Freshwater Tidal Marsh

Community Code: CE2B400000

State Rank: S1

Concept: An estuarine, intertidal, mixed herbaceous marsh flooded by daily tides, occurring in the freshwater reach of coastal rivers.

Environmental Setting: Freshwater Tidal Marshes occur along free-flowing coastal rivers. Tidal amplitude may range from 0 to 150 cm, and average annual salinity is less than 0.5 ppt (from 0.5 ppt to 5 ppt salinity; there is a gradient of species to the more clearly brackish, which has an average annual salinity of 5-18 ppt). This community occurs upstream of Brackish Tidal Marshes, in the upper limits of tidal influence. The community may often be structurally diverse, including high marsh, low marsh, mud flats, rocky shore, ditches, and seepages. High marsh, also called backmarsh, begins with an abrupt bank of peat 1-3 feet above mean low water. Backmarsh is generally more developed along lower gradient rivers, and is often the most diverse vegetated zone of the Freshwater Tidal Marsh. Low marsh develops in small pockets located below the bank of high marsh on muddy or rocky sloping shores of tidal freshwater areas. Large rivers such as the Merrimack have more low marsh habitat in their Freshwater Tidal Marshes than do smaller rivers. Mud flats within the river channel have regular disturbance from sediment deposition and prolonged inundation. They are sparsely vegetated with a different suite of low-growing, usually annual, plants. Rocky shore habitat, like the mud flats, is sparsely vegetated with low growing annuals and is usually limited to small patches on shallow soils. Higher gradient or larger rivers have more of this habitat type than do smaller rivers with less scouring.

Vegetation Description: Freshwater Tidal Marshes are characterized by salt-intolerant plant species. Dominant species include: bluejoint (*Calamagrostis canadensis*), sedges (*Carex stricta*), narrow-leaved cattail (*Typha angustifolia*), wild rice (*Zizania aquatica*),

smartweeds and tearthumbs (*Persicaria punctata*, *P. arifolia*), false pimpernel (*Lindernia dubia*), jewelweed (*Impatiens capensis*), climbing hempweed (*Mikania scandens*), and sweet flag (*Acorus calamus*). Shrubs such as buttonbush (*Cephalanthus occidentalis*) and silky dogwood (*Swida amomum*) may occasionally be present on the upper edges of the backmarsh. Low marsh typically supports stand-forming emergent plants, often with tough mat-forming rhizomes that resist erosion, although some annuals may also dominate large sections of marsh. Large stands of wild rice (*Zizania aquatica*) usually dominate the muddy areas; however, stands of sweet flag (*Acorus calamus*), soft-stem bulrush (*Schoenoplectus tabernaemontani*), grass-leaf arrowhead (*Sagittaria graminea*), pickerel-weed (*Pontederia cordata*), and water dock (*Rumex orbiculatus*) frequently occur in freshwater tidal low marshes. Freshwater cord-grass (*Spartina pectinata*), three-square (*Scirpus pungens*), and water hemp (*Amaranthus cannabinus*) are typical of rockier substrates. Typical species of the more sparsely vegetated mud flats include spike sedges (*Eleocharis* spp.), water purslane (*Ludwigia palustris*), water starwort (*Callitriche palustris*), and bittercresses (*Cardamine* spp.). Rocky shore habitat supports creeping spearwort (*Ranunculus flammula* var. *reptans*) and estuary beggar-ticks (*Bidens hyperborea*), which although shared with brackish tidal marshes, most commonly occur in the freshwater situation.

Differentiating Occurrences: Freshwater Tidal Marshes represent the upstream end of a gradient, ranging from coastal Salt Marsh to Brackish Tidal Marsh to Freshwater Tidal Marsh. Wet Meadows are in wetlands unaffected by tides. Freshwater Tidal Marshes are characterized by salt-intolerant plant species, although some species of Brackish Tidal Marshes also occur in freshwater tidal conditions. Salt Marsh plants such as saltmarsh hay (*Spartina patens*), saltmarsh cordgrass (*S. alterniflora*), and saltmarsh bulrush (*Bolboschoenus robustus*) are not present. Long's bittercress (*C. longii*), along with estuary arrowhead (*Sagittaria montevidensis* ssp. *spongiosa*) and estuary beggar-ticks (*Bidens hyperborea*), although shared with Brackish Tidal Marshes, most commonly occur in the freshwater situation. Some other species that co-occur in Freshwater and Brackish Tidal Marshes are more likely to be found in the brackish to salt condition: lilaeopsis or eastern grasswort (*Lilaeopsis chinensis*), Atlantic mudwort (*Limosella australis*), water-pimpernel (*Samolus valerandi*), Parker's pipewort (*Eriocaulon parkeri*), and Eaton's beggar-ticks (*Bidens eatonii*).

Associated Fauna: This community provides outstanding general wildlife habitat, with abundant food sources for migratory and wintering waterfowl, and is generally associated with river reaches with spawning habitat for anadromous fisheries such as shad or herring (*Alosa* spp.). It tends to have more vertebrate species than do the Brackish Tidal Marshes, including freshwater snakes and muskrats. Freshwater Tidal Marshes provide habitat for nesting marsh birds. Wild rice is a very important food source for migrating Sora (*Porzana carolina*) and other rails. Freshwater mussels are locally abundant along the tidal channel. Associated rare animals include the New England siltsnail (*Floridobia winkleyi*) and the coastal marsh snail (*Littoridinops tenuipes*), which are both known to occur in drainage ditches and seepages in Freshwater and Brackish Tidal Marshes.

Public Access: West Newbury Conservation Area, West Newbury; Willow Brook Farm Preserve (Wildlands Trust), Pembroke; Stetson Meadows, Norwell; Mounces Meadow, Marshfield.

Threats: Rising sea level may change the occurrences to brackish or salt marsh. Water withdrawal upstream may reduce freshwater flow and allow saltwater further upstream. Development associated with recreational activity (docks, landings) may threaten tidal shore habitat. Invasive species may displace native species or change habitat structure. Invasive plants, including common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), and yellow flag (*Iris pseudacorus*), are established in some systems, although long-term threat is unknown.

Management Needs: Monitor invasive plant populations. Prevent alteration of tidal shores. Maintain stream flow and allow tidal flow. Freshwater Tidal Marshes are geographically limited to short, upstream stretches of tidal rivers in coastal areas; in the past, dams were often placed in rivers below the upper reaches of the tidal influence and so reduced the areas with tidal influence. Historic filling and channelization also reduced the shoreline occurrences of tidal marshes. The recent trend of dam removals allows for natural and assisted restoration of freshwater tidal habitat. Alteration of river hydrology from excessive water withdrawal may have significant effects on plant communities; the extent of tidal influence and the upstream range of the salt front depend in part on the amount of water flowing downstream. Other management often needed in Freshwater Tidal Marshes is control of invasive species.

USNVC/NatureServe: A1485 *Zizania aquatica - Zizaniopsis miliacea* Tidal Freshwater Marsh Alliance -- *Zizania aquatica* Tidal Herbaceous Vegetation [CEGL004202]. A1708 *Nuphar advena - Nuphar sagittifolia* Tidal Freshwater Marsh Alliance -- *Nuphar lutea* ssp. *advena* Tidal Herbaceous Vegetation [CEGL004472]; A3579 *Isoetes riparia - Eriocaulon parkeri* Intertidal Freshwater Marsh Alliance -- *Isoetes riparia* Tidal Herbaceous Vegetation [CEGL006058]; and *Eriocaulon parkeri - Polygonum punctatum* Herbaceous Vegetation [CEGL006352]; A3581 *Stuckenia pectinata - Zannichellia palustris - Ceratophyllum demersum* Freshwater Subtidal Herbaceous Alliance -- *Stuckenia pectinata - Potamogeton perfoliatus-* (*Zannichellia palustris*) Tidal Herbaceous Vegetation [CEGL006027]; A3664 *Schoenoplectus acutus - Schoenoplectus fluviatilis- Schoenoplectus tabernaemontani* Deep Marsh Herbaceous Alliance - *Schoenoplectus fluviatilis* Herbaceous Vegetation [CEGL006366]; A4017 *Peltandra virginica - Pontederia cordata - Sagittaria* spp. Oligohaline Tidal Marsh Alliance -- *Sagittaria subulata - Limosella australis* Tidal Herbaceous Vegetation [CEGL004473;] *Peltandra virginica - Pontederia cordata* Tidal Herbaceous Vegetation [CEGL004706]; *Impatiens capensis - Peltandra virginica - Polygonum arifolium - Schoenoplectus fluviatilis- Typha angustifolia* Tidal Herbaceous Vegetation; *Amaranthus cannabinus* Tidal Herbaceous Vegetation [CEGL006080]; *Impatiens capensis - Peltandra virginica - Polygonum arifolium - Schoenoplectus fluviatilis- Typha angustifolia* Tidal Herbaceous Vegetation [CEGL006325]; *Acorus calamus* Tidal Herbaceous Vegetation [CEGL006833].