Juvenile salmon migration report; northern Strait of Georgia to Johnstone Strait

— Hakai Institute Juvenile Salmon Program 2018 —

Aim

To provide regular in-season summaries of juvenile salmon migration catch statistics, health indices, and oceanographic conditions in the northern Strait of Georgia to Johnstone Strait region.

Background

The Hakai Institute Juvenile Salmon Program was launched in the spring of 2015 in a collaborative partnership with UBC, SFU, Salmon Coast, Pacific Salmon Foundation, and DFO. The program operates in the Discovery Islands and Johnstone Strait (Figure 1) and thus provides information on the health of juvenile salmon after passage through:

1) Strait of Georgia – stratified high plankton biomass zone; and
2) Discovery Islands & Johnstone Strait – highly-mixed low-plankton-biomass zone, and area of high wild-farmed fish interactions.

Program Objectives

1) Determine migration timing and pathways;
2) Migration habitat mapping - oceanographic conditions along the migration route;
3) Understand the dynamics of the plankton food-webs that underpin juvenile salmon growth and health;
4) Understand parasite and pathogen infection dynamics and their impact on juvenile salmon growth and health.

Key Parameters Reported

- Catch Statistics
- Lengths
- Parasite Loads
- Oceanographic Conditions

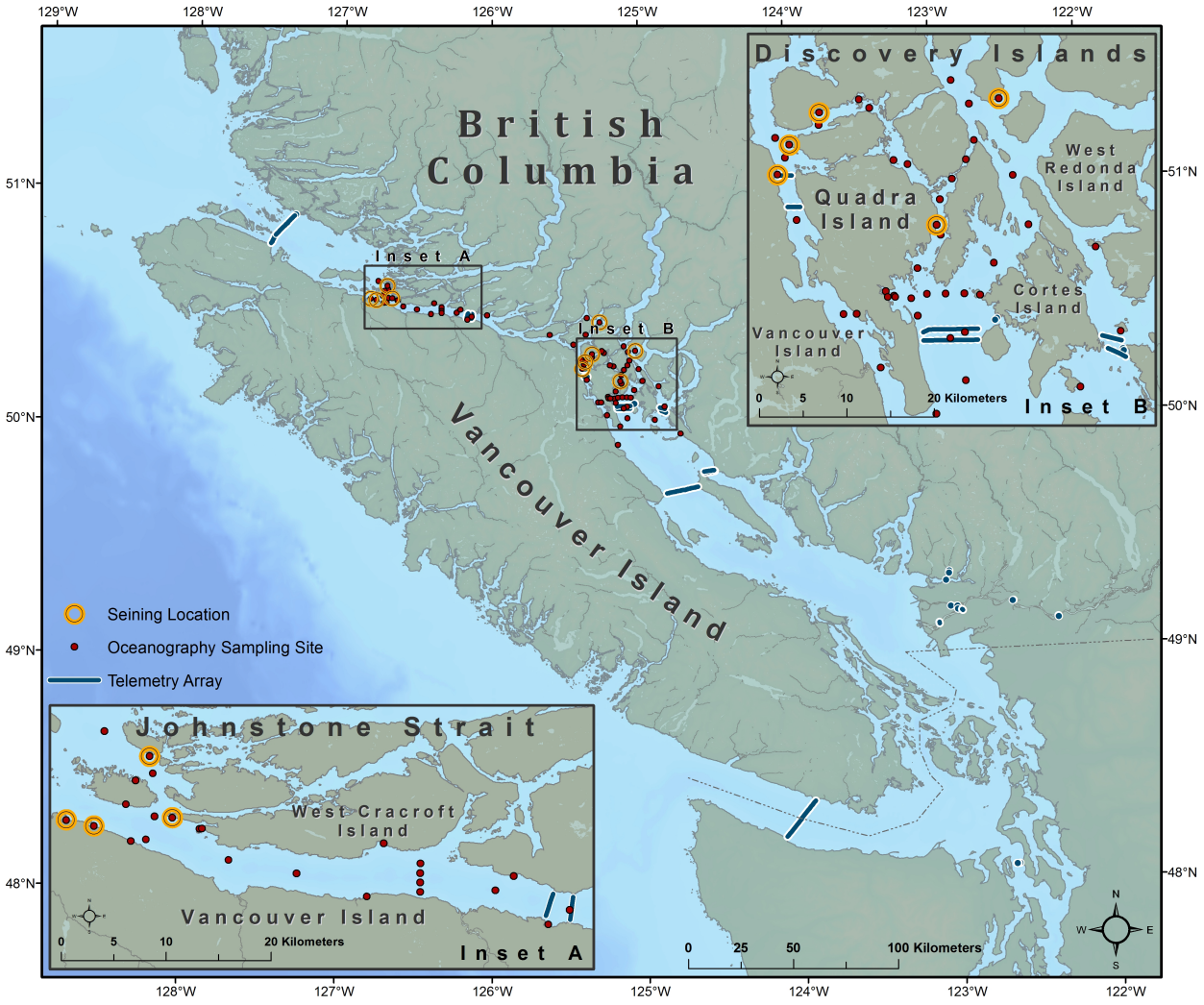

Figure 1: Salmon sampling locations in the Discovery Islands and Johnstone Strait in 2018.

The following plots are subject to change as the underlying data are preliminary and subject to further quality assurance.

We are endeavouring to provide useful information for the entire salmon research community. As such we welcome any feedback. Please direct questions or comments to Brian Hunt (B.Hunt@oceans.ubc.ca) and/or Brett Johnson (Brett.Johnson@hakai.org).

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Updated: 2018-06-29

Catch Statistics

Sockeye Abundance and Timing

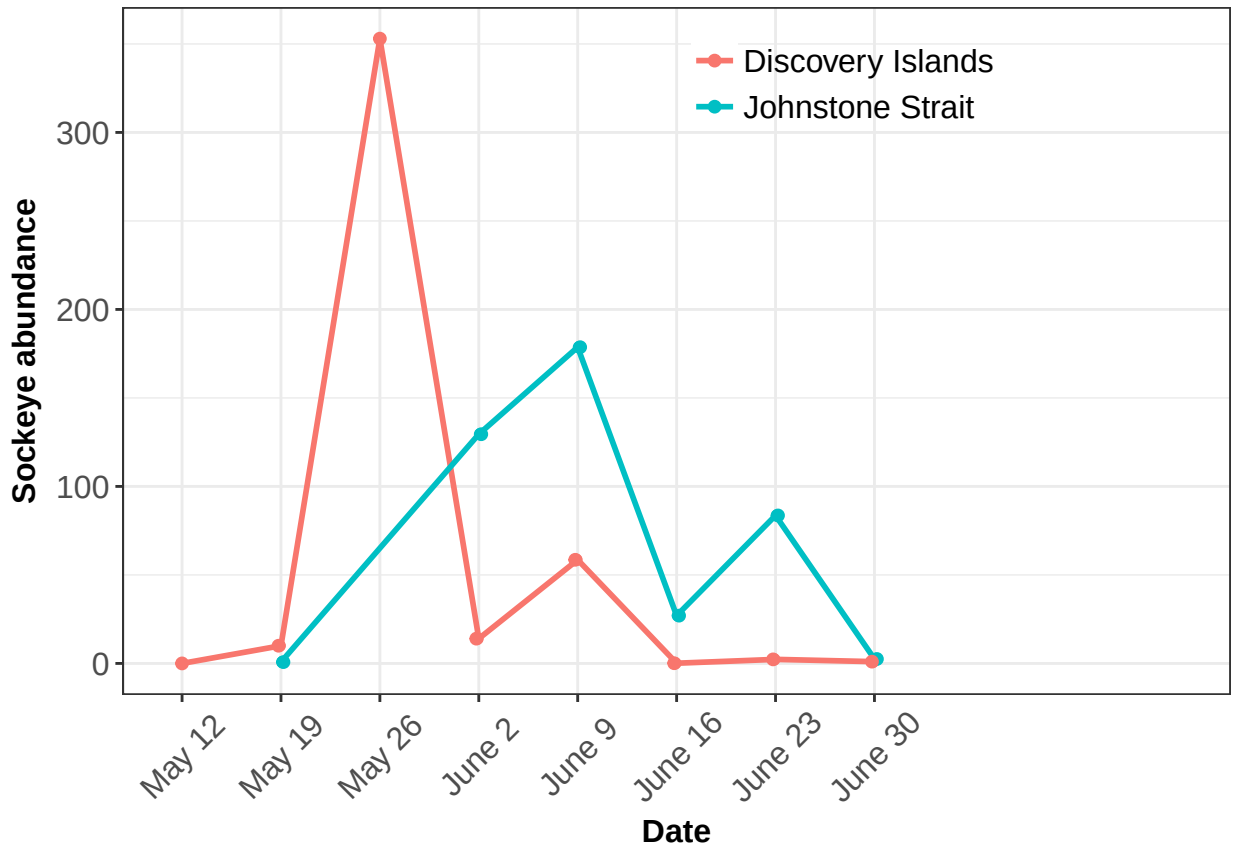

Figure 2: Average number of juvenile sockeye salmon caught in each seine in 2018 averaged over one week periods for each region and represented by the middle day of each week.

Fish Lengths

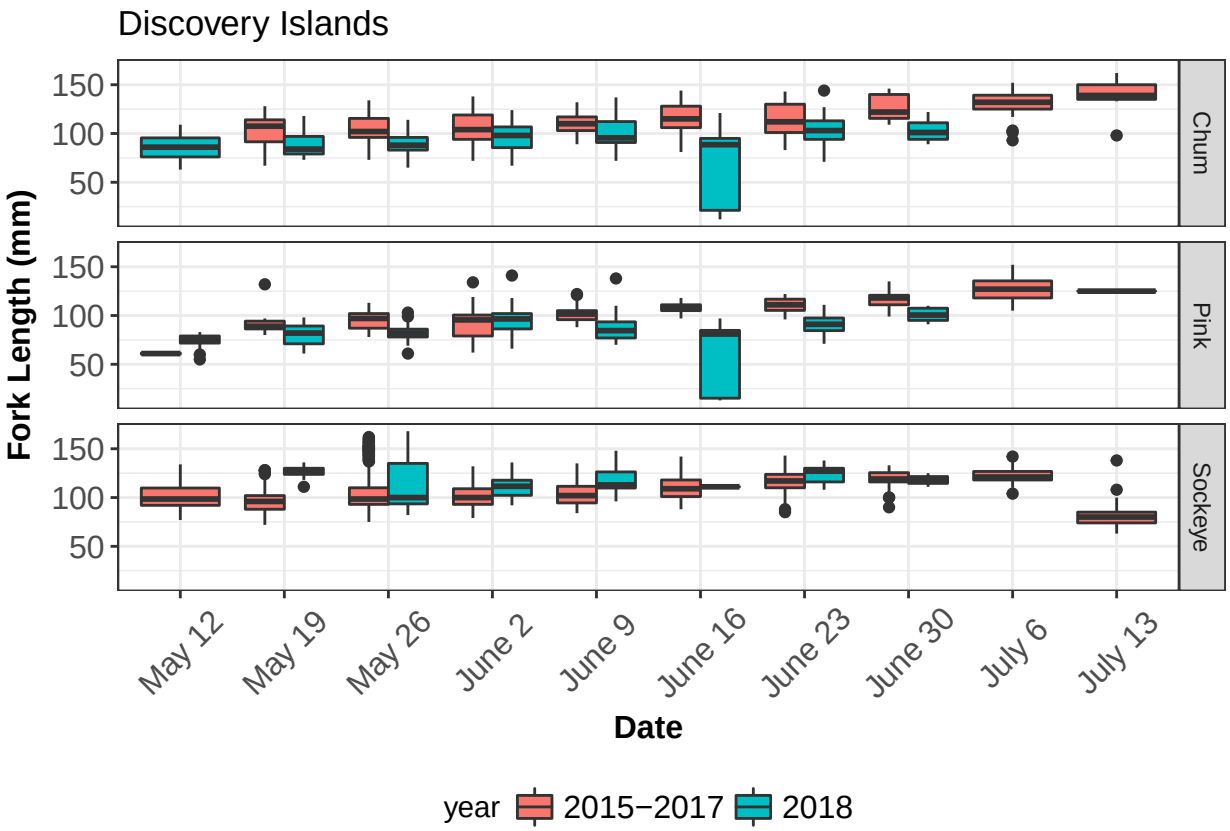

Figure 3: Fork legnth boxplots of juvenile salmon in the Discovery Islands in 2018 grouped by week, and represented by the middle day of each week, compared to the average length from 2015, 2016 and 2017.

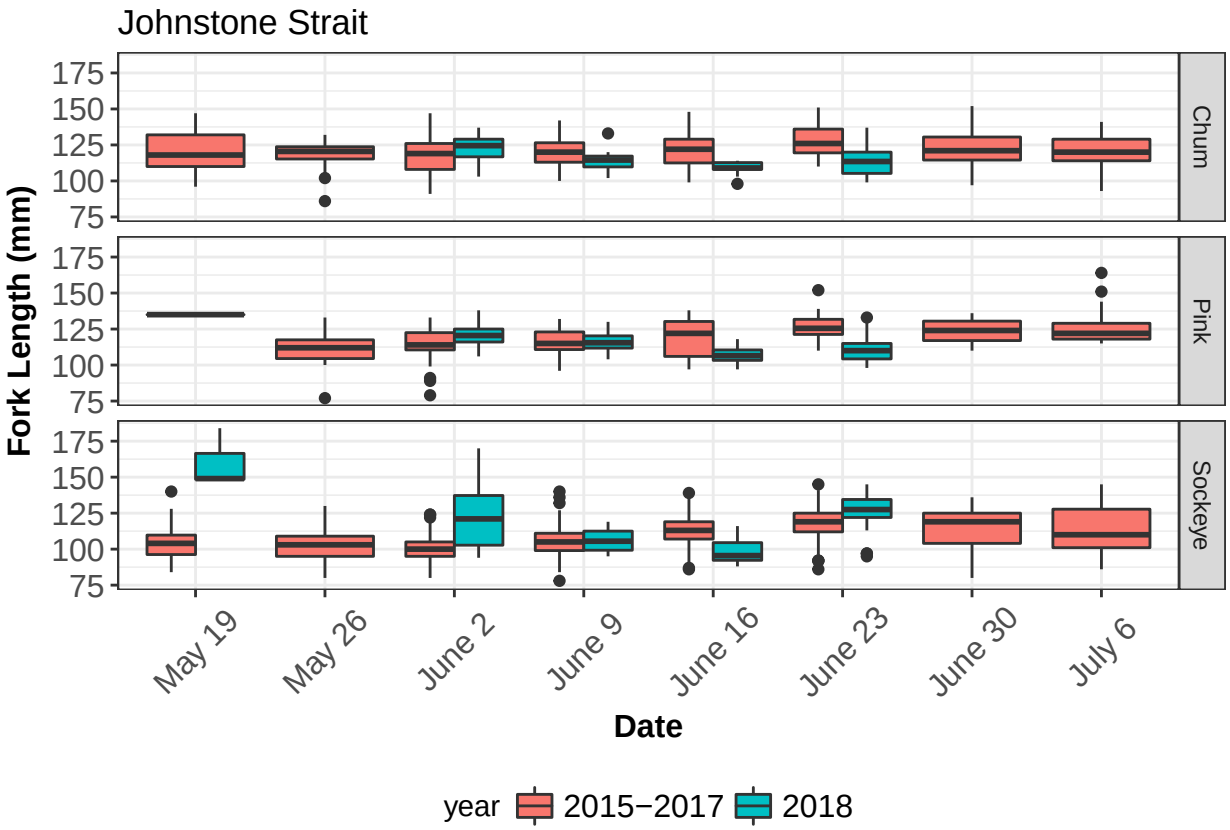

Figure 4: Fork legnth boxplots of juvenile salmon in Johnstone Strait in 2018 grouped by week, and represented by the middle day of each week, compared to the average length from 2015, 2016 and 2017.

Parasite Loads

Definitions[1]

Prevalence: Number of individuals of a host species infected with a particular parasite species ÷ Number of hosts examined.

Mean Infection Intensity: Total number of individuals of a particular parasite species in a sample of a host species ÷ Number of infected individuals of the host species in the sample (= Mean number of individuals of a particular parasite species per infected host in a sample).

Abundance: The total number of individuals of a particular parasite species in a sample of hosts ÷ Total number of individuals of the host species in the sample.

Motile Sea Lice Prevalence

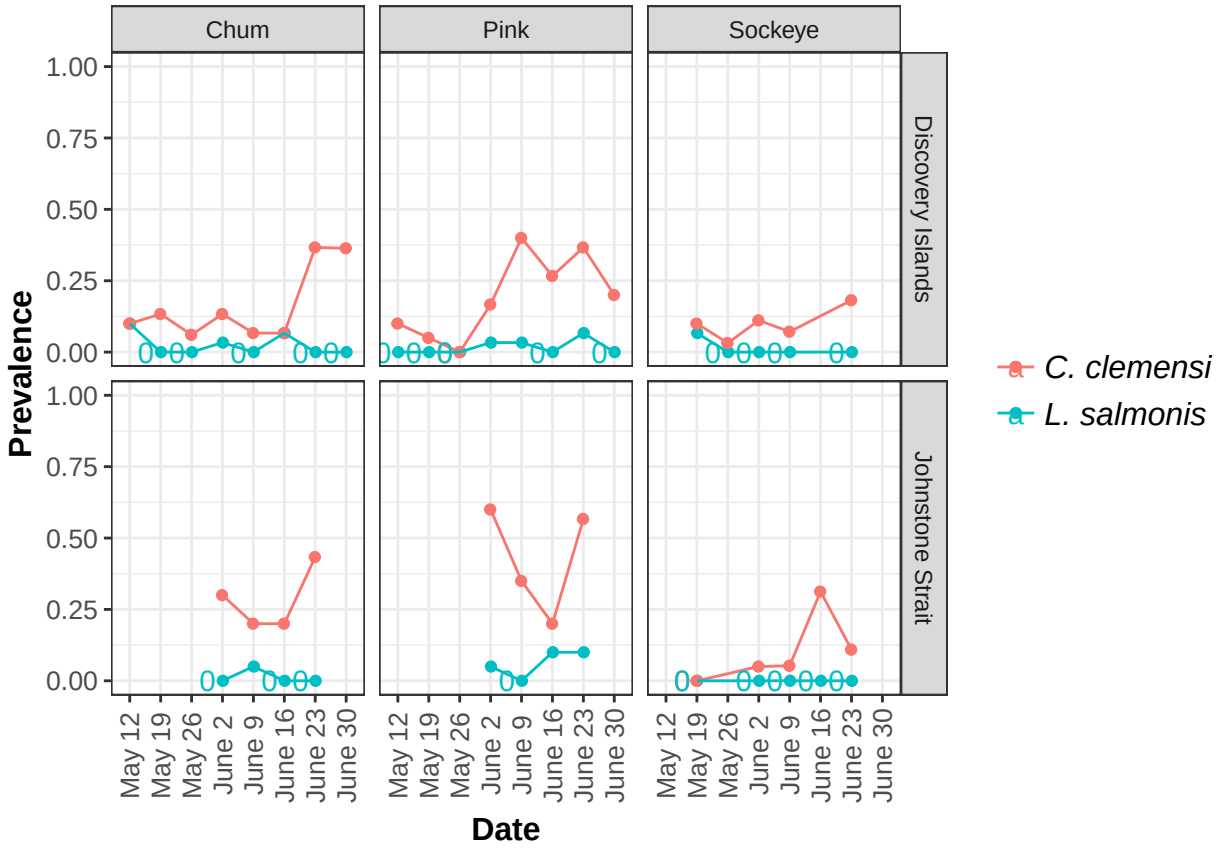

Figure 5: The proportion of juvenile chum, pink and sockeye that had at least one motile sea louse of either *Lepeoptheirus salmonis* and *Caligus clemensi* in the Discovery Islands (DI) and Johnstone Strait (JS) in 2018. Instances of zero prevalence are labelled as such.

[1]Margolis, L., Esch, G.W., Holmes, J.C., Kuris, A.M. and Schad, G.A. (1982). The use of ecological terms in parasitology: report of an ad hoc committee of the American Society of Parasitologists. J. Parasitol. 68:131–133.

Motile Sea Lice Abundance

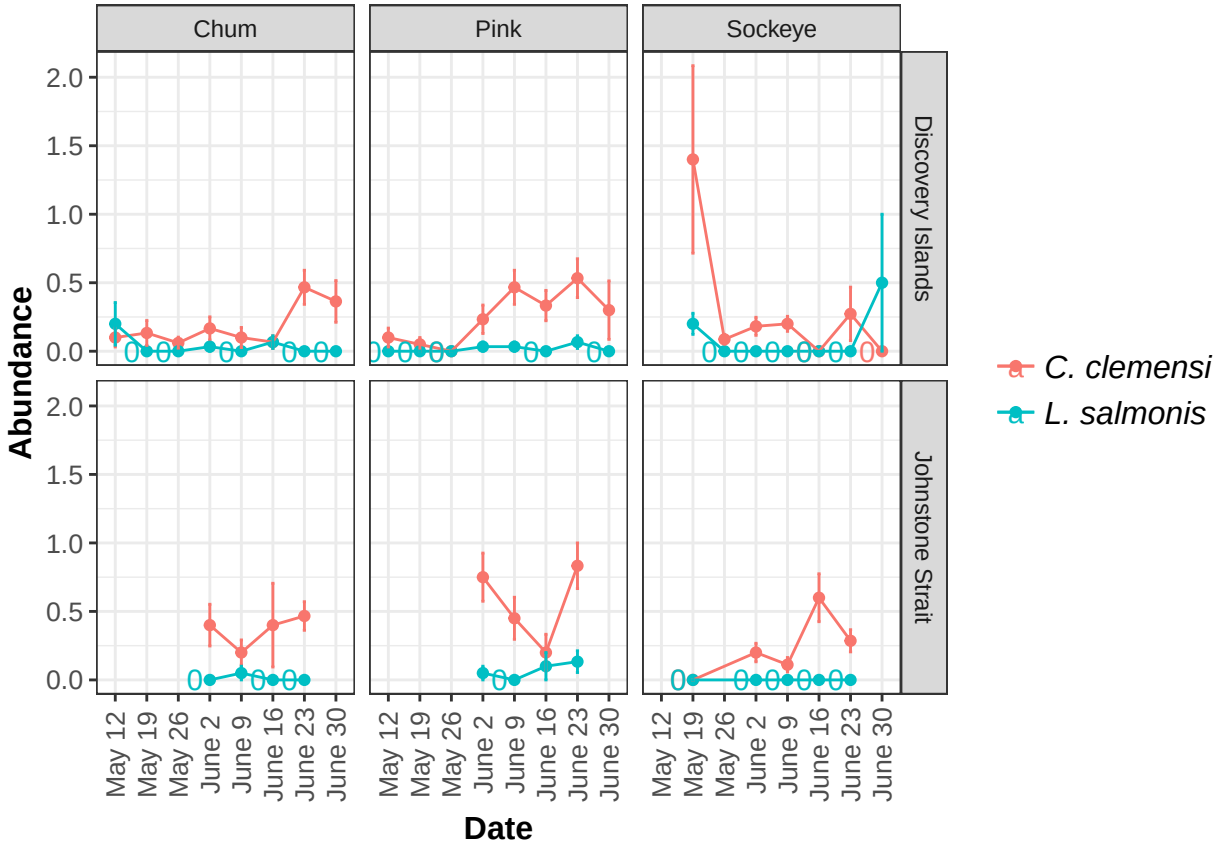

Figure 6: The abundance ± SE of **motile** *Lepeoptheirus salmonis* and *Caligus clemensi* sea lice combined infecting juvenile chum, pink and sockeye salmon in the Discovery Islands and Johnstone Strait in 2018.

Motile Sea Lice Infection Intensity

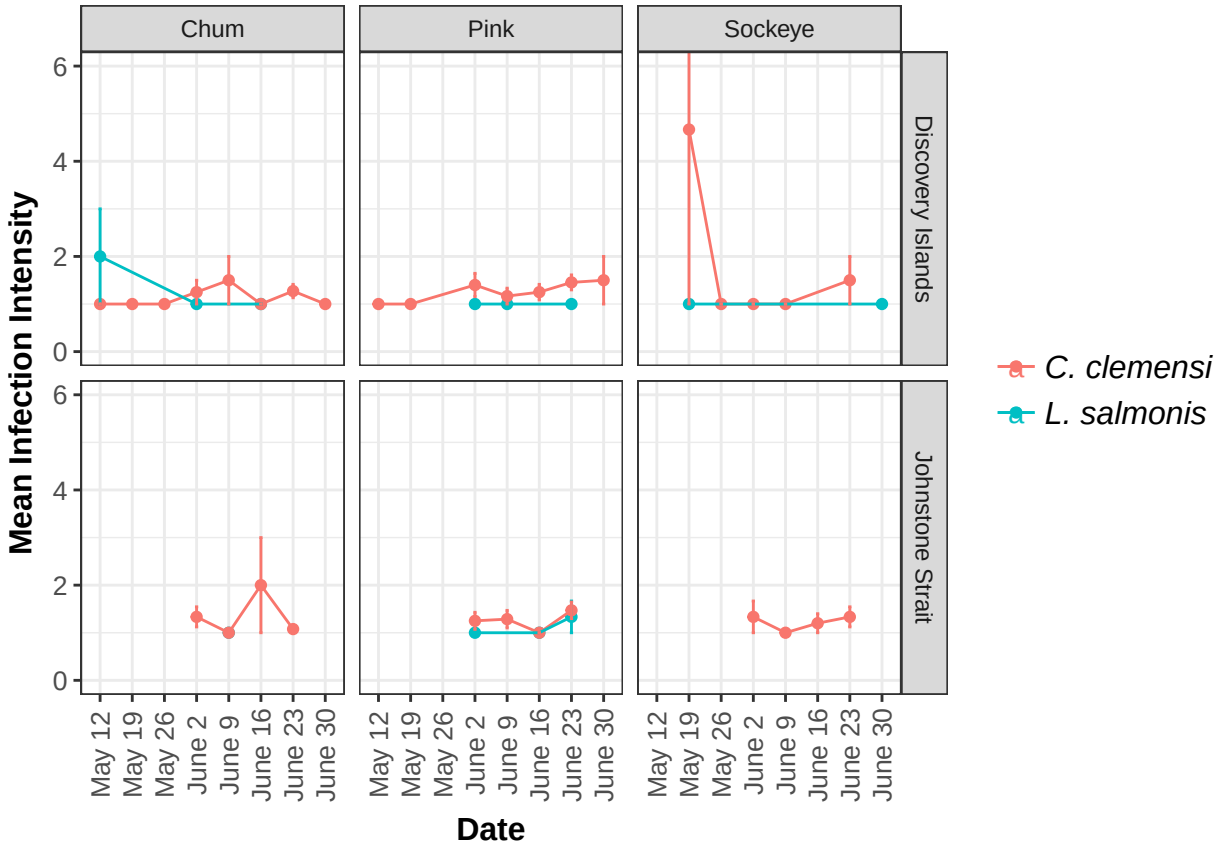

Figure 7: The mean infection intensity ± SE of **motile** *Lepeoptheirus salmonis* and *Caligus clemensi* sea lice per juvenile salmon infected with one or more motile *Lepeoptheirus salmonis* and *Caligus clemensi* louse in 2018.

Oceanography

Discovery Islands Migration Corridors

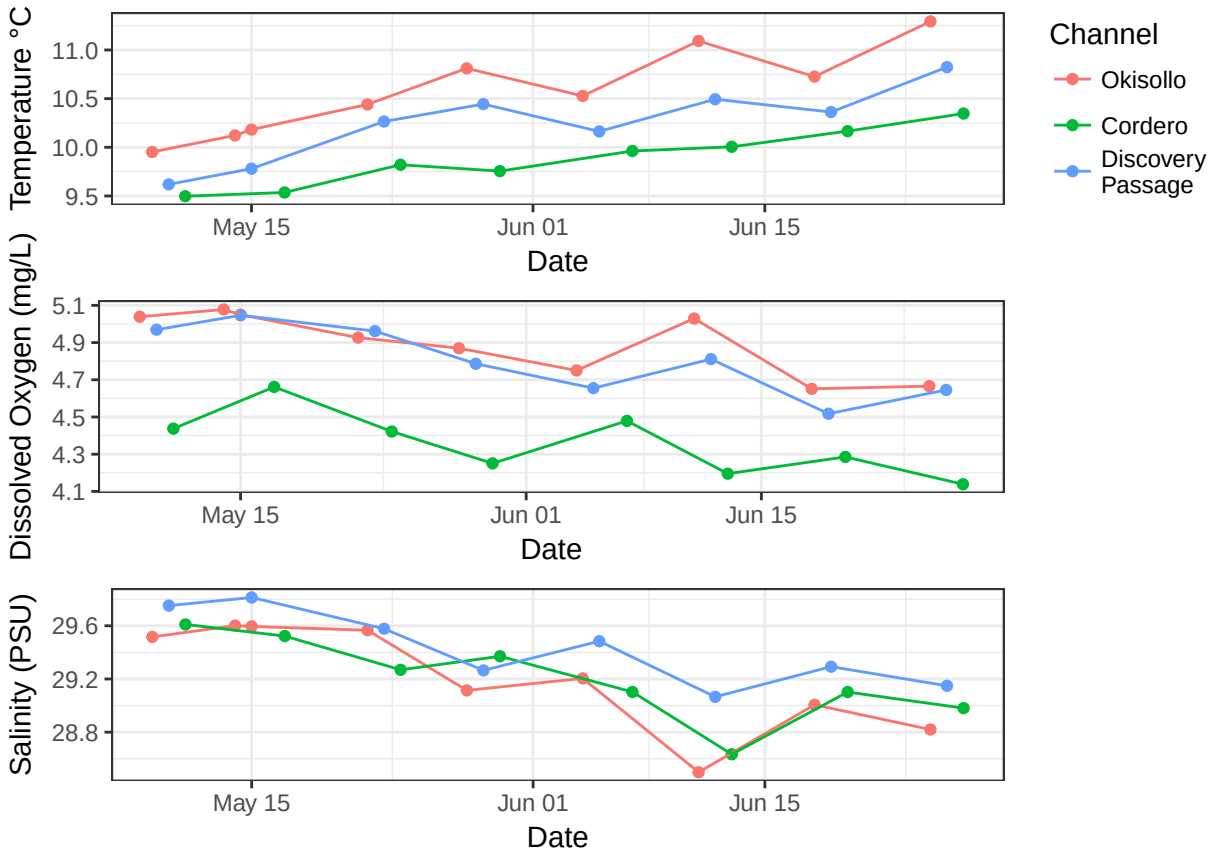

Figure 8: Temperature and Dissolved oxygen averaged in the top 30 m of water in the three main migration corridors in the Discovery Islands, in 2018.