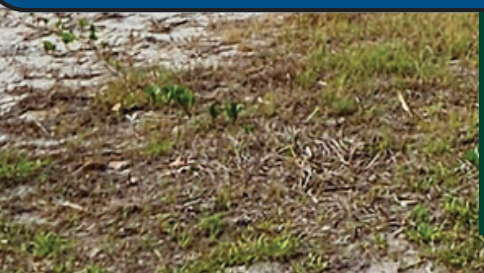
Summer Haven River and Summerhouse
Cost Benefit Analysis and Economic Impact Study

Final Report
July 2025



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Executive Summary

Summer Haven in southern St. Johns County, Florida, (the County) has in recent years been faced with serious coastal erosion challenges, including multiple natural disasters that resulted in closure of the Summer Haven River (SHR) due to beach sand washing into the river. The closure of the formerly open and flowing river has been traumatic for local residents, many of whom have long family ties to the area. Nearby, the Summerhouse Beach and Racquet Club (Summerhouse) has been facing a history of severe erosion at the southern end of the property, exacerbated by the dynamics of intertidal flow in and out of the inlet channel that borders the property to the south. In five incidents since 2017, storm effects have increased structural vulnerability to the southernmost ocean-facing building, and this condition is anticipated to continue creeping northward along the shoreline. Coastal engineering firm INTERA was retained by the County to assess viable options for addressing both areas; this report includes a cost benefit analysis of the engineering and non-engineering options offered by INTERA.

The community is characterized by unique ecological, physical, and socioeconomic characteristics. It is home to many species of wildlife, the composition of which has responded to the changing coastal landscape largely driven by major storm events. Scientific research and educational outreach have long occurred here, taking advantage of the diverse ecosystems. Visitors and local residents recreate along the river, and adjacent parks. While a relatively small area geographically, the economic impact of the recreational users and research is estimated to contribute about $3.4 million annually to County revenues.

The Balmoral Group conducted surveys and research to support a cost-benefit analysis of the engineering options. Surveys found that there is some lack of consensus on the impacts of the river closure and management options; residents that reside in the area full-time less frequently reported noticing the environmental changes and more frequently reported openness to County action compared to those that live in the area only part of the year or part-time.

The cost-benefit analysis considered impacts of the various options on costs to residents as well as benefits of recreational spending, property value impacts, non-market benefits such as public values for local habitats, listed species, and “special places” values, that affect quality of life. In all cases, costs and benefits are assessed against status quo, or business as usual, as the base case. The analysis found that the high maintenance costs drove the results for most options at Summer Haven River, while protection of property drives the results for Summerhouse. A distributional analysis describes how costs and benefits in each option are anticipated to be borne by the public, private sector and local residents.

For Summer Haven, the analysis finds that Managed Retreat delivers the greatest benefits to the community, with Net Benefits exceeding costs at both a 20-year and 50-year planning horizon. The Beach-Dune Nourishment option achieves cost-effectiveness at the 50-year time frame, but

not at 20 years. Benefit Cost Ratios (BCR) represent benefits compared to costs; if BCR is greater than 1, benefits exceed costs, and if BCR is less than 1, benefits are outweighed by costs. **Table 1** provides the results of the SHR Benefit Cost Analysis, using a 3% discount rate at 20 years and 50 years. A sensitivity analysis included in the report provides results at higher and lower discount rates. The detailed results for the Summer Haven River Benefit Cost Analysis are provided in Appendix B.

Table 1. Benefit-Cost Ratios, Summer Haven River
Relative to Base Case

	20 Years	50 Years
OPTION	**3%**	**3%**
Seawall	0.56	0.58
Beach-Dune Nourishment	0.54	1.32
Managed Retreat	4.80	8.31

Source: TBG Work Product

For Summerhouse, the Seawall option provides the greatest benefits to the community. Protection of the structural integrity of Building 20 is accomplished in all of the options, but the associated amenity benefits are the greatest in the beach-dune nourishment option. The Beach-Dune Nourishment and IMP options prove extremely costly over the long term, due to the expected frequency of the nourishment needed to achieve objectives. **Table 2** provides a summary of the Summerhouse Benefit Cost Analysis, using a 3% discount rate at 20 years and 50 years. A sensitivity analysis included in the report provides results at higher and lower discount rates. The detailed results for the Summerhouse Benefit Cost Analysis are provided in Appendix C.

Table 2. Benefit-Cost Ratios, Summerhouse
Relative to Base Case

	20 Years	50 Years
OPTION	**3%**	**3%**
Seawall	2.01	3.14
Beach-Dune Nourishment	0.87	1.01
IMP Dredge & Fill	0.55	0.53
IMP Fill Only	0.38	0.36

Source: TBG Work Product

Both the Summer Haven River and Summerhouse face difficult and challenging situations. The Cost-Benefit Analysis is intended to provide information to the decisions the County and private landowners face. It should be noted that the scope of this study is geared toward County-level benefits. Several of the benefits included herein would be excluded from a Cost-Benefit Analysis prepared for federal funding, likely resulting in lower BCRs than those reported here, since national interest and commercial navigation are less prominent in this local situation.

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Introduction & Scope of Study

Summer Haven in southern St. Johns County, Florida, (the County) has in recent years been faced with serious coastal erosion challenges, including multiple natural disasters that resulted in closure of the Summer Haven River (SHR) due to beach sand washing into the river. The County has explored options to keep the river open, as the river provides multiple benefits including property values, wildlife habitat and other ecosystem services, commercial and recreational boating and fishing, among others. In 2023, INTERA-GEC (INTERA) published a report commissioned by the County that examined environmentally and financially sustainable long-term solutions to protect the shorelines of Summer Haven and minimize the potential for sand infill to the SHR (INTERAa 2023). The report identified two options identified as feasible based on engineering analysis as the most viable and likely to have permits approved: to construct a seawall fronted by a small dune, and to conduct large-scale beach and dune nourishment.

This economic analysis was commissioned by the County to gain information on the costs and benefits of the two engineering options that were presented in the INTERA report. The project involved four main tasks: stakeholder interviews; surveys of residents, visitors, and businesses; cost-benefit analysis of the engineering options; and economic impact analysis of the state of the Summer Haven River.

In addition, a study was conducted of Summerhouse Beach and Racquet Club (Summerhouse). This condominium complex has been facing a history of severe erosion at the southern end of the property, exacerbated by the dynamics of intertidal flow in and out of the inlet channel that borders the property to the south. There are several options the County could consider with respect to management of the erosion issues at Summerhouse that were presented in a separate INTERA report (INTERAb 2023) that were deemed the most viable engineering options and likely to receive the necessary permits. The County commissioned this economic study to obtain a cost-benefit analysis of the options produced by the INTERA analysis of Summer House Beach & Racquet Club area.

Methodology

This study presents an economic analysis of the costs and benefits of the engineering options from the INTERA reports for the Summer Haven River and Summerhouse, as compared to the status quo, or business as usual case, as well as the economic impact and socioeconomic distribution of costs and benefits. The County's objectives in conducting the Cost-Benefit Analyses (CBA) is to understand the costs and benefits to the County, and therefore the CBA is prepared for that perspective. This is an important point, as a CBA prepared to federal standards would be prepared from a different perspective. Some values that are considered critical to local

residents would not be included in a federal standard CBA, as they do not support commercial navigation or national interests.

Figure 1 provides an overview of the Economic Study process.

Figure 1. Summer Haven Economic Study Process

Source: TBG Work Product

The Cost-Benefit Analyses (CBA) of both Summer Haven River and Summerhouse were conducted by identifying all possible costs and benefits to be analyzed. The approach included data collection from local, state government and private vendor sources; site visits; stakeholder interviews; and recreational user, visitor, resident, and business surveys. In addition, TBG worked closely throughout the review with INTERA to understand and properly assess the costs and benefits associated with the base cases in each CBA, as well as the alternatives under consideration. Multi-criteria decision matrices were developed for the Summer Haven River and Summerhouse CBAs to identify and define the respective costs, benefits and socio-economic impacts associated with each alternative. In addition, stakeholder interviews were conducted to better understand the dynamics of the complex natural and social systems that influence recreational and economic activity in the Summer Haven River area. The time horizons for the Summer Haven River and Summerhouse analyses were established at 20 and 50 years. The CBA discounted future values at 3 percent as per federal guidelines. A sensitivity analysis was also performed to assess the impacts of using alternate values for costs, benefits, and the discount rate.

Study Area Characteristics

Summer Haven is located in the southeast portion of St Johns County on the east coast of Florida. It is a small, historic community characterized by an older population, relatively high home values with a high proportion of part-time residents and rental/vacation homes. The most recent US Census estimates indicate a population of 2,979 and median age of 53 for the Summer Haven census tract, about 10 years older than the statewide median age of Florida residents. The median housing value is a little over $500,000, and the median household income for the majority of households in the community is $85,000 (compared to the statewide median of $71,711). Adjoining Summer Haven to the north is Summerhouse Beach and Racquet Club (Summerhouse), consisting of 256 condos across 20 different buildings, on 26 acres fronting 1,400 feet of Atlantic coastline.

The community is characterized by unique ecological, physical, and socioeconomic characteristics. It is home to many species of wildlife, the composition of which has responded to the changing coastal landscape largely driven by major storm events. When the river was open and flowing, it was home to a diverse assemblage including dolphins, manatees, sea turtles, and various nesting shorebirds (INTERAa 2023). Recently, increases in least tern nesting colonies have been documented along shoals in Summer Haven River, an example of the dynamic ecological characteristics of the system.

Summer Haven is also a historic community dating back to the early 1800's and settled in the 1920's by the Mellon Family. The community developed around the Summer Haven River, which provided natural resource and other amenity benefits to community members and visitors over the years. The community's historic homes and scenic value of being located on the Summer Haven River (SHR) and the coast have experienced diminished aesthetic and "special place" values due to the shoaling-in of the river.

The physical setting consists of a narrow barrier island situated between the Atlantic Ocean on the east and the Matanzas River on the west contributing to repeated overwashing of sand, erosion, and repeated inlet formation, impacting both the Summer Haven and Summerhouse communities.

Since the early 1840's, Summer Haven and Summerhouse have been impacted by tropical storms and hurricanes. Storms during the most recent decade have caused significant erosion of the beach and dune system, making the whole area more vulnerable to storms. At Summerhouse, there is increased vulnerability of its buildings, particularly at its southernmost end. Summer Haven has experienced recurring washover zones and repeated inlet formation, and has been designated by the Florida Department of Environmental Protection (DEP) as a critical erosion zone (INTERAa 2023); similarly, Summerhouse had several oceanfront buildings that qualified the DEP standard of eligibility for coastal armoring in the past several years (INTERAb 2023).

Erosion at Summer Haven and Summerhouse during the past 20 years, has necessitated multiple dredge and fill activities by the county and other local, state, and federal entities to reopen the river and restore the beach at Summerhouse. As a result, a stretch of coast with 20 private properties has become "isolated", where the beach has been intercepted by an inlet, and several homes were abandoned and purchased by the county. Today, there are seven homes and 13 privately owned but unoccupied lots, lying immediately north of DEP reference monument R-205.

The major events and their impact on the Summer Haven River are summarized in **Table 3**.

Table 3. Summer Haven River, Recent History of Storm and Dredge/Fill Events

Year	Event	Summer Haven River Impact	Summerhouse Impact
2004	Tropical Storm Jeanne	Beach Erosion	Beach erosion
2005	Hurricane Francis	Beach Erosion	Beach erosion
2008	Tropical Storm Fay	Breach Causing Summer Haven River Closure	Beach erosion
2012	Hurricane Sandy	Beach Erosion	Beach erosion
2016 (Oct.)	Hurricane Matthew	Complete Loss of Protective Dunes, Large Breaches	Complete loss of protective dunes; increased structural vulnerability
2016 (Nov.)	SAPWBD/SJC dredge of SHR North	Filled Breach	N/A
2017	SAPWBD/FDEP dredge of SHR North	Partially restored beach and dune, Partially Opened River	N/A
2017	Hurricane Irma	Major Breach, Closed River Again	Continued erosion, loss of protective dunes, increased structural vulnerability
2018	SAPWBD/FDEP dredge of SHR North	Partially restored beach and dune, Partially Reopened River	N/A
2019	SAPWBD/FDEP/FIND/private dredge of SHR North	Partially restored beach and dune, Partially Reopened River	N/A
2019	Hurricane Dorian	Continued Erosion & Overtopping	Continued erosion, loss of protective dune, increased structural vulnerability
2021	SJC/FEMA dredge of SHR South	Dune Construction; Reopened River	N/A
2021 (Oct)	FEMA Category B Emergency Berm Restoration Project	N/A	Partial dune restoration
2021 (Nov)	Nor'easter	Reopened Breach; River Partially Closed	Possibly partially eroded FEMA Berm
2022 (Sept.)	Hurricane Ian	Substantial Breach; River Closed	Continued erosion, loss of restored FEMA berm, continued increased structural vulnerability
2022 (Nov.)	Hurricane Nicole	Substantial Erosion	Continued erosion and dune loss, continued increased structural vulnerability

Source: TBG work product; INTERAa 2023, INTERAb 2023, and INTERA communication.

To address these circumstances, there are several options for the County to consider. The following sections present the results of cost-benefit and economic impact analyses to inform the County on the costs and benefits of the options related to Summer Haven River and Summerhouse to address erosion from future major storm events and their impacts to these properties and County interests.

Cost-Benefit Analysis: Summer Haven River

CBA Options

The analysis herein assesses the social, economic and environmental costs associated with a total of four options: the base case, two potentially permittable (from an environmental regulatory standpoint) engineering solutions, and a managed retreat option. The total and net benefits of the three alternatives are compared to Option 1: the base case, or "business as usual" approach.

TBG reviewed the INTERA reports with the Professional Engineers to confirm assumptions regarding the impacts of seawall and dune construction design, predictions for design conditions over the time period, probability of losses to beach and other amenities, and probability of property loss.

Option 1: The Base Case: A 'business as usual' scenario.

'Business As Usual' is the Base Case analysis. In this scenario, stabilization occurs as needed for public safety, such as repairs to pipes or structures left bare due to significant coastal hazard events, but otherwise no substantial mitigation activities are undertaken and the summer haven river is not dredged to restore flow. Impacts to the community include the periodic loss of the open and flowing river, and continued administrative costs for County staff. Economic impacts include loss of full property value appreciation enjoyed by other areas of St. Johns County, loss of oyster production and loss of coastal wetland wildlife habitat public values consistent with the current river condition. In this scenario, continued beach erosion, overtopping, and breaching of the existing dune/berm will allow the beach to naturally migrate westward, eventually filling in the portions of the Summer Haven River lying adjacent to the beach and promoting continued siltation in the open segment connected to the inlet.

Option 2: Seawall

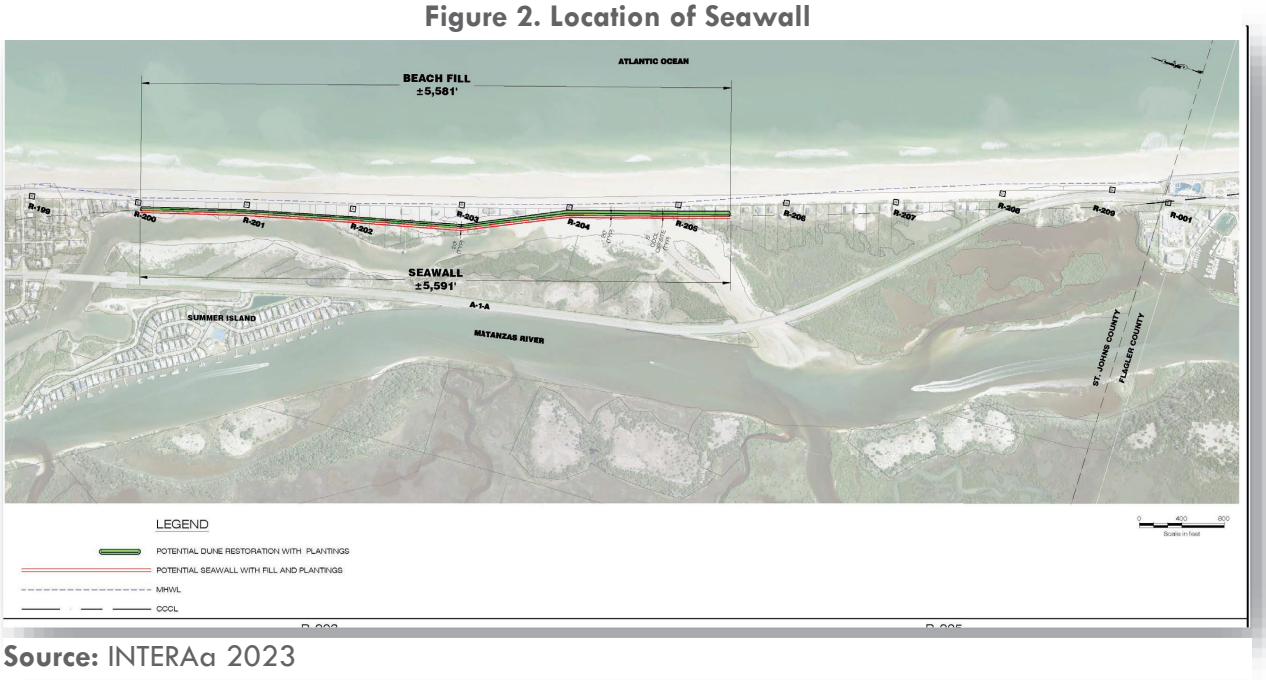
In this option, a seawall is constructed with a small dune, just landward of the Coastal Construction Control Line (CCCL) and the summer haven river is dredged to re-establish flow. The seawall is constructed at historical dune elevations of +14 feet NAVD88, extending from R-200 to R-205.5, or just over one mile long. The dune would front the seawall and serve to protect it from degradation from erosion; it would extend seaward into the CCCL with a crest elevation of +12 ft NAVD88 and a crest width of 20 ft (INTERAa 2023). The location of Option 2 is depicted in **Figure 2**. In this scenario, the seawall is primarily behind the properties along the beach due to the CCCL location and permitting requirements that the structure must be landward of the CCCL. The INTERA report notes on p. 99:

> *Without replenishment of sand fronting a seawall, a significant reduction or elimination of the recreational beach, turtle nesting habitat, and shorebird habitat would likely occur.*

As such, costs include initial construction as well as ongoing sand maintenance, repairs that can be anticipated from storms over time, public values for listed species habitat loss, and administrative costs.

INTERA also notes that Chapter 161.085(2), *Florida Statutes*, allows seawall construction in specific instances when the seawall is seaward of the CCCL, which this area does not meet. It is possible that a seawall landward of the CCCL will be able to be permitted, but INTERA's professional opinion is that a permit would be difficult to obtain. Because this alternative would require encroachment of private property, the County would need to secure easements from each property owner. Property owner feedback provided during the course of this project indicated opposition to such construction, affirming INTERA's professional judgment that

Figure 2. Location of Seawall



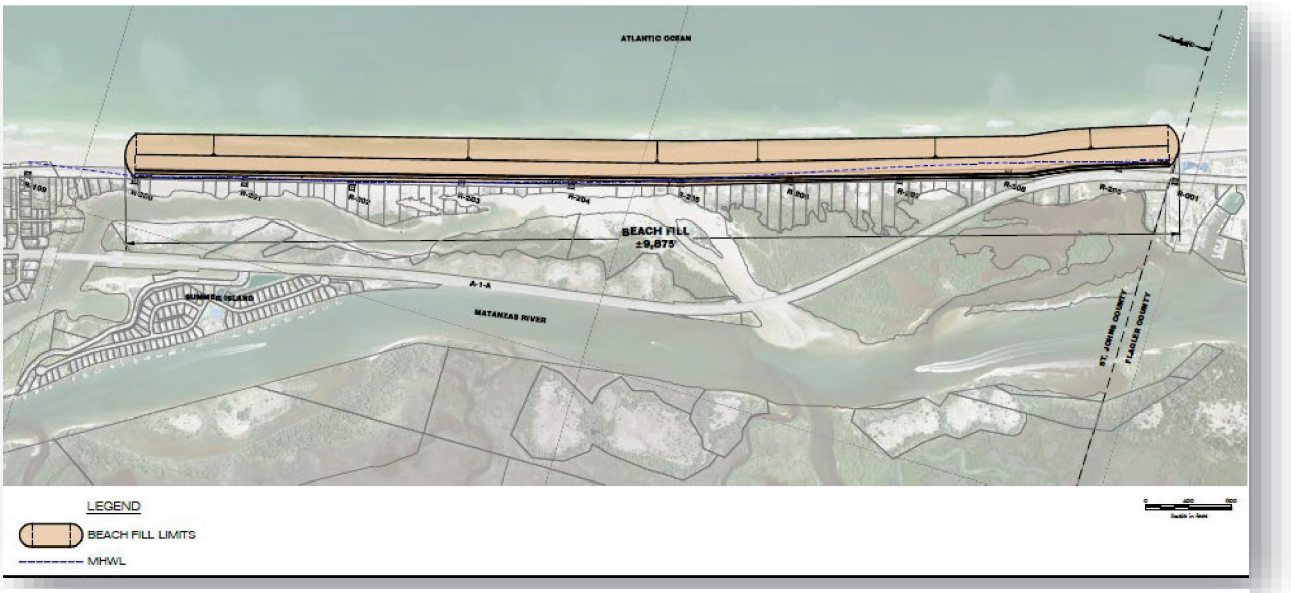
Source: INTERAa 2023

obtaining such easements would prove difficult.

Option 3: Beach and Dune Nourishment

Option 3 consists of constructing a dune that would begin about 40 feet seaward of the five isolated houses, reaching historical dune elevations of +14 feet NAVD88, accompanied by beach nourishment to achieve a 150-ft wide beach berm at +10 feet NAVD88 elevation and a 1V:10H beach slope to the waterline. Additionally, in Option 3, the summer haven river is dredged to re-establish flow. The location of Option 3 is depicted in **Figure 3**.

Figure 3. Location of Dune, Option 2



Source: INTERAa 2023

Option 4: Managed Retreat

Option 4 assumes that properties along the coastal zone (20 properties, of which 7 are occupied) are acquired opportunistically by the County over the next 20 years, and that basic restoration or stabilization will be conducted. Managed Retreat would provide continued access to the shoreline and residual dune system with accordant benefits; the summer haven river is not restored to an open and flowing state.

Typically, in a managed retreat scenario, buy-out programs are used where local, state, or federal funds are used to purchase private property (which would then become public), demolishing the structures and then restoring the natural habitat. The INTERA report notes:

> *Managed retreat has occurred to a limited degree since 2009 along the stretch of property fronting the SHR. As of January 2022, the County has acquired Blocks 3–15 and Blocks 28–32 (Figure 5.11) at a total cost of approximately $400,000, with $208,265 of that amount grant-funded. The 20 remaining private parcels north of R-205 (i.e., within and north of the current breach area) include 13 vacant parcels and 7 parcels with structures. The County has not acquired any of the 28 parcels from R-205 to R-208.5. ….. environmental and/or recreational enhancement of the purchased property could help offset adverse effects.*

Other Parameters of Cost-Benefit Analysis

Uncertainty

The cost-benefit analysis was conducted for two time frames; a 20-year time frame, which is common for public works projects, but is not temporally aligned with the current engineering analysis; and a 50-year time frame, which is temporally aligned with the useful life and Risk Assessment completed for the seawall. There is inherent uncertainty in the projections of events which are completely out of anyone's control; however, the engineering reports completed for the County state that coastal processes in this area will have uncertainty associated with them, which has been quantified and designed for as best as possible. Consequently, the estimates herein incorporate the realisms of financial and economic decisions that consider the probabilities of events within the 20-year and 50-year time frames.

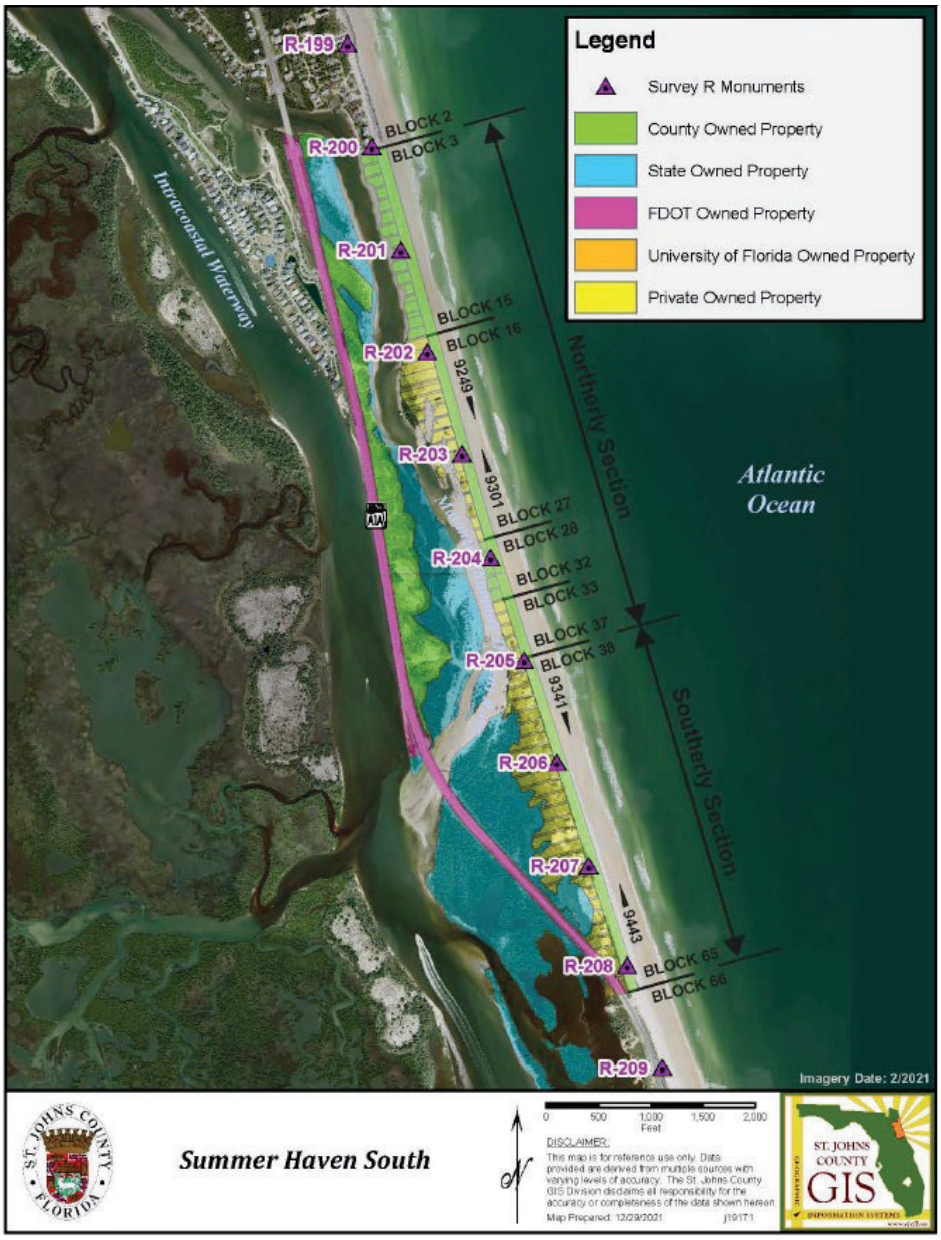
Property Values

Property values are dynamic in any environment, and coastal impacts can magnify these effects. Beach width has consistently been found to be a significant determinant of property values[1], and a 2009 study of ten U.S. beach towns with coastal erosion found that property values are more sensitive to changes in beach width when the erosion rate is high.[2] Anecdotally, property values in areas with sea walls have been found to decline after an initial "honeymoon" period. The analysis herein does not attempt to capture these real estate dynamics and uses current property values only. Property parcels are shown in **Figure 4**.

[1] Kriesel (2005).

[2] Gopalakrishnan (2009).

Figure 4. Summer Haven Parcel Map



Source: TBG Work Product, St. Johns County

Costs and Benefits Considered in the Analysis

The analysis considered three types of costs to the community: direct, indirect and non-market as characterized as follows.

- Direct costs – Out-of-pocket costs, County staff time or other direct expenditure, as for construction or maintenance;

- Indirect costs – generally, a loss of value or income due to an activity, etc.; and
- Non-market costs – generally, environmental services and social impacts that do not have direct pricing and for which proxy values are defined to represent a loss of some value associated with the option. Note that in the analyses for both Summer Haven River and Summerhouse, non-market costs are accounted for as negative non-market benefits.

Likewise, the analysis considered three types of benefits: community-oriented, recreational, and environmental. The latter categories may include direct expenditures and proxies for value identified by "willingness-to-pay."

- Direct benefits – as with costs, typically asset values received from some activity that accrue to the community in general, not to a specific party, in addition to the value of protected property;
- Indirect benefits – benefits that accrue as a result of the action taken; and
- Non-market benefits - generally, environmental services and social impacts that do not have direct pricing and for which proxy values are defined, such as published values for various ecological assets, aesthetic and cultural or heritage values. See note above on non-market costs; when compared to the status quo option, the non-market benefits in some options are negative and are thereby accounted for as non-market costs.

The value of each cost or benefit was assigned and estimated independently for each option. Due to the mutually exclusive nature of the options; a value that may be a cost for one option may be a benefit of another option. In some cases, values were derived directly from the relevant engineering reports. In other cases, published literature or government statistics were used to quantify impacts. Values for recreational, amenity and environmental benefits were derived from a review of relevant publications and calibrated to local visitor counts, household numbers or demographics. For example, the value of visitor expenditures relating to Summer Haven the beach was derived from surveys of weekend visitors onsite and supplemented with estimates from St. Johns County traffic counts at Helen Mellon Schmidt Park, Fort Matanzas National Park data, and previous analysis by Downs & St. Germain Research.

Where ranges of values were available, conservative estimates were used for all non-market costs and benefits, and should be considered a lower bound. In addition, it should be noted that there is a concept of "special places," threats to which affect individual (and the larger community) wellbeing[3]. For Summer Haven River, certain intangible aspects of the river (such as the public willingness to pay (WTP) for habitats, heritage values and listed species), appear to be comparable to activity-based values, such as actual recreational expenditures within the coastal

[3] Devine-White (2010)

sector of the economy, an indicator that Summer Haven River may fall into the category of "special places". Intangibles are less likely to be captured well by market valuation, while activity-based values are often easier to capture by market estimation techniques.

A list of costs and benefits that may be associated with each option was generated, as indicated in **Table 4.**

Table 4. Brief Description of Costs and Benefits for Summer Haven River CBA

Cost or Benefit	Brief Description
Administrative Costs	The direct administrative costs to the County including staff time, planning, engineering, contracting, legal, noticing, and administering emergency response efforts at the frequency of major storm event disruptions, annualized, dealing with public response, meetings etc.
Maintenance/Repair Costs	The costs to maintain the beach with dredge/fill activities, the seawall, or the constructed beach-dune
Construction Costs	The one-time costs to construct a seawall or beach-dune system
Loss of Property Value	The loss of value to private properties in Summer Haven River Area in terms of the marginal rate of value appreciation or depreciation as compared to the same rates county-wide
Non-use Value- WTP to preserve and protect the beach dune system	The public willingness to pay based on published values for the protection of the aesthetic amenity of beaches and dunes
Non-use Value- WTP to preserve and protect wildlife habitat provided by beaches & dunes	The public willingness to pay based on published values for the protection of habitat provided by beaches and dunes for listed wildlife species including sea turtles, coastal nesting bird species
Non-use Value- WTP to preserve and protect wildlife habitat provided by coastal wetlands	The public willingness to pay to protect habitat provided by coastal wetlands for wildlife found in estuarine and marine wetland and saltmarsh habitats such as fish, shellfish, and bird species
Cultural/Heritage Value	The public willingness to pay to protect historic, cultural value of local heritage/sense of special place
Commercial Fisheries Impact	The impact to productivity volume and potential revenues from commercially harvested shellfish from the Summer Haven River
Recreational Value- visitors	The direct spending value by recreational visitors to the area

Source: TBG Work Product

Table 5 summarizes the assignment of various impacts to each option.

Table 5. Costs and Benefits Associated with Each Option

	Option 1	Option 2	Option 3	Option 4
	Base Case: Business as Usual	Seawall	Beach-Dune	Managed Retreat
Construction Costs		X	X	
Administration Costs	X	X	X	X
Demolition & Restoration Costs				X
Property Acquisition Costs*		X		X
Maintenance/Repair/Beach Nourishment Costs	X	X	X	X
Mosquito Control	X			
Property value impacts	X	X	X	X
Salvage Value		X	X	
Recreational Value	X	X	X	X
Commercial fisheries production	X	X	X	X
Listed species impact	X	X		
Habitat values	X	X	X	X
Amenity Value: Beach	X	X	X	X
Heritage Value		X	X	

Source: TBG Work Product

Table 6 provides the basis for or the method of quantifying the various indirect, environmental, and social benefits employed in the analyses. The values are derived in part from literature values specific to Florida or St. Johns County, and its coast, where feasible. Select sources are reinforced by data from studies outside of Florida.

Table 6. Allocation Method for Benefits

Benefit	Description Of Method Used And Allocation Protocol
INDIRECT BENEFIT – Property Value Impact	Property records show that post-COVID (2021-2024) sales transactions in the immediate SHR area have reflected an average price per square foot appreciation that is 2.3% lower than the St. Johns County as a whole. Insufficient sales transactions have occurred within this small area to support a statistically valid hedonic modeling study. The average annual rate of suppressed appreciation (2.3%) was applied to the average square footage of the 218 homes in the area.
INDIRECT BENEFIT - Commercial Fisheries Production	FDACS records show that 2.11 acres of oyster production have historically and remain in production; however, productivity has declined at approximately 2% per year subsequent to the shoaling incidents associated with the SHR. Using current FWC-reported pricing of $6.53/lb and current production of about 3,574 lb/year, 2% annual loss was assigned as cost or benefit, depending on option (in options where loss is averted, the amount is assumed to be recaptured as a gain/benefit).
ENVIRONMENTAL BENEFITS – Listed Species	Willingness-To-Pay (WTP) is considered the best estimate of the public's value of listed species, since the species themselves are not assessed a price in the private market. In Summer Haven River, the relevant listed species for changed conditions are primarily the

Benefit	Description Of Method Used And Allocation Protocol
	least tern and sea turtle. Boeri et al (2020) identified annual payment per household at $6.43, applied to 10,360 households in the ZIP code in which Summer Haven is located. Wallmo & Lew 2012 and Wallmo & Lew 2015 identified payments per household per year averaging $72.55 for sea turtles, also applied to 10,360 households in the zip codes surrounding SHR.
ENVIRONMENTAL BENEFITS – Coastal Wetland Habitat	Coastal Wetland Habitat Benefits are estimated based on meta-analysis of WTP studies published conducted by FEMA (2022). The study estimated a one-time per acre payment of $8,244 after deducting recreational benefits, which are captured separately. The value has been applied to the 22.75 acres of coastal wetland habitat enveloped by the SHR.
ENVIRONMENTAL BENEFITS – Beach & Dunes	Mehvar 2018 for coastal systems WTP of $43,750/ha/yr (2024USD) or $17,499/a./yr as existence value. A higher FEMA value of $250K/a./yr could have been used, but is based on studies largely conducted in more populous areas with heavy beach usage, and results in values for beach and dune existence of half a billion dollars over 20 years. Given the relatively remote location for visitorship and residents of the strip of beach in question, the larger value is less credible in the context of other locations throughout Florida. As such, the Mehvar value was used. The study applied this value to the 109 acres of estimated beach and dune habitat enveloped by the SHR in the base case, and 119 acres in the Beach/Dune Nourishment option, for an additional net 10 acres of beach/dune that would be preserved.
SOCIAL BENEFITS – Heritage or Special Places	Residents offered feedback regarding the heritage value of SHR that lends to the concept of "special places," threats to which affect individual (and the larger community) wellbeing. For Summer Haven River, certain intangible aspects of the river (such as the willingness to pay for habitats, heritage values and listed species), appear to be comparable to activity-based values, such as actual recreational expenditures within the coastal sector of the economy, an indicator that Summer Haven River may fall into the category of "special places". Wright (2016) and Choi (2010) found values of approximately $40 per household per year, over and above other values, which was applied to 10,360 households in the zip codes surrounding SHR.

Source: TBG Work Product

Costs and Benefits Associated with Each Option

Base Case: No Action

In the 'No Action' or Base Case option, County activities are assumed to continue as they have been with no additional action taken to restore flow to the Summer Haven River. In this option, direct costs include repairs as needed for public safety following storm events or other significant coastal events, including continued emergency sand removal and placement based on historical costs, and all staff time needed to support these activities, including communication with the public, as is currently occurring. Direct costs also include mosquito control, as current conditions have created stagnant pools of water that attract mosquitos. Indirect costs include the economic impacts of continued loss of full property value appreciation enjoyed by other areas of St. Johns County[4].

[4] Note that tax revenues associated with suppressed property values are considered a transfer for cost-benefit analysis, and are not included as a cost.

Direct benefits include the value from existing recreational use and spending, and continued oyster production – albeit at a declining rate based on expected change in habitat consistent with the current river condition. In the No Action option, there is an assumption of increased habitat quality for least terns from shoaled-in riverbed, based on scientific expert input, and public willingness to pay values for listed species are included to account for this non-market benefit. In addition, because there is beach today that provides benefits on a regular basis, there is an assumption of a continued aesthetic value of beach and dune habitat that continues to be provided in this scenario but decreases at a constant rate over time. The analysis also considered willingness to pay for coastal wetland habitat and special places/heritage value, however these non-market benefits are both zero in the No Action scenario due to the assumption there would be no value associated with these benefits if the river is not restored to an open and flowing state[5].

Summary results for the No Action option 20-year analysis are shown in **Table 7,** and detailed results are provided in **Appendix B**. In the No Action option, benefits exceed costs and the benefit-cost ratio is 4.43. In subsequent sections that describe Options 2, 3, and 4, the results are presented at the end of each section and are shown as relative to the results of the No Action option, including the benefit-cost ratios. A benefit-cost ratio relative to the No Action option indicates the cost-effectiveness of that option relative to No Action.

Table 7. Summary CBA Results, Option 1: No Action, 20-Year Horizon, 3% Discount Rate

	Costs (in Thousands)			Benefits (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
Base Case	44,439	$3,824	$ 48,269	$183,469	$347	$29,8376	$213,653	4.43

Source: TBG Work Product

Option 2: Seawall

In Option 2: Seawall, Direct costs are for construction (which includes permitting and design) and ongoing maintenance and repair of the seawall and surrounding sand, which has been estimated by the INTERA. Sand replenishment and other repairs that are expected to be needed on a regular basis are estimated at 1% of construction costs annually per the INTERA report. Note, while the expectation is that such repairs would likely be needed every few years, there is of course no way of knowing the specific timing of incidents that would trigger repairs, and thus the costs have been annualized – there have been years where two sand repairs were needed. Additional direct

[5] No value is included in the No Action option, so that when other options restore this value, the net benefit of the recovery is recognized.

costs include property acquisition costs for properties affected by the construction, and an allowance for difficulties in obtaining permits or easements to construct the seawall. Because this approach would require encroachment of private property, the County would need to require easements from each property owner. Industry practice is to allow for 30% of the subject property values to accommodate potential litigation costs prior to construction, which has been applied to the average estimated property values of the 20 properties that would be immediately adjacent to the seawall.

Benefits also include reversal of some of the depressed real estate appreciation against SHR properties; conservatively, 50% of the loss was assumed to be avoided based on INTERA estimates of retention of beach amenity and increased stability, which would not be the same as a natural system but improved from current condition. Property values are dynamic in any environment, and coastal changes can magnify these effects. Beach width has consistently been found to be a significant determinant of property values[6], and a 2009 study of ten U.S. beach towns with coastal erosion found that property values are more sensitive to changes in beach width when the erosion rate is high[7]. Anecdotally, property values in areas with sea walls have been found to decline after an initial "honeymoon" period. The analysis does not attempt to capture these real estate dynamics and uses current property values only.

Business owners who responded to the survey reported that sales, on average, were expected to be 30% higher for those within the SHR buffer area (5-mile radius) based on pre-shoaling sales activity. However, the aforementioned loss of beach amenity would be expected to offset this increase, and as such recreational activity is kept the same as in base case.

Indirect benefits include the assumed continued commercial fisheries production based on the trend in production from 2000 through 2015 applied to the 2.11-acre oyster lease known to currently exist through records from the Florida Department of Agriculture. In discussion with Taylor Engineering and Florida Fish and Wildlife Conservation Commission (FFWCC), the previously active 11.32 acres of lease included areas of lease that were not oyster bed, as the habitat for a significant portion was open bottom and/or salt marsh, which are not oyster habitat. The active oyster lease of 2.11 acres was confirmed with both Taylor Engineering and FFWCC as the appropriate acreage to represent current oyster bed habitat, and improved growth was estimated under the scenarios where the river is open and flowing. Ecologists involved with extensive oyster restoration efforts in damaged oyster beds elsewhere in Florida note that five to ten years into multi-million-dollar oyster restoration efforts, virtually no evidence of recovery is seen in many areas, and at minimum, a five-to-ten-year lag in recovery is routine. Previous documentation reviewed (Berrigan, 2011) stated that somewhere within the study area, oysters

8 Kriesel (2005).

7 O'Connell, Jim (2008) Coastal Dune Protection & Restoration

can re-establish but there is no guarantee where and how much, and with a system that will continue to be stressed, it should be assumed this will be less than 100%. The calculations herein allow for recovery without lag, for the full current lease acreage. Note, a non-market value for water filtration provided by shellfish reefs was not included; had it been, the increase would have been approximately $1,000 a year, using FEMA values, and immaterial to overall results.

The non-market benefits for the seawall option include public willingness to pay values for coastal wetland habitat and special places/heritage values that are assumed would be restored with an open and flowing river, however, it is assumed that neither the beach nor the listed species habitat provided by the beach would be protected under the seawall option. The coastal wetland habitat value is applied to the 22.75 acres that would be restored with an open and flowing river. In conversation with Taylor Engineering, TBG confirmed that 22.75 acres of coastal wetland habitat are appropriate for use in the CBA. The acreage listed in Taylor Engineering's May 14, 2025 memo was derived from historical aerials; no field work was included. Taylor emphasized that areas of different habitats listed were overlapping between categories, and the maximum acreage identified from their aerial analysis was a loss of 39.46 acres of aquatic/wetland habitats between 2005 and 2023. Accordingly, the analysis applies values to 22.75 acres identified from DEP Land Use/Land Cover data as changed habitat from pre- and post-breach conditions.

Total costs exceed total benefits for the seawall option for a benefit-cost ratio relative to the No Action option of 0.56. Summary results are shown in **Table 8**, and detailed results for Option 2: Seawall are provided in **Appendix B**.

Table 8. Summary CBA Results, Option 2: Seawall, Relative to No Action, 20-Year Horizon, 3% Discount Rate

	Costs (in Thousands)			Benefits (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
Seawall	$76,328	$0	$106,165	$16,108	$24	$5,390	$59,619	0.56

Source: TBG Work Product

Option 3: Beach and Dune Nourishment

In Option 3: Beach and Dune Nourishment, Direct costs include construction of the new berm/dune and sand nourishment for stabilization. As in the Seawall scenario, construction costs include design and permitting, and an allowance for difficulty in obtaining required easements is estimated at 30% of affected properties' estimated value. Administrative costs and ongoing maintenance/repair of the sand dune are included based on engineering analysis. Ongoing sand costs approximately every three years total more than $87 million in the 20-year scenario (and more than $60 million over 50 years), and are the primary cost driver.

Indirect costs in this scenario turn into a benefit: the lost property value appreciation in the Base Case are assumed to be avoided.

In Option 3: Beach and Dune Nourishment, non-market benefits include public willingness to pay values for listed species, based on improved conditions for sea turtles and nesting coastal bird habitat, based on improved conditions. This benefit excludes the several month construction period, during which this benefit would not be available. Improved coastal wetland habitat, for the 22.75 acres of restored area, and WTP for beaches and dune ecosystems, are included, as well as the WTP for special places.

Direct benefits include increased recreational visitor spending, which is estimated at a 30% increase for the 45% of spending that occurs within the five-mile buffer of the SHR area based on TBG's results from surveys of recreational user spending in the area.

Indirect benefits include restoration of pre-shoaling oyster production. Costs and benefits are provided in **Table 9.** The detailed results for Option 3 are provided in **Appendix B**.

Table 9. Summary CBA Results, Option 3: Beach & Dune Nourishment Relative to No Action, 20 Years, 3% Discount Rate

	Costs (in Thousands)			Benefits (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
Beach & Dune Nourishment	$87,199	$0	$87,199	$24,768	$24	$18,540	$47,164	0.54

Source: TBG Work Product

Option 4: Managed Retreat

In Option 4: Managed Retreat, direct costs include administrative costs for purposes of planning, engineering, contracting, legal, noticing, addressing public inquiries, and occasional emergency repairs as in the base case, staggered acquisition of 20 properties and demolition of the 7 remaining homes, and continued mosquito control. Sand maintenance does not occur in this scenario, which along with lack of any construction is the driver for this option having the lowest overall total costs.

Indirect costs include the lower rate of appreciation for the remaining homes in the area; without the structures on the coastal zone, the beach would be expected to further fill in, creating additional beach area. As such, the stability of the area would be expected to increase somewhat, increasing the area of beach and dune habitat, and this benefit is included. The coastal wetland habitat is assumed to remain lost as the river would be closed, and the special places benefit is lost as well; no related benefits are recognized for this option.

The INTERA 2023 report[8] cites the protective effects of allowing the shoreline properties to return to natural state in a strategy that:

> *allows (1) the beach to naturally migrate landward, as opposed to attempting to stabilize the beach with engineering solutions, and (2) restoration of developed properties back to their natural ecosystems. Managed retreat has occurred to a limited degree since 2009 along the stretch of property fronting Summer Haven River. County acquisition of the private parcels north of R-205 could facilitate construction of any engineering solutions on these parcels.*

Dunes and beaches dissipate storm wave energy and act as a barrier to storm surges and flooding, protecting landward development and limiting storm wave effects on landward coastal resources.[9] An implied action associated with acquiring properties in the Coastal Hazard Zone is dune restoration. The properties landward of restored areas are, in turn, considered more protected than under existing conditions, which have the foredune compromised by development. However, no quantifiable estimate has been prepared of the area of properties that may be protected under this scenario. Results are shown in **Table 10.** The detailed results for Option 4: Managed Retreat are provided in **Appendix B**.

Table 10. Summary CBA Results, Option 4: Managed Retreat Relative to No Action, 20 Years, 3% Discount Rate

	Costs (in Thousands)			Benefits (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
Managed Retreat	$10,116	$0	$10,116	$0	$0	$3,292	$48,594	4.80

Source: TBG Work Product

Results of the Analysis

As noted, analysis was completed for all scenarios under two time periods. Identical processes were used for each. Under all options, it is recognized that a 50-year time frame for estimating costs or benefits introduces significant uncertainty. Accordingly, values for the 50-year analysis should be considered indicative of future relative outcomes, rather than absolute quantitative estimates. Results are as follows.

Table 11 describes the direct and total costs of each option at the 20 year and 50-year horizons. At the indicated discount rate (3%) and a twenty-year horizon, the lowest direct cost option is

[8] INTERA. (2023). Study of Summer Haven River and Surrounding Areas.

[9] O'Connell, Jim (2008) Coastal Dune Protection & Restoration

Option 4: Managed Retreat, with direct costs of less than $11 million. No Action, with direct costs of about $44 million and total costs estimated at $48 million in the 20-year horizon, is the next lowest direct cost option.

Over the 50-year horizon, the direct costs for Seawall increase nominally, while No Action costs accumulate to almost double the 20-year total. The Beach-Dune option decreases relative to the No Action option due to the relatively higher maintenance costs in Year 50 for the No Action option. Total costs of the Managed Retreat option remain less than those of the No Action, Seawall and Dune options in the 50-year time period, and the Managed Retreat option is the least costly across both time horizons. Higher total costs in the No Action option are due to indirect costs of ongoing property value losses, and in the Seawall option are due to indirect costs of losing beach and dune habitat.

Table 11. Direct & Total Costs Relative to No Action by Option – 20 Years and 50 Years

	Total Direct Costs (thousands)		Total Costs (thousands)	
OPTION	**20 Years**	**50 Years**	**20 Years**	**50 Years**
No Action	$44,439	$76,855	$48,269	$83,478
Seawall	$76,328	$77,343	$106,164	$128,944
Beach-Dune Nourishment	$87,199	$61,720	$87,199	$61,720
Managed Retreat	$10,116	$10,116	$10,116	$10,116

Source: TBG Work Product

Table 12 provides the Net Benefits Relative to No Action across the options for the 20- and 50-year time horizons. At 20 years, Net Benefits in the No Action option total more than $165 million, driven by recreational benefits; the Seawall and Beach-Dune options decrease this amount while Managed Retreat is projected as higher. Net benefits relative to the No Action option are negative for Seawall and Beach-Dune options and positive for Managed Retreat in the 20-year time horizon.

Direct benefits driven by recreation values are the largest determinant for the structural options, while non-market benefits dominate the results for Option 3: Beach and Dune Nourishment and Option 4: Managed Retreat. For the seawall, ongoing maintenance costs drive the results and over time far outweigh the benefits. At 50 years, Net Benefits for the Base Case increase to over $286 million. Relative to No Action, Net Benefits remain negative for the Seawall option but become positive for the Beach-Dune option in the 50-year time frame and increase to over $73 million for Managed Retreat.

Net Benefits for the seawall option under 20 years total negative $46.5 million (costs exceed benefits by $46 million) and under 50 years total negative $53.6 million, relative to Base case. Net Benefits of Beach & Dune Nourishment relative to No Action the base case total negative $40 million over 20 years (costs exceed benefits by $40 million) and $19.9 million over 50 years. Net

Benefits of Managed Retreat relative to the base case under this option are just over $38 million over 20 years and $73.9 million over 50 years.

Table 12. Net Benefits Relative to No Action by Option Across 20 and 50 Years at 3% Discount Rate

	20 Years	50 Years
	In Thousands	
Option	**Net Benefits Relative to No Action**	**Net Benefits Relative to No Action**
No Action	N/A	N/A
Seawall	-$46,546	-$53,695
Beach-Dune Nourishment	-$40,034	$19,943
Managed Retreat	$38,478	$73,925

Source: TBG Work Product

Sensitivity Analysis

A key result of a benefit-cost analysis is the benefit-cost ratio or BCR associated with each alternative strategy that indicates the relative cost-effectiveness of that strategy. BCR's are sensitive to the cost and benefit values used as inputs to the calculations, as well as the discount rates and time horizons. As described in the earlier sections of the report, all estimates have limitations.

Discount Rate

Sensitivity analyses were conducted at discount rates of 2% and 5%, following current federal guidance[10]. **Table 13** provides a summary of results; at 50 years, the seawall and beach-dune nourishment options become less cost-effective, and the managed retreat option becomes more cost-effective in 50 years.

Table 13. Benefit Cost Ratio by Option, at Various Discount Rates

	20 Years			50 Years		
OPTION	**2%**	**3%**	**5%**	**2%**	**3%**	**5%**
No Action	4.43	4.43	4.43	4.43	4.43	4.43
Seawall	0.63	0.56	0.48	0.69	0.58	0.49
Beach-Dune Nourishment	0.52	0.54	0.55	1.53	1.32	1.01
Managed Retreat	4.66	4.80	4.94	10.88	8.31	8.90

Source: TBG Work Product

[10] https://www.whitehouse.gov/wp-content/uploads/2025/01/CircularA-94AppendixC.pdff

Property Values

Property value impacts are an important factor in each of the four options in the analysis. Based on market trends and actual property sales, a long-term average of 11 sales per year was assumed. If a higher value is selected based on the annual property sales in the area from 2009, 34 transactions, the BCR for No Action decreases slightly to 3.79, for Seawall it increases slightly to 0.60 in the 20-year horizon at 3%, for Beach-Dune BCR values increase slightly in both time periods to 0.63 and 1.55, respectively, and the Managed Retreat option's BCR's decrease to 5.20 in the 20-year horizon and 9.00 in the 50-year. Overall findings and conclusions would remain the same based on the relative results across options.

Cost of Sand

The cost of sand in the No Action option for maintenance/repair/nourishment activities that are assumed to be necessary in this scenario was based on the $95/CY from the Atkins June 2023 report. If a lower value of $76/CY is used, based on an analysis of projects implemented by the County and/or other local entities is used, the BCR results change slightly across options. For the 20-year time period, in the No Action option, the BCR increases slightly to 5.26; for Seawall, the BCR decreases slightly to 0.49; for Beach-Dune, the BCR decreases slightly to 0.50, and for Managed Retreat, decreases slightly to 4.05. The results indicate a slight sensitivity to the cost of sand for maintenance in the base case, lowering of which results in slightly lower BCR's across all options.

Non-market Values

Non-market values were considered in this analysis. Nonmarket goods refer to things you cannot purchase in a store, such as water quality, or noise pollution, or clean air, or healthy ecosystems. Nonmarket goods are quantified using published economic measures of the public's valuation for such items.

For non-market values, and when using a Benefit Transfer method as in this study, different options for non-market WTP values may exist for each strategy. TBG used professional judgement to select the most appropriate and applicable values due to factors such as geographic location, ecosystem service of interest, and year published, with more recent studies being preferable.

The measures chosen consider the specific options available to St. Johns County. As such, the information is not intended to be transferrable to other geographies or municipalities (although the measurement technique can be replicated).

For the Coastal Wetland Habitat WTP value, FEMA values were used, which derive from a meta-analysis of many studies of public WTP and total $8,487 per acre, or just under $200,000.

The WTP for listed species uses a lower bound estimate in the base using a 2020 study which estimated the public WTP for an increase in coastal birds at $13.77 per household per year, based

on ecologists' input that the least tern had established new nesting areas in the shoaled-in SHR area. An alternative value would include a Seeteram (2018) study that found a value of $6.41/household/year for endangered species habitat. Portions of this study were conducted in Florida and included the Florida Key Deer. The value is similar to that used, and the coastal bird value is considered more closely related to the subject area.

In the Beach-Dune Nourishment option, the expectation that the beach habitat will improve and provide habitat for multiple endangered species including sea turtles and coastal birds is the basis for applying a higher WTP value, to represent the public value for protecting threatened and endangered species. An average value taken across several studies that estimate the public value for the protection of sea turtle habitat for various species was used at $78.58 per household per year. Alternate values could have included a lower bound from sea turtle-specific WTP studies at $54.70 per household per year for leatherback sea turtle protection, or $118 per household per year for Hawksbill sea turtle protection. The more conservative average value was used.

The value for beaches and dunes was assigned using the value from Mehvar et al 2018 of $17,499/acre/year for the aesthetic values of beach and dune habitat.. An alternative value would have included $1,951 per acre per year, from the Global Ecosystem Services Valuation (ESVD) database for Coastal ecosystems. This value, is from a meta-analysis of many studies across the globe, and includes values from locations with settings very different from Florida. In the Managed Retreat scenario, use of the alternative, ESVD value would result in a BCR of 4.51 at 20 years and 7.81 at 50 years; in the Beach and Dune Nourishment option, the BCR would drop slightly to 0.51 in the 20-year and 1.24 in the 50-year with this value.

Discussion

Timing and Implementation of Options

The various benefits and costs outlined above are applicable for a limited time, perhaps only a few years before further impacts to the coastline and beachfront homes that are currently there accelerate: a decision needs to be made at some point. Based on feedback received during the study, residents, visitors and local experts are of varied opinions regarding whether the County should intervene in what some see as natural processes that will ultimately outweigh engineering solutions. Long-time residents immediately adjacent to the shoaled-in area of the river feel strongly that County intervention is required, although at least some of the homeowners on the coastal side are vehemently opposed to the seawall option. Visitors tended to have no opinion or expressed opposition to County intervention.

From a Net Benefits perspective ($38 million at 20 years and $76 million at 50 years), managed retreat potentially offers a partial solution. The associated community benefits and avoided costs imply that the coastal resources of SHR may continue to generate public revenues and private value in excess of the losses tied to the eventual removal of a number of homes. If the rate of

shoreline change is low, the losses are put off into the future and community revenues persist; if the rate of change increases, property losses affect the community more quickly (and at a greater present worth), but the significant costs of the sea wall and its maintenance are avoided. Managed retreat also leaves open the possibility of sea wall implementation in future should the economics of the situation evolve, and removing the structures (homes) on the coastal side eliminates a key barrier to construction of a seawall.

Implementation of a Managed Retreat option may be handled by various means. The costs of (eventual) home removal and site restoration need to be funded, whether by the property owner at the time, the County, or the State. However, were the property to be abandoned then either a lien holder (e.g., mortgager) or the community at large may be deemed responsible to ensure safety, removal of hazardous items, closure of utilities, etc. Similarly, the costs of site improvement, whether for safety, access, or ecological value (e.g., restoration) would attach to a lien holder or to the community. This is an issue for further consideration and future resolution.

Public safety is a consideration for all options involving the homes in the coastal zones. The community has an interest in maintaining its coastal population and their various economic contributions. Local governments have the authority to condemn property that is no longer safe for habitation or occupation, whether because of fire, a lapse in upkeep of critical supporting structure, etc. Once foundations have been undercut and exposed, coastal homes would be subject to the same authority. Property poised to fall is a risk to the resident, adjacent residents, the utilities, and of course beach users.

Funding of Options

Regardless of the Option selected, funding of costs must also be decided. As noted above, the direct costs are immediate and “out-of-pocket” for the affected parties and as such are more sensitive. Managed Retreat options bear several aspects of cost: compensation to ensure orderly retreat, either for direct purchase or for agreement to vacate in future, would need to be managed, as well as costs to stabilize and restore dunes for public use once immediately adjoining properties are vacated. Costs of the Base Case: Business as Usual option are not immediate and depend upon the rate of shoreline change and the vacation of properties; costs of demolition may be borne by the property owner and the other impacts or costs are borne by the community. The Seawall option presents opportunities for sharing of direct costs, if the County, State and Federal government see mutual advantages for doing so. The community currently enjoys benefits indirectly by visitor and resident expenditures, maintained or increased property values, etc., – if lost, a share of community income is lost which could otherwise contribute to funding.

Funding options available to local governments include general revenues, the capacity to levy special assessments, grants, redirected emergency management funds, and potentially tourism development taxes. The INTERA report provided details on the structural options and their

eligibility for various government funding sources, which hinge on very specific physical and engineering criteria, among other things.

Findings and Implications

The community of Summer Haven River faces a difficult and challenging situation due to coastal erosion. The community's river frontage amenity provided lifestyle options for residents for decades, and economic benefits through tourism and fisheries revenues. The Cost Benefit Analysis conducted herein assessed the engineering and non-structural options which St. Johns County currently faces for dealing with a coastal erosion situation. As a small community, the local economy influences, but does not dominate County-wide economic activity nor exhibit the characteristics of a community with high dependence on SHR tourism activity. The typical lodgings and hospitality amenities that would reflect a high level of tourism dependence are not found in the SHR area. The cost-benefit analysis thus relies more upon the intangible values of the beach, related environmental values, and the relationship of property values to the evolving SHR shoreline.

Comparing the options of No Action, Seawall, Beach and Dune Nourishment, or Managed Retreat, Managed Retreat is the preferred alternative based on the analysis. While not formally considered in this analysis, the County may wish to consider rolling easements, which compensate the property owner in advance for agreeing not to rebuild after the next significant loss. This option retains the beach amenity for the larger community, provides continued ad valorem revenue, and extends the period during which beachfront owner can safely stay in their homes as long as possible without creating irreversible fiscal constraints for decades to come. The retreat alternative also accommodates an adaptive management approach that allows decisions to be revisited in a future period, without eliminating options for future generations. The Seawall Option presents a degree of irreversibility and substantial financial commitment for the project life of 50 years, which appears daunting from not only financial return, but also permitting/regulatory, and property owner acceptance.

The Beach and Dune Nourishment option retains many of the desirable benefits that both visitors and residents value, but at an exorbitant cost. As recent history has demonstrated, natural processes are unpredictable, and could accelerate or dramatically increase the costs without warning.

Distributional Analysis

A distributional analysis of the Summer Haven River CBA results was conducted to identify, for each cost and benefit line item, the beneficiaries or payers to provide additional insight into the distribution of economic impacts of the options. The distributional analysis provides insight into which stakeholders receive the benefits, or incur the impacts and costs associated with each

option for the purposes of assisting decisions regarding funding arrangements. **Table 14** summarizes, by CBA line item across all four options, the amount of benefits or costs that accrue to each stakeholder group.

In No Action, businesses receive a bulk of the benefits from the value generated by overnight visitors who come to Summer Haven. Community and households also receive some value in this option from the continued provision of the value of beaches and dunes and the public value for the habitat provided for listed species. The local government bears the majority of cost in this option due to the required ongoing maintenance costs of beach repair. There is a private cost to homeowners in the No Action option as well from property value impacts that result from properties appreciating at a lower rate than the county.

In the Seawall option, businesses again accrue benefits from recreational values generated by visitors to Summer Haven. Additional community value is provided to households from the provision of the coastal wetland habitat value and heritage site value that would be provided if the river was restored. The bulk of the costs again accrue to the government for the construction and administrative costs associated with the seawall, but there is a benefit of salvage value as well. Private homeowners incur some cost as well, not as high as in the base case, but the lower rate of property value appreciation is still expected to occur.

In the Beach-Dune option, additional recreation values are provided that accrue to local businesses from the increased recreational opportunities provided under this option. Higher beaches and dunes value, coastal wetland habitat value, heritage site value, and listed species values are all provided for community/households in the area under this option. Again, the bulk of costs accrue to the government for the construction, administration, and maintenance costs associated with the beach-dune construction project.

The Managed Retreat option provides the same recreational value benefits to businesses as in the Base Case. It also provides public benefit through the reestablishment of natural beaches and dunes which provide a public value, as well as the value for listed species on the coast. The cost of this option is borne by the government but is lower than costs for the other options and is largely attributed to property acquisition costs.

The relative costs and benefits that accrue suggest that different options may have different funding considerations. For example, the higher level of public benefits associated with the Beach-Dune option could provide rationale for a publicly funded program to fund the higher construction and maintenance costs, if the county chose to pursue this option.

Table 14. Summer Haven River CBA Distributional Analysis (millions)

Stakeholder & Cost/Benefit	CBA Line Item	Type of Good	No Action	Seawall	Beach-Dune	Managed Retreat
Businesses						
Benefits	**Net Benefit**		**$183.81**	**$183.83**	**$208.60**	**$183.81**
	Commercial Fishery Impacts	Private	-0.01	0.00	0.00	-0.01
	Commercial Fishery Production	Private	0.35	0.37	0.37	0.35
	Recreational Spending (Day Visitors)	Private	71.45	71.45	81.09	71.45
	Recreational Spending (Overnight Visitors)	Private	112.02	112.02	127.14	112.02
Community/Households						
Benefits	**Net Benefit**		**29.84**	**5.39**	**48.38**	**33.13**
	Beaches and Dunes Value	Public	27.71	0.00	31.01	31.01
	Coastal Wetland Habitat Value	Public	0.00	2.87	2.87	0.00
	WTP for Heritage Site	Public	0.00	2.52	2.52	0.00
	WTP for Listed Species	Public	2.12	0.00	11.98	2.12
Government						
	Net		**44.44**	**100.69**	**131.63**	**11.28**
Benefit	Salvage Value	Common-Pool	0.00	16.11	0.00	0.00
Costs	**Net Cost**		**44.44**	**84.58**	**131.63**	**11.28**
	Administrative Costs	Common-Pool	1.04	14.57	11.63	1.04
	Construction Costs	Common-Pool	0.00	48.49	35.31	0.00
	Decommissioning Costs	Common-Pool	0.00	0.00	0.00	0.21
	Maintenance & Repair Costs	Common-Pool	43.39	7.21	84.68	0.00
	Mosquito Control Activities	Common-Pool	0.01	0.00	0.00	0.01
	Property Acquisition Costs	Common-Pool	0.00	14.31	0.00	10.02
Homeowners						
Costs	**Net Cost**		**3.77**	**1.89**	**0.00**	**1.89**
	Property Value Impacts	Private	3.77	1.89	0.00	1.89

Source: TBG Work Product

Cost-Benefit Analysis: Summerhouse Beach and Racquet Club

CBA Options

The analysis herein assesses the social, economic and environmental costs associated with a total of four options for the Summerhouse Beach and Racquet Club area (SH): the base case, or "business as usual" approach; two potentially permittable (from an environmental regulatory standpoint) engineering solutions, and an inlet management plan option (which has two cost scenarios). The total and net benefits of each alternative are compared to the Base Case: Business as Usual in the Results section.

TBG reviewed the INTERA reports in depth with the Professional Engineers to confirm assumptions regarding the impacts of seawall and dune construction design, predictions for design conditions over the project horizons, probability of losses to beach and other amenities, probability of property loss, and costs and benefits associated with the inlet management plan option.

Option 1: The Base Case: No Action

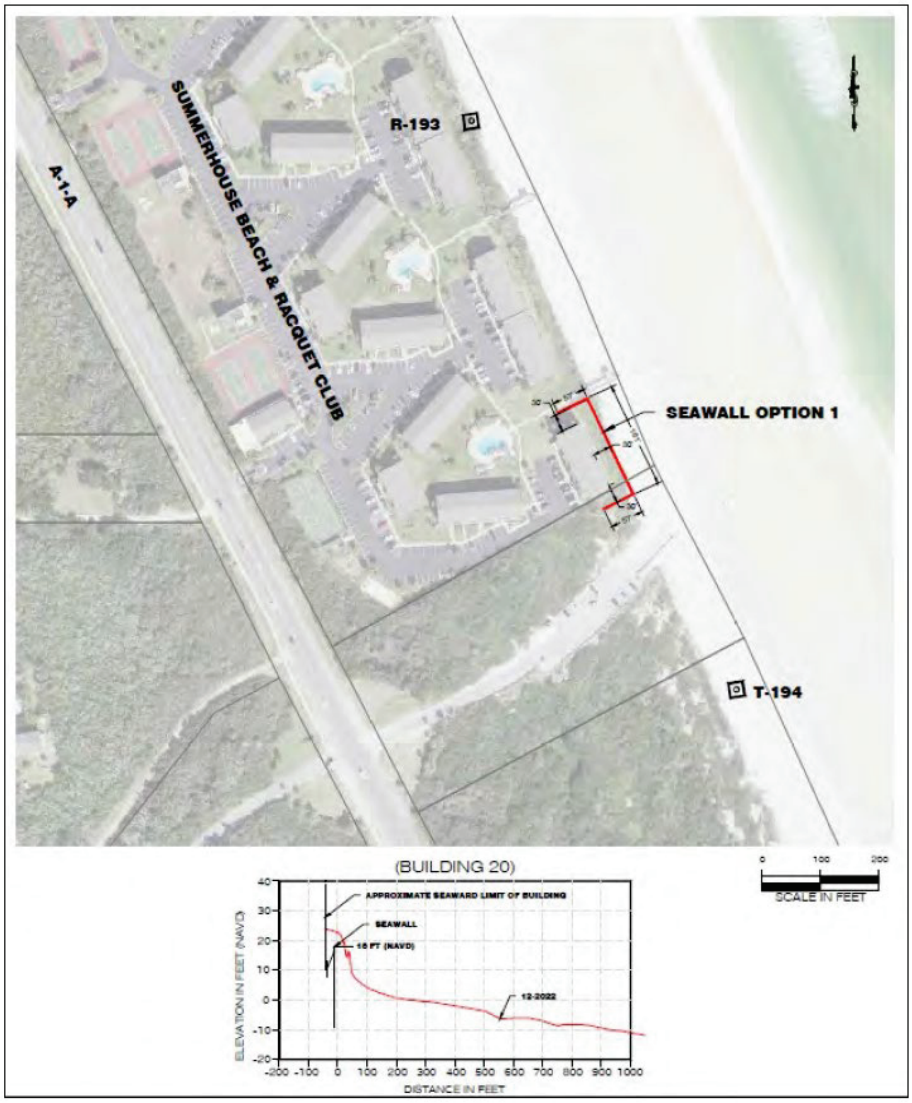
In this alternative, the County would provide no direct assistance to the residents of Summerhouse: the residents would need to fund their own initiatives. Based on prior practice, the residents would likely continue to place sand fencing on the upper beach during recovery periods in hopes of natural dune re-establishment and rely on FEMA emergency sand placement after storms. Under this alternative, the property's southernmost buildings are likely to become more vulnerable to storm events that continue to increase in frequency and intensity, and it is possible that condemnation of some threatened or storm damaged buildings may be warranted (INTERAb 2023).

Option 2: Seawall

Option 2 consists of the construction of a seawall protecting the southernmost building (building 20) in the Summerhouse complex. INTERA estimated the current vulnerability of the eight oceanfront buildings (numbers 1, 5, 6, 10, 11, 15, 16, and 20) and the lateral extent (width) of a potential seawall and presented a seawall design that protects Building 20 only. This alternative

would entail locating the seawall fairly close to the building to minimize negative impacts to the existing dune system. (INTERAb 2023).

Figure 5. INTERA Summerhouse Seawall Conceptual Sketch

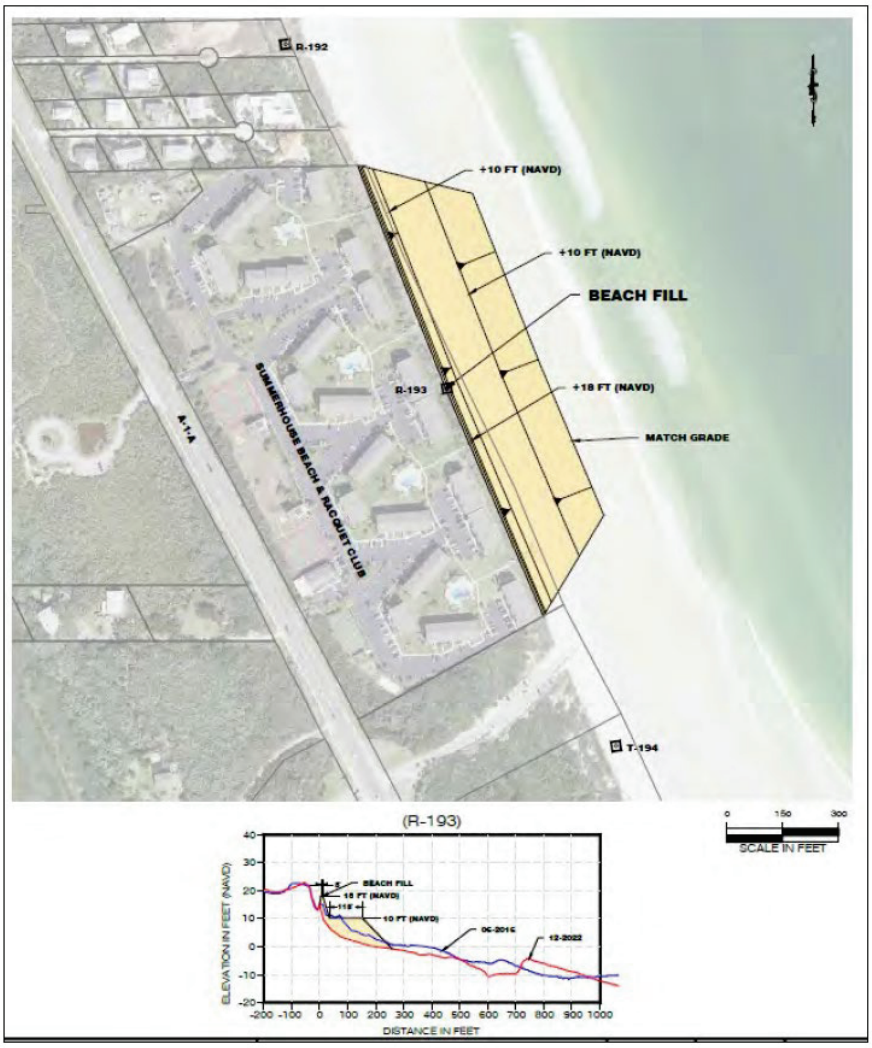


Source: INTERAb 2023.

Option 3: Beach and Dune Nourishment

This alternative entails a small-scale beach nourishment project fronting Summerhouse's 1,400-foot-long shoreline. This option would be implemented by restoring a portion of the secondary dune and completely restoring the seaward tertiary dune that eroded during Hurricane Matthew, which caused significant impacts to Summerhouse. INTERA notes that no fill is expected to remain after approximately three years due to the short length of the project; the report concludes that the small-scale project could potentially provide sufficient storm protection, but frequent renourishments would be required to replace the rapid dispersion of fill.

Figure 6. Summerhouse INTERA Beach and Dune Nourishment Concept Sketch



Source: INTERA Summerhouse Report 2023.

Option 4: Inlet Management Plan

The INTERA report recommended that the St Johns County Board of County Commissioners (BOCC) consider conducting an inlet management plan for Matanzas Inlet. Matanzas is not a traditional navigation inlet and experiences unique dynamics as it is influenced by the abutment of the bridge over the inlet and the revetted south shore of the inlet; the developed shoreline of north Summer Haven limits the natural migration of the inlet. The Intracoastal Waterway (ICWW) contains finer materials that could be better suited for beaches north of the inlet, as in Summerhouse, and Summerhouse could benefit from bypassed material. The recommendation for this option included two non-exclusive scenarios: (a) supporting a US Army Corps of Engineers (USACE)-sponsored inlet management plan for R-151 South to Matanzas Inlet and (b) pursuing a

County-sponsored inlet management plan for Matanzas Inlet through consultation with FDEP and the Florida Inland Navigation District (FIND).

Other Parameters of Analysis

The cost-benefit analysis was conducted for two time frames; a 20-year time frame, which is common for public works projects, but is not aligned with the current engineering analysis; and a 50-year time frame, which is aligned with the useful life and Risk Assessment completed for the seawall. There is inherent uncertainty in the projections of an event which is completely out of anyone's control. The estimates herein incorporate the realisms of financial and economic decisions that consider a 20-year time frame and a 50-year time frame. The reality is that no one can be certain at what point a major coastal event may or will accelerate or continue. All of the engineering reports completed for the County state that coastal processes in this area will have uncertainty associated with them, which has been quantified and designed for as best as possible.

Property values are dynamic in any environment, and coastal impacts can magnify these effects. Beach width has consistently been found to be a significant determinant of property values[11], and a 2009 study of ten U.S. beach towns with coastal erosion found that property values are more sensitive to changes in beach width when the erosion rate is high.[12] Over time, property values in areas with sea walls have been found to decline, anecdotally, after an initial "honeymoon" period. The analysis does not attempt to capture these real estate dynamics and uses current property values only.

Costs and Benefits Considered in the Analysis

The analysis considered three types of costs to the community: direct, indirect and non-market as characterized as follows.

- Direct costs – Out-of-pocket costs, County staff time or other direct expenditure, as for construction or maintenance;
- Indirect costs – generally, a loss of value or income due to an activity, etc.; and
- Nonmarket costs – generally, the value of something that the public values.

Likewise, the analysis considered two types of benefits: recreational and environmental. The latter categories may include direct expenditures and proxies for value identified by "willingness-to-pay."

[11] Kriesel (2005).

[12] Gopalakrishnan (2009).

- Direct benefits – as with costs, typically asset values received from some activity that accrue to the community in general, not to a specific party, in addition to the value of protected property;
- Indirect benefits – benefits that accrue as a result of the action taken; and
- Non-market benefits - published values for various ecological assets, aesthetic and cultural or heritage values

The value of each cost or benefit was assigned and estimated independently for each option. Due to the mutually exclusive nature of the options; a value that may be a cost for one option may be a benefit of another option. In some cases, values were derived directly from the relevant engineering reports. In other cases, published literature or government statistics were used to quantify impacts. Values for recreational, amenity and environmental benefits were derived from a review of relevant publications and calibrated to local visitor counts, household numbers or demographics. Where ranges of values were available, conservative estimates were used for all nonmarket estimates, and should be considered a lower bound. A list of costs and benefits that may be associated with each option was generated, as indicated in **Table 15.**

Table 15. Brief Description of Costs and Benefits for Summerhouse CBA

Cost or Benefit	Brief Description
Administrative Costs	The costs to the County of administering emergency response efforts at the frequency of major storm event disruptions, annualized; dealing with public response, meetings etc.
Maintenance/Repair Costs	The costs to maintain the beach with dredge/fill activities, the seawall, or the constructed beach-dune
Construction Costs	The costs to construct a seawall or beach-dune system
Management Study	The one-time cost of an inlet management plan
Annual Beach Profile Data Collection & Analysis	Annual cost of collecting beach profile data as part of the inlet management plan implementation
Supplemental Inlet Waterways Survey	Cost every five years (annualized) to survey inlet waterways as part of the inlet management plan implementation
Inlet Channel Realignment	Realignment cost of channel to occur approximately every 5 years as part of the inlet management plan implementation
Loss of Property value	The loss of value to private properties in Summerhouse in terms of the predicted 2% chance of property loss in any given year over the time period
Non-use Value- WTP to preserve and protect the beach dune system	The public willingness to pay to protect the aesthetic amenity of beaches and dunes

Cost or Benefit	Brief Description
Non-use Value- WTP to preserve and protect wildlife habitat	The public willingness to pay to protect listed wildlife species habitat such as for sea turtles, coastal nesting bird species
Recreational Value- visitors	The direct spending value by recreational visitors to the area

Source: TBG Work Product

Table 16 summarizes the assignment of various impacts to each option.

Table 16. Costs and Benefits Associated with Each Option for Summerhouse

	Option 1	Option 2	Option 3	Option 4
	Base Case: Business as Usual	**Seawall**	**Dune**	**Inlet Management Plan**
Construction Costs		X	X	
Administration Costs	X	X	X	X
Maintenance/Repair/Beach Nourishment Costs		X	X	X
Property value impacts	X	X	X	X
Loss of Service to Private Properties Impacts	X	X	X	X
Management Study				X
Annual Beach Profile Data Collection & Analysis				X
Supplemental Inlet Waterways Survey				X
Inlet Channel Realignment				X
Salvage Value		X		
Recreational Value		X	X	X
Listed species impact		X	X	X
Amenity Value: Beach		X	X	X

Source: TBG Work Product

Table 17 provides the basis for or the method of quantifying the various non-market costs and benefits employed in the analyses. The benefits are derived in part from literature values specific to Florida or St. Johns County, and its coast, where feasible. Select sources are reinforced by data from studies outside of Florida. Expense and cost information were primarily obtained from INTERA reports and other engineering documents and from regional service providers.

Table 17. Allocation Method for Benefits

Benefit	Description Of Method Used And Allocation Protocol
INDIRECT BENEFIT – Property Value impact	A 2% chance of loss of property in any given year (per INTERA) is applied to the estimated market value (based on St Johns County Property Appraiser data) of each building on the seaward side of the property (Buildings 20, 15, 16, 10, 11, 5, 6, and 1)
ENVIRONMENTAL BENEFITS – Listed Species	Willingness-To-Pay (WTP) is considered the best estimate of the public's value of listed species, since the species themselves are not assessed a price in the private market. Wallmo & Lew 2012 and Wallmo & Lew 2015 identified payments per household per year averaging $72.55 for sea turtles, also applied to 10,360 households in the ZIP code surrounding SHR.
ENVIRONMENTAL BENEFITS – Beach & Dunes	Mehvar 2018 for coastal systems WTP of $43,750/ha/yr (2024USD) or $17,499/a./yr as existence value. A higher FEMA value of $250K/a./yr could have been used, but is based on studies largely conducted in more populous areas with heavy beach usage, and results in values for beach and dune existence of half a billion dollars over 20 years. Given the relatively remote location for visitorship and residents of the strip of beach in question, the larger value is less credible in the context of other locations throughout Florida. As such, the Mehvar value was used. The study applied this value to the 9.72 acres of estimated beach and dune habitat that fronts Summerhouse.

Source: TBG Work Product

Costs and Benefits Associated with Each Option

Base Case: No Action

For the Base Case or 'No Action' scenario, direct costs include county administrative costs related to repairs as needed for public safety following storm events or significant coastal events, including continued emergency sand repair based on historical costs, and staff time to deal with public responses, as is currently occurring. Indirect costs include the economic impacts of the probability of loss of full property value for the Summerhouse buildings located along the seaward side of the complex (i.e., Buildings 20, 15, and 16) (See). Based on input from INTERA, it is expected that there is a 2% chance of property destruction to these buildings in any given year.

Figure 7. Summerhouse Oceanfront Structures

Source: INTERAb 2023

In the base case, non-market benefits include public willingness to pay values for recreational use, wildlife habitat, and aesthetics. For the benefits, the base case is expected to result in continued erosion to the beachfront area in front of Summerhouse; however, it is assumed, per INTERA's report, that the residents of Summerhouse would conducts their own activities placing sand fencing and hope that FEMA conducts emergency repair activities to restore the beach after storm events. Under these circumstances, there could be beach width maintained and benefits provided for recreational activities and listed species habitat and coastal beach-dune aesthetic value. Based on cumulative effects of repeated disruption and recognizing value exists today, approximately 38% of the public willingness to pay values for recreational, wildlife habitat, and aesthetic benefits is estimated as a related benefit. The calculation is based on the estimated percentage in public beach value reduction for the total acres of current beach in front of Summerhouse, assuming damage to the beach every three years, and FEMA assistance to rebuild after storms that would replenish the beach and amenity values, but that the FEMA assistance

would not be provided immediately after every storm – for every other storm event that destroys the beach, assume a two-year period without rebuilding. Summary results are shown in **Table 18**. The detailed results for the No Action option are provided in **Appendix C**.

Table 18. Summary Results, Option 1: No Action, 20 Years, 3% Discount Rate

	Costs (in Thousands)			Benefits (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
Base Case	$12,237	$7,251	$19,488	$4,886	$0	$5,564	$10,450	0.54

Source: TBG Work Product

Option 2: Seawall

In Option 2: Seawall, Direct costs are for construction (which includes permitting and design) and ongoing maintenance and repair of the seawall and surrounding sand, which has been estimated by the coastal engineers. Sand replenishment and other repairs that are expected to be needed on a regular basis are, estimated at 1% of construction costs annually (per INTERA report). While the expectation is that such repairs would likely be needed every few years, there is of course no way of knowing the specific timing of incidents that would trigger repairs, and thus the costs have been annualized. As the base case assumes no maintenance by the County, the result is a higher maintenance burden for residents.

In Option 2: Seawall, non-market benefits include public willingness to pay values for recreational use. Benefits include reversal of the predicted damage to Summerhouse properties predicted in the base case; 100% of the loss in property values for Building 20 only is assumed to be avoided in the Seawall option as compared to the base case, per INTERA. Unless the wall is exposed, little to no maintenance is needed, so maintenance costs of this option are relatively low as compared to the beach-dune nourishment option. The seawall option is not expected to produce additional recreation activity, habitat, or aesthetic value on the beach, but it will protect property value of Building 20. Recreational activity is expected to be similar to the base case.

Therefore, benefits related to beach use for recreation and provision of non-market values are not assumed to occur in this option, per the coastal engineering analysis. Results are shown in **Table 19**. The detailed results for Option 2: Seawall is provided in **Appendix C**.

Table 19. Option 2: Seawall BCA Results with 20-Year Horizon, 3% Discount Rate

	Costs- Relative to Base Case (in Thousands)			Benefits- Relative to Base Case (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
Seawall	($9,729)	($2,432)	$6,841	$285,397	$0	($5,564)	$13,724	2.01

Source: TBG Work Product

Option 3: Beach and Dune Nourishment

In Option 3: Beach and Dune Nourishment, Direct costs include construction of the new berm/dune and sand nourishment for stabilization. As in the Seawall scenario, construction costs include design and permitting. Administrative costs and ongoing maintenance/repair of the sand dune are included based on engineering analysis. Ongoing maintenance costs total more than $32 million in the 20-year scenario, and are the primary cost driver.

Indirect costs in this scenario turn into a benefit: the lost property value in the Base Case is assumed to be partially avoided.

Direct benefits include increased recreational value of the estimated 9 acres of beach in front of Summerhouse.

Non-market benefits include increases in WTP for listed species, based on improved conditions for sea turtles and nesting coastal bird habitat, minus the several month construction period, during which this benefit would not be available. Improved beaches and dunes provide value for the estimated 9 acres of beach in front of Summerhouse. Summary results are provided in **Table 20.** The detailed results for Option 3: Beach and Dune Nourishment is provided in **Appendix C**.

Table 20. Option 3: Beach & Dune Nourishment BCA Results with 20-Year Horizon, 3% Discount Rate

	Costs – Relative to Base Case (in Thousands)			Benefits – Relative to Base Case (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
Beach -Dune	$27,903	($7,251)	$27,903	$7,828	$0	$9,078	$24,157	0.87

Source: TBG Work Product

Option 4: Inlet Management Plan

In Option 4: The INTERA report recommended that the county consider developing an Inlet Management Plan (IMP) to identify an approach that could help both Summerhouse and Summer Haven beaches benefit from the bypassed material that sediment budgets show gets regularly

trapped in the inlet (INTERAb 2023). As part of the current economic analysis research, INTERA staff developed more detailed assumptions and cost estimates for the following two different scenarios that could be developed as an IMP:

1) **IMP Dredge and Fill Option**: a dredge and fill project could be undertaken to partially meet a 100,000 cubic yard goal for inlet channel realignment every 3 to 5 years by dredging sand from the inlet and placing sand north and south of the inlet by trucking it.
2) **IMP Fill-Only Option**: sand fill in this option is accomplished by purchasing the sand and placing it north of the inlet by truck.

Direct costs for each of these IMP options include annual administrative costs; a one-time cost for a management study, including an off-shore sand source investigation; and annual beach profile data collection and analysis. Every five years there are anticipated costs for supplemental inlet waterways surveys and for the IMP Dredge and Fill Option, there would be a cost for periodic inlet channel realignment

Indirect costs include the partially avoided loss of property value and avoided loss of utilities (electric, internet, sewer, economic cost of utilities' service interruptions, etc.) service impacts. Non-market benefits include value of improved habitat for listed species, increased recreational value, and beaches and dunes value as the sand placement on Summerhouse beaches will increase beach area and preserve coastal habitat, but these benefits are assumed to be about 50% of those that occur in the Beach-Dune option because the sand would not necessarily always be placed on Summerhouse property. The sand could sometimes be placed to the north of Summerhouse, where Summerhouse would still receive a benefit as the fill disperses southward, but the benefit wouldn't be equal to direct beach fill on Summerhouse property. The IMP would state that sand needs to be placed north of the inlet within the inlet's area of influence (which includes Summerhouse), but it would not require the sand to be placed directly on Summerhouse property (INTERA personal communication April 30, 2025). The detailed results are provided in **Appendix C**.

Table 21a. Option 4: Dredge and Fill BCA Results with 20-Year Horizon, 3% Discount Rate

	Costs – Relative to Base Case (in Thousands)			Benefits – Relative to Base Case (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
IMP Dredge & Fill	$27,670	(3,625)	$38,896	$1,543	$0	$1,757	$21,540	0.55

Source: TBG Work Product

Table 21b. Option 4: Fill Only BCA Results with 20-Year Horizon, 3% Discount Rate

	Costs – Relative to Base Case (in Thousands)			Benefits – Relative to Base Case (in Thousands)				Benefit: Cost Ratio
	Direct Costs	Indirect Costs	Total Costs	Direct Benefits	Indirect Benefits	Non-Market Benefits	Total Benefits	
IMP Fill Only	$37,028	($3,625)	$48,224	$1,543	$0	$1,757	$18,121	0.38

Source: TBG Work Product

Results of the Analysis

As noted, analysis was completed for all alternatives under the two time periods. Identical processes were used for each. Under all options, it is recognized that a 50-year time frame for estimating costs or benefits introduces significant uncertainty. Accordingly, values for the 50-year analysis should be considered indicative of future relative outcomes, rather than absolute quantitative estimates. Results are as follows.

Table 22 describe the direct, indirect, non-market costs and total costs for the various options at the 20 year and 50-year horizons. Direct benefits driven by recreation values are the largest determinant for the structural options, while non-market benefits dominate the results for Option 3: beach and Dune Nourishment and Option 4: Inlet Management Plan. For the seawall, ongoing maintenance costs drive the results and over time far outweigh the benefits.

At the indicated discount rate (3%) and a twenty-year horizon, the lowest direct cost option is Option 2: Seawall, with direct costs of approximately $9.7 million. Beach-Dune and IMP Dredge and Fill are the next highest and very similar to each other at approximately $27 million, and the IMP Dredge and Truck option has the highest direct costs estimated at approximately $37 million. Costs increase over the 50-year time horizon for all options, almost doubling for Seawall, Beach-Dune and IMP Dredge and Fill options, and more than doubling for the IMP Fill Only option due to regular maintenance and project costs across all options.

Table 22. Results by Option, Relative to Base Case – 20 and 50 Years at 3% Discount Rate (millions)

	Direct Costs		Indirect Costs		Total Costs	
OPTION	20 Years	50 Years	20 Years	50 Years	20 Years	50 Years
Base Case	$12.24	$21.16	$7.25	$7.25	$19.49	$28.41
Seawall	($9.73)	($17.8)	($2.43)	($2.43)	$6.8	$6.8
Beach-Dune Nourishment	$27.9	$43.9	($7.25)	($7.25)	$27.9	$43.9
IMP Dredge and Fill	$27.7	$47.4	($3.62)	($3.62)	$38.9	$66.7
IMP Fill Only	$37.02	$82.04	($3.62)	($3.62)	$48.2	$101.4

Source: TBG Work Product

Table 23 summarizes the net benefits by option across 20 and 50 years at a 3% discount rate. The Seawall option provides positive Net Benefits Relative to Base Case in both the 20 and 50-year time horizons, and the Beach-Dune option provides positive net benefits relative to base case in the 50-year time frame.

Table 23. Net Benefits for Summerhouse by Option Across 20 and 50 Years at 3%

	20 Years	50 Years
Option	**Net Benefits Relative to Base Case**	**Net Benefits Relative to Base Case**
No Action	N/A	N/A
Seawall	$6,883,380	$14,626,254
Beach-Dune Nourishment	($3,745,287)	$309,587
IMP Dredge & Fill	($17,355,674)	($31,615,431)
IMP Fill Only	($30,102,534)	($65,082,593)

Source: TBG Work Product

Sensitivity Analysis

A key result of a benefit-cost analysis is the benefit-cost ratio or BCR associated with each alternative strategy that indicates the relative cost-effectiveness of that strategy. BCR's are sensitive to the cost and benefit values used as inputs to the calculations, as well as the discount rates and time horizons. As described in the earlier sections of the report, all estimates have limitations.

Discount Rate

Sensitivity analyses were conducted at discount rates of 2% and 5%, following current federal guidance[13]. **Table 24** provides a summary of results; at 50 years, the seawall option becomes slightly less cost effective, and the beach-dune nourishment option's cost-effectiveness increases at the 50-year period, increasing to greater than 1. Both IMP options' cost-effectiveness is less than one in both time horizons and remain fairly constant from the 20 to 50-year periods.

Table 24. Benefit Cost Ratio by Option, at Various Discount Rates

	20 Years			50 Years		
OPTION	**2%**	**3%**	**5%**	**2%**	**3%**	**5%**
No Action	0.54	0.54	0.54	0.35	0.37	0.32
Seawall	2.51	2.01	2.60	2.66	3.14	2.92
Beach-Dune Nourishment	0.88	0.87	0.83	1.04	1.01	1.00
IMP Dredge & Fill	0.47	0.55	0.46	0.54	0.53	0.55
IMP Fill Only	0.38	0.38	0.37	0.31	0.36	0.32

Source: TBG Work Product

Estimates of Market Value

Property values are dynamic in any environment, and coastal changes can magnify these effects. Beach width has consistently been found to be a significant determinant of property values[14], and a 2009 study of ten U.S. beach towns with coastal erosion found that property values are more sensitive to changes in beach width when the erosion rate is high[15]. Over time, property values in areas with sea walls have been found to decline, anecdotally, after an initial "honeymoon" period. The analysis does not attempt to capture these real estate dynamics and uses current property values only.

Non-Market Values

Non-market values were considered in this analysis. Nonmarket goods refer to things you cannot purchase in a store, such as water quality, or noise pollution, or clean air, or healthy ecosystems. Nonmarket goods are quantified using published economic measures of the public's valuation for such items.

For non-market values, and when using a Benefit Transfer method, as in this study, different options for non-market WTP values may exist for each strategy. TBG chose the most appropriate and applicable values due to factors such as geographic location, ecosystem service of interest, and year published, with more recent studies being preferable.

[13] https://www.whitehouse.gov/wp-content/uploads/2025/01/CircularA-94AppendixC.pdff

[14] Kriesel (2005).

[15] O'Connell, Jim (2008) Coastal Dune Protection & Restoration

The measures chosen consider the specific options available to St. Johns County. As such, the information is not intended to be transferrable to other geographies or municipalities (although the measurement technique can be replicated).

The WTP for listed species uses an average public value for the protection of sea turtle habitat for various species is used at $78.58 per household per year, based on values for threatened and endangered species from several studies. Alternate values could have included a lower bound from sea turtle-specific WTP studies at $54.70 per household per year for leatherback sea turtle protection, or $118 per household per year for Hawksbill sea turtle protection. The more conservative average value was used.

Discussion

Timing and Implementation of Options

The various benefits and costs outlined above are applicable for a limited time, perhaps only a few years before further impacts to the coastline and beachfront homes that are currently there accelerate: a decision needs to be made at some point. Based on feedback received during the study, residents of Summerhouse are strongly in favor of some action to prevent further erosion of the property and damage to its buildings.

The Seawall option potentially offers solutions. The relatively lower cost as compared to the IMP options and Beach-Dune option, owing to high regular maintenance and sand placement costs, and avoided property damage costs suggest this may be a favorable option to preserve the property, the primary concern of residents. The benefit to coastal habitat and natural resources is lower than the other options, but is outweighed by the benefit of avoided property loss combined with lower initial and maintenance costs of the seawall.

Funding of Options

Regardless of the Option selected, allocation of costs must also be decided. As noted above, the direct costs are immediate and “out-of-pocket” for the affected parties and as such are more sensitive. Costs of the Base Case: Business as Usual option are not immediate and depend upon the rate of shoreline change and the other impacts or costs are borne by the community. The Seawall option presents opportunities for sharing of direct costs, if the County, State and Federal government see mutual advantages for doing so. The community currently enjoys benefits indirectly by visitor and resident expenditures, maintained or increased property values, etc., – if lost, a share of community income is lost which could otherwise contribute to funding.

Funding options available to local governments include the capacity to levy special assessments, or to establish a special taxing district (municipal benefit services or taxing units) that are single purpose, in this case paying the costs of structure removal and/or restoration. These approaches

may warrant consideration. Additional funding options may be available through grants, bonds, or tourist development tax dollars.

Findings and Implications

The Summerhouse complex faces a difficult and challenging situation due to coastal erosion. The complex's location on the Atlantic coast just north of Matanzas Inlet presents complex challenges related to the dynamics of coastal erosion and storm impacts and human activity in the area. The community benefits from tourism revenues generated by visitors to the complex and by recreational users who stay at the complex (or live there). The Cost Benefit Analysis conducted herein assessed the engineering and non-structural options which St. Johns County currently faces for dealing with a coastal erosion situation. As a small condominium community, its economic contributions to the local economy influence, but do not dominate County-wide economic activity. Its value in providing lodging and hospitality amenities is reflected in its property values, and the cost-benefit analysis also accounts for the intangible values of the beach, related environmental values, and the relationship of property values to the evolving Summerhouse shoreline.

Comparing the options of No Action, the Seawall, Beach and Dune Nourishment, or Inlet Management Plan options, the Seawall option is the preferred alternative based on the analysis. The beach-dune option largely retains the beach amenity for the Summerhouse community, while the seawall option does not provide that amenity, but both provide protection to the southernmost vulnerable building on the property; the beach-dune option also provides protection to two additional buildings north of the southernmost building but does not prove to be cost-effective in the 20-year time horizon. Although the beach-dune option becomes more cost-effective over a longer time horizon, it is still less cost-effective than the seawall. The IMP options provide half the property protection and enhanced coastal natural resources as the beach dune option, but their initial and annual costs over the time period make them much more expensive options than the seawall and beach-dune nourishment options. To maintain the beachfront, the seawall option does require periodic maintenance, which are reflected in the costs. As recent history has demonstrated, natural processes are unpredictable, and could accelerate or dramatically increase the costs without warning.

Distributional Analysis - Summerhouse

A distributional analysis of the Summerhouse CBA results was conducted to identify, for each cost and benefit line item, the beneficiaries or payers to provide additional insight into the distribution of economic impacts of the options. The distributional analysis provides insight into which stakeholders receive the benefits, or incur the impacts and costs associated with each option for the purposes of assisting decisions regarding funding arrangements. **Table 25**

summarizes, by CBA line item across all four options, the amount of benefits or costs that accrue to each stakeholder group.

In the No Action option, some benefits are realized by businesses from recreational values and by the community through public beach and dune and wildlife habitat values. However, these are offset by relatively high costs of maintenance to the county, and private property owners experience costs in the base case from property damage and service loss from storms.

In the Seawall option, there are no expected recreational or wildlife, beach-dune benefits. However, expected avoided losses will be experienced by homeowners, reflected in the property value impacts and loss of service impacts, which are lower than the base case. The seawall option presents much lower net costs to government.

In the Beach-Dune option, additional recreation values are provided that accrue to local businesses from the increased recreational opportunities provided under this option. Higher beaches and dunes value and listed species values are all provided for community/households in the area under this option. The bulk of costs accrue to the government for the construction, administration, and maintenance costs associated with the beach-dune construction project. Relative costs and benefits are similar under the IMP Dredge and Fill and IMP Fill Only options. With Fill Only having the highest cost to government. Property damage and service losses are less in these options, but come at a higher project cost.

The relative costs and benefits that accrue suggest that different options could be funded from different sources. For example, the higher level of public benefits associated with the Beach-Dune option could provide rationale for a publicly funded program to fund the higher construction and maintenance costs, if the county chose to pursue this option.

Table 25. Summerhouse CBA Distributional Analysis, NPV (20-yr, 3%, in Millions)

Stakeholder & Cost/Benefit	CBA Line Item	Type of Good	No Action	Seawall	Beach-Dune	IMP Dredge & Fill	IMP Fill Only
Businesses							
Benefits	**Net Benefit**		$4.75	$0.00	$12.35	$6.24	$6.24
	Recreational Spending	Private	4.75	0.00	12.35	6.24	6.24
Community/Households							
Benefits	**Net Benefit**		5.56	0.00	14.64	7.32	7.32
	Beaches & Dunes Value	Public	0.96	0.00	2.53	1.27	1.27
	WTP for Listed Species	Public	4.60	0.00	12.11	6.06	6.06
Government							

Stakeholder & Cost/Benefit	CBA Line Item	Type of Good	No Action	Seawall	Beach-Dune	IMP Dredge & Fill	IMP Fill Only
	Net		12.24	2.74	39.02	39.94	49.27
Benefit	Salvage Value	Common-Pool	0.00	0.28	0.00	0.00	0.00
Costs	**Net Cost**		12.24	2.47	39.02	39.94	49.27
	Administration Costs	Common-Pool	1.04	1.04	1.04	1.04	1.04
	Annual Beach Profile Data Collection & Analysis	Common-Pool	0.00	0.00	0.00	0.60	0.60
	Construction Costs	Common-Pool	0.00	1.24	5.79	0.00	0.00
	Inlet Channel Realignment	Common-Pool	0.00	0.00	0.00	37.31	46.64
	Maintenance/Repair	Common-Pool	11.20	0.18	32.19	0.00	0.00
	Management Study: Off-Shore Sand Source Investigation	Common-Pool	0.00	0.00	0.00	0.75	0.75
	Property Acquisition Costs	Common-Pool	0.00	0.00	0.00	0.00	0.00
	Supplemental Inlet/Waterways Survey	Common-Pool	0.00	0.00	0.00	0.24	0.24
Homeowners							
Costs	**Net Cost**		7.25	4.82	0.00	0.00	0.00
	Loss of Services to Private Properties	Private	0.41	0.28	0.00	0.00	0.00
	Property Value Impacts	Private	6.84	4.54	0.00	0.00	0.00

Source: TBG Work Product

Economic Impacts of Recreational Users

To estimate the overall economic impacts associated with the Summer Haven River, The Balmoral Group used IMPLAN®, an econometric modelling application that generates regional economic impact multipliers. **Figure 8** describes how economic impact models, such as IMPLAN®, translates spending into business spending, employment, earnings, and taxes. To improve the level of public acceptance of the I-O model output, The Balmoral Group understands the importance of explaining how economic impact multipliers are selected and applied.

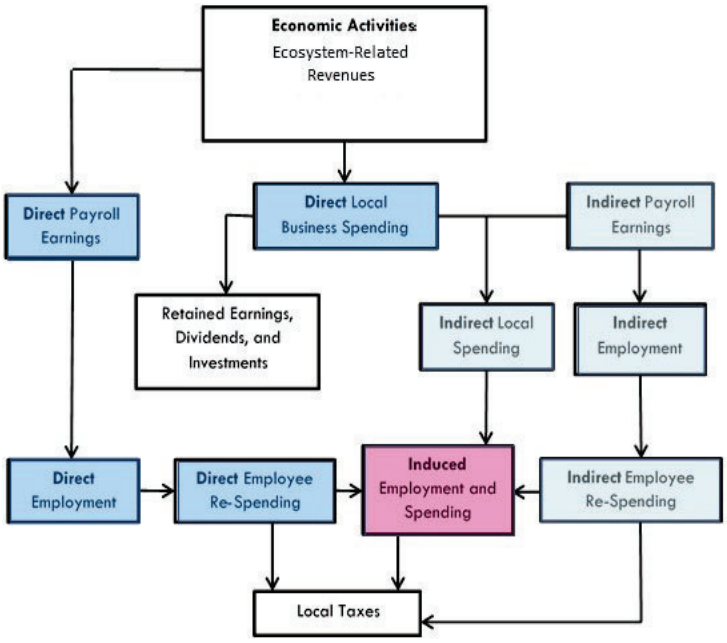
IMPLAN® estimates the flows of supply and demand between and within counties by industry sector, and converts this estimate of cash flows to economic impacts – measured through jobs, revenues, and personal income. An important element of input-output modeling is understanding these flows, and using appropriate data to determine how much of a boat dealer's stock, for example, was purchased from within the dealer's county, versus from an adjacent county, or from elsewhere in the region or state. The local purchases generate indirect and induced impacts, while those that leave the area (which is defined by the scope of the analysis – in this case, the county) do not. The IMPLAN software calculates the specific margins based on data prepared by the Bureau of Economic Analysis.[16]

Two IMPLAN models were prepared for the baseline analysis:

1. Recreational spending; and
2. Business revenues generated by specialized sectors, such as research and education.

Regional economic impacts generated are summarized in **Table 26**.

Figure 8. Input-Output Model for Waterways Economic Impacts



Source: TBG Work Product

[16] The Bureau of Economic Analysis falls within the U.S. Department of Commerce.]

Table 26. Estimated Regional Economic Impacts of the Summer Haven River, by Source

Impact Type	Employment	Direct Effect	Indirect Effect	Induced Effect	Output
Recreational Users	21.8	$2,609,347	$102,849	$8,847	$2,721,042
Research	3.4	$652,942	$20,017	$7,455	$680,415
Total	25.2	$3,262,289	$122,866	$16,302	$3,401,457

Source: TBG Work Product, from Surveys, published FWC data, and Brevard & Indian River Property Appraiser data

The overall economic impacts are generated by two categories:

1. Recreational Users
2. Scientific and Educational research

Table 27 shows a breakdown of the spending by each of the two categories.

Table 27. Spending by Impact Type

Categories by Size	Total Spending
Recreational Users	$18.5 million
Scientific and Educational research	$8.3 million
Total	**$26.8 million**

Source: TBG Work Product

Recreational Users

To estimate the spending of recreational users, data on visitors who indicated that they recreated in Summer Haven are utilized. Recreational users include both overnight and day-trip visitors and residents, and their impact on commercial businesses through spending, TBG and St. Johns County conducted a survey of recreational users and businesses in the Summer Haven River Area. The survey captured spending data for those that engage in recreational activities in the river and beach areas, including those that use river area for shoreline activities such as wildlife viewing, paddle boarding, fishing from the shore, etc. The survey results consisted of both part-time and full-time Summer Haven residents, and visitors to the area. Their frequency of use and the spending associated with their activities were used to estimate direct spending for recreational activities.

Visitors to Summer Haven

Tourists who use the waterways also contribute to the economic impact of the maintenance of the Summer Haven River. Visit Florida data indicates that in 2024 (the most recent data

available), 142.9 million tourists visited Florida, with 3 million visitors to the Historic Coast[17]. (It is important to note that St. Augustine, a famous historical site, is nearby and dominates visitor activity.) The regional area draws hundreds of thousands of visitors annually, with the National Park recording nearly 680,000 visitors annually. Using similar shares of in-state and out-of-state visitors, as well as shoreline uses and boaters, and the County data on traffic counts to Hellen Mellon Schmidt Park, the total visitors who engage in recreational activities around Summer Haven was estimated at 53,575.

Total spending from in-state and out-of-state tourists' activities within the Summer Haven region aggregates to $18.5 million annually. Visitors to Summer Haven from across the State generate annual spending of $2.6 million, with total impacts of more than $2.7 million as shown in **Table 28**.

Table 28. Estimated Economic Impacts, Visitors

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	21.1	$530,959	$1,089,473	$2,609,347
Indirect Effect	0.7	$20,693	$41,183	$102,849
Induced Effect	0.0	$771	$7,091	$8,847
Total Effects	21.8	$552,423	$1,137,747	$2,721,042

Source: TBG Work Product, IMPLAN

Expenditures by Scientific Researchers

Research expenses for Summer Haven are primarily generated by the University of Florida Whitley Lab, which also conducts a local water quality monitoring program. The regional data from the Florida Department of Revenue and IMPLAN for Summer Haven shows that nearly $8.3 million was invested in research-related projects in 2024. The annualized value of $8.3 million in research expenditures was used as input for spending. **Table 29** summarizes the specialized sectors' impacts.

[17] Downs & St. Germain (2023). Florida's Historic Coast Economic Impact Report July 2021 - June 2022.

Table 29. Estimated Economic Impacts, Research Activities

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	3.3	$224,846	$360,932	$652,942
Indirect Effect	0.1	$5,427	$9,205	$20,017
Induced Effect	0.0	$641	$5,982	$7,455
Total Effects	3.4	$230,915	$376,119	$680,415

Source: TBG Work Product, IMPLAN.

Tax Revenues

The economic benefits include the generation of tax revenues for local, state and federal governments. **Table 30** provides a breakdown of calculated tax impacts based on the different sectors used in this report, showing contribution to various public revenue streams annually from Summer Haven in St. Johns County. Overall, just over $588,000 in annual revenues are generated.

Table 30. Tax Revenues from Summer Haven

Description	Local	State	Federal	Total Annual Impacts
Recreational Users	$52,779	$53,943	$97,883	$204,605
Scientific and Educational research	$22,439	$28,744	$332,595	$383,777
Total Annual Impacts	$75,217	$82,686	$430,478	$588,382

Source: TBG Work Product, IMPLAN.

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Appendix A: Summary of Survey Methodology and Results

Survey Administration

Two primary forms of surveying were conducted to capture the perception of residents and visitors to the Summer Haven River (SHR) and SHR area. An in-person intercept survey was conducted at the Hellen Mellon Schmidt Park and surrounding nearby public areas within the Summer Haven area, on December 14th and 15th, 2024. From December 14th 2024 through January 31st 2025, an online survey was made public and open to submission for residents, visitors and businesses in the Summer Haven River Area.

Intercept Survey

The intercept survey was conducted to provide a snapshot perception of the recreational use of the Summer Haven River. TBG staff were in the field, in-person to approach and briefly interview users of recreational areas along the Summer Haven River. This data collection effort included a brief questionnaire to understand the recreational usage of the Summer Haven River. Over the course of the 2-day survey period, 60 interviews were conducted. TBG staff collected the survey interviews on paper and then consolidated survey results into a spreadsheet to analyze the overall trends. The locations and timing of the survey were selected to ensure a diverse and representative sample of the target population was surveyed.

Online Survey

The online survey sampled visitors, residents, and businesses in the Summer Haven River area. The design of the online survey provided survey participants with detailed questions to collect information that included data on spending.

A combination of hard copy flyers and advertisement on the St. Johns County website were used to solicit participants for the online survey. Survey responses were collected via a web-based tool. The survey was administered for 49 days. After the survey launch, Balmoral Group staff monitored results each day to ensure that the demographics of the completed surveys stayed largely in line with the population and monitored for survey completeness. Regular updates were provided to St. Johns County. Survey results were consolidated to analyse trends in user perceptions and typical usages and benefits of the River. The results are described herein.

Intercept Survey

Survey Audience

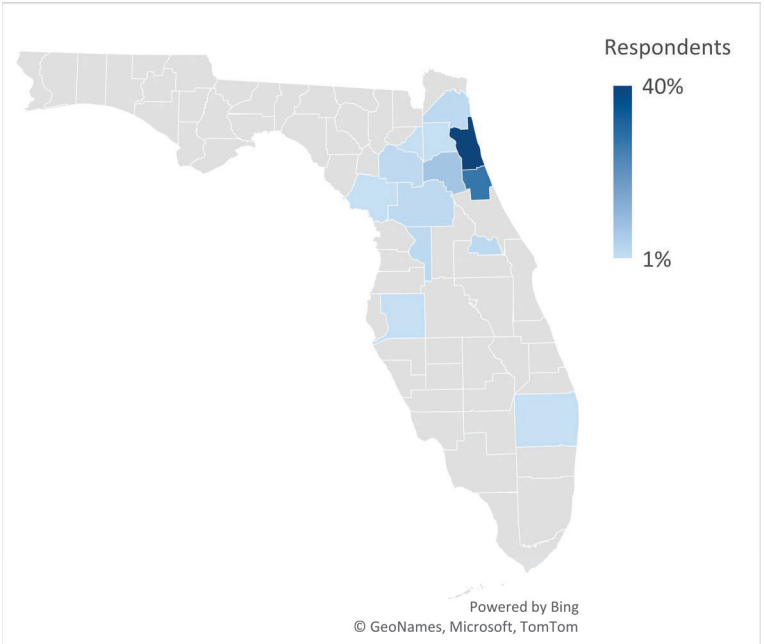
During the intercept survey, The Balmoral Group team members spent their time on foot at Hellen Mellon Schmidt Park and other areas surrounding the Summer Haven River area interviewing recreational users they encountered. The survey instrument was designed to be brief, typical for intercept surveys as time with interviewees is often limited; the design was to take less than a few minutes of the interviewee's time. The intended audience for the intercept surveys were persons recreating in the area, both residents and visitors.

Team members approached persons recreating in the area, first announcing whom they were and that they were contracted by the county before confirming the interviewee's willingness to participate. Surveys were in paper format and the team recorded each survey response on separate forms. The survey instrument questions included asking participants to identify the activities they were there to engage in, where they were coming from and whether they were a resident or a visitor, areas they intended to recreate in that day, and followed with questions about the environmental conditions of the area. The environmental questions also followed up on the impacts to recreational use, if any, and if they had an opinion on the County's involvement. Other demographic information was collected including information about annual household income and number of persons they were recreating with.

Results

Over the course of two-days, the interview team surveyed 77 people, 68 of which were non-resident visitors, representing 88% of the survey participants. The visitors were primarily visiting from nearby, either from St John's County, or from nearby counties; 22 were visitors from other parts of St John's County, 21 were visitors from Flagler County, 21 were from other parts of Florida, and 4 were from out of state (**Figure A-1**). 6% of visitors indicated staying overnight. Of the survey participants that were not visitors, 4

Figure A-1. Intercept Survey Participant Geographical Distribution

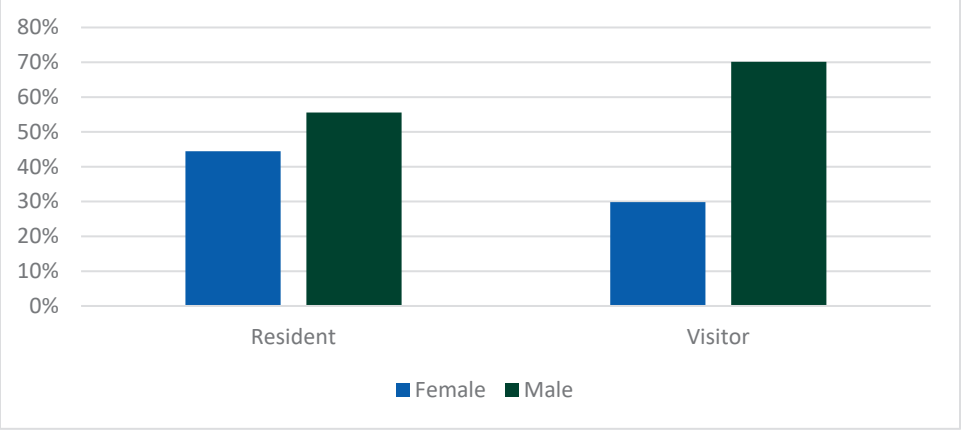


Source: TBG Work Product

indicated that they were full-time residents, 5 were part-time residents.

Survey participants were primarily male (68%), with an observable difference between the respondents that were visitors and those that were residents. Visitors primarily male (70%), compared to the resident participants (56%). **Figure A-2** shows the gender distribution of survey participants. Each group averaged between 2 and 3 people.

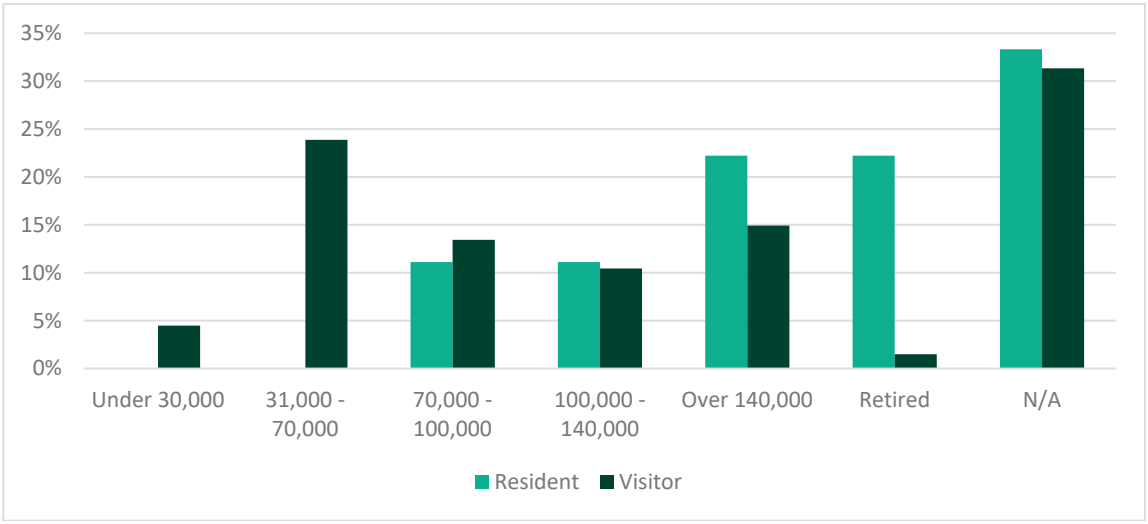
Figure A-2. Gender Distribution by Intercept Survey Participant Type



Source: TBG Work Product

Nearly a third (32%) of intercept survey participants declined to provide their annual household income. Of those that were willing to provide information, most reported their annual household income between $31,000 and $70,000. Only 4% of people indicated their annual income is less than $30,000. The differences between the visitors and residents is clear, with residents more frequently indicating their household income as being greater than $140,000 annually, with 22% indicating this income bracket. To contrast, only 15% of visitors indicated household income

Figure A-3. Annual Household Income by Intercept Survey Participant Type

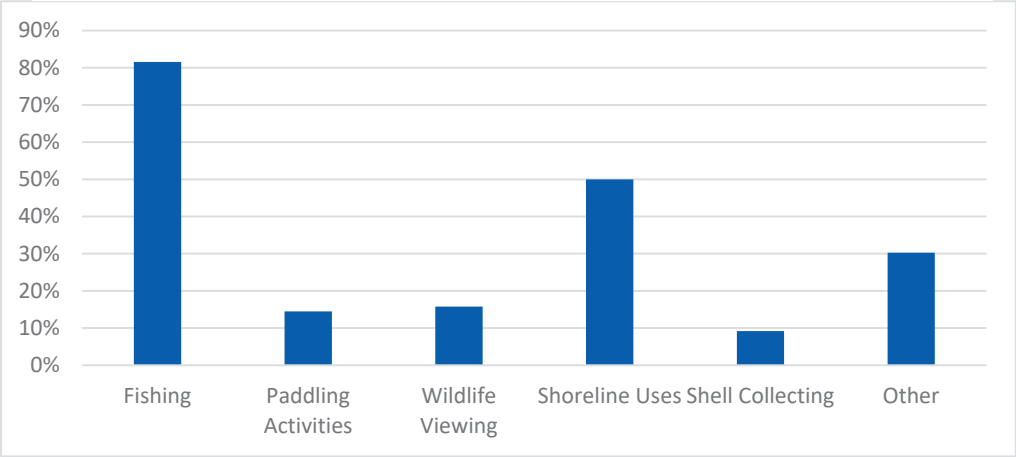


Source: TBG Work Product

greater than $140,000 annually and visitors were the only group to have indicated household incomes in the two lowest brackets, as displayed in **Figure A-3**.

The majority of people (89%) indicated that they were engaging in a day-trip, with fishing listed as the most common activity. **Figure A-4** provides a distribution of activities listed by survey participants.

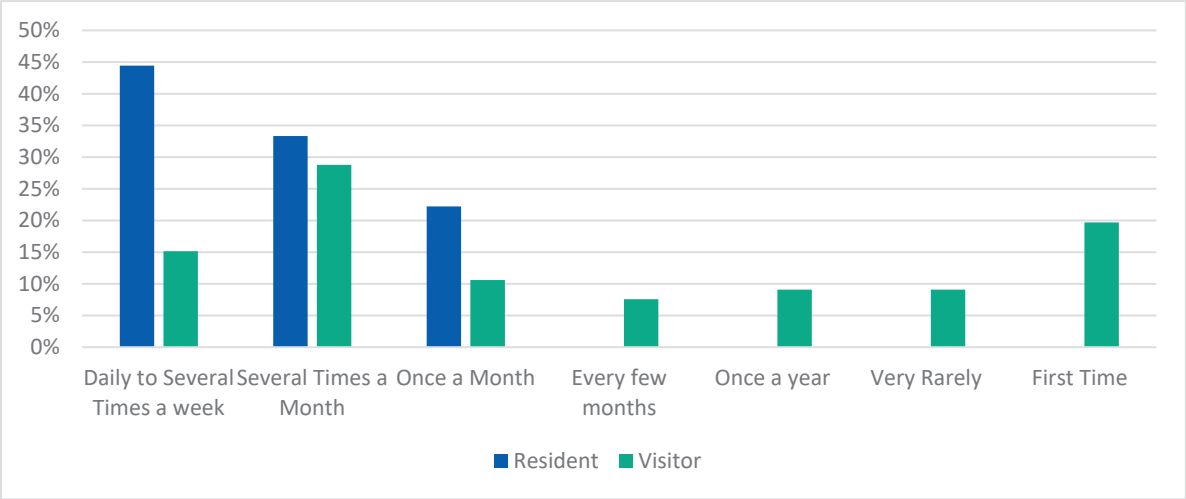
Figure A-4. Activities Reported by Intercept Survey Participants



Source: TBG Work Product

Intercept survey participants were also asked about their visitation frequency annually to gauge how often visitors and residents are recreating in the Summer Haven River. **Figure A-5** shows a wide variation between the residents and visitors that were recreating in the area during the intercept survey; residents indicate high frequency of recreation with 45% stating they recreate daily to several times a week. Visitors reveal a wider distribution of visit frequency, with 20% indicating it was their first time in the area and 18% indicated they either visit once a year (9%) or very rarely (9%). Despite the variation in frequency for visitors, 29% indicated they visit the area several times a month.

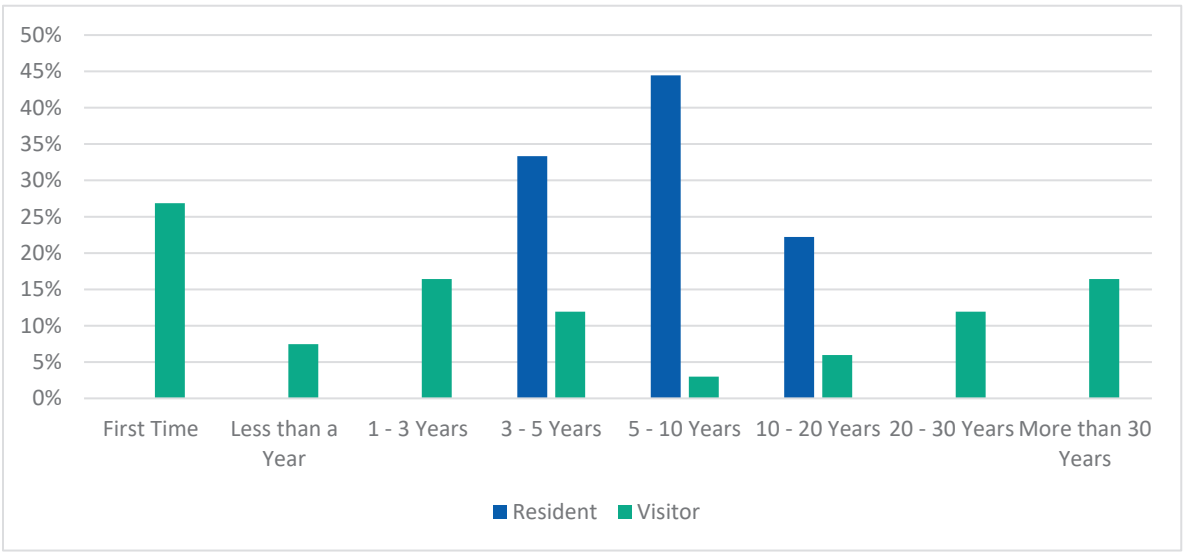
Figure A-5. Annual Visit Frequency by Intercept Survey Participant Type



Source: TBG Work Product

Participants were asked to provide information about their frequency length, either how long they have been a resident of Summer Haven, or if they were a visitor, how long they have been coming to the Summer Haven River Area to recreate. Nearly 45% of residents indicate having resided in Summer Haven between 5-10 years, although a significant share have been in the area longer than 10 years (22%). As described in the annual visit frequency, a high share of visitors were engaging in their first trip to Summer Haven (27%). Observing the distribution for visitor frequency over time, there is a gap in the 5-10 year and 10-20 year frequency groups; The majority were either coming for more than 30 years (16%) or less than 3 years (24%). **Figure A-6** shows this distribution by visitor type.

Figure A-6. Visiting Frequency Over Time by Intercept Survey Respondents

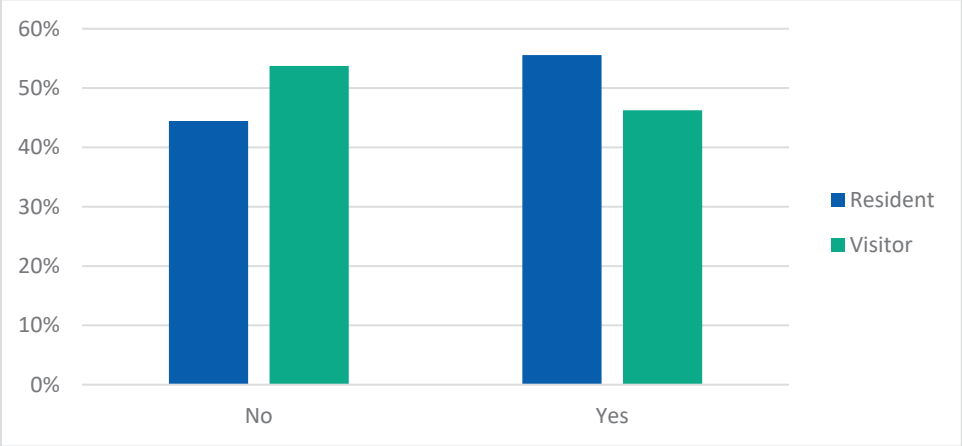


Source: TBG Work Product

As previously stated, the purpose of the intercept survey was to provide a snapshot of recreation in the Summer Haven River. Participants in the intercept survey were also asked about their knowledge of the natural environment and if they noticed any changes over time. If they indicated noticing any environmental changes in the area over time, they were also asked about County action.

Overall, participant responses were fairly split between those that had noticed changes and those that had not, with 53% noticing no changes, and 47% noticing changes. **Figure A-7** shows that residents more frequently reporting noticing the environmental changes than visitors.

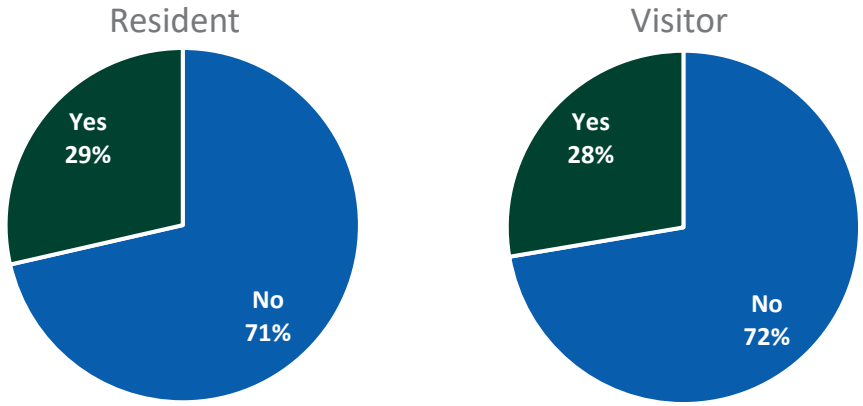
Figure A-7. Notice of Environmental Changes Over Time by Intercept



Source: TBG Work Product

71% of people that had noticed changes stated the changes that they noticed had not affected their usage of the area. It is noticeable however, that visitors and residents had similar responses when asked if the changes have affected their usage of the area, as displayed in **Figure A-8**.

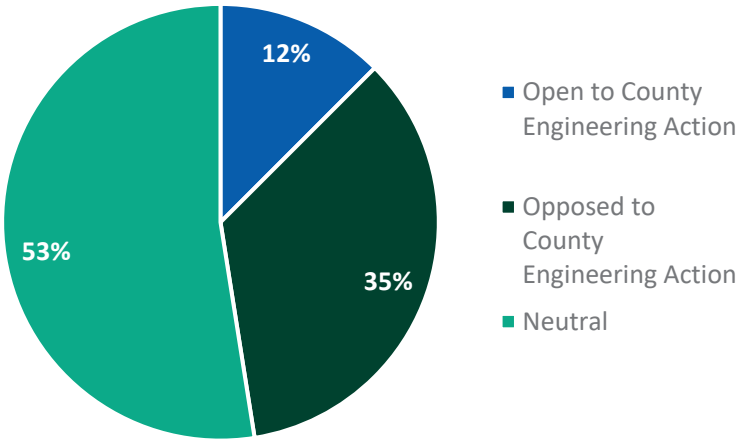
Figure A-8. Change in Use of Area Due to Environmental Changes



Source: TBG Work Product

Of those that indicating they noticed changes in the natural environment, a little over half (53%), were neutral; 35% provided comments opposed to county engineering options and 12% made comments indicating openness to engineering options, as displayed in **Figure A-9**.

Figure A-9. Sentiment Analysis of County Engineering Action



Source: TBG Work Product

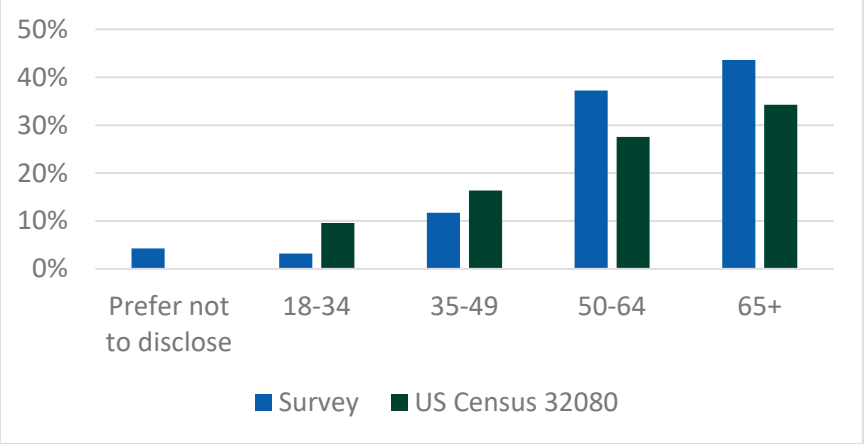
Online Survey

Survey Audience

The sampling design was based on three audiences to allow for an assessment of users as they relate to the Summer Haven River. As stated previously, three survey audiences were selected for the study, and include Residents, Visitors, and Businesses. The audiences were chosen largely to understand the spending associated with the Summer Haven River and implications for the management options in this analysis. The population of residents and visitors that use the Summer Haven River would indicate the spending related to the population that utilize the resources for recreation in the project area.

In total, 238 completed responses were received. The completed survey respondents consisted of 94 residents, 114 visitors, and 30 businesses. The response sample was representative of the Summer Haven River population in gender and age distribution with the exception of the 18-24 age group which was slightly under represented; see **Figure A-10** for comparison.

Figure A-10. Age Distribution of Survey Respondents versus U.S.



Source: TBG Work Product, US Census 2023 ACS 5-Year Estimates

Age distribution was nearly identical to the 2023 US Census ACS 5-Year Estimates for Zip code Tabulation Area 32080 as shown in **Table A-1**.

Table A-1. Gender Distribution of Survey Respondents versus U.S. Census

Gender	Survey	US Census (32080)
Female	51%	52%
Male	48%	48%
Unknown	1%	0%
Total	100%	100%

Source: TBG Work Product, US Census 2023 ACS 5-Year Estimates

The business survey audience, determined by the respondent identifying as having a business in the Summer Haven River area, was consistent with the Business Tax Receipts data from the County Tax collectors. The total universe of potential respondents was approximately 30 based on the tax data, a relatively small number. The Balmoral Group Staff left communication for the survey via post cards with survey links and information at various businesses in Summer Haven River area during the intercept survey efforts; other efforts to reach businesses were through the county's website communications.

Data Analysis

The survey data was downloaded and validated using various quality control checks for outliers, duplicate responses, and out of sample responses. Each response is treated as an observation which provided for analysis of visitor and resident composition and business composition to inform the cost benefit analysis of management options as well as estimating the economic impacts of the spending associated with recreation in the Summer Haven River area. The results provide meaningful insights to support the Cost-Benefit Analysis and Economic Impact Analysis for Summer Haven River.

Primary findings include:

1) Residents more frequently report noticing changes in the natural environment in Summer Haven than Visitors, however residents that reside in the area full-timeless frequently report noticing environmental changes compared to those that reside in Summer Haven only part of the time. Additionally, the residents that reside in the area full-time more frequently report being open to County action compared to those that live in the area only part of the year.
2) Visitors to Summer Haven spend a significant portion of their time within the area throughout the year, often reporting more frequent and longer trips than other visitors

to the County. Visitors are reporting an average of 10 days annually compared to other sources, which report an average of 5.5 days annually.

3) Visitors less frequently report noticing changes in the natural environment, however this finding varies between those that come to the area for day-trips compared to those that stay overnight. Visitors that stay overnight reported noticing environmental changes more frequently than visitors that come for day-trips only, this is likely due to the overnight visitors either reporting living nearby or coming to the area longer as day-trip visitors more frequently reported coming to the area very rarely. Additionally, visitors less frequently report openness to County action on the environmental changes than residents, although it is worth nothing the high occurrence of respondents that indicated openness (67%).
4) Businesses in Summer Haven are primarily operating in the real estate or rental/ leasing industries; however, several operate in tourism-related industries including marinas, hotels, and restaurants. The businesses in Summer Haven largely are aware of the changes in the natural environment within the area and report high impacts to their revenues from the changes with an average reported loss of 28%.

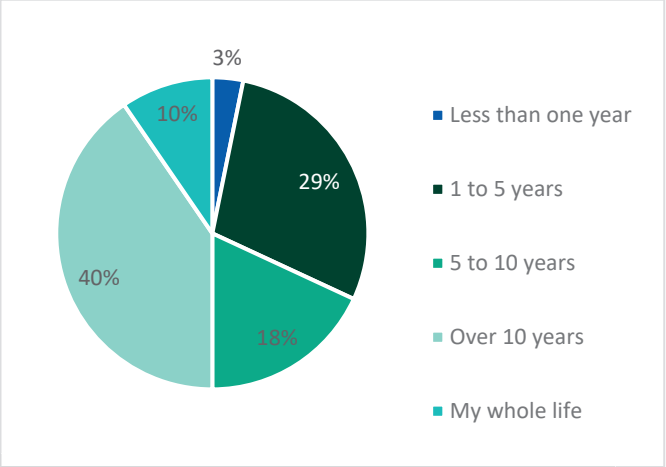
The results are described for each audience in the following sections.

Results

Residents

Residents that responded to the Online Survey Instrument comprised 40% of the respondents. Residents were asked about residency type and length. 37% of respondents indicated they are "Part-Time" residents, or have a separate residency outside of the Summer Haven Area; the remaining 63% are "Full-Time" residents. The majority of survey respondents indicated that they have resided in Summer Haven for more than 10 years (40%), with an additional 10% of resident respondents indicating having resided in Summer Haven their entire life (**Figure A-11**).

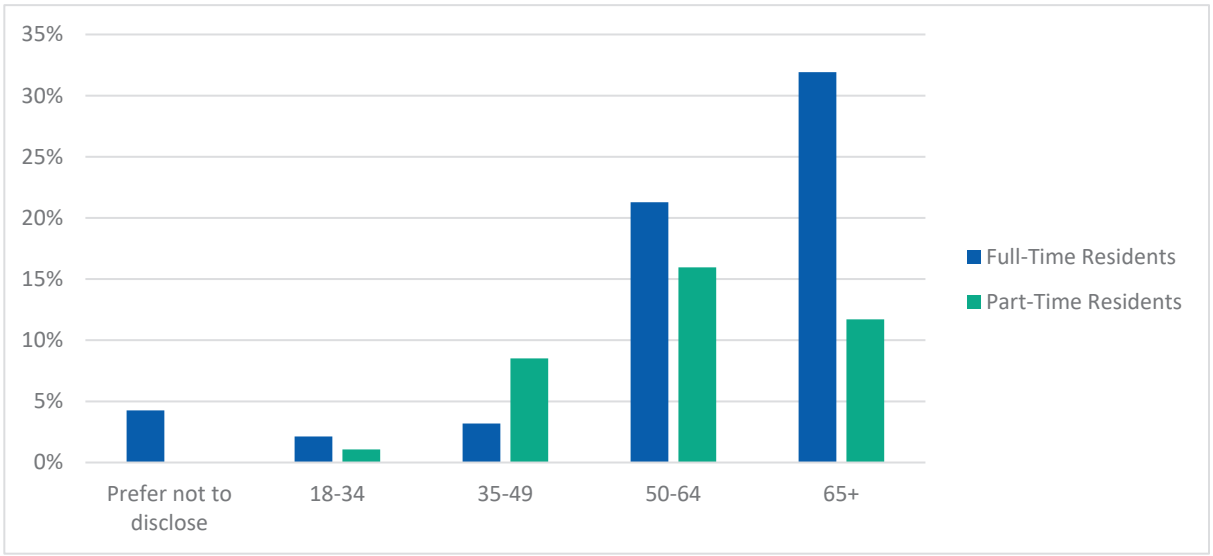
Figure A-11. Residency Length



Source: TBG Work Product

The survey gleaned information about recreational usage of the Summer Haven River and surrounding areas as well as the visitation patterns. On average, residents are recreating more than once a week (68.6 days annually). Full-time residents are spending more time recreating in the area with an average of 74.8 days annually, however although part-time residents are recreating nearly as frequently with 58.1 days reported per year, suggesting that when they are in Summer Haven they may be enjoying the resources more often. Similarly, the part-time residents are reporting larger group sizes with an average of 4.11 persons compared to 3.5 among the full-time resident respondents. This is consistent with the findings that the full-time residents are typically older and have smaller household sizes. A breakdown of the survey results by residency type and age group is in **Figure A-12**.

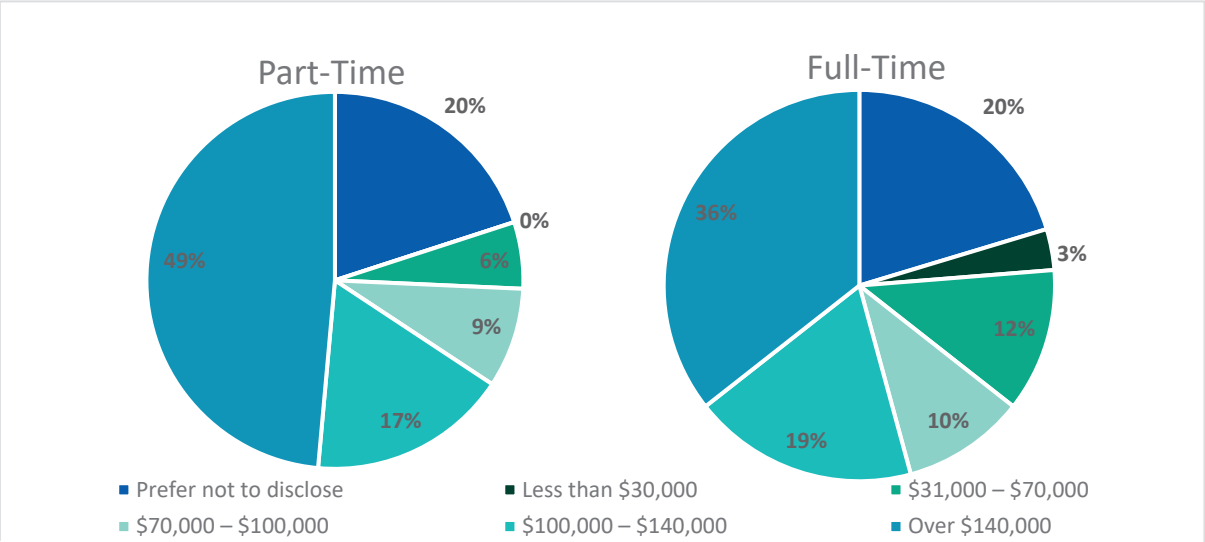
Figure A-12. Age Distribution by Residency Type



Source: TBG Work Product

The income distribution for the resident survey respondents is displayed in **Figure A-13** for both part-time residents and full-time residents of Summer Haven. The survey results reveal that the part-time residents report greater shares among the highest income groups for their households, with 49% of survey respondents indicating annual household income greater than $140,000, compared to 36% of respondents in the full-time resident group. The respondents representing the lowest income groups are more frequently reported in the full-time resident responses with 12% of full-time residents reporting household income between $31,000 and $70,000 annually and 3% of respondents with less than $30,000; to compare, only 6% of part-time residents reported annual household income less than $70,000 annually, with none reporting less than $30,000.

Figure A-13. Income Distribution by Residency Type



Source: TBG Work Product

Compared to the ZCTA 32080 information from 2023 US. Census ACS 5-Year Estimates, Survey respondents skewed slightly towards households that indicated annual household incomes greater than $140,000; US Census reports 28.4% of Households in 32080 compared to 40% represented in the Survey. The lowest income groups were underrepresented in the survey results which represented 2% (less than $30,000) and 10% ($31,000 - $70,000) across all resident responses compared to 15% and 28.3%, respectively for the zip code based on US Census information.

Residents reported high levels of spending within the Summer Haven area, in most cases this spending was reported to be higher than visitors to the area, with an average daily total of $144.43 and shown in **Table A-2**. This would yield large annual spending by residents recreating in the Summer Haven area given they also reported more frequently levels of recreation with part-time residents indicated an average of 60 days annually compared to 77 days annually reported by full-time residents. Resident respondents often indicated the accommodation costs as including expenses such as mortgages.

Table A-2. Recreational Spending per-Day by Residents

	Food & Beverages	Transportation & Accommodation	Fees & Recurring Costs	Gear, Equipment, & Other	Total
Part-time	$79.91	$64.12	$38.50	$45.59	$228.12
Full-time	$33.65	$30.91	$19.14	$10.81	$94.51
Avg. Total	$50.93	$43.32	$26.37	$23.80	$144.43

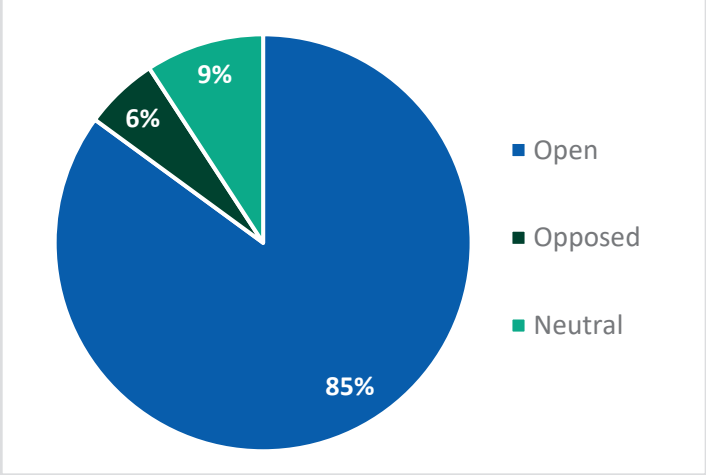
Source: TBG Work Product

When asked about the natural environment, the majority of survey respondents (92%) that provided an answer indicated they have noticed changes to the natural environment in the Summer Haven River Area within the past several years. Conversely, 8% indicated they either had not noticed changes to the natural environment in recent years or were unsure. Respondents that identified as "full-time" residents more frequently reported not noticing or were unsure about the natural environment changes than part-time residents of the area. 10% of the residents that indicated they live in the Summer Haven area full-time reported not noticing environmental changes, compared to 2.8% of part-time residents.

Comments regarding the changes to the natural environment included noticing beach erosion, the river filling in with sand, the inlet filling in with sand as well as changes to current (both less current and more current were mentioned), nutrients, changes to beach access, and changes to the fauna including reported notice of less shellfish, environmental diversity, and less fish abundance.

Survey respondents were further asked to about their thoughts on what, if anything, St. Johns County should do about those changes. Part-time residents and full-time residents responded similarly regarding County action on environmental changes, however part-time residents were slightly less likely than full time residents to indicate openness for county involvement with 6% of these respondents indicating "No". **Figure A-14** shows that 85% of residents (combining part-time and full time) are open to county engineering action to resolve environmental challenges, only 6% of respondents were opposed, and 9% were neutral.

Figure A-14. Sentiment Analysis on County Engineering Action, Residents



Source: TBG Work Product

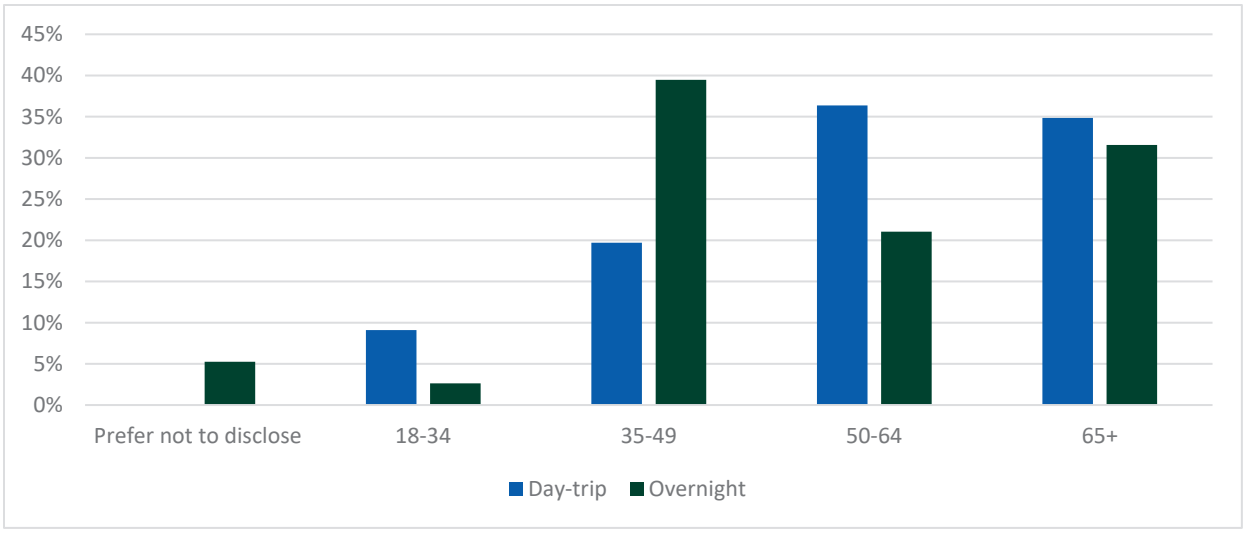
Visitors

Visitors to Summer Haven were the largest share of respondents to the online survey, comprising 118 total responses or 49%. 12% of visitor responses indicated they did not visit Summer Haven within the

last 12 months. The other 88%, or 104 responses, were visitors to the area within the last 12 months. This data is collected to capture an accurate picture of the visitor spending annually within the area and provides input into the economic impact analysis. Visitors to Summer Haven are primarily engaging in day-trips (63%), coming from other areas within driving distance, the other 37% of visitors indicated overnight trips or "both". The distinction between day-trip visitors versus overnight visitors is important to understand the spending patterns and impacts of spending by visitors to the area. Typically, overnight visitors would report average higher spending per trip and may spend more of their total spend within the area they chose to stay; this is described in the narrative.

Demographics of visitors can provide valuable information to the spending composition within the region. Respondents were primarily female, comprising 62% of responses among the visitor dataset. Respondents are also more likely to be older and have relatively high incomes. **Figure A-15** displays the age distribution of visitors that responded to the online survey for the day-trip and overnight visitor groups. Across all visitors, the largest share self-reported as being older than 65 (34%), followed by those in the 50-64 age group (31%) and 27% indicated being between 35 and 49 years old.

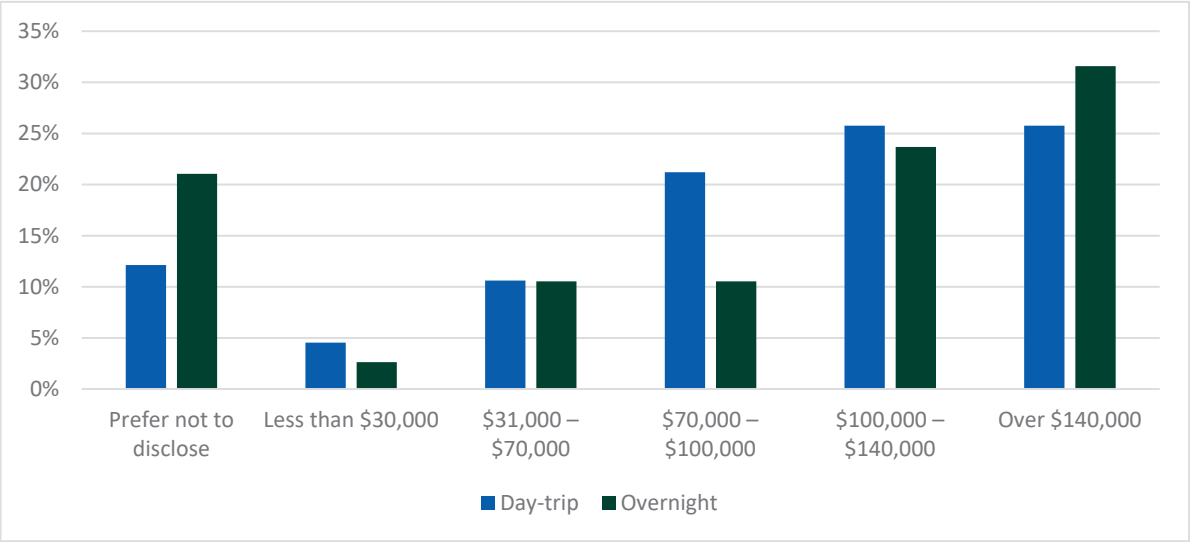
Figure A-15. Age Distribution by Visitor Type



Source: TBG Work Product

Figure A-16 displays the distribution of annual household income reported by visitors in the online survey. Across all visitor respondents, 28% reported incomes greater than $140,000, followed by 25% of respondents indicated income between 100,000 and 140,000 annually. Overnight visitors skewed slightly towards the highest income brackets compared to the day-trip visitors. While day-trip visitors reported similar distribution across the income groups, there were higher reports of visitors in the lowest income groups.

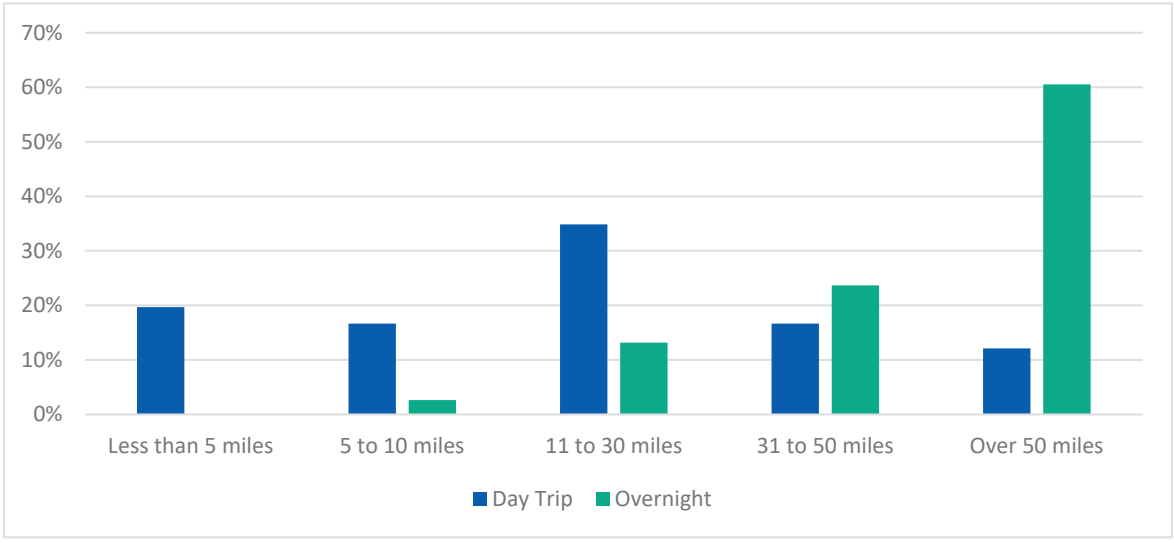
Figure A-16. Annual Household Income by Visitor Type



Source: TBG Work Product

Survey respondents were asked to provide information regarding their home zipcode to further understand the demographics of the visitors to Summer Haven. The majority reside within Florida; however, visitors reported travelling to Summer Haven from as far as Minnesota. The distribution of day-trip visitors reveals that these visitors are primarily travelling beyond the 10-mile radius from Summer Haven, with 64% indicated beyond 11 miles (**Figure A-17**). Day-trip visitors are not travelling from afar, with 35% reporting a range between 11-30 miles travelled. Additionally, a significant share of day-trip visitors is travelling less than 10 miles from Summer Haven (37%). Consistent with typical visitor profiles, overnight visitors to Summer Haven are travelling from beyond 50 miles (61%).

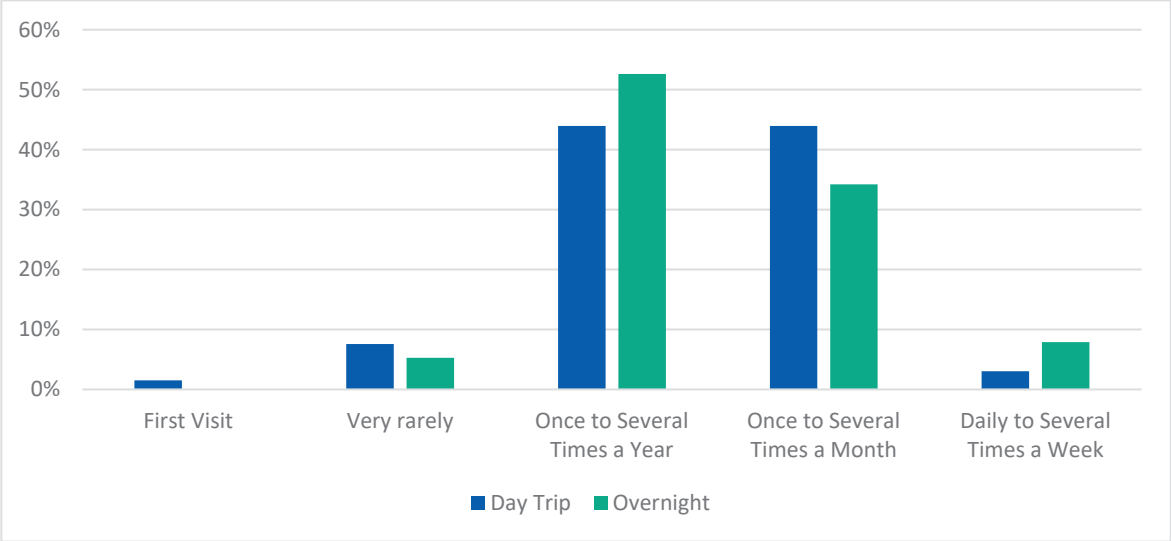
Figure A-17. Distribution of Distance Travelled by Visitor Type



Source: TBG Work Product

An interesting pattern emerges when the data is analyzed for visit frequency, as overnight visitors reported in some cases, more frequent trips to Summer Haven. **Figure A-18** displays the breakdown of visit frequency reported by survey respondents between the day-trip visitors and overnight visitor groups. The overnight visitors reported more than 50% travel to Summer Haven at least annually and in some cases more than once in a year. 34% reported staying in Summer Haven at least once a month, data regarding the comments on accommodations, and visit frequency, gleaned that these responses are more likely to be part-time residents or condominium owners. Their spending data was controlled for in the spending analysis.

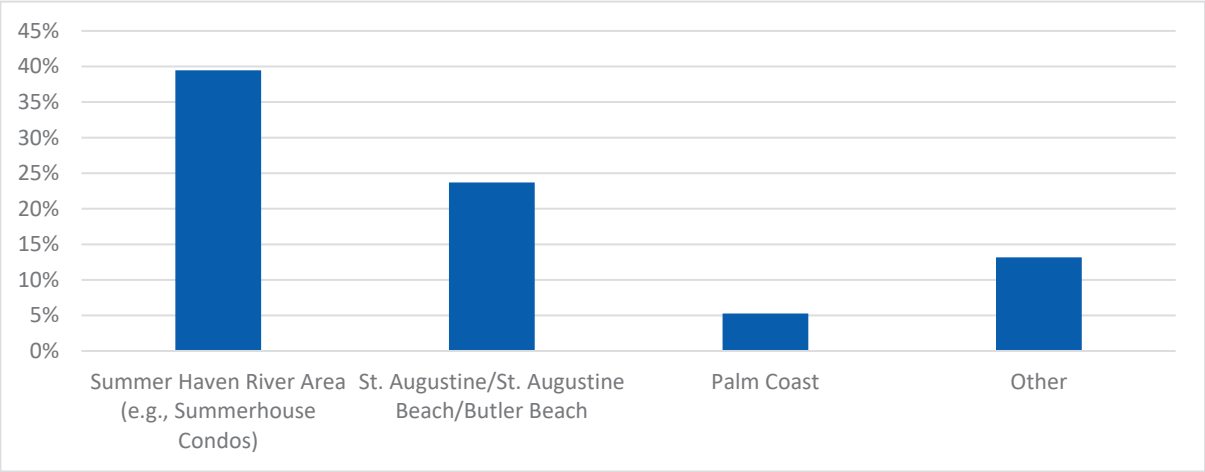
Figure A-18. Visit Frequency by Visitor Type



Source: TBG Work Product

Overnight visitors report overwhelmingly staying in Summer Haven, as displayed in **Figure A-19**. The respondents that selected "Other" indicated camping, owning a condo or residing nearby, or staying with family. Overall, visit frequency and length of stay is high compared to other studies on visitation to St. Johns County.

Figure A-19. Accommodation Locations Reported by Visitors



Source: TBG Work Product

To gather information about spending in Summer Haven River as it relates to recreational activities for purposes of the Economic Impact Analysis and base-line estimates of the current recreation in Summer Haven, visitors were asked to report on aspects of their most recent visit to the area including group size, number of days, trip frequency, and spending, both within Summer Haven and outside of the area. Day-trip visitors reported an average of 8 days annually recreating in the Summer Haven area, while overnight visitors reported 10 days annually. Group sizes between the two visitor types are similar, with day-trip visitors reporting an average of 3.6 persons and overnight visitors reporting 3.5 persons on average. Consistent with other findings, overnight visitors report spending more within Summer Haven, estimating an average of 51% of their expenses within the area compared to day-trip visitors which reported an average of 29% of their expenditures within Summer Haven. **Table A-3** displays the average per-day spending by visitor type.

Table A-3. Recreational Spending per-Day by Visitors

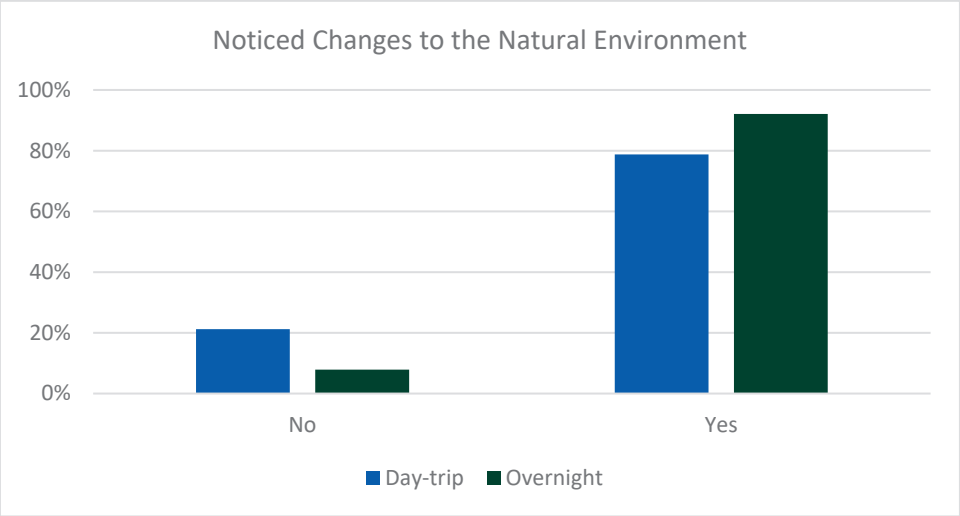
	Food & Beverages	Transportation & Accommodation	Fees & Recurring Costs	Gear, Equipment, & Other	Total
Day-Trip	$23.77	$9.92	$25.08	$0.65	$59.42
Overnight	$91.72	$139.14	$32.93	$18.24	$282.03
Avg. Total	$45.43	$51.10	$27.58	$6.25	$130.36

Source: TBG Work Product

When asked about the natural environment, visitors less frequently report to notice changes to the environment than residents, however the majority of survey respondents (84%) that provided an answer indicated they have noticed changes to the natural environment in the Summer Haven River Area within the past several years. Day-trip visitors less frequently reported to have noticed the environmental changes with 21% indicating they had not noticed changes to the natural environment in Summer Haven

in recent years. This is likely due to day-trip visitors reporting higher instances of infrequency. As stated in previous findings regarding the day-trip visitors versus the overnight visitors, some overnight visitors reside nearby and may be more attuned to the environmental changes. This breakdown is displayed in **Figure A-20**.

Figure A-20. Visitors Reporting Noticeable Changes in the Natural Environment

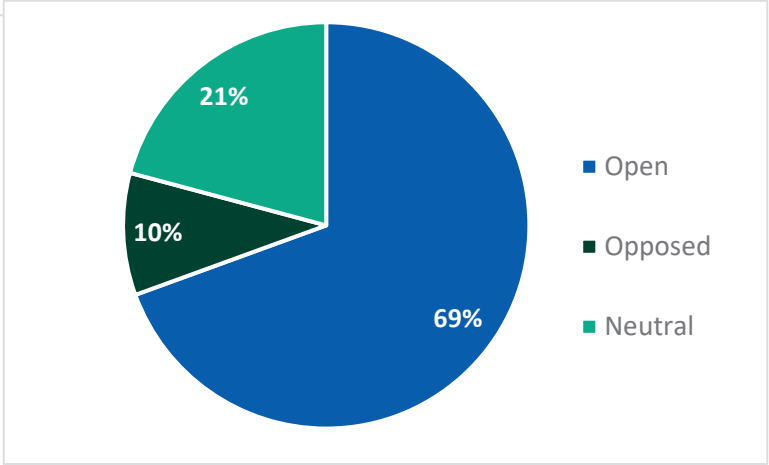


Source: TBG Work Product

Comments regarding the changes to the natural environment included noticing beach erosion, the river filling in with sand, the inlet filling in with sand as well as changes to current and nutrients, lack of beach access, and changes to the fauna including reported notice of less shellfish, environmental diversity, and less fish abundance.

Survey respondents were further asked to about their thoughts on what, if anything, St. Johns County should do about those changes. Visitors less frequently indicated openness to County action, however the majority still indicated openness for County action with 67% indicating "Yes" and providing further comment. The remaining 33% of respondents were either not open to or unsure about county action. Day-trip visitors and overnight visitors responded similarly regarding County action on environmental changes, however day-trip visitors less frequently indicated openness for county involvement with 35% of these respondents indicating "No", compared to 29% of overnight visitors indicating lack of openness for County action over

Figure A-21. Sentiment Analysis on County Action, Visitors



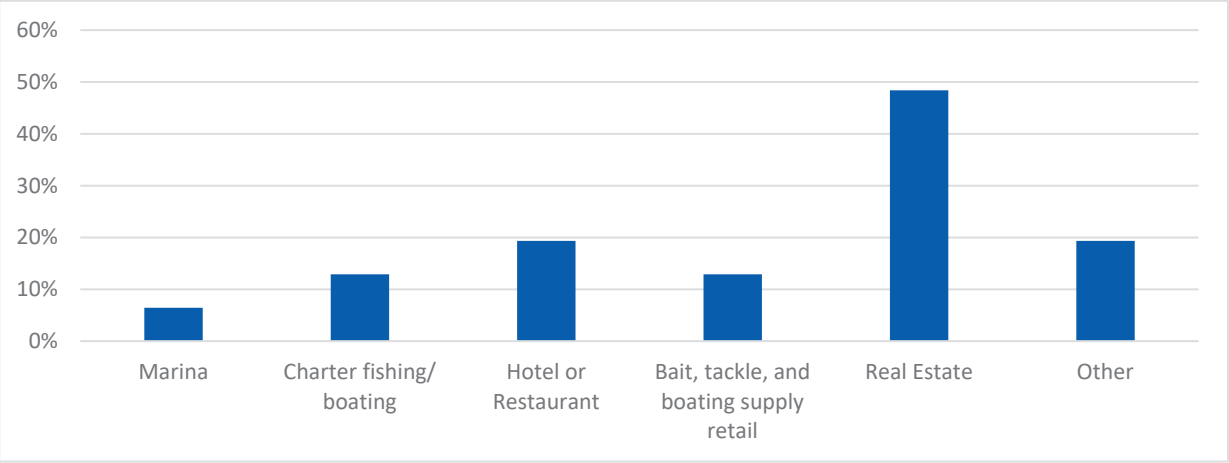
Source: TBG Work Product

environmental changes. The majority (43%) were open to the County's involvement in engineering solutions, however a large share (38%) were neutral to engineering action and 6% were opposed, as displayed in **Figure A-21**.

Businesses

The online survey received responses from 30 local businesses, primarily engaging in the Real Estate or Real Estate Rental industries, as described in the breakout in **Figure A-22**. Respondents could select multiple services, however only 3 respondents selected more than one industry. The respondents that selected "Other" included businesses engaged in consulting, environmental education, operations, wellness, and building contractors. This breakdown is consistent with geocoded business tax receipt data from the County Tax Collector shown in **Table A-4** which includes businesses within the Study Area only.

Figure A-22. Business Survey Respondents by Industry



Source: TBG Work Product

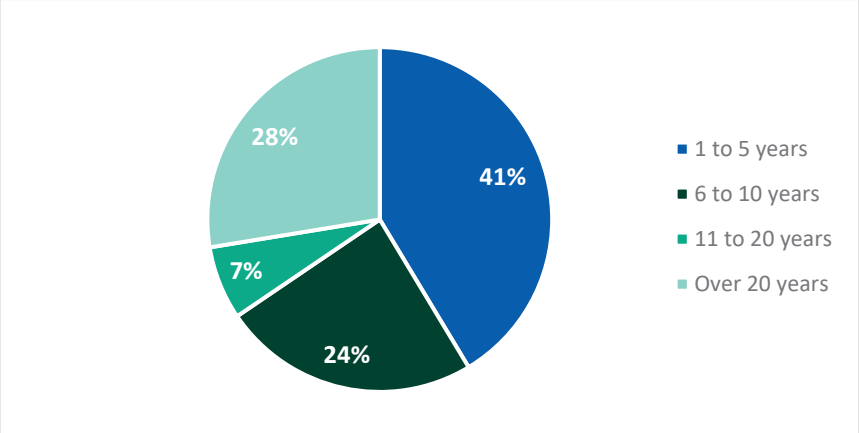
Table A-4. Businesses in Summer Haven as Reported by the St. Johns County Tax Collector

Occupation	Count
Charter Boat	1
Computer Services	1
Consultant	2
Mail Order Service	1
Manufacturing	1
Mobile Home Park	1
Printing Service	1
Rental Property	16
Retail Sales	4
Total	**28**

Source: St. Johns County Tax Collector, TBG Work Product

Businesses in Summer Haven lean younger, with the majority (41%) indicating having been in the area for less than 5 years. Businesses that report operating in Summer Haven longer than 20 years comprised 28% of the survey respondents as displayed in **Figure A-23**.

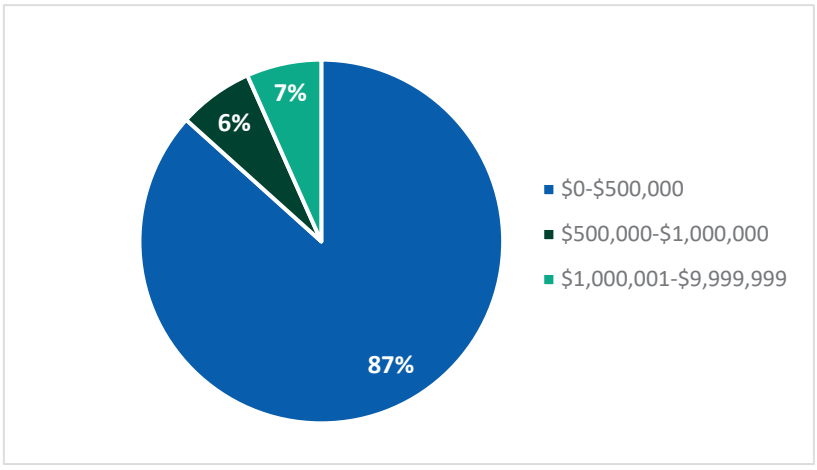
Figure A-23. Reported Tenure of Businesses in Summer Haven



Source: TBG Work Product

Survey respondents provided detail about their revenues. Business respondents indicated an average annual revenue under $500,000, as overviewed in **Figure A-24**. This suggest businesses in the Summer Haven area are primarily small businesses. Businesses reported revenues were generated primarily from Florida-residents, however this share was nearly split, with 53.5% on average from Florida residents and 46.5% from tourists outside of Florida.

Figure A-24. Distribution of Revenue Composition for Businesses in Summer Haven



Source: TBG Work Product

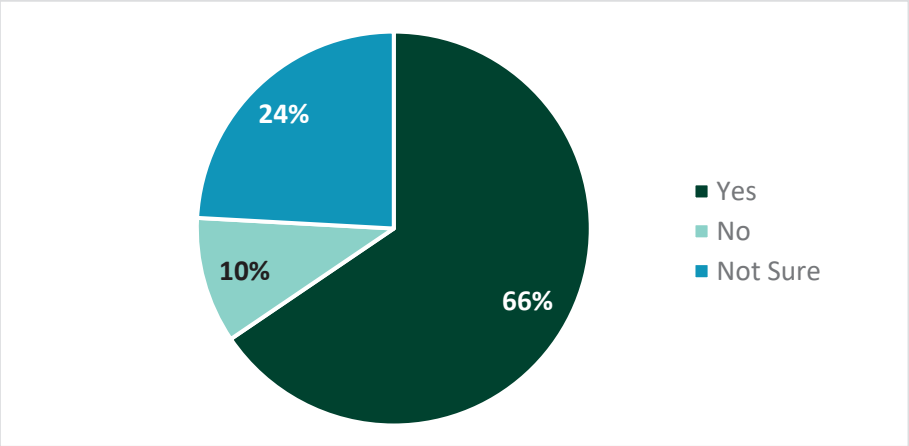
To further support this, businesses on average described employing 4.8 people, however this includes a range between 1 and 50. Self-employed respondents, or those that indicated only 1 employee (self), comprised 13% of the business responses. The majority of business (60%) respondents indicated having between 2-5 employees, followed by 23% indicated having between 5-10 employees, and only 3%

indicated greater than 10 employees. An interesting finding includes the breakdown of employment by revenue groups, whereas those indicating less than $500,000 annually employ 3 people on average, businesses in the $500,000 - $1 million range employ 2.5 people on average and those reporting more than $1 million report an average employment of 29.5 people.

When asked about the natural environment, the majority of survey respondents (97%) that provided an answer indicated they have noticed changes to the natural environment in the Summer Haven River Area within the past several years. Comments regarding the changes to the natural environment included noticing beach erosion, the river filling in with sand, the inlet filling in with sand as well as changes to current and nutrients, lack of beach access, and changes to the fauna including reported notice of less shellfish, environmental diversity, and less fish abundance.

Survey respondents were asked to provide additional information regarding the natural environment changes observed in the Summer Haven River Area over time and whether the changes have affected their business. The majority of respondents (66%) indicated the environmental changes have affected their business, remainder indicated the changes have not affected their business or they were unsure if the changes have affected their business. This is broken down in **Figure A-25**. Businesses were asked to provide further information regarding the effect of the environmental changes on their businesses including how revenues have been impacted. On average, the businesses that reported impacts experience a loss of approximated 28% of revenue.

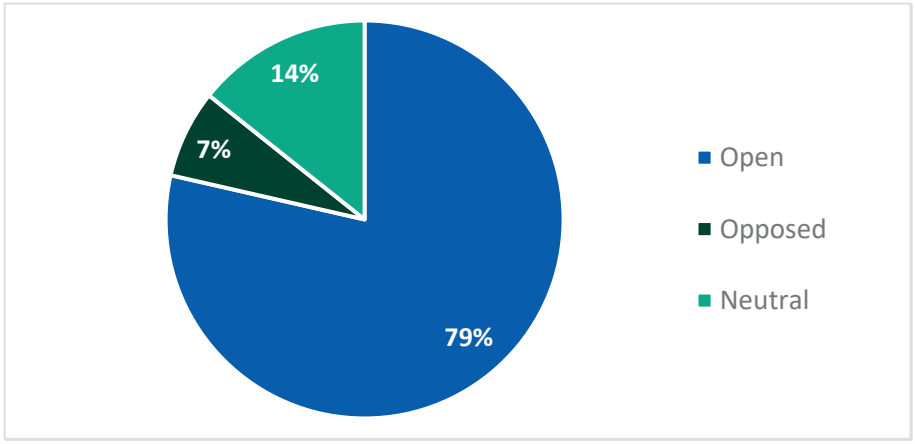
Figure A-25. Businesses Reporting Noticeable Changes in the Natural Environment



Source: TBG Work Product

Survey respondents were further asked to about their thoughts on what, if anything, St. Johns County should do about those changes, 89% indicated “Yes” and provided comment, the remaining 11% were unsure about county action. Of those that provided comment, the majority (76%) were open to the County’s involvement in engineering solutions, 7% were opposed, as displayed in **Figure A-26**.

Figure A-26. Sentiment Analysis on County Engineering Action, Businesses



Source: TBG Work Product

Appendix B: Summary of Cost-Benefit Analysis Methodology and Results: Summer Haven River

Benefit:Cost Analysis Summary

Base Case: No Action

				3%	3%	
				20 Year Horizon	50 Year Horizon	
Direct Costs	**Units**	**Quantity**	**Cost One Time/ Annual Cost**	**Total Cost 3%**	**Total Cost 3%**	**Comments**
Construction Costs	One-time	0	$ -	$ -	$ -	N/A in No Action
Administrative Costs	Hours	40	$ 1,750	$ 1,041,304	$ 1,800,878	Annual Costs, Co Staff time coordinating public response; $70K w/30% fringe from PM-equivalent positions in FL Has a Right to Know
Decommissioning Costs	One-time	0	$ -	$ -	$ -	N/A in No Action
Property Acquisition Costs	Total	0	$ -	$ -	$ -	N/A in No Action
Maintenance/Repair/Beach Nourishment	Annual Cost	30,700	$ 2,916,517	$ 43,390,405	$ 75,041,288	Annualizing the total placement volume from 1990-2021 for SJC projects yields approximately 30,700 cy/yr at $95/CY (cost is from Atkins June 2023 Summer Haven River Final Report, p. 22). 30,700 CY represents the average total cubic yards placed for projects implemented by St Johns County and another entity or SAPWBD and another entity (i.e., locally funded projects) based on Table 2.1 Summer Haven Beach Fill Placement History, p. 8 of INTERA-GEC 2023 report.
Mosquito Control Activities	Annual Cost	1	$ 500	$ 7,439	$ 12,865	Assume $500/yr cost to Anastasia Island Mosquito Control District per TBG MCD 2023 Reports
Direct Cost Sub-Total:				$ 44,439,148	$ 76,855,031	
Indirect Costs	**Units**	**Quantity**	**Cost One Time/ Annual Cost**	**20 Year Horizon Total Cost 3%**	**50 Year Horizon Total Cost 3%**	**Comments**
Property value impacts	Annual Cost	11	$ 257,006	$3,823,606	$ 6,612,714.40	Property values are increasing but appreciating at a lower rate than the county annual rate at a deficit of 2.3% compared to the county; verified sales transactions used to estimate annual loss of value across 218 properties in Summer Haven River area. The impacts are assumed to affect 11 properties, this is the expected number of actual transactions expected to occur each year over the 20 year time period.
Indirect Cost Sub-Total:				$ 3,823,606	$ 6,612,714	
Costs Total:				$ 48,268,863	$ 83,478,309	
Direct Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit 3%**	**Total Benefit 3%**	**Comments**
Salvage Value	One-time	0	-	$0	-	N/A in No Action
Recreational value (Day Visitors)	Per Group	10,103	$ 475	$ 71,449,221	$ 123,567,447	Annual spend per visitor group: 10,103 (Total Day Visitor groups annually based on traffic counts to Helen Mellon Schmidt Park) *$475 (Total annual average day visitor recreational spending as reported by online survey respondents)
Recreational value (Overnight Visitors)	Per Group	4,854	$ 1,551	$ 112,019,569	$ 193,731,604	Annual spend per visitor group: 4,854 (Total Overnight Visitor groups annually based on traffic counts to Helen Mellon Schmidt Park) *$1,551 (Total annual average recreational overnight visitor spending as reported by online survey respondents)
Direct Benefits Sub-Total:				$ 183,468,790	$ 317,299,051	
Indirect Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit 3%**	**Total Benefit 3%**	**Comments**
Commercial fishery production	Per pound	3572	$ 23,328	$ 347,059	$ 600,219	Commercial Lease Production status quo at average FWC price (per pound of oyster production based on FWC Commercial Landings data through 2023); combined with production impacts for total; Commercial Aquaculture Lease in Summer Haven River of 2.11 Acres is 13% of the County Total and equates to 3,572 lbs as share of total county oyster production; multiplied by $6.53/lb price from FWC data is 23,328 in annual production value.
Commercial fishery impacts	Per pound	63	$ (411)	$ (6,108)	$ (10,564)	Commercial Lease Area Productivity Loss annually (1.8% avg loss based on historic FWC landings data 2000-2003; 1.8% of 3,572 = 63) at average FWC price (Commercial Fishery)
Indirect Benefits Sub-Total:				$ 347,059	$ 600,219	
Non-Market Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit 3%**	**Total Benefit 3%**	**Comments**
WTP for listed species	Per Household - Annual	10,360	$ 142,660	$ 2,122,424	$ 3,670,614	WTP Per Person of $5.29 (based on Boeri 2020) multiplied by 2.51, the average number of people per St Johns County household to yield household WTP for coastal bird habitat multiplied by 10,360, the total number of households in the SHR ZIP code. Assume increased habitat quality for least terns from shoaled in riverbed based on scientific expert input.
Beaches and Dunes	Per Acre	109	$ 17,499	$ 27,714,524	$ 47,930,726	There is beach there today that provides benefits, except post-storm events; assume 2% chance of loss in any given year applied to the total acres of beach area based on INTERA report maps, multiply total 109 acres by a per acre value of $17,499 for the aesthetic value of beach/dune habitat from Mehvar et al, 2018.
Coastal Wetland Habitat	Per Acre	-	$ -	$ -	$ -	Absent open and flowing river, no value for this benefit assumed in No Action; assume sunk cost of the loss of 22.75 acres of coastal wetland habitat
WTP for Heritage Site	Per Household - Annual	10,360	$ -	$ -	$ -	Absent open and flowing river, assumption is no value for "special places"/cultural heritage site.
Non-Market Benefits Sub-Total:				$ 29,836,948	$ 51,601,340	
Benefits Total:				$ 213,652,797	$ 369,500,611	
Results						
Net Benefits:				$ 165,383,934	$ 286,022,302	
Benefit:Cost Ratio:				4.43	4.43	

Benefit:Cost Analysis Summary

Summer Haven - Seawall

			20 Year Horizon			50 Year Horizon		
Direct Costs	**Units**	**Quantity**	**Cost** **One Time/ Annual Cost**	**Total Cost**	**Relative to Base Case**	**Total Cost**	**Relative to Base Case**	**Comments**
Construction Costs	One-time	1	$ 48,489,226	$ 48,489,226	$ 48,489,226	$ 48,489,226	$ 48,489,226	Seawall construction costs from INTERA-GEC report Page 10, 2023 value adjusted to 2024 dollars; includes mobilization costs, permitting, property acquisition; includes 20% contingency
Administrative Costs	Hours	40	$ 1,750	$ 14,572,801	$ 13,531,496	$ 16,347,646	$ 14,546,768	Annual Costs, Co Staff time (40 hrs annually) coordinating public response; allowance for difficulty obtaining easements at industry standard; $70K w/30% fringe from PM-equivalent positions in FL Has a Right to Know, $33.65/hr
Decommissioning Costs	One-time	0	$ -	$ -	$ -	$ -	$ -	N/A for Seawall; included in construction costs
Property Acquisition Costs	Per Property	20	$ 14,306,857	$ 14,306,857	$ 14,306,857	$ 14,306,857	$ 14,306,857	Current market value based on two independent sources for 20 properties within construction area
Maintenance/Repair	Annual Costs	1%	$ 484,892	$ 7,213,972	$ (36,176,432)	$ 12,476,164	$ (62,565,125)	1% of Total Construction Cost annually per INTERA preliminary costs estimate
Mosquito Control Activities	Annual Cost	0	$ -	$ -	$ (7,439)	$ -	$ (12,865)	N/A for Seawall option
Direct Cost Sub-Total:					$ 76,327,580		$ 77,342,851	$76,327,580
Indirect Costs	**Units**	**Quantity**	**Cost** **One Time/ Annual Cost**	**20 Year Horizon** **Total Cost**	**Relative to Base Case**	**50 Year Horizon** **Total Cost**	**Relative to Base Case**	**Comments**
Property Value Impacts	Per Site	11	$ 11,789	$ 1,911,803	$ (1,911,803)	$ 3,306,357	$ (3,306,357)	Loss of property value relative to county trend; seawall option would preserve some but not all property values. Conservatively, this option assumes half of the loss is averted; assume long-term avg of 11 sales/yr
Indirect Cost Sub-Total:				1,911,803	-	3,306,357	-	
Costs Total:					106,164,528		128,944,191	
Direct Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit**	**Relative to Base Case**	**Total Cost**	**Relative to Base Case**	**Comments**
Salvage Value	One-time	1	$ 48,489,226	$ 16,108,385	$ 16,108,385	$ -	$ -	Remaining asset life at end of analysis period
Recreational value (Day Visitors)	Visitor Group	10,103	$ 475	$ 71,449,221	$ -	$ 123,567,447	$ -	For businesses within the direct area, which account for 45% of total visitor related sales, owners report an expected increase of 30% if River conditions are improved, however loss of beach amenity likely to offset; therefore kept constant with Base Case.
Recreational value (Overnight Visitors)	Visitor Group	4,854	$ 1,551	$ 112,019,569	$ -	$ 193,731,604	$ -	For businesses within the direct area, which account for 45% of total visitor related sales, owners report an expected increase of 30% if River conditions are improved, however loss of beach amenity likely to offset; therefore kept constant with No Action.
Direct Benefits Sub-Total:					$ 16,108,385		$ -	
Indirect Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit**	**Relative to Base Case**	**Total Benefit**	**Relative to Base Case**	**Comments**
Commercial fishery production	Per pound	3762	$ 24,563	$ 365,435	$ 18,376	$ 632,000	$ 31,781	Assume continued production based on 2000 - 2015 trend
Commercial fishery impacts	Per Pound	-	$ -	$ -	$ 6,108	$ -	$ 10,564	Avoided loss of current trend of 1.8% annual decline could be avoided if river were opened
Indirect Benefits Sub-Total:					$ 24,485		$ 42,345	
Non-Market Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit**	**Relative to Base Case**	**Total Benefit**	**Relative to Base Case**	**Comments**
WTP for listed species	Per Household - Annual	-	$ -	$ -	$ (2,122,424)	$ -	$ (3,670,614)	Neither beach nor current sand flats in River protected under sea wall option
Beaches and Dunes	Per Acre	0	$ 17,499	$ -	$ (27,714,524)	$ -	$ (47,930,726)	Neither beach nor current sand flats in River protected under sea wall option
Coastal Wetland Habitat	Per Acre	22.75	$ 8,487	$ 2,872,447	$ 2,872,447	$ 4,967,738	$ 4,967,738	Per acre FEMA Ecosystem Service value for Coastal Wetland habitat excluding recreational value for 22.75 acres that would be restored with an opened up river that would provide wildife habitat, nursery for various species, seagrass, etc.
WTP for Heritage Site	Per Household - Annual	10,360	$ 16	$ 2,517,956	$ 2,517,956	$ 4,354,665	$ 4,354,665	Household willingness to pay for cultural heritage sites, average of values from two studies: Wright, W. & Eppink, F. 2016. Choi et al 2010. based on the average of values from two studies: Wright, W. & Eppink, F. 2016. Choi et al 2010, multiplied by the total number of households in the Summer Haven River area ZIP code.
Non-Market Benefits Sub-Total:					$ 5,390,403		$ 9,322,402	
Benefits Total:					$ 59,618,948		$ 75,249,094	
Results								
Net Benefits:					$ (46,545,580)		$ (53,695,098)	
Benefit:Cost Ratio:					0.56		0.58	

Benefit:Cost Analysis Summary

Summer Haven - Beach + Dune Renourishment

			20 Year Horizon			50 Year Horizon		
Direct Costs	**Units**	**Quantity**	**Cost One Time/ Annual Cost**	**Total Cost 3%**	**Relative to Base Case 3%**	**Total Cost 3%**	**Relative to Base Case 3%**	**Comments**
Construction Costs	One-time	1	$ 35,311,687	$ 35,311,687	$ 35,311,687	$ 35,311,687	$ 35,311,687	Pg 10 INTERA Report; includes mobilization costs, permitting, property acquisition
Administrative Costs	Hours	40	$ 1,750	$11,634,810	$10,593,506	$12,394,384	$ 10,593,506	Annual Costs, Co Staff time coordinating public response; allowance for difficulty obtaining easements at industry standard; $70K w/30% fringe from PM-equivalent positions in FL Has a Right to Know
Decommissioning Costs	One-time	0	$ -	$ -	$ -	$ -	$ -	N/A; included in construction costs
Property Acquisition Costs	Per Site	0	$0	$0	$ -	$0	$ -	N/A for Beach-Dune Nourishment Option per INTERA report
Maintenance/Repair	Percent of Initial Cost	0.5	$ 3,531,169	$ 84,684,143	$ 41,293,738	$ 90,856,138	$ 15,814,850	From INTERA pge 9: "For the beach and dune nourishment alternative, conceptual analyses have shown that replacing 50% of the initial fill every five years", i.e., (35,311,687*.5)/5
Mosquito Control Activities	Annual Cost	0		$ -	$ (7,439)	$ -	$ (12,865)	N/A for Beach-Dune Nourishment Option
Direct Cost Sub-Total:					$ 87,198,931		$ 61,720,043	
Indirect Costs	**Units**	**Quantity**	**Cost One Time/ Annual Cost**	**Total Cost 3%**	**Relative to Base Case 3%**	**Total Cost 3%**	**Relative to Base Case 3%**	**Comments**
Property Value Impacts	Per Site	11	$ -	$ -	$ (3,823,606)	$ -	$ (6,612,714)	Loss of property value relative to county trend; dune option would preserve property values.
Indirect Cost Sub-Total:				-	-	-	-	
Costs Total:					$ 87,198,931		$ 61,720,043	
Direct Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Comments**
Salvage Value	One-time	0	$ -	$ -	$ -	$ -	$ -	N/A for Beach-Dune
Recreational value (Day Visitors)	Per Visitor Group	10,103	$ 475	$ 81,094,866	$ 9,645,645	$ 140,249,053	$ 16,681,605	For businesses within the direct area, which account for 45% of total visitor related sales, owners report an expected increase of 30% if River conditions are improved. Annual spend per visitor group: 10,103 (Total Day Visitor groups annually based on traffic counts to Helen Mellon Schmidt Park) *$475 (Total annual average day visitor recreational spending as reported by online survey respondents)
Recreational value (Overnight Visitors)	Per Visitor Group	4,854	$ 1,551	$ 127,142,211	$ 15,122,642	$ 219,885,371	$ 26,153,767	For businesses within the direct area, which account for 45% of total visitor related sales, owners report an expected increase of 30% if River conditions are improved. Annual spend per visitor group: 4,854 (Total Overnight Visitor groups annually based on traffic counts to Helen Mellon Schmidt Park) *$1,551 (Total annual average recreational overnight visitor spending as reported by online survey respondents)
Direct Benefits Sub-Total:					$ 24,768,287		$ 42,835,372	
Indirect Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Comments**
Commercial fishery production	Per pound	3,762	$ 24,563	$ 365,435	$ 18,376	$ 632,000	$ 31,781	Assume continued production based on 2000 - 2015 trend
Commercial fishery impacts	Per pound	-	$ -	$ -	$ 6,108	$ -	$ 10,564	Avoided loss of current trend of 1.8% annual decline could be avoided if river were opened
Indirect Benefits Sub-Total:					$ 24,485		$ 42,345	
Non-Market Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Comments**
WTP for listed species	Per Household - Annual	10,360	$ 79	$ 11,980,074	$ 9,857,650	$ 20,814,962	$ 17,144,348	Assume increased habitat for listed species coastal habitat (e.g., sea turtle and nesting birds) as a result of the beach-dune construction MINUS loss of habitat during 2 months of construction in Yr1. Value based on the average household willingness to pay reported across multiple studies that estimate the public value of coastal endangered species habitat. Average public WTP/household/year of $78.58 (Wallmo & Lew 2012 and Wallmo & Lew 2015) multiplied by 10,360, the total number of households in the SHR ZIP code.
Beaches and Dunes	Per Acre	119	$ 17,499	$ 31,006,587	$ 3,292,062	$ 53,624,164	$ 5,693,438	Assume increased aesthetic quality of beach-dune area; multiply total 109 acres by a per acre value of $17,499 for the aesthetic value of beach/dune habitat from Mehvar et al, 2018.
Coastal Wetland Habitat	Per Acre	22.75	$ 8,487	$ 2,872,447	$ 2,872,447	$ 4,967,738	$ 4,967,738	Per acre FEMA Ecosystem Service value for Coastal Wetland habitat excluding recreational value * 22.75 acres that would be restored with an opened up river that would provide wildife habitat, nursery for various coastal wetland, magrove, saltmarsh etc. species.
WTP for Heritage Site	Per Household - Annual	10,360	$ 16	$ 2,517,956	$ 2,517,956	$ 4,354,665	$ 4,354,665	Household willingness to pay for "special places"/cultural heritage sites, average of values from two studies: Wright, W. & Eppink, F. 2016. Choi et al 2010. based on the average of values from two studies: Wright, W. & Eppink, F. 2016. Choi et al 2010, multiplied by the total number of households in the Summer Haven River area ZIP code.
Non-Market Benefits Sub-Total:					$ 18,540,116		$ 32,160,189	
Benefits Total:					$ 47,163,932		$ 81,663,485	
Results								
Net Benefits:					$ (40,034,999)		$ 19,943,442	
Benefit:Cost Ratio:					0.54		1.32	

Benefit:Cost Analysis Summary

Summer Haven - Managed Retreat

			20 Year Horizon			50 Year Horizon		
Direct Costs	**Units**	**Quantity**	**Cost One Time/ Annual Cost**	**Total Cost**	**Relative to Base Case**	**Total Cost**	**Relative to Base Case**	**Comments**
Construction Costs	One-time	0	$ -	$ -	$ -	$ -	$ -	N/A for Managed Retreat
Administrative Costs	Hours	40	$ 1,750	$ 1,041,304	$ -	$ 1,800,878	$ -	Annual Costs, Co Staff time coordinating public response; $70K w/30% fringe from PM-equivalent positions in FL Has a Right to Know
Demolition/Decommissioning Costs	One-time	7	$ 18,000	$ 93,642	$ 93,642	$ 93,642	$ 93,642	Assume 7 homes are demolished; staggered in five year increments, 2 homes per each of 3 increments and one home in the 4th increment
Property Acquisition Costs	Per Site	20	$ 715,343	$ 10,022,813	$ 10,022,813	$ 10,022,813	$ 10,022,813	Assume 20 properties are purchased; staggered in five year increments at market value rates per two independent sources (using the higher of 2 average market transaction values at $715,343)
Maintenance/Repair/Beach Nourishment	Annual Cost	0	$ -	$ -	$ (43,390,405)	$ -	$ (75,041,288)	Assume no maintenance would be performed in Managed Retreat
Mosquito Control Activities	Annual Cost	1	$ 500	$ 7,439	$ -	$ 12,865	$ -	Assume $500/yr cost to Anastasia Island Mosquito Control District per TBG MCD 2023 Reports
Direct Cost Sub-Total:					$ 10,116,455		$ 10,116,455	
Indirect Costs	**Units**	**Quantity**	**Cost One Time/ Annual Cost**	**Total Cost**	**Relative to Base Case**	**Total Cost**	**Relative to Base Case**	**Comments**
Property value impacts	Per Site	11	$ 11,789	$ 1,911,803	$ (1,911,803)	$ 3,306,357	$ (3,306,357)	Loss of property value relative to county trend; managed retreat assumed to allow dune to rebuild, ofering some natural protection, but loss of open and flowing river remains. Assume half the lowered appreciation is averted; assume long-term avg of 11 sales/yr
Indirect Cost Sub-Total:					$ -		$ -	
Costs Total:					$ 10,116,455		$ 10,116,455	
Direct Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit**	**Relative to Base Case**	**Total Benefit**	**Relative to Base Case**	**Comments**
Salvage Value	One-time	0	$ -	$ -	$ -	$ -	$ -	N/A for Managed Retreat
Recreational value (Day Visitors)	Per Group	10,103	$ 475	$ 71,449,221	$ -	$ 123,567,447	$ -	Assume continued recreational use and spending as in No Action; Annual spend per visitor group: 10,103 (Total Day Visitor groups annually based on traffic counts to Helen Mellon Schmidt Park) *$475 (Total annual average day visitor recreational spending as reported by online survey respondents)
Recreational value (Overnight Visitors)	Per Group	4,854	$ 1,551	$ 112,019,569	$ -	$ 193,731,604	$ -	Assume continued recreational use and spending as in No Action; nnual spend per visitor group: 4,854 (Total Overnight Visitor groups annually based on traffic counts to Helen Mellon Schmidt Park) *$1,551 (Total annual average recreational overnight visitor spending as reported by online survey respondents)
Direct Benefits Sub-Total:					$ -		$ -	
Indirect Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit**	**Relative to Base Case**	**Total Benefit**	**Relative to Base Case**	**Comments**
Commercial fishery production	Per pound	3,572	$ 23,328	$ 347,059	$ -	$ 600,219	$ -	Commercial Aquaculture Lease 2.11 Acres is 13% of the County Total and equates to 3,572 lbs as share of total county oyster production; FWC Commercial Landings is 26,693 lbs of oysters in 2023 at an average price per pound of $6.53.
Commercial fishery impacts	Per pound	63	$ (411)	$ (6,108)	$ -	$ (10,564)	$ -	Commercial Lease Area Productivity Loss annually (1.8% avg loss based on historic FWC landings data 2000-2003; 1.8% of 3,572 = 63) at average FWC price (Commercial Fishery)
Indirect Benefits Sub-Total:					$ -		$ -	
Non-Market Benefits	**Units**	**Quantity**	**Benefit One Time/ Annual Value**	**Total Benefit**	**Relative to Base Case**	**Total Benefit**	**Relative to Base Case**	**Comments**
WTP for listed species	Per Household - Annual	10,360	$ 142,660	$ 2,122,424	$ -	$ 3,670,614	$ -	WTP Per Person of $5.29 (based on Boeri 2020) multiplied by 2.51, the average number of people per St Johns County household to yield household WTP for coastal bird habitat multiplied by 10,360, the total number of households in the SHR ZIP code. Assume increased habitat quality for least terns from shoaled in riverbed based on scientific expert input.
Beaches and Dunes	Per Acre	119	$ 17,499	$ 31,006,587	$ 3,292,062	$ 53,624,164	$ 5,693,438	Assume 10 additional acres of beaches and dunes would be provided over the No Action scenario (109 + 10 = 119); multiply total 119 acres by a per acre value of $17,499 for the aesthetic value of beach/dune habitat from Mehvar et al, 2018.
Coastal Wetland Habitat	Per Acre	-	$ -	$ -	$ -	$ -	$ -	No benefit under managed retreat option; assumes river is closed and coastal wetland habitat remains lost
WTP for Heritage Site/Special Places	Per Household - Annual	-	$ -	$ -	$ -	$ -	$ -	No benefit under managed retreat option
Non-Market Benefits Sub-Total:					$ 3,292,062		$ 5,693,438	
Benefits Total:					$ 48,594,270		$ 84,041,083	
Results								
Net Benefits:					$ 38,477,815		$ 73,924,628	
Benefit:Cost Ratio:					4.80		8.31	

Appendix C: Summary of Cost-Benefit Analysis Methodology and Results: Summerhouse

Benefit:Cost Analysis Summary

Summerhouse Base Case: Business as Usual

				20 Years	50 Years	
Direct Costs	**Units**	**Quantity**	**Cost** **One Time/ Annual Cost**	**Total Cost 3%**	**Total Cost 3%**	**Comments**
Construction Costs		0	$0	$0	$0	N/A in the Base Case
Administration Costs	Annual Cost	40	$1,750	$1,041,304	$1,800,878	Annual Costs, Co Staff time (40 hrs annually) coordinating public response; $70K w/30% fringe from PM-equivalent positions in FL Has a Right to Know
Property Acquisition Costs		0	$0	$0	$0	N/A in the Base Case
Maintenance/Repair	Every 3-4 Years	26,405	$752,543	$11,195,932	$19,362,741	Assume similar efforts to FEMA emergency maintenance repair at frequency of disruption (every 3 years, annualized cost assumed to occur 6 times over 20 years): 26,405 CY * $95/CY (the quantity of sand is based on the INTERA report p.7, the FEMA Cat B Emergency Berm Restoration Project volume from 2021)
Management Study: Off-Shore Sand Source Investigation		0	$0	$0	$0	N/A in the Base Case
Annual Beach Profile Data Collection & Analysis		0	$0	$0	$0	N/A in the Base Case
Supplemental Inlet/Wwaterways Survey		0	$0	$0	$0	N/A in the Base Case
Inlet Channel Realignment		0	$0	$0	$0	N/A in the Base Case
Direct Cost Sub-Total:				$12,237,236	$21,163,619	
Indirect Costs	**Units**	**Quantity**	**Cost** **One Time/ Annual Cost**	**Total Cost 3%**	**Total Cost 3%**	**Comments**
Property Value Impacts	Annual Cost in Property Value	1	$22,978,918	$6,837,366	$6,837,366	Assumes a 2% chance of loss of property in any given year to Buildings 20, 15, and 16 per INTERA Report and Model.
Loss of Services to Private Properties	Per Household - Month	36	$1,389,960	$413,582	$413,582	Assume service loss will occur at same probability as storm event that is predicted to damage Buildings 20, 15, and 16 per INTERA model; Total FEMA Disruption & Rental Cost for Loss of Service to all in 3 coastal buildings, assuming average of 12 units per building (12 households per building) * average expected cost of distruption per household for one month based on FEMA service disruption and rental cost; these values are the same as the 20-yr time horizon because it is assumed that these damages would occur within 20 years
Indirect Cost Sub-Total:				$7,250,948	$7,250,948	
Costs Total:				$19,488,184	$28,414,566	
Direct Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit 3%**	**Total Benefit 3%**	**Comments**
Residual Value	One-time	0	$0	$0	$0	N/A in the Base Case
Recreational Value	Per Acre/Year	9.7	$328,428	$4,886,180	$4,886,180	Some benefit in the base case, assuming degradation over time, thus recreation value is assumed to be 38% of the value provided by the beach-dune. Beach unusuable after year 20.
Direct Benefits Sub-Total:				$4,886,180	$4,886,180	
Indirect Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit 3%**	**Total Benefit 3%**	**Comments**
Indirect Benefits Sub-Total:				$0	$0	
Non-Market Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit 3%**	**Total Benefit 3%**	**Comments**
Listed Species Habitat	Per Household	10,360	$309,359	$4,602,486	$4,602,486	Willingness to Pay for listed species habitat (Wallmo & Lew, 2012) $78.58 applied to 10,360 households; 38% of the value provided is retained as some benefit is retained in the base case. This assumes degradation over time that results in 38% of the value. Beach unusuable after year 20.
Beaches and Dunes	Per Acre	10	$64,634	$961,595	$961,595	Assumes beach experiences degradation over time, of which 38% of the ecosystem services value from FEMA of $17,499 is retained and applied to 9.72 acres of beach. Beach unusuable after year 20.
Non-Market Benefits Sub-Total:				$5,564,082	$5,564,082	
Benefits Total:				$10,450,261	$10,450,261	
Results						
Net Benefits:				($9,037,922)	($17,964,305)	
Benefit:Cost Ratio:				0.54	0.37	

Benefit:Cost Analysis Summary

Summerhouse - Seawall

			20 Years			50 Years		
Direct Costs	**Units**	**Quantity**	**Cost** **One Time/ Annual Cost**	**Total Cost 3%**	**Relative to Base Case 3%**	**Total Cost 3%**	**Relative to Base Case 3%**	**Comments**
Construction Costs	One-time	1	$1,276,574	$1,276,574	$1,276,574	$1,276,574	$1,276,574	Construction cost of seawall per INTERA 2023 Report is $1.24 million. The 2023 value is adjusted to 2024 dollars. Construction cost estimate includes all design, permitting, etc and contingency.
Administration Costs	Annual	40	$1,750	$1,041,304	$0	$1,800,878	$0	Annual Costs, Co Staff time (40 hrs annually) coordinating public response; $70K w/30% fringe from PM-equivalent positions in FL Has a Right to Know
Property Acquisition Costs	N/A	0	$0	$0	$0	$0	$0	N/A for Seawall
Maintenance/Repair	Annual	1	$12,766	$189,922	($11,006,010)	$328,460	($19,034,281)	is $124,000; The value is annualized to 1% each year and 2023 value adjusted to 2024 dollars.
Direct Cost Sub-Total:					($9,729,436)		($17,757,707)	
Indirect Costs	**Units**	**Quantity**	**Cost** **One Time/ Annual Cost**	**Total Cost 3%**	**Relative to Base Case 3%**	**Total Cost 3%**	**Relative to Base Case 3%**	**Comments**
Property Value Impacts		1	$15,266,696	$4,542,598	($2,294,768)	$4,542,598	($2,294,768)	Compared to base case, avoided loss of Bldg 20 (at $7.7 million * 2% annually) but with continued potential damage to Bldg 15 & 16 at 2% annually ($15.2 million * 2% annually, with discount rate). Assumes all losses are incurred in first twenty years, so 50 year value is same.
Loss of Services to Private Properties	Building	24	$926,640	$275,721	($137,861)	$275,721	($137,861)	Avoided loss of services to Building 20 that would be impacted by another storm for which 2% chance of occuring any given year; Assume loss only for the 20-yr time period.
Indirect Cost Sub-Total:					($2,432,629)		($2,432,629)	
Costs Total:					$6,840,655.73		$6,840,655.73	
Direct Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Relative to Base Case 5%**
Residual Value	One-time	1	$765,944	$285,397	$285,397	$0	$0	Salvage value for useful life - assumes remaining 30 yrs at Yr 20; at 0 for Yr 50.
Recreational Value	Acre	9.7	$328,428	$4,886,180	$0	$4,886,180	$0	Seawall provides no additional recreational value compared to the base case.
Direct Benefits Sub-Total:					$285,397		$0	
Indirect Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Relative to Base Case 5%**
Indirect Benefits Sub-Total:					$0		$0	
Non-Market Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Relative to Base Case 5%**
Listed Species Habitat	Households - Annual		$0	$0	($4,602,486)	$0	($4,602,486)	Per INTERA: Seawall does not protect recreational function of the beach, so would presumably not protect habitat either
Beaches and Dunes	Acre - Annual		$0	$0	($961,595)	$0	($961,595)	Per INTERA: Seawall does not protect recreational function of the beach, so would presumably not protect habitat either
Non-Market Benefits Sub-Total:					($5,564,082)		($5,564,082)	
Benefits Total:					$13,724,036		$21,466,910	
Results								
Net Benefits:					$ 6,883,380		$ 14,626,254	
Benefit:Cost Ratio:					2.01		3.14	

Benefit:Cost Analysis Summary

Summerhouse - Beach + Dune Renourishment

			20 Year Cost			50 Year Cost		
Direct Costs	**Units**	**Quantity**	**Cost** **One Time/ Annual Cost**	**Total Cost 3%**	**Relative to Base Case 3%**	**Total Cost 3%**	**Relative to Base Case 3%**	**Comments**
Construction Costs	One-time	1	$5,960,778	$5,960,778	$5,960,778	$5,960,778	$5,960,778	Construction cost of Beach-Dune Nourishment per INTERA 2023 Report. 2023 value adjusted to 2024. Construction cost estimate includes all design, permitting, etc and contingency.
Administration Costs	Annual	40	$1,750	$1,041,304	$0	$1,800,878	$0	Annual Costs, Co Staff time (40 hrs annually) coordinating public response; $70K w/30% fringe from PM-equivalent positions in FL Has a Right to Know
Property Acquisition Costs		0		$0	$0	$0	$0	N/A for Beach-Dune Option
Maintenance/Repair	Annual	1	$2,227,379	$33,137,768	$21,941,836	$57,309,923	$37,947,183	Via INTERA report Table 5.2 Beach and Dune Nourishment Maintenance Cost. Assumes nourishment occurs every 3 years at 90% of the initial material; annualized. 2023 value adjusted to 2024. See maintenance tab.
Direct Cost Sub-Total:					$27,902,613		$43,907,960	
Indirect Costs	**Units**	**Quantity**	**Cost** **One Time/ Annual Cost**	**Total Cost 3%**	**Relative to Base Case 3%**	**Total Cost 3%**	**Relative to Base Case 3%**	**Comments**
Property Value Impacts	Building	3	$0	$0	($6,837,366)	$0	($6,837,366)	Avoided loss of property value impacts in the Base Case per INTERA assumption that there is possible damage to buildlings 15, 16, and 20 in the Base Case and the Beach/Dune option would protect all properties
Loss of Services to Private Properties	Units	0	$0	$0	($413,582)	$0	($413,582)	Avoided loss of services per INTERA assumption that there is possible damage to buildlings 15, 16, and 20 in the Base Case and the Beach/Dune option would protect all properties.
Indirect Cost Sub-Total:					($7,250,948)		($7,250,948)	
Costs Total:					$27,902,613		$43,907,960	
Direct Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Comments**
Residual Value		0	$0	$0	$0	$0	$0	N/A
Recreational Value	Acre	9.7	$88,918	$12,714,321	$7,828,141	$22,093,784	$17,207,604	Value of recreational activity from FEMA recreation value ($88,918) x 9.72 acre/yr less loss of recreation during 2 months of initial construction period.
Non-Market Benefits	**Units**	**Quantity**	**Benefit** **One Time/ Annual Value**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Total Benefit 3%**	**Relative to Base Case 3%**	**Comments**
Listed Species Habitat	Household	10,360	$78.58	$12,111,806	$7,509,320	$20,946,694	$16,344,208	Number of households in zipcode (10,3960) x Annual WTP for listed species ($78.58)
Beaches and Dunes	Acre	10	$17,499	$2,530,514	$1,568,919	$4,376,383	$3,414,787	Mehvar et al 2018 ES Beach & Dune Value per acre ($17,499) applied to 9.72 acres.
Non-Market Benefits Sub-Total:					$9,078,238		$19,758,995	
Benefits Total:					$24,157,327		$44,217,547	
Results								
Net Benefits:					($3,745,287)		$309,587	
Benefit:Cost Ratio:					0.87		1.01	

Benefit:Cost Analysis Summary

Summer House - IMP Dredge & Truck

			20 Year Horizon					
Direct Costs	**Units**	**Quantity**	**Cost**		**Relative to Base Case 3%**		**Relative to Base Case 3%**	**Comments**
			One Time/ Annual Cost	**Total Cost 3%**		**Total Cost 3%**		
Construction Costs	One-time	0	$0	$0	$0	$0	$0	N/A for IMP
Administration Costs	One-time	40	$1,750	$1,041,304	$0	$1,800,878	$0	N/A for IMP
Property Acquisition Costs	Per Site	0		$0	$0	$0	$0	N/A for IMP
Maintenance/Repair	Annual Cost	0		$0	($11,195,932)	$0	($19,362,741)	N/A for IMP
Management Study: Off-Shore Sand Source Investigation	One-time	1	$750,000	$750,000	$750,000	$750,000	$750,000	One-time cost at average of $750,000 per INTERA.
Annual Beach Profile Data Collection & Analysis	Annual Cost	1	$40,000	$595,099	$595,099	$1,029,191	$1,029,191	Annual beach profile data collection and analysis at a cost of $40,000/year per INTERA.
Supplemental Inlet/Waterways Survey	Annual Cost	1	$16,000	$238,040	$238,040	$411,676	$411,676	Cost is $16,000 per year based on annualizing $80,000 every 5 years per INTERA.
Inlet Channel Realignment	Annual Cost	33,000	$2,508,000	$37,312,707	$37,312,707	$64,530,248	$64,530,248	Dredge and fill cost for 33,000 CY/year at $76/CY cost per INTERA report (for cost) and 4/30/25 email (for annual CY)
Direct Cost Sub-Total:					$27,699,913		$47,358,374	
Indirect Costs	**Units**	**Quantity**	**Cost**		**Relative to Base Case 3%**		**Relative to Base Case 3%**	**Comments**
			One Time/ Annual Cost	**Total Cost 3%**		**Total Cost 3%**		
Property Value Impacts	Annual Cost	1	$22,978,918	$3,418,683	($3,418,683)	$3,418,683	($3,418,683)	Avoided loss of property value impacts estimated at half of Base Case. The Base Case assumes a 2% chance of loss of property in any given year to Buildings 20, 15, and 16 per INTERA Report and Model.
Loss of Services to Private Properties	Per household - month	36	$1,389,960	$206,791	($206,791)	$206,791	($206,791)	Avoided service loss estimated at half of Base Case. The Base Case assumes service loss will occur at same probability as storm event that is predicted to damage Buildings 20, 15, and 16 per INTERA model; Total FEMA Disruption & Rental Cost for Loss of Service to all in 3 coastal buildings, assuming average of 12 units per building (=12 households per building) x average expected cost of distruption per household for one month based on FEMA service disruption and rental cost; these values are the same as the 20-yr time horizon because it is assumed that these damages would occur within 20 years
Indirect Cost Sub-Total:					($3,625,474)		($3,625,474)	
Costs Total:					$38,895,846		$66,721,115	
Direct Benefits	**Units**	**Quantity**	**Benefit**		**Relative to Base Case 3%**		**Relative to Base Case 3%**	**Comments**
			One Time/ Annual Value	**Total Benefit 3%**		**Total Benefit 3%**		
Residual Value	One-time	0		$0	$0	$0	$0	N/A for IMP
Recreational value	Acre - Annual	9.7	$432,142	$6,429,184	$1,543,004	$11,118,916	$6,232,736	Boating, kayaking/paddling activities, fishing, swimming, birding, etc.at half of full value
Direct Benefits Sub-Total:					$1,543,004		$6,232,736	
Indirect Benefits	**Units**	**Quantity**	**Benefit**		**Relative to Base Case 3%**		**Relative to Base Case 3%**	**Comments**
			One Time/ Annual Value	**Total Benefit 3%**		**Total Benefit 3%**		
Indirect Benefits Sub-Total:					$0		$0	
Non-Market Benefits	**Units**	**Quantity**	**Benefit**		**Relative to Base Case 3%**		**Relative to Base Case 3%**	**Comments**
			One Time/ Annual Value	**Total Benefit 3%**		**Total Benefit 3%**		
Listed Species Habitat	Households - Annual	10,360	$39	$6,055,903	$1,453,417	$10,473,347	$5,870,861	Annual WTP for listed species of $78.58 * 50% (assume half the benefit of beach nourishment for this value) applied to households in zipcode (10,360); assumes a storm event occurs every 3 years.
Beaches and Dunes	Acre - Annual	10	$8,750	$1,265,257	$303,662	$975,468	$13,872	Mehvar et al 2018 ecosystem services Beach & Dune Value per acre of $17,499 applied to 9.72 acres; this is multiplied by 50% to account for half the value of Beach/Dune option is retained due to frequent disruption of activities.
Non-Market Benefits Sub-Total:					$1,757,078		$5,884,733	
Benefits Total:					$21,540,171		$35,105,684	
Results								
Net Benefits:					($17,355,674)		($31,615,431)	
Benefit:Cost Ratio:					0.55		0.53	

Benefit:Cost Analysis Summary

Summer House - IMP Truck Only

			20 Year Horizon					
			Cost					
Direct Costs	Units	Quantity	One Time/ Annual Cost	Total Cost 3%	Relative to Base Case 3%	Total Cost 3%	Relative to Base Case 3%	Comments
Construction Costs	One-time	0	$0	$0	$0	$0	$0	N/A for IMP
Administration Costs	One-time	40	$1,750	$1,041,304	$0	$1,800,878	$0	N/A for IMP
Property Acquisition Costs	Per Site	0	$0	$0	$0	$0	$0	N/A for IMP
Maintenance/Repair	Annual Cost	0	$0	$0	($11,195,932)	$0	($19,362,741)	N/A for IMP
Management Study: Off-Shore Sand Source Investigation	One-time	1	$750,000	$750,000	$750,000	$19,297,323	$19,297,323	One-time cost at average of $750,000 per INTERA.
Annual Beach Profile Data Collection & Analysis	Annual Cost	1	$40,000	$595,099	$595,099	$1,029,191	$1,029,191	Annual cost of $40,000 per INTERA.
Supplemental Inlet/Wwaterways Survey	Annual Cost	1	$16,000	$238,040	$238,040	$411,676	$411,676	Cost is $16,000 per year based on annualizing $80,000 every 5 years per INTERA.
Inlet Channel Realignment	Annual Cost	33,000	$3,135,000	$46,640,884	$46,640,884	$80,662,810	$80,662,810	Dredge and fill 33,000 CY/yr at $95/CY cost per INTERA report (for cost) and 4/30/25 email (for annual CY)
Direct Cost Sub-Total:					$37,028,090		$82,038,259	
Indirect Costs	Units	Quantity	Cost One Time/ Annual Cost	Total Cost 3%	Relative to Base Case 3%	Total Cost 3%	Relative to Base Case 3%	Comments
Property Value Impacts	Annual Cost	1	$22,978,918	$3,418,683	($3,418,683)	$3,418,683	($3,418,683)	Avoided loss of property value impacts estimated at half of Base Case. The Base Case assumes a 2% chance of loss of property in any given year to Buildings 20, 15, and 16 per INTERA Report and Model.
Loss of Services to Private Properties		36	$1,389,960	$206,791	($206,791)	$206,791	($206,791)	Avoided service loss estimated at half of Base Case. The Base Case assumes service loss will occur at same probability as storm event that is predicted to damage Buildings 20, 15, and 16 per INTERA model; Total FEMA Disruption & Rental Cost for Loss of Service to all in 3 coastal buildings, assuming average of 12 units per building (=12 households per building) x average expected cost of distruption per household for one month based on FEMA service disruption and rental cost; these values are the same as the 20-yr time horizon because it is assumed that these damages would occur within 20 years
Indirect Cost Sub-Total:					($3,625,474)		($3,625,474)	
Costs Total:					$48,224,022		$101,401,000	
Direct Benefits	Units	Quantity	Benefit One Time/ Annual Value	Total Benefit 3%	Relative to Base Case 3%	Total Benefit 3%	Relative to Base Case 3%	Comments
Residual Value	One-time	0	$0	$0	$0	$0	$0	N/A for IMP
Recreational value	Acre - Annual	9.7	$432,142	$6,429,184	$1,543,004	$11,118,916	$6,232,736	Boating, kayaking/paddling activities, fishing, swimming, birding, etc.at half of full value.
Direct Benefits Sub-Total:					$1,543,004		$6,232,736	
Indirect Benefits	Units	Quantity	Benefit One Time/ Annual Value	Total Benefit 3%	Relative to Base Case 3%	Total Benefit 3%	Relative to Base Case 3%	Comments
			$0	$0	$0	$0	$0	
Indirect Benefits Sub-Total:					$0		$0	
Non-Market Benefits	Units	Quantity	Benefit One Time/ Annual Value	Total Benefit 3%	Relative to Base Case 3%	Total Benefit 3%	Relative to Base Case 3%	Comments
Listed Species Habitat	Households - Annual	10,360	$39	$6,055,903	$1,453,417	$10,473,347	$5,870,861	Annual WTP for listed species of $78.58 * 50% (assume half the benefit of beach nourishment for this value) applied to households in zipcode (10,360); assumes a storm event occurs every 3 years.
Beaches and Dunes	Acre - Annual	10	$8,750	$1,265,257	$303,662	$2,188,191	$1,226,596	Mehvar et al 2018 ecosystem services Beach & Dune Value per acre of $17,499 applied to 9.72 acres; this is multiplied by 50% to account for half the value of Beach/Dune option is retained due to frequent disruption of activities.
Non-Market Benefits Sub-Total:					$1,757,078		$7,097,457	
Benefits Total:					$18,121,488		$36,318,407	
Results								
Net Benefits:					($30,102,534)		($65,082,593)	
Benefit:Cost Ratio:					0.38		0.36	