

**FISHERIES DISASTER RELIEF PROGRAM (FDRP)
ANNUAL REPORT FOR FY 2007**

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FDRP Project Title and Project No.: Project # 657780; "Application of Otolith-Based Methods to Distinguish Nursery Areas of Juvenile Swordfish

Funding Agency: NOAA

1. Purpose of the Project (one paragraph)

The purpose is to evaluate whether distinct trace element signatures exist within the otoliths of young-of-year (YOY) swordfish that would serve as unique geographic markers of their nursery sites. These YOY swordfish are caught seasonally in the warm water tuna longline fisheries at distant sites across the Pacific and can be sampled either at sea or at port landings. These distant nursery sites across the Pacific may have different water chemistry and/or different forage that may contribute to unique otolith trace element signatures by site. If successful, these markers will provide a basis for future studies to identify the origins of adult swordfish that inhabit the cooler higher latitude fishing grounds targeted by swordfish longline fleets in the Pacific. Knowledge of adult origins and whether particular swordfish fishing grounds rely on local recruitment or recruitment from two or more nursery site areas of the Pacific will aid stock assessment scientists in evaluating how sustainable particular swordfish fishing grounds (such as the swordfish longline fishing grounds north of Hawaii) may be.

2. Progress during FY 2007 (One-two paragraphs, including a comparison of the actual accomplishments to the objectives established for the period, and the reasons for slippage if established objectives were not met):

A contract was set up with Oregon State University, W. M. Keck Collaboratory for Plasma Spectroscopy, for instrument time on the laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) instrument to be used for analyzing the trace element composition of YOY swordfish otoliths. Delays were encountered with this contract due to delays in the availability of FDRP funds and the necessity to seek a contract with a new LA-ICP-MS instrument facility (Oregon State) when the intended facility (Old Dominion University) could no longer conduct this analysis.

Prior to trace element analysis, improved otolith preparations techniques were developed prior to testing an initial sample of 48 YOY swordfish sagittal otoliths from Hawaii (16 in each of three years). These otoliths were analyzed with the LA-

ICP-MS instrument at OSU in May 2007. During this first LA-ICP-MS analysis run, laser sampling parameters were worked out and duplicate sampling transects were conducted for each otolith. A suite of nine elements (Mg, Al, Si, Ca, Mn, Zn, Sr, Ba, and Pb) were analyzed in each of 48 otoliths. This initial analysis was to evaluate the temporal fidelity of the trace element signature for a particular site (in this case Hawaii). These data are currently being evaluated. An interesting result thusfar has been a characteristic peaking of Ba at around 200 microns out from the otolith core in all the Hawaii otoliths analyzed. The LA-ICP-MS analysis work is currently about 5 months behind schedule due to funding and contract delays.

Further efforts are being made to collect YOY swordfish otolith samples from the western Pacific. Contacts with scientists in Japan and Taiwan have been established in order to acquire additional samples of YOY swordfish otoliths from this region of the Pacific. This will complement the available samples from Hawaii, the International Date Line region, Ecuador, and French Polynesia.

3. Plans for project completion:

Three to four more LA-ICP-MS otolith analysis runs (August & November 2007; February 2008, and May 2008 if needed) are planned in order to complete the trace element analysis. Statistical analysis of the trace element results will be conducted after each LA-ICP-MS analysis run. Scanning electron microscopy (SEM) examination of the internal microstructure of the lapili otoliths will be conducted during the summer and fall of 2007. A draft project report will be completed by the end of June 2008.

4. List of papers published in refereed journals during FY 2007.

Hyde, J. R., R. Humphreys Jr., M. Musyl, E. Lynn, and R. Vetter. 2006. A central North Pacific spawning ground for striped marlin, *Tetrapturus audax*. Bull. Mar. Sci. 79(3): 683-690.

5. Other papers, technical reports, meeting presentations, etc.

None