

# Observations of Sea Star Wasting Syndrome in Alaska



SITKA NATIONAL  
HISTORICAL PARK

# 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



Photo: Steve Fradkin

Missing 1 arm

tissue deterioration on 2<sup>nd</sup> arm



Photo: Laura Anderson

Missing 1 arm



Photo: Nathaniel Fletcher

## Category 4

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

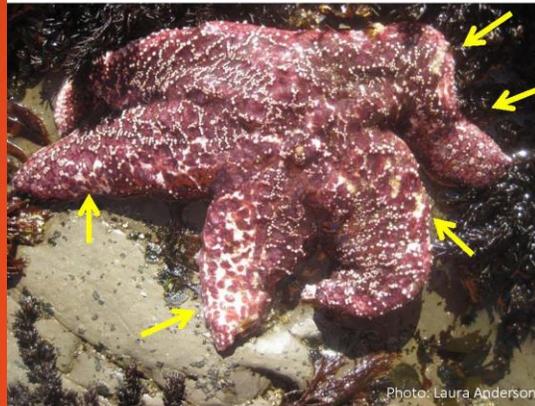


Photo: Laura Anderson

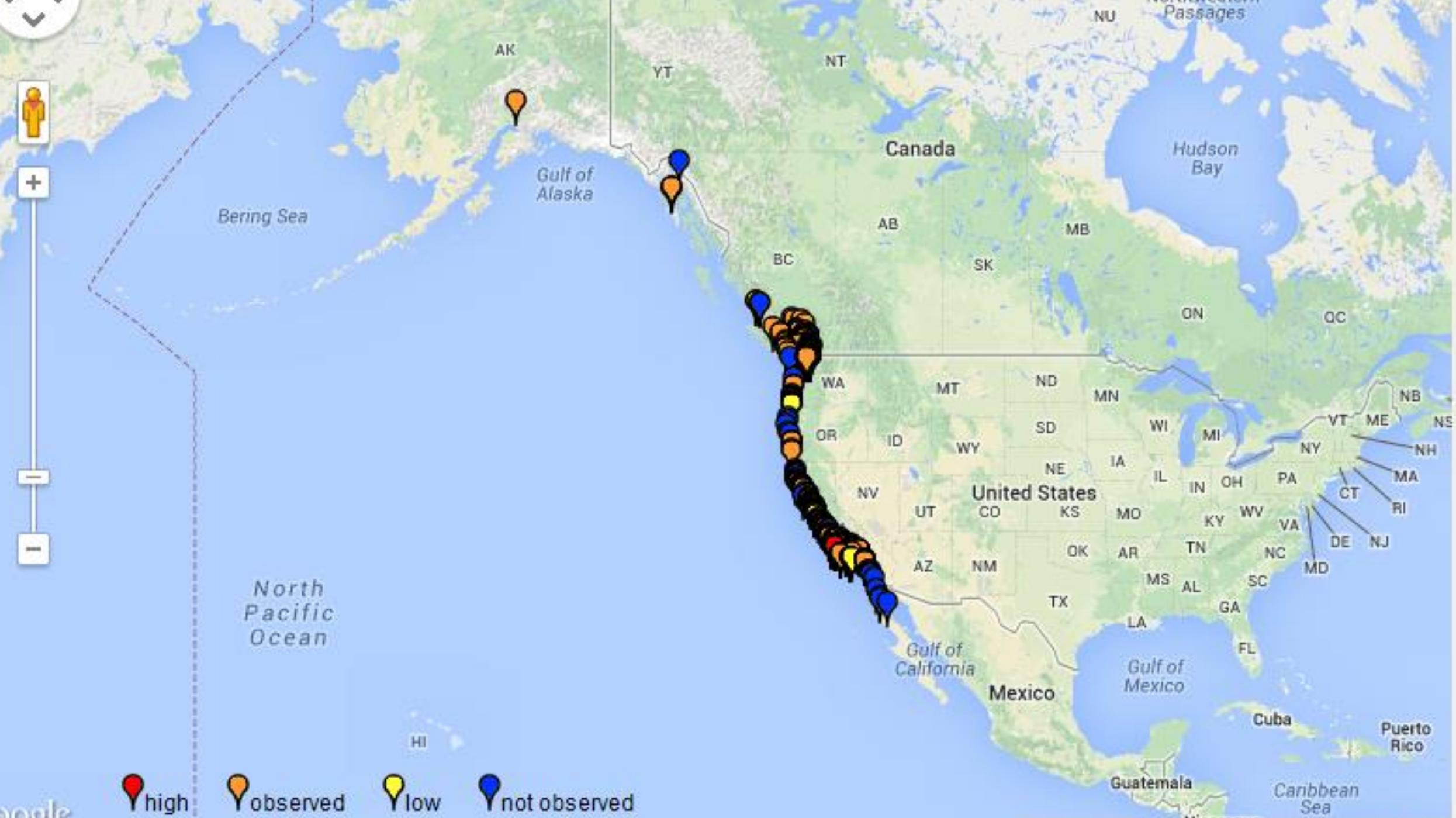
Missing 2 arms and tip of 3<sup>rd</sup>; multiple lesions on arms & body



Photo: Nathaniel Fletcher

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

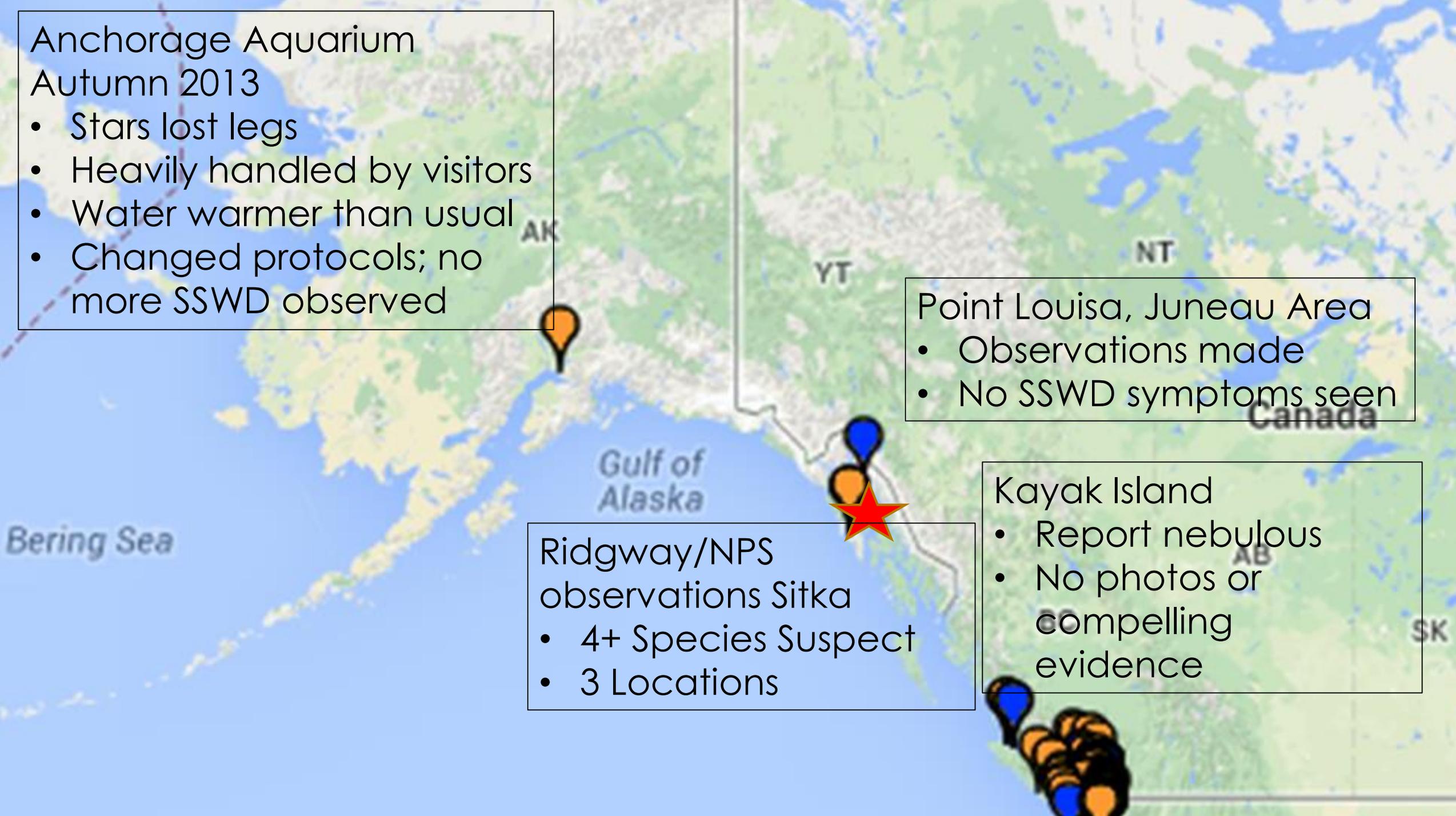
- Observations made
- No SSWD symptoms seen

## 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.

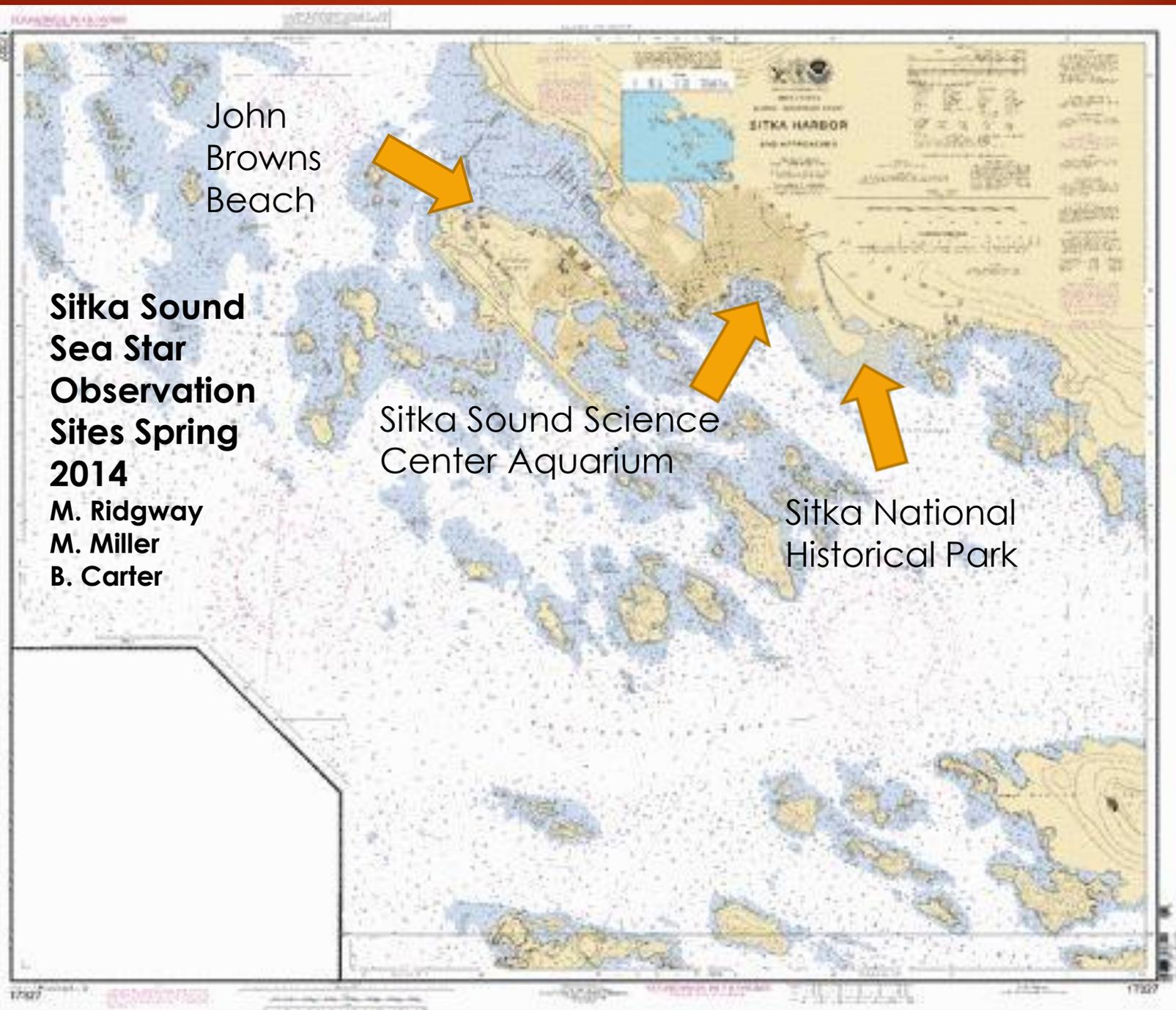
## WHY AN OUTBREAK SO EXTENSIVE ... ANY CLUES?

- ▶ 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





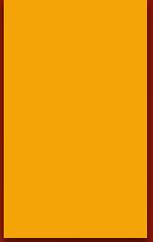
John Browns Beach

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

M. Ridgway  
M. Miller  
B. Carter

Sitka Sound Science  
Center Aquarium

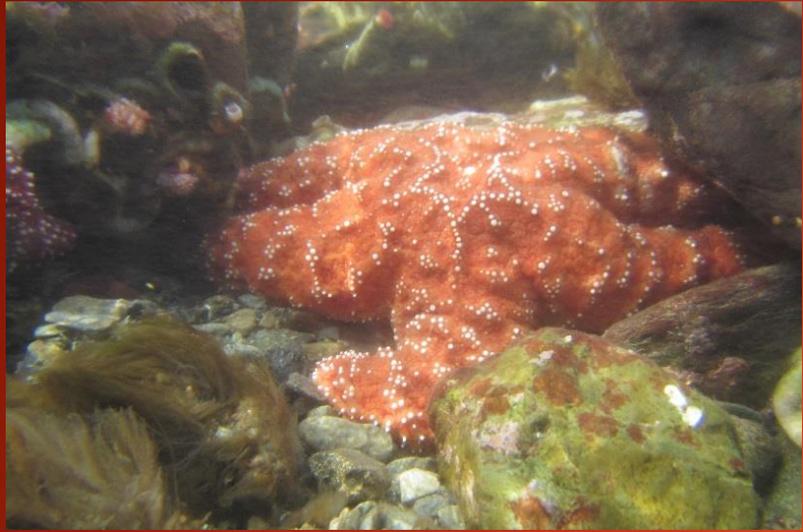
Sitka National  
Historical Park



# *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

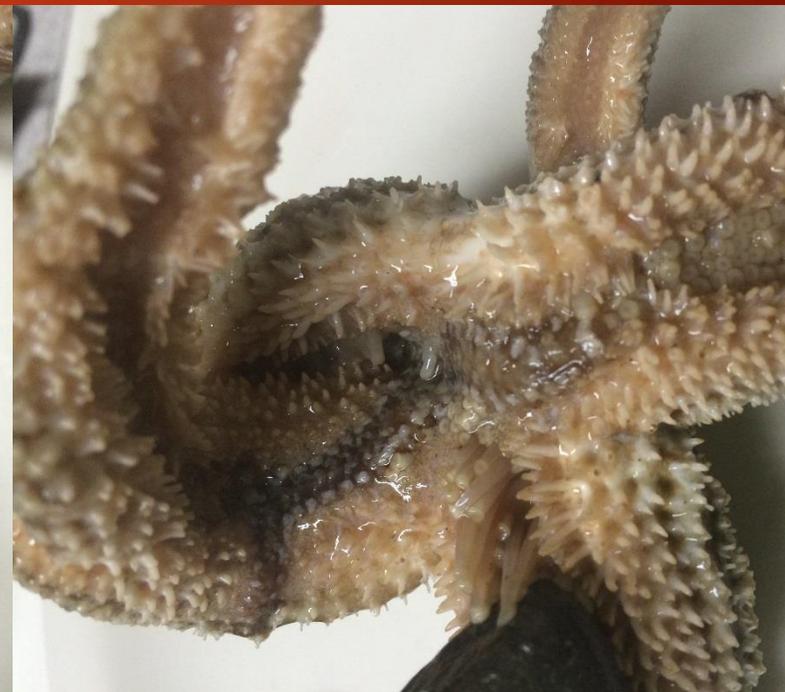
# *Evasterias troschelli* Mottled Sea Star



- 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

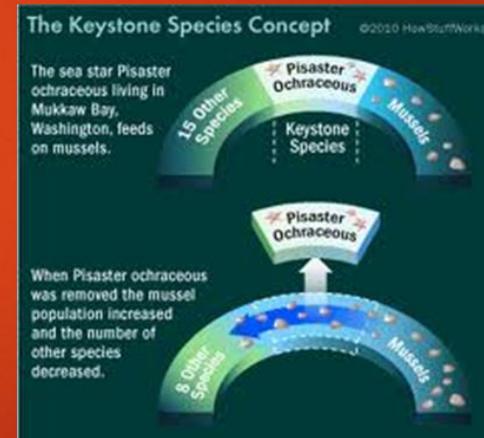
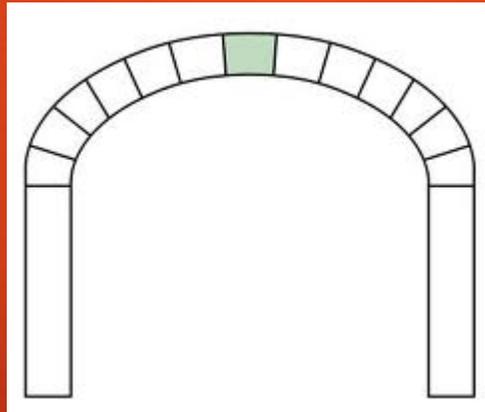
SNHP = Sitka National Historical Park

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

SSSC – Sitka Sound Science Center aquarium

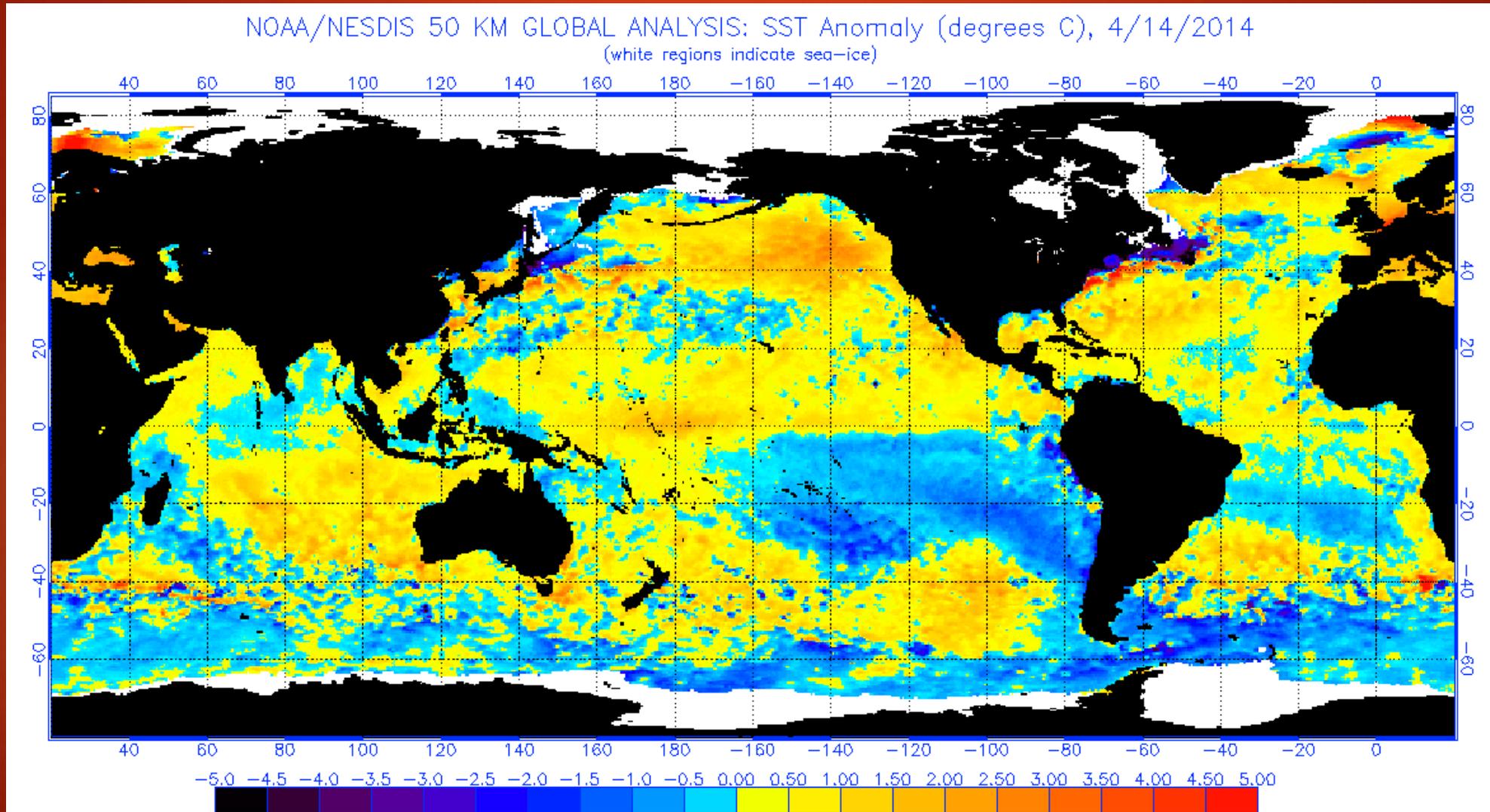
# What's the problem (Is it a big deal)?

- ▶ 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?

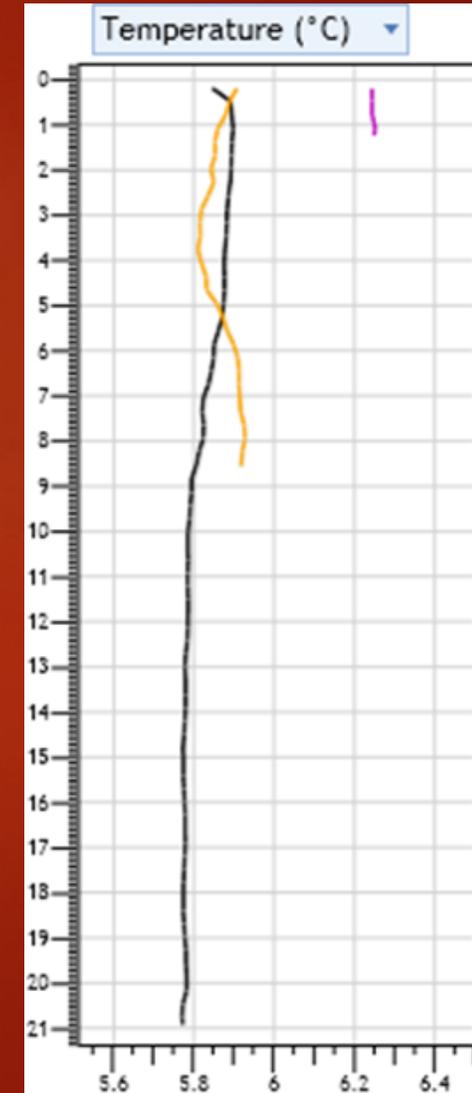
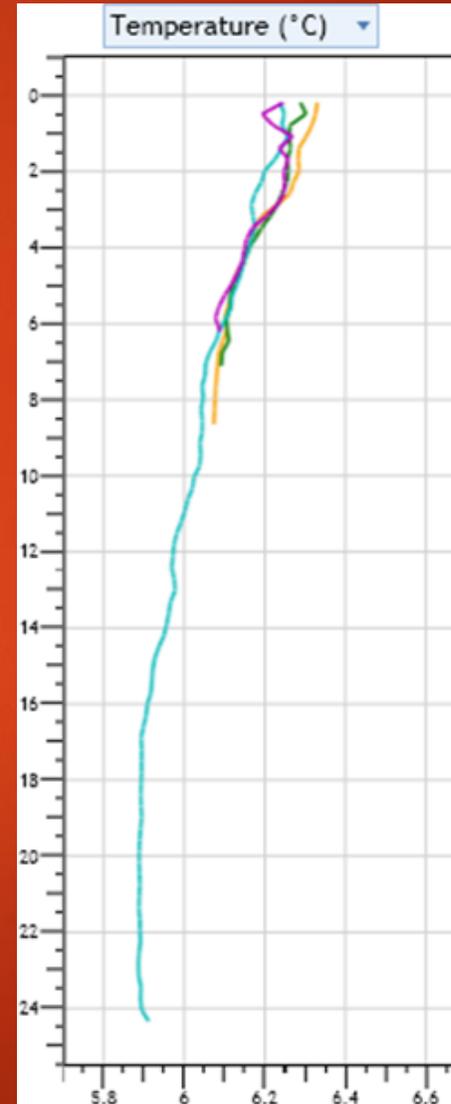
# NOAA Issues Official El Nino Watch As Forecasters Predict Year Of Oceanic Warming



# 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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