

Observations of Sea Star Wasting Syndrome in Alaska



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What is Sea Star Wasting Syndrome or SSWD ?

- ▶ Describes a set of symptoms that are found in sea stars.
- ▶ Lesions appear in the ectoderm, followed by decay of tissue around lesions
- ▶ Body loses limbs, becomes fragmented and dies

Categorizing the Symptoms

Category 1

lesion(s) on 1 arm or body
Tissue degradation in some of these photos may be the result of multiple lesions merging, but it is restricted to a single arm, or single location on the oral disk.



Category 2

lesions on 2 arms or 1 arm and body, deteriorating arm(s)



Arm starting to separate



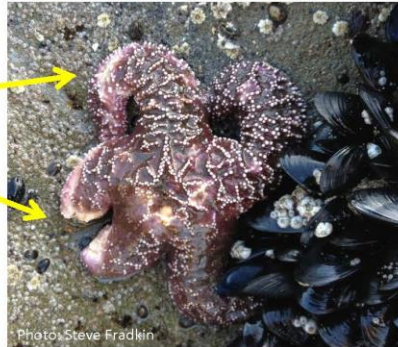
Tissue deteriorating on 2 arms

More severe symptoms ...

Category 3

lesions on most of body, 1-2 missing arms

Missing tips of 2 arms, lesion on 3rd



Missing 1 arm

tissue deterioration on 2nd arm

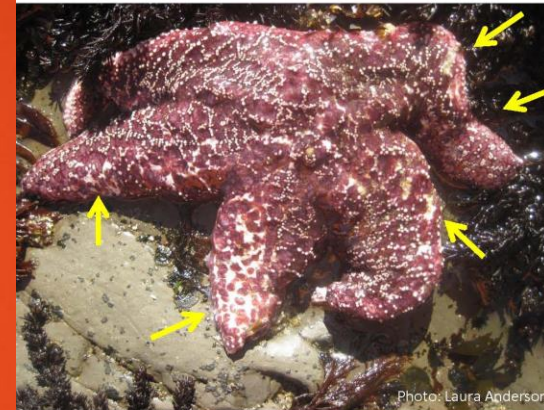


Missing 1 arm



Category 4

lesions throughout arms & body (white patches—some highlighted with arrows)

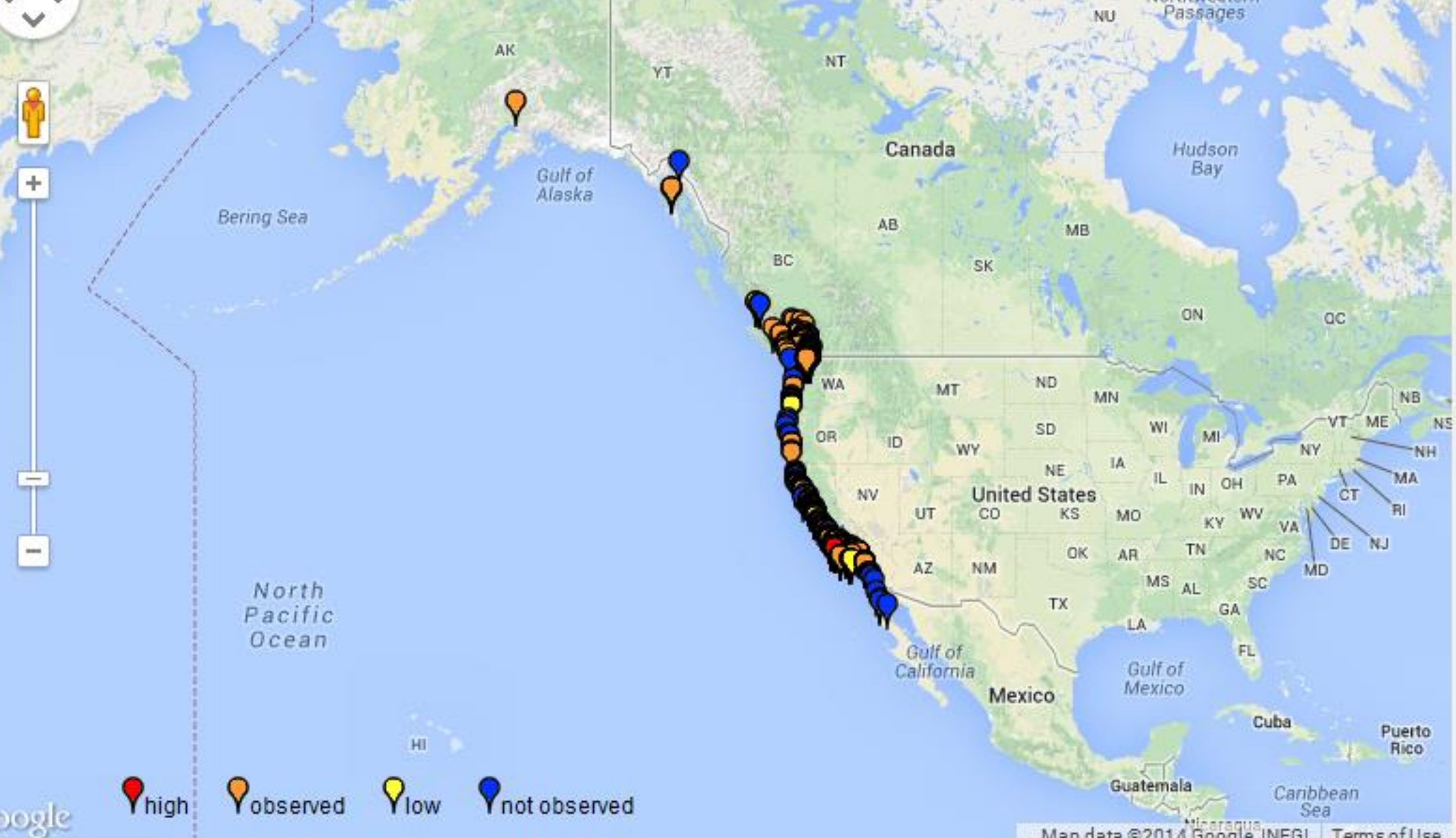


Missing 2 arms and tip of 3rd; multiple lesions on arms & body



Close-up of lesions





Anchorage Aquarium Autumn 2013

- Stars lost legs
- Heavily handled by visitors
- Water warmer than usual
- Changed protocols; no more SSWD observed

Point Louisa, Juneau Area

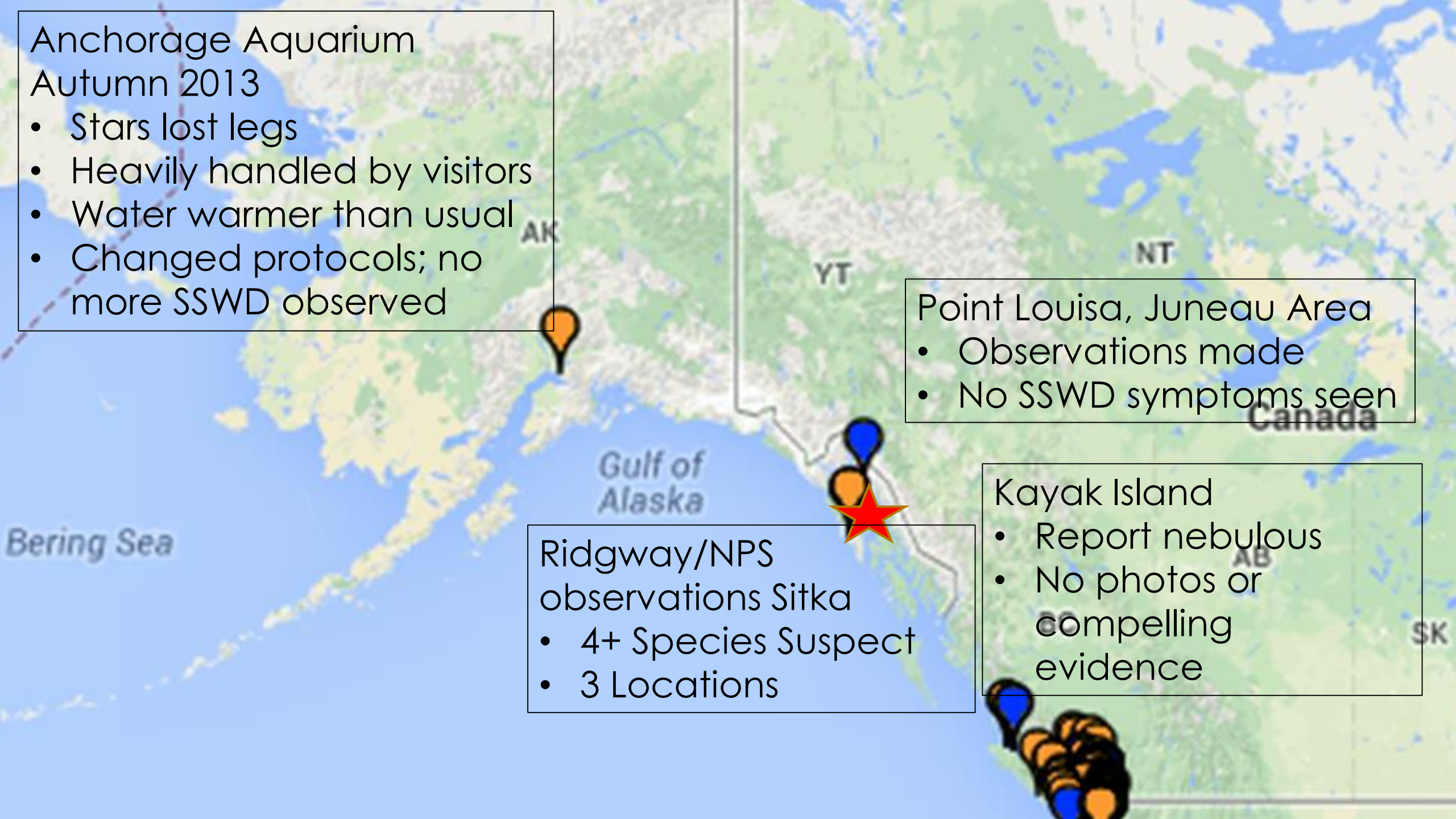
- Observations made
- No SSWD symptoms seen

Ridgway/NPS observations Sitka

- 4+ Species Suspect
- 3 Locations

Kayak Island

- Report nebulous
- No photos or compelling evidence





We have seen this before ... but this time it is very different.

The geographic extent is vastly larger than we've seen before. But the unique and chilling aspect of this event is the number of species involved," (Dr. Drew Harvell, professor of ecology and evolutionary biology, Cornell University).

"There have been wasting disease events with sea stars before, but it's normally a single star species. This has involved up to 12 different species – virtually all of the major species have been affected along the entire West Coast."

Causes of Sea Star Wasting Syndrome

- ▶ When proximal cause examined, often a bacteria (vibrio) is found
- ▶ In 2013, Cornell also identified a virus unique to sickened sea stars.

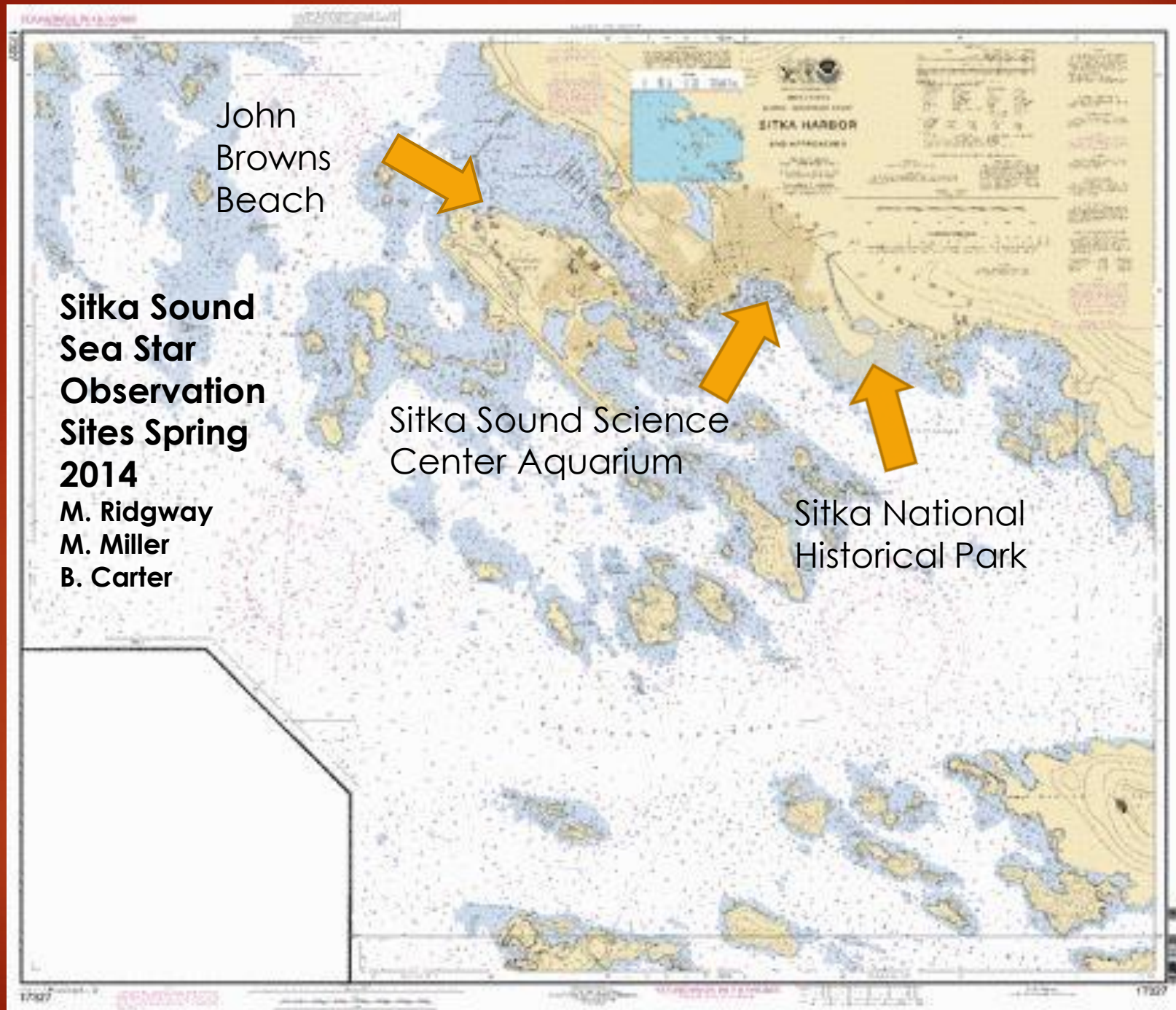
WHY AN OUTBREAK SO EXTENSIVE ... ANY CLUES?

- ▶ Warmer seawater temperatures have been associated with outbreaks in the past
- ▶ There has been NO link found to indicate that Fukushima is influencing SSWD

Reconnaissance in Sitka, Alaska

3 Sites Surveyed March 12-April 8, 2014





John
Browns
Beach

**Sitka Sound
Sea Star
Observation
Sites Spring
2014**

M. Ridgway
M. Miller
B. Carter

Sitka Sound Science
Center Aquarium

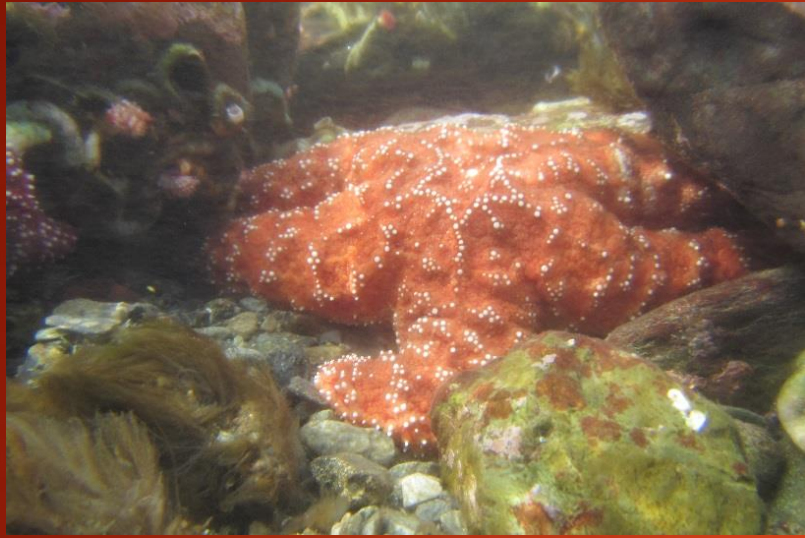
Sitka National
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Pisaster ochraceus

Ochre Sea Star



- Affected broadly on Pacific coast
- Lethal



Variable affliction

Seemingly healthy ...

Not so healthy ...

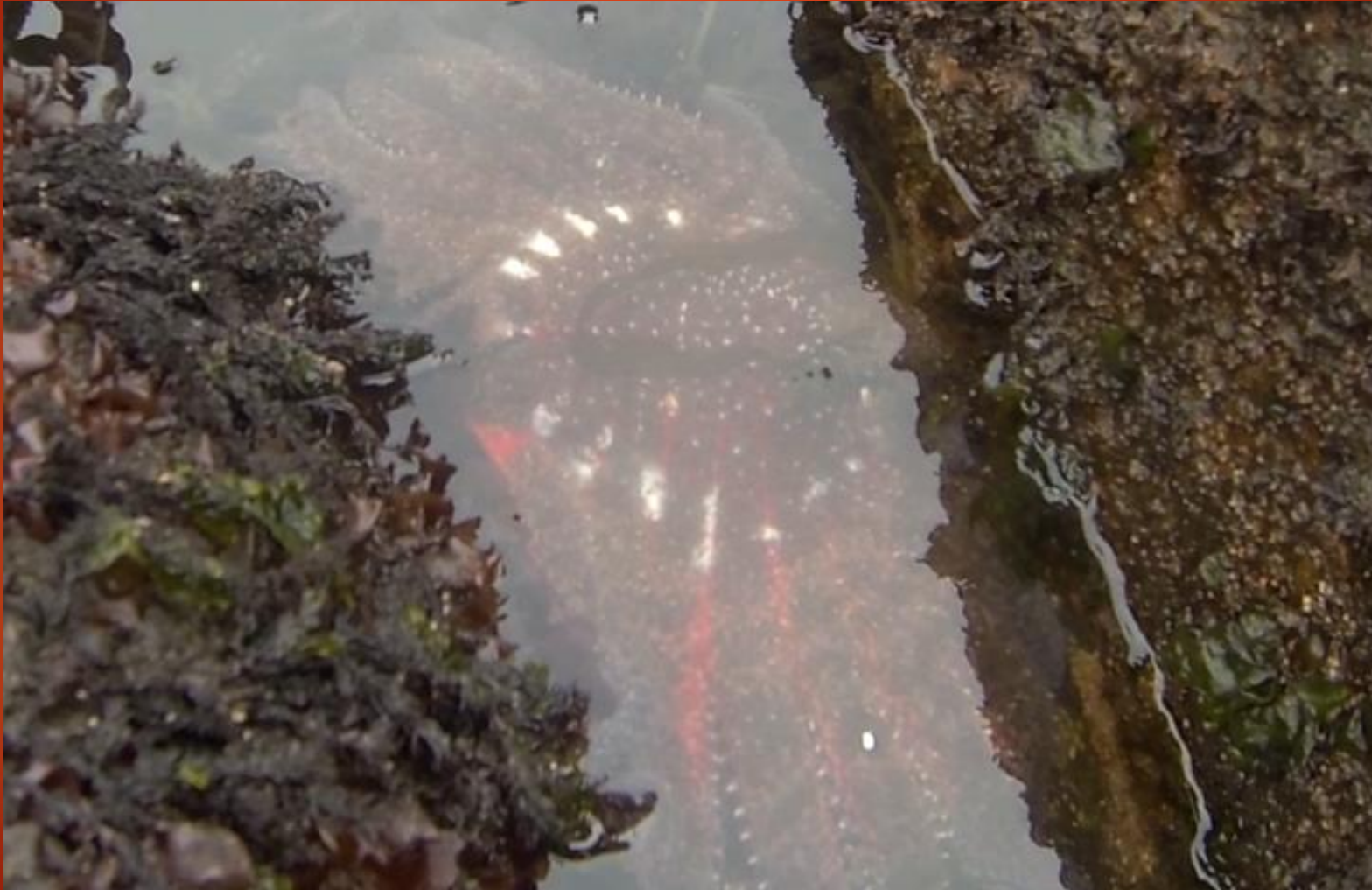


Dermasterias imbricata

Leather Star



Pycnopodia helianthoides
Giant Sunflower Star



Henricia leviuscula

Blood Star



- Pale central disc
- Weak, unattached
- Curled rays

Evasterias troschelli

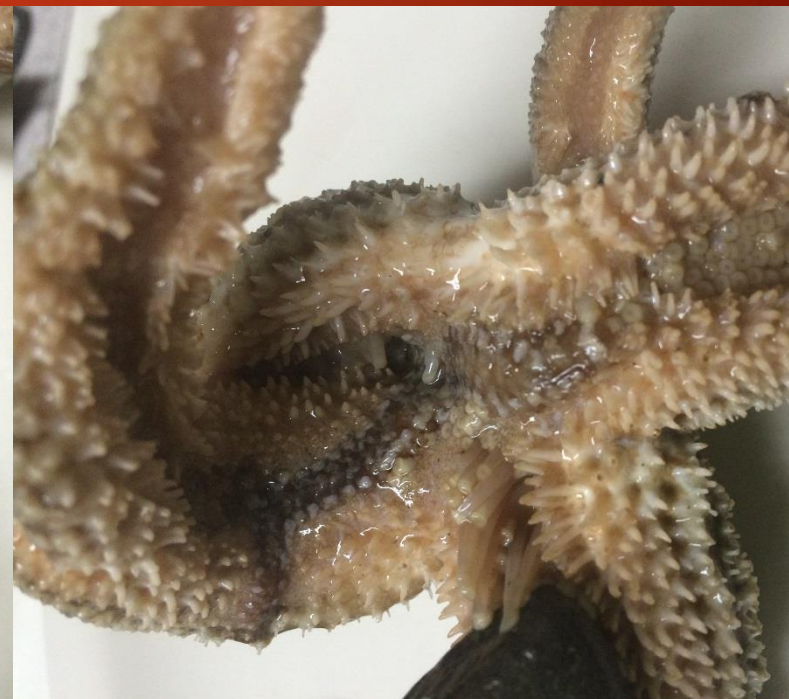
Mottled Sea Star



- High rate of affliction on Pacific Coast
- Lethal



- Limb loss
- Lesions, disfigurement
- Heavy parasitism



Evasterias troschelli

Severe SSWD or other cause?



Sitka Sound Science
Center Tank Specimen

Mediaster aequalis Vermillion Star



Sitka Sound Science
Center Tank Specimen

Leptasterias epichlora

Six-rayed Sea Star



- Not reported affected elsewhere
- No symptoms observed in Sitka

Solaster cf dawsonii

Sun Star



- Lethargic, dull, detached
- Possible lesions

Summary of Observations in Sitka

Sea Star Species	Habitat	Present at Site?			Symptoms of SSWD?		
		SNHP	JBBeach	SSSC Aq	SNHP	JBBeach	SSSC Aq
<i>Henricia cf leviuscula</i>	Lo IT	X	X	X	NO	?	NO
<i>Pisaster ochraceus</i>	Lo IT/tidepool	X	X	X	YES	YES	NO
<i>Mediaster aequalis</i>	Mid IT	0	0	X	NA	NA	?
<i>Dermasteria imbricata</i>	Lo IT	X	X	X	NO	YES	NO
<i>Pycnopodia helianthoides</i>	Subtidal	X	X	0	NO	YES	NA
<i>Evasterias trochelli</i>	Tide Pool Channel	X	X	X	YES	NO	YES
<i>Solaster cf dawsonii</i>	Lo IT	0	X	X	NA	YES?	NO
<i>Leptasterias epichlora</i>	Lo IT/under rx	X	X	X	NO	NO	NO

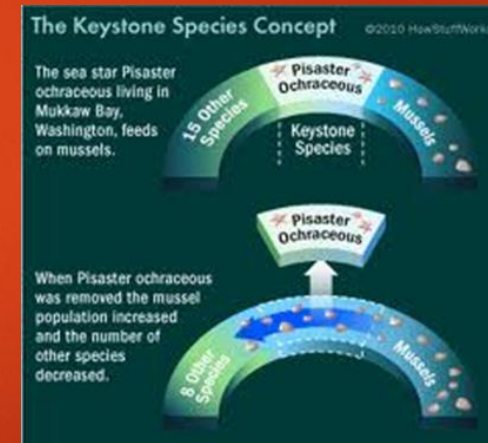
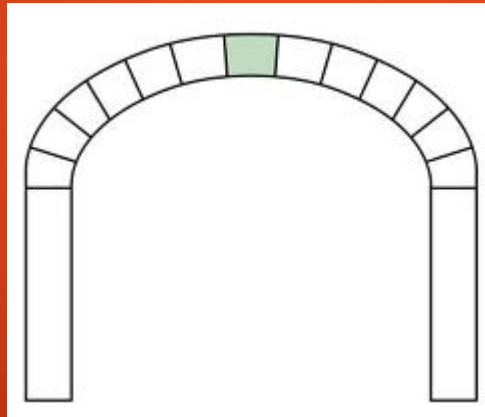
SNHP = Sitka National Historical Park

JBBeach = John Brown's Beach, Japonski Island, Sitka

SSSC – Sitka Sound Science Center aquarium

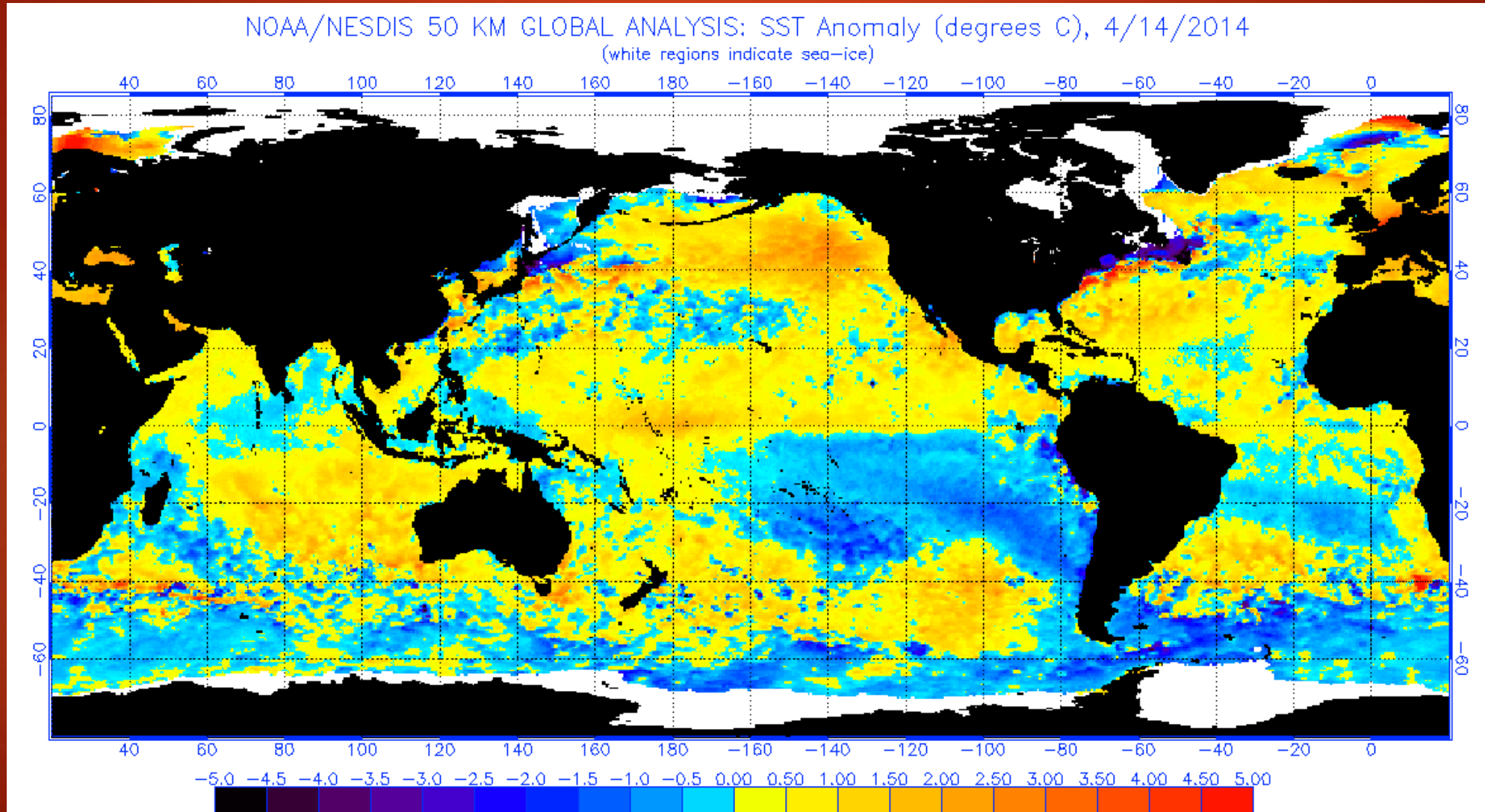
What's the problem (Is it a big deal)?

- ▶ Perplexing to have unexplained marine life illness in “pristine Alaska”, considering our connections to the sea
- ▶ Some sea stars are “Key Stone Species” in our nearshore ecosystem that maintain balance among creatures



- ▶ Does sea star sickness signal a change in the ocean?

NOAA Issues Official El Nino Watch As Forecasters Predict Year Of Oceanic Warming

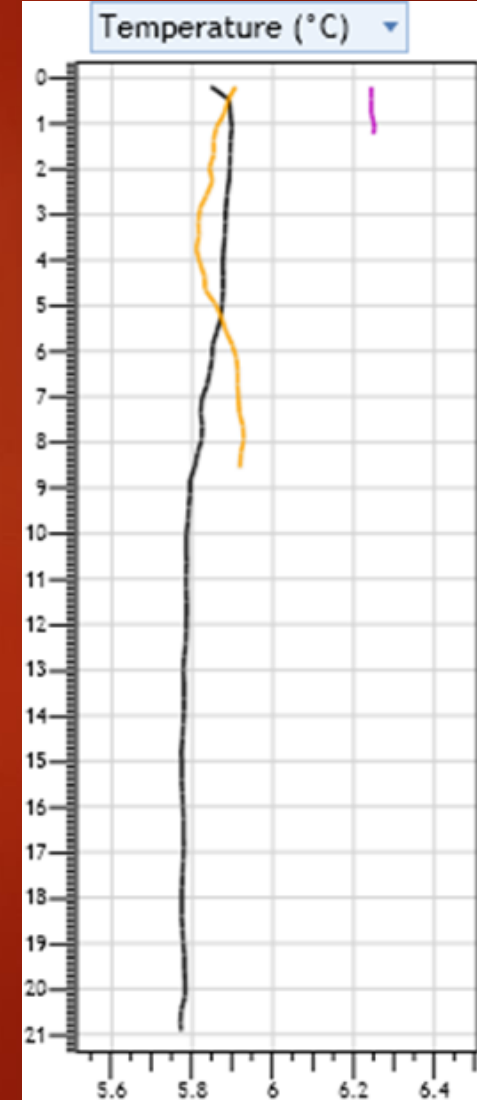
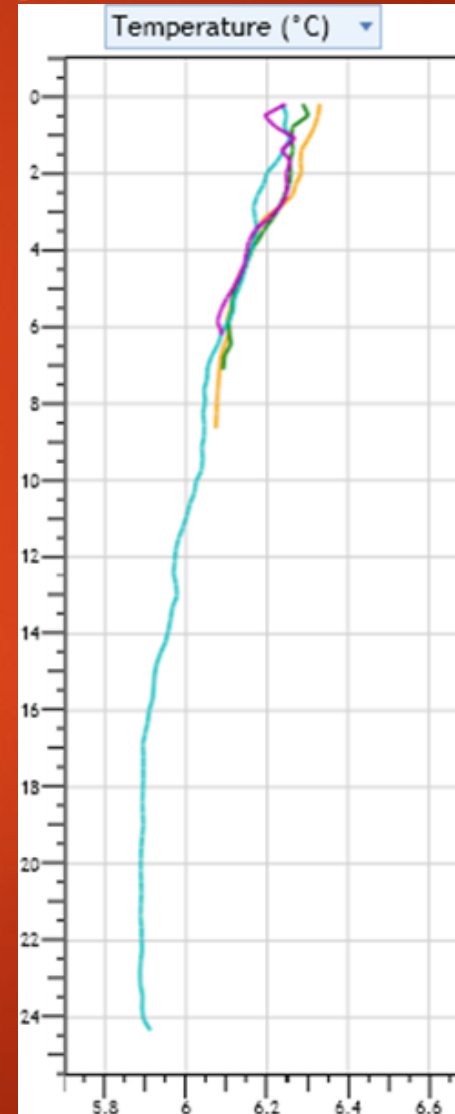


Is high temperature a cause?

Are Alaska seawater temperatures warmer than usual ?



NOAA Buoy & Satellite SST
Hatchery Intake Temperature



Next Steps in SSWD studies...

- ▶ RCN actively used and updated to map and record observations plus nearshore ecosystem effects

<http://www.eeb.ucsc.edu/pacificrockyintertidal/data-products/sea-star-wasting/index.html>

Pacific Rocky Intertidal Monitoring: Trends and Synthesis



- ▶ Sitka National Historical Park continuing monitoring
- ▶ ADF&G observing during dive surveys w/ protocols
- ▶ Aquarists and others that are informed watching stars
- ▶ Cornell, UCSD, WWU, and others trying to diagnose

Should Alaska do more?



Inform the public that may encounter SSWD while out on local beaches (SeaWeek groups, clamdiggers, tourists)

- ▶ Clarify what is known about the syndrome
- ▶ Educate public on what to do with symptomatic seastars
- ▶ Provide guidance to public and researchers how to record and upload photos and information
- ▶ Participate in research on extent and effects
- ▶ Assess ecological implications to fisheries, coastlines & communities

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