



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**

NATIONAL MARINE FISHERIES SERVICE  
Southwest Fisheries Science Center  
Environmental Research Division  
99 Pacific Street, Suite 255A  
Monterey, CA 93940

08-08-2018

Dr. Elliott Hazen  
NOAA Research Ecologist  
Southwest Fisheries Science Center / Environmental Research Division  
99 Pacific St., Ste. 255A  
Monterey, CA 93940  
Phone: 831-658-3202  
Email: [Elliott.hazen@noaa.gov](mailto:Elliott.hazen@noaa.gov)

Dear Dr. Sepulveda,

I acknowledge that I am identified by name as a collaborator on the investigation entitled "Habitat characterization, fishery development and stock structure of swordfish off California" submitted by Dr. Chugey Sepulveda to the California SeaGrant Proposition 84 RFP, and that we intend to carry out the responsibilities identified for us in this proposal. In particular, I will provide oceanographic and ecological expertise and advice. I understand that the extent and justification of my participation as stated in this proposal will be considered during peer review in determining in part the merits of this proposal. I agree that the proposal correctly describes our commitment to the proposed investigation.

Sincerely,

A handwritten signature in black ink that reads "Elliott Hazen".

Elliott Hazen  
Research Ecologist



California Oceans Program  
99 Pacific Street, Suite 200G  
Monterey, CA 93940

tel [831] 333-2046  
fax [831] 333-1736  
nature.org  
nature.org/california

August 6, 2018

John Laird, California Secretary for Natural Resources  
California Natural Resources Agency  
1416 Ninth Street, Suite 1311  
Sacramento, California 95814

Dear Secretary Laird,

I am writing to express The Nature Conservancy's (TNC) support for the proposal, *Habitat characterization, fishery development and stock structure of swordfish off California*, submitted by Dr. Sepulveda of the Pflieger Institute of Environmental Research (PIER). As you know, PIER has a well-established track record for conducting meaningful and timely fisheries research on north Pacific swordfish (*Xiphias gladius*) and has also contributed to broadening the portfolio of harvesting methods available to target highly migratory species off the west coast of the United States.

TNC is actively engaged in exploring innovative solutions to reduce bycatch and improve sustainability of the west coast U.S. swordfish fishery. Over the past few years, we have begun supporting PIER's work to develop linked buoy gear, a highly selective, low bycatch gear that is effective at targeting swordfish. This study compliments this ongoing research and will effectively double the scientific value generated from each fishing trip. The proposed work will fill key data gaps around stock structure, resource distribution, movement, and low-impact fishing gear development to better inform the science and management of the west coast U.S. swordfish fishery. The biological/tagging data gained from using the satellite tags, as well as the genomic data, will contribute toward a more accurate assessment of Pacific swordfish stocks and movement patterns off the United States and Mexico. Findings from this work can be shared to regional management partners, as well as to the variety of other countries that fish on highly migratory species and are equally vested in improving the science available to ensure the long-term sustainability of the resource and economic viability of the fishery.

We strongly encourage you to support this very innovative and collaborative project. Should you have any additional questions, please feel free to contact me.

Sincerely,

Alexis M. Jackson, Ph.D.  
Fisheries Project Director  
The Nature Conservancy  
California Oceans Program



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National Marine Fisheries Service  
Southwest Fisheries Science Center  
8901 La Jolla Shores Drive  
La Jolla, CA 92037-1509

August, 2018

**Re:** Collaborative proposal on Pacific swordfish stock structure

Dear selection committee,

I am writing to express my support for the proposal from PIER and colleagues to advance efforts to understand swordfish stock structure in the eastern Pacific. Understanding stock structure is clearly important for developing effective management strategies. Unfortunately, for highly migratory species (HMS) this can be very challenging for a number of reasons. One important challenge is that we primarily have access to HMS on foraging grounds rather than on spawning ground which provides little insight into the potential for reproductive separation. Reproductive separation is key to defining stocks. There are many examples where animals from separate spawning grounds mix when foraging. The combination of tracking for 12 months (through the spawning cycle) and new genetic approaches will provide powerful complimentary tools to improve our understanding of swordfish stock structure in the North Pacific.

Previous attempts to define swordfish stock structure have led to limited success and a high degree of uncertainty. Currently the swordfish in the North Pacific are considered to be two stocks, a Western Central Pacific (WCP) stock and an Eastern Pacific Ocean (EPO) stock with a dividing line that extends southwest from the Baja Peninsula, Mexico. The WCP stock is considered healthy whereas the EPO stock is listed as being subjected to overfishing based on the most recent stock assessment. It is currently not clear which stock is being targeted by fisheries off California. Understanding the dynamics of these two stocks in the eastern Pacific is critical for sustainable management, especially given their different status.

The team working on this proposal is uniquely qualified to conduct this research. They have access to swordfish through ongoing research. These fish are in great condition because they are caught on buoy gear and do not have to be paid for. The health and cost of fish have limited the scope of previous studies both in the number of fish that can be tagged and the duration of tag deployments. Tagging a fish caught on buoy gear allows for more controlled tag placement. Ultimately pairing tracks with genetic analyses provides a more robust approach to examining stock structure than previous efforts where each tool is used separately. Efforts in the first year can be built upon in subsequent years to expand this study to include more of the range of swordfish in the EPO. I look forward to being a part of this project and seeing the results.

Sincerely,

Heidi Dewar, Fisheries Research Biologist  
NOAA Southwest Fisheries Science Center