U.S. Fish and Wildlife Service

Long Range Transportation Plan for Fish and Wildlife Service Lands

Region 5

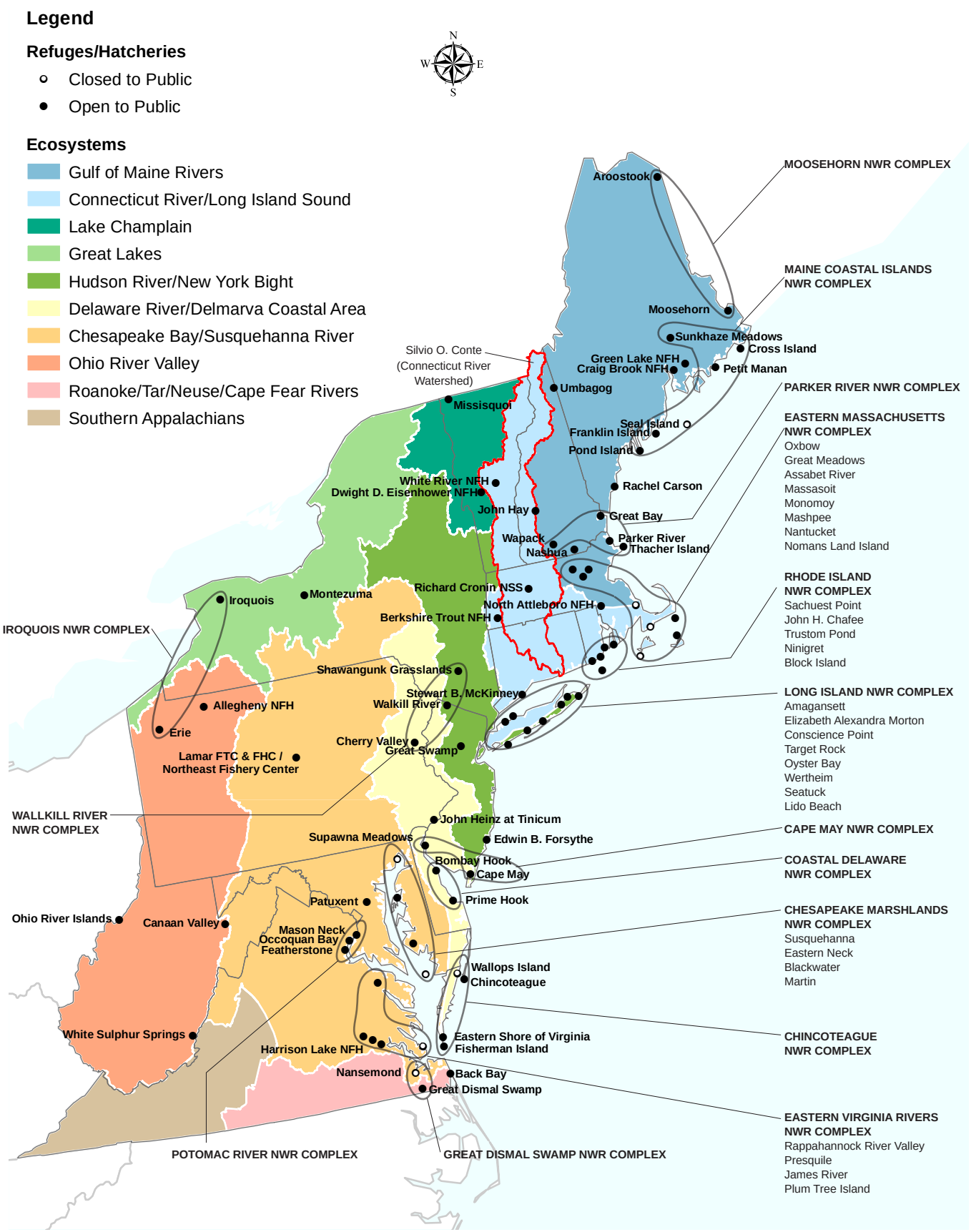


Photo Credits

Front Cover: *Carson Trail at Rachel Carson National Wildlife Refuge. Photo by VHB.*

Region 5 Long Range Transportation Plan

FINAL REPORT
July 2016

Prepared by:

U.S. Fish & Wildlife Service

Region 5

Federal Highway Administration

Eastern Federal Lands Highway Division

Table of Contents

Table of Contents ..... **ii**

Introduction **1-1**

The Service Transportation Program 1-2

Goals and Objectives 1-2

Planning Approach 1-4

Organization 1-4

Primary Audience 1-5

Region 5 Background **2-1**

Natural Resources within Region 5 2-3

Urban Environment 2-4

Visitation 2-4

Regional Transportation System 2-6

Recommendations 2-6

Transportation and the Environment **3-1**

Organization 3-2

Roadway Ecology 3-2

Roadway Design Guidelines 3-3

Natural Landscape Manipulation 3-3

Transportation Pollution and Emissions 3-6

Climate Change 3-7

Communication and Collaboration 3-9

Recommendations 3-9

Visitor Experience **4-1**

Transportation as a Visitor Experience Resource 4-2

Organization 4-2

Guidance 4-2

Existing Visitor Use Trends 4-4

Existing Visitor Experience 4-6

Future Visitor Experiences and Transportation 4-8

Recommendations 4-9

Transportation Network **5-1**

Organization 5-2

Guidance 5-2

Asset Management 5-4

Access, Mobility, & Connectivity 5-7

Safety 5-9

Future Transportation Network 5-12

Recommendations 5-13

Project Programming and Partnerships **6-1**

Region 5 Transportation Funding 6-2

Region 5 Transportation Program Needs 6-5

Project Selection 6-6

Coordinated Opportunities 6-9

Recommendations 6-10

Recommendations **7-1**

Organization 7-2

Long Range Transportation Planning 7-2

Region 5 Investment Strategies 7-4

Outcomes of the LRTP 7-6

Performance Measures 7-21

Acronyms

ATS	Alternative Transportation System
AOP	Aquatic Organism Passage
API	Asset Priority Index
BMP	Best Management Practices
CLIR	Climate Leadership in Refuges
CRV	Current Replacement Value
DOI	Department of the Interior
DOT	Department of Transportation
DM	Deferred Maintenance
EFLHD	Federal Lands Highway Division
FCI	Facility Condition Index
FHWA	Federal Highway Administration
FLMA	Federal Land Management Agency
FLAP	Federal Lands Access Program
FLTP	Federal Lands Transportation Program
GHG	Greenhouse Gas Emissions
ITS	Intelligent Transportation System
LID	Low impact design
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPO	Metropolitan Planning Organization
NFH	National Fish Hatchery
NFWR	National Fish and Wildlife Refuge
NRR	National Research Refuge
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
RDG	Roadway Design Guidelines
LE	Landscape Ecology
PC	Planning Context
DE	Design and Engineering
OP	Organism Passage
SM	Stormwater Management
VE	Visitor Experience
RATE	Regional Alternative Transportation Evaluation
RIP	Road Inventory Program
RSA	Road Safety Audit
SAMMS	Service Asset Maintenance Management System
TAP	Transportation Alternatives Program
WVC	Wildlife-Vehicle Collision

Chapter 1

Introduction

The PLAN 2035 National Long Range Transportation Plan sets a national benchmark for the Fish and Wildlife Service and its transportation network. Integral to that effort are regional long range transportation plans that identify recommendations, strategies and processes that best enable each region to provide a transportation system that supports quality visitor experiences and improves overall environmental conditions.

Dock at a national wildlife refuge. Photo by FWS

Overview

73 National Wildlife Refuges

12 National Fish Hatcheries

535 Thousand acres of habitat

This Region 5 Long Range Transportation Plan (LRTP) is a step down plan from the Service's *PLAN 2035 National Long Range Transportation Plan (PLAN 2035).* This plan focuses on forming transportation goals at the regional level that are consistent with national policy and guidance; defining the overall transportation need at the regional level; framing a consistent process for transportation decision making in the region; and defining ways to enhance the role of refuges in communities and expand opportunities for partnerships throughout the region.

This LRTP sets guidance for the Region 5 transportation system over the next 20 years to advance toward an integrated transportation network that helps to achieve the U.S. Fish and Wildlife Service mission, conserves and protects wildlife, and provides visitors with access to quality experiences in a safe and effective manner.

The Service Transportation Program

The Service Transportation Program supports improved public access to and within Service lands. The transportation program encompasses a number of surface travel modes other than personal automobile, including bicycles, foot trails, transit vehicles, and docks/boat launches. The transportation program is critical to providing visitor access to natural resources and experiences, creating local economic benefits, and enabling the conservation, protection and enhancement of fish, wildlife, plants and their habitats.

For over 15 years the Service has partnered with the Federal Highway Administration (FHWA) to improve transportation service on Service lands through the Federal Lands Highway Program. Region 5 partners with the Eastern Federal Lands Highway Division (EFLHD) of the FHWA. That partnership includes preparation of this long range transportation plan.

From 1998 through 2012 the Refuge Roads Program was the legislatively prescribed transportation improvement initiative for the Service. While this program had many successes, it focused primarily on roads and motorized modes of transportation. The 2012 Moving Ahead for Progress in the 21st Century Act (MAP-21), established a more multimodal approach to mobility on Service lands. The Federal Highway Administration's Federal Lands Transportation Program (FLTP), established under MAP-21 and continued in the 2015 Fixing America's Surface Transportation Act (FAST Act), is now the source for the majority of Service transportation program funding.

Goals and Objectives

This Region 5 LRTP maintains consistency with national transportation planning by adopting *PLAN 2035* vision, goals and objectives and aligning them with strengths and needs particular to the Region 5 transportation system. The goals are focused on six areas, each of which is supported by three to four objectives. **Table 1-1** provides a summary of the goals and objectives.

20 Year Transportation Program Vision

To work collaboratively for future planning and stewardship of a context sensitive, multi-modal transportation system that helps conserve natural resources, provides a superior level of safety, delivers cost effective and environmentally sustainable transportation options, generates local economic opportunities and enhances the visitation experience for all visitors including underrepresented and mobility limited populations.

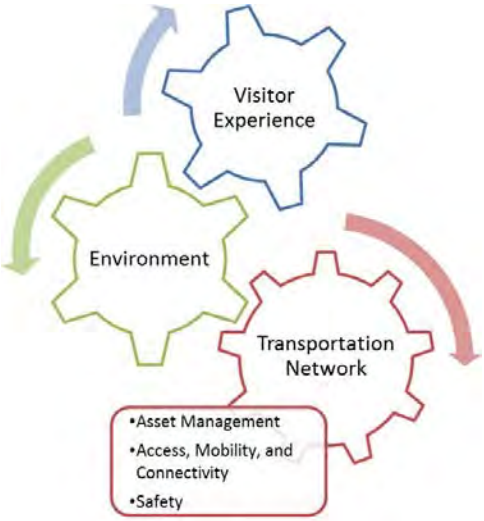
- PLAN 2035 National Long Range Transportation Plan

Table 1-1 National and Region 5 Long Range Transportation Plan Strategic Goals and Objectives

Goal	Objective
Coordinated Opportunities The program will seek joint transportation opportunities that support the Service mission, maximize the utility of Service resources, and provide mutual benefits to the Service and external partners.	▪ Identify and increase key internal and external partnerships at the national, regional, and unit levels. ▪ Maximize leveraged opportunities by identifying and pursuing funding for projects of mutual interest and benefit. ▪ Develop best practices for external engagement that illustrate success in forming and nurturing coalitions and partnerships that support the Service's mission. ▪ Coordinate within Service programs, including Refuges, Ecological Services, Fish and Aquatic Conservation, Hatcheries, and Migratory Birds, during the development of regional long-range and project level plans.
Asset Management The program will operate and maintain a functional, financially sustainable and resilient transportation network to satisfy current and future land management needs in the face of a changing climate.	▪ Use asset management principles to maintain important infrastructure at an appropriate condition level. ▪ Prioritize work programs through the project selection process detailed in this plan or an adaptation thereof. ▪ Evaluate life cycle costs when considering new assets to determine long term financial sustainability. ▪ Consider the impacts of increased climate variability in the planning and management of transportation assets.
Safety The program's network will provide a superior level of safety for all users and all modes of transportation to and within FWS lands.	▪ Identify safety issue 'hot-spots' within the Service's transportation system with the Safety Analysis Toolkit. ▪ Implement appropriate safety countermeasures to resolve safety issues and reduce the frequency and severity of crashes (also with the Safety Analysis Toolkit). ▪ Address wildlife-vehicle collisions with design solutions (Environmental Enhancements). ▪ Use cooperation and communication among the "4Es" of safety including: engineering, education, enforcement, and emergency medical services.
Environmental Transportation infrastructure will be landscape appropriate and play a key role in the improvement of environmental conditions in and around Service lands.	▪ Follow the Roadway Design Guidelines for best practices in design, planning, management, maintenance, and construction of transportation assets. ▪ Reduce greenhouse gas (GHG) emissions and air pollutants by increasing transportation options and use of alternative fuels. ▪ Protect wildlife corridors, reduce habitat fragmentation, and enhance terrestrial and aquatic organism passage on and adjacent to Service lands to conserve fish, wildlife, and plant populations.
Access, Mobility, Connectivity The program will ensure that units open to public visitation have adequate transportation options for all users including underserved, underrepresented, and mobility limited populations.	▪ Offer a wide range of transportation modes and linkages for on and off site access. ▪ Provide clear wayfinding information both on and off Service lands. ▪ Through the Urban Wildlife Conservation Program, integrate Service transportation facilities with local community transportation systems in a way that encourages local visitation and provides economic benefits to partner and gateway communities. ▪ Through coordinated planning, provide context-appropriate transportation facilities that address the specific needs of local visitor groups and respect the natural setting of the refuge or hatchery. ▪ Address congestion issues to and within Service units.
Visitor Experience The program will enhance the visitation experience through improvement and investment in the transportation network.	▪ Improve traveler information through use of intelligent transportation systems (ITS). ▪ Integrate interpretation, education, and resource stewardship principles into the transportation experience. ▪ Evaluate the feasibility of alternative transportation systems at all stations and implement where appropriate. ▪ Encourage connections with existing and planned public and private transportation services. ▪ Design infrastructure in such a way that highlights the landscape, and not the transportation facility.

Planning Approach

The mission of the Service to "… conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people" is a two-fold mission that promises to protect the environment and natural resources while also inviting the American people to enjoy the resources. This LRTP examines the goals of the region in balancing environment and visitor experiences and how transportation can support those goals. At times the balance is an easy harmony while other times the goals are at odds.



Transportation decisions impact the Service mission, as such, environmental and visitor experience needs should be reflected in transportation decision making

This LRTP also examines how Region 5 can best balance the variety of needs within the transportation network itself. These needs include asset management, providing adequate access, mobility, and connectivity within stations, and providing a safe network for users.

Ultimately, each of these needs (environmental resources; visitor experiences; asset management; access, mobility and connectivity; and safety) is a component in an integrated transportation system where every decision impacts all other components. For example, constructing a new road may provide necessary mobility and connectivity in the station to facilitate visitor travel; however, without proper consideration to environmental impacts valuable resources could be lost. Alternatively, without a transportation network that provides visitors appropriate mobility within stations the message of environmental conservation and education cannot be shared.

Organization

Throughout this long range transportation plan certain themes develop and grow from one goal area to the next. At times topics are repeated to provide different perspectives or references are made to other chapters where discussions are also appropriate. This speaks to the integrated nature of needs in the transportation system and the balancing act that the Service maintains. This LRTP covers topics in the following chapters:

- Chapter 2 Region 5 Background
- Chapter 3 Environment
- Chapter 4 Visitor Experience
- Chapter 5 Transportation Network
- Chapter 6 Project Programming and Partnerships
- Chapter 7 Recommendations and Actions
- Final Thoughts

Primary Audience

This Region 5 Long Range Transportation Plan is written for audiences both internal and external to the Service. Internally, project leaders, national management, and regional management can use this LRTP to inform project prioritization and funding decisions. Summarizing the critical needs of the region is essential for that message.

Station management can use this LRTP to help identify needs at individual stations and develop projects that can help meet the goals of the plan. Furthermore, staff at the station level can help pursue partnerships and coordinated funding opportunities.

Externally, potential partners and friends groups can use this LRTP to better understand the direction that the Service is moving in and identify ways they could contribute or opportunities to coordinate efforts to achieve shared agendas.

Timeline and Supporting Documents

This *Region 5 Long Range Transportation Plan* is a collaborative effort by the U.S. Fish and Wildlife Service and the Federal Highway Administration – Eastern Federal Lands Highway Division. The preparation of this plan began in 2013 and most of the technical analyses to support this plan were completed prior to the completion of the Service's *PLAN 2035 National Long Range Transportation Plan* in 2015. The draft Region 5 LRTP was finalized and prepared for public review in early 2016.

Notice of availability and request for comments on the draft Region 5 LRTP was published in the Federal Register on March 7, 2016. Comments received were evaluated and incorporated, as applicable, into this this final Region 5 Long Range Transportation Plan. This final report also includes changes made in references to the Federal multiyear transportation funding legislation. The Fixing America's Surface Transportation Act (FAST Act) was signed in December, 2015 and replaces the 2012 Moving Ahead for Progress in the 21st Century Act (MAP-21).

During the preparation of the LRTP, two primary supporting documents specific to Region 5 were developed. They provide more detailed information on some technical analyses referenced in this LRTP. Those documents are:

- *Region 5 Data Collection Report*, May 2015. This report presents data defining the baseline conditions and trends for the Region 5 transportation system, and the sources of those data.
- *Region 5 Crash Record Data Review*, June 2014. This report presents a screening review of potential vehicle safety "hot spot" locations at high-visitation refuges in the region. The study identifies priority locations for consideration of safety management and countermeasures.

Sunset at Bombay Hook National Wildlife Refuge, Smyrna, Delaware. Photo by FWS

Chapter 2

Region 5 Background

Region 5 has a diverse landscape and climate, which can provide Region 5 visitors experiences with unique natural resources, habitats and wildlife. Some 25 percent of the U.S. population resides within Region 5 and the proximity of the majority of refuges and population along the Atlantic coast provides many opportunities to support the mission and goals of the Service.

Monomoy Light at a distance at Monomoy National Wildlife Refuge. Photo by FWS

Overview

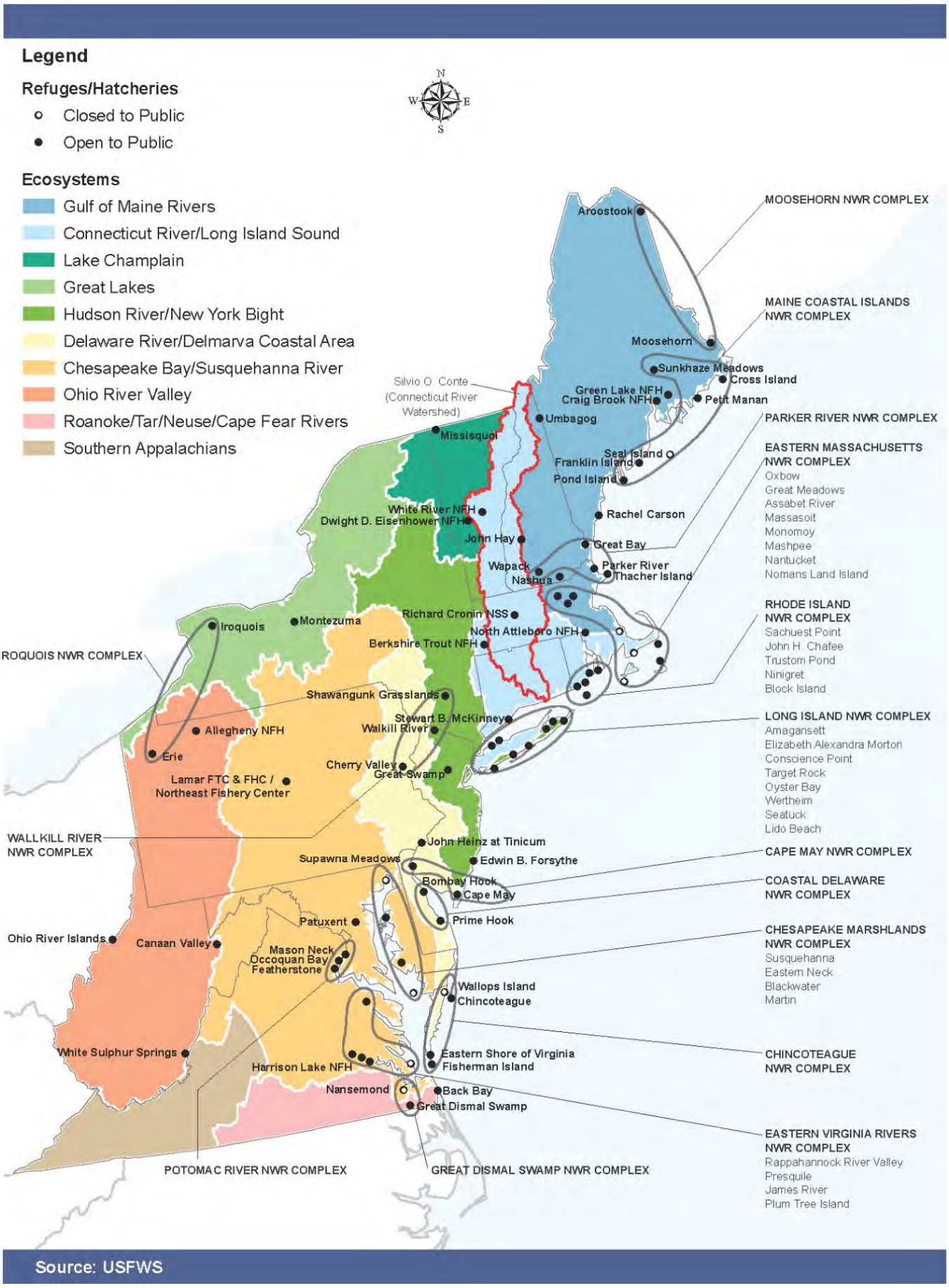
13	States and the District of Columbia
73.3	million people
4	of the Nation's Top 10 Metropolitan Areas
10	Ecosystems

As shown in **Figure 2-1**, Region 5 encompasses 73 refuges and 12 fish hatcheries across 13 states and the District of Columbia.

Located among ten ecosystems, Region 5 is home to a variety of key habitats, including Atlantic northern forest, big rivers, freshwater and salt marshes, coastal plains, estuaries, barrier beaches, and coastal islands. Region 5 is home for 92 types of threatened and endangered species.

Some 73 million people reside within the Region 5 boundaries. Few are far from a refuge or hatchery. Region 5 is the most urbanized of all regions with 37 percent of the urban refuges within the National Wildlife Refuge System.

Figure 2-1 U.S. Fish and Wildlife Service Region 5 Map



Source: USFWS

Natural Resources within Region 5

The natural resources within Region 5 offer a broad scope of opportunities for conservation and education for visitors. Three prominent drainage basins — the Atlantic Slope, the Great Lakes, and the Mississippi Valley — and notable land formations – including the expansive Appalachian Mountains, the intricate geography of glacially-derived landscapes in New England, and the undulating and terraced landforms of the Piedmont and Coastal Plain — play an important role in creating the diverse landscapes. Notable characteristics of this diverse landscape include:

- **Climate:** Region 5 is stretched across three major climate zones, meaning that Region 5 is exposed to extremes in temperature, precipitation, and episodic storm events annually.

- **Vegetation:** A wide variety of vegetation can be found in Region 5, ranging from high-altitude spruce forest to estuarine saltmarsh to moist deciduous woodland and to pine savannah.

- **Habitat Types:** Region 5 is home to a broad range of habitat types and native animals, including both resident and migratory wildlife. Sensitive habitats such as vernal pools, rich cove forests, freshwater tidal marshes, granite outcrops, and shale barrens are scattered throughout the region, and many of these resources are sheltered within the Region 5 refuge system.

- **Aquatic Resources:** Along the Atlantic coast of this vast land area runs 16,750 miles of tidal shoreline, home to numerous habitats, aquatic organisms, vegetation, and terrestrial wildlife who use these waterways as their own transportation corridor.

Aerial of Eastern Shore of Virginia NWR and Fisherman Island NWR. Photo by FWS

Cherry Valley NWR in Saylorsburg, Pennsylvania. Photo by FWS

Urban Environment

The population density within Region 5 is higher than for any other region. Region 5 covers nearly 25 percent of the total U.S. population, but that 25 percent is compressed into a mere seven percent of the total U.S. land area. As illustrated by **Figure 2-3**, most (83%) of the urban population within Region 5 is located within 25 miles of a refuge or hatchery.

Major Metropolitan Areas in Region 5

Boston, MA	*Providence, RI*
Hartford, CT	*New York, NY*
Philadelphia, PA	*Pittsburgh, PA*
Baltimore, MD	*Washington, D.C.*
Richmond, VA	*Virginia Beach, VA*

The proximity of stations to urban populations provides a large potential market for serving the Service's mission to provide and promote the six priority public uses to all visitors — hunting, fishing, wildlife viewing, interpretation, education and photography. The concentration of cities and refuges along the Atlantic Seaboard also creates many opportunities for partnering with urban communities.

Much of the Region 5 transportation network is shaped by the urban environment. High population density equates to an extensive roadway network; one which can bring the challenge of high vehicle traffic volumes through and adjacent to many refuges. Fortunately, high population density also equates to transit and regional trail networks that can provide alternative transportation to refuges and hatcheries.

Visitation

Helping the region reach a diverse visitor audience is one of the requirements of the transportation system. The system should accommodate those young and old, urban or suburban, and automobile drivers and transit riders. As is described in Chapter 5, visitor activities are supported by regional transportation system options for hiking, cycling, canoeing, kayaking, and automobile and tram tours.

In 2014, Region 5 welcomed 6 million visitors to 73 stations (9 are closed to the public). Chincoteague NWR had the highest visitation with 1.3 million visitors, followed by Great Meadows NWR (420,000) and Silvio O. Conte NFWR (273,500). Uniquely high visitation to Chincoteague NWR is driven by summer tourism in partnership with Assateague Island National Seashore. Visitation to national fish hatcheries was highest at White River NFH, with 30,000 visitors.

Figure 2-2 shows region visitation by station for the top 15 stations. These 15 stations account for 71 percent of total visitation in the region.

Increasing visitation is an important opportunity for Region 5. Although Region 5 hosts one-quarter of the U.S. population, its 6 million visits account for only 12 percent of the visitation within the National Wildlife Refuge System.

Figure 2-2 Top Station Visitation
(as a percentage of regional visitation)

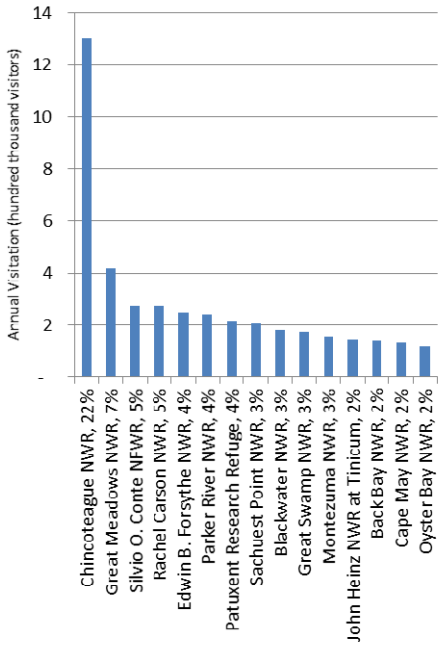
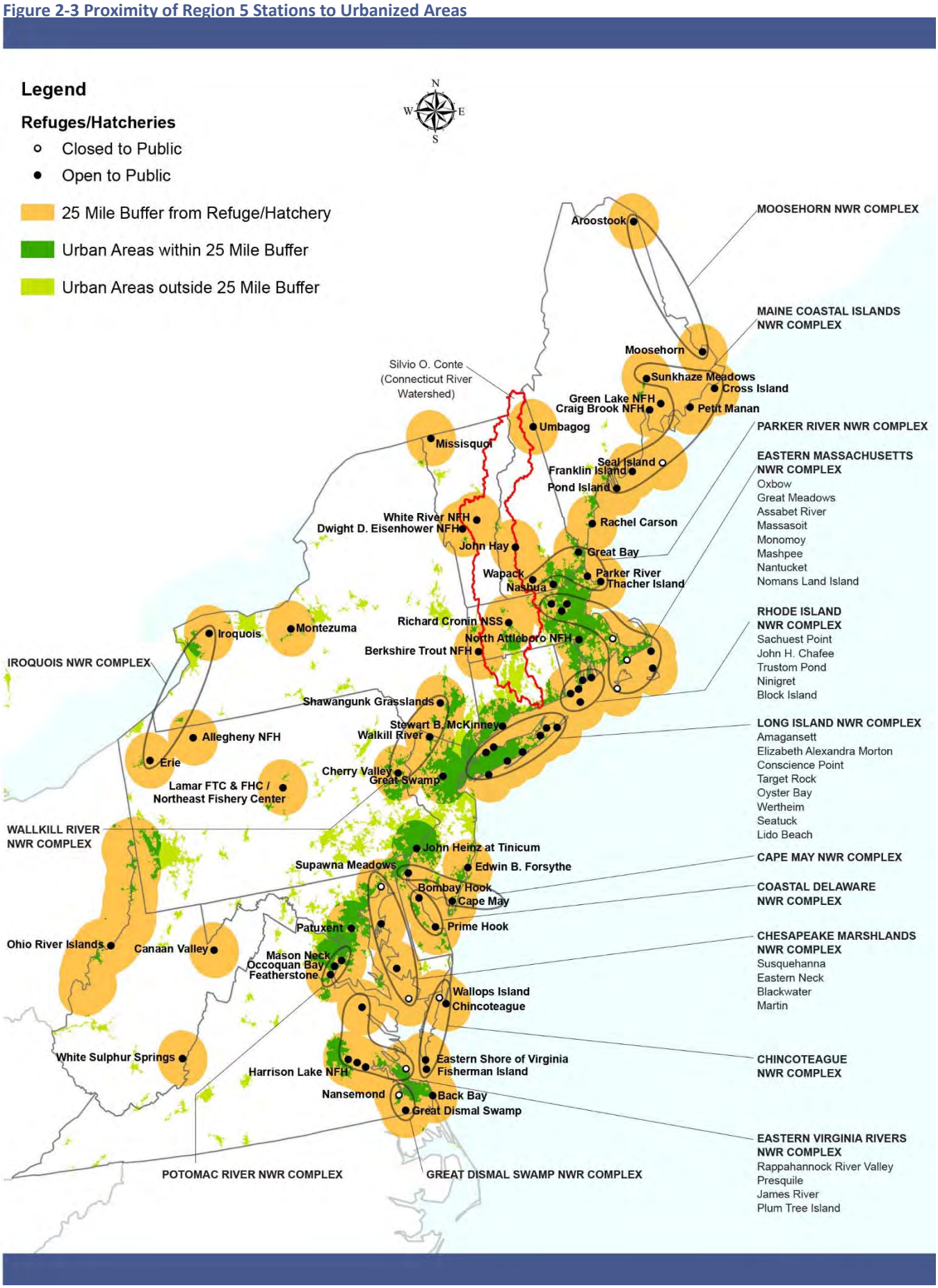


Figure 2-3 Proximity of Region 5 Stations to Urbanized Areas



Accessible boardwalk at Iroquois National Wildlife Refuge. Photo by VHB

Region 5 Transportation System

The transportation network for Region 5 is made up of roads, parking lots, bridges, trails, docks and transit services. With over 600 miles of roadways and 300 miles of trails for pedestrian and bicycle use, most of the roadway, parking, and trail assets are well-maintained in the region. Only eight percent of roadways, seven percent of parking lots and one percent of trails are in poor or failing condition.

Providing comprehensive alternative transportation connectivity is a priority for Region 5. Alternative transportation systems (ATS) include transit services and land or water trail connections. Almost 30 percent of the Region 5 stations are accessible by ATS. With a high population density in the Region 5, ATS help minimize the impact on the environment and habitats within the refuge lands. These systems, external or internal to the Service, enable visitors to explore stations without an automobile, and can improve the visitor experience and provide an opportunity for active transportation.

Water access and mobility is one of Region 5's on-going alternative transportation goals. Canoe and boat launches are available at about one-third of the refuges. These can be used by boat owners to explore water habitats or for tours hosted by partner groups. Canoe/boat rentals are available nearby to 24 refuges, 15 of which offer water tour services within refuges.

Recommendations

- Region 5 has many strengths that should be leveraged to uphold the mission of the Service and achieve the goals of this long range transportation plan.
    - Region 5 has a large and diverse urban population proximate to many refuges. Region 5 can increase visitation through educational partnerships and by cooperative planning on transportation projects to provide connectivity between refuges and urban areas.
    - A large urban population provides Region 5 with the population density surrounding its refuges that invites successful alternative transportation connectivity. The urban environment often creates opportunities to partner with planning agencies and other governmental units who share similar alternative transportation objectives.
    - Region 5 has the water resources and visitor demand for water-based experiences to warrant enhanced water-based transportation infrastructure.

83 % of the urban population in Region 5 lives within 25 miles of a refuge

Chapter 3

Transportation and the Environment

Ensuring that the Region 5 transportation system effectively supports the mission of the Service requires a deep understanding of the natural world and the ecological processes within Region 5. With that foundation, Region 5 can effectively plan and implement future sustainable transportation programs, ultimately facilitating the interconnection of people to experiences with fish, wildlife, plants, and habitats. Using PLAN 2035 as a model, Region 5's LRTP encourages innovative transportation and conservation solutions.

Boardwalk and interpretive trail at Rachel Carson National Wildlife Refuge. Photo by VHB

Overview

10	Ecosystems
16,750	Miles of tidal shoreline
92	Threatened & Endangered Species

Transportation projects and services within Region 5 provide more than access and mobility options. They are opportunities to support the Service mission and improve environmental conditions. For Region 5, a successful transportation network is one that can leverage such opportunities to provide improved transportation mobility for over six million people each year while continuing to enhance habitat conditions throughout the region.

The key to this success is adoption of best management practices for planning and design, to enhance habitat conditions, water quality, biological integrity, and landscape connectivity.

The foundation for success requires a strong emphasis on communication between Service staff throughout Region 5 to align planning interests across all disciplines.

Organization

The purpose of this chapter is to introduce the relationship between transportation and the natural world and to describe some of the transportation planning challenges and opportunities of this dynamic. The discussion focuses on the concepts of roadway ecology, varying outcomes of centuries of landscape and habitat manipulation due to development and urbanization in Region 5, and on climate change issues as they relate to transportation. The chapter concludes with discussion of the importance of communication and collaboration within the Service and within Region 5, and with recommendations to help facilitate continued progress toward a more sustainable transportation program.

Environment

Transportation infrastructure will be landscape appropriate and play a key role in the improvement of environmental condition and in and around Service lands.

- Follow the Roadway Design Guidelines for best practices in design, planning, management, maintenance and construction of transportation assets.
- Reduce greenhouse gas (GHG) emissions and air pollutants by increasing transportation options and use of alternative fuels.
- Protect wildlife corridors, reduce habitat fragmentation, and enhance terrestrial and aquatic organism passage on and adjacent to Service lands to conserve fish, wildlife, and plant populations.

Roadway Ecology

Ecology is the study of organisms, their habitats, and the environment. Thus, roadway ecology is concerned with the interactions of organisms and their habitats as linked to roads and traffic. Historically, roadway systems and transportation corridors have had a negative impact on habitat quality. More recently, "green" transportation practices aim to reduce impacts to habitat quality through state-of-the-art planning and design technologies and roadway ecology. Region 5 aims to use roadway ecology principles to mitigate potential negative impacts and to balance the needs of transportation and the environment.

The Service understands that transportation improvement projects can be administered in a manner that accomplishes project objectives while remaining sensitive to the unique natural settings within federal lands. If planned properly, adverse effects of roads can be mitigated and potential benefits can be derived from ongoing activities within roadway corridors.

For the Service, the proper and early detection of both negative and positive impacts of roadway construction projects on environmental settings allows for better decision-making and proactive management of valuable resources within Service lands. Identification of innovative opportunities to make environmental enhancements to mitigate the impacts of transportation while balancing the values of the mission of the Service is key. The combination of adaptive management and use of Best Management Practices tailored to the specific ecological setting of each individual project will ensure long-term success for both the transportation and ecological assets within Region 5.

> *"**Environmental enhancements** are design solutions intended to soften these impacts and indeed improve adjacent natural resources while providing important access and mobility."*
>
> *PLAN 2035 the National Long Range Transportation Plan*

Roadway Design Guidelines

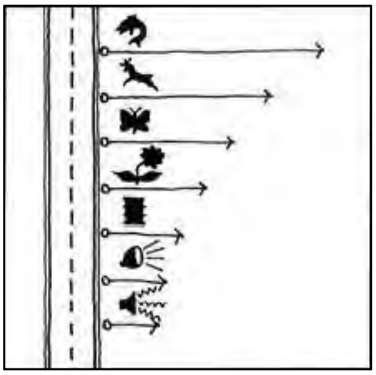
The U.S. Fish and Wildlife Service has adopted guidance to frame the challenges and concerns to be considered during transportation planning. *Roadway Design Guidelines* "… highlights state-of-the-art ecological, planning, design, and engineering consideration for roadway projects that heed both the significant benefits and impacts these projects present."

Roadway Design Guidelines provides 30 guidelines presented in a checklist format. This format allows planners, managers, and construction staff to use the checklist for clear and comprehensive guidance on executing transportation improvement projects while striving to provide environmental enhancements. The guidelines are summarized in six themes: Landscape Ecology (LE), Planning Context (PC), Design and Engineering (DE), Organism Passage (OP), Stormwater Management (SM), and Visitor Experience (VE). Key considerations for each theme are described below.

- Landscape Ecology (LE) – These guidelines encourage consideration for large-scale environmental impacts. This high-level perspective is a good foundation for further decision-making.
- Planning Context (PC) – Similar to Landscape Ecology, this section encourages broad-scale considerations for planning, available resources, and communication.
- Design and Engineering (DE) – Design and Engineering guidelines focus on the specific, technical needs of transportation facility design and engineering across earthwork, geometrics, safety, management, construction, operations, and maintenance.
- Organism Passage (OP) – These guidelines help users develop state-of-the-art solutions to terrestrial and aquatic organism passage challenges.
- Stormwater Management (SM) – Similar to Organism Passage, this section provides state-of-the-art solutions to sustainable stormwater management design, construction, and maintenance.
- Visitor Experience (VE) – These guidelines keep visitors and the Service mission as integral components in project development.

Natural Landscape Manipulation

At the highest level, the need to balance transportation improvements with the environment is a top priority for the Service. A legacy of human manipulation within and between roadway corridors, a phenomenon that is captured in roadway ecology concepts like "mesh size" (i.e., effective area of undisturbed natural habitat patches within the road network) results in smaller, often fragmented, lower-quality habitat conditions. This triggers a variety of habitat issues. The scope and reach of impacts can vary greatly depending on landscape position and other factors. Such issues include, though are not limited to, habitat fragmentation, wildlife vehicle collisions, pollution, stormwater management, and the spread of invasive species.

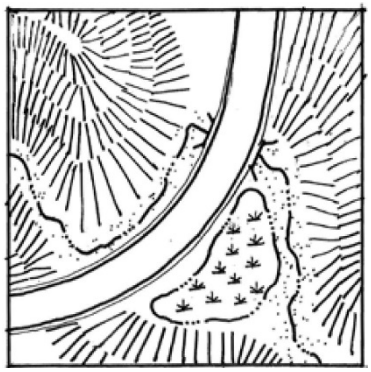


Roadway Design Guidelines LE-2: Reduce Impacts to Wildlife and Habitats

The prevalence of urban centers in Region 5 have important implications for the natural landscape, as negative impacts of road systems are often amplified in urban settings. Critical challenges present within urban environments typically involve disruption of the natural hydrologic landscape, habitat fragmentation, and dispersion of pollutants, runoff, and stormwater.

Hydraulic Landscape

A critical consideration for this LRTP is the effect of development on aquatic resources. This is an especially important environmental concern for Region 5 given the prevalence of water resources in the landscape. Transportation corridors, and their infrastructure, can affect water resources by:

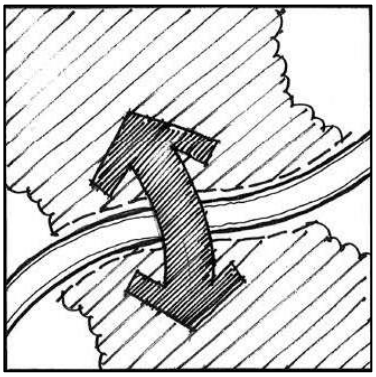


Roadway Design Guidelines LE-3: Understand Hydrologic Processes of Regional Landscape

- Modifying the overall "hydrologic landscape"
- Disrupting naturally dynamic processes (e.g., stream migration, natural sediment flows, and aggregation/degradation)
- Impeding normal groundwater recharge and discharge relationships
- Increasing erosion due to increased runoff, velocity, and discharge of stormwater, as well as reduced vegetation cover in maintained transportation corridors
- Increasing sedimentation in waterbodies and floodways, particularly on the upstream sides of road embankments
- Increasing potentially damaging episodic events such as flooding, upwelling, freeze-thaw, washout, and effects on structural integrity of roads and infrastructure within transportation corridors, with a direct impact on human health and safety.

Opportunities for Region 5 transportation projects to mitigate impacts are summarized in the Landscape Ecology section of *Roadway Design Guidelines*. The guidelines emphasize the importance of planning transportation projects from broad, landscape-scale perspectives. Specific recommendations include review landscape planning and recovery resources, review high-level hydraulic processes of the landscape, consider designs that emphasize lower speeds and roadway geometries that mirror the landscape, give particular attention to transportation impacts within the road-effect zone, and focus on context sensitive solutions that balance the needs of transportation and the environment.

Habitat Fragmentation



Roadway Design Guidelines LE-1: Improve habitat connectivity

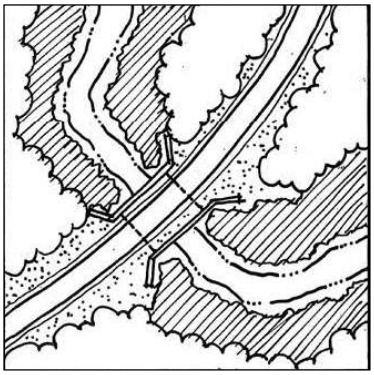
Habitat fragmentation occurs when development, such as a roadway, cuts through an existing habitat, creating an unnatural boundary. Fragmenting a habitat has the potential to disrupt habitat connectivity by reducing "permeability", thus limiting the ability for wildlife movement to occur, and introduces additional risk for direct or indirect species mortality. Consideration for terrestrial and aquatic organism passage is paramount for any transportation improvement project.

Roadway Design Guidelines provides guidance to mitigate potential habitat fragmentation impacts. On a broad scale, opportunities that are aimed at improving or maintaining the hydraulic landscape will be advantageous and greatly enhance habitat connectivity potential.

Wildlife-Vehicle Collisions and Aquatic Organism Passage

Newly hatched bog turtle (threatened) found in New Jersey. Photo by FWS

Wildlife-vehicle collisions (WVCs) can be a direct outcome of habitat fragmentation. When heavily-used habitat corridors are fragmented by a transportation project, wildlife may end up crossing the vehicle travel corridor. At times, vehicles may be able to stop for larger, very visible animals; however, protecting smaller species (e.g., amphibians, reptiles) is a challenge and vital to sustaining the native species of Region 5. Therefore, identification of "wildlife hot-spots" is important with the goal of deploying wildlife crossings, as appropriate.



Roadway Design Guidelines OP-2: Provide and enhance aquatic organism crossings

Habitat fragmentation can be an issue for both terrestrial and aquatic organisms. Oftentimes aquatic species are not readily able to utilize certain habitats because of impediments present within the landscape (e.g., dams and perched culverts). An aquatic organism passage (AOP) will give amphibious organisms freedom to move between patches of a habitat without entering the transportation corridor and aquatic organisms connectivity necessary to thrive. **Table 3-1** summarizes identified WVC and AOP issues in Region 5.

Roadway Design Guidelines provides high-level guidance for addressing this issue including planning for and designing passages in new projects and providing sufficient signage to warn drivers.

Region 5 has placed a high priority on mitigating future wildlife passage issues and enhancing existing deficiencies. Wildlife passage is a concern expressed in the most recent Regional Alternative Transportation Evaluation (RATE) study by a majority of Region 5 stations.

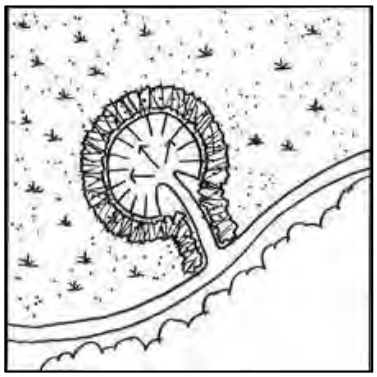
Rehabilitated culvert at Silvio O. Conte NWFR – Nulhegan Basin. Photo by FWS

Region 5 recently completed a large-scale aquatic organism passage project at Silvio O. Conte NWFR – Nulhegan Basin Division. This project rehabilitated culverts throughout the Division by enlarging deficient culverts to provide sufficient aquatic organism passage and improved stormwater management.

This project is also an example of the benefits of multidisciplinary partnerships. Partners that Region 5 worked with to complete this project include FHWA Eastern Federal Lands Highway Division, the State of Vermont, and Trout Unlimited.

Transportation Pollution and Emissions

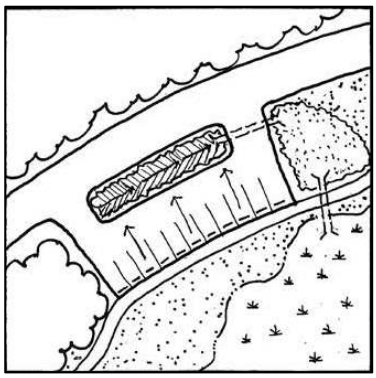
Transportation impacts to the environment do not end with the construction of transportation infrastructure. Vehicles on roads represent the primary source of pollutants along transportation corridors, releasing substances such as oil, grease, hydraulic fluids, metal plating, rust, part linings, rubber, fuel, and exhaust, all of which can be damaging to native plants and wildlife. Other pollution sources include substances released during roadway maintenance such as sand, salt, deicing compounds, road surface materials, and herbicides or pesticides. The magnitude of such impacts is exacerbated in urban environments where the density of people, vehicles, and development is often highest.



Roadway Design Guidelines SM-1: Buffer habitat from polluted runoff

In order to manage impacts of pollution, stormwater management principles and planning need to be implemented early in project development. The goal of stormwater management is to appropriately contain roadway runoff and pollution to regulate its dispersion into the adjacent landscape while accommodating transportation and development.

Roadway Design Guidelines provide guidelines for identifying opportunities to mitigate the risks that pollution poses on habitats. Two opportunities are buffering habitats from pollution and implementing Low Impact Development (LID) principles to promote stewardship of aquatic resources.



Roadway Design Guidelines SM-4: Promote stewardship of aquatic resources

Buffering riparian habitats from polluted runoff can be accomplished by using a natural drainage system (NDS). A NDS will contain and clean polluted runoff prior to entering adjacent receiving waters, thus preventing potential toxins from entering aquatic systems.

Low Impact Development is a development practice that integrates innovative stormwater management facilities into the transportation infrastructure. LID can reduce pavement surface area, provide additional channels for runoff, and provide opportunities as an educational resource for visitors.

Air Quality

Over time, greenhouse gas (GHG) emissions from automobiles can be contribute to poor air quality having a negative impact on both humans and habitats. GHG emissions from vehicles account for one-quarter of the total GHG emissions in the United States. Further, radiative forcing (i.e., the heat absorbed by the earth's surface and back-radiated to the atmosphere) is dramatically altered within transportation corridors due to the extent of impermeable surfaces. These issues contribute to air quality degradation in the region.

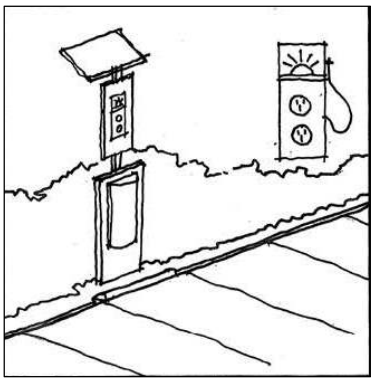
Air quality issues are found at many refuges in Region 5. Thirty-four percent of Region 5 refuges are in areas deemed not in attainment of Environmental Protection Agency (EPA) ozone pollution standards[1]. Ozone is a byproduct of emissions from industrial, motor vehicle, or chemical activities (nitrogen,

[1] Environmental Protection Agency. *Greenbook.* 2008 8-hour ozone standard.

volatile organic compounds) and sunlight. Twenty percent of Region 5 refuges are in areas deemed either not in attainment of particulate matter standards[2] or working towards maintaining attainment standards. Particulate pollutants are less than 2.5 micrometers in diameter and are typically emitted by forest fires, power plants, or automobiles.

Making notable improvements to air quality will require large scale changes on a societal level. Region 5 can do its part by making small changes in daily operations and decision-making, educating visitors about the impacts of climate change and the importance of improving air quality, and by setting a positive example.

One opportunity to mitigate emissions within Service lands is through alternative energy. Providing vehicle charging stations at some refuges is a step that Region 5 has taken towards reducing GHG emissions and one that the region will continue to pursue through future years. Similarly, Region 5 has prioritized providing alternative transportation access and connectivity for transportation to and within stations. Alternative transportation systems include surface and water trails for non-motorized transportation and public transit systems internal and external to stations.



Roadway Design Guidelines LE-5: Address climate change

Climate Change

Pollution and air quality degradation are examples of impacts of development and automobile use. Unrestricted, impacts have expanded to global climate change. Climate change is a long-term impact that has been realized. Of all the environmental issues that are at the forefront of our national consciousness, none is more pervasive than that of global climate change. Research from the Intergovernmental Panel on Climate Change, which synthesized decades of scientific research on the subject, implicated human activity as a driving force in the earth's climate system.

This realization has prompted programmatic responses at the federal level such as Secretarial Order 3226, Amendment No. 1 (Climate Change and the Department of the Interior) and Secretarial Order 3289 (Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources). These federal mandates direct DOI agencies to respond to the impacts of climate change within their jurisdictions through data-sharing framework initiatives and establishment of action priorities.

This document, published in September 2010, focuses on the Fish and Wildlife Service strategy for addressing climate change.

The Service's response, published in 2010 under the title *Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change*, acknowledges that the effects of climate change, particularly rising temperatures, have and will continue to result in changes to the distribution and abundance of native species, as well as potential increases in biological invasions from non-native species. In anticipation of such changes, the Service's 2010 plan specifies an approach to help ensure the sustainability of fish, wildlife, plants, and habitats in the context of climate change through

[2] Environmental Protection Agency. *Greenbook*. Particulate Matter (PM)-2.5 2008 standard.

three action areas: adaptation, mitigation, and engagement. Region 5 has been addressing climate change through adaptation and mitigation strategies and will continue to over the course of this long range transportation plan.

Climate change adaptation is making decisions that will enable existing infrastructure to be resilient in the face of climate change or extreme weather events. Locating infrastructure and designing it to withstand these events will make the best use of limited funding over the long term. An excellent example is the current strategy of enhancing deficient culverts across the region to adapt the infrastructure to heavy rain or storm events and to improve aquatic organism passage.

Climate Leadership in Refuges

In terms of climate change mitigation, the Service and the Department of the Interior have made reducing GHG emissions and carbon neutrality a goal. The Service responded to this goal by developing the Climate Leadership in Refuges (CLIR) tool to assist refuges in determining what their GHG emissions levels are and how to work towards carbon neutrality. This tool is a web-based tool that can be used by individual stations to report and track GHG emissions from a wide variety of activities both on and off Service lands. Moving forward, this tool can be used to track changes over time and determine what impact various mitigation activities are having on GHG emissions. This tool is designed to track GHG emissions from various sources including buildings, staff, visitors, and transportation.

At this point, two refuges (Rachel Carson NWR, Moosehorn NWR) have completed this process of inventorying and documenting carbon emissions to establish a GHG emissions baseline and track future changes. Region 5 has been a role model to the community, setting examples of best practices for reducing GHG emissions and educating visitors to encourage them to employ best practices in their own lives.

Typically, water at this road at Edwin B. Forsythe National Wildlife Refuge is maintained at about 1 to 1 ½ feet deep. After Hurricane Sandy the water depth was over 6 feet in some locations.

Recently a project was completed to armor the roadway by revegetating. This provides strength and structure that soil alone cannot provide. This improvement is also an environmental enhancement for the surrounding habitats.

In addition to revegetating the roadway, water control structures were installed to control water flow through the impoundment during extreme weather events.

Top. *Aerial photo of roadway erosion at Edwin B. Forsythe NWR.*
Bottom. *View of eroded roadway after Hurricane Sandy.*
Photos by FWS

Communication and Collaboration

Communication is necessary among all Region 5 staff to achieve a balance between transportation and conservation, while making effective use of the tools available to achieve program success and sustainability.

Piping Plovers at a Maine beach. Photo by FWS/K. Titherington

Conservation and transportation planners are each attempting to uphold the mission of the Service, but they have a different focus. Observations surrounding transportation and conservation planning suggest that, at times, there is a disconnect between the two disciplines within the Service. This is evident in information and database inconsistencies. Good and timely communication will ensure that transportation projects have the best outcome for both natural resources and for visitors.

Outside of the Service, numerous partnerships can be made with other conservation and transportation agencies. The value of these partnerships are discussed in Chapter 6 – Project Programming and Partnerships.

Recommendations

One of the current strategies in Region 5 for balancing transportation and conservation is to integrate conservation principles and habitat enhancements into all transportation projects when possible. In addition to utilizing tools such as the *Roadway Design Guidelines* to improve project planning, the following specific recommendations are intended to improve the relationship between transportation and the environmental resources of Region 5.

- Use Comprehensive Conservation Planning (CCP) documents to better target management constraints/opportunities at the region, ecosystem, and refuge levels related to impacts to resource protection areas from Region 5 transportation program activities.
- Investigate the advantages of adopting standard operating procedures (SOPs) for evaluating the following at the refuge level to support a sustainable Region 5 transportation program:
    - Existing conditions assessment at all, or strategically targeted, road crossings (e.g., culverts, bridges) with the goal of developing a region-wide GIS database with mapped locations and conditions data to help with prioritizing projects based on management objectives such as critical habitats, threatened and endangered species, high quality waters, and tidal wetlands.
    - Better use of available data provided in CCPs as it relates to wildlife-vehicle collision hotspots (biology of species involved, cover types involved, feeding habitats, fatal vs. non-fatal, etc.) and fish passage concerns (light requirements, desired culvert size) with the intent to incorporate findings early on into a project's design.

Needs for Future Analysis

- Prioritize roadway projects by identifying roadway crossings (e.g., culverts, bridges) that are in poor or failing condition against critical habitats and threatened/endangered species.
- Compare wildlife-vehicle hotspot and fish passage data in CCPs across all regions to look for species trend, and incorporate findings with appropriate mitigation measures into project design.
- Identify and locate areas that have repetitive runoff or drainage issues to prevent habitat fragmentation or habitat disturbance.

- Better explore opportunities in utilizing the Service's Information, Planning, and Conservation (IPaC) System as it relates to Best Management Practices (BMPs), in concert with the Service's *Roadway Design Guidelines*, for transportation improvement projects.
- Deployment of adaptive management concepts as appropriate: monitor and improve future designs based on monitoring results.
- Service biologists must be a core member of the design team and involved in the decision-making process throughout the development of any transportation improvement project.
- Continue to work and identify ways in which the Service can partner with other federal land management agencies in the following areas:
    - Climate Change – Maintain dedication to the Service's three focus action areas as it relates to climate change: adaptation, mitigation, and engagement.
    - Urban Environments – Better provide education and outreach to the public on issues/opportunities more appropriate to urban environments, while simultaneously supporting components of the President's *America's Great Outdoors* initiative.
- Continue to support this "paradigm shift" in roadway ecology concepts by identifying habitat constraints/opportunities early on during the development of any new and/or existing roadway improvement project through the implementation of the *Roadway Design Guidelines* and other available resources (e.g., CCPs, other FLMA documents, state and local resources).
- Continue to work with partners (including Eastern Federal Lands Highway Division, Trout Unlimited, Ducks Unlimited, Nature Conservancy, etc.) to collaboratively support projects that meet and build upon Service conservation goals.

Chapter 4

Visitor Experience

In addition to conserving, protecting, and enhancing the natural world, the Service is tasked with ensuring these resources "… for the continuing benefit of the American people." Accomplishing this aspect of the Service mission requires a focus on visitor experiences. A seamlessly integrated transportation system should provide the necessary access to visitors, allowing them to explore, discover, and learn from the Service without disturbing natural habitats.

Philadelphia school students observing waterfowl at John Heinz National Wildlife Refuge at Tinicum. Photo by FWS

Overview

- 6 Million annual visitors
- 39 Visitor/education centers
- 6 Urban wildlife refuge partnerships
- 5 Refuges with tram/bus tours
- 59 Refuges with hiking and/or cycling trails

Visitor experiences in Region 5 are as varied as the species and habitats the region protects.

The National Wildlife Refuge System provides visitors with opportunities to engage in the six priority public uses: hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation. An integrated transportation network is vital to upholding the mission of the Service and to achieving this goal within Region 5.

Transportation can support visitor experiences in many ways. For example, waterways and boat launches enhance hunting and fishing; hiking and cycling trails provide photography and interpretation from a personal perspective - unfiltered by the automobile; and wildlife tour roads bring environmental education to all users.

Blue Goose Tram filled with passengers at Back Bay National Wildlife Refuge. Photo by VHB

Visitor Experience

The program will enhance the visitation experience through improvement and investment in the transportation network.

- Improve traveler information through use of intelligent transportation systems (ITS).
- Integrate interpretation, education, and resource stewardship principles into the transportation experience.
- Evaluate the feasibility of alternative transportation systems at all stations and implement where appropriate.
- Encourage connections with existing and planned public and private transportation services.
- Design infrastructure in such a way that highlights the landscape, and not the transportation facility.

Transportation as a Visitor Experience Resource

A transportation network is easily visualized as a system of roadways and parking. For the Service, a transportation network is more — it is a multimodal system of transport options that aid visitor access to stations, support mobility within stations, and ultimately enable visits.

The transportation system's role in the visitor experience is not simply facilitating access or mobility. Many stations provide opportunities to use automobiles, trail networks, or transit tour vehicles to give visitors unique experience opportunities and allow them to interpret their surroundings from a variety of perspectives.

Moreover, interpreting the design and engineering of transportation assets can be used to educate visitors on the relationship between the environment and the developed world. Careful decisions about roadway alignments, visitor management through transit services, and the significance of stormwater management and culvert design to protect habitats and preserve habitat connectivity are valuable lessons for visitors to take away from the Service.

Organization

This chapter addresses the relationship between transportation and visitor experience through various aspects of transportation infrastructure and modes, each of which provides a unique visitor experience. The following visitor experience topics are covered:

- existing visitor use trends,
- existing visitor experience during pre-trip planning and travel,
- existing external and internal alternative transportation,
- future vision for visitor experience, and
- recommendations and actions

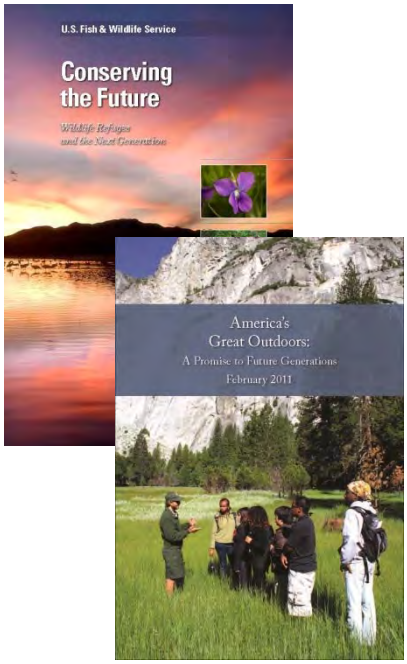
The recommendations and actions described are intended to provide a path for Region 5 to make smart investments, form strong partnerships, and improve visitor experiences.

Guidance

Table 4-1 aligns Federal and Service guidance with visitor experience in the long range transportation planning process. Documents reviewed include: Service mission statement, *Conserving the Future*, *America's Great Outdoors*, and the Fish & Wildlife Service *Roadway Design Guidelines.*

Table 4-1 National Guidance on Visitor Experience and Transportation

U.S. Fish and Wild Service Mission	
"… working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."	
Conserving the Future[1]	▪ **Recommendation 13:** Create an urban refuge initiative that defines excellence in our existing urban refuges and establishes the framework for creating new urban refuge partnerships. ▪ **Recommendation 15:** Develop integrated mechanisms for using web-based and emerging technologies to store and share data, communicate within the System, and inspire and educate visitors and the public. ▪ **Recommendation 17:** The Service will work with state fish and wildlife agencies to conduct a review of current hunting and fishing opportunities, especially for youth and people with disabilities, and prepare a strategy for increasing quality hunting and fishing opportunities. ▪ **Recommendation 18:** Support and enhance appropriate recreation opportunities on national wildlife refuges by partnering with state fish and wildlife agencies, other governmental bodies, conservation organizations and businesses; and by updating relevant policies and infrastructure.
America's Great Outdoors[2]	▪ **2. Enhance Recreational Access and Opportunities:** Increase and improve recreation access and opportunities. ▪ **4. Engage Young People in Conservation and the Great Outdoors:** Build stewardship values and engage youth in conservation and recreation. ▪ **6. Establish Great Urban Park and Community Green Spaces:** Create and enhance a new generation of safe, clean, accessible great urban parks and community green spaces.
Roadway Design Guidelines[3] – Visitor Experience (VE)[3]	▪ **VE-1 Preserve and highlight scenic value:** The scenic value of wildlife refuges plays an important role in the visitor experience. Road alignments should be chosen or revised carefully to preserve the scenic value of the journey. Roadway alignments and locations on FWS managed lands should afford views and prevent roadways from becoming dominant features of the visual landscape. ▪ **VE-2 Promote and facilitate multiple modes of transportation:** Access to FWS managed lands, where compatible with Station purpose, should be available to visitors via multiple forms of transportation, including public transit, bicycle, and walking. Alternative forms of transportation can help reduce visitors' carbon footprints, which may have long term positive affects for natural resources. Planning and building to accommodate sustainable transportation options can help to achieve the FWS mission. ▪ **VE-3 Comply with accessibility standards and guidelines:** FWS managed lands should be accessible to all. FWS is subject to accessibility standards as dictated by the Architectural Barriers Act (ABA). Project teams should use the relevant suite of resources and guidance to ensure all FWS facilities are designed and constructed to comply with or exceed the mandates of the ABA. ▪ **VE-4 Facilitate compatible wildlife dependent recreation and education:** The mission of the Service should be integrated and transparent in the design of roadways on FWS managed lands. Roadways are key in fulfilling the Service's priority of connecting people with nature, and can provide opportunities to do so in ways that are compatible with the conservation mission of the Service.



"National Wildlife Refuges, Fish Hatcheries and other FWS managed lands are national treasures. Facilities there should help visitors connect with the natural heritage that the Service works to conserve."

Roadway Design Guidelines

[1] The National Wildlife Refuge System, U.S. Fish and Wildlife Service, U.S. Department of the Interior. October 2011. *Conserving the Future: Wildlife Refuges and the Next Generation.*
[2] U.S. Department of the Interior, et al. February 2011. *America's Great Outdoors*.
[3] *Roadway Design Guidelines,* U.S. Fish and Wildlife Service, 2014.

Existing Visitor Use Trends

Visitor experience is a qualitative idea concerning how a person feels before, during, and after a station visit. Visitor use is more easily quantified (for example, numbers of visitors, hiking trails, or visitor centers). These measures can be interpreted to infer the quality of the visitor experience.

Visitation

The six million annual visits to Region 5 refuges and hatcheries are made by a wide variety of people, with a wide variety of purposes. Beginning in 2010, the U.S. Geological Survey began a survey effort nationwide on behalf of the Service aimed at compiling a comprehensive database of visitor use and experiences at refuges that can be used to inform decisions and assess needs. To date 16 refuges have participated in the survey effort. Some findings are summarized below.

Providence Parks Urban Wildlife Refuge Partnership sign unveiling. Photo by FWS

- Most visitation involves repeat visits. Some 66 percent of visitors had visited refuges more than once during the past 12 months. On average, those with multiple visits made 19 visits during the past 12 months.
- Approximately 61 percent of visitors are local (live within 50 miles of the refuge).
- Local visitors traveled, on average, 17 miles to reach the refuge. Nonlocal visitors lived an average of 285 miles from the refuge.
- Ninety percent of visitors are visiting in a group of family and/or friends. The size of these groups average about four people.
- Ten percent of visitors traveled in a tour, club, or other group. These groups have an average size of 15 people
- The gender split among visitors is 54 percent male and 46 percent female.

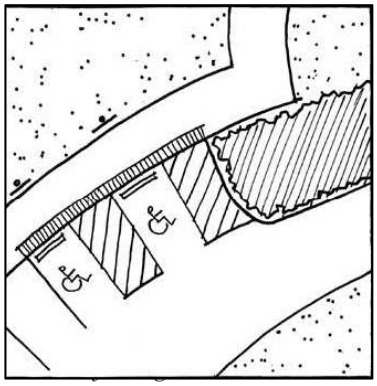
83 % of the urban population in Region 5 states lives within 25 miles of a National Wildlife Refuge

Diversity

Diversity is a key element of Federal and Service guidance documents. Diversity is a broad term that captures a wide scope of existing and potential station visitors.

- **Urban:** The Department of the Interior encourages outreach to urban communities to enhance access to natural resources. Region 5 is playing a role in this effort through the Urban Wildlife Conservation Program. Region 5 is the most densely populated Service region and thus has many opportunities for outreach to urban communities and reaching new visitors. Region 5 now has partnerships in Providence, Rhode Island, New Haven, Connecticut, Baltimore, Maryland, Philadelphia, Pennsylvania, Yonkers, New York, and Springfield, Massachusetts.

- **Youth:** Engaging young people and educating them on the importance of the natural world is critical for the future of the Service and other public land agencies. Young people will shepherd the Service and the environment in the next generation. Region 5 works to inspire and motivate young people to take on this responsibility through hands on education in stations throughout the region. One example is at Presquile NWR. The refuge is an island and is not generally accessible to visitors, but transportation is provided during special events and to support an education center on the island. The education center provides overnight accommodations and classrooms for student group visits.
- **Disabled:** Providing accessible transportation infrastructure and services to facilitate visits by disabled visitors is a priority for Region 5. Eight stations in Region 5 identify on their website that they have trails accessible for mobility impaired visitors. More likely have accessible trails but are missing out on opportunities to serve visitors by not advertising those trails. Five refuges provide tram or van tour services for their visitors. No refuges in Region 5 currently provide accessible water-based experiences.



Roadway Design Guidelines VE-3: Comply with accessibility standards and guidelines

Diversity initiatives will help the region, the Service, and the Department of the Interior meet their goals and should continue to be fostered in future project planning, funding, and partnerships.

Recreation Activities

In addition to the priority public uses, stations offer recreation activities that rely on the internal transportation network to enable or enhance the priority public uses. **Table 4-2** summarizes those resources and their prevalence in Region 5.

Table 4-2 Opportunities for Various Recreation Activities

Recreation Activities	*Region 5 Stations*
Visitor/Education Centers	39
Hunting	45
Fishing	46
Hiking	54
Cycling	5
Accessible Trails	8
Canoeing/Kayaking	27
Camping/Overnight visits	2
Auto Tour Road/Wildlife Drive	11

Source: Various station websites. U.S. Fish and Wildlife Service. 2014. *"U.S. Fish and Wildlife Service"*. URL: www.fws.gov (June 2014).

Kayaker at Ninigret National Wildlife Refuge. Photo by FWS

Existing Visitor Experience

Visitor experiences are based on the feelings that people have about their visits to stations in the region. This qualitative measure and the impact that transportation can have on it are important to understand in the planning process. Decisions and investments made in transportation must be conducive to the Service mission to protect the environment but also to the mission of sharing the Service with visitors for education and interpretation.

New, simplified layout for refuge websites can be viewed at a computer or on a mobile device.

Pre-trip planning

Pre-trip planning includes how visitors learn about refuges and the research they do prior to travel. Word of mouth and static highway signs are the top two means for visitors to first learn of a refuge[4]. Providing sufficient roadway signage is important to continue to encourage visitation and will be explored further as part of the transportation network due to the critical role of wayfinding signage in providing access to stations.

Research prior to travel is primarily done using the internet, making effective web-presence a must. In 2013, Region 5 finished a revision of their refuge station websites using a visually vibrant format to share information with visitors, provide easy access to Flickr accounts to share photography, and to provide some direction to visitors traveling to refuges. Additionally, the new websites can be easily viewed on a computer or a mobile device. These features all help provide a positive visitor experience before and after a visit.

One critical piece of information gathered during pre-trip research is the location of the station and travel directions. Oftentimes, refuges are located in areas that are minimally developed, meaning that roadway access may not be apparent. This can become a disadvantage for stations when common web mapping services are not able to accurately identify station addresses or entrances. At times, visitors can be directed to locations with no entrance or access to a refuge. Providing clear directions in a form that is compatible with smart phones is important for successful pre-trip planning and for safe travel.

Smartphone applications (apps) are another channel through which visitors can communicate with stations and each other. Only one app, for the Chesapeake Bay watershed refuges, is currently available that is geared towards visitors in Region 5.

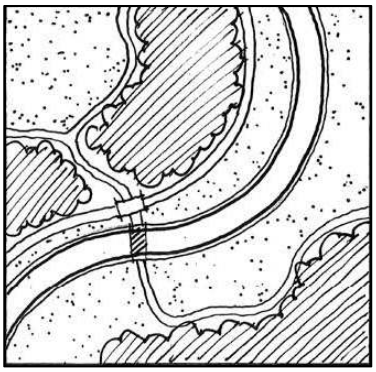
The Chesapeake Bay app provides a platform for users to plan visits, learn about 11 Chesapeake Bay watershed refuges, and share experiences with others from a mobile device.

National Wildlife Refuges: Chesapeake Bay app by National Geographic and Chesapeake Conservancy with support from U.S. Fish and Wildlife Service. Photo from Apple Store

[4] U.S. Geological Survey. *National Wildlife Refuge Visitor Survey*. Data Series 643 (2010/2011) and Data Series 754 (2012). Fort Collins, CO.

Alternative Transportation Systems

Alternative transportation systems (ATS) include public (external) or Service provided (internal) transit service, walking or hiking trails or paths, cycling trails or paths, or waterways that can be explored by canoeing or kayaking. Overall, any of the ATS modes can provide visitors with a unique experience that cannot be achieved using an automobile.



Roadway Design Guidelines VE-2: Promote and facilitate multiple modes of transportation

- **Transit:** Public transit services are accessible to all members of the population, can help minimize impacts of automobile travel and parking in refuges, and can provide access for those without cars. Internal transit service, typically in the form of a tour, can provide visitors with access to areas they might not otherwise encounter and provides the refuge with a venue to interact with and educate those visitors. Internal transit services can also provide a form of visitor management whereby the service is designed to control carrying capacity in sensitive locations.

- **Trails:** Walking and cycling are active forms of transportation that encourage healthy lifestyles while providing personal interaction with nature and the community. Most stations have trails and those trails provide a hands-on visitor experience where visitors can personally interact with the environment in a way that is unfiltered by the confines of an automobile. The greatest challenge with trails inside refuges is accessibility to those with limited mobility. Trails external to a station that connect to a nearby neighborhood or community can promote active recreational transportation for the community and repeat visitation for the refuge.

- **Waterways:** Exploring a refuge from the water engages visitors with habitats and landscapes unseen from the land, and exploring those habitats by canoe or kayak is a unique and memorable visitor experience in and of itself. Expanded water-based transportation is among the most frequently cited needs in visitor surveys yet few visitors have access to the water. Refuges can often attract regional visitation of those who own canoes and kayaks by providing put-ins and landings. However, most people do not have personal watercraft. For some refuges, nearby private boat rentals and water tour outfitters are important partners in providing water-based experiences to all visitors.

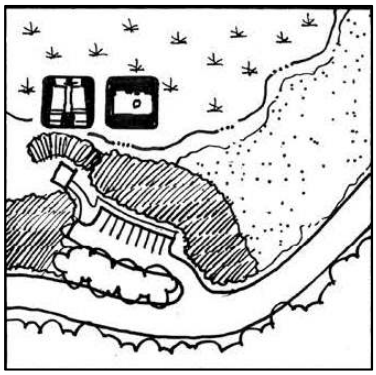
Future Visitor Experiences and Transportation

Chincoteague National Wildlife Refuge. Photo courtesy of John White and FWS.

Visitor experiences are a key element in the LRTP planning process because positive visitor experiences are supported by an integrated transportation network. Without a well maintained transportation network visitors will not have the opportunity to access stations or mobility to explore within their boundaries. A multimodal transportation network can enhance visitor experiences in ways that an automobile cannot.

The vision for visitor experience and the Region 5 transportation system is one that provides suitable access to diverse visitors at stations where feasible and appropriate. Making smart decisions about where investments are made is as important as deciding which projects to carry forward. An emphasis should be placed on urban stations where existing transportation resources oftentimes already exists. Areas that should be emphasized when prioritizing projects and allocating funds are described below.

- **Websites:** The majority of visitors are using the internet throughout their daily lives. This is a key tool for communicating with existing and potential visitors and providing positive visitor experiences. As such, the region should focus on providing accurate information that will ease planning and travel, enhance visits, and engage new visitors.
- **Urban:** As the region with the most opportunities to reach urban population centers, Region 5 should continue to foster partnerships with urban communities and find opportunities to close gaps in ATS at urban stations.
- **Water Recreation:** Opportunities for water recreation (canoeing, kayaking) is a need that visitors have identified for the region. In the short term, the region should begin to identify what opportunities exist for water recreation at stations and how best to connect visitors to the water. Findings and recommendations provided in this plan will be a first step towards filling this need.
- **Youth and Group visitation:** Youth visitors have been identified as the future of the Service and will be caring for the environment in future generations. The region should continue to pursue opportunities to use stations to educate youth. Furthermore, the transportation infrastructure necessary for group visitation should be provided at stations as appropriate.
- **Multimodal mobility:** Alternative transportation systems present an opportunity to provide visitors with new experiences and focused education. Region 5 should continue to find new opportunities to provide these experiences. One example is ensuring that the 11 stations in the region offering auto tour routes make this experience multimodal.



Roadway Design Guidelines VE-4: Facilitate compatible wildlife dependent recreation and education

Recommendations

- Explore opportunities for further water access in the region and how best to enable visitors to utilize this resource.
- Auto Tour Road/Wildlife Drive accommodation as multimodal facilities that allow all users (bicycles, pedestrians, etc.) to have multiple transportation options and visitor experiences, wherever appropriate.
- Internally, ensure that suitable infrastructure and resources are in place to facilitate visits by young people, specifically school groups, to bring environmental education to the greatest number of people to help *America's Great Outdoors* meets its goals.
    - Reach out to diverse visitors including youth, disabled, and underserved to determine what their transportation needs are and how they can be met.
    - Continue to support and build upon the Urban Wildlife Conservation Program and urban wildlife refuge partnerships.
- Externally, form partnerships and advocate for appropriate transit and trail connections to stations, particularly in urban areas where access to private automobiles is less consistent.
- Inform visitors of nearby vendors who can provide rental kayaks, canoes, and bicycles to enable multimodal and active transportation during refuge visits. Consider forming partnerships with vendors to further enhance the multimodal visitor experience.
- Encourage external canoe/kayak vendors to help advertise the refuge either by displaying refuge brochures or by word of mouth.
- Improve pre-trip planning by ensuring that stations provide thorough and accurate data throughout the region
    - Provide clear and uniform information through websites: official address, GPS address, multimodal connections, FWS brochures and maps, local rental vendors, information about available recreation activities for all users (e.g., youth, groups, disabled)
    - Enhance static wayfinding to provide outreach to visitors and seamless travel to refuges.

Conserving the Future, Recommendation 17

"The Service will work closely with state fish and wildlife agencies to conduct a review of its current hunting and fishing opportunities, especially opportunities currently offered for youth and people with disabilities. …"

Needs for Future Analysis

- Identify opportunities to provide multimodal transportation options.
- Identify opportunities for further water access by closing infrastructure gaps or equipment needs for visitors.
- Identify possible connections between nearby transit stops and the refuges.
- Identify inconsistencies and needs for data published on websites.

Interpretive station at Rachel Carson National Wildlife Refuge, Wells, Maine. Photo by VHB

Chapter 5

Transportation Network

The transportation network that supports the goals and initiatives of the Service is an important resource in itself. An integrated transportation network enables Service staff to care for habitats and ecosystems, visitors to engage with nature, and wildlife to thrive without harm or endangerment. The transportation network is a complex system made up of numerous assets, across various modes located in every station. Maintaining such a network is no small task.

Fishing dock at Assabet River National Wildlife Refuge. Photo by VHB

Overview

2,500	transportation assets, worth $0.5 billion
633	miles of roadways
280	miles of trails
23	Refuges accessible by ATS

The transportation network for Region 5 is made up of roadways, parking lots, bridges, trails, docks, and internal transit services across the 86 stations in the region. These assets provide visitors and employees with access to and mobility within refuges and hatcheries. The condition and functionality of every asset is the responsibility of the region.

In addition to managing physical assets, the region is also tasked with ensuring safety within the transportation network for visitors, employees, and wildlife. Visitor and staff safety can be compromised by dangerous roadway infrastructure, trails, or refuge transit systems both internal and external to Service lands. Wildlife safety can be compromised when transportation infrastructure design does not fit within the natural landscape ecology causing habitat fragmentation leading to wildlife-vehicle collisions and other losses of wildlife.

Organization

This section addresses three aspects of the transportation network: asset management; access, mobility and connectivity; and safety. Each of these aspects has their own unique LRTP goals and objectives to be achieved and challenges to overcome. Yet, the transportation network is being covered as a single core topic because of the interconnected nature of these goals and challenges. Deteriorating asset conditions can lead to critical safety concerns or loss of community access to a station. Identifying and remedying weaknesses in these areas could easily have a positive impact on the entire transportation network.

This section concludes with a summary of future challenges that the transportation network faces and recommendations to be considered over the duration of the LRTP.

Guidance

Table 5-1 summarizes various federal and Service guidelines that have been considered in this long range transportation planning process. Documents reviewed include: the Service mission statement, *Conserving the Future, America's Great Outdoors*, and the *Roadway Design Guidelines*. The *Roadway Design Guidelines* report is of particular relevance to this section because it directly addresses many of the challenges and needs of the transportation network. By utilizing the guidelines, future projects can be planned, designed, and constructed in a way that conforms to the natural environment and habitats.

Ohio River Islands National Wildlife Refuge Visitor Center. Photo by FWS

Table 5-1 National-Level Guidance on Region 5 LRTP – Transportation Network

U.S. Fish and Wild Service Mission	
"… working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."	
Conserving the Future	▪ **Recommendation 18:** Support and enhance appropriate recreation opportunities on national wildlife refuges by partnering with state fish and wildlife agencies, other governmental bodies, conservation organizations and businesses; and by updating relevant policies and infrastructure.
America's Great Outdoors	▪ **2. Enhance Recreational Access and Opportunities:** Increase and improve recreation access and opportunities. ▪ **6. Establish Great Urban Park and Community Green Spaces:** Create and enhance a new generation of safe, clean, accessible great urban parks and community green spaces. ▪ **8. Conserve and Restore Our National Parks, Wildlife Refuges, Forest, and Other Federal Lands and Waters:** Conserve, restore, and manage federal lands and water to ensure access and enjoyment for future generations while contributing to the protection of a larger natural and cultural landscape. Advance national, regional, and community-supported work to preserve and enhance unique landscapes, natural areas, historic sites, and cultural areas while ensuring openness and transparency in any land designations. ▪ **9. Protect and Renew Rivers and Other Waters:** Empower communities to connect with America's great outdoors through their rivers and other waterways.
Roadway Design Guidelines	**Purpose:** *"Roadway projects on FWS managed lands should conform to planning and design criteria that have been established to support the FWS mission. This document provides such criteria in the form of guidelines. "* ▪ **Landscape Ecology (LE):** The guidelines provide measures to reduce transportation impacts on the environment, improve habitat connectivity, restore the natural landscape, and respond to climate change. ▪ **Planning Context (PC):** Planning context guidelines step through valuable project-level planning tasks to ensure that the project is designed and completed in a way that conforms to the environment and landscape. ▪ **Design and Engineering (DE):** These guidelines emphasize designs that work with the natural landscape, encourage sustainable practices and life cycle costs, and are safe for users. ▪ **Organism Passage (OP):** Organism passage guidelines provide various tools for organism passages through a transportation network, maintaining habitat connectivity. ▪ **Storm Water Management (SM):** These guidelines provide storm water management tools for managing water and more importantly the impacts of storm water on habitats. ▪ **Visitor Experience (VE):** These guidelines describe ways in which the transportation network can be incorporated into the visitor experience. Visitor experience guidelines were described in detail in the previous section.

Asset Management

The program will operate and maintain a functional, financially sustainable and resilient transportation network to satisfy current and future land management needs in the face of a changing climate.

- Use asset management principles to maintain important infrastructure at an appropriate condition level.
- Prioritize work programs through the project selection process detailed in this plan or an adaptation thereof.
- Evaluate life cycle costs when considering new assets to determine long term financial sustainability.
- Consider the impacts of increased climate variability in the planning and management of transportation assets.

Asset Management

Asset management is imperative in achieving the goal of providing a safe and financially sustainable transportation system. The region needs to understand the condition of assets to make wise investments, address critical transportation needs, and to plan for future infrastructure challenges. Transportation assets are divided into five general categories: roads, parking, bridges, trails, and docks. Assets in each category are further divided into public or administrative in purpose. The following metrics are used to assess the condition of assets:

- **Current Replacement Value (CRV):** represents the cost that the region would have to pay to replace an asset at the present time.
- **Deferred Maintenance (DM):** represents the backlog of maintenance cost associated with an asset.
- **Facility Condition Index (FCI):** measures the cost necessary to bring an asset to full repair. It is defined as the estimated deferred maintenance as a percentage of an asset's current replacement value. Values range from 0.0 for a brand new asset in perfect condition to 1.0 for an asset with maintenance needs equal to the value of the asset.
- **Asset Priority Index (API):** reflects the importance of an asset to the Fish and Wildlife Service mission, it is measured on a scale from zero to 100 with 100 being the most crucial, irreplaceable assets.

The Region 5 transportation network is made up of over 2,500 assets amounting to over half a billion dollars in current replacement value. These assets include over 600 miles of roads and nearly 300 miles of trails. Despite making up approximately 90 percent of CRV, pavement assets (roads and parking) are well maintained, evidenced by a low FCI. Each of the transportation asset types have high API on average, indicative of the importance of transportation assets to station operations. The current condition of Region 5 transportation assets is summarized in **Table 5-2**.[1]

Figure 5-1 Region 5 Transportation Assets by Current Replacement Value

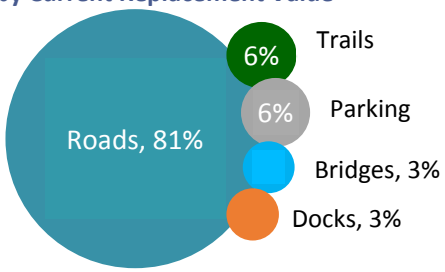


Table 5-2 Transportation Network Condition Summary

Assets	Quantity	Current Replacement Value	Deferred Maintenance	Facility Condition Index	Average Asset Priority Index
Roads	633 lane miles	$423,709,200	$37,773,100	0.09	63
Parking	108 acres	$33,186,000	$2,132,700	0.06	53
Bridges	2,776 linear feet	$15,398,483	-	-	66
Trails	280 linear miles	$32,405,388	-	-	53
Docks & Boat Launches	10,813 sq. yards	$15,533,333	-	-	57
Total	-	**$520,232,404**	**$39,905,800**	**0.08**	**57**

Source: Asset quantity and condition data provided by the U.S. Fish & Wildlife Service
Roads and Parking: Roadway Inventory Program, Cycle 4, July 2013. Trails: Trail Roadway Inventory Program, Cycles 2 and 3, July 2013.
Bridges, Trails, Docks, and Boat Launches: Service Asset Maintenance Management System, 2014

[1] FWS transportation program is transitioning to new data collection protocols. Many data collection efforts require multiple years to gather complete data sets. As old data are replaced with new data, discrepancies can emerge from changing methodologies.

Asset Condition

The Service Asset Maintenance Management System (SAMMS) database, roadway inventory program reports (RIP), and Region 5 bridge inventory provide an inventory of Service transportation assets, their characteristics and conditions. Assets inventoried in RIP include roadways and parking lots, while SAMMS includes trails, docks and boat launches. Each pavement asset in the RIP database is rated into one of five conditions – excellent, good, fair, poor or failed conditions. Assets in the SAMMS database are characterized as being in good, fair, poor, or serious condition. Bridges assets are characterized as being in very good, good, satisfactory, fair, or poor condition.

Roadways, Parking, and Bridges

Roadway assets account for 80 percent of value of transportation assets in Region 5. There are 85 miles of paved and 548 miles of unpaved roads in the region, with 35 percent of roadways being public roads. Sixty-three percent of these roadways are in excellent or good condition, and eight percent are in poor or failed condition.

There are 108 acres of parking facilities in Region 5. Sixty-three percent of the parking facilities are in excellent or good condition and seven percent of parking facilities are in poor or failed condition. Some 43 percent of parking areas are paved.

Forty-four bridge assets are located in Region 5. There are 2,776 linear feet of bridges, including both road bridges and culvert road bridges. The majority of bridges, 84 percent, are in satisfactory or better condition.

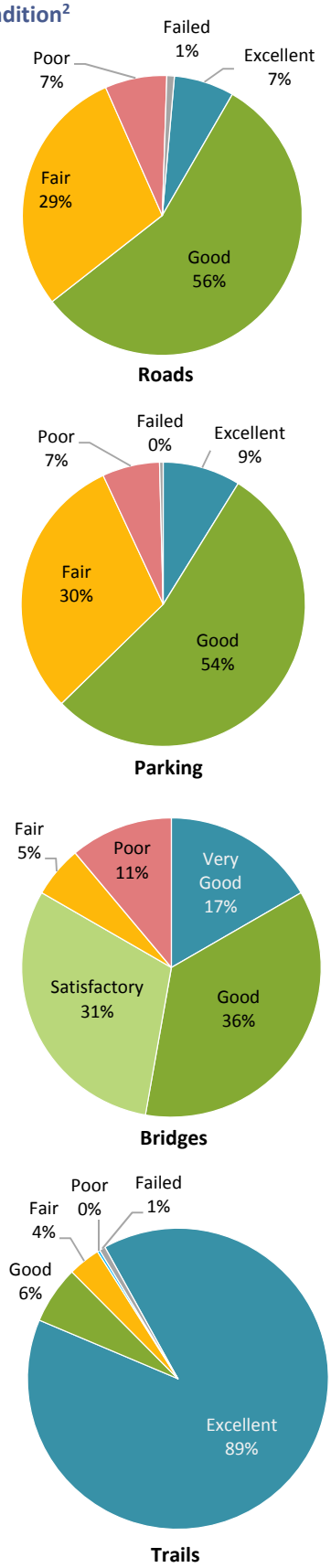
Trails

The trails category of assets (paved trails, unpaved trails, trail bridges, and boardwalks) account for approximately nine percent of the value of transportation assets in Region 5. With 280 linear miles of trails in Region 5, the majority are well-maintained, with 95 percent of trails in excellent or good condition. Only one percent of trails are in poor or failed condition.

Transit

In Region 5, five refuges offer a transit service internally: Back Bay NWR, Chincoteague NWR, Edwin B. Forsythe NWR, Parker River NWR and Patuxent Research Refuge. Great Dismal Swamp NWR is served by scheduled bus tours operated by the local municipal tourism agency. Transit services typically operate as partnerships with local organizations, friends groups, and volunteers.

Figure 5-2 Region 5 Transportation Assets by Condition[2]



[2] Road, Parking, and Trail conditions based on Roadway Inventory Program (Cycle 4) and Trail Inventory Program (Cycles 2 and 3) data. Bridge conditions based on Region 5 Inventory, September 2014.

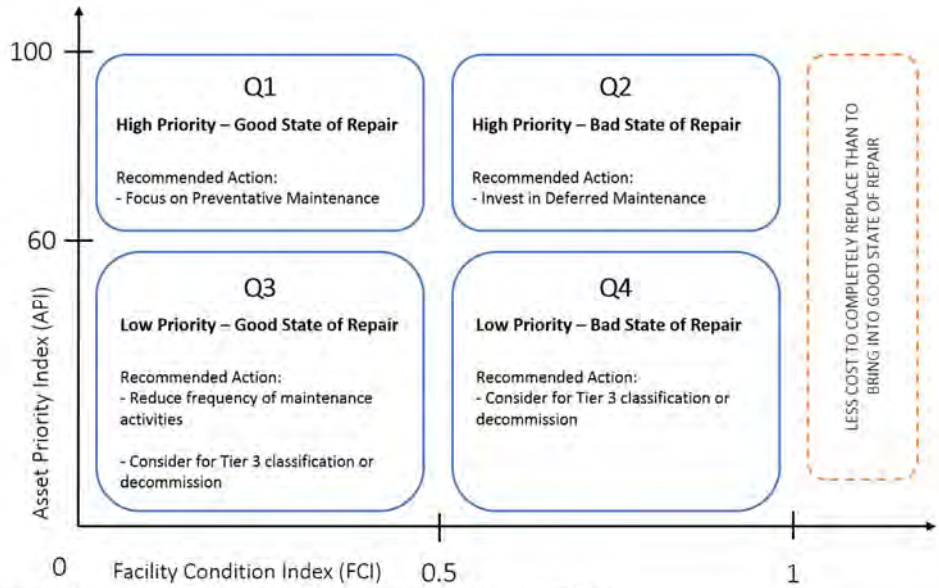
Asset Management and Investment Strategy

Service-wide and in Region 5, transportation assets account for the majority of deferred maintenance. Thus it is important to utilize an effective asset management system and a targeted management strategy to maintain transportation assets while working within a limited and evolving funding environment.

Region 5 utilizes the national asset management system and follows the national investment strategy. A critical component of this is the investment strategy is "State of Good Repair" which focuses on maintaining assets in good or excellent condition at their current conditions. Figure 5-3 illustrates how the Service Investment Strategy targets high priority assets (API between 60 and 100). The focus for low priority assets is reducing the need for future maintenance and potential decommission to eliminate future liabilities.

The vast majority of deferred maintenance is attributable to roads and parking areas. Investments in these facilities are prioritized for Tier 1 and Tier 2 assets.[3] The FHWA provides the Service with periodic inventories of pavement conditions and conducts modeling of investment scenarios. These analyses indicate that under current budgetary allocations there is funding sufficient only to maintain the current conditions of roads and parking areas.

Figure 5-3 Fish and Wildlife Service Asset Condition and Priority Matrix



Source: *PLAN 2035 the National Long Range Transportation Plan.*

[3] Tier 1 facilities generally include main access routes, auto tour routes and visitor center parking. Tier 2 facilities generally include connector road, administrative facilities and parking pull-outs. Tier 3 facilities are generally non-mission critical and low volume, with non-engineered/native surfaces.

Access, Mobility, & Connectivity

Alternative Transportation Systems

Alternative Transportation Systems (ATS) are systems that provide transportation without a personal vehicle. These include transit systems, trails, and waterways. These systems could be external (providing access) or internal (providing mobility and connectivity) to the Service.

- **Trails:** Trails are a non-motorized route which accommodates pedestrians and/or cyclists without interference from automobiles. External trails could be as developed as a sidewalk or bike path along a busy street or as simple as a locally established path through a park or neighborhood. Internal trail networks are necessary to provide mobility and connectivity across a station.
- **Transit:** External transit provides an environmentally friendly travel option for visitors to access stations. This could be in the form of regional or municipal public transit or station-specific tour shuttles or buses. An internal transit service provides mobility and connectivity without roadway capacity for every visitor automobile, manages automobile usage, and provides easier control over visitor travels within a station, which may be necessary in protecting vulnerable or sensitive habitats or in stations that are too large to explore on foot.
- **Waterways:** Waterways are routes where visitors can access the stations from external water bodies or travel internally within the station via canoes, kayaks, or non-motorized boats. Water access and mobility can potentially reduce or minimize the disturbance of habitats within a refuge, while still allowing visitors to experience and explore the refuge. More opportunities for water recreation was cited by visitors as a particular need in Region 5[4].

Multimodal Access

One goal the Service set for long range transportation planning is to better understand external ATS connections. The *Regional Alternative Transportation Evaluation* (RATE)[5] took the first steps in this process, and additional data was gathered in conjunction with the LRTP effort.

The RATE study found that only three refuges have a viable public transit connection, i.e., one within one-half mile. Only 11 have transit service even within three miles.

Access, Mobility & Connectivity

The program will ensure that units open to the public have adequate transportation options for all users including underserved, underrepresented, and mobility limited populations.

- Offer a wide range of transportation modes and linkages for on and off site access.
- Provide clear wayfinding information both on and off Service lands.
- Through the Urban Wildlife Conservation Program, integrate Service transportation facilities with local community transportation systems in a way that encourages local visitation and provides economic benefits to partner and gateway communities.
- Through coordinated planning, provide context-appropriate transportation facilities that address the specific needs of local visitor groups and respect the natural setting of the refuge or hatchery.
- Address congestion issues to and within Service units.

[4] U.S. Geological Survey. *National Wildlife Refuge Visitor Survey*. Data Series 643 (2010/2011) and Data Series 754 (2012). Fort Collins, CO.
[5] U.S. Fish and Wildlife Service, John A. Volpe National Transportation Systems Center. May 2012. Regional Alternative Transportation Evaluation Report-Region 5.

Stations providing ATS Mobility

5%	*transit*
62%	*trails*
44%	*waterways*

Stations accessible by:

public transit	3
trail connections	14
waterways	48

Fourteen refuges have regional trail connections that directly connect to the refuge or are within one-half mile. Another six refuges have regional trails within three miles of the refuge.

To understand future water-based opportunities, mapping of waters near refuges were reviewed. Forty-eight refuges are adjacent to flat waters (lakes, inlet, bays, slow moving rivers) and have waterways that can provide public access to the station.

Multimodal Mobility and Connectivity

Providing multimodal mobility enables visitors to explore stations first hand, without an automobile. This improves the visitor experience, reduces negative impacts such as pollution on habitats, and provides an opportunity for active transportation.

The majority of Region 5 stations have bicycle and/or hiking trails. There is no formal inventory on availability of water trails. For the purpose of this plan, water trails within refuges were determined through the refuge websites. Approximately half of refuges have water trails.

Five refuges in Region 5 offer a transit service providing mobility within the refuge: Back Bay NWR, Chincoteague NWR, Edwin B. Forsythe NWR, Parker River NWR and Patuxent Research Refuge. Funding consideration is being given to potential new transit services at Wertheim NWR and Monomoy NWR in partnership with other local, state and national agencies. Additionally, the existing tram service at Back Bay NWR is being studied for possible expansion to provide external access to the refuge.

Electric tram at Patuxent National Research Refuge. Photo by FWS

Electric trams are used at several refuges in Region 5 to provide scheduled and reserved tours. Not only do they have zero tailpipe emissions, but the quiet operation and low speeds allow them to approach birds and animals for better viewing without disturbance or harm to habitats.

Electric trams are less expensive to buy and operate, and easier to maintain, than vans and small buses. This tram, at Patuxent NRR, is open air. Enclosed trams, with heat and air conditioning, are used at Forsythe NWR.

Wayfinding

Wayfinding signage has been cited in visitor surveys as one of the most important methods for visitors to first learn of a refuge. Not only is wayfinding signage a tool for increasing visitation, it is often critical in ensuring a good visitor experience.

GPS services have made static wayfinding signage less important for directing drivers, but many refuges are in areas where cellular service is poor and visitors cannot rely on traffic and navigation apps. Where cellular service is available, only limited wayfinding signage may be needed to direct drivers to a visitor center, but popular secondary locations require more comprehensive wayfinding signage since they may not be easily located by GPS services.

Lack of appropriate wayfinding signage is a significant challenge in Region 5 as funding has not historically been available. Wayfinding signage should be incorporated into applicable new projects. For existing locations, partnership opportunities can be pursued where communities recognize the economic contributions of a refuge.

Safety

Providing a safe transportation system for visitors and staff when traveling to and within refuges is essential. To do so relies on accurate data about vehicle crashes to identify "hot spot" locations so that Roadway Safety Audits and the Service's national Safety Analysis Toolkit can be used to develop appropriate countermeasures and actions to remedy safety issues at a location.

Identifying "Hot Spots"

A screening review was conducted at 28 refuges to identify possible vehicle safety "hotspots" locations. The 28 refuges comprise more than 90 percent of the recorded visitation among all stations in Region 5. Crash data records were obtained from state transportation agencies and departments of transportation for locations that are primary access points to visitor centers and contact stations. At some refuges, crash data for other high-activity locations, such as key trailhead parking areas, were also collected.

Safety

The program's network will provide a superior level of safety for all users and all modes of transportation to and within FWS lands.

- Identify safety issue 'hot-spots' within the Service's transportation system with the Safety Analysis Toolkit.
- Implement appropriate safety countermeasures to resolve safety issues and reduce the frequency and severity of crashes (also with Safety Analysis Toolkit).
- Address wildlife-vehicle collisions with design solutions (Environmental Enhancements).
- Use cooperation and communication among the "4Es" of safety including: engineering, education, enforcement, and emergency medical services.

Patuxent Research Refuge non-compliant signage observed during a Road Safety Audit. Photo by VHB

Roadway Design Guidelines DE-4: Consider road geometries for lower speeds, safety and alertness

The majority of locations had no recent crash history and none of the locations reviewed showed recent fatal crashes. In all, there were 134 crashes, including 39 crashes that resulted in injuries. Approximately two-thirds of all crashes occurred at nine locations. After a thorough review of contributing factors such as time of day, weather conditions and lighting conditions, seven locations were considered as potential "hot spot" candidates for further safety review. These are listed in **Table 5-3**.

Safety issues are collaboratively addressed using the "4E"s – engineering, education, enforcement and emergency management system. The national Safety Analysis Toolkit provides information on appropriate countermeasures to reduce the frequency and severity of crashes. Implementation of these countermeasures often requires coordination with municipal or state agencies. Many states and larger cities offer a Road Safety Audit program where refuge staff and the local community can be assisted by engineering and law enforcement staff in identifying and mitigating vehicle safety issues.

Table 5-3 Safety 'Hot Spot' Candidate Locations

Refuge	Location
Patuxent Research Refuge	▪ Powder Mill Road at American Holly Drive and Laurel Bowie Road
Edwin B. Forsythe National Wildlife Refuge	▪ Great Creek Road at US Route 9 ▪ Great Creek Road (to Visitor Center)
Sachuest Point National Wildlife Refuge	▪ Paradise Avenue at Hanging Road ▪ Hanging Rock at Sachuest Point Road
Missiquoi National Wildlife Refuge	▪ Missiquoi National Wildlife Refuge Boat Launch at Route 78 ▪ Campbell Bay Road at Route 78

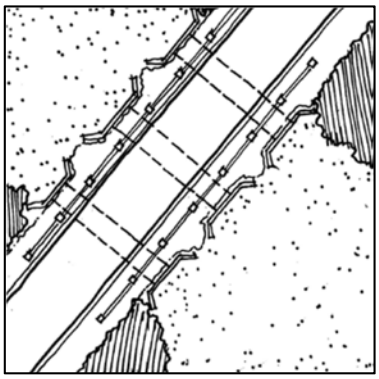
Wildlife-Vehicle Collisions

Safety for visitors and staff is important; however, safety for wildlife and habitats cannot be neglected. Wildlife-vehicle collisions (WVC) are a major concern within refuge lands, but there is currently no comprehensive study of hotspots for WVC on Service units.

Regional Alternative Transportation Evaluation (RATE) surveys provide a limited amount of information on WVCs. RATE asked refuge managers if their refuges experience any issues regarding wildlife-vehicle collisions. Approximately 30 percent of the refuges experience WVC issues and/or safety-related issues relating to wildlife-vehicle collisions.

Currently, data on wildlife-vehicle collisions within the refuges are limited. A uniform crash data collection method for WVCs should be implemented across Region 5 refuges to begin to close this critical data gap. Having a uniform method within and among the stations would facilitate in identifying crashes that involve specific refuge habitats. Tracking the species impacted in wildlife-vehicle collisions can help identify population impacts.

The *Roadway Design Guidelines* provide guidance on corridor plan for habitat, as well as terrestrial wildlife crossings. It also provides guidance on evaluating needs for wildlife fencing and other guiding features for animals, as well as warning and safety systems to alert drivers of the presence of wildlife on a roadway. Alternatively, the use of alternative transportation systems within the refuge can help reduce the use of roads and parking lots, which can help minimize the number of wildlife-vehicle collisions.



Roadway Design Guidelines OP-3: Provide and enhance terrestrial wildlife crossings

Roadway Design Guidelines OP-1: Develop your corridor plan for crossing

Black Bear. Photo by FWS

The US Route 17 widening project near Great Dismal Swamp NWR involved cooperation of six state and federal agencies and 21 environmental organizations. Protecting wildlife and the swamp ecosystem were important elements of the projects. The project incorporated several large animal crossings at bridges and culverts.

Funding for animal crossings is authorized under FAST Act and the national Plan 2035 calls for allocating funds specifically to Environment Enhancements such as wildlife crossings.

Future Transportation Network

There are a wide number of issues that will shape the future transportation network over the next 20 years. The intent of this section is to summarize and project trends in certain areas that will play a critical role in future decision making.

Maintain Assets

Regular maintenance and smart investments in assets are critical to achieving a financially sustainable asset portfolio,. Maintaining assets in good condition can improve the longevity of assets, minimize liabilities and deferred maintenance, improve safety and ultimately enhance visitor experience. The Service's asset management systems and the national investment strategy policies define how best to do this.

Edwin B. Forsythe NWR damage following Hurricane Sandy.
Photo by R. Hagerty/FWS

Climate Change

Region 5 is vulnerable to sea level rise and storm surge during extreme weather events because the vast majority of stations in Region 5 are coastal or wetland habitats along the eastern coast of the United States. Road systems and other transportation corridors in low-lying areas are at risk of damage or flooding from such events. All of these factors highlight the importance of implementing sound adaptation, mitigation, and engagement programs to meet the Service's commitments to proactive climate change response.

Adaptation is critical for asset management. As assets are washed out during these events, consideration needs to be given to adapting assets to climate change or in some cases abandoning (decommissioning) assets that will never be able to withstand the impacts of climate change.

Mitigating contributions to climate change (greenhouse gas emissions) can be done through promoting multimodal connections to stations, reducing the need for visitors to drive within stations, and providing visitors with alternative transportation options. These small changes can be used to educate visitors and encourage further changes in their day-to-day lives.

Commercial kayak tour group departing Back Bay National Wildlife Refuge.
Photo by VHB

Access, Mobility, Connectivity

To improve mobility within stations, reduce habitat disturbances and greenhouse gas emissions from visitors, additional opportunities for ATS should be made available for visitors. This means providing not only the necessary infrastructure (shuttles, boat launches, trails), but sometimes even the boats and bicycles to travel that infrastructure.

Canoe and boat launches are available at 30 percent of refuges, and cycling is permitted at a handful of refuges. However, these can only be enjoyed by visitors who provide their own equipment. Visitors who do not own or have the ability to transport bicycles, canoes, or kayaks are limited in their ability to

fully explore stations. This is especially common within urbanized areas, where potential nearby visitors might be constrained by limited space in their residence to store a kayak or bicycle, or by lower rates of vehicle ownership.

The vision for future ATS in stations includes partnerships with private vendors who are able to rent bicycles, canoes, and kayaks to visitors, or provide a pick-up and drop-off service at the refuges. Stations can also consider purchasing and providing equipment rentals on site. This will enable visitors to explore new places from new perspectives. Additionally, an environmental benefit of providing and housing equipment locally is the reduced likelihood of introducing foreign influences to the natural habitat.

Stations with nearby commercial operations providing access by water:

Kayak Rentals	*24*
Water Tours	*15*

Recommendations

- Encourage multi-use roadways by adapting Auto Tour Routes/Wildlife Drives as shared auto, pedestrians and bicycle paths.
- Externally, form partnerships and advocate for appropriate ATS connections to stations, particularly in urban areas where access to private automobiles is less consistent.
    - Focus on stations where transportation gaps could be bridged. For example, John Heinz NWR at Tinicum has a half-mile trail gap between the station and a transit connection.
- Form partnerships with external vendors who can provide rental kayaks, canoes, and bicycles.
- Improve visitor awareness and travel experience by providing wayfinding signage to refuges.
- Partner with municipalities and state agencies to conduct Road Safety Audits of locations where vehicle and pedestrian safety is a concern.
- Implement a uniform wildlife vehicle collision data collection methodology across the region and establish a data sharing website to discuss best practices for addressing wildlife-vehicle collisions.
- To proactively address wildlife vehicle collisions, use *Roadway Design Guidelines* as a reference on corridor planning for habitat and terrestrial wildlife crossings, as well as evaluating needs for wildlife fencing and other guiding feature for animals.
- Take a proactive approach to climate change adaptation by determining the vulnerability of critical transportation assets.
- Partner with local transportation agencies and police departments to provide opportunities in data sharing, enhance data quality, and help identify safety issues within the Service's transportation system.
- Coordinate and partner with agencies to work as a team in identifying safety hot spots and implementing safety countermeasures.

Needs for Future Analysis

- Develop a uniform documentation method of wildlife-vehicle collisions.
- Identify WVC hotspots and trends by geolocating past and future wildlife-vehicle collisions.
- Identify critical transportation assets that are vulnerable to climate change.
- Identify areas that lack wayfinding signage.
- Identify opportunities for water access.

Kayakers at Ninigret National Wildlife Refuge, Charlestown, Rhode Island. Photo by FWS

Chapter 6

Project Programming and Partnerships

Region 5 has adapted the national project selection framework to best meet the transportation needs of the region based on available core funding, principally from the national Federal Lands Transportation Program. Region 5 has historically used, and will continue to use, partnerships to leverage funding and to access supplemental funding sources.

Lewis Pond at Silvio O. Conte NFWR, Nulhegan Basin Division. Photo by FWS

The Fixing America's Surface Transportation Act (FAST Act) and the earlier Moving Ahead for Progress in the 21st Century Act (MAP-21) transportation legislation emphasize performance requirements, providing multimodal transportation options, and a focus on high-use recreation areas and economic generators.

Fast Act and MAP-21 also modified and consolidated transportation funding programs to increase the number of federal agencies accessing the funds, to broaden the types of projects for which the funds could be used, and to incentivize cooperation with gateway communities.

This chapter presents the past and present funding opportunities for Region 5, and the project programing policies to best use that funding.

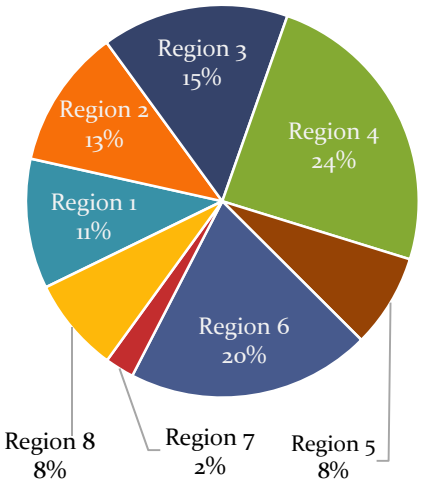
Region 5 Transportation Funding

Region 5 transportation funding includes dedicated funding through the Federal Lands Transportation Program, and competitive supplemental funding. The supplemental transportation funding comes from a mix of programs within Region 5, such as deferred maintenance, along with grants that are competitive among federal land management agencies, states, communities and others. FAST Act legislation has made more types of projects eligible for funding, but at the same time has increased the competition for the supplemental funding.

Federal Lands Transportation Program

Region 5 has historically received dedicated transportation funding each year through the FAST Act Federal Lands Transportation Program (FLTP) and the predecessor Refuge Roads Program. The FLTP provides some $1.75 million annually to Region 5. Federal Lands Transportation Program funds can be used for refuges and hatcheries as long as those lands are open to the public and the benefitting assets are included in the Service's transportation facility inventory.

Figure 6-1 FWS FLTP Fund Allocation



Source: FWS National Reauthorization 2013 Prioritization Pilot and Work Optimization Analyses Report

The Service receives $30 million in FLTP funding and it is allocated among all regions. The allocation formula weights highest (55%) a region's share of the combined national inventory of roads, bridges and parking; followed by the condition of the road and parking inventory (30%); and visitation (15%). The formula for the weighting of the asset inventory is itself weighted toward road mileage and one reason Region 5 receives a relatively low share of the nationwide funds is because it has a lower percentage of roads among its transportation assets (80% for Region 5 vs. 93% nationally).

Of note in the Service's FLTP allocation formula is that the calculation for the criterion of condition of road and parking inventory excludes assets in poor or failed condition and gives half weight to assets in excellent condition. This is consistent with general asset management principles of investing to maintain assets rather than to reconstruct assets. Region 5's condition percentages are consistent with national averages.

In addition to funding for construction projects, five percent of the annual FLTP budget is set aside for planning purposes. Activities under the transportation planning program include safety, bridge, pavement and congestion management systems; long range transportation planning; data collection and establishment of data standards; and bridge inspections.

Other Service Funding Programs

Within the Service, other funding sources are available to make improvements and address needs on Service lands. Such improvements are not specific to transportation; however, many aspects of operations in the Service are interconnected, including transportation. Such funding sources include construction, deferred maintenance, and visitor facility enhancement.

- **Construction** funds are distributed at the national level. The Fiscal Year 2015 construction budget is $15.7 million with $6.6 million specifically for line-item construction items.
- **Deferred Maintenance** funds are available to reduce the backlog of maintenance needs throughout the Service. In the past these funds have been used to address maintenance needs, large and small, across the Service. In more recent years, this fund source has been cut in half and projects have been geared towards smaller, preventative maintenance needs and rarely on transportation facilities. Region 5 funding for deferred maintenance has dropped from $6.0 million in 2007 to $3.3 million in 2013.
- **Visitor Facility Enhancement** funds are used to address needs that impact visitor experience. Any facility, transportation or otherwise, can contribute to or detract from a visit. As such, Visitor Facility Enhancement funds can be spent in many ways. Similar to Deferred Maintenance funds, this fund source has been decreasing in recent years.

FAST Act Supplemental Funding Opportunities

The FAST Act legislation includes two supplemental funding programs that are important for the Region 5 transportation system.

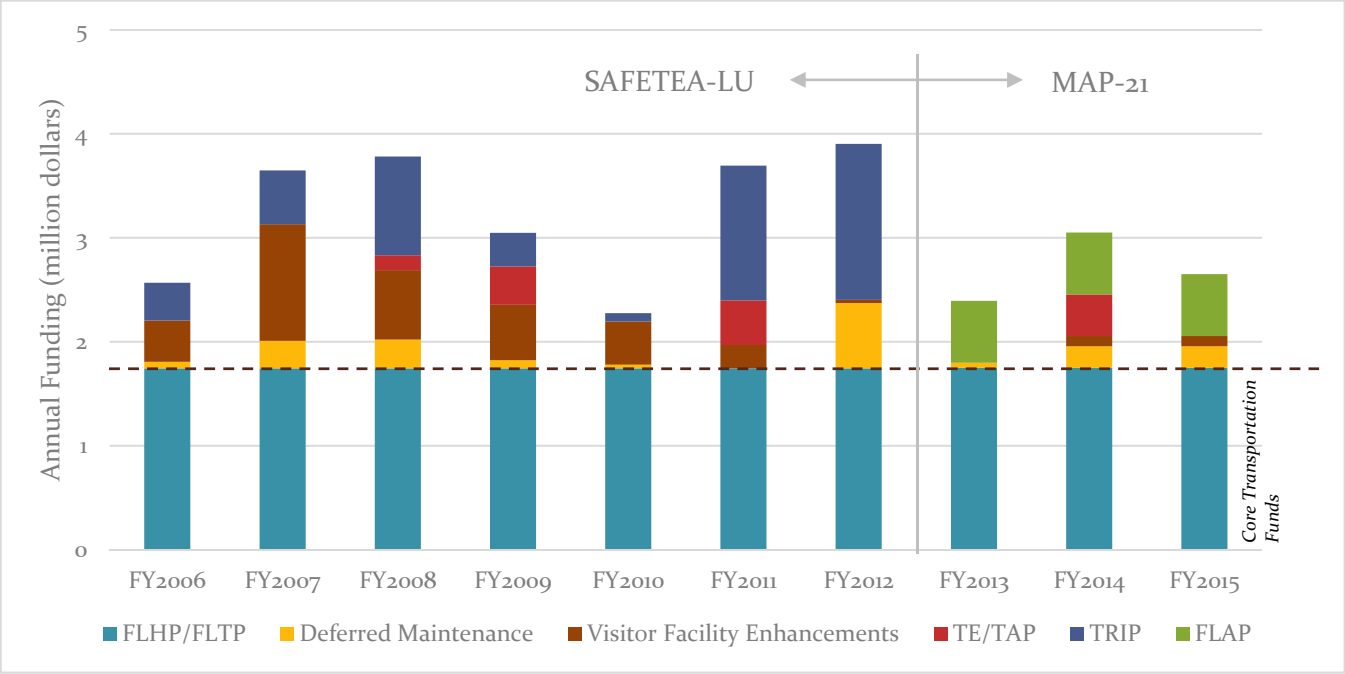
The **Surface Transportation Block Grant (STBG)** program includes a set-aside of funding for transportation alternatives. Eligible projects include pedestrian and bicycle facilities, recreational trails, and environmental mitigation projects such as stormwater managements, mitigation of wildlife-vehicle collisions, and restoration of connectivity among terrestrial and aquatic habitats. The funding can be used directly by the Service or in partnership with local governments and transit authorities. Region 5 has in the past used similar funding under an earlier Transportation Enhancements program for some trail projects. Unfortunately, the STBG is a very competitive program with limited funding. In addition, STBG funding, priorities, and policies are administered separately by each state and this makes it difficult to pursue effectively.

The **Federal Lands Access Program (FLAP)** provides funding for improvements to transportation facilities owned or maintained by state and local agencies that provide access to federal land management agency sites. The funding is awarded to the owner of the transportation asset, such as a local community or state department of transportation, and not to the federal agency. The owner of the property is also responsible for the final preparation and submittal to the FHWA Federal Lands Highway Division office of the application, although typically most supporting documentation is prepared by the federal agency. Funding is allocated to each state based on the prevalence of federal lands in the state, the mileage of federally owned roads and the number of federally owned bridges in the state, and the annual visitation to federal land units in the state. Annual FLAP funding in Region 5 states ranges from less than $15,000 in Rhode Island to more than $3 million in Virginia. In 2013, Region 5 received a total of $765,000 in FLAP funds for projects in Featherstone NWR (Virginia) and Canaan Valley NWR (West Virginia).

Historic Funding Summary

Figure 6-2 shows historic funding trends for Region 5. Core transportation (FLTP) funds have been, and are projected to be, stagnant at about $1.75 million annually over the foreseeable future. Supplemental funding has been considerable in past years, sometimes doubling the annual budget for transportation investments, but the magnitude of historically obtained supplemental funding in Region 5 is not expected to continue in future years.

Figure 6-2 Region 5 Historic Funding



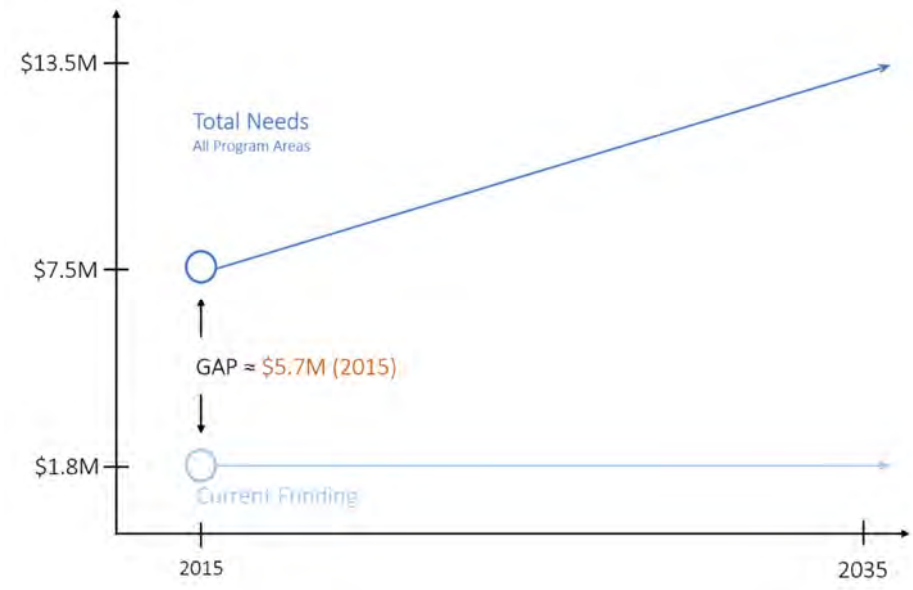
Source: Historic funding data FY 2006 – FY 2014 provided by Region 5, U.S. Fish & Wildlife Service.

The most substantial changes are expected in Visitor Facility Enhancement funding and in grants for alternative transportation initiatives. Region 5 has averaged since FY2006 roughly $400,000 in Visitor Facility Enhancement funding for transportation-related projects, but the amount has been decreasing in recent years as the need for the funding for all project types, not just transportation-related, continues to grow. The most notable change will be due to the loss of the Sarbanes Transit in Parks (TRIP) grant program. This was discontinued in 2012 under MAP-21. Region 5 had been very successful in pursuing TRIP grants, receiving more than $1 million in each of the last two years of the program.

Region 5 Transportation Program Needs

The national *PLAN 2035* sets metrics for the desired conditions of transportation assets and for transportation initiatives. To achieve these targets would require annual funding of $7.5 million for Region 5. With current core funding at $1.75 million, there is a $5.7 million annual financial gap (current dollars) in transportation needs versus allocated revenues.

Figure 6-3 Region 5 projected funding needs and gap



Approximately 60 percent of Region 5 annual transportation program need, some $4.5 million, is for roads and parking. This percentage is consistent with the average Service-wide. The objective of the road and parking program needs is to improve the condition of those assets to achieve an overall average of 'good' condition.

The remaining $3.0 million in annual program need is related to bridges, trails, transit, and environmental enhancements. The objectives for bridges and trails, as stated in *PLAN 2035*, is to have at least 95 percent of those assets in good or excellent condition. The objective for transit is a "modest expansion at key locations" and the objective for environmental enhancements is to incorporate aquatic and terrestrial passages and other improvements in some projects each year.

Project Selection

PLAN 2035 outlines a national project selection framework that provides uniformity in project selection across the Service. The project selection process, illustrated by **Figure 6-3**, was developed to provide an objective means, using best-available data, to arrive at effective funding decisions.

Project Scorecard

The project selection scorecard was developed for *PLAN 2035*. Criteria are split among the six goal areas. Criteria will likely evolve from year to year to best reflect the needs and priorities of the region; however, the desire for the criteria to be used to meet LRTP goals will not change. The characteristics of high scoring projects are summarized below.

Coordinated Opportunities: This goal area is focused on ensuring that all projects have strong partner support. The criteria elements include support by partners, using partner expertise for planning, designing, constructing or operating the project, and partner funding.

Asset Management: Asset management scoring criteria include bringing assets to 'good' condition, taking into account vulnerability to extreme and changing weather patterns, and life-cycle costs.

Safety: Improving transportation-related safety for visitors, staff, and wildlife should be considered for every transportation project. The safety criteria cover all of the "4Es" of safety — engineering, education, enforcement, and emergency medical services — and apply to all modes of travel.

Environmental: All projects are expected to be designed to reduce negative impacts to fish, wildlife, habitat and cultural resources. Higher scoring projects will be those that also reduce greenhouse gas emissions, enhance wildlife connectivity and reduce habitat fragmentation.

Access, Mobility, and Connectivity: The focus of these criteria is to expand modal options other than private automobiles. Expanding access to underrepresented visitor groups and providing increased connections to existing roads, trails and transit are strongly supported.

Visitor Experience: The criteria for scoring visitor experience elements range from wayfinding for visitor orientation, addressing congestion 'hot spots', and incorporating environmental education, interpretation and stewardship into the travel experience.

Figure 6-3 Region 5 Project Selection Process

Step 1
October – November
Region Solicits Projects from Units

- Regional Coordinator provides guidance to unit managers for completing application and submitted important data.

Step 2
December – Mid-January
Region Prepares Applications for Scoring

- Regional Coordinator ensures applications contain required information and are in a proper format.

Step 3
Mid-January – February
Region Scores Projects

- A Regional Scoring Team and the Regional Coordinator score and evaluate individual applications based on the Prioritization Scorecard

Step 4
February – Mid-February
Project Prioritized

- Regional Coordinator and Regional Scoring Team tally results and determine relative priority of highest scoring projects. Corresponding FLH Field Visits to verify data.

Step 5
Mid-February – March
Determine Project for Regional Program

- Regional Coordinator, Chief, and Regional Score Team evaluate ranked and tiered project and determine where they fit in the current FLTP work program.

Step 6
March – May
Eligibility Check and Program

- Regional and National Coordinators send list to National Program Manager to confirm project eligibility. After review, projects are added to the amended FLTP 5-year program of projects.

Step 7
May – October
Adapt for Next Cycle

- Regional Coordinator and Regional Scoring Team evaluate results and make changes for next cycle.

Source: Adapted from *PLAN 2035 the National Long Range Transportation Plan*

Project Selection Process in Region 5

The framework of the project selection process is standard across the Service with regions provided flexibility to adapt the framework to fit their specific needs and circumstances. Key elements of the project selection process specific to Region 5 include the following:

Regional Project Scoring Team: The Region 5 Project Scoring Team is made up of the Regional Transportation Coordinator, the Region 5 Chief/Deputy Chief, the North and South Zone Superintendents, the Assistant Regional Director of Refuges, the Assistant Regional Director of Hatcheries, and a field or station representative to provide perspective from the station level.

Submitting project information: Region 5 has developed an application-based system to allow refuges to submit applications for potential projects.

Sub-criteria: Region 5 does not add sub-criteria to the national project scorecard. The national scorecard was found to adequately represent the needs and priorities of Region 5.

Process for assigning scores: The region assigns scores based on the criteria laid out in the scorecard and inform stations through the application-based process.

Goal category weights: The goal category weights as proposed by the national project framework accurately reflect the emphasis areas that are important to Region 5.

Scheduling: The schedule for updating the project selection process can be dictated by each Region Project Scoring Team. (Figure 6-3)

Use of scores in final project selection: Project selection takes the project scores into consideration; however, final decision remains with the project selection team. Often, headquarters helps in the final decisions. A key factor that the project selection team will consider is how to efficiently utilize a limited budget. For example, high scoring projects that require the majority of an annual budget may have to be passed over in favor of more efficient project programming.

Priority Transportation Projects

Given the constraints of the available funding, the annual list of regionally selected projects does not reflect true program needs. To help the Service identify funding needs at a larger scale, all regions submit to headquarters a list of "top projects" each year. The projects are grouped in the following categories: Wildlife / Habitat Improvement, Safety, Trails, Bridges, Parking, Auto Tour Routes, Primary FWS Access Roads, Primary non-FWS Access Roads, and "Mega" projects. The current list of Region 5 priority transportation projects exceeds $40 million.

Coordinated Opportunities

Partnerships are a critical element of successful project programing, and these partnerships can be internal within the region organization and external with existing and new organizations and agencies.

External

There are a myriad of common interests among Region 5 and its many agency and organizational partners. Often these partners can provide technical skills to assist with the design and construction of projects. More often, the transportation program benefits from coordination regarding project identification and project funding.

Both the Federal Lands Access Program (FLAP) and the Surface Transportation Block Grant (STBG) set-aside program for transportation alternatives are oriented towards partnering on transportation projects. The STBG can be used for projects both on and off of Service lands, and is a good opportunity for working with a gateway community to establish, for example, a regional trail link to a refuge. The FLAP mandates partnering by the Service since it covers projects that are located primarily on non-Service lands and applications must be submitted by the state or local government that owns or operates the facility.

Region 5 has a history of making good use of such supplemental funding opportunities provided by federal surface transportation authorizations. Under the MAP-21 legislation, Region 5 helped win two significant FLAP applications for projects that will benefit both the participating refuges and their partners.

Featherstone NWR is located in Woodbridge, Virginia along the western shore of Occoquan Bay. The western edge of the refuge property is defined by railroad tracks used by the Virginia Railway Express (VRE). These railroad tracks have limited the public's ability to access the refuge due to safety concerns. Until recently, the refuge was closed to the public. With the 1.2 miles of trail, boardwalk, and bridge infrastructure that the FLAP funding will provide, Featherstone NWR will be both accessible and traversable to the public via the Potomac Heritage Scenic Trail. Additionally, this trail provides a connection between Featherstone NWR and nearby Occoquan Bay NWR. The new segment will be located along the existing VRE corridor. This project is an example of a multi-agency partnership that includes the Fish and Wildlife Service, the National Park Service, Virginia Railway Express, and Prince William County, Virginia.

Canaan Valley NWR is located in Davis, West Virginia. The refuge access on County Route 35/18 is viewed as unsafe for heavy vehicles based on the condition of the existing bridge over the North Fork of the Blackwater River. School buses carrying students have been specifically impacted by this deficiency. The West Virginia Department of Transportation has partnered with the Service to complete maintenance work on this bridge and the

Coordinated Opportunities

Seek partnered transportation solutions that support the Service's mission, maximize the utility of Service resources, and provide mutual benefits to the Service and its external partners.

- Maximize leveraging opportunities by identifying and pursuing partners for projects of mutual interest and benefit.
- Develop best practices for each goal that illustrate success in forming and nurturing coalitions and partnerships to support the Service's mission.
- Identify and increase key potential internal and external partnerships at the national, regional, and unit levels.
- Coordinate within Service programs, including Refuges, Ecological Services, Fisheries, and Migratory Birds, during the development of regional long-range and project-level planning.

Since the beginning of the Federal Lands Access Program (FLAP), Region 5 has received

$765,000

approaching roadway through the FLAP program. By completing this project, Canaan Valley NWR will be able to offer greater opportunities to the community to experience the refuge.

Internal

One issue from which the Region 5 transportation program suffers, and which is common to transportation programs throughout the Service, is that there has not always been the desired level of coordination between the transportation group and other groups in the region. Every project is improved in its planning, design, implementation and operation if technical services such as ecology and visitor use are involved. Moreover, opportunities to use transportation projects to enhance habitat or incorporate interpretation can be lost when the transportation program operates in a silo. Ensuring understanding and inclusion of the transportation program in non-transportation planning efforts can help identify such opportunities.

Recommendations

Region 5 must consider grant opportunities and innovative funding strategies moving forward. Core transportation fund amounts have been held relatively steady over the last decade including two transportation funding bills; however, alternative transportation systems and non-transportation funding was redistributed during the last transportation funding bill (the FAST Act) resulting in less consistent funding availability.

Internal coordination among various disciplines within the Service should be sought on all projects. Better outcomes can be achieved by incorporating a variety of technical viewpoints so that project weaknesses and concerns can be successfully addressed early on.

Supplemental funding opportunities such as the Federal Lands Access Program and the Surface Transportation Block Grant set-aside program must be pursued from the station level up. These programs can vary slightly or a great deal from state to state. Station staff should be familiar with the requirements of each program in their own state. Additionally, these fund sources reward partnerships. Viable partners can also be best identified on the station level.

External agency partnerships could be considered for any transportation project. External partners may be able to provide knowledge, resources, or funds that Region 5 or the Service cannot. External partners are not limited to transportation partners, such as state departments of transportation, rather they may include planning agencies (Metropolitan Planning Organizations), local governments, conservation agencies (Trout Unlimited), public transit agencies, or other federal land management agencies (National Park Service).

Chapter 7

Recommendations

The national transportation vision and goals provide guidance and direction for decision-making over the next 20 years. Long range transportation planning efforts for the U.S. Fish and Wildlife Service strive to balance the Service mission to protect environmental resources and educate visitors with the demands of maintaining a safe and effective transportation network. Region 5 will employ strategies that leverage the strengths of the region to achieve these goals and uphold the mission of the Service.

Matinicus Rock at Maine Coastal Islands National Wildlife Refuge. Photo by FWS

The purpose of this chapter is to summarize the recommendations and conclusions of the long range transportation planning process that Region 5 has completed and provide specific guidance to inform transportation project prioritization and funding in the short term to help the region achieve long term goals.

Recommendations and guidance have been developed by reviewing the goals and objectives of the LRTP and aligning them with the unique strategies and characteristics of Region 5. The intention is that the recommendations and action items proposed in this report will be used to guide both long-term vision (20 year planning horizon) and short-term decision-making (5 year period until subsequent LRTP update).

Organization

The following sections are covered in this chapter:

- Vision, Goals & Objectives for Region 5;
- Region 5 Investment Strategy;
- Outcomes of the LRTP
  - Recommendations,
  - Action Items, and
  - Performance Targets for achieving LRTP goals.

Long Range Transportation Planning

The long range transportation planning process required the region to undertake thoughtful analysis and reflection of the current state of the regional transportation system, priority issues, and needs or challenges faced. This process included adopting a vision for the transportation system and a set of goals and objectives that the region hopes to achieve over the 20 year long range planning horizon.

Vision, Goals & Objectives for Region 5

Region 5 has adopted the *PLAN 2035* goals and objectives and transportation vision: "To work collaboratively for future planning and stewardship of a context sensitive, multimodal transportation system that helps conserve natural resources, provides a superior level of safety, delivers cost effective and environmentally sustainable transportation options, generates local economic opportunities and enhances the visitation experience for all visitors including underrepresented and mobility limited populations."

Table 7-1 summarizes the goals and objectives adopted by Region 5. By adopting the *PLAN 2035* goals, Region 5 can align regional efforts with the national vision.

Another outcome of the planning process was the identification of certain themes that are important to Region 5 and a reflection of the strengths of the region and what makes it unique to the Fish and Wildlife Service. These unique characteristics, along with the goals and objectives of the LRTP, have been used to inform the list of recommendations and actions that the region should take moving forward.

Table 7-1 Region 5 Long Range Transportation Plan Goals and Objectives

Goal	Objective
Coordinated Opportunities The program will seek joint transportation opportunities that support the Service mission, maximize the utility of Service resources, and provide mutual benefits to the Service and external partners.	▪ Identify and increase key internal and external partnerships at the national, regional, and unit levels. ▪ Maximize leveraging opportunities by identifying and pursuing funding for projects of mutual interest and benefit. ▪ Develop best practices for external engagement that illustrate success in forming and nurturing coalitions and partnerships that support the Service's mission. ▪ Coordinate within Service programs, including Refuges, Ecological Services, Fish and Aquatic Conservation, Hatcheries, and Migratory Birds, during the development of regional long-range and project level planning.
Asset Management The program will operate and maintain a functional, financially sustainable and resilient transportation network to satisfy current and future land management needs in the face of a changing climate.	▪ Use asset management principles to maintain important infrastructure at an appropriate condition level. ▪ Prioritize work programs through the project selection process detailed in this plan or an adaptation thereof. ▪ Evaluate life cycle costs when considering new assets to determine long term financial sustainability. ▪ Consider the impacts of increased climate variability in the planning and management of transportation assets.
Safety The program's network will provide a superior level of safety for all users and all modes of transportation to and within FWS lands.	▪ Identify safety issue 'hot-spots' within the Service's transportation system with the Safety Analysis Toolkit. ▪ Implement appropriate safety countermeasures to resolve safety issues and reduce the frequency and severity of crashes (also with Safety Analysis Toolkit). ▪ Address wildlife-vehicle collisions with design solutions (Environmental Enhancements). ▪ Use cooperation and communication among the "4Es" of safety including: engineering, education, enforcement, and emergency medical services.
Environment Transportation infrastructure will be landscape appropriate and play a key role in the improvement of environmental conditions in and around Service lands.	▪ Follow the Roadway Design Guidelines for best practices in design, planning, management, maintenance and construction of transportation assets. ▪ Reduce greenhouse gas (GHG) emissions and air pollutants by increasing transportation options and use of alternative fuels. ▪ Protect wildlife corridors, reduce habitat fragmentation, and enhance terrestrial and aquatic organism passage on and adjacent to Service lands to conserve fish, wildlife, and plant populations.
Access, Mobility, Connectivity The program will ensure that units open to public visitation have adequate transportation options for all users including underserved, underrepresented, and mobility limited populations.	▪ Offer a wide range of transportation modes and linkages for on and off site access. ▪ Provide clear wayfinding information both on and off Service lands. ▪ Through the Urban Wildlife Conservation Program, integrate Service transportation facilities with local community transportation systems in a way that encourages local visitation and provides economic benefits to partner and gateway communities. ▪ Through coordinated planning, provide context-appropriate transportation facilities that address the specific needs of local visitor groups and respect the natural setting of the refuge or hatchery. ▪ Address congestion issues to and within Service units.
Visitor Experience The program will enhance the visitation experience through improvement and investment in the transportation network.	▪ Improve traveler information through use of intelligent transportation systems (ITS). ▪ Integrate interpretation, education, and resource stewardship principles into the transportation experience. ▪ Evaluate the feasibility of alternative transportation systems at all stations and implement where appropriate. ▪ Encourage connections with existing and planned public and private transportation services. ▪ Design infrastructure in such a way that highlights the landscape, and not the transportation facility.

Region 5 Investment Strategies

The investment strategies reflect the strategies, qualities, and characteristics that best define Region 5 and its unique regional context. As such, they support the development of recommendations and actions that are appropriate, effective, and achievable.

Region 5 Investment Strategies

- Supporting the Mission through Transportation Improvements
- Alternative Transportation Systems as a Transportation Tool
- Water Access and Mobility
- Urban Area Connectivity
- Partnerships, Communication, and Collaborative Planning

Supporting the Mission through Transportation Improvements

Region 5 has employed a strategy of addressing critical habitat enhancement issues with transportation improvements, where appropriate. By linking necessary transportation system maintenance with critical habitat needs Region 5 is able to make efficient use of funds, time, and planning efforts. This strategy should continue to be employed moving forward. Furthermore, efforts can be supplemented with implementation of the *Roadway Design Guidelines* Project Checklist, which "… highlights state of the art ecological, planning, design, and engineering consideration for roadway projects that heed both the significant benefits and impacts these projects present."

The impacts of transportation on the natural world are wide and varied; however, one issue has proven to be a common challenge that must be addressed: habitat connectivity. Habitat connectivity issues can result in wildlife/vehicle collisions for terrestrial species or limitations for aquatic species due to a lack of aquatic organism passages under roadways.

Alternative Transportation Systems as a Transportation Tool

Alternative Transportation Systems (ATS) include both transit service and multimodal trails within Service lands or accessing Service lands. Each of these alternatives can provide various opportunities to improve transportation system operations in various ways.

Greenhouse Gas (GHG) Emissions: ATS can provide visitors with additional transportation options to access a station, therefore reducing their GHG emissions during travel. Alternatively, ATS provided within a station provides an opportunity to reduce GHGs emitted by visitors through refuge activities.

Visitor Experiences: ATS mobility provides a variety of new visitor experience options. Multimodal trails that allow walking, hiking, and/or cycling opportunities provide active transportation for visitors and new perspectives from which to interpret refuge resources. Transit services or tours effectively provide a mobile classroom that refuge staff or volunteers can utilize to reach visitors and promote education and interpretation. Additionally, areas that are exclusively accessible by transit are more easily managed and negative visitor impacts on sensitive environs can be controlled.

Region 5 has been proactive about seeking out and acting upon opportunities to provide improved ATS in stations. Moving forward, the region should continue to pursue ATS projects and supplement their efforts by seeking partners with similar transportation needs and coordinate efforts.

Water Access and Mobility

The U.S. Geological Survey conducted visitor use surveys throughout the Fish and Wildlife Service nationwide to better understand visitor issues. One outcome of the survey for Region 5 was learning that visitors in the region are interested in having more opportunities to experience stations through water recreation. Water access and mobility is an active mode of transportation, provides new visitor experience perspectives, and should be widely available in Region 5. Region 5 stations are largely water-based due to the proximity of the Atlantic coast and associated rivers and wetlands.

Region 5 should work towards inventorying assets needed for water-based recreation, locating potential barriers or gaps in the region, and partnering with others to provide opportunities for every visitor to access both the refuges and the equipment necessary to enjoy this visitor experience.

Urban Area Connectivity

With the release of *America's Great Outdoors* and the Urban Wildlife Conservation Program that it generated, Region 5 has been able to make strides towards introducing urban populations to the natural world. Thirty-five refuges in Region 5 are located within 25 miles of an urban area.

To date, Region 5 has upheld the Urban Wildlife Conservation Program by making urban wildlife refuge partnerships in six locations regionwide. Region 5 was able to accomplish this by forming local partnerships with community, environmental, and education stakeholders. Region 5 provides staff and volunteers from the Service to participate in programs in refuges and in local parks to support youth engagement and education. The region should continue to promote the importance of environmental education and outreach in urban areas through transportation investment in key stations to close transportation gaps to support greater connectivity to stations in urban areas.

Partnerships, Communication, and Collaborative Planning

Region 5 recognizes that importance of working with other stakeholders both within the Service and external to the Service in order to effectively complete projects and achieve goals.

Internally, Region 5 should work towards establishing a clear and consistent line of communication between conservation and transportation planning.

Externally, Region 5 has been successful in collaborating with other FLMAs and with local stakeholders to complete key projects. These practices should be maintained moving forward to continue to involve diverse partners and diversify funding resources.

At the station level, stations should work together and share best practices to successfully address challenges and minimize duplicative efforts. Stations should particularly look to other stations within the same ecosystem for best practices suited for their own unique environs.

Outcomes of the LRTP

Outcomes of the long range transportation planning process include recommendations and action items for the region to use to achieve their transportation system goals and objectives. The recommendations cover topics that build upon current successes, address current weaknesses, and prepare for macro trends that the Service and the region may be subject to in the future. The action items provide projects, efforts, and strategies that Region 5 could implement in the near term as first steps along a path toward achieving the goals of this LRTP.

Recommendations

The Region 5 Long Range Transportation Plan provides many specific recommendations as they relate to each of the goal areas. It is not uncommon for the same recommendation to be made for multiple goal areas. This is a reflection on the interconnected nature of the Service and its transportation network. Changes or improvements to transportation can easily impact assets, safety, the visitor experience, and the environment — in positive or negative ways.

As a result, the following recommendations are intended to summarize the findings of the long range transportation planning process and provide guidance that will help achieve the goals and objectives of the LRTP in a way that fits within the context of Region 5.

1. Use the *Roadway Design Guidelines* to help shape and enhance projects through planning, design, construction, and maintenance.
2. Continue to reduce financial obligations for transportation assets by lowering deferred maintenance, maintaining assets in good or better condition, and keeping up with operations and maintenance.
3. Integrate climate change adaptation and mitigation and resiliency principles into projects through planning, design, construction, and maintenance.
4. Develop databases/GIS data to better track critical issues in Region 5 such as crash data, wildlife-vehicle collision issues and undersized culverts/aquatic organism passages, and compile best practices to inform solutions.
5. Conduct Roadway Safety Audits at identified safety hot-spots regionwide.
6. Enhance existing transportation facilities to accommodate multimodal access to refuges.
7. Enhance existing transportation facilities to accommodate multimodal mobility within refuges and expand opportunities for active transportation.
8. Enhance opportunities for water-based recreation and public use where appropriate.

9. Expand opportunities for urban visitation through transportation improvements to facilitate underrepresented populations (e.g., youth/group visitation, urban populations, mobility limited populations).
10. Improve pre-trip planning resources to better reach visitors and improve visitor experiences. Priority pre-trip planning resources include websites (consider both personal computers and mobile devices), smartphone apps, and static highway signage.
11. Form internal partnerships within Service stakeholders to improve coordination between conservation and transportation needs, funding across multiple sources, and to capitalize on resources and data available within the Service.
12. Form partnerships with external stakeholders such as other federal land management agencies, friends groups, local agencies or organizations with similar transportation needs, or vendors who may be able to fill a transportation need.

Action Items

Presented on the following pages are specific action items that Region 5 can take during the short term to make progress towards the long-term vision described in this long range transportation plan. The short term covers the next five years, at which point the transportation system will be re-evaluated for the subsequent LRTP.

There are a dozen action item recommendations. Each are summarized around the discussion points of: “Where are we now?”, “Where are we going?”, and “How do we get there?”. If applicable, an example of implementing the recommendation at a station is provided. The relevance of the action items to the LRTP strategic goals are highlighted on each summary page using the graphic symbols used throughout this report to represent the six goals — Coordinated Opportunities; Asset Management; Safety; Environmental; Access, Mobility, Connectivity; and Visitor Experience.

It should be noted that, while this document is excluded[1] from the requirement to prepare a detailed statement under the National Environmental Policy Act of 1969 (NEPA), implementation actions related to achieving the goals and objectives of this long range transportation plan may be subject to compliance and permitting. The guidance provided by this document does not lend itself to meaningful analysis of environmental effects and thus those effects are to be considered as part of the development and implementation of specific actions and projects.

[1] Per 43 CFR 46.210 (i)

Recommendation 1
Use the *Roadway Design Guidelines* to enhance projects through planning, design, construction, and maintenance

The *Roadway Design Guidelines* were developed by the Service to aid in transportation decision-making while placing a strong emphasis on upholding the mission of the Service to conserve and protect the natural world.

Where are we now?
The Service has adopted the *Roadway Design Guidelines* to be used as national guidance to all regions.

Where are we going?
Region 5 will use the *Roadway Design Guidelines* to guide project planning and implementation. Additionally, the Project Checklist will be used to systematically evaluate project needs and characteristics.

Action Item 1
Employ *Roadway Design Guidelines* on future projects

How do we get there?
The *Roadway Design Guidelines* should be referenced throughout the life of a project; including planning, design, construction, and maintenance.

Focus Station: Regionwide

No specific focus station is identified for this action. Decision-makers at the regional level and the station level should reference this checklist when proposing new projects and carrying programmed projects forward. As new projects are identified the Roadway Design Guidelines and Project Checklist should be consulted.

Recommendation 2
Reduce the backlog of deferred maintenance

Deferred maintenance on transportation assets presents a financial obligation that Region 5 does not have sufficient funding to address. This can result in safety deficiencies that could be a hazard to visitors and staff, impacts to adjacent habitats, and impacts to access or mobility. Limited financial resources will be the greatest challenge to address on this recommendation.

Where are we now?
Currently, Region 5 can generally maintain about 55 percent of roadway assets in good or better condition. Annually, Region 5 will work towards addressing critical deferred maintenance needs; however, the funding and staffing are not available to get ahead of deteriorating assets and make progress towards reducing deferred maintenance.

Where are we going?
Region 5 and the Service as a whole hope to reduce deferred maintenance through wise financial investments and efficient use of available funds. Much of what is possible will be dictated by available funding. Region 5 should prepare by pursuing strategies that will be applicable in a funding environment that is constantly evolving.

Deteriorating parking lot at Ohio River Islands NWR considered for partial decommissioning. Photo by FWS

Action Item 2
Progress toward addressing backlog of deferred maintenance

How do we get there?
Region 5 should continue to reduce deferred maintenance on road, trail, and bridges assets through thoughtful transportation planning, funding partnerships, and innovative strategies. Reducing the deferred maintenance will require funding decisions geared toward high-impact projects. Maintenance projects should be carefully planned to make the most effective use of limited transportation funding.

Focus Station: Ohio River Islands National Wildlife Refuge

Ohio River Islands National Wildlife Refuge has parking lots that are over-sized, under-utilized, and in poor condition. Reducing the pavement footprint by decommissioning sections of parking lots and restoring the natural landscape can eliminate future deferred maintenance costs.

Recommendation 3
Integrate climate change adaptation, mitigation, and resiliency principles into projects and operations

Road rebuilt after Hurricane Sandy at Sachuest Point NWR. Photo by FWS

Climate change is an ever growing concern for many, and the Service is no exception. The majority of Region 5 stations are located along the eastern seaboard from Maine to Virginia, a region that is vulnerable to the impacts of climate change. Integrating climate change principles into project decisions and operations can help prepare Region 5 for potentially damaging impacts of environmental changes and extreme weather events.

Tree uprooted at Great Swamp NWR due to Hurricane Irene. Photo by FWS

Where are we now?
Region 5 is following climate change guidance provided at the national level including *Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change* (2010), the Climate Leadership in Refuges (CLIR) guidance and tool for tracking greenhouse gas emissions, and Executive and Secretarial Orders.

Where are we going?
Moving forward, climate change planning should provide guidance for Region 5 operations and for individual stations throughout the region to help inform investments while taking the unique characteristics of each station into consideration.

Breach at Prime Hook NWR following Hurricane Sandy. Photo by FWS

Action Item 3
Develop climate change step-down plans

How do we get there?
The first step toward addressing climate change is to develop a step-down plan summarizing the baseline condition and how the region will address climate change. Region 5 should utilize data and tools developed at the national level and within the DOI and FHWA to develop a step-down plan that specifically describes the nature of climate change and the impacts that it has and could have on the unique resources in Region 5.

Focus Station: Moosehorn National Wildlife Refuge

Despite being located further inland than many other Region 5 refuges, Moosehorn NWR has historically addressed transportation asset damage due to major storm events. Most recently, a heavy rain event washed out numerous culverts. With cooperation from local partners, culverts were either decommissioned or adapted for future extreme weather events.

Recommendation 4
Develop and utilize databases to encourage data-driven transportation decision-making

Databases are an important resource that enable data-driven decision-making and ensure efficient use of funds. Effective transportation decision-making should be informed by environmental needs, critical habitat needs, asset needs, safety needs, visitor needs, and partner needs. Appropriate databases to quantify these needs should be made available. These data needs cannot be addressed at once, rather a systematic approach should be undertaken.

Rehabilitated culvert at Silvio O. Conte – Nulhegan Basin Division provides stormwater management and aquatic organism passage.

Where are we now?
Currently, Region 5 has visitor and assets needs quantified in databases. Information about visitors is available in a USGS visitor survey database. This information was collected at 15 refuges regionwide. Asset data are in the Servicewide Asset Maintenance Management system, the Roadway Inventory Program database, and the Trail Inventory Program database.

Where are we going?
Additional needs for Region 5 include critical habitat locations and deficiencies, transportation impacting habitat locations and deficiencies, water-based transportation needs, crash history, and refuge greenhouse gas emissions levels for use in the Climate Leadership in Refuges tool.

Action Item 4
Initiate development of databases to address data gaps

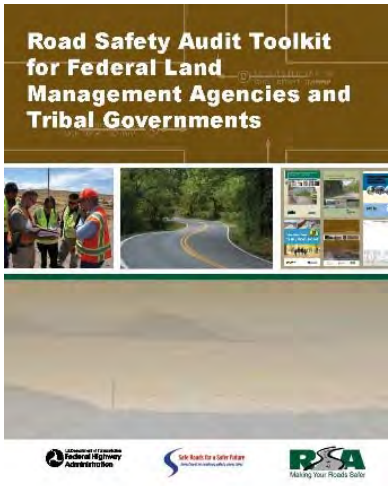
How do we get there?
Summarizing this volume of data will require time and effort. Region 5 should attempt to take on these needs one at a time to systematically close the existing data gap. Priority data needs for Region 5 are those concerning transportation impacts on habitats and availability of water-based transportation.

Focus Station: Region Headquarters

The Region 5 Headquarters office should initiate this effort with assistance and coordination from the station level. Key stations of concern can better identify locations where transportation is negatively impacting habitat quality or connectivity. A pilot station should be selected based on prior wildlife-vehicle collision needs and/or aquatic organism passage needs for which a preliminary database can be developed.

Recommendation 5
Address roadway safety hot spots for visitors and staff

Providing a safe transportation network for all users is a top priority for the Service as a whole and Region 5 specifically. Roadway safety for drivers (visitors and staff) is focused on reducing automobile crashes at key locations in refuges. Hot spots are those key locations providing user mobility at refuges (e.g., entrance roads) that also have a crash history indicative of a safety problem.



The Federal Highway Administration Roadway Safety Audit Program can help identify safety issues and countermeasures.

Where are we now?
High-level safety analysis has been completed for apparent critical locations using readily available state department of transportation data. As described in Recommendation/Action Item 4, there is not an existing crash database that can be used to identify further hot spot locations.

Where are we going?
The Service's Safety Analysis Toolkit is available and, along with Road Safety Audits, will be used to help identify "hot spots" and appropriate safety countermeasures.

Action Item 5
Conduct Roadway Safety Audits to address known hot spots

How do we get there?
With the safety data that are available, Region 5 can begin to identify safety countermeasures at critical locations. Roadway Safety Audits (RSAs) should be completed at locations with known safety deficiencies. RSAs are specifically designed to gain feedback from all transportation stakeholders, giving them a great opportunity to form partnerships with stakeholders and work with others to address transportation needs.

Focus Station: Sachuest Point National Wildlife Refuge

Through the Region 5 hot spot safety evaluation, Sachuest Point NWR was found to have the greatest number of crashes in Region 5 annually over the last five years. Although the entrance roadways of concern are not within Service jurisdiction, they still impact staff and visitor safety and visitor experience. An RSA at this hot spot could be completed to help Region 5 identify appropriate countermeasures and partners to address this need.

Recommendation 6
Enhance transportation facilities to improve multimodal access to refuges

Providing multimodal access to refuges provides transportation options for visitors who may not have a personal automobile, provides a new visitor experience, and provides active transportation that is encouraged by federal guidance such as *America's Great Outdoors*. Oftentimes, the challenge of providing multimodal access is that key access routes lie outside the jurisdiction of the Service.

Where are we now?
Recent studies and surveys have provided some information about multimodal access needs, but feedback from the station level is still necessary to identify gaps and access needs.

Where are we going?
Since the passage of the MAP-21 transportation funding bill in 2012, more fund sources have been geared towards spending outside of federal lands jurisdiction to address access needs. The FAST Act legislation of 2015 continues this effort.

Action Item 6
Form partnerships and pursue grant funding to address multimodal access

How do we get there?
Form partnerships with refuge stakeholders to identify mutual transportation access and/or safety needs and pursue competitive funding opportunities. Supplemental funding programs such as the Federal Lands Access Program and the Surface Transportation Block Grant Program encourage, or require, partnerships with local stakeholders to apply for funding. Cooperation from the station level is key to success. Station managers have the best perspective for identifying projects and partners.

The John Heinz at Tinicum NWR is the most urban of all refuges in the National Wildlife Refuge System. There are more than 600,000 people residing within five miles of the visitor center.

The Philly Urban Wildlife Refuge Partnership was formed in 2014 to help educate and engage youth, promote sustainable communities, bring nature to the city, and connect residents to the refuge.

Visitor Center entrance, John Heinz at Tinicum National Wildlife Refuge. Photo by VHB

Focus Station: John Heinz at Tinicum National Wildlife Refuge

The refuge is working to remove transportation barriers and connect with its communities. The refuge is working to establish bike-share stations at the refuge and in nearby neighborhoods, is working to create four bicycle and foot trails to improve access to the refuge from throughout Philadelphia, and is hiring a Transportation Scholar to lead those efforts and to create a comprehensive multimodal transportation action plan.

Recommendation 7
Enhance transportation facilities to improve multimodal mobility within refuges and promote active transportation

View from Wildlife Drive at Blackwater NWR. Photo by FWS/R. Pattera

Auto tour routes that are exclusive to motorized vehicles limit the ability of visitors to experience the natural world first hand. By upgrading an existing facility into a multiuse facility new visitor experiences can be introduced to the station, new forms of multimodal mobility can be added to a station, and greenhouse gas emissions can be reduced by removing automobile vehicle miles traveled.

Where are we now?
Eleven refuges in Region 5 have auto tour routes/wildlife drives that allow visitors to drive through portions of the refuge. Without an inventory of the existing auto tour routes, existing multimodal accommodations are not well documented.

Where are we going?
Guidance such as *America's Great Outdoors* has encouraged federal land management agencies to provide communities with more opportunities for active transportation. Multimodal facilities should continue to be a priority, particularly in urban areas where vehicle ownership is less widespread.

Action Item 7
Upgrade an existing Auto Tour Route into a multiuse facility

How do we get there?
Upgrade an existing auto tour route to ensure that the facility is safe and compatible with multimodal uses, and consider the compatibility of auto tour routes where they do not currently exist. This improvement will reduce environmental impacts, offer greater multimodal mobility, and improve visitor experiences.

Focus Station: Patuxent National Research Refuge

Patuxent National Research Refuge is an urban refuge in Region 5 located outside of Baltimore, MD and Washington D.C. that has the fifth highest visitation in Region 5. The existing auto tour route (Wildlife Loop) at the refuge is in need to rehabilitation. The majority of Wildlife Loop is rated in 'Poor' condition. Addressing the pavement needs at this refuge can also be an opportunity to assess the multimodal accommodations along the route and make necessary improvements.

Recommendation 8
Enhance opportunities for water-based recreation and public use, where appropriate

Due to the natural landscape of Region 5, the region is positioned well to provide water-based recreation to visitors. Improved access to water-based activities will provide an alternative form of transportation, opportunities for active transportation, and a new perspective for visitors to experience refuges. At some locations, some improvement is necessary to close access gaps.

Canoers releasing Blanding's Turtles at Assabet River NWR. Photo by FWS

Where are we now?
The majority of stations in Region 5 are accessible by waterways; however, visitors are suggesting that Region 5 needs to provide more water-based activities. At the majority of stations, Region 5 has the appropriate water resources at stations and the necessary infrastructure (e.g., boat launches) to support water-based activities.

Where are we going?
Based on the current transportation legislation and the visitor feedback through surveys, water-based recreation is a priority as alternative and active mode and a unique visitor experience.

Kayakers at John H. Chaffee National Wildlife Refuge. Photo by FWS

Action Item 8
Improve access to water-based activities through cost-effective solutions and partnerships

How do we get there?
One gap in providing water-based access is not all visitors can provide equipment to participate in activities. Through low-cost measures the region could leverage existing resources to close this gap. For example, by refuges partnering with local vendors who rent canoes or kayaks visitors could gain access to waterways. Additionally, such vendors should be viewed as potential friends of the station.

Focus Station: Blackwater National Wildlife Refuge

Blackwater NWR provides three water trails and a canoe launch, as described on the refuge website. However, there is an access gap for visitors who do not own the equipment to participate in water-based activities. To enhance the water-based experience for those visitors, Blackwater NWR can consider partnering with nearby vendors and listing their information on the refuge website. Blackwater Paddle and Pedal is located on the same watershed as Blackwater NWR approximately two miles from the Visitor Center.

Recommendation 9
Expand visitation opportunities for urban and underrepresented populations

America's Great Outdoors has provided recommendations and guidance to encourage federal land management agencies to reach out to urban and underrepresented populations. High population densities and numbers of refuges in urban areas make Region 5 well positioned to meet these goals. Providing the unique resources and facilities that these visitors need is a critical first step.

Where are we now?
Currently, Region 5 has developed six urban wildlife refuge partnerships. These partnerships provide opportunities for students in urban areas to visit and complete activities in refuges or with refuge staff in other local community parks and spaces. Region 5 plans to continue to develop and expand these relationships.

American Kestrel presented at Patuxent NRR 75th anniversary. Photo by FWS

Where are we going?
Region 5 should continue to uphold this trend of forming partnerships with community groups to reach out to urban and other underrepresented populations, specifically youth groups. Youth are key to upholding the future of the Service.

Action Item 9
Support youth visitation through Watershed On Wheels

How do we get there?
Schools, like other public institutions, are feeling the constraints of limited funding. The Service Watershed on Wheels (WOW) Express Grant has provided funds in the past for development of a mobile visitor center. The existing WOW Express in Region 5 for Silvio O. Conte NWR is used in the Springfield, Massachusetts area to share the resources and experiences of the refuge with the community in an accessible way.

Focus Station: Great Swamp National Wildlife Refuge

Great Swamp NWR is an urban refuge located outside of Newark, New Jersey. This could be a good candidate for a second Watershed on Wheels Express in the region that could reach youth living in New Jersey, just outside of the New York City Area. Other refuges in this urban area include Oyster Bay NWR and Edwin B. Forsythe NWR.

Recommendation 10
Improve pre-trip planning resources to improve visitor experiences

Pre-trip planning resources include web-based tools (e.g., websites, smart phone applications, GPS links) and static wayfinding signage on local roadways. The prevalence of smart phones and other mobile devices is something that the Service must consider when developing pre-trip planning tools. However, static wayfinding signage is still valuable on local roads near refuges where cellular service may not be available.

Signage at Great Dismal Swamp NWR. Photo by VHB

Where are we now?
Recently, Region 5 updated websites and other web-based material to a format that is easily viewed in mobile devices. In terms of static wayfinding, many refuges have noted this as a challenge or a need. Wayfinding signage can be expensive to implement effectively, which is a barrier for the region.

Where are we going?
Mobile device usage and functionality will continue to expand and grow in the coming years. Region 5 and the Service should continue to remain conscious of their web-presence and continue to engage users on that platform. At the station level, staff should be aware of existing and needed wayfinding signage.

Action Item 10
Inventory and improve wayfinding signage

How do we get there?
Wayfinding signage needs must be identified on the station level. This need could also be identified through a signage inventory. Region 5 should begin to address the wayfinding issues systematically starting with refuges with known wayfinding needs. The Regional Alternative Transportation Evaluation survey could provide this information.

Focus Station: Eastern Massachusetts National Wildlife Refuge Complex

The Eastern Massachusetts National Wildlife Refuge Complex has identified that appropriate and effective static highway signage is a major challenge for refuges. Discussion with station personnel and an inventory of available static highway signage can be done to identify static signage needs.

Recommendation 11
Work within Region 5 to integrate the LRTP into conservation planning

Encourage inter-disciplinary communication and collaboration to ensure that the goals and objectives of the long range transportation planning effort are integrated into conservation planning and that conservation is considered in all transportation planning. This practice will support Region 5 efforts to uphold the mission of the Service and focus on habitat needs through transportation improvements where appropriate.

Where are we now?
Observations of transportation and conservation planning in Region 5 suggest that, at times, there is a disconnect between the two disciplines. There are no clear channel of communication between the two.

Where are we going?
In the future, Region 5 would like to collaborate across disciplines on projects, data needs, and filling data gaps.

Action Item 11
Work within Region 5 to integrate the LRTP into conservation planning

How do we get there?
In order to meet the goals and objectives of the LRTP moving forward, the transportation program needs to establish communication protocols to remain aware of conservation efforts. Work within Region 5 with conservation specialists to ensure that the goals and objectives of the LRTP are integrated into conservation planning and that conservation is considered in transportation planning.

Focus Station: Region Headquarters

Region headquarters should establish a line of communication with the conservation staff and share with them the goals and objectives of the LRTP. The hope is that this internal partnership will enable both groups to more effectively use resources and achieve mutual goals.

Recommendation 12
Form partnerships with external stakeholders

Region 5 should work toward forming partnerships with external stakeholders such as federal land management agencies, friends groups, local agencies, and conservation partners. Partners can be a valuable resource that provide the Service with knowledge, funding, and other tangible and intangible benefits.

Where are we now?
Currently, Region 5 has formed partnerships as needed in various states and localities to address project needs. From the federal lands perspective, Region 5 has worked with transportation counterparts in the National Park Service Northeast Region Office.

Where are we going?
The value of partnerships has been emphasized throughout current national transportation funding legislation and that trend is anticipated to continue. Additionally, the Plan 2035 National Long Range Transportation Plan has emphasized the importance of partnerships moving forward.

Action Item 12
Add official Fish and Wildlife Service partners and friends through sub-regional planning efforts

How do we get there?
Subregion planning efforts focused on locating an area within Region 5 that has potential opportunities for the Service to partner with other federal or local agencies to achieve mission and transportation goals. Partner agencies likely have similar mission priorities, face similar transportation challenges, or can offer new or different resources that ultimately expand opportunities for other partners.

Focus Station: Potomac River NWR Complex

The Potomac Segment Plan was prepared by the National Park Service in 2015. It seeks to enhance national land and water trails along the Tidal Potomac River. Segments of the Star-Spangled Banner and Captain John Smith Chesapeake national historic trails are proximate to the Potomac River NWR Complex refuges and there are opportunities to coordinate non-motorized boat access and environmental education.

Summary

Table 7-2 summarizes the twelve action items detailed on the pages prior. The summary aligns each action item with LRTP goal areas and includes the focus stations that have been identified as a potential candidate for implementing the action items.

Table 7-2 Actions Items for Achieving LRTP Goals

Action Item		LRTP Goals						Focus Station
		✓	✓	✓	✓	✓	✓	
1. **Roadway Design Guidelines**	Employ the *Roadway Design Guidelines*	✓	✓	✓	✓	✓	✓	All stations
2. **Maintain Assets**	Progress toward addressing backlog of deferred maintenance		✓	✓			✓	Ohio River Islands NWR
3. **Climate Change**	Develop a climate change step-down plan		✓		✓			Moosehorn NWR
4. **Data Needs**	Initiate development of databases to address gaps	✓	✓	✓	✓			Region 5 headquarters
5. **Safety**	Complete a safety study to identify solutions at 'hot-spots'			✓			✓	Sachuest Point NWR
6. **Multimodal Access**	Form partnerships and pursue supplemental funding (e.g., FLAP, STBG)	✓	✓			✓		Block Island NWR
7. **Multimodal Mobility**	Upgrade an auto tour route for multimodal use		✓	✓	✓	✓	✓	John Hienz at Tinicum NWR
8. **Enhance water-based recreation**	Improve access to water-based activities through low-cost solutions	✓			✓	✓	✓	Blackwater NWR
9. **Diverse Visitation**	Support Watershed on Wheels program	✓				✓	✓	Great Swamp NWR
10. **Pre-trip Planning Experience**	Inventory and identify needs for wayfinding signage	✓		✓		✓	✓	Eastern Massachusetts NWR Complex
11. **Internal Partnerships**	Work within Region 5 to integrate the LTRP into conservation	✓			✓			Region 5 headquarters
12. **External Partnerships**	Add official Service partners and friends through sub-regional planning efforts	✓						Potomac River NWR Complex

Performance Measures

Table 7-3 lists the performance measures from the Plan 2035 National Long Range Transportation Plan, as well as the targets for those performance measures both Servicewide and for Region 5 specifically.

In addition to the Plan 2035 National Long Range Transportation Plan performance targets, Region 5 has some additional performance measures and targets that reflect Region 5 priorities. These additional Region 5 priorities are highlighted in italics in the table below.

Table 7-3 National Long Range Transportation Plan Performance Targets

Performance Measure	National 20-year Target	Region 5 20-year Target	Region 5 Current Performance
Coordinated Opportunities			
▪ Increase the total number of official Fish and Wildlife partners and friends groups year to year	Plus 10%	Plus 10%	Baseline TBD
▪ Increase the percentage ratio of supplemental funding to base funding for projects and planning	40%	40%	Baseline TBD
▪ Increase the number of transportation projects that leverage multiple funding sources.	5 per year	1 per year	Baseline TBD
▪ *Region 5: Increase the number of larger, non-maintenance projects where internal and external partners are consulted*		*100%*	*80%*
▪ *Region 5: Incorporate Maintenance Action Team (MAT) projects into the program each year*		*3 per year*	*1 per year*
Asset Management			
▪ Increase percentage of road miles in good or excellent condition	80% or higher	80% or higher	85% RIP Cycle 4
▪ Maintain percentage of trail miles in good or excellent condition	Maintain or Improve current	Maintain or Improve current	95% RIP Cycle 4
▪ Increase percentage of bridges in very good or good condition	95% or higher	95% or higher	53%
▪ Increase percentage of programmed FLTP project that have been scored and prioritized via a standardized selection process	50% in 2 years, 100% in 5 years	50% in 2 years, 100% in 5 years	Not applicable (0%)
▪ *Region 5: Incorporate the CLIR tool into future projects*		*100%*	*Not applicable*
▪ *Region 5: Increase general maintenance practices*		*5% of funding*	*2% of funding*
Safety			
▪ Complete safety assessments for highly visited refuges	5 per year	1 per year	<1 per year
▪ Reduce number of transportation related fatalities that occur on refuges and hatcheries	Zero fatalities	Zero fatalities	Zero in past 5 years
▪ Reduce number of wildlife/vehicle collisions	Zero collisions	Zero collisions	Baseline TBD
▪ *Region 5: Complete Roadway Safety Audits at identified hot-spots*		*1 refuge per year*	*<1 per year*
▪ *Region 5: Expand safety assessments to include non-motorized travel*		*100%*	*Not applicable*

Table 7-3 (Continued) National Long Range Transportation Plan Performance Targets

Objective	National 20-year Target	Region 5 20-year Target	Region 5 Current Performance
Environmental			
▪ Increase percentage of transportation projects that track the elements of the *Roadway Design Guidelines* through the Project Acknowledgements checklist	60% at year 1, 100% by year 5	60% at year 1, 100% by year 5	20%
▪ Increase the number of projects that enhance aquatic or terrestrial organism passage	5 per year	1 per year	1 per year
▪ Complete assessments on existing wildlife crossings and aquatic passages	5 per year	1 per year	Baseline TBD
▪ Reduce or offset the carbon footprint of the transportation network	20% below 2010 baseline	20% below 2010 baseline	Baseline TBD
▪ *Region 5: All project planning include assessment of habitat enhancement opportunities*		*100%*	*Baseline TBD*
Access, Mobility, and Connectivity			
▪ Increase the total number of multimodal connection to refuges and hatcheries.	3 projects per year	1 per year	<1 per year
▪ Increase the number of multimodal transportation options on refuges and hatcheries	5 projects per year	2 per year	<1 per year
▪ Increase the number of projects that improve access at main ingress/egress points	2-3 projects per year	2 per year	2 per year
▪ *Region 5: Alternative transportation information on all websites*		*100%*	*64%*
▪ *Region 5: Continue to pursue FLAP and similar to form partnerships and acquire funding for multimodal access projects*		*5 projects per year*	*3 projects per year*
Visitor Experience			
▪ Integrate wayfinding and ITS into transportation projects.	2-3 projects per year	2 projects per year	Baseline TBD
▪ Maintain or improve transportation satisfaction rating	Maintain or Improve existing	Maintain or Improve existing	Baseline TBD
▪ *Region 5: Enhance wayfinding at high-visitation stations*		*2 projects per year*	*<1 per year*
▪ *Region 5: Increase youth visitation through outreach and partnerships with schools, youth, and conservation organizations*		*10,000 students per year*	*Baseline TBD*

Final Thoughts

Autumn at Umbagog National Wildlife Refuge/Photo by FWS

The transportation program vision for Region 5 is the same as for every region in the Service: *To work collaboratively for future planning and stewardship of a context sensitive, multi-modal transportation system that helps conserve natural resources, provides a superior level of safety, delivers cost effective and environmentally sustainable transportation options, generates local economic opportunities and enhances the visitation experience for all visitors including underrepresented and mobility limited populations.*

This LRTP outlines how Region 5 will use best practices, align planning across all disciplines, seek out coordinated opportunities, form strong partnerships, and make wise investments to provide an effective and sustainable transportation network for the future; one that balances the protection of natural resources with the need to provide access and mobility for visitors. This plan should be viewed as a living document that will be updated every five years to best reflect changing conditions, challenges, and needs within Region 5. Updating the document at five year milestones will encourage continued growth in the region and serve as an opportunity to evaluate past efforts and inform future planning.

The success of this plan rests on the individual staff and stakeholders who will advocate, plan, program, design and implement future transportation projects. Stakeholders at all levels, internal and external to the Region 5 and the Service can benefit from the guidance provided in this document. Program managers at the federal and regional level can use this document to direct funding, station level staff can use this document to develop projects and identify needs, and external partners can use this document to recognize mutual needs.