Distribution and Abundance of Pelagic Fish Resources

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Objectives

- Historic fish surveys
- What are the key species
- Distribution and abundance of key species
- Data gaps and issues
BPA Plume Study
Target Station Locations

- Tatoosh Island
- Queets River
- Grays Harbor
- Willapa Bay
- Columbia River
- Cape Falcon
- Cape Meares
- Cascade Head
- Newport
- Cape Perpetua
- Newport
- Astoria
- Tillamook
- LaPush

Washington

Oregon

Willapa Bay, Queets River, Grays Harbor, Columbia River, Cape Falcon, Cape Meares, Cascade Head, Newport, Cape Perpetua, Astoria, Tillamook, LaPush

264 Rope Trawl fished at the surface
Fishing width = 30 m
Offshore Fish Surveys

• Brodeur and Ware 1995
  – Interdecadal variability in distribution and catch rates of epipelagic nekton in the Northeast Pacific Ocean.

• Matarese et al. 2003
  – Atlas of abundance and distribution patterns of ichthyoplankton from the Northeast Pacific Ocean and Bering Sea Ecosystems based on research conducted by the Alaska Fisheries Science Center (1972-1996).

• Pacific sardine and Northern anchovy spawning surveys
  – SWFSC ongoing

• At present there are no offshore pelagic fisheries research surveys being conducted in offshore waters (from shelf to 200 nm)
Key Species

- Small migratory fishes
  - Anchovy, sardines
- Small non-migratory fishes
  - Pacific saury, pomfret, myctophids
- Large migratory fishes
  - Tuna, mackerel, sharks
- Squid
- Mammals
Northern anchovy (*Engraulis mordax*) spawning

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Temperature at 3 m</th>
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<tr>
<td>5-26 July 1994</td>
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<td>5-14 July 1995</td>
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<td>14-25 June 1996</td>
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<td>9-21 July 1997</td>
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<td>7-18 July 1998</td>
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**No. of eggs/0.05 m²**

- 1 to 5
- 6 to 10
- 11 to 20
- 21 to 30
- 31 to 40
- 41 to 50
Pacific sardine (*Sardinops sagax*)

NMFS Ichthyoplankton Sampling 1994-1998

Sardine Larvae per 0.05m²

Temperature at 3 m
Sardine spawning surveys

0504 CalCOFI Survey
March 28 - May 1, 2005

- Pacific sardine (Sardinops sagax)
- Northern anchovy (Engraulis mordax)
- Jack mackerel (Trachurus symmetricus)

April 2006
Pacific saury (Cololabis saira)
Pacific pomfret
California flashlight fish
(*Protomyctophum crockeri*)

Northern lampfish
(*Protomyctophum thompsoni*)
Albacore tuna (*Thunnus alalunga*)
Jack mackerel
(*Trachurus symmetricus*)

Pacific hake
(*Merluccius productus*)
Pacific salmon (*Oncorhynchus* spp.)
Blue shark
(*Prionace glauca*)

Soupfin shark
Thresher shark
Salmon shark
White shark
Thresher shark
Soupfin shark
Salmon shark
White shark
Neon flying squid
(Ommastrephes bartramii)
Nail squid
(Onychotheuthis borealijaponica)
Sperm whale (*Physeter macrocephalus*)

Fur seal (*Callorhinus ursinus*)
Conclusions

• Offshore pelagic nekton resources are many.
• Some of these resources are abundant and support commercial exploitation.
• We know relatively little about this offshore pelagic ecosystem:
  – Status of these stocks?
  – Food web?
  – What is the effect of climate change?
What will be the effect of ballast water discharge?

- Diseases and parasites on eggs, larvae and adult nekton?
- Introduction of other plankton (phytoplankton and zooplankton) species on food web?
- Columbia River plume?
Thank You!