE: Increase off-channel water depth
 - CRITERIA: Increase area with water depths >2 meters to reduce resuspension of sediment.
- OBJECTIVE: Increase the quantity and quality of backwater fish habitat
 - CRITERIA: Backwater Fish Overwintering Habitat Criteria
 - Water Velocities: <0.003 m/sec over 80% of area
 - Water Temperatures:
 - 4° C, 35 % of area
 - 2 – 4° C, 30% of area
 - 0 – 2° C, 35 % of area
 - Dissolved Oxygen: > 3ppm
 - Depth: > 1.3 m over 40% of area

FEATURE EXPLANATIONS:

Catherine Pass Alternative 1 Features:

CP Bankline Restoration: The bank along this area has some low spots that are at risk of eroding and introducing flow into the Pierce County Islands waterfowl refuge area. This feature would require this shoreline to be elevated, widened and stabilized to reduce the risk of bank failure.

CP Channel Plug: This feature would completely cut off flow from Wisconsin Channel. Ideally the channel plug would be constructed to a width that would create a stable shoreline while maintaining some of the deep water on the north side to offer some bathymetric diversity to the area.

CP Dredge Area 1: Conceptual drawing of an area for backwater dredging. Illustration is not drawn to scale. Fine material from the dredge cut will be used to potentially cover the peninsula, island, dike and bankline restoration features in Catherine Pass. Fine material from the dredge areas could also be placed into the CP Mudflat feature.

CP Dredge Area 2: Conceptual drawing of an area for backwater dredging. Illustration is not drawn to scale. Fine material from the dredge cut will be used to potentially cover the peninsula, island, dike and bankline restoration features in Catherine Pass. Fine material from the dredge areas could also be placed into the CP Mudflat feature.

CP Dredge Area 3: Conceptual drawing of an area for backwater dredging. Illustration is not drawn to scale. Fine material from the dredge cut will be used to potentially cover the peninsula, island, dike and bankline restoration features in Catherine Pass. Fine material from the dredge areas could also be placed into the CP Mudflat feature.

CP Island 1: Conceptual drawing of an island in the open water area out from Bay City. May require additional information regarding foundation conditions, deeper water construction and island stability for this feature.

CP Island 2: Conceptual drawing of an island in the open water area out from Bay City. May require additional information regarding foundation conditions, deeper water construction and island stability for this feature.

CP Mudflat: The mudflat would be an area to place fine material from backwater dredging operations. This area could also provide a location for fine material generated from access dredging or the navigation channel.

CP Peninsula 1: Peninsula extending into Catherine Pass. The peninsula should be constructed to an elevation lower than existing forested peninsula bordering the Wisconsin channel but would still support bottomland forest.

CP Peninsula 2: Peninsula extending out into the water towards bay City. This peninsula would be constructed to function as a containment berm for the hydraulic placement of fine material. The peninsula should be constructed to an elevation lower than existing forested peninsula bordering the Wisconsin channel but would still support bottomland forest.

CP Peninsula 3: Peninsula extending into Catherine Pass to break up wind fetch. The peninsula should be constructed to an elevation lower than existing forested peninsula bordering the Wisconsin channel but would still support bottomland forest.

CP Peninsula 4: Construct peninsula to tie into the existing forested peninsula. The peninsula should be constructed to an elevation that would tie into the existing island and support bottomland forest.

CP Peninsula 5: Peninsula extending into Catherine Pass to break up wind fetch. The peninsula should be constructed to an elevation lower than existing forested peninsula bordering the Wisconsin channel but would still support bottomland forest.

CP Peninsula 6: Peninsula extending into Catherine Pass to break up wind fetch. The peninsula should be constructed to an elevation lower than existing forested peninsula bordering the Wisconsin channel but would still support bottomland forest.

CP Peninsula 7: Peninsula extending into Catherine Pass to break up wind fetch. The peninsula should be constructed to an elevation lower than existing forested peninsula bordering the Wisconsin channel but would still support bottomland forest.

CP Shoreline Protection: Shoreline protection indicates that some form of protection may be needed along this bank (not a prescriptive measure to riprap the entire shoreline). Shoreline protection could include riprap, rock groins, veins, etc. Incorporation of woody material into these areas is encouraged.

CP WLM Dike 1: This feature is dependent upon having a water source for waterfowl habitat management. Clear and grub trees and shrubs, reconstruct water level management dike, construct water level control structure.

CP WLM Dike 2: This feature is dependent upon having a water source for waterfowl habitat management. Clear and grub trees and shrubs, reconstruct water level management dike, construct water level control structure.

CP WLM Dike 3: This feature is dependent upon having a water source for waterfowl habitat management. Construct the new water level management dike and water level control structure.

Catherine Pass Alternative 2 Features (If it is determined that Catherine Cut cannot be closed off)

All features the same as Alternative 1 except for the following:

CP Channel Plug: Removed feature

CP Peninsula 1: Extended peninsula to the north approximately 100 meters.

CP Peninsula 5: Changed shape of the peninsula and extended it to the southeast.

CP Peninsula 7: Removed feature

CP Shoreline Protection: Removed shoreline protection along the removed CP Channel Plug feature. Extended shoreline protection down both sides of the Catherine Cut.

Wacouta Bay Features

WB Berm: Construct sand berm that will create an isolated wetland to the west. The berm will be constructed to an elevation lower than the wooded areas to the north.

WB Dredge Area 1: Conceptual drawing of an area for backwater dredging. Illustration is not drawn to scale. Fine material from the dredge cut will be used to cover the peninsula and berm features in Wacouta Bay.

WB Dredge Area 2: Conceptual drawing of an area for backwater dredging. Illustration is not drawn to scale. Fine material from the dredge cut will be used to cover the peninsula and berm features in Wacouta Bay.

WB Island Peninsula 1: Construct peninsula to tie into the existing forested peninsula. Foundation conditions are a concern as the peninsula extends east. The peninsula should be constructed to an elevation that would tie into the existing island and support bottomland forest.

WB Island Peninsula 2: Peninsula extending into Wacouta Bay to break up wind fetch. The peninsula should be constructed to an elevation lower than WB Island Peninsula 1 but would still support bottomland forest.

WB Island Peninsula 3: Optional addition to WB Island Peninsula 2 that would create an isolated wetland to the north. The peninsula should be constructed to an elevation lower than WB Island Peninsula 1 but would still support bottomland forest.

WB Shoreline Protection: Shoreline protection indicates that some form of protection may be needed along this bank (not a prescriptive measure to riprap the entire shoreline). Shoreline protection could include riprap, rock groins, veins, etc. Incorporation of woody material into these areas is encouraged.