**Proposal Cover Sheet**

**Term: Fall\_\_X\_\_ Spring \_\_\_\_\_ Year \_2011\_\_**

**Instructor \_\_\_Dr. Nora Demers\_\_\_\_\_\_\_\_\_\_\_**

Name: \_\_\_\_Beth Arnold\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Present Year in Education (e.g., freshman, sophomore, etc.): \_\_\_\_\_\_\_\_Junior\_\_\_\_\_\_\_

E-mail Address: \_\_\_\_\_\_bearnold@eagle.fgcu.edu\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Major \_\_\_\_\_\_\_\_\_\_\_\_\_\_Environmental Studies\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Have you identified a research mentor for a senior thesis (if applicable)?

\_\_\_\_\_ Yes \_\_X\_\_ No.

If yes, please identify.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Title of Proposal:**

\_\_\_\_\_\_\_\_Does Longline Fishery Bycatch Have a Negative Effect on the Scalloped Hammerhead Shark Population\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Keywords (3-5) \_\_\_\_\_\_\_\_Longline Fisheries, Scalloped Hammerhead, Bycatch\_\_\_\_\_\_\_\_

**Checklist:**

All required portions of the first submission are included \_\_X\_\_ Yes \_\_\_\_\_ No

I had an external reviewer read the proposal \_\_\_\_\_ Yes \_\_X\_\_ No

If Yes, who \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ When \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I authorize the use of this proposal as an example in future courses \_\_X\_\_ Yes \_\_\_\_\_ No

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**II. Abstract**

This is an observational study conducted on the shark species Sphyrna lewini, commonly known as Scalloped Hammerhead to determine the affect longline fisheries are having on the overall population in the Gulf of Mexico along the coast of SW Florida. Sharks are a vital part of marine ecosystems around the world and are presently undergoing population decline at an alarming rate. Through observational data entry and tagging I will estimate the population in the SW Florida area and determine if incidental bycatch from longline fisheries are contributing to the decline. The data collected should lead to further studies that contribute to the an affective management plan for the species and the protection of the overall ecosystem.

**III. Introduction**

 Longline fishing is among the great number of technological advances that have given humans the ability to harvest marine species past the point of sustainability. Sharks are among the fish populations that are experiencing devastating declines in world populations, but few studies have been done to see if and which shark populations are being affected by longline fisheries. Industrialized fishing has raised serious concerns for it’s effects on marine ecosystems (Myers & Worm 2003). The target catch for long line fisheries is swordfish, but without exclusion mechanisms, devices preventing unintentional catches known as bycatch, many other pelagic species are susceptible to longline fishing methods such as te­leosts, elasmobranchs, and marine mammal and sea turtle species (Beerkircher, Cortes & Shivji 2002). These incidental catches are continuously discarded dead or alive because of their lack in value. The removal of large, predatory fish such as pelagic shark species is typical of longline fisheries and can lead to both individual species declines and changes in large marine ecosystem (LME) structure (Shepherd & Myers 2005).

 Sharks are extremely susceptible to over fishing pressures because of their slow growth rate, late maturity and low fecundity (Musick et al. 2000). Pelagic shark populations are believed to have declined from historic times. Using meta-analytic approaches, it is estimated that the large predatory fish biomass today is only about 10% of pre-industrial levels (Myers & Worm 2003). Heithaus et al. conducted a recent study using drumlines and longlines to determine shark community composition in the Florida Keys. It was found in that area there had been a large decrease in shark populations compared to data collected in the 1920’s (Heithaus et al. 2007). Numerous studies have been conducted worldwide and have came to the same conclusion that declines of large predators in coastal regions have extended throughout the global ocean (Myers & Worm 2003). Sharks are an integral part in the overall function of the LMEs around the world. General studies have been done on sharks as a whole but not on a single species level. It is important to study these animals on a single species level to determine an effective management plan to ensure the survival of each shark species and the ecosystems they are part of on this planet. This decline in shark populations have potentially serious consequences for marine ecosystems.

 To manage the decline in shark population it is important to understand what is having the greatest impact on a single shark species. It has been found that individual species of sharks do have different responses to the variations of the elements (Heithaus et al. 2007). This enhances the importance of studying shark population decline on a single species basis to develop more quantitative data on the abundance and population decline factors of single shark species to form affective population management strategies. The Sphyrna lewini commonly known as Scalloped Hammerhead is among the pelagic species listed as endangered worldwide. It is prominent in the Gulf of Mexico waters and susceptible to bycatch from commercial longline fisheries. The Scalloped Hammerhead is easily recognized and believed to be experiencing rapid decline in population. These factors make this shark perfect for this observational study. I will use tagging methods and observational recordings to estimate the overall population of the species and to determine the impact longline fisheries are having on the scalloped hammerhead shark population in the Gulf of Mexico.

**IV. Research Objective**

The objective of this research is to determine/estimate the population number of Sphyrna lewini in the Gulf of Mexico off the coast of SW Florida. Once the population is determined it will be compared to the bycatch rate of longline fisheries in the same area to determine if the longline fisheries are having an affect on the Sphyrna lewini population and if the industry is contributing to the populations rapid decline.

**V. Methods**

**A. Study Design**

 During this study I will be tagging wild Scalloped Hammerhead sharks (Sphyrna lewini). Because I will be working with animals I will seek approval from IACUC, Institutional Animal Care and Use Committee, at Florida Gulf Coast University.

 This is an observational study to determine the general population of Sphyrna lewini that travel through the Gulf of Mexico along the SW Florida Coast and the affect long line fisheries have on that population. I will be working with a sample size of around 250 sharks. The location for population determination will be located 6 miles off the Ft. Myers Beach, FL area. Chumming is used to attract the sharks and the amount of sharks observed will be collected once a week for six months. For the longline observational study two longline vessels will be chosen around the same area to board and record data on the Sphyrna lewini bycatch. The vessels are chosen by qualifying to the longline specifications described by the Beerkircher, Cortes & Shivji (2002) article, and the allowance of observational recorders aboard their ships. Each vessel will be observed on separate days once a week for the same six month period as the population observation.

**B. Data Collection**

The population is determined by conducting the study off the coast of Ft Myers Beach, FL once a week for six months. During this time I will tag according to the methods in Kohler et al. 1998, photograph, name and record each shark into the shark logbook. The data collected will include size, sex, if shark had previously been released from a longline, release condition, and number of sittings by date over the six month period.

Table 1. Shark Log

Name/Tag Number/Picture

|  |  |
| --- | --- |
| Size |  |
| Sex |  |
| Number of Sittings by Date |  |
| If Released From Longline |  |
| Condition When Released From Longline |  |

Each longline vessel will be boarded once a week for the same six month period as the population observation. For every trip the date, type of mainline used, length of drop line, and make and model of hooks used is recorded in the longline gear characteristic log (Beerkircher, Brown, Lee 2002). The date, location and time duration for each set and haulback, environmental information, speed at which the vessel sets the gear, and type of bait used is recorded in the longline haul log (Beerkircher, Brown, Lee 2002).Each Shark caught and released alive will be recorded in the shark log previously stated.

Table 2. Longline Gear Characteristics Log

|  |  |
| --- | --- |
| Date |  |
| Type of Mainline Used |  |
| Length of Drop Line |  |
| Make and Model of Hooks |  |

Table 3. Longline Haul Log

|  |  |
| --- | --- |
| Date/Time |  |
| Location |  |
| Time Duration of Set and Haulback |  |
| Environmental Factors |  |
| Speed at which Vessel Sets Gears |  |
| Bait Used |  |

**C. Data Analysis**

 The CPUE (sharks caught) is compared to the sharks observed in the wild using analysis of variance (ANOVA) to determine the percentage of the known population being caught on longlines per day/month/6 months (Beerkircher, Cortes, Shivji 2002). The same test is done to compare the amount of dead sharks observed on longlines to the amount of sharks observed in the wild. This data should show through the percentage of the shark population compared to the sharks caught and killed the impact longline fishing is having on the scalloped hammerhead shark population off the coast of SW Florida.

 This is a small test area so further research is needed to find the impact of longline fisheries on sharks worldwide. This research is intended to contribute to further research that can be used to determine an effective management plan to ensure the survival of each shark species and the ecosystems they are a part of on this planet.

**D. Expected Equipment**

1. Boat

2. Tagging Equipment

3. Tags

4. Camera

5. Shark Log

6. Gear Log

7. Haul Log

8. Measuring Equipment

9. Chumming Equipment

10. IACUC Permit

**VI. Reference Cited**

Beerkircher, L. R., Cortes, E., Shivji, M. (2002) Characteristic of Shark Bycatch Observed on Pelagic Longlines off the Southeastern United States, 1992-2000. Marine Fisheries Review. 64: 40-49.

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Myers, R. A., Worm, B. (2003) Rapid worldwide depletion of predatory fish communities. Letters to Nature: 423: 280-283.

Shepherd, T. D., Myers, R. A. (2005) Direct and indirect fishery effects on small coastal elasmobranchs in the northern Gulf of Mexico. Ecology Letters. 8: 1095-1104.

Beth Arnold 10/17/2011

Beth Arnold

903 NW 18th Terr.

Cape Coral, Fl 33993

239-478-0284

bearnold@eagle.fgcu.edu

**Goals:**

My goals are to graduate from FGCU with a BA in Environmental Studies and to find a job that deals with environmental issues.

**Education:**

FGCU, Ft. Myers Florida

 Degree: BA Environmental Studies

 Biology Minor

 Interdisciplinary Studies Minor

 Graduation: 2012

High School: Mariner High School

 Graduation: 2007

**Employment:**

Barbara B. Mann Performing Arts Hall: Community Concerts Specialist

Deal directly with community concert patrons by selling tickets, dealing with problems, building shows and knowing general knowledge for every community concert held.

Sept. 2009 - Oct. 2011

**School Group Associations:**

Backyard Farmers: Secretary

 Answer emails, complete paperwork and activity scheduling.

Fall 2011

**Service:**

Volunteer:

Coalition of Immokalee Workers: helped raise money and awareness for the issues of tomato farm worker wages.

Fall 2010

FGCU Food Forest: helped develop the FGCU food forest by building berms and pathways and planting seeds.

Summer 2011