



**Institute for Coastal Science and Policy**  
**Division of Research and Graduate Studies**

East Carolina University, Flanagan Hall 250, Greenville, NC 27858-4353  
252-328-6220 office; 252-328-9400 fax 252-328-4265  
[rulifsonr@ecu.edu](mailto:rulifsonr@ecu.edu)

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May 1, 2013

Dr. Alan Desbonnet  
Interim Director  
Rhode Island Sea Grant

Re: SNECRI Grant

Dear Dr. Desbonnet:

Thank you for forwarding the comments of the reviewers for our final report, "Is Cape Cod a Natural Delineation for Migratory Patterns in US and Canadian Spiny Dogfish Stocks?" In looking over the reviews, my team and I believe that the reviewers must have had an earlier version of the research proposal, because in the final version we were to use 8,000 traditional tags in order to increase the number of acoustic tags and keep the funds approximately the same. Since this was the only concern of the first reviewer, below we focus on comments from the second reviewer.

Comments 1 and 2 are addressed above. The original target was 8,000 and not 10,000 tags.

Comment 3: For objective 3, we think that it is implicit that the results obtained address the objective based on the data used for the analysis, which of course are specific to the temporal range where fishery-dependent surveys were conducted. We agree that these results could have been different if conducted at a different time and under different conditions, but at the same time results could have been similar to the outcome reported in our final report. This is speculative at best and without additional funding and years of study, we will never know the answer to that question. Also, it is important to note that our surveys were all conducted during the fishing season for dogfish in New England. Therefore, we can assume with a certain degree of confidence that these results, although based on a limited time span, are very informative for the commercial fishery.

Point 3 asks if *results, analysis, and discussion sections of the report, did the team answer their original research question(s)?* We believe that we provided sufficient explanation in the results and discussion for the likelihood that these sex ratio changes indeed do occur, particularly in the south study area, based on the available data collected; therefore, we were able to answer the original research question. Actually, this type of behavior has been demonstrated in other shark species and so it was not a surprising finding. Indeed, even our commercial fishermen, and those interviewed in developing the original proposal, had noted these sex ratio changes throughout the day and had used that information (Traditional Ecological Knowledge, or TEK) in their commercial fishing operations to optimize catches.

The reviewer suggested that we might have used more sophisticated model techniques, but the reviewer did not cite or suggest which models to use. We purposefully chose a simplistic approach that could be understood by commercial fishermen, but simple doesn't necessarily mean incorrect or wrong. The objective was to estimate the mixing rate, and, to our knowledge, there is not a specific equation used in past studies to estimate mixing rate. We think that using a more sophisticated model (again, which one?) will make the analyses unnecessarily complicated. The mixing rates in our results are based on two separate types of data: tag returns from fishermen (i.e., a harvested fish), and recording the presence of acoustic tags at fixed station locations (i.e., acoustic receivers without harvest). It is true that our

estimates may change when more tags are redetected over time, but this is something we cannot control for, as we had to present a final report under a specific time requirement.

Comment 4: We do not understand the basis of the reviewer to state that our conclusions about the existence of two stocks are not supported. We have provided a clear and explicative rationale for our results that led us to this conclusion, with both external and acoustic tags, for which we also provided two independently derived estimates of the intermixing rate at and around Cape Cod.

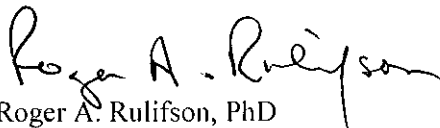
The existence of two stocks does not imply that intermixing is not occurring. Both Dr. Steven Campana of Fisheries and Oceans Canada, and I (Rulifson) had derived independent estimates of 10% mixing rates based on traditional tag return studies prior to undertaking the study reported here. Our current study does have a mixing rate higher than the reviewer was expecting because Cape Cod is not a complete physical barrier that prevents individuals from the two stocks to mix together. Rather, Cape Cod is a physical demarcation that has associated environmental conditions unique to the area. These two stocks are likely to follow those conditions and food resources in the general area; however, the small number of tag returns outside of the immediate area strongly suggests that the mixing zone is limited to the Cape Cod and its environs.

We do not understand to what Reviewer 2 is referring in the last comment. Perhaps Figure 12? If that is the case, the differences are likely due to longline catches being a direct consequence of a feeding behavior, while gillnet catches may not. We stated in the discussion that the changes in sex ratio are not dependent on gear, meaning that changes due occur in both gears.

We hope our answers satisfy the concerns of the reviewers, and finalize the final report to your satisfaction. The traditional tags are still being turned in, and we will provide a final count at the termination of the contract on June 30, 2013.

Oh, by the way, one of our acoustic tags was heard by South Carolina researchers in March. We are tracking down the data associated with that tagged fish, and will update you at the end of June 2013.

Sincerely,



Roger A. Rulifson, PhD  
ECU Scholar-Teacher for 2010-11  
Professor and Senior Scientist  
Department of Biology, and ICSP  
East Carolina University  
252-412-4411 (work cell)

Cc: Andrea Dell'Apa, Jennifer Cudney-Burch, Cynthia Harper