



# Zooplankton in Puget Sound

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# Zooplankton in Puget Sound

What do we know about Puget Sound zooplankton?

What zooplankton data sets exist (and don't) in PS?

# What do we know about zooplankton in Puget Sound?



Species composition  
Important salmon prey taxa (diet studies)

Life history patterns of several species

Depth distributions

Seasonal cycles  
Spatial patterns  
Interannual variability



# Extant zooplankton datasets in Puget Sound:

- UW (Frost) cruises:
  - 1973-1974 and 2001, bi-monthly
  - 216 $\mu$ m mesh, 1m ring, vertical lifts from near bottom
  - Fully analyzed
- UW (Keister) PRISM cruises:
  - Winter and summer 2008-2011
  - $\leq 200\mu$ m mesh, 60cm ring, vertical tows
  - Various depths depending on winch availability “wire time”
  - Mostly not analyzed
- NOAA (Greene) ‘nearshore’ sampling, monthly, 2012
  - ~Upper 15 m, two net types
  - Fully analyzed
- NOAA (Greene) Skagit time series
  - 2008, 2009 (partial), 2010
  - Analyzed for total copepods only (?)

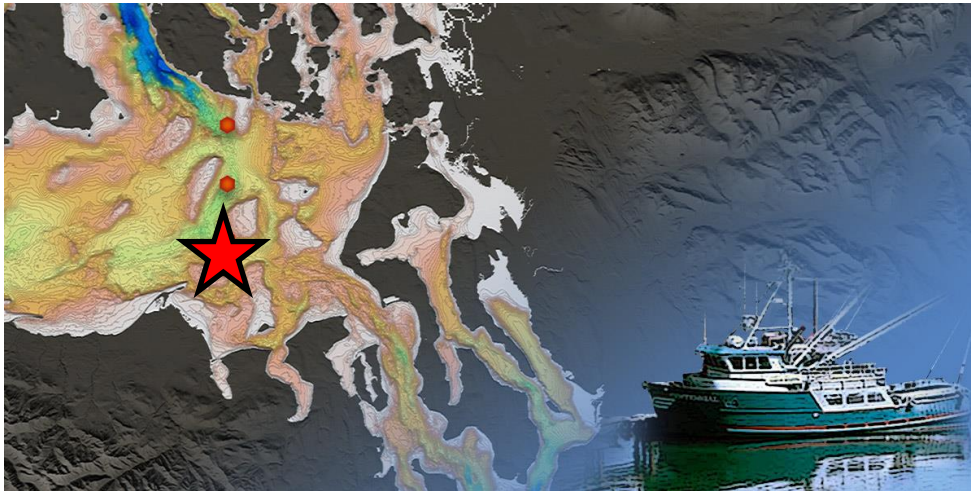
# Extant zooplankton datasets in Puget Sound:

- UW (Keister) Developing monthly (or better) time series:
  - **JEMS time series (w/ WA DOE in Strait of Juan de Fuca)** – partially analyzed
  - Lower Hood Canal, 2010-2011 (w/ HCSEG) – partially analyzed
  - P28 Main Basin, 2011-ongoing (w/ OIP)
  - Commencement Bay, ongoing since Spring 2012 (w/ Foss Waterways)
  - Possession Sound, starting now (w/ Everett Community College)
  - Northern Hood Canal starting now (Port Gamble S’Klallum Tribe)
  - Miscellaneous others in 1960’s and 70’s
- WDFW (Penttila) herring spawn surveys:
  - Herring spawn site surface zooplankton tows
  - Canadian border to Olympia, in the Straits to Dungeness Bay (some years Willapa and Grays Harbor)
  - 0.5mm plankton net towed horizontally behind zodiac
  - Mostly qualitative, presence/absence

# JEMS

## Joint Effort to Monitor the Strait

Sponsored by Washington Department of Ecology  
Monthly monitoring from FHL since 1999  
Zooplankton sampling added in 2003



- CTD casts (T,S,D,DO)
- Bottle chlorophyll, nutrients, oxygen
- Zooplankton net tows
  - 1-m diameter  
150 $\mu$ m mesh
  - Surface (0-40 m) and deep (80-120 m) tows

# Terribly lacking:

- Time series spanning >2 years
- Consistent methodology
  - Seasonal cycles
  - Interannual variability
- Dynamics of critical prey taxa (crab larvae, euphausiids, amphipods)
- Spatial patterns and “hot-spots” of abundance

# Considerations:

## **Variability among basins**

How much data do we need to understand PS patterns?

## **Quantitative vs. Qualitative?**

(i.e., abundance vs. relative species composition)

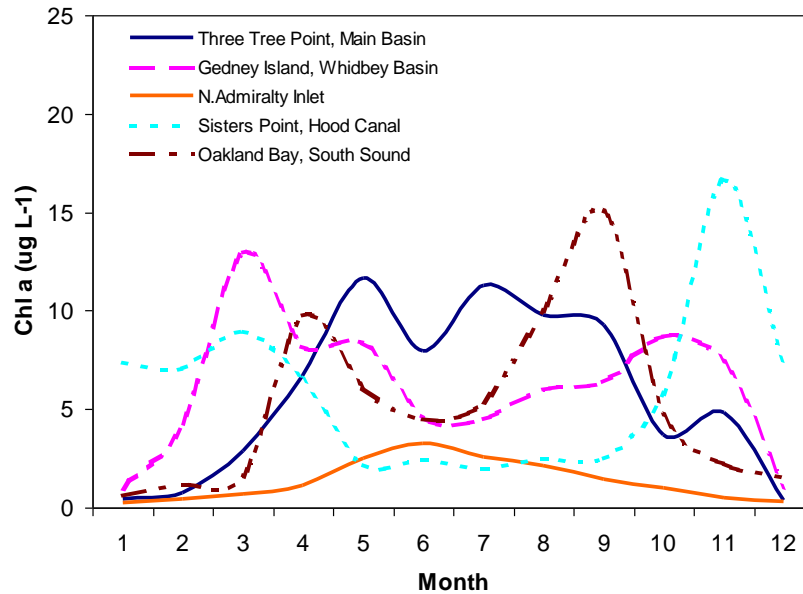
## **Time to 'enlightenment'**

5 years? 10 years?

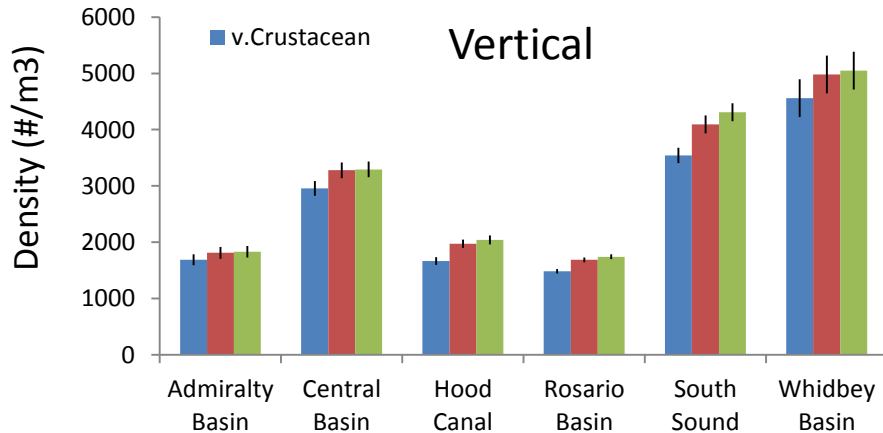


# Variability among regions of Puget Sound:

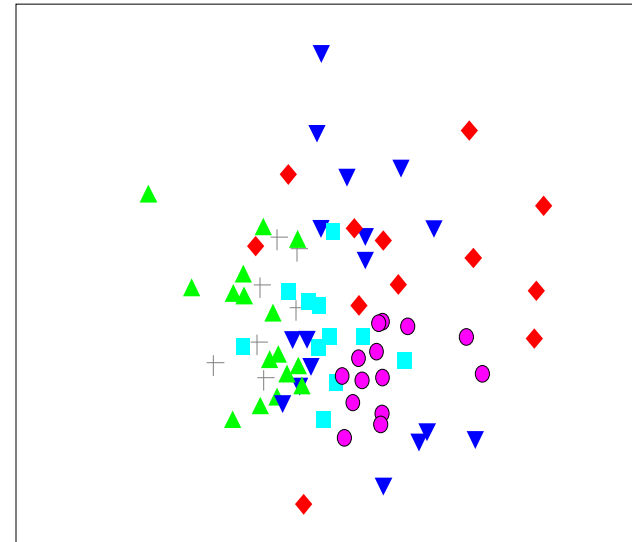
Seasonal cycles of chlorophyll across the basins:



Abundances vary:



Species present differs:



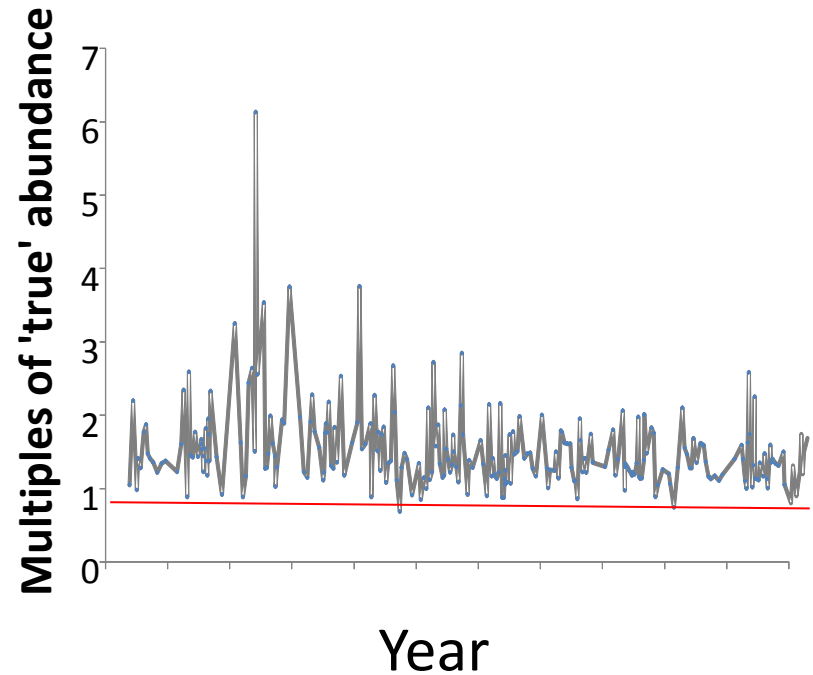
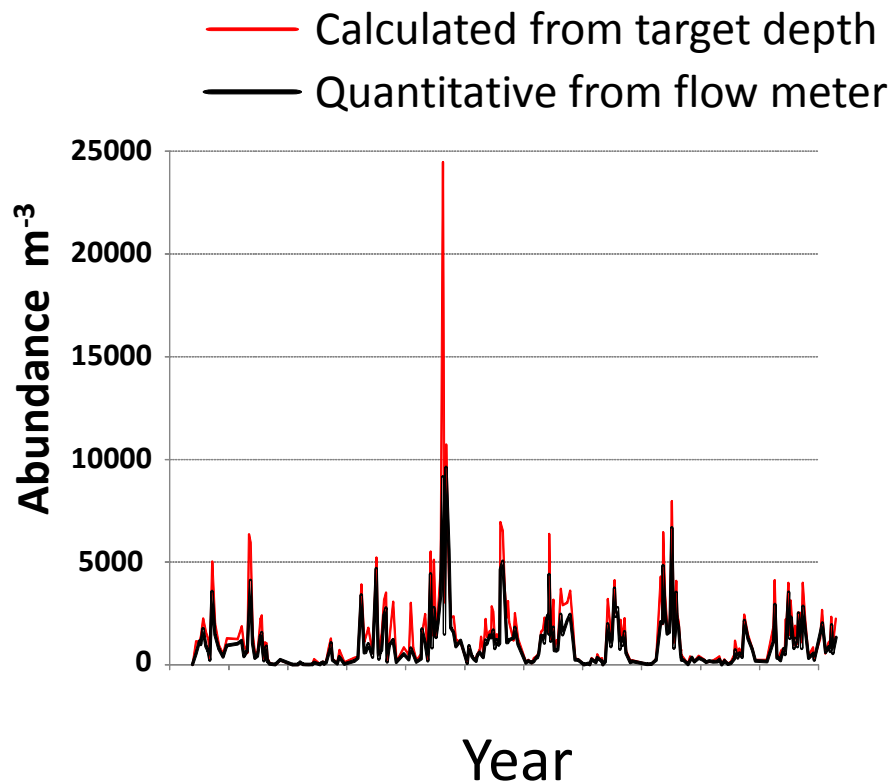
Basin

- ▲ Rosario Straits
- ▼ Whidbey Basin
- Central Basin
- ◆ Hood Canal
- South Sound
- + Admiralty Inlet

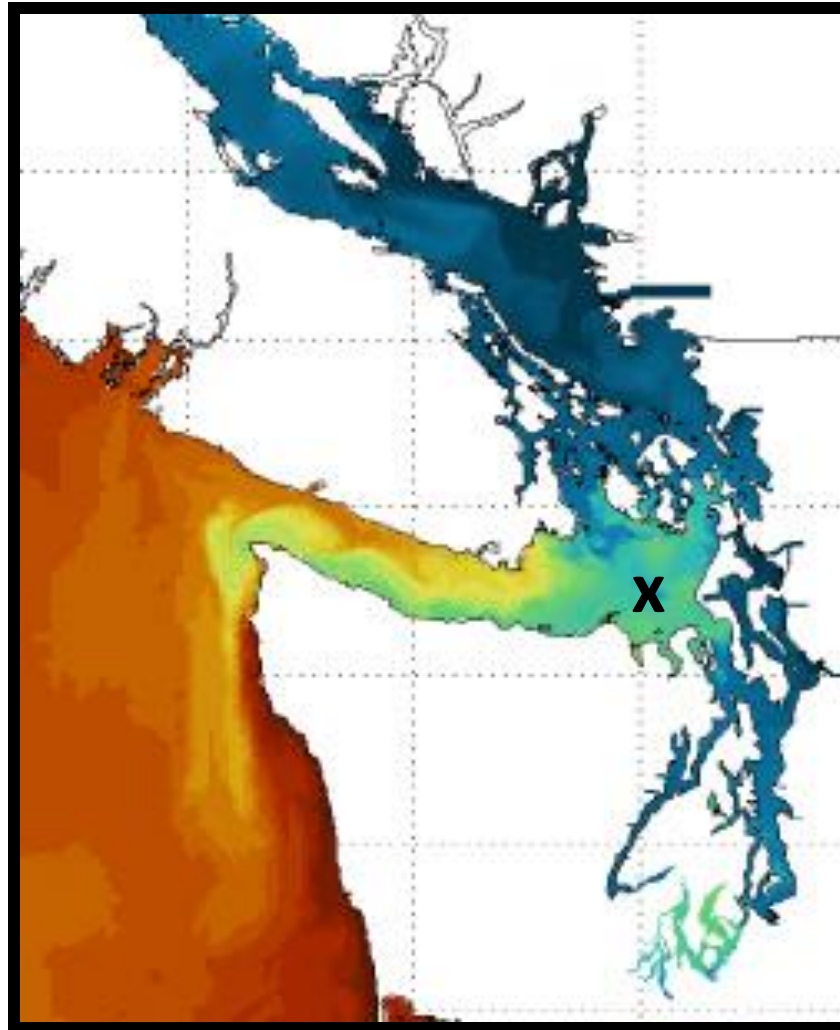
# Quantitative vs. Qualitative?

(i.e., abundance vs. relative species composition)

...Or: “Why to use a flow meter”



Surface salinity from MOSSEA





**Thank you!**

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