

**Title page:** Field Testing of a novel application to examine habitat use and migration patterns of spiny dogfish (*Squalus acanthias*) in the Western Gulf of Maine

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**Project objectives and scientific hypotheses:** Central to any successful fishery management plan is the availability of accurate, detailed and updated life history information on the species. Several reports, including the current spiny dogfish FMP, outline an extensive list of research needs that would help build a successful management plan for this species. Two of the most important questions regionally, is whether or not spiny dogfish in the Gulf of Maine should be considered as part of the NW Atlantic stock and what areas of the Gulf of Maine are represent essential fish habitats for this species. Satellite tags offer a means to study the real time movement patterns and how an animal utilizes its environment. The success of this technique on several marine species, suggest that the use of this technology will provide insight into dogfish movements and habitat use in the Gulf of Maine. If the method in this pilot effort proves successful, the use of these techniques may be expanded to determine whether or not spiny dogfish should be considered a unit stock in Gulf of Maine and the determination of EFH for this species. Thus our goals are to test the feasibility of using satellite tag technology to track spiny dogfish movement in the Gulf of Maine.

**Methods and work plan:** We have used the PTT-100 Archival popup x-tag Tag produced by Microwave Telemetry, WA Columbia, MD to track dogfish movements. Dummy tags were purchased in order to conduct pilots study in order to determine the appropriate tagging procedure. After several intensive studies, the appropriate method for attaching the satellite was to actually drill into the base of the dorsal fin. Here, a plastic screw is pushed through the drill hole, fastened with a nut and then bolted. Between the dorsal fin and screw there are plastic washers that that contain a soft rubber housing. This arrangement offers the least amount of friction between the dorsal fin and tethered satellite tag. Using this fastening technique, the satellite tag placed on the dogfish in the pilot study remained on the animal for 3 months, before the animal mysteriously died. In the field, three dogfish were captured by hook and line and individually strapped to a wooden gurney and held underwater in a designated on-board live well. After attachment of the tags in the field, each individual dogfish was monitored for 30 minutes. No outward signs of stress were observed and all specimen's were released back to the Gulf of Maine.

**Work completed to date:** Three tags were purchased and deployed on female dogfish. One was deployed on October 31<sup>st</sup>, and the other two on November 7<sup>th</sup>.

**Results to date:** All tags have transmitted data. Two tags were at liberty for 3 months the other for 6 months. The data that was recovered offered information that goes

against many current paradigms for this species in the western Atlantic. This includes north-south movement ranges that are much wider and more active in scope than previously described for this shark. Moreover, deeper more constant depth profiles were also observed for this species.

**Data:** We are currently filtering the data from the first two tags that have transmitted data. Filtering gives a more precise estimate of movement patterns and habitat use. The raw data for the two tags are listed in Figures 1 and 2.

**Impacts and applications:** Scientifically, satellite tags offer a unique technology that appears to have the ability to answer important questions concerning the Gulf of Maine spiny dogfish population and its northwest Atlantic stock status. Moreover, any information pertaining to movement patterns or habitat use of spiny dogfish will offer new knowledge towards understanding the biology of this species. This project also has potential benefits to the Gulf of Maine fishing community. If indeed, spiny dogfish are found to remain within the Gulf of Maine, and not migrate to the north or south, changes in quota (possible increases) and fishery management plans would need to be reassessed and developed to account for this phenomenon. Additionally, the techniques to attach the satellite tags and the fact that they can be used on such a small shark is useful to the scientific community. Future work left on the duration of the grant period will be to continue or R&D to improve upon our tag attachment protocols.

**Related projects:** N/A

**Partnerships:** N/A

**Presentations:** The seventh annual Northeast Consortium Participants Meeting; title-Skate's, Dogs, and a big net; a cooperative research love story; date-12/11/07; location-Portsmouth NH.

Sulikowski, J.A. **W. Buble**, and P. C.W. Tsang. 2008. The Potential Use of Pop-up Archival Transmitting (PAT) Tags to Examine Habitat Use and Migration Patterns of Spiny Dogfish (*Squalus acanthias*) in the Western Gulf of Maine. Ann. Mtg. Am. Soc. Ichty. and Herp. Montreal, CA, July 23-28th.

**Student participation:** Undergraduate: Nathan Furey, Angela Cicia, Brittany Palm, Andy Wargo. Graduate: Walter Buble, University of New Hampshire.

**Published reports and papers:** N/A

**Images:** See Attached.

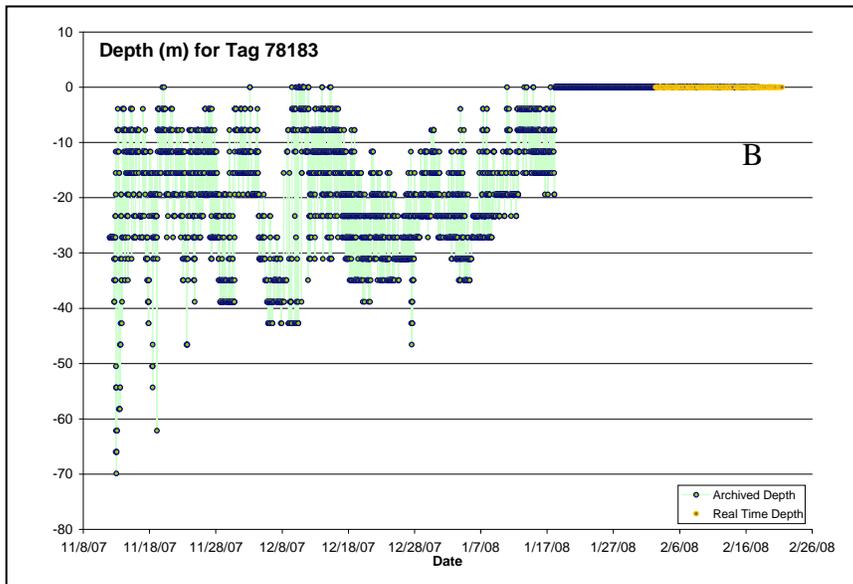
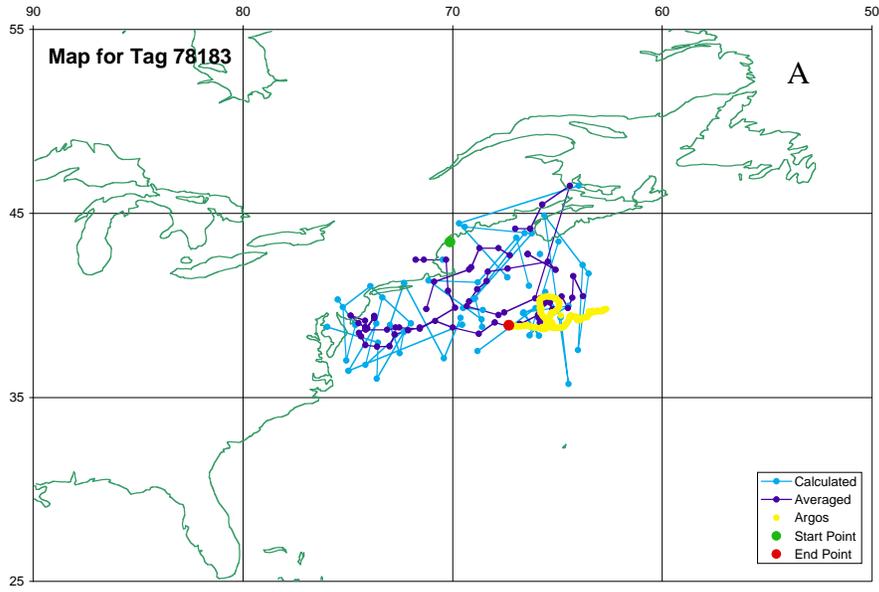


Figure 1. Figure A represents satellite tag track and figure B represents the depth profile for a 83 cm FL female tagged and released on November 7<sup>th</sup> 2007.

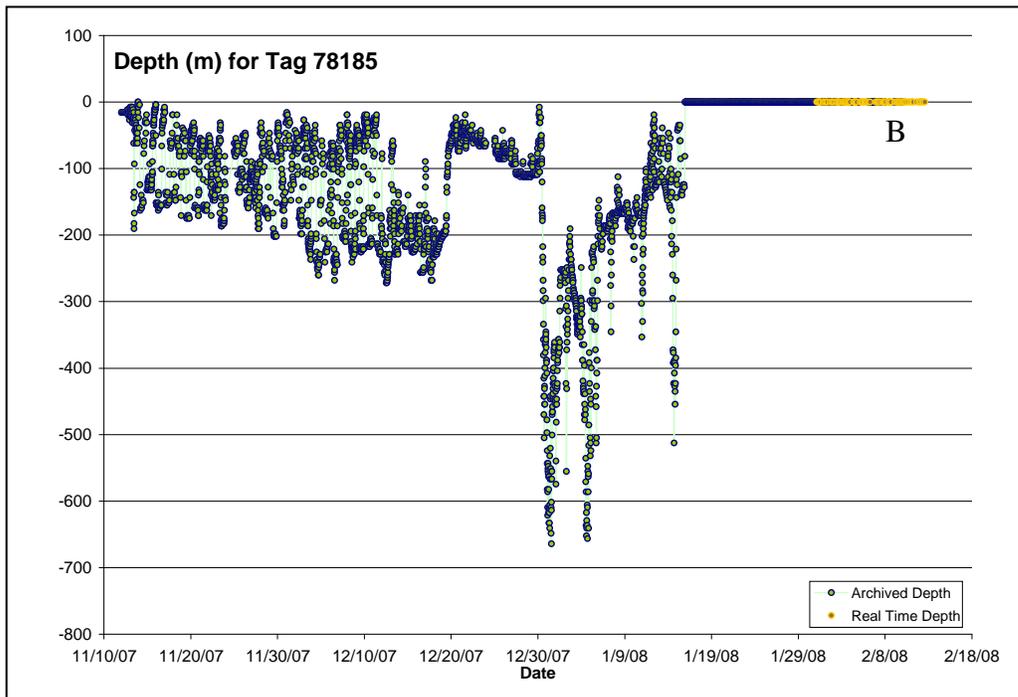
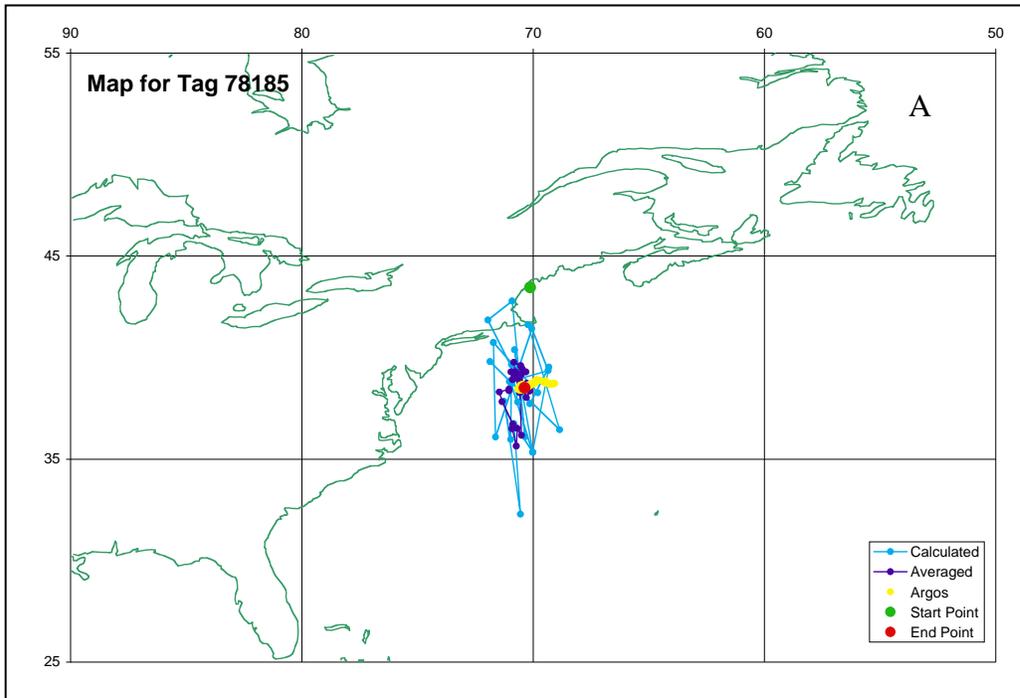


Figure 2. Figure A represents satellite tag track and figure B represents the depth profile for a 80 cm FL female tagged and released on November 7<sup>th</sup> 2007.