



Interim Forest Management Plan

Property Identifiers

Property Name and Designation: Green Bay West Shore Wildlife Area, Gift lands, Green Bay Coastal Fish Habitat (Collectively West Shore)

County(ies): Marinette, Oconto, Brown

Property Acreage: 9,011 – GBWSWA, 802 – Gift Lands, 82 – Green Bay Coastal Fish Habitat

Forestry Property Code(s): 503, 505, 3801, 3814, 4329

Master Plan Date: July 26, 1979, Update March 18, 2008

Part 1: Property Assessment (1-2 pages maximum)

General Property Description

- Landscape and regional context: The Green Bay West Shores Wildlife Area (GBWSWA) is located along the west shore of Green Bay in the Central Lake Michigan Coastal and Northern Lake Michigan Coastal Ecological Landscapes. The study area occurs on ground moraine and lacustrine plains. Lacustrine plains are created where the Oconto, Pensaukee, Suamico, and Peshtigo Rivers; Duck Creek; and other smaller rivers and streams create deltas upon entering Green Bay. Important landform features are also created by long-shore currents in Green Bay.

Water levels of Green Bay are extremely important to both form and function of the study area. The elevation of many of the wetlands is equal to the elevation of the bottom of Green Bay. This results in water of the bay flowing through these wetlands and found behind them. Daily, seasonal, and long-term water levels affect the fish, wildlife, and plant community location and use. Daily changes, produced by seiches, can inundate a dry area with a few inches of water and then dry out again. Annual flooding events allow small streams and tributaries to run for a month or two, creating important wildlife habitat and fish spawning areas. Long-term changes in the water levels of Green Bay, although difficult to notice, have large impacts on the ecology of the area. Wetland natural communities shift depending on water levels. An Emergent Marsh may shift to Southern Sedge Meadow, Shrub-carr, and eventually Southern Hardwood Swamp as water levels decrease. Upon a rise in the water level of Green Bay, this area may become open water, killing trees and shrubs and possibly shifting the natural community back to Emergent Marsh.

The Green Bay West Shore is located within three Landtype Associations (LTAs):

- Lewiston Basin (212Te10). The characteristic landform pattern is nearly level lake plain with many swamps. Soils are predominantly somewhat poorly drained loamy fine sand over sandy lacustrine.
- Brookside Moraines (212Tb28). The characteristic landform pattern is nearly level till and lake plain complex. Soils are predominantly somewhat poorly drained fine sandy loam over calcareous loamy till or lacustrine.
- Green Bay Plains (212Zb06). The characteristic landform pattern is nearly level lake plain with scattered low dunes. Soils are predominantly somewhat poorly drained loamy fine sand over sandy and silty lacustrine and beach deposits.



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- History of land use and past management: The West Shore has a long history of human occupation. Rivers and the shoreline were used by Native Americans who utilized the resources of the Bay and adjacent land. Missions and trading posts were established at several locations on the shore beginning during the French settlement of the area in the 1700's and continuing throughout British and American settlement in the 1800's. The area was logged with lumber mills located at Peshtigo, Oconto, and Pensaukee. The West Shore supported a commercial fishing industry which continues to the present on a much smaller scale. In some areas, agriculture followed land clearing though poorly drained soils and water level fluctuations present challenges.

Interest in government involvement of conservation of the West Shore began in the 1930's with establishment of a National Wildlife Refuge on Longtail Point which was eventually terminated and turned over to the State for inclusion in the Wildlife Area. State acquisition of land along the West Shore began in 1948 in the Sensiba Unit. Other units were established in 1954 (Peshtigo Harbor), 1956 (Pensaukee), 1962 (Rush Point), 1965 (Charles Pond), and 1967 (Oconto Marsh). In 1965, all West Shore properties in Marinette and Oconto Counties were placed under one project. In 1978, the project was expanded to include state acquisition of relevant properties within Brown County. Management has focused on wildlife habitat and wildlife based recreation with emphasis on waterfowl, wetland-dependent wildlife, migratory birds, and forest game species.

Because the shore zone is vitally important to the fish assemblage of Green Bay, properties have been acquired under authority of the Scattered Fishery Habitat acquisition project. These sites have a hydrologic connection to the Bay and provide fish spawning and nursery habitat for a variety of fish species, particularly northern pike. Protection of these sites and enhancement of fish habitat and spawning substrate are the primary fish management activities.

Site Specifics

Current forest types, size classes and successional stages: Approximately 40% of the land cover is forested, with only 35% of the landscape being scheduled for forest management. The primary forest cover types include swamp hardwood, bottomland hardwood, red maple, aspen, and oak. Scattered small forest stands of northern hardwood, white birch, hemlock, and pine are also present. Currently, 57% of the forested acreage is omitted from management planning, primarily due to deferral coding in anticipation of the revision of the Master Plan for the property.

Swamp hardwood stands comprise more than 30% of the forested acreage throughout the Green Bay West Shores. Many of these stands are primarily red maple. These stands vary in tree diameter and size and quality, with some stands having low site productivity while others are highly productive with the potential to manage for sawtimber sized trees through extended rotation. Currently more than 70% of swamp hardwood stands are more than 60 years old and approaching rotation age for the red maple component, with less than 1% of the swamp hardwood stands younger than 30 years old.

Bottomland hardwood stands are common throughout the river bottoms on these properties, comprising 20% of the forested acreage. Little management has been completed in this forest type due to soil and water quality concerns, in addition to questionable regeneration success. Similar to the swamp hardwood stands, more than half of this cover type is greater than 80 years old.

Red maple stands, which have similar characteristics to the swamp and bottomland hardwood types, also comprise 20% of the forested acreage of the Green Bay West



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Shores property group. Over 50% of the red maple stands present exceed 60 years in age and are nearing rotation age on some sites, with less than 4% of the type acreage being less than 30 years old.

Aspen has been managed on a more regular basis throughout this property to create young forests for wildlife habitat, though it only comprises 16% of the forest stands. More than 20% of the aspen stands exceed 65 years of age and some of these stands are declining due to poor site quality.

Mature oak stands are scattered throughout these properties, representing less than 10% of the forest cover. Only 5% of the oak stands are under 50 years in age, with more than 10% over 120 years in age, and the bulk of the stand age between 60 and 90 years old. These stands vary from poor/moderate to higher quality depending on the soil type and site quality. Some stands have been impacted by drought and periodic gypsy moth defoliation, which has created visible stress on tree health and quality.

- State Natural Area designations: State Natural Area designations – There are three designated SNA's within the Green Bay West Shores WA: Charles Pond, Peshtigo Harbor Lacustrine Forest, and Peshtigo River Delta Marshes. High Value Conservation Forests (HCVF) or other resources/natural community types limited in the landscape: All of the primary sites identified in the Rapid Ecological Assessment for the Green Bay West Shores WA are considered HCVF's. Biotic Inventory status: The Rapid Ecological Assessment for the Green Bay West Shores WA was completed in 2010. Deferral/consultation area designations (refer to the following website): Yes. The Peshtigo Harbor Unit (GBPG01) has areas designated as SNA's (GBPG01d and GBPG01e) which are deferral as is the adjacent Badger gift lands (GBPG01a). The remainder of the primary site in the Peshtigo Harbor Unit is consultation. Charles Pond (GBPG07), Oconto Marsh Unit (GBPG02) Pensaukee Marsh (GBPG03), Long Tail (GBPG05), Duck Creek/Peats Lake (GNPG06), and Sensiba (GBPG04) are all consultation. Rush Point, Pecor Point, Little Tail, and Tibbett-Suamico Units were not designated as either deferral or consultation.
- Rare species: There are 61 rare species (43 animals and 18 plants) documented in the Rapid Ecological Assessment.
- Invasive species: Several invasive species are present and well-established on the West Shore of Green Bay. Giant reed (*Phragmites australis*) is prevalent along the lakeshore and reaches upstream along watercourses. Reed canary grass (*Phalaris arundinacea*) and purple loosestrife (*Lythrum salicaria*) are also common along the shore and in wetlands on the property and reed canary is present in some forest stands. Both common and glossy buckthorn (*Rhamnus spp*) is found throughout the area and can affect forest regeneration. Emerald ash borer (*Agrilus planipennis*) has been documented in Brown County near the West Shore. Gypsy moth (*Lymantria dispar*) is found throughout the West Shore. Many other invasive species are found along the shore.
- Soils: The gradual sloping west shore of Green Bay is a combination of low erodible plains and wetlands which are subject to periodic and occasional flooding. The Tendrow-Roscommon, Wainola-Deford, and Kinross Deford-Angelica Associations of soils are the most widespread soils immediately inland of the Bay shore. These soils are loamy fine sands, fine sandy loams and loams of lacustrine origin which are deep, nearly level, and poorly drained. The water table in these soils is near the surface especially during wet periods. It is also low in natural fertility. This severely limits agriculture. Residential development and recreation (in the form of camping, picnicking and trails) are also limited due to wetness, flooding, or blowing when exposed soils become droughty. Most of these soils are in low quality woodlots, pasture, or brush and recommendations for use include a suitability for wildlife habitat, hunting and outdoor recreational education.



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The Rousseau-Shawano Association is found mixed with the Wainola-Deford Association just south of the Oconto area and occurs on the lake borders and outwash plains. The soil association is comprised of loamy fine sands which are nearly level and moderately well drained to well drained. The soils are subject to wind erosion when exposed and are low in soil fertility, again limiting agricultural use. Most of the area of this soil type on the west shore is in second growth timber or brush. Some forms of recreation (camping, picnicking, and trails) are moderately to severely limited by repeated trampling and disturbance of the soil. Compatible uses include wildlife habitat, hunting, and nature observation and study.

- The marshes and swamps adjacent to the Bay shore have developed moderately deep and very poorly drained, nearly level, organic soils. The Carbondale-Cathro-Marsh Association dominates the southern West Shore-Peats Lake Unit. The Markey Muck Series occurs periodically along the entire west shore but is particularly evident in Peshtigo Harbor Unit. It is a herbaceous organic material over a sandy substrate and often occurs jointly with the Lupton Muck, a woody organic soil in the northern part of the west shore. Also present in the Peshtigo Harbor Unit area is the Saprist's Aquents, a variable inundated soil. All of these organic soils when drained are moderately suited to crops but when exposed, are subject to blowing and consolidation. The majority of these soils are vegetated with water tolerant grasses, sedges, shrubs, and trees. Their use for timber production or as residential and recreational areas is severely limited with only wildlife habitat, hunting and education as compatible uses.

Cultural and Recreational Considerations

- Cultural and archeological sites: Because of the long history of human occupation of the West Shore there are numerous cultural and archaeological sites known. The Bureau of Facilities and Lands maintains records of these resources and these records are consulted prior to land management activities. Many of the sites are culturally sensitive and therefore a complete listing of specific locations is not included in the Master Plan. Resources include encampments, village sites, and cemeteries of both Native Americans and early settlers, as well as mounds, lighthouses, trading posts, and abandoned infrastructure from the logging era. There is ongoing archaeological work on the West Shore and the WDNR archaeologist is involved with oversight when this occurs on state-owned property.

Part 2: IFMP Components (1-2 pages maximum)

Management Objectives (Outline primary forest management objectives): The goal of the Green Bay West Shore Wildlife Area is to manage the West Shore with an emphasis on wildlife protection, wildlife-based recreation, and habitat preservation keying on migratory waterfowl and certain non-game birds. Management is directed at maintaining the ecological integrity of the shore zone as a vital aspect of the total Green Bay ecosystem. Gift lands were obtained to provide protection and management of wildlife and fish species associated with the Green Bay ecosystem and to provide recreational opportunities associated with those resources. Fish Habitat lands provide habitat protection and management opportunities for fish species in the Green Bay ecosystem. Because these management goals are complementary across the various land designations included in the Plan, they are implemented to varying degrees on each land type as opportunities present themselves.



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The lower Peshtigo River and the Green Bay West Shore wetlands are both designated as Important Bird Areas for their contribution to both breeding and migratory birds. Management of the West Shore seeks to provide a variety of habitats along this important coastal area. Wetlands and marshes are protected. Forest management is designed to provide a variety of forest types and age classes to benefit a wide array of birds. Some areas have been designated as State Natural Areas.

Wildlife-based recreation is important along the West Shore because of the opportunities available and the property's proximity to urban areas. All of the units provide hunting opportunities for waterfowl, small game, deer, and bear. Trapping occurs on several of the units. Trails and viewing opportunities have been developed at a variety of locations. Educational materials have been developed for three trails within the Peshtigo Harbor Unit to highlight cultural resources, habitat types, and wildlife species present on the area. An area of the Peshtigo Harbor Unit is being used to demonstrate land management activities for early-successional habitat specialists. Forestry techniques as well as opening management and invasive species control will take place on this area.

Property Prescriptions: Much of the West Shore is not forested. These types are either open wetlands or shrub-carrs. Forested acres are largely hardwoods. Early-successional species such as aspen and white birch are managed using even-aged techniques to develop balanced age-class diversity. Oak types and oak within other types is generally favored. Regeneration of these types is even aged. Red maple, and various hardwood types are managed to provide a diversity of habitat types on the landscape. One large area of swamp hardwoods is set aside to be managed passively as the Peshtigo Harbor Lacustrine Forest and bottomland hardwoods along the Peshtigo River and elsewhere are generally managed to provide large trees and long rotations. Wetland resources including stream threads connected to the Bay are managed to protect and enhance their value to the interface between land and water and to benefit fish and wildlife. Invasive species control is conducted where necessary to maintain habitat values or to facilitate regeneration of desired forest types. Past forest management has focused largely on maintaining the current cover types. Swamp and bottomland hardwood stands have been managed through extended rotations to encourage large diameter tree development in many areas although even-aged harvests have been prescribed for some stands. Some stands have been deferred from management due to soil and water quality concerns in addition to concerns about regeneration. Mature and overmature even-aged types such as aspen, red maple, and oak that are present throughout the property will continue to be managed to reproduce these forest types generally using even-aged management. Age-class diversity is desired throughout the property. Harvest on the large amount of mature and overmature stands will develop the desired age class distribution and maintain forest productivity for timber and non-timber resources on the property. Aspen and oak will generally be managed using even-aged silvicultural systems to promote opportunities for early-successional wildlife species and to maintain those types on the landscape. Other hardwood species will be managed using appropriate management techniques to provide a diversity of age classes and structural attributes. Some red maple and swamp hardwoods will be managed using all-aged prescriptions and some using even-aged techniques. Site location and stand quality in addition to wildlife habitat objectives will be used to determine management. Bottomland hardwoods will generally be managed using all-aged techniques with long rotations but some stands may be managed using even-aged systems. As with the other hardwoods, site location, quality, and objectives combined with silvicultural management guidelines will determine management. Other stands on the property will be managed sustainably using appropriate silvicultural techniques. Non-timber management of brush, grass, and wetland types may be prescribed to complement the wildlife values of the forested component of the property.



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Approvals:

District Ecologist Date

Forester Date

Property Manager Date

Area/Team Supervisor Date