
Recent Marine Mammal Strandings in Southern California

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What is a “stranded” marine mammal?

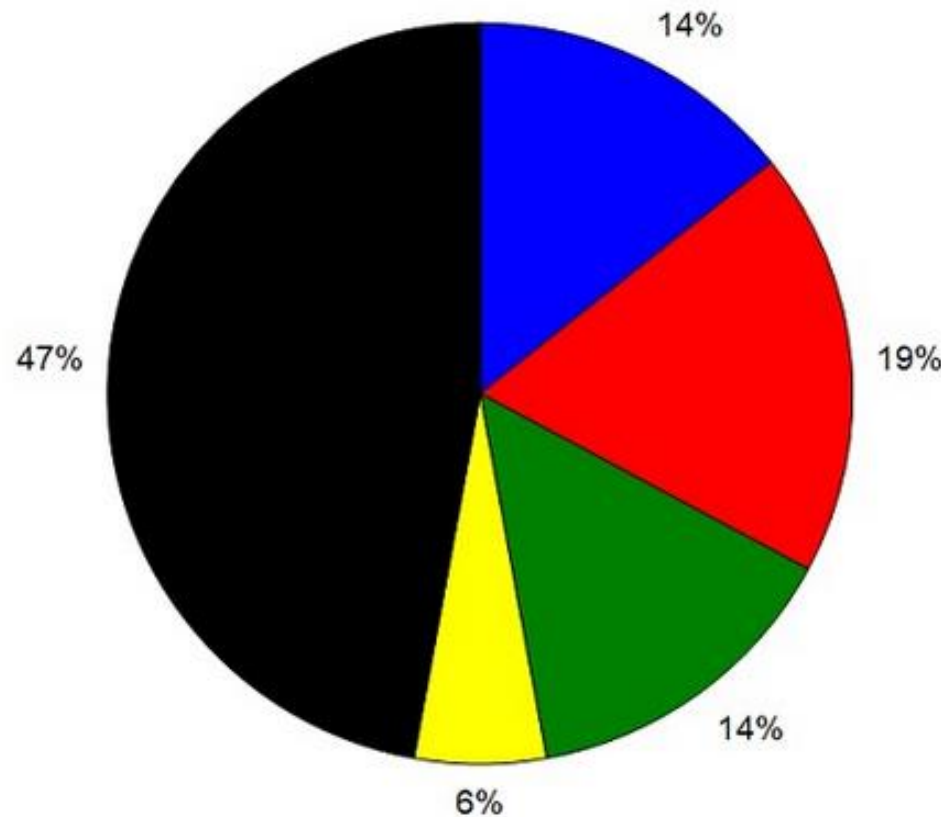
- Animal on the shore and unable to return to the water
- Animal in need of apparent medical attention or trapped away from their normal habitat
- A dead marine mammal on the beach or in the water



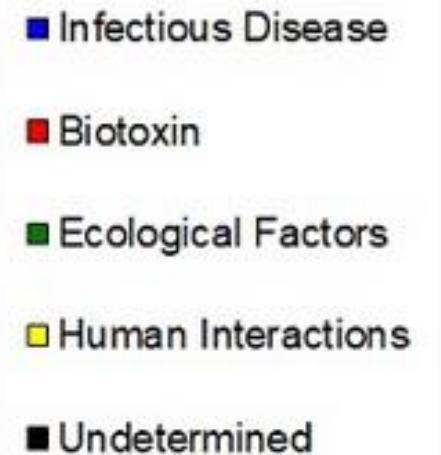
Causes of marine mammal strandings

- Marine mammal strandings can be caused by numerous factors including:

- Malnutrition
- Biotoxins
- Pathogens
- Human interactions

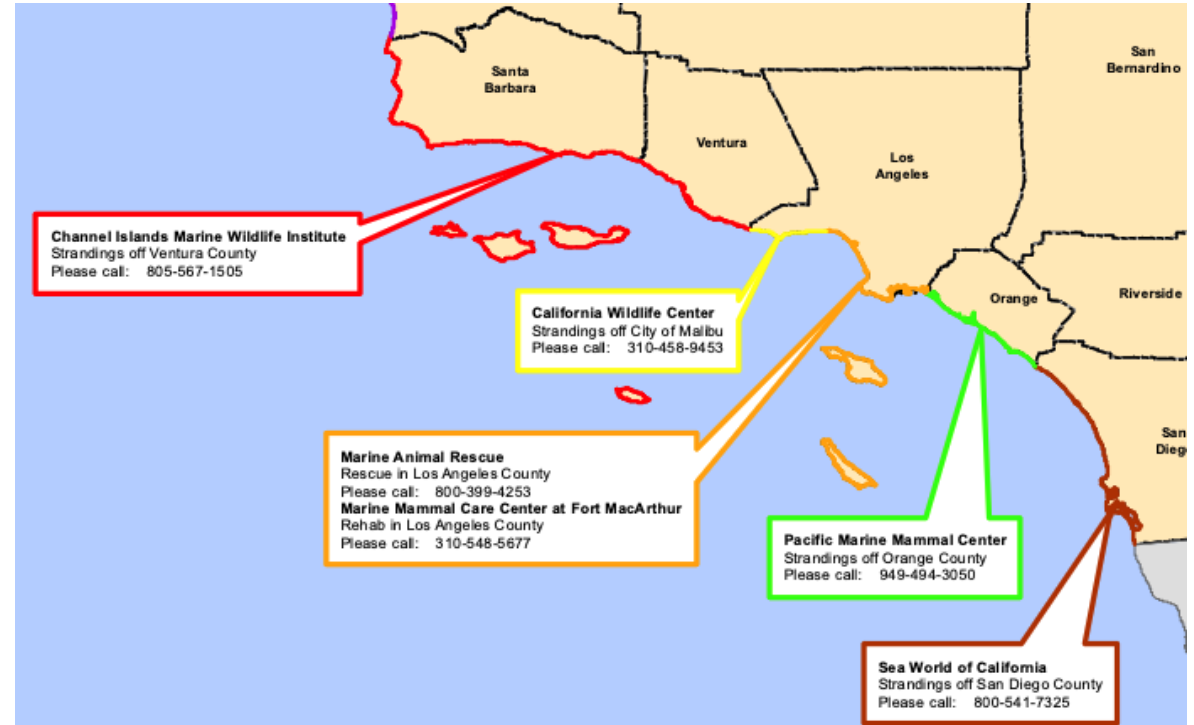


Causes of Mass Stranding events
1991-2020



Fate of stranded marine mammals

- CA Stranding Network covers entire coast
- Live animal strandings are rescued and treated
 - Most rehabilitated animals are returned to the ocean
 - Some rehabilitated animals are non-releasable and are sent to zoos
- Dead animals are also collected
 - Species, sex, and level of decomposition cataloged

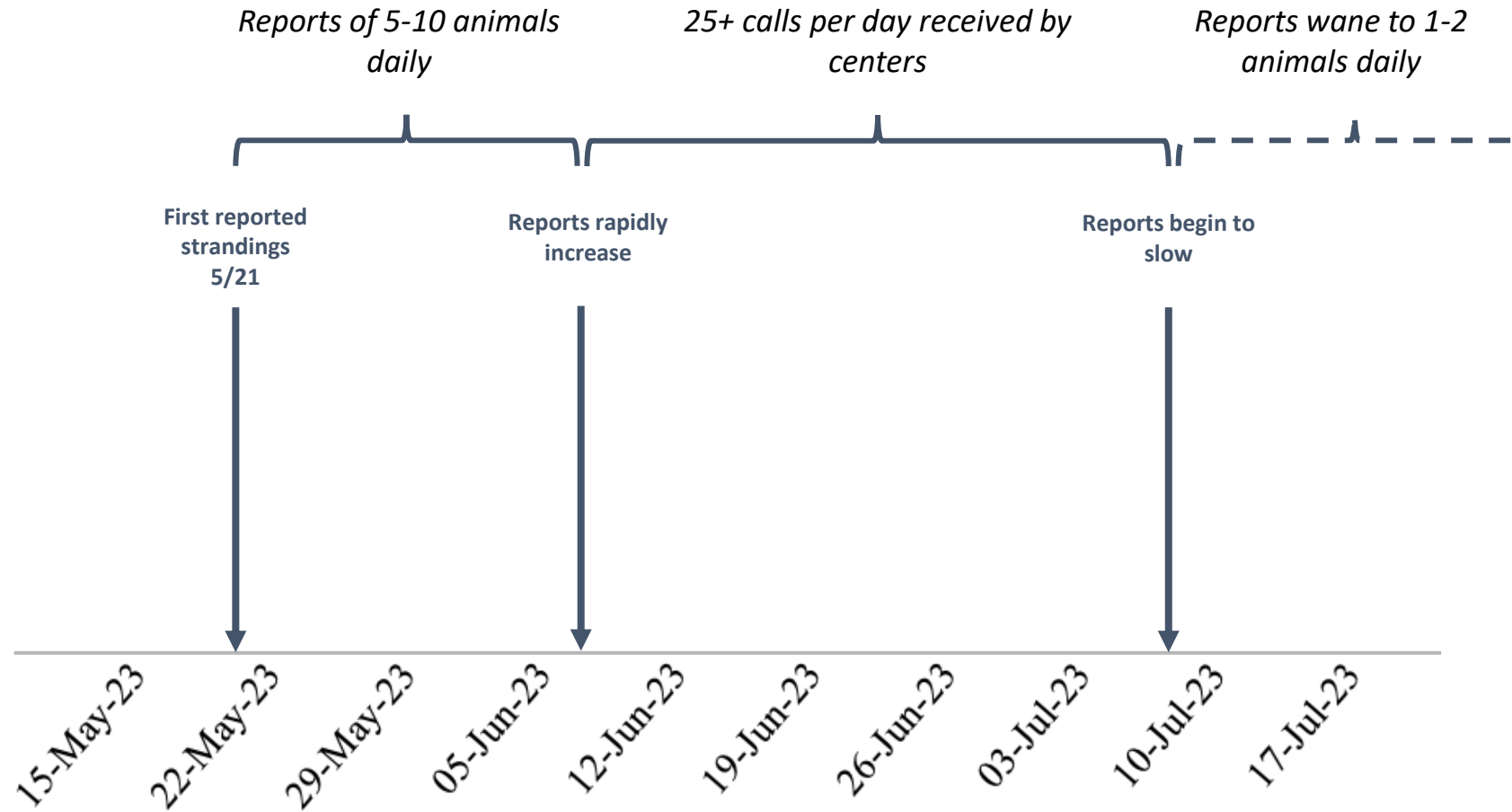


This Summer's Marine Mammal Stranding Event

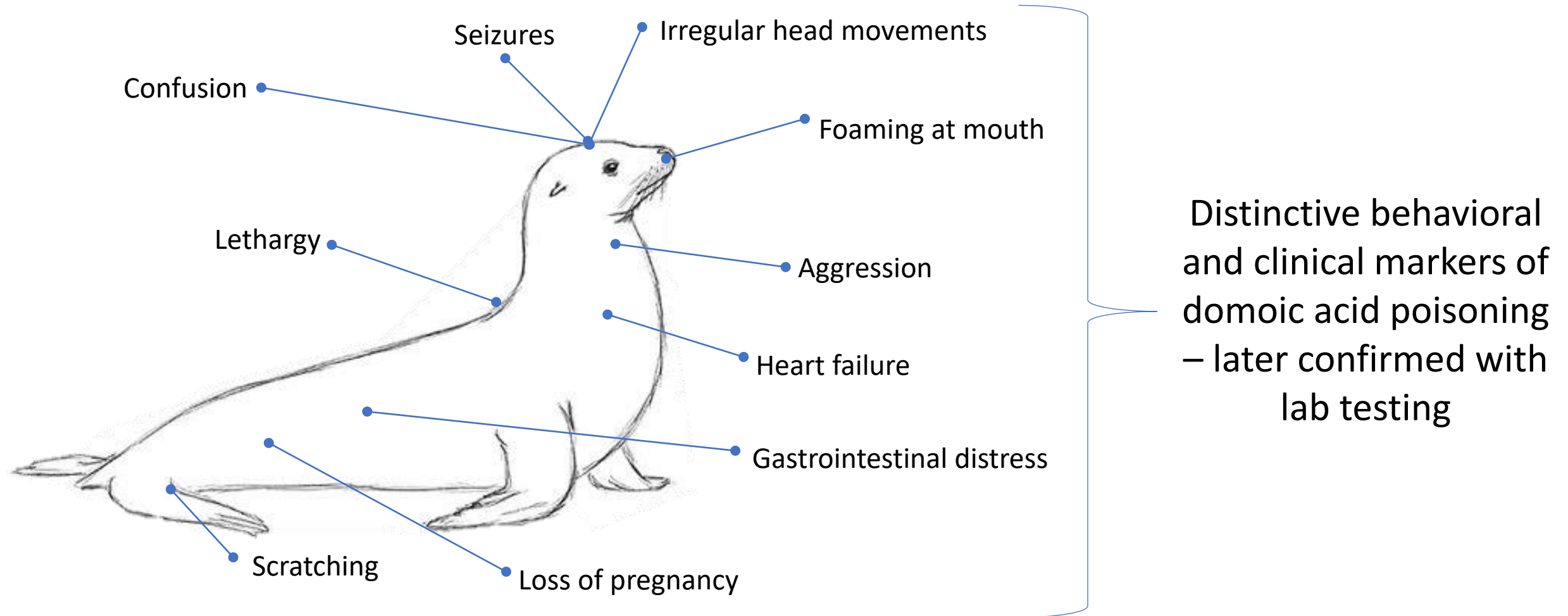


- ~850+ animals impacted (counts still in progress)
- California Sea Lions & Long Beak Common Dolphins primarily impacted
- Large number of pregnant female sea lions reported to have lost their pregnancies
- Multiple reports of sea lion attacks on humans – 30 estimated attacks

Progression of the Event



Domoic acid poisoning linked to strandings



What is Domoic Acid?

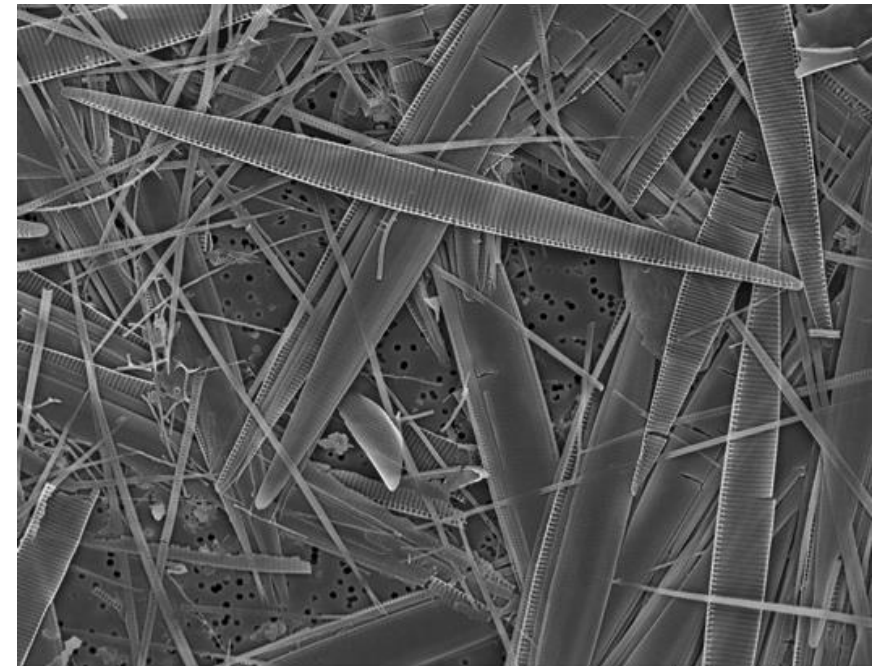
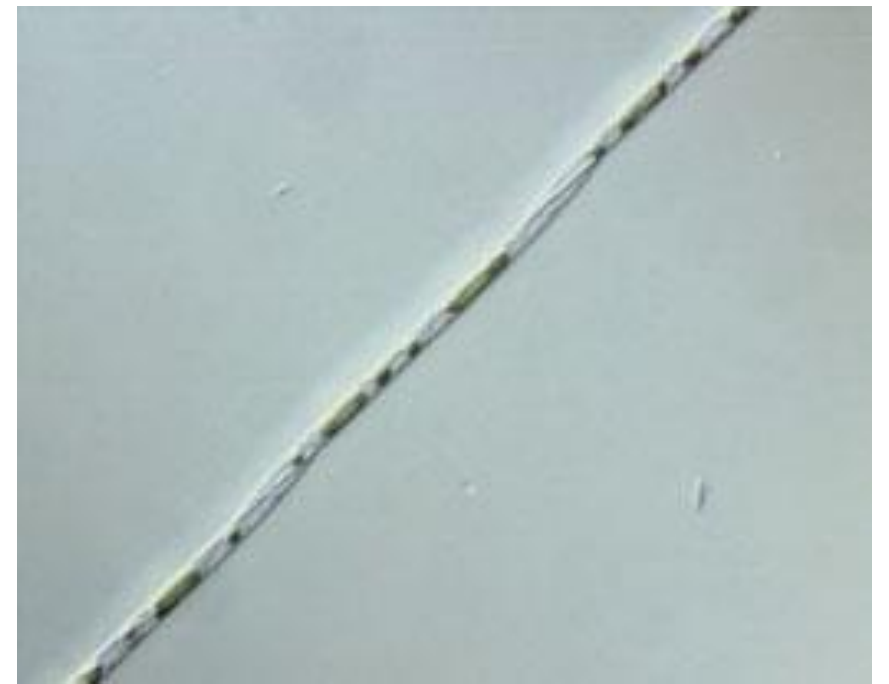
Produced by the diatom, *Pseudo-nitzschia*

Bioaccumulates in shellfish

Trophic transfer throughout the food web

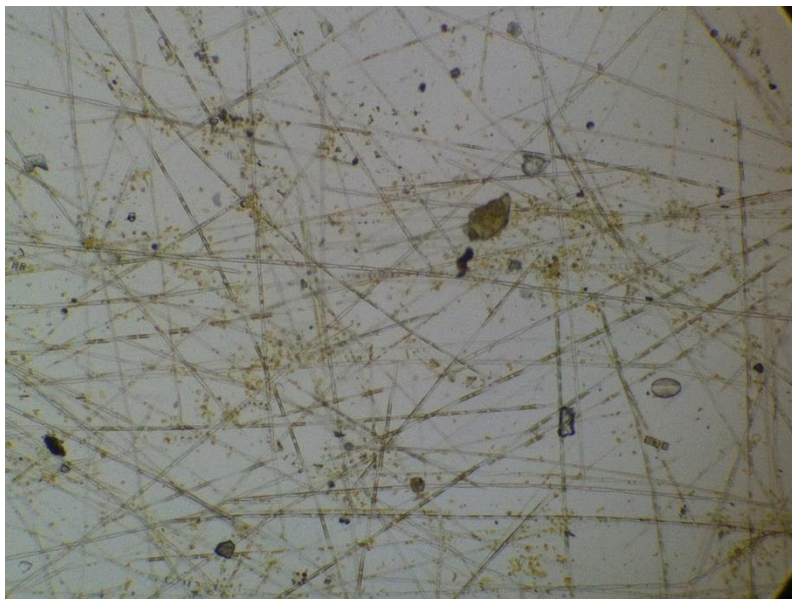
Symptoms of DA poisoning

Death, short-term memory loss, disorientation, nausea, vomiting, diarrhea, seizures



20µm 1000X

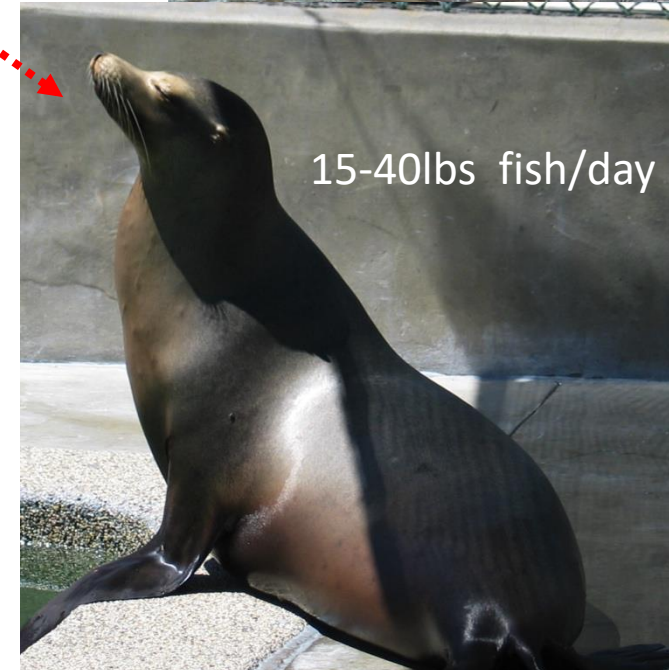
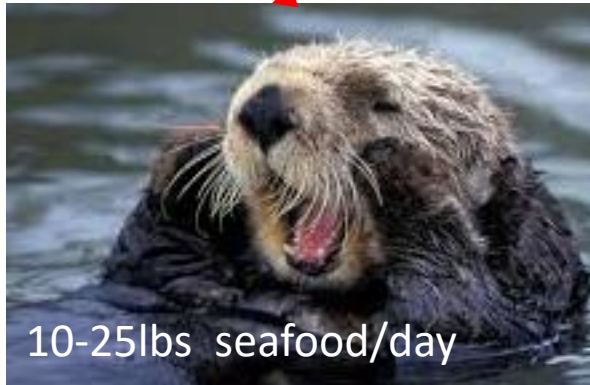
Marine mammals can't avoid domoic acid



Planktivorous fish

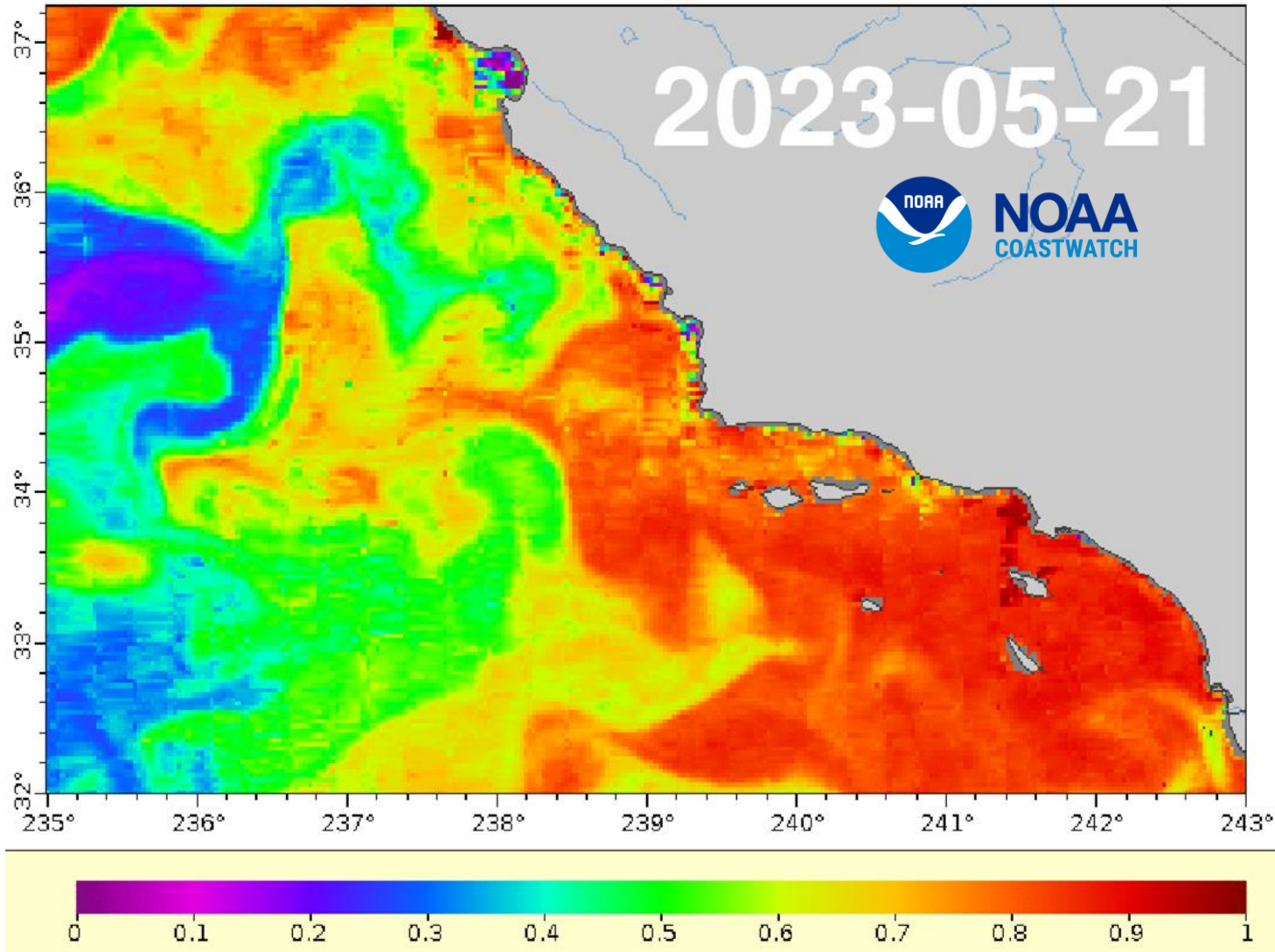


Shellfish



Bight-wide bloom that extended offshore

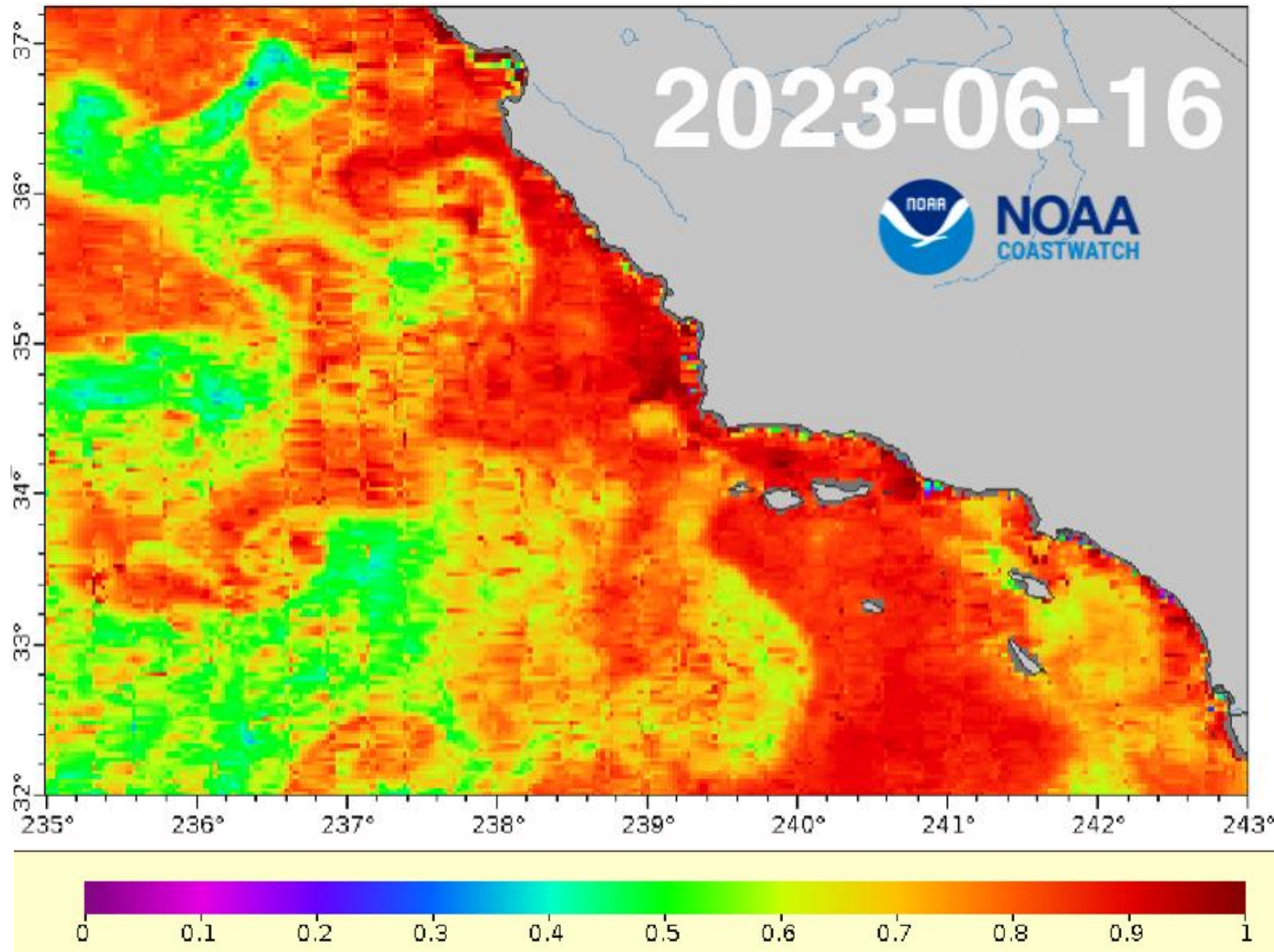
California-Harmful Algal bloom Risk Mapping (C-HARM): May 21st to July 20th



Probability of Particulate Domoic Acid $> 0.5 \mu\text{g L}^{-1}$

Bight-wide bloom that extended offshore

California-Harmful Algal bloom Risk Mapping (C-HARM): May 21st to July 20th



Probability of Particulate Domoic Acid > 0.5 µg L⁻¹

- High DA probabilities extended far offshore
 - Involvement of dolphins also suggests offshore bloom activity
- Bloom appeared to progress from north to south
 - Persistent in SB Channel

What is being done to respond?

Response team:



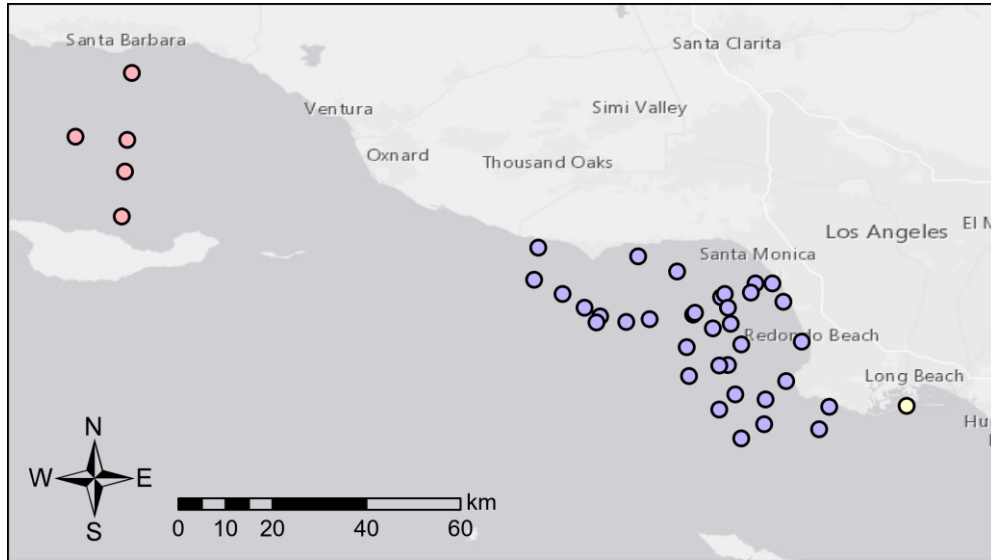
Team Efforts:

Activity 1: Determine DA levels in marine wildlife experiencing impacts

Activity 2: Enhance spatial coverage of existing DA monitoring

New sampling efforts

40+ surface water grab sampling events between June 21– July 22

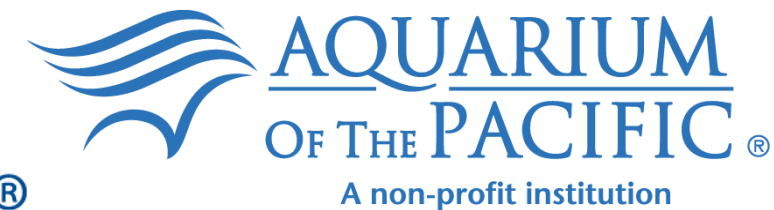


Sampling agency

- Aquarium of Pacific
- LA Waterkeeper
- SB Channel Keeper



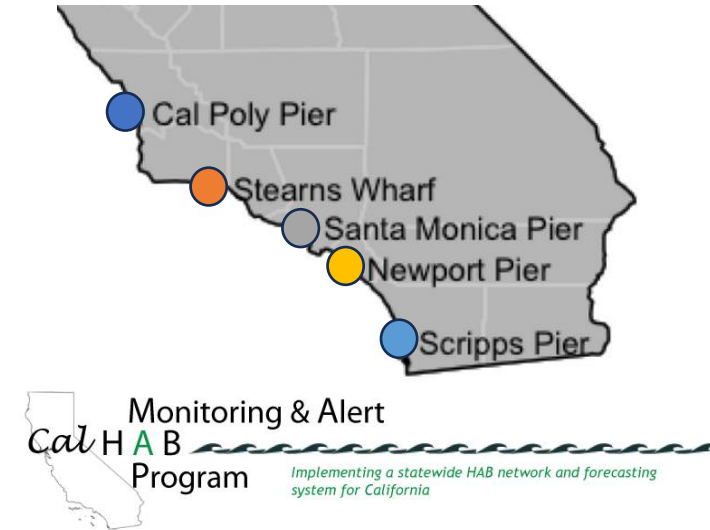
Sampling Partners:



Lessons Learned

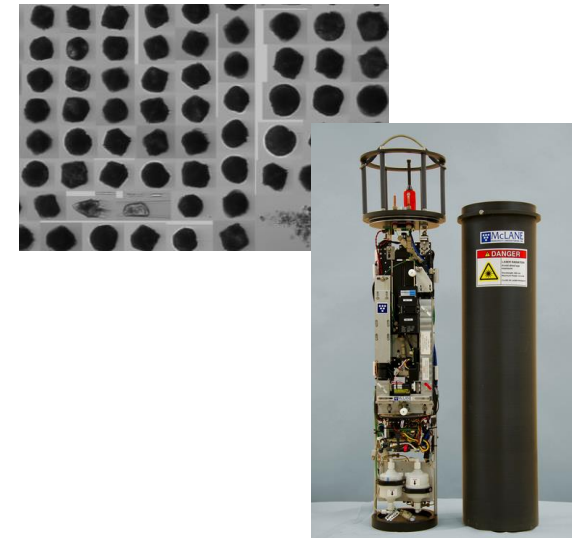
1. Pier monitoring is spatially limited

- For this event, pier observations only gave us a partial picture of bloom extent and magnitude
- Offshore monitoring helps give a fuller picture of an event

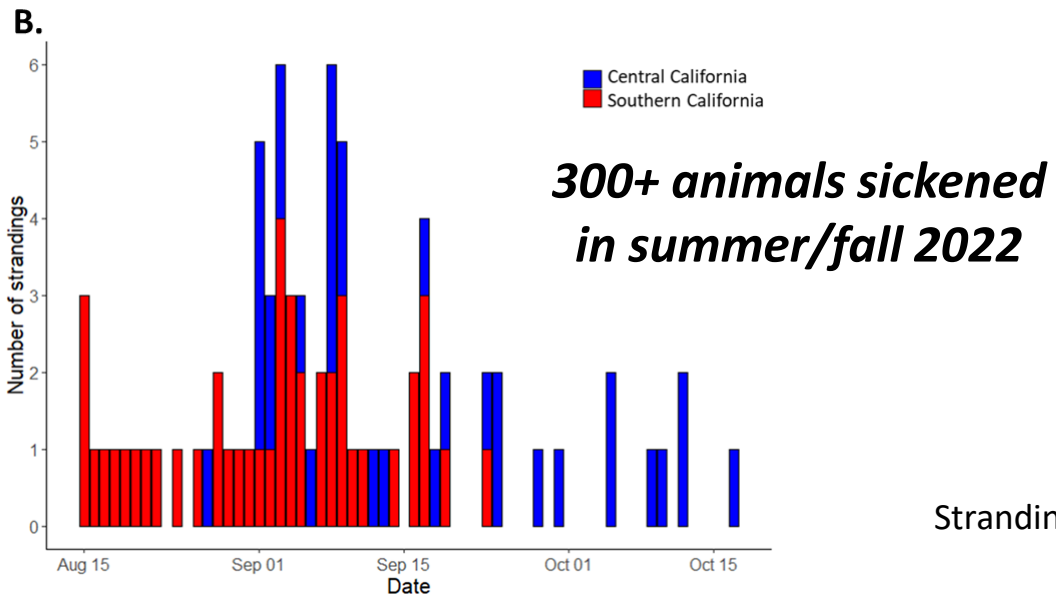
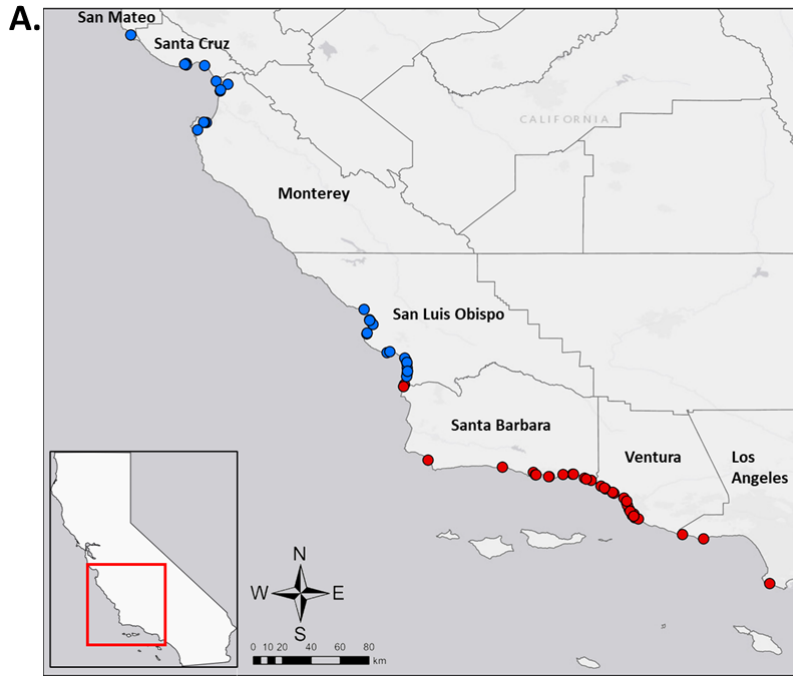


2. Real time monitoring is great...when it works!

- California's Imaging Flow Cytobot Network can provide real time HAB data
- Unfortunately, *all four IFCB units in the Bight* were out of commission for this event



How does 2023 compare to other events?

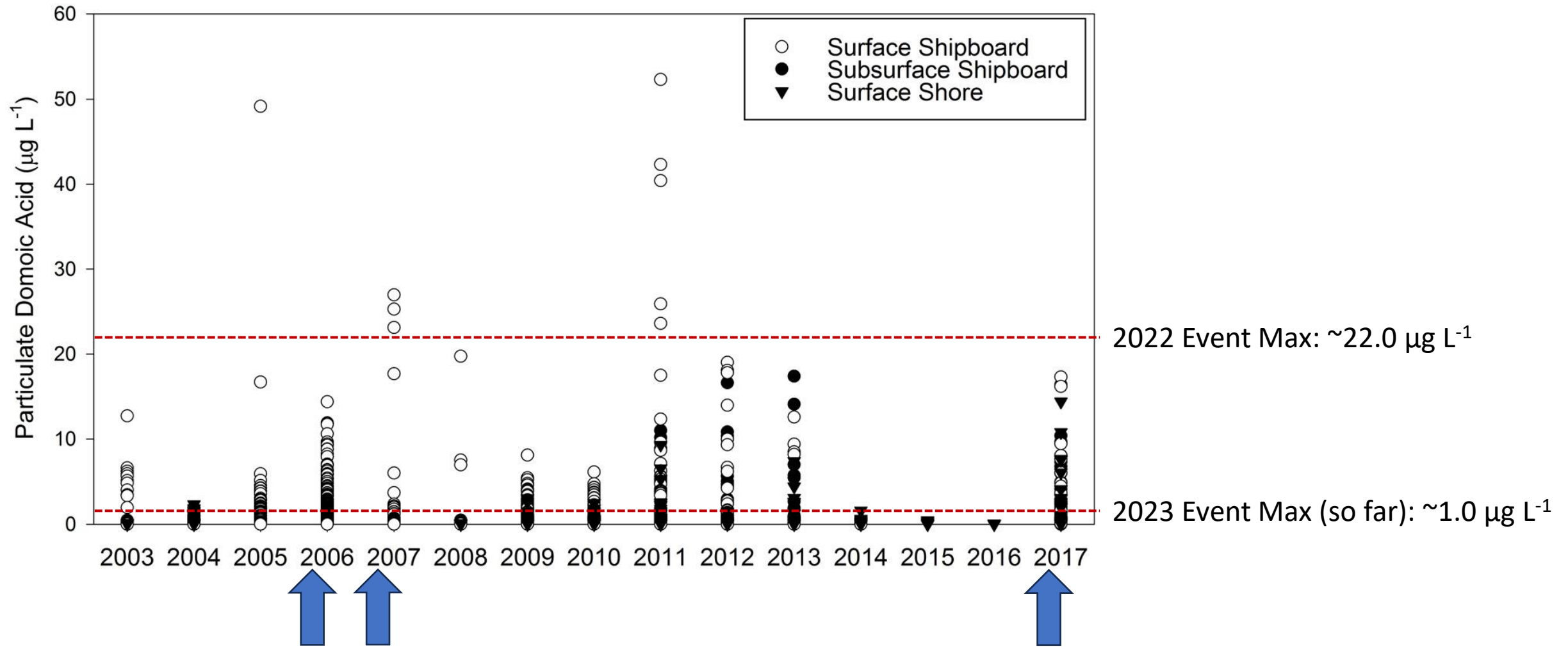


Channel Islands Marine & Wildlife Institute rescuing intoxicated sea lion

Stranding Network Partners:

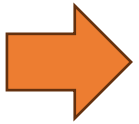


Comparisons to historical events in the Bight



Broader effects of domoic acid events

This year's event



Shellfish Safety Notification: Sport-Harvested Bivalve Shellfish from Santa Barbara County

Date: June 16, 2023

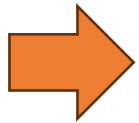
Number: SN23-003

Contact: CDPHpress@cdph.ca.gov

Domoic acid events resulted in safety notifications in Santa Barbara County

- Bloom occurred during annual quarantine period

It can be a lot worse!



Federal Government Declares 2016 Crab Season A 'Disaster'

A new law could provide crab fishermen with \$138 million in relief.

By Neal McNamara (Patch Staff) - January 20, 2017 9:58 am ET | [P](#) |

Long term closure of crab fisheries in 2015/16

- CA economic losses estimated at **\$49 million**

Public perception of HAB causes includes nutrients

The New York Times

Hundreds of Sea Lions Are Dying. Is an Algal Bloom to Blame?



By Livia Albeck-Ripka
Reporting from Los Angeles

June 21, 2023

NBC NEWS

For California marine mammals, toxic algae bloom is a mass casualty incident

June 27, 2023, 4:35 AM PDT

By Dennis Romero

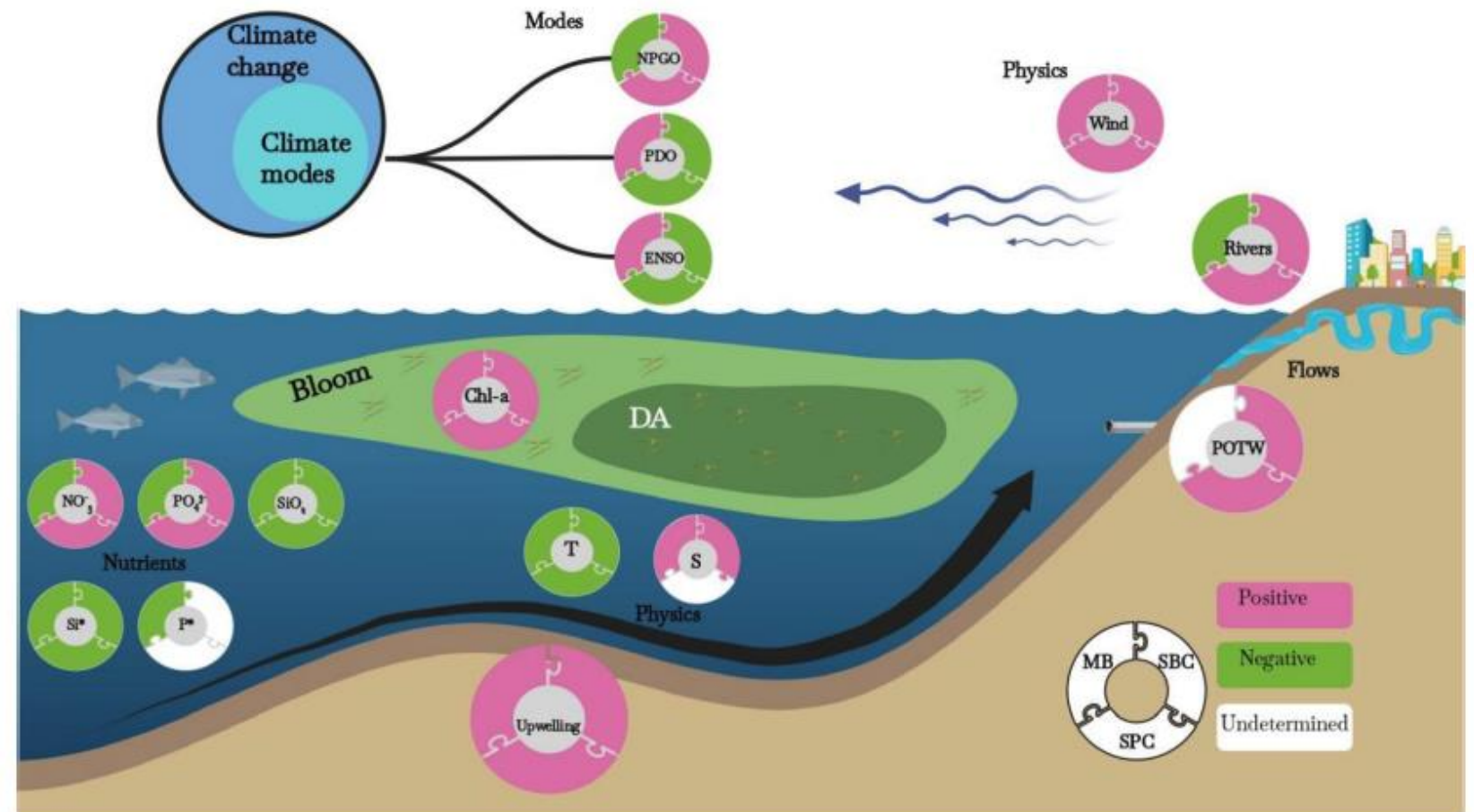
blooms occur naturally, human activities that disturb ecosystems are thought to play a role in their more frequent occurrence and heightened intensity. This includes pollution and climate change, according to the [NOAA](#).

Scientists believe the blooms, which are becoming almost annual affairs, are also boosted by urban runoff that includes [farm fertilizer and human waste](#). The increasing frequency of the blooms can also be correlated to global warming, as well as to the warmer, wetter climes of El Niño, the weather phenomenon [present and expected to strengthen by winter](#).

Nutrients are important, but it's complicated

Field observations and experiments point to:

- Multiple drivers
- Combination of natural and anthropogenic influences
- Interacting effects

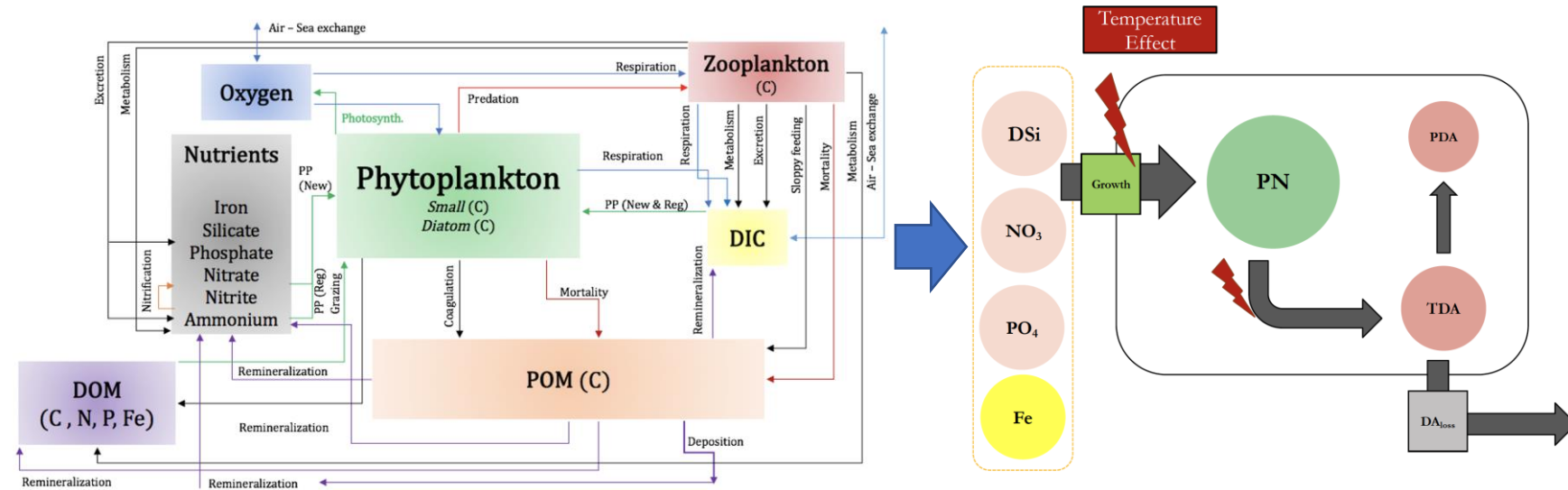


Modeling work to untangle role of individual factors

Reproduce mechanistic relationship between environmental conditions and DA production

Tool to better understand drivers:

- Local nutrient inputs
- Climate change drivers
- Other factors



Moreno et al., 2022

Sandoval Belmar et al., 2023

Partners:





Questions?

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