

Chapter 4: Future Management Direction; Tomorrow's Vision

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Throughout this document, five national wildlife refuges (NWRs, refuges) are discussed individually—such as the Gravel Island NWR or the Green Bay NWR. This document also discusses all five NWRs collectively as one entity and when doing so, refers to the group as the “Great Lakes islands refuges” or “Great Lakes islands NWRs.”

Great Lakes Islands Refuges Vision, Goals, Objectives and Strategies

The planning team developed goals and objectives for three broad management alternatives that will apply to all of the Great Lakes islands refuges. These alternatives include:

- Alternative A: Current Direction to Maintain Natural Integrity
- Alternative B: Minimal Management to Preserve Wilderness Qualities
- Alternative C: Enhanced Management to Promote Natural Integrity and Public Stewardship

The Environmental Assessment (EA) (Appendix A) describes and evaluates each alternative. Alternative C is the preferred alternative, and it forms the basis for the Great Lakes islands refuges Comprehensive Conservation Plan (CCP). The goals, objectives, and strategies are presented on the following pages. The planning team established goals for major management areas, objectives for achieving those goals, and the specific strategies that will be employed by the refuges' staff. The goals are organized into the broad categories of ecosystem, wildlife, habitat, people, and cultural.

Vision Statement for Great Lakes Islands Refuges

Management of Great Lakes islands refuges will reflect the mission of the National Wildlife Refuge System (NWRS, Refuge System) by conserving in perpetuity a rich mosaic of island habitats and enabling nesting and migrating birds and other wildlife of conservation concern in the Great Lakes to thrive here. The refuge islands will serve as a resilient source of evolving habitats and ecosystem processes even as structure and composition are altered due to climate change. With the help of our conservation partners, we will apply sound, scientific principles based on research, studies, and adaptive management strategies to:

- sustain the long-term health and integrity of Great Lakes habitats;

- expand community outreach and environmental education and interpretation programs; and,
- motivate visitors to embrace stewardship of natural resources.

Goals for Great Lakes Islands Refuges

The following goals were developed after consideration of refuge purposes, the U.S. Fish and Wildlife Service (FWS, Service) and Refuge System missions, the refuge vision statement, and the mandates, plans, and conservation initiatives described above. They are intentionally broad, descriptive statements of purpose. The goals highlight elements of our vision statement that emphasize future refuge management.

Ecosystem Goal

Protect and maintain natural ecological communities to promote a healthy functioning ecosystem and identify future scenarios for Great Lakes islands ecosystems

Wildlife Goal

Protect, restore and maintain a natural diversity of fish and wildlife native to the Great Lakes, with an emphasis on Service Resource Conservation Priority Species.

Habitat Goal

Perpetuate the biological diversity and integrity of native plant communities to sustain high quality habitat for migratory birds, fish, and endangered species.

People Goal

Communicate and work in partnership with communities, governments, and appropriate organizations throughout the Great Lakes watershed to understand and appreciate the island ecosystems of the Great Lakes and further the mission of the Refuge System. Protect the cultural resources and cultural history of the refuges to assure historical preservation and connect refuge staff, visitors, and the community to the area's past.

Objectives and Strategies for Great Lakes Islands Refuges

The following management objectives and strategies are divided into two sections. The first section deals with issues and management approaches that are common to all refuge islands. The second section describes specific actions, or strategies, that will be applied to individual islands.

Objectives and Strategies Common to All Island Refuges

Ecosystem Goal

Ecosystem Objectives 1: Climate Change

Within five years of CCP approval, identify potential impacts of the projected climate changes on both abiotic and biotic components of the Great Lakes island ecosystem and communicate these issues to the public.

Discussion and Rationale

Managing at the proper scale is fundamental to the accomplishment of conservation objectives. Managing natural resources and landscapes is becoming increasingly complex. Land use changes and impacts such as drought, wildfire, contaminants, invasive species, disease, and a rapidly changing climate can threaten native species and their habitats. The impacts of climate change are already evident in warmer water, longer ice-free season, earlier spring runoff, changing water levels and resulting habitat alterations and impacts to water quality and ecological processes. Species range shift, species extinction, phenological changes, and community restructuring are the major climate change issues affecting the Great Lakes Region. Secretarial Order 3226 requires that climate change impacts be considered and analyzed when planning or decision making.



Restoration Supporters, Plum Island, Green Bay NWR (Photo by Tim Sweet)

Making people more aware of how the accelerating climate change is harming fish and wildlife and how it reduces the flow of societal goods and affects ecosystem services is a challenge for the Service, our state and tribal counterparts, and the conservation community at large. The same ecosystem functions that provide for sustainable fish and wildlife populations also provide communities with significant benefits, such as good water quality, flood and fire protection, and recreation. Meeting the challenge will require that the Service and its partners use every available communication tool to engage the public about the ecological, economic, social, and cultural costs exacted by climate change.

Strategies

1. Refuge staff, as appropriate, will work directly with the Upper Midwest and Great Lakes Landscape Conservation Cooperatives to implement resource assessments, climate model applications to appropriate scale, vulnerability assessments, inventory and monitoring protocols, and conservation plans and designs.
2. Participate in climate change discussions with our local, national, and international partners in the public and private sectors.
3. Actively seek knowledge from state, federal, tribal, and local government agencies; non-governmental organizations; business and industry already engaged in addressing climate change; and individual citizens.
4. Continue working and developing new collaborative island management efforts with other agencies, state and local governments, and non-governmental organizations to

increase our understanding of global climate change impacts and use our combined expertise and creativity to help wildlife resources adapt in a climate-changed world.

Ecosystem Objective 2: Island Acquisition

Through the life of the plan, protect highly threatened Great Lakes island habitat that is either underrepresented and unique; or critical for threatened and endangered species, focal colonial waterbird species, or birds of conservation concern for Region 3 of the Service.

Discussion and Rationale

It is important to consider the islands of the Great Lakes as a single, irreplaceable resource. The value of the whole collection of islands is much greater than the islands' individual resources. Great Lakes islands form a landscape unique in the world and support remarkable diversity. With their relative isolation, they offer opportunities to protect the unique biological legacy of Great Lake islands. Acquiring additional islands will add to local island biodiversity and protect important island habitat in the Great Lakes Basin.

Strategies

1. Implement the Land Protection Plan (Appendix C) by adding up to 14,133 acres of important island habitats.
2. Continue seeking out funding sources for acquisition and working with conservation partners to implement the plan in the Great Lakes Basin.
3. Develop partnerships for acquisition of lighthouses and associated structures so the Service does not have to take on restoration and/or preservation of these structures.
4. Update the priority islands periodically as wildlife, threats, and habitat conditions change over time.

Wildlife Goal

Wildlife Objective 1: Inventory and Monitoring

Within five years of CCP approval, implement a monitoring program to track the presence, abundance, population trends, and/or habitat associations of select resources including but not limited to Region 3 Conservation Priority Species, habitats, communities and ecosystems (e.g., Great Lake islands' habitat). Resources to be monitored are identified under the island's specific objectives or in forthcoming step-down plans. As the need arises, implement research to answer questions that have been raised regarding the management of resources and other issues.

Discussion and Rationale

These islands are valuable patches of habitat for a variety of migratory birds during both the migration and the breeding season. In particular, colonial waterbirds make use of them as loafing and breeding sites. The location of these islands, near forage fish habitat combined with their relatively undisturbed condition during spring and early summer, offer these species of migratory birds the necessary protected habitat. Habitat for colonial waterbirds has been under intense pressure on some refuge islands as shoreline development continues.

Strategies

1. Work with Region 3 Biological Monitoring Team (BMT) staff to develop a monitoring plan that will improve biological inventory and monitoring tools for the refuge islands, and set up a framework of adaptive management.
2. Conduct periodic reviews of the monitoring plan to assess trends of refuge resources, and determine if there are any priorities for research or monitoring.
3. If a research issue has been identified, initiate research at the station level. If the issue goes beyond the boundary of the refuge, take the lead role in contacting other federal, state, university, and other organizations; and develop a broader scale research project to address those issues.
4. Continue colonial waterbird nest counts, and assist Regional staff with census efforts to assess population abundance, distribution, and trends for species with conservation management or stewardship priority. Surveys will use aerial survey methodology when possible. The use of aerial photos decreases disturbance typically associated with ground counts.

Wildlife Objective 2: Applied Research

During the life of the CCP, promote applied research aimed at answering wildlife-, habitat-, community-, and ecosystem-based questions without compromising wildlife, visitor, and wilderness values.

Discussion and Rationale

The islands have served as research sites for the Service and colleagues for many years. These studies contribute valuable information about contaminants and their impacts to waterbirds and natural resources. Currently, research projects are being conducted at some islands that will assist in directing future planning and management for wildlife species, their habitats, and associated communities and ecosystems. These islands offer rare opportunities to study the changes that are occurring on the landscape with minimal human intrusion. There are very few such natural sites available to study and document long-term changes in the absence of human disturbance.

Strategies

1. Monitor and assess research annually including access for researchers and the location, duration, and impacts of research.
2. Continue and promote applied research, and initiate dialogue with federal and state agencies, universities, and other organizations to answer management questions.
3. Seek external research funding through partnerships with others outside of the Service, where and when possible.
4. Communicate research findings with the broader conservation community through peer-review and other publications, lectures, and other outreach activities.
5. Inform visitors of research findings and explain their importance for planning and management on refuge islands.

6. Prioritize research on priority species, habitats, communities, and ecosystems of conservation priority.
7. Develop a better understanding as to how refuge ecosystems function on a landscape and regional scale, including the effects of future climate change.

Wildlife Objective 3: Protect Waterbird Colonies

During the life of the CCP, limit disturbance to colonial waterbird colonies in order to maintain current nesting population levels of gull, tern, egret, and heron species.

Discussion and Rationale

Colonial waterbirds are extremely sensitive to human disturbance. Disturbance during the pre-nesting and nest-building phase can cause the birds to abandon the island for the current and future nesting seasons. During the incubation and chick-rearing phase, disturbance may cause loss of eggs and chicks. When incubating adults are induced to leave the nest, eggs and chicks are vulnerable to predation from gulls and other opportunistic predators (consuming eggs and chicks whole) and heat stress, which can kill eggs and chicks in a matter of minutes on a hot day.

Strategies

1. Improve and maintain boundary signs. Using buoy markers will alert boaters and kayakers and assure boaters maintain an appropriate distance to avoid disturbance to nesting birds.
2. Continue law enforcement patrols.
3. Monitor applied research activities to ensure activities are conducted with minimal disturbance to nesting birds.
4. Build support for protecting waterbird colonies through public outreach, education, and promoting waterbird conservation opportunities.

People Goal

People Objective 1: Community Outreach

Within five years of CCP approval, 50 percent of neighboring communities and businesses will express support for the refuge through active promotion of island habitat protection and refuge special events.

Discussion and Rationale

Outreach is a two-way communication between the Service and the public to establish and promote involvement and influence attitudes and actions—with the goal of improving joint stewardship of our natural resources. Outreach includes congressional relations, news media relations, community relations, and public informational activities such as speeches and open houses.

Island habitats can be fragile, and wildlife species can be sensitive to disturbance by humans. In light of this fact, refuge managers have to determine whether existing and future opportunities for wildlife observation and photography, hunting, fishing, environmental education and interpretation are appropriate and sustainable on specific islands.

Strategies

1. Maintain websites with current information about refuge management and events.
2. Work closely with Friends Groups (where applicable) to maintain and increase important connections with the local communities.
3. Develop outreach plans for important resource issues.
4. Increase community partnerships.
5. Establish dedicated staff for island refuges. In 2007, the region conducted a staffing model exercise, which indicated the need for up to three staff positions dedicated to the islands. This level of staffing probably can't be supported without a large increase in refuge budgets. However, a staff member at Seney and Horicon NWRs, with a significant portion of their work dedicated to the islands would greatly assist in implementing this plan. See Chapter 5 for more details.

People Objective 2: Cultural Resource Protection

Within five years of CCP approval, develop strategies to protect specific, known cultural and historic sites on the island refuges.

Discussion and Rationale

Several Great Lakes islands refuges contain unique, and often highly visible, historic sites. Refuge managers need to ensure these sites, especially the lighthouses, receive adequate care, restoration, and protection into the future.

Cultural resources are both physical manifestations and intangible values that connect us to our past, providing the means to study and reflect upon the events and processes that have shaped our nation, our communities and ourselves. Many of these resources are unique and irreplaceable. Their true value rests in what they offer us in terms of scientific information, interpretive opportunities, and cultural identity. Cultural resources managed by the Service are important, because the study of managed cultural resources provides important information on changes to our environment and landscapes over thousands of years, and this contributes directly to the Service's primary mission of managing wildlife and natural landscapes.



Thunder Bay Lighthouse, Michigan Islands NWR

We take seriously our responsibility to consider the effects of our actions on archeological and historic resources. This dedication is underscored by our compliance with Section 106 of the National Historic Preservation Act before disturbing any ground. Compliance may require any or all of the following: review of State Historic Preservation Office records, consultation with Native American Tribal Historic Preservation offices, a literature survey, or field survey.

The National Historic Preservation Act considers deterioration of historic structures as an adverse effect upon them. All historic structures owned by the Service are managed by non-profit organizations through cooperative agreements. All of these structures were in various states of repair when acquired by the Service. Most of these structures have received repairs since acquisition, but all require further repairs to place them in stable condition. Establishment of a regular program of cyclical maintenance, involving items such as painting and roofing repairs, will also be essential to protect these historic structures.

In addition, we will continue our program to maintain historic lighthouses and/or associated structures to at least minimum national historic preservation standards. The Service is not directly responsible for maintaining any historic structures on the existing refuge islands. However, several lighthouses and related structures are maintained under cooperative agreements with private non-profit organizations.

As noted under Ecosystem Objective 2 (Island Acquisition), we will acquire additional refuge lands. However, we are not purposefully seeking to acquire any more historic structures except as necessary to protect refuge biological resources.

Strategies

1. Conduct site-specific surveys prior to ground-disturbing projects, and protect known archeological, cultural, and historic sites.
2. Within 10 years of CCP approval and with the assistance of the Regional Historic Preservation Officer (RHPO), develop a step-down plan for surveying lands to identify archeological resources and for developing a preservation program to meet the requirements of Section 14 of the Archaeological Resources Protection Act and Section 110(a)(2) of the National Historic Preservation Act.
3. Identify and nominate to the National Register of Historic Places all historic properties including those of religious and cultural significance to Indian tribes.
4. Inform the RHPO early in project planning to ensure compliance with Section 106 of National Historic Preservation Act.
5. Ensure archeological and cultural values are described, identified, and taken into consideration prior to implementing undertakings.
6. Inspect the condition of known cultural resources on the refuge, and report to the RHPO changes in the conditions.
7. Integrate historic preservation with planning and management of other resources and activities.

Objectives and Strategies Specific to Green Bay NWR (Plum and Pilot Islands)

Wildlife Goal

Wildlife Objective 1: Inventory and Monitoring

Within 5 years of CCP approval, implement a monitoring program to track the presence, abundance, population trends, and/or habitat associations of select resources, including but not limited to Region 3 Conservation Priority Species, habitats, communities, and ecosystems. Priority species that are currently found on Plum Island include (but are not limited to), the Bald Eagle, Black-billed Cuckoo, Red-headed Woodpecker, Northern Flicker, and Black-throated Blue Warbler. Valued resources also include the unique island community types found on Plum Island. Examples include the limestone pavement lakeshore communities and boreal habitat that supports the federally threatened dwarf lake iris that is endemic to the Great lakes Region. As the need arises, implement research to answer questions that are raised regarding the management of these resources.

Discussion and Rationale

From a biodiversity perspective, Great Lakes islands are of particular importance and support relatively high numbers of endemic plant and animal species and distinct plant communities, and they serve as refugia to migrating and breeding birds. The islands are highly vulnerable and without a monitoring program; challenges such as over browsing by deer and invasive species threaten important island habitat.

Strategies

1. Work with Region 3 Biological Monitoring Team (BMT) staff to develop a monitoring plan that will improve biological inventory and monitoring tools for the refuge islands, and set up a framework of adaptive management. For example, implement a landbird inventory protocol to monitor spring and fall migratory birds use on Plum Island.
2. Continue colonial bird nest counts on Pilot Island and assist Regional staff with census efforts to assess population abundance, distribution, and trends for species with conservation management or stewardship priority.
3. Re-visit permanent vegetation plots set up on Plum Island to monitor habitat changes, and assess effectiveness of active management and/or restoration efforts.
4. Continue to develop collaborative efforts with other agencies, state, and local governments, and other organizations. Given the shortage of resources and the cost associated with islands work, these partnerships will be necessary to achieve adequate island management and monitoring goals.

Wildlife Objective 2: Deer Population

Annually, maintain the Plum Island deer population consistent with State Management Unit 81 at a density of 10–19 deer per square mile based on annual winter surveys. A more liberal bag limit on Plum Island may be necessary to achieve wildlife goals and enhance the restoration and protection of native vegetation.

Discussion and Rationale

Based on studies and long-term experience with deer herd management by Wisconsin Department of Natural Resources (DNR), this is the optimal population density or carrying capacity of white-tailed deer on island habitat in this region.

Historically, few if any deer were present on Plum Island. At present, the deer herd on Plum Island is over state population goals and estimated to be between 15 and 20 per square mile. An over-abundant deer population can alter the structure, composition, and diversity of the forest community. Sustained browsing pressure can limit regeneration of favored and susceptible woody plants and eliminate populations of herbaceous plants. The forest habitat on Plum Island is exhibiting signs of an overabundant deer population. This is evident by the browse line and the current structure and composition of the forest habitat.

Strategies

1. Annual deer hunts will be necessary to prevent an overabundance of deer on the island. Depending on the level of hunter interest and potential for crowding, the refuge may institute a permit system to assure a safe and quality hunter experience.
2. Annually, monitor for signs of habitat damage such as browse lines on the refuge that would indicate that carrying capacity has been surpassed. A deer exclosure could also be established to assist with these monitoring efforts.
3. Interact with hunters, and listen to feedback on ways to improve the hunt.
4. Due to the challenges for hunters to access Plum Island during state regulated deer hunting seasons, it may be necessary to reduce over-abundant deer populations by other means. Refuge staff may consider the use of sharpshooters to reduce deer populations and protect native vegetation if the hunting program is not successful at achieving wildlife management goals and objectives. Harvested deer would be donated to local food pantries.

Wildlife Objective 3: Conflict Species

Strategies in Addition to Those Common to all Island Refuges

1. Participate in the Interagency Cormorant Coordination Group to gather information, discuss, and coordinate annual cormorant census, management, and research efforts in Wisconsin.
2. Prevent Double-crested Cormorant colony expansion on Plum Island. No cormorants have been observed nesting on the island. If cormorants attempt to nest on Plum Island, refuge staff will use an integrated management approach, as described in *Environmental Assessment: Reducing Double-Crested Cormorant Damage in Wisconsin*, to prevent the establishment of a new colony.
3. Assess Double-crested Cormorant populations annually on Pilot Island. At the present time, there is insufficient justification for cormorant population reduction at Pilot Island. The island was acquired primarily to protect breeding bird habitat. Initiating control measures now would disrupt the ongoing island cormorant research projects. However, if future data warrants reduction of cormorant numbers for the protection of historic

property, fish populations, or co-nesting species, refuge management could implement/permit Double-crested Cormorant control activities, so long as the impacts do not exceed those analyzed in *Environmental Assessment: Reducing Double-Crested Cormorant Damage in Wisconsin*.

Habitat Goal

Habitat Objective 1: Northern Mesic Forest

Annually, maintain 227 acres on Plum Island for a diversity of successional stages, and (where and when possible) restore historic composition and structure for the diversity of species present, including Region 3 Conservation Priority Species Bald Eagle, Black-throated Blue Warbler, and Northern Flicker.

Discussion and Rationale

This habitat type contains a wide range of forest conditions, from those composed primarily of early successional species such as aspen and to forest dominated by sugar maple, basswood, and eastern hemlock. The interior of Plum Island is dominated by a sugar maple and basswood forest. Visits to the island in the 1970s documented an old-growth sugar maple and basswood forest with a dense Canada yew understory and no deer.

The forest has since been altered by heavy selective and/or clear-cut logging activities and browsing by over-abundant deer. Thus, the forest composition has shifted to more early successional species with a relatively uniform age structure. This is different than historical conditions, which contain greater species and structural diversity. Future management and restoration efforts should focus on promoting ecological integrity of the forest by promoting compositional and structural diversity and (in most instances) moving succession forward.

Strategies

1. Promote a forest dominated by late successional stages of mixed forest.
2. Use management techniques that mimic natural ecological disturbances (windthrow and native pathogens).
3. Use commercial and non-commercial mechanical treatments, where and when appropriate.
4. Ensure white-tailed deer populations do not negatively affect the habitat.
5. Manage invasive species aggressively.
6. Protect active Bald Eagle nests, and maintain high quality suitable habitat for nesting Bald Eagles on Plum Island.

Habitat Objective 2: Great Lakes Alkaline Rock Shore and Alvar

On Plum Island, annually protect and maintain 40 acres of coastal habitat for the diversity of species present including Regional Priority Species Sedge Wren and American Woodcock and the federally threatened dwarf lake iris.

Discussion and Rationale

Crevice, coastal, horizontal exposures of dolomite support a distinct plant community. They are influenced by wave action, ice push, and fluctuating levels of Lake Michigan. White cedar is the dominant shoreline tree, and common shrubs include red-osier dogwood and shrubby cinquefoil. Understory species include the federally threatened dwarf lake iris.

On the northwestern coast of Plum Island is a sheltered wetland with shallow water and an accumulation of calcareous mud, gravel, and cobble. The meadows are dominated by sedges and bulrush. Southwest of the wetland on Plum Island is a 16-acre sedge meadow. The meadow is dominated by bluejoint and tussock sedge. The water levels in this wetland area are dictated by the fluctuating water levels of Lake Michigan.

Strategies

1. Manage invasive species aggressively. Continue ongoing efforts to control invasive *Phragmites australis*.
2. Continue to map and monitor the population of dwarf lake iris to assure the necessary protection from potential threats, including management activities.

Habitat Objective 3: Open Land

On Plum Island, reduce open land habitat from 2007 levels (36 acres) by 21 acres, and manage the remaining 15 acres to protect historical U.S. Coast Guard (USCG) structures.

Discussion and Rationale

This habitat type consists primarily of anthropogenic habitats created prior to the acquisition of Plum Island in 2007. Open areas occur on the island in the southern range light area and near the USCG structures.

The areas near the USCG structure (approximately 10 acres) will be maintained as open areas, especially in the path of the range light, which will continue to function as an active aid to navigation. USCG Aids to Navigation will maintain the areas near the range lights. Note: After Service acquisition, the USCG crew cut down several large diameter cedar trees in the path of the range light. The downed cedar trees currently lie where they fell. To this date no efforts have been initiated by USCG staff to clean up/remove the downed trees.

Many non-native grass species, such as Kentucky bluegrass and several brome species, characterize these areas. Fields other than near the USCG structures should be allowed to succeed to forest habitat or be actively managed to do so.

Strategies

1. Maintain openness near historical USCG structures via mechanical methods (mowing).
2. Remove downed cedar trees (cut by USCG), and slash to reduce potentially hazardous fuel by mechanical means and/or prescribed fire operations (burn piles).
3. Elsewhere, restore fields to upland deciduous forest stands either passively or through natural secondary succession.

4. Manage invasive species aggressively (see below).

Habitat Objective 4: Invasive Species Management

By 2015, reduce the area infested with target invasive plant species on Plum Island (e.g., phragmites, spotted knapweed, and hound's tongue) by 50 percent from the documented 2011 level, and eliminate new infestations of these and other highly invasive species as they occur.

Discussion and Rationale

Islands are especially vulnerable to invasive species. Exotic plants have been identified on Plum Island, with a few being invasive, and more invasive species are expected to arrive in the area in the future. For example, garlic mustard is currently not found on Plum Island, but there is a high potential for it to spread to this island. This invasive herb has the potential to take over and destroy the native herbaceous understory of the mesic forest habitat on Plum Island. The plant is now dominant at Peninsula State Park, and visitors to Peninsula Park would likely be visitors to Plum Island, inadvertently transporting the seeds from this invasive plant.

Areas around the USCG structures, which were disturbed from the USCG's hazardous waste clean-up activities are of particular concern. These areas are dominated by invasive spotted knapweed. Invasive exotic species occur in the wetland and shorelines (phragmites), in the open areas (spotted knapweed), and to some extent in the forested areas (spotted knapweed and hound's tongue).

Management should strive to assess the threat these species have on native ecosystem/habitat structure and function, and for those species that constitute the greatest threats an active management and monitoring program should ensue.

Strategies

1. Prior to access on Plum and Pilot Islands, special attention should be focused on preventing the spread of invasive species. Steps such as placing signs to require and ensure shoes and all equipment are cleaned and free of seeds and soil will be implemented.
2. Document the locations and sizes of targeted populations. The access sites need urgent and frequent attention.
3. Use chemical, mechanical, prescribed, and natural fire (where appropriate) as means to manage infestations in cases where biological control techniques have not been developed.
4. Monitor the infestations and effectiveness of management measures.
5. When available, use biological control as a preferred strategy.

People Goal

People Objective 1: Public Access

Provide access opportunities for the public to enjoy high quality wildlife-dependent recreation on Plum Island while protecting the natural and cultural resources of the island.

Discussion and Rationale

Plum Island will be managed primarily for the conservation of fish, wildlife, and plants through careful planning and regulation. Plum Island provides the public with unique opportunities for recreation, education, and interpretation. Providing these opportunities: hunting, wildlife observation and photography, environmental education, and environmental interpretation is consistent with the refuges' purpose and the National Wildlife Refuge Improvement Act of 1997. Specific activities must be compatible with the purpose of the Green Bay NWR. The islands are remote but still within access to visitors. Plum Island is near Washington Island, a favorite Door County tourist destination, and is located six miles from the mainland.

Visitors to Plum Island will have the opportunity to observe and photograph wildlife from interpretive trails. People hiking along refuge trails will cause some disturbance to wildlife, such as resting birds that may flush and move to other areas and birds sitting on nests that may temporarily leave. Overall, if visitors remain on the trails, as proposed, disturbance is limited to a small portion of the entire island.

Prior to opening the island up to public access, it is critical to have the proper infrastructure (trails, regulatory signs, and sanitary facilities) in place to protect the sensitive nature of the islands. Extra precautions will be needed to protect the location of the federally threatened dwarf lake iris population and active Bald Eagle nests. For example, eagle nests that are located near trails will prompt trail closings until the young are fledged, which is typically after the July 4th holiday.

The existing dock at Plum Island is in acceptable condition for staff and volunteers. Recent efforts to improve the condition and safety of the dock were accomplished through cooperation between refuge staff and the Friends of Plum and Pilot Islands (FOPPI). A more formal assessment of the current condition and evaluation of safety concerns may be required prior to opening the island to public access.

Chapter 5 of this document lists a proposal to complete a Visitor Services Plan to evaluate interpretive opportunities and provide a necessary tool to guide the development of future visitor services on the island. This work could be completed through a contract with a local university. The study would provide staff with information on the impacts of activities and may lead to adjustments in specific strategies.

Strategies

1. Establish interpretive hiking trails on Plum Island to accommodate wildlife observation, photography, and cultural resource site interpretation annually from Memorial Day to Labor Day, during daylight hours only. The old patrol road that follows the perimeter of the island and the existing trail between the lifesaving station and lighthouse would make ideal trail locations. Both of the locations have already been disturbed by past USCG activities, eliminating the need to disturb pristine habitat. Actual trail location will be determined through a site analysis and more detailed Visitor Services Plan.
2. Install a restroom facility, requiring minimal maintenance, near the access point/dock area.
3. Develop and install regulatory signage.

4. Visitors will be allowed to access Plum Island via private watercraft including motorboats, sailboats, kayaks, and canoes. Due to the fragile nature of plant communities, docking boats at undesignated beach areas will not be permitted. Boats will be required to moor at designated areas at the dock. A launch/landing area designated for kayaks and canoes will also be designated near the dock. There will be no fees to access Plum Island.
5. Commercial, public, and private companies and organizations offering charter boat service to Plum Island and/or guided wildlife tours and activities, will be allowed authorized access under the terms of a Commercial Use Authorization or Special Use Permit pending the completion of a Visitor Services Plan. Activities may include the following: kayak tours, bird watching excursions, wildlife viewing or photography trips, nature programs, and environmental education field outings
6. Continue participating in conversations regarding the Lake Michigan Water Trail (LMWT), and support efforts to include Plum Island as a day-use only public access site (no camping). Wisconsin's LMWT will consist of a series of paddler access and camping sites and related user information along the 523-mile shoreline. Wisconsin's LMWT will provide access to both visitors and the nearly two million residents within a 30-minute drive of the shoreline as well as form a keystone in the water trail circumnavigating Lake Michigan. The trail will promote stewardship, wildlife appreciation, ecotourism, physical activity, and a sense of place.

People Objective 2: Environmental Education and Interpretation

Within five years of CCP approval, 50 percent of visitors will be able to explain a key environmental theme for the refuge. The themes may include island ecology, human impact on fragile ecosystems, wilderness status, value for migratory birds, and climate change impacts.

Discussion and Rationale

Environmental education is a process designed to teach citizens and visitors the history and importance of conservations and the biological and scientific knowledge of our Nation's natural resources. Through this process, we can help develop a citizenry that has the awareness, knowledge, attitudes, skills, motivation, and commitment to work cooperatively towards the conservation of our Nation's environmental resources.

Environmental education includes both onsite and offsite programming and distance education via computer.

It also pertains to activities such as formal curriculums about the refuge environment, Junior Duck Stamp programs, and Scout badge projects. Interpretation is a communication process that forges emotional and intellectual connections between the audience and the resource.



Guided Bird Watchers, Plum Island, Greed Bay NWR (Photo by Tim Sweet)

A limited amount of onsite environmental education occurs now on Plum Island. The refuge currently does not have a staff person to promote and conduct environmental education and interpretation. Green Bay NWR is in the position to provide more environmental education than it does now to grade-level and college students in northeastern Wisconsin.

Refuge staff will strive to provide educational opportunities that highlight the objectives of this plan, so the public will understand future management activities and provide support. For example, a person who understands invasive species control on islands will be more likely to support refuge decisions.

Strategies

1. Support special events and programs on Plum Island that interpret the refuge, its habitat, wildlife, and wildlife management. Examples include, The Door County Bird Festival, Migratory Bird Day, National Public Lands Day, and National Trail Day
2. Develop and place interpretive signs for planned hiking trails on Plum Island. Interpretive signs could include information about other island refuges in the area that will remain closed to visitors: Pilot, Hog, Gravel, and Spider Islands; and cultural resource information, including archeological, lighthouse, and shipwreck information.
3. Develop and install a kiosk to place near the Plum Island access point/dock that will allow visitors to view refuge maps and regulations and help interpret habitat, wildlife, and wildlife management.
4. Hire a full-time Visitor Service Specialist (see Chapter 5).
5. Develop refuge brochures and bird lists.
6. Evaluate during the development of the Visitor Service Plan, the use of the former USCG buildings on Plum Island—such as the boathouse and/or lifesaving station—as a visitor contact station. Space could be provided for refuge staff and volunteers, interpretive exhibit, dioramas of local wildlife, an information desk, restrooms, multipurpose room, and a small interpretive bookstore. The partnership with FOPPI, other local conservation groups, and other local state and federal conservation agencies could allow this visitor contact station to serve as an information station for people interested in Great Lakes islands ecology.
7. Maintain websites with current information about refuge management and events.
8. Work with local teachers to develop grade-specific curricula that meet local, state, and national educational standards and that emphasize the importance of island habitat, ecosystem processes, and wildlife management.
9. If feasible, train volunteers to provide tours for onsite environmental education and cultural resource programs on Plum Island or offsite environmental education programs and lessons for classrooms.
10. Devise and encourage additional opportunities for research, such as wildlife surveys within the ability of high school science or biology classes.
11. Encourage partnerships with local schools, community groups, and surrounding agencies
12. Train educators to conduct their own programs via teacher workshops.

People Objective 3: Community Outreach

Within five years of CCP approval, increase awareness of refuge management and issues concerning management within surrounding areas by annually providing opportunities for at least 100 students to participate in programs, 10 teachers to participate in training programs, and 100 people to be members of a supporting volunteer Friends Group.

Discussion and Rationale

Outreach is a two-way communication between the Service and the public to establish and promote involvement and influence attitudes and actions—with the goal of improving joint stewardship of our natural resources. Outreach includes congressional relations, news media relations, community relations, and public informational activities such as speeches and open houses.

It is critical to the mission of the refuge that the neighbors and citizens of the surrounding landscape know about the refuge and support it as a valuable and contributing part of the community.

Strategies

1. Work closely with the FOPPI to foster understanding and mutual priorities.
2. Support an active volunteer program, and work with the FOPPI to recruit and train volunteers for assistance in refuge programs.
3. Offer training programs to teachers and local naturalist facilities that focus on the refuge's place in the ecological landscape, the importance of habitat management, and the objectives of this plan.
4. Increase community partnerships.
5. Participate in offsite community events.
6. Maintain websites with current information about refuge management and events.

People Objective 4: Protection of Cultural Resources

Within five years of CCP approval, initiate a Cultural Resources Management Plan that incorporates all existing surveys and investigations, identifies future needs, and guides permanent protection measures for historic structures on Plum and Pilot Islands.

Discussion and Rationale

Most buildings and structures on Plum and Pilot Islands are listed on the National Register of Historic Places. The Pilot Island lighthouse was added to the Register in 1983 and the entire Plum Island district, which includes all buildings and structures of substantial size and scale, was added to the Register in 2010. Additionally, numerous shipwrecks have occurred in the area, and the remains of some can be found off the coasts of Plum and Pilot Islands.

The structures on Plum and Pilot Islands were in various conditions when acquired by the Service. Refuge staff is committed to assuring the historical structures receive adequate care,

restoration, and protection into the future. Realizing that minimal funding will be available for these efforts, it is critical to establish and maintain existing partnerships and future partnership efforts.

FOPPI formed shortly after the acquisition of Plum and Pilot Islands. A Service Memorandum of Understanding was put in place to formalize the cooperation of the Service and the Friends. Together, the Service and Friends support the preservation, restoration, and maintenance of the lighthouses, accessory buildings, and other historic resources on Plum and Pilot Islands as well as conserve and protect wildlife resources, while providing opportunities for quality wildlife-dependent recreation on Plum Island. The Friends have been an invaluable asset, securing funding to complete stabilization plans for the building and implementing the most urgent repairs necessary to protect the historical structures on both Plum and Pilot Islands.

Strategies

1. Continue existing partnership with FOPPI. FOPPI will continue to work toward developing political and public support for maintenance of these historical structures and developing interpretation and educational programs related to the history of lighthouses and associated structures on Plum and Pilot Islands.
2. Continue to consult closely with the Wisconsin State Historical Society and FOPPI regarding repairs and annual and cyclical maintenance for the three National Register listed buildings on the refuges.
3. Complete an inventory of maintenance needs necessary to bring each building to national and state preservation standards; incorporate needs into a database system. Seek alternative funding sources and pursue additional partnerships to accomplish priority work.
4. Develop a step-down plan for surveying lands to identify archeological resources and for developing a preservation program. The intent of this statement is to meet the requirements of Section 14 of the Archaeological Resources Protection Act and Section 110(a)(2) of the National Historic Preservation Act.
5. Continue efforts with FOPPI to develop an oral cultural history to preserve the “community memories” and maritime history of Plum and Pilot Islands.
6. Explore the idea of utilizing the historical structures as historic/cultural museums if/when the structures are stabilized and restored to acceptable conditions.

People Objective 5: Cultural Resource Appreciation

Within five years of CCP approval, 50 percent of visitors to the islands will understand and appreciate the cultural history of the Green Bay NWR—especially the history of the lighthouses and USCG lifesaving station.

Discussion and Rationale

Our understanding of a national landscape is enhanced by knowing its human history as well as its natural history. People develop connections with the land based on the land itself, experiences they have on the land or at a memorable location, or even buildings on the land. Those connections motivate citizens to help preserve and protect what they care about. An

effective cultural resource appreciation program that increases understanding of history by visitors to Plum Island will increase their connection to the land.

Strategies

1. Incorporate cultural history messages into programs, tours, exhibits, and other media with an emphasis on use of the refuge landscape throughout time.
2. Incorporate cultural resource interpretation into trail development. Develop signs on interpretive trails that help tell the unique maritime history of the local area.
3. Continue FOPPI partnership efforts to provide information through outreach and education, which builds on a sense of connection to the land and guides people toward being better stewards of the cultural resources and land conservation in general.

Objectives and Strategies Specific to Harbor Island NWR

People Goal

People Objective 1: Community Outreach

Within five years of CCP approval, 50 percent of the neighboring communities and businesses will express support for the refuge through active promotion of island habitat protection and refuge special events.

Strategies in Addition to Those Common to all Island Refuges

1. Support newly-formed refuge Friends Groups. The new Harbor Island National Wildlife Preservation Society (HINWRPS) would establish a productive and cooperative relationship between the refuge and area residents.
2. Work with Friends Group to pursue additional sources of potential funding to support the refuge.
3. Estimate visitation numbers and develop a Visitor Use Plan. Harbor Island NWR is part of a large complex of islands that are close together. Several of the islands are privately-owned and include year round or seasonal residents. Drummond Island supports a large year round population. Harbor Island currently gets quite a bit of visitation.
4. Work with the HINWRPS to make Harbor Island more accessible to visitors. The mission of HINWRPS is " . . . to support and promote Harbor Island NWR and the NWRS in their efforts to conserve habitat and wildlife."
5. The HINWRPS has proposed to fund and maintain a trail loop on the island. A suitable location will be selected for a trail to interpret the island habitats and concentrate or keep most use away from nesting eagles and some historical sites on the refuge.
6. Place small signs at beach access points and along the route of the primitive trail loop. HINWRPS will provide and place benches along the route.

Objectives and Strategies Specific to Gravel Island NWR (and Spider and Hog Island of Green Bay NWR)

The planning team grouped these islands together for the purpose of defining objectives based on the islands having similar biological and physical diversity and geographic location.

Wildlife Goal

Wildlife Objective 1: Inventory and Monitoring

Within five years of CCP approval, implement a monitoring program to track the presence, abundance, population trends, and/or habitat associations of select biological resources including but not limited to Region 3 Conservation Priority Species, colonial waterbirds, habitats, communities, and ecosystems (e.g., Great Lake Island habitat). As the need arises, implement research to answer questions regarding the management of these resources.



Hog Island, Wisconsin Islands Wilderness Area, Green Bay NWR

Discussion and Rationale

These islands are invaluable patches of habitat for a variety of migratory birds both during the migration and during the breeding season. In particular, colonial waterbirds make use of the islands as loafing and breeding sites. The location of these islands, near forage fish habitat, combined with their relatively undisturbed condition during spring and early summer, offer these species of migratory birds the necessary protected habitat. Habitat for colonial waterbirds has been under intense pressure in Door County as shoreline development continues.

Strategies

1. Work with Region 3 Biological Monitoring Team (BMT) staff to develop a monitoring plan that will improve biological inventory and monitoring tools for the refuge islands, and set up a framework of adaptive management.
2. Conduct periodic reviews of the monitoring plan to assess trends of refuge resources and determine if there are any priorities for research or monitoring.
3. If a research issue has been identified, initiate research at the station level. If the issue goes beyond the boundary of the refuge, take a lead role in contacting other federal, state, university, and other organizations; and develop a broader scale research project to address those issues.
4. Continue colonial waterbird nest counts on the wilderness islands, and assist Regional staff with census efforts to assess population abundance, distribution, and trends for species with conservation management or stewardship priority. Surveys will utilize aerial survey methodology when possible. The use of aerial photos decreases disturbance typically associated with ground counts.

Wildlife Objective 2: Research

Promote applied research aimed at answering wildlife-, habitat-, community-, and ecosystem-based questions without compromising wildlife, visitor, and wilderness values.

Discussion and Rationale

The islands have served as research sites for the Service for more than 35 years. These studies contribute valuable information about contaminants and their impacts to waterbirds and natural resources. Currently, research projects are being conducted at the refuge that will assist in directing future planning and management for wildlife species, their habitats, and associated communities, and ecosystems. These islands offer rare opportunities to study the changes that are occurring on the landscape with minimal human intrusion. There are very few such natural sites available to study and document long-term changes in the absence of human disturbance.

Strategies

1. Monitor and assess research annually including access for researchers and the location, duration, and impacts of research.
2. Continue and promote applied research, and initiate dialogue with federal and state agencies, universities, and other organizations to answer management questions.
3. Seek external research funding through partnerships with others outside of the Service, where and when possible.
4. Communicate research findings with the broader conservation community through peer-review and other publications, lectures, and other outreach activities.
5. Inform visitors of research findings, and explain their importance for planning and management on refuge islands.
6. Prioritize research on species, habitats, communities, and ecosystems of conservation priority.
7. Develop a better understanding as to how refuge ecosystems function on a landscape and regional scale, including the effects of future climate change.

Wildlife Objective 3: Protect Waterbird Colonies

During the life of the CCP, limit disturbance to colonial nesting waterbird colonies to maintain the productivity of the Ring-billed Gull, Herring Gull, Black-crowned Night Heron, Common Tern, Caspian Tern, Great Blue Heron, and Great Egret.

Discussion and Rationale

Colonial nesting waterbirds are extremely sensitive to human disturbance. Disturbance during the pre-nesting and nest-building phase can cause the birds to abandon the island for the current and future nesting seasons. During the incubation and chick-rearing phase, disturbance may cause loss of eggs and chicks. When incubating adults are induced to leave the nest, eggs and chicks are vulnerable to predation from gulls and other opportunistic predators (consuming

eggs and chicks whole) and heat stress, which can kill eggs and chicks in a matter of minutes on a hot day.

Strategies

1. Improve and maintain boundary signs. Using buoy markers will alert boaters and kayakers and assure boaters maintain an appropriate distance to avoid disturbance to nesting birds.
2. Continue law enforcement patrols.
3. Monitor research activities to ensure activities are conducted with minimal disturbance to nesting birds.
4. Build support for protecting waterbird colonies through public outreach, education, and promoting waterbird conservation opportunities.

Habitat Goal

Habitat Objective 1: Waterbird Habitat

Maintain and provide nesting habitat favorable to colonial nesting waterbirds and other waterbirds (such as waterfowl), including Region 3 Conservation Priority Bird Species—Black crowned Night-Heron, Common Tern, and Double-crested Cormorant—without compromising the wilderness integrity.

Discussion and Rationale

Great Lakes islands provide essential habitat for colonial nesting waterbirds. These islands support nesting colonies of Ring-billed Gull, Herring Gull, Black-crowned Night Heron, Common Tern, Caspian Tern, Double-crested Cormorant, Great Blue Heron, and Great Egret. The islands offer protected habitat that has been eliminated from most other places in the immediate vicinity.

Strategies

1. Monitor the bird populations and nesting success annually during the nesting season (April–July).
2. Assess Double-crested Cormorant populations annually and protect remaining habitat for other tree and shrub-nesting waterbirds on Hog Island by implementing Double-crested Cormorant control methods when deemed biologically necessary and when staff availability and funding will allow and as described in *Environmental Assessment: Reducing Double-crested Cormorant Damage in Wisconsin*.

Habitat Objective 2: Exotic and Invasive Species Control

By 2020, inventory all refuge land for invasive species, target control efforts on species that threaten habitat, and eliminate new infestations of these and other highly invasive species as they occur.

Discussion and Rationale

The Mute Swan is a non-native species and its population continues to grow at a rapid rate near refuge islands. Mute Swans compete for resources with native waterfowl such as ducks, colonial waterbirds, Tundra Swans, and geese and will sometimes completely displace, or even kill, native waterfowl. Due to the tendency of Mute Swans to concentrate in large numbers at productive feeding areas, there is concern that they will deplete aquatic plants needed by native waterfowl. In flocks, Mute Swans can overgraze submerged vegetation to the point that the vegetation cannot fully recover. This causes a reduction in the quantity and quality of aquatic habitat that may affect the food web, impact resident and migratory waterfowl, and affect an area's biodiversity. Ground nesting waterfowl including Mallards, Red-breasted Mergansers, and Black Ducks use the dense brush areas on refuge islands for nesting. Additionally, migrating waterfowl feed in the shallow areas adjacent to refuge islands. Controlling Mute Swans will protect native waterfowl nesting habitat and protect aquatic habitat diversity for migrating waterfowl.

The colonial nesting bird population on Hog, Spider, and Gravel Islands dictate vegetative conditions on these islands. The arboreal vegetation has been destroyed by the urea of nesting colonial waterbirds, such as Herring Gulls and Double-crested Cormorants. The understory of these islands currently consists of native and exotic herbs such as catnip, nettles, motherwort, and thistles. These species do not pose a serious threat to the habitat. Efforts to control/eradicate invasive plant species in the presence of nesting colonial waterbirds would be difficult due to the rapidly changing conditions brought on by the nesting activities of thousands of nesting birds. However, it is still important to monitor and prevent new infestation of aggressive exotic invasive species that could pose a threat in the future.

Strategies

1. Continue partnership efforts to work with U.S. Department of Agriculture, Wildlife Services and Wisconsin DNR to control and reduce invasive Mute Swan populations near refuge islands.
2. Destroy nests and eggs of nesting Mute Swans during routine monitoring efforts.
3. Prior to accessing islands for monitoring or research activities take proper precautions to assure shoes and all equipment are clean and free of seeds or soil before boarding a boat.
4. Document the locations and sizes of targeted exotic invasive plant populations.
5. When available, use biological control methods as a preferred strategy.
6. Use chemical and mechanical methods and prescribed fire (when appropriate) as means to manage infestations in cases where biological control techniques have not been developed.
7. Monitor the infestations and effectiveness of management measures.

People Goal

People Objective 1: Protect Wilderness Character

Protect wilderness character by maintaining natural qualities of the island through limited human presence and disturbance

Discussion and Rationale

Green Bay NWR (Hog Island) and Gravel Island NWR (Spider and Gravel Islands) were designated as a Federal wilderness area in 1970 primarily because of the islands' importance as nesting grounds for colonial waterbirds. The islands are small and provide resting and feeding habitat for migratory birds. The islands are managed to minimize human disturbance to the nesting birds and will remain closed to the public. The isolated location of the refuge islands along with difficult and often hazardous access have dictated limited management potential. Limiting human presence, as in the past, will continue to preserve the wilderness character.

Strategies

1. Continue periodic law enforcement visits. Evidence of closure violations will increase frequency and timing of visits.
2. Update the 1981 Wilderness Management Plan.

People Objective 2: Environmental Education and Interpretation

Within five years of CCP approval, all off-refuge outreach contacts will understand, appreciate, and support the Gravel Island NWR, the wilderness status, and the need to preserve the islands for colonial nesting birds.

Discussion and Rationale

Environmental education is a process designed to teach citizens and visitors the history and importance of conservations and the biological and scientific knowledge of our Nation's natural resources. Through this process, we can help develop a citizenry that has the awareness, knowledge, attitudes, skills, motivation, and commitment to work cooperatively towards the conservation of our Nation's environmental resources. Environmental education includes both onsite and offsite programming and distance education via computer. It also pertains to activities such as formal curriculums about the refuge environment, Junior Duck Stamp programs, and Scout badge projects. Interpretation is a communication process that forges emotional and intellectual connections between the audience and the resource.

Because the islands are undisturbed, they provide unique opportunities to reach out to the public with an environmental message. There is a unique opportunity to educate visitors about islands with no human disturbance, in contrast to islands with a history of human occupation.

Strategies

1. Develop brochures and information sheets for distribution to off-refuge contacts.
2. Partner with FOPPI to develop displays at the newly established visitor center at Northport, near the Washington Island Ferry dock.
3. Develop informational signs and kiosks for use at area boat landings. These signs would also serve to inform boaters and kayakers and alert them to maintain an appropriate distance to avoid disturbance to colonial nesting waterbirds.

4. In all off-refuge presentations, include information about the Green Bay and Gravel Island NWRs, their wilderness status, and the need to prevent disturbance to breeding colonies.

People Objective 3: Community Outreach

Increase awareness of refuge by increasing community outreach efforts in the local community

Discussion and Rationale

Outreach is a two-way communication between the Service and the public to establish and promote involvement and influence attitudes and actions—with the goal of improving joint stewardship of our natural resources. Outreach includes congressional relations, news media relations, community relations, and public informational activities such as speeches and open houses.

It is critical to the mission of the refuge that the neighbors and citizens of the surrounding landscape know about the refuge and support it as a valuable and contributing part of the community.

Strategies

1. Participate in offsite community events.
2. Increase community partnerships and volunteer base.
3. Offer training programs for teachers and local naturalists on the refuge's place in the ecological landscape and the objectives in this plan.
4. Develop outreach plans for important issues, such as Double-crested Cormorant management and research programs.
5. Improve outreach to refuge neighbors.
6. Maintain websites with current information about refuge management and events.

Objectives and Strategies Specific to Huron NWR

People Goal

People Objective 1: Welcome and Orient Visitors

Within five years of CCP approval, staff will develop and employ an inventory technique to better understand Island visitation numbers.

Discussion and Rationale

In order to better understand the impact on island resources and the impact interpretation may have on those resources, baseline information on the number of visitors using the refuge is necessary.

Strategies

1. Working with staff from the Service's Fort Collins Inventory and Monitoring group and with the Regional Visitor Services Staff, develop an inventory technique and database to determine and record baseline visitation information for Huron NWR.

People Objective 2: Interpretation/Outreach

Within the life of this plan, interpretation and/or outreach about Huron NWR will have increased by 50 percent and 100 percent respectively compared to 2012 effort levels.

Discussion and Rationale

Interpretation is a process designed to help visitors form an emotional and intellectual connection between them and the natural resources. It also helps explain complex scientific processes and natural history in a way the layman may understand. Through this process we can help develop a citizenry that has the awareness, knowledge, attitude, skills, motivation, and commitment to work towards the conservation of our Nation's natural resources. Interpretation may include both onsite and offsite resources (i.e., signs, kiosk, website, presentations). Refuge staff will strive to provide interpretation opportunities that highlight the objectives of this plan, so the public will understand future management activities and support the efforts. Outreach is a two-way communication between the Service and the public to establish and promote involvement and influence attitudes and actions with the goal of improving joint stewardship of our natural resources. Outreach includes congressional relations, new media relations, community relations, and public informational activities such as presentations and open houses.

Strategies

1. Develop a visitor use plan.
2. Develop interpretive materials (signs, kiosks, articles, presentations, etc.) to educate the public about Huron NWR (wilderness, lighthouse history, flora, fauna, etc.).

People Objective 3: Cultural Resource Protection

Within the life of this plan, island cultural heritage holdings will be assessed and then maintained as determined necessary.

Discussion and Rationale

The Huron Island lighthouse on Lighthouse Island, part of Huron NWR, was listed on the National Register of Historic places in 1976. The other structures, including the lighthouse keeper's quarters, barracks, fog horn building, boathouse, and various other structures, are not listed on the Register. Structures on the island are in various conditions of repair. Refuge staff, in conjunction with the Huron Island Lighthouse Preservation Association (HILPA), is committed to assuring the historical structures receive adequate care.

Strategies

1. Ensure archaeological and cultural resources are identified, described, and taken into consideration prior to implementing undertakings.
2. Determine need and ultimate disposition of refuge buildings—there are eight buildings/structures on Huron Island associated with the old USCG station. The exterior of the lighthouse, a National Historic Landmark, has been rehabbed and maintained through the efforts of the HILPA. The remaining buildings are in various stages of decay.
3. Coordinate with HILPA to preserve and maintain structure and historical integrity of lighthouse and associated structures selected for preservation.
4. Ensure all doors and windows on the lighthouse building, fog horn building, and barracks are either locked or covered with plywood to protect the interior of the buildings from weather damage, to prevent vandalism, for safety concerns, and to keep the general public from entering.
5. Cover all openings in the lighthouse keeper's quarters by the end of fall 2013. Currently, the house is completely open (no windows or doors) to the elements and is slowly deteriorating.
6. Within one year of completion of this plan, cut down and remove all trees and shrubs growing against or over any of the buildings and structures to maintain the exterior condition of the buildings.
7. Establish efforts with HIPLA and others to develop an oral cultural history to preserve the "community memories" and maritime history of the Huron Islands.

Objectives and Strategies Specific to Michigan Islands NWR (Seney)

People Goal

People Objective 1: Community Outreach

Within five years of CCP approval, 50 percent of neighboring communities and businesses will express support for the refuge through active promotion of island habitat protection and refuge special events.

Strategy in Addition to Those Common to all Island Refuges

1. Reinvigorate cooperation with the USCG. Seney NWR has a long history of working with the USCG at Huron NWR and Hat and Gull Islands. The lighthouse at Huron NWR is still a functioning lighthouse, although automated. There are numerous opportunities with the USCG to strengthen and expand our cooperative relationship on all islands. See Chapter 5 for more details.

Wildlife Goal

Wildlife Objective 2: Applied Research

During the life of the CCP, promote applied research aimed at answering ecosystem-, wildlife-, habitat-, and community-based questions without compromising wildlife, visitor, and wilderness values.

Strategy in Addition to Those Common to all Island Refuges

1. Establish a formal Memorandum of Understanding with Central Michigan University (CMU). CMU runs a biological station on Beaver Island that is active during the summer months. The four Seney NWR-managed islands of the Michigan Islands NWR are all located fairly close to Beaver Island. A formal Memorandum of Understanding with CMU would promote biological and ecological studies and provide opportunities for students to learn about and conduct real science.

Objectives and Strategies Specific to Michigan Islands NWR (Shiawassee)

Ecosystem Goal

Ecosystem Objective 1: Preserve Great Lakes Alvar Communities on Thunder Bay and Sugar Islands

Throughout the life of the CCP, maintain and protect all alvar sites on Thunder Bay and Sugar Islands through proactive monitoring and aggressive control of non-indigenous invasive plants and animals.

Discussion and Rationale

The refuge has an opportunity to contribute to the conservation of this rare ecosystem, which supports several rare and declining species. One of the primary threats to alvar ecosystems is colonization and spread of nonindigenous invasive plants such as common buckthorn, common mullein, and St. Johnswort.

Strategies

1. Within five years of CCP completion, develop an Inventory and Monitoring Plan. Components of this plan would include surveys of flora and fauna with emphasis on characteristic and indicator alvar species, rare and declining species, and invasive species. It would also include mapping of boundaries of alvar sites and vegetative cover types, locations of resources of concern and invasive species within alvar sites, and the development of protocols to measure current and future alvar status and effectiveness of conservation strategies.
2. Within five years of CCP completion, develop a Habitat Management Plan. Components of this plan would include preservation of alvar sites and their component characteristic and indicator species, rare and declining species, and other resources of concern. Incorporate invasive species control as an important component of alvar conservation on the refuge.

Wildlife Goal

Wildlife Objective 1: Maintain and Provide Nesting Habitat

Throughout the life of the CCP, maintain and provide nesting habitat on Little Charity and Scarecrow Islands favorable to colonial nesting waterbirds, including Region 3 Conservation Priority Species: Black-crowned Night-Heron and Common Tern.

Discussion and Rationale

Little Charity and Scarecrow Islands provide important habitat to several species of nesting colonial waterbirds including Double-crested Cormorant, Great Blue Heron, Great Egret, Black-crowned Night-Heron, Ring-billed Gull, Herring Gull, Caspian Tern, and Common Tern. Black-crowned Night-Heron is an Upper Mississippi River/Great Lakes Region Joint Venture (UMR/GLRJV) Focal Species and a state listed species of special concern. Caspian Tern is a state listed threatened species. Common Tern is a UMR/GLRJV Focal Species, Service Region 3 Bird of Conservation Concern, and state listed threatened species. The Upper Mississippi River/Great Lakes Region Waterbird Conservation Strategy includes Little Charity and Scarecrow Islands on its list of the most important sites for breeding colonial waterbirds in the United States Great Lakes. The Waterbird Conservation Plan lists population inventory and monitoring, habitat protection and management, and management of human disturbance as priority conservation actions for waterbirds.

Strategies

1. Continue annual surveys of nesting colonial waterbird colonies at Little Charity and Scarecrow Islands. These surveys have been ongoing since 2002.
2. Within five years of CCP completion, develop an Inventory and Monitoring Plan. Components of the plan would include an assessment of nesting colonial waterbirds at Little Charity and Scarecrow Islands.
3. Within five years of CCP completion, develop a Habitat Management Plan. Components of the plan would include conservation of nesting waterbirds colonies at Little Charity and Scarecrow Islands through prevention of human disturbance, suppression of invasive non-indigenous species, and other practices.

Habitat Goal

Habitat Objective 1: Preserve Pitcher's Thistle

Preserve Pitcher's thistle on Big Charity Island and dwarf lake Iris on Thunder Bay and Sugar Islands.

Discussion and Rationale

Pitcher's thistle is a state and federally listed threatened species, which occurs on Big Charity Island. The refuge has opportunities to implement actions listed in the Pitcher's Thistle Recovery Plan and actions identified in the five-year review of the plan, toward delisting of this species. Dwarf lake iris is a state and federally listed threatened species, which occurs on Thunder Bay Island. This species may also occur on Sugar Island. A five-year review of the Dwarf Lake Iris Recovery Plan identifies specific recovery action and is located at <http://www.fws.gov/Midwest/Endangered>.

Strategies

1. Immediately employ practices to control of phragmites in and adjacent to Pitcher's thistle habitat.
2. Within five years of CCP completion, develop an Inventory and Monitoring Plan for Pitcher's thistle. Components of the plan would include an assessment of Pitcher's thistle population on Big Charity Island, surveys to more precisely determine thistle population, mapping of thistle sites and non-indigenous invasive species, and development of protocols to measure current and future Pitcher's thistle status and effectiveness of conservation strategies.
3. Within five years of CCP completion, develop a Habitat Management Plan. Components of this plan would include preservation of Pitcher's thistle and its habitat. Incorporate invasive species control as an important component of Pitcher's thistle conservation on the refuge.
4. Within five years of CCP completion, develop an Inventory and Monitoring Plan for dwarf lake iris. Components of this plan would include an assessment of dwarf lake iris population on Thunder Bay and Sugar Islands, surveys to more precisely determine iris population size, mapping of iris locations, and development of protocols to measure current and future dwarf lake iris status and effectiveness of conservation strategies.

Habitat Objective 2: Protect Sensitive Habitat by Reducing Invasive Plant Species

By 2020, protect sensitive colonial bird habitat by reducing the area infested with target invasive plant species on Scarecrow and Big Charity Islands (e.g., common buckthorn, phragmites, reed canarygrass) by 50 percent from the documented 2011 levels and eliminate new infestations of these and other highly invasive species as they occur.

Discussion and Rationale

Nonindigenous invasive species are a threat to specific resources of concern on several refuge islands. Alvar communities are being degraded by a suite of species such as common mullein, St. Johnswort, and Kentucky bluegrass. Phragmites threatens to overtake Pitcher's thistle habitat at Big Charity Island.

Further, invasive species are a threat to the overall habitat quality of the islands. Extensive common buckthorn control has been undertaken to preserve nesting waterbird colonies adjacent to Scarecrow Island. Phragmites and reed canarygrass are displacing native wetland plants and covering cobble beach along the shoreline at Big Charity Island to the detriment of migrant waterfowl and shorebirds. The Mute Swan population in Saginaw Bay is burgeoning. This species is aggressive toward native waterbirds and waterfowl, and their feeding habits can severely damage wetland plant communities. These impacts have contributed to the State of Michigan's program to substantially reduce its Mute Swan population.

Strategies

1. Within five years of CCP completion, develop an Inventory and Monitoring Plan. Components of the plan would include an assessment of nonindigenous invasive species on all refuge islands, protocols for the early detection of invasive species,

mapping of sites occupied by invasive species, and protocols to measure current and future invasives status and effectiveness of conservation strategies.

2. Within five years of CCP completion, develop a Habitat Management Plan. Components of the plan would include provisions to reduce adverse impacts of invasive species—in particular common buckthorn, Phragmites, reed canarygrass, and mute swan. The plan would also incorporate practices to eradicate incipient invasions discovered through early detection processes.

People Goal

People Objective 1: Environmental Education

Within three years visitors to Big Charity Island will recognize that the majority of the island is part of the National Wildlife Refuge System.

Discussion and Rationale

This will broaden knowledge and understanding of the refuge and help protect species and habitats on the island through development of an appreciation for these natural resources.

Strategies

1. Erect a one panel kiosk near the boat harbor where visitors to the private lighthouse will be able learn about the island's biological values and role in the Refuge System.
2. Within two years, visitor use will be investigated near the end of the summer tourist season by looking for areas of worn paths, trampled vegetation, etc. If use is negatively impacting the habitat, a visitor use plan will be developed to address the issue.