Sea Star Wasting Disease Updates

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Is Sea Star Wasting Disease (SSWD) Still Around?

- Symptoms
  - Twisted arms, deflated appearance
  - Tissue decay, lesions
  - Arm loss, often death

- Worst in 2013 – 2014
- Still present at low levels (< 20%)
- Most severely impacted:
  - *Pisaster ochraceus*
  - *Pycnopodia helianthoides*
Where did SSWD come from?

- Probably the North American Pacific coast
- Happened before on regional scales
  - Often coincided with El Niño or warm water
- Was present at very low levels for decades
Do we know what causes it? Pathogen search

• Unknown cause and mechanism of spread
  • Virus(es) involved?
  • Environmentally driven?
  • Stress-driven?

• Lab trials of sea star microbiome
  • No consistent pathogen found to cause lesions
Do we know what causes it? Environmental factors
Environmental factors relevant for whole coast

↑ Proximity to nearest infected site

↑ Afternoon low tide exposure
No clear relationship with warm water

• No warm water pattern
  – Different from prior outbreaks

• Low tide duration
  – ↑ virulence?
  – ↑ susceptibility?

• Correlation, NOT causation
Are the surviving stars immune?

- Not sure if immune or just recovered
- Possible resistance genes in *Pisaster* under investigation (UC Merced)
Recovery in progress for *Pisaster*, but not normal yet

- Relatively high recruitment in Sanctuary
- Shifted size structure to small individuals
- Biomass still low → low predation pressure
Comparison to long-term

- Most regions below long-term average abundance
- Further below long-term average biomass (predation pressure)

Pisaster ochraceus sizes, Long Marine Lab, Santa Cruz

Arm length (mm)

Sampling year + season
Pisaster ochraceus sizes, Hopkins Marine Station, Pacific Grove

Arm length (mm)

Sampling year + season

Number of individuals
Pisaster ochraceus sizes, Point Sierra Nevada, San Luis Obispo County

Arm length (mm)

Number of individuals

Sampling year + season
Pycnopodia not recovering

Sunflower stars $\rightarrow$ urchins (mostly purple) $\rightarrow$ kelp
Intertidal community effects of low *Pisaster*

Hakai Magazine
Asilomar, April 2014

Asilomar, April 2015
Perspective on mussel bed change
Kelp loss and urchin barrens

Van Damme

Point Arena Cove

Timber Cove

Fort Ross

Mendocino County

Sonoma County

CA Dept. of Fish and Wildlife
Results: Whole coast patterns – neighbor sites and low tide duration

• $\downarrow$ Distance from nearest infected site
Results: Whole coast patterns – neighbor sites and low tide duration

- ↑ Afternoon low tide exposure
Skewed size structures

Terrace Point, CA