

# WELCOME !



## Harmful Algal Bloom Integrated Observing System Workshop 2

**HAB = Harmful Algal  
Bloom**

**HAB = Harmful Algal Bloom**

**A.K.A.**

**Red Tide**

**Brown Tide**

**Toxic and Noxious Algal Blooms**

**Includes many algal groups**

**(Cindy Heil presentation)**

# Emphasis on Harmful

- **Human illness and mortality**
  - **Toxins consumed in food**
  - **Exposure to toxins in water or aerosol**
- **Fish, marine mammal, turtle, bird, invertebrate mortality**
  - **toxins in food or water**
- **Ecosystem effects, e.g. Low Oxygen**
- **Water discoloration, aesthetics**
- **Bad taste or smell to water or animals**

# Human Health Problems

(more detail from Cindy Heil)

- **PSP** Paralytic Shellfish Poisoning
- **ASP** Amnesic Shellfish Poisoning
- **NSP** Neurotoxic Shellfish Poisoning
- **DSP** Diarrhetic Shellfish Poisoning
- **CFP** Ciguatera Fish Poisoning
- **Cyanobacteria** hepatotoxins, neurotoxins, dermatotoxins, gastrotoxins

Nancy has had this!



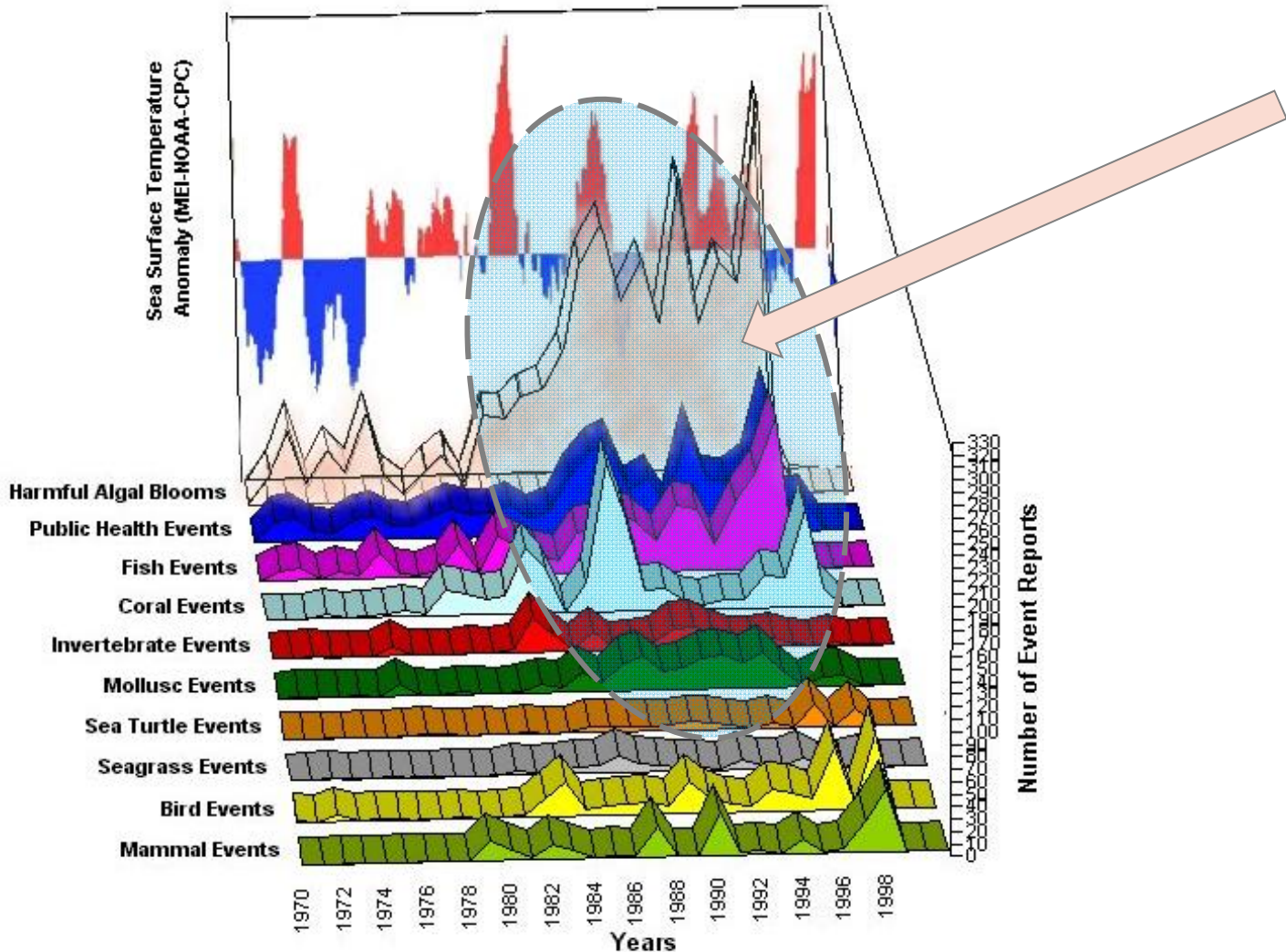
Nancy's Res Assoc  
has had this!



# Reasons for Global Increase in HABs

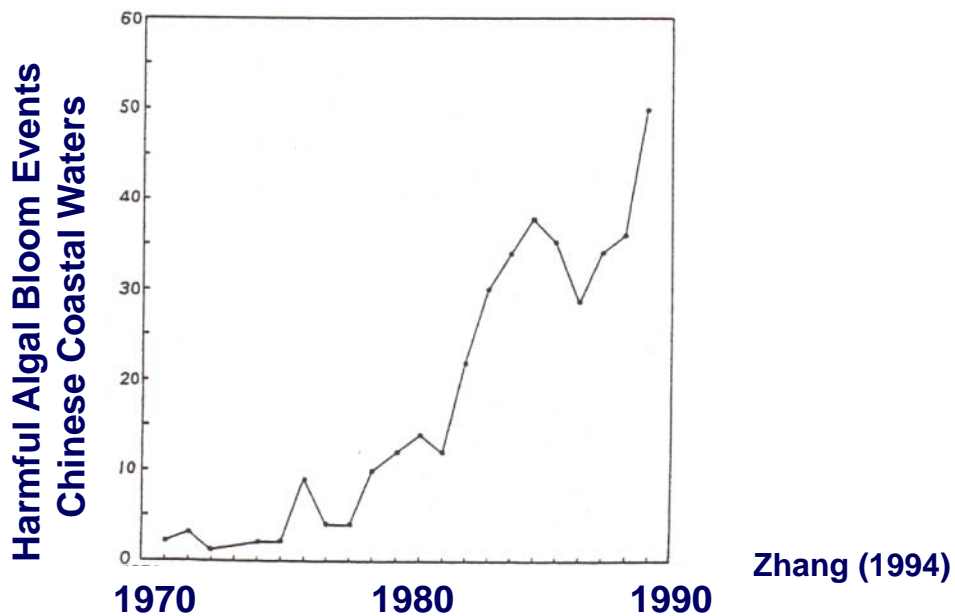
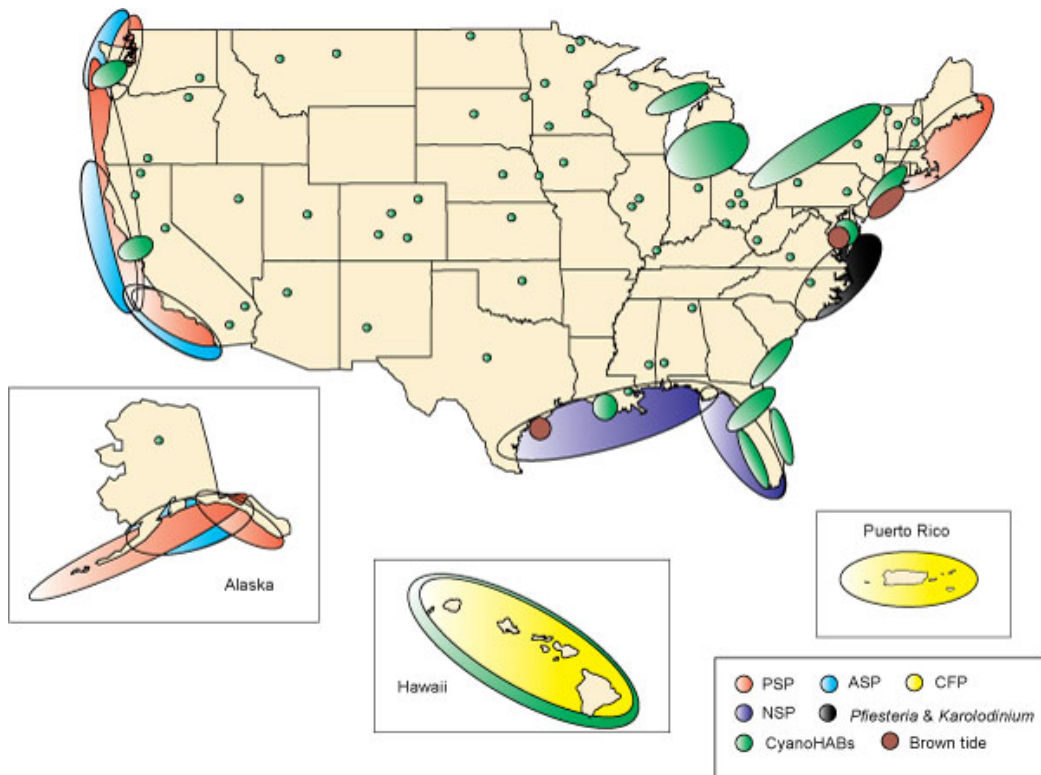
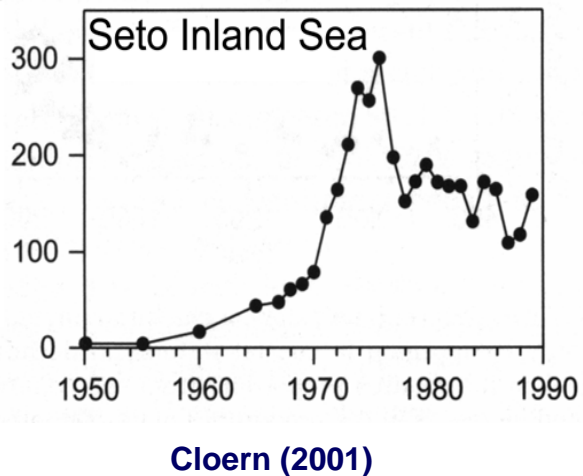
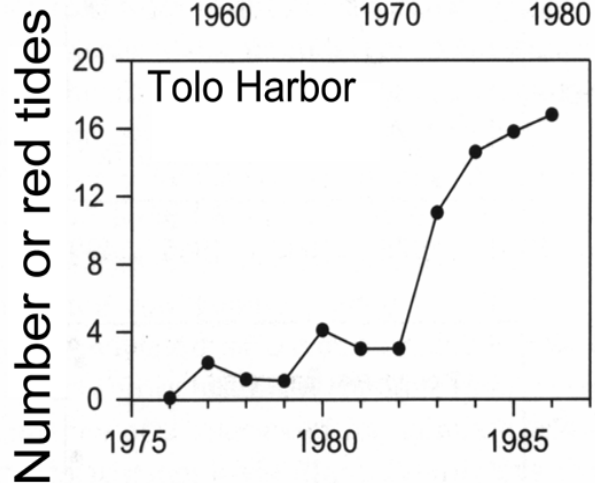
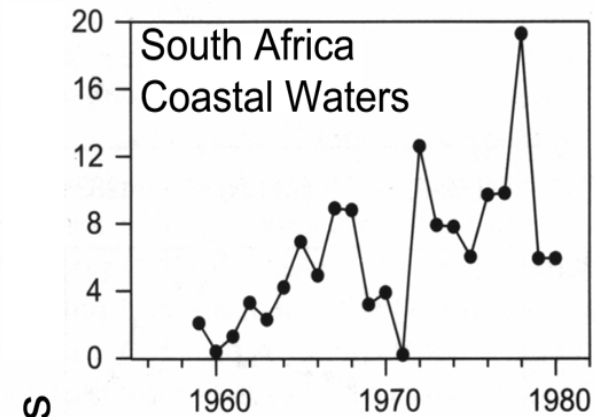
- **Increasing coastal eutrophication**
  - Increasing nutrient loads
  - Changing nutrient ratios
- **Increasing shipping**
  - Ballast water
  - Live fish and shellfish
- **Increased aquaculture/mariculture**
- **Global change in climate**

# Major Marine Ecological Disturbances NW Atlantic, Gulf of Mexico, Caribbean Sea



Health, Ecological and Economic Dimensions

[heed.harvard.edu/heed/datacatenso.gif](http://heed.harvard.edu/heed/datacatenso.gif)



# **Problems in the N. Gulf of Mexico**

## **Human Health Impacts**

(further details from Cindy Heil)

- **Brevetoxins--Neurotoxic Shellfish Poisoning (NSP)**
- **Cyanobacterial Hepatotoxins**
- **Domoic Acid --Amnesic Shellfish Poisoning (ASP)**
- **Okadaic Acid--Diarrhetic Shellfish Poisoning (DSP)**

# Need for HABIOS

- **HABs** represent diverse algal groups
- **Multiple causes for HABs**
  - Both natural & anthropogenic
  - Interactions between causes
- **Gulf of Mexico has HABs**
  - Some stimulated by nutrients
  - Could get worse
  - **Critical need for monitoring and transferring data**