

Harmful Algal Research and Response: A Human Dimensions Strategy

Following the Recommendations of the National HAB Plan

Dan Ayres

Washington Department of Fish and Wildlife

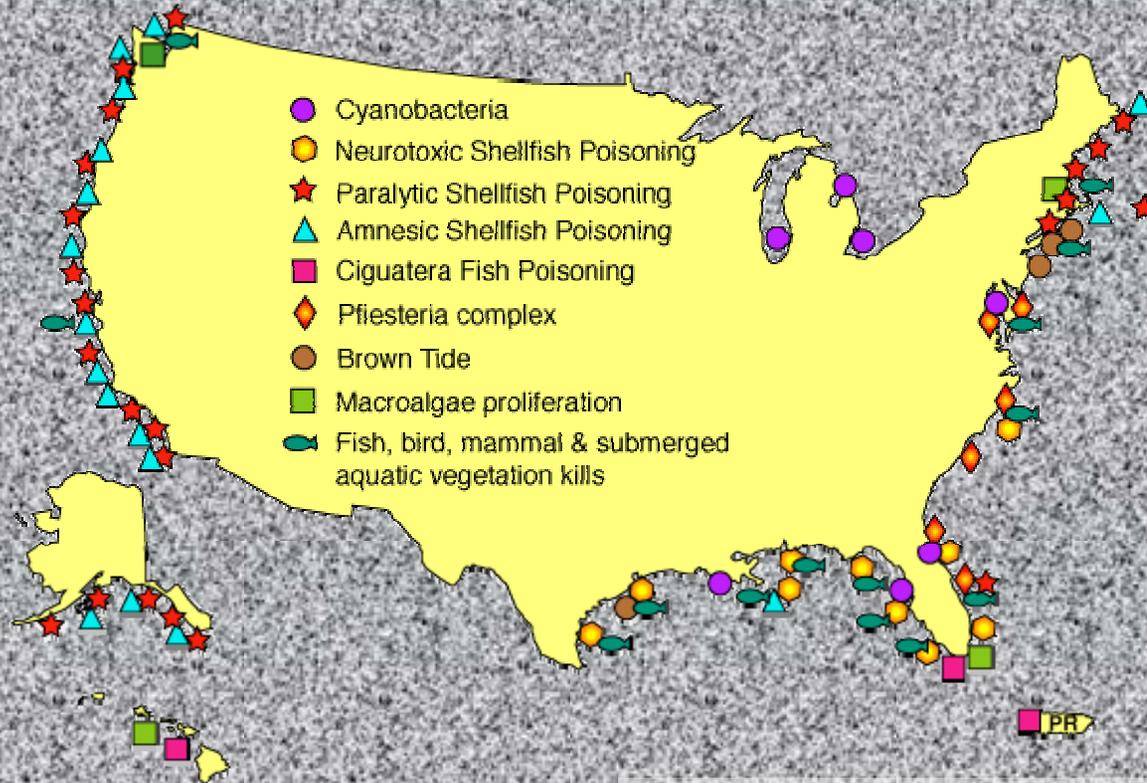


Marybeth Bauer

NOAA National Centers for Coastal Ocean Science



Major HAB-related Events in the Coastal U.S.



Human Impacts of HABs

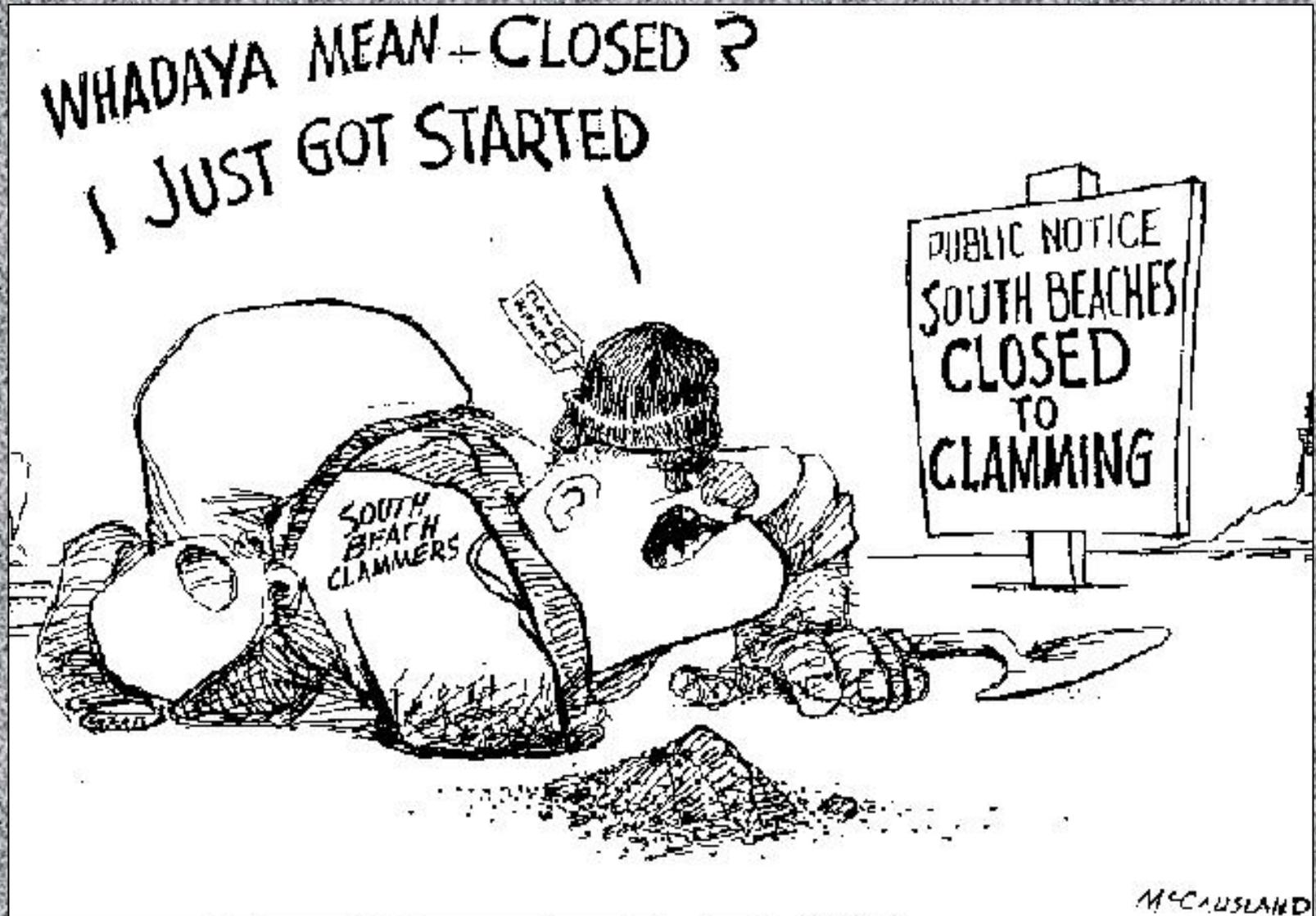
- Public Health
- Economic
- Sociocultural

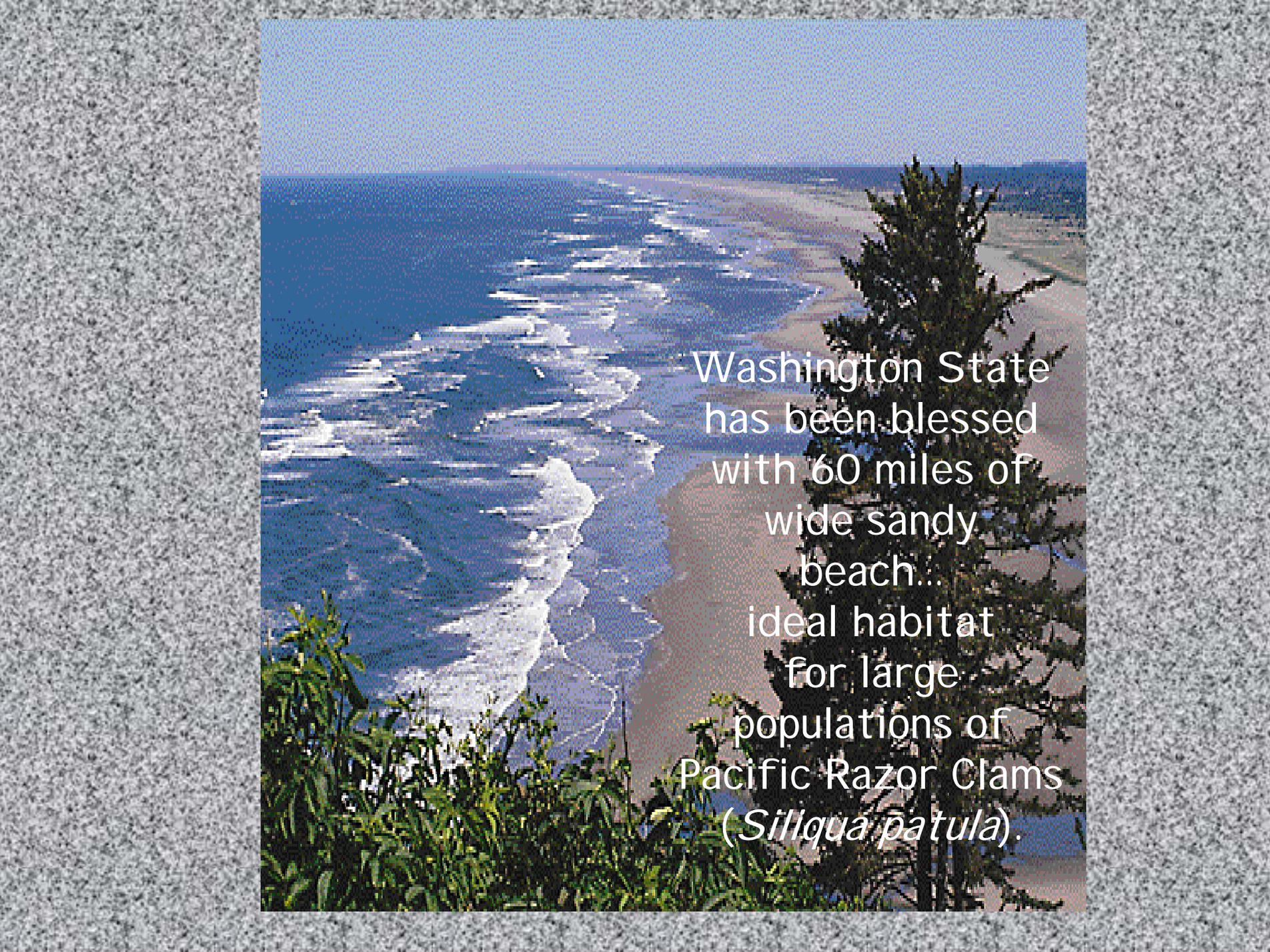
Managing An Important Shellfish Fishery...



2005.03.06

Around Harmful Algal Blooms...





Washington State
has been blessed
with 60 miles of
wide sandy
beach...
ideal habitat
for large
populations of
Pacific Razor Clams
(*Sillqua patula*).

A photograph of a beach scene. In the foreground, a pile of approximately ten razor clams is scattered on the dark sand. The clams have a characteristic elongated, spindle shape with a mix of brown, tan, and white colors. In the background, a digger is lying on the sand. The digger has a long, light-colored wooden handle and a metal shaft that ends in a wide, flat, blue-painted metal blade. The blade is partially covered in sand. The background shows the gentle waves of the ocean meeting the shore.

The Recreational Razor Clam Fishery

- * 250,000 to 350,000 digger trips annually.
- * Not unusual to have 30,000 digger trips daily.
- * Between \$10-\$12 million (1989 informal study).



Clam opener canceled due to high toxin count

OLYMPIA — The first razor clam dig of the fall season has been postponed due to elevated levels of marine toxins on Washington's

Beaches affected by the health closure include Long Beach, Twin Harbors, Copalis, Mocrocks and Kalaloch.

Dear WDFW Director:

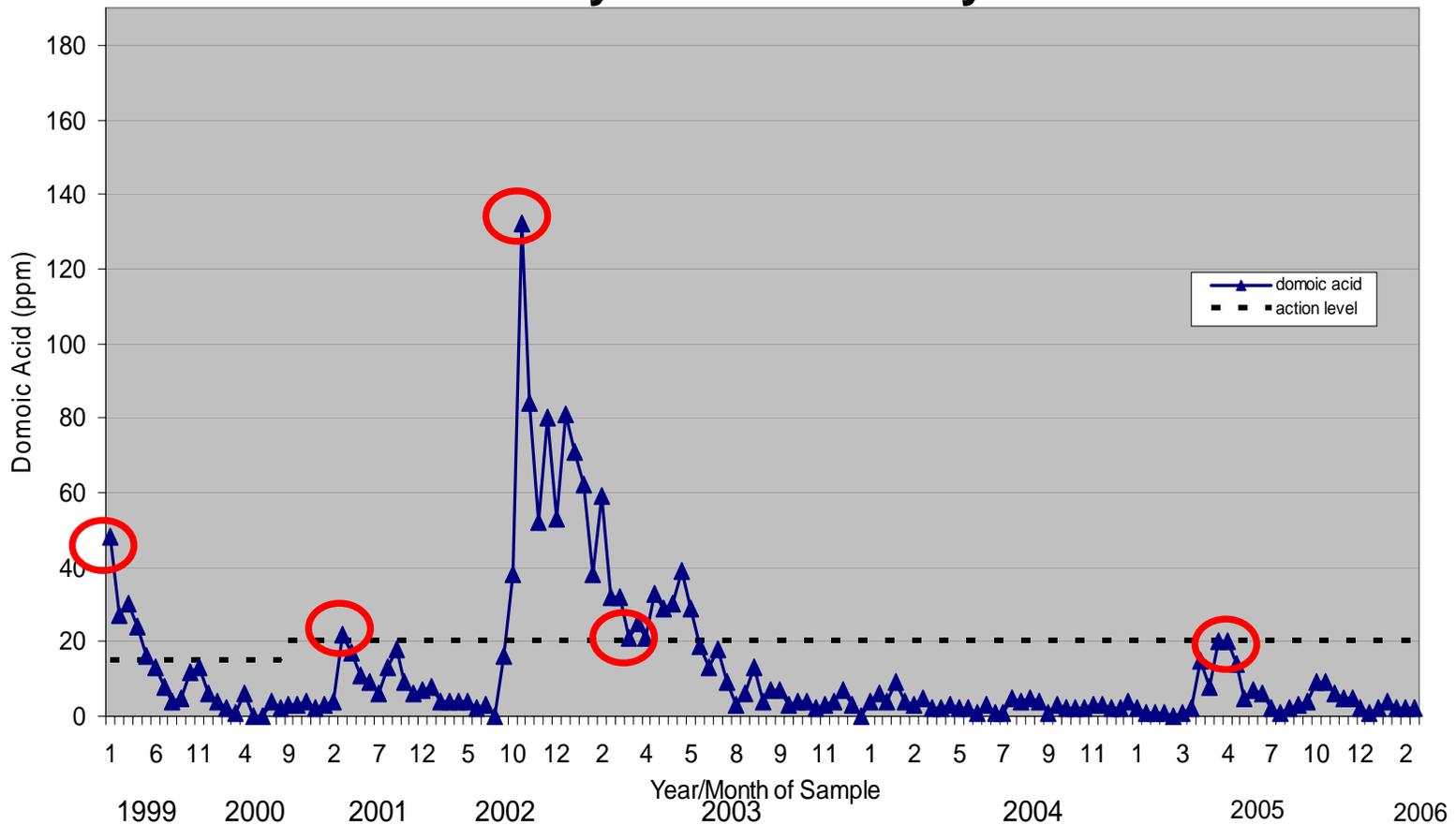
What's going on? I mean to tell me that the **What's going on?** we are all shot to hell! Why can't you people plan these "toxin events" better! This is a pretty smart toxin to be able to pop up just in time for the start of clam season! The notice said you took samples on the weekend and then it took three days to say you were going to close the season, a day before the season, **why such short notice?**

I've been digging clams for 47 years and **never** **never been sick!** digging them! I think you just made up this acid scare to prevent people from doing ANY digging! If you care to reply my e-mail address is xyz.com

A disgruntled license holder

Risk Communication

Domoic Acid Levels - Long Beach January 1999 - February 2006

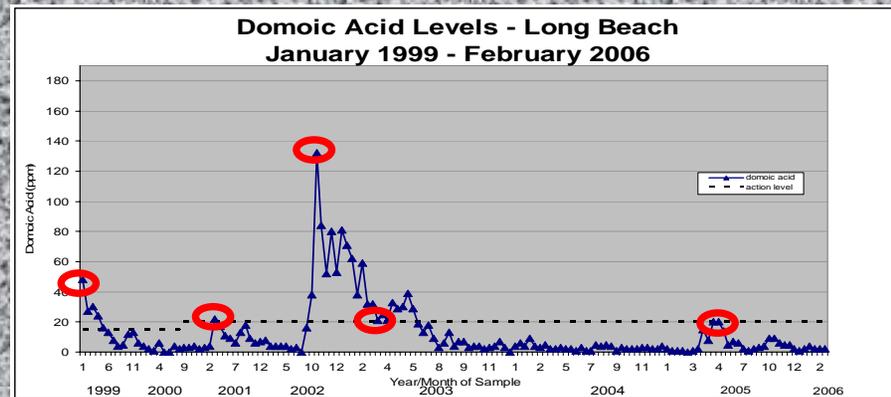


Need: Risk Communication Research

Agencies have a responsibility to communicate potential impacts, forecast information, closures, etc. in ways that help stakeholders avoid harm.

An understanding of public knowledge and perceptions helps agencies develop effective messages.

Methods: Diverse, Including Focus Groups and Surveys



Many people depend on the social value of the fishery...





Razor clams are part coastal history and culture



Need: Social Impact Assessment

Understanding how HABs affect community culture, recreation, families, social networks, and trust between regulating agencies and the public can help focus mitigative strategies.



Methods: Baseline Community Profiles and Rapid Impact Assessment



Clam seasons are very important to the many businesses depend on the income generated by thousands of visitors.



...pares to plunge in after razor clams on the beach near Ocean City, Grays
...astal shores during Sunday afternoon's low tide. During slow tourism sea

...nomics' calls t



Businesses in coastal communities use revenue from winter clam digs to bridge the gap between summer seasons. Whether a beach opens for clamming or not can make or break these coastal towns.

BY JEFFREY P. MAYOR
The News Tribune

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Need: Economic Impact Assessment

Choices among different management approaches to HABs such as when to close a fishery involve trade offs. Putting a dollar figure on impacts enables evaluation of those trade offs.

Businesses in coastal communities use revenue from winter clam digs to bridge the gap between summer seasons. Whether a beach opens for clamming or not can make or break these coastal towns.

BY JEFFREY P. MAYOR
The News Tribune

Methods: Economic Impact Assessment,
Dollar-Based Evaluation of Trade Offs

LONG BEACH, PACIFIC COUNTY - On Super Bowl Sunday,



Razor Clams



[Frequently Asked Questions](#)



[Latest domoic acid levels](#)

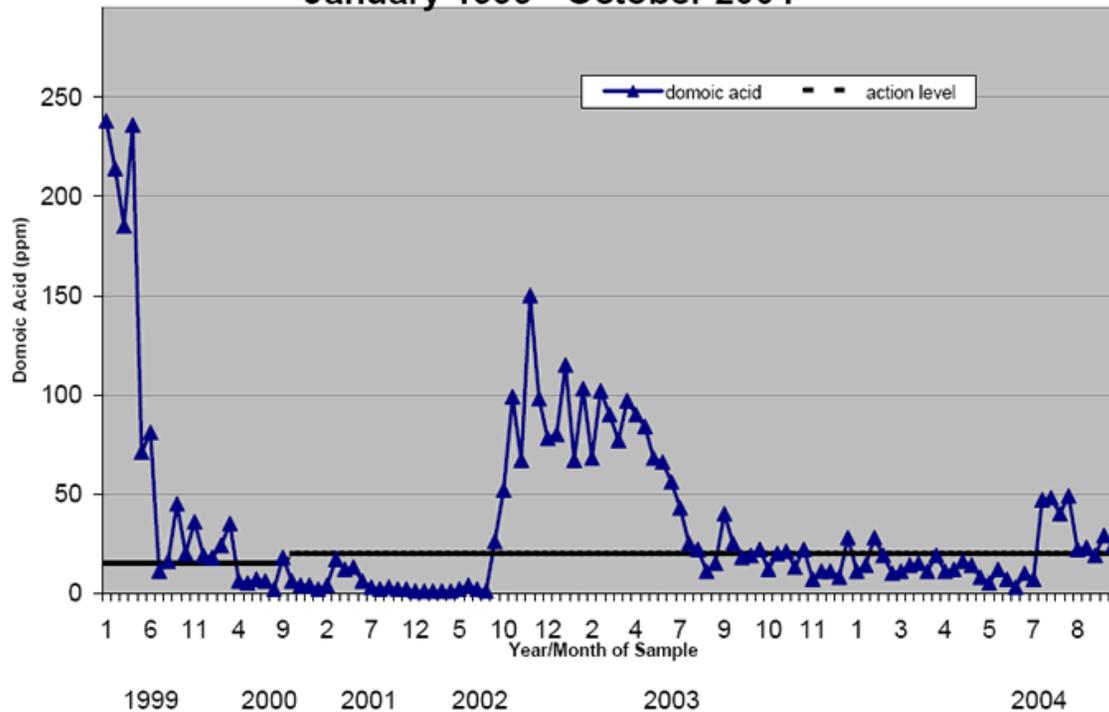
DOMOIC ACID - A MAJOR CONCERN TO WASHINGTON STATE'S SHELLFISH LOVERS

In 1991, a relatively new marine toxin, domoic acid, was first detected on the West Coast of the U.S. When this marine toxin was discovered in certain West Coast fish and shellfish, recreational and commercial fisheries were closed. These closures had serious

Clam opener canceled due to high toxin count
OLYMPIA — The first Beaches affected by the

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Domoic Acid Levels - Kalaloch January 1999 - October 2004





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Jeff Koenings, Ph.D.
Director

Will Roehl
Chairman
Washington Fish &

Scientists investigate marine toxin plaguing razor clam fishery

Posted February 2004

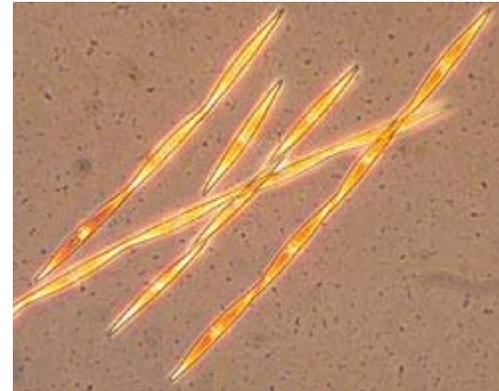
Summary

Dangerously high levels of domoic acid off the Pacific coast prompted closure of Washington state's razor clam fishery for the entire 2002-03 season, the third such season-long closure since 1991. Domoic acid, a marine toxin produced by the *Pseudo-nitzschia* algae, can produce serious illness and even death in humans if ingested in sufficient quantities. While there have been no known fatalities in Washington from domoic acid poisoning, season closures designed to protect human health have cost coastal communities millions of dollars in lost economic activity and affected recreational opportunities for tens of thousands of state residents.

Since 1999, the Washington Department of Fish and Wildlife (WDFW) has been working with a consortium of federal, state and local agencies; tribal governments; academic institutions; and marine-based businesses to find new ways to detect and predict outbreaks of domoic acid. That group, known as the Olympic Regional Harmful Algal Blooms (ORHAB) Partnership, is addressing the problem of domoic acid in a variety of ways.

By the Washington Department of Fish and Wildlife

With the start of the razor clam fishery just a month away, the 2002-03 season was shaping up as one of the best ever in Washington state. Stock assessments conducted by the Washington Department of Fish and Wildlife (WDFW) and tribal biologists found an abundance of clams, while coastal tide charts revealed plenty of opportunities for digging. Just as important, test results from the Washington



Brian Bill, NOAA

As seen through a microscope, the needle-like cells of Pseudo-nitzschia can produce domoic acid. (Click on image to enlarge.)

http://wdfw.wa.gov/science/articles/razor_clams/index.html

NEWS RELEASE

Meetings set on Kalaloch razor clam closure



OLYMPIA – The extended closure of Kalaloch Beach to razor clam digging will be the focus of public meetings next week in Port Anaeles and Forks.

“Representatives of all three agencies involved in this issue will be there to discuss the reason for the closure and answer any questions people might have.”



Need : Outreach and Education Assessment

The success of education and outreach initiatives relies on tailoring programs and products to the audiences they aim to reach and finding ways to involve stakeholders.
Are we hitting the mark?

Methods: Social Assessment
Product Testing
Public Participation

Olympic Region Harmful Algal Bloom (ORHAB) Study

Coast-wide study funded by NOAA's Coastal Ocean Program
2000-2005

Participants Included:

National Marine Fisheries Northwest Fisheries Fisheries Science Center,
and the Olympic Coast National Marine Sanctuary

Washington State Departments of *Fish and Wildlife*, Health and Ecology

University of Washington School of Oceanography and the Olympic Natural
Resource Center

Quinault Indian Nation

Battelle Northwest Marine Laboratory

Pacific Shellfish Institute

Saigene Corporation

Lessons Learned from ORHAB

- A grass roots effort.
- Regional monitoring capacity developed.
- A true collaboration.
 - Scientists learned to appreciate the challenges faced by managers.
 - Managers learned to speak the language of science.
- Public recognition.
- More "we" than "them".

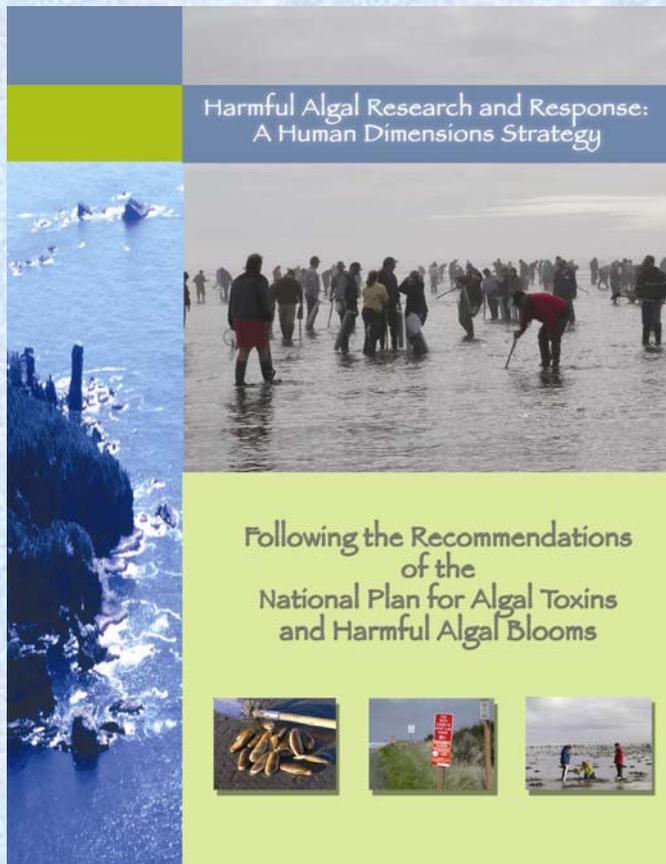
Need: Institutional Analysis



Lessons Learned for
Effective Cooperation



Harmful Algal Research and Response: A Human Dimensions Strategy



Risk Communication: Cross-Cutting Need Socioeconomic Impacts

- Data Infrastructure

- Social Impact Assessment

- Economic Impact Assessment

- Community Vulnerability Assessment

- Economic Benefits of Forecasts

Public Health Impacts

- Diagnostic Tools

- Surveillance

- Epidemiological Methods

- Susceptible Populations

- Early Warning Mechanisms

Recreational and Drinking Water Impacts

- Monitoring and Documentation

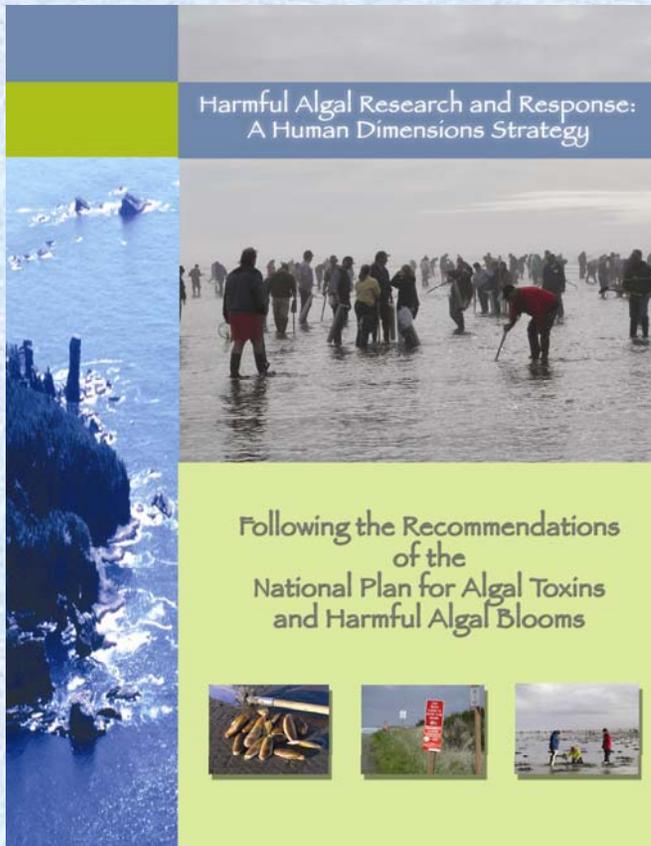
- Short-Term Response Plans

- Water Quality Standards

Education and Outreach

For More Information on:

*Harmful Algal Research and Response:
A Human Dimensions Strategy*



Please Contact:
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