St. Johns River at Tosohatchee Wildlife Management Area (Orange County) Photo by Paul Russo

Floodplain Marsh

Description: Floodplain marsh is a wetland community occurring in river floodplains and dominated by herbaceous vegetation and/or shrubs. Sand cordgrass (*Spartina bakeri*), sawgrass (*Cladium jamaicense*), and maidencane (*Panicum hemitomon*) are common dominants, but various other herbs may be found distributed along a hydrologic gradient. Broadleaf emergents and floating plants, particularly bulltongue arrowhead (*Sagittaria lancifolia*), bladderworts (*Utricularia* spp.), pickerelweed (*Pontederia cordata*), yellow pondlily (*Nuphar advena*) occupy the deepest, most frequently flooded sites, and mixed herbaceous stands are found in the somewhat higher portions of the marsh (Toth 1993). In wetter sites, coastalplain willow (*Salix caroliniana*) or common buttonbush (*Cephalanthus occidentalis*) may form shrub thickets. The highest part of the marsh is often a drier, wet prairie-like zone with a large diversity of graminoids and forbs. While the progression from high to low marsh occurs generally from the upland edge to the river edge, these vegetation patches may also be scattered throughout the marsh, which provides a diversity of habitats beneficial to wildlife. Additional herbs can include dotted smartweed (*Polygonum punctatum*), bulrushes (*Scirpus* spp.), common reed (*Phragmites australis*), tickseeds (*Coreopsis* spp.), primrosewillows (*Ludwigia* spp.), fimbries (*Fimbristylis* spp.), spikerushes (*Eleocharis* spp.), flatsedges (*Cyperus* spp.), manyflower marshpennywort (*Hydrocotyle umbellata*), soft rush (*Juncus effusus* ssp. *solutus*), grassleaf rush (*Juncus marginatus*), beaksedges (*Rhynchospora* spp.), rosy camphorweed (*Pluchea rosea*), lemon bacopa (*Bacopa caroliniana*), spadeleaf (*Centella*

asiatica), swamp rosemallow (*Hibiscus grandiflorus*), saltmarsh morning glory (*Ipomoea sagittata*), cattails (*Typha* spp.), southern cutgrass (*Leersia hexandra*), and climbing hempvine (*Mikania scandens*; Wetzel et al. 2001; Lee et al. 2005). Other than occasional thickets, woody vegetation is generally sparse, although some marshes can be dominated by common buttonbush, coastalplain willow, and/or wax myrtle (*Myrica cerifera*). Occasionally, cabbage palm (*Sabal palmetto*) and other flood tolerant trees are widely scattered in floodplain marsh, becoming more concentrated in the ecotone to adjacent hydric hammocks.

Most floodplain marshes are freshwater (salinity less than 0.5 parts per thousand); however, saltwater may influence marshes near the mouths of rivers (freshwater tidal marsh variant) and in areas where there is upwelling groundwater that is partly saline. In these situations, dominant species are those tolerant of brackish conditions, particularly sawgrass, sand cordgrass, needle rush (*Juncus roemerianus*), perennial glasswort (*Sarcocornia perennis*), seashore dropseed (*Sporobolus virginicus*), giant cutgrass (*Zizaniopsis miliacea*), and shoreline seapurslane (*Sesuvium portulacastrum*).

Floodplain marshes are found along rivers and streams from just below the headwaters to the freshwater portions of tidally influenced river mouths. They also occur in river overflow channels and lakes with both input and output of river flow. Floodplain marshes are directly influenced by river flooding on an annual or semi-annual basis where most of the marsh is inundated from approximately 120 to 350 days per year (Toth et al. 1998). Soils are typically sand or a thin to thick organic layer over sand and may be saturated for most of the year. Floodplain marsh may burn periodically depending on dominant vegetation.

Characteristic Set of Species: sawgrass, maidencane, or sand cordgrass

Rare Species: The rare lowland loosestrife (*Lythrum flagellare*) is known from floodplain marshes along the Myakka River, and corkwood (*Leitneria floridana*) is known from the freshwater tidal marsh variant of floodplain marsh where sawgrass marsh grades into low levees of floodplain swamp.

Floodplain marshes are important habitat for black rail (*Laterallus jamaicensis*), limpkin (*Aramus guarauna*), bald eagle (*Haliaeetus leucocephalus*), and wading birds, particularly great egret (*Ardea alba*), white ibis (*Eudocimus albus*), little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), black-crowned night-heron (*Nycticorax nycticorax*), yellow-crowned night-heron (*Nyctanassa violacea*), and glossy ibis (*Plegadis falcinellus*). Historically, snail kites (*Rostrhamus sociabilis plumbeus*) were found in floodplain marshes but are now absent, probably due to habitat degradation (Sykes, Jr. 1984).

Range: Floodplain marsh is most abundant in Central Florida along the St. Johns and historic Kissimmee Rivers, but also occurs at river mouths throughout the state north of Lake Okeechobee. Similar marshes are found throughout the southeast.

Natural Processes: The characteristic herbaceous species re-sprout vigorously following burns, and there is evidence that frequent fire helps to limit shrub invasion (Miller et al. 1998; Lee et al. 2005). Frequent fires in the freshwater tidal floodplain

marshes maintain a sawgrass dominance, but woody species, although widely spaced, often persist in these marshes, coppicing from roots or quickly germinating seedlings (Clewell 1989).

Flat topography and slow drainage in the largest floodplain marshes create a prolonged inundation period from approximately 120 to 350 days per year with most of the marsh inundated over 250 days (Toth et al. 1998). Hydrology alteration in these systems has sometimes dramatically reduced this hydroperiod. Flood pulses provide oxygenated water to the system and allow small fish and larvae of larger game fish to utilize large portions of the vegetated marsh. The rising and receding water levels help create a variable mosaic of plant communities, and at times of low water, concentrate prey. These areas can be critical feeding sites for wading bird populations, snail kites, and bald eagles (Toth et al. 1998).

Community Variations: Within and among floodplain marshes, plant composition can vary based on variation in hydrology, salinity, and fire history. Saltpans that are devoid of vegetation are common in floodplain marshes between Lake Poinsett and Puzzle Lake along the St. Johns River floodplain.

One commonly occurring variant of floodplain marsh is recognized here.

Variant: FRESHWATER TIDAL MARSH – Occurs in river mouths that receive pulses of freshwater in response to tides. Salt and freshwater marsh species intermingle as salt water is diluted by freshwater inflow and tidal fluctuation is damped (Thompson 1977; Clewell 1997). These marshes are occasionally influenced by salt water during storms, seasonal high tides, and periods of low river flow. Sawgrass is dominant, forming large stands either directly adjacent to the river, or just behind slightly raised levees of floodplain swamp or hydric hammock vegetation.

Associated Communities: Floodplain marsh is similar in vegetation composition and structure to other freshwater marshes in the state (e.g., depression and basin marshes). The primary feature distinguishing floodplain marsh is its position within a floodplain influenced by river flow, even if only during high flood stages. Basin marshes may form the headwaters of a river or drain into a riverine system, but do not receive water from the river; floodplain marshes, by contrast lie directly along the river's course and are influenced by river flow. Floodplain marshes (especially the freshwater tidal marsh variant) may occur near salt marshes at river mouths. Although structurally similar to salt marshes, floodplain marshes are tolerant of only slight salinity levels, and do not contain halophytic species such as saltmarsh cordgrass (*Spartina alterniflora*).

Management Considerations: Maintenance or restoration of natural hydrology is an important consideration for floodplain marsh management. Channelization, as has occurred in the large Kissimmee River floodplain, may lead to a loss of plant diversity and more homogeneous plant assemblages as water levels are artificially stabilized (Toth 1993). In the Kissimmee, water control structures removed seasonal fluctuations in water levels and altered natural vegetation structure (Goodrick and Milleson 1974). Channelizing the Kissimmee River also resulted in sharp declines in wading bird and

game fish populations, and much of the natural sediment filtration function of the pre-channelized river was lost (Toth 1993). Vegetation in the wettest part of the marsh is probably most sensitive to long-term effects of hydrologic alterations. Wetzel et al. (2001) showed that seed banks of characteristic species in these zones are greatly diminished following prolonged drainage.

Early work on restoration of the Kissimmee River showed that weedy native and exotic species such as common ragweed (*Ambrosia artemisiifolia*), dogfennel (*Eupatorium capillifolium*), and Caesar's weed (*Urena lobata*) were reduced after stream flow was re-established in the natural river channels (Toth 1993). Fish, wading birds, and waterfowl responded positively, at least partially in response to improvements in invertebrate populations (Toth 1993). A return of seasonal water fluctuations to the Kissimmee River marshes is reported to encourage growth of waterfowl food plants (Perrin et al. 1982).

Prescribed fire, in addition to maintenance or restoration of natural hydrology, may aid in reducing shrub cover in floodplain marsh. Burning is often used as a tool to decrease fuel loads and to maintain wildlife habitat and natural community structure (Miller et al. 1998).

In a marsh along the St. Johns River, Lee et al. (2005) found that although willow encroachment was reduced only slightly by a single dormant season fire, a similar fire within two years significantly decreased willow cover. A well-developed herbaceous understory was needed to carry fire into the willow, and they postulated that thickets where the herb layer had been lost may be impossible to burn. In a similar study, wax myrtle, red maple (*Acer rubrum*), and groundsel tree (*Baccharis halimifolia*) were eliminated and buttonbush cover was significantly decreased by a single prescribed fire in the upper St. Johns River basin (Miller et al. 1998).

Wildlife responses to prescribed fires should also be considered in implementing a prescribed fire regime in floodplain marsh. Legare et al. (1998) surveyed black rail populations following two different prescribed fires in floodplain marsh dominated by sand cordgrass. They suggest that prescribed burns should leave a patchwork of unburned habitat to provide shelter for marsh wildlife. The same recommendation was given by Holder et al. (1980) after studying habitat for the dusky seaside sparrow (*Ammodramus maritimus nigrescens*), now extinct. They suggested that the sand cordgrass marshes of the St. Johns River should burn every three years. However, in freshwater tidal marshes, Nyman and Chabreck (1995) recommend prescribed burns be used only when needed to control woody encroachment, and that fires be conducted in the fall and winter to avoid nesting wildlife and lower the possibility of a peat fire.

Cattle grazing has been a major land use in much of Florida's floodplain marshes (Holder et al. 1980). Marshes and wet prairies contain more than 100 species of native plants that cattle will use for forage (Rummell 1957). Holder et al. (1980) found that cattle grazing reduced plant diversity in sand cordgrass-dominated floodplain marshes along the St. Johns River, but did not significantly affect the dominant species. In addition to potential negative effects by cattle, feral hog rooting may also contribute to a degradation of marshes (Winchester et al. 1985). Off-road vehicle use for recreation and hunting is a common occurrence in floodplain marshes, and can cause alteration of the natural vegetation, particularly in sawgrass-dominated marshes (Girardon and Lowe 1986).

These and other disturbances, particularly ditching and draining, can facilitate the establishment of invasive exotic plants in the marsh. In particular, torpedo grass (*Panicum repens*), Peruvian primrosewillow (*Ludwigia peruviana*), alligator weed (*Alternanthera philoxeroides*) para grass (*Urochloa mutica*), West Indian marsh grass (*Hymenachne amplexicaulis*), and Caesar's weed are all noxious weeds that are at times dominant in floodplain marsh.

Exemplary Sites: Tosohatchee Wildlife Management Area (Orange County), Kissimmee Prairie Preserve State Park (Okeechobee County), Myakka River State Park (Sarasota County), Apalachicola River Wildlife and Environmental Area (Franklin County)

Global and State Rank: G3/S3

Crosswalk and Synonyms:

Kuchler	113/Southern Floodplain Forest
Davis	13/Grasslands of Prairie Type
	16/Fresh Water Marshes
SCS	25/Freshwater Marsh and Ponds
Myers and Ewel	Freshwater Marshes - riverine or floodplain marshes
SAF	N/A
FLUCCS	641/Freshwater Marshes

Other synonyms: river marsh and freshwater marsh (Wharton 1978), freshwater tidal marsh, tidal woods (Clewell 1989)

References:

Clewell, A.F. 1989. Botanical inventory of the Choctawhatchee River valley, Florida. Report to the Northwest Florida Water Management District, Havana, Florida.

Clewell, A.F. 1997. Vegetation. Pages 77-109 in C.L. Coultas and Y.P. Hsieh, editors. Ecology and Management of Tidal Marshes: A Model from the Gulf of Mexico. St. Lucie Press, Delray Beach.

Girardon, D.L., and E.F. Lowe. 1986. The effects of off-road vehicle traffic on vegetation of the floodplain of the Upper St. Johns River. Technical Publication SJ 87-6. St. Johns River Water Management District, Department of Water Resources, Palatka, Florida.

Goodrick, R.L., and J.F. Milleson. 1974. Studies of floodplain vegetation and water level fluctuation in the Kissimmee River Valley. Technical Publication 74-2. South Florida Water Management District, West Palm Beach, Florida.

Holder, G.L., M.K. Johnson, and J.L. Baker. 1980. Cattle grazing and management of dusky seaside sparrow habitat. Wildlife Society Bulletin 8:105-109.

Lee, M.A.B., K.L. Snyder, P. Valentine-Darby, S.J. Miller, and K.J. Ponzio. 2005. Dormant season prescribed fire as a management tool for the control of *Salix*

caroliniana Michx. in a floodplain marsh. Wetlands Ecology and Management 13:479-487.

Legare, M., H. Hill, R. Farinetti, and F.T. Cole. 1998. Marsh bird response during two prescribed fires at the St. Johns National Wildlife Refuge, Brevard County, Florida. Page 114 in T.L. Pruden and L.A. Brennan, editors. Fire in Ecosystem Management: Shifting the Paradigm from Suppression to Prescription. Tall Timbers Fire Ecology Conference Proceedings, No. 20. Tall Timbers Research Station, Tallahassee, Florida.

Miller, S.J., K.J. Ponzio, M.A. Lee, L.W. Keenan, and S.R. Miller. 1998. The use of fire in wetland preservation and restoration: are there risks? Pages 127-139 in T.L. Pruden and L.A. Brennan, editors. Fire in Ecosystem Management: Shifting the Paradigm from Suppression to Prescription. Tall Timbers Fire Ecology Conference Proceedings, No. 20. Tall Timbers Research Station, Tallahassee, Florida.

Nyman, J.A., and R.H. Chabreck. 1995. Fire in coastal marshes: history and recent concerns. Pages 134-141 in S.I. Cerulean and R.T. Engstrom, editors. Fire in Wetlands: A Management Perspective. Proceedings of the Tall Timbers Fire Ecology Conference, No. 19. Tall Timbers Research Station, Tallahassee, Florida.

Perrin, L.S., M.J. Allen, L.A. Rowse, F. Montalbano, III, K.J. Foote, and M.W. Olinde. 1982. A report on fish and wildlife studies in the Kissimmee River Basin and recommendations for restoration. Florida Game and Fresh Water Fish Commission, Office of Biological Services, Okeechobee, Florida.

Rummell, R.S. 1957. Beef cattle production and range practices in south Florida. Journal of Range Management 10:71-78.

Sykes, P.W., Jr. 1984. The range of the snail kite and its history in Florida. Bulletin of the Florida State Museum Biological Science 29:211-264.

Thompson, S.M. 1977. Vascular plant communities and environmental parameters under tidal influence on the Wakulla and St. Marks Rivers, Florida. Thesis, Florida State University, Tallahassee.

Toth, L.A. 1993. The ecological basis of the Kissimmee River restoration plan. Florida Scientist 56:25-51.

Toth, L.A., S.L. Melvin, D.A. Arrington, and J. Chamberlain. 1998. Hydrologic manipulations of the channelized Kissimmee River - implications for restoration. Bioscience 48:757-764.

Wetzel, P.R., A.G. van der Valk, and L.A. Toth. 2001. Restoration of wetland vegetation on the Kissimmee River floodplain: Potential role of seed banks. Wetlands 21:189-198.

Wharton, C.H. 1978. The Natural Environments of Georgia. Geologic and Water Resources Division and Resource Planning Section, Office of Planning and Research, Georgia Department of Natural Resources, Atlanta.

Winchester, B.H., J.S. Bays, J.C. Higman, and R.L. Knight. 1985. Physiography and vegetation zonation of shallow emergent marshes in southwestern Florida. Wetlands 5:99-118.