

**The Economic Effects of Okefenokee National Wildlife Refuge and its Partners
including Stephen C. Foster State Park, Okefenokee Swamp Park,
and Okefenokee Adventures**

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Executive Summary

This report provides a baseline economic analysis for Okefenokee National Wildlife Refuge (ONWR) and its partners including Stephen C. Foster State Park (SCFSP), Okefenokee Swamp Park and Okefenokee Adventures (OSP). All are located wholly or partially within the boundaries of ONWR. This report analyzes the economic effects of the following: recreational public use, commercial timber, budget expenditures, ecosystem services, and refuge revenue sharing payments.

Tables ES-1 through ES-5 summarize the economic effects of selected goods and services provided by the ONWR and its partners. A wide variety of environmental and ecosystem goods and services are provided; however, data limitations allow the quantification of only a small subset of these services. Table ES-1 shows recreation visitation and associated economic contributions; Table ES-2 summarizes ONWR timber sales and economic contributions; Table ES-3 shows ONWR budget expenditures and contributions; Table ES-4 shows SCFSP budget expenditures and contributions; Table ES-5 shows OSP budget expenditures and contributions and Table ES-6 summarizes the economic value of selected ecosystem services provided by the ONWR and its partners.

| ES-1. ONWR and its partners: Annual Average Recreation Expenditures and Associated Jobs, Job Income and Tax Revenue, 2017-2021 | | |
|---|------|----------------|
| Average Expenditures | Jobs | Job Income |
| \$39.2 million | 826 | \$17.5 million |

| ES-2. ONWR Timber Sales and Associated Jobs and Job Income: Annual Average 2010-2020 | | | |
|---|-------------|------|------------|
| Annual Harvest Average (Harvest Years) | Total Sales | Jobs | Job Income |
| 14,848 tons | \$189,100 | 9 | \$452,000 |

| ES-3. ONWR Labor and Non-Labor Budget Expenditures and Associated Jobs and Job Income: Annual Average 2016-2020 | | |
|--|------|------------|
| Budget Expenditures | Jobs | Job Income |
| \$4.8 mill | 80 | \$4.3 mill |

ES-4. SCFSP Labor and Non-Labor Budget Expenditures and Associated Jobs and Job Income: 2019

| Budget Expenditures | Jobs | Job Income |
|---------------------|------|------------|
| \$474,000 | 9 | \$494,000 |

ES-5. OSP Labor and Non-Labor Budget Expenditures and Associated Jobs and Job Income: Annual Average 2018-2021

| Budget Expenditures | Jobs | Job Income |
|---------------------|------|---------------|
| \$1.6 million | 31 | \$1.2 million |

ES-6. Estimated Economic Values for Selected Ecosystem Services on ONWR and its partners: Present Value at 3% Discount Rate with 100 year Time Horizon (2021 Dollars)

| Storm protection | | Water Quality | | Carbon Sequestration | | Total | |
|------------------|------------|---------------|------------|----------------------|------------|----------|------------|
| Per Acre | Region | Per Acre | Region | Per Acre | Region | Per Acre | Region |
| \$2,900 | \$1.1 bill | \$5,031 | \$1.9 bill | \$503 | \$188 mill | \$7,931 | \$3.2 bill |

Introduction

Background

The purpose of this report is to provide a baseline for ONWR and its partners' economic contributions within the Okefenokee Region (Region), where the Region includes the four-county area of Charlton, Clinch, and Ware Counties in Georgia and Baker County, Florida.

Okefenokee National Wildlife Refuge

ONWR was established in 1937 to preserve the unique qualities of the Okefenokee Swamp. Located in Charlton, Ware, and Clinch counties in Georgia and Baker County in Florida, the Okefenokee is the largest National Wildlife Refuge in the eastern U.S., and includes over 407,000 acres. ONWR has many designations including being a RAMSAR Wetland of International Importance, National Water Trail, National Recreation Trail, an Important Bird Area, and is a proposed World Heritage Site. There are also 383,000 acres of National Wilderness Area within the ONWR. The Okefenokee is considered the largest intact blackwater wetland in North America.

ONWR is made up of a variety of habitats, and includes over 40,000 acres of pine uplands that are managed for longleaf pine and the endangered red-cockaded woodpeckers around the swamp perimeter and on interior islands. Other habitats include open prairies, forested wetlands, scrub shrub, and open water (lakes).

Stephen C. Foster State Park

SCFSP is a 143-acre park located within ONWR and is also a primary entrance to the Okefenokee Swamp. The SCFSP is a certified dark sky park by the International Dark Sky Association. The SCFSP is managed through a long term lease agreement between the U.S. Fish and Wildlife Service and the Georgia Department of Natural Resources – State Parks and Historic Sites Division. This lease agreement allows for the management of a state park and state park buildings on federal lands. The SCFSP affords visitors very unique services including RV and tent camping as well as cabin rentals. These visitor services are very uncommon in the National Wildlife Refuge System and have proven to be very popular due to the park's remote location.

Okefenokee Swamp Park and Okefenokee Adventures

OSP was founded in 1946 as a non-profit dedicated to showcasing and conserving the wildlife, vast wilderness, waterways, and habitats of the Okefenokee Swamp. The OSP cares about the lands and waters on which the Okefenokee and surrounding communities depend. Their mission is to provide visitor access and interpretive education that inspires conservation advocacy for the Okefenokee Swamp with a long-term vision

to foster a world where the diversity of life thrives, and people act together to conserve nature for its ability to fulfill our needs and enrich our lives.

The OSP is a 501c-3 non-profit and partner to the U.S Department of the Interior through concession agreements with the USFWS and the state of Georgia through the 100-year lease agreement it currently manages with the Dixon Memorial State Forest. Both Okefenokee Swamp Park and Okefenokee Adventures provide unique opportunities for accessing the swamp and learning about its rich history.

Approach to Estimating Economic Effects

From an economic perspective, ONWR and its partners provide a variety of environmental and natural resource goods and services used by people either directly or indirectly. The use of these goods and services may result in economic effects to both local and state economies. The various services ONWR and its partners provide can be grouped into five broad categories: (1) Maintenance and conservation of environmental resources, services and ecological processes; (2) Production and protection of natural resources such as fish and wildlife; (3) Production and protection of cultural and historical sites and objects; (4) Provision of educational and research opportunities; and (5) Outdoor and wildlife-related recreation. People who use these services benefit in the sense that their individual welfare or satisfaction level increases with the use of a particular good or service. One measure of the magnitude of the change in welfare or satisfaction associated with using a particular good or service is *economic value*. Aside from the effect on the individual, use of the good or service usually entails spending money in some fashion. These expenditures, in turn, create a variety of economic effects collectively known as *economic contributions*. For this report, the term *economic effects* encompasses both economic value and economic contributions.

Economic value is the economic trade-off people would be willing to make in order to obtain some good or service. It is the maximum amount people would be willing to pay in order to obtain a particular good or service minus the actual cost of acquisition. In economic theory this is known as *net economic value* or *consumer surplus*. In the context of this report, estimates of the economic value of particular recreational activities are used to determine the aggregate value of recreational use of ONWR and its partners.

Economic contributions refer to employment, employment or labor earnings, economic output and federal, local, county and state tax revenue that occur as the result of the ONWR's and its partners' activities. *Economic output* includes three types of effects: direct, indirect and induced effects. "Indirect effects result from changes in sales for suppliers to the directly-affected businesses (including trade and services at the retail, wholesale and producer levels. Induced effects are associated with further shifts in spending on food, clothing, shelter and other consumer goods and services, as a consequence of the change in workers and payroll of directly and indirectly affected businesses" (Weisbrod and Weisbrod p.11, 1997). The indirect and induced effects represent any multiplier effects due to the loss of revenue. These cost estimates include the various potential scenarios that were considered. Both job income and tax revenue

are derived from total economic output (aggregate sales). For example, labor costs are paid out of total sales revenue for a company as are taxes. To add taxes and job income to output would double-count economic impacts.

Economic output is explained above. *Jobs* and *job income* include direct, indirect and induced effects in a manner similar to economic output. Employment includes both full and part-time jobs, with a job defined as one person working for at least part of the calendar year, whether one day or the entire year. *Tax revenues*¹ are shown for business taxes, income taxes, and a variety of taxes at the local, state and national level. Like output, employment, and income, tax impacts include direct, indirect and induced tax effects.

For this report, the following economic effects are addressed: (1) contributions associated with annual consumer expenditures on recreation and value associated with recreation; (2) contributions associated with budget expenditures; (3) contributions associated with ONWR timber harvests; and (4) effects associated with selected ecosystem services, and (5) ONWR revenue sharing payments. (For more information about estimating economic impacts, refer to Appendix 1.)

This report provides a comprehensive economic profile (baseline) of ONWR and its partners and estimates of the economic effects associated with the use of Okefenokee-produced goods and services. For those goods and services having nebulous or non-existent links to the marketplace, economic effects are more difficult or perhaps even impossible to estimate. Some of the major contributions of the ONWR and its partners to the natural environment, such as watershed protection, maintenance and stabilization of ecological processes, and the enhancement of biodiversity would require extensive on-site knowledge of biological, ecological and physical processes and interrelationships even to begin to formulate economic benefit estimates. This report estimates a selection of ecosystem services but others are beyond the scope of this report.

This report focuses on a limited subset of goods and services, primarily those directly linked in some fashion to the marketplace, such as recreation use, budget expenditures, and timber sales. It should be kept in mind that the emphasis on these particular market-oriented goods and services should not be interpreted to imply that these types of goods and services are somehow more important or of greater value (economic or otherwise) than the non-market goods and services previously discussed.

Structure of this Report

The remainder of this report is structured as follows:

- **Recreational Activities**

¹ The overall tax rate is about 13.7 percent of economic output and includes direct, indirect and induced tax effects nationwide. The tax rate is calculated within the economic modeling software used to estimate economic impacts.

- **Timber Harvests**
- **Budget Expenditures**
- **Ecosystem Services**
- **Refuge Revenue Sharing Payments**

Recreational Activities

ONWR and its partners offer a wide variety of recreational activities, which are all located wholly or partially within the boundaries of ONWR. ONWR has 3 primary entrances and 2 secondary entrances for visitor access. There are multiple onsite partners who aid in the daily visitor services that are conducted on ONWR. At the Main Entrance to ONWR, located near Folkston GA, Okefenokee Adventures is the on-site concessionaire that provides interpretive boat tours, canoe/kayak rentals, a sales operation, and a food service. The Okefenokee Swamp Park, located near Waycross GA, operates under a concession agreement with ONWR and a lease agreement from the state of Georgia. This entrance offers boat tours, a train ride, educational programs, and live animal exhibits. SCFSP, located near Fargo GA, operates under a long-term lease agreement with ONWR and offers camping, boat tours, boat rentals, canoe/kayak rentals, and educational programs. SCFSP is a designated International Dark Sky Park and attracts visitation for night sky programs and stargazing. ONWR offers visitors nearly 120-miles of water trails in the Wilderness Trail System with day-use and overnight camping opportunities administered through a permit system. Additional visitor opportunities include: Richard S. Bolt Visitor Center, Swamp Island Drive (7.2 mile long auto tour route), Chesser Island Homestead, and the Chesser Island Boardwalk. Hunting and fishing opportunities are available in multiple locations throughout ONWR.

A growing visitor presence in the Region can be expected in the future. Many of the public use opportunities currently provided are very popular and are forecasted to attract increasing amounts of participants in the coming years due to population growth and increased demand for outdoor recreation. Sightseeing and National/State parks are a major draw for Georgia travelers, rating 5th and 6th in the top reasons to visit the State ahead of museums and the beach (DK Shifflet 2018).

Recreational Activities

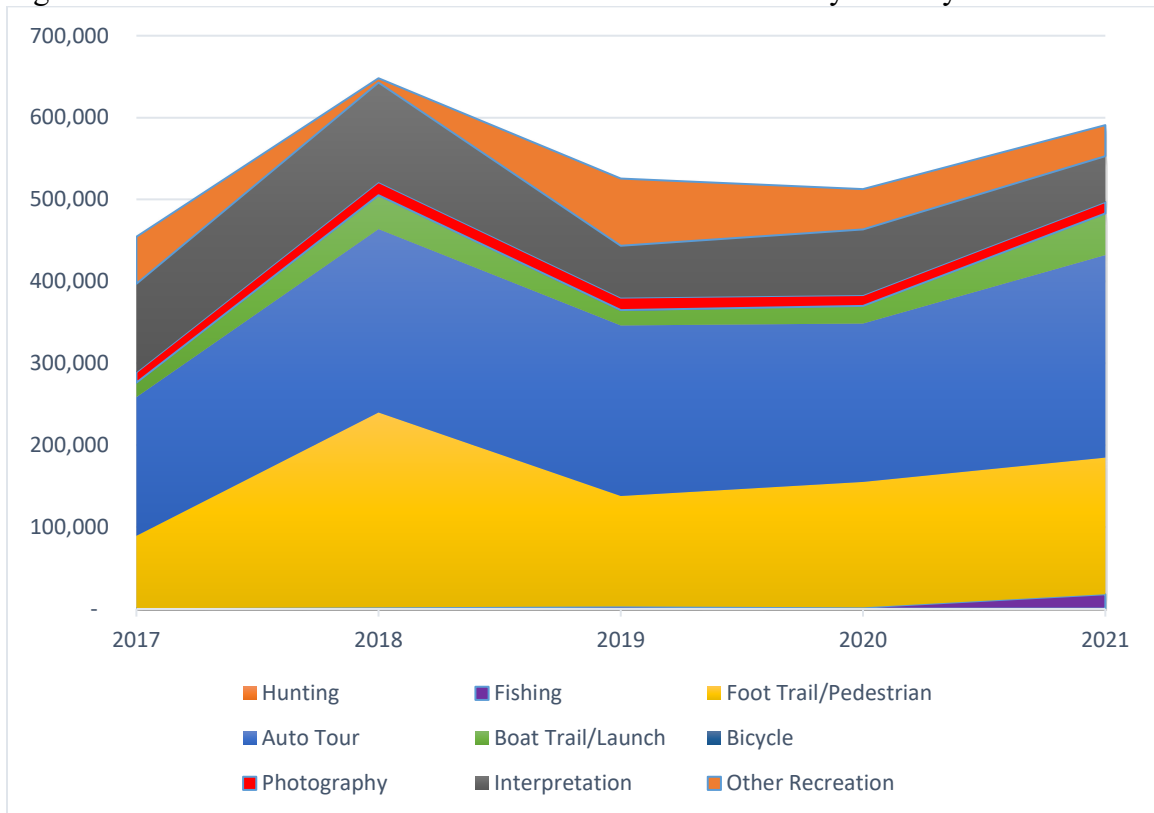
Recreational activities are maintained in the Service's database "Refuge Annual Performance Plan" (RAPP) (U.S. Department of Interior, 2017-2021). ONWR staff along with their partners estimate the number of visitors² and each visitor's visits³ for each activity. This paper uses both terms to distinguish between (1) the number of people (visitors) at ONWR and its partners and (2) the number of individual activities (visits) that each person participates in. The RAPP data sums both visitors and visits for ONWR and its partners

² A visitor is someone who comes to ONWR or its partners and participates in one or more of the activities available.

³ Visits are not the same as visitors. One visitor could be responsible for several visits (activities). For example, if a family of four went fishing in the morning and hiked a short nature trail in the afternoon, they would have contributed eight activity visits to the refuge; yet, they are only four visitors.

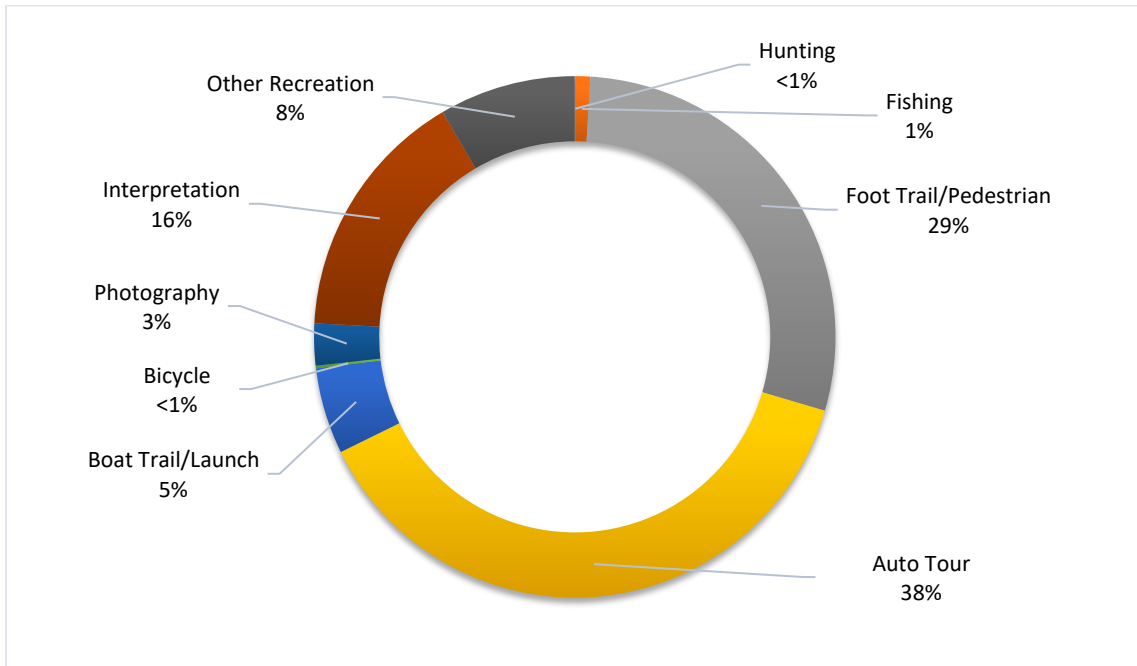
Figure 1 shows the 5-year visit trend (2017-2021) for the ONWR and its partners. There is a dip in the number of visits to 454,000 in 2017 owing to long duration drought and ONWR closure due to the West Mims Fire and another dip in visitation to about 513,000 visits in 2020 due to the Pandemic. In 2021, visitation increased to 592,000 visits due to the demand for more outdoor recreation. Over the past 5 years, visitation averaged about 547,000 visits annually.

Figure 1. ONWR and its Partners: Annual Recreational Visits by Activity 2017-2021



The distribution of activities for ONWR and its partners is depicted in Figure 2. Nearly all recreation visitors participated in a variety of non-consumptive activities such as hiking, boating, and photography. Less than 1 percent of visits comprised hunting and fishing combined. Visitors came to the area to partake in recreational opportunities, educational and interpretation programs.

Figure 2. ONWR and its Partners: Average Annual Recreational Visits by Activity 2017-2021

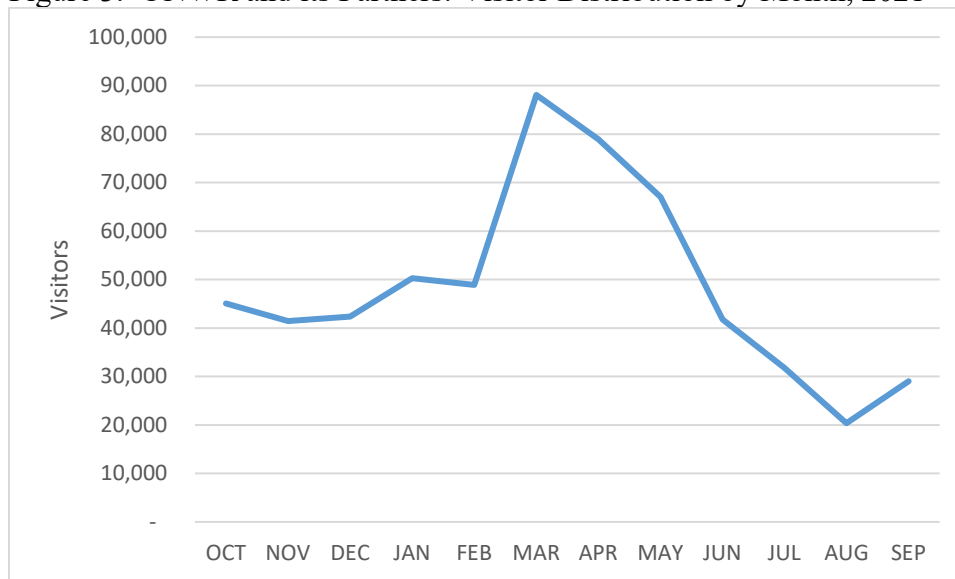


Source: RAPP 2017-2021.

Visitors are distributed across ONWR and its partners. In 2021, SCFSP comprised 49 percent of visitors, followed by ONWR (44 percent), and OSP (7 percent). The variety of activities offered by the organizations attributes to some of this difference in visitor distribution. For example, SCFSP offers boat tours, rental boats and canoes, picnic shelters, and overnight lodging including cottages and campsites while OSP offers guided interpretive tours with professional naturalists and guides. ONWR offers an auto tour route along Swamp Island Drive along with hiking trails, boat rentals, and the ONWR Visitor Center.

Visitors are also distributed by season. Figure 3 shows the distribution of visitors by month to the ONWR and its partners. Forty percent of visitors arrive in during the spring months of March, April, and May.

Figure 3. ONWR and its Partners: Visitor Distribution by Month, 2021



Recreational Visitor-Related Expenditures

This study combines RAPP data along with the onsite visitor use survey conducted by Dietsch et al (2019)⁴. The Dietsch survey was administered for two 14-day sampling periods between March 2018 and February 2019 with a response rate of 54 percent and 195 completed surveys. Visitors were asked “*Do you live in the local area (within 50 miles of this refuge)?*” and “*How much time did you spend at this refuge during your most recent visit?*” With this survey data, visitors were categorized as “Residents” and “Non-Residents.” Results showed that 23 percent of visitors were from the local area while 77 percent traveled more than 50 miles.

Expenditure patterns used in this report were also obtained from onsite visitor use survey conducted by Dietsch et al (2019)⁵. Visitors were asked to “*Record the amount of money that you and other members of your group spent in the local 50-mile area during your most recent visit to this refuge.*” Survey respondents estimated their expenditures for trip-related items such as lodging (e.g., hotel, camping), food (e.g., restaurants and groceries), transportation (e.g., gasoline and local transportation), and other miscellaneous expenses (e.g., guides, equipment rental, and souvenirs). After converting the group expenditures to account for the number of people in the group and the length of stay, the average trip expenditures per day per person were estimated for both local visitors and non-local visitors. Visitor recreation expenditures for 2019 are shown in Table 1.

⁴ Past economic contribution analyses by the Service merged RAPP data with Refuge staff’s estimates for the distribution of residents and non-residents and the duration of each visit. Thus, this report’s results are not comparable to previous reports such as Banking on Nature.

⁵ Past economic contribution analyses by the Service utilized regional, activity-specific expenditure patterns from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Thus, this report’s results are not comparable to previous reports such as Banking on Nature.

As noted earlier, ONWR and its partners offer different recreational visitor activities which most likely have different expenditure patterns. Due to data availability, the expenditure data derived from the Dietsch et al (2019) were applied to all visitors to ONWR and its partners.

Table 1. Average Individual Daily Expenditures

| Category | Local Visitors | Non-Local Visitors |
|----------------------|-----------------------|---------------------------|
| Lodging ¹ | \$11 | \$25 |
| Food/Drink | \$22 | \$16 |
| Transportation | \$16 | \$9 |
| Retail | \$20 | \$11 |
| Other Miscellaneous | \$9 | \$7 |
| Total | \$78 | \$68 |

Source: Dietsch et al, 2019.

¹While it is more likely for non-local visitors to pay for lodging, visitors from the local area may also choose to extend their stays overnight.

Economic Contributions from Recreational Visits

Two types of information are needed to estimate the economic contributions⁶ of recreational visits: (1) the amount of recreational use; and (2) expenditures associated with recreational visitors. With these data, total expenditures for each activity can be estimated. These expenditures, in turn, can be used in conjunction with regional economic models to estimate industrial output, employment, employment income and tax impacts associated with these expenditures.

Input-output models were used to determine the economic contributions of expenditures on the local areas. Local effects are defined as contributions occurring within the four-county area of Charlton, Clinch, and Ware Counties in Georgia and Baker County, Florida. It is assumed that visitor expenditures occur primarily within these counties.

From 2017 to 2021, the average annual expenditures associated with recreational visitors to ONWR and its partners totaled \$39.2 million. Table 3 shows the average annual economic contributions associated with recreation expenditures inclusive of ONWR and its partners. Economic output averaged approximately \$53.1 million with associated employment of 826 jobs, \$17.5 million in employment income and \$4.5 million in total local, state and Federal tax revenue (Table 2).

⁶ See Appendix 1 for more information regarding the measurement of economic contributions.

Table 2. ONWR and its Partners: Local Average Annual Economic Contributions Associated with Recreational Visitors (2017-2021) (2020 dollars in thousands)

| | Residents | Non-Residents | Total |
|---|------------------|----------------------|--------------|
| Economic Output | \$13,643.3 | \$39,445.1 | \$53,088.4 |
| Jobs | 204 | 622 | 826 |
| Job Income | \$4,654.1 | \$12,851.6 | \$17,505.7 |
| Value Added | \$7,173.2 | \$20,155.0 | \$27,328.2 |
| Total Local, State and Federal Tax Revenue | \$1,117.0 | \$3,415.9 | \$4,532.9 |

Table 3 shows the distribution of the average annual contribution by organization. As noted in the previous section, expenditure profiles are only available for ONWR visitors and were applied to ONWR’s partners. Thus, distribution of the economic contribution is based on the percentage of visitors at each organization.

Table 3. Local Average Annual Economic Contribution by Organization, (2017-2021) (2020 dollars in thousands)

| | Okefenokee Refuge | Stephen C. Foster State Park | Okefenokee Swamp and Okefenokee Adventures |
|---|--------------------------|-------------------------------------|---|
| Economic Output | \$23,266.9 | \$26,224.2 | \$3,597.3 |
| Jobs | 362 | 408 | 56 |
| Job Income | \$7,672.2 | \$8,647.3 | \$1,186.2 |
| Value Added | \$11,977.1 | \$13,499.4 | \$1,851.8 |
| Total Local, State and Federal Tax Revenue | \$1,986.6 | \$2,239.1 | \$307.2 |

ONWR and its partners’ economic contribution associated with recreational visitors varies each year. For example, the number of visitors in 2020 is 9 percent lower than the 5-year average and 21 percent lower than the high in 2018. Thus, economic contributions derived from recreational visitors can vary depending on drought, fires, and the pandemic.

The economic contributions from recreation expenditures estimated in this report are gross area-wide impacts. Information on where expenditures may occur locally and the magnitude and location of resident and non-resident expenditures (resident and non-resident relative to the geographical area of interest) is not currently available. Generally speaking, non-resident expenditures bring outside money into the area and thus generate

increases in real income or wealth. Spending by residents is simply a transfer of expenditures on one set of goods and services to a different set within the same area. In order to calculate net economic contributions within a given area derived from resident expenditures, much more detailed information would be necessary on expenditure patterns and visitor characteristics. Since this information is not currently available, the gross area-wide estimates are used as an upper-bound for the net economic contributions of total resident and non-resident spending in the four county area. The economic contribution of non-resident spending in Table 2 represents a real increase in wealth and income for the area (for additional information, see Loomis p. 191).

Economic Benefit of Recreational Visitation

Consumer surplus estimates were derived from the ONWR survey conducted by Dietsch et al (2019). The survey asked, “*As you know, costs of travel such as gasoline, hotels, and public transportation often increase. If your total trip costs were to increase, what is the maximum extra amount you would pay and still visit this refuge?*” Respondents were allotted 16 choices ranging from \$0 to \$770, resulting in an average consumer surplus estimate of \$76 per day for resident visitors and \$96 for nonresident visitors (2020\$). Based on the average annual visitation of approximately 557,000 visitors (2017-2021), the annual benefit to ONWR visitors totaled approximately \$51 million. Economic benefits derived by recreational visitors can vary depending on drought, fires, and the pandemic. The economic benefits associated with recreation are inclusive of ONWR and its partners.

Table 4. ONWR and its Partners: Economic Benefit of Recreational Visitation (2020\$)

| | Visitors | Benefit per Day | Annual Benefit |
|---------------|-----------------|------------------------|-----------------------|
| Residents | 128,157 | \$76 | \$9,775,000 |
| Non-Residents | 429,047 | \$96 | \$41,126,000 |

Forest Management

Timber Harvests and Economic Contributions

ONWR manages its existing boundary to promote healthy habitat and aid in the support of target species. All harvested timber is pine. From 2010 to 2019, annual timber harvests ranged from zero tons to over 22,000 tons (Table 5).

Table 5. ONWR: Timber Harvest and Sales (2020 dollars in thousands)

| Year | Tons | Cords | Total Sales |
|--|-------------|--------------|--------------------|
| 2010 | 966 | 351 | \$11.8 |
| 2011 | 25,179 | 9,156 | \$200.3 |
| 2012 | 17,953 | 6,528 | \$96.4 |
| 2013 | - | - | - |
| 2014 | - | - | - |
| 2015 | 7,917 | 2,879 | \$71.8 |
| 2016 | 20,738 | 7,541 | \$514.9 |
| 2017 | 22,363 | 8,132 | \$386.7 |
| 2018 | 8,821 | 3,208 | \$41.9 |
| 2019 | - | - | - |
| 10 Year Total | 103,938 | 37,795 | \$1,323.8 |
| Annual Average | 10,394 | 3,780 | \$132.4 |
| Annual Average in Years with Harvests | 14,848 | 5,399 | \$189.1 |

Source: Okefenokee NWR, pers. communication 2020

Timber harvests have distinct impacts on Georgia's economy. This report focuses on the economic impacts generated by logging, hauling, processing the logs, and processing the residuals. The impacts at the logging and primary processing sectors differ between ONWR-harvested timber and commercially-harvested timber. First, the ONWR would thin timber stands, which would thereby be more labor intensive than commercial clearcutting. As a result, a greater number of jobs would be generated for every thousand board feet harvested compared to commercial clearcutting. About 25 percent more jobs are generated for thinning compared to clearcutting (Lippke and Mason 2005). Second, the impacts at the primary processing level (i.e., sawmills) for logs harvested on commercially-owned land differ from the impacts for logs harvested on federally-owned land because federal timber cannot be exported. Due to the strong export market, about 50 percent of commercial timber volume is currently exported (Lecture, May 2011). As a result, 50 percent of commercial timber is not processed in local mills and does not generate additional jobs or tax revenue beyond the amount generated by the actual felling.

The economic contributions associated with timber were derived using timber response coefficients⁷ for the Southeast States (2017). Thus, the economic contributions depicted below would not be localized in the local 4 county area. Instead, the impacts would occur throughout the southeast. As noted above, the economic contributions presented include Region-wide contributions associated with logging, hauling, processing the logs, and processing any residuals. Average annual timber harvested at ONWR would contribute to 9 jobs and \$452,000 in job income annually (Table 6).

Table 6. ONWR: Economic Contribution of Timber Harvest – Average Annual for Years with Harvests (2020\$)

| | Annual Average |
|---------------------------------|-----------------------|
| Timber Harvested (cords) | 5,399 |
| Jobs | 9 |
| Job Income | \$452,000 |

ONWR manages the land for not only timber but for ecological benefits as well. Forests offer not only timber value but also many non-timber benefits such as wildlife habitat, recreational opportunities, nutrient cycling, and flood control. While these nonmarket ecosystem services are difficult to quantify, some of these effects are represented in other sections of the report.

⁷ *Response coefficients* estimate the effect on the economy for a change in the amount of timber harvested.

Budget Expenditures

Budget expenditures contribute to a number of economic contributions in areas where these expenditures occur. These expenditures can be classified as either labor (employee salaries) or non-labor expenditures (those goods and services which keep ONWR and its partners operating). These effects, or contributions, consist of: 1) the expenditures themselves; 2) the total economic activity associated with these expenditures, or economic output; 3) the total employment associated with the economic output; 4) total employment income associated with these jobs; 5) local, state and federal taxes generated by the budget expenditures.

This section presents budget expenditures and their economic contributions for ONWR and its partners. Due to data availability, the ONWR budget is an annual average for 2016-2020, the SCFSP budget is 2019 expenditures, and the OSP budget is an annual average for 2018-2021. Fiscal years may vary between the ONWR and its partners but this does not have a measurable impact on the results. All expenditures are in 2021 dollars.

Okefenokee National Wildlife Refuge Budget Expenditures and Associated Economic Contributions

ONWR budget expenditures consist of labor and non-labor expenditures. Table 7 shows the annual average labor and non-labor budget expenditures from 2016 to 2020.

Table 7. ONWR Budget Expenditures by Type: Annual Average 2016-2020.

| Non-Labor Expenditures | Counties | Within State | Outside State | Total |
|----------------------------------|------------------|---------------------|----------------------|--------------------|
| Travel | \$23,317 | \$6,520 | \$66,557 | \$96,394 |
| Utilities | \$15,133 | \$34,799 | \$64,307 | \$114,239 |
| Printing | \$0 | \$0 | \$6,976 | \$6,976 |
| Contracts | \$147,127 | \$3,954 | \$1,611,162 | \$1,762,243 |
| Facilities operation maintenance | \$5,569 | \$3,498 | \$28,879 | \$37,946 |
| Equipment operation maintenance | \$42,565 | \$5,096 | \$23,882 | \$71,542 |
| Supplies and materials | \$104,339 | \$5,054 | \$141,154 | \$250,548 |
| Asset procurement | \$10,912 | \$9,517 | \$298,279 | \$318,709 |
| Land and structures | \$0 | \$70,985 | \$10,641 | \$81,626 |
| Agreements | \$255 | \$0 | \$180,514 | \$180,768 |
| Total Non-Labor | \$349,218 | \$139,422 | \$2,432,351 | \$2,920,990 |

| | | | | |
|---------------------------|--|--|--|--------------------|
| Labor Expenditures | | | | \$1,871,300 |
| Total Expenditures | | | | \$4,792,290 |

Counties: Charlton, Clinch, Ware Counties GA. State: Within Georgia but outside the three counties. Out-of-state: Expenditures outside of Georgia

Tables 8 and 9 show the economic contribution estimates of ONWR budget expenditures. Table 8 shows the national impact of ONWR labor expenditures. Since specific information is not available to partition out labor expenditures to different areas or regions, a national focus is used. Table 9 shows the economic contributions of non-labor budget expenditures.

Table 8. Economic Contribution of ONWR Budget Expenditures (Labor): Annual Average 2016 – 2020 (dollars in thousands)

| Area | Expenditures | Output | Employment | Income | State and Local Taxes | Federal Taxes |
|------|--------------|-----------|------------|-----------|-----------------------|---------------|
| U.S. | \$1,871.3 | \$3,852.6 | 22 | \$1,196.2 | \$195.8 | \$304.2 |

Table 9. Economic Contribution of ONWR Budget Expenditures (Non-Labor): Annual Average 2016 - 2020 (dollars in thousands)

| Area | Expenditures | Output | Employment | Income | State and Local Taxes | Federal Taxes |
|---------------|------------------|------------------|------------|------------------|-----------------------|----------------|
| Counties | \$349.2 | \$470.6 | 8 | \$160.1 | \$29.6 | \$33.2 |
| State | \$139.4 | \$203.4 | 2 | \$71.0 | \$5.7 | \$12.8 |
| Out-of-state | \$2,432.3 | \$5,979.9 | 48 | \$2,820.3 | \$289.0 | \$648.8 |
| Total* | \$2,920.9 | \$6,653.8 | 58 | \$3,051.4 | \$324.2 | \$694.8 |

Totals may not sum due to rounding.

Stephen C. Foster State Park Budget Expenditures and Associated Economic Contribution Estimates

SCFSP budget expenditures consist of labor and non-labor expenditures. Table 10 shows the annual average labor and non-labor budget expenditures for 2019. A few assumptions apply to this budget analysis section. Since specific information is not available to partition out labor expenditures to different areas or regions, a national focus is used. Also, only total budget expenditures for 2019 were available so SCFSP's 2010 labor/non-labor ratio (66%/33%) was applied. Furthermore, ONWR estimates for the distribution of where non-labor budget expenses occurred were applied for SCFSP.

Table 10. SCFSP Budget Expenditures by Type: 2019 (dollars in thousands)

| | Counties | Within State | Outside State | Total |
|-------------------------------|----------|--------------|---------------|---------|
| Non-Labor Expenditures | \$56.7 | \$22.6 | \$393.8 | \$474.3 |
| Labor Expenditures | | | | \$303.9 |
| Total Expenditures | | | | \$778.2 |

Source: Stephen C. Foster State Park Annual Report 2019.

Counties: Charlton, Clinch, Ware Counties GA. State: Within Georgia but outside the three counties. Out-of-state: Expenditures outside of Georgia.

Totals may not sum due to rounding.

Tables 11 and 12 show the economic contribution estimates of SCFSP budget expenditures. Table 11 shows the national impact of ONWR labor expenditures. Table 12 shows the economic contributions of non-labor budget expenditures.

Table 11. Economic Contribution of SCFSP Budget Expenditures (Labor): 2019 (dollars in thousands)

| Area | Expenditures | Output | Employment | Income | State and Local Taxes | Federal Taxes |
|------|--------------|---------|------------|---------|-----------------------|---------------|
| U.S. | \$303.9 | \$625.6 | 4 | \$194.3 | \$31.8 | \$49.4 |

Table 12. Economic Contribution of SCFSP Budget Expenditures (Non-Labor): 2019 (dollars in thousands)

| Area | Expenditures | Output | Employment | Income | State and Local Taxes | Federal Taxes |
|---------------|--------------|-----------|------------|---------|-----------------------|---------------|
| Counties | \$56.7 | \$76.4 | 1 | \$26.0 | \$4.8 | \$5.4 |
| State | \$22.6 | \$33.0 | <1 | \$11.5 | \$1.0 | \$2.1 |
| Out-of-state | \$393.8 | \$968.1 | 8 | \$456.6 | \$46.8 | \$105.0 |
| Total* | \$474.3 | \$1,077.5 | 9 | \$494.1 | \$52.5 | \$112.5 |

*Totals may not sum due to rounding.

Okefenokee Swamp Park and Okefenokee Adventures (OSP) Budget Expenditures and Associated Economic Contribution Estimates

ONWR has an extensive partnership with the Okefenokee Swamp Park and Adventures (OSP) complex. As with the ONWR budget expenditures, OSP budget expenditures also contribute to local, state and national economies. Since Okefenokee Swamp acquired Okefenokee Adventures in 2020, OSP expects budget expenditures to continue to increase in the upcoming years. Table 13 summarizes annual average budget expenditures based on the four-year period from 2018 to 2021. Labor, including benefits and other staffing costs, averages \$990,500 annually while operating expenses average \$628,800.

Table 13. Budget Expenditures for Okefenokee Swamp Park and Adventures: Four-year Annual Average (2018 – 2021)

| Non-Labor Expenditures (Operating Expenses) | |
|--|--------------------|
| Facility Maintenance | \$25,385 |
| Utilities | \$79,146 |
| Supplies | \$22,767 |
| Postage | \$2,092 |
| Equipment Maintenance | \$17,546 |
| Sign Rent | \$9,371 |
| Other (1) | \$472,473 |
| Total Operating Expenses | \$628,780 |
| Labor, Benefits, Staffing Expenditures | \$990,519 |
| Total Annual Average Expenditures | \$1,619,299 |

(1) Includes University of Georgia, taxes and fees, insurance, promotions, gift shop, Center for Okefenokee Studies, other expenses not listed above.

Source: personal communication, Kim Bednarek, Okefenokee Swamp Park and Okefenokee Adventures, March 4, 2022.

Table 14 shows the national economic contributions of OSP budget expenditures. These contributions include local, state and out-of-state economic contributions from OSP budget expenditures. Annual expenditures averaged approximately \$1,619,300 resulting in 31 associated jobs with an income of \$1,199,100 and economic output of \$3,931,300. Total local, state and federal tax revenue amounted to \$425,100.

Table 14. National Economic Contribution of Okefenokee Swamp Park and Okefenokee Adventures Budget Expenditures: Four-year Annual Average (2018 – 2021) (dollars in thousands)

| Expenditure | Expenditure | Jobs | Job Income | Output | State and local tax revenue | Federal tax revenue |
|--------------------|--------------------|-------------|-----------------------|------------------|--|------------------------------------|
| Non-Labor | \$628.8 | 12 | \$542.4 | \$1,617.2 | \$122.7 | \$138.7 |
| Labor | \$990.5 | 19 | \$656.7 | \$2,314.0 | \$93.7 | \$286.4 |
| Total | \$1,619.3 | 31 | \$1,199.1 | \$3,931.3 | \$216.4 | \$425.1 |

Ecosystem Services

ONWR and its partners provide a range of biological and ecological services which in turn are used directly or indirectly by people. Table 15 shows a number of examples of ecosystem services in four categories (Millennium Ecosystem Assessment, 2005): (1) provisioning services – products obtained from the natural ecosystem; (2) regulating services – benefits obtained from regulation of ecosystem processes; (3) cultural services – non-material benefits that contribute to wider needs and desires of society; and (4) supporting services – necessary for the production of all other ecosystem services. A study by the University of Georgia (Patton et al., 2012) in collaboration with the FWS Head Quarters Division of Refuges and Division of Economics, looked at a subset of these services, including water quality provisioning, storm protection and carbon sequestration. The ONWR impacts water quality as low nutrient water from the ONWR dilutes nutrient loads from agricultural sources decreasing impacts to the relatively dense populations downstream (Patton et al., 2012, p. 29). Storm protection benefits arise from seasonal rains being impounded by the Okefenokee Swamp that might otherwise contribute to downstream flooding (Bergstrom et al. p.30). Carbon sequestration on the ONWR is significant due to the amount of peat and forested wetlands on the ONWR (Patton et al.,2012, p. 30).

Table 15. Examples of Ecosystem Services

| Provisioning Services | Cultural Services |
|-----------------------------------|----------------------------------|
| Food, | Aesthetic values |
| Fuel, wood, fiber | Religious and spiritual values |
| Medicinal plants, pharmaceuticals | Educational |
| Genetic resources | Recreation and tourism |
| Ornamental resources | |
| Regulating Services: | Supporting Services |
| Climate regulation | Nutrient cycling |
| Flood control | Primary production |
| Water regulation and purification | Soil formation |
| Bioremediation of wastes | Water cycling |
| Pollination | Provision of habitat |
| | Production of atmospheric oxygen |

Source: Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. p. vi.

Table 16 and Table 17 summarize the economic value (adjusted for inflation to 2021 dollars) estimates for selected ecosystem services on ONWR annually and for the present value of these services discounted over a 100-year time horizon at 3% (see Patton et al., 2012 for methodology). Table 13 shows the annual value of storm protection at \$35 million, water quality at \$58 million for a total of \$93 million annually for storm protection and water quality. Table 14 shows the present value of storm protection, water quality and carbon sequestration provided by ONWR using 2010 conditions over a 100-year time horizon at \$3.2 billion. These ecosystem services are accrued for ONWR and its partners because all entities are within the ONWR boundary.

Table 16. ONWR and its Partners: Estimated Economic Values per Year for Selected Ecosystem Services (2021 Dollars)

| Storm protection | | Water Quality | | Total | |
|------------------|-----------|---------------|-----------|----------|-----------|
| Per Acre | Total | Per Acre | Total | Per Acre | Total |
| \$94 | \$35 mill | \$154 | \$58 mill | \$248 | \$93 mill |

Source: Patton et al., 2012

Table 17. ONWR and its Partners: Estimated Economic Values for Selected Ecosystem Services: Present Value at 3% Discount Rate with 100 year Time Horizon (2021 Dollars)

| Storm protection | | Water Quality | | Carbon Sequestration | | Total | |
|------------------|-----------|---------------|------------|----------------------|------------|----------|------------|
| Per Acre | Total | Per Acre | Total | Per Acre | Total | Per Acre | Total |
| \$2,900 | \$1.1bill | \$5,031 | \$1.9 bill | \$503 | \$188 mill | \$7,931 | \$3.2 bill |

Source: Patton et al., 2012

Refuge Revenue Sharing Payments

The Refuge Revenue Sharing Act (16 U.S.C. 715s) requires the FWS to make payments to counties and local governments to account for land administered by the FWS which has been taken off the tax rolls. For purchased and donated land, the Refuge Revenue Sharing Act, as amended, requires that FWS payments to counties and other units of local government be based on the greater of: (a) 3/4 of 1 percent of the market value; (b) 25 percent of the net receipts from, for example, timber harvesting, grazing fees and cattle production, and crop harvests; (c) 75 cents per acre. In contrast, for public domain land that was never on the tax rolls, the Refuge Revenue Sharing Act requires the FWS to pay counties and other units of local government 25 percent of the net receipts collected on those lands (<https://www.fws.gov/program/land-acquisition-and-realty/revenue-sharing>).

Table 18 below shows refuge revenue sharing payments to the four counties within ONWR boundaries. Payments totaled \$258,193 in FY 2021, with over 80 percent of the total going to Charlton County in Georgia. Due to the size of the payments, the IMPLAN model was not applied for refuge revenue sharing payments.

Table 18. Refuge Revenue Sharing Payments to Counties within ONWR FY 2021

| County | Payment |
|--------------|------------------|
| Charlton GA | \$210,221 |
| Clinch GA | \$38,776 |
| Ware GA | \$5,089 |
| Baker FL | \$4,107 |
| Total | \$258,193 |

Source: **National Wildlife Refuge Fund (Refuge Revenue Sharing) FY 2021 Payments for FY 2020 by State and Local Government.** USFWS Division of Realty, Washington DC. 2022.

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Appendix 1 – Measuring Economic Contributions

Spending associated with ONWR and its partners' activities can generate a substantial amount of economic activity in local and regional economies. For example, visitors spend money on a wide variety of goods and services. Trip-related expenditures may include expenses for food, lodging and transportation. Because this spending directly affects towns and communities where these purchases are made, recreational visitation can have a significant impact on local economies, especially in small towns and rural areas. These direct expenditures are only part of the total picture, however. Businesses and industries that supply the local retailers where the purchases are made also benefit from recreation spending. For example, a family may decide to purchase binoculars for an upcoming vacation. Part of the total purchase price will go to the local retailer, say a sporting goods store. The sporting goods store in turn pays a wholesaler who in turn pays the manufacturer of the binoculars. The manufacturer then spends a portion of this income to cover manufacturing expenses. In this fashion, each dollar of local retail expenditures can affect a variety of businesses at the local, regional and national level. Consequently, consumer spending associated with recreation at ONWR and its partners can have a significant impact on economic activity, employment, household earnings and local, state and Federal tax revenue.

Similarly, timber sales also generate a substantial amount of economic activity. For example, timber may be harvested, hauled to the mill, processed as lumber, and then processed as furniture. Furthermore, processing residuals may be processed into paper. Each step in production can contribute to economic activity, employment, income, and tax revenue.

To estimate the total economic activity, employment, employment income and federal and state taxes generated by ONWR and its partners' activities, this report uses IMPLAN⁸, a regional input-output model and software system. The following is a list of terms and definitions that are commonly used in economic impact analysis (Minnesota IMPLAN Group, Inc. 2004 and Miller and Blair 1985).

Expenditures shows the estimated expenditures/revenue due to ONWR and its partners' visitors, ONWR and its partners' budget expenditures, or ONWR timber revenue.

Economic output (aggregated sales) shows the total industrial output associated with the estimated expenditures such as recreation or budget expenditures. Total output is the production value (alternatively, the value of all sales plus or minus inventory) of all output generated by an activity. Total output includes the direct, indirect and induced effects of visitor expenditures, budget, or timber sales.

⁸ "IMPLAN...was originally developed by the USDA Forest Service in cooperation with the Federal Emergency Management Agency and the USDOJ Bureau of Land Management to assist the Forest Service in land and resource management planning." (Minnesota IMPLAN Group, Inc. 2004). First developed in 1979, IMPLAN data and software was privatized in 1993 by the Minnesota IMPLAN Group, Inc. For additional information, see www.implan.com. For additional information on input-output modeling, see Miller and Blair *Input-Output Analysis*.

Direct effects are simply the initial effects or impacts of spending money; for example, spending money in a sporting goods store for binoculars. The purchase of the binoculars by the sporting goods store from a wholesaler would be examples of an indirect effect. Finally, induced effects refer to the changes in production associated with changes in household income (and spending) caused by changes in employment related to both direct and indirect effects. More simply, people who are employed by the retailer, by the wholesaler, and by the manufacturer of binoculars spend their income on various goods and services which in turn generate a given level of output. The dollar value of this output is the induced effect of the initial binocular purchase.

Jobs and job income include direct, indirect and induced effects in a manner similar to total industrial output. Employment includes both full and part-time jobs, with a job defined as one person working for at least part of the calendar year, whether one day or the entire year. Job income in the IMPLAN system consists of both employee compensation and proprietor income.

Tax revenues are shown for business taxes, income taxes, and a variety of taxes at the local, state and national level. Like output, employment and income, tax impacts include direct, indirect and induced tax effects of snake expenditures. The magnitude of the economic contribution of a given level of expenditures depends, in part, on the degree of self-sufficiency of the area under consideration. For example, a county with a high degree of self-sufficiency (out-of-county imports are comparatively small) will generally have a higher level of contributions associated with a given level of expenditures than a county with significantly higher imports (a comparatively lower level of self-sufficiency). Consequently, the economic contributions of a given level of expenditures will generally be less for rural and other less economically integrated areas compared with other, more economically diverse areas or regions.

Visitor is someone who comes to the ONWR or its partners and participates in one or more of the activities available.

Visits are not the same as visitors. One visitor could be responsible for several visits. For example, if a family of four went fishing in the morning and hiked a short nature trail in the afternoon, they would have contributed eight activity visits; yet, they are only four visitors.