

## Progress Report

**Title:** *Increasing the quality and resolution of data from the fishery using satellite popup tag technology: Characterizing the fine-scale habitat positioning of sablefish in the water column and tracking movements during spawning*

**Principal Investigator:** Steven Roberts

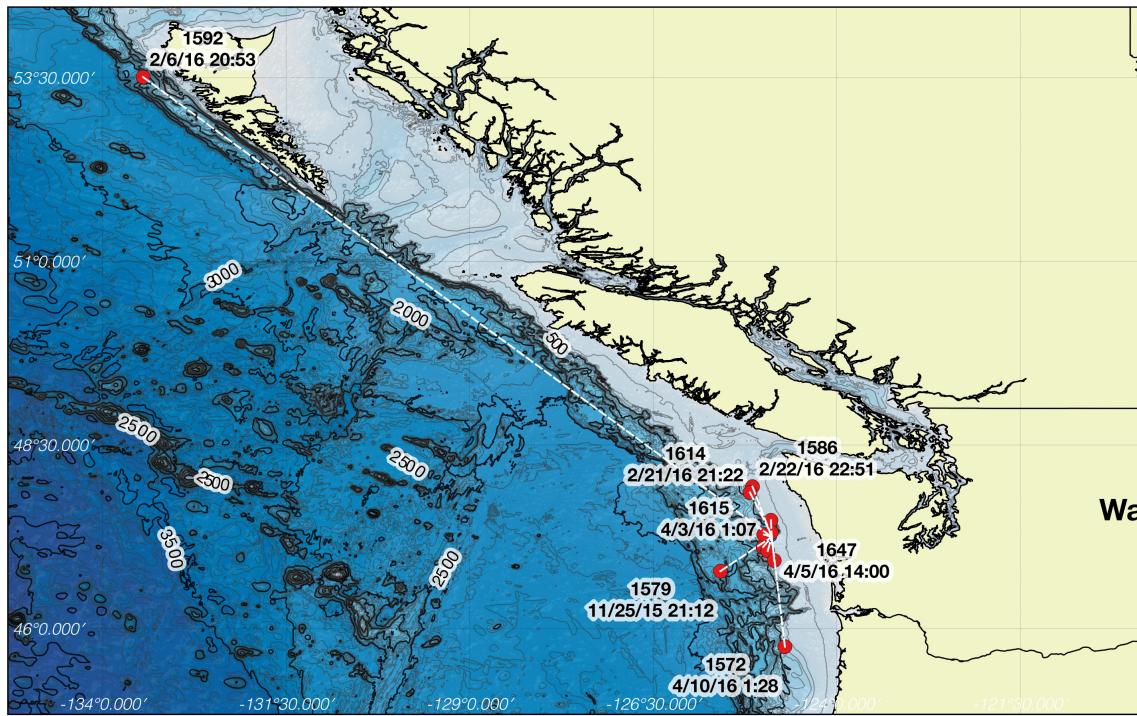
### **Grant Objectives:**

**Fall tagging:** In the fall of 2015 (10/14 & 10/15), 20 sablefish (average fork length = 767 mm) were deployed with satellite popup tags set to release from the fish on April 3 (10 tags) and April 10 (10 tags). Of the 20 tags, 6 prematurely released from the fish and this could have been a result of mortality, predation or exceeding the crush depth of the tag that automatically activates the release. The position at which they released is known from transmissions to the ARGOS satellite system. Of the remaining 14 tags, 9 cannot be accounted for (have not transmitted to the ARGOS satellite system) and the remaining 5 released normally and transmitted data to ARGOS. Of these 5, we physically retrieved 4 in the ocean and were able to download all of the data. These downloads provide a very detailed picture of the depth, temperature and light profiles of the fish from November, 2015 to April, 2016.

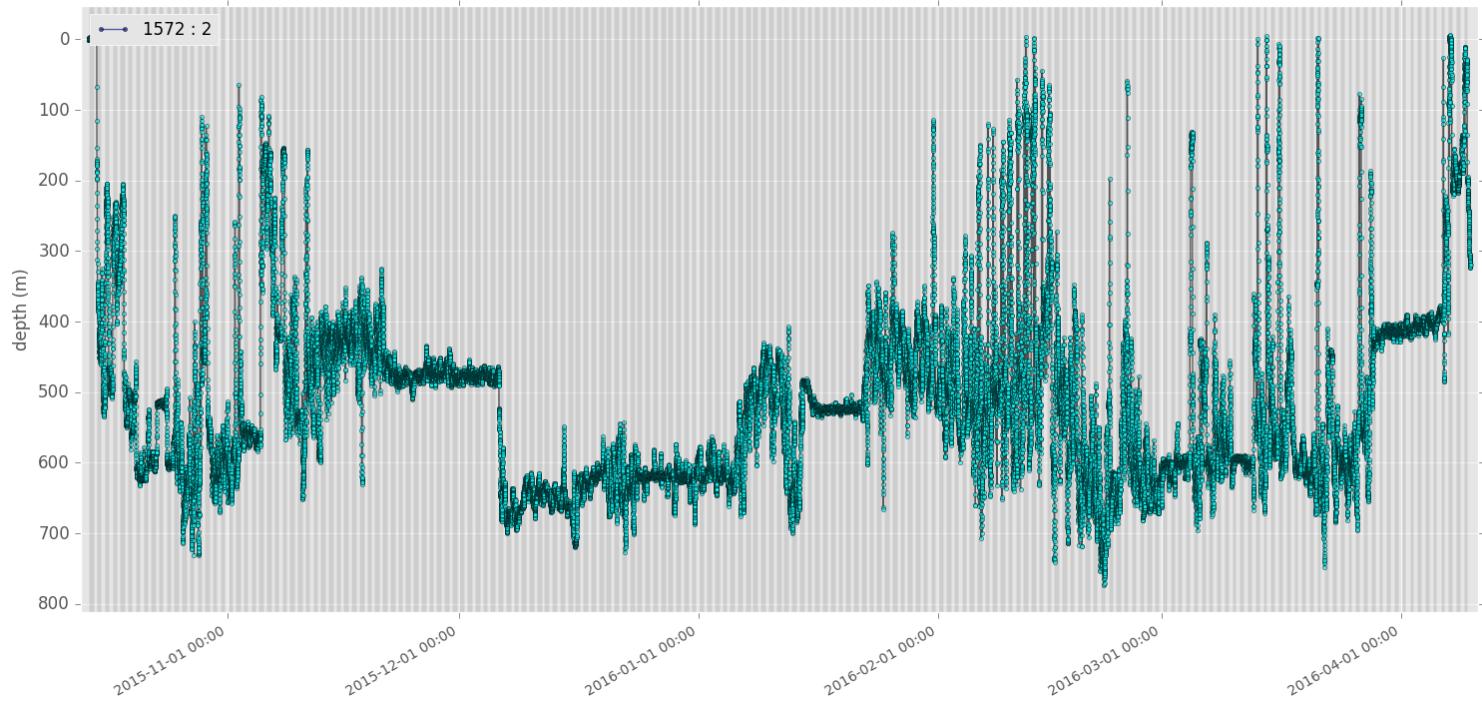
**Release locations:** Mapping of the release locations of all tags that surfaced (prematurely or normally) indicates that most were in the area near their initial tagging: Quinault Canyon off the Washington coast (Figure 1). However, there were tags that released further south off Tillamook, Oregon and north off Graham Island, Canada (Figure 1).

**Retrieving tags:** Using ARGOS locations and direction finding equipment it was easy to physically locate and retrieve tags in the ocean. The major problem with tag retrieval is having access to boats during times when weather and sea conditions are acceptable for retrieval. In fact, of the 5 tags that surfaced normally, we easily retrieved 4. The fifth tag stopped transmitting to ARGOS shortly after surfacing or we could have retrieved it as well.

**Tag Data:** The data from the 4 tags that were retrieved is very rich since depth, temperature, light and geomagnetic strength were recorded at 4-minute intervals from November to April. We are still analyzing data but it is clearly evident that even though adult sablefish live at very great depths (800 meters or greater), they also undergo extreme vertical migrations in the water column that can span hundreds of meters and come close to the surface (Figure 2). Further, these migrations occur at night and may be timed with the diel vertical migration of prey.



**Figure 1: Sites at which satellite tags surfaced in the Pacific Ocean. North - Graham Island, Canada to South Tillamook Oregon.**



**Figure 2: Depth trace for a satellite tag deployed on a sablefish for 6 months from November, 2015 to April, 2016. Sampling at 4 minute intervals**