

1) Domoic Acid Background

History

- Produced by several species of diatoms within the genus *Pseudo-nitzschia*.
- The first reported outbreak was in 1987 on Prince Edward Island, Canada - 3 deaths occurred from consuming contaminated blue mussels (*Mytilus edulis*). A 1991 outbreak was responsible for hundreds of seabird deaths in Monterey Bay. A coast-wide survey showed detectable levels of domoic acid in bivalve shellfish from all counties in California (highest in Santa Cruz and Monterey in the fall of 1991). Domoic acid was subsequently identified in mussels, razor clams and other seafood.

Foods Affected

- Mussels, oysters, clams and scallops.
- Viscera of anchovies, sardines, crabs and lobsters are susceptible.
- Commercially caught shellfish should not contain domoic acid: each state conducts rigorous testing of commercial bivalve shellfish.

Mode of Action

- Neuroexcitatory amino acid - acts by binding and stimulating various neurotransmitter receptors, leading to cell death and possible permanent damage linked to loss of short-term memory.
- Toxin insensitive to heat and freezing.
- No antidotes.

Diatom/Phytoplankton Blooms

- Causes of domoic acid toxin-producing diatom/phytoplankton blooms are not well understood.
- Little is known about what triggers the domoic acid toxin-producing diatom/phytoplankton blooms. Hypotheses that are being investigated include increased nutrient discharging into the coastal waters coupled with changes in currents, upwelling of deep colder offshore water events, salinity and coastal water temperature.
- Associations with urban runoff, rainfall, upwelling of deep colder offshore water, currents and nutrient loading are being investigated, however we are not aware of any conclusive links with any of the aforementioned occurrences.
- The current phytoplankton bloom is impacting coastal waters from San Luis Obispo through Orange Counties offshore to at least the Channel Islands. This event was first detected near Avila Beach in San Luis Obispo County. High numbers of cells of the toxic diatom have also

been detected inside Monterey Bay and in Pt. Reyes, although domoic acid has not been detected in these areas so far. Additional monitoring is being conducted in San Diego County by the California Department of Health Services (CDHS). CDHS continues to monitor the entire coastline of California for the toxin-producing phytoplankton species and for domoic acid in various seafood items. Quarantines and Health Advisories will be issued as needed.

Health Effects

Humans

- Vomiting, abdominal cramps, diarrhea, headache, disorientation, seizures can occur between 15 minutes to 36 hours after consumption of implicated seafood.
- Older individuals and individuals with impaired kidney function are more vulnerable.
- Severe poisoning cases can lead to permanent short-term memory loss, coma and death.

Wildlife

- Wildlife symptoms are similar to physical effects on humans.
- For more information regarding wildlife:
 - Wetlands & Wildlife Care Center - www.wwccoc.org
 - Pacific Marine Mammal Center - www.pacificmmc.org
 - California Department of Fish and Game - www.dfg.ca.gov

California Department of Health Services Marine Biotoxin Monitoring Program Shellfish Information Phone Numbers

- (800) 553-4133.
- (510) 412-4643.

2) What is being done about this issue at the County? Beyond?

Since the causes of the domoic acid bloom are not well understood and it seems to be a large regional issue, the County does not have this as a research priority. However, studies are being conducted by California Department of Health Services Marine Biotoxin Monitoring Program staff and researchers at USC.

3) Is HCA & Watershed partnering on this issue?

HCA and RDMD Watershed and Coastal Resources are not currently engaged in researching this issue.

4) Does HCA think short-term urban runoff measures such as UV treatment and long-term measures such as the over-watering campaign help in addressing reduction of domoic acid?

Since the causes of the blooms are not well understood, we do not know what the effect of UV treatment or the control of over-watering will have on future blooms.

Also, Environmental Health's Food Protection Program (FPP) has begun the two-fold response and involvement as follows.

Starting immediately, FPP inspectors are to provide facilities that carry seafood a copy of the most recent CDHS press release that provides valuable information to our operators regarding the quarantine. The "Mussel Quarantine Order 07" document also provides a warning in Spanish. Inspectors will be notified of updated information/press releases to ensure they can provide as much accurate information to our operators as possible.

During the course of routine inspections of facilities that carry seafood, inspectors will be checking sales receipts and invoices to ensure that seafood items on the advisory were obtained from approved sources. In addition, they are to document on their inspection reports that receipts indicate that the seafood in question were from approved sources. If documentation cannot be provided, the product will be embargoed.