

McKinney NWR Great Meadows Unit, Stratford, Connecticut
Conceptual Marsh Restoration Summary
June 2012

Restoration Project Goals:

1. Restore salt marsh communities to provide estuarine fishery habitat and other ecological functions and services
2. Enhance disturbed wetland and coastal upland habitats to provide greater ecological functions and services

Project Objectives:

1. Restore salt marsh community types including both low marsh dominated by smooth cordgrass (*Spartina alterniflora*) and high marsh dominated by salt hay (*S. patens*), salt grass (*Distichlis spicata*) and other species
2. Avoid or minimize adverse impacts to regulated wetlands
3. Protect or restore state-listed marsh pink (*Sabatia stellaris*) habitat and marsh pink populations
4. Protect or enhance state-listed northern diamondback terrapin (*Malaclemys t. terrapin*) nesting habitat
5. Maintain or enhance forested and scrub-shrub habitat for songbirds
6. Restore or enhance salt marsh habitat for state-listed saltmarsh sparrow (*Ammodramus caudacutus*) and seaside sparrow (*A. maritimus*)
7. Maintain and enhance native communities by controlling invasive vegetation
8. Control salt marsh mosquito production
9. Maintain or improve public access and education
10. Provide marsh research opportunities and project performance monitoring

Restoration Project Alternatives:

1. **Alternative 1: Tidal Connection to Ponds and Marsh Creation** – Two ponds and existing wet *Phragmites* totaling ~3.7 acres would be connected to existing intertidal creek channels to provide regular tidal exchange. The work would involve the construction of two connecting channels by excavating and grading ~280 feet of intertidal channel to connect the ponds with nearby salt marsh creeks. The freshwater ponds would be converted to intertidal marsh habitat dominated by smooth cordgrass. This alternative would minimize impacts to and enhance terrapin nesting habitat along existing sandy berm. Foot access along the berm could be maintained but limited to avoid secondary impacts to terrapin nesting habitat. Marsh elevations and hydrology affecting the habitat between and along the perimeter of the two ponds would be restored to provide marsh pink habitat in the restored high marsh area between the two ponds. This alternative may also include marsh pink propagation and planting program.

2. **Alternative 2: 6.5-Acre Fill Removal and Channel Construction** – Targeted fill removal and channel construction would occur in a tidally-restricted and filled area southeast of the GMU parking lot and east of Alternative 1. Channel construction is needed in the poorly drained, *Phragmites*-dominated southern portion of this area to provide regular tidal exchange and fish access, and to also address the significant production of nuisance mosquitoes (The berm restricts tidal exchange, making the site favorable to producing hordes of salt marsh mosquitoes). Fill removal (~1.5 acres) would occur in the northern portion of this area along with perimeter berm removal to restore to high and low marsh elevations. Target marsh elevations would be ~4.5-5.0 ft NGVD to provide mix of high and low marsh communities. Existing marsh with documented marsh pink populations would be protected or enhanced by the proposed work. This alternative may also include marsh pink propagation and planting program. Excavated fill would be placed in targeted areas to minimize existing wetland impacts and protect or enhance existing forested and/or scrub-shrub habitat used by songbirds along the western border of this area.

3. **Alternative 3: 5.6-Acre Channel Construction and Berm Removal** – Targeted fill removal (~2.5 acres) at berms and construction of channels are proposed east and southeast of Alternative 2. The focus of this work would be channel construction to improve regular tidal exchange at the existing poorly-drained low marsh (and to eliminate mosquito production, as described above); removal of perimeter berm to provide marsh plain tidal sheet flow; and cleaning and/or repair of an existing culvert under the GMU public walking trail to enhance tidal exchange via the culvert. Additional tidal channel connections would be tied into previously excavated channels to the west of this site. Target marsh elevations would be ~4.5-5.0 ft NGVD to provide mix of high and low marsh communities. This alternative could also include marsh pink propagation and planting program. As part of this alternative, minor grade increases in the existing foot-access trail would be provided to maintain public access. Excavated fill soils would be strategically placed in on-site uplands or disposed of off-site.

4. **Alternative 4: 2.2-Acre Fill Removal** – Greater fill removal (up to ~5-foot fill cut) would occur to restore low and high marsh immediately north of Alternative 3 and west of the man-made pond. Target marsh elevations would be ~4.5-5.0 ft NGVD to provide mix of high and low marsh communities. Channels would also be excavated as a component of this alternative with connection into previously excavated channels to the west of this site. This alternative could also include marsh pink propagation and planting program. Excavated fill soils would be strategically placed in on-site uplands or disposed of off-site.

5. **Alternative 5: Enhance 1.75-Acre Tidal Pond Hydrology** – This alternative would be to remove and modify the existing defunct flap gate on the culvert discharging flows from the man-made pond. The existing flap gate has a corroded hole in the structure. The flap gate would be removed, and tidal flow would be established provided impacts to

up-gradient infrastructure would not be adversely affected. Alternatively, a tide gate or managed weir (Agri Drain water control structure or equivalent) would be installed to allow increased, regular tidal exchange with the pond, but limit tidal flooding to prevent flooding of up-gradient industrial warehouses and infrastructure (to be further assessed). USFWS GMU staff would be required to manage and maintain the structure, following an operation and maintenance plan that would be developed as part of this alternative. This alternative would enhance tidal habitat conditions within the ~1.75-acre shallow-water pond and potentially affect additional surrounding marsh area bordering the pond.

6. **Alternative 6: Invasive Plant Mowing/Cutting and Herbicide Application** – Areas within the GMU and located within or bordering the previously described project alternatives are adversely affected by common reed (*Phragmites australis*), Russian olive (*Elaeagnus angustifolia*) and other non-native, invasive plant species. The invasive plant control would be accomplished by one or more mowings of common reed, cutting of Russian olive, and one or more herbicide applications to control these plants. Work would be completed by experienced and licensed pesticide applicators and restoration specialists contracted through CT DEEP or USFWS. A total of up to 10 acres of the GMU would be addressed by this alternative, and be carried out over a 5-year period.

Accomplishing project goals will require working with the USFWS McKinney NWR and other stakeholders to manage for trust species and to strive to achieve regional habitat restoration goals. Any and all combinations of the alternatives should be considered. Any potential contaminated soil issues would also need to be addressed. The number and extent of the alternatives that are undertaken will be commensurate with the level of funding needed for projected work activities and a contingency for unanticipated work items, and the amount of available funding.

Project Cost Estimates

Alternative 1 – Tidal Connection to Ponds and Marsh Creation

Site survey and assessment: \$8,000
Design and permitting: \$10,000
Construction: \$14,190 - \$17,856
Supplemental plantings: \$20,000
5-year performance monitoring: \$15,000
Total project cost: \$67,190 - \$70,856

Alternative 2 – 6.5-Acre Fill Removal and Channel Construction

Site survey and assessment: \$17,000
Design and permitting: \$20,000
Construction: \$141,390 - \$175,950
Supplemental plantings: \$35,000
5-year performance monitoring: \$20,000
Total project cost: \$233,390 - \$267,950

Alternative 3 – 5.6-Acre Channel Construction and Berm Removal

Site survey and assessment: \$17,000
Design and permitting: \$20,000
Construction:
Supplemental plantings: \$20,000
5-year performance monitoring: \$15,000
Total project cost: \$166,950 - \$191,365

Alternative 4 – 2.2-Acre Fill Removal

Site survey and assessment: \$17,000
Design and permitting: \$20,000
Construction: \$191,850 - \$250,010
Supplemental plantings: \$45,000
5-year performance monitoring: \$20,000
Total project cost: \$293,850 - \$352,010

Alternative 5 – Enhance Tidal Pond Hydrology (Tidal Exchange Structure)

Site survey and assessment: \$10,000
Design and permitting: \$10,000
Construction: \$91,030
5-year performance monitoring: \$10,000
Total project cost: \$121,030

Alternative 6 – Invasive Plant Mowing/Cutting and Herbicide Application

Site survey and assessment: \$5,000
Design and permitting: \$10,000

Implementation: \$22,500
5-year performance monitoring: \$15,000
Total project cost: \$52,500