## U.S. Fish and Wildlife Service Regional Alternative Transportation Evaluation Report – Region 2 March 2012



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## **RATE Background**

The U.S. Fish and Wildlife Service (FWS) and the U.S. Department of Transportation (DOT) Volpe Center (Volpe Center) conducted a regional alternative transportation evaluation (RATE) in Region 2, which is comprised of Arizona, Oklahoma, New Mexico, and Texas, to ensure effective consideration and integration of alternative transportation systems (ATS, Box 1) into the goals and recommendations of the Region 2 Long Range Transportation Plan (LRTP). Working with Central Federal Lands Highway Division (CFLHD), Region 2 is scheduled to commence work on its LRTP in early 2012. Accordingly, this RATE served as an informal kick-off of the region's LRTP work to assist with identifying future needs.

Staff from the Volpe Center, FWS (Region 2 and Headquarters offices), and CFLHD met in Albuquerque, New Mexico, in September 2011 to discuss alternative transportation needs and constraints in the region

and to develop an ATS Questionnaire. This team then visited Bosque del Apache, Hagerman, Tishomingo, and Brazoria National Wildlife Refuges (NWRs) as well as the newly acquired Middle Rio Grande NWR in Albuquerque to identify specific opportunities for ATS in these and other stations. Following these visits, the Region distributed the questionnaire to all refuges and national fish hatcheries in Region 2. The team also contacted Deep Fork NWR, which the team was not able to visit in person but that, by NWR staff responses to the questionnaire, indicated that they had transportation issues that could be alleviated by ATS. The RATE also provided lessons on how ATS may be instituted more broadly across Region 2.

#### Box 1: What are Alternative Transportation Systems?

Alternative transportation systems generally include any travel means other than personal automobile, such as:

- Buses, shuttles, or vans operating internally within stations
- Shuttles and van transit connecting stations with other destinations
- Regional transit connections (bus, light rail, trolley, commuter rail, passenger rail)
- Bicycle and pedestrian infrastructure (sidewalks, paths, bicycle lanes, shared lanes, trails)
- Water-based transportation (ferry, water taxi)
- Publicly and privately operated systems

FWS Headquarters and Regional staff approached the RATE with the understanding that increased ATS will benefit Region 2 stations and complement Service-wide goals and themes, particularly those that the Region 2 LRTP will likely contain, such as:

- The use of transit, non-motorized, and water-based modes supports natural resource protection. By reducing the use of personal automobiles, FWS can reduce the impacts that these vehicles have upon natural resources. Vehicular resource impacts include wildlife collisions, invasive species, noise pollution, particulate emissions, erosion, and pollutants that can enter the soil or water.
- Over the long term, increasing ATS for stations with increasing visitation can minimize the need for new roads or parking, thus preserving more area for wildlife habitat.
- ATS can also be a critical visitor management tool for station staff facing increasing visitor demands, particularly during special events, and limited resources.
- The use of transit can enhance visitors' understanding of the station's natural resources by facilitating interpretive tours or directing visitors for special events.
- Signs and orientation information directed at non-automobile modes can help integrate these modes effectively into station transportation.

• ATS can reduce the Service's carbon footprint, reduce the use of carbon-based fuels by visitors, enhance accessibility, and reduce air pollutants emitted from vehicles.

## **Key Findings**

Based on the station visits and strategic discussions, the following are key findings and outcomes from the RATE:

- 1. County and/or state roads leading into refuges are in poor shape due to significantly limited transportation and construction budgets. Poor local infrastructure can degrade the visitor experience, discourage visitation, and can be unsafe for visitors and through traffic as well. Poor infrastructure may discourage ATS, particularly bicycle and pedestrian access, if safe, well-maintained routes are not available. Poor roads can also negatively affect emergency access to and from the refuge.
- 2. Opportunities exist to establish better connections to gateway communities. In many instances, stations are successfully partnering or are attempting to partner with gateway communities to expand access to refuges using ATS.
- 3. Visitation growth is straining station resources, particularly as funding levels remain stagnant. The Service is trying to maintain a balance between resource protection and providing educational and recreational access for visitors, and visitation growth is straining the Service's ability to maintain that balance. Further, urban growth is occurring closer to refuges that were once far from urban centers. At the same time, the Service is also developing refuges in urban areas, which may see visitation patterns more akin to other urban parks.
- 4. Over 90 percent of all roads in the refuge system are dirt/gravel and there is currently a moratorium on spraying dust suppression chemicals. Dust is a significant problem for many refuges in Region 2, particularly because many areas are dry for long periods of time.

## **Region 2 Background and Trends**

Stations in Region 2 manage more than 2.5 million acres and focus their conservation missions primarily on migratory birds, endangered species, fishery resources, and the preservation of these species' habitats. Programs in the Region include:

- Providing biological advice to other agencies and industry concerning the conservation of fish and wildlife habitats;
- Enforcing Federal laws that protect endangered species and other wildlife, including interstate/international trade; and
- Working with landowners and agriculture agencies to conserve wetlands and other wildlife habitat on private lands.

One of the significant characteristics of Region 2 is its location along the Central Flyway, a series of major north-south migratory bird routes (Figure 1). The abundant habitats along the Flyway attract not only birds, but also bird watchers, and throughout the region visitation patterns tend to reflect that of the migrating birds: high in both the spring and fall. Fishing is also a popular activity at many Region 2 stations, and the region's lakes, rivers, reservoirs and the Gulf of Mexico provide ample fishing opportunities.



## Figure 1: Map of Major American Bird Migration Routes

The unique environments of the four states that make up the Region range from sub-tropical along the Gulf Coast to desert in New Mexico and Arizona, and provides a range of resource protection needs, from managing vast wetlands, to protecting and providing habitat for migrating birds.

Aligned with the FWS goal of increasing the number of urban refuges, the Region has existing refuges in urban areas and is expanding into new areas. Just outside of Austin, in Texas Hill Country, Balcones Canyonlands NWR provides refuge for endangered birds and other species. Balcones Canyonlands is relatively new to the Service, recently celebrating its 15<sup>th</sup> anniversary. The Lower Rio Grande Valley NWR and Santa Ana NWR straddle U.S.-Mexico border in the fast growing Lower Rio Grande valley of Texas, near McAllen.

The Region continues to grow in urban areas. In September 2011, a new urban refuge was authorized at the Price's Dairy property (to be called Middle Rio Grande NWR), becoming New Mexico's first urban refuge. The Price's Dairy property is within the city limits of Albuquerque, just a short drive from downtown and will provide visitors access to natural educational opportunities as well as wildlife viewing along the Rio Grande.

Most refuges in Region 2 are not near any transit services; however, urban refuges are not necessarily far from transit service. Balcones Canyonlands, Lower Rio Grande, Santa Ana, and Middle Rio Grande are in or near the service area of transit providers, and opportunities exist to connect urban population near these refuges with transit.

Wildlife observation, specifically bird watching, is the primary visitor activity at many of the stations in the Region. Historically, hunting and fishing were popular in the region, and while they remain significant activities at many stations with hunts scheduled during specific times of the year, hunting has become less significant in recent years. Visitors are seeking more active recreation on NWRs in the region in addition to enjoying wildlife observation and participating in activities such as camping and picnicking. Hiking and bicycling on refuges have increased in the past few years at several refuges; many residents of adjacent communities visit refuges regularly for walking, jogging, bicycling, and other exercise. This increase in active recreation may be due to urban development approaching refuge boundaries, which puts refuges in closer proximity to people's homes or workplaces and their use of the refuges as parks.

Many stations participate in nature festivals or other types of special events, often in conjunction with surrounding communities and with the help of friends groups. Stations also host school groups; some station staff offer interpretation to these and other groups, which may take place onsite in visitor facilities or on board those groups' buses. If station staff do not provide this interpretation, then interpreters from the various friends groups may provide this service. Partnerships take many forms; one standout is at Bosque del Apache NWR, where the friends group has a school bus scholarship fund that raises funds to help offset some of the transportation costs for school groups to visit the refuge.

Many stations are in fairly close proximity to areas of high population growth, particularly in Texas and Arizona, where state populations have grown more than 20 percent between 2000 and 2010. In fact, as a whole, Region 2 has seen population growth of almost 20 percent over the past ten years (Table 1). Three states in Region 2 substantially exceeded the national growth rate of 9.7 percent, and growth trends are likely to continue, particularly once the economy recovers. As population grows, so too will visitation to refuge facilities. This growth will likely continue to strain the transportation systems of stations and will require infrastructure improvements that accommodate visitor growth while also allowing the stations to meet Service resource protection goals.

| Year     | Arizona   | New Mexico | Oklahoma  | Texas      | Region 2   |
|----------|-----------|------------|-----------|------------|------------|
| 2010     | 6,392,017 | 2,059,179  | 3,751,351 | 25,145,561 | 37,348,108 |
| 2000     | 5,130,632 | 1,819,046  | 3,450,654 | 20,851,820 | 31,252,152 |
| % Change | 24.6%     | 13.3%      | 8.8%      | 20.6%      | 19.5%      |

 Table 1: Population change 2000 – 2010 in Region 2 states

 Source: U.S. Census Bureau

When construction occurs, FWS often develops combined office/visitor/interpretive centers. Between 2006 and 2012, the region has built eight new office/visitor/interpretive centers. Due to budget constraints, there is only one structure – a standalone visitor contact station – that is currently under construction. With population and visitation growth trending upwards, the Service will need to likely build not only more visitor and interpretive centers, but also transportation infrastructure to match. ATS can help the Service meet these growth needs without relying solely on roads and parking. Furthermore, right-sizing ATS appropriate for each locale can ensure that increased visitation does not result in resource degradation.

## **Accessibility for Underserved Populations**

#### Overview

The RATE team selected four metropolitan areas in Region 2 to assess with regard to ATS connectivity from locations with high densities of underserved populations to nearby NWRs. The team chose the communities of Austin, TX; Brownsville, TX; Houston, TX; and Tulsa, OK, for study. The team selected these metropolitan areas based on the presence of nearby refuges, the availability of alternative transportation services throughout the region, and the occurrence of underserved populations.

#### Methods

The team identified three demographic variables – median household income, car ownership per household, and percentage of non-white population – to represent underserved populations. The team classified median household income using the 2009 national poverty threshold (\$21,954) and national median household income (\$49,777) figures for reference. The yellow circles on each of the resulting maps denote target areas for improving access to refuges, based on high rates 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. Regional metropolitan planning organizations (MPOs), local and state geographic information system (GIS) resources, and other local and state public agencies were sought out for each region as potential providers of this data. The RATE team used the best data available at the time of publication at the appropriate regional scale, which may not include detailed or new transit routes and trails.

#### Austin, TX (Balcones Canyonlands NWR)

The Balcones Canyonlands NWR is located 25 miles to the northwest of Austin, occupying a wide swath of land almost equivalent to the urbanized area of the city itself. The Capital Metropolitan Transportation Authority offers one bus route near the refuge (Figure 2). Route 214 (Lago Vista Flex) serves the community of Lago Vista approximately four miles southeast of refuge headquarters, operating roughly every hour on weekdays. Passengers are allowed to bring bicycles on board this route. There is no bicycle infrastructure connecting population in nearby areas to the refuge, but the City of Austin's 2009 Bicycle Master Plan recommends providing a wide shoulder along Farm to Market Road 1431 from Lago Vista into the refuge to better facilitate bicycle travel.

Alternative transportation connections to this refuge are not well-situated for the populations that may need these services most. Many of Austin's non-white and low-income populations are located to the east and southeast of the city, further away from the refuge (Figure 3, Figure 4, and Figure 5).

One future opportunity for the refuge to facilitate non-vehicular access to the refuge would be to partner with the Capital MetroRail passenger rail service to offer enhanced service on weekends. Stations along the route close to the city center are accessible to some of these underserved populations, as well as low-vehicle ownership households. A potential arrangement could involve a shuttle vehicle transporting passengers between a station and the refuge headquarters. However, visitors would still need to overcome a nearly 20-mile distance from either the Lakeline or Leander Stations in order to reach the refuge.

#### McAllen - Brownsville - Harlingen, TX

#### (Lower Rio Grande Valley NWR, Santa Ana NWR, and Laguna Atascosa NWR)

Three refuges are within proximity of the major cities of McAllen, Harlingen, and Brownsville in Texas' Lower Rio Grande Valley (Figure 6), but there are few connections between underserved populations and these refuges. Units of the Lower Rio Grande Valley NWR are dispersed throughout the region, primarily along the Rio Grande. Visitor facilities are shared with the Santa Ana NWR at that unit's 2,000 acre site, approximately eight miles south/southeast of the city of Pharr, near McAllen. The Laguna Atascosa NWR, by contrast, encompasses over 65,000 acres along the Gulf Coast in Cameron County, with refuge headquarters between 20-25 miles northeast of both Harlingen and Brownsville. The widespread prevalence of Hispanic and low-income populations provides extensive opportunities for underserved populations to visit the refuges (Figure 7 and Figure 8). Areas also exist within the region with a prevalence of non-white populations (Figure 9) and low car ownership households (Figure 10)<sup>1</sup>.

Major transit agencies in the region include the Brownsville Urban System (or Brownsville METRO), the Valley Metro System (routes only partially shown), and METRO McAllen.<sup>2</sup> Valley Metro features two routes offering service within or near refuge lands, each allowing bicycles onboard vehicles. Route 30

<sup>&</sup>lt;sup>1</sup> Over 80 percent of the Valley's population is Hispanic, and poverty rates for the region exceed 33 percent

<sup>&</sup>lt;sup>2</sup> Data showing METRO McAllen routes was not available

(not shown on maps) runs between downtown Pharr and the community of Las Milpas. Las Milpas is approximately a six-mile drive to the Santa Ana and Lower Rio Grande Valley NWR headquarters along high-speed roads, thereby making bicycling unlikely. Brownsville METRO runs Route 50 from downtown Brownsville to the town of Laguna Vista, but the nearest stop is approximately 12 miles south of Laguna Atascosa NWR's headquarters, thereby making a transit connection to the refuge infeasible. No bicycle infrastructure data is available for this region; the Rails-to-Trails Conservancy does not identify any regional bicycle/pedestrian trails in the study area.

#### Tulsa, OK (Deep Fork NWR)

Two refuges are located in the northeastern Oklahoma region to the south and southwest of Tulsa (Figure 11). The Deep Fork NWR, which recently opened a new administrative office and visitor center, is approximately 40 miles south of Tulsa along US-75. This road is a two-lane highway in each direction for much of its length between Tulsa and the gateway community of Okmulgee, making access via bicycle challenging. The Sequoyah NWR headquarters are located off of I-40 south of the community of Vian, approximately 75 miles southeast of Tulsa. Each refuge is situated well out of the reach of Tulsa's bikeway network, as well as far outside of the service area of Tulsa Transit.

Although alternative transportation access from Tulsa would be difficult to implement, connections to the closer communities of Okmulgee and Muskogee may be better attainable. Each of these cities is home to population segments with low income levels (Figure 12) with Muskogee and areas on the north side of Tulsa also containing a relatively high proportion of non-white residents (Figure 13) and low car ownership households (Figure 14). The refuges may increase visitation among these populations by better engaging their neighboring communities and working to develop more multimodal access. Okmulgee stands to particularly benefit from establishing such connections, as it lies on both the northern and eastern extents of the Deep Fork NWR and is only six miles north of the administrative office and visitor center. Muskogee is approximately 30-35 miles away from each refuge making such connections more difficult to implement.

#### Houston, TX (Trinity River NWR, Anahuac NWR, Moody NWR)

There are a number of refuges to the east and southeast of Houston, but these refuges do not have direct access to bicyclists, pedestrians, or transit users (Figure 15). The closest of these refuges to Houston, the Trinity River NWR, is located approximately 35 miles to the east and northeast of Houston's city center in Liberty County. An observation pier, butterfly garden, and trails are available at the refuge's Champion Lake Public Use Area, but the refuge office itself is located in the community of Liberty. The Anahuac NWR features a visitor information station at its entrance gate, which is approximately 12 miles southeast of the nearby community of Anahuac. Moody NWR, situated to the west of Anahuac NWR, is closed to the public.

Developing transit and trail connections from underserved populations to these refuges would be challenging. Although the City of Houston and some outlying communities feature bicycle infrastructure, the Rails-to-Trails Conservancy does not identify any regional bicycle/pedestrian trails in the study area. The bus and light rail services of Houston METRO are also well out of reach of these refuges. Galveston Bay serves as a barrier between the Anahuac NWR and the rest of the Houston metropolitan area, with I-10 serving as the only road Houstonians can use to access the roads leading to the refuge. The Champion Lake Public Use Area of the Trinity River NWR is also best accessed by I-10, although it is also possible to reach the site using local roads. Any potential bicycle trail from Houston would need to cross the San Jacinto River to reach the Public Use Area and other portions of the refuge. There is a pocket of high-minority population on the eastern side of the San Jacinto River approximately 14 miles southwest of the Champion Lake Public Use Area, but most instances of underserved populations are clustered near Houston's downtown area (Figure 16, Figure 17, and Figure 18).



Figure 2: Transportation infrastructure in the Austin metropolitan area



#### Figure 3: Median household income in the Austin metropolitan area



Figure 4: Vehicles per household in the Austin metropolitan area



## Figure 5: Non-white population rates in the Austin metropolitan area



Figure 6: Transportation infrastructure in the McAllen - Brownsville - Harlingen metropolitan areas



Figure 7: Median household income in the McAllen - Brownsville - Harlingen metropolitan areas



Figure 8: Hispanic population rates in the McAllen - Brownsville - Harlingen metropolitan areas



Figure 9: Non-white population rates in the McAllen - Brownsville - Harlingen metropolitan areas



Figure 10: Vehicles per household in the McAllen - Brownsville - Harlingen metropolitan areas



Figure 11: Transportation infrastructure in the Tulsa metropolitan area



Figure 12: Median household income in the Tulsa metropolitan area



Figure 13: Vehicles per household in the Tulsa metropolitan area



Figure 14: Non-white population rates in the Tulsa metropolitan area



Figure 15: Transportation infrastructure in the Houston metropolitan area



#### Figure 16: Median household income in the Houston metropolitan area



Figure 17: Vehicles per household in the Houston metropolitan area



#### Figure 18: Non-white population rates in the Houston metropolitan area

## **Effective ATS Strategies for Region 2**

Conversations with FWS headquarters, regional, and station staff, as well as with CFLHD staff, indicate several planning and management strategies that can help Region 2 and its stations increase the use of ATS. These strategies include new and expanded types of ATS that would work well at specific stations as well as supportive management and planning actions at the station and regional level that can increase ATS use.

For many of the stations included in the RATE, several key strategies would help effectively and appropriately increase ATS. These strategies are as follows:

- <u>Use of transit for special events and peak weekends</u>: Refuge staff can use transit vehicles, such as buses and vans, during festivals, special events, or peak weekends when visitation is much higher than normal. During these events, refuges can use transit for wildlife observation tours, shuttles to on- or off-site parking, or transportation to public transit stations. Having a large van or small shuttle bus on-site or shared between stations or other partners would also enable station staff to accommodate school groups or other large groups that are not able to use their own bus to access and/or tour the station.
- <u>Partnerships</u>: Transit agencies, local governments, other state and federal agencies, and friends groups can help to enhance or add new transit service, fundraise for new or improved non-motorized infrastructure or bus/shuttle rentals, promote existing connections, and provide transit for special events. Partnerships with transit agencies are the first step to connect urban and suburban stations within transit service areas to local bus routes. Partnerships may also help station staff expand their capacity for the maintenance of trails within and leading to the station.
- <u>Promotion</u>: Stations can advertise existing and underutilized ATS connections through the station website, social media sites (such as Facebook and Twitter), brochures, local media, station staff, and its partners' promotional materials. Promotional partnerships and materials can emphasize refuge access via non-motorized trails or transit, and they can also advertise the use of transit at special events.
- <u>Provision of new or improved pedestrian and bicycle infrastructure, facilities, and connections</u>: The construction or provision of non-motorized paths, trails, sidewalks, and bicycle lanes are necessary to connect stations with gateway towns, existing non-motorized trail networks, and local and regional amenities. Separate non-motorized paths and trails can help encourage visitors to use these alternative modes particularly in areas where most roads are unpaved and subject to dust problems during dry weather. In some cases, existing or missing connections only need minor maintenance improvements or updates to increase their usability. Pedestrian and bicyclist facilities can be added or enhanced/improved in stations to allow for non-motorized travel on or adjacent to auto tour or station roadways, where compatible with the purpose of the station and consistent with other activities.
- <u>Consideration of ATS at early planning stages of new visitor facilities</u>: Rapid population growth and urbanization near many stations presents an opportunity for early ATS planning and development. Several stations have recently completed construction on new office/visitor/interpretive centers. These new centers will draw more visitors from nearby schools and communities, particularly in fast-growing areas. Stations slated for new visitor facilities in coming years should anticipate higher visitation and the potential for ATS service to address new transportation issues. Station staff can plan for parking lots that can accommodate shuttles, non-

motorized trails that could bring visitors to the station without relying on a car, and buses and kiosks and entrances to their facilities that are proximate to drop-off areas for ATS passengers.

• <u>Utilize water-based access</u>: Many of the stations in Region 2 include or are adjacent to rivers, lakes, and the Gulf of Mexico. Accordingly, stations have the potential to utilize water-based access to bring visitors to and transport visitors within their lands.

#### **Alternative Transportation Questionnaire**

The Volpe Center, FWS Region 2, and CFLHD staff jointly developed the RATE Alternative Transportation Questionnaire to collect information comprehensively about the needs and opportunities for transportation among stations in Region 2. The questionnaire was available to station managers in an online format over a five-week period in October and November 2011.

#### **Station and Visitation Background**

A total of 27 stations responded to the survey (out of 44 stations in the region, representing a 68 percent response rate), and of these, 92.5 percent (25 stations) were open to public use. The questionnaire asked each station to estimate its visitors' access modes, as shown in Figure 19. Most visitors access stations by personal vehicle (90.9 percent), followed by water-based access (11.8 percent), public transit (5.1 percent), and bicycling (3.7 percent). There are a few users who access refuges through private transit or walking. The majority of stations (83.3 percent) note that school groups or friends groups provide transportation to the station via bus or van.





The questionnaire also asked for estimations of visitor demographics, origin, and activities. Families and senior citizens are the most prominent visitor demographic group, according to the respondents. Sixty-seven percent of respondents noted a significant number of families, and 53 percent have a significant number of seniors. Approximately 30 percent of the respondents note a significant number of youth/school groups, minority populations, and low-income populations. Forty percent of respondents said that a significant number or some visitors would be comfortable with bicycling, and 23 percent responded that their visitors would likely be familiar with transit. A third of respondents have some mobility impaired visitors while 47 percent have few or none.

Figure 20 shows respondents' estimations of how far away visitors have traveled to get to their refuges. Fifty-five percent of respondents estimated that a "significant" amount of their visitors came from 10 to 50 miles from their station and 39 percent of respondents estimated that a significant amount of visitors came from within 10 miles of their station. Forty-five percent of respondents also noted significant visitation from tourists (which were defined as coming from more than 50 miles away) and almost 60 percent of respondents noted that they had some international visitors.



**Figure 20: Estimation of Visitor Distance Traveled (N = 29)** 

Figure 21 shows respondents' estimations of visitor activity participation. Seventy-nine percent of respondents noted a significant number of visitors engaged in wildlife observation, 52 percent of respondents indicated that visitors enjoy fishing, 50 percent of respondents noted that visitors enjoy photography, and 41 percent of respondents estimated that visitors enjoy hunting on their refuges. A little over 30 percent of respondents also noted significant numbers of environmental education and interpretation activities.



Figure 21: Estimation of Visitor Activity Participation (N = 29)

#### **Transit and Trail Connections**

A significant part of the questionnaire focused on transit and trail connections to stations. No stations have direct transit service or transit service within a mile; two stations (San Bernard NWR [Dow Woods Unit] and Tishomingo NWR [Headquarters office]) have transit service between one and three miles from the station. The majority of respondents (92 percent) do not have transit service within three miles from the station.

The majority of respondents (77 percent) did not see an opportunity for transit to assist for special events. However, seven respondents (22 percent) did see such an opportunity. More respondents (29 percent) believe their station has an opportunity for transit to provide access for the general visitor.

One refuge (Wichita Mountains NWR) has a direct trail connection to a regional trail. No respondents have a regional trail nearby up to a mile away and only one refuge is located one to three miles from a regional trail. The majority of respondents (92 percent) do not have trail access within three miles from the station.

#### **Transportation Challenges and Opportunities**

The next section of the questionnaire asked station managers to self-evaluate transportation challenges and opportunities. Respondents rated a list of challenges as major, minor, or little to no challenge (Figure 22). There was a separate section to fill in challenges not listed in the questionnaire and to prioritize the station's greatest challenge. The biggest transportation challenges are often ones that are beyond the control of the FWS. Station managers most frequently cited the lack of transit service and distance from population centers as major challenges, which make it difficult for many visitors to use alternative transportation assets (78 percent), staff capacity shortages (73 percent), and funding shortages (57 percent). Safe pedestrian access was a major or moderate concern for 43 percent of respondents, and a minor concern for 57 percent. Forty percent of respondents noted that unsafe road conditions surrounding the station were a challenge. Respondents also noted that signage and orientation could offer challenges, with 57 percent expressing challenges with appropriate and effective signage, and 53 percent with visitor orientation to and within stations.



#### Figure 22: Transportation Challenges (N = 30)

Many respondents called for signage improvements to enhance their visitor programs. Over 71 percent of respondents would like improved signage for orientation to their station and over 46 percent would like improved signage for orientation. With regard to alternative transportation specifically, the desired alternative transportation improvements were pedestrian paths within the station (64 percent), bicycle paths within the station (43 percent), bicycle paths for access to the station (32 percent), and pedestrian paths for access to the station (25 percent). An additional 21 percent called for new transit service to access the station, while 25 percent believed internal seasonal transit and 14 percent thought that year-round transit would benefit their station.

Sixty-eight percent of respondents have special events with visitation ranging from 20 to 2,000 people. Many of these events focus on fishing, hunting, observing migratory birds and eagles, or public open houses. The most popular times of year for these events are during spring and fall months. Most station staff manage increased visitation through providing more parking, either through overflow lots on site (54 percent) or through off-site parking with partners (seven percent). One respondent uses transit. Some respondents noted that their current infrastructure can handle the increased visitation.

Most respondents in Region 2 expect increased visitation, with 61 percent expecting increased visitation levels in the future. Thirty-nine percent of respondents expected visitation to stay the same, and no respondents anticipated that visitation would decrease. Fifty-nine percent of respondents said that their station has an auto-tour route.

Many respondents have multiple partnerships, most with nearby state or federal government entities or friends groups (Figure 23). Other partners include regional and state governments, universities, schools, and non-profits.



#### Figure 23: Partnerships

Almost 26 percent of respondents said that they thought their station would benefit from having a more detailed look at alternative transportation opportunities and challenges. Approximately 52 percent responded maybe to this question.

#### **Analysis and Implications**

Questionnaire responses indicate that most stations in Region 2 could benefit from improved wayfinding and orientation, which may be useful for both motorized and non-motorized access. Wayfinding improvements can often be made with inexpensive strategies such as improved signage and site or trail design. These strategies often require greater coordination with neighboring jurisdictions and transportation agencies.

In general, more respondents would like to see alternative transportation improvements within their stations than to their stations. Of these respondents, more stations would like to see non-motorized improvements than transit improvements. This observation might reflect a broader trend in active transportation preferences for visitors or a greater shift towards wildlife observation activities that may be well-suited to non-motorized modes. Based on this information, regional staff can focus technical assistance efforts on funding programs and guidance for signage, trails, sidewalks, bike lanes, and other bicycle and pedestrian facilities.

The greatest barriers to alternative transportation use in Region 2 tend to be ones related to the remote locations of stations and limited funding availability. Stations may not be able to overcome challenges of long distances from population centers or a lack of transit service, but they can target visitors that may walk or bike to the station and plan to incorporate more non-motorized infrastructure into the station where compatible. Similarly, station staff can stretch limited resources by enlisting friends groups and leveraging partnerships with local governments and transportation agencies. They can also work with regional staff to identify appropriate grant programs or other funding sources.

While many stations expect increased visitation in the next few years, a small number of stations voiced concern for transportation infrastructure meeting visitation demands. Analysis of these results provides a glimpse into the where future needs may occur in the transportation network and should be reevaluated in

the next update of the region's LRTP. Regional staff may target these stations in the future, particularly ones in which transit or trail access could be enhanced or promoted to minimize the need for costly improvements to the roadway and parking infrastructure.

## **Funding Sources for ATS**

#### **Direct to Stations**

The Region 2 LRTP will describe a variety of funding sources, including specific programs for alternative transportation, and will provide examples of projects funded by these sources for transportation projects in the region. FWS stations can apply directly to these funding programs, which include:

- Eligible to receive:
  - Refuge Roads Program for public use roads
  - Refuge System Deferred Maintenance (can be used for public and administrative roads)
  - Fish Hatchery Deferred Maintenance
  - Emergency Relief for Federally Owned Roads (ERFO) for qualifying disasters
- Can apply to:
  - Transportation Enhancements
  - Recreational Trails Program
  - Scenic Byways
  - Public Lands Highway Discretionary Program
  - High Priority Projects Program
  - o Paul S. Sarbanes Transit in Parks (TRIP) Program

#### **Indirect through Partnerships**

There exists a multitude of federal alternative transportation funding sources that local transit agencies and local governments are eligible to receive. While FWS stations cannot apply directly for these funds, they can work with local transit authorities and/or local governments on project submittals, provided that the local agencies submit the application and are the funding recipients.

The U.S. DOT hosts several additional websites with links to resources on alternative transportation funding sources. Federal non-motorized transportation funding sources are listed at the following Federal Highway Administration website: <u>http://www.fhwa.dot.gov/hep/bkepedtble.htm.</u> Federal public transit funding sources are available at the following Federal Transit Administration (FTA) website: <u>http://www.fta.dot.gov/funding/grants\_financing\_263.html</u>.

Though transit funds are federal in origin, application procedures for these funding sources differ by state and some states combine their allotment of federal funds with state funds. The most relevant of these federal funds, which are allocated by the FTA to the states, are:

- <u>Metropolitan Planning</u> (5303)
- <u>Statewide Planning</u> (5304)
- <u>Grants for Other than Urbanized Areas</u> (5311)

Two major federal sources of funding for bicycle and pedestrian facilities are <u>Transportation</u> <u>Enhancements</u> and <u>Congestion Mitigation and Air Quality</u> funds. Like federal transit funds, these funds are allocated to the states, which in turn allocate the funds to dedicated recipients, such as metropolitan planning organizations, which then determine what projects will be funded.

Partnerships with friends groups, adjacent landowners, local governments, school districts and colleges/universities, transportation and government agencies, and transportation providers can help

stations expand their funding capacity. These partners may 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 engineering services. Advanced planning and regular communication with partners allows station staff to identify more cost-savings strategies to reduce overall funding needs.

### Summary of Station Opportunities, Needs, and Strategies

This section summarizes observations and recommendations for ATS at the four stations visited as part of the Region 2 RATE: Bosque del Apache, Hagerman, Tishomingo, and Brazoria NWRs. The team also had a phone conversation with staff from Deep Fork NWR. This conversation was scheduled after refuge staff completed their survey and it became clear that the refuge would benefit from an additional conversation about alternative transportation.

#### **Bosque del Apache NWR**

#### Refuge background

Bosque del Apache NWR was established on December 18, 1936, with the acquisition of land, using the authority of the Migratory Bird Conservation Act (16 U.S.C. 712d) of 1936 to provide refuge and breeding grounds for migratory birds and other wildlife as well as incidental fish and wildlife-oriented recreational development, the protection of natural resources, and the conservation of endangered or threatened species.

The refuge is comprised of 57,191 acres at the northern edge of the Chihuahuan desert and straddles the Rio Grande River, approximately 20 miles south of Socorro, New Mexico. The heart of the refuge is about 12,900 acres of moist bottomlands 3,800 acres are active floodplain of the Rio Grande and 9,100 acres are areas where water is diverted to create extensive wetlands, farmlands, and riparian forests. The rest of Bosque del Apache NWR is made up of arid foothills and mesas, which rise to the Chupadera Mountains on the west and the San Pascual Mountains on the east. Most of these desert lands are preserved as wilderness areas.

The refuge received almost 170,000 visitors in 2010. The peak season occurs between November and February, with weekends having higher visitation than weekdays. During this time period, the cranes migrate and bird watchers and hundreds of photographers park on the shoulder along State Route 1 (SR 1) to observe the wildlife because it is free and close to town, in contrast to the refuge auto tour route.

The refuge has an auto tour route and charges a \$5 fee for vehicles entering the route. The route is 15 miles long and a CD is available for visitors wishing to have an interpretive as well as scenic experience. The refuge also owns two old diesel buses (that were formally operated at the Grand Canyon) for group tour use. Through a fiscal year 2008 TRIP grant, the refuge is about to receive a new alternative fuel (propane/natural gas) bus to operate in lieu of the old buses. There are bus tours daily during the week of the crane festival (described below), on weekends, and twice a day during the week during the peak season. There is no charge for the bus tour and tour information is available on the refuge's and Friends of the Bosque websites.

Other visitors arriving by bus include school groups, a Gray Line tour group, and a van that brings elderly visitors from nearby Socorro. The friends group is an important partner, particularly regarding school groups, where they provide special interpretive programs for the children. The friends group also

maintains a school bus scholarship fund that aims to defray the transportation cost of bringing school children to the refuge.

Bicyclists and pedestrians also enjoy the refuge auto route, even though they share the road with motor vehicles. While motor vehicles do not disrupt the cranes, which can feed and relax very close to the roadway edge, bicycles can be disruptive; the refuge attributes this to the unpredictability of bicycle movement. As a result, the refuge prohibits bicycles on the auto tour route from October 1<sup>st</sup> through March 31<sup>st</sup>. However, bicyclists are allowed on the non-motorized trail that stretches 11 miles along the Rio Grande. Pedestrians are allowed to walk the auto tour route as well.

#### Major events

The refuge hosts an annual week-long crane festival in November, a major event not only for the refuge but the entire county. The festival draws over 1,000 visitors, which fills all refuge parking lots, resulting in bumper-to-bumper traffic and visitors parking on the shoulders of the roadways. The crane festival fills every hotel room in the county, and the county shares a portion of hotel receipts with the refuge, amounting to about \$15,000 annually.

#### Opportunities and needs

- Bosque del Apache recognizes a need for transportation improvements and a FY 2011 TRIP application reflects these needs. The application requested planning funds for the following:
  - To study potential solutions to the parking and safety issues on SR 1, where the refuge is now prohibiting visitors from parking on the shoulders due to safety concerns relating to them setting up tripods and photographing on the active BNSF railroad bed
  - o Planning pedestrian facilities and/or parking areas along the 15-mile auto tour loop
  - Planning trails for the nearly 2,500 cyclists who use the refuge annually; however, this will need to occur carefully considering the potential disruption to wildlife
- Longer term, the refuge plans to coordinate with the possible extension of the New Mexico Rail Runner, which is anticipated to one day provide service between is current terminus in Belen, south of Albuquerque, to Las Cruces and possibly El Paso, Texas, through the refuge on the BNSF corridor. Another longer term ATS opportunity is to link non-motorized trails on the refuge along the Rio Grande to the expanding Rio Grande River Trail.
- Bosque currently owns two transit buses, is receiving a new alternative-fuel bus, and encourages visitors to participate in bus tours of the refuge.
- The Friends group is an important ally in assisting the refuge with promotion and outreach. The Friends group operates the Nature Store inside the refuge visitor center, provides school bus scholarships to help defray the transportation costs for school groups, and organizes numerous tours on the refuge.

#### Hagerman NWR

#### Refuge background

Hagerman NWR was established in 1946 as an overlay of a portion of the Big Mineral arm of Lake Texoma. Consisting of about 12,000 acres<sup>3</sup>, the Refuge provides a variety of habitats for birds and wildlife. Canada, snow, white-fronted, and Ross' geese along with pintail, mallard, gadwall and other ducks use refuge impoundments and fields as stop-over and wintering grounds. White pelicans by the

<sup>&</sup>lt;sup>3</sup> The Army Corps of Engineers owns 130,000 acres including and surrounding Lake Texoma, including the 12,000 acres that the refuge manages.

thousands can be seen here during their spring and fall migrations. Deer, turkeys, bobcats, hawks, and songbirds are abundant.<sup>4</sup>

Hagerman NWR is in north Texas, on the southern side of Lake Texoma, which straddles the Oklahoma border (Tishomingo NWR is on the northern part of Lake Texoma in Oklahoma) and was formed by the construction of the Denison Dam, built by the Army Corps of Engineers in 1943, flooding the town of Hagerman and creating a refuge for migrating birds along the Central Flyway. Hagerman NWR is about 1 to 1.5 hours north of the Dallas/Fort Worth metro area, which has a population of about 6.2 million people. However, the nearest urbanized area to the refuge is Sherman-Denison, about 15-20 miles from the refuge. The 2030 population projection for this area calls for growth from 60,000 to 200,000, which will place visitation pressure on Hagerman as an area of natural beauty and respite.

The lake and the birds are big draws for visitors, and Hagerman receives about 150,000 visitors annually (which is an increase of 60 percent over the last three years). Visitation peaks in the winter (December/January) as thousands of ducks and geese fly through. The busiest week is during National Wildlife Refuge week in November. The spring and fall are also popular seasons for fishing on the lake. The refuge is seeing increasing interest among school groups, especially given the recent opening of the new refuge's new visitor center. Considering this recent improvement and regional population growth, the refuge expects visitation to continue increasing. The refuge hopes to add a public use person to its staff in the near future.

The unique character of Hagerman, and its ownership by the Army Corps, includes mineral rights for private energy companies. Because the Army Corps did not purchase the mineral rights, only the land, there are 150 oil wells on the refuge. Oil pipelines crisscross the refuge and pose potential environmental challenges. Further, tanker trucks travel refuge roads between holding tanks and main roadways, causing roadway damage and exacerbating the refuge's significant dust problem (Figure 24).



Figure 24: A dirt/gravel road at Hagerman NWR

The refuge offers tours twice per week in a 15-passenger van visitation periods. These tours last three hours and the refuge announces them on Facebook, the friends group's flyer, and the local television station. The refuge requires that visitors make a reservation by phone for the tours. Due to staff

<sup>&</sup>lt;sup>4</sup> Hagerman NWR, <u>http://www.fws.gov/southwest/refuges/texas/hagerman/</u>, accessed October 10, 2011

restrictions, the refuge does not plan to increase the frequency of the tours. There is interest, however, in additional group tours. On a recent Second Saturday event (described below) during peak season, the friends group organized a sold-out bird-watching tour on a 30-passenger bus that the Sherman-Denison Metropolitan Organization's Texoma Area Para-Transit System (TAPS) provided.

Other transportation-related amenities include five hiking trails, two bicycle trails, and three concrete boat launches (boating is permitted March 15 – September 30). The refuge is also building an ADA accessible trail near the visitor center as well as a photo blind with parking nearby.

#### Major events

The largest event on the refuge is National Wildlife Refuge week, which occurs in October. Working with the refuge, the friends group promotes and organizes many special events all week long, from tours to nature talks and photo contests. The refuge was also part of the Red River Birding Festival. Finally, Hagerman holds Second Saturday events to promote activities at the refuge, which used to attract about 15 people. Recently, these events have attracted nearly 100 people, 30 of which are children.

#### **Opportunities** and needs

- Increasing the number of group tours on buses or trams would help reduce automobile traffic and potentially dust; however, the refuge has a limit on the number of tours it can provide due to staff constraints.
- The refuge has a significant problem with dust generated on refuge roads. The high levels of traffic, both by visitors, cut-through traffic and tanker trucks, and refuge and roadway characteristics (dry weather and mostly gravel roads) causes tires to kick up a significant amount of dust. This presents challenges for the operation and visitor's experience with current and potential alternative transportation, such as bicycles, pedestrians, and open-air transit, such as certain electric trams.
- Speeding vehicles is another significant problem on the refuge, primarily due to cut-through traffic. The speed limit is now 20 miles per hour (MPH), which was recently decreased from 35 MPH. The refuge has issued over 300 speeding tickets over the last 2.5 years. The refuge is very concerned that a speeding vehicle could crash into an unsuspecting birder who has pulled over to the shoulder of a road.
- Visitation is likely to continue to increase, considering the new visitor center and population growth, and parking may become an issue, even though there is currently sufficient capacity. The refuge has 20-25 overflow parking spaces available and does not consider overflow parking on grassy surfaces to be an issue.
- There is a need for signage both on and off refuge. The refuge has thus far been unsuccessful in working with the state to add signs on the new Route 289. The refuge also needs signage on Route 82 leading to Route 289.
- The refuge recognizes the importance of using larger capacity vehicles to improve the visitor experience. In addition to its 15-passenger van, the refuge (with the friends group) has used transit vehicles in the past to offer special tours of the refuge. The refuge is interested in an up to 30-person electric vehicle four tours, but since dust is such a concern, the vehicle would have to have dust screens or not be open-air.
- In addition to the Army Corps and friends group, the refuge has additional partners in the area. The refuge coordinates with the Texas Parks and Wildlife Department. Austin College is another partner; the refuges donated 100 acres to the college for research on prairie restoration. Finally, the chambers of commerce in Denison, Sherman, and Pottsboro recognize the importance of the

refuge, and estimate that \$208 million of the local economies is attributable to the attractions on the refuge.

• There is a need for signage both on and off refuge. The refuge is so far unsuccessful in working with the state to add signs on the new Route 289. The refuge also needs signage on Route 82 leading to Route 289.

#### **Tishomingo NWR**

#### Refuge Background

On January 24, 1946, President Harry S. Truman authorized and established Tishomingo NWR. The purpose of the Refuge is to: "Provide refuge and breeding grounds for migratory birds and other wildlife." The refuge is adjacent to the town of Tishomingo (population 3,034<sup>5</sup>), in south central Oklahoma. The refuge is about 130 miles from both Oklahoma City and Dallas/Fort Worth, the nearest metropolitan areas. Tishomingo is the Johnston County seat, and also the capital of the Chickasaw Nation. The refuge is at the end of the Trail or Tears.

Tishomingo receives about 210,000 visitors annually. Spring is a significant peak for visitation, and the refuge is popular with both fishermen and bird watchers. The refuge also receives high visitation during the migratory season in the fall.

Although originally established to provide habitat for migratory ducks and geese, through land and water management, it now provides a diversity of habitats for a wide range of migratory and resident species, including the interior least tern and piping plover, both of which are federally listed as threatened or endangered species.

The refuge encompasses a successfully restored waterfowl habitat area in south central Oklahoma that partially fills a large gap along the Central Flyway. The refuge's farming program serves the objectives for the establishment of the refuge by providing adequate grain to meet the feeding requirements of waterfowl and other wildlife. In addition to waterfowl, other wildlife species are benefiting from the Refuge's habitat restoration efforts. Habitat management to maintain populations of neotropical migrants and shorebirds associated with the Arkansas/Red River Ecosystem have become major objectives. The region's value to waterfowl and other wildlife species and their habitats has increased since the refuge's development.<sup>6</sup>

Tishomingo is on the northern edge of Lake Texoma (at the Cumberland Pool), in southern Oklahoma. The refuge comprises 16,464 acres, and is on the site of the former Washita (Chapman) farm. Similar to Hagerman NWR, Tishomingo is an overlay on the U.S. Army Corps of Engineer's Denison Dam and Lake Texoma Project. The Oklahoma Wildlife Department co-manages a portion of the refuge, termed the Wildlife Management Unit.

The refuge has a rich history. In 1851, it was the site of the Chickasaw Manual Labor Academy. It was the first boarding school for tribal youth established in the Chickasaw Nation. Most of the main structures from the original academy site were located in what is now the Refuge headquarters area. After the relocation of the academy, the former site was converted to farming operations. Starting in 1920, the Washita (Chapman) Farm prospered at the site. The farm "was a very elaborate installation with 53 poured concrete residences; a brick school, frame church, steam-heated chicken house of concrete and

<sup>&</sup>lt;sup>5</sup> U.S. Census Bureau, 2010 Population Finder, <u>http://www.census.gov/popfinder/</u>, accessed October 12, 2011

<sup>&</sup>lt;sup>6</sup> Tishomingo National Wildlife Refuge, Comprehensive Conservation Plan, 2010.

tile" and other structures.<sup>7</sup> There are a few old farm buildings on the refuge today, and the surrounding landscape is dotted with oil wells, though unlike Hagerman, there are no wells on the refuge. The Cumberland Pool, which covers about 4,500 acres, is popular with boaters, but the refuge closes the lake during the peak migratory season (October to March) to protect the bird population.

The refuge has a few trails, the longest of which is three-fourths of mile long. Local residents use the refuge's roads for walking, jogging, or bicycling on a regular basis.

#### Major events

Some significant events occur at or near the refuge including a three-day, county-wide Arbuckle-Simpson Nature Festival in April. This event primarily focuses on showcasing the natural heritage and bounty of the county and to increase public appreciation and enjoyment of the area's natural resources. During the nature festival, the refuge holds two birding and two photography events in addition to nature walks. The refuge requests four vans from Murray State College to bring visitors onto the refuge for this event. The refuge is not always successful in their request, depending on other priorities for the vans. If the refuge is unable to use the vans, or if there are not enough, six to ten cars will "follow the leader" on guided tours through the refuge. The events are coordinated between the Tishomingo Refuge Ecology and Education Society (TREES, the Refuge's friends group), Murray State College, and the Johnston County Chamber of Commerce.<sup>8</sup>

Other events on the refuge include two birding and photography events and nature walks. The Chickasaw Nation also holds events on the refuge and sometimes bring a van to transport larger groups. The Nature Conservancy also runs tours on their Pontotoc Ridge Preserve (about 40 miles north of the refuge), which last year drew about 2,000 people.

#### **Opportunities** and needs

• The refuge visitor center is about 4.5 miles (driving) from Murray State College, which borders the refuge. It is also possible to walk between Pennington Park in Tishomingo (which the town manages through a lease from the Army Corps) and the refuge, partially on a trail that runs past Murray State College and Tishomingo Airpark, which is about 5.2 miles. Approximately one-fourth mile of this trail is currently cut off and overgrown with vegetation between the city and the refuge (Figure 25). This section of the trail used to be a road that refuge cut off in 1990 after going through the compatibility process and determining that a single point of vehicular access to the refuge was necessary. The city of Tishomingo has, for the past 10 years, been attempting to connect the town to the refuge in other ways and develop a wider hike and bike trail network of 10 to 15 miles. The city has applied for funding to construct the trails but has been unsuccessful.

<sup>&</sup>lt;sup>7</sup> Tishomingo National Wildlife Refuge, Comprehensive Conservation Plan, 2010, page 1-3.

<sup>&</sup>lt;sup>8</sup> Arbuckle-Simpson Nature Festival, <u>http://www.asnfok.net/</u>, accessed October 12, 2011.

# Figure 25: The dilapidated section of trail between Tishomingo NWR and the city of Tishomingo near Murray State College



- The refuge notes that occasionally during special events, the parking lot at the visitor center fills up, leading to some congestion issues. The use of vans by groups can help mitigate this congestion, and there is the potential to expand the use of vans or small shuttles if the vehicles are available from area partners such as Murray State College.
- One potential partnership for joint use of vans or shuttles exists with Tishomingo National Fish Hatchery, which is 17 miles from the refuge (and hosts a fishing derby that attracts 1,500 children every year), and/or with Hagerman NWR, which is about 55 miles from Tishomingo. If there is coordination of special events so that they do not occur simultaneously, it is foreseeable that each of these stations could share one vehicle or set of vehicles.
- The local friends group, TREES, is an important partner for the refuge. TREES has about 100 members, one of whom is the president of the local Chamber of Commerce, which stresses the economic importance of the refuge to the surrounding community. TREES membership is transitioning from a more conservation purpose to a more active role in attracting and engaging visitors. They provide some educational services for the refuge, have restored the visitor center, and operate the bookstore. The refuge also recognizes the importance of TREES to outreach, particularly through TREES' facebook page.
- Local universities, school groups, and the Chickasaw are also important partners. For example, Oklahoma University maintains a biological research station on Lake Texoma and the Chickasaw host a Youthful Celebration in November, a Native American event where kids (not only Native Americans) come to the refuge from all over the state. On Earth Day, the Natural Resources Conservation Service (NRCS) holds a one-day educational event for 4<sup>th</sup> graders at the refuge pavilion. The Sutton Center brings 4<sup>th</sup> to 7<sup>th</sup> graders from four nearby counties to the refuge. Other school groups also come to the refuge arriving by school bus, sometimes without announcement; an estimated 300 to 500 school children come to the refuge every year. The variety of existing youth events and interest among the various partners to bring children to the refuge creates an opportunity to expand these efforts, and alternative transportation is an important asset for this outreach because transportation costs can sometimes be prohibitive for schools.

#### Brazoria NWR

#### Refuge Background

Brazoria NWR is part of the Texas Mid-Coast National Wildlife Refuge Complex, which also includes San Bernard NWR and Big Boggy NWR. Brazoria comprises a total of 43,388 acres including 5,000 acres of bluestem prairie. Wildlife is abundant on the refuge, and range from snakes and alligators to egrets, cranes, and warblers. Prior to the establishment of the refuge, the land served several purposes: home to the Karankawa Indians, followed by Spanish and Mexican sugar cane and cotton trade, and then as farm fields and ranch lands.<sup>9</sup>

The refuge is on the Gulf Coast (on Christmas and Galveston bays) in Brazoria County, and the nearest towns are Angleton (the county seat), Clute, Freeport, Lake Jackson, and Richwood, all about 10-12 miles away. Galveston is about 50 miles northeast of the refuge and Houston's southernmost communities are also about 50 miles north of the refuge. Including the greater Houston metropolitan area, there are almost six million residents<sup>10</sup> within a one to two hour drive of the refuge and the region continues to grow, with a 26 percent growth rate between 2000 and 2010.

The refuge receives about 35,000 visitors annually, and the primary activity on the refuge is fishing. During the week, the refuge hosts school groups, but the bulk of visitation occurs on weekends. The number of school groups averages about 20 annually, mainly 4<sup>th</sup> and 7<sup>th</sup> graders, with about 100 students in each group. Most of these groups are from Brazoria County; however, a few come from as far away as Houston. School groups tour the refuge on the bus they arrive on, and either a Friends of Brazoria Wildlife Refuges group volunteer or refuge staff rides on the bus while it travels on the refuge to provide interpretation. School groups plan their trips well in advance and are arranged by a complex staff member; all reservations for the 2011-12 school year were made by the time of the RATE visit in early September. The refuge hosts the Discovery Center, a unique type of visitor center with a lab/classroom for school groups. This center is adjacent to an ADA accessible foot bridge and outdoor pavilion.

The primary amenities on the refuge include the Big Slough Auto Route (7.5 miles) (Figure 26), a welcome center, and the Discovery Center, which has an indoor classroom, outdoor pavilion, and trail access. Refuge staff and/or volunteers staff this center Friday to Sunday. Aside from the auto tour route, the transportation amenities include provisions for boating. The refuge has one put-in for kayaks and canoes in the Salt Lake and Clay Banks areas; the refuge only allows non-motorized boats on refuge waters, though these waters are open to the Intracoastal Waterway where motorized boats are allowed.

<sup>&</sup>lt;sup>9</sup> Brazoria National Wildlife Refuge, <u>http://www.fws.gov/refuges/profiles/index.cfm?id=21543</u>, accessed October 11, 2011.

<sup>&</sup>lt;sup>10</sup> Houston Facts and Figures, <u>http://www.houstontx.gov/abouthouston/houstonfacts.html</u>, accessed December 6, 2011.



Figure 26: The auto tour route roadway at Brazoria NWR

Brazoria does not have many trails; however, the refuge allows hiking and bicycling on the auto tour route. Due to the many mosquitoes, bicycling in particular is not a popular activity at the refuge. Pedestrian trails are limited; however, the refuge did recently receive funding to construct a 1.5-mile loop trail that will begin at refuge headquarters and meander around the area.

The only motorized vehicle that qualifies as alternative transportation is a unique "marsh buggy" that has wide tires and is capable of traveling in the unique marsh environment without getting stuck. The marsh buggy can carry 12 passengers, and Brazoria uses it sometimes to carry smaller school groups. Brazoria maintains one marsh buggy, while San Bernard has two additional vehicles.

#### Major events

The friends group hosts an annual bird migration celebration in the spring. The event originates at San Bernard, but Brazoria also receives a significant amount of visitation during this event. The refuge also hosts various hunts, but the refuge does not organize these hunts. The Texas Youth Hunters Association hosts a feral pig hunt and other hunting tournaments occur on the refuge as well.

#### **Opportunities** and needs

- The roadway leading to the field office is unpaved and one lane wide but open to two way traffic. There are passing problems along the road, and following the construction of the new trail at the field office, the refuge expects traffic to increase along this road.
- Dust is an issue on the roadway leading to headquarters, and the refuge would like to pave this road to help reduce the dust problem.
- The refuge recognizes the potential to provide more tours if they had a vehicle capable of carrying groups, particularly around the auto-tour road near the Discovery Center. The refuge could share this vehicle with San Bernard.
- Brazoria maintains partnerships with local, state, and federal agencies including Texas Wildlife Commission, RICE (Rice Industry Coalition for the Environment, which has enabled the Mid-Coast Complex to expand its land area), the Army Corps (which manages the Intracoastal waterway) and San Bernard NWR. The refuge has mutual aid agreements with not only San Bernard, but with area communities, for issues such as fire fighting. In addition to the friends group, these groups represent potential partners for future alternative transportation endeavors.

#### **Deep Fork**

#### Background

Deep Fork NWR is a rural, riverine refuge covering nearly 9,500 acres in east-central Oklahoma, about 35 miles south of Tulsa and 100 miles east of Oklahoma City. Established in 1993, Deep Fork NWR is relatively new to the FWS system. The refuge is still growing and is expected to ultimately encompass 18,359 acres. In addition to some of this land being owned by private landowners, the state of Oklahoma manages the Okmulgee Wildlife Management Unit and the Eufaula Wildlife Management Unit, on the northwest and southeast borders of the refuge, respectively.

The refuge is home to a variety of resident as well as migratory animals. The primary public use areas are south of the town of Okmulgee at the Montezuma Creek parking area and the Cussetah Bottoms Boardwalk area. The primary uses at these sites include hunting, fishing, wildlife observation, wildlife photography, interpretation, and environmental education.

Okmulgee (population 12,321) is the largest town near the refuge. Being a long and skinny refuge, the north end of the refuge wraps around the town of Okmulgee; there is the potential to connect the town to the refuge with a multi-use cycling/pedestrian trail, which would be about 2-2.5 miles in length. The creation of such a trail is dependent on the continued success of the refuge in purchasing lands currently in private hands. In order to complete the trail, a buy-out or securing of an easement is necessary.

Schulter (population 509) is midway down refuge; many residents of this town visit the refuge. Working with the Oklahoma Department of Transportation, the refuge received stimulus funding to pave a 3.75-mile road to their new office. The refuge notes that it may one day be possible to connect Schulter to the refuge with a multi-use cycling/pedestrian trail that would run parallel to the new road.

A railroad grade runs through the refuge that could be the focus of a new auto-, or perhaps a bicycle-tour route. The tour would be about three miles in length, with one end terminating at an overlook off of a road and the other at the river. In order to complete this route, the refuge would need to purchase some additional land or secure an easement from a private landholder. For this route to not be an single corridor, a refuge road would need to be improved so that users could loop back via roads to the tour's starting point.

## **Region 2 ATS Criteria, Needs, and Opportunities**

#### **ATS Criteria**

The Volpe Center developed criteria to rate and prioritize the potential and need for ATS at stations throughout Region 2 (Table 2). The Volpe Center incorporated the broad goal areas from the National LRTP into these criteria, which include access, mobility, and connectivity, safety and security, visitor experience, environmental consideration, and organizational effectiveness and coordination. The criteria focus on assessing relative levels of needs and opportunities. This assessment is accomplished through evaluating specific needs for visitor management, resource protection, and safety, and through determining capacity from existing planning efforts and partnerships.

|                               | High   | Medium  | Low   |
|-------------------------------|--|---|---|
| Severity of<br>Need           | Station demonstrates urgent or<br>critical need for ATS to address<br>high visitation, safety, and/or<br>resource protection issues.   | Station has a demonstrated or<br>strong future need for ATS,<br>but the station could function<br>effectively without<br>improvements.              | ATS is not needed in the<br>short term; there may be a<br>desire or long-term need<br>for ATS.                                |
| Visitation                    | Station has high visitation or<br>growing visitation that is<br>exceeding facility and<br>management capacity.                         | Station has relatively high<br>visitation, high seasonal<br>visitation, or high visitation<br>during special events.                                | Station has low visitation.   |
| Opportunity                   | New visitor infrastructure,<br>partnerships, and/or nearby<br>development provides a unique<br>opportunity to add ATS<br>improvements. | General visitation and<br>development patterns present<br>opportunities for ATS, but<br>these opportunities may not<br>be unique or time-sensitive. | Station has limited<br>opportunities for ATS (due<br>to remote location and lack<br>of visitor amenities or<br>partnerships). |
| Underserved<br>Populations    | The station is located near<br>underserved populations, and<br>ATS can help those potential<br>visitors access the station.            | There is some potential to<br>offer ATS access to<br>underserved populations.   | The station has limited or<br>no potential to offer ATS<br>access to underserved<br>populations.                              |
| Existing ATS<br>Plans/Actions | Station staff are actively planning for and pursuing ATS.  | Station staff have considered<br>ATS and may have initiated<br>some planning for ATS.   | Station has little or no planning for ATS.  |

Table 2: Criteria to Rate and Prioritize the Potential and Need for ATS in Region 2 Stations

The stations listed in the section below are assigned priority ratings to help regional staff target technical assistance and funding efforts. The overall priority ranking of each station reflects the aggregated total of all criteria. For example, a station with a "medium" ranking may meet high priority criteria for one or two areas, but medium rankings for most criteria.

#### **ATS Needs and Opportunities**

Table 3 includes alternative transportation needs and opportunities from all refuges visited during the RATE and from those that responded to the ATS questionnaire. While identifying alternative transportation needs and opportunities is an important first step, additional analysis of actual need and usage is needed before projects are planned.

# Table 3: Region 2 NWR ATS Needs and Opportunities

|   | Refuge  | Transit Distance Trail Distance Priority                                  |   |                   |  |
|---|---|---|---|-------------------|--|
| 1   | Bosque del Apache NWR   | 20 miles  | More than 3 miles                               | High              |  |
|   | San Antonio, NM   |   |   |                   |  |
| Exist   | ting or Planned ATS:  |   |   |                   |  |
| Oppo  | <ul> <li>Station is planning to use new buses acquired thro<br/>offering tours of the refuge.</li> <li>prtunities for future ATS:</li> </ul>  | ugh the Transit in the I  | Parks program to cont                           | inue              |  |
|   | <ul> <li>The Mid-Regional Council of Governments New 1</li> </ul>   | Mexico Rail Runner E  | xpress service may ex                           | tend south        |  |
|   | from its current terminus in Belen through the refu   | ige to Las Vegas, NM  | and El Paso, TX.                                |                   |  |
|   | <ul> <li>Study potential solutions to the parking and safety visitors from parking on the shoulders due to safet photographing on the active BNSF railroad bed.</li> <li>Pedestrian facilities and/or parking areas along the Trails for the nearly 2,500 cyclists who use the ref.</li> </ul>  | issues on SR 1, where<br>y concerns relating to<br>15-mile auto tour loop | the refuge is now pro<br>them setting up tripod | hibiting<br>s and |  |
|   | <ul> <li>Coordinate with the possible extension of the New</li> </ul>   | Mexico Rail Runner.   |   |                   |  |
|   | <ul> <li>Link non-motorized trails on the refuge along the</li> </ul>   | Rio Grande to the expa  | anding Rio Grande Ri                            | ver Trail.        |  |
| 2   | Tishomingo NWR  | 1-3 miles   | 1-3 miles                                       | High              |  |
|   | Tishomingo, OK  |   |   | e                 |  |
| Opp   | ortunities for future ATS:  |   |   |                   |  |
|   | <ul> <li>The refuge visitor center is about 4.5 miles (driving) from Murray State College, which borders the refuge. It is also possible to walk between Pennington Park in Tishomingo (which the town manages through a lease from the Army Corps) and the refuge, partially on a trail that runs past Murray State College and Tishomingo Airpark, which is about 5.2 miles. Approximately one-fourth mile of this trail is currently cut off and overgrown with vegetation between the city and the refuge and re-connecting this trail is an opportunity for the refuge.</li> <li>The use of vans by groups can help mitigate parking lot congestion, and there is the potential to expand the use of vans or small shuttles if the vehicles are available from area partners such as Murray State College.</li> <li>One potential partnership for joint use of vans or shuttles exists with Tishomingo National Fish Hatchery, which is 14 miles from the refuge (and hosts a fishing derby that attracts 1,500 children every year), and/or with Hagerman NWR, which is about 55 miles from Tishomingo. If there is coordination of special events so that they do not occur simultaneously, it is foreseeable</li> </ul> |   |   |                   |  |
| 3   | Wichita Mountains NWR   | 20 miles  | 0 miles   | High              |  |
| <b>F</b>  | Indianoma, UK   |   |   |                   |  |
| <ul> <li>Existing or Planned A1S:</li> <li>The refuge owns a new bus that is used to provide interpretive tours through the Special Use Area, which is normally closed to the public.</li> <li>The refuge has built shoulders along several highways to allow for safer cycling and as a pull-over for vehicles that need to stop. These shoulders are a part of the Duty Rowe Fit Kids Fitness Trailway, which connects to gateway communities.</li> </ul>                                 |   |   |   |                   |  |
| Opportunities for future ATS:   |   |   |   |                   |  |
| <ul> <li>There is the potential to complete pedestrian and cycle lanes throughout the refuge.</li> <li>With the gateway community of Medicine Park, and the Fort Sill military base's Lake Elmer Thomas Recreation Area, there is the potential to introduce bike sharing as an option to help reduce automobile travel between these sites.</li> <li>There is also the opportunity to connect these areas and the top of Mount Scott, the busiest site on the refuge by transit</li> </ul> |   |   |   |                   |  |
| 4   | Buenos Aires NWR<br>Arivaca, AZ   | 60 miles  | More than 3 miles                               | Medium            |  |

|   | Refuge   | <b>Transit Distance</b>  | Trail Distance            | Priority   |  |
|---|--|--------------------------|---------------------------|------------|--|
| Opp   | ortunities for future ATS:   |                          |                           |            |  |
|   | • Development of a staff carpool system could help alleviate the long drives that staff make to access the refuge  |                          |                           |            |  |
|   | • The introduction of a transportation scholarship fu  | nd similar to that at Bo | osque del Apache cou      | ld help    |  |
|   | provide funds for schools other communities as the   | ey lack transportation f | funding.                  | P          |  |
| 5   | Cibola NWR   | 22 miles                 | None available            | Medium     |  |
|   | Cibola, AZ   |                          |                           |            |  |
| Opp   | ortunities for future ATS:   |                          |                           |            |  |
|   | • There is the potential to bring in seniors and other using transit.  | user groups to the refu  | ge from the surroundi     | ng areas   |  |
| 6   | Las Vegas NWR<br>Las Vegas, NM   | 6 miles                  | More than 3 miles         | Medium     |  |
| Opp   | portunities for future ATS:  | 1                        |                           |            |  |
|   | <ul> <li>There is a potential to develop a community-based Vegas to the refuge.</li> <li>Padastrian trails on the refuga are in need of impresented of the refugation of the r</li></ul> | l bicycle and/or pedest  | rian trail to link the ci | ty of Las  |  |
| 7   | Pedesular trans on the refuge are in need of impre   | 40 miles                 | 30 miles                  | Medium     |  |
| /   | Okmulgee OK  | 40 miles                 | 50 miles                  | Medium     |  |
| Onr   | portunities for future ATS:  |                          |                           |            |  |
| Opp   | • There is the potential to develop an auto-tour route   | e on the refuge along a  | former railroad bed       |            |  |
|   | <ul> <li>Therefuge also notes that multi-use trails near the</li> </ul>  | town of Okmulgee and     | d Schulter could conn     | ect to the |  |
|   | refuge.  | town of Okindigee un     |                           | eet to the |  |
| 8   | Brazoria NWR   | 10 miles                 | Data not provided         | Medium     |  |
|   | Angleton, TX   |                          | L.                        |            |  |
| Opp   | portunities for future ATS:  |                          |                           |            |  |
|   | <ul> <li>The roadway leading to the field office is unpaved and one lane wide but open to two way traffic. There are passing problems along the road, and following the construction of the new trail at the field office, the refuge expects traffic to increase along this road.</li> <li>The refuge recognizes the potential to provide more tours if they had a vehicle capable of carrying groups, particularly around the auto-tour road near the Discovery Center. The refuge could share this vehicle with San Bernard NWP.</li> </ul>   |                          |                           |            |  |
| 9   | Hagerman NWR   | More than 3 miles        | More than 3 miles         | Medium     |  |
|   | Sadler, TX   |                          |                           |            |  |
| Opp   | portunities for future ATS:  |                          |                           |            |  |
|   | • There are opportunities to provide seasonal transit  | and cycle trails/paths i | internally at the station | n.         |  |
|   | <ul> <li>Signage improvements are necessary leading up to</li> </ul>   | the station.             |                           |            |  |
|   | • Visitation is increasing, particularly since the new   | visitor center opened.   | A seasonal bus or trar    | n would    |  |
| 10  | help improve the visitor experience.   | <b>7</b> 1               | M (1 2 1                  |            |  |
| 10  | Lower Rio Grande Valley NWR  | 5 miles                  | More than 3 miles         | Medium     |  |
| Opr   | Alumo, IA  |                          |                           |            |  |
| • The greatest enpertunity for alternative transportation at the station is the train/rail line that is seven miles |  |                          |                           |            |  |
| away and the notential to connect hus transit to the refuge   |  |                          |                           |            |  |
| 11  | San Bernardino and Leslie Canyon NWRs  | 12 miles                 | Data not provided         | Low        |  |
| 11  | Douglas. AZ  | 12 miles                 | Duru not provided         | LOW        |  |
| Major challenges and problems:  |  |                          |                           |            |  |
| • Station cites the lack of transit service, staff capacity shortages, and distance from population centers as      |  |                          |                           |            |  |
| major challenges.   |  |                          |                           |            |  |
|   | • The major transportation safety issue is the primiti   | ve nature of the road le | eading to the refuge.     |            |  |
| 12  | Southwest Arizona Refuges Complex  | 1-3 miles                | More than 3 miles         | Low        |  |
|   | Yuma, AZ   |                          |                           |            |  |

|   | Refuge   | <b>Transit Distance</b>    | <b>Trail Distance</b>   | Priority    |  |
|---|--|----------------------------|-------------------------|-------------|--|
| Maj   | or challenges and problems:  |                            |                         |             |  |
|   | • The complex cites distance from population center  | s as a major challenge     |                         |             |  |
|   | • The complex indicates signage directing the public                                       | to the new station as a    | a need.                 |             |  |
| 13  | Bitter Lake NWR  | 10 miles                   | More than 3 miles       | Low         |  |
|   | Roswell, NM  |                            |                         |             |  |
| Maj   | or challenges and problems:  |                            |                         |             |  |
|   | <ul> <li>Station cites lack of parking for special events as the</li> </ul>                | he most significant trai   | nsportation problem.    |             |  |
| Opp   | ortunities for future ATS:   |                            |                         |             |  |
|   | • There is the potential to develop partnerships with                                      | school districts.          |                         |             |  |
| 14  | Maxwell NWR  | 30 miles                   | More than 3 miles       | Low         |  |
|   | Maxwell, NM  |                            |                         |             |  |
| Opp   | oortunities for future ATS:  |                            |                         |             |  |
|   | • There is an opportunity to create walking paths on                                       | the refuge.                | 1                       |             |  |
| 15  | San Andres NWR   | Not provided               | Data not provided       | Low         |  |
|   | Las Cruces, NM   |                            |                         |             |  |
| Maj   | or challenges and problems:  |                            |                         |             |  |
|   | • The station cites the distance between town and th                                       | e refuge as the most sig   | gnificant transportatio | on problem. |  |
|   | • Security restrictions imposed by White Sands Miss  | sile Range present add     | itional issues getting  | to and from |  |
| 16  | the refuge to headquarters.  | 22                         | Man (1 2                | Τ           |  |
| 10  | Sevilleta NWK  | 22 miles                   | More than 3 miles       | Low         |  |
| 0.00  | SOCOTTO, NM  |                            |                         |             |  |
| Opp   | The Mid Designal Group it of Group manager N   |                            | <b>F</b>                |             |  |
|   | • The Wild-Regional Council of Governments N   | vew Mexico Rail Ru         | iner Express service    |             |  |
|   | extend south from its current terminus in Bele   | en through the refuge      | to Las Vegas, NM        | and El      |  |
| 17  | Paso, 1X.  | 20 1                       | NT '1 1 1               | T           |  |
| 1/  | Little River NWR   | 38 miles                   | None available          | Low         |  |
| Moi   | Broken Bow, OK   |                            |                         |             |  |
| wiaj  | • There are no public transportation options available                                     | a in the grag. The stati   | on is located in a rura | aroo and    |  |
|   | • There are no public transportation options available visitation is projected to increase | e ili ule area. The statio | on is located in a fura | alea allu   |  |
| 18  | Sequovab NWR   | 12 miles                   | More than 3 miles       | Low         |  |
| 10  | Vian OK  | 12 111103                  | More than 5 miles       | Low         |  |
| On  | portunities for future ATS:  | 1                          | 1                       |             |  |
|   | • There is the potential to offer guided refuge and w                                      | ildlife tours using alter  | native transportation   |             |  |
| 19  | Washita NWR  | 28 miles                   | More than 3             | Low         |  |
| 1   | Butler, OK   | 20 111105                  | miles: Elk City         | 2011        |  |
|   |  |                            | Lake Bike Trail         |             |  |
| Exi   | sting or Planned ATS:  | 1                          |                         |             |  |
| • The station is purchasing a bus to allow for easier access for participants in refuge tours.              |  |                            |                         |             |  |
| Opt   | portunities for future ATS:  | 1 1                        | 8                       |             |  |
|   | • There is a great opportunity to improve interior ref                                     | uge roads to improve t     | he quality of tours.    |             |  |
| 20  | Attwater Prairie Chicken NWR   | 40 miles                   | More than 3 miles       | Low         |  |
|   | Eagle Lake, TX   |                            |                         |             |  |
| Opportunities for future ATS:   |  |                            |                         |             |  |
| • The CCP notes improvements to the entrance road, re-alignment of the auto-tour route, and the addition of |  |                            |                         |             |  |
|   | a new trail as opportunities.  | , ,                        | ···· , ··· -            |             |  |
| 21  | Balcones Canyonlands NWR   | 5 miles                    | Data not provided       | Low         |  |
|   | Marble Falls, TX   |                            | · ·                     |             |  |

| Refuge   | <b>Transit Distance</b>   | <b>Trail Distance</b>   | Priority       |  |  |
|--|---------------------------|-------------------------|----------------|--|--|
| Major challenges and problems:   |                           |                         |                |  |  |
| • The station notes that the most significant transpo  | rtation problems includ   | e:                      |                |  |  |
| <ul> <li>Limited signage on Texas DOT Roads.</li> </ul>  |                           |                         |                |  |  |
| • Lack of turning lanes.   |                           |                         |                |  |  |
| • Roads that are narrow, steep, and winding.   |                           |                         |                |  |  |
| • Station notes that the greatest opportunity for new  | or improved alternativ    | e transportation inclu  | des paving     |  |  |
| Warbler Vista Road to the parking lot and buildin  | g left and right turn lan | es into the headquarte  | rs and         |  |  |
| Doeskin Ranch Public Use Area.   | 10 '1                     | NT '1 1 1               | T              |  |  |
| 22 Buffalo Lake NWR  | 10 miles                  | None available          | Low            |  |  |
| Major challenges and problems:   |                           |                         |                |  |  |
| Station sites funding shortsgas and at grade railes  | ad anossings as maion a   | hallon and the at and   | a mailmood     |  |  |
| • Station cites funding shortages and at-grade ratifo  | ad crossings as major c   | nallenges; the at-grad  | e ranroad      |  |  |
| The station notes that neuroment from Taxes Form   | to Market Dood 169 to     | handquarters is the r   | aost           |  |  |
| • The station notes that pavement from Texas Farm<br>significant transportation problem/need                   | -10-Market Koau 100 tt    | neauquarters is the h   | lost           |  |  |
| 23 Cadda Laka NWR  | 10 miles                  | More than 3 miles       | Low            |  |  |
| Karnack TX   | 19 miles                  | whole than 5 miles      | Low            |  |  |
| Major challenges and problems:   |                           |                         |                |  |  |
| • Station cites funding shortages and the lack of trai   | nsit as major challenges  |                         |                |  |  |
| <ul> <li>The station cites the lack of public transportation</li> </ul>  | as the most significant t | transportation problem  | n              |  |  |
| 24 Muleshoe NWR  | 72 miles                  | 100 miles               | Low            |  |  |
| Muleshoe. TX   | , 2 miles                 | 100 miles               | 2011           |  |  |
| Major challenges and problems:   |                           |                         |                |  |  |
| • Station cites funding shortages, staff capacity short  | rtages, distance from po  | pulation centers, con   | dition of      |  |  |
| existing transportation assets, and visitor orientati  | on to and within the sta  | tion as major challens  | ges.           |  |  |
| • Major safety issues include animal-vehicle collision   | ons, weather-related ha   | zards. and sight distar | ices.          |  |  |
| Impassability of dirt roads leading to headquarters  | and wildlife viewing a    | reas after rain and sno | ow are the     |  |  |
| most significant transportation problems.  | C                         |                         |                |  |  |
| • While refuge visitation has increased 300 percent  | over the past three year  | s, the surrounding are  | ea is rural so |  |  |
| transit potential may be limited.  | 1 V                       | C C                     |                |  |  |
| 26 McFaddin NWR  | 35 miles                  | Not available           | Low            |  |  |
| Sabine Pass, TX  |                           |                         |                |  |  |
| Major challenges and problems:   |                           |                         |                |  |  |
| Station cites lack of transit and distance from pop  | ulation centers as major  | challenges.             |                |  |  |
| 27 San Bernard NWR   | 15 miles                  | More than 3 miles       | Low            |  |  |
| Brazoria, TX   |                           |                         |                |  |  |
| Opportunities for future ATS:  |                           |                         |                |  |  |
| The refuge notes that alternative transportation co  | uld help during special   | events.                 |                |  |  |
| 29 Trinity River NWR   | 24 miles                  | More than 3 miles       | Low            |  |  |
| Liberty, TX  |                           |                         |                |  |  |
| Opportunities for future ATS:  |                           |                         |                |  |  |
| • The station is also planning for a new visitor center, and there may be opportunities to connect this center |                           |                         |                |  |  |
| by alternative transportation.   |                           |                         |                |  |  |

# Appendices

Include text of the ATS Questionnaire, informational materials distributed to refuges, or other relevant materials.

| REPORT DOCUMENTATION PAGE   |   |   |  | Form Approved<br>OMB No. 0704-0188                                      |  |
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