

Juvenile salmon migration report; Discovery Islands

— Hakai Institute Juvenile Salmon Program 2021 —

Aim

To provide a rapid interim summary of juvenile salmon migration characteristics and oceanographic conditions in the Discovery Islands and northern Strait of Georgia region in British Columbia, Canada.

Background

The Hakai Institute Juvenile Salmon Program was launched in the spring of 2015. For a complete background including methods see Hunt et al. 2018. The program operates in the Discovery Islands (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 – highly-mixed low-plankton-biomass zone, and area of, historically, high potential for wild-farmed fish interactions.

Program Objectives

- 1) Determine migration timing and relative abundance;
- 2) Map migration habitat - 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 and Migration Timing
- Lengths
- Parasite Presence
- Ocean Temperatures

The following plots are subject to change as the underlying data are preliminary and subject to further quality assurance. The Hakai Institute embraces an “Open Science Policy”; to

Key Parameters Reported

that end you can access the time series data used in this report at <http://dx.doi.org/10.21966/1.566666>.

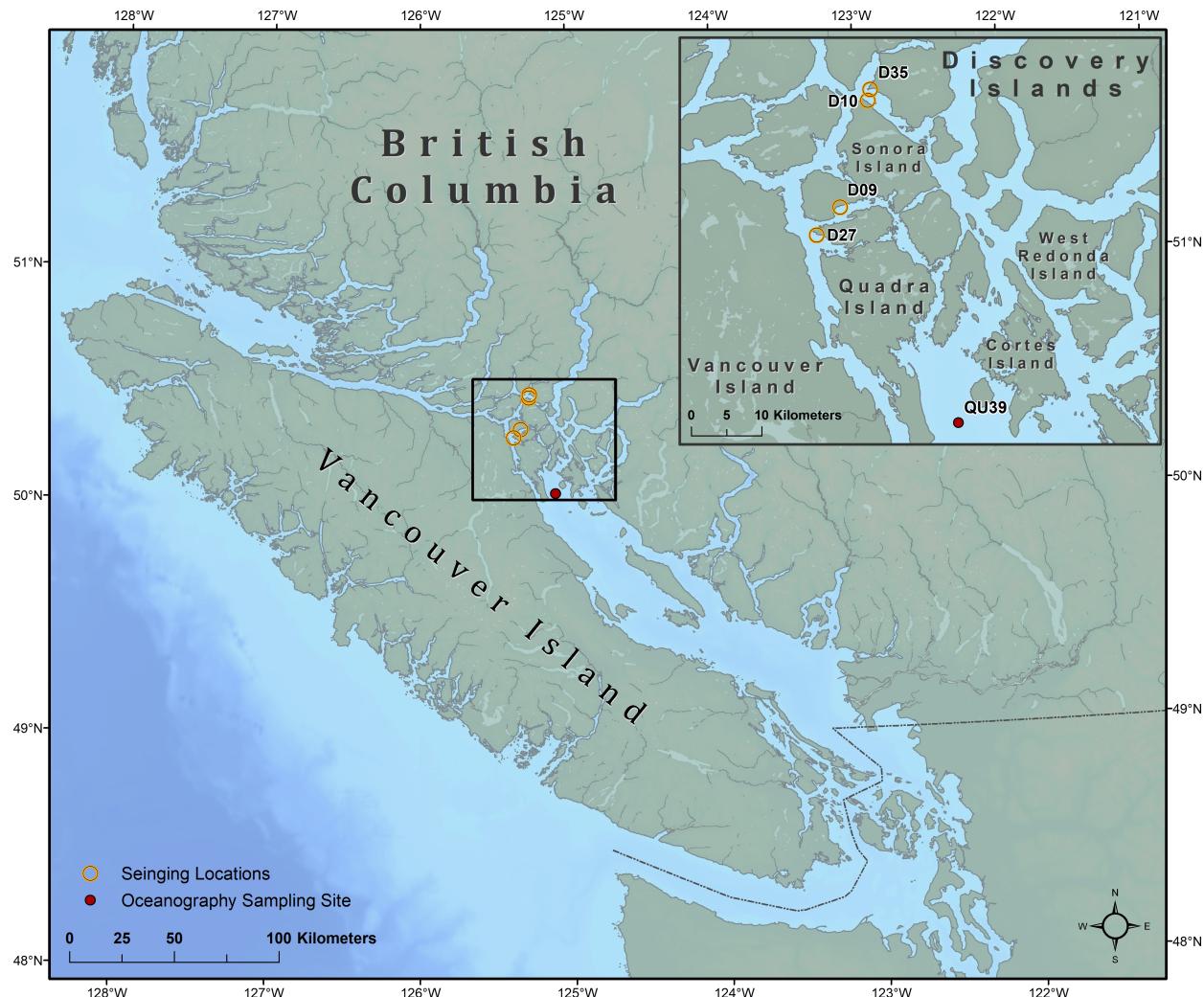


Figure 1: Salmon seining and oceanographic sampling locations in the Discovery Islands in 2021.

Migration Timing

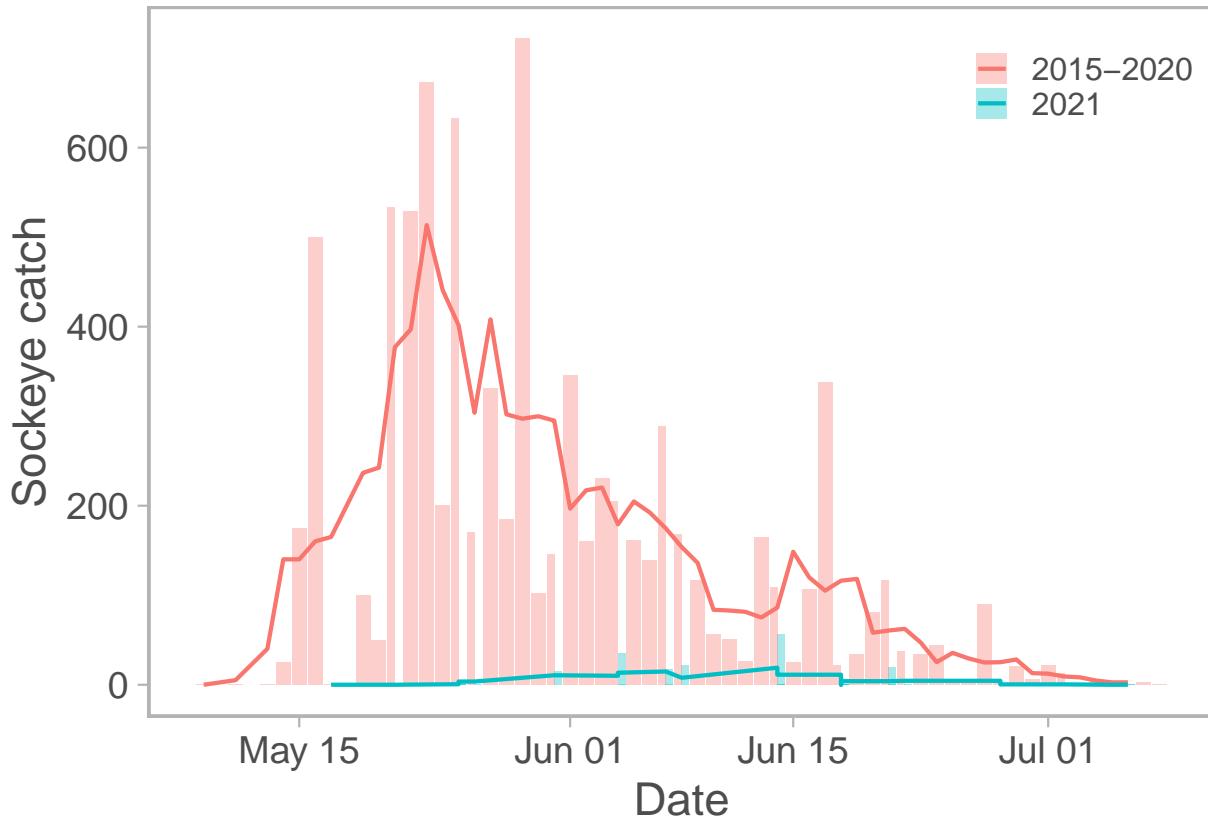


Figure 2: Purse seine catches of juvenile sockeye (bars) and rolling seven day averages (lines) in 2021 compared to catches averaged by day across all years in the Hakai Juvenile Salmon Program time series from 2015–2020.

Catch Intensity

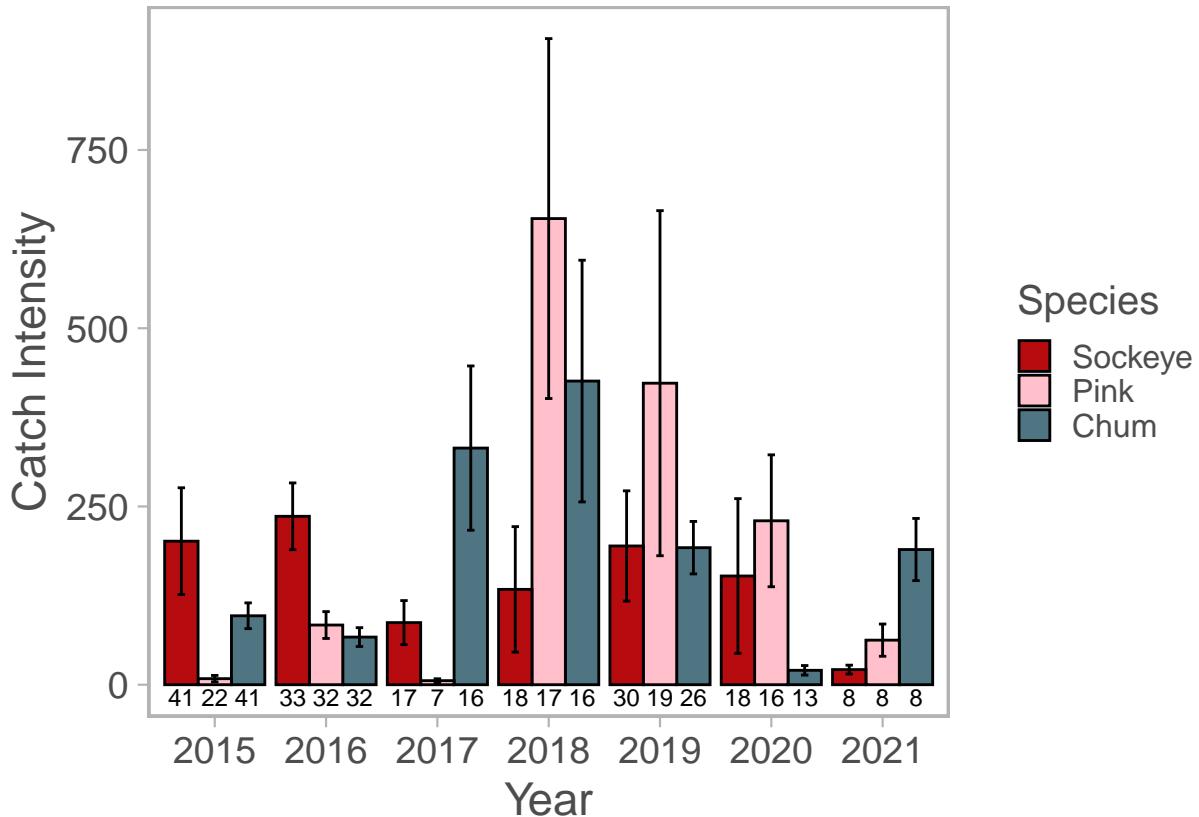


Figure 3: The catch intensity (average number of species i when $i > 0$ and when sockeye were also caught) of sockeye, pink, and chum salmon in the Discovery Islands. Numbers under each bar indicate the number of seines in which the species was caught, and error bars indicate 1 standard error.

Species Proportion

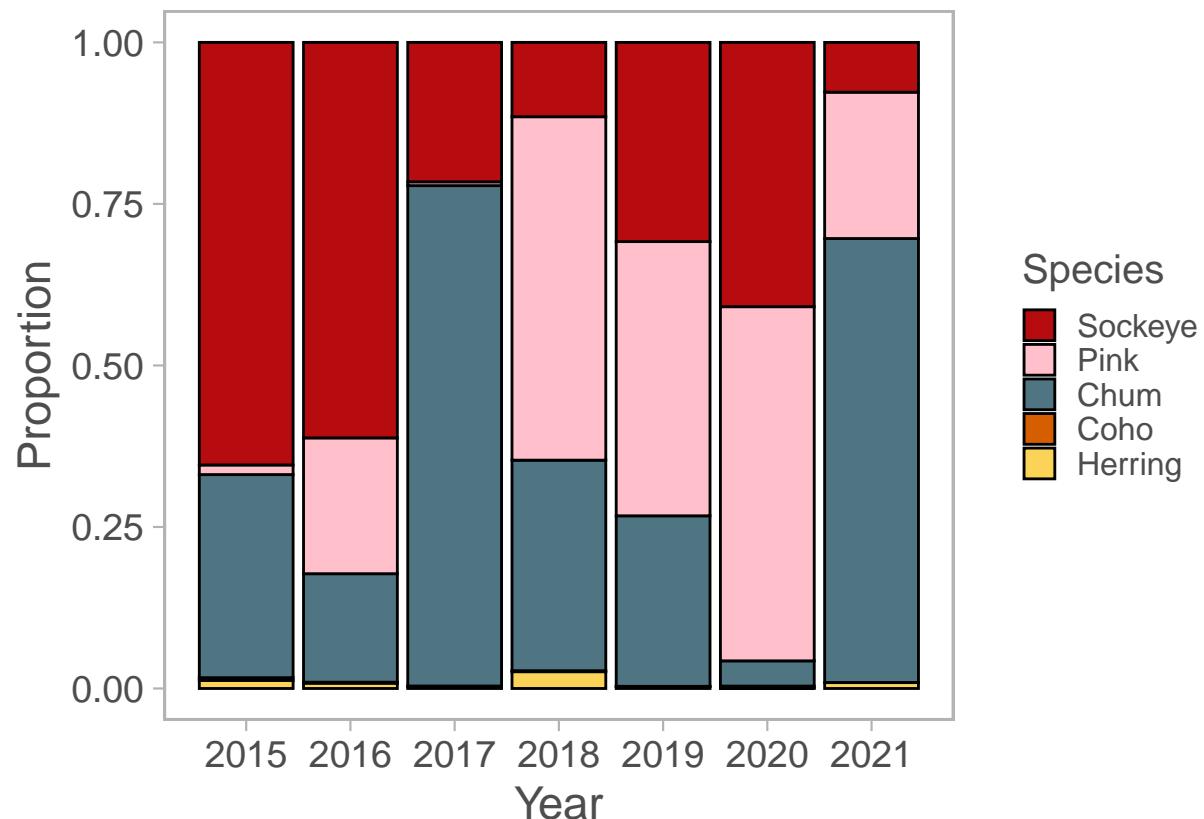


Figure 4: Proportion of juvenile salmon species caught in the Discovery Islands from 2015-2021.

Fish lengths

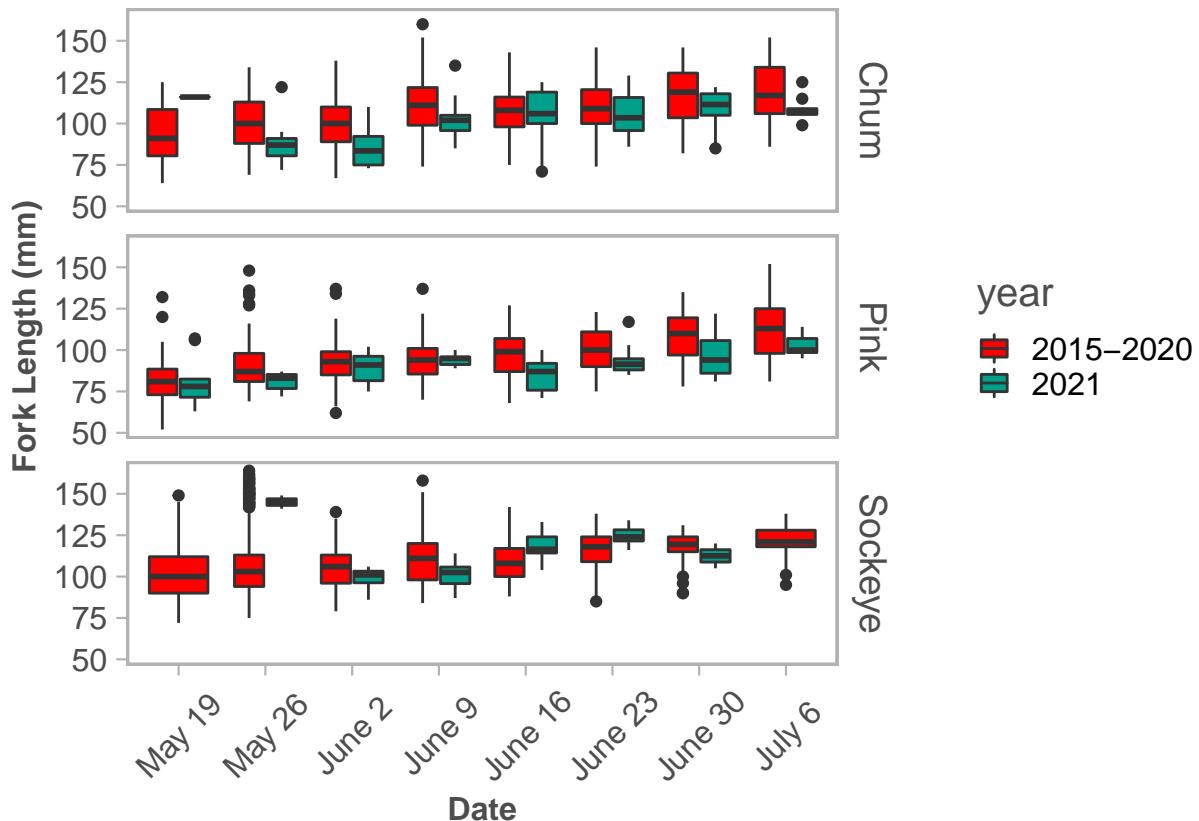


Figure 5: Fork-length boxplots of juvenile salmon in the Discovery Islands in 2021 grouped by week, and represented by the middle day of each week, compared to all lengths from 2015–2020.

Parasite Prevalence

Presence or absence of sea lice parasites was determined with the un-aided eye in the field in 2020 and 2021 and prevalence is compared between these two years for this report. Comparison with the entire time series will only be possible after laboratory analysis.

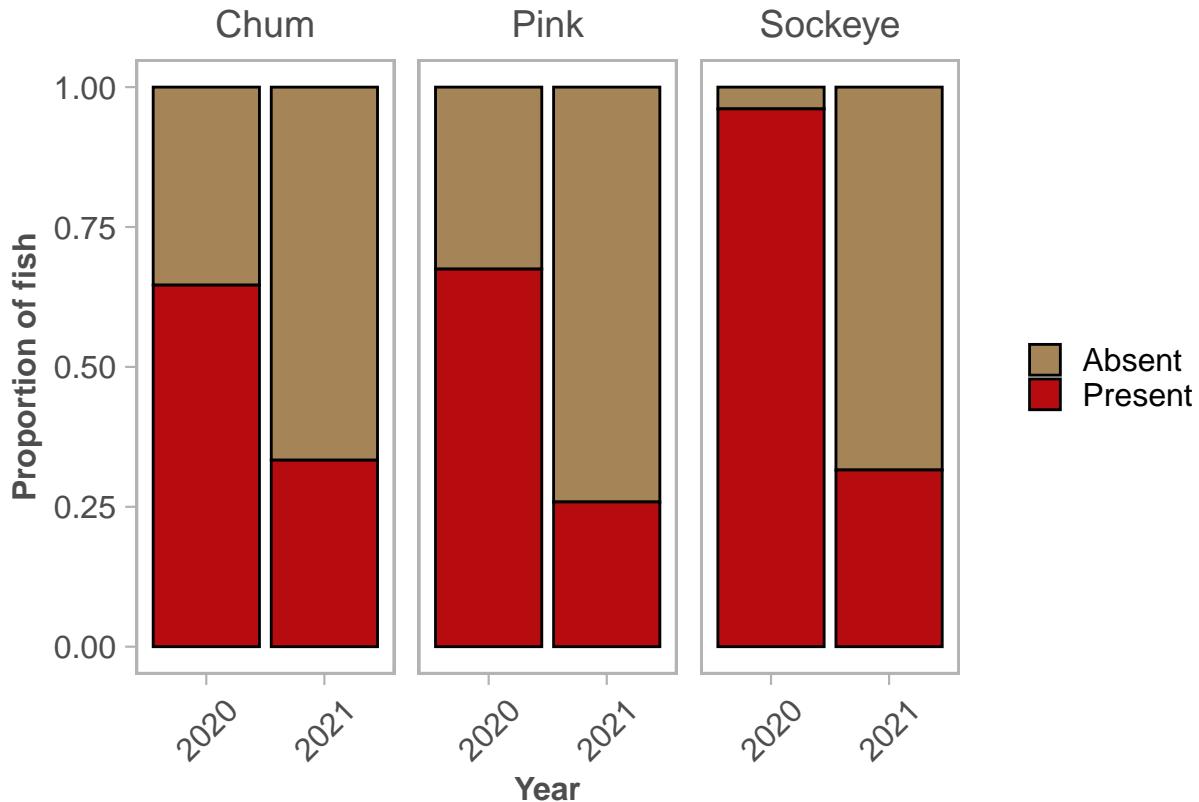


Figure 6: The proportion of juvenile chum, pink, and sockeye infected with at least one sea-louse of either *Lepeophtheirus salmonis* and *Caligus clemensi*, in the Discovery Islands in 2021.

Ocean Temperatures

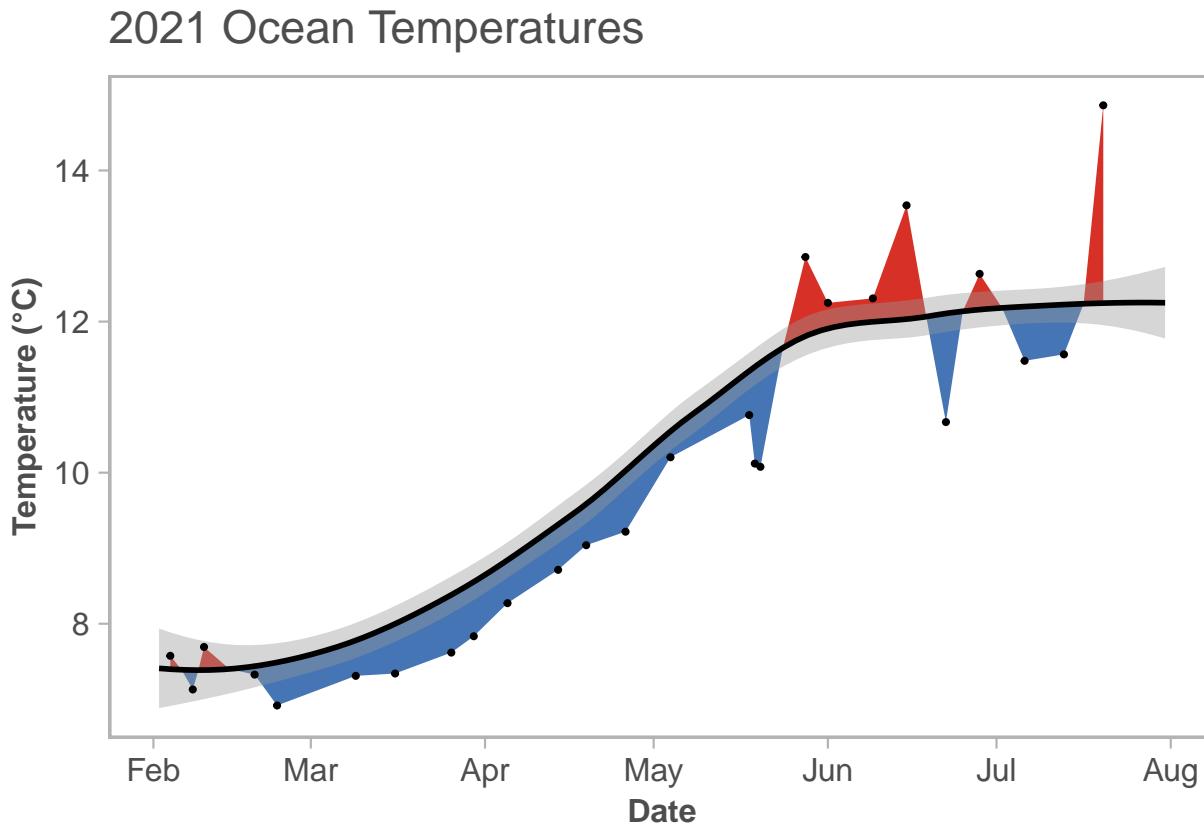


Figure 7: Ocean temperatures (top 30 m) at station QU39 in the northern Strait of Georgia between Quadra and Cortes Island. The solid black line is a LOESS regression based on temperatures from 2015-2020, representing the study period average. The shaded grey area is 1 SE of the LOESS regression. Blue areas represent temperatures from 2021 that are below average and red areas represent above-average temperatures.

Highlights

- Peak sockeye migration timing was up to two weeks later than in previous years
- Sockeye catch abundance was low compared to all other years
- Sea lice prevalence was lower on all species of salmon observed in this year compared to 2020

References

Hunt, B.P.V., B.T. Johnson, S.C. Godwin, M. Krkosek, E.A. Pakhomov, and L. Rogers. 2018. The Hakai Institute Juvenile Salmon Program: early life history of sockeye, pink and chum salmon in British Columbia, Canada. NPAFC Doc. 1788. 14 pp. Institute

References

for the Oceans and Fisheries and Department of Earth, Ocean and Atmospheric Sciences, University of British Columbia, Hakai Institute, Earth to Ocean Research Group, Simon Fraser University, Department of Ecology and Evolutionary Biology, University of Toronto, and Salmon Coast Field Station (Available at <http://www.npafc.org>).