Chapter 4: Future Management Direction

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4.1 Introduction

Goals are broad descriptive statements of desired future conditions. There are three goals for Whittlesey Creek National Wildlife Refuge (NWR, Refuge). Each goal is followed by a series of objectives, which are specific statements describing management intent. Beneath each objective is a list of strategies—the specific actions, tools, and techniques needed to meet the objective. Finally, rationale statements describe background, history, assumptions, and/or technical details of the objectives and strategies. Unless otherwise noted, the U.S. Fish and Wildlife Service (FWS, Service) intends to meet these objectives within the next 15 years.

Full achievement of Refuge goals will require the time and expertise of both a biologist and a park ranger. Constraints on staffing and/or funding would necessarily limit implementation of some of the objectives and strategies described below. These potential constraints and their impact on Refuge priorities are explained in chapter 5.

The Habitat Management Plan (HMP) for Whittlesey Creek NWR (FWS, 2006c) will continue to provide direction and guidance for all habitat activities as this Comprehensive Conservation Plan is implemented. HMP goals, objectives, and strategies are included in appendix C.

4.2 Objectives, Strategies, and Rationales

WILDLIFE

Goal 1: Protect, restore, and maintain a diversity of wildlife species native to naturally functioning Refuge habitats, with special emphasis on coaster brook trout and migratory birds.

Objective 1-1: Brook Trout

Continue to participate in the interagency experimental coaster brook trout restoration program on the Bayfield Peninsula of Lake Superior, with Refuge responsibility for restoration of brook trout habitat in Whittlesey Creek. Within two years, develop and implement new criteria for prioritizing and integrating all habitat restoration activities, emphasizing use of the Sediment Impact Analysis Methods (SIAM) (U.S. Army Corps of Engineers [USACE], 2010) and Soil and Water Assessment Tool (SWAT) models (Lenz et al., 2003) to maximize long-term brook trout benefits.

Strategies:

- Regularly work with implementation team to evaluate the reintroduction project and determine if the Refuge efforts are meeting the habitat restoration needs for coaster brook trout.
- Participate in meetings of brook trout interagency team to evaluate progress of the restoration program including discussions of possible population assessment alternatives.
- Support Ashland Fish and Wildlife Conservation Office's (FWCO) brook trout monitoring program in the watershed.

Rationale:
The importance of brook trout habitat enhancement, restoration and protection is well recognized. Coaster brook trout is an FWS Region 3 Species of Concern (http://www.fws.gov/midwest/es/soc/), and brook trout populations within the Great Lakes basin and inland waters are a Region 3 resource conservation priority (FWS, 2002). Brook trout is a surrogate species for riverine and riparian habitats in the Upper Midwest Great Lakes geography (FWS, 2014), and a focal species for the Lake Superior Landscape Restoration Partnership (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/az/home/?cid=stelprdb1247205).

The interagency Whittlesey Creek coaster brook trout restoration experiment is the only Wisconsin project that combines stocking, protective regulations, habitat restoration, and monitoring to gage success, therefore it is intended to serve as a model for other streams in the future. Through on-going dialogue with Ashland FWCO and by participating in interagency team meetings, the Refuge's habitat restoration efforts can address the brook trout project's priority needs and support the monitoring program.

The Refuge's habitat program is almost entirely focused on the Whittlesey Creek watershed. Others who are involved have responsibilities across a much larger area. The Refuge has successfully taken the lead to secure funding and implement numerous enhancement, restoration, and protection efforts in the watershed. Long-term relationships with project partners, landowners, and local officials have fostered necessary trust.

Support for the Refuge, habitat restoration, and the coaster brook trout experiment through funding, in-kind contributions, and various types of assistance has come from diverse sources including:

- Wisconsin Department of Natural Resources
- Trout Unlimited
- Volunteers
- Cooperating landowners
- U.S. Forest Service
- National Park Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- Great Lakes Restoration Initiative
- U.S. Geological Survey
- Town of Barksdale
- Bayfield County Land and Water Conservation Department

- U.S. Department of Agriculture – Natural Resources Conservation Service
- Fish America Foundation
- American Sportfishing Association
- National Fish and Wildlife Foundation – Sustain Our Great Lakes Grant Program
- Northland College
- Northern Great Lakes Visitor Center
- Conservation Corps Minnesota and Iowa
- Wisconsin Department of Agriculture, Trade and Consumer Protection
- Ducks Unlimited
- American Land Conservancy

Partner support will continue, and is expected to expand.

Objective 1-2: Migratory Birds

Continue to provide benefits to migratory birds through restoration of forests, wetlands, and floodplains on the Refuge and in the watershed.

Strategies:

- Restore forest blocks in conjunction with riparian restoration projects.
- Restore historic conifer community.
- Develop and conduct scientifically valid bird monitoring to answer specific management questions.
- Evaluate and, if warranted, limit human disturbance at the mouth of Whittlesey Creek. Consider migratory birds when making decisions, especially in light of our concern for disturbance at the mouth of the creek as well as potential for piping plover habitat along the shore of Chequamegon Bay.

Rationale:
Although the Refuge is relatively small, it is located in an important area for migratory birds at the south shore of Chequamegon Bay. The Bay is an important migratory bird stopover site for many species of waterfowl and shorebirds. The mouth of Whittlesey Creek is also heavily used by shorebirds, gulls, bald eagles, and waterfowl. It is also used by a small wintering population of black ducks.

Our goal is to incorporate migratory bird benefits into our habitat restoration strategy for coaster brook trout, a major priority for the Refuge. When feasible and cost effective, small changes or additions to habitat restoration projects can also provide additional benefits for other species. Restoration of forest blocks will be conducted in conjunction with riparian work to increase block size. Riparian work will also benefit bird species of concern associated with the Refuge including northern waterthrush, veery, black duck, and sora rail.

Bird monitoring would be valuable but not a high priority for expected staff resources and funding over the next 15 years. The Refuge will consider implementing surveys that provide useful data and that can be conducted by volunteers or college students at little cost to the Refuge. Whittlesey Creek NWR provides migratory bird benefits, but it is not a major contributor to overall populations.

HABITAT

Goal 2: Preserve, restore, and enhance the native habitats of Whittlesey Creek and its watershed.

Objective 2-1: In-Stream

Work toward long-term restoration (30+ years) of high quality in-stream habitat as defined in the HMP (cover, roughness, pools, gravel, fish passage) in Whittlesey, Little Whittlesey, and Terwilliger Creeks. Within 10 years, install approximately 500 additional logs on lower Whittlesey Creek and the North Fork to restore large woody debris to two miles of stream. Within 10 years, begin adding logs to Little Whittlesey and Terwilliger Creeks. Within two years, complete a comprehensive culvert survey to document locations and deficiencies. Utilize the information to rank culvert replacements to reduce erosion and sedimentation and restore fish passage on all three creeks. Prioritize additional in-stream restoration activities and locations within two years (see Objective 1-1).

Strategies:

- Continue to use and improve current methods of logjam and culvert design and installation.
- Continue to collaborate with Bayfield County Land and Water Conservation Department (LWCD), Natural Resources Conservation Service (NRCS), U.S. Forest Service (USFS), Town of Barksdale, Northland College, Youth Conservation Corps (YCC) participants and other partners to complete and evaluate restoration projects.
- Remove beaver dams at upper end of the North Fork to reestablish a free-flowing coldwater system.
- Review road and bridge infrastructure needs; work with local governments.
- Replace the bridge on Wickstrom Road within one year.
- Work with local government units to replace other deficient bridges along Whittlesey and Little Whittlesey Creeks.
- Consider Little Whittlesey and Terwilliger Creeks when determining priorities for in-stream habitat restoration.
- Document via GIS all in-stream structures, restorations, and infrastructure such as culverts and bridges in the watershed.

Rationale:
Since European settlement, land use changes such as logging, agriculture, and development of transportation networks have increased erosion, sedimentation, and flash flooding in Whittlesey, Little Whittlesey, and Terwilliger Creeks. These factors have degraded the suitability of in-stream habitat for many aquatic organisms including fish. Brook trout are especially susceptible to habitat degradation since they thrive in cold, clear streams with abundant woody cover. Culverts and bridges that are poorly designed and installed can have additional negative impacts by impeding fish passage, thereby reducing access to feeding, spawning, and nursery habitat.

Because of the logging and agricultural history of riparian areas, few large trees are naturally recruited, especially in the downstream reaches. Strategically adding logs to the stream channels can provide benefits including reducing flood power and erosion; providing cover for fish and substrate for aquatic macroinvertebrates; enhancing channel complexity by creating riffles and pools; and transporting sediment through the system. The SIAM model helps guide restoration design and focuses efforts and funding on the most feasible projects that have the greatest chance of producing long-term benefits. The SIAM and SWAT models should be rerun periodically as restorations alter conditions in the system, inputs such as land cover, precipitation, and flow change; and as new tools such as spatial and elevation (LIDAR – Light Detection and Ranging) and data become available. Utilize new and improved models as they are developed.

Visually inspecting and monitoring restoration projects facilitates modifying engineering, design and installation of large woody debris, culverts, and bridges in order to achieve habitat management objectives. Documenting existing infrastructure allows ranking of retrofit or replacement projects based on severity of deficiencies. Continuing and expanding existing partnerships provides access to diverse expertise, knowledge of the latest efficient and effective techniques, and enhances collaborative funding opportunities.

Objective 2-2: Watershed

Over the long-term (30+ years), reduce upland erosion and slow overland water flow to historic levels in the Whittlesey Creek watershed. Within one year, develop priority criteria for easement acquisition and private lands projects (see Objective 1-1). Within three years, develop and implement new watershed protection tools—including buffer strips and riparian easements—with NRCS, USFS, private landowners, and other partners.

Strategies:

- Work with the USFS, NRCS, Wisconsin Department of Natural Resources (WDNR), Bayfield County LWCD and others to develop a more comprehensive watershed-based partnership, engaging in the existing Western Lake Superior basin's Lake Superior Landscape Restoration Partnership. Collectively secure funding to implement high-priority projects. Expand partnerships with local governments and landowners.
- Work on habitat restoration projects in the defined groundwater recharge area, which includes land located outside of the topographically delineated watershed.
- Continue to acquire easements from willing watershed landowners focusing on lands in the lower part of the watershed to protect the riparian zone along the creek, especially those areas with springs that contribute to base flow.
- Enhance and restore habitat on Service easements.
- Continue to assist landowners with habitat improvements on their property through the FWS Partners for Fish and Wildlife Program and other funding sources. In the case of competing priorities, use data from the SWAT model to determine the most cost-effective projects to fund.
- Partner with NRCS and LWCD for farm program implementation in the watershed and recharge area.

Rationale:
Facilitating surface water infiltration and controlling erosion within the upstream watershed are crucial to successful restoration of downstream fish and wildlife habitat on Refuge lands. Habitat projects such as reforestation and wetland restoration as well as farm conservation efforts including improved cropping practices, grade stabilization, and installation of detention basins are among the techniques typically utilized. Easements, buffers, and setbacks that regulate land use along bluff tops and in the riparian zone can reduce bank and bluff failures and the resultant erosion and sedimentation while protecting coldwater springs that contribute to watershed base flow.

Partners are critical to watershed health since they can provide, for example, complementary expertise, resources including funding, and access to property. Assistance is often directed toward specific types of practices within board categories, and this changes over time. NRCS and LWCD typically assist with habitat and farm conservation projects. FWS, USFS, and WDNR generally only provide habitat restoration assistance. FWS can also purchase permanent conservation easements within the Whittlesey Creek watershed. It would be beneficial to formally organize those who have a stake in watershed protection, conservation, enhancement and restoration initiatives. The group should include landowners and non-governmental organizations. Potential projects should be collectively identified, ranked, and implemented by way of appropriate funding sources. A formal partnership with USFS is especially important since they own much of the watershed's land base, including a large part of the groundwater recharge area; and therefore they are critical to engage for a more comprehensive look at the watershed, its management, and restoration.

Objective 2-3: Floodplain and Coastal Wetland

Work toward long-term restoration (30+years) of floodplain function and native plant composition on Refuge lands. Within 10 years, plant native trees on all former agricultural fields and on stream banks subject to erosion. Within two years, determine highest-priority actions, locations, and timeline for restoration of coastal wetlands and sedge meadows (see Objective 1-1).

Strategies:

- Continue to use and improve current tree planting methods described in "Habitat Restoration and Management," located in section 3.6 Refuge Programs. Annual deer repellent application on browse-susceptible species is critical until growth exceeds browse height.
- Conduct targeted control of priority invasive plants during restoration projects.
- Work with partners using best available science to determine priorities.
- Build landowner support for future floodplain reconnection and restoration of stream meanders.
- Continue to acquire land within the approved Refuge boundary from willing sellers.
- Complete high priority habitat restoration projects including planting trees on remaining open fields on the Refuge, complete removal of soil piles on the golf course site, remove invasive trees from floodplain and riparian sites. Complete riparian restoration work along Whittlesey, Little Whittlesey, and Terwilliger Creeks.

- Complete seasonal wetland basin restoration by installing scrapes in the floodplain based on soils and location of historic seasonal basins.
- Consider these strategies in the overall prioritization of activities for the watershed restoration efforts.

Rationale:
Floodplain and coastal wetland habitat types provide valuable ecosystem functions by storing and slowly releasing floodwaters, promoting infiltration and groundwater recharge, assimilating nutrients, filtering sediment, and dissipating wave energy. The complex plant communities, influenced by fluctuating water levels, are utilized by diverse suites of species. The Refuge fee-title acquisition area is largely comprised of floodplain and coastal wetland habitats that have been altered to varying degrees. Logging, draining, land forming, farming, and stream channel straightening have degraded their function by altering hydrology and reducing species richness.

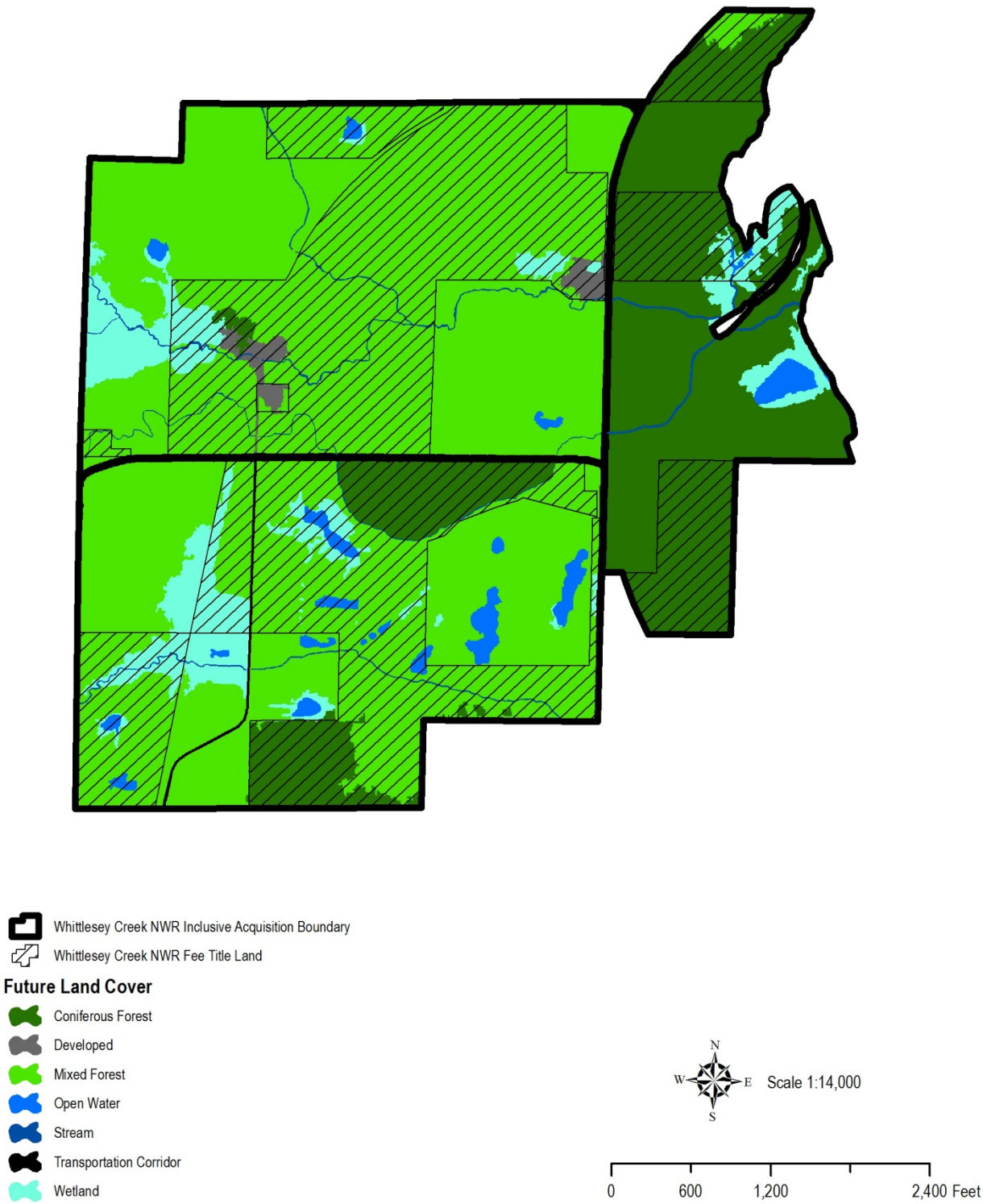
Wetland hydrology will continue to be restored by utilizing aerial imagery, evaluating soil characteristics, and ground-truthing to map drainage networks and basins. This assists with prioritizing restoration that focuses on plugging ditches and scraping seasonal basins prior to planting trees. Existing sedge meadows and moist meadow habitat will be maintained by cutting or burning encroaching brush.

Overbank sediment deposition, channel straightening, and channel incision have affected floodplain hydrology by making it more difficult for flood flows to overtop the stream banks. Floodplain reconnection by bank shaping and restoring meanders can reduce flood power and enhance floodplain function. A great deal of planning will be needed to successfully initiate floodplain reconnection and restore meanders due to mixed public-private land ownership and the existing infrastructure such as buildings, roads, culverts, and bridges. Current log installations are designed to produce sinuosity in the existing straightened channel, generating some of the benefits of meanders on a much smaller scale.

Successful forest restoration techniques continue to be used but will be modified as needed. The Refuge partners with USFS and others to expand tree planting, invasive species control, and deer repellant application and to reduce costs. Invasive plants impact native plant diversity and habitat utilization, and their competition can limit reforestation success. Therefore, priority invasives including buckthorn, box elder, and crack willow (*Salix fragilis*) will be suppressed and controlled. Cut-stump glyphosate treatment is effective for buckthorn and box elder control, minimizes herbicide use, and is a targeted application technique that reduces impacts to non-target organisms. Limited late-season foliar glyphosate treatment may be used on dense stands of buckthorn seedlings. Crack willow was planted along stream banks decades ago. These large trees are girdled and treated with glyphosate, an effective technique that also limits herbicide use. Treatment creates canopy gaps for seedlings planted underneath, provides habitat for cavity nesting birds, and contributes woody debris to the stream (Figure 4-1).

Reed canarygrass can be extremely competitive and is costly to effectively suppress or control. Trees and shrubs have been successfully established in dense reed canarygrass, ultimately providing suppression by shading. As resources allow, reed canarygrass will be suppressed by burning prior to tree planting. Restoring hydric soil conditions can control reed canarygrass and promote hydrophytic plant species such as sedges. Monitoring for purple loosestrife infestations is ongoing, with beetles (*Galerucella spp.)* introduced as needed to limit the spread and provide control of this aggressive invasive plant. Once controlled, native wetland plants quickly recolonize affected the site.

Figure 4-1: Desired Future Land Cover



Objective 2-4: Climate Change

Prioritize and integrate all restoration actions using best available science to increase ecosystem resilience and achieve long-term habitat and wildlife benefits in the face of a changing climate.

Strategies:

- Incorporate the latest information from the Wisconsin Initiative on Climate Change Impacts (WICCI) into all planning efforts.
- Utilize the latest brook trout range map models that project decline with increasing temperature over time.
- Develop a working partnership with climate change scientists at WICCI to understand actions the Refuge can take to increase ecosystem resilience on a local scale in the Whittlesey Creek watershed.
- Continue to restore habitat in Whittlesey Creek to increase the quality of coaster brook trout habitat and mitigate for the negative impacts of climate change.

Rationale:
Early climate change models predict a substantial reduction in brook trout throughout their range as temperature increases. Wisconsin may lose up to 98 percent of its brook trout habitat with a 5.5 °F (3 °C) rise in temperature. Bayfield County streams, especially Whittlesey Creek, are expected to retain suitable coldwater brook trout habitat. Additionally, watershed vegetation may change dramatically by the end of the century: boreal forest and wetland species currently at the southern edge of their natural range in northern Wisconsin could be lost altogether here; hardwood forest species are expected to expand in Wisconsin; and increasingly we will be faced with managing system transformations and may need to focus on sustaining ecological functions rather than historical assemblages of plants and animals.

Habitat enhancement, restoration, and protection efforts that are underway and being pursued on the Refuge and in the watershed are consistent with numerous plans and reports including WICCI's observations and recommendations. The WICCI indicates, "In streams that may show resilience to climate change impacts, stream habitat may be managed to create and enhance refugia from high water temperatures. For example, stream channels can be narrowed and deepened, overhead cover can be added, and deep pools can be created to provide coldwater refugia in those streams receiving sufficient groundwater input. Riparian areas can also be managed to provide shading by tall grasses or trees." Additionally, sound land management practices in a watershed, such as conservation tillage and the enrollment of environmentally sensitive land into the Conservation Reserve Program, can be used to protect the biological integrity of coldwater streams and enhance their resiliency to climate change impacts. It will be critical to continue using the latest scientific information, monitoring, management techniques, programs, and partnerships to minimize the effects of climate change.

The Whittlesey Creek watershed may prove to be an important site for testing a long-term, multi-faceted approach to reintroducing brook trout. This information could provide valuable insights for additional brook trout management efforts.

Objective 2-5: Biological Monitoring

Within three years, develop and implement a prioritized habitat and wildlife monitoring plan for Whittlesey Creek NWR. Focus on key habitat metrics that determine the success of restoration projects, and key wildlife species to verify a response to restored habitat.

Strategies:

- Complete the Inventory and Monitoring Plan for the Refuge.
- Integrate Refuge monitoring with other agency efforts in the watershed (partnerships).
- Continue to assist with Ashland FWCO electrofishing in support of the brook trout experiment.
- Continue student research and monitoring programs that contribute to Refuge objectives.
- Continue in-stream habitat restoration monitoring.
- Continue to monitor post- habitat restoration fish and aquatic macroinvertebrate populations.
- Continue to pay for gaging station in partnership with USGS, Ashland FWCO, and Bayfield County LWCD.
- Continue limited migratory bird monitoring when volunteer resources are available.
- Add new data to SWAT model and rerun every five years.
- Follow adaptive management principles, evaluating restoration work and fish survey results, to assess the effectiveness of the Coaster Brook Trout Restoration experiment.

Rationale:
Monitoring of wildlife and habitat accomplishes several purposes: it allows for evaluation of current land use and management practices, it can provide early warning of problems in the system, and it provides the foundation for future management decisions. Service policy on refuges (chapter 701 FW 2) states that we must (1) collect baseline information on plants, fish, and wildlife, (2) monitor, as resources permit, critical parameters and trends of selected species and species groups on and around Service units, and (3) base management on biologically and statistically sound data derived from such inventory and monitoring. Monitoring at Whittlesey Creek NWR will be directed at complementing the Service's overall efforts to reintroduce coaster brook trout into the watershed. Due to limited budget and personnel, we must strategically allocate resources to address the highest priority needs. Assessing questions that have the greatest impact on management decisions will be the highest priority.

A general description of monitoring for the Refuge was outlined in the HMP to provide guidance until the Inventory and Monitoring Plan (IMP) was completed. The IMP will be completed during 2015 following guidance in Service Manual chapter 701 FW 2. The general direction of monitoring will focus on stream hydrology and habitat, fish populations, and terrestrial invasive species. Student and volunteer involvement in research and monitoring on the Refuge has been critical to our success. It is important to coordinate these activities closely so that good quality data is collected, analyzed, and utilized when making management decisions.

The Refuge also funds a portion of the operation and maintenance costs of the USGS gaging station on Whittlesey Creek. This station is critical to understanding the hydrology of the creek. The data from the gaging station are also used in the Sediment Impact Analysis Methods model to help the Refuge make decisions about restoration projects on the creek and to provide input for project engineering and design.

PEOPLE

Goal 3: Provide a diverse audience with opportunities to experience high quality, wildlife-dependent activities and to understand and appreciate a natural functioning landscape.

Objective 3-1: Northern Great Lake Visitor Center Partnership

Continue the current level of involvement in the Northern Great Lakes Visitor Center (NGLVC, Visitor Center, Center) partnership. Within five years, develop a Memorandum of Understanding with the USFS that clarifies roles and responsibilities.

Strategies:

- Maintain on-site office for Refuge staff and contact point for Refuge visitors.
- Refuge manager continues to serve on NGLVC Board of Directors.
- Participate in NGLVC events that meet Refuge purposes and the National Wildlife Refuge System (NWRS, Refuge System) mission.
- Coordinate educational/interpretive programming with NGLVC programs.
- Maintain Refuge exhibit in the NGLVC.

Rationale:
The Refuge's participation in the NGLVC partnership is an efficient use of funds to allow the Refuge access to over 120,000 visitors each year as well as a high quality facility for the Visitor Services program. The Center is strategically located on the south shore of Lake Superior along the main east-west highway that connects northern Minnesota to northern Michigan through Wisconsin. The partnership is a cost-effective arrangement that allows the Service access to classrooms, exhibit space, and a trail system and a closer relationship with other federal and state agencies. The cost for a comparable facility would be much greater for the Service if housed alone. Through the Refuge exhibit and Refuge programs, visitors have the opportunity to learn about the Service.

The NGLVC is coordinated through a Board of Directors with one representative from each of the agencies and non-profits at the Center (USFS, National Park Service, FWS, University of Wisconsin Extension, Wisconsin Historical Society, and the Friends of the Center Alliance, LTD). The Board of Directors sets the general budget for the Center operations as well as coordinates some of the partnership direction for the Center.

Each agency and organization retains its individual identity, although some are more intricately tied to the operation of the Center than the Service. With the Refuge's location next to the Center, the FWS has a responsibility to complete Refuge projects that may not always relate to the mission of the Center. Where overlap exists, the Refuge plays an important role as a partner at the Center.

Objective 3-2: Welcome and Orient Visitors

Provide a welcoming, safe, accessible experience for Refuge visitors.

Strategies:

- Quarterly review and update the Refuge website to provide clear and current information about Refuge management, natural history, and visitor activities.
- Ensure that entrance and directional signs are in good condition and meet Service standards.
- Maintain existing kiosk and parking area on the Refuge.
- Provide and maintain publications that are clear and accurate and meet Service publication standards. Evaluate the best cost-effective solution for providing information to the public when they visit the Refuge. Revise the general Refuge information brochure or provide a better information source.
- Ensure that all facilities are accessible according to the standards of the Americans with Disabilities Act.
- Continue to work with the NGLVC partnership to ensure that visitors are welcomed, and understand the role of the Refuge as one of many partners at the Visitor Center.

Rationale:
Welcoming and orienting Refuge visitors contributes to a quality wildlife-dependent recreation program as identified in the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) and defined in the Service Manual (chapter 605 FW 1). The ease with which the public can understand where they can go, what they can do, and how they can ethically engage in wildlife-related activities increases visitor satisfaction and creates a positive impression of the Service and an appreciation of the mission and goals of the agency.

The needs and satisfaction of visitors are known only from chance conversations with Refuge users. While Refuge-specific visitor surveys would provide better information for improving visitor opportunities, the procedures used to conduct proper visitor surveys are time consuming and costly. Therefore, basic data will continue to be obtained within the constraints of limited Refuge resources.

With the small size of several tracts of Refuge lands, the focus will be to ensure that all lands are correctly posted to avoid unintentional trespass on adjacent private lands.

Objective 3-3: Environmental Education and Interpretation

Provide Refuge-specific environmental education and interpretive programming for at least 1,000 students and 500 visitors per year. Emphasize curriculum-based environmental education packages and multiple visits by students that include hands-on outdoor experiences. At least 90 percent of teachers will report that Refuge environmental education programs support their curriculum and help to promote resource stewardship and conservation.

Strategies:

- Continue the River of Words program with fourth-grade students in the Washburn School District.

- Educate and mentor Northland College and YCC participants.
- Increase collaboration with Ashland FWCO to develop and deliver environmental education and interpretive programming.
- Expand themes to include watershed/trout connection.
- Increase use of the Coaster Classroom through partnerships with local agencies, colleges, or universities.
- Hire a park ranger or visitor services specialist to replace the position held vacant since 2011.

Rationale:
Environmental education and interpretation are both priority wildlife-dependent recreational activities, which are listed in the Improvement Act. The Refuge had an active environmental education and interpretation program until the park ranger position was held vacant for regional savings in 2011. The ability of the Refuge to capitalize on the NGLVC partnership is tied to the ability to re-hire the park ranger position. Many of the strategies can only be implemented once the vacant park ranger position is filled.

The vision for the Refuge's environmental education and interpretation program is to focus on Refuge-specific messages and where possible, partner with other agencies at the NGLVC to provide high quality programming in the natural resources field. The Refuge's approach to environmental education and interpretation has been to collaborate with other agencies at the Center when there is a clear connection to Refuge goals and objectives. Each agency at the NGLVC partnership has a different mandate and set of interpretive and educational priorities for programming at the Center. Some partner agencies are very dependent on grant funding, which can direct priorities. One value of the partnership is that between all of the agencies and organizations there are programs to address a wide variety of public interests. Through co-location, individuals who attend a program may learn about another offering, increasing the chance that they will attend a program hosted by another agency. Centralized promotion of programs by the partnership is a cost-effective method of encouraging participation in events.

Refuge programs are targeted to local schools, especially the fourth through sixth grades, with curriculum based programs like the River of Words. Environmental education and interpretation can advance awareness, understanding, and appreciation of conservation issues and the role of the Refuge and the Service in protecting and restoring fish, wildlife, and habitat.

The Refuge also participates in special events at the Center that have a tie to the Service mission. The Service is a partner in the Chequamegon Bay Birding and Nature Festival, for example, hosting several programs on the Refuge as well as providing staff for tours.

The Refuge also works closely with local high schools and colleges to provide mentorship and employment opportunities. These opportunities are coordinated by the Refuge biologist who incorporates classes and volunteers into biological projects on the Refuge.

Objective 3-4: Hunting and Fishing

Provide the public with safe and enjoyable hunting and fishing opportunities that minimize conflict with other compatible public uses and are consistent with sound fish and wildlife management practices.

Strategies:

- Continue current waterfowl and archery deer hunts on the Refuge.
- As additional land is acquired, reevaluate the areas that are open to hunting.
- Open the Refuge to fishing in accordance with state regulations.
- Evaluate each new acquisition to determine if it meets the criteria (>20 acre block size) for opening it to hunting. If so, complete opening package for new lands.
- Update website with current hunting regulations.

Rationale:
Hunting and fishing are two of the six wildlife-dependent recreational uses that receive priority consideration in Refuge planning and management under the Improvement Act. Hunting and fishing can instill a unique understanding and appreciation of fish and wildlife, their behavior, and their habitat needs. Well-managed hunting and fishing programs provide traditional outdoor activities for the public with negligible adverse impacts to the biological integrity of the Refuge.

Due to the small size of the Refuge, areas open to hunting will be evaluated after any new land acquisition. The goal will be to open deer hunting on the largest blocks of Refuge land to minimize potential impacts on neighboring lands through trespass. In general, we will look for minimum blocks of 20 acres in order to open it to hunting.

In an effort to eliminate confusion with the fishing regulations, the Refuge is proposing to align Refuge regulations with state regulations by opening the Refuge to fishing. Refuge regulations currently do not allow fishing, but according to state law, individuals may walk in the creek and legally fish. The Refuge was involved in the overall planning for the restoration of coaster brook trout when the state of Wisconsin established catch and release regulations for Whittlesey Creek. By aligning Refuge regulations through Title 50 Code of Federal Regulations, Wildlife and Fisheries with state regulations, we hope to minimize confusion for the visiting public.

Objective 3-5: Wildlife Observation and Photography

Continue to provide year-round opportunities for visitors to safely observe and photograph wildlife on the Refuge.

Strategies:

- Provide a new accessible foot trail from the NGLVC to the Coaster Classroom; coordinate the off-Refuge segment with NGLVC partners.
- Allow year round off-trail access on foot throughout the Refuge, including snowshoeing and cross-country skiing in the winter. The Refuge reserves the right to close specific units throughout the year for management or safety purposes.
- Evaluate the feasibility of providing an accessible foot and biking trail along the old railroad right-of-way through the Refuge.

Rationale:
Wildlife observation and photography are priority wildlife-dependent recreation activities listed in the Improvement Act. They are popular and important activities that promote understanding and

appreciation of natural resources and their management. If properly managed, these uses provide valuable opportunities for interaction between people and the natural environment with little or no detrimental effect to wildlife or habitat. Good wildlife viewing opportunities are available along town roads that pass through the Refuge. Developing and maintaining trails and overlooks can enhance access to locations that offer premium wildlife viewing opportunities.

Any trail and overlook proposals need to consider the important resources at the Refuge, especially the creeks and adjacent riparian zones. Trails should not create impacts in these areas that may result in increased erosion, sedimentation, or destruction of wetland resources. Due to potential impacts to migratory birds, an observation deck at the mouth of Whittlesey Creek was dropped from consideration. Although this is an excellent viewing area for many species of birds, we do not want to create additional disturbance at this important stopover, feeding, and wintering site. Numerous gulls, eagles, and waterfowl gather here to take advantage of the outflow of Whittlesey Creek. The beaches also provide migratory habitat for many species of shorebirds. Because of the importance of this site to migratory birds, we determined that minimal disturbance at this site would be in line with the purposes of the Refuge.

The existing railroad right-of-way (ROW) is currently used as a snowmobile trail during the winter season pursuant to existing easements held by the county. Recently there was a proposal to develop a hiking and biking trail along the ROW that would also require approval from many other landowners along the proposed trail system. The Refuge is opposed to any additional motorized uses of the railroad ROW including ATV use. Certain non-motorized uses such as hiking and biking may provide enhanced wildlife observation opportunities along the corridor. Ownership along the railroad ROW will need to be clarified before evaluating any trail proposal.

Objective 3-6: Outreach

Throughout the life of the plan, increase local community support and appreciation for the role of the Service and the Refuge in fish and wildlife conservation.

Strategies:

- Develop a message that relays the important role Whittlesey Creek NWR plays in conservation, and include it in all visitor services activities.
- Coordinate with other FWS stations and partners to expand outreach through local news media. Provide news releases, television/radio spots, interviews, newsletter articles, etc. a minimum of three times per year.
- Maintain regular contact with community leaders and organizations through tours, meetings, presentations, and events.
- Increase opportunities to interact with and listen to local residents and landowners.
- Maintain Facebook page once park ranger position is filled.

Rationale:
It is important to the success of Whittlesey Creek NWR that people, organizations, and agencies in the area know about the Service and the Refuge and support it as a valuable part of the community. Building support for land and water conservation among Refuge neighbors is essential to protect natural resources over the long-term. Outreach can foster a sense of

ownership in the greater community and contribute to achievement of Whittlesey Creek NWR purposes and the Refuge System mission. Effective outreach depends on open and continuing communication and collaboration between the Refuge and the public.

The NGLVC partnership presents a unique and cost-effective opportunity for the Service to work with other federal and state agencies to coordinate outreach efforts. In addition to Refuge specific social media tools like the website or Facebook, partner agencies also host a NGLVC website and Facebook page. Outreach needs to consider the balance between the needs of the partnership and the need to maintain the identity of the Refuge and its mission. The Refuge will also target much of our outreach effort to the landowners in the Whittlesey Creek watershed and the adjacent recharge area. Efforts to restore coaster brook trout and accomplish Refuge purposes are directly tied to landowners in these important areas.

Objective 3-7: Volunteers Programs and Community Partnerships

Throughout the life of the plan, work with local communities and organizations to generate support for the Refuge resulting in at least 500 volunteer hours annually.

Strategies:

- Recruit, orient, and train volunteers to assist with a variety of projects including visitor services programs, habitat restoration, biological programs, and maintenance tasks.
- Engage volunteers to monitor various suites of bird species such as raptors and shorebirds if the data is valuable for refuge, regional, or national monitoring efforts.
- Maintain mutually beneficial partnership opportunities with Northland College.
- Examine potential of working with existing non-profit conservation organizations to take a larger role in supporting the Refuge. There are no plans to develop a formal Friends group for the Refuge, but several groups with closely aligned missions may be interested in formalizing a partnership with the Refuge.

Rationale:
The Service recognizes the value of time and expertise contributed by individuals and groups. Volunteers help the Service achieve agency goals. An effective volunteer program: (1) provides people with opportunities to assist in the accomplishment of the Refuge System mission; (2) enhances our performance through the creativity, innovations, labor, and expertise contributed by volunteers; (3) provides opportunities for students and others to gain experience in areas of interest for future careers; and (4) encourages stewardship of wild lands, wildlife, and other natural and cultural resources through public participation in Service programs. Whether through volunteers or other important partnerships in the community, Refuge staff seeks to make Whittlesey Creek NWR an integral part of the community.

The volunteer program at the Refuge will be a combination of Refuge-specific volunteers and volunteers through the NGLVC partnership who may volunteer for multiple agencies at the Center. An important part of the Refuge's volunteer program will be coordination with the other agencies to implement an efficient program and provide clearly defined supervisory responsibilities. Numerous volunteers are recruited through other agencies and their respective programs but at the Center volunteers often work with staff from multiple agencies. Constant communication of needs and opportunities with the Center's volunteer coordinator is crucial to the success of the program.

The biologist at the Refuge also maintains a working relationship with local colleges and professors. Numerous student volunteers work directly with Refuge staff on small research or habitat restoration projects. This program also provides a mentoring opportunity to the students.

There are no plans to develop a Friends group for the Refuge. There is a Friends of the Center Alliance, (FOCAL) at the NGLVC that focuses efforts on raising funds for Center operations. There are a large number of Friends groups and other non-profit organizations in the local area but only a small number of individuals that are involved in many of them. Competition for limited local funds and grants is a constant challenge for these groups. The FOCAL group has served as a fiscal agent for Refuge projects in the past and is a valued partner to the Refuge.

Objective 3-8: Law Enforcement

Visitors feel safe and resources are protected on Service lands.

Strategies:

- Post and maintain Refuge boundaries.
- Annually inspect each FSA and Service easement, and follow up with landowner contact.
- Ensure that all easement files meet requirements identified in the Service Easement Manual.
- Continue to work with Service zone Law Enforcement Officer, WDNR officers, and local authorities to address enforcement concerns and violations.

Rationale:
The Service recognizes the value of providing a safe environment for all Refuge visitors and staff. The Refuge relies on coverage from the zone officer located in Necedah, WI, over three hours from Whittlesey Creek NWR. Therefore, it is important that the Service work closely with local officials, especially the Bayfield County Sheriff's Office to address any immediate enforcement concerns. The zone officer coordinates any follow-up investigations or support for the Refuge.