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**Project Name:** Abundance, distribution and habitat use of sea turtles in St. Joseph Bay, Florida

**Submitting entity:** United States Geological Survey, Southeast Ecological Science Center,  
7920 NW 71<sup>st</sup> Street, Gainesville, FL 32653

**I. Please select one or more eligible activity the project is classified under:**

**Restoration and protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region.**

**Mitigation of damage to fish, wildlife and natural resources**

**Implementation of a federally approved marine, coastal or comprehensive conservation management plan, including fisheries monitoring**

**Workforce development and job creation**

Improvements to or on state parks located in coastal areas affected by by Deepwater Horizon oil spill

Infrastructure projects benefitting the economy or ecological resources, including port infrastructure

Coastal flood protection and related infrastructure

Planning assistance

**Promotion of tourism and seafood in the Gulf Coast region**

**II. Please provide an executive summary of the project. Describe/quantify the economic (jobs, infrastructure, tourism, etc) and environmental benefits (habitat, quality, knowledge, long-term sustainability, etc).**

St. Joseph Bay in Gulf County, Florida supports one of the largest assemblages of juvenile turtles in the Gulf of Mexico. A large stranding event that occurred due to exceptionally cold weather in 2010/2011 resulted in the recovery of more than 1,700 juvenile turtles from St. Joseph Bay, most of which were endangered green turtles (*Chelonia mydas*). Research suggests however that this bay also supports large numbers of critically endangered Kemps ridley (*Lepidochelys kempii*) and threatened loggerheads (*Caretta caretta*). Although this bay appears to serve as an extremely important habitat for a large number and wide variety of marine turtles, little is known about the abundance, distribution and habitat use of turtles in St. Joseph Bay.

Because of this lack of knowledge, impacts to turtles from recreational and commercial activities are unknown.

The life-cycle of a marine turtle is complex and typically involves disparate habitats separated by hundreds to thousands of kilometers. Hatchlings leave the nesting beach and spend up to ten years in oceanic habitat where they feed on plankton and *Sargassum*. As juveniles, research suggests they navigate back to foraging grounds located near their natal nesting beach where they will exhibit fidelity and remain until they reach reproductive maturity. This shallow juvenile habitat provides abundant protection from predators and plentiful resources for foraging. However juveniles that inhabit more northerly regions, such as the northern Gulf of Mexico, must contend with seasonal changes in habitat and water temperature that may affect their distribution and abundance.

Because sea turtles are cold-blooded reptiles, their body temperature is regulated by the temperature of the surrounding environment. When water temperatures drop, turtles may make seasonal movements to warmer waters. They make these movements to avoid becoming too cold but also because the habitat they depend on for foraging also changes as it gets cold. Seagrasses die back in the winter and the invertebrates and fish that inhabit the seagrass habitat typically move in response to these changes. Although St. Joseph Bay borders the temperate zone, preliminary research suggests that turtles in this coastal habitat do not make these movements. A large proportion of turtles appear to remain in St. Joseph Bay year-round. It is unknown how the habitat in St. Joseph Bay changes throughout the year and how these seasonal changes affect the turtles that use the Bay.

Juvenile sea turtles face many threats to survival. Studies suggest protecting the juvenile life-stage provides the greatest contribution to sea turtle population recovery therefore understanding how many turtles inhabit St. Joseph Bay, what areas they use throughout the year and what the primary causes of mortality are for these species is critical to sea turtle conservation. Because St. Joseph Bay is such an important area to juvenile turtles, conserving them in this water body contributes greatly to their conservation throughout the Gulf of Mexico. This knowledge will help managers develop effective programs to reduce juvenile mortality and provide proper protection. Because seagrass habitat is also critical habitat for many species of sport-fish, scallops and shrimp, juvenile sea turtles foraging in this habitat often interact with these activities. Limiting these activities in the entire bay may protect turtles however it would also harm those industries, the people that depend on those industries for their income and the overall economy of Gulf County. However, if managers know details about turtle use of the Bay, such as what areas are most important, whether these areas change throughout the year, and exactly how turtles are affected by human use of the Bay, this amazing habitat can support recreational interests, commercial activities and tourism while still providing necessary habitat for the turtles that draw many tourists to the region.

This project will provide a great deal of support to Gulf County, both economically and environmentally. Gulf County has the opportunity to become the premier Sea Turtle Research Center on the Gulf Coast, bringing additional research scientists and industrial managers for offshore concerns to explore the findings based on work conducted in Gulf County. It will require employing 12 biologists and supporting the local economy through renting properties for employee housing, using local businesses for vehicle repairs and supply purchases, and contributing to local events such as the Scallop Festival. In addition, by providing data for better management of marine habitat and the sea turtles that use them, the County can continue to grow as a tourist destination while still protecting the natural resources that draw people to the area.

Sea turtles are a high-profile species that attract a great deal of attention and draw tourists to the area. Maintaining healthy habitat and sea turtle populations in St. Joseph Bay will benefit the tourism economy. Environmentally, this project will provide critically important data on the abundance of turtles in this important juvenile assemblage. Currently, no baseline information exists on the number of turtles using St. Joseph Bay throughout the year therefore it is impossible to know when numbers of turtles decline. This project will also help us better understand the relationship between alterations to the marine and juvenile sea turtle distribution. As more people come to Gulf County, additional boats and snorkelers will use the waters of St. Joseph Bay. If these activities are undertaken in balance with the environment, increases in tourism can occur without reducing the natural resources that the tourists are coming to enjoy.

This project proposes a large-scale investigation of the ecology of juvenile turtles in St. Joseph Bay. It includes 4 primary tasks that consist of several activities each:

1. Habitat mapping
  - a. Surveys: yearly and seasonal, aerial mapping, GIS
  - b. Creation of an isoscape: stable isotopes of sediment and vegetation
  - c. Temperature changes: data loggers
2. Turtle movements
  - a. Satellite tracking: large-scale movements of all three species
  - b. Acoustic tracking: small-scale movements of all three species
3. Abundance estimates
  - a. Mark-recapture – contributing to long-term data set
  - b. Aerial surveys – assist with turtle counts

## Methods

### *Habitat mapping*

Vegetation and invertebrate sampling in designated plots and camera-based surveys along transects will occur in summer (July) and winter (January) to document changes in seagrass and invertebrate (crabs, clams, whelks, etc) distribution and abundance. In addition, permanent plots located throughout the bay will be sampled monthly to assess the relationship between water temperature and habitat distribution. Data from this sampling will be used to create habitat maps which can be compared to previous maps so long-term changes in habitat can be observed. These maps can also serve as baseline data so changes in habitat can be monitored to ensure health of the habitat.

Isotopes of carbon and nitrogen can be used to create individual signatures in living organisms including sediment. When animals ingest these organisms (vegetation, fish, plankton, etc), those signatures can be observed in the tissue of the animal. These signatures can be used to identify areas separated by thousands of kilometers (such as adult sea turtle foraging areas separated by hundreds of kilometers) or in relatively small spaces (such as within St. Joe Bay). By sampling vegetation, invertebrates and sediments throughout St. Joseph Bay, an isotopic map can be made of the bay. Then, when tissue from any sea turtle (alive or dead) is analysed, we can determine where that turtle was foraging and what it was eating regardless of where it was caught. This technique can also be used for other animals (fish, manatees, sharks, rays, etc) and will provide a relatively easy way to identify home ranges of animals that were foraging inside the bay.

Because many marine species are cold-blooded, they are greatly affected by water temperature. Understanding the temperature patterns in the bay throughout the year will help understand the distribution of not only turtles but they prey they eat and other species that use the bay.

#### *Turtle movements*

Movements of marine species, particularly those that undertake long-distance migrations, are extremely difficult to document. Without this knowledge, we are unable to identify critical habitat and protect species while they're in that habitat. Satellite tracking marine turtles allows us to remotely follow the turtles for up to one year. This provides invaluable information on residence patterns (do they stay in the bay year-round?), habitat use (do they move all over the bay or stay in one place?), and timing of migration (do they move when it gets cold, when they reach a certain size, etc?).

The disadvantage of satellite tags is that they are relatively large, expensive and short-lived. Because of their size, they cannot be deployed on very small turtles so we know very little about this size-class. In addition, tags last up to one-year which does not allow comparisons among years and the expense of the tags prevents large sample sizes. Acoustic tags do not transmit remotely so data must be gathered either by hand (following the turtle in a boat using a hydrophone) or by a receiver. The receiver is placed in the water and every time a turtle comes within 0.5km of the receiver, the unique identifier for the tag is stored in the receiver along with time and date. Every 6 months, data from the receivers is downloaded to a computer and are available for mapping and analyses. This information provides very detailed movement data which allow identification of fine-scale habitat use and affects of environmental variables. In addition, because acoustic tags are much smaller than satellite tags (generally the size of a AA battery), they can be deployed on very small turtles. These tags can also last more than 5 years which allows long-term tracking.

#### *Abundance estimates*

Turtles in St. Joseph Bay have been marked with flipper and PIT tags since 2001. During that time, more than 200 turtles have been marked. By marking and then recapturing individual turtles, we can generate accurate estimates of turtle abundance. Knowing the number of turtles that are using St. Joseph Bay is necessary for proper management of this habitat. It is not possible to determine increases or decreases in abundance if there is no original abundance to compare these changes to. Therefore, long-term mark-recapture projects are invaluable to conservation and management of turtle populations. In addition, aerial surveys can be used to count turtles at the water's surface. Because the water of St. Joseph Bay is relatively clear, turtles in the Bay can be counted even when they are underwater. Also, we selectively mark a group of turtles with bright white or yellow paint so we can count them on surveys again and record locations. These turtles are easily observed from a plane allowing us to standardize counts and record movements.

### Economic and Environmental Benefits

#### *Economic*

This project will require employing 12 biologists or biological technicians for five years.

These personnel will require housing which means at least one local residence will be rented for the five-year duration of the project.

This project will make use of vehicles and boats that require frequent maintenance and purchase of supplies such as gasoline, boat supplies, office supplies etc.. We currently use local, Port St. Joe businesses for this work and would continue to use these businesses for this project.

The objectives of this project aim to allow for continued development of the tourism economy in Gulf County without harming marine wildlife. Many tourists visiting the Peninsula do so to observe the abundant natural resources that inhabit Gulf County, particularly marine wildlife such as sea turtles. Being able to support a growing tourism economy without damaging the wildlife these tourists are coming to see would be a great benefit to Gulf County.

#### *Environmental*

This project would address serious gaps in our understanding of sea turtle ecology and the habitat that they rely on for survival. Sea grass habitat provides the foundation for most marine species; it serves as a nursery ground for sport-fish, sharks, invertebrates (including scallops and shrimp), manatees and turtles. In addition, it filters water and allows for a clean-water environment. By providing baseline data on the extent and needs of the seagrass inhabiting St. Joseph Bay, we would be promoting the continued health of this vital habitat. By protecting seagrass, we are protecting the health of the entire bay and its inhabitants.

In addition, this project would provide support for a long-term mark-recapture project that began in St. Joseph Bay in 2001. This ongoing project provides the only data on juvenile turtles in the northern Gulf and is therefore critical to the conservation and management of marine turtles. The USGS is committed to this long-term and will provide the logistic support necessary to ensure its continued success.

### **III. Please provide a cost summary/budget. Detail and matching/cooperative funds available for use, and any cooperative support from governmental or other agencies.**

Matching funds to support this project have already been requested from the Disney Conservation Grant (\$30,000), National Fish and Wildlife Federation (\$50,000), State of Florida Marine Turtle Grant (\$25,000), Department of Defense (\$90,000) and DEP Restore Act funds (\$900,000).

Funds are already in place to support preliminary portions of this project from the Florida Department of Transportation (\$90,000), USGS (\$50,000) and the Department of Defense (\$10,000).

In-kind support is available from the USGS, the University of Florida, the Department of Defense and the US Fish and Wildlife Service in the form of personnel support, use of equipment and supplies, and administrative support.

We are requesting \$1,900,000 for this 5 year period. This includes:

Salary = \$750,000 for a Principal Biologist, 2 assistant biologists, 2 technicians and 7 interns  
Equipment = \$315,000 for a boat, satellite and acoustic tags, acoustic receivers, a camera and a net.

Supplies = \$175,000 for all field and office supplies including fuel, tags, satellite tracking fees, housing for technicians and interns, travel costs.

Overhead = USGS 50% = \$660,000

**IV. Please provide a timeline for project completion. Explain the technical and environmental feasibility (including any permitting considerations) of the project.**

Project duration: 5 years (initiation immediate upon receipt of funds)

Data gathering will occur during the first four years. Data analysis and modelling will occur in the final year.

1. Habitat mapping:
  - a. Surveys: summer/winter of first four years of the project
  - b. Creation of an isoscape: Sample collection in summer and winter for the first four years of the project
  - c. Temperature: deployment of data loggers at the initiation of the project.
2. Turtle Movements
  - a. Satellite tagging of turtles: immediate upon release of funds and continuing for the first four years of the project
  - b. Deployment of acoustic receivers: immediate upon release of funds
  - c. Deployment of acoustic tags on turtles: immediate upon release of funds
3. Abundance estimates
  - a. Mark-recapture: immediate upon release of funds
  - b. Aerial surveys: once per week for one week in summer and one week in winter for the first four years of the study
4. Data Analysis: fifth year of the study

**V. Please provide the qualifications of the submitting entity, the financial feasibility/sustainability, and the economic feasibility and sustainability of the project (probability of success, etc).**

This project would be overseen by Dr. Margaret Lamont at the USGS Southeast Ecological Science Center (SESC). Dr. Lamont has been conducting research and monitoring on marine turtles on the St. Joseph Peninsula since 1995 and in St. Joseph Bay since 2001. At the USGS-SESC she has the support of a full administrative team, a Center Director and Supervisory Biologist. The USGS-SESC can provide additional vehicles, personnel and financial support if necessary to fill in any gaps that may arise

during the conduct of the project. Dr. Lamont currently oversees a team of 4 technicians and interns that capture and tag juvenile turtles in St. Joseph Bay year-round and she has deployed satellite tags on more than 15 juvenile turtles throughout the northern Gulf of Mexico, so she is fully aware of the logistics necessary to undertake this proposed project.

The long-term research (18 years) she has conducted in this area demonstrates the feasibility and sustainability of this project. She has published multiple peer-reviewed journal articles summarizing the data she has collected and because her project on the St. Joseph Peninsula and within St. Joseph Bay represent the only long-term dataset on marine turtles in the northern Gulf, her data has provided all of the existing information regarding these turtles. This proposed project will provide valuable support to this already ongoing, long-term research that will continue once this proposed research is completed.

**VI. Please provide the anticipated results of the project, and whether it is included in the City of Port St. Joe, City of Wewahitchka, or Gulf County Comprehensive and Mitigation Plan.**

Results of this project will provide comprehensive ecological information on three different aspects of St. Joseph Bay: habitat, turtle abundance and distribution, and the relationship between turtle distribution and environmental variables. It will also provide economic benefits to the County.

1. Specifically, it will provide detailed maps that identify the habitat, temperature regimes, and turtle locations and abundance in St. Joseph Bay. This set of maps will illustrate seasonal changes to the habitat and environment and how they affect turtle distribution and abundance.
2. It will also provide specific tools such as an isoscape map showing isotopic values for the different regions of St. Joseph Bay. In addition to allowing relatively quick and easy identification of foraging location for any turtles captured or stranded in St. Joseph Bay, it will also be particularly useful for managers and researchers studying other marine organisms (such as manatees, dolphins, sharks, and vegetation).
3. This project will result in abundance estimates for turtles using St. Joseph Bay throughout the year.
4. This project will also result in economic benefits to the County in the form of new jobs, use of local businesses, renting local residences for housing of employees and involvement in local events and festivals.

This project directly addresses goals and objectives defined in Chapters 5 and 6 of the Gulf County Comprehensive Plan.

Chapter 5:

Goal 1: To guide development in such a manner that coastal resources will not be damaged or destroyed.

- a. Objective 1.1: To allow low density or limited development while promoting the protection of the coastal resources of Gulf County, including wetlands, living marine resources, coastal barriers, and wildlife habitats, shall be managed through the implementation of land development regulations, and by implementing Policies 1.1.1 through 1.1.10.
- b. Objective 1.2: Gulf County shall maintain or improve estuarine environmental quality by requiring all development to be consistent with State and Federal permitting requirements and by implementing Policies 1.2.1 through 1.2.2
- c. Objective 1.3: Gulf County shall implement criteria for prioritizing shoreline uses which give priority to water-dependent and water-related uses.

Chapter 6

Goal 1: Protect, manage, and promote energy efficiency, greenhouse gas reduction and conserve the natural resources of Gulf County to ensure their continued best use for the current and future citizens of the County.

- a. Objective 1.3: Gulf County will strive to conserve, appropriately use, and protect the quality and quantity of current and projected water sources and waters that flow into estuarine waters or oceanic waters y implementing Policies 1.3.1 through 1.3.9
- b. Objective 1.4: Gulf County will conserve, appropriately use, and protect its natural resources, including fisheries, wildlife, wildlife habitat, marine habitat, minerals, soils, and native vegetative communities by implementing Policies 1.4.1 through 1.4.11.
- c. Objective 1.5: Gulf County will seek to protect natural resources from the effects of hazardous waste by implementing Policies 1.5.1 through 1.5.5.

This project also supports the goals and objectives of Chapter 7 and Chapter 11 of the Comprehensive Plan by ensuring continued public use of the coastal and marine habitats and by creating multiple jobs and supporting local businesses.

Submitted by: Margaret Lamont

Signature 

Date: 2/18/13

Company Name: United States Geological Survey

Address: 7920 NW 71<sup>st</sup> Street

Address: Gainesville, FL 32653

Telephone Number: 352-209-4306

Email address (if applicable): [mlamont@usgs.gov](mailto:mlamont@usgs.gov)

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BOARD OF COUNTY COMMISSIONERS  
GULF COUNTY, FLORIDA

**RESTORE ACT COMMITTEE (R.A.C.)**

1000 CECIL G. COSTIN SR. BLVD., ROOM 312, PORT ST. JOE, FLORIDA 32456  
PHONE (850)229-6144 • FAX (850) 229-9252 • EMAIL: tkopinsky@gulfcounty-fl.gov

**PUBLIC RECORDS POLICY AND PUBLIC ACCESS ACKNOWLEDGMENT FOR  
GULF COUNTY RESTORE ACT APPLICANTS**

I, Margaret Lamont the undersigned authority and/or representative of the entity USGS SE Ecological Science Center and or the individual who has submitted the Gulf County RESTORE Act Proposal/Pre-Proposal titled Abundance, distribution and habitat use of sea turtles in St. Joseph Bay, Florida hereby acknowledge, consent and accept the following representations that coincide with my/our submission for consideration, evaluation and possible recommendation and approval by the Gulf County Board of County Commissioners for funding from the RESTORE Act distribution that strictly complies with the guidelines and regulations set forth under the Restoration and Ecosystems Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States Act of 2012:

1. I/We am the authorized representative of the application/pre-proposal referenced above.
2. I/We have thoroughly reviewed and familiarized myself and/or my entity on which I have submitted the application/pre-proposal on behalf of with the entirety of the Gulf County Public Records policy.
3. I/We have thoroughly reviewed and familiarized myself and/or my entity on which I have submitted the application/pre-proposal on behalf of with the entirety of the Florida Statute Chapter 119 which controls and permits public access to information.
4. I/We hereby acknowledge, consent and agree to the controlling policies and statutes above as well as the free and open exchange of any and all submissions provided hereunder this application/pre-proposal and all information exchanged hereafter including but not limited to further amendments to these proposals as well as surveys, studies, research, data production, books, drawings, property records, work papers, county owner lists, files, forms, reports, accounts, documents, manuals, handbooks, instructions, printouts relating in any manner for the production of the application. In addition, all papers, notes, data, reference material, documentation, programs, printouts, and all other media and forms of expression that in any way include, incorporate or reflect any confidential information of what ultimately shall become the Gulf County plans for use and application of the RESTORE Act funding.
5. I/We acknowledge, agree and fully consent to cooperate with the appointed Gulf County RESTORE ACT committee, county officials and staff as a continuing obligation and condition of final review for this RESTORE Act application/pre-proposal.
6. I/We have submitted this acknowledgment to Gulf County RESTORE Act Committee and the Gulf County Board of County Commissioners for the purpose and intent of receiving an evaluation, review and possible recommendations for anticipated funding from the Restoration and Ecosystems Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States Act of 2012.

  
Signature of RESTORE Act Applicant

Date: 2/27/13

Margaret Lamont  
Printed Name