

ART has Provided Assistance to a Variety of Partners Including:



STATE AGENCIES & ACADEMIC INSTITUTIONS

- Delaware Department of Natural Resources & Environmental Control
- Florida Marine Research Institute
- Georgia Department of Agriculture
- LUMCON, Louisiana
- New Jersey Division of Fish and Wildlife
- South Carolina Department of Health and Environmental Control
- South Carolina Department of Natural Resources
- Texas Parks and Wildlife
- California Dept. of Fish and Game

NON- GOVERNMENTAL

- Mote Marine Laboratory, FL
- Monterey Bay Aquarium Research Institute, CA
- The Marine Mammal Center, CA
- Newport Aquarium, KY
- Pittsburg Zoo, PA
- Seaworld, CA
- Los Angeles County Museum, CA

INTERNATIONAL

- Philippines General Hospital, Manila
- Scottish Association for Marine Science
- University of Quebec, Centre Hospitalier (CHUL), Canada
- Kuwait National Government

UNITED STATES GOVERNMENT

- US Food and Drug Administration
- USAMRIID, Fort Detrick
- NMFS, Office of Protected Species
- US Fish & Wildlife Service, FL & WI
- NOS Marine Forensics Branch
- Smithsonian Institution, Washington, DC
- U.S. Navy, Dolphin Training Center, CA

The organization of ART is based on the premise that unusual mortality events are largely unpredictable. ART is comprised of a multidisciplinary team of scientists responsible for designing and implementing an event specific solution to resolve the issue at hand.



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Key to the success of the team is that the response is based upon the unique problems associated with each event and draws upon the expertise of the people rather than a predesigned protocol.

To request assistance regarding harmful algal blooms, marine animal mortalities, or other related incidents please contact :

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NOAA/Marine Biotoxins Program
CCEHBR
219 Fort Johnson Rd.
Charleston, SC 29412 USA



Marine Biotoxins Program Harmful Algal Bloom Analytical Response Team



Bloom of *Lingulodinium polyedrum*

Providing rapid and accurate identification of algae and their toxins associated with harmful algal blooms, marine animal mortality events, and human intoxications.

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Marine Algal Toxins

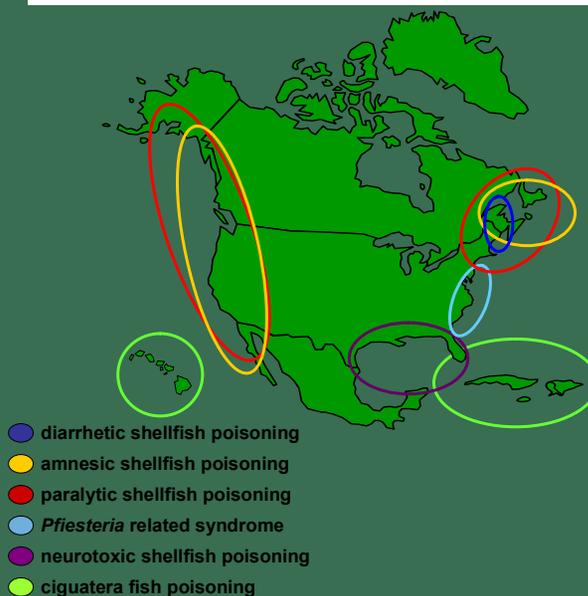
Marine algal toxins have been suspected in mass mortality events of marine life and are responsible for a variety of human intoxication syndromes. Confirmation of algal toxins has historically been elusive due to numerous ambiguities, including non-specific symptomatology, complexity of toxin detection, and undefined levels of impact to affected species.



Establishing an Analytical Response Team

The NOAA Analytical Response Team (ART) was established within NOAA's Marine Biotoxins Program to provide a formal framework through which coastal managers can request immediate, coordinated assistance during harmful algal blooms, related health incidents, and marine animal mortality events. This program supplies accurate information in a timely manner, allowing managers to make informed decisions involving shellfish harvests, life support for marine mammals, beach closures, and remedial actions.

Toxicity Associated with Harmful Algal Blooms in North America



Major Events Investigated by ART

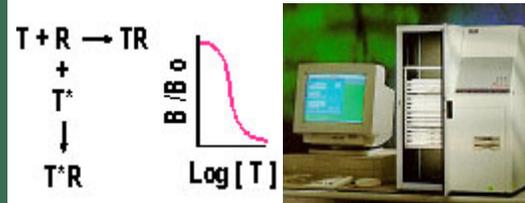
- Domoic acid associated with sea lion and grey whale mortalities in California
- Brevetoxin associated with Florida manatee mortalities
- Brevetoxin in bottlenose dolphin mortalities in the Florida panhandle
- Saxitoxin in serum and urine in victims of a PSP outbreak in Kodiak, Alaska
- Ciguatera in monk seals from Hawaii
- Saxitoxin in pufferfish from the Indian River Lagoon, Florida
- Domoic acid in Scottish scallops
- Microcystin in freshwater lakes around Charleston, South Carolina
- *Prorocentrum lima* identification off the coast of Maine.

Capabilities

With the Team's combined expertise in algal taxonomy, toxicology, and toxin chemistry, ART is capable of promptly solving most events associated with harmful algal blooms. For toxin detection and quantification, a two tiered approach is used. A suite of toxin class-specific assays are first employed to quickly determine the presence of specific toxic activity. Sophisticated instrumental analysis is then used to quantify and determine the exact toxin composition of samples. The application of this approach has transformed the detection of toxins from the use of non-specific animal based tests to yield accurate, precise toxin analysis provided to the scientific community, managers, and health care professionals in a timely manner.

Two Tier Approach To Analysis

Fast screen by toxin (T) class-specific bioassay such as receptor (R) binding assay



Confirmation of toxin by analytical methods such as LC-MS

