

ISLAND COUNTY'S BULL KELP PROJECT:

Year 5 Update

Linda Rhodes
Island County Marine Resources Committee



MRC meeting
1 October 2019

ACKNOWLEDGMENTS!

VOLUNTEERS

2015

Vernon Brisley
Lenny Corin
Leal Dickson
Linda Kast
Don Meehan
Debra Paros

2016

Barbara Bennett
Vernon Brisley
Barbara Brock
Paulette Brunner
Debra Paros
Gregg Ridder

2017

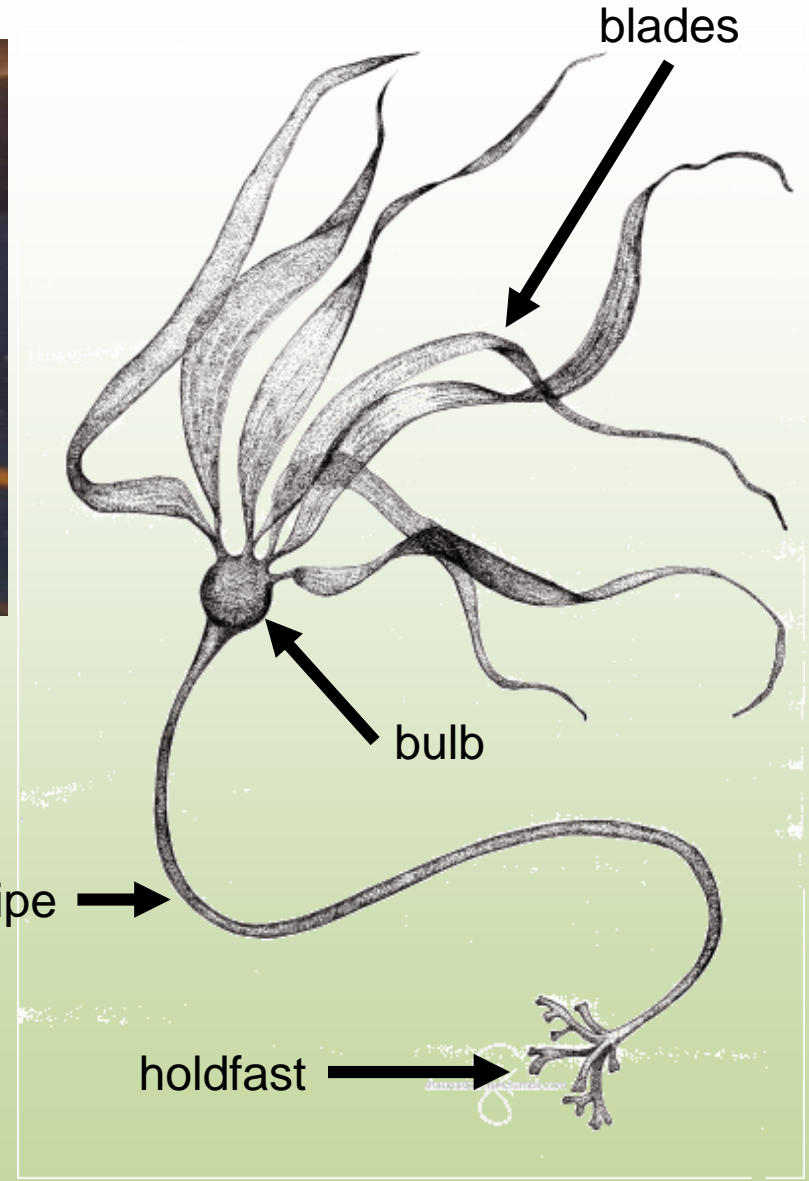
Vernon Brisley
Barbara Brock
Paulette Brunner
Debra Paros
Gregg Ridder

2018

Ron Beier
Barbara Bennett
Vernon Brisley
Debra Paros
Gregg Ridder
Tim Verschuyt

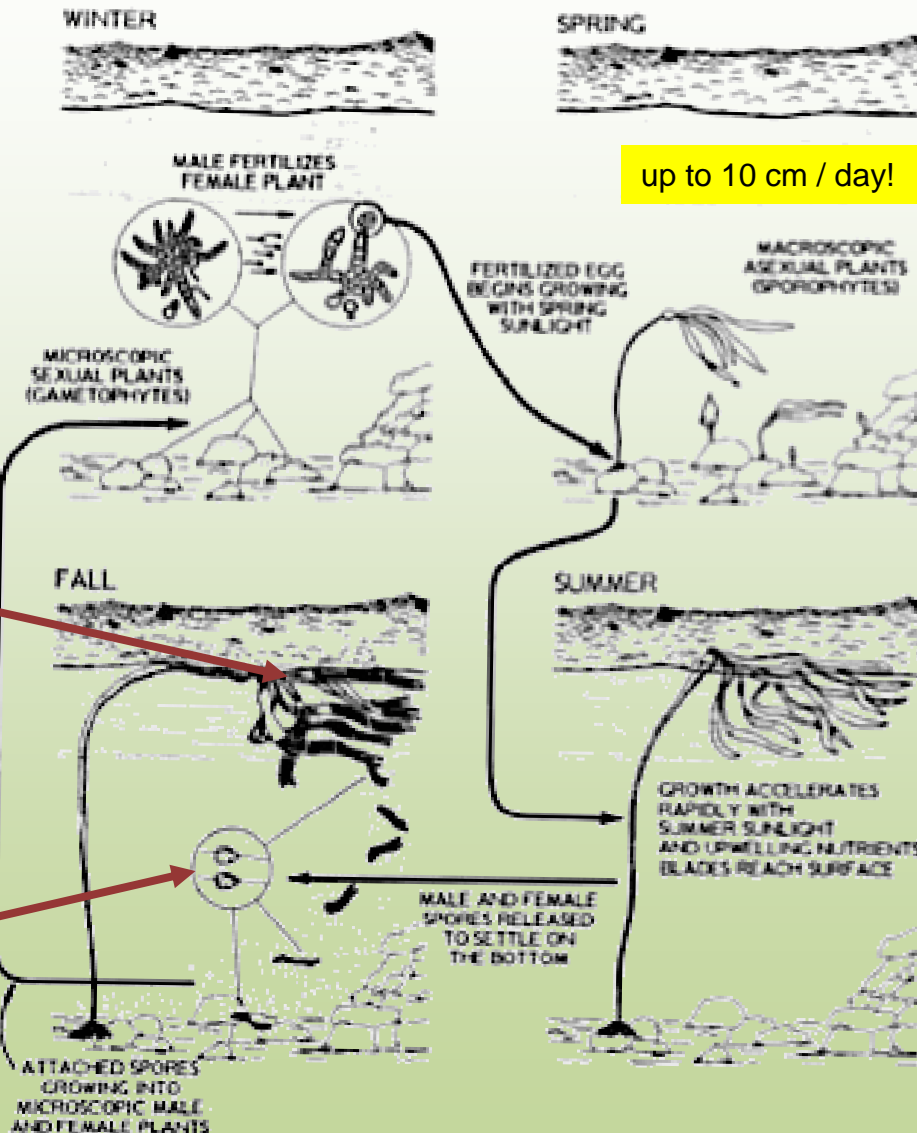
2019

Ron Beier
Barbara Bennett
Vernon Brisley
David Davis
Barbara Hardman
Gregg Ridder



LIFE CYCLE

- Microscopic sexual phase



- Annual life cycle
- Can persist for a 2nd year
- Macroscopic asexual phase

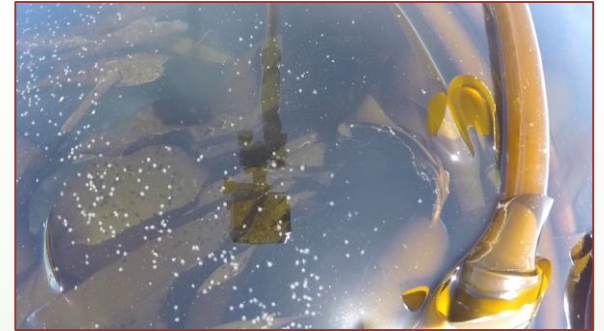
Sorus on blade

Zoospores released from sorus

Our surveys



WHY BULL KELP?



STRUCTURAL HABITAT

- Shelter for invertebrates, juvenile fish, adult fish
- Critical Habitat under the GMA & Shoreline Master Programs

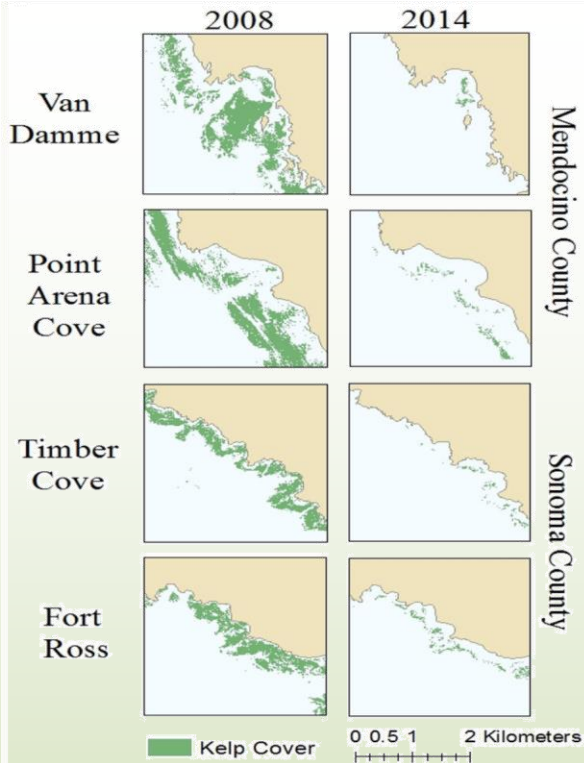
FOOD WEB

- Grazing by invertebrates
- Biomass export to other habitats

WATER QUALITY

- uptake of inorganic nutrients
- uptake of CO_2 & production of O_2

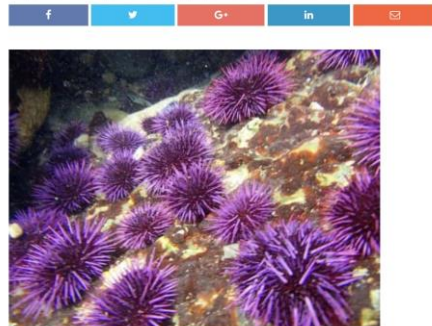
CALIFORNIA



Warm ocean temperatures, a sea star disease outbreak, and a boom in urchin populations decimated bull kelp forests along the California coast between 2008 and 2014. CA

US Commerce Department Declares Federal Fishery Disaster

SEPTEMBER 27, 2019 LOCAL NEWS, TOP STORIES



The US Commerce Department has declared the northern red sea urchin seasons of 2016 and 2017 as federal fishery disasters. This opens the door for the few divers and fish processors in the North Coast who are still in the industry to apply for financial aid. It may also allow for money to restore balance to an ecosystem in chaos. Sea-star wasting disease meant there were no predators to curtail the invasive purple urchins, who decimated the bull kelp forests along the North Coast. This situation has also severely impacted abalone fishing.

2011: Harmful algal bloom (*Gonyaulax spinifera*)



↓ invertebrates
(sea stars, abalone, urchins)

2013-14: Sea star wasting disease



↓ sea stars

2014-15: "The Blob"; 2015: strong El Nino



↑ sea surface temperatures

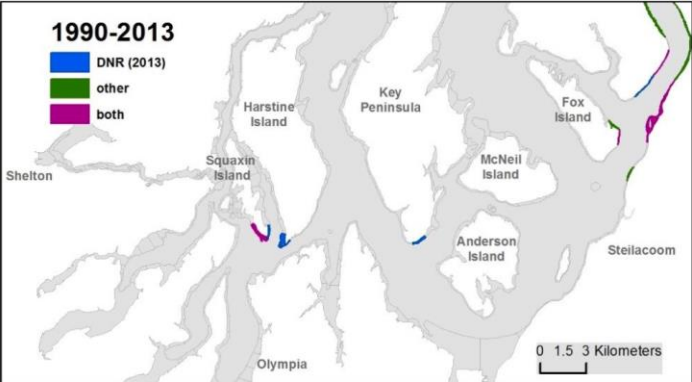
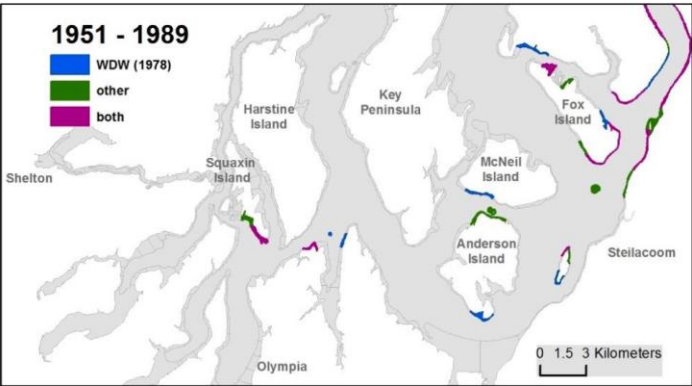
2016 - 17: Purple urchin overpopulation



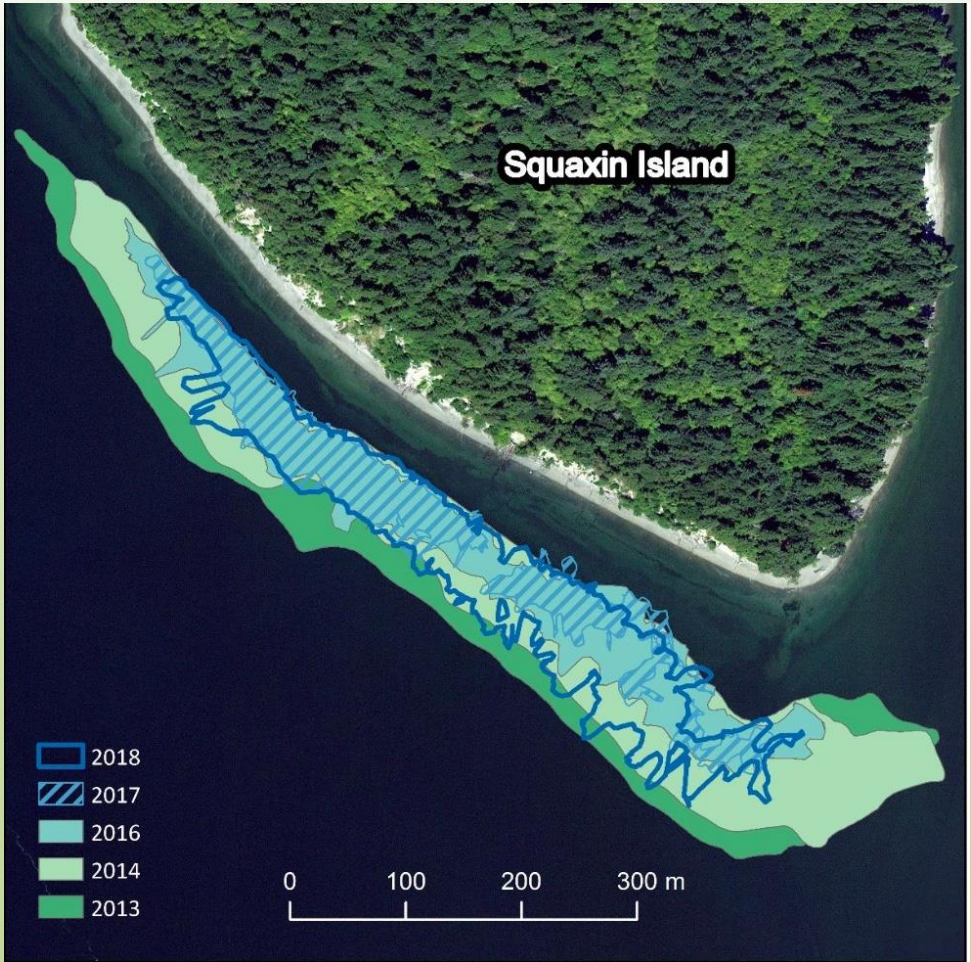
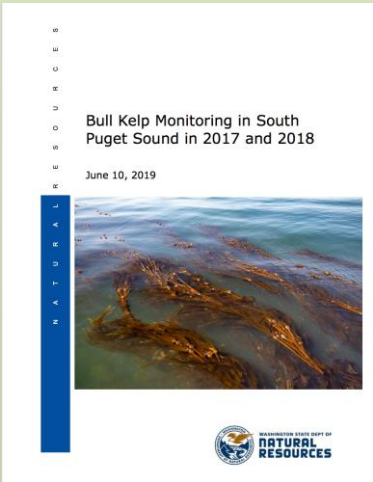
Bull kelp bed decimation

WASHINGTON

68% loss of area from 2013 to 2018



Berry, 2017



FACTORS AFFECTING DISTRIBUTION

Light

photoperiod x intensity

Temperature

3 – 17°C

Nutrients

NO_3 , NH_4 , PO_4

Wave action

dissolved gases, disruption

Disease

Streblonema, parasitic alga

Competition

algae, epiphytes

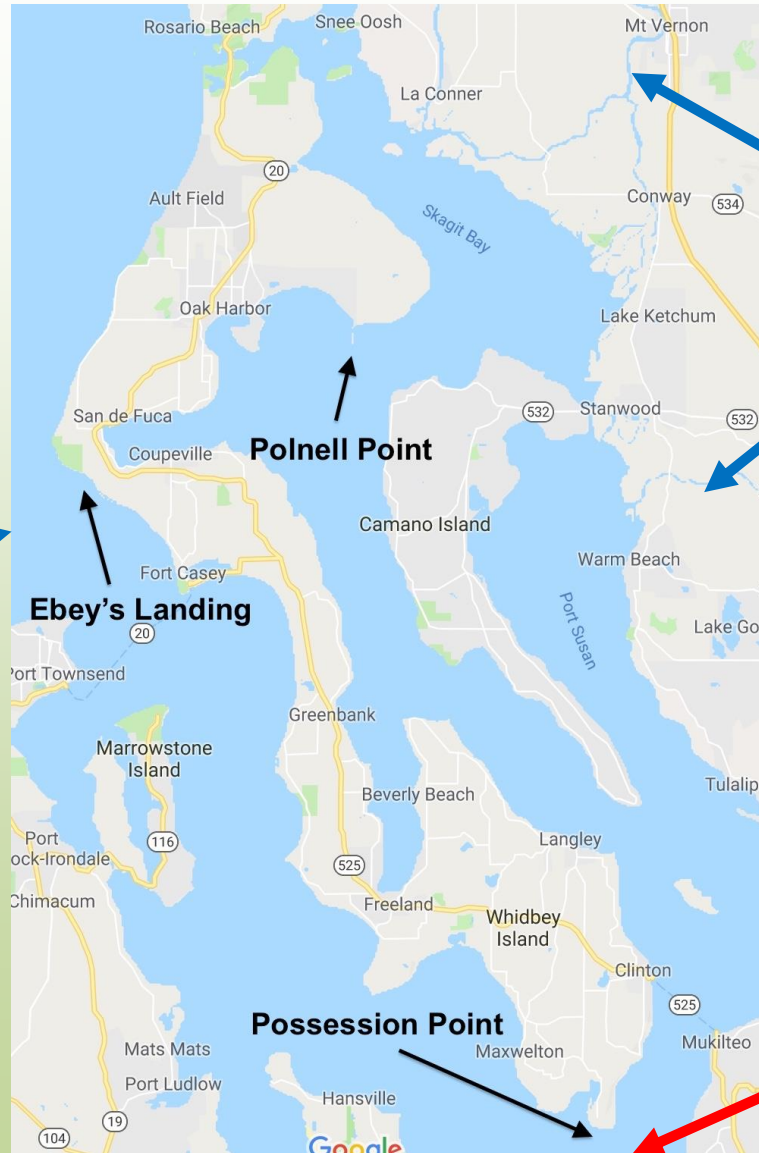
Herbivores

urchins, mollusks, crustaceans



2019 MRC Boat-based Survey

Marine influence

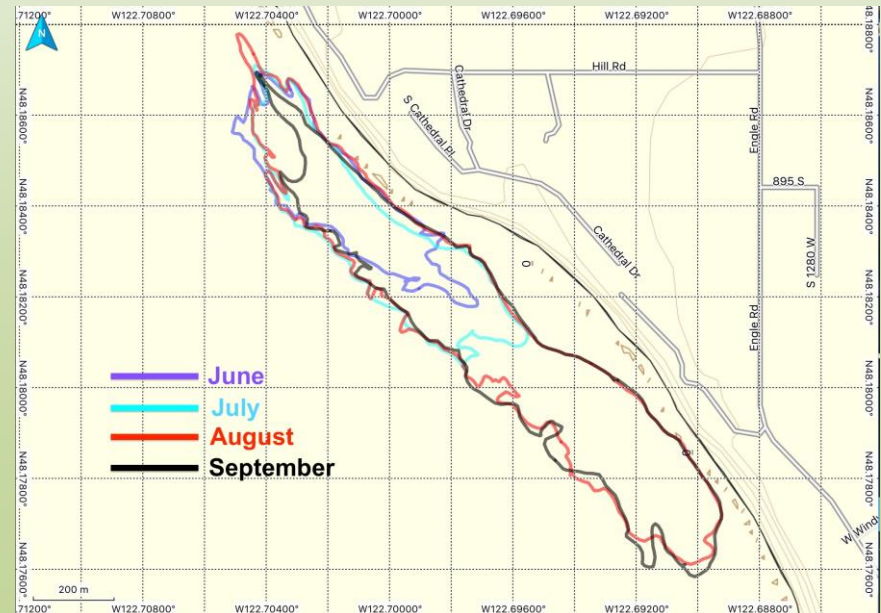
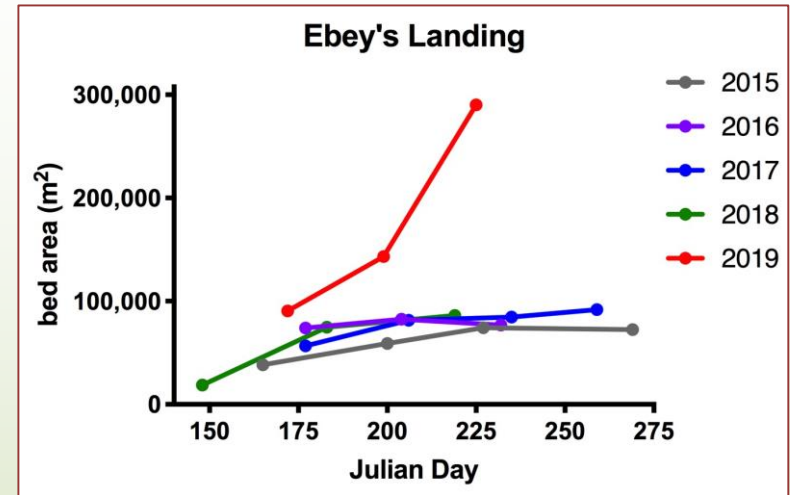
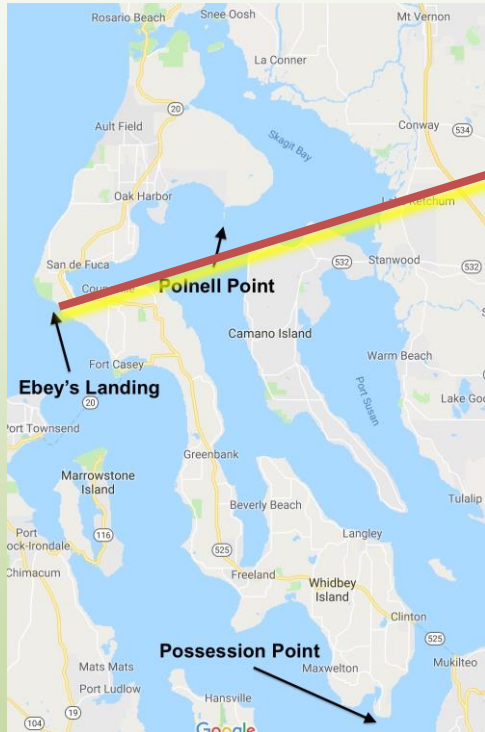


River influence

Human influence

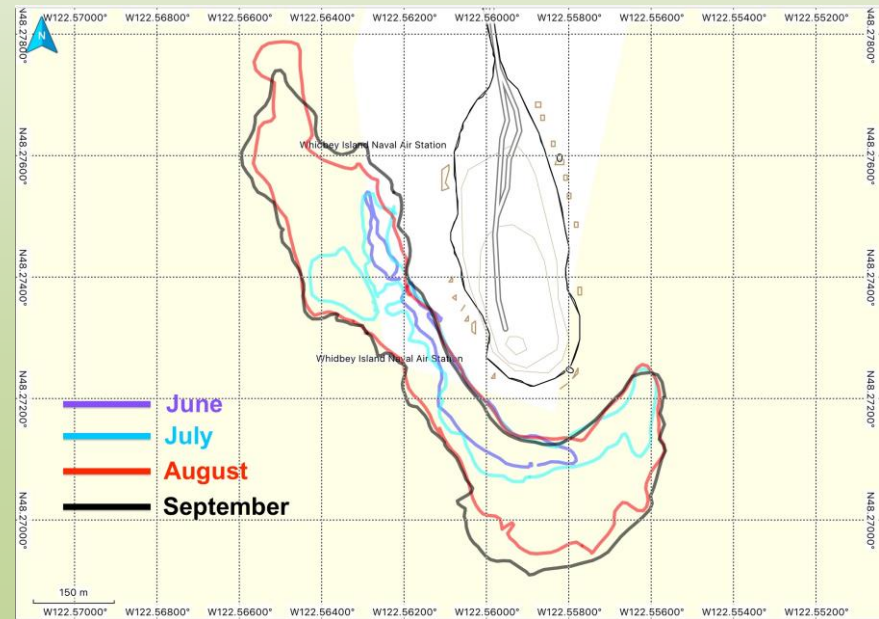
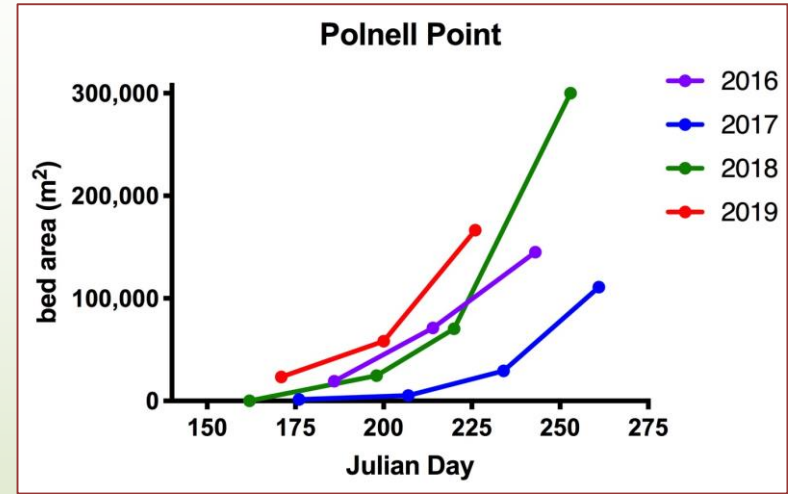
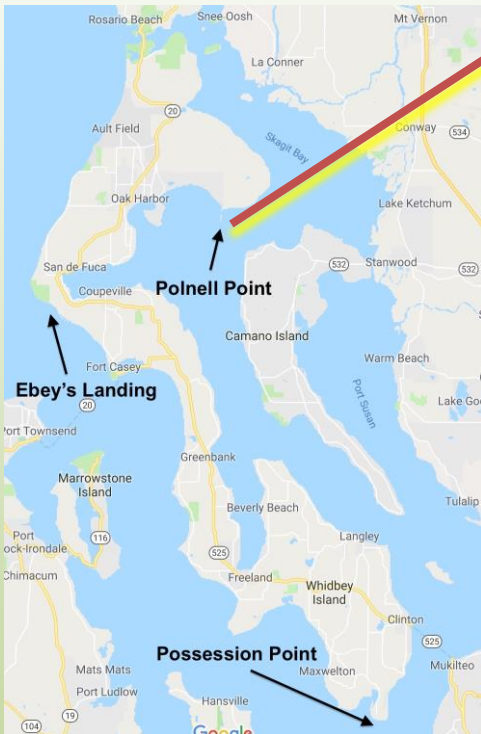
2019 MRC Boat-based Survey

Ebey's Landing



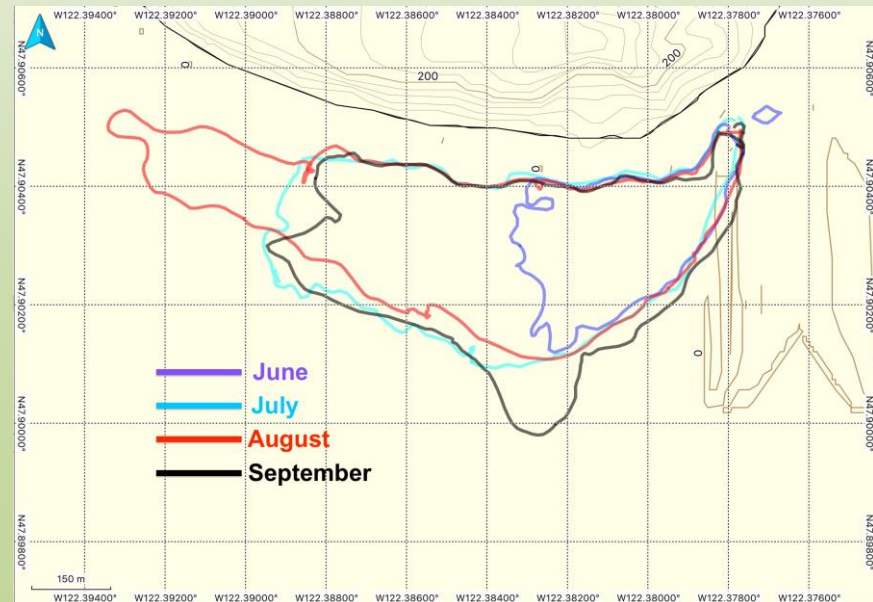
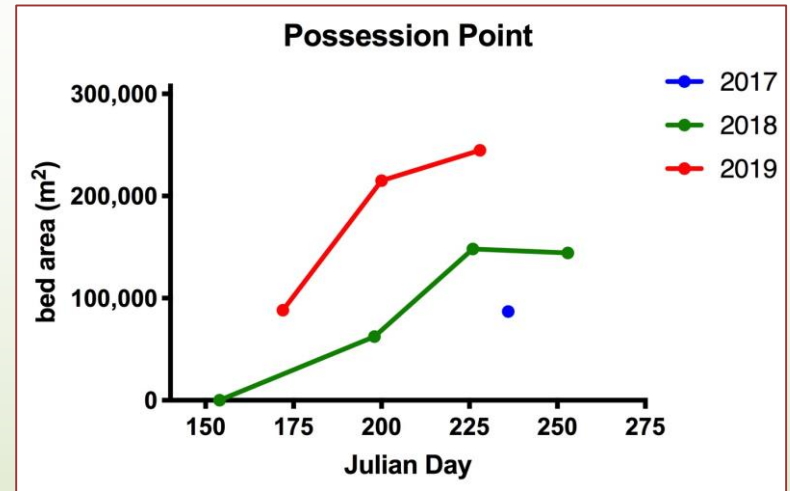
2019 MRC Boat-based Survey

Polnell Point

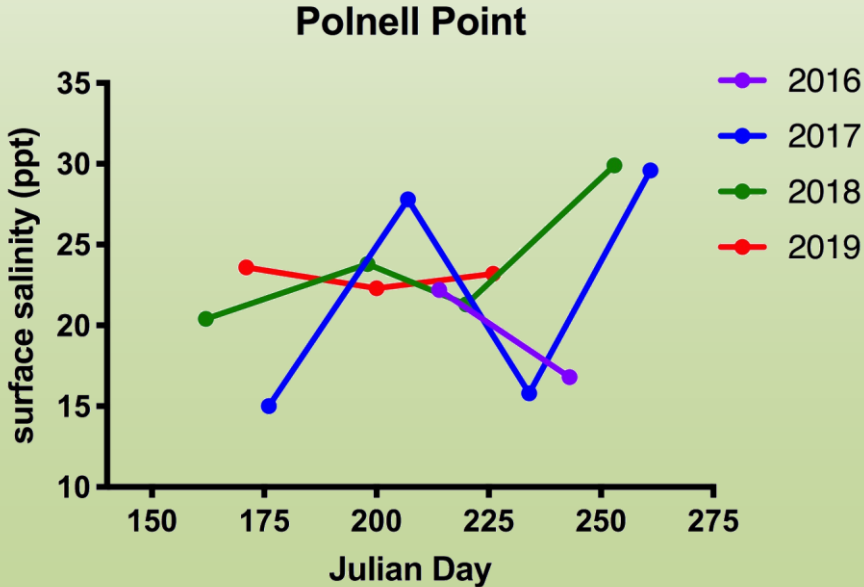
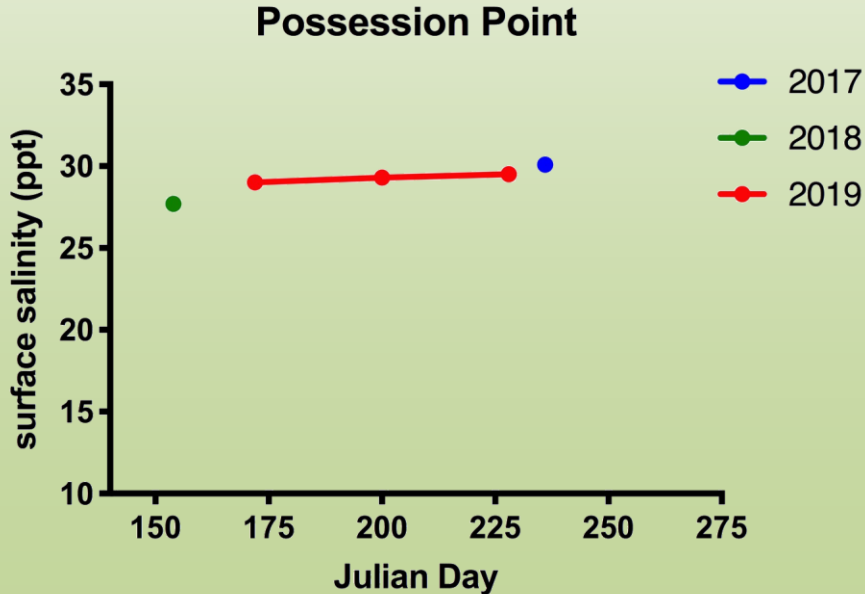
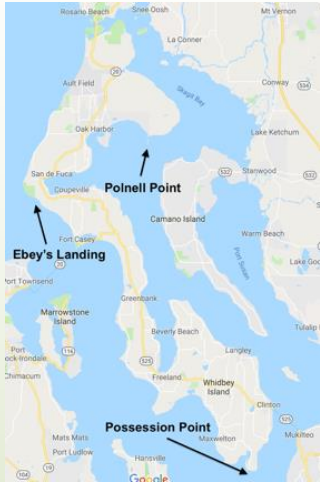
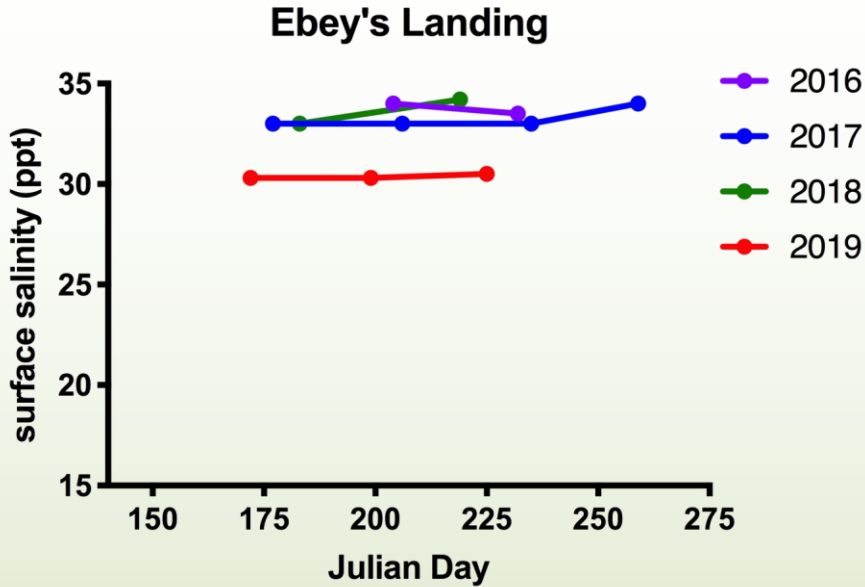


2019 MRC Boat-based Survey

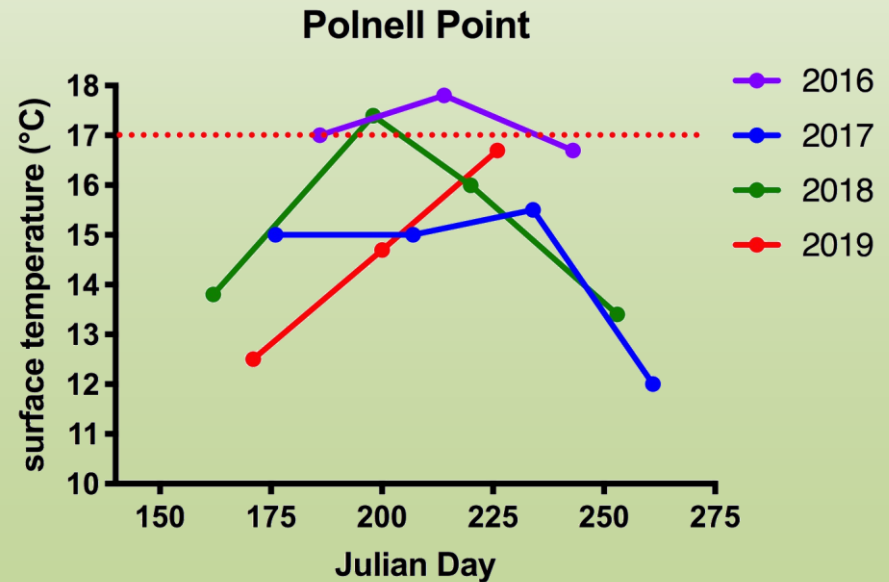
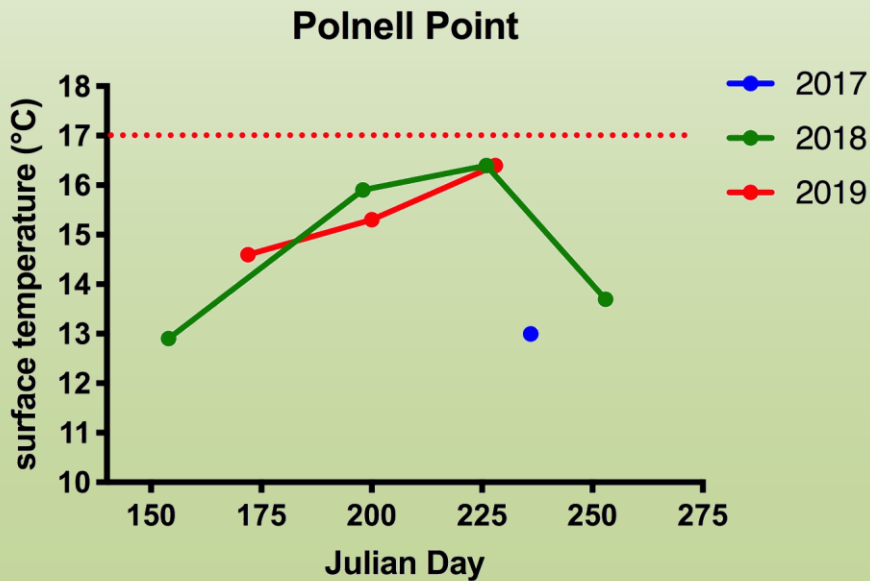
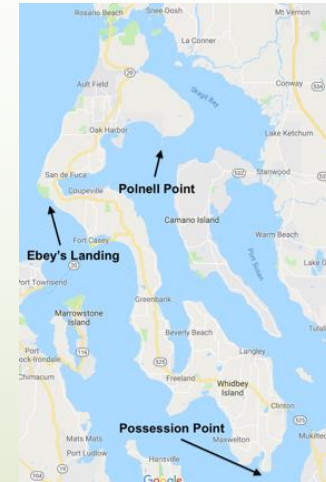
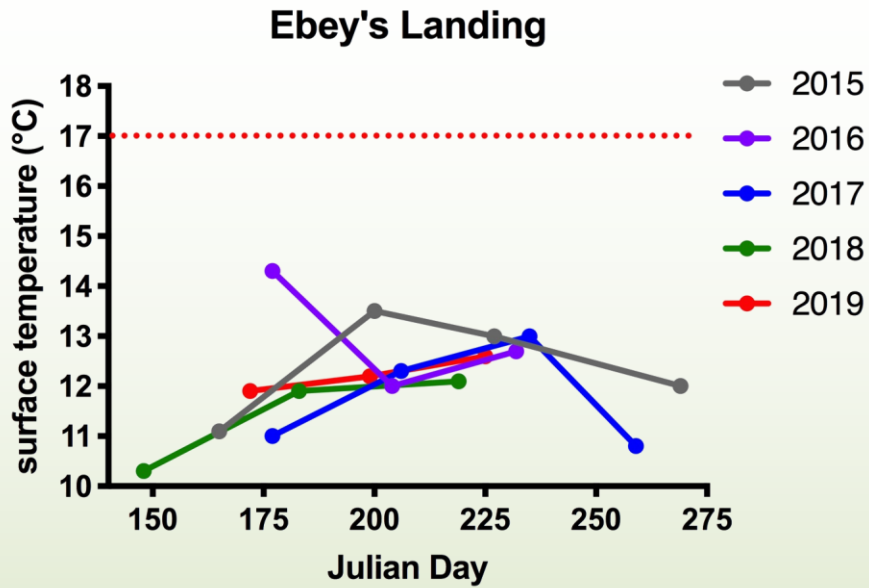
Possession Point



SALINITIES



TEMPERATURES





Loggers for Temperature Profiles

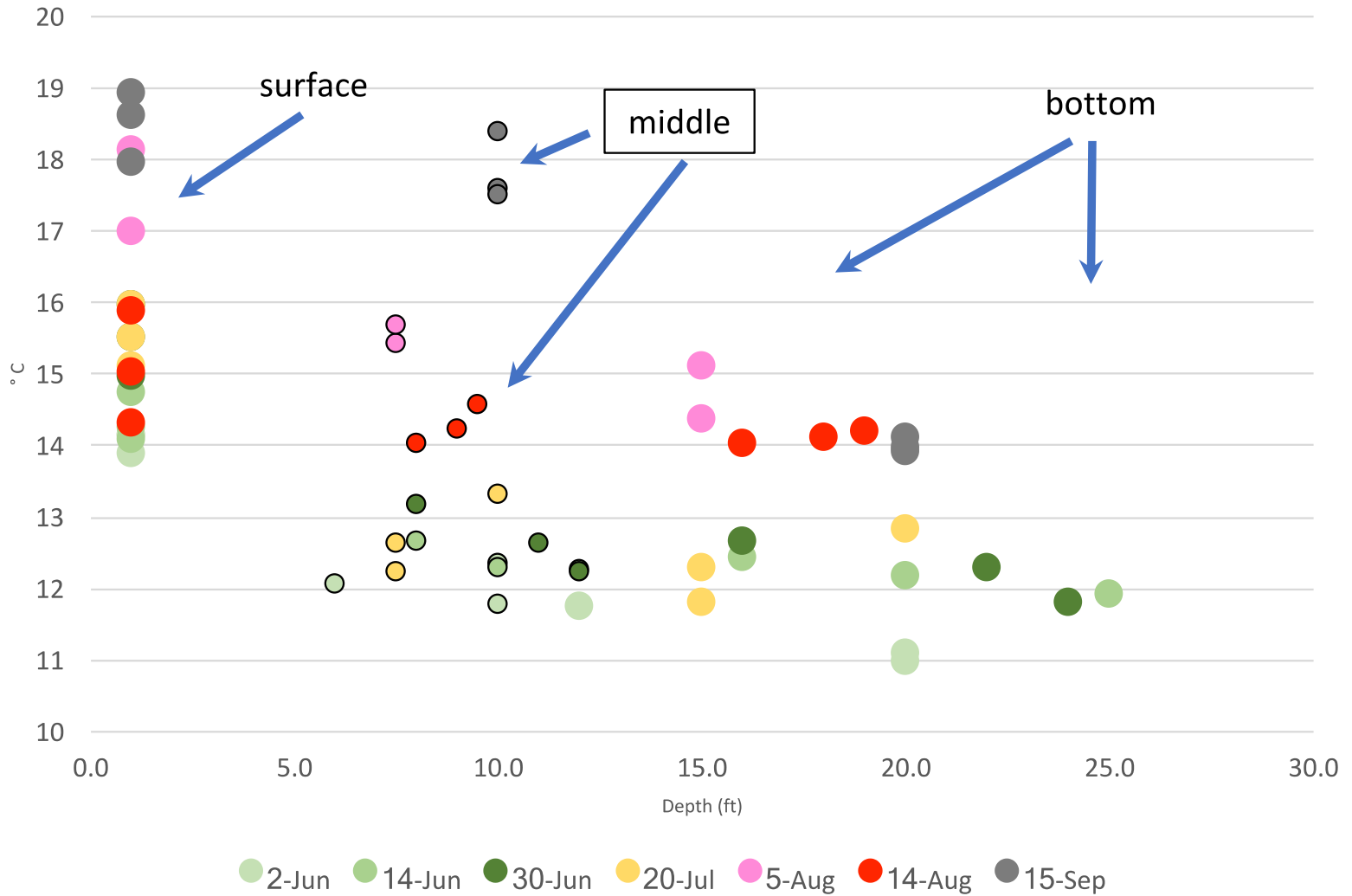


Photo by Rich Yukubousky



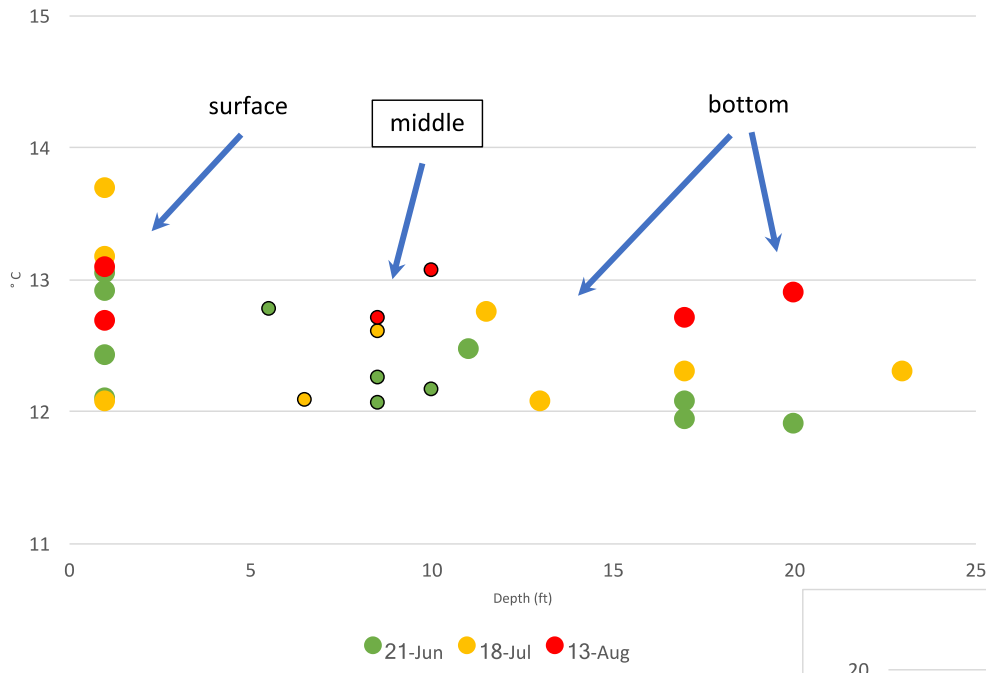
Photo by Rich Yukubousky

Possession Point Hobo Temperatures

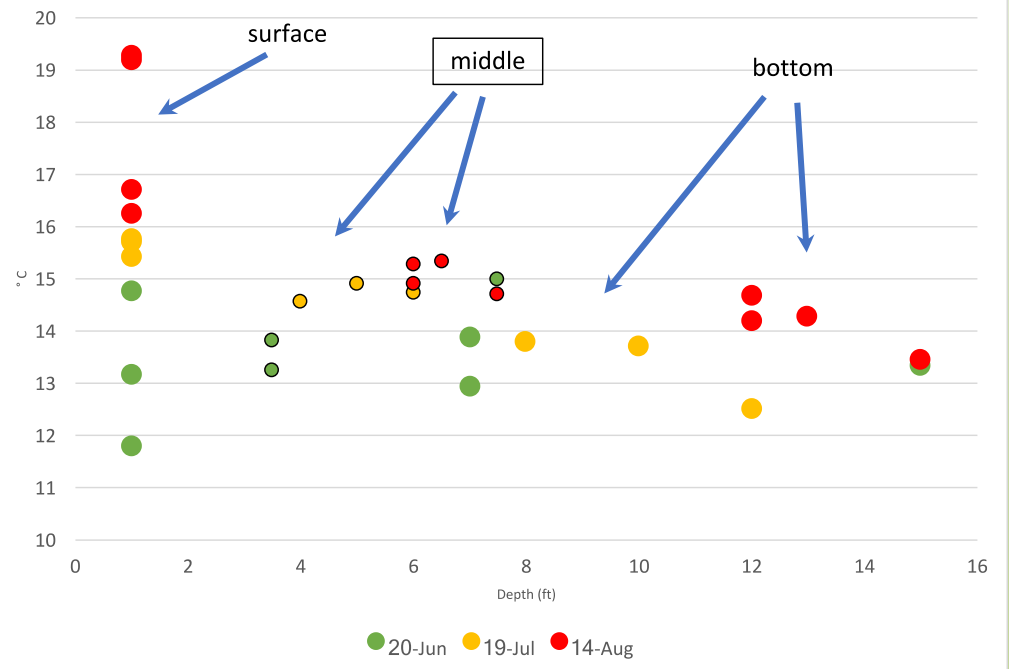


Dave Davis & Barbara Hardman

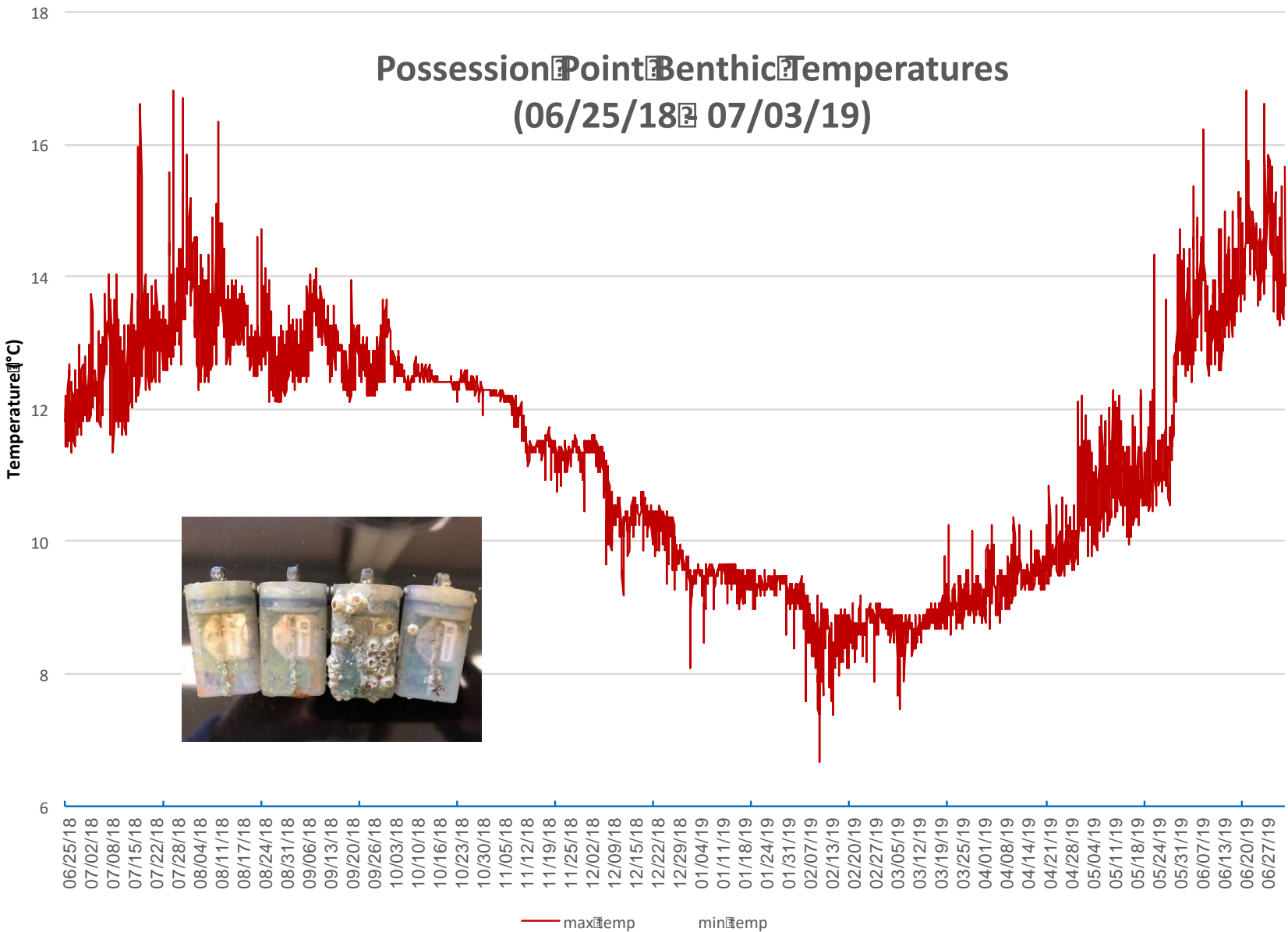
Ebey's Landing Hobo Temperatures



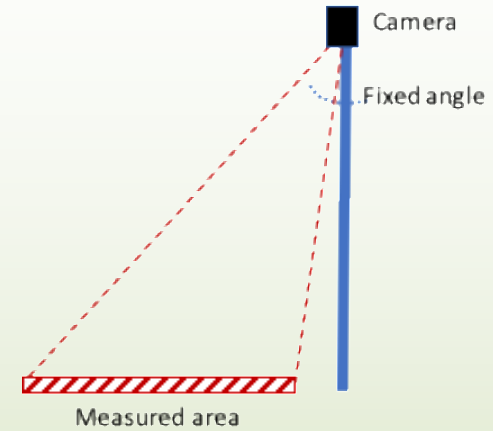
Polnell Point Hobo Temperatures



Possession Point Benthic Temperatures (06/25/18 to 07/03/19)



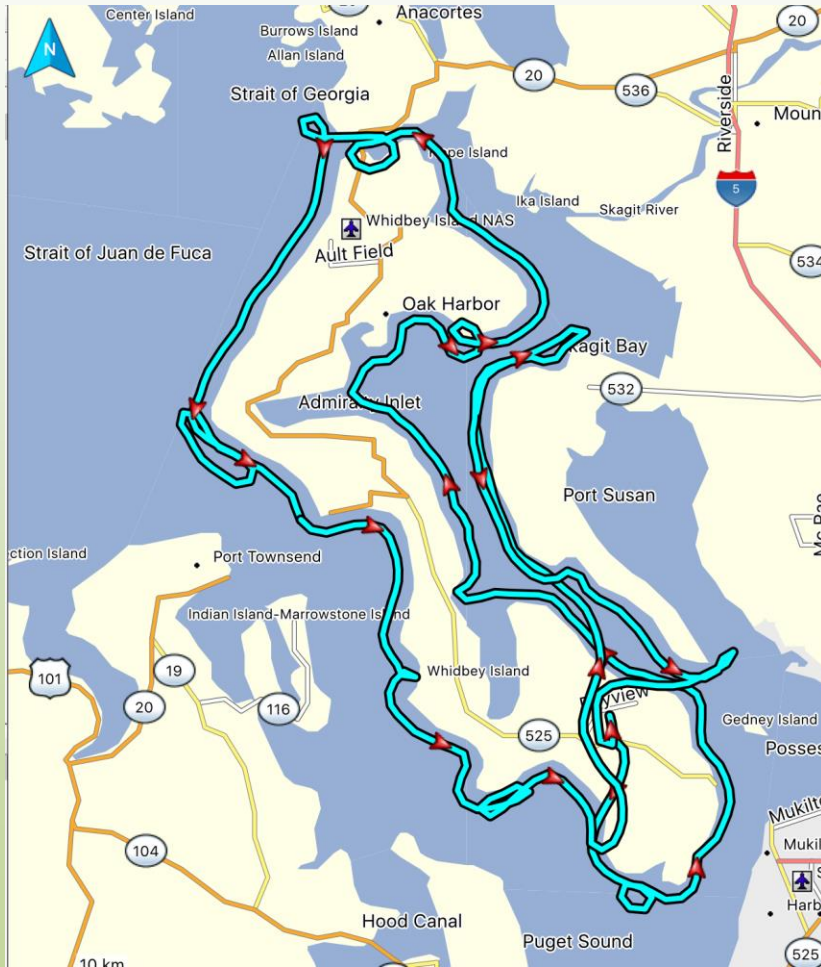
Bulb Density Estimates



Bulb Density Estimates



Aerial Imaging for Kelp

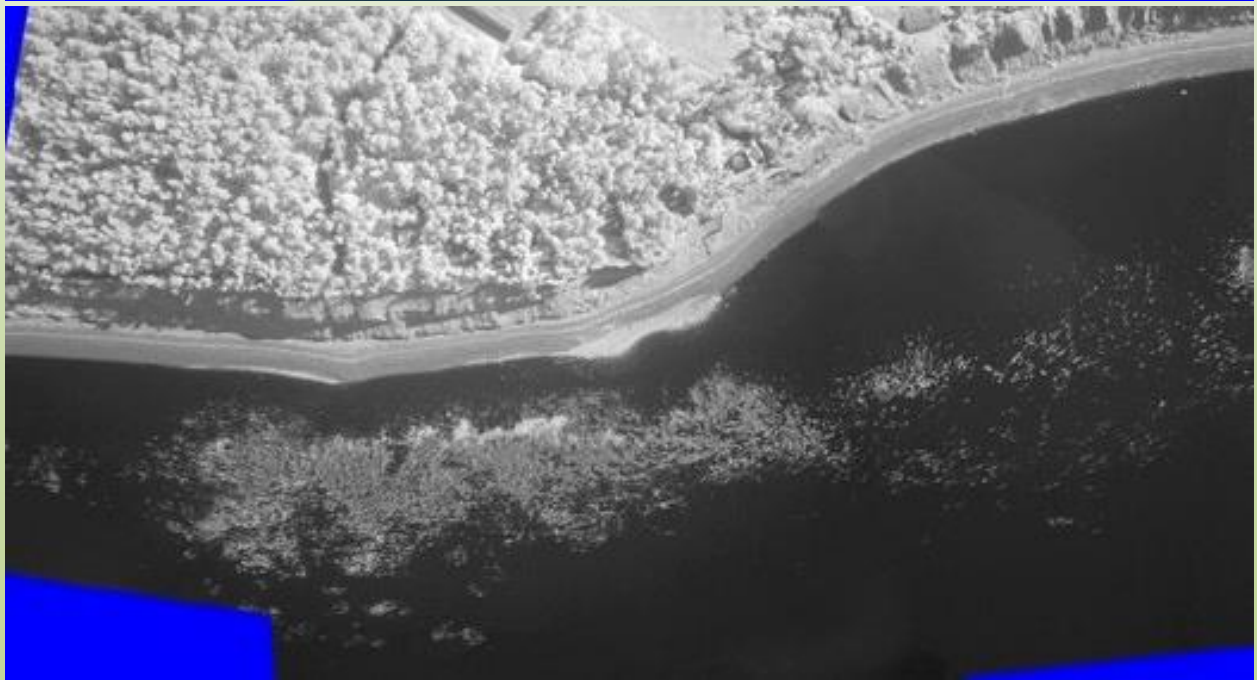


- Estimate amount of shoreline with associated bull kelp
- Identify potential beds for groundtruthing
- Serve as baseline for future aerial surveys

RGB



NIR





~ 21.1 miles
(~ 11%)

2018



~ 17.3 miles
(~ 9%)

Anecdotal Biological Observations



<https://vimeo.com/357399758>

HERRING!



2019 Summary & 2020 Plans

- There are distinct differences in monthly bed growth between marine-influenced & river-influenced kelp beds
- 2019 appeared to be a good year for bed area & fish abundance in beds
- Water temperatures may pose a future threat & deserve more extensive monitoring
- Continue boat-based surveys of 3 kelp beds in Island County
- Continue aerial survey of Island County shoreline

THANK YOU!

