

Change in Marine Fish Parasite Abundance Across Depth in Puget Sound



By Emily Pinneo

Introduction:

- Parasites are critical to ecology, controlling food web interactions and population sizes and acting as indicator species
- Complex life cycle parasites in Puget Sound fish decreased over the past 100 years with a strong correlation to warming
- Surface ocean warms faster than deep ocean, but deep species live in a static environment and may be less able to tolerate change

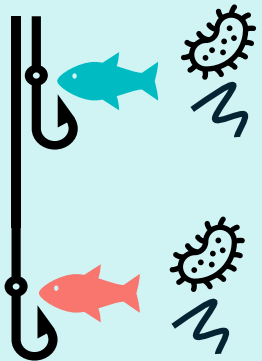
Question:

Does catch depth of fish specimens impact the change in abundance of direct or complex life cycle parasites in a historical dataset in Puget Sound?

Hypothesis:

Complex parasites in shallow caught specimens will see a higher rate of decline, due to increased severity of warming in surface waters

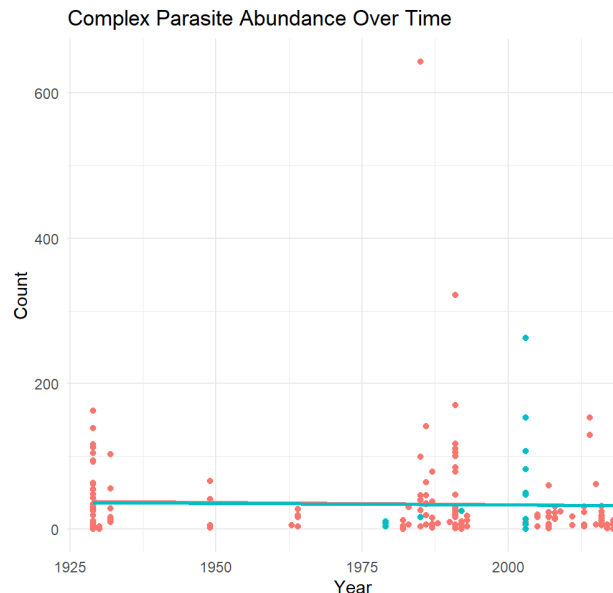
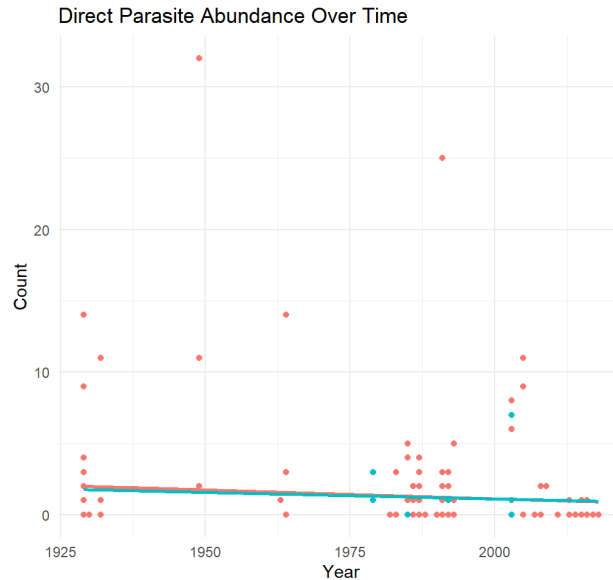
Methods:



- Extract catch depth data for fish specimens dissected for parasites
- Bin catch depth into shallow (0-50 m) or deep (over 50 m) category
- Model relationship between time, direct and complex parasite abundance, and depth using a linear regression in R

Figures:

Key:
● Shallow (0-50 m) ● Deep (over 50 m)



Results:

- No statistically significant relationship over time in deep or shallow categories
 - Very high p-values (0.45-0.8)
- Neither complex life cycle or direct life cycle parasite abundance changes at a different rate across depth

Discussion:

Why doesn't depth drive differential parasite declines in Puget sound? Here are some possible explanations:

- Puget Sound is too shallow for depth to create distinct habitat
 - Maximum depth ~ 280m
- Catch depth may not reflect where fish hosts spend majority of time, or fish may migrate across entire water column
- Anthropogenic changes may not yet be severe enough to show clear depth difference
- Anthropogenic changes may have different but equal impact on shallow and deep habitat that 'cancel out':
 - Increased warming, runoff in shallow water
 - Low oxygen conditions, organisms less adapted for change in deep water

Conclusion:

Depth is not currently driving differential declines in parasite abundance in Puget Sound, but it may in other locations, or in the future, as warming and anthropogenic impacts increase.