

# ARC Grant Proposal Form

**Title of Proposal**

**Principal Investigator (PI) Name**

**Principal Investigator Position/Job Title**

**Contact E-mail Address:**

**Contact Phone:**

**PI School:**

**PI FSW ID #**

**Co-Principal Investigator Name(s) and Position/Affiliation(s) (if needed)**

**Proposed project start and completion month/year**

**Funding Requested**

**ARC Research Type**

ARC Research Types: **Action** research describes research into new facets of learning or learning methods to be completed in the classroom or with FSW students as part of the faculty's instructional role in an effort to pilot or clarify pedagogical or learning support pathways. **Classical** research describes the classical or typical academic research where the PI is seeking to add to generalizable knowledge in the field of study which can be applied in other settings. **Experiential** research describes research that might be considered classical (social research) in the sense that it is seeking to add to generalizable knowledge in the field of study but it is conducted on FSW students or the FSW community. **Discovery** research describes research in which some travel may be required to extract rare, unusual, or otherwise isolated data such as oral histories or archived manuscripts that will add to generalizable knowledge in the field of study.

**Will proposed research  
require IRB approval?**

**Will proposed research  
require FSW IT support?**

\_\_\_\_\_  
*Principal Investigator Signature*

\_\_\_\_\_  
*Printed Name*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Co-Principal Investigator Signature*

\_\_\_\_\_  
*Printed Name*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Co-Principal Investigator Signature*

\_\_\_\_\_  
*Printed Name*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Department Chair/Coordinator Signature*

\_\_\_\_\_  
*Printed Name*

\_\_\_\_\_  
*Date*

## Dean Approval

Method complies with practices of department/division and equipment requests are justified based on methodology.

Approved

Not approved

\_\_\_\_\_  
*Dean Signature*

\_\_\_\_\_  
*Printed Name*

\_\_\_\_\_  
*Date*

## ***Grant Budget Breakdown***

Please provide a description and purpose for the requirements needed for the proposal in the appropriate area below along with expected costs.

**Equipment Requirements & Purpose** (complete page 3 of this form if this section is needed)

**Equipment \$**

**Travel Requirements & Purpose** (complete page 4 of this form if this section is needed)

**Travel \$**

**Student Stipend Requirements & Purpose**

**\$ (Max \$10/hr)**

**Supplies (General supplies, texts, etc.) Requirements & Purpose**

**Supplies \$**

**Technology Requirements (Hardware/software) & Purpose**

**Technology \$**

**Other Requirements & Purpose**

**Other \$**

# ***Grant Equipment Breakdown***

to be completed only if equipment requirements were listed on page 2

**Equipment Storage Location (include Campus, building, and room numbers)**

List items to be purchased and estimated cost.

- |     |       |                 |
|-----|-------|-----------------|
| 1.  | Item: | Estimated Cost: |
| 2.  | Item: | Estimated Cost: |
| 3.  | Item: | Estimated Cost: |
| 4.  | Item: | Estimated Cost: |
| 5.  | Item: | Estimated Cost: |
| 6.  | Item: | Estimated Cost: |
| 7.  | Item: | Estimated Cost: |
| 8.  | Item: | Estimated Cost: |
| 9.  | Item: | Estimated Cost: |
| 10. | Item: | Estimated Cost: |
| 11. | Item: | Estimated Cost: |
| 12. | Item: | Estimated Cost: |
| 13. | Item: | Estimated Cost: |
| 14. | Item: | Estimated Cost: |
| 15. | Item: | Estimated Cost: |
| 16. | Item: | Estimated Cost: |
| 17. | Item: | Estimated Cost: |
| 18. | Item: | Estimated Cost: |
| 19. | Item: | Estimated Cost: |
| 20. | Item: | Estimated Cost: |

**Please describe any in-kind services that are anticipated for the research**

## ***Grant Travel Worksheet***

to be completed only if travel requirements were listed on page 2

### **Transportation**

**Airfare:**

**Please List Flights:**

**Rental Car(s):**

**Rental Car Fuel:**

**Mileage (@ \$0.445/mi):**

**Total Miles:**

**Parking Costs:**

**Parking Description (e.g. hotel):**

**Taxi / Car Service:**

**Transportation TOTAL:**

### **Lodging**

**Hotel Total:**

**Hotel Rate & # of Nights**

### **Meals**

**Breakfast (@ \$6/day):**

**Lunch (@ \$11/day):**

**Dinner (@ \$19/day):**

**Meals TOTAL:**

# The Population and Reproductive Ecology of Different Species of Turtles in Southwest Florida

## **Goals & Significance:**

Peninsular Florida offers a variety of unique habitats with large quantity of Biodiversity across taxa (Pearlstone et al., 2002). The diversity of habitats and subtropical climate has allowed numerous reptiles, both native and nonnative to exploit and disperse throughout the geographic region (Engeman et al., 2011). Of these species, turtles are one of the most successful and enduring groups, occupying several different habitat types, including those created by human disturbance (Connor et al., 2005). However very few studies on turtles in the peninsular region, specifically, on the gulf coast. This lack of information limits our knowledge of the unique ways these animals may be exploiting an environment that undergoes perpetual summer, with very few instances of lingering cold weather. The warm subtropical climate of the area could potentially influence activity patterns, reproductive patterns, and general behavior to deviate from more northern conspecifics and congeners. In the state of Florida, year-round nesting and increased reproductive output has been observed in several species as recorded by Iverson (1977), however most of these observations occurred in more northern latitudes with only a few examples of extended reproduction being described in peninsular Florida (Donini et al 2018).

This makes the southern peninsula region the perfect area to investigate not only reproductive patterns and life history characters, but also differences in genetic structure, as many populations of turtles in the area are isolated in small barrier island regions, or via areas of man-made habitat fragmentation (McLaughlin, 1990; Aresco, 2005; Lebuff and Lechowicz, 2014). The proposed study consists of four primary objectives, With the goal of furthering

our knowledge of south Florida turtle biology and introducing budding science students into the world of conservation biology.

The first of these objectives is to survey and better understand the habitat use of more cryptic species in regions where little information has been attained, allowing for some limited population status estimates, and to facilitate future areas of conservation practice for species of interest, such as Mud turtle species (*Kinosternon baurii*, *K.steindacheri*), Chicken turtles (*Dierochelys reticularia*), Box turtles (*Terrapene baurii*), Diamondback terrapins (*Malaclemys terrapin*), and Cooter species (*Pseudemys peninsularis*, *P.nelsoni*) among others. This would be facilitated by the use of radio-telemetry and other mark and recapture techniques.

The second objective revolves around the investigation of reproductive biology in these southern populations, using hormone quantification from blood plasma samples, and portable ultrasound investigation to assess reproductive status in individuals. The more life history we understand in these animals, the better they can be protected and conserved.

The third objective involves analyzing the population and genetic structure of these southern populations using tissues samples, to assay for genetic diversity and unique haplotypes in some more isolated regions. With many exotic pet dealers in close proximity, and with illegal turtle collection for the international pet trade putting stress on wild populations (Gong et al., 2009), further understanding of the unique genetics in this region could help detect and prevent loss individuals and of genetic diversity.

The fourth objective involves introducing students into the world of conservation biology by allowing them first hand experience in the field. Allowing students to set up traps, learn to mark and tag turtles, and track them with radio-telemetry will allow for early resumé building for both academic and career opportunities, they would be unlikely to otherwise gain. In addition to

this, some conservation studies have eagerly discussed the participation of young students & volunteers in the work, citing their importance in maintaining the study, as well as providing the spark for future conservation advocates & scientists (Brewer 2002; Cooper et al. 2007). The inclusion of students in this project is imperative to its success and overall purpose, for students to not only receive hands on experience, but to motivate future conservationists.

### **Timeline:**

This project is set to start in March of 2019 in terms of initial population surveys and site detection and the first leg of the project will continue until at least March of 2021 with the idea of long term, long lasting monitoring project in mind continuing even longer. With this said, it is expected funding would be needed from August 2019 until August of 2020 where the project will require more intense trapping efforts and more trapping equipment, along with a portable ultrasound machine, and radio-telemetry equipment in order to assess the ecology & reproductive biology outside of the normal nesting period for most species.

### **Research Design:**

Our formal questions revolve around the ideas of Iverson's (1977) paper discussion of continuous nesting in Florida turtles. We seek to find out if there are extended or year round nesting seasons in Southwest Florida turtle species, whether the genetics of turtles in these region of Florida are unique compared to their northern Florida counter parts, how these animals are using both preserved & urban habitat, and what the general population status of turtles in a region that is increasingly growing in human populace.

With this research we hope to conclusively report vital data on the life history and biology of turtle populations in southwest Florida, making them a direct target for increased conservation practices.

### **Methodology:**

The research will be predominantly conducted as a classical field study, with turtle being captured and sampled for data right at the point of capture before release. This will allow us to gain critical ecological information about the animals, without overly disturbing their normal patterns. Turtles will be sampled year-round via opportunistic hand capture techniques, baited and non-baited traps of varying size and design, including, single funnel hoop traps, modified crab traps, basking traps, and Fyke-nets. Each trap will be strategically placed and checked every 6 hours upon deployment, and will be fitted with floatation devices to insure no mortality from drowning. Any by-catch (fish, amphibians, snakes, etc.), will be documented and released as traps are checked. Each trap will be marked with given permit ID and a phone number to prevent any confusion with local enforcement groups who might be in the area.

All turtles will be measured to collect morphometric data such as shell length, width, height, and overall to better describe characteristics in a population.

Upon first encounter a small blood sample for hormonal analysis will be taken from the subcarapacial blood sinus, or the dorsal coccygeal vein. Area will be sterilized with alcohol or betadine solutions to prevent irritation/infection, and a heparinized 22-25-gauge needle attached to a 3ml syringe will be used depending on the size of the animal (Berry et al., 2006). Less than 0.05% of the animal's total weight volume in blood will be drawn (approximately 0.5-2ml)



depending on the size and species. Whole blood will then be stored on ice before centrifugation and the separation of plasma for analysis, and then stored in a -20 freezer.

A small clipping of the toe webbing on the left hind foot will be taken and stored in ethanol for genetic analysis in collaboration with the Florida Fish and Wildlife Commission and the University of Southern Mississippi while plasma samples will be sent to colleagues at Southeastern Louisiana University for hormonal analysis.

Turtles will be monitored with a portable ultrasound (CONTEC MEDICAL CMS600P2, or KeeboTouch 8 20V) device to detect the presence of eggs and/or ovarian follicles (Horne et al., 2003; Donini et al., 2017). Diameters of eggs (and their yolk), and follicles will be taken to determine the reproductive status, and all newly captured turtles will be externally notched on the marginal scutes via the system developed by Cagle (1939), and fitted with Passive Integrated Transmitter (PIT) tags (BIOMARK<sup>®</sup>), to insure identification. Several species (Mud turtles, Musk turtles, Chicken turtles, & Box turtles) will be fitted with radio transmitters (Advanced Tracking Systems<sup>®</sup>) and tracked for a 6-12-month period to determine habitat use, and reproductive habits. Transmitters will be less than 10% of the animal's body weight in grams, and attached to the top of the shell via epoxy, and painted cryptic colors to prevent any additional predation risks than normal (Marchand et al. 2004; Tucker et al. 2014). Turtles will then be monitored weekly to determine movement patterns. After all sampling concludes, all animals will be released at the site of capture.

### **Future Research:**

As mentioned previously, this project is envisioned as a long term study over a number of years, that will hopefully continually inform research and conservation practices in terms of southwest Florida turtles, along with enabling young students to get firsthand experience in

wildlife research. In the future, assessing dietary preferences, microhabitat use through telemetry monitoring, and other such projects would only continue to aid in our conservation of southwest Florida turtles. Initially student participation will be based on a volunteer experience basis, or as part of select projects from courses focusing on relatable material. However, in the future, part-time paid positions for radio-tracking and surveying will hopefully be initiated.

In addition to submitting an application for the ARC Grant, applications for small grants (\$1000.00 or less) to support the project will also be developed and sent to organization including but not limited to, The Diamondback Terrapin Working Group, The Minnesota Herpetological society, the Chicago Herpetological Society, the Texas Zoo Grant, and the New York Turtle and Tortoise Club Research grant.

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