Using Angler Reported Catch to Determine the Prevalence of CCT Ectoparasite Infections

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CCT Ectoparasites

- Feed on host mucus, epidermal, dermal, and subdermal cells, subdermal muscle, and blood.
- Can lead to fungal (*Saprolegnia* spp.) or bacterial infection (*Aeromonas salmonicida*).
- Can serve as an intermediate host for parasitic nematodes.
- Mechanical vector for Spring viraemia of carp.
- Species-Specific: No effect, behavioral modifications, anemia, mortality.
- In small numbers, generally relatively harmless.

CCT Ectoparasites

Argulids (*Argulus* spp.)

- Observed on CCT, steelhead, surf perch species, copper rockfish, and whitespotted greenling.
- Coho?

Copepods (*Lepeophtheirus salmonis*)

- Found on Pacific salmon, Atlantic salmon, sea trout, and three-spined stickleback.

Little is known about the prevalence and occurrence of these parasites on CCT

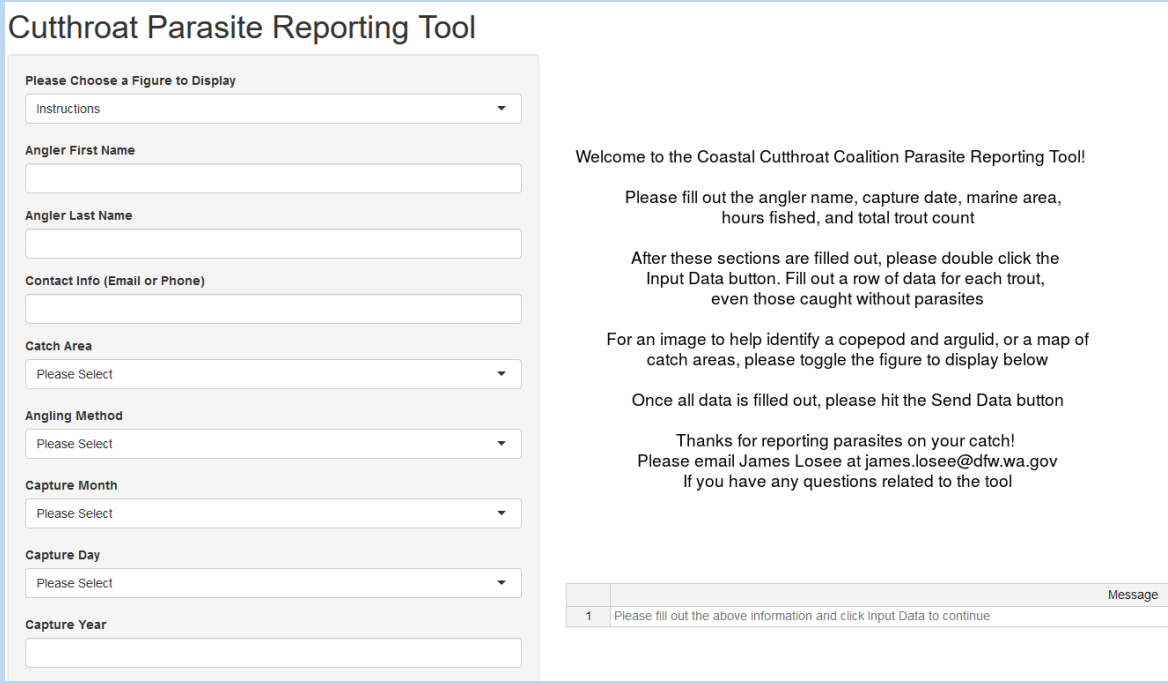
Aims

- Determine spatial and temporal trends in CCT ectoparasite infections.
- Determine causes of increased likelihood of ectoparasite infections.

- But… with limited staff time and funding available.
- Develop online tool for recreational angler reporting.

Introduction to the Tool

- Instructions, catch area map, pictures of parasites.
- Record angler name, contact info, catch area, angling method, capture date, # hours fished, # anglers, fish species, fish size, # parasites.
- Contact anglers regarding unusual records (e.g., double entry).
- Tool is not specific to CCT – salmon catch is recorded as well.



Available at: https://salmonid.shinyapps.io/Cutthroat_Reporting/

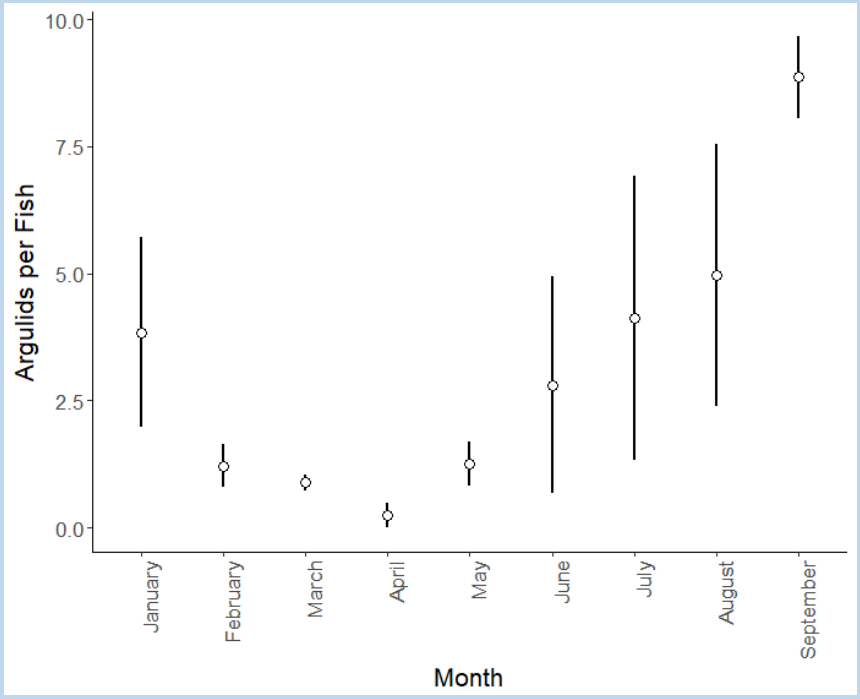
Reporting Success so Far?

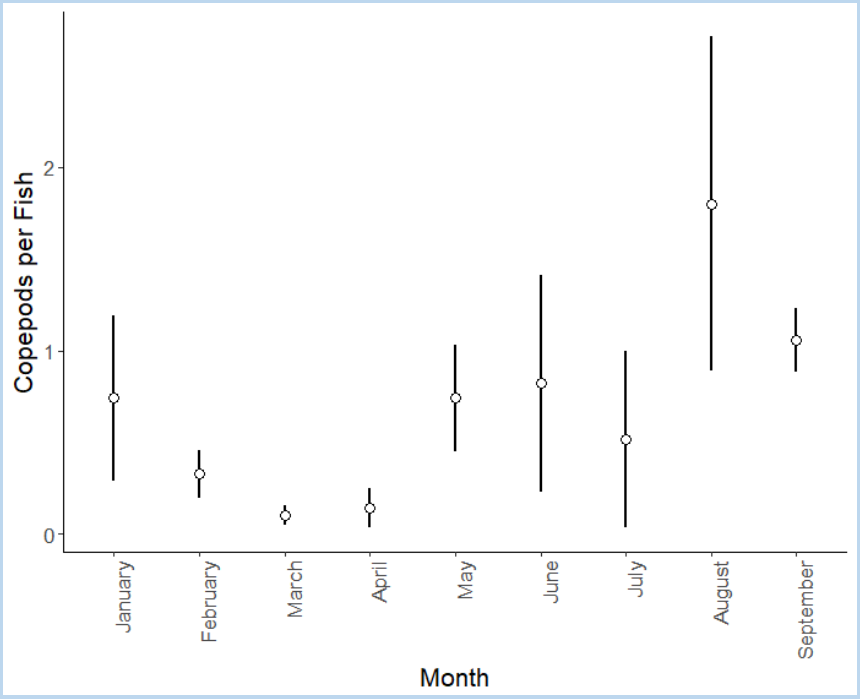
- 1148 CCT captures (Jan. 2017 to Sept. 2018).
- 320 Coho captures.
- Chum/Chinook also reported, but in very low numbers.
- Most reporting in Spring/Fall.
- Coincides with peak CCT recreational angling months.
- CCT incidentally captured during coho fisheries.
- Most captures in Hood Canal and South Puget Sound.

Month	CCT	Coho
1	44	48
2	200	196
3	398	32
4	73	15
5	91	6
6	40	0
7	31	9
8	29	6
9	242	8

Area	CCT
BC	39
Hood Canal	661
Juan de Fuca	21
South Sound	417
Unknown	8
WA Coastal	2

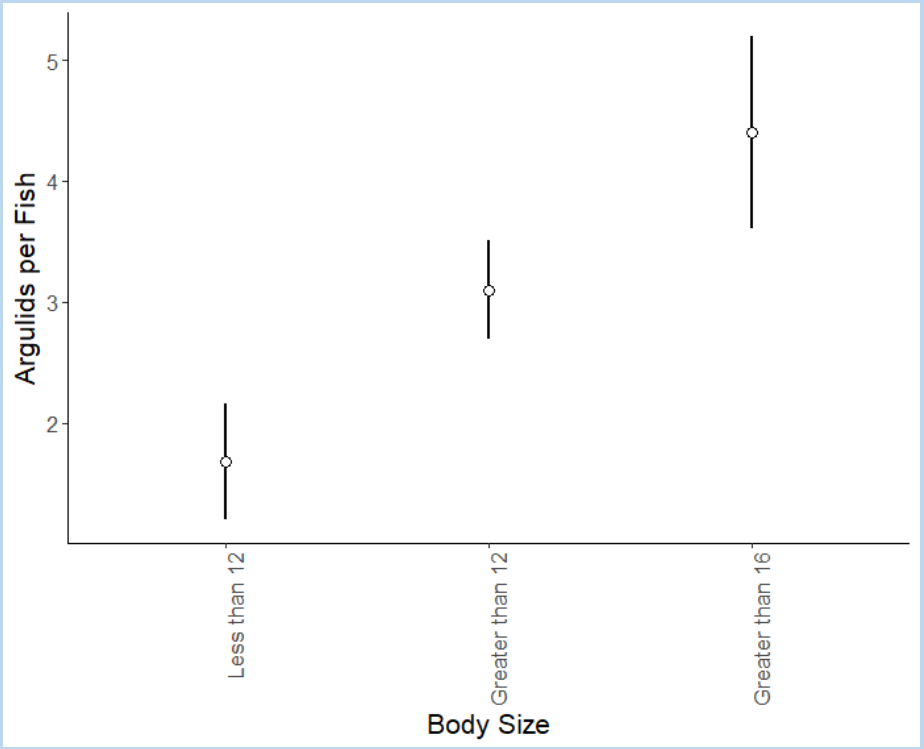
Parasite Abundance Over Time

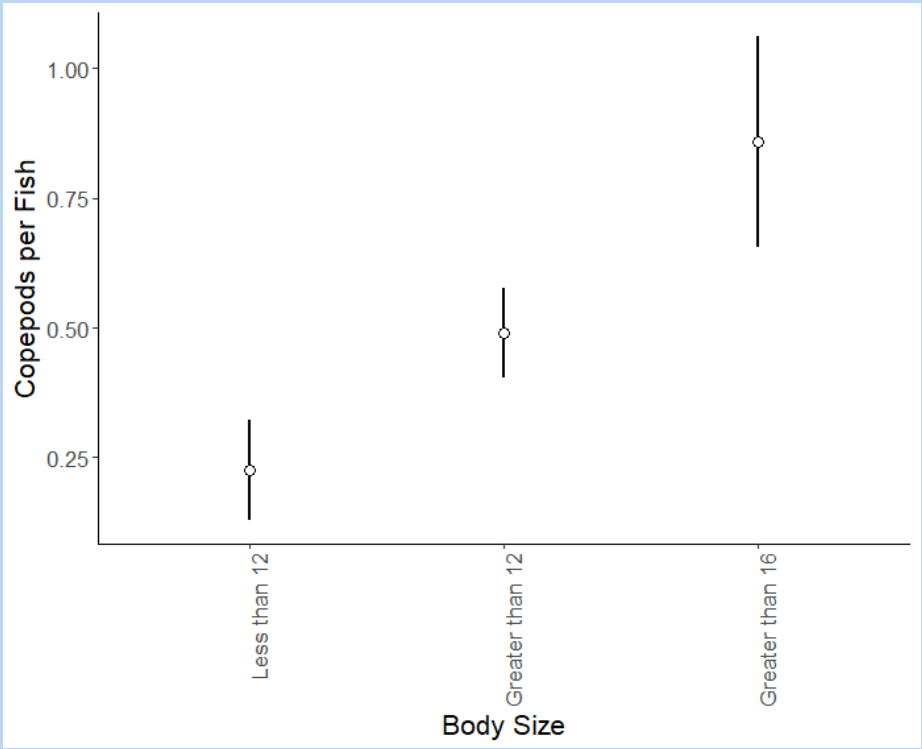




- Dips in parasite abundance in February to May likely correspond with freshwater migration.
- Potentially related to seasonal parasite abundance?

Body Size and Parasite Abundance





- Larger fish = more time to accumulate parasites?
- More potential area to utilize.

- Hood Can
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- Removed
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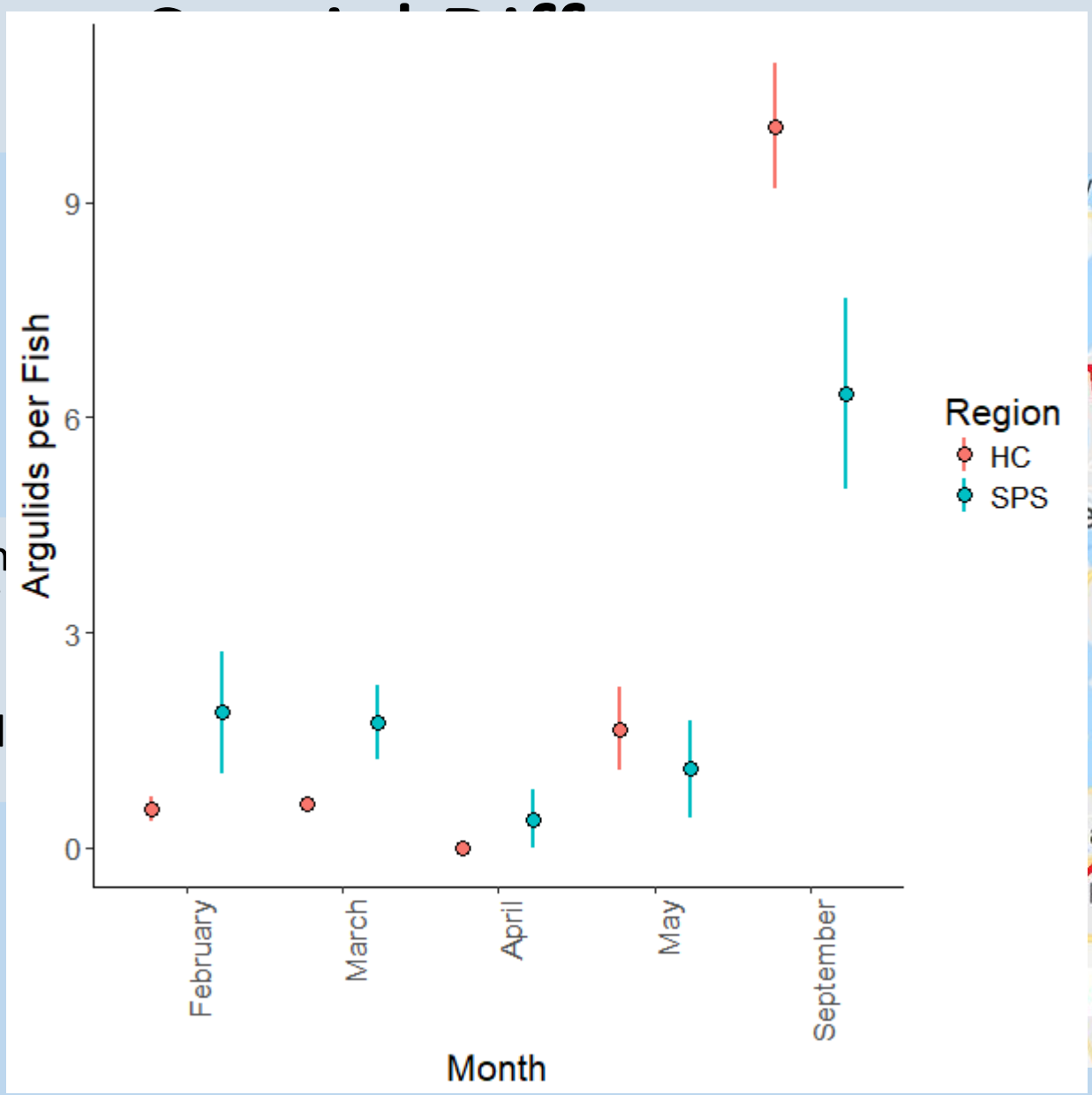
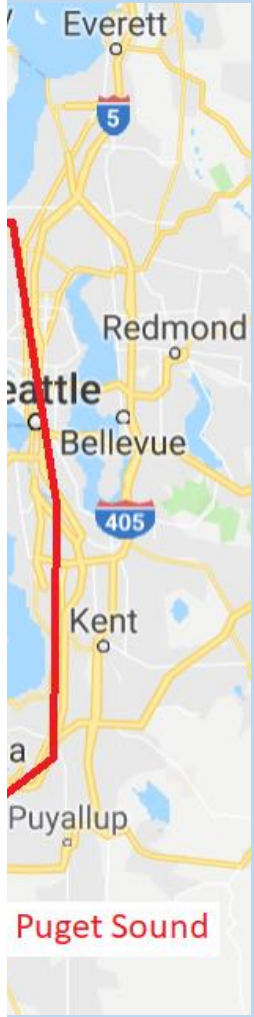


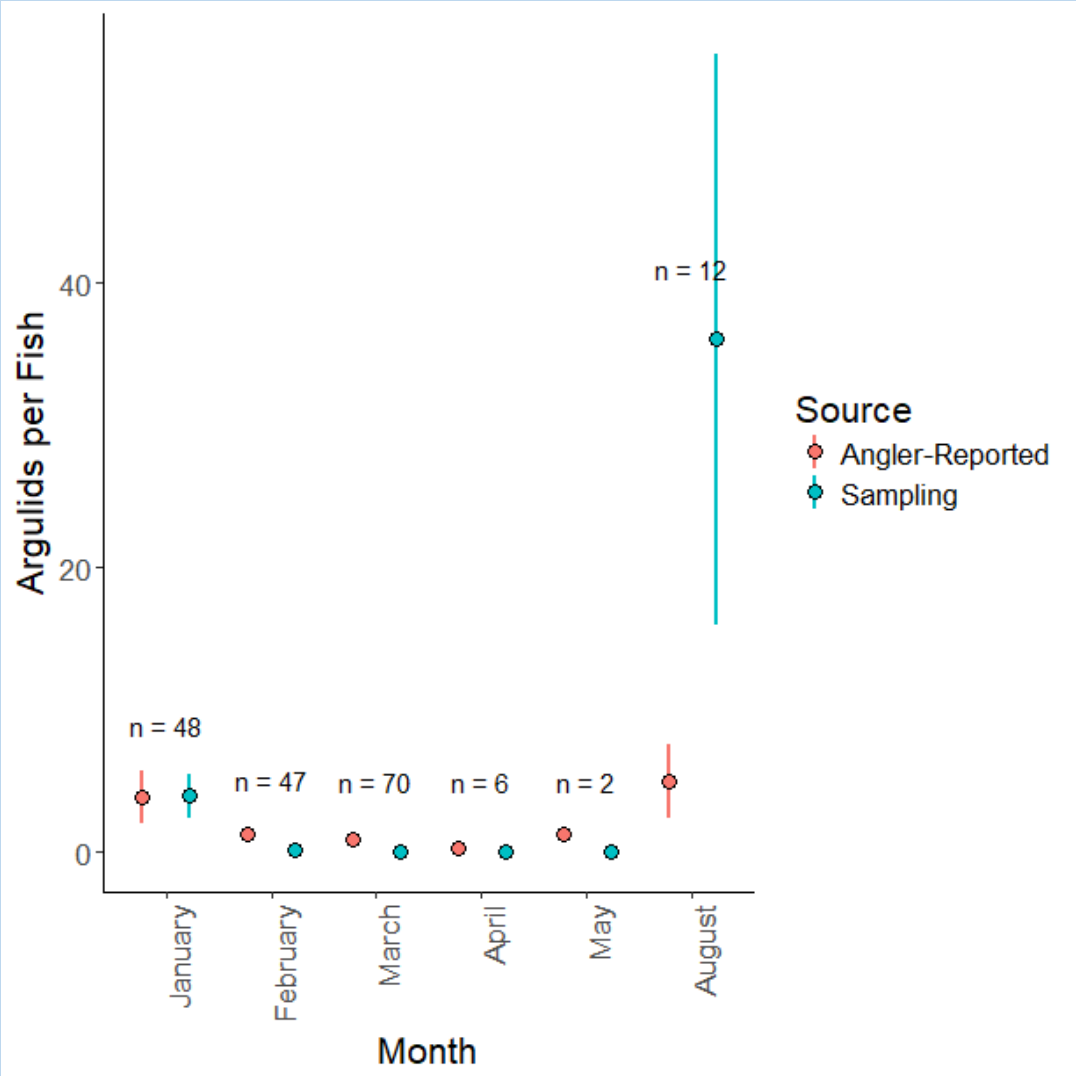


Coho

- More data necessary to perform statistical analysis (320 capture events; 88% between Jan. and Mar.).
- Coho parasite reports are important for better understanding cutthroat parasites.
- No coho reported with argulids.
- Argulids uncommon on coho – only two examples in the literature (1903, 2005).
- Partial validation of angler id?

Comparison Against WDFW Sampling

- No sampling data available for June, July, September
- Similar trends in angler-reported parasites versus biologist-reported sampling.
- Limited sample sizes (n=185).
- Possible underreporting by anglers when there are a large number of parasites?
- Possible spatial differences?



Conclusions & Future Analysis

Conclusions:

- Citizen science can be a useful tool for CCT.
- Parasites less prevalent on CCT in February to May.
- More real estate, more parasites

Future work:

- Would benefit from a full year of data.
- Additional years of data – interannual parasite fluctuation.
- Exposure in new locations/angler groups = improved spatial analysis.

Acknowledgements

- Coastal Cutthroat Coalition.
- The WDFW South Sound sampling team.
- James Losee
- Recreational anglers contributing to the tool.

Questions?

Reporting Tool Website: https://salmonid.shinyapps.io/Cutthroat_Reporting/

Also available through the Coastal Cutthroat Coalition website here:

https://www.coastalcutthroatcoalition.com/