The following supplements accompany the article

Risk perceptions and conservation ethics among recreational anglers targeting threatened sharks in the subtropical Atlantic

Austin J. Gallagher*, Steven J. Cooke, Neil Hammerschlag

*Corresponding author: Gallagher.austin@gmail.com

Endangered Species Research 29: 81–94 (2015)

Supplement 1: Part A.

Survey that was distributed to survey respondents.

The following survey will take just a few minutes of your valuable time to complete. Your answers are critical to our study on shark conservation. Thank you for your cooperation.

Section A: Fishing Practices

1. **How often do you practice catch and release for all fish species off Florida that could otherwise be retained?**

   (A) 100% of the time (always)
   (B) 51-75% of the time (often, but not always)
   (C) 26-50% (sometimes)
   (D) 1-25% of the time (rarely do I release)
   (E) 0% of the time (Never, I keep everything)
   (F) Rather not answer

2. **How often do you encounter sharks while fishing off Florida?**

   (A) 100% of the time (always)
   (B) 51-75% of the time (frequently)
   (C) 26-50% (commonly)
   (D) 1-25% of the time (rarely)
   (E) 0% of the time (Never)

3. **Do you ever specifically fish for sharks in Florida? (If NO, Skip Question 4)**

   (A) Yes
   (B) No

4. **Please describe your current style of fishing (including sharks)?**

   (A) Catch and keep
   (B) Catch and release
   (C) Both styles

5. **When taking a photo of a shark before it is release, do you take it out of the water?**

   (A) Always
   (B) Sometimes
   (C) Never
   (D) I never catch sharks

6. **Have you ever caught a shark with a research tag attached to its body (dart tag, or satellite tag)? (If NO, skip Question 7)**

   (A) Yes
   (B) No

7. **If you capture a previously tagged shark, do you make an effort to contact the scientist, research group, or agency to which the tag belongs?**

   (A) Always
   (B) Sometimes
   (C) Never
   (D) I don't know what the tag means or how to contact the scientist
   (E) I have never caught a previously tagged shark

Section B: Education and Conservation

8. Do you consider yourself knowledgeable about shark-related conservation issues?

(A) Yes
(B) No

9. Please indicate if you agree or disagree with the following statement:

"large reproductively mature sharks are important to the overall ecosystem"

(A) Yes, I agree
(B) No, I disagree
(C) No opinion/prefer not to answer

10. In your opinion, what percentage of sharks ultimately suffer mortality after being released by recreational gears?

(A) 100%
(B) 51-75%
(C) 26-50%
(D) 1-25%
(E) 0%

11. Which of these factors do you think is the *most* important or influential in determining the survival of a released shark?

(A) The type of fishing gear used (including hook type and size)
(B) Hooking location on animal
(C) How long the animal was fought for
(D) If the animal was removed from the water prior to release
(E) The species itself may be more/less tolerant to fishing stress
(F) It's a combination of all of them
(G) None of these

12. Since you have been fishing off Florida, have you noticed an overall increase or decrease in the number of sharks?

(A) Large increase in number of sharks
(B) Slight increase in number of sharks
(C) Neither increase or decrease
(D) Slight decrease in number of sharks
(E) Large decrease in number of sharks
(F) No opinion/prefer not to answer

13. Please select the impact you think each of these activities has on shark populations (check one response per row)

Activity	No Impact	Small Impact	Moderate Impact	Large Impact
Loss of habitat (removal of mangroves, reefs, coastal development)	◯	◯	◯	◯
Direct commercial harvest (including shark finning)	◯	◯	◯	◯
Climate change (warming of atmosphere and waters)	◯	◯	◯	◯
Recreational fishing (including harvest and catch and release)	◯	◯	◯	◯
Pollution (input of plastics, oils, and other non-organic compounds)	◯	◯	◯	◯
Bycatch in commercial fishing (incidental capture in other fisheries)	◯	◯	◯	◯

14. Which group of sharks is more threatened?

(A) Pelagic (open-ocean)
(B) Coastal
(C) They are both equally threatened
(D) No opinion

15. (A) Please indicate, in your opinion, the degree of threat facing the following six species of sharks found in Florida waters:

Shark Species	No Threat	Minimally Threatened	Moderate Threatened	Highly Threatened	Critically Threatened
Tiger shark	◯	◯	◯	◯	◯
Bull shark	◯	◯	◯	◯	◯
Lemon shark	◯	◯	◯	◯	◯
Nurse shark	◯	◯	◯	◯	◯
Blacktip shark	◯	◯	◯	◯	◯
Great hammerhead shark	◯	◯	◯	◯	◯

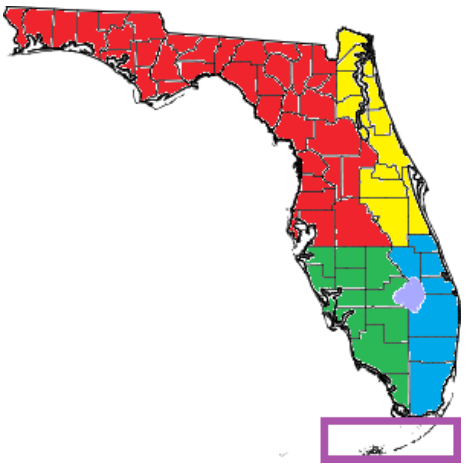
(B) For the species you selected as “critically threatened” or “highly threatened," which management options would you choose (check all that apply):

- ○ Nothing
- ○ Prohibit all recreational harvest
- ○ Regulate the maximum number retained per boat/day (aka, ‘creel limit’)
- ○ Regulate the harvest of species to maximum/minimum sizes
- ○ Closing of areas/times where species frequent or aggregate in large numbers
- ○ Mandatory use of circle hooks for sharks that will be released
- ○ Institute mandatory catch and release practices
- ○ Create marine protected areas that regulate/limit fishing activity
- ○ I didn’t select any species in these categories.

(C) For the species you selected as “minimally threatened” or “moderately threatened," which management options would you choose (select all that apply):

- ○ Nothing
- ○ Prohibit all recreational harvest
- ○ Regulate the maximum number retained per boat/day (aka, ‘creel limit’)
- ○ Regulate the harvest of species to maximum/minimum sizes
- ○ Closing of areas/times where species frequent or aggregate in large numbers
- ○ Mandatory use of circle hooks for sharks that will be released
- ○ Institute mandatory catch and release practices
- ○ Create marine protected areas that regulate/limit fishing activity
- ○ I didn’t select any species in these categories.

Section C: Angler Demographics



16. What is your gender?

(A) Male
(B) Female

17. What is your age group?

(A) Less than 21 years old
(B) 22-30 years old
(C) 31-40 years old
(D) 41-50 years old
(E) 51-64 years old
(F) 65 years or older

18. How long have you been saltwater fishing off Florida waters?

(A) Less than 5 years
(B) 6-10 years
(C) 11-20 years
(D) 21-30 years
(E) 31-40 years
(F) 41 years or more

19. What is the highest level of education that you have completed?

(A) 12th grade or less
(B) High school graduate or GED
(C) Associate or technical school degree or college coursework
(D) Bachelor's degree (ex: BA or BS)
(E) Advanced, professional, or doctoral degree or coursework

20. Approximately how many days per year do you fish?

(A) Less than 20
(B) 20-40 days
(C) 41-60 days
(D) 61-100 days
(E) 101-150 days
(F) More than 150 days

21. In which of the following regions on the map do you fish the most often (select one)?

Northwest Florida Coast (red)

Northeast Florida Coast (yellow)
Southeast Florida Coast (blue)
The Florida Keys (purple box)
Southwest Florida Coast (green)

22. Are you affiliated of any conservation groups? (CCA, IFGA, TBF, RFA, Ducks Unlimited, other)?

(A) Yes
(B) No

Gear Raffle

As a token for your support of this project, **each survey participant who completed a survey will be entered win a prize package (5 in total) that includes rods, reels, clothes, and more!** If you would like to be informed of the final results of the survey, please email us at sharksurveyfl@gmail.com

Thank you again for completing the survey and your support of our shark conservation research!

Please return this survey in the postage-paid envelope provided.

Supplement 2: Recoding of categorical variables.

In Part B of the survey, respondents were asked to rank the impacts of various anthropogenic impacts on local shark populations (presented in a randomized order as followed: habitat loss, commercial harvest, climate change, recreational fishing, pollution, and bycatch in commercial fishing). They were also asked to rank the status ("No Threat," "Minimally Threatened," "Moderately Threatened," "Highly Threatened," and "Critically Threatened") facing six shark species commonly encountered in Florida: blacktip (*Carcharhinus limbatus)*, bull (*Carcharhinus leucas*), great hammerhead (*Sphyrna mokarran*), lemon (*Negaprion brevirostris*), nurse (*Ginglymostoma cirratum*), and tiger (*Galeocerdo cuvier*). They were also asked to select hypothetical management options they thought were appropriate for threatened versus non-threatened species.

All categorical demographic (i.e., independent) variables were re-coded into ordinal levels as follows: subjective knowledge of shark conservation issues (1 = No, I do not have any knowledge of shark conservation issues, 2 = Yes, I do have knowledge of shark conservation issues); gender (1 = Male, 2 = Female); age (which was collapsed into three categories due to low sample size in the young age classes; 1 = < 21 years – 30 years, 2 = 31 – 50 years, 3 = >50 years); encounter rate of sharks (1 = 'Low,' 0 – 25%, 2 = 'Moderate,' 26 – 50%, 3 = 'High,' 51-100%); experience (which was collapsed into three categories due to low sample size in the lower experience classes 1 = < 5 – 10 years, 2 = 11 – 30 years, 3 = 31+ years); education (1 = ≤ high school diploma or GED, 2 = Associate's or technical school degree or college coursework, 3 = Bachelor's, 4 = Advanced, professional or doctoral degree/coursework); days per year spent fishing (1 = < 20, 2 = 20-40, 3 = 41-60, 4 = 61-100, 5 = 101-150, 6 = >150); and predicted mortality levels of sharks (1 = 'Low,' 0-25%, 2 = 'Moderate,' 26 – 50%, 3 = 'High,' >50-100%). For our dependent variables, we calculated proportions for the dependent variables "sharks selected as threatened," "factors affecting shark survival," and "management tools for sharks selected as threatened." Rankings of impacts of anthropogenic hazards were coded and averaged a follows: 0 = 'No Impact', 1 = 'Small Impact', 2 = 'Moderate Impact', 3 = 'High Impact'.