Local Abundance and Movement of Atka Mackerel and Other Steller Sea Lion Prey in the Aleutian Islands

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Objective

Examine the impacts of fishing on the Steller Sea lion prey fields

1. Estimate Atka mackerel movement and abundance in the Aleutian Islands in three local aggregations of Atka mackerel

2. Analyze population patterns in growth

Compare sexed length frequencies in our study areas

Methods

Atka mackerel were tagged and released on the charter vessel Pacific Explorer in May-June 2011 (Fig. 2). Fish are tagged with Flip T-bar tags, measured and released into the water. We chose three separate study sites:

Seguam Pass: Commercial fishery present, sea lion population stable
Tanaga Island: Limited commercial fishery present (small quota), sea lion population declining
Petrel Bank: Commercial fishery present (large portion of the quota), outside critical habitat for Steller sea lions.

In August-September 2011 and in March 2012 we recovered tagged fish aboard the chartered FTSeafisher (Fig. 3). Catches are sorted and sampled for species composition similar to observer sampling on commercial vessels. In addition length frequencies and biological samples were collected for every haul.

Model:

We will use an integrated maximum likelihood model based on tagging and auxiliary data (McDermott et al., 2005).

Results to Date:

Abundance estimates of Atka mackerel are high at Seguam Pass (438,000 mt), lower at Petrel Bank (197,000 mt) and Tanaga (16,000 mt) (Fig. 5). This high estimate at Seguam Pass and low estimate at Tanaga may be due to seasonal movement across the border of the trawl exclusion zones (TEZs). We did not have access to the inside of the TEZs for tag recovery.

Underwater camera tows:

During the release and recovery cruises, we conducted 31 underwater camera transects in the locations of the trawl hauls whenever weather permitted this operation. Results from this work will give insight into bottom habitat type and fish density. In addition this will be a step towards developing tools for assessing fish abundance in untraversable areas.

Background

Atka mackerel are the most abundant groundfish in the Aleutian Islands (2013 adult biomass 387,000 metric tons). They are distributed in dense aggregations in areas of strong currents from Kamchatka to the Gulf of Alaska along the Aleutian Island chain.

Atka mackerel are semi-pelagic and mostly occur at a depth of 100-200m.

During the spawning season from July through October, males establish nesting sites where they actively guard the nests.

Atka mackerel and Steller sea lions

Atka mackerel are one of the main prey items of the endangered Steller sea lion in the Aleutian Islands. In 1997, the western Stock of Steller sea lions was declared endangered. In 2000, 10-20nm trawl exclusion zones were established around rockeries and haulouts. In addition, the fishery was allocated in space and time to avoid local overfishing.

In 2010, as Steller sea lions populations were still declining in the Western and Central Aleutian Islands, the entire Western Aleutian Island subarea was closed to Atka mackerel and Pacific cod fishing and the Central Aleutian Island subarea was closed to fishing inside critical habitat (Fig. 1).

These mitigation measures were put in place to avoid competition between the fishery and Steller sea lions for prey.

However, the National Marine Fisheries Service acknowledged that there was much uncertainty as to the impact of fishing on the Steller sea lion prey field.

References


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