

High seas food webs as a cornerstone of salmon production

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INTERNATIONAL
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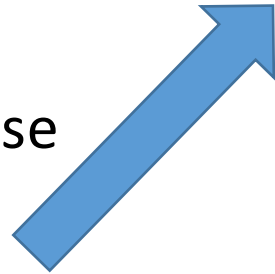


Ocean life phase

Pre-condition

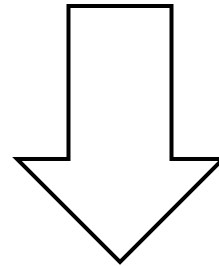
- Freshwater
- Early marine phase

Outward migration



Foraging success

- Prey quantity
- Prey quality



Post-condition

- Migration success
- Spawning success
- Egg / fry survival

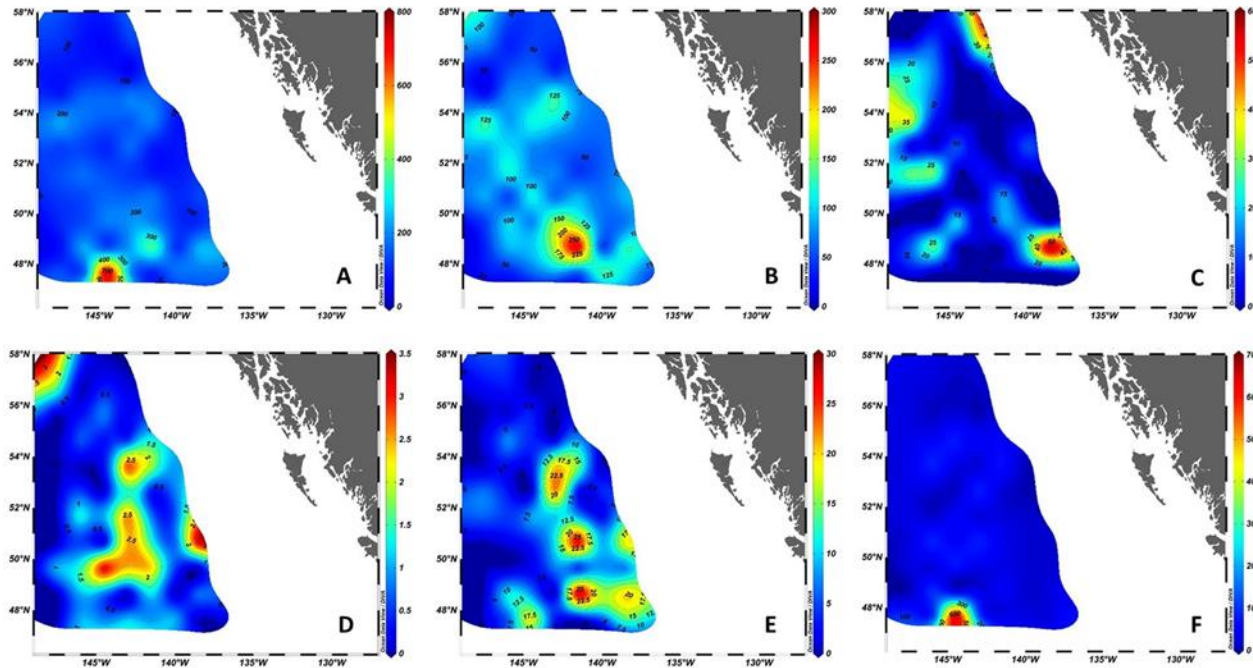
Return migration



Following slides identify 5 important questions linking salmon production to ocean conditions

Prey quantity

1. What is the spatial distribution of prey resources?

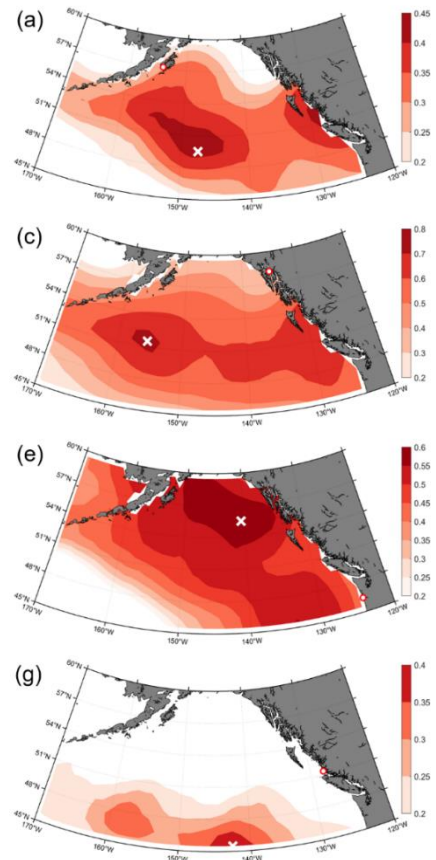
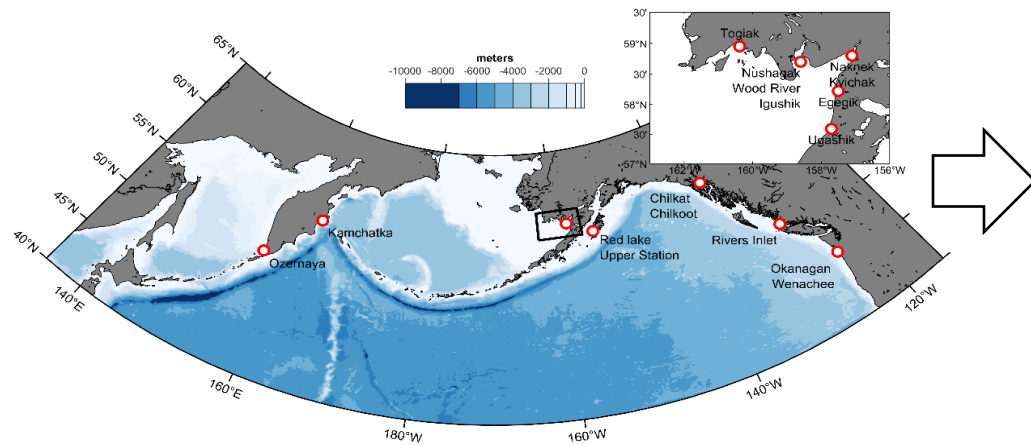


Need to understand the oceanographic drivers of zooplankton composition and biomass across spatial and temporal scales relevant to salmon.

Collate and collect *in situ* data to enable model development and forecasting.

Prey quantity

2. How do salmon interact with prey spatial distributions?



Salmon species / stock specific distributions determines prey access.

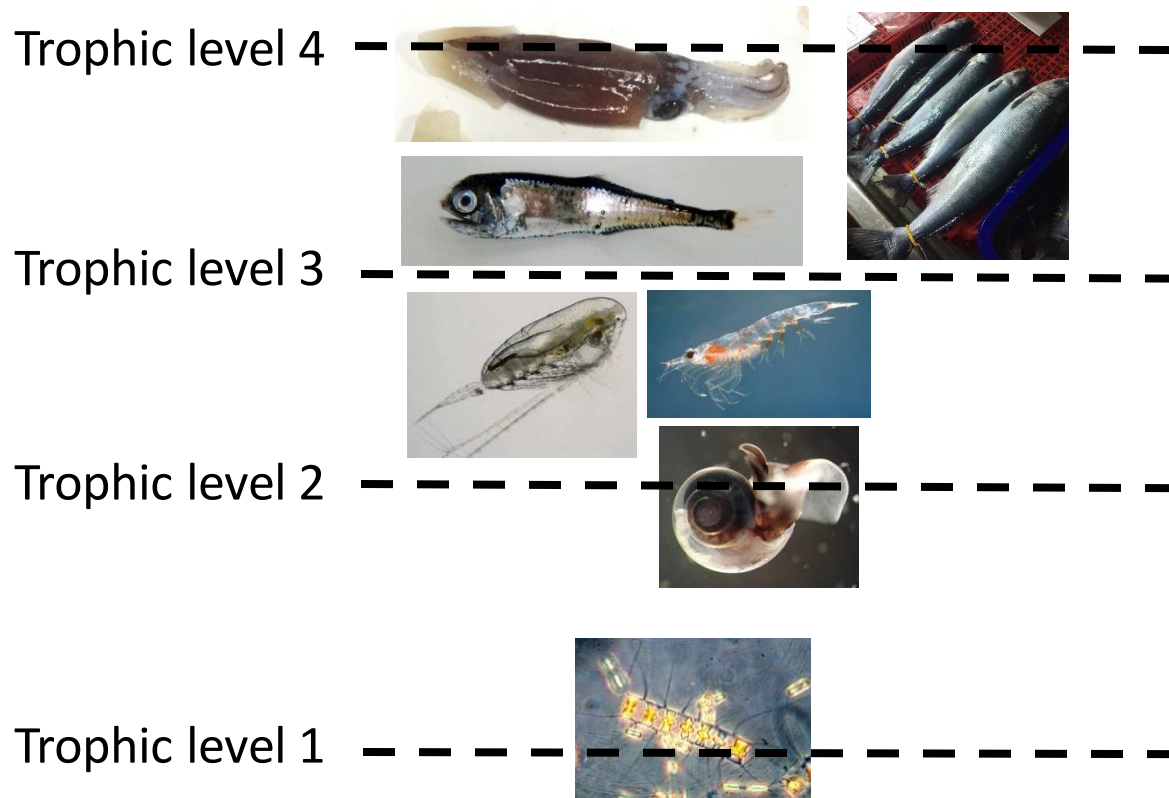
Isoscapes – coarse temporal and spatial resolutions

Trawl surveys – IYS contribution

Tagging – insight into diel behavior and interaction with oceanographic features.

Prey quantity

3. What is the true extent of competition?



Isotope & stomach data indicate that:

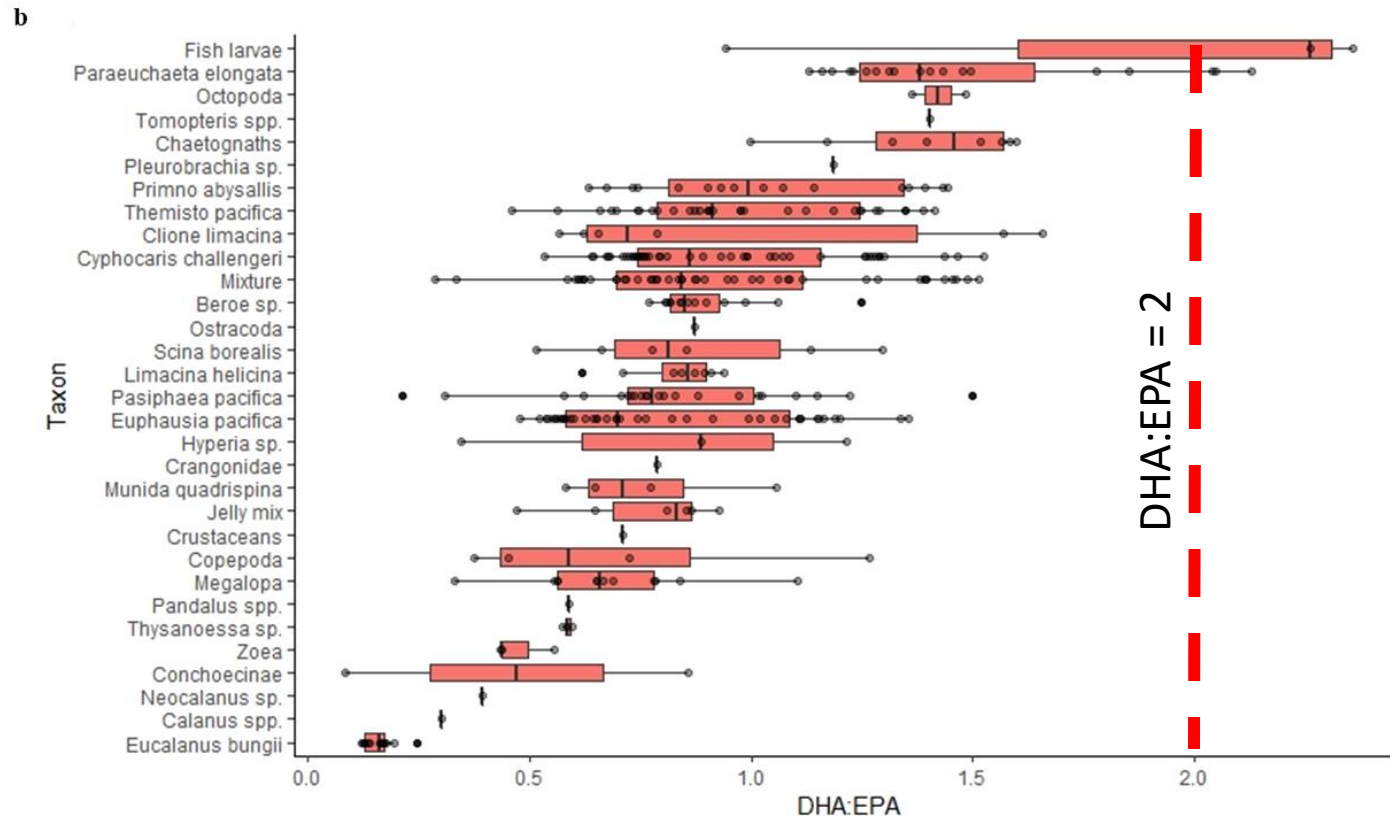
- zooplankton are consistently a major portion of salmon diet*
- Considerable trophic niche overlap between salmon & micronekton*

Need to consider micronekton as competitors not just prey

Prey quality



4. How does prey quality relate to ocean conditions?



Salmon nutritional health and performance dependent on fatty acids and micronutrients

Nutritional value of prey is highly variable

- determined by phytoplankton production & zooplankton composition

Need to establish link between ocean conditions and food web nutrition & fill data gaps for key prey species

Prey quality



5. How does salmon nutritional health effect production?



Effect of ocean conditions does not end on the high seas - Maternal effects on egg quality and fry health.

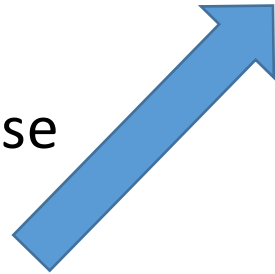
- **HUFAs** – essential to egg production, physiological performance, immune response
 - **Carotenoids**, particularly astaxanthin (ASX) - immune system health
 - **Vitamin B1 (Thiamine)** - is critical to metabolic function and neural development
- Determined by ocean conditions and food web processes but link to high seas conditions poorly understood.**

Ocean life phase

Pre-condition

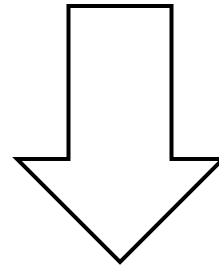
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