Introduction

Harbor Seals in Oregon
Harbor seals are a common but understudied marine mammal on the Oregon coast. There are ~10,000-12,000 harbor seals in OR.1
Harbor seals are generalists, eating more than 100 species of fish and invertebrates.2

The at-sea spatial habitat use of harbor seals, and correlation of space use with diet has not been thoroughly examined in Oregon.

Our primary research questions were:
1. Where are areas of importance for seals in Oregon, and can we quantify unique life history strategies within our sample?
2. Are harbor seals utilizing marine reserves and wave energy sites as part of their home range? And how frequently do they visit these areas?
3. Do seals with a high degree of marine reserve use have unique diets?
4. Does isotope analysis allow us to estimate prey consumed by seals in OR?

Methods

To answer these questions, we attached Wildlife Computers SPOT5© tags (shown above) to 24 adult seals (23FM/1F) in Netarts and Alsea Bays, OR to track their movements.

To estimate diet, I collected one whisker from each animal, and conducted stable isotope analysis of Carbon-13 (δ13C) and Nitrogen-15 (δ15N). I compared these values to muscle of fish collected by ODFW and NOAA.

I used generalized models to estimate which environmental variables contributed to habitat use, and cluster analyses to group seals by habitat use and isotopic composition to estimate foraging 'groups'.

How do you catch seals?

Adult seals were captured using a 'beach rush' method- two small skiffs were driven to shore near where animals were hauled out (resting on land). Researchers individually captured animals with hoop nets. Seals were weighed and then temporarily restrained for ~10 minutes while we attached external tags to the head with quick-setting epoxy.

These tags began transmitting as soon as the animals entered the water, and provided a location when they surfaced until the tag was naturally molted.

Spatial Habitat Use

• Data were filtered and corrected and provided in total 57,220 locations over 606 days.
• Seals nearly exclusively utilized the continental shelf, and spent an average of 42% of their time within bays or river sites.
• Only 1.3% of seals' time was spent within marine reserves, but some individuals spent up to 32% of their time within these areas.
• Seals were not present at wave energy test site areas, an important consideration for the future as this may change.
• Some animals traveled farther than 200km in this study, from Alsea Bay to the Columbia River.

Dietary Composition

• Rockfish collected within marine reserves appeared to be too large for harbor seal consumption, suggesting these areas may not be foraging grounds of important for harbor seals in Oregon.

• Seals seemed to be strongly associated with flatfish.

Environment

• Data were filtered and corrected and provided in total 57,220 locations over 606 days.
• Seals nearly exclusively utilized the continental shelf (depths <200m), and spent an average of 42% of their time within bays or river sites.
• The average home range for seals was 365 km², but this varied widely between 3.20km² to 1647.93 km².
• Cluster analysis suggested 2 distinct foraging strategies (‘Localized Foragers’ and ‘Long-Ranging Foragers’) based on distance from shore, range in latitude and longitude, home range size, and δ13C.

<table>
<thead>
<tr>
<th>Cluster Group</th>
<th>From Shore</th>
<th>Mean Lat.</th>
<th>Mean Lon.</th>
<th>Range (Lat)</th>
<th>Range (Lon)</th>
<th>Range (km²)</th>
<th>Mean °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foragers</td>
<td>83.81</td>
<td>41.1586</td>
<td>121.087</td>
<td>2.37</td>
<td>5.57</td>
<td>3.20</td>
<td>6.78</td>
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<tr>
<td>Far Range</td>
<td>82.8</td>
<td>41.1586</td>
<td>121.087</td>
<td>145.06</td>
<td>120</td>
<td>1647.93</td>
<td>14.71</td>
</tr>
</tbody>
</table>

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