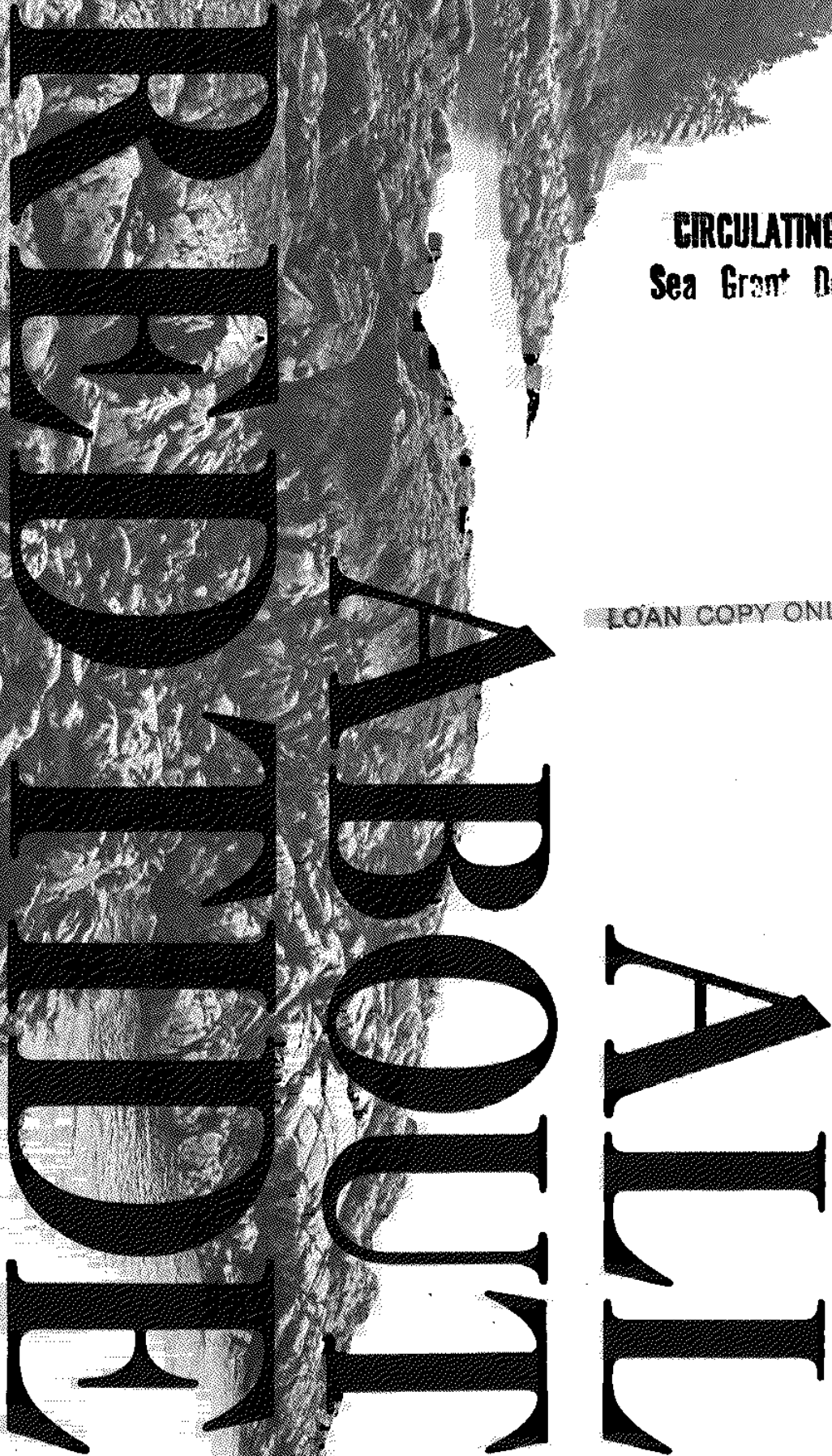


MEU-G-81-001

c.2

**CIRCULATING COPY**  
**Sea Grant Depository**

LOAN COPY ONLY

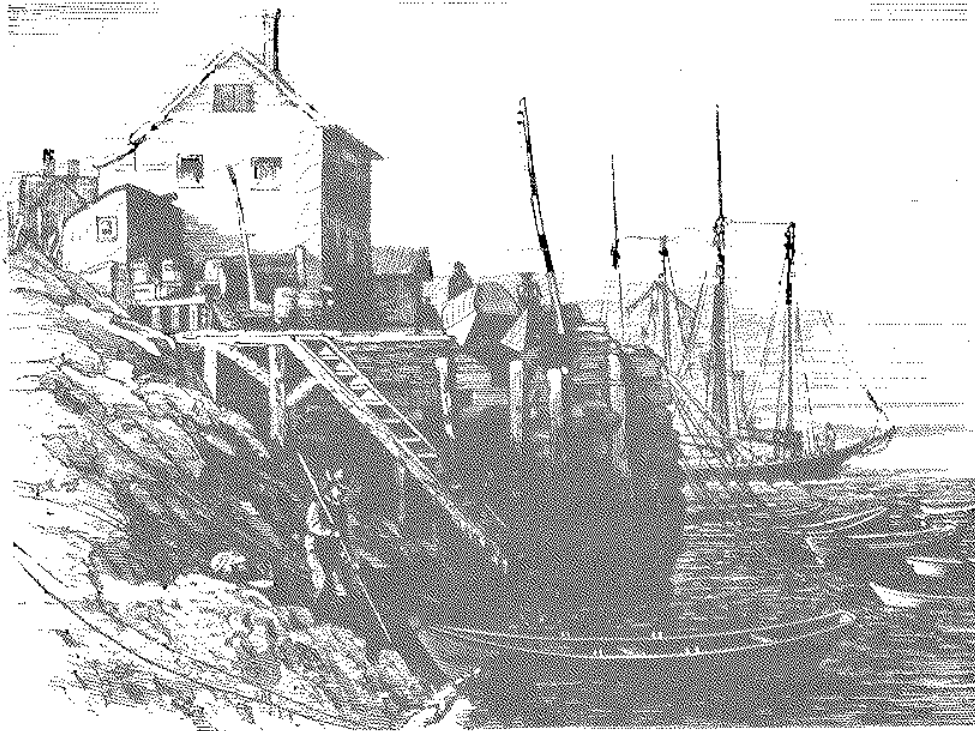


**FIELD**  
**REPORT**  
**AVAILABLE**

# SO YOU THINK YOU KNOW ABOUT RED TIDE

Test yourself by answering the following questions either True (T) or False (F):

- \_\_\_\_\_ 1. There has been a general increase in red tide along the Maine coast since the early 1970's.
- \_\_\_\_\_ 2. It's always red and therefore easy to detect.
- \_\_\_\_\_ 3. It's a modern phenomenon — just one more disaster brought on by modern man.
- \_\_\_\_\_ 4. Most of Alaska's coastline, invaded by red tide, has been closed to harvesting since 1947.
- \_\_\_\_\_ 5. The so-called "red tide" is actually the blooms of a microscopic organism (one of the marine algae), specifically the dinoflagellate *Gonyaulax tamarensis*.
- \_\_\_\_\_ 6. The *Gonyaulax* toxins, which cause Paralytic Shellfish Poisoning (PSP), have killed thousands of people worldwide throughout history.
- \_\_\_\_\_ 7. Mussels are more affected by red tide than clams.
- \_\_\_\_\_ 8. PSP displays its first symptom as a tingling sensation in the tongue beginning a half-hour after eating poisonous clams or mussels, and it is always fatal to the victim.
- \_\_\_\_\_ 9. There is no counteracting antidote for the *Gonyaulax* toxin.
- \_\_\_\_\_ 10. Don't eat mollusks in the months that don't have 's (May, June, July, August), and you'll always be safe from PSP.



## What is Red Tide?

- The microscopic plants that live in the light, surface layers of the ocean are single-celled, algae-like organisms that capture and use the energy from sunlight. They reproduce rapidly when the light, temperature, nutrient level, and salinity are in the right proportion.

One of these plants, *Gonyaulax tamarensis*, causes the condition known as "red tide" in Canadian and New England waters. When the *Gonyaulax* "bloom" in the coastal waters overlying the shellfish-harvesting areas, they contaminate the shellfish and may cause illness or death in birds or mammals if eaten in quantity.

For centuries people have known about the effects of eating contaminated shellfish — long before Paralytic

Shellfish Poisoning (PSP) received its name.

Marine animals directly affected by these microscopic plants are those that filter their food from the water. Shellfish such as clams, mussels, and oysters use this simple filter-feeding method, and during a bloom, thousands of these tiny plants may be filtered through a shellfish's system.

Lobsters, crabs, scallops, and finfish, however, are meateaters, and do not accumulate the *Gonyaulax* poison, and may be eaten in safety.

The term "red tide" as applied to this contamination is misnamed. Although at certain seasons in Maine waters and elsewhere these organisms containing a reddish-brown pigment produce a reddish color in the waters, color is not a reliable indicator of toxic organisms in Maine waters.

## How Do Red Tides "Bloom"?

- Since the 1930's when the *Gonyaulax* organism was identified in California, scientists have learned a lot about the red tide and Paralytic Shellfish Poisoning. Scientists now know that the specific organism along the eastern North American coast is called *Gonyaulax tamarensis*; and that this organism tends to "bloom" between the months of April and October, generally peaking during the summer months. They also know that certain conditions seem to favor such blooming: warm surface waters of 50 degrees Fahrenheit, solar radiation, calm seas, salinity, and sudden nutrient enrichment of coastal waters.



- PSP toxin acts within minutes. The victim may feel a tingling in the lips, a burning sensation in the gums and tongue, and a numbness that spreads from the face to the neck, arms, and legs. In the most severe poisonings, the throat feels constricted and speech become incoherent. Death may follow as a result of respiratory arrest.



The toxin is relatively stable and can even survive cooking. Until recently there was no antidote, and treatment was to remove as much infected shellfish as possible from the stomach by inducing vomiting.

Research undertaken by the Maine Medical Center in conjunction with the Poison Control Center in Portland (871-2381) has found that a therapy, called charcoal hemoperfusion, is effective in removing PSP toxin from the blood. Blood is taken from an artery, pumped through a filter of activated charcoal, and returned to the body. The poison is thus removed from the blood circulation and paralysis is prevented.

Strangely enough, the shellfish grow well on these toxic plants, but concentrate the poison in their tissues at the same time.

When the bloom is over, the shellfish purify themselves of the toxin and are once again safe to eat.

## How is Red Tide Monitored?

- During an outbreak of red tide in 1980, which hospitalized 16 shellfish

consumers in New England, the Maine Department of Marine Resources closed the state's entire 3,500 mile coastline, banning the harvesting of clams, mussels, oysters, snails, and quahogs.

The red tide was a temporary disaster for Maine's shellfish industry. By October 1980, when the flats were reopened to harvesting of all shellfish except mussels, the industry's losses had exceeded \$7 million



Not too long ago, the policy was to close off the entire coast or long stretches of it. Closure can now be highly selective. A total shutdown of the Maine coast in a peak season could cost clam diggers as much as \$50,000 in a single day.

Maine's shellfish toxin-monitoring program involves 18 primary surveillance sites from which samples are processed weekly from April through October, and nearly 200 secondary and tertiary sites which are used to further define the geographical extent of blooms once they have been detected at the primary sites.

The mussel (*M. edulis*) is used as the initial indicator organism in this program. Once quarantine levels of

toxin have been observed in mussels, other shellfish species of current commercial interest are also monitored.

The toxicity of the shellfish is measured by a standardized mouse test in which mice are injected with an extract of ground-up shellfish suspected of contamination.

## Facts and Fallacies

- A major problem in the management of PSP has been people who live in coastal areas where red tide is endemic. After years of eating shellfish, they have developed a tolerance to the poison and therefore do not regard PSP as a problem.

Similar problems concern folklore relating to how to tell if a shellfish is contaminated. One folktale says that shellfish are safe in months that have an "r" in them. Another, that a silver spoon put in the pot while cooking contaminated shellfish will tarnish, while if the shellfish are safe the spoon will remain bright.

In fact, it is impossible to tell if a shellfish is contaminated without a chemical test.

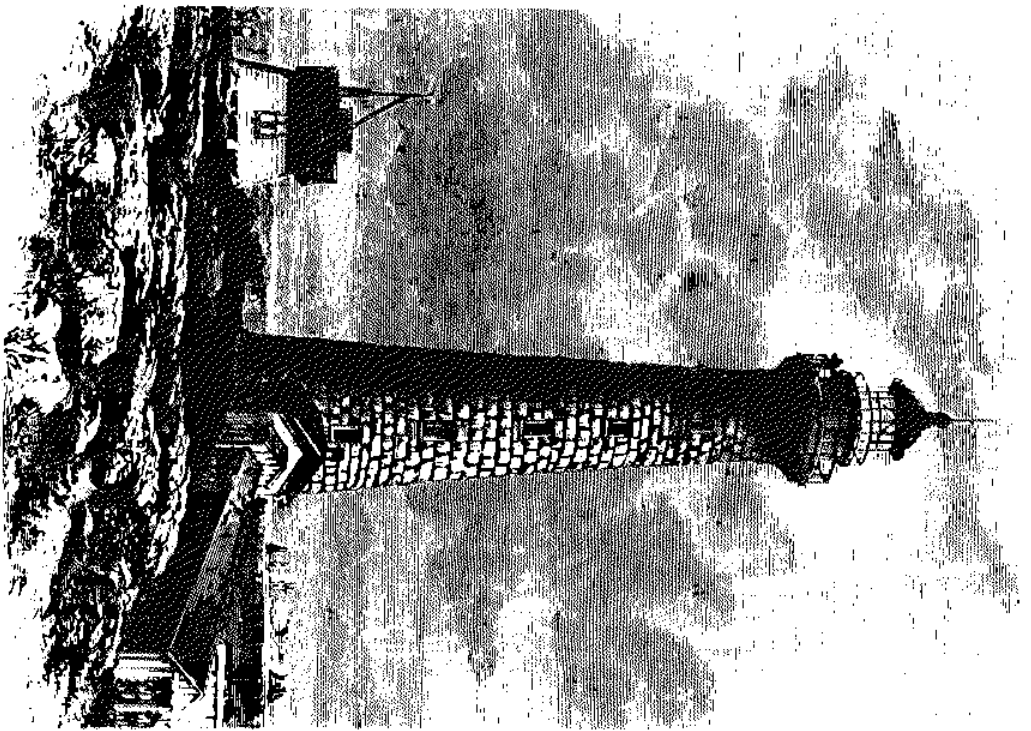


University of Maine  
University of New Hampshire  
Sea Grant College Program

# SEA GRANT Maine Sea Grant

NATIONAL SEA GRANT DEPOSITORY  
PELL LIBRARY BUILDING  
URI, NARRAGANSETT BAY CAMPUS  
NARRAGANSETT, RI 02882

RECEIVED  
PELL LIBRARY BUILDING  
URI DEPOSITORY  
DATE FEB 1 1982



Edited by Kathleen Lignell  
Designed by Joanna Young

This publication is made possible by grant #NA81AA-D-00035 from the National Oceanic and Atmospheric Administration to the Maine Sea Grant College Program.

Additional copies available from the Marine Advisory Program, Maine Sea Grant College Program, 30 Coburn Hall, University of Maine, Orono, ME 04469.

E-MSG-81-1 12/81 1M