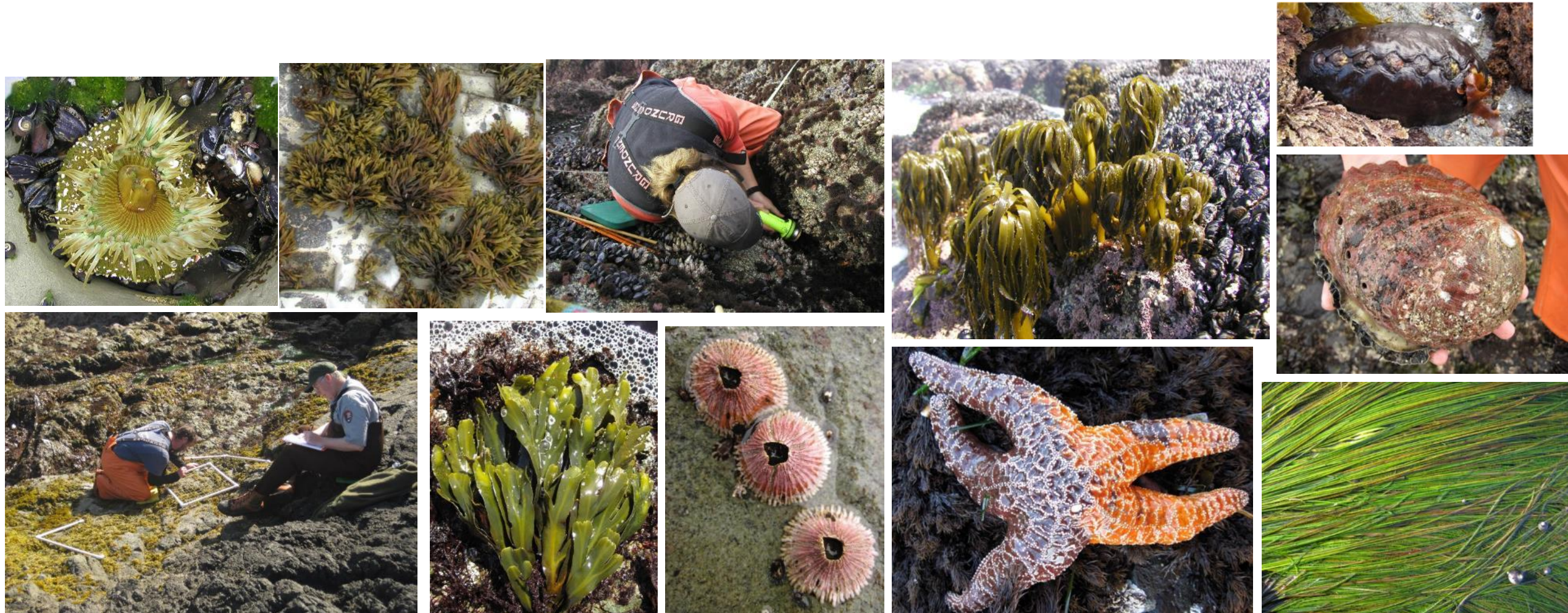# Local and Broadscale Patterns in Sea Star Recovery
Melissa Miner, UC Santa Cruz

Long-Term Surveys: ~130 sites in CA, OR, WA, AK
sampled annually or semi-annually

- Targeted assemblages/species (most are foundation or keystone species)

Washington

Oregon

California

Alaska / British Columbia

Mexico

Sea Star Counts and Sizes in Permanent Plots

Pisaster ochraceus ochre star

Ochre star counts over time

Post Point

Legend: ● Evasterias ● Katharina ● Pisaster ochraceus
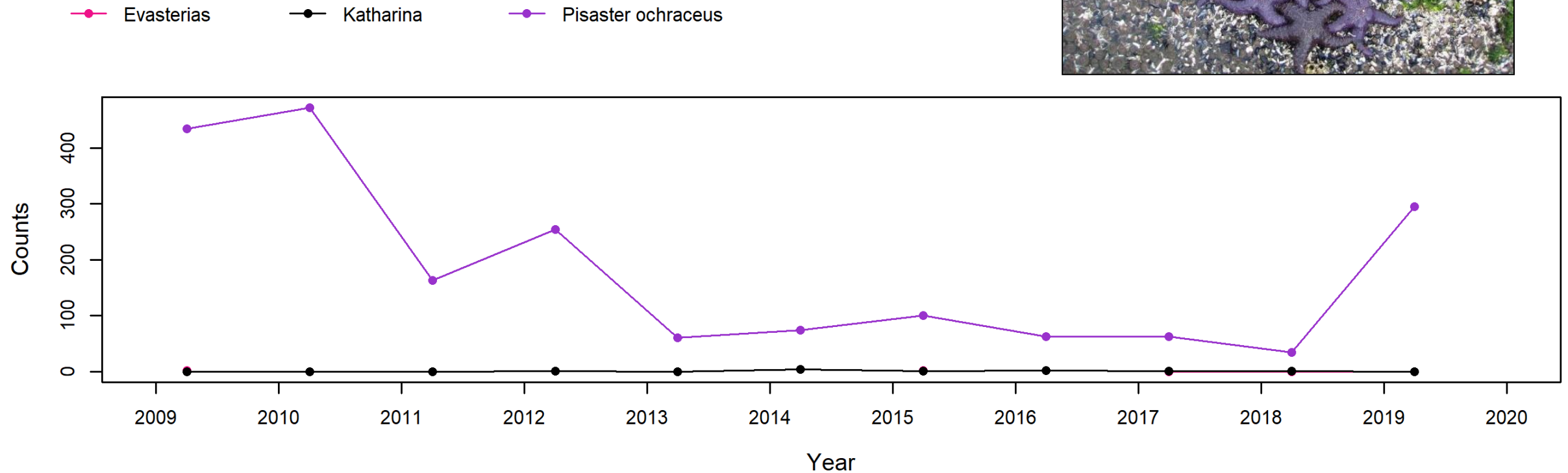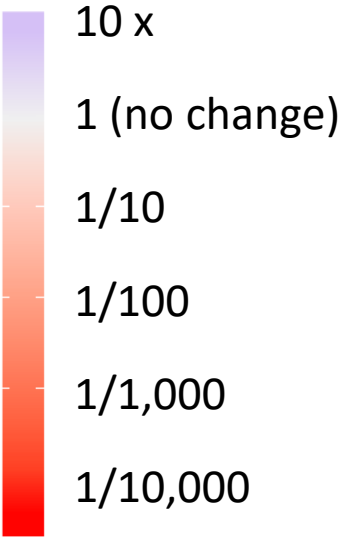
Sea Star Wasting Disease: What is it?

- <u>General</u> description for a set of symptoms that have been seen in many species of sea stars (and historically other echinoderms)

- Previous events were much smaller in scale, cyclical (tied to warm water), and pathogen never identified

- Continued study of the microbiome (viruses and bacteria) associated with sick stars (Hewson, Cornell and others) and how other factors (e.g., temp, pH) might contribute

- > 20 species affected

- Has persisted in system since 2013 (nearly 7 years)

- Temperature link still unclear—anomalies likely important?

Impact of SSWD on ochre star populations

Annual Relative Population Size

10 x

1 (no change)

1/10

1/100

1/1,000

>99% decline

1/10,000

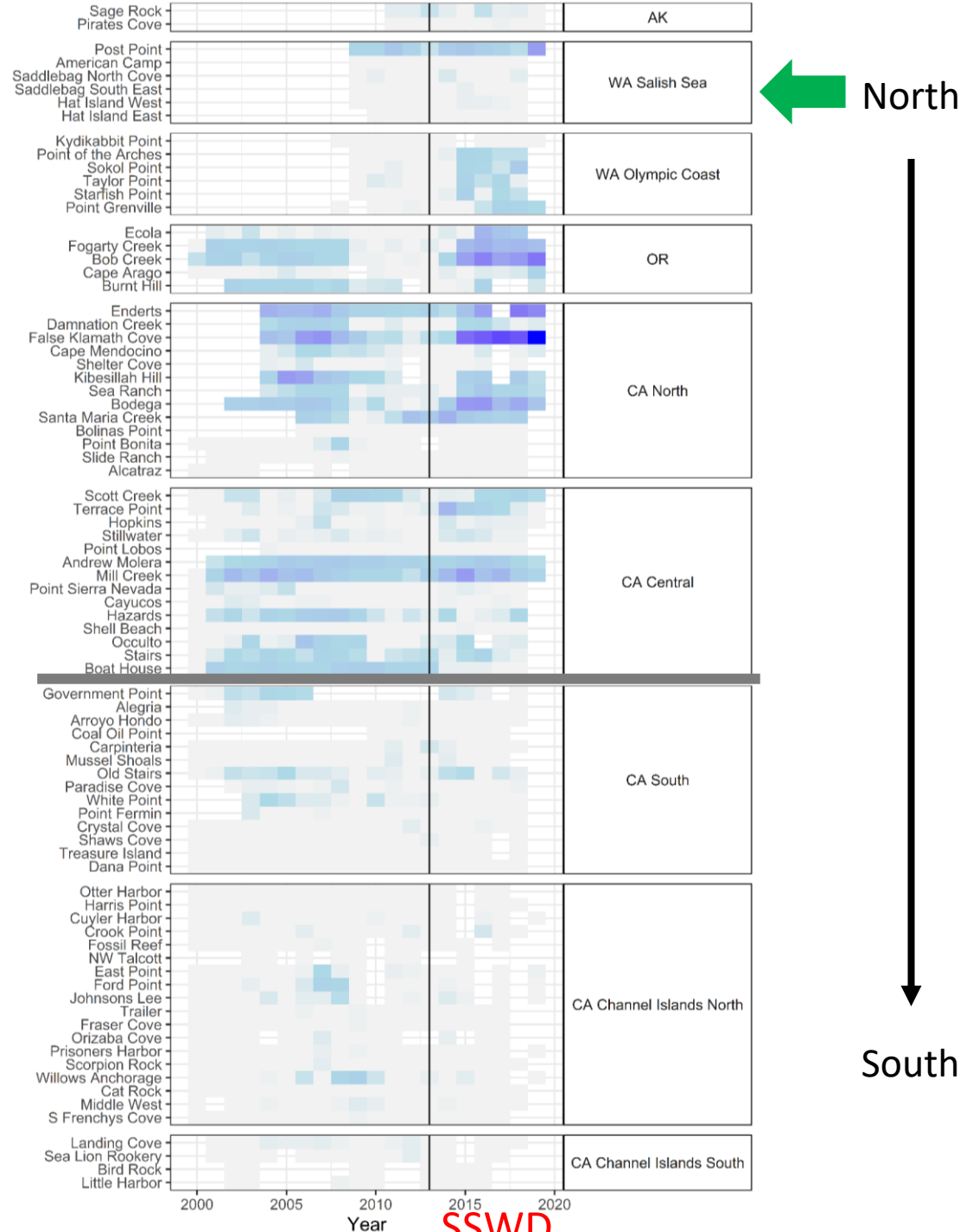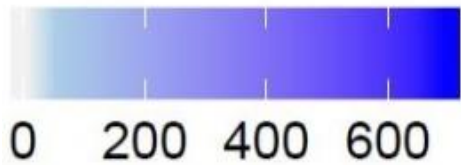Annual relative population size (adults/mean adults pre SSWD)

0.001 0.010 0.100 1.000

North

South

AK — Sage Rock, Pirates Cove

BC — Point Atkinson, West Vancouver Rope Site, Ferguson Point, Dunbar, Yellow Point

WA Salish Sea — Post Point, American Camp, Saddlebag North Cove, Saddlebag South East, Hat Island West, Hat Island East

WA Olympic Coast — Kydikabbit Point, Point of the Arches, Taylor Point, Starfish Point, Point Grenville, Sokol Point

OR — Ecola, Fogarty Creek, Bob Creek, Cape Arago, Burnt Hill

CA North — Enderts, Damnation Creek, False Klamath Cove, Cape Mendocino, Shelter Cove, Kibesillah Hill, Sea Ranch, Bodega, Santa Maria Creek, Bolinas Point, Point Bonita, Slide Ranch, Alcatraz

CA Central — Scott Creek, Terrace Point, Hopkins, Stillwater, Point Lobos, Andrew Molera, Mill Creek, Point Sierra Nevada, Cayucos, Hazards, Shell Beach, Occulto, Stairs, Boat House

CA South — Government Point, Alegria, Arroyo Hondo, Coal Oil Point, Carpinteria, Mussel Shoals, Old Stairs, Paradise Cove, White Point, Point Fermin, Crystal Cove, Shaws Cove, Treasure Island, Dana Point

CA Channel Islands North — Otter Harbor, Harris Point, Cuyler Harbor, Crook Point, Fossil Reef, NW Talcott, East Point, Ford Point, Johnsons Lee, Trailer, Fraser Cove, Orizaba Cove, Prisoners Harbor, Scorpion Rock, Willows Anchorage, Cat Rock, Middle West, S Frenchys Cove

CA Channel Islands South — Landing Cove, Sea Lion Rookery, Bird Rock, Little Harbor

2000 2005 2010 2015 2020

Year

SSWD

MBON

Abundance of ochre stars (*Pisaster ochraceus*) at sites in Olympic Coast National Marine Sacntuary
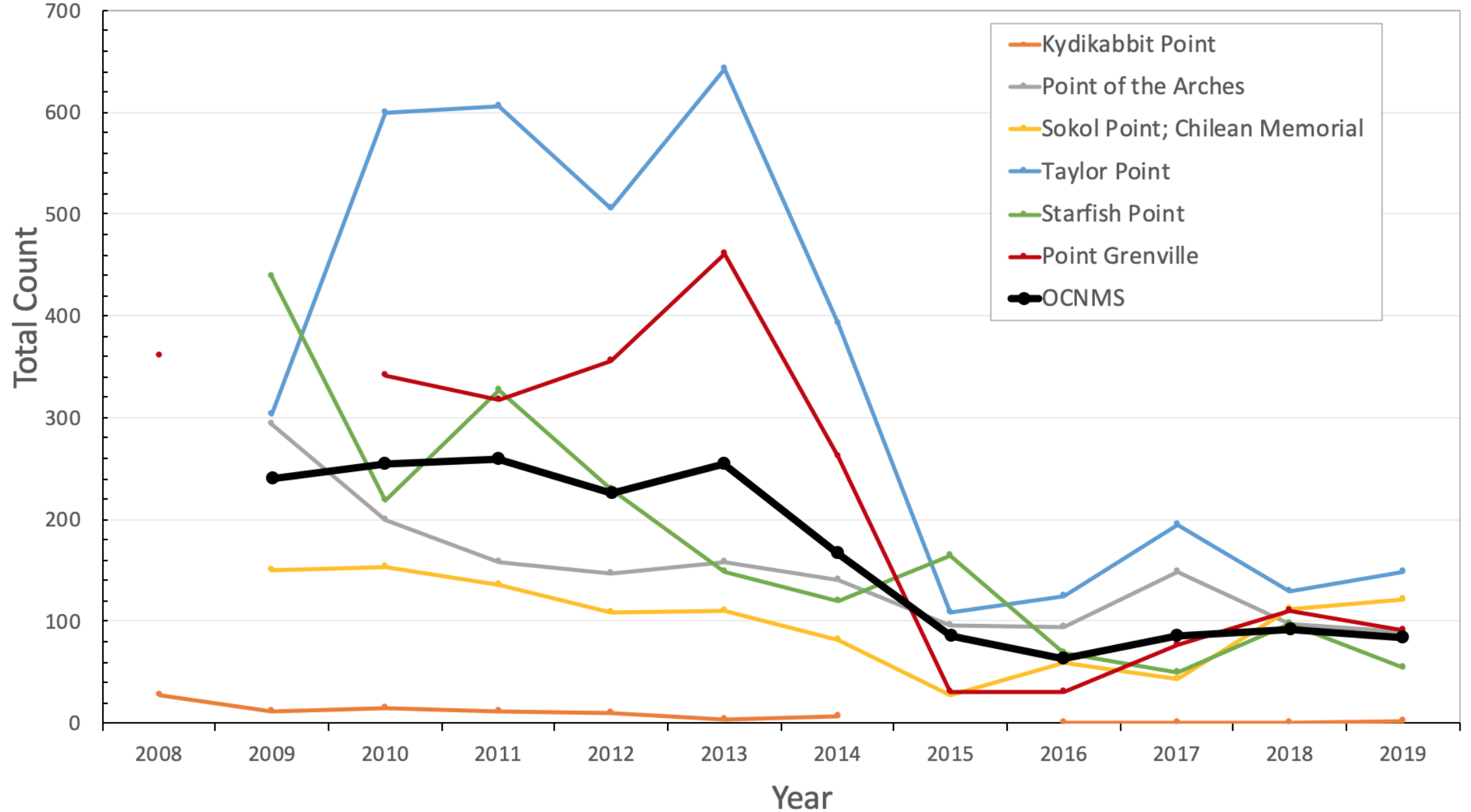
Legend:
- Kydikabbit Point
- Point of the Arches
- Sokol Point; Chilean Memorial
- Taylor Point
- Starfish Point
- Point Grenville
- OCNMS

Y-axis: Total Count
X-axis: Year

Recruitment Patterns

# of Juveniles (<30mm)

North

South

Recruitment Patterns

# of Juveniles (<30mm)

WA Salish Sea

WA Olympic Coast
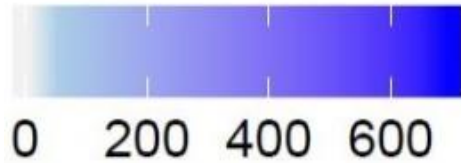
SSWD

Ochre star sizes over time at Post Point
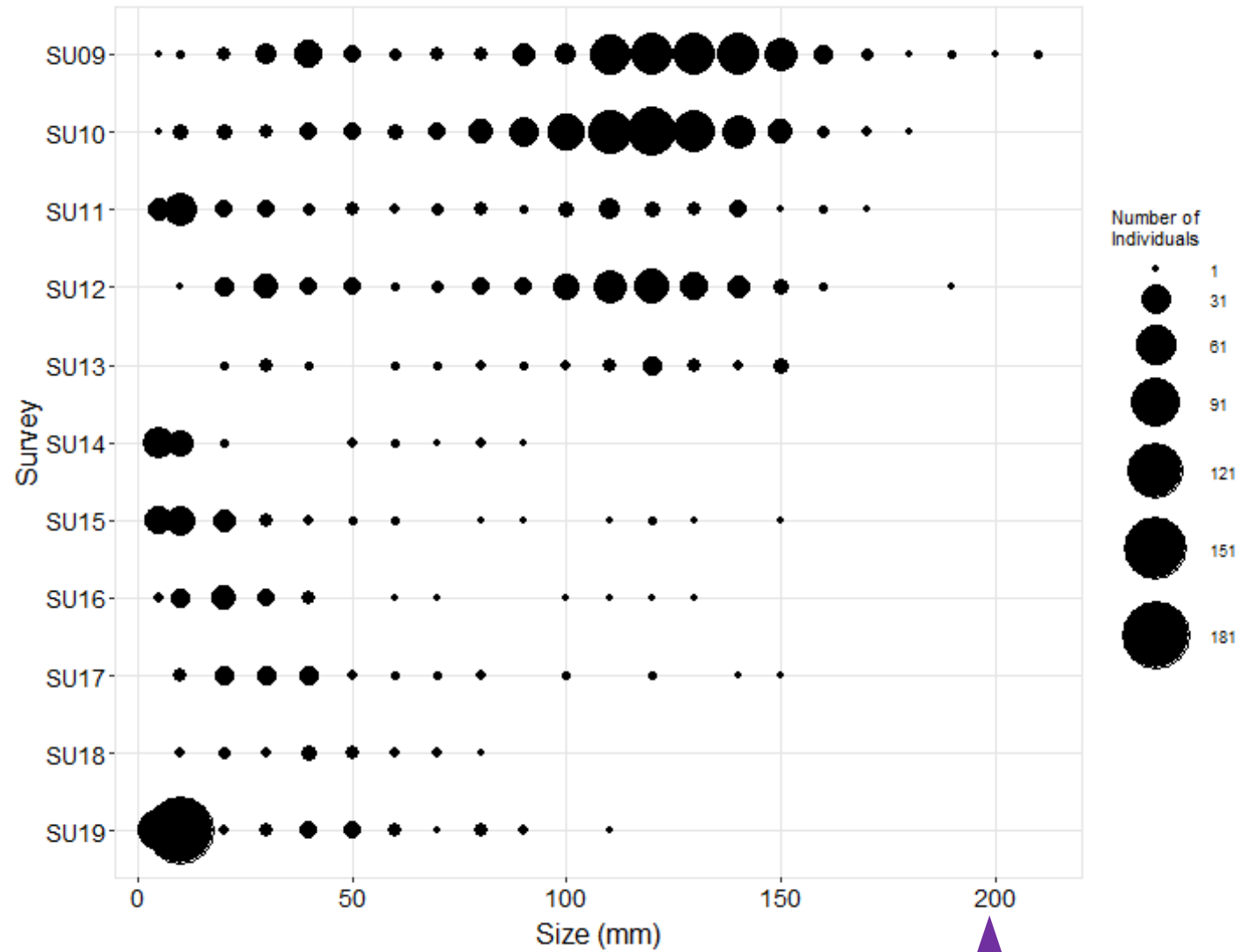
Erin McKittrick, Seldovia, AK

Ken Collins, Holmes Harbor, WA

Pycnopodia recovery?

Pycnopodia helianthoides
Sak Rock, Sechelt Inlet, BC
Jan 9, 2014
Neil McDaniel photo

Pycnopodia Recovery Working Group (Sarah Gravem, Oregon State University)

- Determine extinction risk
  - IUCN assessment/listing
- Create database of existing *Pycnopodia* data sets
- Develop and support recovery strategies
- Generate awareness (public, managers, etc.)

Pycnopodia Decline (> 97% worldwide)
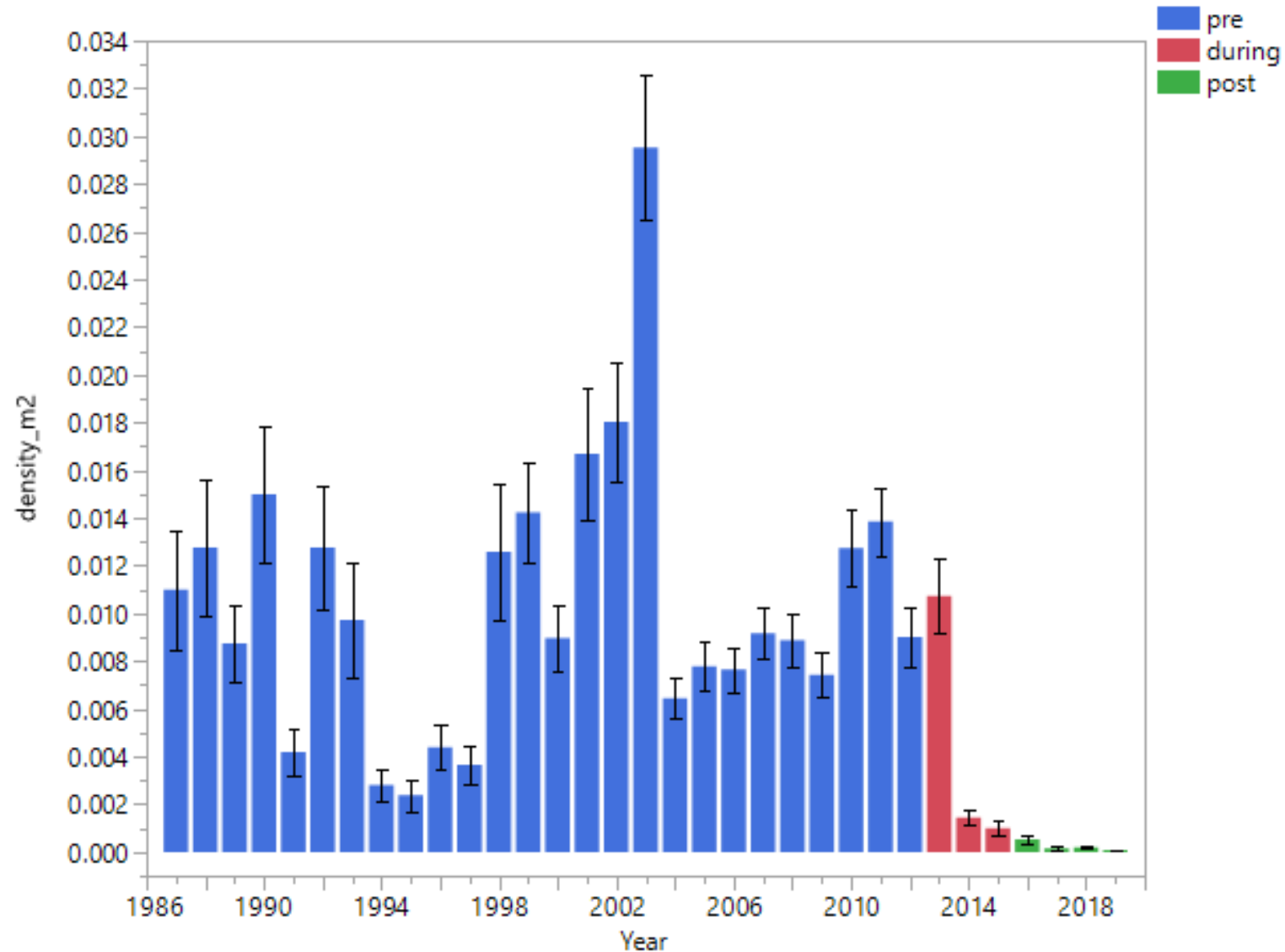
Partnership for Interdisciplinary Studies of Coastal Oceans

PISCO

ABOUT US   OUR PLACES   OUR WORK   HIGHLIGHTS   **RESOURCES**   DATA   CONTACT

THE SEA STAR WASTING SYNDROME TASK FORCE

HOME » RESOURCES

Marine diseases are on the rise.

In response to the sea star wasting disease outbreak, we have assembled a Sea Star Wasting Syndrome Task Force to identify:

- Gaps in Knowledge
- Research Goals
- Action Items
- Potential Conservation Strategies

The Task Force is populated by academic scientists, state and federal agencies, conservation organizations, aquaculture specialists, and
private partners to respond effectively to the disease. Many Task Force members are the authors of the first issue of the Sea Star Wasting

EXPLORE:

SEA STAR WASTING SYNDROME

STRATEGIC ACTION PLAN

WORKSHOPS & EVENTS

OUR WORK

primed-osu.weebly.com

Apps   Bookmarks   7-Day Forecast for...   Recent - Google Dri...   Google Maps   My Books - Google...

PRIMED

PRIMED
Primary Responders in Marine Emergent Diseases
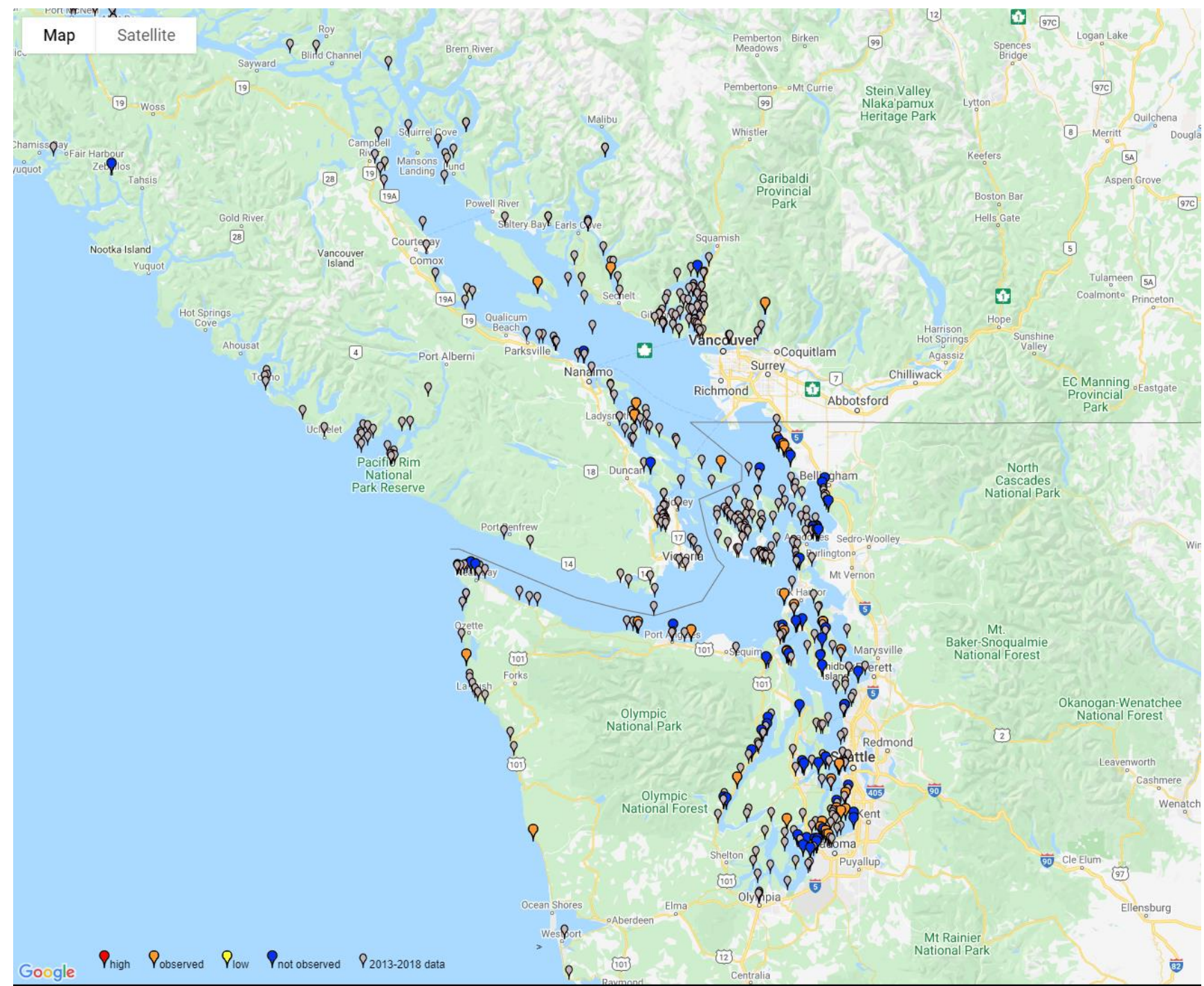
PRIMED for the Future

The number and severity of marine disease outbreaks are increasing
with climate change and human activity. Marine diseases threaten not
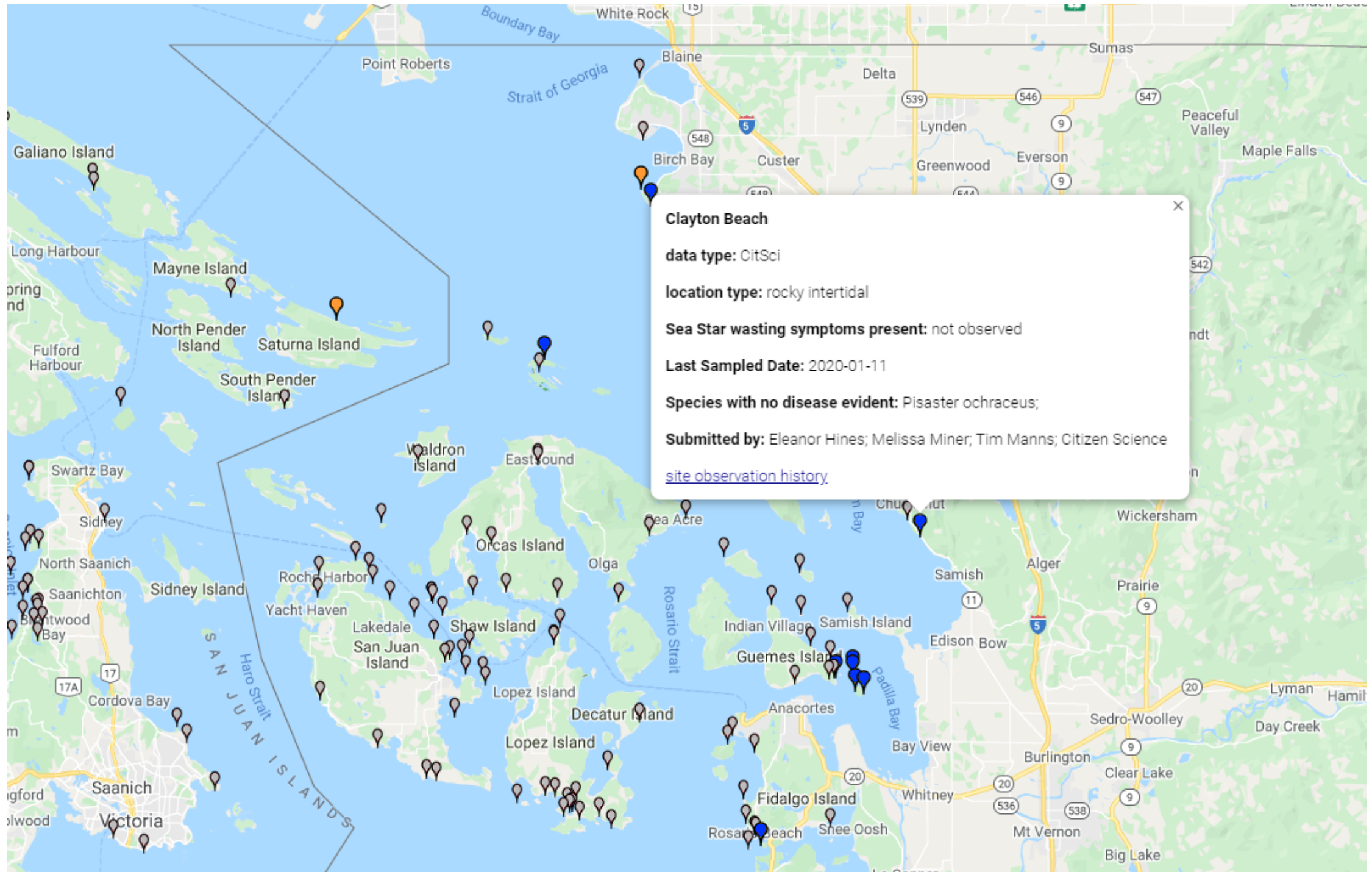only the ecosystems they impact but also disrupt key ecological services.
Because effective responses are time-sensitive and detection
requires cohesive pre-disease information, we have formed a collaborative
research network called PRIMED:

Primary Responders In Marine Emergent Disease

The purpose of PRIMED is to establish connections between scientists

Sea Star Map

Clayton Beach

data type: CitSci

location type: rocky intertidal

Sea Star wasting symptoms present: not observed

Last Sampled Date: 2020-01-11

Species with no disease evident: Pisaster ochraceus;

Submitted by: Eleanor Hines; Melissa Miner; Tim Manns; Citizen Science

site observation history

Online Resources
seastarwasting.org
(pacificrockyintertidal.org)

cmminer@ucsc.edu