Western Washington University
Western CEDAR

Salish Sea Ecosystem Conference

2022 Salish Sea Ecosystem Conference (Online)

Apr 26th, 4:30 PM - 5:00 PM

European green crab (Carcinus maenas) predation in Puget Sound estuaries

Mary Fisher
University of Washington

Follow this and additional works at: https://cedar.wwu.edu/ssec

Fisher, Mary, "European green crab (Carcinus maenas) predation in Puget Sound estuaries" (2022). *Salish Sea Ecosystem Conference*. 280.
https://cedar.wwu.edu/ssec/2022ssec/allsessions/280

This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.

What are the trophic impacts of European green crab in the Salish Sea?

Mary C. Fisher[1], Emily W. Grason[2], Kirstin K. Holsman[3], Ryan P. Kelly[1], Phillip S. Levin[1,4], P. Sean McDonald[1]

1. University of Washington. 2. Washington Sea Grant. 3. Northwest Fisheries Science Center. 4. The Nature Conservancy.

P. Sean McDonald

The invasive European green crab was first detected in the Salish Sea in 2012 (Sooke Basin, BC; Curtis et al. 2015) and in the Puget Sound in 2016 (Behrens Yamada et al. 2017, Grason et al. 2018).

Once fully established, this species has the potential to significantly alter ecosystems and food webs by:

- Damaging eelgrass beds
- Depleting local shellfish populations
- Competing with native crab species

It is difficult to conduct early quantitative assessments of trophic impacts in newly invaded ecosystems like the Salish Sea. However, **by combining DNA metabarcoding and bioenergetic modeling, we can evaluate the impact of European green crab predation in the Salish Sea.**

Sample Collection. "Early arrivals" were drawn from the Washington Sea Grant Crab Team's specimen collection (Fig. 1).

	Sampling Site	Years Collected	N
DS	Dungeness Spit	2018, 2019	13
DH	Drayton Harbor	2020	17

Crab were dissected to remove stomach contents, and to evaluate stomach fullness on a semi-quantitative scale.

Prey Identification. DNA was extracted from stomach contents, to conduct DNA sequencing of the COI gene region. The COI gene region is used as a "barcode" for prey identification.

Site Suitability. With prey identity and stomach fullness information as inputs, we will use a bioenergetic model (Fig. 2; adjusted from McDonald et al. 2006) to estimate site-specific green crab growth rates. A higher growth rate indicates that a site may be at higher risk for green crab population establishment.

Trophic Impact. Using consumption information from the bioenergetic model (Fig. 2), and abundance estimates from Crab Team trapping data, we will quantify the current and potential impact of green crab predation on local prey populations for each site.

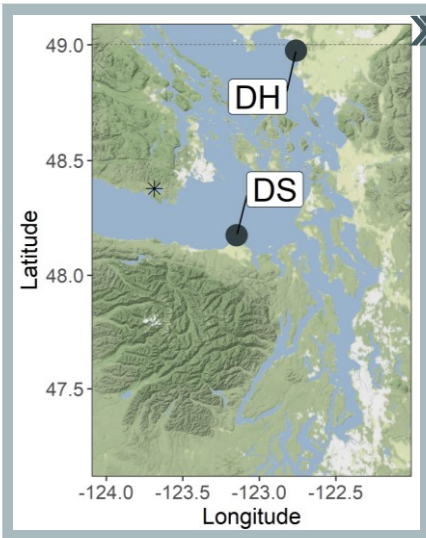

Figure 1. Map of the Puget Sound with the two sampling sites for this study, Drayton Harbor (DH) and Dungeness Spit (DS). Sooke Basin, BC is marked (∗) for reference.

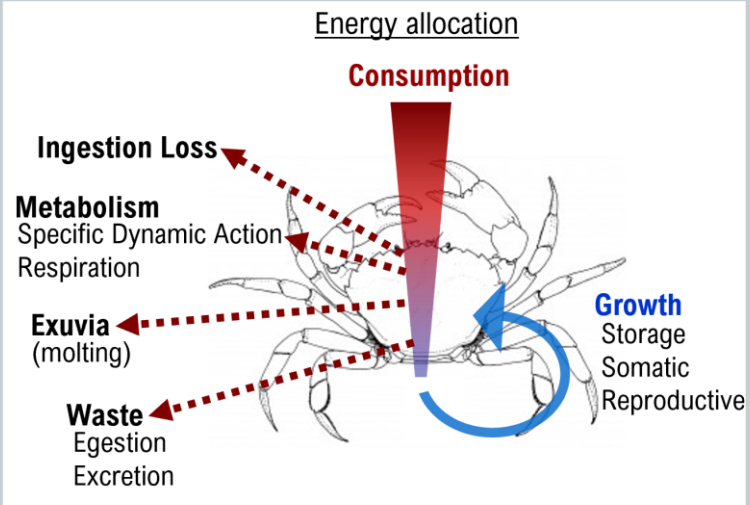

Figure 2. Schematic of energy allocation in the European green crab bioenergetic model. Energy is taken in through consumption and allocated to the remaining processes.

Acknowledgements: Research and student funding provided by the Hall Conservation Genetics Research Fund and the NSF Graduate Research Fellowship Program. Specimens were collected by the US Fish and Wildlife Service and NW Straits Commission, in partnership with WA Sea Grant.

Sources: Curtis et al. (2015) DFO Science Advisory Report 2015/016. 74 p. | Behrens Yamada et al. (2017) Journal of Shellfish Research 36:201-208. | Grason et al. (2018) Management of Biological Invasions 9:39-47. | McDonald et al. (2006) Estuaries and Coasts 29:1132-1149.