Apr 26th, 1:30 PM - 3:00 PM

Forecasting central Salish Sea Dungeness crab populations: A study in patience

Sarah Grossman

Forecasting central Salish Sea Dungeness crab populations: A study in patience

Sarah K. Grossman, Claire E. Cook, Julie S. Barber - Swinomish Indian Tribal Community

Salish Sea Ecosystem Conference April 26, 2022

Dungeness crab in Puget Sound

Outdoors | Sports

Unlike elsewhere, crabbing prospects solid in the Puget Sound region

Originally published December 2, 2015 at 7:03 pm | *Updated December 2, 2015 at 7:13 pm*

While pretty much the entire coast of southern Oregon and northern California wallows in sorrow about Dungeness crab fishing closures, it is quite the opposite around Puget Sound where fishing remains excellent.

By Mark Yuasa

Seattle Times staff reporter

Share story

Puget Sound crabs are plentiful, delicious and easy to catch. Here's how.

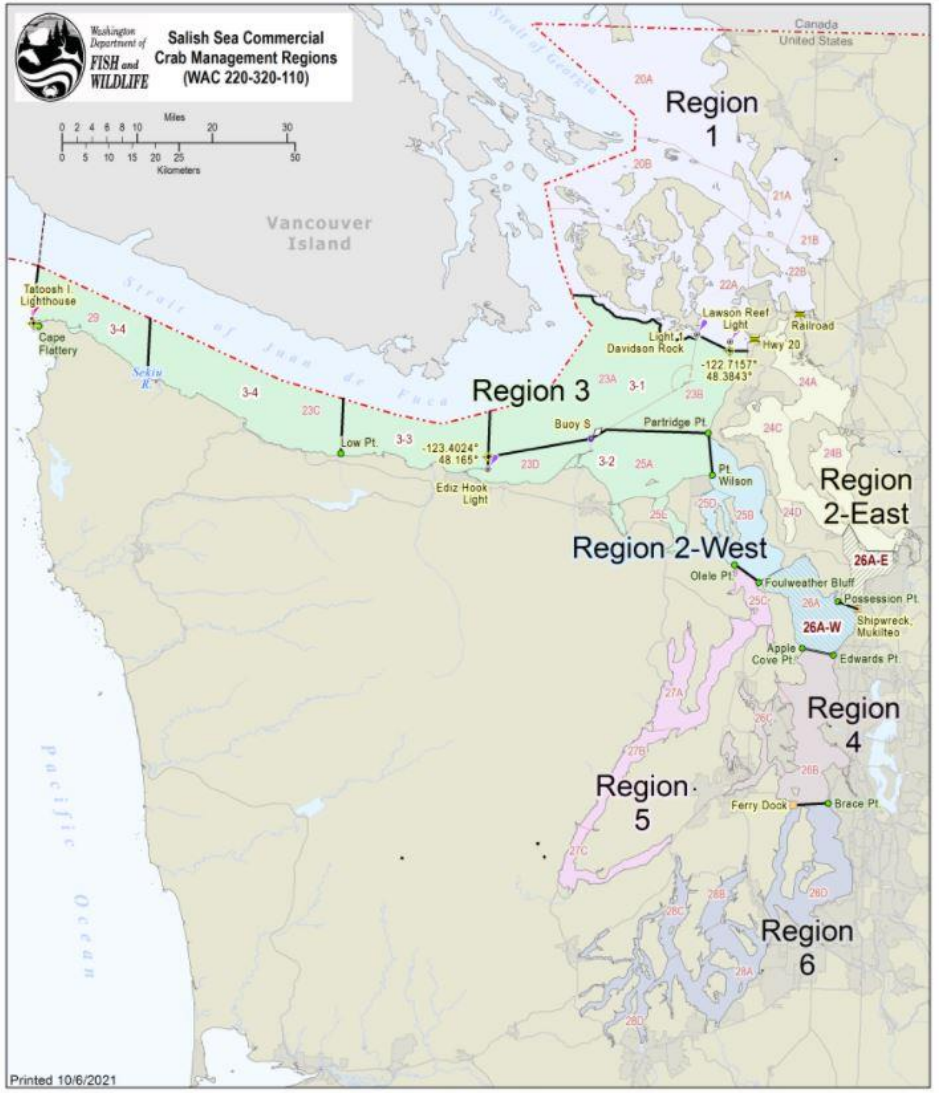
Originally published July 20, 2016 at 4:17 pm | *Updated July 25, 2016 at 1:06 pm*

1 of 2 | Nelson Nakata, of Seattle, inspects a crab. (Mark Yuasa/The Seattle Times)

It could be another record season for the Dungeness fishery in Western Washington waters.

By Mark Yuasa

Seattle Times staff reporter



Commercial Crab Management Regions and Areas. Crab Management Region 3-4 is new for the 2021-2022 season.

WDFW PS Crab Team

Dungeness crab in Puget Sound

Key Peninsula News
The Voice of the Key Peninsula

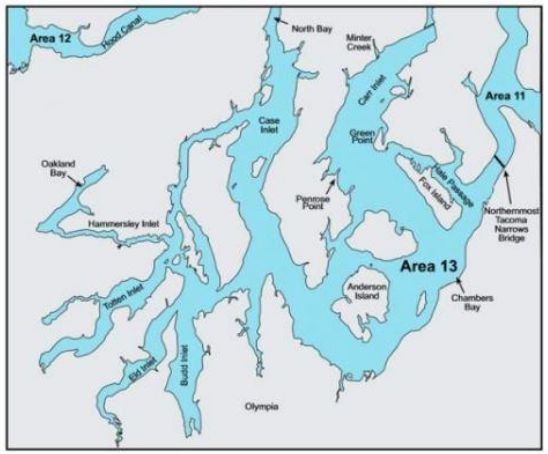
Crabbing Season Closed in South Sound

Posted Sunday, July 1, 2018 4:50 am

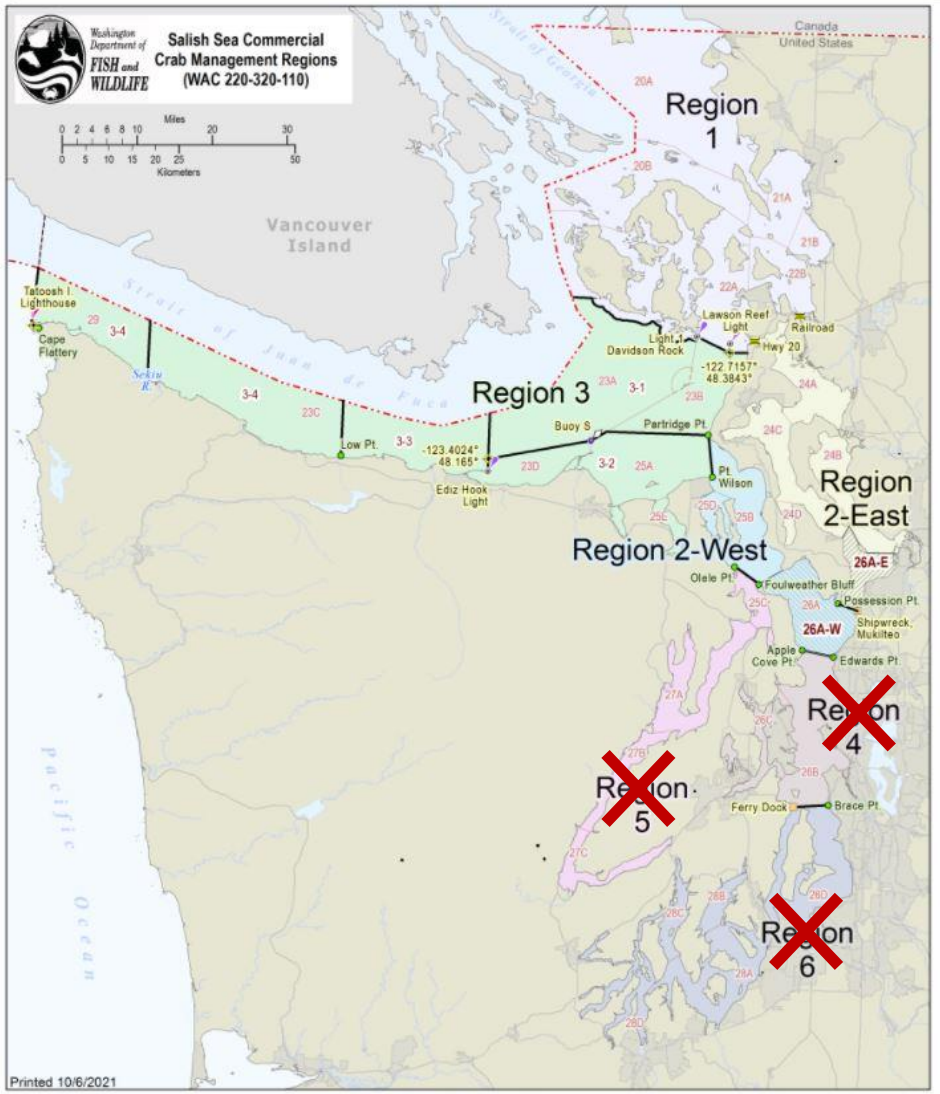
Sara Thompson, KP News

In May the Washington state Department of Fish and Wildlife announced that south Puget Sound is closed this season for all crab harvesting, including Dungeness and red rock crabs.

"A combination of trends in crab population over the last five years and some recent scientific papers and presentations about crab survival led to this decision," said Robert Sizemore, Puget Sound shellfish manager for the WDFW. "Harvest reports from south Puget Sound have been dismal."



Courtesy: Washington State Department of Fish and Wildlife

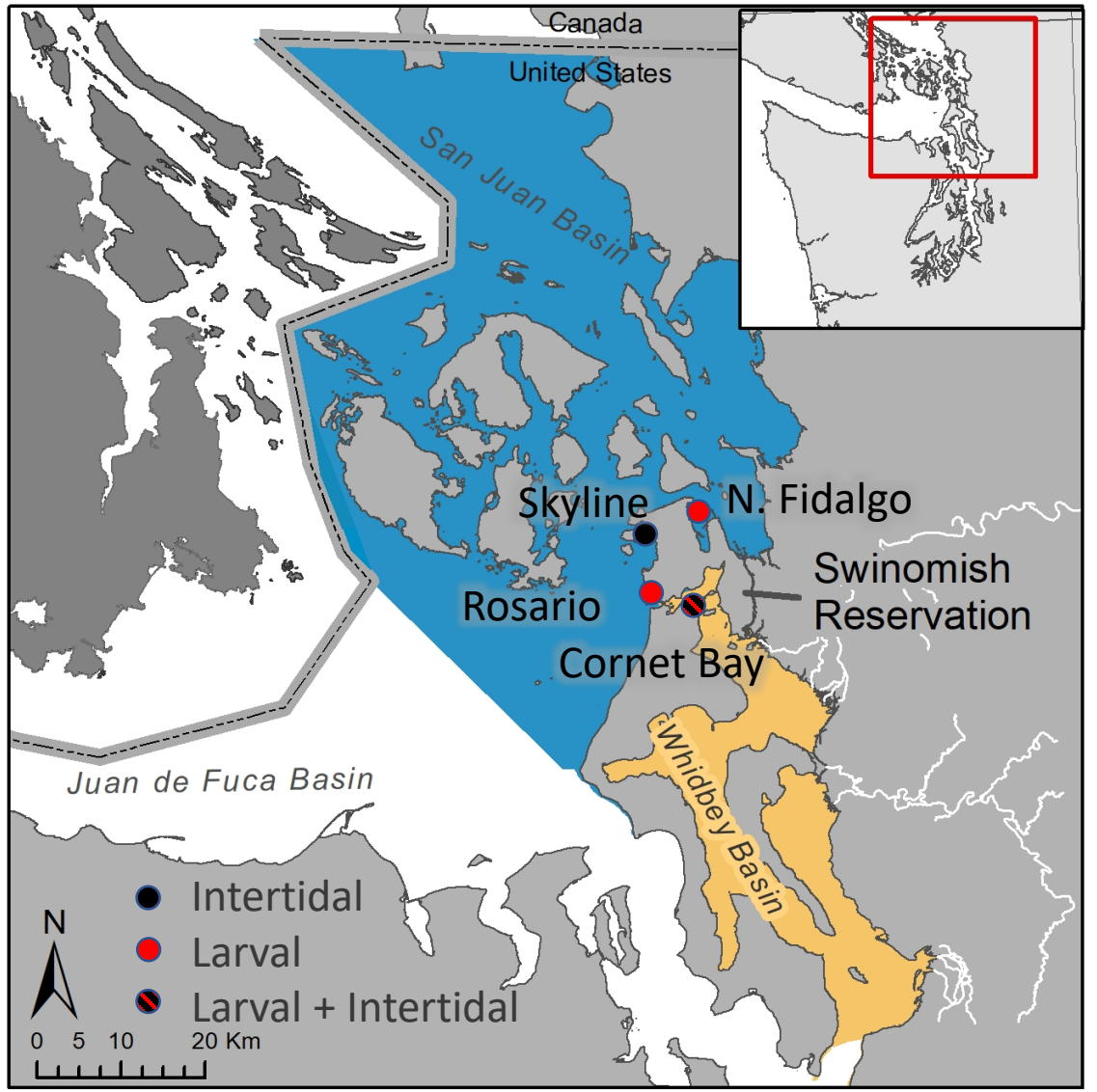


Commercial Crab Management Regions and Areas. Crab Management Region 3-4 is new for the 2021-2022 season.
WDFW PS Crab Team

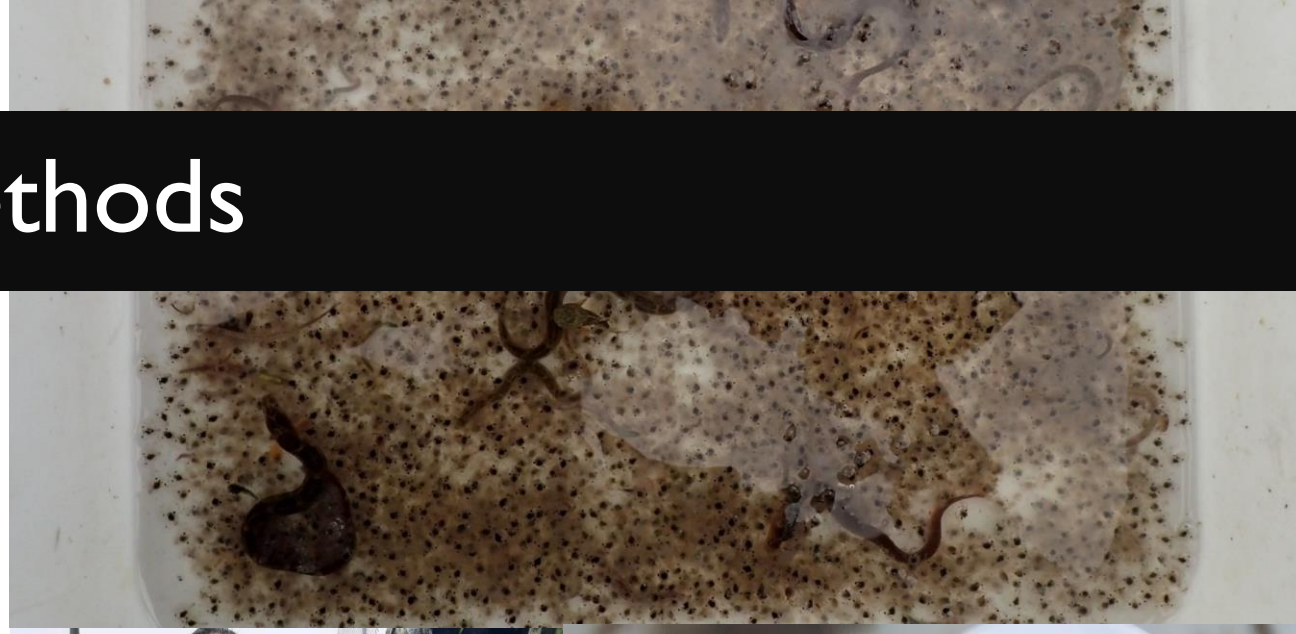
Factors influencing recruitment to the fishery

Long-term goal: Develop a model to better forecast Dungeness crab harvest in Swinomish management regions

Q: What effect does timing and initial size at settlement have on recruitment to the fishery



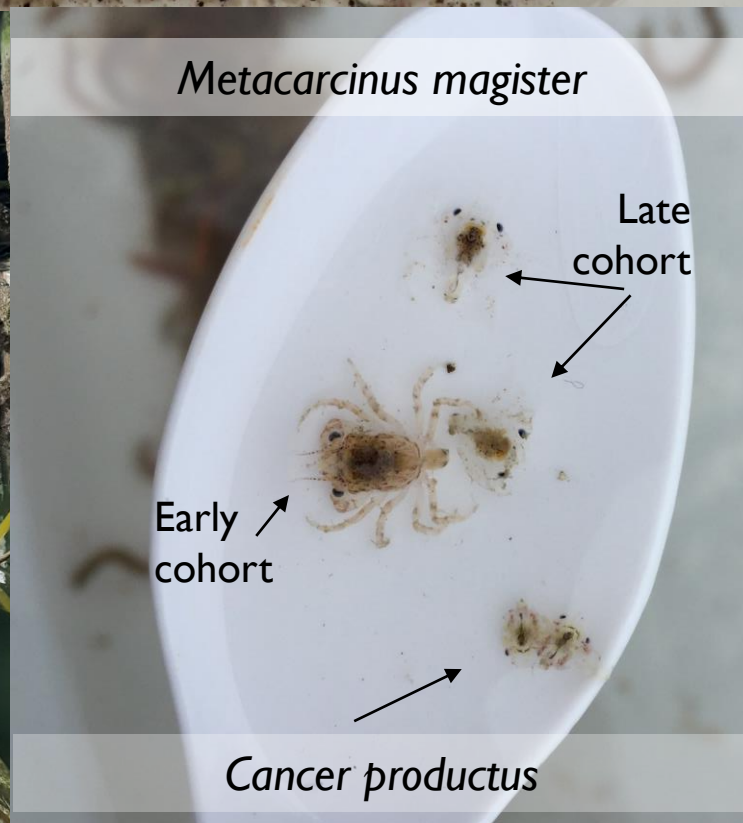
Larval Dungeness crab methods



Monitor daily abundance of megalopae (catch/hour) from April to ~September

Measure CW/CH/TH for up to 30 Dungeness crab megalopae per week

*Quantify other crab species



Megalopae = late-stage larvae;
CW = carapace width; CH = carapace height; TH = total height
Early cohort = ~April to mid-June;
Late cohort = mid-June to ~August

Juvenile intertidal methods

Survey beaches monthly

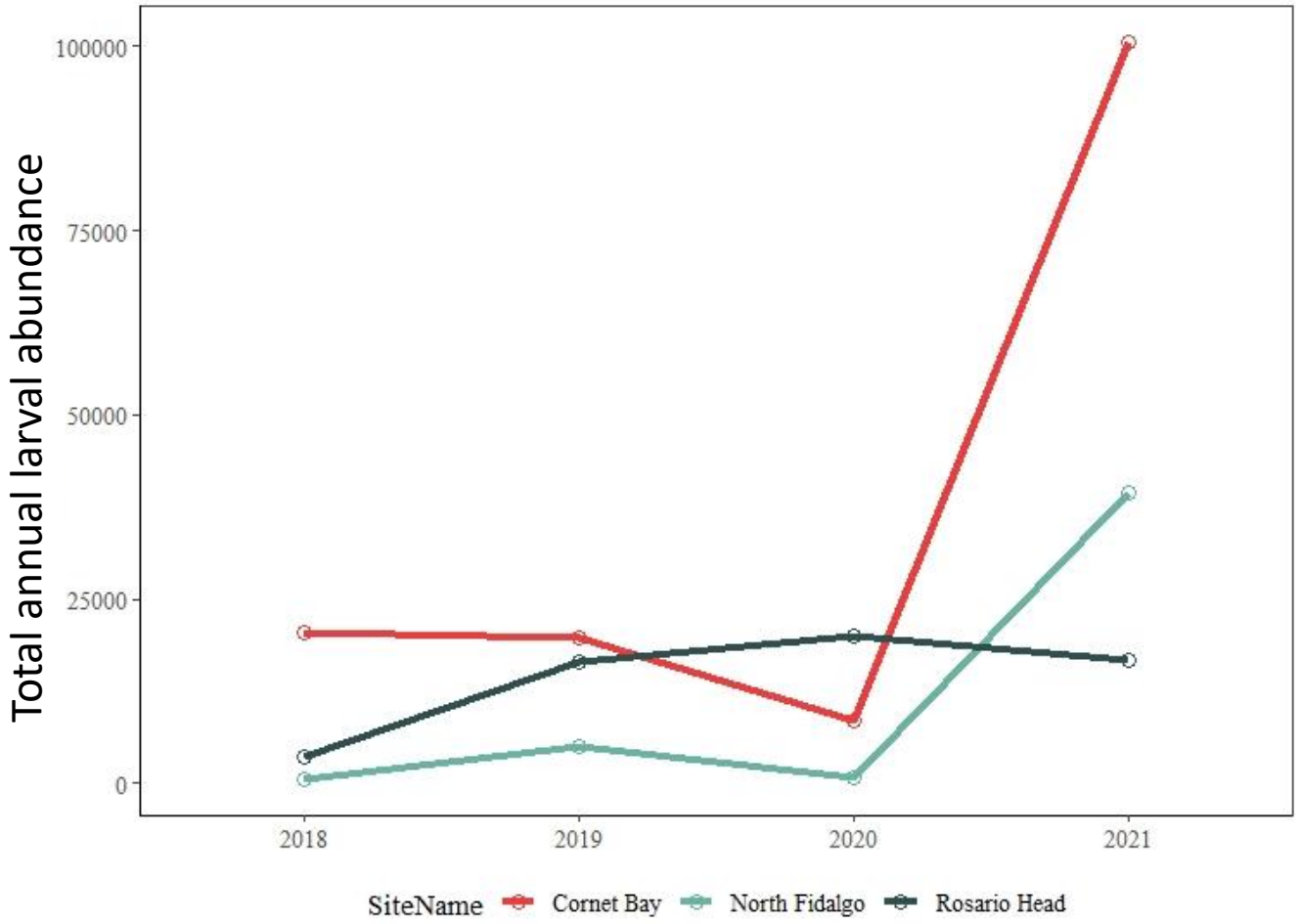
Measure CW/CH for crab >4 mm to ~40 mm[1]

Plus random molts and larger roaming crab

J1 = Juvenile instar stage 1; J2 = juvenile instar stage 2

[1] Juvenile Dungeness crab occupy intertidal habitats until ~40 mm CW.

Larval results: Annual variability 2018 to 2021

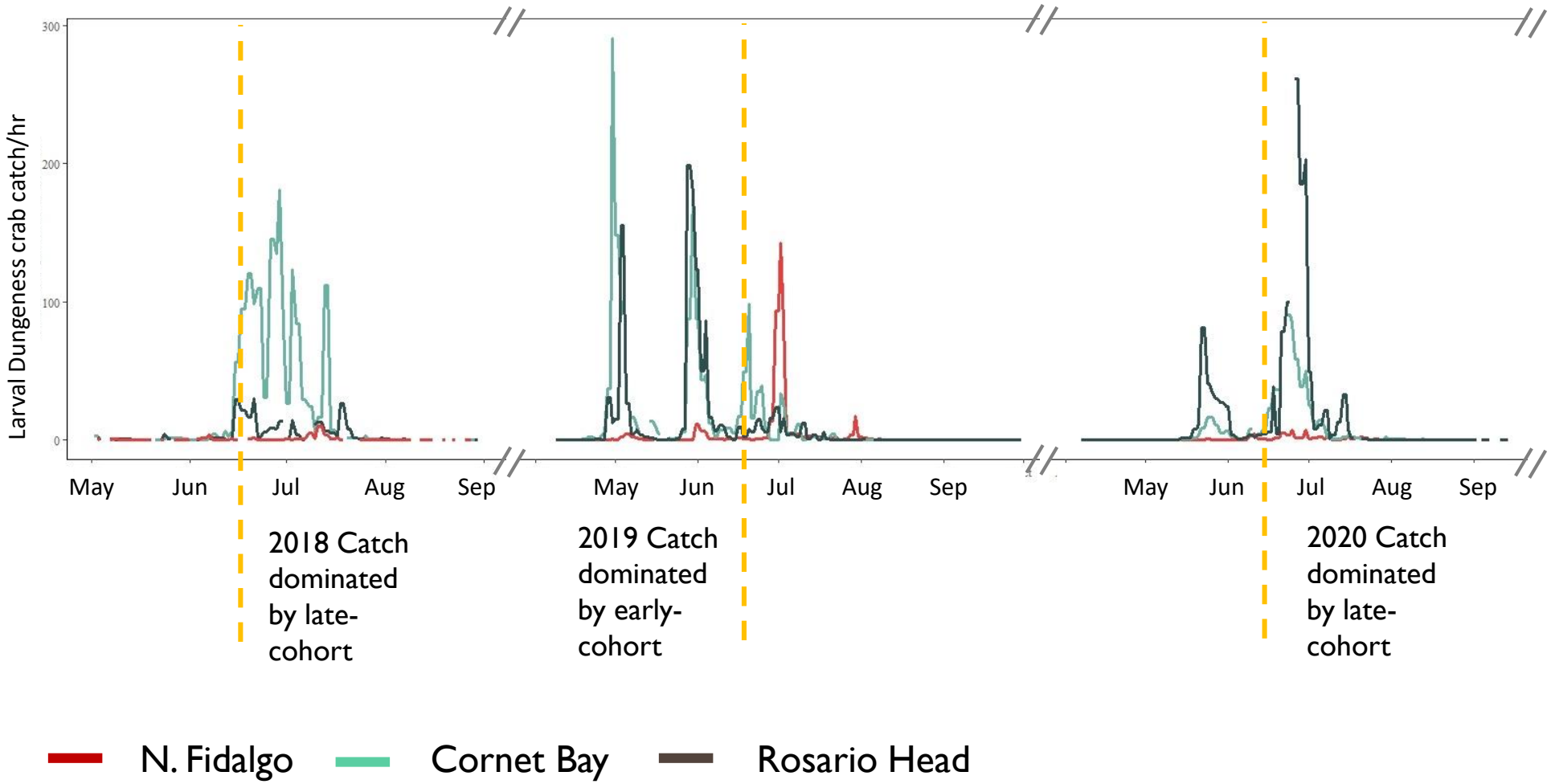


Larval abundances varied by up to 12x between years and sites

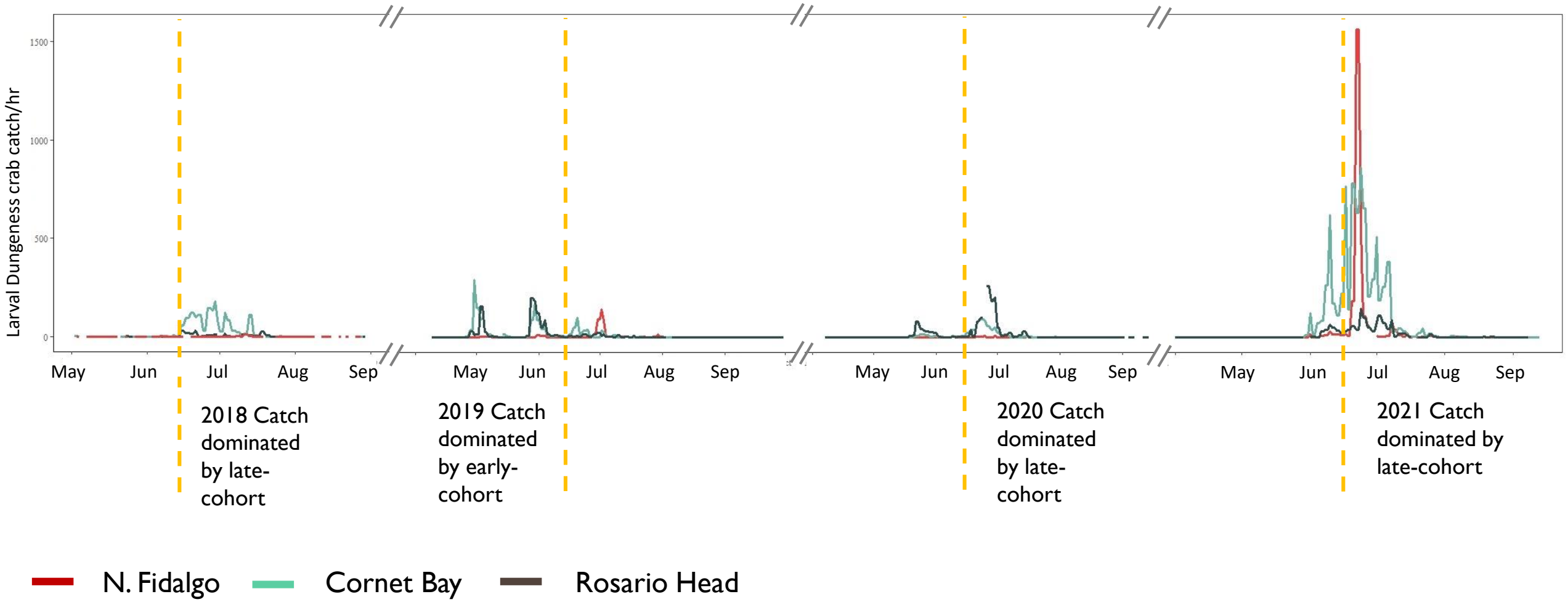
Region 2E

Recruitment Year	Megalopae Caught	Commercial Fishing Year	Commercial Landings, lbs
2018	20,592	2021/2022	1,954,000
2019	19,740	2022/2023	???
2020	8,427	2023/2024	
2021	100,480	2024/2025	

Larval results: Temporal variability 2018 to 2021



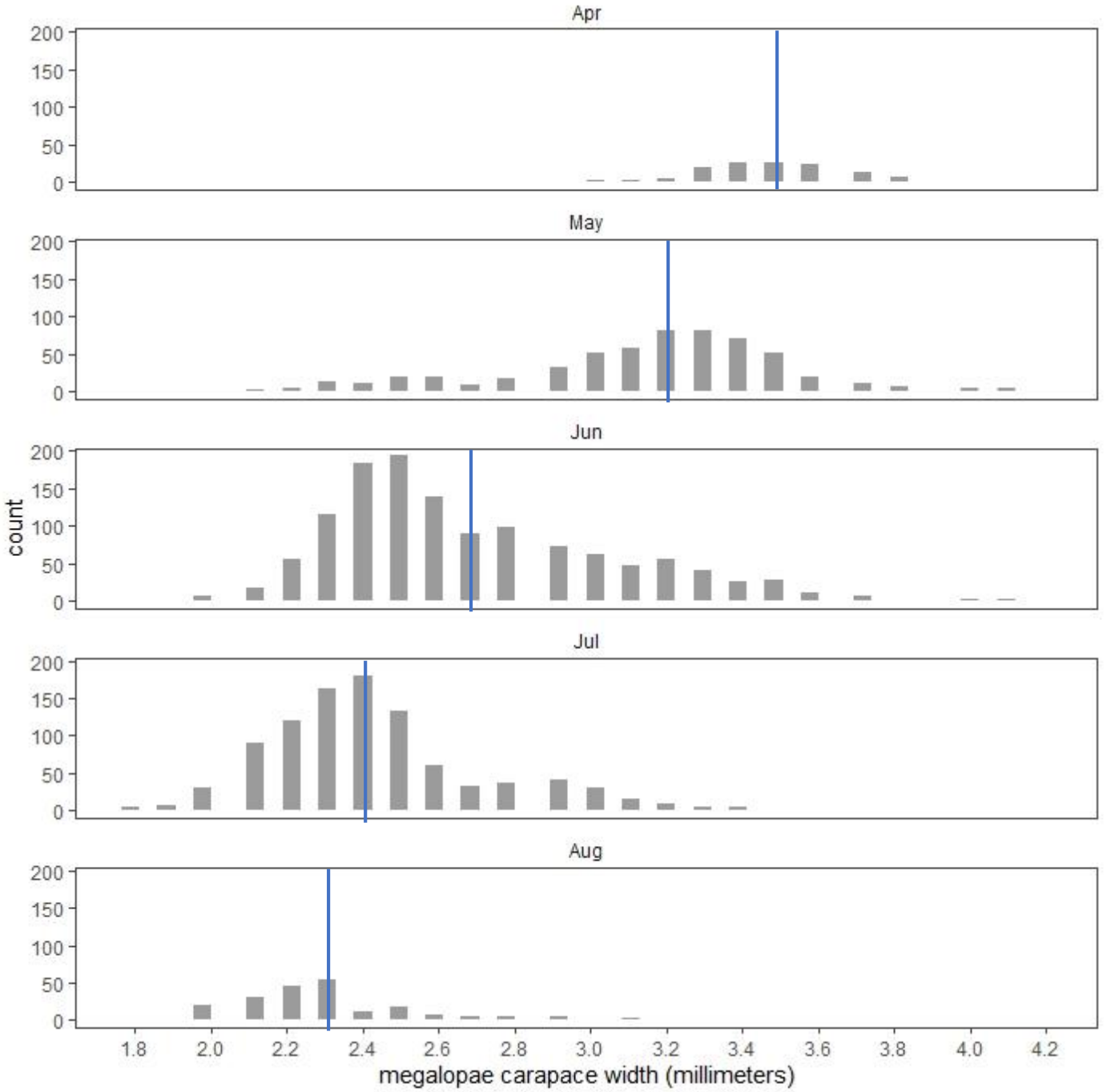
Larval results: Temporal variability 2018 to 2021

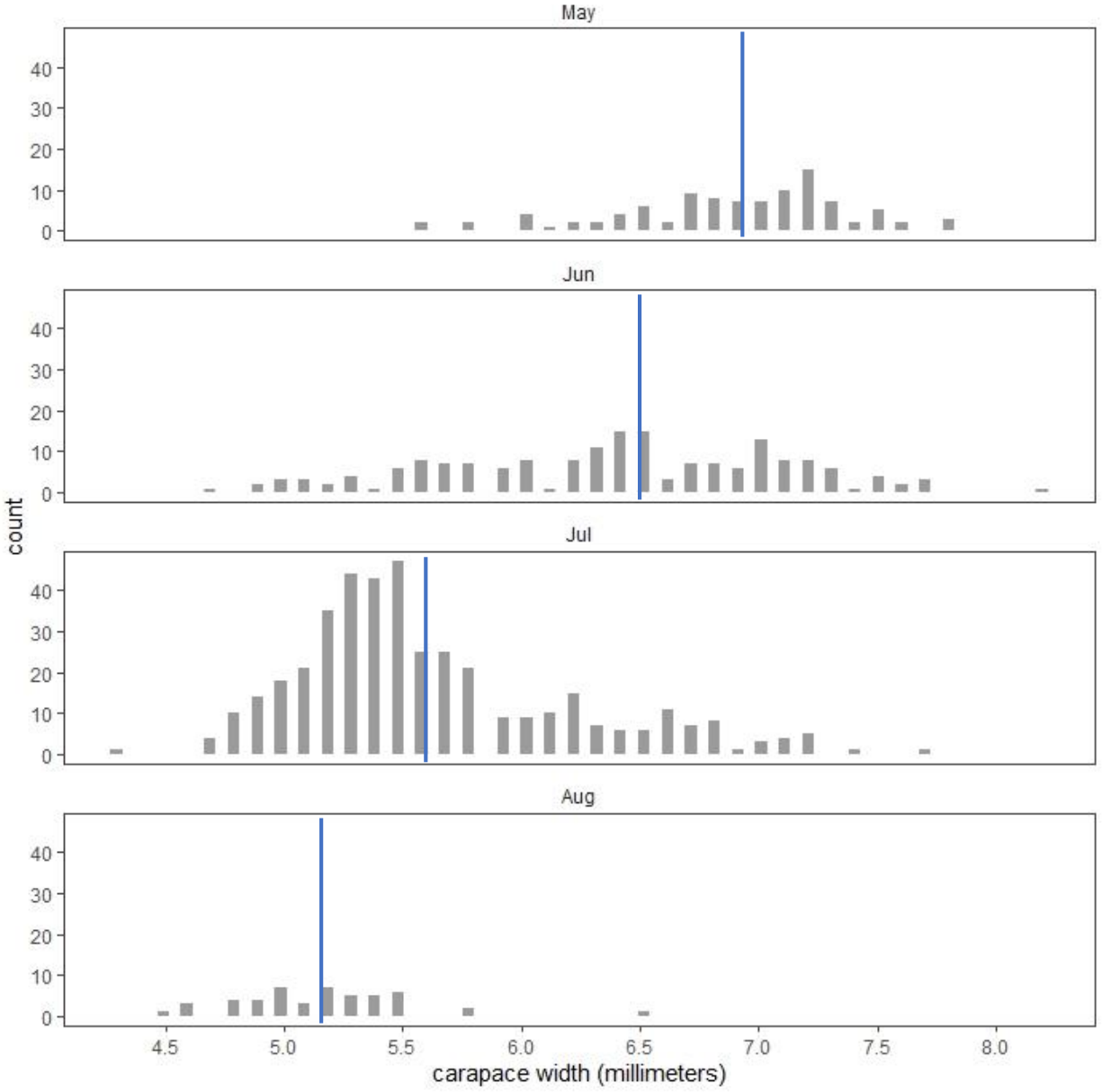


Megalopae sizes

Why is timing of delivery important?

1.2 mm decrease in mean monthly CW April to August





Intertidal J1 sizes

Size at settlement tracks with larval sizes, over time

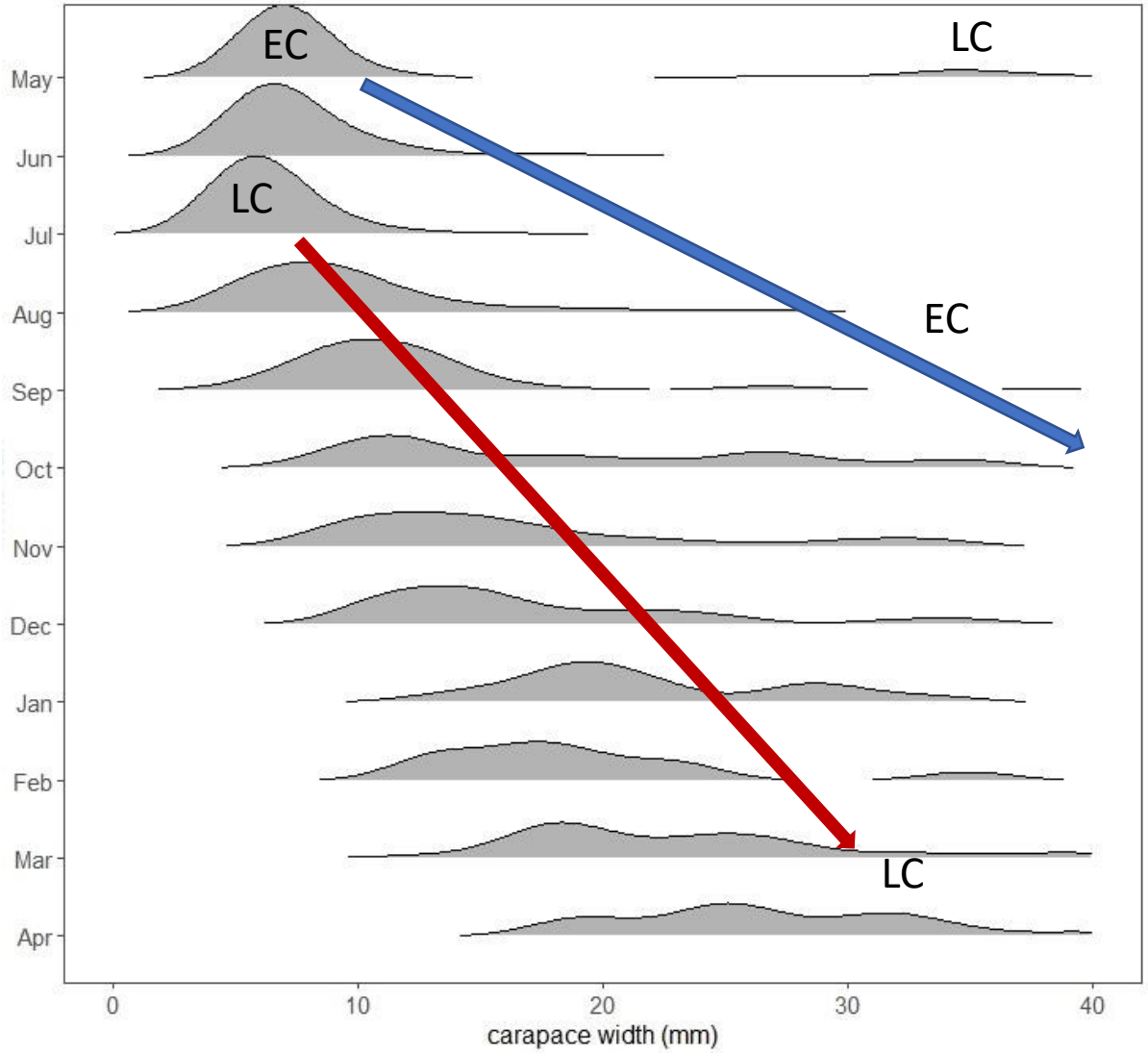
1.7 mm decrease in monthly mean CW, May to August

Intertidal juvenile growth: Early vs. late cohorts

EC instars that settle in May reach 40 mm by the fall of year 1

LC instars overwinter in the intertidal, reach 40 mm in spring of year 2

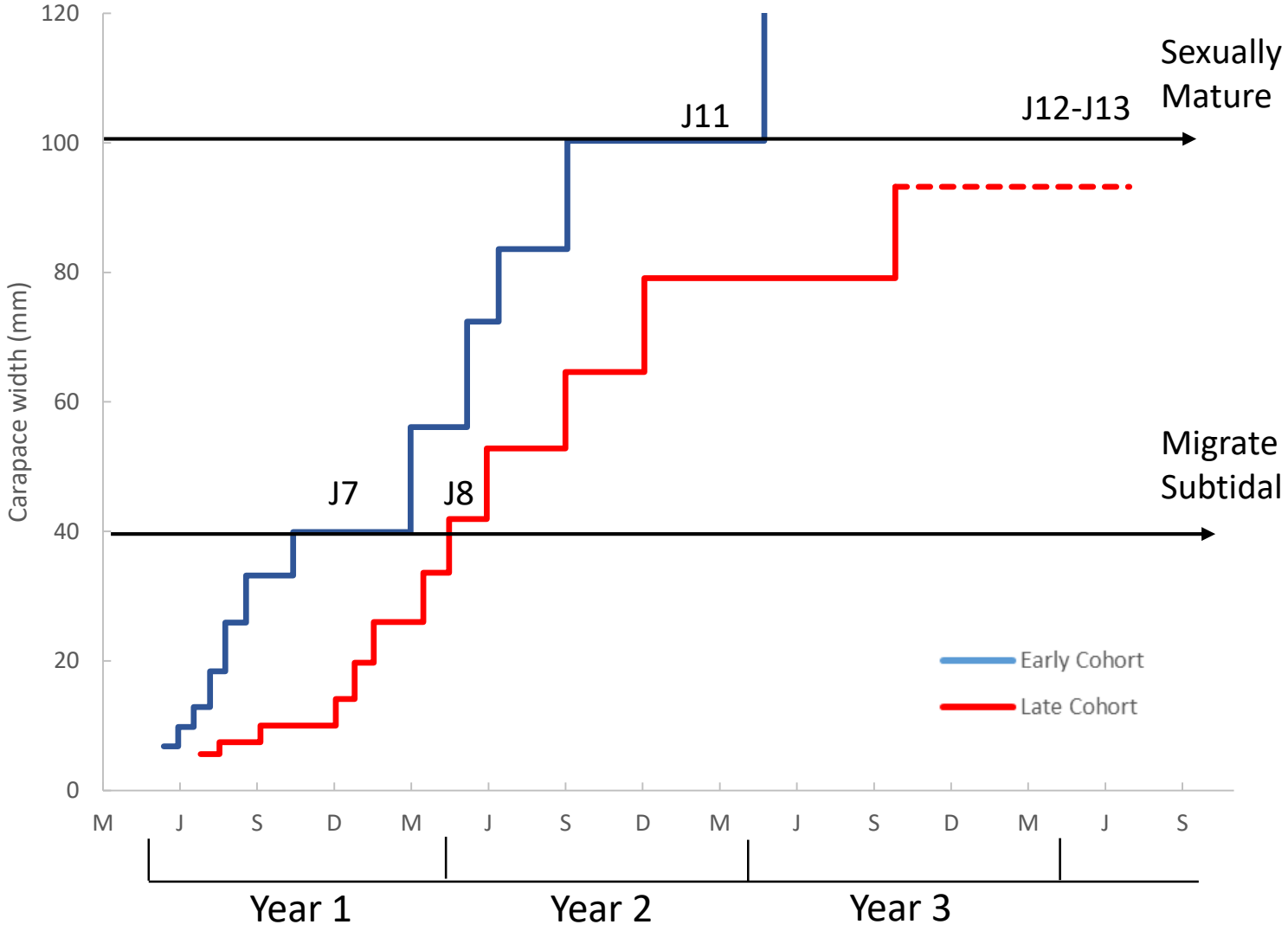
All instars of the previous settlement year emigrate from the intertidal by May/June



Juvenile growth: continued

EC settlers reach sexual maturity by year 2: ~ 1 to 2 years earlier than LC settlers

LC molt 1-2 times more than EC before sexual maturity

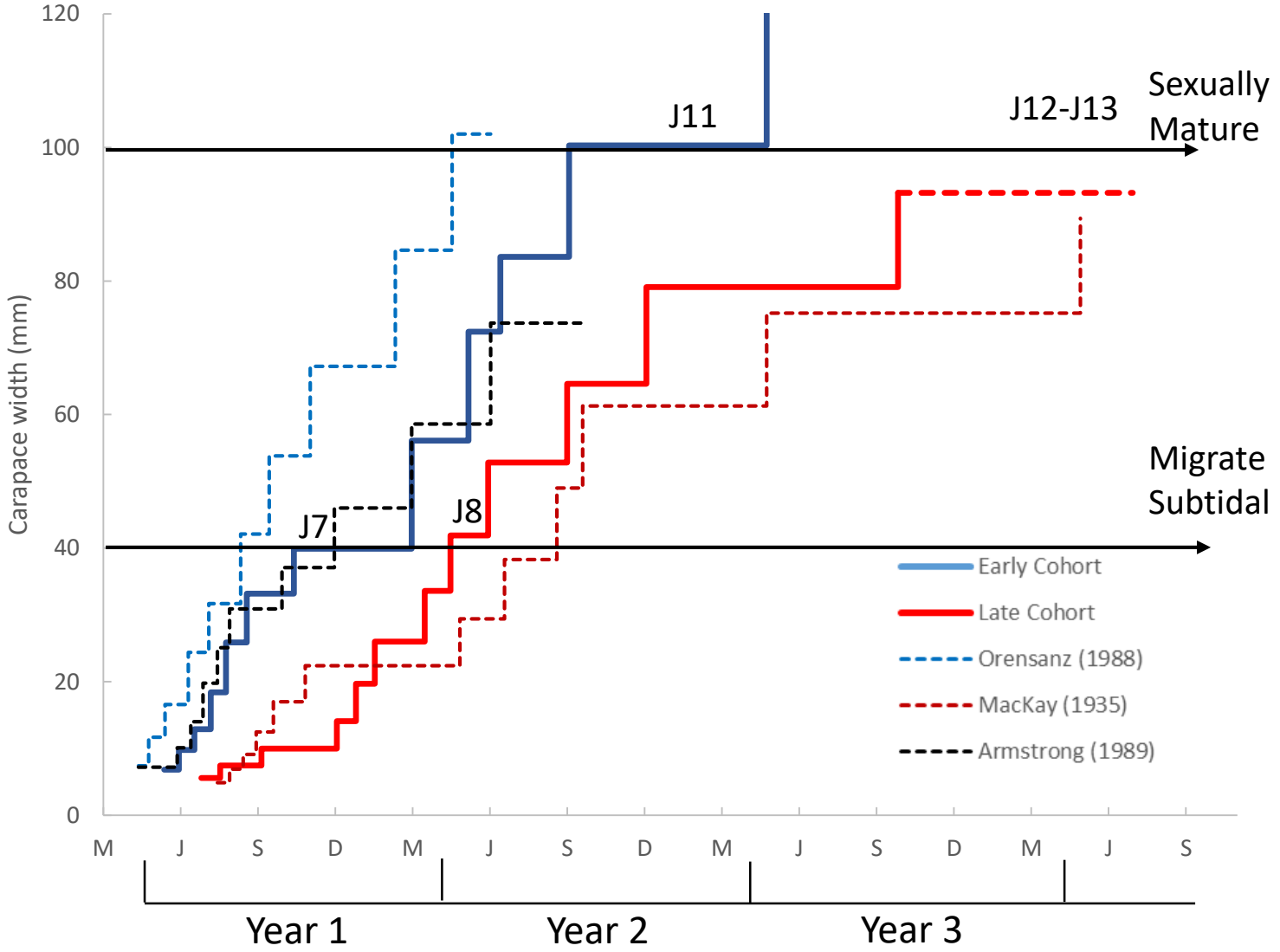


Summary

What effect does timing and initial size at settlement have on recruitment to the fishery?

EC settlers grow to harvest limit in ~3.5-4.5 years vs. LC in ~5-6 years

To date, majority of larvae delivered to central Salish Sea are LC



Orensanz and Gallucci (1988): San Juan Island, WA; MacKay and Weymouth (1935): Boundary Bay, B.C.; Armstrong et al. (1989): Grays Harbor, WA

This work would not be possible without support from

Swinomish Senate and Fish and Game Committee, Tandy Wilbur, and all of the Fisheries Shellfish Team

Pacific Northwest Crab Research Group, Deception Pass State Park, Port of Anacortes, and our wonderful volunteers from the Salish Sea Stewards and the Sound Water Stewards

In memory of Lorraine Loomis, who encouraged and enthusiastically supported our research

Swinomish Indian Tribal Community

U.S. Environmental Protection Agency #PA-01J27601, Bureau of Indian Affairs #A19AP00216 , U.S. Fish and Wildlife Service #F18AP00618