

U.S. Fish and Wildlife Service
Regional Alternative Transportation Evaluation Report

Region 5

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RATE Background

The U.S. Fish and Wildlife Service (FWS) and the U.S. Department of Transportation (DOT) John A. Volpe National Transportation Systems Center (Volpe Center) conducted a Regional Alternative Transportation Evaluation (RATE) in FWS Region 5 to ensure effective consideration and integration of alternative transportation systems (ATS, Box 1) into the goals and recommendations of the Region 5 Long Range Transportation Plan (LRTP). From north to south, Region 5 is comprised of the thirteen northeastern states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, New York, Connecticut, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, and West Virginia. The Region 5 RATE team, consisting of staff from the Volpe Center, FWS Washington Office and Region 5, and Eastern Federal Lands Highways Division (EFLHD), traveled through portions of Massachusetts and southeastern Virginia in December 2011, to explore and discuss alternative transportation needs and constraints in the region with the staff of a group of FWS refuges. The RATE visits also helped to develop an alternative transportation systems (ATS) questionnaire, which was later sent to all refuges in the region. During the RATE, the team visited Great Meadows National Wildlife Refuge (NWR), Back Bay NWR, the Eastern Shores of Virginia NWR Complex, and Great Dismal Swamp NWR to identify specific opportunities for ATS in these and other stations. Ultimately, the RATE provided selective baseline information, and identified opportunities and constraints, on how ATS may be instituted more broadly across Region 5.

Box 1: What are Alternative Transportation Systems?

Alternative transportation systems generally include the use of any travel mode other than a personal automobile. ATS systems thus include, but are not limited to, the following:

- Motorized multi-passenger transportation systems operating internally within FWS station boundaries
- Shuttles and van transit vehicles connecting FWS stations with other destinations in the vicinity
- Regional transit connections (public or private bus, light rail, trolley, commuter rail, or passenger rail)
- Bicycle and pedestrian infrastructure (sidewalks, multiuse paths, bicycle lanes, regional trails)
- Water-based transportation services such as passenger ferries
- Publicly and privately operated fixed-route or demand responsive systems using any of these general vehicle types
- Water-based transportation
- Publicly and privately operated systems

FWS Headquarters and Regional staff approached the RATE with the understanding that the provision of increased ATS operations would benefit Region 5 stations and complement Service-wide goals. The FWS has determined that the use of transit, nonmotorized, and water-based transportation modes supports natural resource protection. Since ATS reduces the use of personal automobiles, FWS can reduce the impacts of such vehicles upon natural resources within each station. ATS can also reduce the Service's overall carbon footprint, reduce the use of carbon-based fuels, enhance accessibility, and reduce the volume of air pollutants emitted from vehicles. Additional vehicular resource impacts that could be reduced as a result of expanded ATS operations include wildlife collisions, introduction of invasive species, noise pollution, particulate emissions, dust, erosion of road shoulders, and emissions of pollutants that can enter the soil or water.

Over the long term, increasing use of ATS for stations can minimize the need for new roads or parking facilities, thus preserving more area for wildlife habitat. ATS can also be a critical visitor management tool for station staff facing visitor services demands and limited resources. For example, the use of transit

can enhance visitors' understanding of the station's natural resources by facilitating interpretive tours or directing visitors for special events. Signage and orientation information directed at non-automobile transportation can help integrate these modes effectively into station transportation.

Key Findings

Based on the limited number of station visits conducted and strategic discussions, the following are key findings and outcomes from the Region 5 RATE. These findings and themes appear throughout the Questionnaire responses, the case studies, and other parts of this report.

- As compared with other FWS regions that have conducted RATEs, the refuge staff in Region 5 appear to have a higher awareness of and interaction with transportation systems, and in particular with alternative transportation. Staff have a greater understanding of the benefits of ATS and an awareness of relevant discretionary funding programs, due in part to an active transportation agenda at the regional level. Many innovative transportation projects within and accessing refuges have stemmed from multi-stakeholder initiatives directed by enterprising refuge and regional staff.
- Region 5 refuges tend to be located within a short drive of a number of major metropolitan areas. The refuges are often accessible to diverse population groups and have greater potential for connections to multimodal transportation systems. Some refuge visitors seem to already have a greater exposure to the use of public transit systems than visitors in other FWS regions. While some refuges in the region are working to target new and underserved populations and to consider connections to regional transportation systems, most visitors currently access refuges by personal vehicle.
- The region has several successful examples of internal tram and bus tours operated by partner groups, but there are currently no refuge operated systems. In some cases refuges have used federal funding sources to purchase vehicles and rely on friends groups for some portion of the operations and maintenance funding. Internal transit service for interpretive programs has been successful in areas with high tourism and for use during special events, such as at Patuxent NWR and Back Bay NWR.

Region 5 Trends

Several characteristics of Region 5 affect the management and use of its visitor transportation systems. Some of the trends described in this section are not unique to Region 5, but each contributes to the evolution and future opportunities and needs of the refuges' transportation infrastructure.

Visitation

Wildlife observation, especially birding, and photography remain very popular uses in the region. In the past decade, visitation has trended towards more non-consumptive recreational use, including bicycling, and walking, and even beach recreation. Hunting and fishing are declining on some refuges in the region, though they remain popular activities on other refuges. Through conversations with refuge and regional staff, the RATE team observed that some managers encourage recreational uses at refuges as a means to expose more visitors to refuge resources and interpretation; other emphasize only traditional wildlife-dependent recreation. Many refuge staff have recognized that increased but low-impact public visitation that generates support for refuges is necessary to ensure future support for the National Wildlife Refuge (NWR) system, as stated in the Conserving the Future NWRS vision document. Refuges that are actively trying to encourage more interpretation and environmental education and balance visitation with natural

resource protection are often limited by staff capacity, facilities, and a lack of appropriate visitor amenities, including transportation infrastructure.

Management Issues

Natural resource management is a key purpose and responsibility for all refuges, and staff must determine how to accommodate visitor use while protecting sensitive natural resources. Refuge managers are very autonomous in individual refuge management decisions, especially in developing management strategies. Regional staff can promote alternative transportation as a means of reducing negative impacts on resources. They can also promote both the visitor experience and interpretation benefits that come from using alternative transportation.

Climate change is another relevant issue for refuge managers, especially for coastal stations, as they see the tangible results of sea level rise and more severe storm patterns and must plan for such impacts. Extreme storms have also impacted mountainous refuges, including Moosehorn and Walkill NWRs, in the past few years. Anecdotally and as expressed at a workshop at Parker River National Wildlife refuge, refuge staff would like to have a stronger role in reducing emissions and achieving carbon neutrality, as per the FWS Climate Change Strategic Plan. Climate change can be one way to engage refuge staff by connecting alternative transportation to a reduction in greenhouse gas emissions and planning for transportation infrastructure that can adapt to changing conditions.

Funding

The Refuge Roads Program (RRP) funding project selection process is largely based on the EFLHD's condition assessments, as well as safety information, roadway functional classification, and several other need-based factors. While station managers have recently begun to nominate some projects for the five-year plan, when merited, most refuge staff tends to have only limited involvement in or awareness of the RRP project selection process. The RRP focuses primarily on the existing public use road system, with a small amount of funding to assist with the rehabilitation of existing public use trails. Currently the RRP is legally constrained from funding motorized ATS facilities or rolling stock.

With very limited funding available for Region 5 through the RRP (roughly \$1.75 million annually), refuge staff rely on discretionary grant programs to fulfill unmet needs or transportation needs that are ineligible for RRP funds. Region 5 refuge staff are highly educated about and active in applying for competitive grants focusing on transportation in general, and specifically alternative transportation. In recent years, Region 5 refuges have applied to national discretionary grant programs disproportionately more than refuges from other regions, though the Region's states have relatively less federal land area than other states. However, the region does have greater relative population sizes and visitation than many other regions, resulting in greater use of transportation facilities.

Planning and Partnerships

Most Region 5 refuges have completed Comprehensive Conservation Plans (CCPs) or are now engaged in CCP development. While regional staff have been involved in developing guidance for integrating transportation system improvement plans into CCPs, transportation still remains a minor or non-existent component for many refuge plans. However, the CCPs reviewed for this RATE had a relatively high number of alternative transportation considerations, compared to other CCPs around the nation, which may reflect a higher awareness of ATS in the region, a desire to capture discretionary funding, or both.

Many refuge staff have established formal or informal partnerships with gateway communities and participate in local community meetings to contribute to decisions that may affect the refuge. The region has some good examples of transportation planning efforts conducted cooperatively between gateway communities and refuges. There may be additional opportunities to expand upon existing relationships

and partnerships to consider transportation and access issues, even where the relationships did not develop around transportation.

Information and Promotion

According to refuge staff, refuge visitors are increasingly reliant upon the use of social media, mobile devices, and the Internet for planning their visits (although word-of-mouth and highway signs remain the most popular means of learning about refuges, as captured in the 2011 Visitor Survey). Refuge staff are trying to better integrate web and mobile tools to better serve visitors and enhance their experiences. This opens the potential to use web and mobile tools to strengthen the use of ATS, such as through providing direction on refuge websites for multiple modes, information on water and land-based refuge opportunities, and posting transit service announcements on Facebook or Twitter.

Region 5 Strategies for ATS

The RATE team identified the following strategies as the most useful for Region 5 to increase ATS utilization at refuges.

Nonmotorized Transportation

- Many visitors to Region 5 refuges currently choose to walk or use bicycles to travel within refuges. Improved infrastructure for these visitors would improve their safety and minimize their impact on natural resources. In cases where visitor amenity areas are dispersed, refuge staff can plan future amenities or interpretive elements to be located within walking or bicycling distance of existing amenities. Where funding or environmental constraints prevent the construction of new infrastructure (such as separated bicycle lanes or sidewalks), signage indicating the presence of pedestrians and bicyclists along internal refuge public roadways may be an appropriate substitute (or interim) measure.
- Refuges in Region 5 have been instrumental in constructing new regional multiuse trails for bicyclists and pedestrians, as well as extending existing external trails to connect with refuges. Refuges are able to access funding sources specific to federal lands as well as funds they compete for with other groups, which helps supplement local and state funds. Trails can effectively provide connections to recreational, nonmotorized visitors. Trails that include interpretive information on species and habitat can provide a stronger connection between nonmotorized recreation and transportation and the FWS mission. Regional trails that provide access between the refuge and other regional destinations, such as public parks and gateway communities, encourage more visitors to actively travel to the refuge using ATS.

Water-based Transportation

- Visitors use water-based transportation modes for wildlife-based recreation on most of the region's refuges. A few refuges have water trails specifically designed for kayaks and canoes. Refuges can enhance the ability of visitors to travel to and within refuges by boat through providing adequate boat launch facilities, specifically for nonmotorized boaters; providing interpretation materials and programs aimed at boaters; and partnering with concessionaires or private businesses to rent out canoes and kayaks to refuge visitors.

Transit

- Refuges in Region 5 may be well-suited to use transit for special events due to their location near urban areas, the availability of partners or contractors to provide short-term vehicle use, and a visitor base that is familiar with transit. While many refuge managers expressed an interest in the

use of transit for special events in the online questionnaire, the vast majority of refuges have not indicated any significant current use of transit for the movement of visitors during special events.

- A small number of refuges are located within the existing service areas of public transit systems. Some visitors already use public transit to access refuges, such as at John Heinz NWR in Philadelphia, but most refuges would need to partner with transit agencies to provide access to their stations. In all cases where the potential exists for transit to provide access to the refuges, widespread promotion of the service throughout the transit service area is critical to attracting ridership.
- Refuges in the region have demonstrated success in the use of transit for educational and interpretive programs, which allow visitors to travel within the refuge without the use of a personal vehicle. In some cases, these programs also allow visitors to access parts of the refuge closed to general visitation. Internal transit systems may be run by friends groups or other partners, which may relieve refuges short on staff and funding capacity. However, programming run directly by the refuges gives the refuge more control over education and interpretation.

Partnerships

- Because of proximity to urban and suburban populations, there may be increased opportunities for refuges in Region 5 to take advantage of partnerships and friends groups to help plan for transportation improvements and leverage funding. With limited staff capacity, friends groups may extend the refuge's capacity for managing transportation projects and leading educational and interpretive programs, such as through running internal transit service with on-board interpretation.
- Partnerships with local governments and metropolitan planning organizations (MPOs) help refuges coordinate their needs with those of the surrounding community. Several of these partners have successfully applied for funding to complete transportation projects on or accessing refuges (see Funding Sources for ATS).

Promotion

- Among urban and suburban areas with many recreational and natural amenities, refuges may not be well-known among a diverse metropolitan population. In many cases, these refuges can be accessed via transit, walking, or through connection with a multi-use regional trail. Promoting the amenities of these refuges and ATS access can help attract new and underserved visitors, when used with target outreach efforts.
- A large number of refuges are close to gateway communities and regional trails, making access via nonmotorized modes attractive and feasible. A few refuges are connected to public transit systems. Refuge signage on trails, in gateway communities, and in transit vehicles can help increase access via these modes, as can the inclusion of multimodal access information on refuge websites.

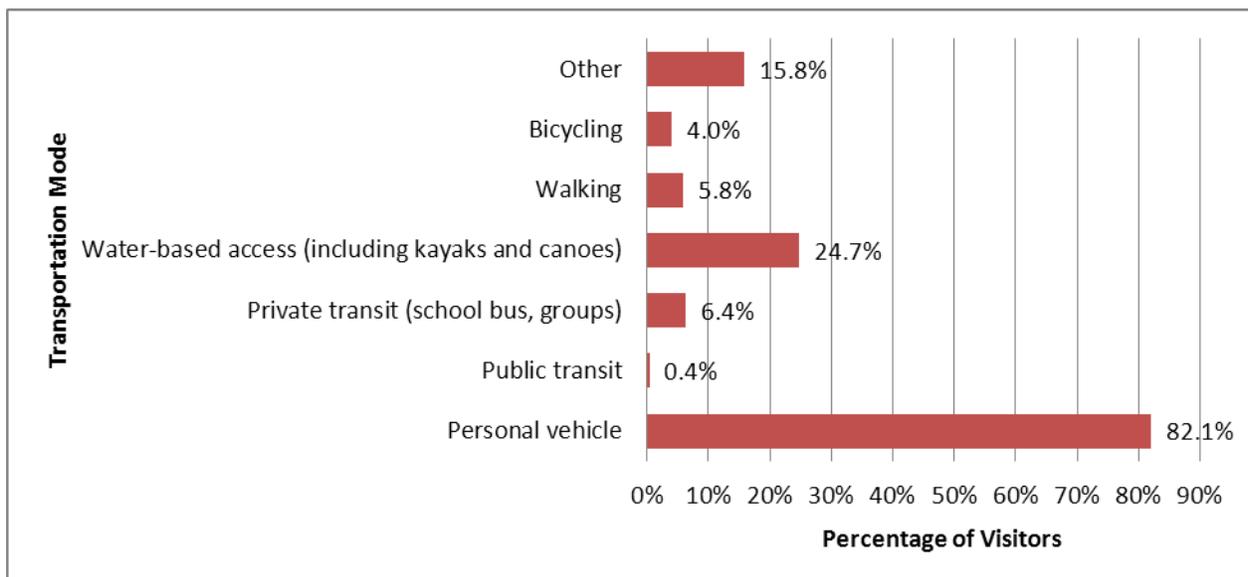
ATS Questionnaire Analysis

The RATE team jointly developed the Region 5 ATS Questionnaire to collect information about the transportation needs and opportunities of stations in the region. Station managers responded to the questionnaire in an online format during January and February 2012. Data from the questionnaire will help inform regional priorities and understand the needs for alternative transportation across the region. It will also allow regional staff to target technical assistance.

Station and Visitation Background

A total of 54 stations responded to the survey (out of 71 stations in the region, representing a 76 percent response rate). Of these 54 respondents, 91 percent (49 stations) are open to public use. The questionnaire asked each station manager to estimate the transportation modes that visitors use to access the station. According to the results illustrated on Figure 1, most visitors access stations in Region 5 by personal vehicle (82.1 percent), followed by water-based access (24.7 percent), private transit (6.4 percent), walking (5.8 percent), and bicycling (4.0 percent). There are currently very few visitors (0.4 percent) who access refuges through the use of public transit services.¹ The majority of station managers (66.7 percent) also commented that they have school groups or friends groups that provide transportation to the station via bus or van.

Figure 1: Visitor Access Mode (average percent) (N=54)



Transit and Trail Connections

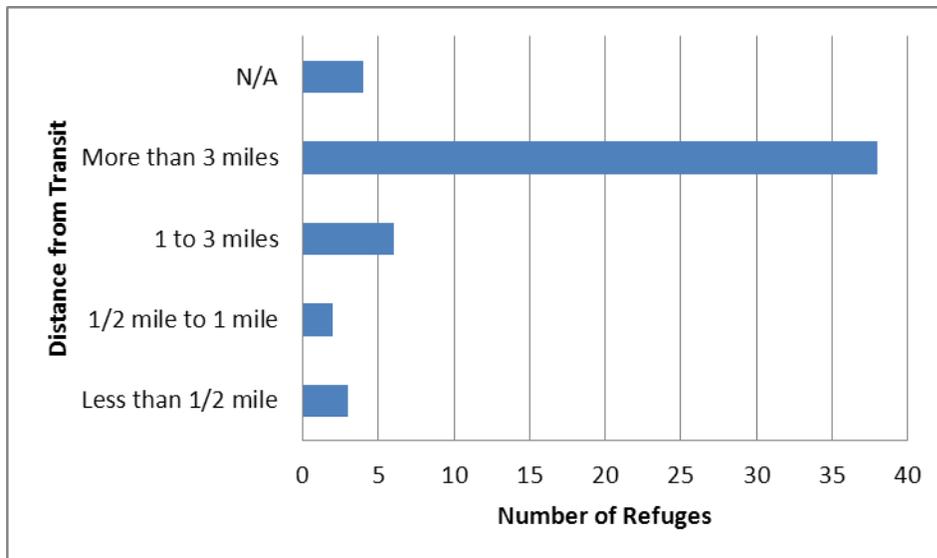
Several questions focused on transit and trail connections to stations.² The results for these responses are shown in Figure 2 and Figure 3, respectively. Five stations reported having direct public transit service or transit service within one mile (Stewart B. McKinney NWR, Potomac River NWRC, Occoquan Bay

¹ The Nulhegan Basin Division of the Silvio O. Conte NFWR responded that 70 percent of visitors accessed via snowmobile, and Massasoit NWR noted that the majority of visitors do not enter the refuge because it is closed to the public (reflecting a response error of the questionnaire). Both of these responses fit into the “other” category, causing a larger number than reflected by other respondents.

² Transit and Trail Connections: Assessment of Visitor Access to National Wildlife Refuges (a 2010 report developed by the Volpe Center) includes information on transit and trail connections. The 2010 report results on transit are very similar to those of the RATE Questionnaire; the report found three refuges with transit within ½ mile of transit, an additional three refuges within one mile of transit, and six refuges between one and three miles. The results were less accurate for trails, since the report authors had limited means to identify regional trails. The report found four refuges with a direct trail connection, one refuge with a trail within one-half mile, and two refuges with a trail within three miles.

NWR, John Heinz NWR, and Edwin B. Forsythe NWR); and six stations (John H. Chaffee NWR, Long Island NWR Complex, Monomoy NWR, Parker River NWR, Patuxent NWR and Rappahannock River Valley NWR) have transit service between one and three miles from the station. The majority of respondents (79 percent) indicated that they do not have public transit service within three miles from the station. Although over 20 percent of respondents have some form of transit service within three miles of their station, the average percentage of visitors that use transit to access the refuge is only 0.4 percent of the total estimated annual visitation, implying that greater effort is needed in strengthening and promoting public transit connections.

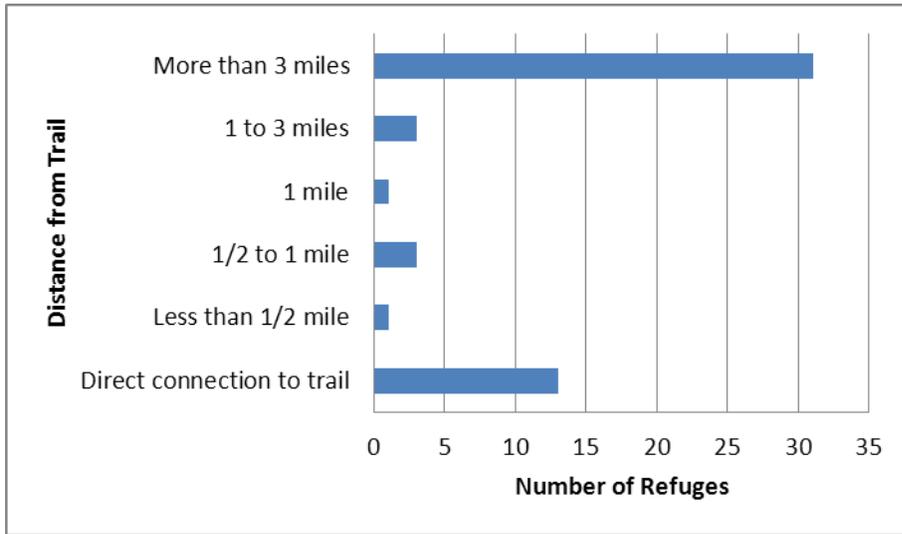
Figure 2: Refuge Distance from Public Transit Service (N=53)



Seven refuges (13 percent) have transit service (including van or tram tours) that runs internally at the station, all but one of which are operated by partners or friends groups. These seven stations are Back Bay NWR, Chincoteague NWR, Edwin B. Forsythe NWR, Great Dismal Swamp NWR, Moosehorn/Aroostook NWR, Nantucket NWR, and Patuxent Research Refuge.

As illustrated on Figure 3, a total of 13 refuges (25 percent) have direct connections to a regional multiuse trail, and five refuges (10 percent) are within one mile of a regional trail. The large number of refuges with direct or very close connections to regional multiuse trails often results from instances in which refuges have worked closely with their partners to fund or support the construction of a new trail or trail extension. The majority of respondents (61 percent) do not have trail access within three miles from the station. Further promotion of successful trail connections may help other refuges pursue partnerships for regional trails and increase nonmotorized access to their refuges.

Figure 3: Refuge Distance from Regional Trails (N=51)

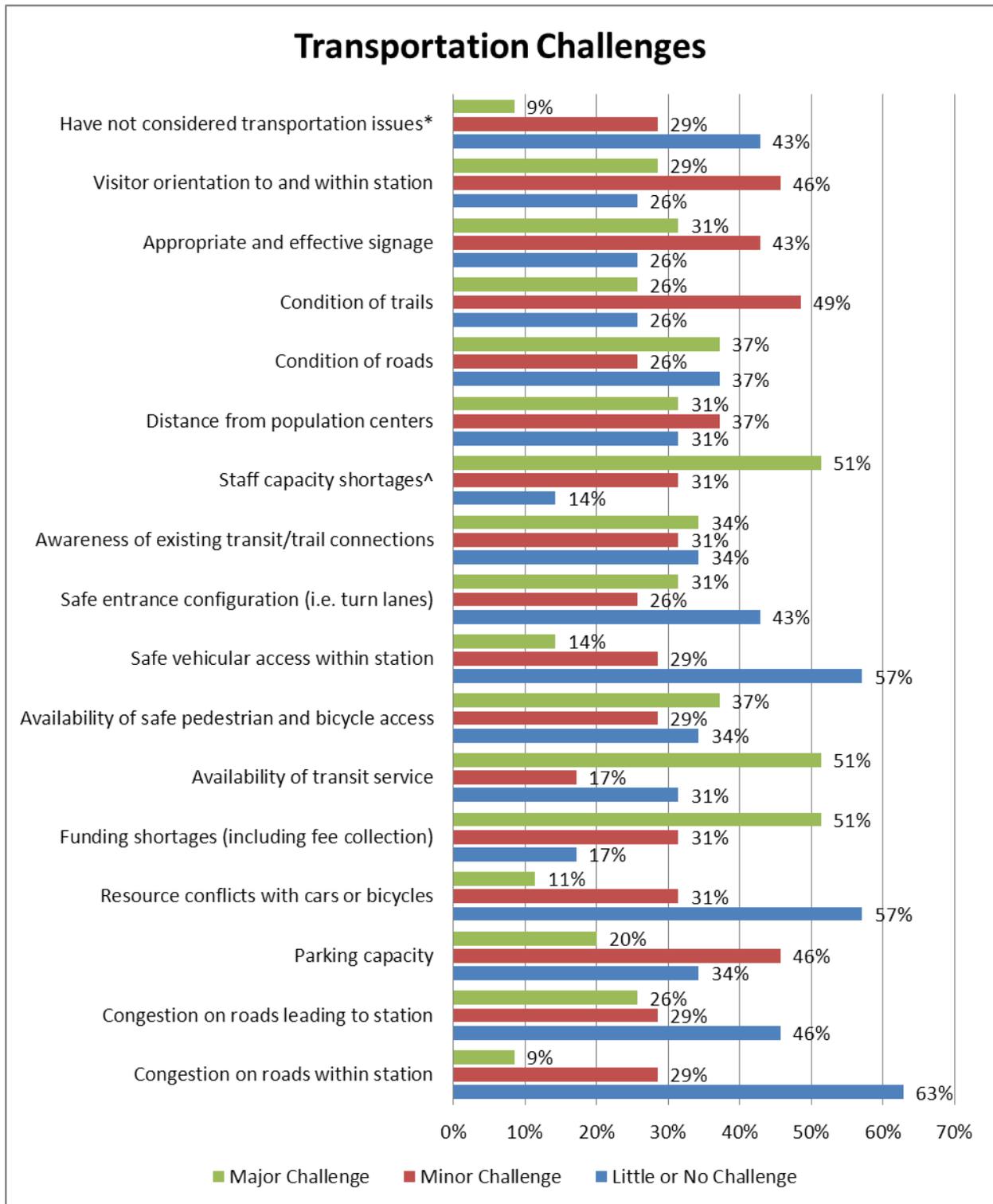


Transportation Challenges and Opportunities

The questionnaire asked the Region 5 station managers to self-evaluate transportation challenges and opportunities. Respondents rated a list of challenges as major, minor, or little to no challenge (Figure 4). Some of the most significant transportation challenges are beyond the direct control of the FWS, such as the lack of nearby public transit service, which makes it difficult for many potential visitors to use alternative transportation to access refuges. Some of the other issues most frequently cited as “major challenges” relate to broader management challenges within the Service, such as limitations on funding and staff capacity.

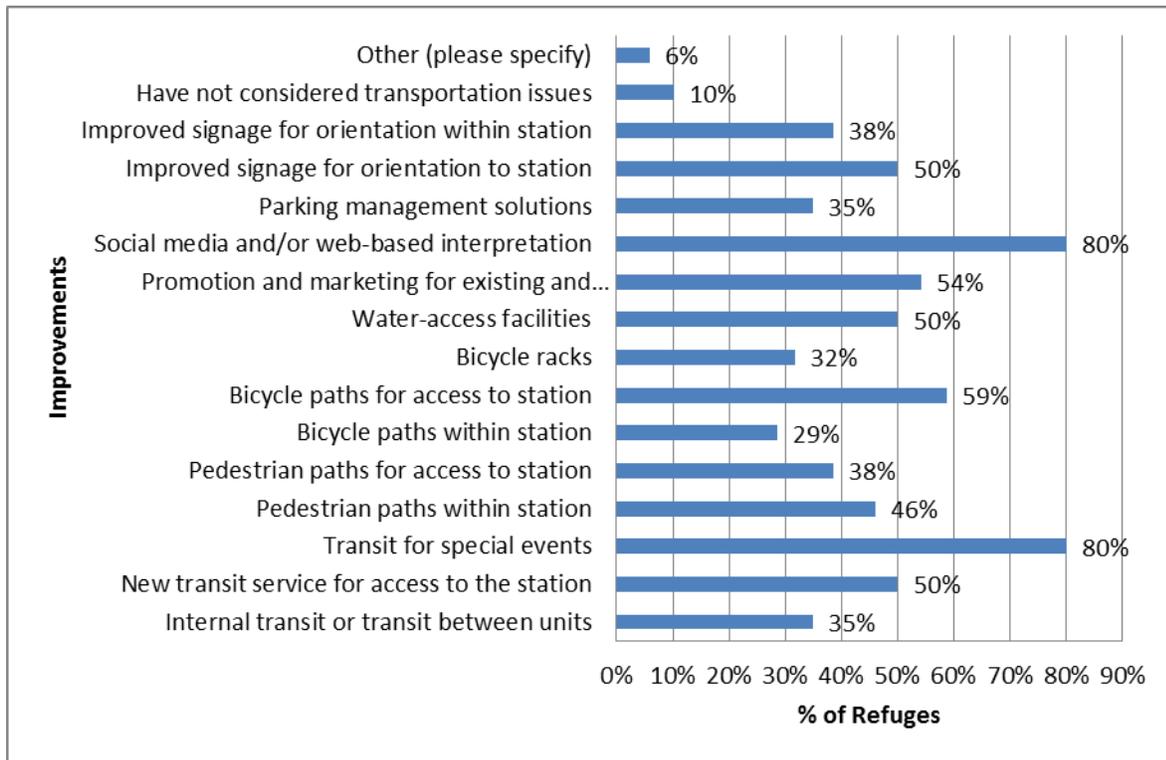
A subset of other significant challenges included some concerning the state of infrastructure. Some managers noted that the condition of roads and trails could be improved, although this was more often considered a “minor challenge,” while others noted challenges with safe pedestrian and bicycle access. Another set of challenges concerned visitor awareness of and orientation to ATS on the refuge. Many noted that the absence of adequate signage and wayfinding orientation are minor challenges, and an awareness of transit and trail connections was cited as lacking at some stations.

Figure 4: Transportation Challenges



Note: The number of responses (n) = 54 for all except: * n=28; and ^ n=34

Figure 5: Potential Transportation Improvements to Enhance Visitor Program (n=44)



The Region 5 refuge managers identified a number of improvements with the potential to enhance visitor programs, as shown in Figure 5. The most commonly cited transportation-related visitor improvements are more expansive use of social media and web-based interpretation and the provision of transit services for special events (24 refuges out of 44 refuges responded to this question). Given the demand for these types of visitor services, Region 5 staff may want to consider offering some guidance or best practices in these areas.³ Refuge managers also noted a few needs for infrastructure and access improvements, such as pedestrian paths within the station (17 refuges) and bicycle paths for access to the station (20 refuges), which reinforces some stations' desire for strong nonmotorized connections, and new transit service for access to the station as well (18 refuges). Improved signage is another cited infrastructure-based visitor improvement (18 refuges). Also, 19 managers called for greater marketing and promotion of existing and potential transportation systems, which is another area that Region 5 staff or DOT partners or contractors could offer best practices and technical assistance.

Additional Findings

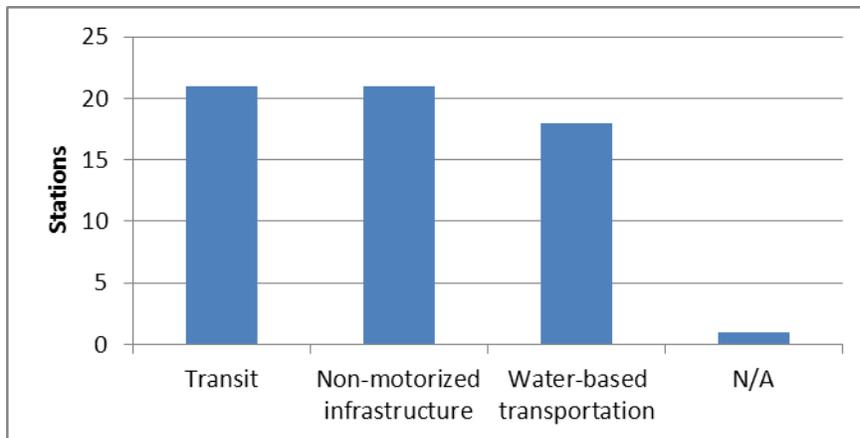
This section provides additional insights from the questionnaire results for application to future planning and implementation of ATS at Region 5 stations.

Many managers are actively planning for ATS in the future or expressed a strong interest in doing so. Six stations have completed transportation-specific studies, with three of those studies explicitly including

³ Region 5 has a web manager and new media specialist who can offer guidance to refuge and regional staff on social media. Staff should contact Alexa Marcigliano for questions and guidance.

alternative transportation. Further, 16 refuges reported the inclusion of ATS actions or goals in their completed Comprehensive Conservation Plans. The questionnaire asked managers whether they considered several alternative transportation modes as important to the future of their station. Responses indicate that about one-half of the stations in Region 5 responded affirmatively to the importance of bicycle, pedestrian, water-based, and transit access to and within the station. Figure 6 illustrates the ATS modes that managers believe will be important to their stations (managers could select more than one mode). Finally, more than half of managers expressed interest in conducting in-depth alternative transportation assessments at their stations.

Figure 6: Stations Foreseeing ATS by Type (n=54)



Station managers see alternative transportation as a way to address safety along station roadways, particularly in the form of better accommodation for bicycles and pedestrians. Station managers cite speeding vehicles as the biggest safety concern (56 percent of stations), followed by weather-related issues (46 percent) and bicycle and pedestrian safety (37 percent). Creating separate bicycle/pedestrian paths or marking road shoulders could help reduce the danger to cyclists and pedestrians, although these measures may be difficult on unpaved roads. “Share the road” and improved speed warning signs would also help alleviate some of these concerns.

The questionnaire also asked station managers about their existing partnerships and potential to expand those partnerships to include transportation system improvements. Most station managers responding to the questionnaire have already established general partnerships with local (50 percent) and state (61 percent) governments, other Federal Lands Management Agencies (FLMAs) (44 percent), and non-governmental organizations (61 percent). A few station managers (16 percent) have existing transportation-related partnerships, but many station managers indicate a willingness to expand partnerships to more explicitly include transportation.

Region 5 staff can help station managers in the region explore expanded partnerships with friends groups, schools, and other organizations. Currently, friends groups and schools use vans and buses to bring groups to many refuges, and refuge staff can approach friends groups to have them provide transit and bring new audiences to special events, which was one of the most commonly cited visitor improvements. Expanded transportation partnerships could be used to implement new ATS initiatives, such as bicycle sharing or canoe/kayak improvements. Twelve stations identified an interest in exploring the concept of bicycle sharing. While 36 station managers noted that their stations currently permit canoeing and kayaking, only 14 stations indicated that they had adequate facilities to support these activities.

Conclusion

The questionnaire results demonstrate an overall interest among Region 5 station managers to expand ATS in the future. It also finds overlap between some of the needs and challenges associated with

transportation, such as safety for nonmotorized users and lack of transit service, and opportunities to improve the visitor experience, such as through increasing the scope of internal and external bicycle and pedestrian trails and adding transit service for special events. There is also potential to strengthen the use of transportation plans and partnerships to further expand ATS among Region 5 stations.

Underserved Populations Analysis

Overview

The RATE team selected three metropolitan areas in Region 5 to assess ATS connectivity from locations with high densities of underserved populations to nearby NWRs. The team chose the regions of Hampton Roads, Virginia; Boston, Massachusetts; and Long Island, New York. The team selected these metropolitan areas based on the presence of nearby refuges, the availability of alternative transportation services throughout the region, and the potential to use ATS to connect underserved populations to refuges. The 2011 population estimates for each region, calculated by metropolitan statistical area, is shown in Table 1.

Table 1: Populations of Regions in Underserved Populations Analysis

Metropolitan Region	Population
Boston-Cambridge-Quincy, MA-NH	4,552,402
Virginia Beach-Norfolk-Newport News, VA-NC	1,671,683
New York-Northern New Jersey-Long Island, NY-NJ-PA	18,897,109
Nassau-Suffolk (Long Island)	2,832,882

Source: U.S. Census Bureau Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2010 to July 1, 2011

Methods

The team identified three demographic variables – median household income, car ownership per household, and percentage of non-white population – to represent underserved populations.⁴ The yellow circles on each of the resulting maps (see Figure 8, Figure 9, Figure 10, Figure 12, Figure 13, Figure 14, Figure 16, Figure 17, and Figure 18) denote target areas for improving access to refuges, based on high percentages of underserved populations in those areas. Each of these demographic variables draws upon 2009 data from the American Community Survey at the Census block level.

In addition to thematic maps created for the three demographic variables, an additional map shows the transportation infrastructure present in each region (see Figure 7, Figure 11, and Figure 15). Data sources include MPOs, local and state GIS resources, and other local and state public agencies. The RATE team used the best data available at the time of publication and at the appropriate regional scale, which may not include detailed or new transit routes and trails.

⁴ The team classified median household income using the 2009 national poverty threshold (\$21,954) and median household income by state.

Hampton Roads

Hampton Roads encompasses several cities along the southeast coast of Virginia including Norfolk, Virginia Beach, Newport News, Suffolk, and Portsmouth. There are a number of refuges throughout the Hampton Roads area protecting wildlife habitat and offering interpretive experiences and nonmotorized access to visitors. The Great Dismal Swamp NWR is located near the city of Suffolk, with the refuge headquarters situated approximately 7.5 miles south of the city. The refuge offers a number of unpaved hiking and bicycling trails. Back Bay NWR is situated approximately 15 miles south of Virginia Beach. While there are some pedestrian and bicycle connections to the refuge, there are nearly 15 miles of bicycle and pedestrian infrastructure within the refuge. The Eastern Shore of Virginia NWR lies at the southern tip of the Delmarva Peninsula at the northern terminus of the Chesapeake Bay-Bridge Tunnel. The new, 2.6 mile Southern Tip Bike and Hike Trail along US-13 north of the Eastern Shore of Virginia NWR offers nonmotorized access to the refuge. The case studies section of the RATE has more information on each of these refuges.

Due in part to its large size, Great Dismal Swamp NWR has several opportunities to expand access to neighborhoods with underserved populations in the cities of Portsmouth, Chesapeake, Suffolk, and Norfolk. Many of these neighborhoods are located within 10 miles of the refuge, but current alternative transportation access is limited outside of urban areas. Additionally, visitor facilities are concentrated in parts of the refuge that are not accessible without a personal vehicle. Underserved populations in Suffolk can currently access the refuge through a city-run bus tour (with a fee paid to the city), which departs from the Suffolk Visitor Center in downtown Suffolk. In the future, an extension of transit service from Chesapeake or new nonmotorized infrastructure from any of the gateway communities could expand access to underserved populations.

At Back Bay NWR, expanded bicycle infrastructure or new transit service could provide access to Virginia Beach and the Naval Air Station Oceana, where data shows many residents have low rates of vehicle ownership. The region's greatest concentration of underserved populations is in the downtown areas of Norfolk and Portsmouth. While people living in these areas cannot access refuges using transit or trails, they could be served by a temporary transit service for tour groups or special events, perhaps coordinated with community groups in these areas.

Figure 7: National Wildlife Refuges and Transportation Infrastructure in the Hampton Roads Region

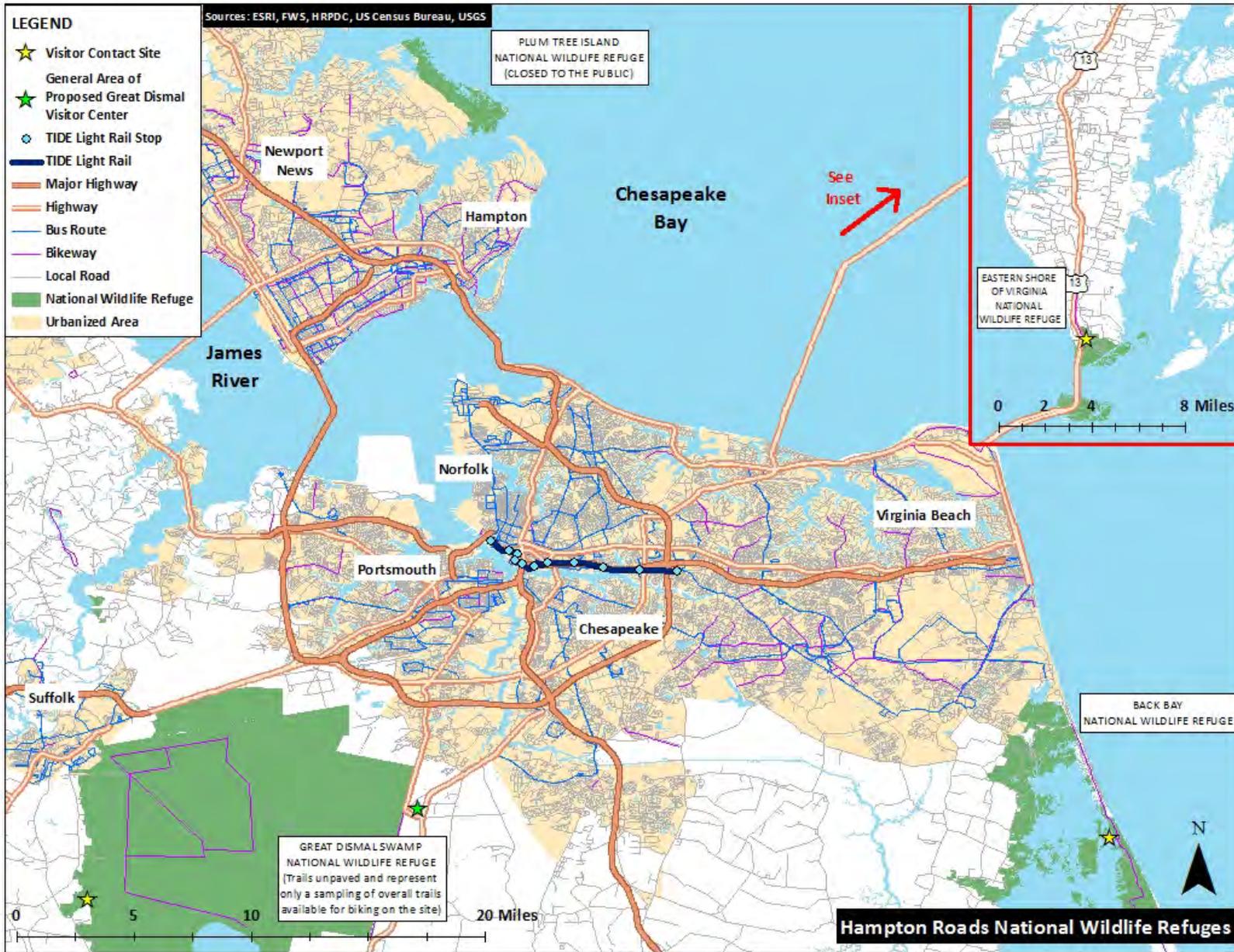


Figure 8: Low-Income Populations and Accessibility to NWRs in the Hampton Roads Region

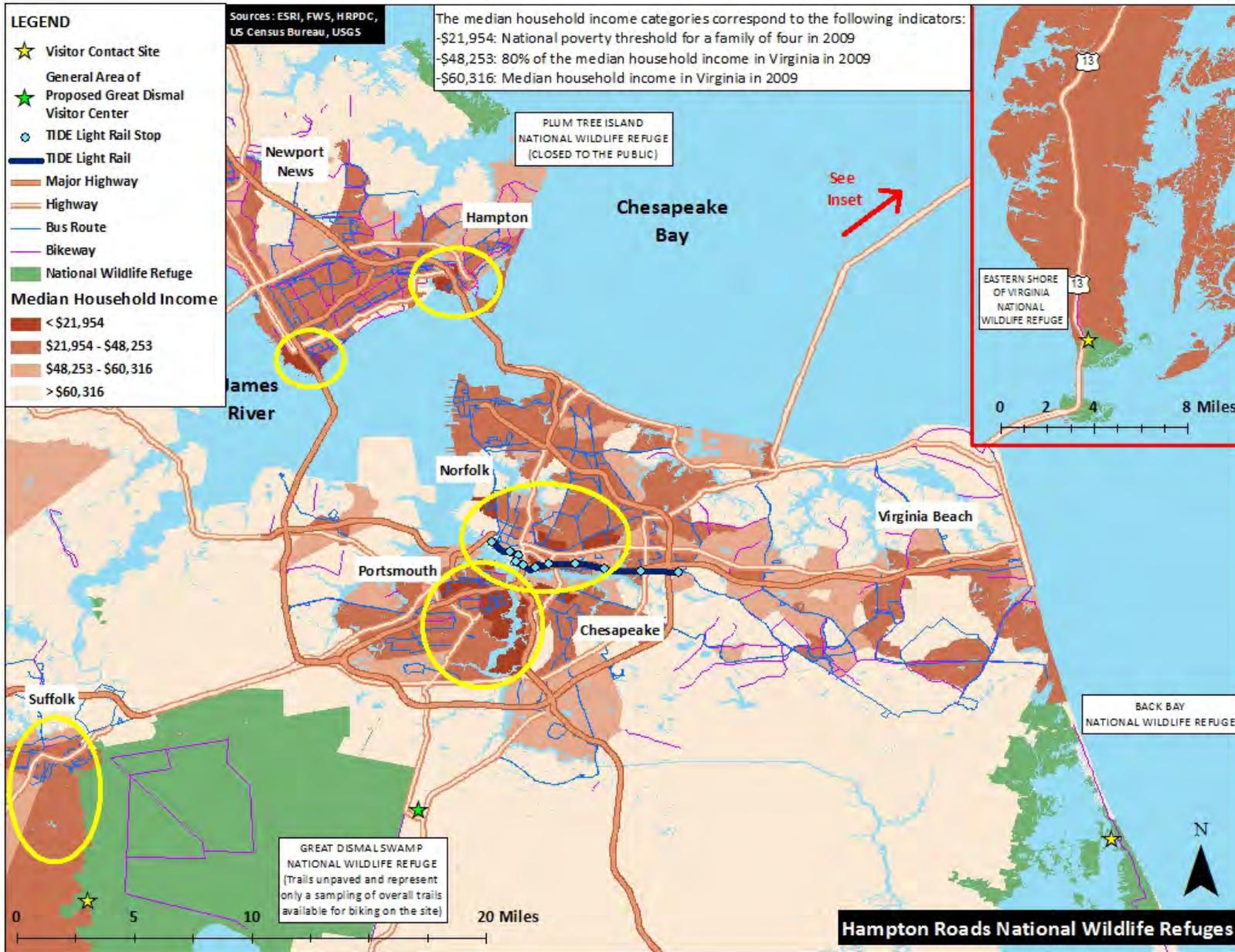


Figure 9: Non-White Populations and Accessibility to NWRs in the Hampton Roads Region

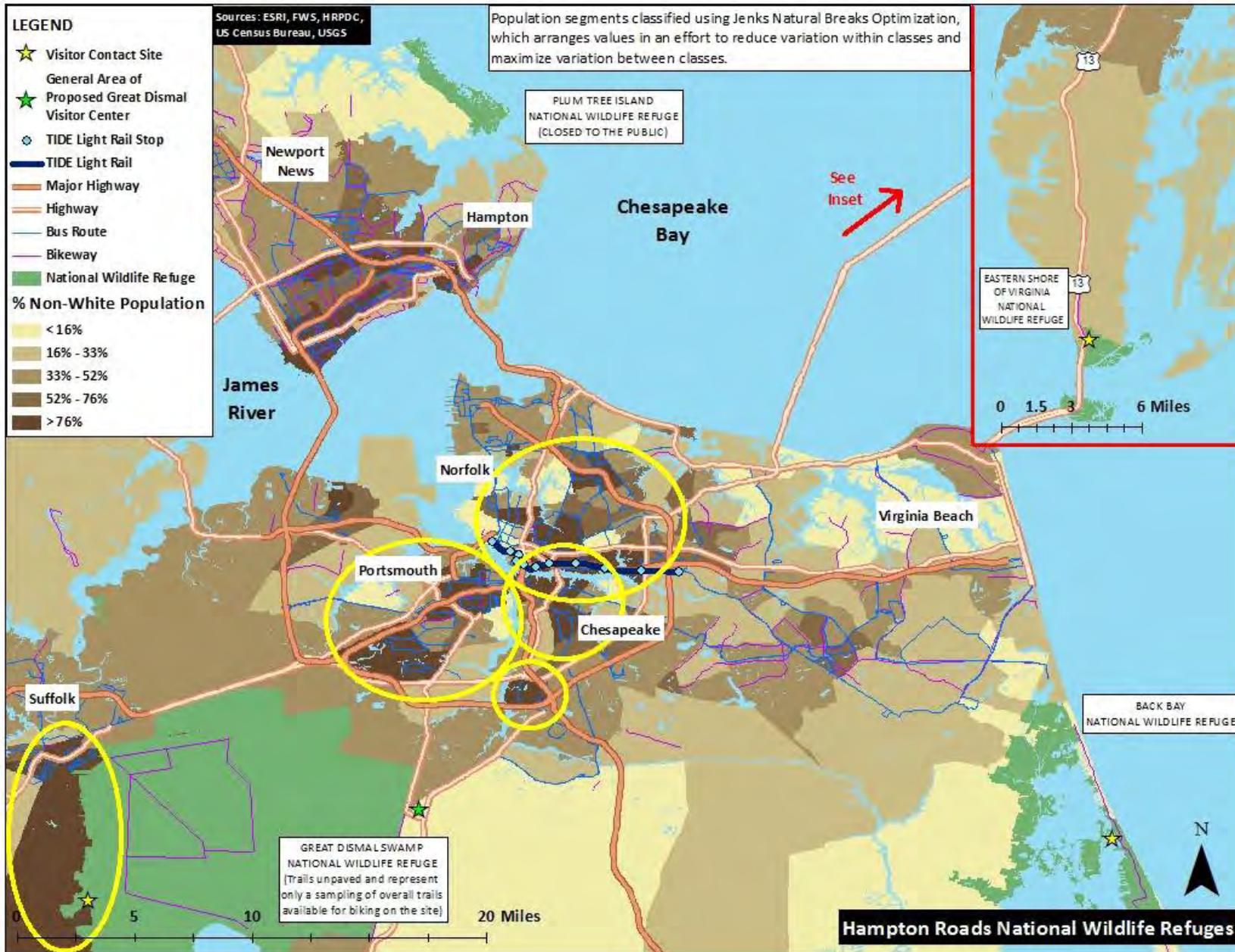
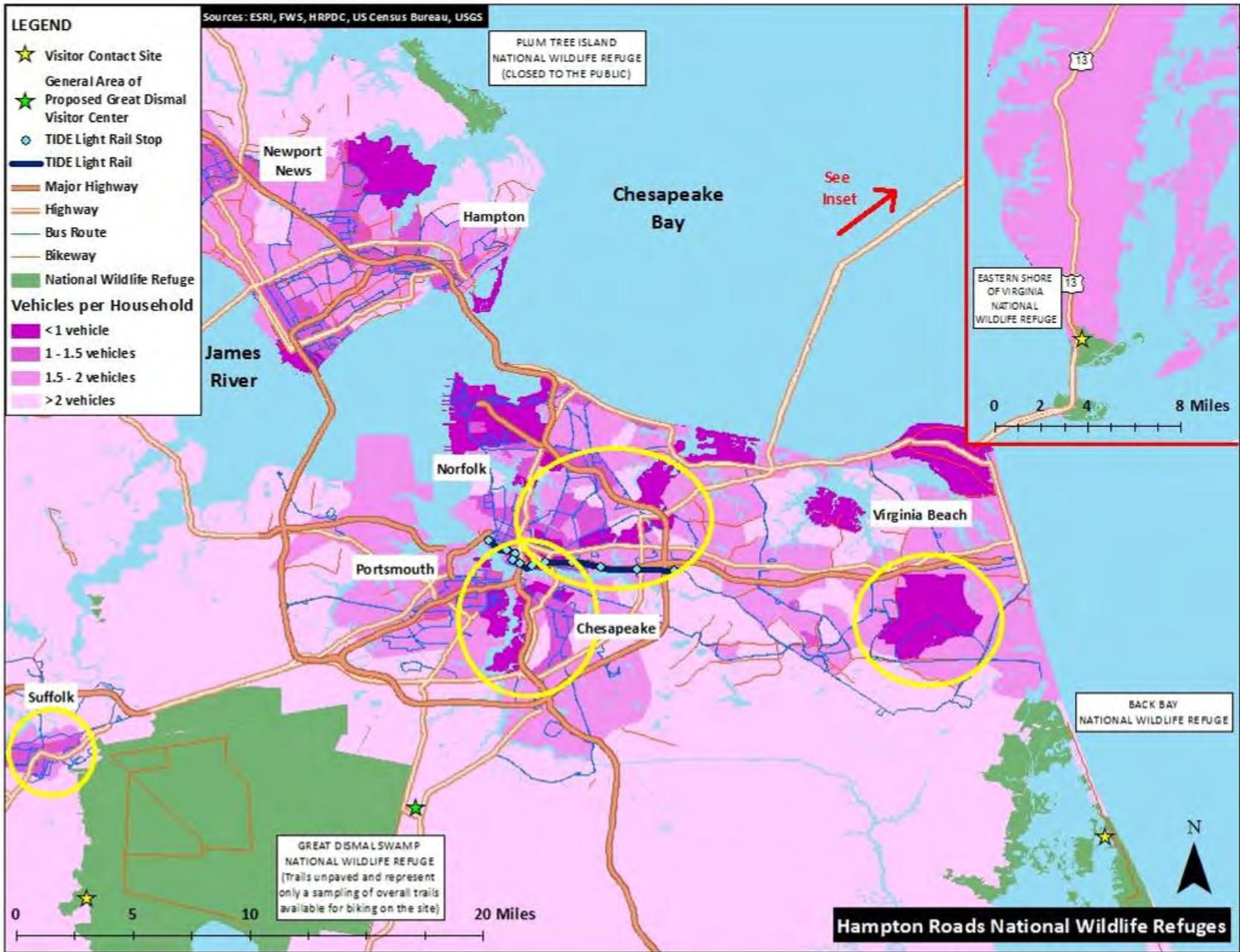


Figure 10: Vehicle Ownership and Accessibility to NWRs in the Hampton Roads Region



Boston Region

MBTA Commuter Rail service and local bicycle/pedestrian trails offer opportunities for alternative transportation access to the refuges within Boston's metropolitan area (Figure 11). Parker River NWR features a new visitor center in Newburyport, approximately 30 miles northeast of Boston. This visitor center is less than two miles from the MBTA's Newburyport commuter rail station. Assabet and Great Meadows NWRs, part of the Eastern Massachusetts Refuge Complex, both are located near commuter rail lines and bicycle/pedestrian trails. The Reformatory Branch Trail provides direct access to the Concord unit of Great Meadows. This trail connects to the Minuteman Bikeway, a popular 10-mile rail-trail connecting to the City of Cambridge and the MBTA subway system. The Assabet River Rail Trail runs along the northwest edge of the Assabet NWR, with on-street connections to the South Acton commuter rail station 3.5 miles to the north.

Many of the underserved populations around Boston neighborhoods (including low-income, low-vehicle ownership, and non-white populations) are concentrated in the areas within and immediately surrounding the city, as well as in the cities of Lowell, Lawrence, and Haverhill along the Merrimack River (Figure 12, Figure 13, and Figure 14). Marketing alternative transportation connections between these population centers and the refuges would best serve the underserved populations of this region. "Last mile" connections aimed at bringing visitors to refuges from nearby alternative transportation corridors, particularly from commuter rail stations, are key to increasing alternative transportation among visitors. Parker River and Great Meadows NWRs, which both have concentrations of visitor amenities less than three miles from a rail station, would benefit most from the development of these connections. A few areas of moderate concentrations of non-white and low-car-ownership populations are also located near Great Meadows and Assabet NWRs; increasing safe nonmotorized connections to these refuges would also be beneficial.

Figure 11: National Wildlife Refuges and Transportation Infrastructure in the Greater Boston Metropolitan Area

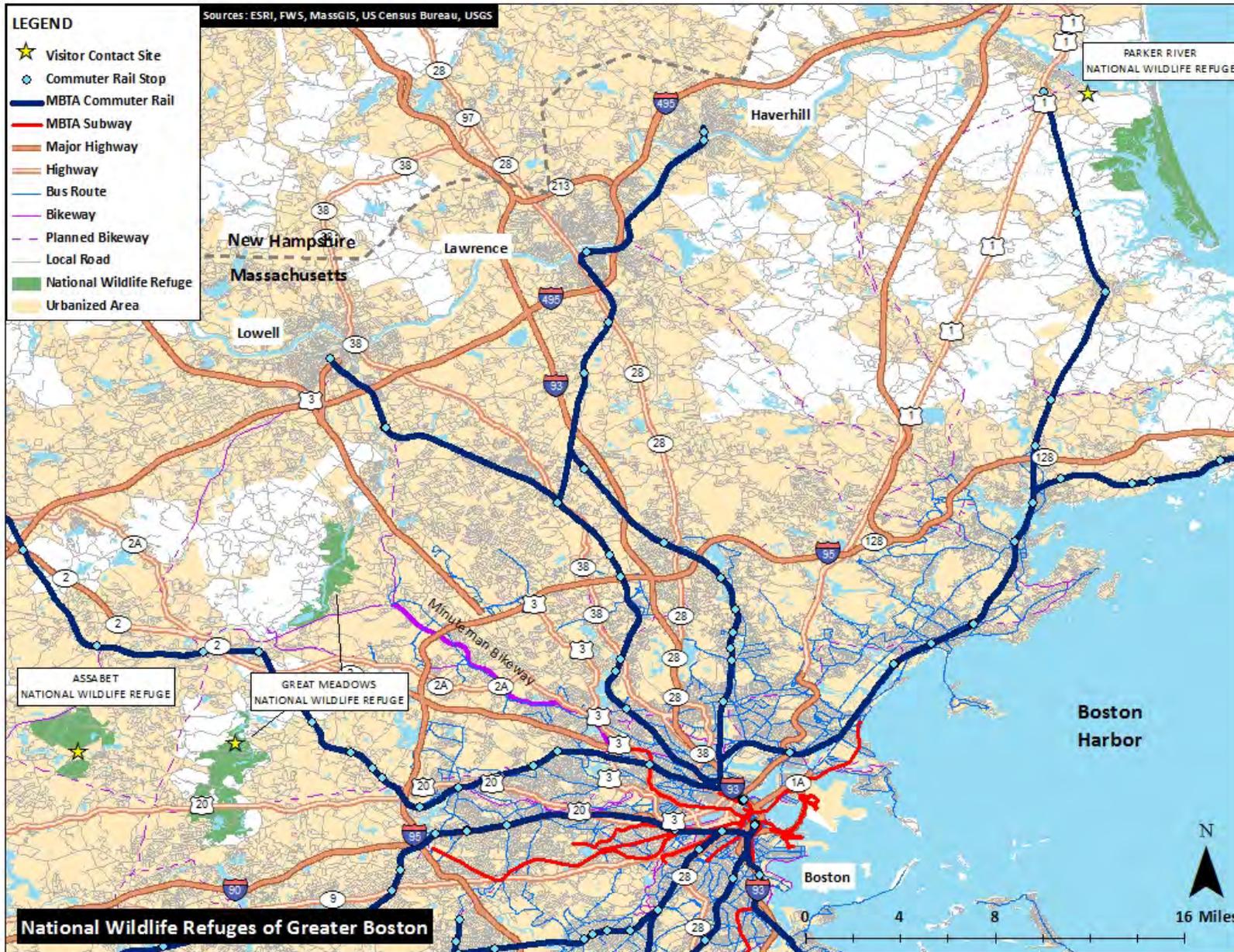


Figure 12: Low-Income Populations and Accessibility to NWRs in the Greater Boston Area

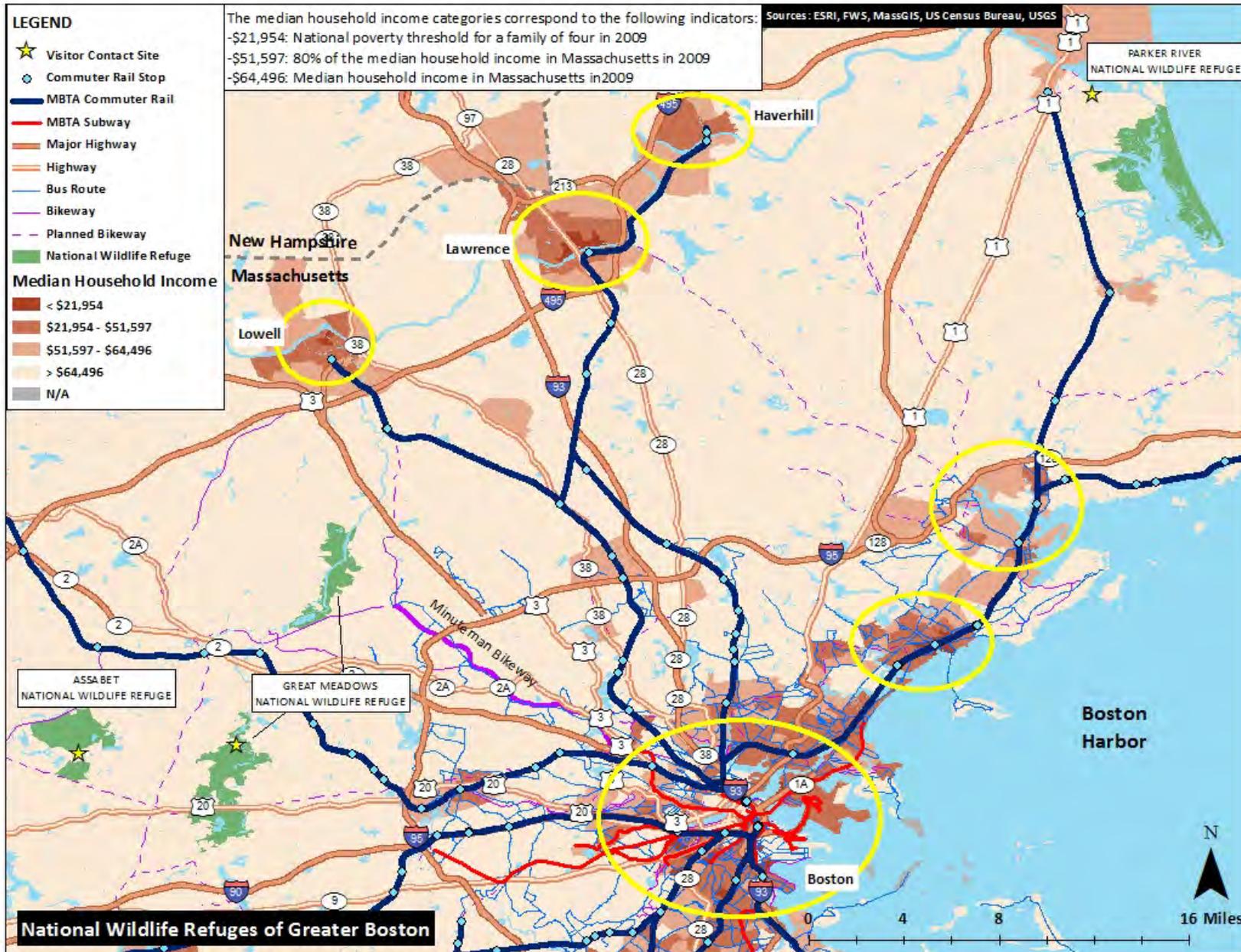
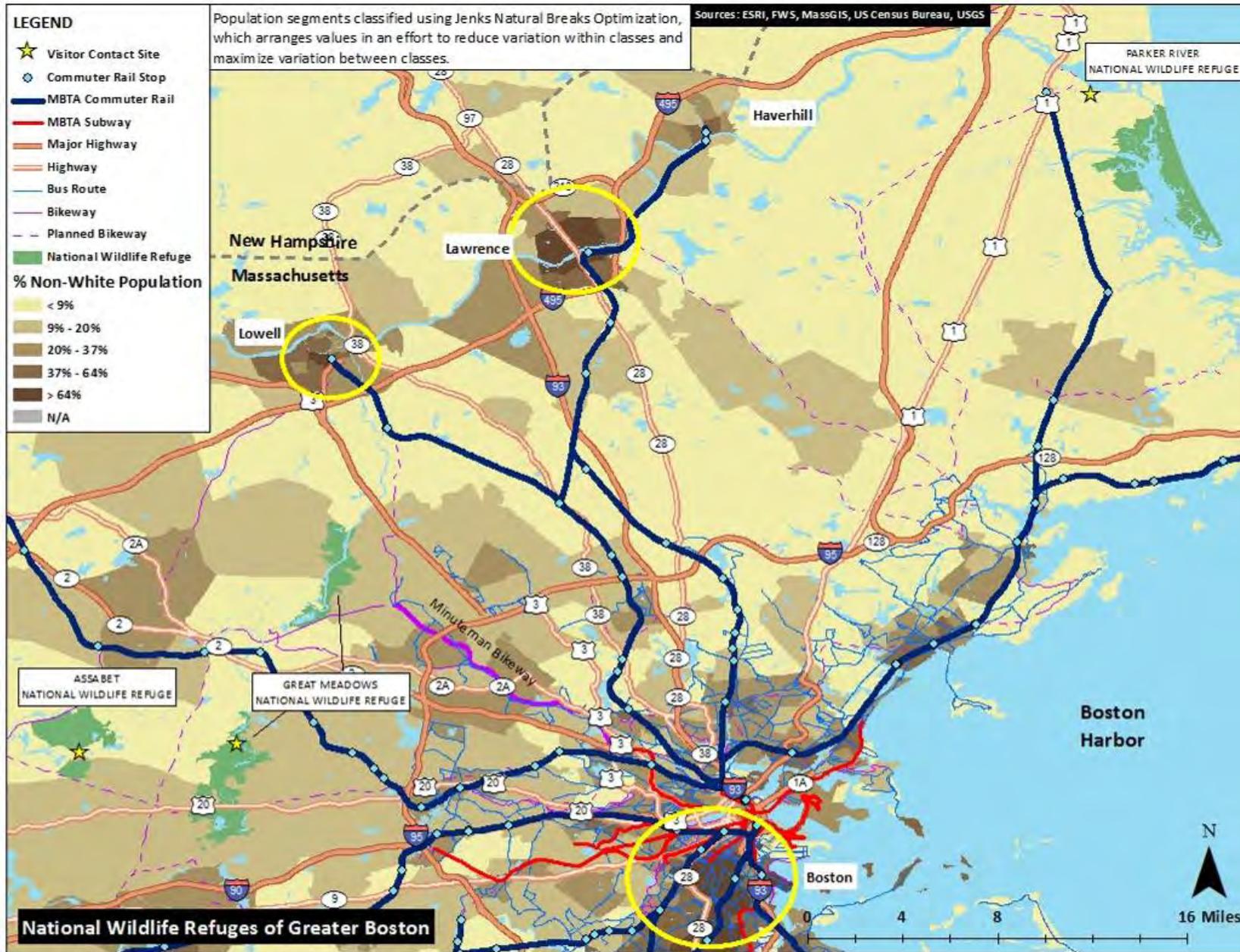


Figure 13: Non-White Populations and Accessibility to NWRs in the Greater Boston Area



Long Island

The refuges on Long Island, New York, are located near one of the densest population concentrations in the U.S. (Figure 15). However, many of these refuges are closed to the public, have limited visitor facilities, or are on remote parts of the Island, making them more accessible for visitors with a private vehicle. To combat this problem, the Long Island NWR Complex Visitor Center, opening in 2012, intends to serve as the central visitor station for the nine wildlife refuges and management areas on Long Island. The visitor center is located at the Wertheim NWR in Shirley, which recently added three miles of new trails from the visitor center and two new viewing platforms. The location of the new visitor center is one-third mile from the Mastic-Shirley station along the Long Island Rail Road's (LIRR) Montauk Branch. Suffolk County Transit's 7E bus route also runs along Smith Road with a direct connection to the visitor center, with service Monday through Saturday.

The underserved populations concentrated in New York City can access Wertheim NWR, but a visit requires extensive travel. LIRR services from the Jamaica Station in Queens take more than an hour to reach the Mastic-Shirley Station, and the travel time from Manhattan's Penn Station to Mastic-Shirley is nearly two hours. However, scattered communities along the Montauk Branch have high non-white populations or rates of low vehicle ownership, providing opportunities for these populations to use LIRR to reach the refuge. Figure 16 through Figure 18 show the location of underserved populations around Long Island relative to locations of refuges. The new visitor center's close proximity to rail and bus service gives the refuge incentive to promote and encourage these connections. The development of safe bicycle infrastructure, which appears to be limited in the region, would also help facilitate alternative transportation access.⁵

⁵ FWS staff also recommend cooperating with the National Park Service, which manages the Jamaica Bay Wildlife Refuge on the western side of Long Island, within New York City. The Jamaica Bay Wildlife Refuge is not part of the NWRS, but it may offer visitors in the New York area an accessible wildlife observation experience.

Figure 15: National Wildlife Refuges and Transportation Infrastructure in Long Island, NY

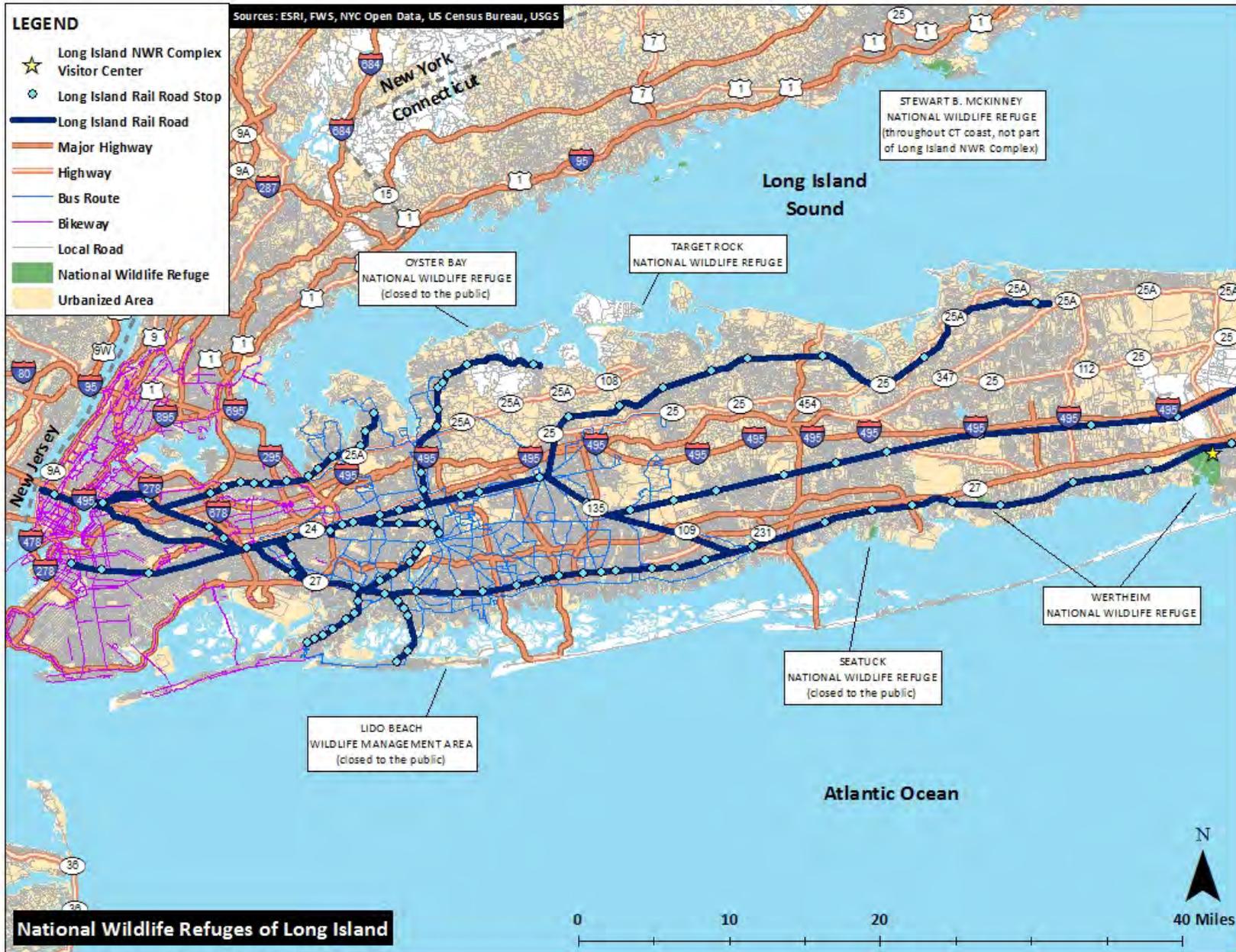


Figure 16: Low-Income Populations and Accessibility to NWRs on Long Island

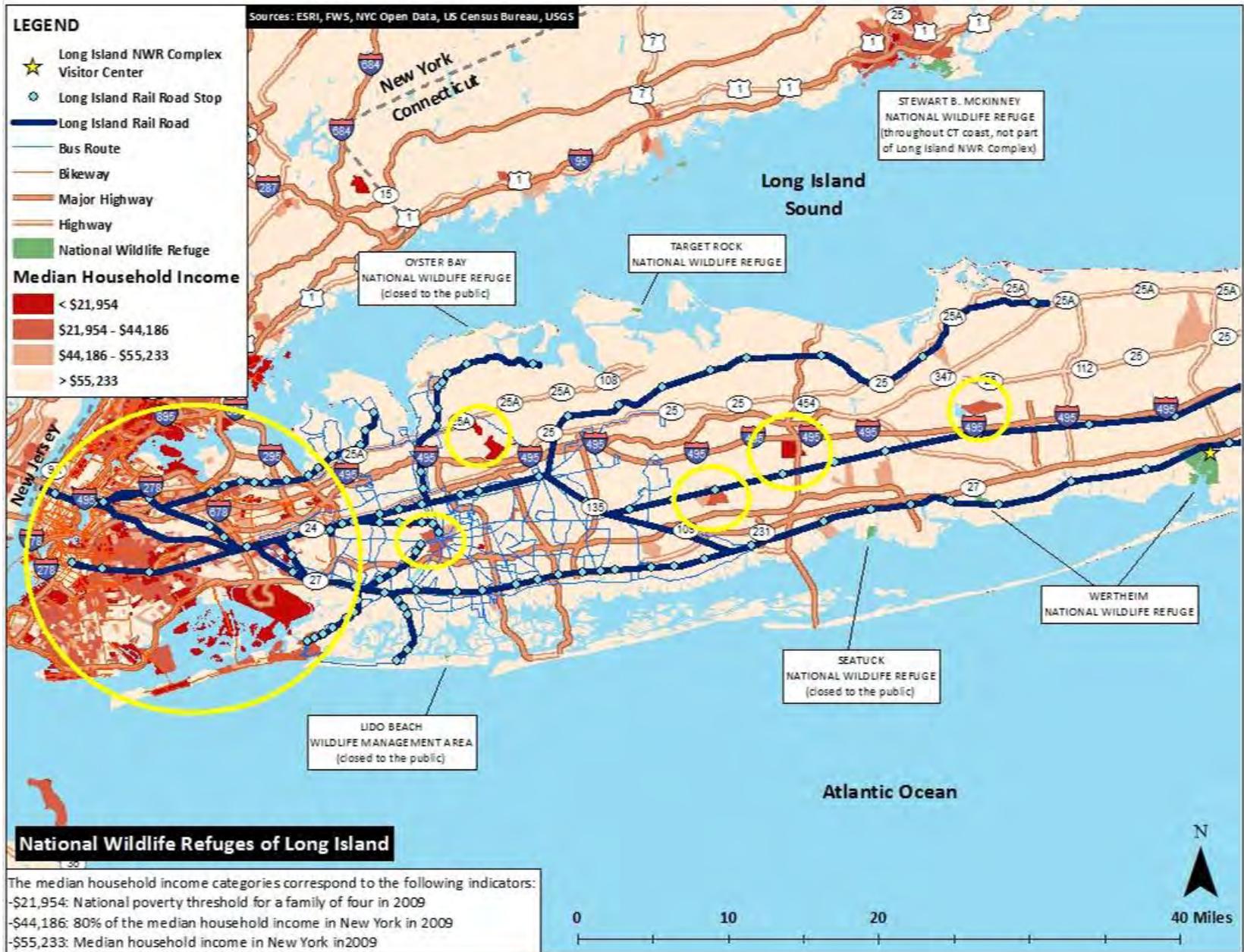


Figure 17: Non-White Populations and Accessibility to NWRs on Long Island

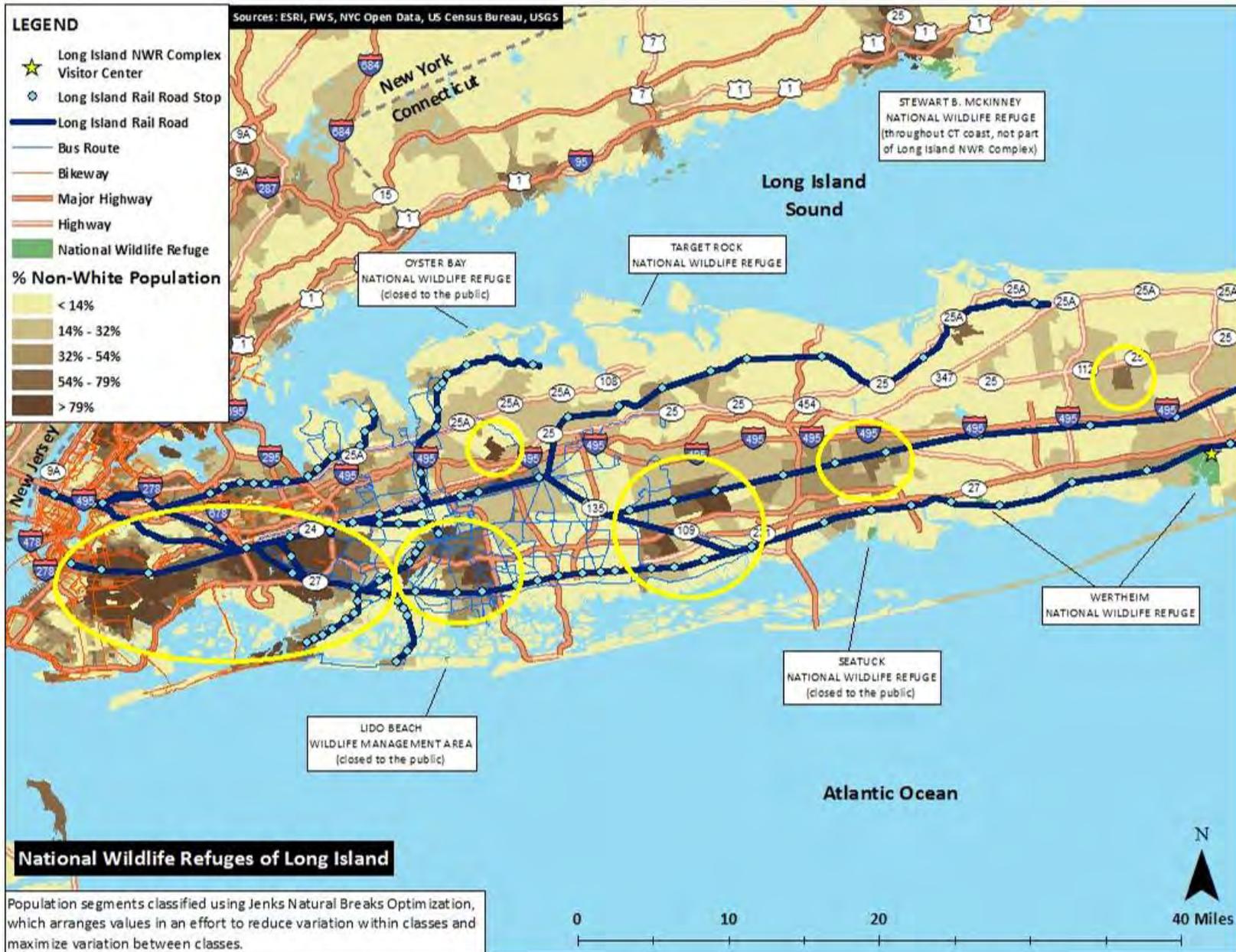
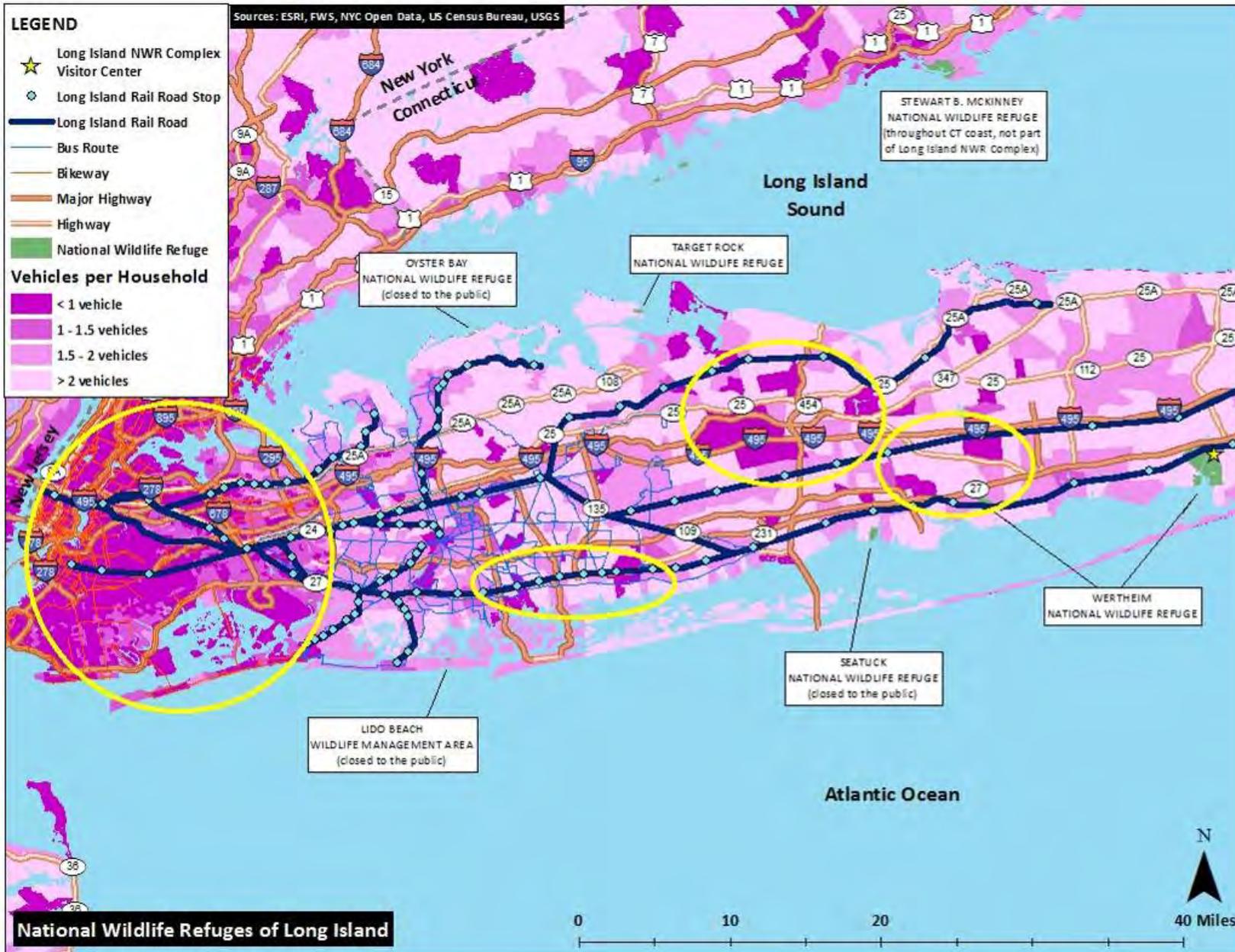


Figure 18: Vehicle Ownership and Accessibility to NWRs on Long Island



Funding Sources for ATS

The majority of transportation projects in Region 5 are funded through the Refuge Roads Program (RRP); Region 5 receives approximately \$1.75 million annually from the \$29 million nationwide program. The funding allocation for each region is based on several factors, including: current road mileage, parking and bridge surface areas, maintenance of assets costs, and annual visitation. Although Region 5 has high visitation compared to some other regions, it receives a relatively small allocation of RRP funds due to its low mileage of public roads (road mileage is heavily weighted in the allocation formula). RRP funds are primarily intended for the maintenance and improvement of refuge roads, and annual needs for roads in the region have always exceeded available funding. Pedestrian and bicycle facility maintenance and improvement activities in or adjacent to refuges are also eligible, but the region typically seeks other funding sources for these activities. The region also can receive funds directly from the Fish Hatchery Deferred Maintenance program for use on hatchery roads and parking lots, and the Emergency Relief for Federally Owned Roads (ERFO) program, which is used for roads and trails projects only to repair damage caused by flooding or other natural disasters.

Region 5 relies heavily upon discretionary sources to fund its transportation needs that are not covered through the RRP, hatchery deferred maintenance, and ERFO. Many discretionary sources are targeted toward or include eligibility for ATS projects. Region 5 has been competitive and successful in applying for discretionary funding programs through working closely with the Regional Roads Coordinator to match appropriate funding sources with ATS needs. Individual refuges also coordinate with local partners to strengthen support for transportation projects, leverage matching funds, and/or demonstrate connectivity with a larger regional transportation system.⁶

Federal Funding Sources

The two primary federal funding sources that have supported the greatest number of ATS projects are the Paul S. Sarbanes Transit in Parks (TRIP) program and Transportation Enhancements; Table 2 and Table 3 show the funded projects in Region 5 using these sources. Following the tables, a bulleted list of additional discretionary funding sources is presented and includes a brief program description, information on example projects in Region 5 (if applicable), and a link to federal government websites that provide additional information.

- **Paul S. Sarbanes Transit in Parks (TRIP):** The Paul S. Sarbanes Transit in Parks (TRIP) program is administered by the USDOT's Federal Transit Administration (FTA) and supports planning and implementation of alternative transportation projects within or accessing public lands. In addition to the federal land management agencies (FLMAs) which own and manage public lands, state and local government agencies with jurisdiction over public lands are eligible to apply with the consent of the Federal Land Management Agencies (FLMAs). Among other goals, the program seeks to reduce and conserve resources, reduce congestion and pollution, and enhance the visitor experience. This competitive grant award program covers the planning, engineering, and capital expenses for new or existing ATS, including bus and rail systems or pedestrian and bicycle trails. Operating costs, such as shuttle

⁶ All information on funding sources is accurate as of the date of publication. Many programs may change or be eliminated during the next transportation reauthorization.

operations or trail maintenance, are not eligible expenditures. Stations or their partners apply directly to FTA in an annual application cycle.

- *Additional information:* http://fta.dot.gov/grants/13094_6106.html
- *Funded projects in Region 5:* See Table 2

Table 2: Paul S. Sarbanes Transit in Parks Funded Projects in Region 5, 2007-2011

Year	Refuge	State	Project	Amount
2011	Monomoy NWR	MA	Purchase Biodiesel-fueled Shuttle Vehicles	\$400,000
2011	Chincoteague NWR	VA	Off-Site Supplemental Parking Facility	\$1,500,000
2011	Back Bay NWR (with City of Virginia Beach)	VA	Back Bay NWR Alternative Transportation Study	\$449,000
2011	John Heinz NWR (with Delaware Valley Regional Planning Commission)	PA	Trail and Transit Access to John Heinz NWR Planning Study	\$446,758
2010	Thatcher Island NWR	MA	Purchase a Replacement Ferry Boat for Visitor Service to Wildlife Refuge	\$79,042
2009	Parker River NWR	MA	Alternative Fueled Vehicle Visitor Initiative	\$122,300
2009	Presquile NWR	VA	Ferry and Transportation Alternatives Study	\$200,000
2008	Chincoteague NWR	VA	Provide Intelligent Information Traffic System (IITS)	\$350,000
2008	Chincoteague NWR	VA	Construct Pedestrian/Bike Trail	\$600,000
2007	Monomoy NWR	MA	Expansion of Alternative Transportation Planning Study	\$100,000
2007	Patuxent Research Refuge/Multiple Refuges	MD	Research and Design of Low Environmental Impact Tram	\$248,000
Total Sarbanes TRIP Funds to Region 5				\$4,495,100

- **Transportation Enhancements:** Under the Transportation Enhancements program, FHWA allocates funding to state DOTs for projects that expand transportation choices and enhance the multimodal surface transportation system. Eligible activities include pedestrian and bicycle infrastructure and safety programs, scenic and historic highway programs, landscaping and scenic beautification, historic preservation, and environmental mitigation. Funding requirements, lead agencies, and application processes vary by state. Due to the allocation through the statewide planning process, refuges can be most successful in obtaining funds through partnering with local governments or working directly with state DOTs. Transportation Enhancement program funds require a 20 percent match, but other FWS funds and RRP can be used for all or a portion of the match.

- *Additional information:* <http://www.fhwa.dot.gov/environment/te/index.htm>
- *Funded projects in Region 5:* See Table 3

Table 3: Transportation Enhancements Projects in Region 5, 2008-2011

Year	Refuge	State	Project	Amount
2011	Chincoteague NWR	VA	Rehabilitation of Assateague Island Lighthouse	\$430,000
2009	Chincoteague NWR	VA	Rehabilitation of Assateague Island Lighthouse	\$65,000
2009	Canaan Valley NWR	WV	Heart of the Highlands Trail System	\$156,800
2009	Eastern Shore of Virginia NWR	VA	Construction of Shared Use Path	\$147,400
2008	Eastern Shore of Virginia NWR	VA	Construction of Shared Use Path	\$70,000
2008	Eastern Shore of Virginia NWR	VA	Construction of Shared Use Path	\$73,000
Total Funds to Region 5				\$942,200

- **Public Lands Highway – Discretionary Program:** The Public Lands Highway Discretionary (PLHD) Program, funded by FHWA, provides funding for new construction, repair, and maintenance of roads, bicycle and pedestrian enhancements, and operation and maintenance of transit facilities. The program gives preference to projects from 13 western states that each contain at least 3 percent of the U.S. public lands; Region 5 refuges are eligible to compete for funds but do not receive preference. FWS units must apply directly to state DOTs, where staff reviews applications for completeness before transmitting to FHWA. Federal-Aid and Federal Lands Highway Divisions and Headquarters staff review these applications as well. Selected projects demonstrate alignment with the needs and strategic goals of the FWS (or other land management agency), as well as those that leverage other funding sources and streamline project delivery.
 - *Funded projects:* Chincoteague NWR received \$728,000 in 2011 under the PLHD program to construct Phase 2 of their Pedestrian/Bicycle Trail.
 - *Additional information:* <http://flh.fhwa.dot.gov/programs/plh/discretionary/>
- **Recreational Trails Program (RTP):** The RTP program, funded by FHWA, provides funding to develop and maintain recreational trails and trail-related facilities for both motorized and nonmotorized recreational use. Funding requirements, lead agency, matching requirements, and application processes vary by state. Deadlines may change annually. Project applicants must coordinate directly with the RTP State Administrator, which is listed on the FHWA website below, to determine eligibility. Due to limitations in grant size and requirements for matching funds, refuges are often most effective in using RTP funds for small-scale trail enhancement projects.
 - *Funded projects* No known projects in Region 5, but the region has submitted applications in the past.
 - *Additional information:* http://www.fhwa.dot.gov/environment/recreational_trails/index.cfm

- **National Scenic Byways:** FHWA Byways funding supports and enhances designated National Scenic Byways, All-American Roads, and state-designated byways. Funding may be used for the construction of bicycle and pedestrian facilities and the installation of signing along these roads. Funds are allocated through a competitive, state-based grant process, with 10 to 20 percent matches required. In other regions, refuges that are located on designated byways have successfully used byways funds for roads, trails, and other visitor facilities.
 - *Funded projects* Region 5 recently identified those refuges located along designated byways or byway corridors, opening opportunities for future funding applications. No known projects in Region 5 at this time.
 - *Additional information:* <http://www.bywaysonline.org/>
- **Rivers, Trails, and Conservation Assistance Program (RTCA):** The RTCA program, funded by the National Park Service, offers assistance for conservation and recreation projects through building partner relationships, developing conceptual project plans, helping partners define project goals, and identifying potential funding sources for implementation. FWS stations and local community partners are eligible to apply, although funds may not be used for construction or implementation. Applicants apply through a local RTCA office; refuges may work with partners to seek planning assistance for nonmotorized projects through the RTCA.
 - *Funded projects* Region 5 refuges have used RTCA for non-transportation projects, such as the identification and removal of invasive species.
 - *Additional information:* <http://www.nps.gov/ncrc/programs/rtca/index.htm>
- **Transit Enhancements:** While not a discretionary funding program, FTA administers a funding program available for use in urbanized areas with a population of 200,000 or more for projects or project elements that are designed to enhance mass transportation service or use and are physically or functionally related to transit facilities. FTA administers the program through formula funding to states. FTA funds may also be used for pedestrian improvements within one-half mile and bicycle improvements within three miles of a public transportation stop or station. Refuges can work with local government partners and MPOs to use this funding for bicycle and pedestrian access to transit, bicycle storage, and transit access to refuges.
 - *Funded projects* No known projects associated with refuges in Region 5 at this time.
 - *Additional information:* http://www.fhwa.dot.gov/environment/transportation_enhancements/guidance/te_provision.cfm

Additionally, the region received over \$8.5 million in one-time funding designations in the 2005 transportation authorization bill – SAFETEA-LU, many of which contributed to ATS projects. SAFETEA-LU allocated funding over a five-year period, beginning in FY2005 and ending in 2009. Although the authorization formally ended on September 30, 2009, a series of continuing resolutions (CRs) have been used since then to continue and fund the approved programs. The most recent CR authorizes the various provisions of SAFETEA-LU through June 30, 2012. While the various programs authorized in SAFETEA-LU funded 10 projects in Region 5 refuges, future transportation bills are not likely to include specific project earmarks, and this should not be considered as a sustainable long-term funding source. Funding amounts shown in Table 4 indicate total amounts received by Region 5 in the form of specific project earmarks, after any rescissions.

Table 4: High Priority Projects Program

Year	Refuge	State	Project	Amount
2005	Assabet River NWR	MA	Design and Construction of Parking Areas	\$377,957
2005	Rhode Island NWR Complex	RI	Construct a handicapped accessible trail and platform at Kettle Pond Visitor Center Administrative Facility	\$143,985
2005	Rhode Island NWR Complex	RI	Construct Trail and Facility Improvements	\$910,466
2005	Cape May and Supawna Meadows NWR	NJ	Roadway and Parking Lot Improvements	\$427,558
2005	Oxbow NWR	MA	Design and Construction of a Visitor Contact Station	\$1,349,851
2005	Parker River NWR	MA	Rehabilitation and paving of Parker River Road	\$179,980
2005	Montezuma NWR	NY	Construct Access to NYS Thruway	\$0 (\$1.2 million earmarked but never transferred due to changing NYS Thruway priorities)
2005	Bombay Hook NWR	DE	Rehabilitate Auto Tour Route	\$1,200,000
2005	Patuxent Research Refuge	MD	Road Improvements	\$2,592,000
2005	Blackwater NWR	VA	Construct Blackwater NWR Visitors Center, Trails and Road Improvements	\$1,349,108
Total Dedicated SAFETEA-LU Project Funds Provided to Region 5				\$8,530,905

The U.S. DOT has several additional websites with links to resources on alternative transportation funding sources. Federal nonmotorized transportation funding sources are listed on the following FHWA website: <http://www.fhwa.dot.gov/hep/bkepedtble.htm>. Federal public transit funding sources are available at the following FTA website: http://www.fta.dot.gov/funding/grants_financing_263.html.

Additional Funding Sources

Many of the federal funding sources described above are allocated to states for discretionary funding, and states may have their own funding programs for ATS projects. Programs vary by state and may be housed in more than one state agency, including those with a primary focus on transportation, recreation, environment and natural resources, and planning. MPOs and local governments may be another source for funding for ATS projects, often using funds allocated from the state or U.S. DOT. The regional roads coordinator can help refuges identify appropriate state and regional funding sources beyond those listed in this report.

Identifying and developing partnerships with friends groups, adjacent landowners, local governments, school districts, transportation and government agencies, and transportation providers can help stations expand their funding capacity and increase eligibility.

These partners may be eligible for and have access to additional funding sources, such as those from the local, state, and federal government and private foundations, and can provide matching funds for projects of mutual benefit. They also may be able to share capital infrastructure, such as buses or overflow parking, and technical expertise, such as planning or engineering services. Advanced planning and regular communication with partners allows station staff to identify more cost-savings strategies to reduce overall funding needs.

Project Prioritization and Selection

During its LRTP process, Region 5 will develop a framework to guide project selection for all transportation projects and focus on projects for inclusion in the five-year plan using RRP. The framework will inform selection of transportation projects using RRP and the Fish Hatcheries Deferred Maintenance Program funds. The region will base its framework on the goals of its LRTP, with guidance from the national LRTP pertaining to project prioritization.

Given that the framework will focus on projects funded through the RRP, which may include ATS components but usually concentrates on roads projects, the RATE team recommends several considerations to emphasize the benefits of ATS. First, Region 5 should consider developing a separate ranking framework or plan for non-RRP projects. Since much of ATS is not RRP eligible, the goal of the project selection framework would be for regional prioritization to allocate time, effort, and perhaps match funds. Second, the general framework for project selection include criteria that reinforce the goals of ATS, which will help projects with ATS components rate favorably and encourage roads projects to include ATS components for greater benefits.

The use of a second framework for non-RRP projects can help the region articulate its priorities for ATS and new construction projects that are ineligible or are not priorities for funding under the RRP. Region 5 should then match all potential projects with eligible funding sources, with possible rankings by funding source. The separate priority list can help regional staff allocate technical assistance to preparing grant applications for high-priority projects or demonstrate need to the FWS Washington Office and other funding sources. Non-RRP projects would be evaluated using the same project selection criteria as RRP projects, with the possible inclusion or higher weighting of a few additional criteria that may be specific to ATS projects. Regional staff can also use this list to communicate with station staff about relevant alternative funding sources for ATS projects that may not fit within the five-year plan for RRP funds. If there are high-priority projects on the non-RRP list that do not receive discretionary funding within a defined time period, they can be moved onto the five-year plan if they are eligible to do so.

When developing a framework for project selection, Region 5 should consider the benefits of ATS within several topical areas for evaluation criteria. The criteria for these areas can be written to require staffs that are evaluating projects to recognize the direct and indirect benefits of ATS projects or project components. Below is a list of categories that are likely to be included in the LRTP goals, along with related considerations in developing project selection criteria that allows ATS to help the region meet its goals.

1. Environment and Resource Protection
 - a. ATS projects can reduce use of roads and parking lots, which can result in less noise, vibration, and wildlife-vehicle collisions. It can also avoid or defer the need for new infrastructure, which indirectly reduces impacts to surrounding resources.

- b. ATS projects reduce greenhouse gas (GHG) emissions by promoting nonmotorized modes and/or greater fuel efficiency through the use of transit vehicles. Lower emission transit vehicles, such as those using alternative fuels, should receive a higher score. Note that transit capital and operations expenses are not currently eligible for RRP funds.
 - c. Criteria may consider evaluating the total net change in GHG emissions and/or fuel savings from a proposed project, particularly if the ATS project could significantly encourage mode shift away from single-occupancy vehicles.
 - d. In evaluating the lifecycle costs and durability of transportation infrastructure, nonmotorized infrastructure may extend the service life of roads and bridges (by reducing vehicle use) and have lower annual operations and maintenance costs than infrastructure serving motor vehicles.
 - e. ATS projects should be designed to be context sensitive and incorporate recycled materials whenever possible.
 - f. Road projects that include sidewalks, bicycle lanes, parallel multiuse trails, transit stops, or other ATS components should receive additional credit in the area of sustainability.
2. Visitor Experience
- a. ATS may enhance the visitor experience by providing fewer barriers between visitors and natural resources.
 - b. Trails and transit offer multiple opportunities for interpretation that single-occupancy vehicle-based transportation does not. These include interpretive kiosks and signs along trails and transit-based interpretive tours.
 - c. ATS may expand visitor access opportunities to underserved groups or new visitors, including low-income or low-car-ownership populations. Through the provision of greater or more convenient access to these groups, ATS projects may enhance the visitor experience for a more diverse group of visitors.
3. System Performance and Safety
- a. ATS projects may reduce the number of vehicles traveling to and within the station, extending the life and reducing maintenance activity on roadways and parking lots.
 - b. A reduction in the number of vehicles on refuge roads can reduce the risks of vehicle accidents, but proper safety features must be included to protect the safety of ATS users.
 - c. The provision of nonmotorized infrastructure such as bicycle lanes, widened shoulders on auto tour routes, separated multiuse trails, and pedestrian crossings improves safety for all visitors by designating and separating uses.
4. Partnering and Planning
- a. Criteria should include eligibility for partnerships with trail organizations, transit agencies, and other relevant partners (not only road or transportation agencies).
 - b. ATS projects for access to the station necessitate the involvement of local and regional partners to ensure seamless connectivity between the refuge and surrounding destinations. Evaluation criteria should consider the existence of multi-year partnerships for regional trails and other nonmotorized infrastructure. For example, most public transit systems involve partners in the purchase or operations of transit service.

- c. Through the use of partnerships, ATS projects may qualify for additional funding sources or leverage matching funds. The demonstration of multi-stakeholder support through financial commitment should contribute favorably to project ranking.
- d. ATS projects should be coordinated with other existing FWS management plans, such as Comprehensive Conservation Plans (CCPs). Since many CCPs have historically not included specific transportation improvement projects, project proposals should also note regional, county, or local trail or transit plans that list the project.

Selected Regional ATS Opportunities

The ATS opportunity list includes the four stations visited during the RATE (Back Bay, Eastern Shore of Virginia, Great Dismal Swamp, and Great Meadows NWRs), which represent a spectrum of needs and opportunities in Region 5. The RATE team also decided to highlight four additional refuges that have demonstrated significant needs and opportunities for alternative transportation in recent years through grant applications, independent unit level transportation studies, and responses to the recently distributed Region 5 ATS questionnaire. The four additional refuges are: Canaan Valley NWR (WV), John Heinz NWR (PA), Wertheim NWR (NY), and Parker River NWR (MA). Visitation data comes from the Refuge Annual Performance Planning reports and the transit and trail distance is from the ATS questionnaire.

These eight refuges represent a range of existing ATS conditions throughout the region, with some refuges having direct or proximate access to trails and transit, water-based transportation, shuttle services, and transportation-based relationships with local and regional partners. While the list of opportunities and needs is not exhaustive, it represents some of the most promising shorter-term activities that have either not yet been funded or have been very recently funded and are still in the process of further scoping. It also represents several longer-term activities that would be relevant for many refuges throughout the region.

In addition to these eight specific refuges, the RATE team noted numerous opportunities for using ATS at other Region 5 stations and recognizes that the potential needs for ATS in the region substantially exceed what can be identified in this initial assessment report.

Refuge	Visitation	Transit Distance	Trail Distance
Back Bay NWR <i>Virginia Beach, VA</i>	130,000	More than 3 miles	Direct connection
<p>Existing ATS:</p> <ul style="list-style-type: none"> • A tram service with interpretation runs along refuge roads and offers access to False Cape State Park to the south. The refuge friends group operates the shuttle on a seasonal basis. • Most refuge roads are closed to private vehicles and open only to bicyclists, pedestrians, and tram passengers. There are also hiking trails for use by refuge visitors. • There are strong pedestrian and bicycle connections from the neighboring public beach that is owned and maintained by the City of Virginia Beach. These connections include the recently upgraded Entrance Road with wider shoulders to accommodate bicyclists and pedestrians traveling from the public beach to the Refuge Visitor Center. • The refuge operates a canoe/kayak launch at Horn Point in cooperation with the City of Virginia Beach. Motorized boats are also able to launch from this site, though they must be small enough to be transported on top of a car, as the refuge does not allow trailer parking at any of the launch areas. <p>Opportunities and Needs:</p> <ul style="list-style-type: none"> • Partner with the City of Virginia Beach to further study ATS options for accessing the refuge. 			

- Increase promotion of bicycling and hiking trails to inform potential visitors of ATS opportunities. The refuge may add additional interpretive tours by foot or bicycle, or more explicitly promote existing opportunities to observe wildlife by foot or by bicycle.
- Build relationships with the federally-designated metropolitan planning organization (the Hampton Roads Transportation Planning Organization) to explore how the refuge fits into short- and long-term regional transportation plans. Areas of intersection could include expanded transit, bicycle and pedestrian projects, and/or coordination on planned roadway projects that affect access to or around the refuge.
- Explore ways to increase tram service to provide more opportunities for visitors to access the False Cape State Park at different times of day or for longer periods of time, to provide environmental education to school groups or other groups, or to provide enhanced interpretive services.
- Partner with the City of Virginia Beach to improve safety and mobility along Sandpiper Road and future multi-use trails. Improvements could include a new trailhead from the beach parking lot connecting to the refuge, allowing visitors to park there and walk or bicycle to the refuge, as well as multi-use trail connections between residential and commercial areas and a future Visitor Center site.

Refuge	Visitation	Transit Distance	Trail Distance
Eastern Shore of Virginia NWR <i>Cape Charles, VA</i>	36,000	More than 3 miles	Direct connection

Existing ATS:

- The Southern Tip Bike & Hike Trail, a new three-mile paved multi-use trail, connects the refuge with Kiptopeke State Park to the north. The trail runs parallel to U.S. 13.
- Pedestrians can access the refuge via a trail entrance near the Welcome Center on U.S. 13 (operated by the Eastern Shore of Virginia Tourism Commission).
- Canoeing and kayaking are popular visitor activities and there is a boat launch at the refuge. There is a private kayak rental facility located across U.S. 13 from the refuge.

Opportunities and Needs:

- Continue promotion of the Southern Tip Bike & Hike Trail, and pursue extension of the trail. This might require a refuge boundary expansion to acquire the land, or finding another entity willing and able to take the lead in either land acquisition or obtaining access rights through private land holdings. In addition to the site work and construction, the partners may need assistance in clearing the encroachments along the right of way.
- Pursue implementation of an improved and safer bicycle/pedestrian crossing of U.S. 13 to connect the existing multi-use trail with the State Park. Possible improvements include signage, flashing lights, an enhanced crosswalk, or a pedestrian activated traffic signal, to allow users to safely cross the road. Given the traffic speeds and the roadway width, the refuge will have to work closely with VDOT to determine a safe and feasible improvement.
- Provide guided bird/wildlife walks and/or canoe/kayak tours.

Refuge	Visitation	Transit Distance	Trail Distance
Great Dismal Swamp NWR <i>Suffolk, VA</i>	70,000	More than 3 miles	Less than ½ mile

Existing ATS:

- The refuge offers bus tours to specific areas in the refuge (often those not publicly accessible) approximately six times per year in addition to those offered during special

events. They publicize the tours on their website and through flyers at trailheads. Visitors must call ahead to reserve a space on the vehicles.

- The City of Suffolk runs bus tours of the refuge on Saturdays and Tuesdays from April through October, with interpretation provided by a naturalist. Suffolk has offered these four hour duration tours for approximately seven years and manages all organization and publicity. The City charges \$10 per person for adults and \$8 for seniors and children.
- The refuge allows bicycle and pedestrian use on approximately 50 miles of dirt and gravel ditch roads, which are generally off limits to vehicles. In addition to the ditch roads, the refuge has developed several boardwalks with interpretive elements.
- The Dismal Swamp Canal Trail opened in April 2011 adjacent to the canal that defines the eastern boundary of the refuge. The paved, multi-purpose trail is 8.5 miles in length and is owned and maintained by the City of Chesapeake. There is no direct access between the trail and the refuge (due to the canal), although the trail does extend to a public boat launch located at Feeder Ditch, which is not owned by the refuge but offers water-based access to the refuge’s waterways.
- Visitors use canoes, kayaks, and other shallow, non-commercial vessels on Lake Drummond. Boaters have year-round access to the lake via the Feeder Ditch, which the refuge does not own or maintain. A limited number of boaters with a special seasonal permit from the refuge may use the refuge’s boat launch on the Interior Ditch road for fishing in Lake Drummond.

Opportunities and Needs:

- Continue to develop and promote recreational opportunities that are accessible from the Visitor Center and other parking areas by foot and bicycle.
- Improve roadway conditions, parking, and visitor facilities at the Portsmouth Ditch entrance.
- Conduct a transportation assistance group (TAG) meeting to explore multiple possibilities for alternative transportation services to and within the refuge.
- Build relationships with the federally-designated metropolitan planning organization (the Hampton Roads Transportation Planning Organization) to explore how the refuge fits into short- and long-term regional transportation plans. Areas of intersection could include expanded transit, bicycle and pedestrian projects, and/or coordination on planned roadway projects that affect access to or around the refuge.
- Increase connections to Dismal Swamp Canal Trail by improving refuge amenities near the City of Chesapeake boundary and at the Portsmouth Ditch entrance.
- Pursue a Visitor Center on the eastern side of the refuge; design it to maximize motorized and nonmotorized land and water-based connections. A new Visitor Center could provide an additional opportunity to connect to the Dismal Swamp Canal Trail.

Refuge	Visitation	Transit Distance	Trail Distance
Great Meadows NWR <i>Sudbury, MA</i>	385,000	More than 3 miles	Direct Connection

Existing ATS:

- Refuge trails offer opportunities for recreational walking and wildlife observation. Many of these are located in or adjacent to residential neighborhoods, providing convenient access by foot for residents of these areas.
- The Concord Impoundments are directly connected to two regional bicycle/pedestrian trails. The four-mile Reformatory Branch Rail-Trail is adjacent to the Impoundments and links the communities of Concord and Bedford, where it meets the Minuteman Bikeway, which is one of the most heavily-used trails in the region, and connects to transit as well

as major urban population. The trail running along the Impoundments also connects to the Bay Circuit Trail, a 180-mile multiuse, passive recreation trail linking 57 towns and cities in the Boston area.

- The refuge participates in the Sudbury, Assabet and Concord (SuAsCo) Wild & Scenic River Stewardship Council. The Council has identified boating trails along both the Sudbury and Concord Rivers. The Sudbury River Boater’s Trail is 15 miles in length, much of which passes through the refuge. The Concord River Boater’s Trail is approximately 11 miles in length, running through parts of the refuge from Concord to Billerica.
- The refuge maintains a public boat launch for nonmotorized vessels and small motorboats at the Sherman Bridge Road in Sudbury, near the refuge headquarters. The refuge also maintains a public parking lot and boat launch for motorized and nonmotorized boats in Carlisle along State Route 4.

Opportunities and Needs:

- Pursue a multi-modal alternative transportation study that focuses on providing improved connections to regional transit and trails, connections within and between units and nearby refuges, and connecting to underserved and urban populations in the Boston area. Partner with the National Park Service where possible and appropriate.
- Explore extending access between the Minuteman National Historic Park (NHP) and the Concord Unit through acquiring private property or the leasing of access rights for connecting a public road with the Concord Unit.
- Promote and enhance non-motorized water-based access on the Sudbury, Concord, and Assabet Rivers.
- Promote opportunities for visitors arriving by rail to access the refuge via bicycle or water-based transportation. The Concord MBTA station is located 2.5 miles from the entrance to the Concord Impoundments unit, and visitors can also rent canoes and kayaks from a vendor located approximately one-half mile from the commuter rail station with access to the Sudbury and Concord Rivers.

Refuge	Visitation	Transit Distance	Trail Distance
Canaan Valley NWR <i>Davis, WV</i>	32,895	More than 3 miles	1 mile

Existing ATS:

- The Refuge is located close to the Allegheny Trail, a 330-mile hiking trail that passes through the Allegheny Mountains in West Virginia. The trail’s northern terminus is on the West Virginia-Pennsylvania border near Bruceton Mills, West Virginia. Its southern terminus is at the Appalachian Trail on Peters Mountain, north of Pearisburg, Virginia at the Virginia-West Virginia state line.
- The Refuge has 31 miles of roads and trails for use by walking, cross-country skiing or snowshoeing. Of these, 23 miles are open for bicycle riding and 22 miles are open for horseback riding. Some trails are also designated to allow access to fishing.

Opportunities and Needs:

- Improve trail access and conditions, identify opportunities for new bicycle and pedestrian trails and boardwalks to improve safety and provide alternatives to using busy roadways.
- Explore opportunities for bicycle sharing or rental options.
- Explore opportunities for expanded canoe/kayak facilities.
- Pursue training opportunities for expanding trails.
- Pursue training opportunities for use of social media for use in interpretation as well as transportation and other logistical information about visiting the refuge.

Refuge	Visitation	Transit Distance	Trail Distance
John Heinz NWR <i>Philadelphia, PA</i>	130,000	Less than ½ mile	Direct connection
Existing ATS:			
<ul style="list-style-type: none"> The refuge is located within close proximity to three high-frequency bus routes and two rail transit routes, offering service throughout the Philadelphia region. Transit service is provided by Southeastern Pennsylvania Transportation Authority (SEPTA). There is no direct transit service at this time that provides access to or operates within the station. The roads surrounding the refuge have some bicycle and pedestrian facilities (though not all continuous), but the refuge access road has no designated facilities. There are bicycle racks at the Visitor Center. While refuge staff promotes bicycle access to the refuge, they try to limit bicycle use within the refuge to small groups or individual use for wildlife viewing purposes. 			
Opportunities and Needs:			
<ul style="list-style-type: none"> The Delaware Valley Regional Planning Commission (DVRPC) is the federally-designated metropolitan planning organization for the Philadelphia region. In coordination with the refuge, DVRPC has recently received a grant from the FTA's Paul S. Sarbanes Transit in Parks program to study bicycle, transit and pedestrian-friendly connections between Tincum Township, Norwood Borough, and Delaware and Philadelphia Counties and the refuge. Improve internal and external wayfinding signage to guide transit and trail users to the refuge. Work with partners such as East Coast Greenways, the Pennsylvania Clean Air Council, and DVRPC to examine expanded connections to existing or planned regional multi-use trails. Explore opportunities for ATS connections with facilities on the western end of refuge, near State Route 420. Explore opportunities for improved trail connections to local public transit services. Explore opportunities for expanded canoeing and kayaking facilities. Explore opportunities to improve pedestrian and bicycle safety, including expanded wheelchair-accessible trails. 			

Refuge	Visitation	Transit Distance	Trail Distance
Long Island Refuge NWR Complex, Wertheim NWR <i>Shirley, NY</i>	80,000	1-3 miles	More than 3 miles
Existing Conditions:			
<ul style="list-style-type: none"> Part of the Long Island Refuge Complex, the Wertheim NWR entrance is located close to Long Island Railroad (LIRR) and county bus service. Suffolk County Transit offers a low-frequency bus that stops just outside the entrance; a Long Island Rail Road station on the Montauk Branch serves the Mastic-Shirley community, offering access to New York City and points across Long Island, is less than one mile away. The new Visitor Center facility at Wertheim NWR, which opened in late 2011, offers additional opportunity to provide ATS-related information and interpretation to visitors. The new facility project included development of three miles of new multi-use trails originating at the building and two new viewing platforms along the Carmans River. 			
Opportunities and Needs:			
<ul style="list-style-type: none"> Improve signage for orientation to and within the station to better support ATS access. Work with local and regional transit service providers as appropriate to improve 			

wayfinding signage from commuter rail transit stations and nearby bus stops.

- Use social media and/or web-based interpretation to provide more information about ATS options and/or information to ATS users.
- Consider a shuttle or transit service with nearby town centers or with the Mastic-Shirley LIRR station with service to new Visitor Center, or coordinate with private transit services that currently run from LIRR station to NPS ferry terminal.
- Pursue the purchase of an electrically powered vehicle for trail patrols by volunteers or visitor interpretive tours to newly accessible parts of the refuge.
- Explore opportunities for expanding canoeing and kayaking facilities along the refuge's waterways.
- Improve visitor information for how to access the refuge by public transit and include directions via transit on the refuge website.

Refuge	Visitation	Transit Distance	Trail Distance
Parker River NWR <i>Newburyport, MA</i>	278,655	1-3 miles	Direct connection

Existing Conditions:

- Visitors frequently access the refuge by bicycle and travel within the site using nonmotorized transportation. An access plan, published in January 2008, explored bicycle and pedestrian connections between the refuge and the town of Newburyport.
- The Clipper City Rail Trail in Newburyport is partially completed and will improve nonmotorized transportation access to the refuge. The first portion to be completed was a 1.1 mile section connecting the Massachusetts Bay Transportation Authority (MBTA) commuter rail station with downtown Newburyport, which improves one of the most dangerous sections of bicycle/pedestrian access between the station and the refuge.
- The refuge rents transit vehicles from a private company for use during special events, including the Eagle Festival in February.
- A Transit Feasibility Study, published in July 2011, recommends the use of a refuge owned and operated transit vehicle for interpretive programs and potential use for refuge access.

Opportunities and Needs:

- Purchase a transit vehicle for refuge-led interpretive programs, and consider offering limited service to connect the refuge to Newburyport and the MBTA station.
- Continue to work with partners to use transit vehicles for interpretation, environmental education, and special events.
- Improve wayfinding signage and safety measures for nonmotorized users within the refuge and on roads leading to the refuge. These safety measures might include, but would not be limited to, the following actions: including the potential for the provision of wider shoulders for pedestrians and bicyclists as part of any planned pavement rehabilitation projects or the installation of painted bicycle lanes or the designation of shared use lanes on the existing paved part of the road.

Summary of Station Opportunities and Strategies

Back Bay National Wildlife Refuge

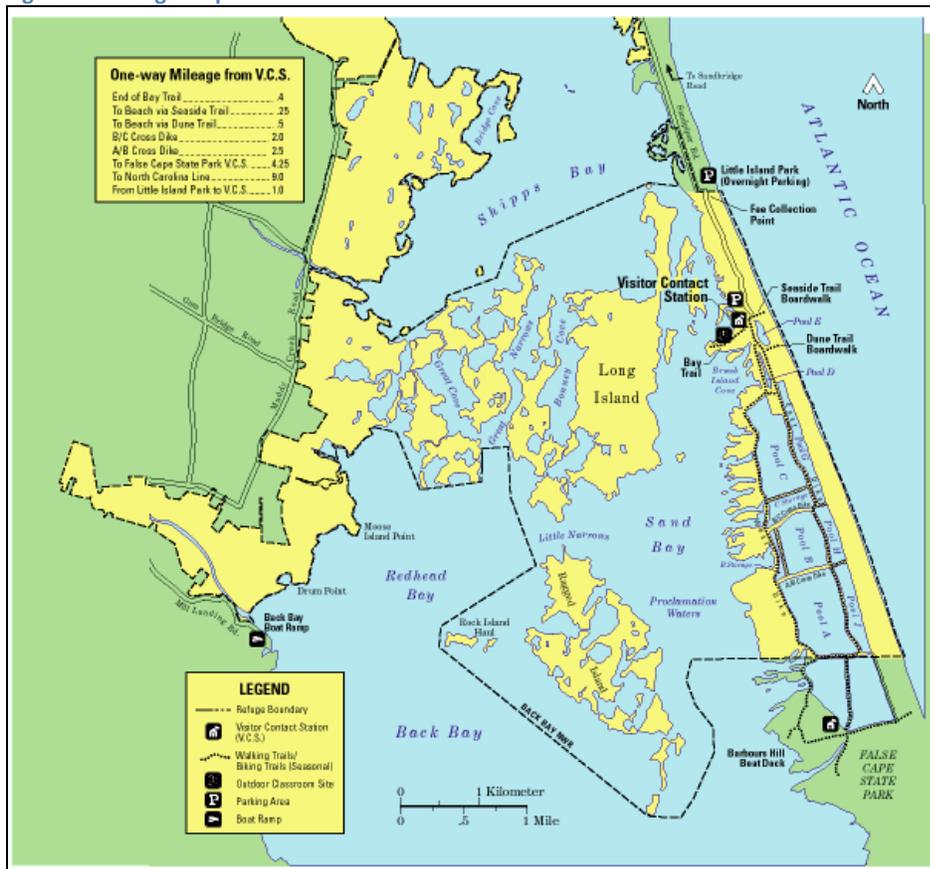
Refuge Background

The 9,120-acre Back Bay National Wildlife Refuge is located in southeastern Virginia along the Atlantic Ocean and within the southern half of the city limits of Virginia Beach. The refuge includes five miles of oceanfront beach, a 900-acre freshwater impoundment complex, numerous bay islands, bottomland mixed forests, and freshwater wetlands adjacent to Back Bay and its tributary shorelines.

The refuge was established in 1938, in cooperation with the Commonwealth of Virginia, to protect wintering waterfowl habitats, the estuarine system, and water quality in the bays and wetlands. Current visitor facilities are located in the eastern, barrier island portion of the refuge, though recent land acquisitions since the 1990s have created opportunities for visitor facilities along the western portion of the refuge. A map of the refuge area is provided in Figure 19.

Refuge visitation is approximately 130,000 per year, with most visitors coming from June through September, as determined by vehicle counts at the entrance station. Approximately 95 percent of the non-local visitors arrive by car, with visitors coming from elsewhere in Virginia, Washington, D.C., North Carolina, Tennessee, and Pennsylvania. To gather additional visitor information in the near future, the refuge will participate in the regional visitor use survey in the summer of 2012.

Figure 19: Refuge map



Source: USFWS

Primary uses at the refuge include wildlife observation and photography, hiking, and bicycling. Many visitors enter the refuge en route to False Cape State Park, which is accessible only through the refuge. The refuge also runs an environmental education program focusing on the role of management in the maintenance of healthy ecosystems and the conservation and enhancement of fish and wildlife resources. Visitors also hunt and fish on the refuge, although the refuge restricts these activities to hunters chosen by a lottery and to designated fishing areas for those with a Virginia fishing license.

Access to and within the Refuge

Back Bay is situated between the city-owned Little Island City Park recreational beach to the north and the False Cape State Park to the south. The three destinations provide a range of recreational options, with higher intensity use and full facilities at the city beach, wildlife-oriented activities at the refuge, and a more remote beach experience at the State Park. The refuge is generally able to focus on wildlife-based visitor activities, due in large part to the proximity of other recreational beach resources.

Private motorized vehicles are not permitted on roads south of the Visitor Contact Station, located approximately one mile south of the main entrance station and fare collection booth (see Figure 19). All access beyond that point is by foot, bicycle, boat, or refuge-operated tram. Therefore, almost all visitors partake in a form of alternative transportation to travel within the refuge.

Access within the Refuge

Transit Access

Back Bay started providing a tram tour 1998, largely to provide access to False Cape State Park after the refuge closed its roads to private vehicles. The tram tours operate on a regular schedule from April to October, with more limited trips at other times in the year. Tram tours are provided daily from Memorial Day through Labor Day (weather permitting), on weekends during shoulder months (April to May, and September to October), and twice per month during the November through March impoundment closure. The tram tour leaves the Visitor Contact Station at 9:00 AM, drops the passengers at False Cape State Park, and returns from the State Park at 1:00 PM. The travel time is approximately 20 minutes and includes some interpretation. In the summer, there are also occasional interpretive evening trips that travel down to the State Park and back, with just a short stop at the Park. The refuge currently owns two high efficiency, gasoline-engine, open-air trams, that each seat 24 passengers. The trams were acquired through a \$160,000 FY2006 grant from the Federal Transit Administration Alternative Transportation for Parks and Public Lands grant program (now known as the Paul S. Sarbanes Transit in Parks program). The tram is operated by the Back Bay Restoration Foundation (BBRF), which manages scheduling, publicity, and the hiring of drivers. The refuge conducts and pays for vehicle maintenance. BBRF monitors demand but does not take reservations for the tram; while the tram is popular and well used, there are rarely times when demand exceeds seat capacity. The second tram is available as a back-up and is also sometimes used by the State Park for programs, groups, or to pick up visitors coming to camp at the park.

Figure 20: Blue Goose Express Tram



Data on annual and average monthly tram usage from 2007 to 2011 is provided in Table 5 and Table 6.

Table 5: Total Annual Tram Ridership

Year	Total Annual Ridership
2007	1,622
2008	1,454
2009	1,252
2010	1,255
2011	1,213

Table 6: Average Monthly Tram Ridership

Month	Average Ridership
January	23
February	47
March	36
April	79
May	121
June	180
July	282
August	315
September	139
October	79
November	41
December	17
Total	1,359

The only access to the False Cape State Park is through the refuge. Visitors to the State Park must arrive by foot, bicycle, or tram. FWS and the Commonwealth of Virginia have an agreement regarding access to the beach from November to March, when the dike roads are closed to protect wintering waterfowl. During the winter months, the State Park uses the “Terra Gator”, a large, soft-tire, vehicle that can hold up to 34 passengers, to access the State Park, via the beach. It occasionally operates during the April 1 - October 31 period, for groups requesting it via special use permit. The Terra Gator is operated by Park staff; the Park charges a ridership fee, which they collect and keep.

Figure 21: Terra-Gator



Source: http://www.dcr.virginia.gov/state_parks/fctrgratr.shtml

Bicycle and Pedestrian Access

Walking is one of the primary ways to travel within the refuge, in particular on the dike roads and trails. There are two boardwalk trails that lead to the beach and are open to foot traffic only. The Bay Trail and portions of the interior dikes are also open to visitors on foot.

Bicycle use on the refuge has increased in recent years, with the East and West dikes alternately open to bicyclists on a seasonal basis. Both dikes close for wildlife protection from November through March. Given the lack of vehicular traffic on the dike roads (with the exception of the seasonal tram tours), these roads are popular with families and other recreational cyclists. There are bicycle rental operations near the refuge, and the refuge offers interpretive bicycle tours in the summer months (visitors bring their own bicycles for the tours).

Figure 22: Refuge dike road (tram, bicycle, and pedestrian access only)



The Back Bay NWR Entrance Road was rehabilitated in early 2011. Prior to the project, the 1.2 mile road, stretching from Sandbridge Road to the Visitors Center, was in very poor condition. In addition to resurfacing the roadway, the project also incorporated bicycle and pedestrian safety improvements. The road was widened slightly and striped to allow for more room for pedestrians and bicyclists. The project

also allows for simpler and safer pedestrian connectivity between the Visitors Center and the City of Virginia Beach owned parking lots, as well as to the Sandbridge area and planned trails in the vicinity. The Visitor's Center parking lot was also rehabilitated, to make the parking area more functional and attractive. This project greatly improved the visitor experience as they enter and travel within Back Bay NWR.

Figure 23: Newly paved and striped Entrance Road



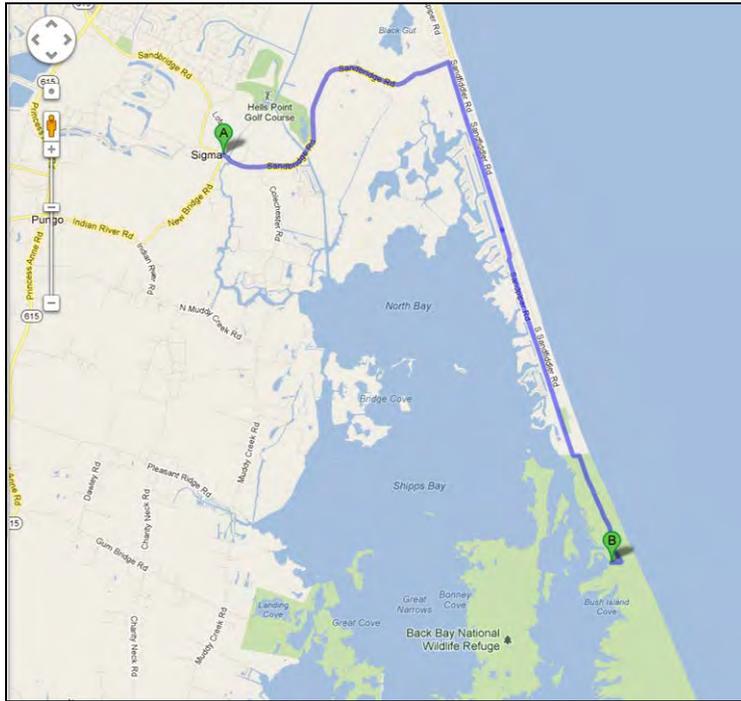
Water Access

The refuge operates a canoe/kayak launch at Horn Point in cooperation with the City of Virginia Beach. Motorized boats are also able to launch from this site, though they must be small enough to be transported on top of a car, as the refuge does not allow trailer parking at any of the launch areas. The Refuge supports nonmotorized boating, as well as motorized boating associated with traditional Bay uses, such as hunting and fishing.

Access to the Refuge

Most refuge visitors arrive by car, due in part to the relatively remote location of the refuge. As shown in Figure 24, for approximately eight miles leading to the refuge, almost all visitors travel on a two-lane roadway. Immediately leading to the refuge is Sandpiper Road, a narrow, two lane roadway with relatively dense residential development on both sides of the road for much of the six miles leading to the refuge. The vehicle access to Sandpiper Road is via Sandbridge Road, which also has two travel lanes. Traffic often backs up on these roadways in the peak visitation season, with visitors to the refuge as well as to Little Island Park overwhelming the roadway capacity.

Figure 24: Roadway access to Back Bay National Wildlife Refuge



Source: USFWS

Bicycle and Pedestrian Access

The roads leading to the refuge from Virginia Beach have very limited dedicated on-road bicycle facilities and there are several stretches of road that many cyclists consider hazardous; typically only a few advanced cyclists ride to the refuge from the city. Visitors more commonly drive to the refuge or the city beach with their bicycles and then ride within the refuge. A portion of Sandbridge Road heading toward the refuge has a shoulder that provides increased space for bicyclists, but much of the roadway has sharp curves and adjacent drainage ditches that would make it difficult to widen to provide additional bicycle facilities. The City of Virginia Beach is working to provide more bicycle facilities, as funding allows, but existing road conditions may not be adequate for bicycle access for many years. Even with additional facilities, the distance to the refuge from most other locations within the city may be prohibitive for most cyclists.

Some visitors, in particular those who wish to camp overnight at the State Park, walk in to the refuge from the city beach, as there is no overnight parking permitted on the refuge.

Transit Access

Hampton Roads Transit offers a regional transit service in the City of Virginia Beach. The nearest transit stop is at the Red Mill Landing Shopping Plaza, approximately eight miles from the Visitor Contact Station (or approximately 3.5 miles from the Refuge Headquarters). The long term regional transit vision includes fixed guideway service to the Oceana Naval Air Station approximately 12 miles away, and enhanced bus service throughout the city, which might come closer to the refuge but would not directly serve it.

Major Events

The refuge hosts various events throughout the year, including events for fishing, birding, and refuge cleanup. The refuge has no transportation-management issues associated with any of these events.

Partnerships

The refuge has close and productive relationships with the City of Virginia Beach and the Virginia Department of Conservation and Recreation, especially with regard to access between the city beach, the refuge, and the State Park. The refuge and the city continue to collaborate to try to improve access between the beach and refuge area, such as through joint applications for transportation improvements and planning studies. The refuge and the Hampton Roads Transportation Planning Organization (which serves as the metropolitan planning organization for the Norfolk/Virginia Beach area) have not had much contact thus far, but may have opportunities to work together on transportation and access issues.

Opportunities and Needs

The refuge has identified several potential ways to improve access to the refuge through the use of ATS. Some of these ideas have been developed to the point of submitting grant applications, while other ideas may require additional refinement.

Short term:

- Partner with the City of Virginia Beach to further study ATS options for accessing the refuge – The city recently received an award of \$449,000 from the Federal Transit Administration (FTA) Paul S. Sarbanes Transit in Parks Discretionary Program (TRIP) to evaluate alternative solutions and transportation modes to bring visitors to the Back Bay National Wildlife Refuge, including providing trams from populated areas of the city to the refuge, construction of a shared-use path for biking and walking, development of canoe-kayak facilities and other alternatives. The study may include some of the other recommendations listed below, such as increasing tram service and promotion of bicycle and pedestrian access.
- Increase promotion of bicycling and hiking opportunities – FWS could further the recreational bicycling and hiking opportunities at the refuge. Once on the refuge, bicycling is relatively flat and safe, on trails and dike roads with almost no vehicular traffic. Options might include additional interpretive tours by foot or bicycle, or more explicit promotion of opportunities to observe wildlife by foot or by bicycle.
- Build relationship with regional transportation planning agency – The refuge could continue to build a relationship with the Hampton Roads Transportation Planning Organization to discuss how the refuge fits in to short- and long-term regional transportation plans. This may include potential future options for expanded transit or bicycle and pedestrian projects, as well as coordination on any planned roadway projects that may affect access to or around the refuge.

Long term:

- Partner with the City of Virginia Beach to improve safety and mobility along Sandpiper Road – Sandpiper Road accesses the city beach and then continues to the refuge. The two-lane road experiences significant traffic congestion in the summer months, with vehicles lining up to access the 750-space Little Island Park parking lot, which often fills to capacity and blocks access to the refuge and State Park. The refuge and the city have applied for grant funding to construct a turning lane and ¾-mile bypass lane around the entrance to the beach parking lot, improving access for the refuge. The lane would be built on right of way currently owned by the city. This project would also create a trailhead from the beach parking lot down to the refuge, allowing visitors to park there and walk or bicycle to the refuge. This project would provide improvements

to drivers as well as hikers and bicyclists. The application did not receive funding in the most recent round of TRIP projects, but may be included in a future round using FY 12 funds.

- Increase tram service – FWS could use its second tram to increase service, providing additional opportunities for visitors to access the State Park at different times of day or for longer periods of time, to provide environmental education to school groups or other groups, or to provide enhanced interpretive services.
- Partner with the City of Virginia Beach to pursue additional multi-use paths – As the refuge considers development of a new Visitor Center further into the future, the refuge and city have discussed building a multi-use path along a city-owned right of way. It would connect to commercial and residential areas, and the new planned visitor center complex near the intersection of Sandbridge Road and New Bridge Road. It would also connect to Sandpiper Road, providing a four to six mile trip from commercial/residential areas to Little Island Park. Visitors could then easily continue on to the refuge. This type of facility might encourage local residents to walk or bicycle to the refuge and the beach, rather than drive.
- Extend tram service to a future Visitor Center – As the refuge considers development of a new Visitor Center in the future, it may consider extending tram service to the new Visitor Center to reduce vehicular traffic along Sandbridge and Sandpiper Roads. Visitors could then park at the Visitor Center and travel all the way through the refuge and to the State Park without the use of personal vehicles. This would likely require using both of the current trams to provide sufficient headways during peak times.

Eastern Shore of Virginia National Wildlife Refuge

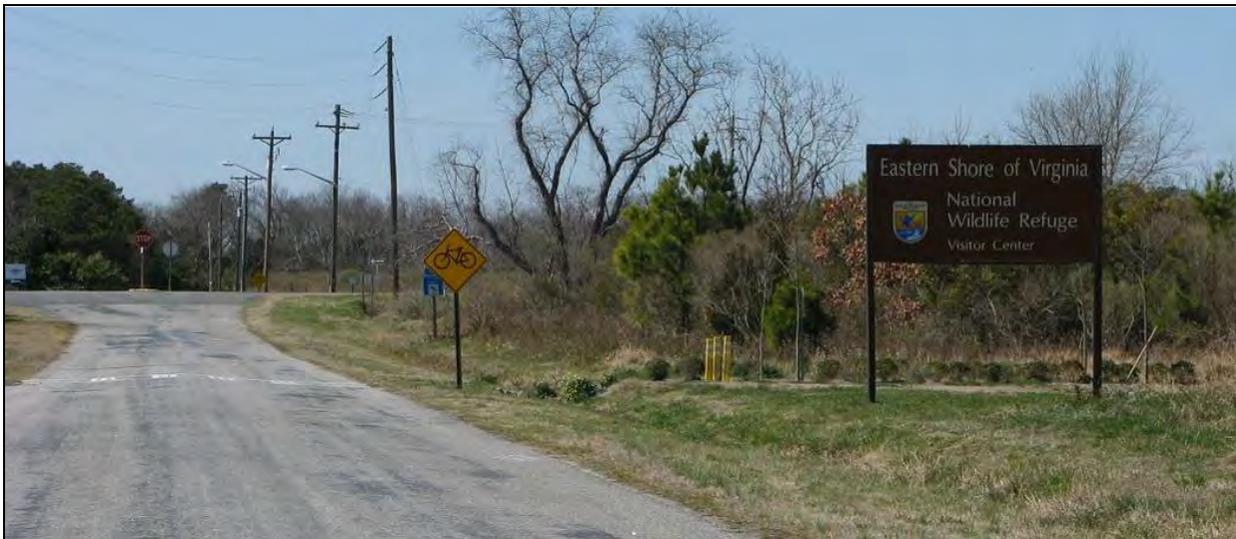
Refuge Background

The 1,442-acre Eastern Shore of Virginia Refuge is located at the southern tip of the Delmarva Peninsula in Northampton County, Virginia, at the mouth of the Chesapeake Bay. The refuge contains a variety of habitats such as maritime forest, myrtle and bayberry thickets, grassland, fresh and brackish ponds, tidal salt marsh, and beach. The refuge and its adjoining woodlands are considered one of the most important migratory bird concentration points along the East Coast. Millions of migratory birds rest and feed at the Eastern Shore of Virginia Refuge until favorable winds assist them in crossing the Chesapeake Bay.

The refuge was created in 1984 when the U.S. Air Force transferred 180 acres to the U.S. Fish and Wildlife Service (FWS) from the U.S. Air Force through the General Services Administration. There have been several land acquisitions since, through purchases, as well as conveyances from and land swaps with the Chesapeake Bay Bridge-Tunnel Authority, The Nature Conservancy and other agencies and organizations.

Refuge visitation is approximately 36,000 per year. The refuge only captures data on the number of people who go to the Visitor Center, and they calculate total refuge visitation as equal to double the number of Visitor Center entries. The refuge is located just off of U.S. Route 13, which runs from the Virginia mainland up the entire length of the Delmarva Peninsula; the refuge therefore receives many short visits from those who are passing through the area. There is also significant visitation from people who live in the surrounding county and towns.

Figure 25: Refuge entrance and trail crossing



The primary activities on the refuge are wildlife observation, photography, and interpretation. The refuge is a stop on the Virginia Birding and Wildlife Trail Coastal Area Eastern Shore Loop⁷ and the Captain John Smith Chesapeake National Historic Trail. .

⁷ <http://www.dgif.virginia.gov/vbwt/loop.asp?trail=1&loop=CES>

There is limited hunting activity on the refuge. Hunting is permitted for deer only, with two weeks of archery and one week of gun hunting allowed each year. There is significant boating activity, both from motorized and nonmotorized boats. Fishing does not occur on the refuge, though some visitors use the boat launch to then fish in waters outside of the refuge boundary.

Access to and within the Refuge

Eastern Shore is situated just off of U.S. 13, at the southern tip of the Delmarva Peninsula, and approximately three miles south of Kiptopeke State Park. It is approximately 12 miles from the town of Cape Charles. The State Park is a regional destination with a range of camping and lodging options, biking and hiking trails, a fishing pier, a boat ramp, and swimming. It is one of few places on the bayside of the Eastern Shore of Virginia with public sandy beaches and deep water boating access.

U.S. 13 is the main road connecting the Hampton Roads area to the Eastern Shore of Virginia and Maryland and Delaware to the north, via the Chesapeake Bay Bridge-Tunnel. Given its location off of U.S. 13 and distance from other major destinations, most visitors arrive by vehicle, although some arrive by bicycle from the State Park, Cape Charles, and other points north.

Bicycle and Pedestrian Access

In October 2011, the refuge opened the 2.6 mile Southern Tip Bike & Hike Trail. The path begins at the Visitor Center and runs mostly parallel to U.S. 13, terminating near the entrance to Kiptopeke State Park. Use of the path during its first few months of operation indicate that it has been well received and well-traveled. One initial issue is the lack of a safe crossing of U.S. 13 near the entrance to the State Park, which would likely promote additional use and improve connections with the State Park.

The trail is part of a 10-mile, 66-foot wide abandoned railroad right of way (ROW) that extends from the Visitor Center to Cape Charles. The Nature Conservancy purchased the ROW in the 1990s, and FWS purchased the southernmost three miles in 1997. The 2004 Accomack-Northampton Planning District Commission (ANPDC) Eastern Shore of Virginia Bicycle Plan includes a shared use path along the 10-mile ROW. ANPDC encouraged the FWS to build the first leg of the trail, which the refuge funded through multiple sources, including Transportation Enhancements and Visitor Facility Enhancements funds. The existing portion of the trail, which included significant re-vegetation, cost approximately \$750,000 to construct.

Figure 26: Southern Tip Bike & Hike Trail



While ANPDC, The Nature Conservancy, the Refuge, and other stakeholders have a long-term vision to extend the trail to Cape Charles, the completion will be contingent upon the use of the railroad ROW. Some of the ROW has experienced encroachment from adjacent users, mostly agricultural in nature. These encroachment issues would need to be settled before development of a trail. The Refuge may have to pursue boundary expansion, additional acquisition, or partnerships in order to take the lead on trail construction.

Many visitors experience the refuge by foot on two short walking trails that provide opportunities for interpretation and wildlife observation. These include the half-mile Butterfly Trail and half-mile Wildlife Trail. The Butterfly Trail leaves from the Visitor Center and connects to the interpretive Wildlife Trail, which loops through mixed hardwoods, past an old cemetery, and out to the saltmarsh overlook. From the Wildlife Trail, visitors can also access the Bunker Overlook and Marsh Overlook, providing a panoramic view of refuge marshes, barrier islands, bays, inlets, and the Atlantic Ocean.

In addition to the trails noted above, there is also a short trail, approximately one-tenth mile, which connects the Eastern Shore Welcome Center (operated by the Eastern Shore of Virginia Tourism Commission) at the Chesapeake Bay Bridge-Tunnel rest area on U.S. 13 to the Butterfly Trail. This connection allows visitors parked at the rest area to access the refuge Visitor Center and other trails. The entrance to the trail connector is shown in Figure 27.

Figure 27: Trail entrance from Eastern Shore Welcome Center



Water-based Access

Many visitors use the refuge for boating, given its location along the Chesapeake Bay, the Atlantic Ocean, and the Virginia Inside Passage. Visitors boat throughout the year, as the water areas on the refuge are largely protected from winds and strong currents. Canoeing and kayaking are popular activities, and visitors can rent canoes and kayaks at a private business across the street from the refuge entrance. From the refuge boat launch, users travel through the Virginia Inside Passage to access the Chesapeake Bay, Atlantic Ocean, and nearby islands. There is also a popular public canoe/kayak launch approximately one-quarter mile away, which provides direct access to the salt marsh.

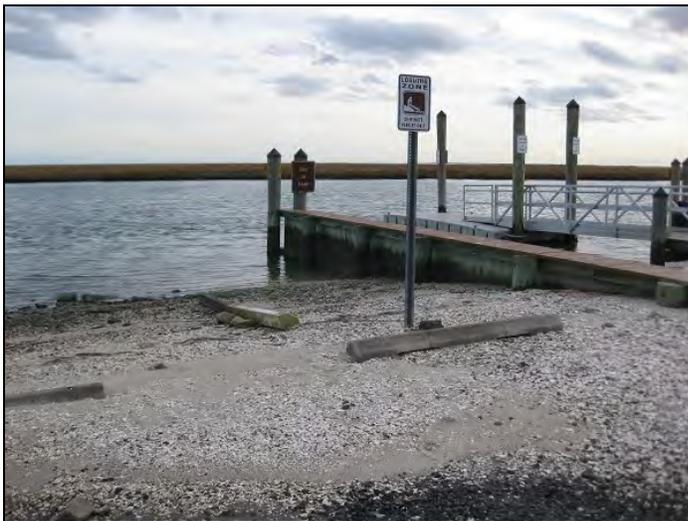
All fishing associated with the refuge occurs by boat, as the refuge prohibits fishing from the shore and there is no fishing pier. Most motorized boat use is for recreational fishing. The refuge charges boat launch users a parking/launching fee of \$10 per day or \$120 per season, which is collected by an employee at the fee booth at the entrance to the boat launch during the spring, summer and fall and is

collected via drop box the other time of the year or when not staffed. The launch is open year-round, with temporary closures during the deer hunt and extremely high tides.

The launch area has a gravel parking lot, rebuilt in 2006, that can hold approximately 75 vehicles: 20 cars, 41 trailers, and 12 commercial vehicles (in sites that are designated for commercial users with permits). There are three spots designated for refuge staff use.

Use has increased significantly since the lot was built but the lot does not normally fill beyond capacity. Refuge staff expect in the coming years, the parking lot will experience “filled to capacity” closures as the location becomes discovered by boaters within the region. The refuge is exploring ways to better mark parking spaces, which could result in overall more efficient parking operations and make best use of the lot capacity. Given its location and surrounding wetlands, the parking area cannot be expanded.

Figure 28: Boat launch and loading area



Transit access

There is no existing or planned transit access to or within the refuge. There are limited tour bus visits, which are generally not coordinated in advance with the refuge.

Major Events

The refuge’s largest events are International Migratory Bird Day in May and the Eastern Shore Birding and Wildlife Festival in October. Current refuge transportation infrastructure is sufficient to accommodate heavy visitation days and events, but the refuge may need to consider parking alternatives for future large events that attract higher attendance levels.

The Sunset Beach Hotel, located across U.S. 13 from the refuge entrance, hosts an annual Harvest Festival in October. This festival is heavily attended, with visitors parking anywhere they can find space, creating potential parking conflicts or safety issues near the entrance to the refuge.

Partnerships

The refuge has close and productive relationships with a number of other local governmental and nongovernmental groups, primarily related to preservation issues. The refuge has worked with The Nature Conservancy since the 1990s on issues of shared interest, primarily land acquisition for habitat protection and restoration. FWS and TNC worked together closely on acquisition of the railroad ROW and development of the Southern Tip Bike & Hike Trail. The refuge also worked closely with the Accomack-Northampton Planning District Commission on development of this trail.

The refuge has relationships with several local schools and summer camps, who visit to participate in wildlife interpretation and educational activities. Beginning in 2012, all local elementary school children will also be visiting the refuge to walk on the new Southern Tip Bike & Hike trail and other refuge trails, as part of an initiative to promote health and physical activity.

Opportunities and Needs

The refuge has identified several potential ways to improve access to the refuge through the use of ATS.

Short term:

- Continue promotion of the Southern Tip Bike & Hike Trail – FWS and partners could continue to work with partners to promote the trail throughout the region. In addition to tourism-related groups, the refuge could also make connections with health-related groups and other local organizations to raise awareness of the walking and bicycling opportunities that the trail provides. Building use and support for the trail may help make the case for its extension as well as a safer crossing of U.S. Route 13 near Kiptopeke State Park.
- Pursue improved crossing to connect the Southern Tip Bike & Hike Trail with Kiptopeke State Park – FWS could work with the Virginia Department of Conservation and Recreation (DCR) and Virginia Department of Transportation (VDOT) to explore options for a pedestrian and bicycle crossing of U.S. Route 13 to better connect the Southern Tip Bike & Hike Trail with Kiptopeke State Park. Possibilities might include signage, flashing lights, a crosswalk, or a traffic signal, to allow users to safely move between the trail and the State Park. The roadway has four travel lanes in that section – two in each direction, separated by a wide grassy median. Given the traffic speeds and the width, the partners will have to work closely with VDOT to determine what is safe and feasible.
One good candidate location for a crossing would be at the intersection of U.S. 13 with County Road 718/Latimer Siding Road, which enters the southern portion of the State Park. This location would be closest to the State Park hiking and biking trails.
- Provide guided bird/wildlife walks – FWS could promote walking on the trails on the refuge by providing additional opportunities for interpretation. These could include guided walks along the trails to view birds and other wildlife and learn about the history of the refuge. Participants could park at the Visitor Center and then walk together along the trails.
- Provide guided canoe/kayak tours – FWS could promote nonmotorized boating at the refuge by providing periodic guided canoe or kayak tours. There might be opportunities to partner with the canoe rental shop across the street from the refuge for boat rentals and parking for participants, so as to limit the need for parking at the refuge boat launch. Kiptopeke State Park has been providing guided canoe trips through Refuge marshes for a number of years.
- Encourage carpooling to refuge – FWS could encourage the groups that regularly visit the refuge for bird watching or other activities to consider carpooling during group visits to limit the need for single occupant driving trips to and on the refuge.

Long term:

- Pursue extension of the Southern Tip Bike & Hike Trail – FWS could work with the Accomack-Northampton Planning District Commission, The Nature Conservancy, VDOT, and other partners to extend the Southern Tip Bike & Hike Trail. This might require a refuge boundary expansion to acquire the land from TNC, or finding another entity willing and able to take the lead. In addition to acquiring funding for the site work and construction, the partners may need assistance in clearing the encroachments along the ROW. Partnerships with the local and county governments

may assist in this effort. The Rails to Trails Conservancy may also be able to provide advice or support.

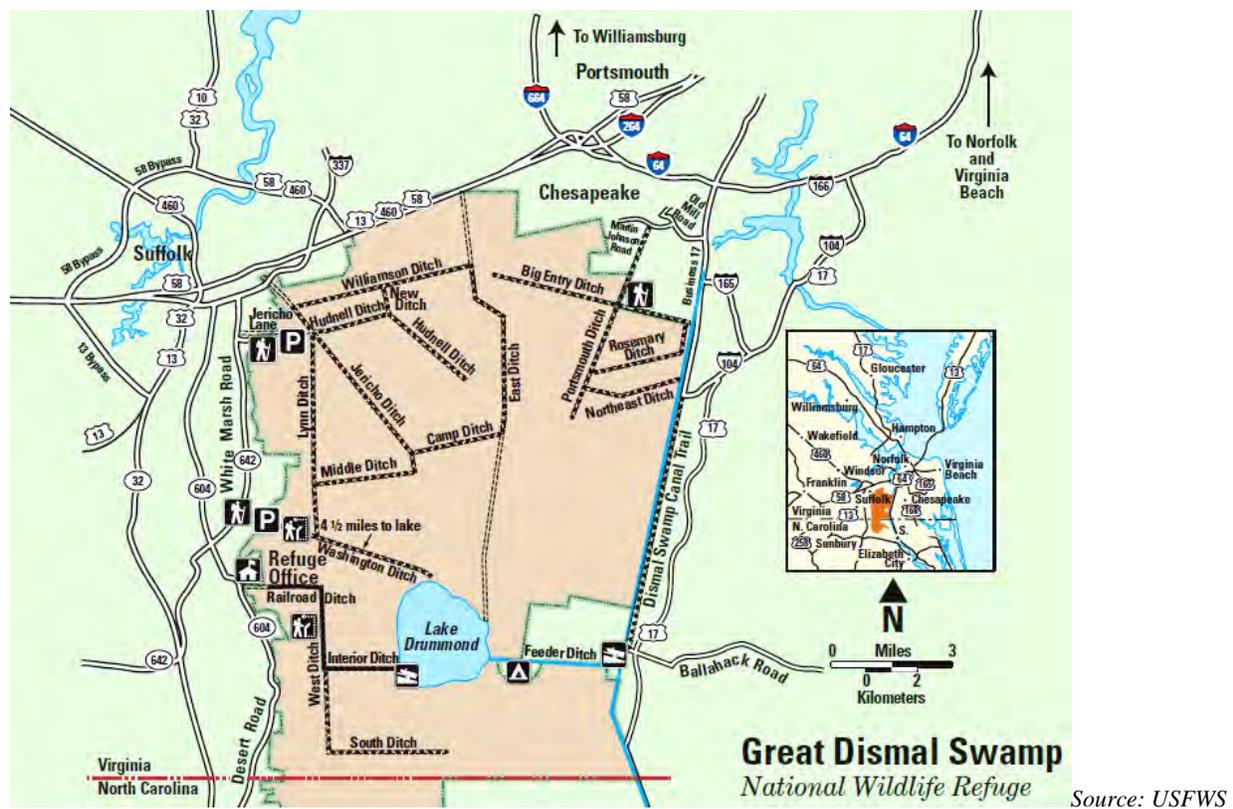
- Broader strategy for awareness and promotion of the refuge – FWS could consider a longer term strategy for providing general information, awareness, and promotion of the refuge, to make it more of a regional destination. Having more visitors planning their trips in advance rather than deciding to visit while driving past may lead to more walking, bicycling, and nonmotorized boating on the refuge, as visitors will have the information about these opportunities prior to arrival onsite. Given the size of the refuge, the opportunities for alternative transportation are quite impressive, and could be better publicized.
- Consider transit for large events – FWS could consider exploring the periodic use of vans, school buses, or other transit vehicles for selected special events, to transport visitors from some central point to the refuge.

Great Dismal Swamp National Wildlife Refuge

Refuge Background

The Great Dismal Swamp National Wildlife Refuge (Refuge) is located in southeastern Virginia and northeastern North Carolina, covering over 112,000 acres. The refuge is located adjacent to the cities of Chesapeake and Suffolk, and approximately 12 miles southwest of the Norfolk, Virginia metropolitan area. It is within the boundaries of the Hampton Roads Transportation Planning Organization (TPO) and the Virginia Beach-Norfolk-Newport News Metropolitan Statistical Area (MSA). The refuge is adjacent to U.S. Route 13 and U.S. Route 17. Route 17 is a major transportation corridor for travel between Williamsburg, VA, and the Outer Banks of North Carolina. The refuge is also located near Interstates 64, 264, and 664.

Figure 29: Great Dismal Swamp Map



The refuge was established in 1974 after the Union Camp Corporation donated land to the Nature Conservancy. The land was transferred to the Department of the Interior and became the Great Dismal Swamp NWR. The refuge consists of seasonally flooded wetland forest and the 3,100 acre Lake Drummond, the largest natural freshwater lake in Virginia. A series of drainage canals and dikes control water flow between Lake Drummond and the U.S. Army Corps of Engineers (COE) Intracoastal waterways. The refuge hosts neotropical migratory birds in the spring and provides habitat for other wildlife year-round. Great Dismal Swamp is also the site of several significant cultural and historic resources, including a ditch whose construction was organized by George Washington and is a recognized site in the Underground Railroad Network to Freedom.

Figure 30: Lake Drummond



Along the dikes, the refuge maintains dirt roads. A very limited number of dirt roads are open to vehicles, approximately fifty miles of dirt roads are open to pedestrians and bicyclists, and 100 miles of dirt roads are for administrative use only (some of which are also open during hunting season).

Refuge Visitation

Staff estimates that the refuge receives between 65,000 and 70,000 visitors annually. Visitors from the greater Norfolk metropolitan area enjoy using the refuge for birding, wildlife observation, bicycling, boating and fishing, and limited hunting. The hunting and fishing seasons are both limited.

The majority of refuge visitors are not locals; they come from within and outside the region, including from international locations, to see the refuge's natural and cultural resources. Non-local visitors may stop at the refuge en route to the Outer Banks or to Colonial Williamsburg, or a day trip as they are vacationing in the area. The spring is the most popular time for tourists to visit, as they come to watch migratory birds. They tend to either walk the trails at Washington Ditch or drive their vehicles to Lake Drummond (since the road to the lake is closed on weekends, this activity occurs on weekdays only). The refuge does not charge fees to visitors for use of refuge facilities. Refuge staff only collects fees for hunting licenses. The refuge is experiencing a new surge of visitation by non-traditional audiences with interest in the new Underground Railroad Education Pavilion.

Access to and within the Refuge

Most refuge visitors access the refuge by vehicle, concentrating on attractions on the west side of the site near the City of Suffolk. Visitors must drive along a series of rural and residential roads with limited directional signage to find parking lots on the west side of the site, such as Washington Ditch and Jericho Lane, where the majority of visitors park. Many visitors arriving by car also choose to visit Lake Drummond, accessible from the Refuge Office entrance, also on the west side of the refuge. Refuge staff maintains approximately 100 miles of ditch roads for management and fire suppressant, approximately 50 of which are open to the public for non-motorized use only and six miles of which are open to public vehicles. Ditch roads run along raised surfaces alongside the swamp's canals, providing unpaved surfaces for circumnavigating the refuge.

Figure 31: Ditch road open to pedestrians and bicyclists



Access to Lake Drummond via vehicle is along the Railroad Ditch, West Ditch, and Interior Ditch roads. Vehicles accessing Lake Drummond must pass through an electronic gate by obtaining a code from refuge staff. The six-mile auto tour road is open by permit year-round, from 8 AM to 3 PM, Monday through Friday. Refuge staff is considering programming the electronic gates at the Railroad Ditch road, similar to those at Washington and Jericho, to allow vehicle access to Lake Drummond on weekends. Pedestrian and bicycles access to the lake is also available on Washington Ditch (4.5 miles each way).

A small number of visitors also access the site near Chesapeake, at the Portsmouth Ditch entrance. This entrance has access to miles of ditch roads, open to pedestrians and cyclists. The parking area is undeveloped and limits visitation; it consists of a small pull-off on Martin Johnson Road with space for only a few vehicles. The entrance road to the Portsmouth Ditch entrance is in poor condition and may need to be improved to expand access to this area.

The refuge does not open the use of its ditch roads in the North Carolina section of the refuge, except on a limited basis during hunting season, but a new Dismal Swamp State Park (North Carolina) is opening visitation to this part of the Swamp. Visitors to the State Park's visitor center can park on the east side of the canal and cross to the park via a pedestrian bridge. The State Park maintains all trails on their lands. The site of a future refuge Visitor Center is located on the east side of the refuge several miles north in Virginia.

Transit Access

The refuge has considered the use of transit as part of its plans for interpretation and wildlife observation. The refuge's Comprehensive Conservation Plan includes plans for interpretive boat and tram tours as a means of enhancing visitor access to wildlife observation and photography on the refuge while limiting wildlife and habitat impacts (CCP 2006, 104). The refuge owns a small, 12-seat vehicle, and refuge staff offers bus tours approximately six times per year plus during special events. They publicize the tours on their website and through flyers at trailheads. Visitors must call ahead to reserve a space.

While the refuge's transit operations are limited, many visitors enjoy guided bus tours of the refuge through a service offered by a refuge partner. The City of Suffolk runs naturalist bus tours of the refuge on Saturdays and Tuesdays from April through October. The four-hour tours run on a 24-passenger bus and visit Lake Drummond and Washington Ditch. Suffolk has offered these popular tours for approximately seven years and manages all organization and publicity. The City charges \$10 per person for adults and \$8 for seniors and children, with all funds going to the City to cover operating costs. Some commercial tour buses visit the refuge, but they do not always contact the refuge in advance, making it difficult to track their visitation numbers.

Bicycle and Pedestrian Access

The refuge allows bicycle and pedestrian traffic on 50 miles of their dirt and gravel ditch roads, which are generally off limits to vehicles (except for the auto tour road and selected ditch roads during hunting season). Consequently, almost all land-based, public travel within the refuge occurs by bicycle or pedestrian modes. In addition to the ditch roads, the refuge has developed several boardwalks with interpretive elements. The most popular boardwalk is the Dismal Town Boardwalk Trail at Washington Ditch, which runs for one mile through a variety of swamp habitats. The West Ditch Boardwalk Trail is a 100 yard wooden trail accessible from West Ditch Road, and a new Underground Railroad Education Pavilion and interpretive boardwalk opened in 2012 within walking distance from the Refuge Office.

Ditch roads are also popular for mountain bicyclists. The dirt and gravel ditch roads near the Jericho Lane entrance offer more than 20 miles of mountain biking loops and are very popular with local mountain bikers. The unpaved road surfaces are not conducive to road bicycling.

The Dismal Swamp Canal Trail opened in April 2006 adjacent to the canal/intercoastal waterway that makes up the eastern boundary of the refuge. The paved, multi-purpose trail is 8.5 miles in length and owned by the City of Chesapeake. There is no direct access between the trail and the refuge (due to the canal in between), although the trail does extend to a public boat launch located at Feeder Ditch (not owned by the refuge).



Figure 32: Washington Ditch Boardwalk Trail

Water-based Access

The refuge contains Lake Drummond, which is the largest freshwater lake in Virginia. The U.S. Army Corps of Engineers manages two navigable canals along the eastern boundary of the refuge. The first is a section of the U.S. Intracoastal Waterway, the historical Dismal Swamp Canal, and the second is the Feeder Ditch, which connects the Dismal Swamp Canal to Lake Drummond. Boating is therefore a popular refuge activity. Visitors use canoes, kayaks, and other shallow, non-commercial vessels on Lake Drummond. Boaters have year-round access to the lake via the Feeder Ditch. Boaters with a special permit from the refuge may use the refuge's boat launch on the Interior Ditch road for fishing and boating in Lake Drummond. The refuge limits the number of permits distributed each season; the season runs from April 1 to June 15.

Historically, the refuge offered intermittent motorized boat tours of the lake. FWS owns six canoes, which are used during special events. FWS would encourage a public/private partnership to run boat tours, such as the use of a private concessionaire to provide interpretive tours on Lake Drummond in the future, as called for in the CCP. Currently, the City of Suffolk occasionally offers a canoe tour of Lake Drummond, which visitors access via bus from the city. The tours run for five hours and cost \$35 per person, including equipment.

Major Events

The Great Dismal Swamp Birding Festival in May attracts 500 people over three days. During the festival, the City of Suffolk and the refuge run their bus tours for free to festival visitors with high-frequency runs. Refuge staff also lead walking tours and offer photography and birding classes.

Partnerships

- The U.S. Army Corps of Engineers (COE) operates and maintains the Dismal Swamp Canal, forming the eastern boundary of the refuge, and the Feeder Ditch canal, offering access from the Dismal Swamp Canal to Lake Drummond. The FWS has an informal agreement with the COE to close the Intracoastal waterway to boating traffic during dry periods.
- The City of Suffolk, Virginia, promotes use of the refuge through its ecotourism campaigns. It offers public bus and canoe tours of the site. It is also a partner in the Great Dismal Swamp Birding Festival.
- The City of Chesapeake, Virginia, owns and maintains the Dismal Swamp Canal Trail and is a sponsoring partner and contributor for the annual Birding Festival. The City also promotes use of the refuge through its ecotourism marketing campaigns.

Opportunities and Needs

With 1.6 million people living within an hour's drive of the refuge (within the Virginia Beach-Norfolk-Newport News MSA), Great Dismal Swamp has significant opportunities to increase visitation and to use ATS as a means to bring in new visitors while minimizing impacts to the natural resources. Refuge staff is already engaged in taking advantage of the site's natural and historical landmarks and focusing on developing amenities that are accessible by non-vehicular modes, and the existing ATS opportunities are very popular with visitors. The following list offers both some immediate and long-term opportunities and needs. The refuge is already pursuing some of these, alone or with its partners, whereas others which would require additional planning and funding.

Short-term:

- Refuge staff has been working to improve the recreational opportunities that are accessible by foot from the Refuge Office. One such improvement is the Underground Railroad Education Pavilion and boardwalk trail, located one-quarter mile from the Refuge Office. The refuge could continue to develop and promote these opportunities that allow visitors to travel around the refuge without using their car and to access more amenities during the weekends to promote a lower carbon footprint, lower travel costs, and an active, healthier way to connect with the outdoors (all of which are goals of the NWRS Vision Document, *Conserving the Future*).
- The trailhead area at Portsmouth Ditch, which is the closest public use area to Chesapeake and Norfolk, has very limited amenities and no parking. The refuge could become a more viable destination for residents and visitors to Chesapeake by adding more parking and visitor facilities and improving the road at the Portsmouth Ditch entrance. A Public Lands Highway Discretionary grant would fund adding gravel to the entrance road and making a gravel parking lot with parallel parking to increase access to this area and present greater opportunities for ATS access. Refuge staff applied for the PLHD grant in FY 2012 and is awaiting a funding decision.
- Participants discussed completing a transportation assistance group (TAG), which would include the refuge's many partners, to explore multiple possibilities for alternative transportation to and within the refuge. The TRIPTAC provides funding for TAGs.

Long-term:

- The refuge can better take advantage of the new Dismal Swamp Canal Trail by improving refuge amenities near Chesapeake or through adding a Visitor Center near the site of the Dismal Swamp Canal Trail and then connecting to the trail and to trails on adjacent Virginia Department of Game lands. The City of Chesapeake is currently in the planning phase of extending the Dismal Swamp Canal Trail to the north to a new city park and athletic center. A possible connecting bridge

across the Dismal Swamp Canal to the refuge trail system has been discussed. Another way to connect the Trail to the refuge would be through the installation of interpretive elements along the trail.

- The CCP identified a new Visitor Center on the eastern side of the refuge. Refuge staff is considering a site near where Route 104 meets the canal, which would also include a pedestrian bridge, a dock for water access, and a trail to the lake. A new Visitor Center could be designed to maximize motorized and non-motorized land and water-based connections, including the Dismal Swamp Canal Trail.

Works Cited

Refuge Comprehensive Conservation Plan: <http://library.fws.gov/CCPs/GDS/greatdismalswamp06.pdf>

Refuge website: <http://www.fws.gov/northeast/greatdismalswamp/index.html>

Great Meadows National Wildlife Refuge

Refuge Background

The Great Meadows National Wildlife Refuge (Refuge) consists of more than 3,800 acres of wetlands and other wildlife habitat located along the shores of the Concord and Sudbury Rivers in eastern Massachusetts within the greater Boston metropolitan area. The refuge is part of the Eastern Massachusetts Refuge Complex. It consists of the Concord and Sudbury Units, located primarily in Concord, Carlisle, and Sudbury, and also adjacent to the towns of Bedford, Billerica, Lincoln, Framingham, and Wayland. The refuge is located in a heavily-populated suburban area, within twenty miles of the city of Boston and accessible to the Massachusetts Bay Transportation Authority (MBTA) commuter rail system and to several regional rail trails. The complex is adjacent or proximate to many natural and cultural resources that attract visitors from around the region and state.

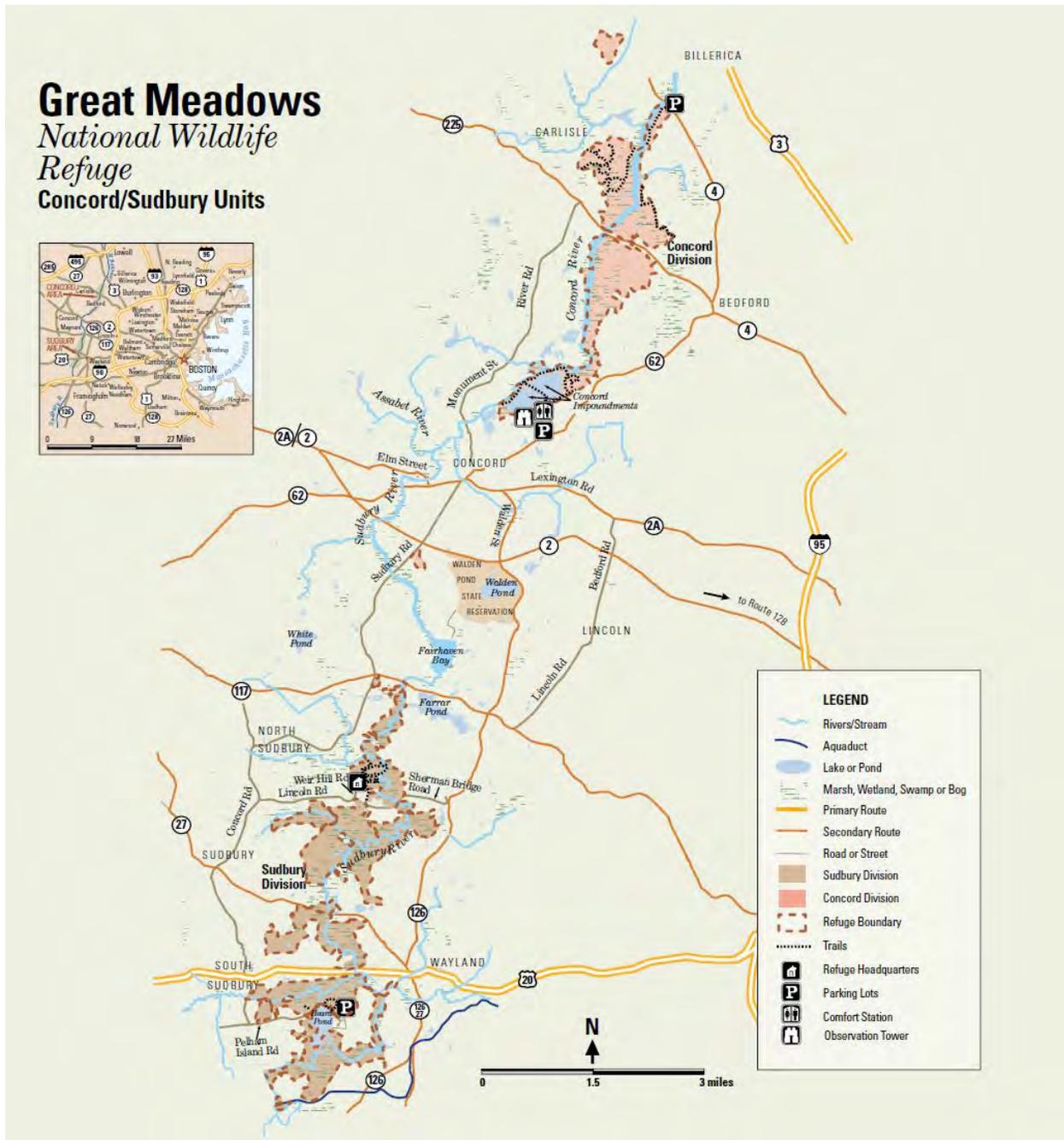
The refuge was established in 1944 when Samuel Hoar, prominent Massachusetts lawyer and local hunter, donated 250 acres of wetlands supplemented with earthen dikes to the U.S. Fish and Wildlife Service (FWS). The Service purchased additional land, starting in the 1960s, to protect more habitat within these wetlands. The refuge consists of riverine wetlands and floodplains and provides critical habitat for migratory birds. The Sudbury and Concord Rivers run through the refuge; both rivers are designated as National Wild & Scenic Rivers, due in part to the presence of the refuges and other conservation areas along the river banks. The rivers are open to motorized and non-motorized boats, with marked water trails.

Figure 33: Concord River at the Concord Impoundments



The refuge includes two units: the Sudbury unit is located to the south along the Sudbury River, near the towns of Sudbury and Wayland. The Sudbury unit contains the refuge headquarters with a visitor contact station and several pedestrian trails, boat launch sites, and a trail and parking area near Heard Pond. The Concord unit is located north near the towns of Concord, Carlisle, Bedford, and Billerica, along the shores of the Concord River. While the Concord unit contains pedestrian trails in Carlisle, most of the visitation for the unit, and for the refuge as a whole, is concentrated in the Concord Impoundments. Figure 2 shows the units and amenities of the refuge.

Figure 34: Map of Great Meadows NWR



Source: USFWS

Refuge Visitation

Popular visitor activities at Great Meadows include wildlife observation, photography, and fishing. Refuge staff estimates that 80 percent of total refuge visitors experience the refuge by walking the trails to observe wildlife. The majority of visitation occurs at the Concord Impoundments (Impoundments), which are accessible by water via the Concord River and accessible by land via a residential neighborhood in Concord. The Concord Impoundments contain 2.5 miles of trails (open to walkers only), a parking area with bathrooms, an observation tower, and river access. Visitation at the Impoundments is very high

among birders in the greater Boston area. Local “celebrity” birders and other birding clubs frequently host tours and events there.

Outside of the Impoundments, visitors travel on pedestrian and water trails for wildlife observation, photography, fishing, and other activities. The Town of Carlisle maintains some trails in the northern part of the Concord Unit, mostly accessible through Foss Farm, a Carlisle land conservation area. Also in the Concord Unit, there is a refuge-maintained parking lot and trailhead in Billerica on Route 4; the unpaved lot has capacity for eight vehicles and leads to a refuge-maintained trail along the Concord River. The trail passes through a small section of Billerica conservation lands, the result of recent coordination with the Town, and there is an eventual connection planned with a trail in the Bedford section of the refuge.

Due to the lack of covered facilities for educational activities, the Eastern Massachusetts Complex refuge staff direct education programs to Assabet River NWR, which has a Visitor Center for hosting field trips and is located approximately 12 miles west of Great Meadows NWR.

Access to and within the Refuge

Most refuge visitors access the refuge by personal motorized vehicle. The majority of visitors park at the Impoundments, which is accessible via a small residential road off of Route 62 in Concord. A few small signs in downtown Concord and along Route 62 direct visitors to the refuge. Other visitors access the refuge by parking at the refuge headquarters, a boat launch site, or the Heard Pond parking area, the latter two of which have very small parking capacities. According to refuge staff, a small number of refuge visitors, estimated to be less than five percent, access the refuge through Foss Farm, a conservation land in Carlisle. They park in a Foss Farm parking lot and use Foss Farm trails to access refuge trails. Some visitors access the refuge by foot, either at the designated access points described above or illegally through residential areas that border the refuge.

Some visitors also access the refuge by non-motorized modes, including bicycling, walking, and boating. The following sections describe access to and within the refuge by transit and trails

Transit Access

The refuge is located within close proximity to several MBTA commuter rail stations, offering access to Boston and surrounding cities and towns. The Concord MBTA station is located 2.5 miles from the entrance to the Concord Impoundments unit. While there is currently no direct transit connection for visitors arriving by commuter rail, visitors could take their bikes onto the commuter rail and ride to access points in the refuge. Visitors can also use the commuter rail to access a canoe and kayak rental vendor (South Bridge Boat House), located approximately one-half mile from the commuter rail station, from which they can paddle the Sudbury and Concord Rivers to access many refuge sites. The refuge headquarters is located approximately three miles from the Lincoln MBTA station.

Great Meadows NWR does not currently offer internal transit. However, the Liberty Ride, a private transit system offering trolley tours of historic sites in the towns of Concord and Lexington, offers transit service close to the refuge and connects to MBTA commuter rail stations and bus stops. Liberty Ride runs daily from May 30 through October 30, and weekends during April and May, catering to tourists. The full tour has a 90 minute duration, includes admission to three historic sites, and offers multiple boarding sites and opportunities for visitors to explore sites at their own pace. A day pass for the trolley costs \$25 for adults and \$10 for children ages 5-17. The nearest Liberty Ride boarding site is at North Bridge and Old Manse, which is approximately 2.3 miles by road or 0.7 miles by foot (if the pedestrian access route from North Bridge is opened?).

Bicycle and Pedestrian Access

Figure 35: Reformatory Branch Rail Trail at the Concord Impoundments



The refuge location offers several advantages in terms of bicycle and pedestrian access. Located in a residential area, many of the refuge trails offer amenities to nearby residents for recreational walking or wildlife observation. The surrounding towns also have a strong recreational bicycle and pedestrian culture, with many nonmotorized trails on conservation lands and initiatives to expand multiuse trails through and between towns.

The Concord Impoundments are directly connected to the Minuteman Commuter Bikeway, a multi-use rail trail extending from the Alewife MBTA station in Cambridge to Bedford (the MBTA offers subway service from Alewife throughout Boston and its inner suburbs). The Minuteman Bikeway is one of the most heavily-used trails in the region; a May 2011 trail use study in Bedford recorded 1,400 daily (Boston Regional Metropolitan Planning Organization 2011). The Minuteman Bikeway is paved for approximately 10 miles from Cambridge to Bedford. From Bedford to Concord, trail users can continue along the Reformatory Branch Rail-Trail, a four-mile unpaved trail for use by pedestrians and off-road bicyclists. The Reformatory Branch Rail-Trail is adjacent to the Impoundments. Bedford plans to eventually pave the trail portion between Bedford and Concord, resulting in an eventual direct connection to the Concord Impoundments.

The Reformatory Branch Rail-Trail continues 1.2 miles west to Monument Road, approximately one-quarter mile south of the Old North Bridge site of the Minuteman National Historic Park and 0.4 miles north of downtown Concord. There are sidewalks along Monument Road connecting the Historic Park with the trail. The Reformatory Branch Trail offers pedestrian and bicycle access to the main vehicular entrance to the Impoundments, although there are currently no signs on Monument Road to direct nonmotorized users to entrance via the trail.

The refuge also contains part of the Bay Circuit Trail, which is a 180 mile multiuse, passive recreation trail linking 57 towns and cities in the Boston area. The Bay Circuit Trail follows the unpaved Reformatory Branch Trail for approximately 1.5 miles through the Concord Impoundments, and later passes through the Heard Pond area in the southern end of the Sudbury Unit. The volunteer group “Friends of the Wayland Rail Trail” plans to eventually develop a section of the Bay Circuit Trail that runs along a railroad bed on the boundary of the Sudbury Unit just south of Route 20.

Finally, regional bike maps published by Rubel (a private company) contain information on roads with favorable bike conditions for cyclists throughout Massachusetts. Several roads that run through or adjacent to the refuge, including Route 4 in Carlisle, are designated as bike routes on the map. Therefore, the roadways adjacent to the refuge units experience relatively high volumes of bicycle traffic.

Water-based Access

The refuge has taken advantage of its Wild & Scenic River designation through participating in the Sudbury Assabet and Concord Wild & Scenic River Stewardship Council. The Council organized a Boater's Trail along both the Sudbury and Concord Rivers. The Sudbury River Boater's Trail is 15 miles in length, with much of its length passing through the refuge. The refuge maintains a public boat launch for nonmotorized vessels and small motorboats at the Sherman Bridge Road in Sudbury, near the refuge headquarters. There is also a landing and pedestrian trail access at the refuge headquarters.

Figure 36: Boat launch site near Sherman Bridge Road



The Concord River Boater's Trail is approximately 11 miles in length, running from Concord to Billerica. The refuge maintains a public parking lot and boat launch for motorized and nonmotorized boats in Carlisle along Route 4. Visitors can also access the river from a private canoe rental location in Concord on Rt. 62. The Concord Impoundments pedestrian trails also offers pedestrian access to the river. The Boater's Trail also passes through the Minuteman National Historic Park near the Old North Bridge and the Old Manse.

Due to the popularity of river access, refuge staff faces management challenges related to illegal access to the river via private property along the river banks.

Major Events

The refuge participates in or hosts several events that attract relatively high levels of visitation to the refuge. Riverfest is an annual event in June that includes over 50 events over two days, occurring along the Assabet, Sudbury, and Concord Rivers. The refuge hosts fishing events, family activities, and walking tours on refuge lands, although events occur at sites throughout the towns adjacent to the three rivers. A secondary event is International Migratory Bird Day, which attracts a small number of participants for educational activities. The refuge does not promote the event extensively, and refuge staff considers it a low priority to raise the profile of this event. Refuge staff also notes that many other organizations around the three river area host wildlife-themed events, so local and regional residents may have less of a demand for additional refuge-hosted events.

Partnerships

Due to its location in a suburban area, proximate to many popular cultural resources, the refuge is a strong example of the importance of connection to and coordination with adjacent and surrounding stakeholders and partners. These connections allow for efficient access to and within the refuges.

Through its participation on the Wild & Scenic River Stewardship Council, the refuge staff has active relationships with the National Park Service, state conservation agencies, local land conservation managers, private land trusts, and other affiliated organizations. The refuge has open communications with staff from these organizations, and while the relationships may not focus on transportation projects, there is the potential to call upon partners for transportation-related issues.

There is no friends group for the refuge, but the refuge runs their own interpretive bird walks and promotes them heavily.

Opportunities and Needs

Great Meadows NWR, along with Oxbow and Assabet refuges, would benefit from a multi-modal alternative transportation study that focuses on the potential for a regional transit system. Refuge staff indicated that there is high potential for regional shuttle system or expansion of existing systems like the Liberty Ride to connect Great Meadows, Oxbow, and Assabet refuges with other highly-visited regional attractions.

Several preliminary goals that refuge staff noted are:

1. Attract a greater diversity of visitors, especially from underserved and urban populations in the Boston area, and offer connections from MBTA stations to the refuges for non-car-owning populations.
2. Facilitate connections between the three refuges, within refuges, and with regional attractions.
3. Attempt to promote and attract visitors to underutilized refuge amenities.

An alternative transportation study should also address the nonmotorized connections to access or travel within the refuges. The study can consider existing and planned trails, on-street bicycle routes, and pedestrian and water access points.

While a regional shuttle system may be a long-term opportunity, there are shorter-term options for the refuge to accomplish their preliminary goals:

1. Interpretive or directional materials provided on the Liberty Ride to direct riders to the Concord Impoundments, or include a stop near the Reformatory Branch Trail to allow riders to walk to the site.
2. Use partnerships to extend information about the refuge to a wider audience.
3. Test the use of transit during special events, such as Riverfest, using rented vehicles and contract staff.
4. Explore access between the Minuteman National Historic Park (NHP) and the Concord Unit.

In addition to the alternative transportation study focused on the regional shuttle, the refuge also may have the following additional ATS opportunities:

1. Promote and enhance non-motorized water-based access on the Sudbury, Concord, and Assabet Rivers. A partnership with existing or new canoe rental business may strengthen the connection between water-based recreation and visitor appreciation for refuge resources. The partnership could be enhanced through providing a shuttle service between the rental facility and canoe launch points.
2. Expand educational programs with urban schools to Great Meadows NWR or expand current programs at Assabet. Exposing new populations to refuges through schoolchildren can be an effective long-term strategy for increasing the diversity of visitors. The use of MBTA trains to transport schoolchildren to Concord or Lincoln can reduce transportation costs and allow families to travel to the refuge site after their children have visited.

3. There are several opportunities to strengthen the connection between the Minuteman National Historic Park North Bridge site and the Concord Impoundments. An existing nonmotorized connection of 1.2 miles via the Reformatory Branch Rail-Trail could be enhanced through increased signage or information. Additional connections may include a pedestrian connection via Great Meadows Road and a boat launch on the Concord River at the Old North Bridge site. The Great Meadows Road connection could shorten the current pedestrian connection via the Reformatory Branch Trail, but it would require acquiring access through 0.1 mile of private property to reach the Concord Impoundments trail. A partnership with the National Park Service or Trustees of the Reservation may enable the addition of boat access near Old North Bridge to connect to the refuge.

Works Cited

Link to refuge website: <http://www.fws.gov/northeast/greatmeadows/>

Link to Conservation Comprehensive Plan: http://library.fws.gov/CCPs/greatmeadows_final05.pdf

Source: Boston Regional Metropolitan Planning Organization. 2011. Livability – Bicyclist/Pedestrian Count Database. http://bostonmpo.org/apps/bike_ped/bike_ped_query.cfm

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				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
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12. DISTRIBUTION/AVAILABILITY STATEMENT					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (Include area code)