



National Wildlife Health Center
Wildlife Health Bulletin 2013-06

Sea Star Mortality on the West Coast

To: Natural Resource/Conservation Managers
From: Dr. Jonathan Sleeman, Center Director, USGS National Wildlife Health Center
Date: December 11, 2013

Millions of sea stars on the west coast, from Alaska to Southern California, have recently been dying from unknown causes. The USGS National Wildlife Health Center is collaborating with scientists from multiple entities to learn more about this mortality event, coordinate a response, conduct necropsies, and uncover the cause. Collaborators include the Monterey Bay, Seattle, and Vancouver, B.C. Aquaria; University of California–Santa Cruz and UC Davis/SeaDoc Society; Wildlife Conservation Society; Western Washington University; Cornell University; Roger Williams University; and a veterinary pathologist from Northwest ZooPath. The event, which began in June 2013, is affecting various sea star species in wild and captive populations; the two species affected most are *Pisaster ochraceus* (purple sea star or ochre starfish) and *Pycnopodia helianthoides* (sunflower sea star).

The most commonly reported clinical sign is small white lesions on the arms of the starfish that quickly progress into large extensive lesions encompassing the arm and disc, causing the animal to lose limbs and eventually disintegrate within a few days. Dense aggregations of sea stars may die in a matter of weeks. Entire populations have been decimated in Puget Sound and the Salish Sea (Washington and Vancouver) and along the California coast. Scientists have been monitoring these intertidal ecosystems for decades.

To date, no underlying cause(s) of these mass mortalities have been identified. In previous outbreaks, bacterial and viral agents, as well as environmental toxins and contaminants were suggested as underlying causes, but they were not confirmed. The 2013 outbreak appears more severe than previous outbreaks, killing up to 95 percent of some populations and affecting a much larger geographic area along the west coast. Scientists are compiling mortality reports from the public, monitoring designated sites along the Pacific coast, collecting specimens for diagnostic necropsy, and conducting diagnostic microbiology and genetic sequencing to determine if infectious or toxic agents are involved.

Previous outbreaks on the west coast include the 1983 die-off in Southern California that almost completely eliminated *Pisaster ochraceus* from tidal pools. A smaller scale die-off occurred in 1997 that scientists hypothesized may have been catalyzed by warm waters from El Niño currents; sea stars prefer cooler waters. Warm temperatures have been shown to negatively impact sea star health and can lead to infected wounds. A similar but smaller outbreak in sea stars also occurred in the spring of 2013 along the east coast.

Pisaster ochraceus is considered a top predator in the rocky intertidal zone and has long been referred to as a keystone species as its diet includes mussels, barnacles, snails, limpets, and mollusks. If this sea star is removed from the intertidal ecosystem through disease or some other mechanism, the mussel population has the potential to dramatically increase, which could significantly alter rocky intertidal community structure. In the subtidal zone, *Pycnopodia helianthoides* is a major predator of numerous

species, spanning many phyla, and a decline in its population will likely have far-reaching impacts. In addition, sea star larvae are an important component of plankton, the base of the ocean food chain. Sea star predators include other invertebrates, such as other starfish, mollusks, shorebirds, gulls, and occasionally sea otters.

For further information on sea star wasting syndrome, please visit these Web sites:

The Pacific Rocky Intertidal Monitoring Program (within UC Santa Cruz):

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

Vancouver Aquarium, Sea Star Wasting Syndrome: <http://www.vanaqua.org/act/research/sea-stars>

To report or request assistance for wildlife mortality events or health issues, please visit the NWHC Web site at http://www.nwhc.usgs.gov/mortality_events/reporting.jsp or contact a NWHC staff member listed below ([see map of states by region](#)):

Western states: Barb Bodenstein, 608-270-2447, bbodenstein@usgs.gov

Central states: LeAnn White, 608-270-2491, clwhite@usgs.gov

Eastern states: Anne Ballmann, 608-270-2445, aballmann@usgs.gov

Hawaii and Pacific Islands: Thierry Work, 808-792-9520, thierry_work@usgs.gov

Single animal mortalities: Jennifer Buckner, 608-270-2443, jbuckner@usgs.gov

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Whitish areas on this diseased *Pycnopodia helianthoides* (sunflower sea star) are lesions that result in the detachment of arms from the central disc (photo courtesy of Dr. Lesanna Lahner, Seattle Aquarium).