

Chapter 1

Ron Holmes/USFWS



A bald eagle soars over the refuge with a fish.

The Purpose, of and Need for, Action

- **1.1 Introduction to John Heinz National Wildlife Refuge**
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1.1 Introduction to John Heinz National Wildlife Refuge

John Heinz National Wildlife Refuge at Tinicum (NWR, refuge) currently includes 993 acres of the 1,200 acres within its approved acquisition boundary. The refuge protects over 200 acres of the last remaining freshwater tidal marsh in Pennsylvania. It is an important migratory stopover along the Atlantic Flyway, and provides protected breeding habitat for State-listed threatened and endangered species, as well as many neotropical migratory birds (Cohen 2004). The refuge is located in Philadelphia and Delaware Counties in the Commonwealth of Pennsylvania (map 1.1)

John Heinz NWR includes a variety of important resources and also provides a unique opportunity for education and outreach near the urban center of the city of Philadelphia, the nation's fifth largest metropolitan area (U.S. Census Bureau 2011). Sustaining and protecting these resources requires planning, active on-the-ground management, and partnerships with the surrounding communities of the Delaware Valley.

John Heinz NWR is managed by the U.S. Fish and Wildlife Service (USFWS, the Service, our, we) as part of the National Wildlife Refuge System (Refuge System). The Refuge System maintains the biological integrity, diversity, and environmental health of natural resources on lands within it for the benefit of present and future generations.

This draft comprehensive conservation plan (CCP) and environmental assessment (EA) for the refuge combines two documents required by Federal law into one document:

- A CCP, required by the National Wildlife Refuge System Administration Act (Refuge Improvement Act) of 1996, as amended by the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57; 111 Stat. 1253)
- An EA, required by the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 *et seq.*, 83 Stat. 852)

Following the public review of this draft CCP/EA, the Service's Northeast Regional Director will decide on the components of a final CCP to guide refuge management decisions over the next 15 years. The Service will use the final CCP to promote the understanding of, and support for, refuge management among State and Federal agencies, our conservation partners, Tribal governments, local communities, and the public.

This draft CCP/EA is organized in several chapters to outline the history, driving mandates, purposes, and conservation priorities guiding the proposed actions, as well as the affected environment of the refuge and alternatives reviewed in the course of plan development.

Chapter 1, "The Purpose of, and Need for, Action," explains the purpose of, and need for, preparing a CCP and EA, and introduces the 5 subsequent chapters and 11 appendixes.

Chapter 2, "Affected Environment," describes the biological and socioeconomic landscape context as well as the physical, biological, and human environments of the refuge.

Chapter 3, "Alternatives Considered, Including the Service-preferred Alternative" presents three management alternatives and their objectives and strategies for meeting refuge goals and addressing public issues. It also describes the activities that the Service expects to occur regardless of the alternative selected for the final CCP. The range of alternatives we analyzed include continuing our present management of the refuge unchanged, expanding visitor

services, restoring coastal plain habitats found on the refuge, and enhancing habitat management and visitor services with a wider, regional focus.

Chapter 4, “Environmental Consequences,” assesses the environmental effects of implementing each of the three management alternatives. It predicts the foreseeable benefits and consequences affecting the socioeconomic, physical, cultural, and biological environments described in chapter 2.

Chapter 5, “Consultation and Coordination with Others,” summarizes how the Service involved the public and our partners in the planning process. Their involvement is vital for the future management of this refuge and all national wildlife refuges.

Chapter 6, “List of Preparers,” credits Service and non-Service contributors to the planning effort.

Eleven appendixes, a glossary with acronyms, and a bibliography section provide additional documentation and references to support our analysis summarized within the report.

1.2 Purpose of, and Need for, the Proposed Action

In 1997, Congress passed the Refuge Improvement Act establishing a unifying mission for the Refuge System. The Refuge Improvement Act highlights six priority public uses that each refuge should evaluate for compatibility with its “wildlife first” mandate. These six public uses include wildlife observation, interpretation, photography, environmental education, hunting, and fishing. The Refuge Improvement Act also requires that all refuges established prior to 1997 prepare a CCP by 2012.

The Service proposes to develop a CCP for the refuge that, in the Service’s best professional judgment, best achieves the purposes, vision, and goals of the refuge; contributes to the mission of the Refuge System; adheres to Service policies and other mandates; addresses identified issues of significance; and, incorporates sound principles of fish and wildlife science.

NEPA regulations require our evaluation of a reasonable range of alternatives, including a no action and a proposed or preferred action. The no action alternative can be either (1) taking no management action, or (2) not changing current management. In this draft plan, alternative A is the latter. All alternatives will be evaluated and compared as to how well they meet the purpose of, and need for, a CCP.

The purpose of adopting a CCP for this refuge is to accomplish the following goals:

- Goal 1.** Protect, maintain, and restore where possible, the biological integrity, diversity, and environmental health of southeastern Pennsylvania coastal plain ecological communities that are unique to the refuge and sustain native plants and wildlife, including species of conservation concern.
- Goal 2.** Contribute to the enhancement of native species diversity in the Delaware Estuary, including migratory birds and other species of conservation concern, within the refuge’s managed open waters and grasslands.
- Goal 3.** Provide a wide range of environmental educational opportunities, focusing on urban youth, which raise awareness and understanding of the Service and the National Wildlife Refuge System, inspire appreciation and stewardship of our natural and cultural resources, and expand understanding of Tinicum Marsh as a unique component of the Delaware Estuary and the local community.

Goal 4. Ensure that visitors, students, and local residents of all ages and abilities enjoy their refuge experience, understand and appreciate the refuge's natural and cultural resources and its contribution to conserving those resources in the Delaware Estuary, and are inspired to become better stewards in their everyday lives.

Goal 5. Provide quality, wildlife-dependent recreation that allows a diversity of visitors to connect with nature in the outdoors.

Goal 6. Communicate and collaborate with local communities, Federal and State agencies, Tribal governments, academic institutions, and conservation organizations throughout the Delaware Estuary to promote natural and cultural resource conservation and the mission of the National Wildlife Refuge System.

Several Service policies providing specific guidance on implementing the Refuge Improvement Act have been developed since the refuge was established. A CCP incorporates those policies, and develops strategic management direction for the refuge for 15 years, by

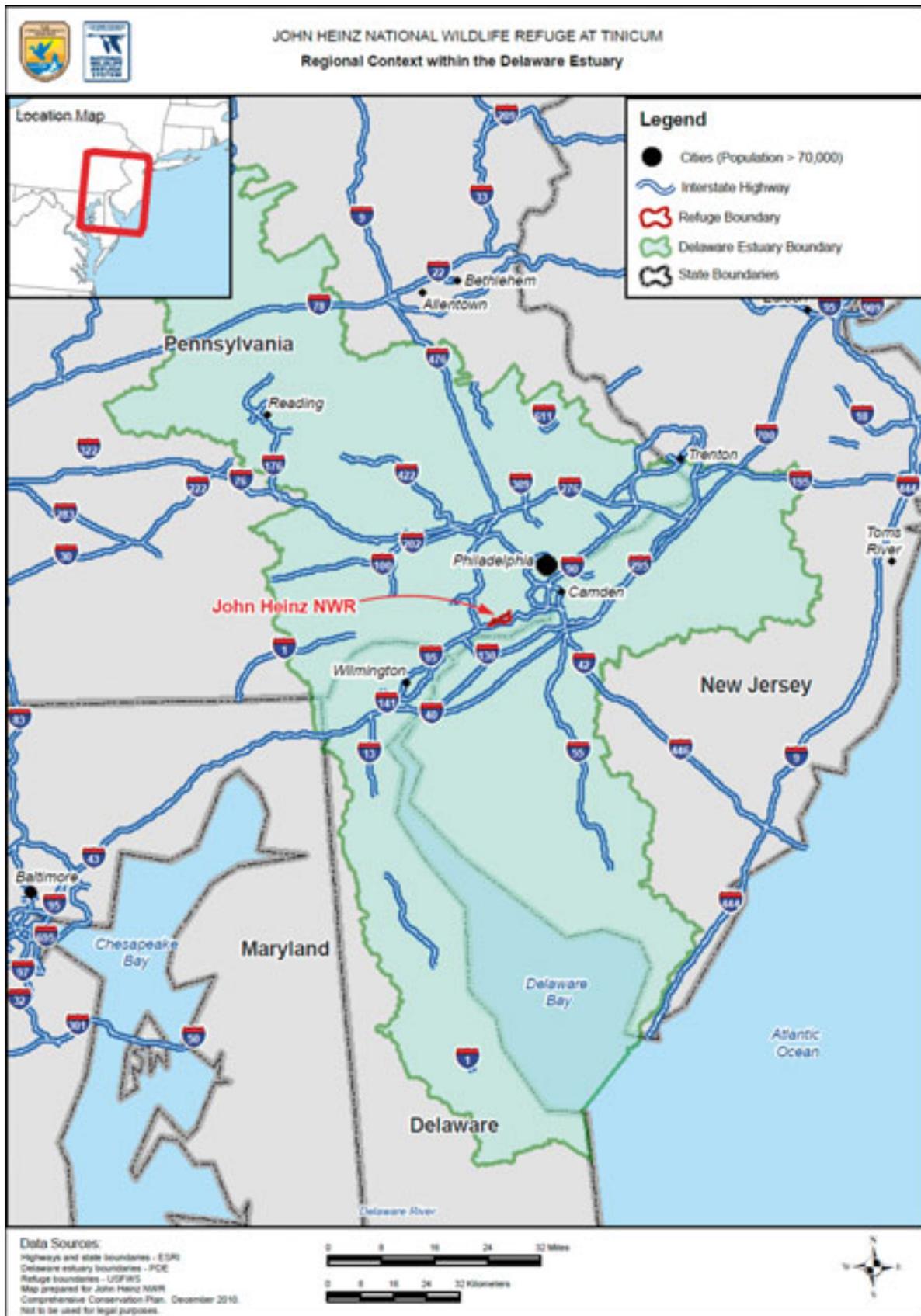
- stating clearly the desired future conditions for refuge habitat, wildlife, visitor services, staffing, and facilities;
- explaining concisely to state agencies, refuge neighbors, visitors, partners, and other stakeholders the reasons for management actions;
- ensuring that refuge management conforms to the policies and goals of the Refuge System and legal mandates;
- ensuring that present and future public uses are appropriate and compatible;
- providing long-term continuity and consistency in management direction; and,
- justifying budget requests for staffing, operating, and maintenance funds.

In addition to the needs for a CCP outlined by Service policies and mandates, John Heinz NWR has not completed a large-scale planning effort since development of its original master plan in 1980. The refuge, its use, and surrounding landscapes have changed significantly since then. Additional property has been acquired, biological management has shifted from a preservation-based approach to adaptive management focus, and improvements have been made to promote refuge visitation and recreational use. Conservation science has also improved over the past 30 years, including identification of priority species for conservation in light of population trends, available habitat, and landscape-level biological threats. All these changes since the refuge master plan are being considered in developing the CCP.

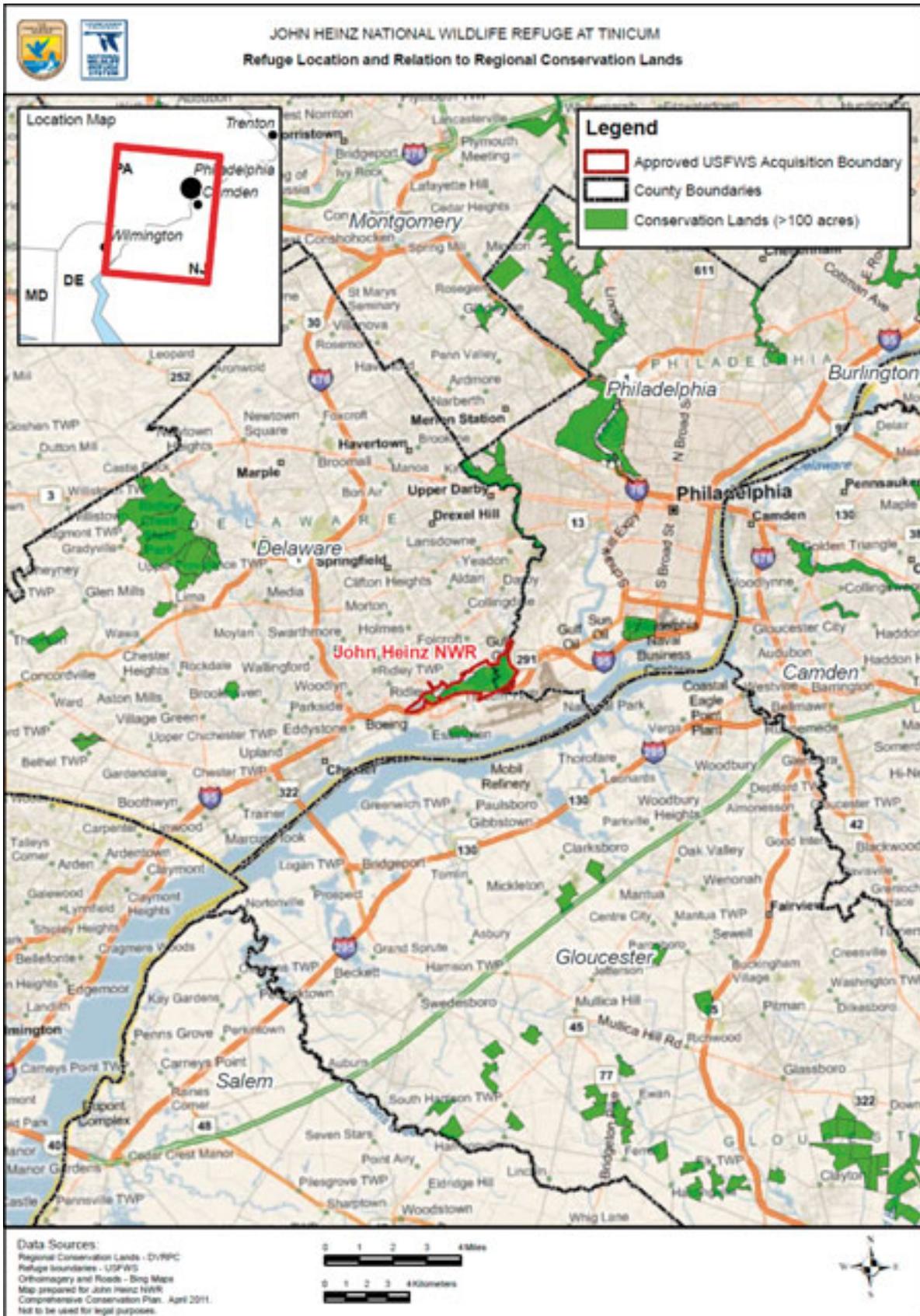
Project Area

The project location is John Heinz NWR, which is located in Philadelphia and Delaware Counties in the State of Pennsylvania. Darby Creek flows through the site shortly before its confluence with the Delaware River. The regional context of the project area is defined by the interactions of the surrounding Philadelphia metropolitan area, the Delaware Estuary, and the Darby Creek watershed (see maps 1.1 through 1.3). The refuge lies within the Atlantic Coastal Plain physiographic province. This area is located in the most southeastern part of the State, running approximately 40 miles in length and 4 miles in width. Local relief is very low in this section and elevations range from sea level to 200 feet above sea level (PADCNR 2010).

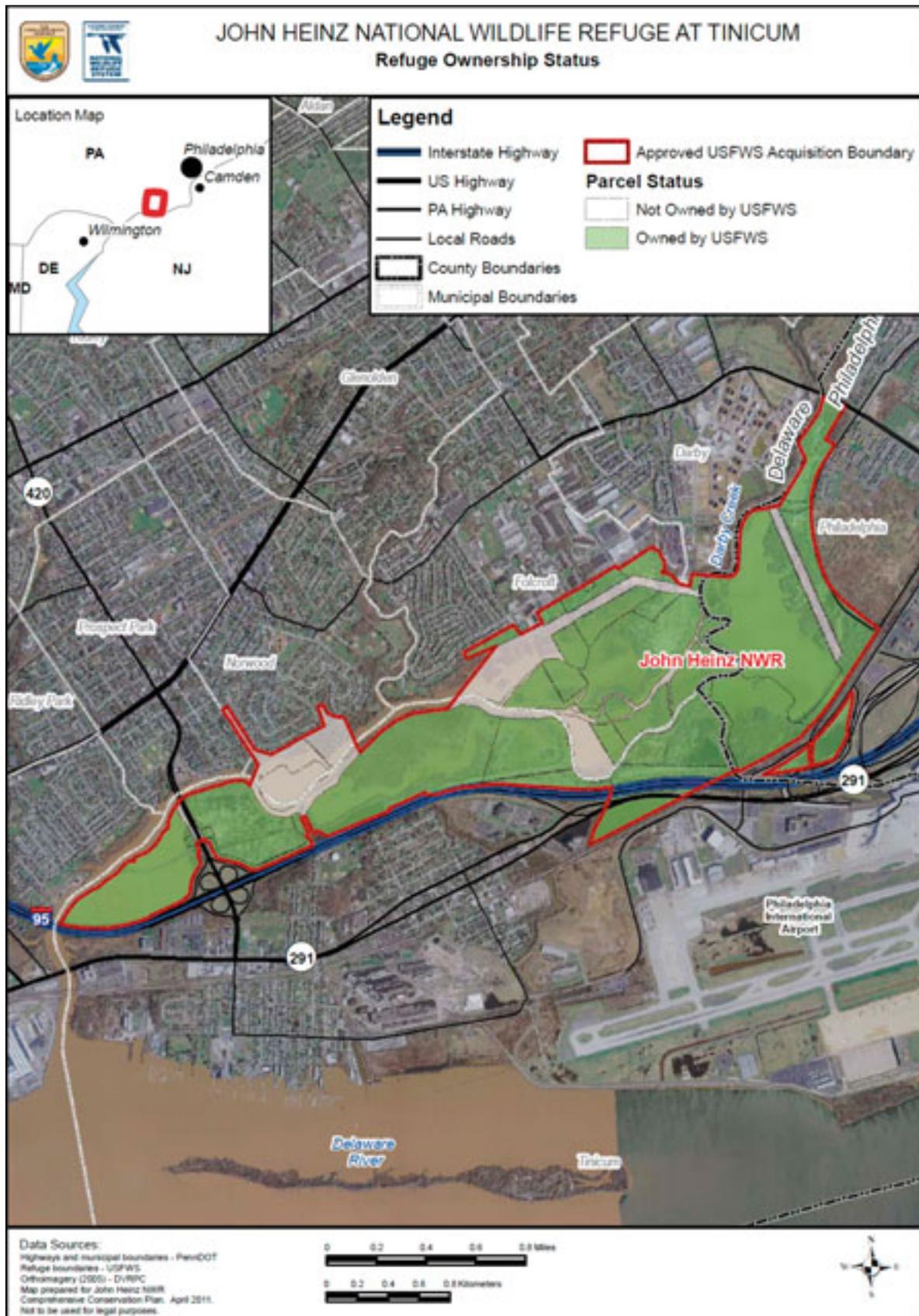
Map 1.1 John Heinz National Wildlife Refuge at Tinicum and Regional Context Within the Delaware Estuary



Map 1.2 John Heinz National Wildlife Refuge at Tinicum Location and Relation to Regional Conservation Lands



Map 1.3 John Heinz National Wildlife Refuge at Tinicum Ownership Status



1.3 Service and Refuge System: Policies and Mandates Guiding Planning

The U.S. Fish and Wildlife Service and its Mission

As part of the Department of the Interior, the Service administers the Refuge System. The Service mission is, “Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.”

Congress entrusts to the Service the conservation and protection of the following national natural resources:

- Migratory birds and fish
- Federally listed, endangered or threatened species
- Interjurisdictional fish
- Wetlands
- Certain marine mammals
- National wildlife refuges

The Service also enforces Federal wildlife laws and international treaties on importing and exporting wildlife, assists states with their fish and wildlife programs, and helps other countries develop conservation programs.

The Service Manual (USFWS 2010) contains the standing and continuing directives on implementing our authorities, responsibilities, and activities. The Service publishes special directives that affect the rights of citizens or the authorities of other agencies separately in the Code of Federal Regulations (CFR); the Service Manual does not duplicate them (see 50 CFR 1–99 at: <http://www.gpoaccess.gov/cfr/index.html>; accessed January 2012).

The National Wildlife Refuge System and its Mission and Policies

The Refuge System is the world’s largest network of lands and waters set aside specifically for the conservation of wildlife and the protection of ecosystems. More than 550 national wildlife refuges encompass more than 150 million acres of lands and waters in all 50 States and several island territories. Each year, more than 40 million visitors hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretation on refuges (Carver and Caudell 2007).

In 1997, President Clinton signed into law the National Wildlife Refuge System Improvement Act (Public Law 105-57; 111 Stat. 1253) amending the Refuge Administration Act (see Introduction of this chapter). The Refuge Improvement Act establishes the following unifying mission for the Refuge System:

“The mission of the [Refuge] System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (Refuge Improvement Act; Public Law 105–57).

It also establishes a new process for determining compatibility of public uses on refuges, and requires the Service to prepare a CCP for each refuge. The Refuge Improvement Act states that the Refuge System must focus on wildlife conservation and that the mission of the Refuge System, coupled with the purpose(s) for which each refuge was established, will provide the principal management direction on that refuge.

The U.S. Refuge System Manual (Refuge Manual) contains policy governing the operation and management of the Refuge System that the Service Manual does not cover, including technical information on implementing refuge policies and guidelines on enforcing laws. The Service is in the process of updating and transferring the policies and guidance in the Refuge Manual into the Service Manual. While many of these policies are in the Service Manual, some have not been transferred yet and are still recorded in the Refuge Manual (USFWS 1989). The Refuge Manual is not available online, but can be viewed at refuge headquarters. Following are a few noteworthy policies instrumental in developing this draft CCP/EA.

Policy on the National Wildlife Refuge System Mission, Goals, and Purposes

This policy (601 FW 1) sets forth the Refuge System mission noted above, how it relates to the Service mission, and explains the relationship of the Refuge System mission and goals, and the purpose(s) of each unit in the Refuge System. In addition, it identifies the following Refuge System goals:

- Conserve a diversity of fish, wildlife, and plants.
- Develop and maintain a network of habitats.
- Conserve those ecosystems, plant communities, and wetlands that are unique within the United States.
- Provide and enhance opportunities to participate in compatible, wildlife-dependent recreation.
- Help to foster public understanding and appreciation of the diversity of fish, wildlife, and plants and their habitats.

This policy also establishes the following management priorities for the Refuge System:

- Conserve fish, wildlife, and plants and their habitats.
- Facilitate compatible wildlife-dependent recreational uses.
- Consider other appropriate and compatible uses.

Policy on Refuge System Planning

This policy (602 FW 1, 2, 3) establishes the requirements and guidance for Refuge System planning, including CCPs and step-down management plans. It states that the Service will manage all refuges in accordance with an approved CCP that, when implemented, will help

- achieve refuge purposes;
- fulfill the Refuge System mission;
- maintain and, where appropriate, restore the ecological integrity of each refuge and the Refuge System;
- achieve the goals of the National Wilderness Preservation System (NWPS) and the National Wild and Scenic Rivers System (NWSRS); and,
- conform to other applicable laws, mandates, and policies.

This planning policy provides step-by-step directions and identifies the minimum requirements for developing all CCPs. Among them, the Service is to review any existing special designation areas such as wilderness and wild and scenic rivers, specifically address the potential for any new special designations, conduct a wilderness review, and incorporate a summary of that review into each CCP (602 FW 3). We include the wilderness review for John Heinz NWR as appendix G to this draft CCP/EA.

Policy on the Appropriateness of Refuge Uses

Federal law and Service policy provide the direction and planning framework for protecting the Refuge System from inappropriate, incompatible or harmful human activities and ensuring that visitors can enjoy its lands and waters. This policy (603 FW 1) provides a national framework for determining appropriate refuge uses to prevent or eliminate those that should not occur in the Refuge System. It describes the initial decision process the refuge manager follows when first considering whether to allow a proposed use on a refuge. An appropriate use must meet at least one of the following four conditions:

- (1) The use is a wildlife-dependent recreational use as identified in the Refuge Improvement Act.
- (2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Refuge Improvement Act became law.
- (3) The use follows state regulations for the take of fish and wildlife.
- (4) The use has been found to be appropriate after concluding a specified findings process using 10 criteria.

We include the findings of appropriateness for John Heinz NWR in appendix B to this draft CCP/EA.

Policy on Compatibility

This policy (603 FW 2) defines a compatible use as a use “that will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge.” The compatibility policy complements the appropriateness policy. Once a refuge manager finds a use appropriate, they conduct a further evaluation through a compatibility determination assessment. We include the compatibility determinations completed for those public uses determined to be appropriate for John Heinz NWR as appendix B to this draft CCP/EA.

The policy provides guidelines for determining compatibility of uses and procedures for documentation and periodic review of existing uses. Highlights of this guidance follows:

- The Refuge Improvement Act and its regulations require an affirmative finding by the refuge manager on the compatibility of a public use before the Service allows it on a refuge.
- The refuge manager may authorize those priority uses on a refuge when they are compatible and consistent with public safety.
- There are six wildlife-dependent recreational uses that are to receive enhanced consideration on refuges: hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

- When the refuge manager publishes a compatibility determination, it will stipulate the required maximum reevaluation dates: 15 years for wildlife-dependent recreational uses and 10 years for other uses. However, the refuge manager may reevaluate the compatibility of a use at any time: for example, sooner than its mandatory date if new information reveals unacceptable impacts or incompatibility with refuge purposes (603 FW 2.11, 2.12).
- The refuge manager may allow or deny any use, even one that is compatible, based on other considerations such as public safety, policy, or available funding.

Policy on Wildlife-dependent Public Uses

This policy (605 FW 1) presents specific guidance on implementing management of the priority public uses. This policy defines a quality, wildlife-dependent recreational program as a one that

- (1) promotes safety of participants, other visitors, and facilities;
- (2) promotes compliance with applicable laws and regulations and responsible behavior;
- (3) minimizes or eliminates conflict with fish and wildlife population or habitat goals or objectives in an approved plan;
- (4) minimizes or eliminates conflicts with other compatible, wildlife-dependent recreational uses;
- (5) minimizes conflicts with neighboring landowners;
- (6) promotes accessibility and availability to a broad spectrum of the American people;
- (7) promotes resource stewardship and conservation;
- (8) promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources;
- (9) provides reliable and reasonable opportunities to experience wildlife;
- (10) uses facilities that are accessible to people and blend into the natural setting; and
- (11) uses visitor satisfaction to help to define and evaluate programs.

Policy on Maintaining Biological Integrity, Diversity, and Environmental Health

This policy (601 FW 3) provides guidance on maintaining and restoring the biological integrity, diversity, and environmental health of the Refuge System, including the protection of a broad spectrum of fish, wildlife, and habitat resources in refuge ecosystems. It provides refuge managers with a process for evaluating the best management direction to prevent the additional degradation of environmental conditions and restore lost or severely degraded components of the environment. It also provides guidelines for dealing with external threats to the biological integrity, diversity, and environmental health of a refuge and its ecosystem.

Other Mandates

Although Service and Refuge System policy and the purpose(s) of each refuge provide the foundation for its management, other Federal laws, executive orders, treaties, interstate compacts, and regulations on conserving and protecting natural and cultural resources also affect how the Service manages refuges. The "Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service" describes many of them at: <http://www.fws.gov/laws/Lawsdigest.html> (accessed January 2012).

Of particular note are the Federal laws that require the Service to identify and preserve its important historic structures, archaeological sites, and artifacts. NEPA mandates our consideration of cultural resources in planning Federal actions. The Refuge Improvement Act requires the CCP for each refuge to identify its archaeological and cultural values. Following is a highlight of some cultural and historic resource protection laws which relate to the development of CCPs.

The Archaeological Resources Protection Act (ARPA) (16 U.S.C. 470aa–470ll; P.L. 96–95) approved October 31, 1979 (93 Stat. 721), largely supplanted the resource protection provisions of the Antiquities Act of 1906 for archaeological items. ARPA establishes detailed requirements for issuance of permits for any excavation or removal of archaeological resources from Federal or Native American lands. It also establishes civil and criminal penalties for the unauthorized excavation, removal, or damage of those resources; for any trafficking in those removed from Federal or Native American land in violation of any provision of Federal law; and for interstate and foreign commerce in such resources acquired, transported, or received in violation of any state or local law.

The Archeological and Historic Preservation Act (AHPA) (16 U.S.C. 469–469c; P.L. 86–523,) approved June 27, 1960 (74 Stat. 220), as amended by P.L. 93–291, approved May 24, 1974 (88 Stat. 174), carries out the policy established by the Historic Sites, Buildings and Antiquities Act (see below). It directs Federal agencies to notify the Secretary of the Interior whenever they find that a Federal or federally assisted licensed or permitted project may cause the loss or destruction of significant scientific, prehistoric, or archaeological data. The act authorizes the use of appropriated, donated, or transferred funds for the recovery, protection, and preservation of that data.

The Historic Sites, Buildings and Antiquities Act (Historic Sites Act) (16 U.S.C. 461–462, 464–467; 49 Stat. 666) of August 21, 1935, as amended by P.L. 89–249, approved October 9, 1965 (79 Stat. 971), declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provides procedures for designating, acquiring, administering, and protecting them. Among other things, National Historic and Natural Landmarks are designated under the authority of this act.

The National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470–470b, 470c–470n), P.L. 89–665, approved October 15, 1966 (80 Stat. 915), and repeatedly amended, provides for the preservation of significant historical features (buildings, objects, and sites) through a grant-in-aid program to the states. It establishes a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468–468d). This act establishes an Advisory Council on Historic Preservation, which became a permanent, independent agency under P.L. 94–422, approved September 28, 1976 (90 Stat. 1319). The act also created the Historic Preservation Fund. It directs Federal agencies to take into account the effects of their actions on items or sites listed or eligible for listing on the National Register of Historic Places.

The Service also has a mandate to care for museum properties it owns in the public trust. The most common are archaeological, zoological, and botanical collections, and historical photographs, objects, and art. Each refuge maintains an inventory of its museum property. Our museum property coordinator in Hadley, Massachusetts, guides the refuges in caring for that property, and helps us comply with the Native American Grave Protection and Repatriation Act (P.L. 101-601) and Federal regulations governing Federal archaeological collections.

This program ensures that those collections will remain available to the public for learning and research.

Other Federal resource laws are also important to highlight as they are integral to developing a CCP. The Wilderness Act of 1964 (16 U.S.C. 1131–1136; P.L. 88–577) establishes the NWPS that is composed of federally owned areas designated by Congress as “wilderness areas.” The act directs each agency administering designated wilderness to preserve the wilderness character of areas within the NWPS, and to administer the NWPS for the use and enjoyment of the American people in a way that will leave those areas unimpaired for future use and enjoyment as wilderness. The act also directs the Secretary of the Interior to review every roadless area of 5,000 acres or more and every roadless island (regardless of size) within the Refuge System and National Park System (NPS) for inclusion in the NWPS. Service planning policy requires that the Service evaluate the potential for wilderness on refuge lands, as appropriate, during the CCP planning process. We include the wilderness review for John Heinz NWR as appendix G to the draft CCP/EA.

The Wild and Scenic Rivers Act of 1968 (P.L. 90-542; 16 U.S.C. 1271 *et seq.*), as amended, selects certain rivers of the nation possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values; preserves them in a free-flowing condition; and protects their local environments. Service planning policy requires that the Service evaluate the potential for wild and scenic rivers designation on refuge lands, as appropriate, during the CCP planning process. We include the wild and scenic rivers review for John Heinz NWR as appendix H to this draft CCP/EA.

1.4 Refuge Establishing Purposes

John Heinz NWR was established in 1972, under special legislation, for the following purpose:

- “Preserving, restoring, and developing the natural area known as Tinicum Marsh....a wildlife interpretative center for the purpose of promoting environmental education, and to afford visitors an opportunity for the study of wildlife in its natural habitat.” (86 Stat. 891, dated June 30, 1972).

Some additional refuge lands were acquired under the following authorities:

- To be of “particular value in carrying out the national migratory bird management program.” 16 U.S.C. §667b (An Act Authorizing the Transfer of Certain Real Property for Wildlife).
- “Development, advancement, management, conservation, and protection of fish and wildlife resources...(16 U.S.C. §742f (a)(4))...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services....” 16 U.S.C. §742f(b)(1) (Fish and Wildlife Act of 1956).
- “[F]or use as an inviolate sanctuary, or for any other management purpose, for migratory birds....” 16 U.S.C. §715d (Migratory Bird Conservation Act).

1.5 Conservation Plans and Initiatives Guiding the Proposed Action

Important guidance for habitat management and visitor service management at John Heinz NWR has already been provided by a series of refuge-specific, State, regional, and national plans and their priorities.

Regional and National Plans and Initiatives

Refuge System Visioning: Fulfilling the Promise, Conserving the Future
The 1999 report, “Fulfilling the Promise, The National Wildlife Refuge System: Visions for Wildlife, Habitat, People and Leadership” (USFWS 1999), was the culmination of a year-long process by teams of Service employees to create a

Refuge System vision. This report was a result of the first-ever Refuge System Conference held in Keystone, Colorado, in October 1998. It was attended by every refuge manager in the country, other Service employees, and scores of conservation organizations. The report contains 42 recommendations organized under 3 vision statements relating to wildlife and habitat, people, and leadership. We have often looked to these recommendations while writing this draft CCP/EA. For example, the 1999 report recommends forging new alliances through citizen and community partnerships, and strengthening partnerships with the business community. One of the goals in our CCP is devoted to the development of community partnerships, while several of our strategies focus on forging new partnerships or strengthening existing ones.

The Refuge System's "Conserving the Future" conference was convened in July 2011 to renew and update the 1999 vision. It began with a draft vision document. Over the course of the conference, the Service collected both online and in-person feedback which was used to revise and finalize the draft vision. The Service finalized the "Conserving the Future" vision document in October 2011 (USFWS 2011). The document has 20 recommendations, including one focusing on urban refuges. Currently, implementation teams are developing strategies to help us accomplish the vision. We will incorporate implementation strategies for this recommendation and the others, as appropriate, in our step-down plans and refuge programs.

North Atlantic Landscape Conservation Cooperative Operations Plan (USFWS 2009a)

The Service is developing a coordinated network of landscape conservation cooperatives (LCCs) across the United States to address major environmental and human-related factors that limit fish and wildlife populations at the broadest of scales, including developing adaptation strategies in response to climate change. John Heinz NWR is located in the North Atlantic LCC, which is currently using the principles of strategic habitat conservation (SHC) to develop and communicate landscape-scale scientific information to shape conservation across the northeastern United States. The North Atlantic LCC's Operations Plan outlines the regional threats to conservation, priority species, and habitats, as well as active regional partnerships.

Mid-Atlantic Coast Bird Conservation Region Implementation Plan (USFWS 2008a)

The implementation plan for the Mid-Atlantic Coast Bird Conservation Region (BCR 30) combines regional plans, assessments, and research completed over the past two decades to develop continental-based bird conservation efforts. John Heinz NWR is located within the narrow portion of the Mid-Atlantic Coastal Plain in southeastern Pennsylvania. As such, this coastal zone is unique to the State of Pennsylvania and thus many of the priority species listed for BCR 30 are also species of concern listed within the Pennsylvania Wildlife Action Plan. These rankings and the recommendations of the inventory have been considered along with other local and regional conservation priorities.

A Natural Heritage Inventory of Philadelphia County, Pennsylvania (PNHP 2008)

The Philadelphia County Natural Heritage Inventory was compiled by the Pennsylvania Department of Conservation and Natural Resource's (PADCNR) Natural Heritage Program (PNHP) and the Western Pennsylvania Conservancy. It provides information on the general locations of rare, threatened, and endangered species and the highest quality natural areas in the county, and identifies areas in need of restoration. PNHP also provides State conservation rankings for each species of conservation concern in Pennsylvania. These rankings and the recommendations of the inventory have been considered along with other local and regional conservation priorities.

Pennsylvania Wildlife Action Plan (PGC and PFBC 2008)

The State Wildlife Action plan was completed in 2005 and updated in 2008 (Pennsylvania Game Commission (PGC) and Pennsylvania Fish and Boat Commission (PFBC) 2008). While creating a strategic focus for State fish and wildlife management agencies, this plan attempts to provide a Statewide perspective on conservation by presenting geographic, species, and habitat priorities. Considering John Heinz NWR's protection of habitats unique to the State of Pennsylvania, species of conservation priority were considered in development of the refuge's resources of concern.

USFWS Migratory Bird Program Strategic Plan (USFWS 2004)

The Migratory Bird Program Strategic Plan provides direction for the Services' migratory bird management over the next decade (2004 to 2014). The plan contains a vision and recommendations for the Refuge System's place in bird conservation. It defines strategies for the Service, including the Refuge System, to actively support bird conservation through monitoring, conservation, consultation, and recreation. The refuge's draft Habitat Management Plan (HMP), to the extent practical, uses standard monitoring protocols, habitat assessment and management, and promotes nature-based recreation and education to forward the vision of the Migratory Bird Program Strategic Plan.

USFWS Birds of Conservation Concern (USFWS 2008b)

The USFWS Birds of Conservation Concern (BCC) report identifies the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the Service's highest conservation priorities and draws attention to species in need of conservation action. The plan's geographic scope includes the United States, including the island territories in the Pacific Ocean and Caribbean. Bird species considered for inclusion on lists in this report include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska, and Endangered Species Act candidate, proposed endangered or threatened, and recently delisted species. Assessment scores are based on several factors, including population trends, threats, distribution, abundance, and area importance.

Wildlife Habitat in Pennsylvania, Past, Present, and Future (PADCNR 2001)

Today, the PADCNR ranks coastal plain habitats as "impaired." The coastal plain region of Pennsylvania includes some of the last remaining habitats for certain wetland species in the State. The 2001 PADCNR report *Wildlife Habitat in Pennsylvania, Past, Present, and Future*, recommends that where possible, wetlands along the Delaware River should be restored. The plan recommends urban forest management to provide habitat for some tolerant forest wildlife. The reduction of runoff into streams and wetlands is also noted as a top priority, along with restoration of natural communities in undeveloped areas.

Bird Conservation Plan for the Mid-Atlantic Coastal Plain (Physiographic Area 44) (PIF 1999)

Partners in Flight (PIF) is a partnership of government agencies, private organizations, academic researchers, and private industry throughout North America focused on coordinating voluntary bird conservation efforts to benefit species at risk and their habitats. BCRs have been developed to guide management on a regional scale. Version 1.0 of the Mid-Atlantic Coastal Plain BCR Plan was completed in 1999. John Heinz NWR is located within this physiographic province and thus is considering the conservation priorities of this plan along with other conservation plans.

Delaware Estuary Comprehensive Conservation Management Plan (DEP 1996)

The Delaware Estuary is faced with continuing threats from toxic substances, habitat loss and fragmentation, and human development. To help address

these threats, the Delaware Estuary Program worked with many partners to develop the Comprehensive Conservation and Management Plan (CCMP) for the Delaware Estuary (DEP 1996). The CCMP is a comprehensive document describing the existing conditions of the Delaware Estuary and providing seven action plans (land management, water use management, habitat and living resources, toxics, education and involvement, and monitoring) and an implementation plan. While the Delaware Estuary Program has since merged with the Partnership for the Delaware Estuary, this reorganized entity is still active and is now responsible for addressing the various actions identified in the CCMP. We used this plan as a reference in developing habitat management and land protection planning objectives.

Refuge-specific Plans

We consulted a number of other refuge-specific plans in either their draft or final format to help guide decisionmaking. These plans will also be maintained and updated as necessary to maintain accordance with the recommendations of the CCP.

John Heinz National Wildlife Refuge at Tinicum Draft Habitat Management Plan (Appendix C)

The refuge's draft HMP (appendix C) proposes a long-term vision and specific guidance on managing the habitats for the indentified resources of concern at John Heinz NWR. The plan provides direction for the next 15 years. Subsequent reviews every 5 years and use of adaptive management will assess and modify management activities as research, monitoring, and priorities require. This plan will be finalized upon final approval of the CCP.

Draft White-tailed Deer Management Plan for John Heinz National Wildlife Refuge at Tinicum (D'Angelo 2011)

Refuge staff consulted with U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services to study the refuge's deer population and its impacts on refuge habitats, wildlife, and humans. The purpose of the deer management plan is to institute a biologically sound program to efficiently manage the deer population within a sustainable and healthy balance within the habitat and objectives of the refuge. This plan will be finalized upon final approval of the CCP.

Visitor Service Review (VanBeusichem et al. 2009)

A Service-based review team assessed the public use issues, opportunities, and facilities available at John Heinz NWR in preparation of the refuge's comprehensive conservation planning process and to develop recommendations to improve the quality of the refuge's visitor services program. The Visitor Services Review recommendations are used as a stepping-off point for visitor services planning. We used its recommendations to help develop goals, objectives, and strategies for refuge visitor services planning.

Restoration Management Plan for the Lower Darby Creek with Recommendations for the John Heinz National Wildlife Refuge at Tinicum (Salas et al. 2006)

This restoration management plan was developed in 2006 by Delaware Riverkeeper Network under a Delaware Estuary Grant awarded to the Friends of the Heinz Refuge and funded by the National Fish and Wildlife Foundation. The purpose of this plan was to initiate an ecological restoration approach to habitat management at the refuge. This plan identified historic disturbances to the site, the ecological communities existing at the refuge, and provided recommendations for the restoration of a more natural ecological composition, structure, and function to these communities. The extensive field and Geographic Information System (GIS) data, along with historic records and information compiled as part of this plan, were used heavily in the development of the Draft HMP.

Pennsylvania Important Bird Area #73: Phase I Conservation Plan (Cohen and Johnson 2004)

John Heinz NWR was designated as an Important Bird Area (IBA) by the National Audubon Society because of its critical location within the Atlantic Flyway and its complex of unique habitats. This plan identifies habitat-based site boundaries, describes the birds and wildlife habitat which occur on the site with special reference to the species for which the site was selected as an IBA, identifies conservation issues and threats to the site, and provides recommendations for conservation actions. Its conservation recommendations are being considered with those of other refuge and regional plans.

Step-down Plans

The Service Manual's refuge planning policy (602 FW 4) identifies more than 25 step-down management plans that may be completed for each refuge. Those plans provide the details necessary to "step-down" general goals and objectives to specific strategies and implementation schedules. Some require annual revisions, while others are revised every 5 to 10 years. Some require additional NEPA analysis, public involvement, and compatibility determinations before they can be implemented. The following is a list of step-down plans we anticipate needing for John Heinz NWR. Some of these plans are already completed, others have been released in draft form, and some have yet to be drafted.

- Annual Habitat Work Plan (most recently completed 2010, updated annually)
- Wildlife Disease Surveillance and Contingency Plan (completed 2006)
- Fire Management Plan (completed 2006, updated annually)
- Visitor Services Plan (currently in draft form, to be finalized in 2011)
- Law Enforcement Plan (currently in draft form, to be finalized in 2011)
- Hurricane Action Plan (completed 2010, updated annually)
- Energy Management Plan (completed 2003, updated annually)
- Safety Plan (completed 2010, updated annually)
- Fishing Plan (to be completed within 3 years of CCP approval)
- Deer Management Plan (currently in draft form, to be finalized within 1 year of CCP approval)

1.6 Refuge Vision

The planning team developed the following vision statement to provide a guiding philosophy and sense of purpose in the CCP.

John Heinz National Wildlife Refuge at Tinicum is a green respite nestled within the urban setting of the city of Philadelphia. Refuge lands are a thriving sanctuary teeming with a rich diversity of fish, wildlife, and plants native to the Delaware Estuary. Healthy and productive expanses of freshwater tidal marsh, open waters, mudflats, and forests support the hundreds of species that breed, rear their young, rest during migration, and call the refuge home year-round.

With partners' support, the refuge leads by example in the restoration and conservation of freshwater tidal marsh within the Delaware Estuary. Also, given its accessibility and visibility to over 35 million Americans living within a 2-hour drive, the refuge serves as a prominent ambassador of the National Wildlife Refuge System. Its high-quality programs promote natural and cultural resource

stewardship, demonstrate the conservation of urban wildlife habitat, encourage compatible outdoor public use, and serve as a living classroom to connect people with nature and local history. Those who visit John Heinz National Wildlife Refuge are inspired to take action to improve the quality of life for themselves and those around them.

1.7 Refuge Goals

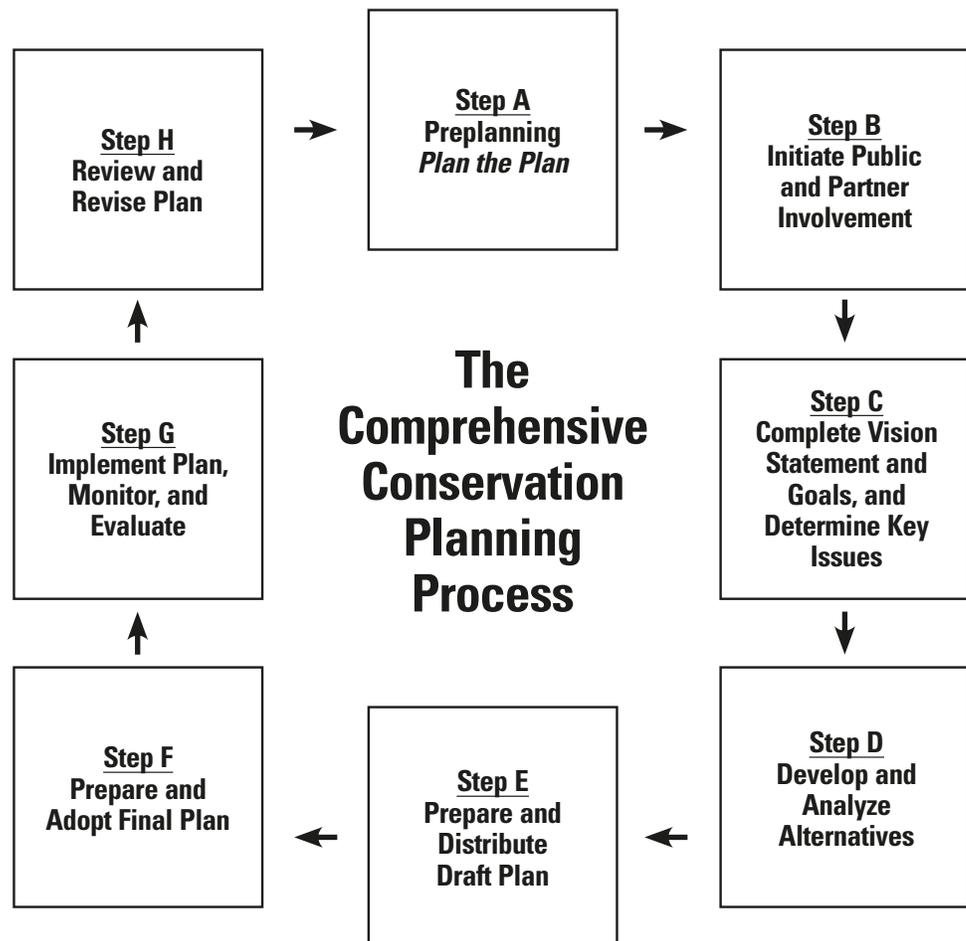
As we introduced earlier in this chapter, the planning team developed six goals (see section 1.2) after considering the vision statement, the purposes for establishing the refuge, the missions of the Service and the Refuge System, and the mandates, plans, and conservation initiatives noted above. These goals are intentionally broad, descriptive statements of purpose. They highlight elements that we will emphasize in its future management.

1.8 The Comprehensive Conservation Planning Process

Service policy (602 FW 3) establishes an eight-step planning process that also facilitates compliance with NEPA (see figure 1.1). The full text of the policy and a detailed description of the planning steps can be viewed at: <http://policy.fws.gov/602fw3.html> (accessed January 2012). The specific process implemented by John Heinz NWR's planning team in developing this draft CCP/EA is described below.

Since 1972, we have focused on conserving lands within the approved refuge boundary; facilitating wildlife-dependent public uses; managing habitat for several focal species, such as waterfowl and waterbirds; and establishing relationships with the community and our partners.

Figure 1.1. The Comprehensive Conservation Planning Process



Steps in the Planning Process

Step A: Initial Planning

We began formally developing a CCP on January 21, 2010, during a conference call between refuge staff, Regional Office staff, and planning contractors. One of the major outcomes of the meeting was a timetable for accomplishing the major steps in the planning process. Initially, we focused on collecting information on the refuge's natural and cultural resources and public use program. The CCP core team of refuge and Regional Office staff and a representative from PGC started meeting to discuss existing information, draft a vision statement, and prepare for the public scoping meeting and a technical meeting of State and Federal partners.

Step B: Public Scoping

The process seeking public involvement officially began in early April 2010, when the planning team distributed a newsletter to approximately 377 individuals, organizations, and agencies announcing the planning process and public scoping period. A press release announcing the public scoping meeting and requesting public input was distributed to major media outlets on April 22, 2010. Next, the Notice of Intent (NOI) to prepare a CCP was published in the *Federal Register* on Friday, May 7, 2010 (75 FR 25285).

Scoping activities in May 2010 included two public scoping meetings which were held at the visitor center on May 11, 2010. The meetings included a total of 24 attendees, including 17 attendees from the public and 7 members of refuge and planning staff. The meetings were held in an open house format with brief presentations on the refuge and CCP process status, followed by a question and answer session and informal discussion to identify issues and concerns. The planning team provided displays of the refuge context, habitat management units, visitor services and facilities, the past and planned marsh restoration projects, and handouts on the draft vision and goals.

The public scoping comment period ended on June 11, 2010. On June 21, 2010, the planning team discussed the major issues identified in the agency and public scoping meetings. A second newsletter was developed by the planning team to inform interested individuals, organizations, and agencies about the range of issues identified throughout the scoping process. The newsletter was sent to approximately 432 individuals, organizations, and agencies.

Steps C and D: Vision, Goals, and Alternatives Development

On February 19, 2010, invitations for the interagency scoping meeting were sent to 55 Federal and State contacts, elected officials, and 13 contacts from federally recognized Tribes associated with Pennsylvania, Delaware, and New Jersey. On March 29, 2010, the planning team met at the visitor center to finalize the draft vision and goals and coordinate agency scoping meeting logistics.

The agency scoping meeting was held on Wednesday, March 31, 2010, at the refuge's visitor center and included 26 attendees, including 13 contacts from partner agencies, 3 Service staff from Ecological Services, and 10 refuge and planning staff members. The meeting was held in a workshop-style format with brief presentations on the refuge and CCP process status; displays of the refuge context, habitat management units, visitor services, and facilities; and handouts on the draft vision and goals. We continued to consult with experts throughout 2010 and 2011, and to meet regularly as a core team, as we developed and refined our alternatives.

Step E: Draft CCP and NEPA Document

This draft CCP/EA represents planning step E to prepare a draft plan and NEPA document. We will publish a Notice of Availability in the *Federal Register*

announcing our release of this draft for a 30-day period of public review and comment. During the comment period, we will also hold one or more public meetings to obtain comments directly from individuals. We expect to receive comments by regular mail, e-mail, or at the public meeting. After the comment period ends, we will review and summarize all of the comments received, develop our responses, revise the CCP as warranted based on the comments, and publish the comments and our responses in an appendix to the final CCP.

Step F: Adopt Final Plan

Once we have prepared the final CCP, we will submit it to our Regional Director for approval. The Regional Director will determine whether it warrants a Finding of No Significant Impact (FONSI), and may find this document's analysis sufficient to simultaneously issue a decision adopting a CCP. If the Regional Director has concerns, we may be required to revise the EA or complete an environmental impact statement (EIS). We will announce the final decision by publishing a Notice of Availability in the *Federal Register*, where we will also notify people of the availability of the final CCP. That will complete planning step F to prepare and adopt a final plan.

Step G and H: Implement, Evaluate, and Revise the Plan

With the planning phase of the CCP process complete, “Step G: Implement Plan, Monitor and Evaluate” will begin. Periodic review of the CCP will be required to ensure that objectives are being met and management actions are being implemented. Ongoing monitoring and evaluation will be an important part of this process. Monitoring results or new information may indicate the need to change our strategies.

As part of “Step H: Review and Revise Plan,” the Service will modify or revise the final CCP, as warranted, following the procedures in Service policies 602 FW 1, 3, and 4 and the NEPA requirements. Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3C) will require only an environmental action memorandum. As the Refuge Improvement Act and Service policy stipulate, the Service will review and revise the CCP at least every 15 years.

Issues, Concerns, and Opportunities

The Service defines an issue as “any unsettled matter requiring a management decision” (USFWS 2010). Issues can include an “initiative, opportunity, resource management problem, threat to a resource, conflict in use, or a public concern.” Issues arise from many sources, including refuge staff; other Service programs; other Federal, state, local, and Tribal agencies; Congress; or our partners, neighbors, and user groups. One of the distinctions among the proposed management alternatives is how each addresses those issues.

From agency and public meetings and planning team discussions, we developed a list of issues, concerns, opportunities, and other items requiring a management decision. We placed them in two categories: key issues and issues outside the scope of this analysis and the EA.

Key issues—Key issues are those the Service has the jurisdiction and authority to resolve. The key issues, together with refuge goals, form the basis for developing and comparing the different management alternatives we analyze in chapter 3. The varying alternatives were generated by the wide-ranging opinions on how to address key issues and conform with the goals and objectives. We describe them in detail below.

Issues and concerns outside the scope of this analysis—These topics fall outside the jurisdiction and authority of the Service or were deemed impractical. We discuss them after “Key Issues” below, but this plan does not address them further.

The following summary provides a context for the issues that arose during the scoping process.

Key Issues

We derived the following key issues from public and partner meetings and planning team discussions. How they are addressed and how well they support refuge goals primarily distinguishes the three management alternatives in chapter 3.

Biological Management

For national wildlife refuges, the conservation of wildlife and habitats is the highest priority, and serves as the foundation for all that the Service does. Many refuges were established for a very specific purpose, such as protecting a particular species or habitat. John Heinz NWR has specific purposes mandating the preservation and restoration of Tinicum Marsh, as well as development of the refuge as an environmental education center.

Protection and restoration of coastal plain wetlands and their associated species on the refuge is an important issue addressed in this draft CCP/EA. The planning team received many opinions on specific actions or techniques to accomplish that endeavor. Some suggestions and actions fall outside Service jurisdiction. Some are best accomplished in partnership with other Federal or state agencies, or non-governmental organizations.

Specific questions asked regarding the topic of biological management, include:

(1) *How will the refuge accommodate potential impacts of climate change on existing refuge habitats?*

Climate change and its corresponding effects on sea level rise, species migrations, extreme shifts in temperature and precipitation, historic species range distributions, and invasive species introductions may pose dramatic threats and alterations to the habitats encompassed within the refuge and the world. The ability to adapt to or address these ever-changing concerns requires a comprehensive understanding of the refuge's landscape context, individual habitats, species utilization, and their resilience.

John Heinz NWR is located at or near sea level and is subject to tidal hydrology across much of its lands. We are evaluating potential changes caused by rising sea levels. We have analyzed the affect of sea level rise on refuge habitats through the use of a Sea Level Affecting Marshes Model (SLAMM) analysis originally completed in 2009, and recently refined in December 2010. We include the SLAMM analysis as appendix J to this draft CCP/EA. We also discuss the results of the analysis in chapter 2 and explain how the refuge will respond to its implications in chapter 3 under goal 1 for each alternative.

(2) *How will the refuge work to improve its biological connectivity with other habitats throughout the region?*

Fragmentation of both terrestrial and aquatic habitats can have adverse effects on many plant, fish, and wildlife species by reducing biodiversity, limiting genetic diversity, and increasing susceptibility to species invasion and other stressors.

The refuge is a biological oasis in an intensely urbanized landscape. As a result, except for a few rivers, streams, and riparian lands, few opportunities remain for improving biological connections to adjacent habitats. Most lands providing optimal connection to adjacent habitats are located outside refuge lands and require extensive landowner or partner coordination.

We envision working with a variety of partnerships with Federal, state, and non-governmental organizations to address biological connectivity to the refuge. We discuss how the refuge will respond to connectivity needs in chapter 3 under goals 1 and 2 for each alternative.

(3) *How will the refuge continue to fulfill its original mandated purpose to protect Tinicum Marsh and conserve freshwater tidal marsh it encompasses?*

Several questions and comments from state and Federal agencies focused on the refuge's protection of the original remnant of Tinicum Marsh, as well as expanding the freshwater tidal marsh through restoration of additional lands that were historically marsh.

Restoration of freshwater tidal marshes on other parts of the refuge through the removal of former fill material is a complex undertaking. Considerations of soil composition (including potential contaminants), surface elevations, hydrologic conditions, species establishment, and long-term maintenance are all necessary for successful restoration. Climate change impacts, such as sea level rise, increase the complexity for future tidal marsh restoration projects. These projects are also costly due to the equipment, duration, regulatory requirements, and complexities required in construction. Many areas of former tidal marsh have been altered and now encompass open water areas or forested habitats.

Identifying the ideal location and conditions for tidal marsh restoration, and evaluating their existing versus future potential in light of existing habitats and threats from climate change, will be necessary to ensure cost-effective and successful results. We discuss how the refuge will respond to concerns related to freshwater tidal marsh conservation and restoration needs in chapter 3 under goal 1 for each alternative.

(4) *How will the refuge manage invasive, nonnative, and overabundant species?*

Invasive plant species threaten refuge habitats by displacing native plant and animal species, degrading wetlands and other natural communities, and reducing natural diversity and wildlife habitat values.

Climate change may also result in a shift of species distributions or conditions across the region that may allow introduction of additional species in the future. Prioritization and management of invasive species should be put in context with other regional efforts to be most effective, but is compounded by limits on staff and resources available to implement treatments against invasive species.

Native species can also adversely affect natural biological diversity when they become overabundant. Numerous Federal and state agency partners noted the importance of managing and controlling both invasive, nonnative species and overabundant native species. Our response to these concerns is discussed in chapter 3 under goals 1 and 2 for each alternative.

(5) *How will the refuge manage its 145-acre impoundment?*

Impoundments are confined bodies of water. The refuge has one large impoundment with a water control structure (WCS) totaling approximately 145 acres and two small impoundments without water control structures totaling approximately 20 acres. Natural changes in water levels can occur from rainfall

and natural springs. Water levels in the impoundment with a water control structure can be altered by inserting or removing boards that either release water or allow tidal water to flow into the impoundment. Changes in water levels during specific times of the year provide habitat and food for an array of wildlife including shorebirds, wading birds, and waterfowl.

The 145-acre open water impoundment is the most accessible area for public observation of wildlife and a focal point for many refuge visitors. It provides a combination of habitats for migratory birds, and supplementary habitat for rare species of reptiles and amphibians. Water level management is difficult due to groundwater elevations, stormwater inputs, the staff resources required, and the capacity, design, and location of the control structures. Some recommendations have been made to restore part or all of the impoundment to freshwater tidal marsh as well as maintain it as open water, but with fluctuating (possibly tidal) hydrology. Our response to these concerns is discussed in chapter 3 under goals 1 and 2 for each alternative.

(6) How will the refuge address contaminants and other environmental hazards that may adversely affect wildlife and other resources on the refuge?

Polychlorinated biphenyls (PCB's), polycyclic aromatic hydrocarbons (PAH's), and other toxic hazards are known to occur within refuge lands and waters, posing a health risk to fish and wildlife species using the refuge. These compounds affect fish and wildlife by causing reproductive abnormalities, increasing embryonic mortality, increasing physical abnormalities, and decreasing immune system response.

The Lower Darby Creek Remedial Area is a designated Superfund site that consists of two closed landfills that pose these environmental health hazards to the refuge. The U.S. Environmental Protection Agency (USEPA), as a result of the Superfund designation, is leading the remediation efforts. One of these sites, Folcroft Landfill, is located on refuge property. This site is undergoing implementation of a long-term remediation strategy. Some concerns were voiced regarding the immediate and long-term effect of these compounds on fish and wildlife at the refuge. Our response to these concerns is discussed in chapter 3 under goals 1 and 2 for each alternative.

(7) What role will the refuge play in conservation throughout the Delaware Valley region?

The refuge, located within the city of Philadelphia and within an hour of four states (Pennsylvania, New Jersey, Delaware, and Maryland), has the potential to act as a regional portal for conservation. Its location and facilities can provide suitable accommodations for meetings, events, and other forums. Refuge staff has the potential to act as a clearinghouse of information related to issues facing the refuge and regional conservation community, such as tidal marsh restoration, deer management, public use effects and compatibility, and invasive species control. At the same time, the region is surrounded by many other organizations and agencies involved with fish and wildlife conservation. Defining our role in regional conservation is important to ensure the refuge protects those resources it can have the greatest impact on, minimizes duplication of efforts, and works with other organizations to achieve management goals. Several questions and comments were made asking us to consider various ways the refuge might embody a partnership or leadership role within regional conservation and associated issues. Our response to these concerns is discussed in chapter 3 under goals 1 through 5 for each of the alternatives.

Visitor Services

John Heinz NWR was created with the specific purpose of promoting environmental education, as well as wildlife observation. With limited land available to promote species and habitat conservation, providing appropriate and compatible public use is an important issue addressed within this draft CCP/EA. As with biological management, the issue of visitor services management encompasses a series of topics identified during the scoping process.

(1) *How will the refuge continue to fulfill its original mandated purpose to create an environmental education center; and what types of programming and target audience will the refuge provide?*

The refuge's location provides a great opportunity to introduce the public to the Service and Refuge System, and our role in conservation. With limited staff resources and several other environmental education providers within the region, identifying potential partnerships, the most receptive target audiences, and unique educational components is critical for providing the most effective environmental education opportunities at the refuge.

Several comments were received from agency staff and the public regarding environmental education at the refuge. Several commenters noted that the refuge needs to improve and focus educational programming to engage urban youth in and around the city of Philadelphia. Other recommendations included the need to improve and update refuge displays and expand offsite education, including new digital and interactive media technologies. Our response to these concerns is discussed in chapter 3 under goal 3 for each alternative.

(2) *What will the refuge do to improve its environmental interpretation, wildlife-dependent recreation, and compatible public uses?*

The refuge offers numerous opportunities for environmental interpretation by maintaining 10 miles of hiking trails, interpretive signs, displays, and kiosks, as well as sponsoring several public events focused on fish, wildlife, habitat, and their conservation. The majority of refuge visitors participate in self-guided interpretive or wildlife-oriented recreation, outside of planned programs and events.

Most refuge visitors access the refuge on foot for purposes of wildlife viewing, photography, fishing, environmental education programs, or exercise. Additional, but restricted, access is allowed for bicyclists and vehicles used by people with disabilities, where compatible with refuge management. Due to the location and surrounding urban context, there have been several requests to incorporate at least a portion of the refuge's trail system into local and regional bicycle trails. Recommendations have been made to improve access to the tidal marsh through new trails, viewing platforms, or shuttle buses as well as development of eco-tourism with nearby businesses. Determining what access is desired and compatible with the Refuge System mission, as well as feasible on the refuge, will be required to make the appropriate improvements to public accessibility.

We have also received requests to improve access and interpretive facilities at the refuge's west entrance near the SR420 entrance located in Delaware County (see map 1.3). With limited space and staff resources, identifying the most receptive target audiences and effective interpretive components are important for effectively accomplishing our goals for interpretation. Our response to these concerns and recommendations is discussed in chapter 3 under goals 4 and 5 for each of the alternatives.

(3) *What will the refuge do to educate the public about local cultural resources on or around the refuge?*

The refuge location and surrounding lands are significant not only from a natural resource standpoint, but also for cultural history. To date, the refuge has not incorporated many components of the regional cultural history into its education and interpretation. Opportunities to tie into the rich Philadelphia-area settlement history, Lenni-Lenape culture, as well as showcasing natural history topics, such as the changing history of conservation and attitudes towards wetlands, have been recommended for the refuge to consider incorporating into its public use programs. Historic and cultural programs can also attract a wider audience and can introduce new individuals to conservation and stewardship. Considering how, when, and what aspects of cultural history to incorporate into the refuge education and interpretation need to be defined in light of existing and proposed programs, their goals, and available resources. Our response to these concerns and recommendations is discussed in chapter 3 under goals 3 and 4 for each of the alternatives.

(4) *How will the refuge utilize partnerships with area agencies, businesses, and organizations to benefit resource conservation and visitation?*

Despite the focus of management on the refuge, there are many partners within the surrounding region that can complement or support refuge programs related to education, interpretation, biological management, and public use. The partnerships we develop can have lasting benefits to refuge resources and promoting the Refuge System mission. We continue to partner closely with the Friends of the Heinz Refuge to accomplish a variety of refuge goals related to biological management and environmental education and interpretation.

Several possibilities for partnerships and ways they may benefit the refuge were identified in comments from both agency partners and the public. Fostering transportation and tourism-based partnerships with Philadelphia International Airport, SEPTA, and the city of Philadelphia has potential to yield increases in visitors. The refuge was encouraged through public comment to cooperate and “cross-market” to audiences with other local and regional historic sites and conservation organizations to increase visitation. Participation and coordination with other local organizations and agencies can reduce duplicate efforts and enhance participation in events and programs. Identifying and developing partnerships throughout the region takes time and careful consideration to ensure results and compatibility with refuge goals and objectives. Our response to these concerns and recommendations is discussed in chapter 3 under goals 1 through 6 for each of the alternatives.

Issues and Concerns Outside the Scope of this Analysis

We derived the following concerns and issues from public and partner meetings and further team discussions. These topics listed below fall outside the jurisdiction and authority of the Service or were deemed impractical. As a result, they are not discussed further within this plan.

(1) *How will the refuge address degraded water quality entering the refuge and its associated impacts on fish and wildlife?*

The water quality at the refuge is determined by the combination of waters from Darby Creek, Cobbs Creek, and the Delaware River. Philadelphia Water Department and other local, regional, and State agencies have conducted a series of watershed assessments and water quality characterizations that have detailed the water quality impacts related to urbanization and other watershed impacts.

Other smaller streams (such as Muckinipattis and Hermesprota Creeks) directly connected to the refuge may also pose important considerations for water quality. Organic loading and pathogens are a growing water quality concern from State agencies in the Darby Creek watershed. Many water quality issues are watershed-scale concerns. The refuge, located at the base of the watershed, requires an understanding of these impacts and water rights and regulations to most effectively manage for environmental health.

Addressing the sources of degraded water quality requires a proactive, watershedwide, and multijurisdictional approach. We do not have the regulatory authority to adequately address the variety of nonpoint source pollution inputs that are impacting the refuge. We acknowledge that water quality plays an important role in the environmental health of the refuge. As a result, we will explore options for improving our monitoring of water quality as it relates to management on the refuge. As opportunities arise, we will support partner organizations to address water quality concerns that would directly benefit the refuge. These approaches are discussed in chapter 3 under goals 1 and 2 for each of the alternatives.