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ECONOMIC IMPACTS OF RESTORATION AND RECREATION PROJECTS AT ROBINSON PRESERVE IN FLORIDA

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ABSTRACT

Robinson Preserve is a 705-acre restoration project site in Bradenton, Florida. Following nearly a century of agricultural and industrial use, this location was acquired by Manatee County to reestablish it as a tidal marsh and fish nursery habitat. Later land acquisitions would support recreationally important fish species and add recreational opportunities such as kayaking and pedestrian/biking trail use. Using a survey to establish use patterns and recreation expenditure patterns from Rosenberger et al. (2017), the researchers modeled the economic impacts of Phase II restoration efforts at Robinson Preserve in IMPLAN across five models (two restoration models and three recreation models). Restoration construction efforts (such as excavation, grading, and planting) supported an estimated 220 jobs and $11.3 million in labor income in Manatee County across roughly a decade, while monitoring efforts supported 19 jobs and $1.3 million in labor income in Manatee County. Recreation use by out of state visitors and Florida residents living outside of the Manatee County study area support 25 jobs and nearly a million dollars in labor income each year. In sum, restoration efforts supported roughly 16 jobs per million invested during the construction and monitoring phases, which includes ongoing jobs as a result of recreation use at RP. This study quantifies the economic benefits of restoration efforts. Moreover, the results support future restoration efforts involving land purchases and the addition of recreational opportunities.

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INTRODUCTION

The aim of this study is to quantify the economic impacts of restoration efforts at Robinson Preserve in Bradenton, Florida. Robinson Preserve (henceforth RP, see Figure 1)[1] is a 705-acre coastal area and a successful restoration site. Multiple phases of community-based restoration efforts spanning nearly two decades mitigated agricultural and industrial impacts on the RP site to restore wetland habitats supporting shellfish, seagrasses, mangroves, and salt and freshwater fish species. Post-restoration, RP again functions as a tidal marsh and coastal wetland habitat near Tampa Bay, supporting Florida sport fish species such as common snook and tarpon. Further, it provides a potential habitat for threatened and endangered species. Restoration efforts also culminated in recreation and community-focused opportunities. These included over nine miles of trails (inclusive of pedestrian and biking-friendly trails), kayak launches, kayak storage tubes, restrooms, picnic and play spaces, and the Mosaic Center for Nature, Exploration, Science and Technology (NEST) educational space.

The Palma Sola region of Florida (which includes the land designated within the RP) has a century-long history of agricultural and industrial use (Volk et al., 2017). Farming modifications (such as draining and ditching) created fertile fields for fruits, vegetables, and ornamental plant production. Later, what would become the western end of RP's lands was leased for industrial uses (roofing production), adding pollutants to the ground and by-products such as abandoned oil drums (Croteau, 2019). These changes came at the cost of thoroughly disrupting the coastal wetlands and uplands found at this site, reducing or altogether removing its ability to function as a fish nursery and wildlife habitat within Tampa Bay (Croteau, 2019).

RP presents a useful case study in pairing restoration efforts with land acquisition to create a public benefit. In total, 684 of the 705 acres at Robinson Preserve have been restored. This began in May 2003, when Manatee County finalized the purchase of 482 acres and initiated Phase I restoration efforts. Collaborating with National Oceanic and Atmospheric Administration (NOAA) via the Community-based Restoration Program, Manatee County partnered with Florida Communities Trust, Florida Forever Program, Florida Fish and Wildlife Conservation Commission, Southwest Florida Water Management District, Sarasota Bay Estuary Program, and the US Army Corps of Engineers to excavate over 450,000 cubic meters of soil to create 4.9 hectares of open water, 22.7 hectares of marshlands, and four hectares of uplands (Croteau, 2019). This work also drained, reshaped, and reconnected existing ponds generated by agriculture operations to the Manatee River, Palma Sola Bay, and Perico Bayou. The space was initially opened in 2008

[1] A current map of trail and other visitor amenities at Robinson Preserve is available online for free at: http://www.robinsonpreserve.com

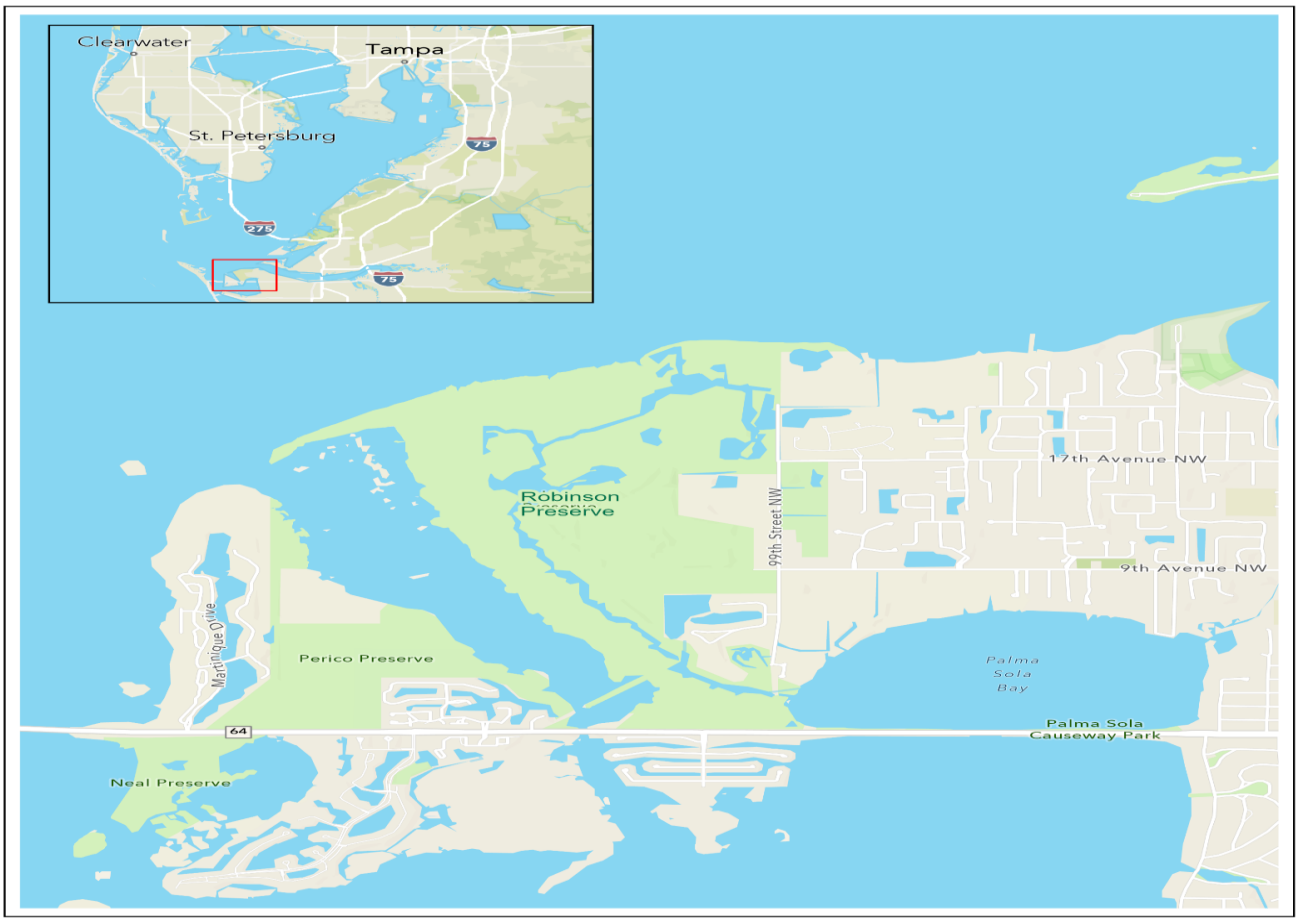

Figure 1. Map of Robinson Preserve.

for public use as restoration work continued and expanded into surrounding properties. Two further land acquisitions initiated a second phase of restoration. A 2012 land donation from the Conservation Foundation of the Gulf Coast expanded RP by 150 acres. The purchase included a conservation easement to ensure the property will be retained in a natural condition in perpetuity. A 2016 track lease with the State of Florida added an additional 52 acres. These efforts supported Phase II restoration efforts, which Manatee County implemented through a multidisciplinary collaboration of federal, state and local agencies, private contractors, engineering firms, universities, community members, and local advocacy groups. Notable funding support for Phase II was provided by RESTORE Council and NOAA's Connecting Coastal Waters initiative.

Phase II focused on restoring fish habitats within the wetland complex and monitoring the results with a central interest to benefit popular Florida sport fish, such as common snook and tarpon (NOAA, 2023). Restoration efforts developed underwater sanctuary-like habitat features to prevent predator access, and restructuring water connections. Phase II also expanded recreation efforts, in particular the addition of the NEST area and trail networks. Adding recreational opportunities of this kind (particularly walking trails and nature experiences) support healthy outcomes and provide opportunities for local community members and tourists alike to engage with nature (Zwart and Ewert, 2022). Moreover, the addition of recreation opportunities (such as the kayaking entry points and storage lockers available at RP) creates a magnet for attracting tourism expenditures that will continue long after the restoration bulldozers have departed. Ecological monitoring of the Phase II restoration is presently ongoing.

Previous efforts in Florida (where RP is located) to leverage land acquisition and restoration have provided a variety of public benefits. For example, the State of Florida has used land acquisition programs as a central part of restoration efforts in the Everglades (Perry, 2004). Southwest Florida Water Management District conservation efforts included land acquisition in four recent examples: flood remediation in the Four River Basins, water supply and management via Save Our Rivers, protecting ecosystems under the Preservation 2000 Act (P2000), and pairing restoration and recreation under the Florida Forever program (SWFWMD, 2011). The latter two programs (P2000 and its replacement, Florida Forever) have collectively purchased 2.6 million acres as part of managing and conserving lands (FDEP, 2025). Likewise, the Jan K. Platt Environmental Lands Acquisition and Protection Program (ELAPP) presently manages 63,400 acres of habitat, implementing invasive and feral species control, prescribed burns, species inventories, and habitat improvements for endangered and threatened plants and animals. This includes Double Branch Bay Preserve in Hillsborough County, where restoration efforts maintained mangrove communities and established sustainable recreational hiking trails and paddling access (Water & Air Research, Inc, 2018).

The economic value of restoration efforts can be difficult to meaningfully document and quantify, guiding researchers to develop effective strategies to measure and describe the economic value of restoration efforts over the last decade. For example, Iftekhar et al. (2016) identified four important barriers to quantifying restoration: identifying and assessing social/economic benefits, fully estimating restoration costs, ranking project merits and outcomes among multiple projects, and establishing the long-term costs of restoration projects.

Notably, it can be difficult to address each of these barriers in a single study, and fully documenting restoration impacts can require multiple studies to be conducted, each addressing separate facets of the restoration's value. Such studies also require engaging detailed, comprehensive models (De Groot et al., 2013) and pursuing rigorous methodologies (such as Bodin et al., 2021) to provide a meaningful, comprehensive result. Likewise, ongoing monitoring is a central part of restoration in part to ensure that earlier efforts remain effective and to understand its ongoing ecological value (Rohr et al., 2018). A well-designed restoration project study within these parameters offers a useful cornerstone for economic development (Bramwell et al., 2024) while linking the environment into the cultural memory of local communities (Samaras et al., 2024).

Economic impact presents one tool in studying the social and economic benefits of restoration efforts (Thomas et al., 2023). Restoration work is somewhat overlooked as a form of economic output and employment, even while the handful of studies completed provided valuable results (BenDor et al., 2015). BenDor et al.'s (2015) review of 14 case studies found restoration projects supporting as high as 33 jobs per $1 million invested in restoration efforts, with a total economic output employment multiplier between 1.60 and 2.59. Moreover, these results were highly localized through the engagement of local labor and resources in the phytoremediation process. Recent economic impact studies analyzing National Oceanic and Atmospheric Administration (NOAA)-related projects have reported a steady range of jobs per million supported by restoration efforts. These include using the methodology applied in Edwards et al.'s (2013) finding 17 jobs per million over a summary of fifty American Recovery and Reinvestment Act (ARRA) projects, Samonte et al.'s (2017) finding of 15 jobs per million spent across 125 ARRA projects, and NOAA's Performance, Risk, and Social Science Office (PRSSO) (NOAA, 2024)'s recent findings of 13 jobs per million spent across 173 Infrastructure Investment and Jobs Act projects. Unlike economic impact studies, it can be quite difficult to adapt economic thinking to the social benefits of natural resources like having access to clean rivers, as this has no clear market (Brouwer and Sheremet, 2017) or in fully modeling the economic consequences of losing a natural resource such as timber and non-timber forest products (Wilson et al., 2012). Recent work by PRSSO (NOAA, 2024) outlines a clear economic impact methodology for analyzing Infrastructure Investment and Jobs Act restoration project budgets, including techniques for overcoming common issues in translating budget activities into modellable industry activities (see Thomas et al., 2023) and linking restoration budget items to IMPLAN (IMpacts for PLANning) economic impact models. These provide a useful starting point for a detailed understanding of how restoration culminates in numerous benefits to local populations.

Economic impact can also quantify the benefits of recreation access. Recent federal investments have elevated outdoor recreation as a form of economic development. Thinking broadly, the outdoor recreation economy represents an important and growing sector of the US economy over the last decade across a wide swath of human and engine-powered recreation types (OIA, 2017; Rzeznik and Franks, 2023). Recent statistics on the 2023 Bureau of Economic Analysis's Outdoor Recreation Satellite Account (ORSA) indicated that outdoor recreation supported $1.2 trillion in economic output across the United States (BEA, 2024). Recent legislation has fomented this sector's growth, including the Great American Outdoors Act (from 2020) and EXPLORE Act (2024), which both include increasing access to recreational opportunities on public lands. Additionally, several restoration projects included in Infrastructure Investment and Jobs Act funding directly address adding new recreation opportunities and/or reestablishing lost recreation activities.

Outdoor recreation represents an important part of Florida's economy overall across multiple measures and approaches, and a great deal of work has quantified this impact. As of 2023, outdoor recreation represented 3.6% of Florida's GDP, behind only a handful of states (Hawaii, Alaska, Vermont, Montana, and Wyoming) (BEA, 2024). Additionally, Florida saw a 3.7% increase in outdoor recreation employment from the prior year. In 2022, Florida's outdoor recreation economy supported $52 billion in total outdoor recreation value added (or gross domestic product, which is the wealth created by industry activities), 465,853 jobs, and $26.5 billion in labor income (BEA, 2022). The study further ranked Florida's outdoor recreation economy 2nd in value added and 4th in value added growth since 2021. This value added was up 20% since 2021, growing faster than the US outdoor recreation economy's increase of 15%. Florida's state economy ranked 2nd in ORSA employment. These findings also hold true prior to the pandemic. Using a tourism-focused measure, Seidel et al. (2017) estimated the state's outdoor recreation economy supported $145 billion in output and $70 billion in visitor spending in 2017. A similar 2019 study of Florida's organized sport economy (which is not synonymous with outdoor recreation economy) found that it supported $146 billion in output (Tourism Economics, 2022). Likewise, Florida's 11 national parks supported 12,082 jobs across the state as a result of 13.3 million annual visits (NPS, 2023).

Florida's wide variety of outdoor recreation opportunities is attractive to visitors and residents alike. Florida is a top national and global destination for recreational fishing, attracting an estimated 4.3 million angler visits in 2021. That year, recreational fishing generated $13.9 billion in economic output and supported 120,380 jobs (ASA, 2021). Other common tourist outdoor recreation demands include saltwater beach activities, wildlife viewing, walking/jogging, and swimming (outdoor pools), while top outdoor recreation demands for residents of Florida include walking/jogging access, wildlife viewing, saltwater beach activities, visiting historical sites, and picnicking (Seidel et al., 2017). These demands overlap well with the opportunities available in Southwestern Florida. Southwestern Florida includes numerous public lands along the coastal lowlands, including national wildlife refuges (Caloosahatchee, Egmont Key, Florida Panther, Island Bay, J.N. Ding Darling, Matlacha Pass, Passage Key, Pine Island, and Ten Thousand Island) and a national monument (De Soto). It is also home to 69 municipal and county parks, which include beaches and trails. Overall, residents are satisfied with the quality of the recreational opportunities in Southwestern Florida, with 76% of residents rating these opportunities as excellent or good while only 2% rated them as poor (Seidel et al., 2017). Concomitant to surging demands to live near outdoor recreation opportunities amid a post-pandemic job market (see Nickerson and Black, 2000), this region is expected to increase its population by 30% over the next decade (Seidel et al., 2017).

The goal of the present study is to measure the economic impacts of restoration efforts at RP with an eye on its Phase II restoration expenditures and account for the additional inputs from resident and visitor recreation use patterns. The researchers created new

knowledge on RP use patterns through an on-site survey, create visitation estimates through trail and vehicle counters and observations, and model expenditure patterns as well as Phase II restoration expenditures in IMPLAN to create a nuanced understanding of the economic value of restoration efforts at this location.

METHODOLOGY AND MATERIALS

Survey Methodology

The researchers utilized on-site intercept surveys to establish new knowledge on RP visitor experiences, namely demographics and use patterns, which are described in detail throughout the paper. The researchers used a stratified sampling approach to ensure a comprehensive and inclusive sample. Sampling times were randomized across two-hour intervals covering both mornings and afternoons and occurring on both weekdays and weekends. Surveys were available in English and Spanish on both tablets and print surveys based on respondent preference. Survey collection occurred June 2022 to April 2023 with 369 surveys being completed and a response rate of 72%. Persons declining to take the survey reported most often they either did not have time or had already taken the survey. While cleaning the data, 15 cases were removed due to completing less than half the survey, leaving 354 usable cases.

Visitation Estimate Method

The researchers constructed the annual visitation estimate for RP using pre-calibrated TRAFx infrared trail and vehicle counters alongside observational sampling approach. Infrared counters are an accepted approach in visitor monitoring (Creany et al., 2021). The researchers collaborated with Manatee County Natural Resource Managers to identify ideal counter locations at RP, with final locations including three parking lots, the north entrance trail, and the south fishing bridge. Additionally, researchers validated data collection using a stratified random sampling approach where each site was observed for at least 24 hours for data accuracy (Pettebone et al., 2010). These observations supported regression correction coefficients utilized to adjust estimates (Wan et al., 2011). Calibration coefficient estimates ranged from 0.45 to 0.77 for trail counters and 0.31 and 0.54 for vehicle counters. Visitation estimates were conservatively reduced by 5% to adjust for Manatee County staff triggering counters. After calibration, the researchers estimated RP receives 240,111 visits each year.

Table 1 delineates annual visitation estimates into categories that can be utilized in the economic impact estimates. Visitation includes three categories: visits by Manatee County residents (residents), visits by persons living inside Florida but outside of Manatee County (in-state visits), and visits by persons living outside of Florida (out of state visits). Note that the last two visitor categories will specifically be modeled in IMPLAN as economic impact, as local resident expenditures are considered as redirected expenditures already existing in the local economy, rather than new dollars spent in said economy. Utilizing results from the survey, researchers attribute ~59% of visits to Manatee County residents, ~24% of visits to in-state residents living outside of Manatee County, and ~16% of visits to persons living outside of Florida. The researchers also reduced visitation estimates to account for primary visits, which indicate RP was their central reason for visiting (as opposed to part of a multi-stop visit). For example, 99% of Manatee County resident visits were identified as primary visits based on survey results, while 94% of in-state and out of state visits were identified as primary. In both cases, non-primary visits were excluded from model. These adjusted visitation estimates are utilized to model recreation expenditures at RP in the IMPLAN analysis described later in this study.

IMPLAN Study Area

For this study, Manatee County, Florida, has been selected as the study area, and selected economic measures are provided in Table 2. Manatee includes the RP property and includes the city (and county seat) of Bradenton. Table 2 lists descriptive statistics of the study the area's economy. Manatee County's economy includes $20 billion in gross domestic product and $24 billion in personal income across 209,069 jobs and 170,939 households. The 2022 population is estimated to be 405,069, a 2.43% annual increase. Overall, poverty (estimated at 10.2 in 2022) is declining while median household and property values are increasing.

Table 1. Visitation estimate breakdown.

Visit category	% of visits in category	Total visit estimates (rounded)	Total primary visit estimates (rounded)
Manatee County residents	59.33%	142,399	141,687
Visits by persons living outside of Manatee County			
Visits by in-state residents	24.29%	58,299	54,830
Visits by out of state residents	16.38%	39,314	37,171

Table 2. Study area descriptive statistics (Manatee County, Florida).

Variable	Statistic
GDP	$20,109,652,540
Total Personal Income	$24,858,271,353
Total Employment	209,069
Total Households	170,939
Industry Count	380
Population	405,069
Median Age	49.4
Poverty Rate	10.20%
Median Household Income	$71,385
Median Property Value	323,900

(GDP, TPI, TE, and TH from IMPLAN; Remainder of measures from datausa.io)

IMPLAN Models

This study includes five models examining different aspects of RP's Phase II restoration efforts. Table 3 summarizes these five models using IMPLAN categories, activity descriptions, and sum expenditures, and these are further discussed below. Model 1 examines the initial construction of hydrological elements of the habitat restoration process, 2015-2017. In IMPLAN, construction impacts (here modeled as sector 56: construction of other new nonresidential structures) are discussed separately from any other non-construction economic impacts examined in the study because construction expenditures often follow work projects from place to place rather than creating new jobs in each place where a project exists (Clouse, 2019). For example, construction workers might complete one project over two years in Pinellas County before moving to the next project in Hillsborough County for six months. As such, annual job estimates in the analysis are likely just existing jobs relocating to a new project and including them alongside expenditures like tourism spending would overstate job estimates. This model also includes support activities for agriculture and forestry (sector 19), which includes planting native species in RP post-construction. The researchers elected to treat expenditures in this sector as akin to construction jobs, as they often involve teams moving from project to project. Note that the supply of plants in this case is often are sourced from local growers/nurseries, keeping expenditures and economic impacts local.

Model 2 analyzes the economic impacts of constructing amenities at RP, 2012-2021. Amenities to date include the creation of a nature center, canopy zone playground, 1.5 miles or rubber surface trail, 1.5 miles of shell trails, seven boardwalk bridges linking trails, seven shade stops, two restroom facilities, four picnic pavilions, 80 kayak storage tubes, and two parking lots. These amenities are modeled using construction sector 56 as with Model 1, and will be discussed separately from later models.

Model 3 examines the restoration planning efforts and scientific monitoring of RP. Tasks here include designing waterways, replacing nonnative species with native species, and monitoring fish habitats in subsequent years. This model includes two categories in IMPLAN: environmental and other technical consulting services (sector 463) and scientific research and development services (464). These expenditures occurred over five years (2015-2020).

Table 3. IMPLAN models with inputs and sectors.

Activities Modeled	IMPLAN Sector	Expenditures Modeled
Model 1: Hydrological construction and Planting (2015-2017)		
Conservation and development construction	56 (Construction of other new nonresidential structures)	$6,216,364.96
Planting, seeding, native/wild seeding	19 (Support activities for agriculture and forestry)	$877,173.72
Model 2: Amenities Construction (2012-2021)		
Construction of amenities, including trail development and nature center	56 (Construction of other new nonresidential structures)	$8,200,000.00
Model 3: Restoration Design and Monitoring (2015-2020)		
Ecological and wetland restoration consulting services; Site remediation, environmental, biological, and economic consulting services; Environmental reclamation planning services	463 (Environmental and other technical consulting services)	$636,648.00
Environmental and fisheries research; Anthropological, Sociological, and Historic and cultural preservation research	464 (Scientific research and development services)	$1,164,737.00
Model 4: Visitors residing inside Florida, total annual outdoor recreation expenditures (2024)		
Expenditures at dine-in restaurants with wait staff	3509 (Commodities, Full-service restaurant services)	$193,139.56
Expenditures at fast-food restaurants	3510 (Commodities, Limited-service restaurant services)	$193,139.56
Expenditures for lodging at hotels and motels	3507 (Commodities, Hotels and motel services)	$0.00
Expenditures for gasoline and related transportation expenditures at gas stations	3154 (Commodities, Refined petroleum products)	$623,767.28
Expenditures for retail outdoor recreation equipment purchases	3410, (Retail services - Sporting goods)	$84,467.69
Model 5: Visitors residing outside Florida, total annual outdoor recreation expenditures (2024)		
Expenditures at dine-in restaurants with wait staff	3509 (Commodities, Full-service restaurant services)	$772,898.95
Expenditures at fast-food restaurants	3510 (Commodities, Limited-service restaurant services)	$772,898.95
Expenditures for lodging at campgrounds	3508 (Commodities, Other accommodation)	$177,586.63
Expenditures for lodging at hotels and motels	3507 (Commodities, Hotels and motel services)	$1,217,070.22
Expenditures for gasoline and related transportation expenditures at gas stations	3154 (Commodities, Refined petroleum products)	$1,076,766.96
Expenditures for retail outdoor recreation equipment purchases	3410, (Retail services - Sporting goods)	$198,628.48
Not Modeled: Manatee County resident, total annual outdoor recreation expenditures (2024)		
Expenditures at dine-in restaurants with wait staff	-	$245,547.25
Expenditures at fast-food restaurants	-	$245,547.25
Expenditures for gasoline and related transportation expenditures at gas stations	-	$943,059.29
Expenditures for retail outdoor recreation equipment purchases	-	$323,122.23

The remaining two models (Models 4 and 5) examine outdoor recreation expenditures across two categories of visitors found in RP: visitors living in the state of Florida (but outside Manatee County) and visitors living out of state. The low number of cases representing the expenditures of visitors living beyond Manatee County created a methodological concern for economic impact analysis, as lower sample sizes are subject to the influence of outliers (Thomas et al., 2019). As such, the researchers applied the Benefits Transfer Method, a set of best practices in using the results from one study in another, to select recreation tourism expenditure patterns that could be applied in this study (USEPA, 2010). Albeit a common approach in economic impact studies, the Benefits Transfer Method requires thoughtful focus on comparable application and localization to lead to reliable estimates (Newbold et al., 2018). Steps to the methodology include describing attributes to be addressed by case studies, selecting relevant case studies, and identifying issues, transferring values and localizing those results, and noting irregularities and potential issues with the transfer process. The end target is to utilize existing results from previous comparable studies as a proxy measure of expenditures in the existing study.

After careful consideration of the options available, the researchers selected outdoor recreation expenditures from Rosenberger et al.'s (2017) exhaustive study of recreation user patterns at National Forests. These expenditure patterns are created through the National Visitor Use Monitoring (NVUM) survey. The NVUM is a rigorous and respected source of outdoor recreation data utilized in economic analysis. NVUM offers a great deal of flexibility in customizing results to specific situations. For example, the researchers selected the low spending profiles per party per trip (Rosenberger et al., 2017: Table 7, p. 13) to better match likely expenditure patterns in Manatee County. This table delineates between resident and visitor expenditures, which is important because local residents are rarely included in economic impact analysis. Exceptions include examining an activity not found elsewhere or, in select cases, where the activity's initial creation is being modeled. This NVUM table also delineates expenditures for overnight visits and day-use visits to prevent overestimation. These expenditures also exclude downhill skiing/snowboarding expenditures, which are not relevant to this study and can inflate expenditures due to higher recreation costs. The researchers localized results from Rosenberger et al. (2017) by focusing on expenditure categories common to Seidel et al. (2017), which focus on lodging, restaurant, transportation, and recreational retail expenditures. The researchers made further adjustments to limit the overestimation of economic impacts. For example, visitors living in Florida (but outside Manatee County) will not include lodging expenditures as the researchers posit the visitor would return to their home after the visit. For out of state visitors, all four categories are modeled. Note that the results from Rosenberger et al. (2017) are per-party expenditures, so the researchers adjusted these based on group size and visitation frequencies. These expenditures were also updated to 2024 expenditures to address inflation.

Further work is needed to translate expenditure patterns into IMPLAN. For example, restaurant expenditures are divided between dine-in restaurants, which utilize wait staff and cooks (sector 3509, full-service restaurant services) and fast-food restaurants (3510, limited-service restaurant services). Transportation costs are modeled to gasoline and oil purchases as part of maintaining a vehicle on a trip (3154, refined petroleum products) and are limited only to the percentage of visitors who utilized an automobile to travel to RP. Recreational retail (which includes equipment purchases ranging from bike parts to paddles) is modeled as sector 3410 (retail sporting goods). Lodging (applied only to visitors residing out of state) was divided between hotel/motel use (3507, hotel and motel services) and camping/RV use (3508, other accommodation).

The researchers applied a commodities approach to modeling all of these tourism expenditures based on IMPLAN best practices, as it could be ascertained what was purchased from local businesses, but it could not be determined what was produced locally (Lucas, 2020). Where applicable, local purchasing percentages were set to the social accounting matrix (lodging and restaurants), which allows the default regional purchasing coefficient to determine the total demand met by local supplies for that commodity. The purchase price was utilized for modeling transportation and recreation retail purchases. After a careful review of RP, the researchers opted not to include transportation such as taxis or guide services, as these are rarely utilized there. Additionally, no use fees were modeled as RP is free to access and use. Fishing licenses could be a possible exception here, but it is difficult to ascertain where those licenses were purchased and used, so the researchers elected to leave these out to prevent overestimation. Future studies should consider this potential study limitation.

IMPLAN Terminology

This study includes economic impact analyses crafted utilizing IMPLAN, which utilizes input-output modeling to simulate economic changes and estimate their effects on industries, households, and communities. IMPLAN results frame economic change across four forms of impacts (employment, labor income, value added, and output) as well as three levels (direct, indirect, and induced) to monitor how economic activities support changes throughout the wider economy.

IMPLAN model results are presented across four categories of impacts: employment, labor income, value added, and output (Slovacheck, 2023). Employment includes full and part-time employment as well as seasonal jobs and entrepreneurs. Employment in IMPLAN is reported in portions of jobs relevant to the model. For example, if a full-time pizza restaurant waiter spends approximately half their time supporting tourists, that could appear as .5 jobs in a tourism recreation study. Labor income is the sum of employee compensation and proprietor income. This figure includes the costs of total payroll and payments received by self-employed workers, as well as unincorporated businesses where applicable. Value added includes the prior labor income measure plus other property income and taxes on production and imports. This measure is often treated as a measure of contribution to the gross domestic product. Finally, output includes value added and labor income plus the costs of intermediate inputs (intermediate inputs being goods and services used in the production process but not sold as a final demand product).

IMPLAN model results are further reported at three effect levels to understand how expenditures create changes throughout the economy: direct, indirect, and induced (Demski, 2020). The analysis begins with direct effects, which represent the expenditures (inputs) modeled in the model. For example, in a model examining the impacts of recreation tourism, a tourist spending $20 at a pizza restaurant would be a direct effect. Those direct effects then translate into additional expenditures as businesses conduct transactions with other businesses, and their employees spend their paychecks in the local economy. Indirect effects examine transactions between businesses required in the process of preparing for the next sale. In the case of the aforementioned pizza restaurant, this business will create indirect effects by purchasing more materials for making future pizzas

(dough, tomatoes, cheese) and paying for necessary services such as electricity and rent. Note that some of these expenditures will occur in the study area and create additional rounds of impacts, while others will be spent beyond the study area and gradually leak out of the model. Finally, IMPLAN examines the induced level, where households spend labor income as they see fit. Continuing our example, the pizza restaurant's employees will need to spend money on rent and mortgages, buying groceries, and purchasing goods such as clothes. As with indirect expenditures, any expenditures occurring inside the study area can continue to create additional rounds of economic activity.

RESULTS AND DISCUSSION

Survey Results: Demographics

Table 4 summarizes the demographics of survey respondents in this study. Survey responses were relatively evenly distributed between females and males. Most respondents indicated some level of college education with 33% indicating attending graduate school for advanced degrees. Ages were concentrated in the 65 and up community (54%) followed by the 50 to 64 range (23%) with nearly 60% of respondents indicating they are retired. The mean age was 61 with a range of 21-90. Note the survey was limited to adults, so actual use patterns likely skew younger when including children who did not qualify to be included in the survey. Incomes (including pre-retirement incomes for retirees in the sample) were spread across all age categories with a subtle concentration in the $100k and higher income brackets. Although not reported in the table, the majority of respondents indicated their race as being White.

Survey Results: Use Patterns

Table 5 summarizes new knowledge on use patterns for RP. In all, 60% of respondents indicated living in Manatee County. An additional 7% lived in another Florida county, while 17% lived in Florida for at least some portion of the year. The remaining 16% lived out of state. Visitors living outside of Florida arrived from 22 states (most often Wisconsin, Ohio, Illinois, and North Carolina) as well as four countries. Visitors from Florida living outside of Manatee County reported living most often in Pinellas, Sarasota, or Hillsborough.

Overall, respondents indicated being repeat (and even frequent) users of RP. Only 16% of respondents indicated that they were on their first visit to RP. This statistic was highly influenced, however, by place of residence. For example, nearly half of out of state visitors were on their first visit, while only 5% of Manatee County residents in the survey were on their first visit. Similarly, visitation frequency varied based on place of residence. Manatee County residents reported high levels of repeat use of RP, with over 50% indicating they visited/would visit more than 30 times this year. Concomitantly, out of state visitors came less often, but 43% indicated they planned to come as many as 6 times in a normal year.

Table 4. Demographics of survey respondents.

Measure	Frequency	Percent
Sex (n=336)		
Female	170	51.00
Male	161	48.00
Another category	5	1.00
What is your highest level of education? (n=336)		
High School or GED	49	14.58
College	165	49.11
Graduate school	112	33.33
Technical school	10	2.98
What is your age? (n=325)		
Age 18 to 29	24	7.38
Age 30 to 49	47	14.46
Age 50 to 64	76	23.39
Age 65 and up	178	54.77
Are you retired? (n=337)		
No	137	40.65
Yes	200	59.35
What is your current/pre-retirement pre-taxed income? (n=243)		
$24,999 or less	11	4.52
$25,000 to $49,999	29	11.93
$50,000 to $74,999	48	19.75
$75,000 to $99,999	42	17.29
$100,000 to $149,999	52	21.4
More than $150,000	61	25.11
How many people are in your household? (n=334)		
One Person	52	15.57
Two persons	213	63.78
Three persons	32	9.58
Four persons	21	6.28
Five or more persons	16	4.79

Table 5. Use and travel patterns at Robinson Preserve.

Measure	Frequency	Percent
Are you a Florida resident? (n=354)		
No, I live out of state	58	16.38
No, but I am a seasonal Florida resident	61	17.23
Yes, in Manatee County	210	59.32
Yes, in another county in Florida	25	7.06
Have you visited Robinson Preserve before? (n=350)		
No this is my first visit to RP in the last 12 months	56	16.00
Yes, I have visited RP in the last 12 months	294	84.00
How many times have you visited Robinson Preserve in the last year? (n=346)		
First time visitor	56	16.18
1-6 times	79	22.83
7-12 times	34	9.83
13-20 times	28	8.09
21-30 times	21	6.07
More than 30 times	128	36.99
How did you get to Robinson Preserve today? (n=347)		
Biked from residence	70	20.17
Drove a car	243	70.03
Walked from my residence	34	9.8
Was Robinson Preserve the sole purpose of your trip today? (n=340)		
No, I/we went to other tourism areas as a result of this trip.	9	2.65
Yes, it was the sole (primary) purpose of this trip.	331	97.35
If you were not visiting Robinson Preserve, what would you do today? (n=340)		
Go somewhere else in Florida for another non-outdoor recreation activity	18	5.29
Go somewhere else in Florida for outdoor recreation	140	41.18
Visit another coastal wetland area in Florida	9	2.65
Visit another coastal wetland in the area	59	17.35
Go to work	20	5.88
Stay home	94	27.65

Data from this study support that RP is a viable recreation destination in Florida's tourism industry. In all, 97% of respondents indicated that visiting RP was the primary purpose for their visit, with the remaining 3% indicating they would also be visiting other places amid their trip (namely, Emerson Point, Perico, and Neal Preserves). Respondents also indicated that, given the absence of RP, 41% would seek outdoor recreation opportunities at another location in Florida.

RP is also drawing use from across the county. For example, while 63% of Manatee Residents indicated living within a few miles of RP, 24% were traveling over 20 miles to recreate there. Likewise, users engaged multiple forms of transportation to arrive, with 20% riding their bike from home and almost 10% walking from home. Users come to RP for a wide variety of reasons. The most common reason is to engage in the walking, running, and jogging trails available there (52%). Another 28% are also engaging in trails for biking (broadly defined). Dog walking (6%), kayaking and paddling (4%), and wildlife viewing/bird watching (4%) were occasionally noted. Perhaps surprisingly, fishing use, which is limited to specific areas of RP, was less common at 2%. That said, there is anecdotal evidence of subsistence fishing occurring at this site by communities who do not speak or speak limited English causing them to be underrepresented in the survey. Future research utilizing survey translations may help engage these users.

IMPLAN Economic Impact Analysis

Table 6 summarizes the economic impacts of the five models. Recall Model 1 examines the economic impacts of construction efforts ($7 million) occurring at RP in the restoration process. There, expenditures support an estimated 113 jobs and $5.4 million in labor income. Beyond supporting ~88 construction and planting jobs across the life of the project, expenditures at the indirect level support jobs in building materials (retail and wholesale), services such as real estate and architecture, and transportation. As households spend labor income (induced level), these expenditures support numerous services from restaurants to medical care to general store and grocery workers. Likewise, the project adds $6.8 million to the value of the study area over the project's life.

Model 2 examines the impacts of amenities construction ($8.2 million). There, expenditures support ~106 jobs in the study area. These include an estimated 75 jobs in construction. Expenditures supported services relevant to construction, such as retail building material purchases and architecture services, similar to those in Model 1. This model also supports $5.9 million in labor income and adds $7.6 million in value added.

Model 3 examines the impacts of non-construction restoration work as well as monitoring efforts ($1.8 million). There, expenditures support 19 jobs in the study area and $1.3 million in labor income. At the direct level, this model supports careers in agricultural planting services, environmental consulting, and scientific research. As these services are fulfilled, spending largely influences the impacts in services (real estate, employment, management, legal, architecture, and accounting). Household spending (resulting from $1.3 million in labor income across the project) supports common service industries such as restaurants, medical care, and retail

shops. Across the life of the project, these expenditures add $1.8 million in value to the study area's economy.

Models 4 and 5 document the annual economic impacts of tourism to RP post-restoration. Model 4 examines visit expenditures from persons who reside inside the state of Florida but do not live inside the study area (Manatee County). Each year, such visits support over $200K in labor income for local workers and jobs in restaurants and retail shops. In comparison, Model 5 examines out of state visitors' annual expenditures in the study area. These expenditures (which are higher overall due to the inclusion of overnight stays and lodging expenditures) support 19 jobs in the study area and $767K in labor income. In both Models 4 and 5, the indirect and induced spending follow similar patterns. As these businesses prepare for future visitors, they often support local services such as management services, building repairs, warehousing, and accounting. Household expenditures often return to the economy through spending at local restaurants and medical care.

Although not modeled in IMPLAN, residents of Manatee County represent an important user of RP. Each year, residents of Manatee County spend over $1.7 million as a result of their trips to RP. Residents of study areas are typically not treated as economic impacts due to their expenditures already existing in the study area's model.

Restoration construction efforts (such as excavation, grading of habitat features, and planting) supported an estimated 220 jobs and $11.3 million in labor income in Manatee County across roughly a decade, while monitoring efforts supported 19 jobs and $1.3 million in labor income in Manatee County. Recreation use by out of state visitors and Florida residents living outside of the Manatee County study area supports 25 jobs and nearly a million dollars in local labor income each year. Restoration efforts supported roughly 16 jobs per million invested during the construction and monitoring phases. These include ongoing jobs as a result of recreation (see Models 4 and 5). This estimate may increase over time as tourism to the site increases and more workers are needed to meet recreation user demands. This study represents only one part of a broader effort to understand and establish the full benefits of restoration, which in this case include potential improvements to local resident well-being, co-benefits such as reduced flooding, and increases to housing value and local economic development.

Table 6. Economic Impact Model Results (reported in 2024 dollars).*

Model/Impact Type	Employment^	Labor Income	Value Added	Output
Model 1: Construction and Planting (one-time activities)				
Direct	88.15	$ 3,999,392.97	$ 4,183,609.35	$ 8,641,018.21
Indirect	10.89	$ 684,870.28	$ 1,161,835.56	$ 2,172,720.64
Induced	14.95	$ 733,349.59	$ 1,532,723.66	$ 2,566,242.34
Totals	113.99	$ 5,417,612.84	$ 6,878,168.56	$ 13,379,981.19
Model 2: Construction of Amenities (one-time activities)				
Direct	75.47	$ 4,289,916.62	$ 4,494,859.28	$ 10,167,376.32
Indirect	13.99	$ 876,522.25	$ 1,483,780.83	$ 2,772,102.96
Induced	16.57	$ 813,028.28	$ 1,699,343.71	$ 2,845,252.25
Totals	106.03	$ 5,979,467.15	$ 7,677,983.82	$ 15,784,731.53
Model 3: Science and Monitoring (one-time activities)				
Direct	9.92	$ 840,426.71	$ 1,005,556.47	$ 1,968,126.98
Indirect	5.86	$ 334,852.20	$ 476,177.67	$ 980,407.12
Induced	3.71	$ 182,188.43	$ 380,812.04	$ 637,608.10
Totals	19.49	$ 1,357,467.35	$ 1,862,546.18	$ 3,586,142.20
Model 4: In-state visitors (annual expenditures)				
Direct	3.89	$ 129,820.38	$ 222,617.50	$ 435,734.44
Indirect	0.91	$ 50,403.41	$ 79,268.74	$ 163,074.21
Induced	0.56	$ 27,425.21	$ 57,308.90	$ 95,947.92
Totals	5.37	$ 207,648.99	$ 359,195.14	$ 694,756.56
Model 5: Out of state visitors (annual expenditures)				
Direct	14.75	$ 495,251.32	$ 794,822.95	$ 1,535,387.61
Indirect	3.13	$ 171,210.35	$ 272,835.82	$ 562,553.16
Induced	2.07	$ 101,391.35	$ 211,869.12	$ 354,715.18
Totals	19.95	$ 767,853.02	$ 1,279,527.89	$ 2,452,655.95

*Although not modeled, residents of the study area spend $1,757,276,02 annually as a result of visits to Robinson Preserve.
^Employment estimates reported as IMPLAN annual average of employment positions, not full-time equivalents (FTE).

Discussion and Application of Results

The findings of this study presented new knowledge on the economic impacts of restoration work when it overlaps with recreation opportunities. Collectively, Phase II of RP restoration supported ~264 jobs in Manatee County and $13.7 million in labor income for local workers in a wide array of industries. This includes an ongoing annual economic impact by recreation activities supporting ~25 jobs and nearly a million in labor income. This breaks down to roughly 16 jobs per million spent on restoration efforts and includes ongoing jobs supported by recreation opportunities created at RP as a result of the restoration efforts. It is useful to note that the ongoing benefits of recreation at RP will continue to produce economic benefits every year going forward and ostensibly could even grow as the site becomes more regionally/nationally known, population changes occur in the region, and new recreation activities are added.

These results demonstrated an ongoing value in linking restoration projects with recreation opportunities. From an economic impact perspective, restoration projects alone are one-time impacts: when the planting and earth work is done, the economic impacts of these activities cease. However, by adding recreational activities to the restored site, the local economy potentially gets an ongoing dose of activities which can support both local and visitor uses. This provides additional economic value above and beyond the restoration process. One possible limitation of the study was the decision to exclude lodging expenditures for in-state visitors. When examining restoration projects which include tourism elements, it may be useful to include a sensitivity test to consider to what degree in-state residents utilize overnight lodging. One future approach to this could also include breaking residential locations into categorized locations where, for example, nearby locations do not utilize overnight lodging while further away (but still in state) locations do include lodging expenditures.

The demographics and use patterns from this study present the need for future conversations about health benefits from restoration projects. In this study, the researchers noted a relationship between local retirees and their use of walking trails at RP. Ostensibly, these place-based opportunities support potential health benefits to local residents and others using the trails. These are questions that should be examined in future studies so that this can be applied to the economic values of restoration projects. These are especially pertinent for acquisition and restoration actions aimed at improving ecosystem health and recreational opportunities.

Restoration projects such as RP also provide an opportunity to pair outdoor recreation and public land use with sustaining habitats. As previously substantiated by extensive national research, outdoor recreation is a vibrant form of economic impact and is well-established in Florida's vast coastal areas and its global reputation as a tourism playground. It follows that improving the quantity and quality of habitats such that they function as salt marshes or tidal ponds also supports outdoor recreation and tourism. At RP, visitors can fully access the property in a multitude of ways while doing so without impacting its natural function as a fish nursery and more. Along the way, visitors also see restoration efforts in progress and learn about the value of the work being done. More studies are truly needed here, but this blend of restoration and tourism may help tourists and locals alike better understand the environmental balance needed to protect coastal areas even while ensuring economic development. The similarity of the RP area to other impacted tidal areas along the coast of Florida provides an opportunity to consider how restoring other former farming/industrial areas may be beneficial to ecosystems and economies.

CONCLUSIONS AND RECOMMENDATIONS

The RP restoration project highlights the multidimensional benefits that ecological restoration can offer, demonstrating how providing public access to recreational opportunities in coastal natural areas can generate positive environmental, economic, and social outcomes. Through a blend of restored coastal wetland ecosystems, public infrastructure, and recreational opportunities, RP serves as a model of sustainable coastal restoration that balances conservation with community use. The economic impact analysis of RP demonstrates that the area supports individual well-being (e.g., job creation and induced effects), but also contributes to the local economy. Beyond RP, the results of this study reveal that coastal natural areas throughout Southwest Florida are important for both economic and environmental sustainability. Recreational activities such as kayaking, fishing, and wildlife viewing contribute to regional tourism and economic growth. By aligning conservation goals with public engagement and economic initiatives, future restoration projects can ensure that the benefits of restoration are broadly shared and sustainable. Restoration efforts, such as at RP, will be essential for building resilient communities, supporting regional economies, and preserving the ecosystems that define the region.

The results of this study support conducting future studies examining restoration projects and their wider economic impacts. This study presented a model for future restoration projects involving recreation opportunities. This study establishes an IMPLAN methodology that successfully blends restoration activities (such as construction, planting, and monitoring) alongside recreation activities. This also includes the option of continuing the use of NVUMS expenditure patterns in future studies to reduce survey burden. Future studies should further consider other measures of economic outcomes, such as customer surplus, hedonic analyses of property value change in restoration efforts, educational outcomes from restoration projects, and ecosystem benefits (including water quality improvement). Moreover, the study's results provide a gateway for discussing future restoration efforts in Florida in support of its vibrant outdoor recreation economy in its many forms.

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