

# The Economic Impact of the Florida Wakulla Springs Birding and Wildlife Festival

Hosted in Wakulla County, April 2003

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## Overview of The Annual Florida Wakulla Birding & Wildlife Festival

The *Wakulla Birding & Wildlife Festival* (WBWF), an annual public educational event, was held at Wakulla Springs State Park and Lodge with activities and field trips at other surrounding state parks and the St. Marks National Wildlife Refuge, from April 25 – 26, 2003. Program partners included the Florida Fish and Wildlife Conservation



WBWF, 2003. Birders. Photograph by Tim Donovan.

Commission, Apalachee Audubon Society, DEP's Park Service – Wakulla Springs State Park and Lodge, U.S. Fish and Wildlife Service – St. Marks National Wildlife Refuge, UF Extension Master Wildlife Conservationists, and the Wakulla County Tourist Development Council. At least 1,100 people came to Wakulla Springs on the day of the event, with more than 258 of these participants registering for specific festival activities that had associated fees. This event grossed \$2,881.00 to help with festival expenses and expansion. Almost all the festival's guided tours were full to overflowing. There were 59 questionnaires returned with very positive responses to the event. Eighty-three percent of participants who completed the survey indicated they would be very likely to come to the event next year, and 81% said they would be very likely to recommend this festival to others.

Festival partners and an additional nine agencies, businesses and organizations supplied staff, setup and materials for 7 learning stations and 12 presentations that provided experiential educational opportunities for festival participants of all ages. In addition to the learning stations, there were 17 exhibitors at this event educating participants with wildlife, environmental and conservation themes.

More than 60 volunteers and numerous paid staff from many different organizations, and agencies enabled the event (which included all the learning stations, presentation and 25 outdoor guided tours) to run smoothly and offer all who attended an excellent opportunity to enjoy themselves while learning a great deal about North Florida's wildlife and flora.

### Birding in Florida

Florida is a birder's paradise, thanks to its diversity of habitats, its location on migration routes, the extent of its remaining wild lands, and its geographic span of both temperate and subtropical climates. More than 470 verified species occur here, including much sought-after birds such as the rare Florida burrowing owl, the Florida scrub-jay, the snail kite and Florida's wealth of wading birds. The Great Florida Birding Trail, a planned 2,000 mile route connecting birding sites throughout the Sunshine State, makes it easy for all birders—both casual and expert, local and tourist—to find new and productive birding venues throughout Florida. Trail literature details what species to expect at each

site and what kind of an experience each offers: a quick stop versus an all day hike, or a driving loop versus a foot-access only property.<sup>1</sup>

Birding activity on the southeastern peninsula of the United States has been fueled by the emergence of birding and wildlife festivals, which have blossomed during the latter half of the 1990s. Birding and wildlife festivals are local eco-celebrations combining a passive appreciation of land, wildlife, and culture with active learning and participation. Typically three to four day events, these festivals are designed to showcase a region's environmental treasures— its indigenous habitats and species. The WBWF is one of five major birding and wildlife festivals held in Florida during the Spring birding season, and is emblematic of the overlapping themes espoused by *event eco-tourism*: education, conservation, and the economic benefits associated with both. This latter theme, the creation of *green revenues*, is the focus of this report on the WBWF, and the survey instrument and methodology employed are described in the next section.

## Survey Description and Methodology

Data were obtained through a survey instrument created by Florida Fish and Wildlife Conservation Commission staff and Dr. Tim Lynch, Center for Economic Forecasting and Analysis. Staff attended the Festival and solicited representative family members at the designated registration site. One member per family was given a registration pamphlet and asked to participate in the survey. Attendees had the option to complete the questionnaire at the registration site or to complete and return it later (during the festival or by mail after the festival). All members of the family were given a poster for filling out the questionnaire. A total of 59 survey questionnaires were collected. It should be emphasized that this questionnaire sample has an 11.25% margin of error, at the 95% level of confidence. The results from this survey are representative of the greater universe of attendees, however, a very representative sample size (at the 5% margin of error) would have included responses from at least 154 respondents.

The following list presents a brief description of the four key elements that comprise the survey instrument.

- A pre-survey to identify and classify participants as in-state local, Florida non-local and out-of-state non-local.
- A set of questions/statements related to targeted marketing: past attendance, motivation for attending the festival, lodging type and location, and how participants learned about the festival.
- Demographic composition of the attendees: gender, age, household income and educational attainment.
- Festival related spending by the attendee.

Festival-related spending forms the basis of the economic impact estimates and analysis reported in this paper. Respondents were asked to project and categorize their spending within the Wakulla county area, over the course of the two-day event. The survey is uniquely designed to net out spending that attendees would have made had the festival NOT been held. While this approach yields a conservative spending estimate, the estimate is entirely attributable to the WBWF.

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<sup>1</sup> Extracted from the Great Florida Birding Trail, [floridabirdingtrail.com](http://floridabirdingtrail.com), Florida Fish and Wildlife Conservation Commission.

## Origins of the WBWF Birders

Survey results indicate that the 2003 WBWF participants traveled primarily from Florida to attend the event (Figure 1). Approximately 90 percent of the registered attendees live in the local area, which includes permanent and seasonal residents of the Wakulla-Leon-Gadsden tri-county area. An additional 10 percent of WBWF attendees resided in other locales within the state of Florida. This implies that the largest segment of WBWF attendees was comprised of visitors from the local region in the state of Florida. The nature of the attendees being more localized could be due to recent events such as 9-11 and the conflict in Iraq, however, Florida tourism data (collected by Visit Florida) reflects that tourism numbers returned to normal levels and are continuing to increase yearly, since the last two quarters of 2002.

**Figure 1. Primary Residence of the 2003 WBWF Participants**

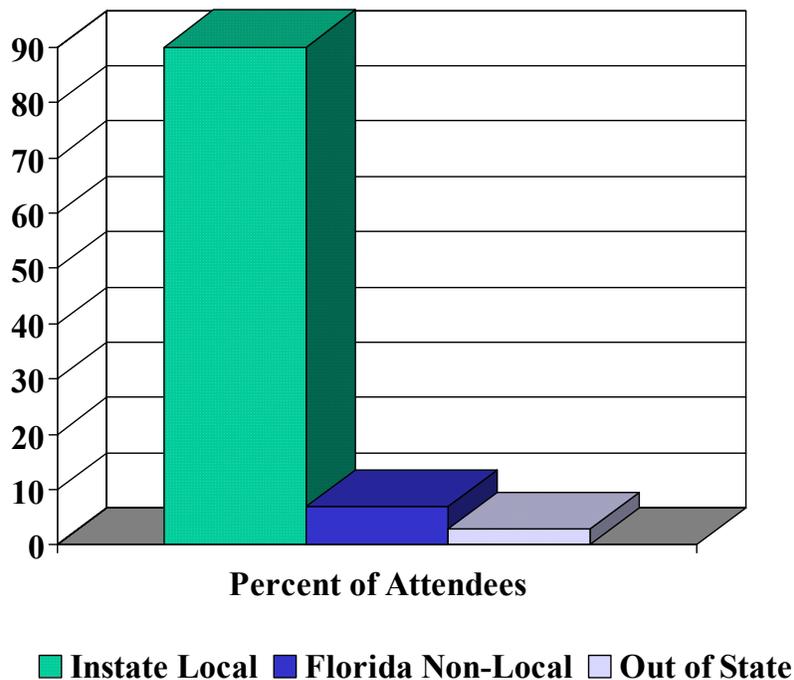
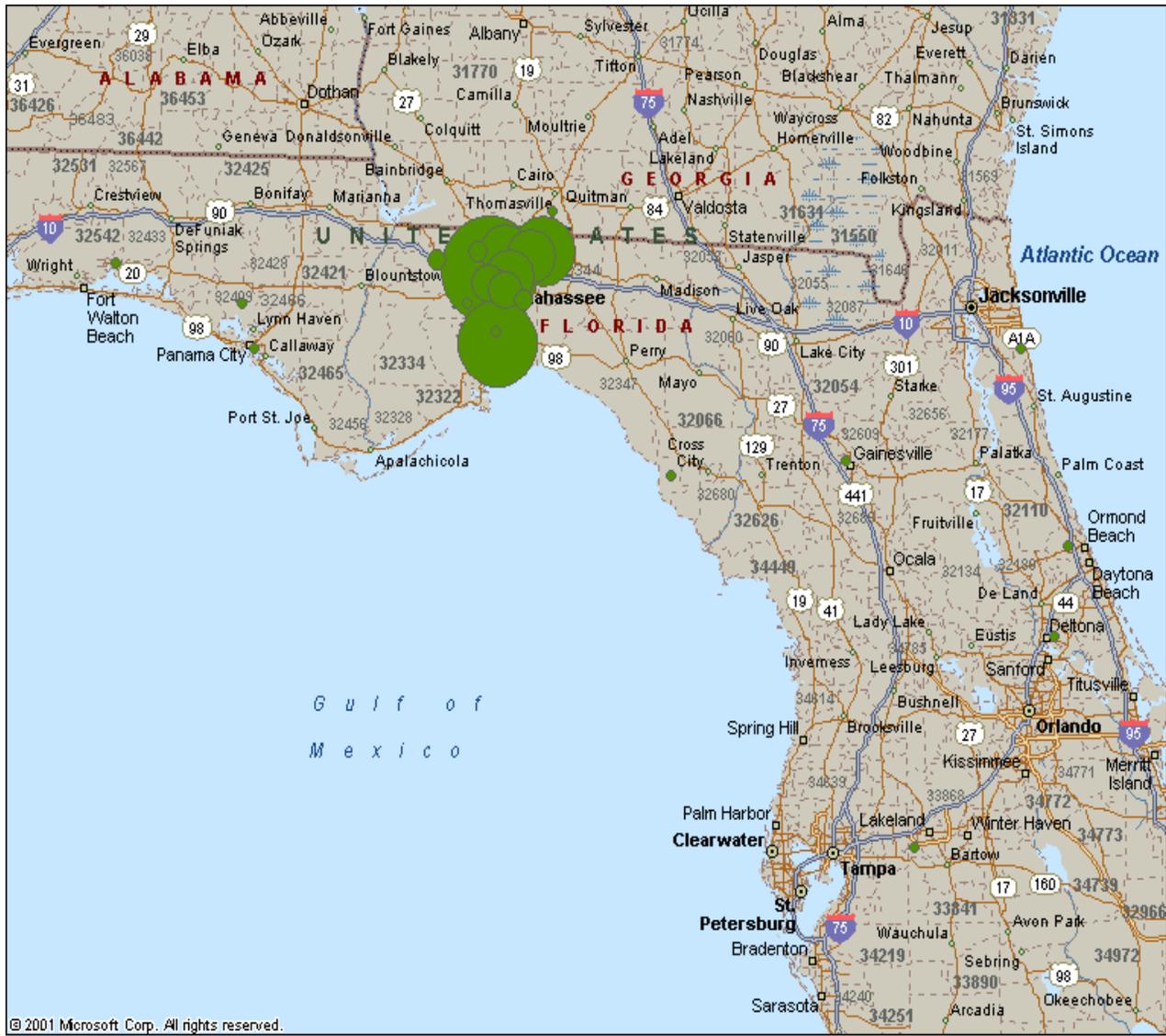


Figure 2 provides an overview of the distribution of WBWF attendees by geographic origin. In this map, circles represent the relative number of individuals attending the Festival from respective areas of the United States. Circles enlarge in direct relation to the number of observations. As mentioned previously, it is evident that the vast majority of WBWF attendees were respectively drawn from northern Florida, southern Georgia and Alabama.

Figure 2. Distribution of WBWF Participants by Geographic Origin



## Profiling the WBWF Eco-Tourist

Birding and other wildlife viewing activities are a growing part of the global non-consumptive eco-tourism activities sweeping across the American recreation and leisure industries. On average, recreational bird watchers have considerably higher incomes and levels of education than the average population and tend to be middle-aged or older with significant resources to expend on their chosen leisure and recreation activities [Wight (1996a,b); Scott, et al. (1997)].

Survey results from the WBWF population who participated in the survey are consistent with these trends. Figure 3 details the distribution of household income among Festival registrants who filled out the questionnaire. The data reveal that the distribution of income among WBWF birders is relatively high, with greater than 17 percent of the WBWF population residing in households where earnings accrue to more than \$100,000 per year. To provide some perspective, only 11 percent of Floridian households earn more than \$100,000 per year [Florida Statistical Abstract (2001)]. Moreover, only about 21 percent of the WBWF population resides in households where earnings accrue to less than \$40,000 per year, compared to 37 percent of the general Florida population [Florida Statistical Abstract (2001)].

**Figure 3. Distribution of Household Income of WBWF Participants**

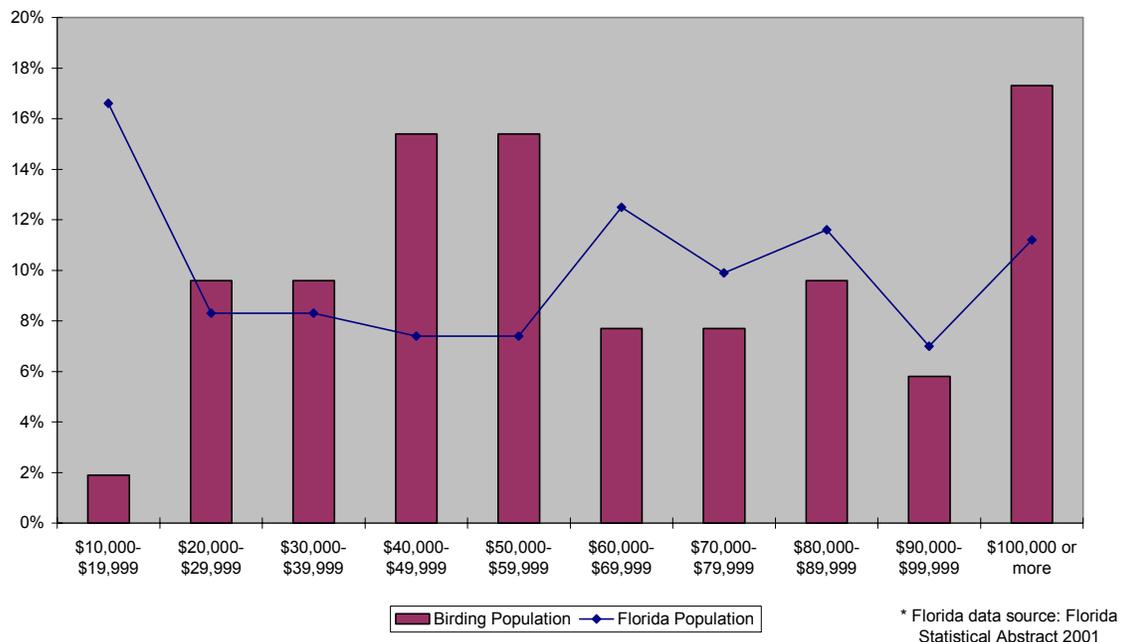
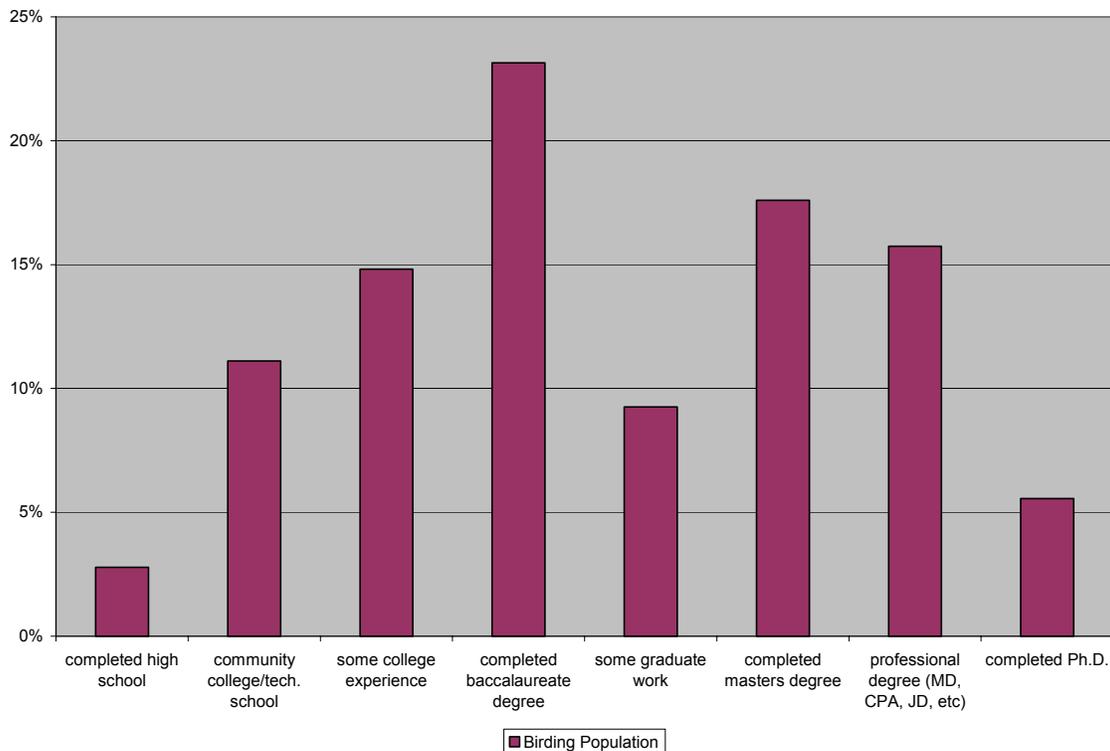


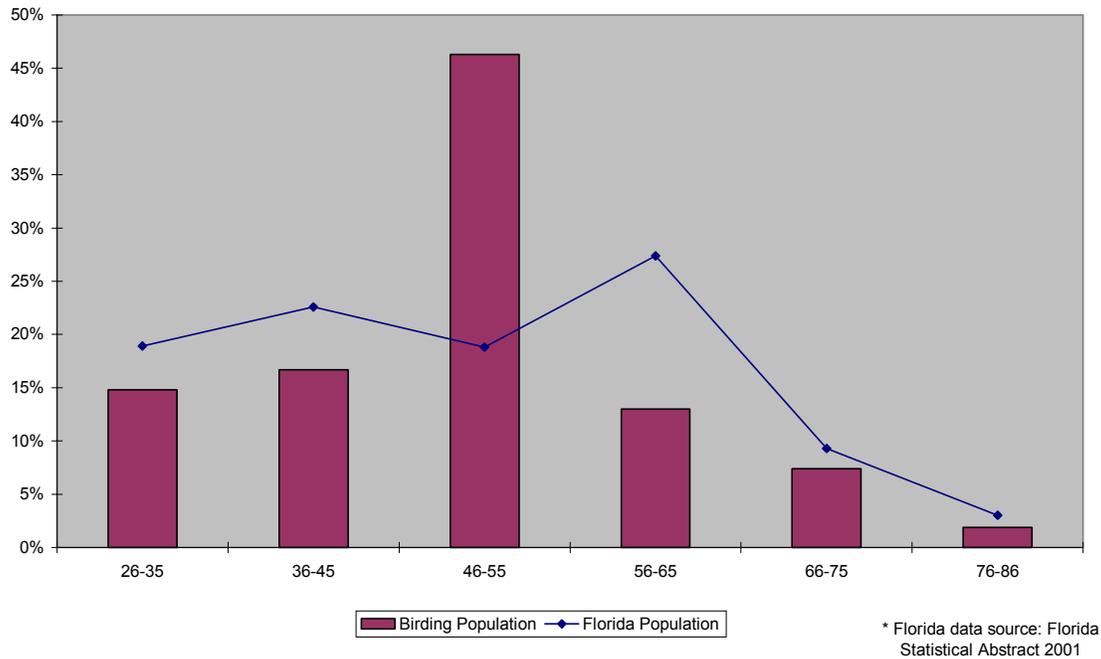
Figure 4 provides a profile of the educational attainment levels of Festival registrants. Overall, WBWF birders are exceptionally well educated, with about 60 percent completing college and some graduate classes, and an amazing 37 percent completing advanced graduate or professional degrees. Although the Wakulla area has a higher percentage of government and university personnel, and hence a higher educated workforce than other areas of Florida, it is still reflective of the higher education found among the birder population. Statewide, only 17 percent of Floridians complete a college degree, and only about 6 percent earn a graduate or professional degree [Florida Statistical Abstract (2001)]. Educational asymmetries are also observed at the bottom end of the educational ladder. About 56 percent of all Floridians have earned no more than a high school diploma compared to only 4 percent of the WBWF registrants who responded to the survey [Florida Statistical Abstract (2001)].

**Figure 4. Educational Attainment of WBWF Participants**



Finally, the WBWF participant age mix is considerably older than that of the general Floridian population (Figure 5). Only 15 percent of those birders surveyed are younger than 35 years of age, while 63 percent range in age from 36 to 55 years. With respect to senior citizens, 20 percent of the WBWF population falls within the 56-to-75-age bracket, with the remaining 2 percent aged 76 and older. This age distribution is consistent with the advanced levels of income described earlier and represents a valuable, income-laden tourist for the Wakulla county area during the spring off-season.

**Figure 5. Average Age Distribution of WBWF Participants**



## **Economic Impacts of the Wakulla Birding and Wildlife Festival**

What are the potential economic benefits that flow from eco-tourist wildlife viewing, hunting and fishing? In the United States, demographic and economic trends associated with bird and wildlife viewing is consistent with the overall growth in world nature-based tourism. According to a 2001 National Survey of Fishing, Hunting, and Wildlife-Association Recreation, 66.1 million people age 16 years and older engaged in wildlife observation, spending about 38.4 billion dollars per annum. Wildlife watchers who embarked on trips away from home for the purposes of observing, feeding, or photographing wildlife numbered almost 22 million. The largest subset of wildlife viewing is birding, which comprised about 82 percent of all wildlife trips away from home. Moreover, according to a 1994-95 National Survey on Recreation and the Environment, between 1982-83 and 1994-95, bird watching activity in the United States increased by 155.2 percent.

Southwick Associates, Inc., in collaboration with Florida Fish and Wildlife Conservation Commission (FWC) staff completed a study of the economic benefit of Florida's fish and wildlife-related recreation in 2001. The study is based on the U.S. Fish and Wildlife Service's 2001 National Survey of Fishing, Hunting and Wildlife Associated Recreation. Summary results for Florida wildlife viewing are outlined in Table 1.

**Table 1. Summary of the 2001 Economic Benefit of Florida's Wildlife Viewing Activities**

	<b>Wildlife Viewing</b>	<b>Each Florida Wildlife viewer annually generates:</b>
<b>Number of Participants</b>	3.24 million	
<b>Retail Sales</b>	\$1.575 billion	\$486
<b>Sales Tax Generated</b>	\$79.6 million	\$24.6
<b>Economic Impact</b>	\$2.861 billion	\$883
<b>Jobs Created</b>	28,427	
<ul style="list-style-type: none"> <li>Southwick Report "The 2001 Economic Benefits of Watchable Wildlife Recreation in Florida, Feb 10, 2003</li> </ul>		

Wildlife viewing annually generates \$2.861 billion in economic impact and creates 28,427 jobs; taken together, hunting, freshwater fishing, wildlife viewing, and saltwater fishing generate approximately \$1.575 billion in retail sales. Sales tax benefits to the state that are directly associated with Florida's fish and wildlife-related recreation are estimated at \$79.6 million.

By way of comparison:

Year 2001 retail sales for hunting, fishing and wildlife viewing were more than twice that of all Florida lottery ticket sales for 1999. The Florida sales tax revenues from hunting, fishing and wildlife viewing are more than the annual tuition paid by 22,700 in-state university students.

More than one out of every five state residents is a wildlife viewer and spends an average of \$486 annually on trip related and equipment expenditures. What yearly spending patterns do eco-tourists who attended the WBWF manifest?

The Wakulla Birding and Wildlife Festival (WBWF) survey solicited information on the average amount of money expended by the respondents in a single year on trips associated with bird watching. The average dollar amount spent by the WBWF birder was \$84.85; the maximum an attendee spent was \$610. For the American Birding Association (ABA) birder [see Scott, et al. (1997)], the largest single annual category of spending is transportation (\$1,163), with lodging expenditures (\$737) second, followed by meals (\$417). Lesser amounts were spent on equipment (\$72), books and subscriptions (\$45), entrance fees (\$61), and miscellaneous items (\$206). Total annual per capita spending (on average) exceeded \$3,054 for bird watching related trips. Thus, the average WBWF birder is an interested birder but perhaps not as serious or committed as the ABA birder, spending only about three percent of the ABA birder's annual birding expenditure.

That this constitutes a significant spending stream from an affluent, older population into Wakulla County is self-evident. But more specifically, what are the economic impacts flowing from the WBWF on the area economy? These impacts were determined by way of estimating the direct and indirect stimulus to the area economy from direct spending by attending birding eco-tourists. Florida State University economists, using data generated from the Wakulla Birding and Wildlife Festival staff, used the IMPLAN<sup>2</sup> economic model to ascertain a total impact on the Wakulla County Area. IMPLAN

<sup>2</sup> IMPLAN is the registered trademark of MIG, Inc. , Stillwater, MN, [www.IMPLAN.com](http://www.IMPLAN.com).

analysis is performed by taking direct measures of local expenditures by WBWF birders over the Festival time. Spending categories are defined broadly as

- Transportation (gas, car rental, etc.);
- Food bought and prepared;
- Restaurants;
- Lodging accommodations;
- Gifts and souvenirs;
- Other purchases; and;
- Festival purchases.

Data were obtained through a survey instrument applied to a significant portion (59, or 23 percent) of the WBWF population. Respondents were asked to detail their expenditures on motel/hotel and other lodging, food and restaurant spending, gasoline and automobile related spending, other retail purchases, and birding conference expenses across the Wakulla County area.

The average of the birders' responses were estimated and then applied to the entire WBWF registrant population (including those who did not take the survey). This effort yields a fairly comprehensive (and relatively conservative) set of estimates of direct economic spending stimulus produced in the local economy EXCLUSIVELY from hosting the WBWF event. This direct spending economic stimulus is then entered into the IMPLAN economic impact assessment model which translates this direct spending into indirect and induced economic stimulus. Summing the respective effects provides an estimate of the overall economic impact to the area economy.

### ***WBWF Direct Local Spending***

The WBWF survey of birders' spending suggests that upon their arrival the largest single expenditure for most visiting birders is lodging accommodations. The survey indicates that approximately 29 percent of the out-of-town WBWF attendees stayed in motels while 74 percent utilized lodging in private residences (e.g., guest rooms with friends, or attendees homes). The average hotel/motel cost of lodging that birders paid, in total, was \$29.45. The total number of people associated with attending the WBWF was 258 and the total direct lodging expenditures associated with the birding festival was \$7,598.

Spending for food in local restaurants and bars is the second largest category of expenditures for visiting birders. The average amount spent by the survey respondents was \$18.41, and total expenditures were \$4,749.

Other large purchases were goods, such as gasoline, associated with automobile usage. In a study conducted at the Corkscrew Swamp Sanctuary area of Florida in the 1993-1994, 77.6% of attendees indicated they had purchased a tank of gasoline and related auto servicing expenses that averaged to about \$5 per vehicle. Regarding the WBWF survey, the average amount spent for transportation: gasoline, car rental fees and maintenance expenses was \$11.78, and total expenditures in this category were \$3,039.

A large majority of respondents also made a variety of retail purchases while they visited the Wakulla area for the Festival. The Corkscrew study indicated that a majority (54.2%) of respondents made purchases in one of the five primary areas: 1) books; 2) souvenirs; 3) small equipment purchases; 4) groceries; and, 5) other miscellaneous items. Regarding WBWF survey respondents, the average retail spending per person was

about \$13.53, general retail purchases made during the Festival time period. The most common purchases were gifts and souvenirs (about 54%), other miscellaneous items (about 24%), and groceries (about 22%). Therefore, during the Festival, total direct attendee spending for retail purchases is estimated to be \$3,491. Spending appeared to be higher by the respondents regarding direct Festival expenses. The average spent was \$14.15, with a total Festival spending estimated to be \$3,651.

Summing the broad categories of spending yields total eco-tourist related WBWF expenditures in the Wakulla County area of \$22,528.

Finally, actual sponsor-related birding festival expenses are also included. The festival organizers contracted with local businesses to the extent that it was possible; local spending is broken down as follows:

**Table 2. WBWF Expenses including Registration, Banquet, Field Trips, among others.**

<b>Expense Item</b>	<b>Amount</b>	<b>Expense Item</b>	<b>Amount</b>
Handling Fees	\$ 146	Other Adv. (bags from TDC)	\$50
Food for Volunteers	150	Transportation	10
Supplies	25	Staff Hours (St Marks)	880
Local Newspaper Ads	1,134	Staff Hours (FWS)	11,891
Brochures & Brochure holders	663	Printing & Reproduction	603
		<b>Total</b>	<b>\$15,552</b>

This last category of spending is then added to the total direct expenditures for a combined direct spending level of \$38,080. This direct spending was then entered into the IMPLAN economic impact input-output model of the region to assess final direct, indirect and induced impacts to the local area.

***Final Direct Indirect and Induced Economic Impacts***

Table 3 provides the final direct, indirect and induced (secondary or multiplier) impacts from the WBWF. The total economic stimulus is \$66,224, with income generation effects of \$27,367. Value-added impacts of the Festival were \$40,519, while the equivalent of 1.0 yearlong jobs were created in the local area as a result of Festival spending. Finally, \$3,335 in Federal, State and Local taxes was generated.

Clearly, the Festival serves as a major stimulus to the local economy, and as it grows so will the economic pulse from greater numbers of visitors both during the Festival and at other times during the year. Once exposed to the wonders of Wakulla County, visitors oftentimes return to explore nature on their own with many eventually relocating to the area.

**Table 3. Final Direct, Indirect, and Induced Economic Impacts from the Wakulla Birding and Wildlife Festival, 2003.**

<b>Impact Measure</b>	<b>Direct*</b>	<b>Indirect*</b>	<b>Induced*</b>	<b>Total*</b>
Income Impacts	16,023	5,222	6,122	27,367
Value Added Income	22,837	7,480	10,202	40,519
Output Impacts	37,619	12,662	15,943	66,224
Employment	0.7	0.1	0.2	1.0
Tax Impacts <i>Total State/Local/Fed</i>				3,335
*2003 dollars (except employment)				

## **Summary And Conclusions And Prospects For The Future**

Birders, and other eco-tourists, provide significant revenue infusions to the region year round. Local businesses and policy-makers should recognize the economic impact of the 258-plus eco-tourists attending the Wakulla Birding and Wildlife Festival as an important contribution to the community. Over \$66,000 flowed into the local community from this single event; spending will continue to grow as the festival matures and expands.

All the reported spending flows directly to local stores, tourist rental properties, motels, camping operations, restaurants and retail outlets. The full impact is \$66,224 including \$3,335 in taxes, with the bulk of tax revenues directed to local coffers. Wakulla Springs State Park, St. Marks National Wildlife Refuge, Ochlockonee and Bald Point State Parks – focal points of the Wakulla Birding & Wildlife Festival -- will continue to draw tourists year round, but the Festival provides additional economic boost during the spring.

There are several points of interest that stem from this analysis that should be of interest to local businesses, elected officials, and appointed policy makers.

- The first is to continue to support and encourage the WBWF as an engine of local economic development and growth. As more people visit the area's natural wonders (especially during the slower seasons), more revenue is generated.
- The second is to encourage out-of-state, instate and locals (especially Tallahassee, Panama City-Ft. Walton, Pensacola, Gainesville, and Jacksonville) to visit the area for longer periods of time. By extending the average visitor's length of stay, the Festival could add significantly to the revenues generated. More importantly, by encouraging local participation the surrounding communities would also benefit, as residents would spend longer times in their own community, and spend more money locally as opposed to traveling to attend similar events and expend resources elsewhere.

A carefully designed marketing strategy would greatly enhance the prospects of expanding eco-tourism growth in the Wakulla County area. Emphasis in tourism advertising should continue to focus on the great birding opportunities in this area and also reflect the fact that while the scenery is beautiful (and contains wonderful photographic potential), other wildlife is abundant.



WBWF, 2003. Photo courtesy of Tim Donovan.

Other recreational opportunities abound in the region such as boating, fishing, hunting, hiking, bike riding and kayaking. All these activities are compatible with the abundance of open space in the area; moreover, they place an emphasis on heritage themes (e.g., “the way Florida used to be”) that permeate tourist and recreational attractions in what is referred to as “Old Florida.” The WBWF event can be combined with other leisure opportunities to make for an extended stay and much larger economic capture. This focus also underscores the important point that the foundation of

this richness of recreational opportunities stems from the wealth and quality of the natural resources of the area. These environmental treasures should be protected as they are the jewels in the crown of future high quality, low impact economic growth in the area, a foundation based upon nature tourism.

Local businesses should be kept informed about Festival-related activities in order to help determine what types of special services may be offered (special tours, fishing tournaments, wild life photography classes, kayak tours and so forth). This would help extend the stay of birders and facilitate capture of a greater proportion of available tourism dollars. For birders, the variety of retail items and goods and services available could be made more diverse; this could offer a greater opportunity for local merchants and specialty interest groups to gain “double sell” opportunities in addition to the Festival events.

Although the primary message of this report is economic in nature, the reader should also realize that there is a message about the link between environmental ethics and good business. The key to eco-tourism’s development in “Old Florida” is access to abundant, high quality pristine environments, open spaces, and abundant wildlife found in Wakulla Counties. Without these amenities, tourist draws are weakened, and tourist dollars flowing into the community will be substantially weakened.

It is evident that businesses, elected and appointed officials, and other citizens of the region do recognize that a healthy environment translates into a healthy economy. This is the reason they have acted to ensure high quality, low-density development as the foundation for growth across the region. The future environment, and economy, resides in the hands of local citizens and the policy makers they elect.

Continued support of the WBWF can ensure the continuance of St. Marks and Wakulla Springs and the notion that event eco-tourism can succeed in “Old Florida.” Conversely, minimal effort and support can usher in the demise of this category of economic value and allow future eco-tourist dollars to flow into other municipalities, communities that are more cooperative, better organized, and aggressively marketing and protecting their local wilderness virtues. Proper support of these efforts will result in long-term dividends for the local economy and environment and help ensure a higher quality of life for local citizenry and area visitors.

## **Feedback From Festival Attendees**

Festival organizers, in an effort to continuously improve the quality of the annual festival, sought the opinions and advice of visitors on specific areas that could make next year’s festival more enjoyable. The following are some suggestions that attendees offered.

## **WBWF Suggestions**

- Aim to advertise schedule of events in the local paper(s). One participant noted that he/she “wouldn’t have slept in had I known I was missing so much”.
- The availability of on-line registration would be most beneficial to the registrants and simplify their lives. It could also provide a database of future interested attendees that could receive agendas and other notifications. The WBWF organizers could also get a prospective head count prior to the festival.
- Have a broader selection of drinks, including decaffeinated coffee.
- Continue with the significant volunteer force for support during the WBWF.
- Continue with the scavenger hunt, both for the fun and learning factor.
- Continue with the drawing workshops next year, and in the future.
- Many attendees’ comments praised the excellent organization of the WBWF and the registrants stressed what a wonderful festival it was.

## **Other Florida Birding Festival Suggestions Applicable to WBWF**

- Target university student newspapers in the surrounding areas, both within Florida and the contiguous states of Alabama and Georgia. Student newspaper advertising is inexpensive and would help capture the attention of a younger demographic; additionally, it provides a logical conduit to a highly educated audience such as the faculty and staff at those universities. It was noted that individuals associated with the provision of higher education comprised a noticeable proportion of those attending the WBWF Festival.
- Communication and coordination among festival organizers and community volunteers are vital if the attendees are to have an enjoyable experience, free of hassles. Some attendees suggested extending the hours of registration so that those individuals arriving shortly before much-anticipated events could pick up their registration packets quickly and be apprised of any last-minute updates, leaving them sufficient time to participate in their chosen activities. This coordination difficulty occurred most frequently for early-morning excursions. Since birds are early morning creatures, people must rise in the pre-dawn hours to enjoy their feathered friends’ antics.
- More volunteers at future festivals may provide some relief by sharing the responsibilities for the myriad events among a greater number of individuals. Sharing responsibilities is particularly important when events begin in the pre-dawn hours and continue until late into the evening.
- Expand the number of vendors and the days/times wares are available for the visitors. Vendors may attract a larger portion of the local population. Wildlife photography; birdfeeders, birdhouses, and other items that attract wildlife to yards; birding equipment such as binoculars and special clothing; indigenous jewelry and artifacts; and event souvenirs such as t-shirts, hats, and pins are items that would be appropriate to offer for sale at an eco-tourism event. In addition, local organizations, such as the garden club or local animal shelters, could offer items for sale; flowers, plants, and pet collars, leashes, and toys are a few obvious choices.
- Continue to improve the signage leading visitors to the registration center and to various event venues. Street banners could improve the festival’s visibility for future festivals; some additional directional signs at various locations might be helpful for visitors arriving from the east, west, and north.



The St Marks Lighthouse, Karen Stewart, Tallahassee, Florida, 2002

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# Appendix A



WBWF, 2003. Bird and Wildlife Watching at Bald Point.  
Photographs by Tim Donovan, 2003.



## IMPLAN Model

In contrast to REMI, IMPLAN is exclusively an input-output model. It is non-survey based, \*and its structure typifies that of input-output models found in the regional science literature. Similar to REMI, IMPLAN assumes a uniform national production technology and uses the regional purchase coefficient approach to regionalize the technical coefficients.

The model generates two types of multipliers: Type I multipliers and what IMPLAN refers to as Type III multipliers. The difference between IMPLAN's Type I and Type III multipliers is an induced consumption effect. Their Type III multiplier differs from the standard Type 11 multiplier because the consumption function is nonlinear, that is, the marginal propensity to consume is not constant, decreasing as income in the region rises. Population completely responds to employment changes and drives consumer spending. Multipliers are generated for employment, output, value added, personal income, and total income.

IMPLAN builds its data from top to bottom. National data serve as control totals for state data. In turn, state data serve as control totals for county data. The primary sources of employment and earnings data are County Business Patterns data and BEA data. Furthermore, IMPLAN's procedure for finding in suppressions in the 1997 model parallels REMI's, except the ES-202 data set is not a primary source of data for counties.

IMPLAN estimates output at the state level by using value added reported by BEA as proxies to allocate U.S. total gross output. Also, IMPLAN allocates state total gross output to counties based on county employment earnings. The use of the BEA Gross State Product series for states, and implicit assumption of uniform value added-to-earnings ratios across counties within a state, parallels REMI's procedure. However, because of REMI's neoclassical production function, differential labor costs cause REMI's labor intensities to differ across states and counties. In addition, REMI adjusts real value added in U.S. dollars reported by BEA for differences in regional unit factor costs.<sup>3</sup>

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<sup>3</sup> Adapted from *Dan S. Rickman and R. Keith Schwer, REMI AND IMPLAN Models: The Case of Southern Nevada.*