



# *Casco Bay Intensified PSP Sampling Project*

*conducted by*  
**MER Corp.**  
*in cooperation with*  
*the Maine DMR*  
*with funding from the*  
**Casco Bay Estuary Partnership**  
*October 16, 2006*

## Problems:

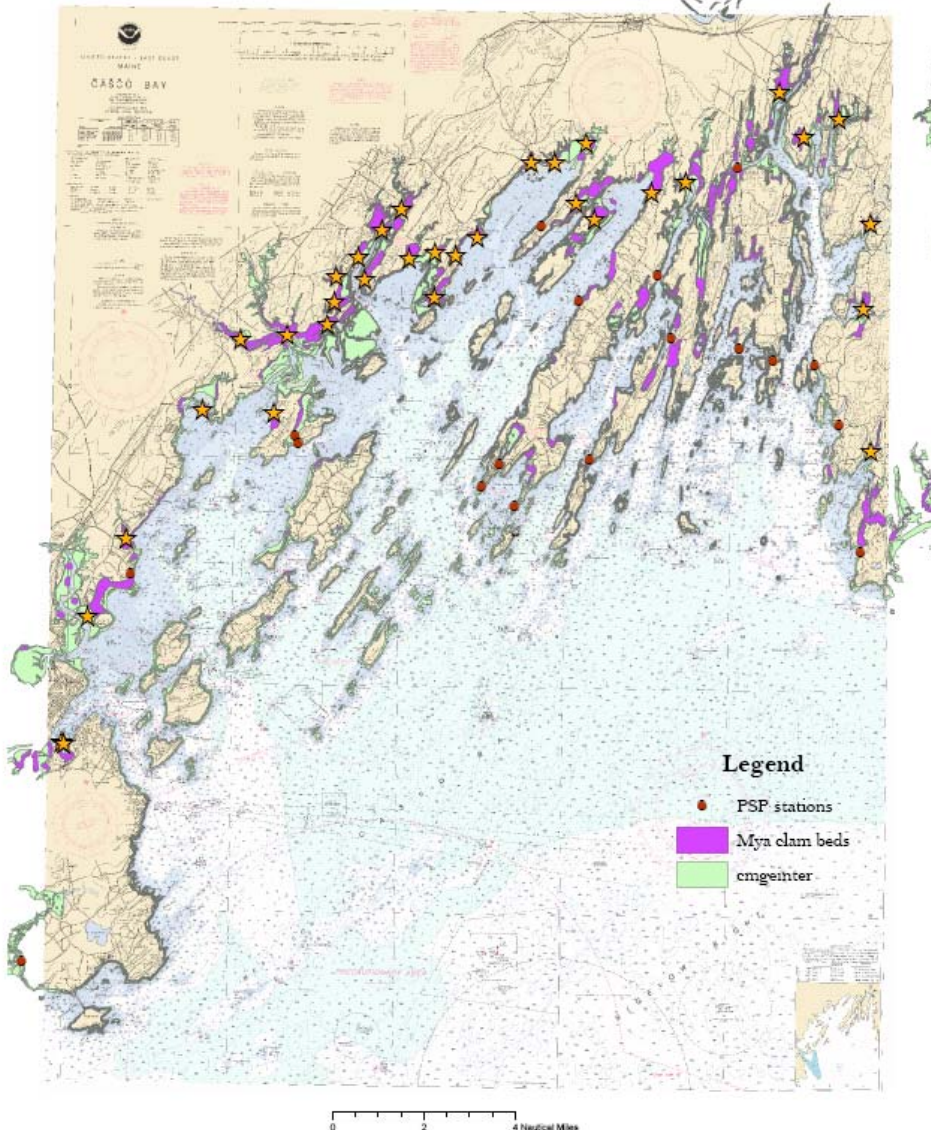
1. Limited number of routine PSP sampling locations resulted in large area closures based on limited sampling data;
2. Routine sampling was restricted to low water when samplers could reach mussels for sampling, thereby limiting number of sampling sites reached per tide.

## Solutions:

1. Samples collected subtidally or from moored buoys to allow tide level independence;
2. Increased frequency of sampling;
3. Expanded data collection included several related parameters, *e.g.* phytoplankton, water quality, nutrients [N].



## Casco Bay PSP Sample Stations CBEP 2006



## Project Area:

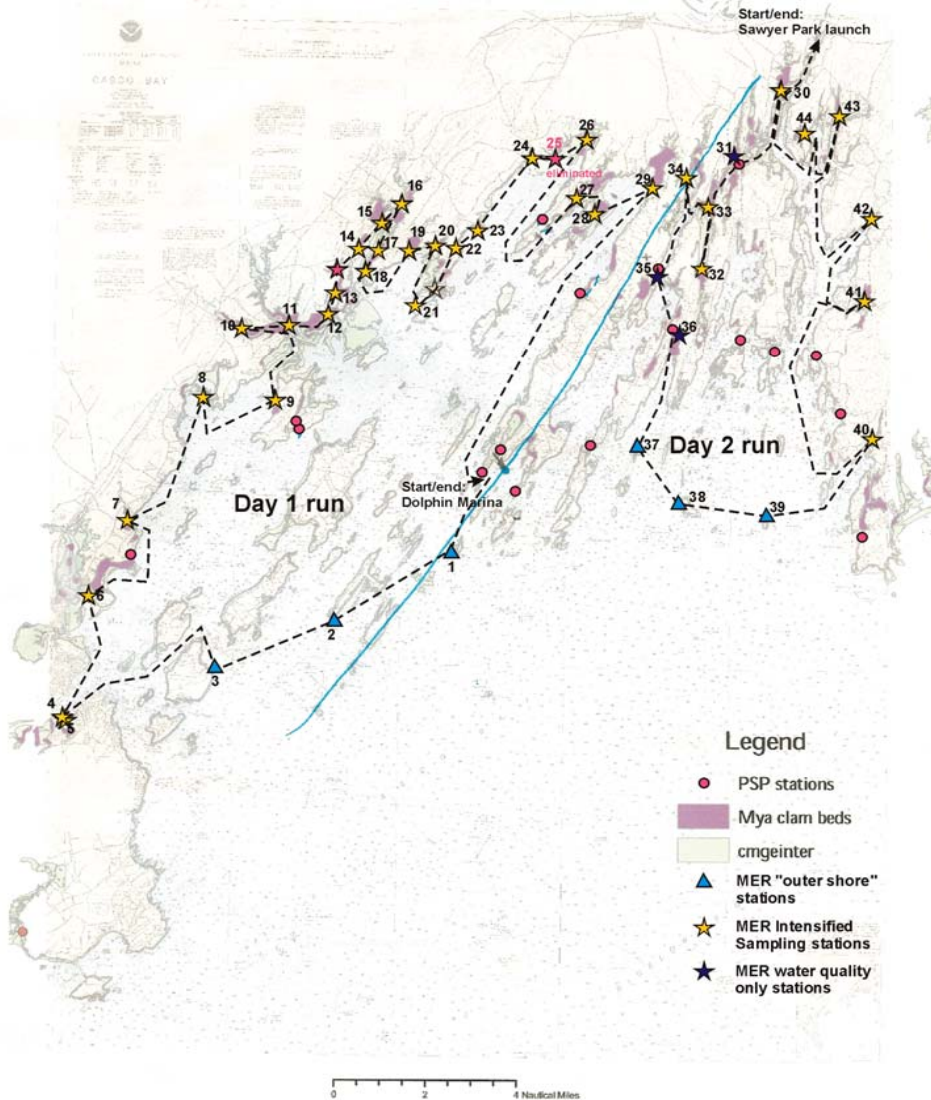
**Purple areas indicate intertidal clam flats; light green areas indicate subtidal flats.**

**Red dots indicate routine DMR sampling stations; yellow stars indicate MER Intensified PSP Sampling Program stations.**





## Casco Bay PSP Sample Stations CBEP 2006



**Sampling station location:**

**44 additional sampling stations supplementing data for DMR's 17 routine shoreline stations in Casco Bay.**

**Includes 6 "offshore" stations to allow comparison of PSP levels from outer Casco Bay and inner Casco Bay.**

**All 44 stations are sampled w/in 2 days, every week.**



**Buoy with attached mussel bags.**





**Mussel bags attached to buoyed line.**





**Station identification tags placed in mussel bags.**



**Anne Barrett, DMR intern, deploying phytoplankton net.**





**Phytoplankton sample taken off Mark Island, Eastern Casco Bay.**



**Water sample collected and ready for filtration for nutrient sample.**





**Nutrient samples are filtered into sample container, then placed on ice.**

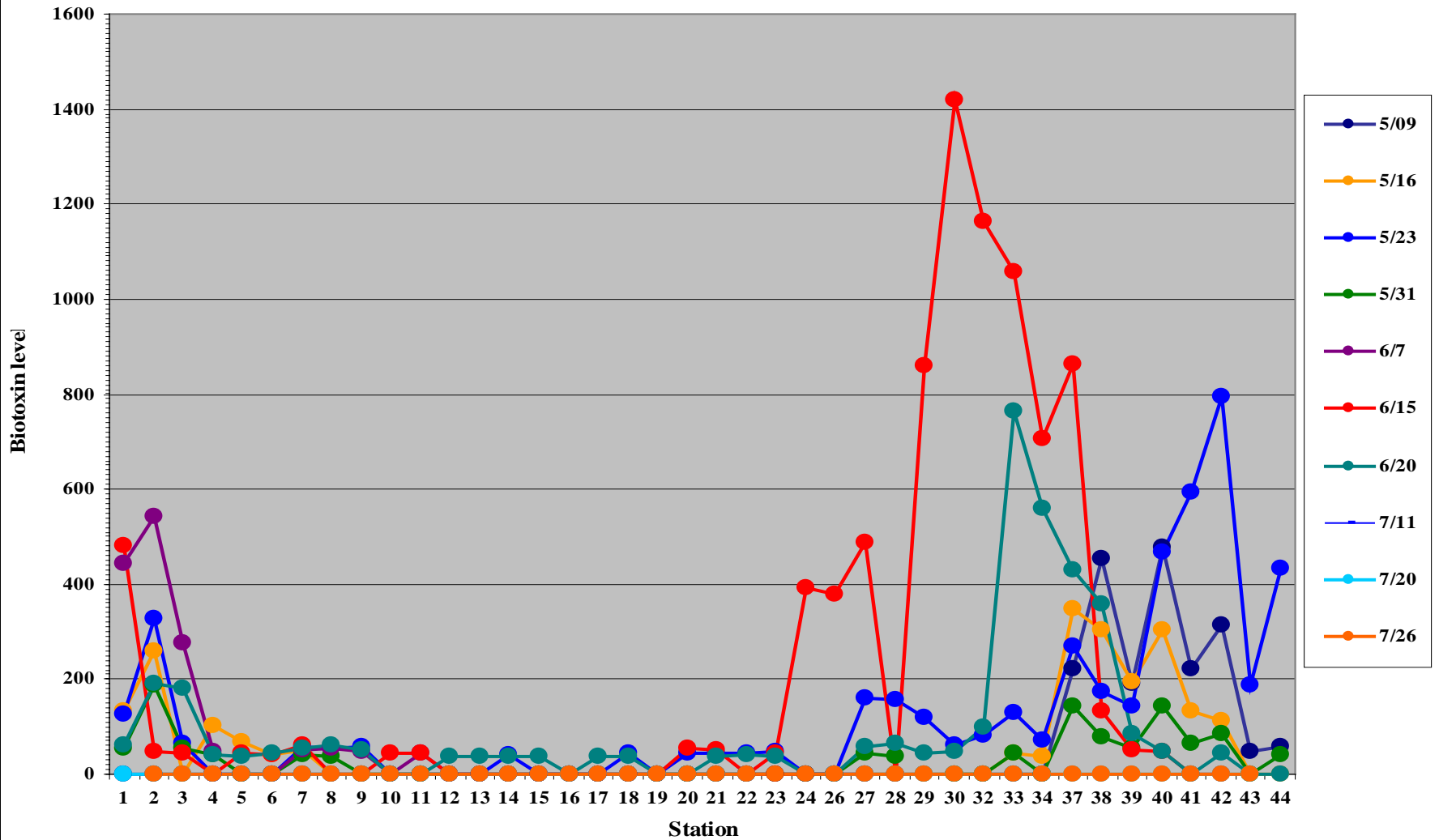


**Water column profiler being deployed.**



# Intensive PSP Sampling Program Results

May, 9 through July 27, 2006 (weekly)





## 2006 CBEP / MER Project

Week of May 8

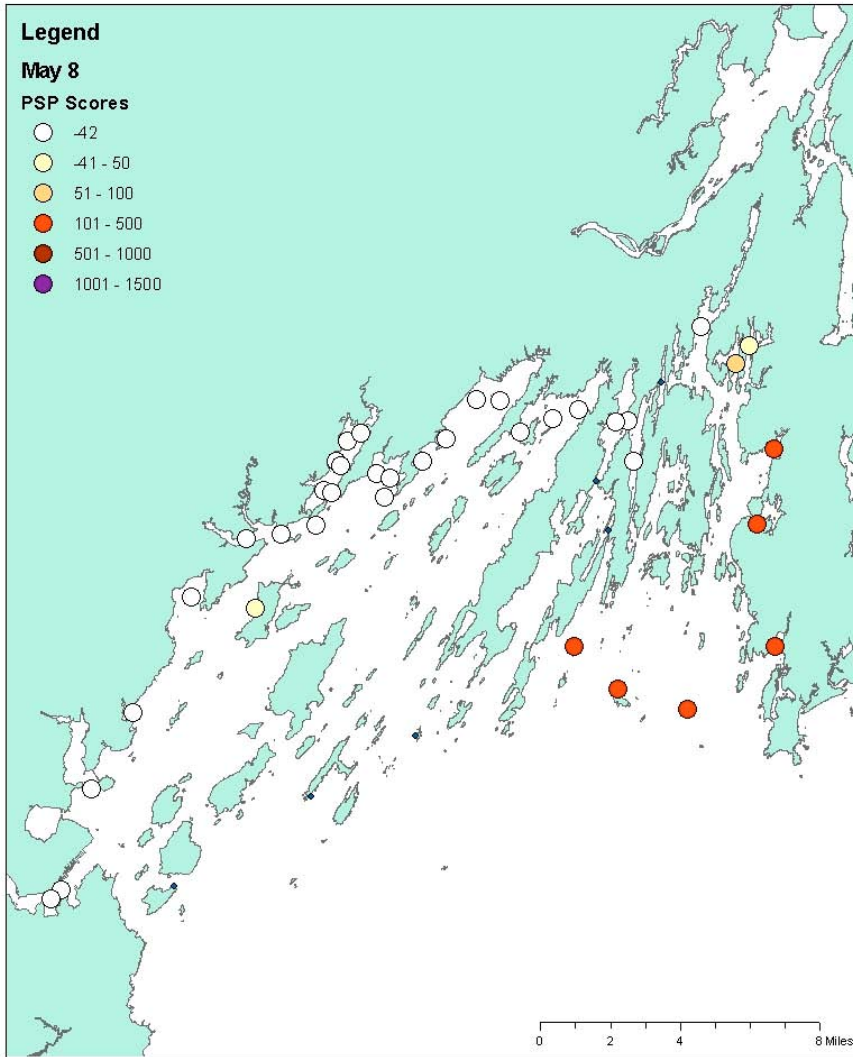


### Legend

#### May 8

##### PSP Scores

- -42
- -41 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1500



## 2006 CBEP / MER Project

Week of May 15

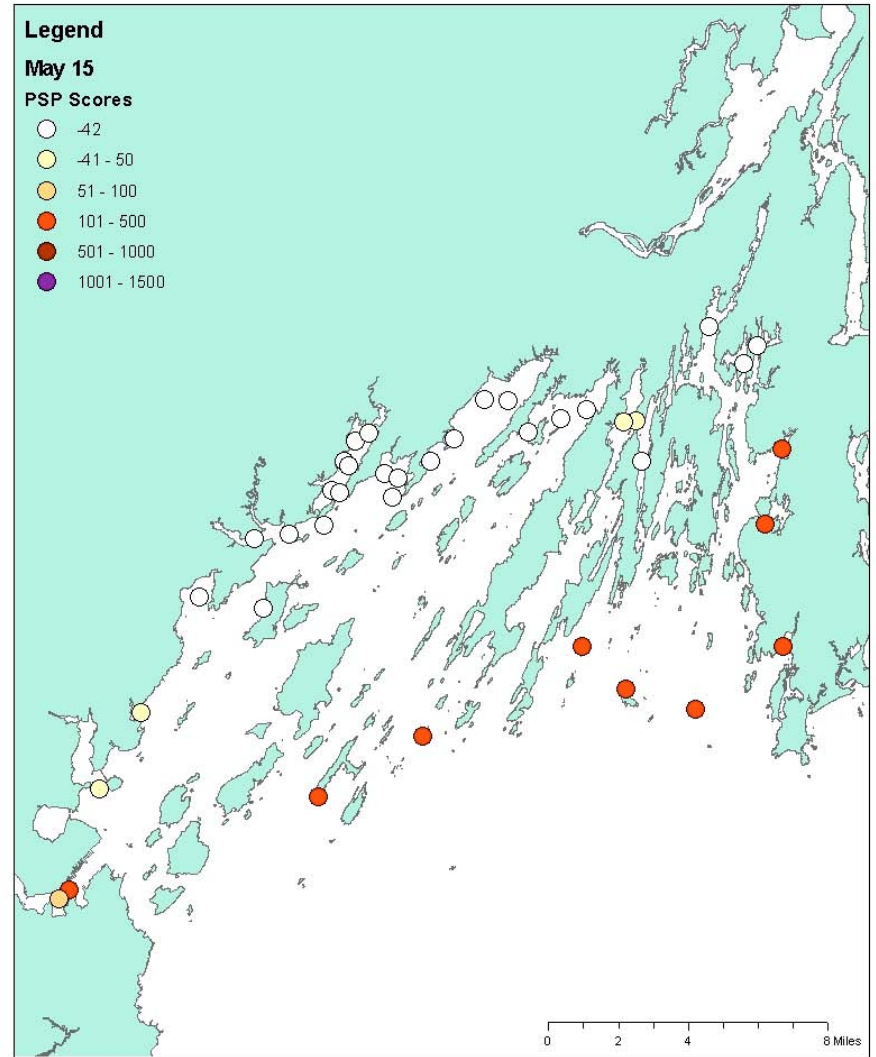


### Legend

#### May 15

##### PSP Scores

- -42
- -41 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1500







## 2006 CBEP / MER Project

Week of May 22

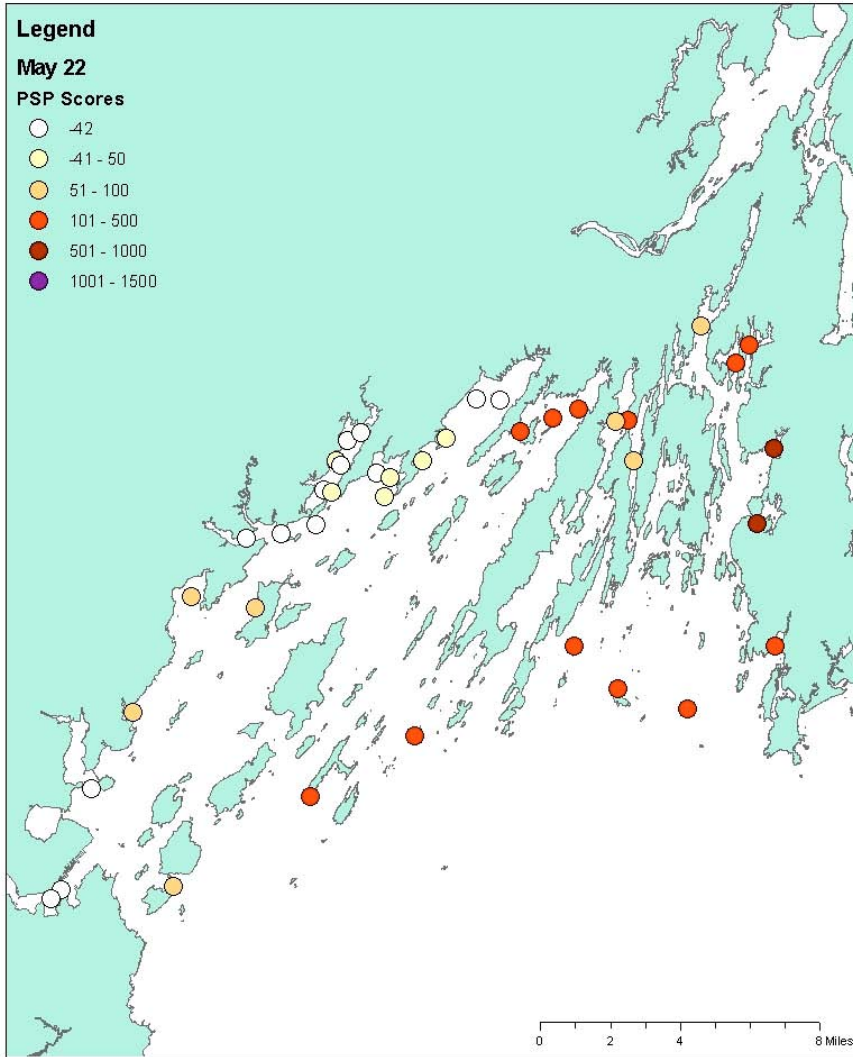


### Legend

May 22

PSP Scores

- -42
- -41 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1500



## 2006 CBEP / MER Project

Week of May 29

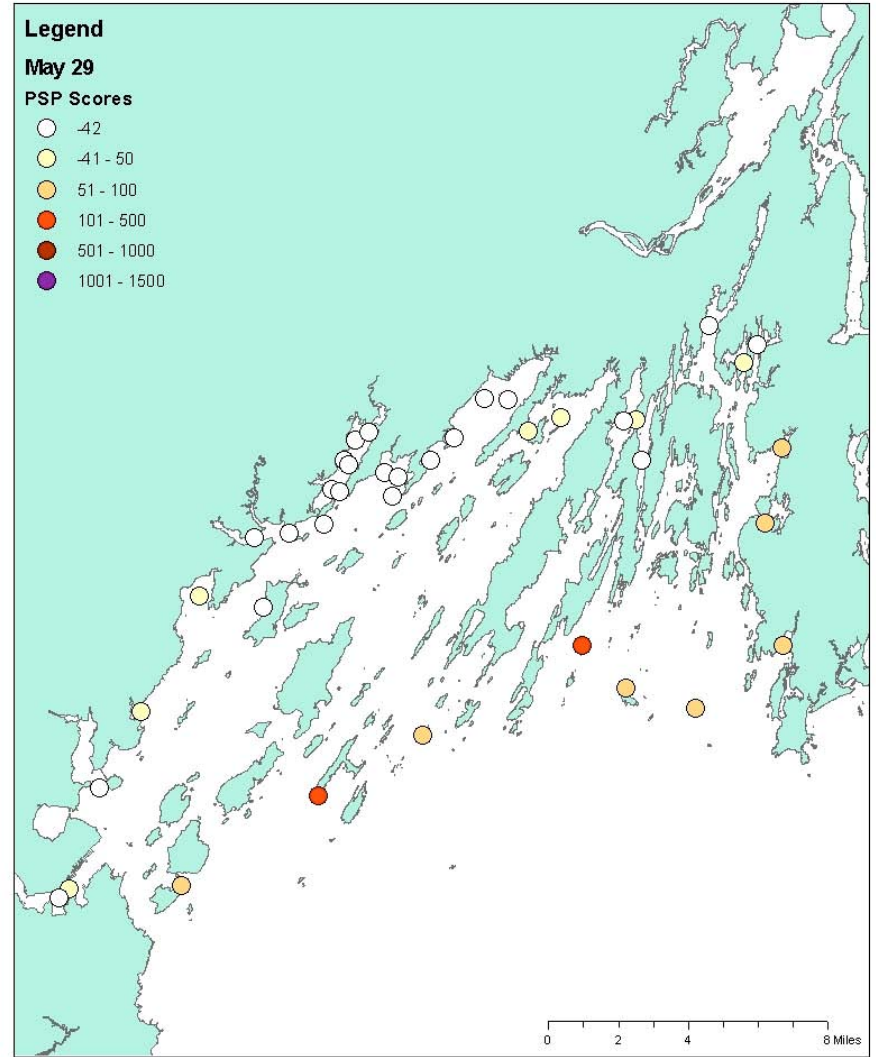


### Legend

May 29

PSP Scores

- -42
- -41 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1500





## 2006 CBEP / MER Project

Week of June 5

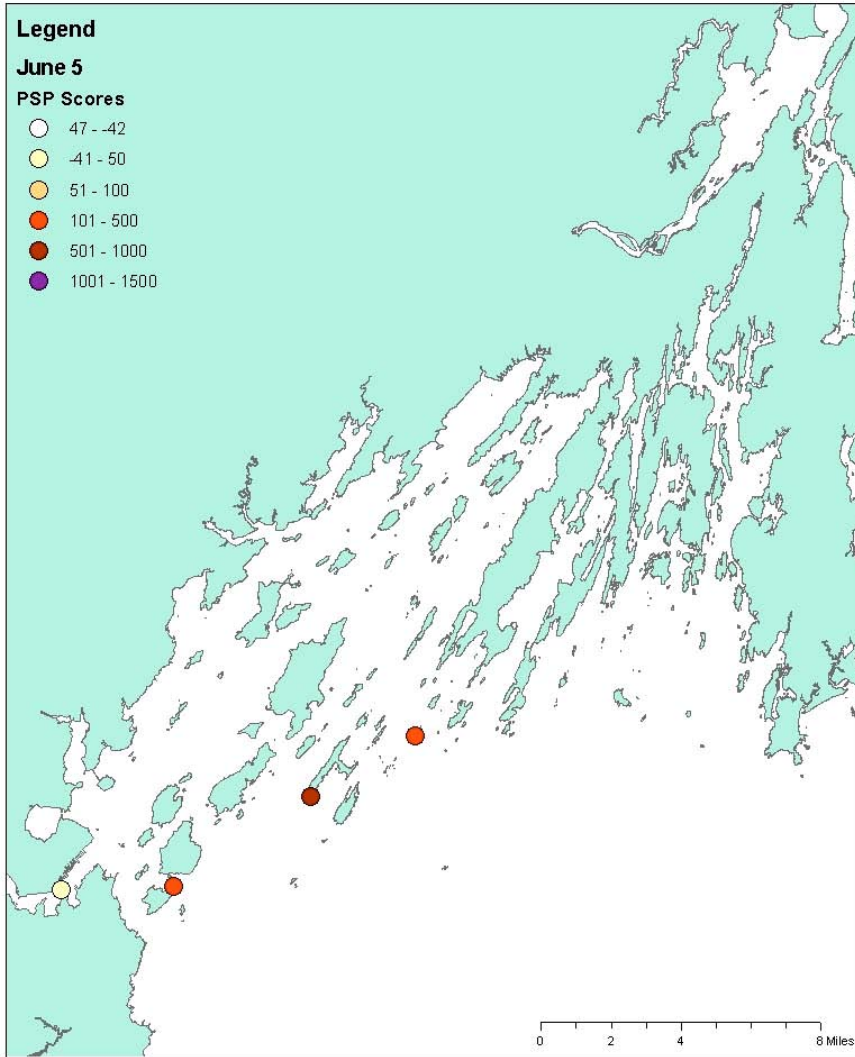


### Legend

#### June 5

##### PSP Scores

- 47 - 42
- 41 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1500



## 2006 CBEP / MER Project

Week of June 12

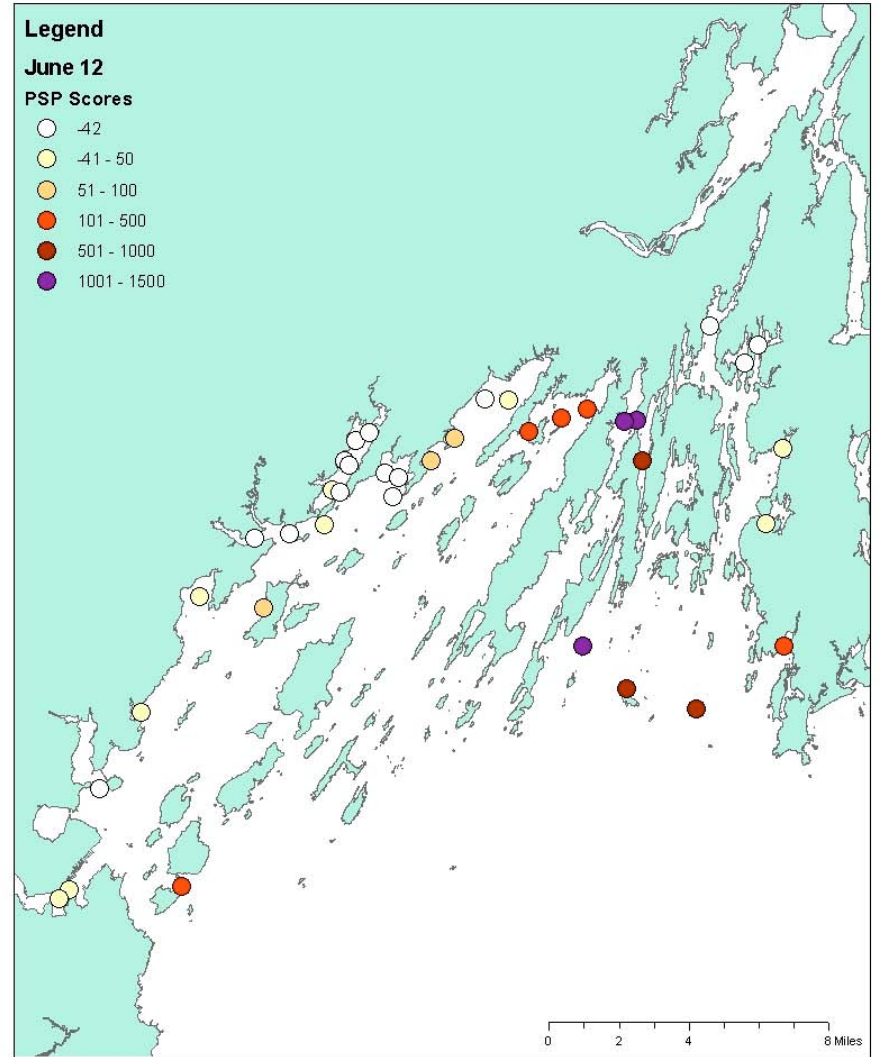


### Legend

#### June 12

##### PSP Scores

- 42
- 41 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1500







## 2006 CBEP / MER Project

Week of June 19

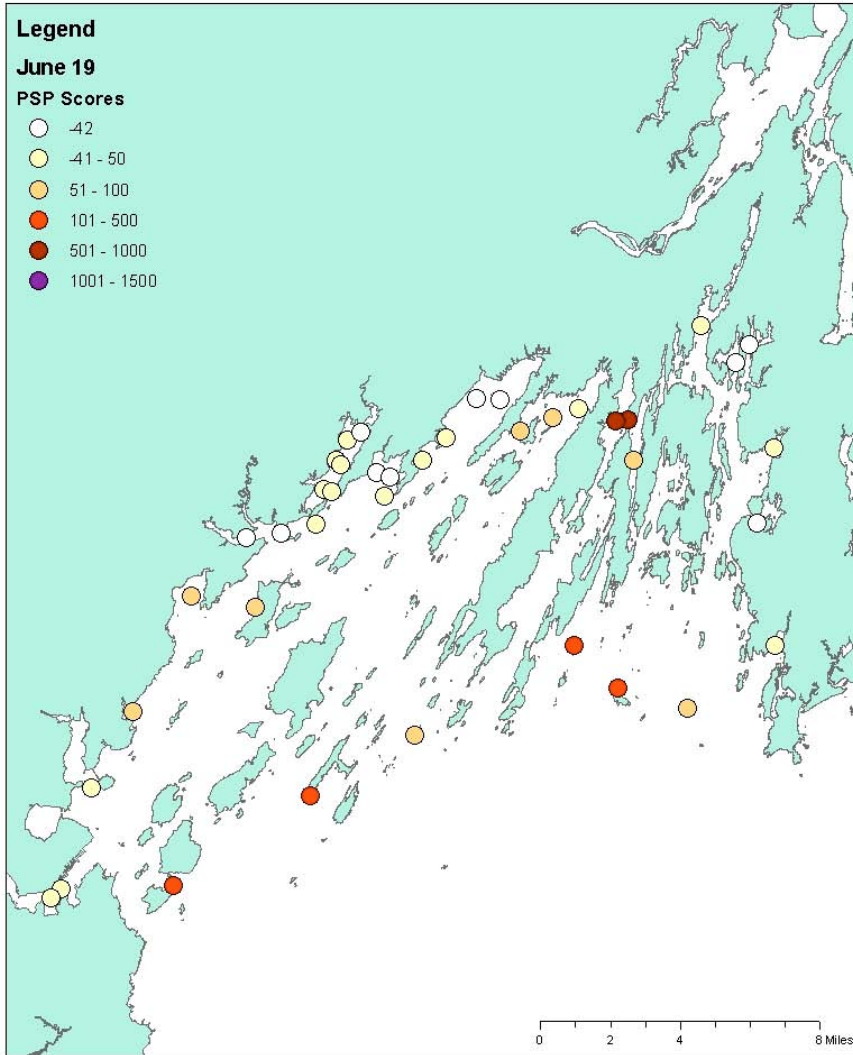


### Legend

June 19

PSP Scores

- -42
- -41 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1500



## 2006 CBEP / MER Project

Week of July 10

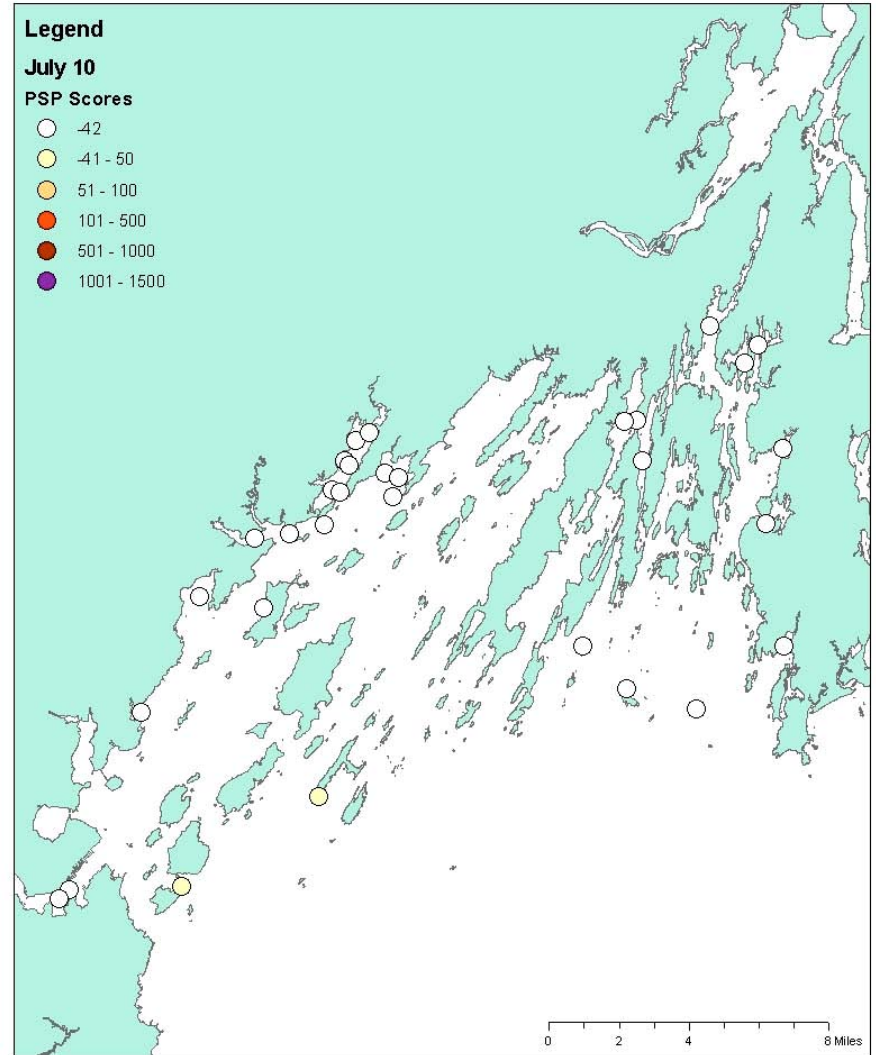


### Legend

July 10

PSP Scores

- -42
- -41 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 1500

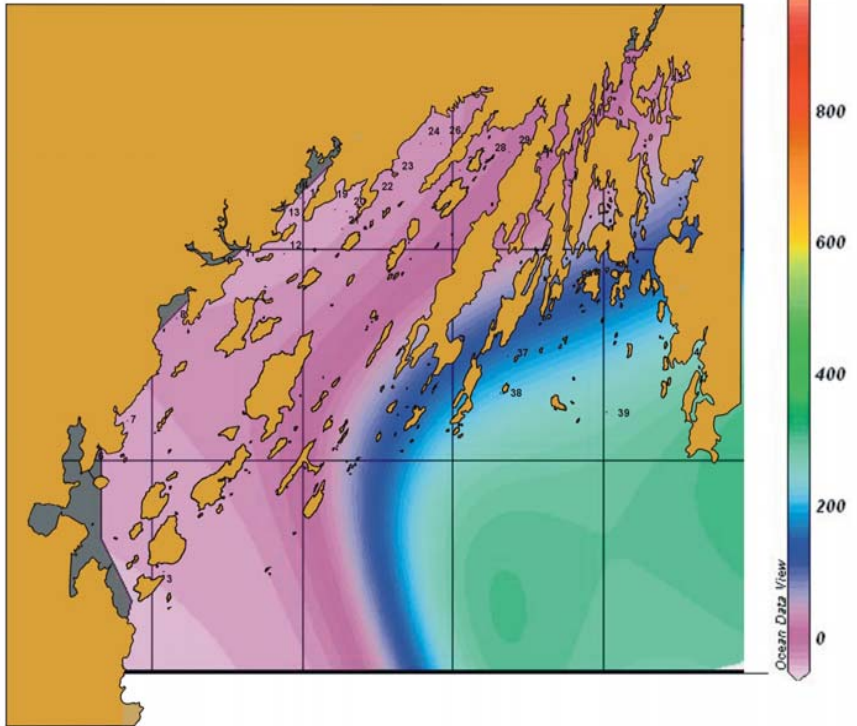


# Visually presented results -

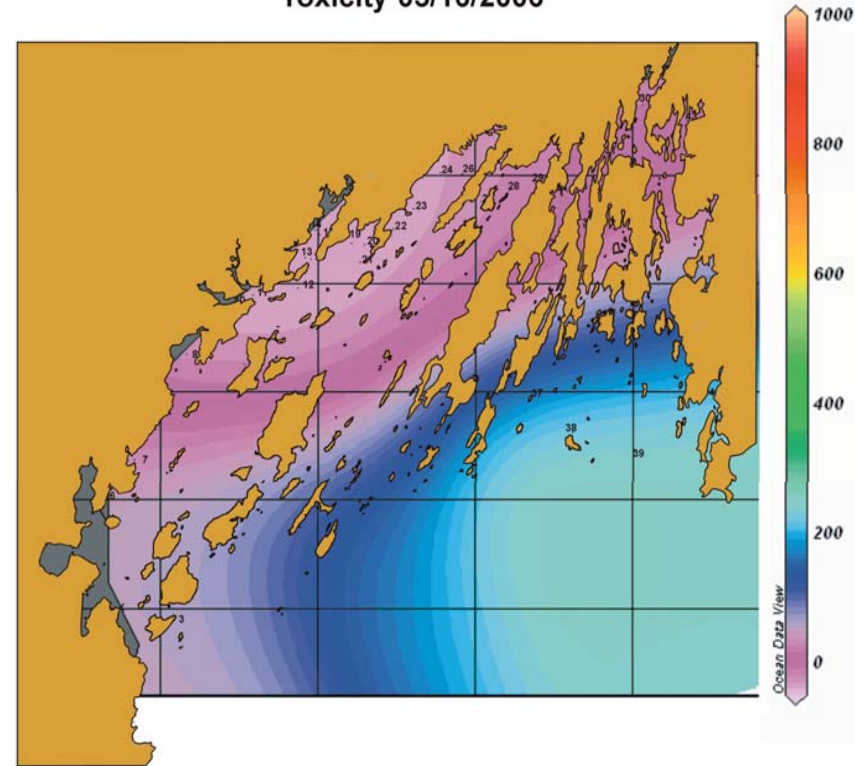
Ocean Data View Reference:

Schlitzer, R., Ocean Data View, <http://www.awi-bremerhaven.de/GEO/ODV>, 2004

Toxicity 05/09/2006



Toxicity 05/16/2006



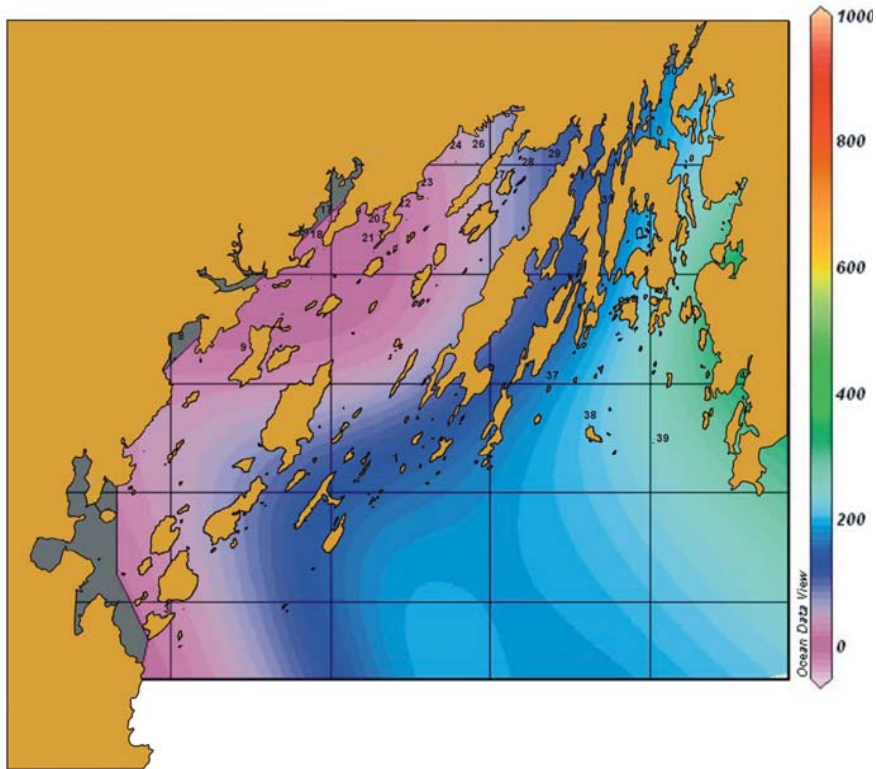


# Visually presented results -

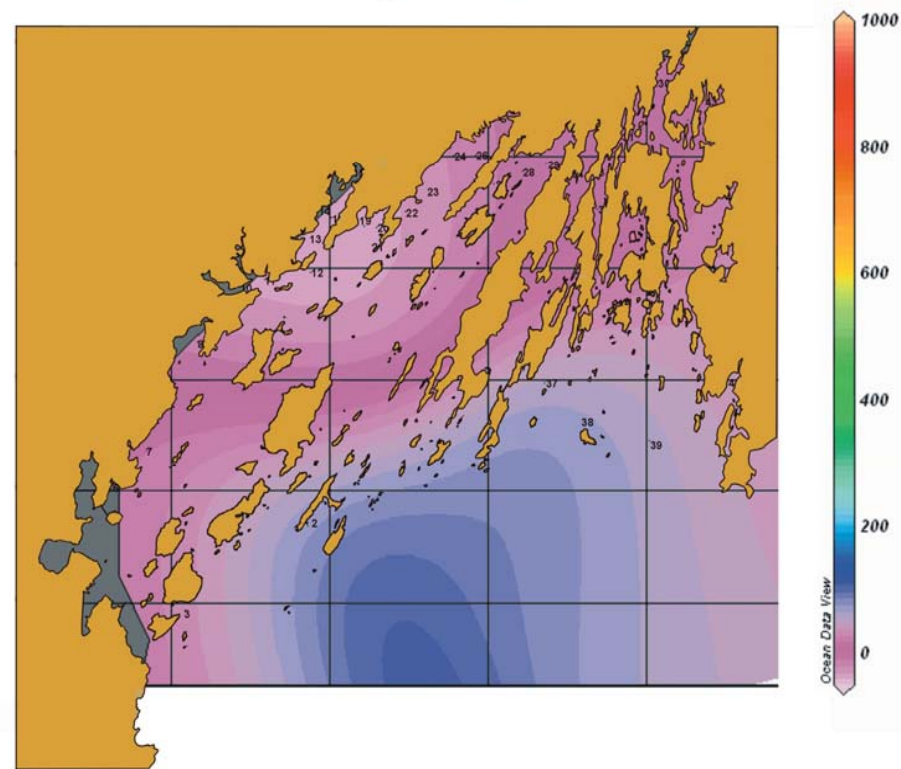
Ocean Data View Reference:

Schlitzer, R., Ocean Data View, <http://www.awi-bremerhaven.de/GEO/ODV>, 2004

Toxicity 05/23/2006



Toxicity 05/31/2006

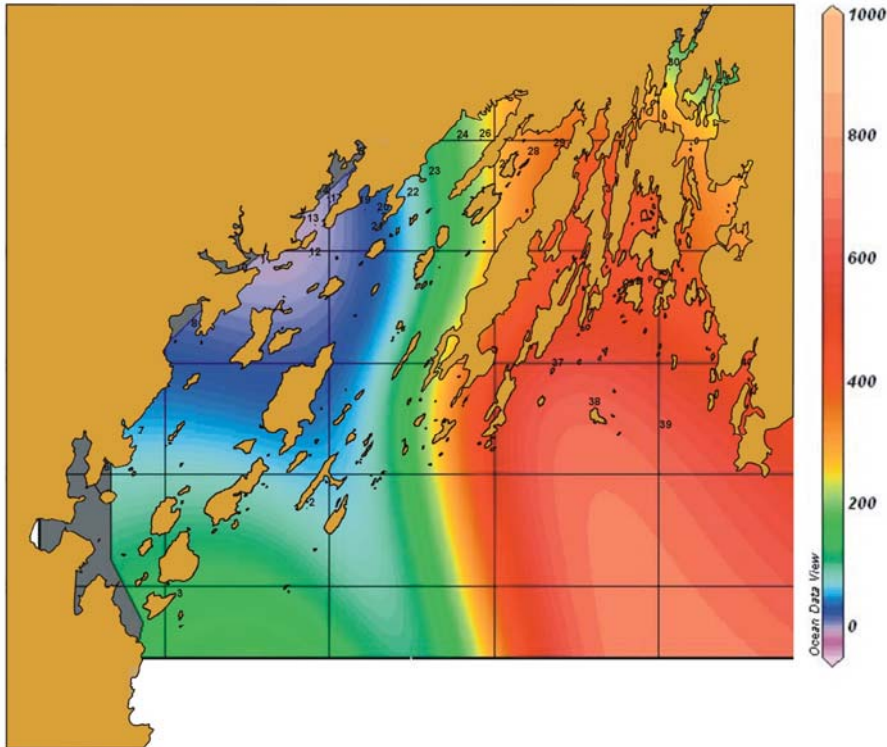


# Visually presented results -

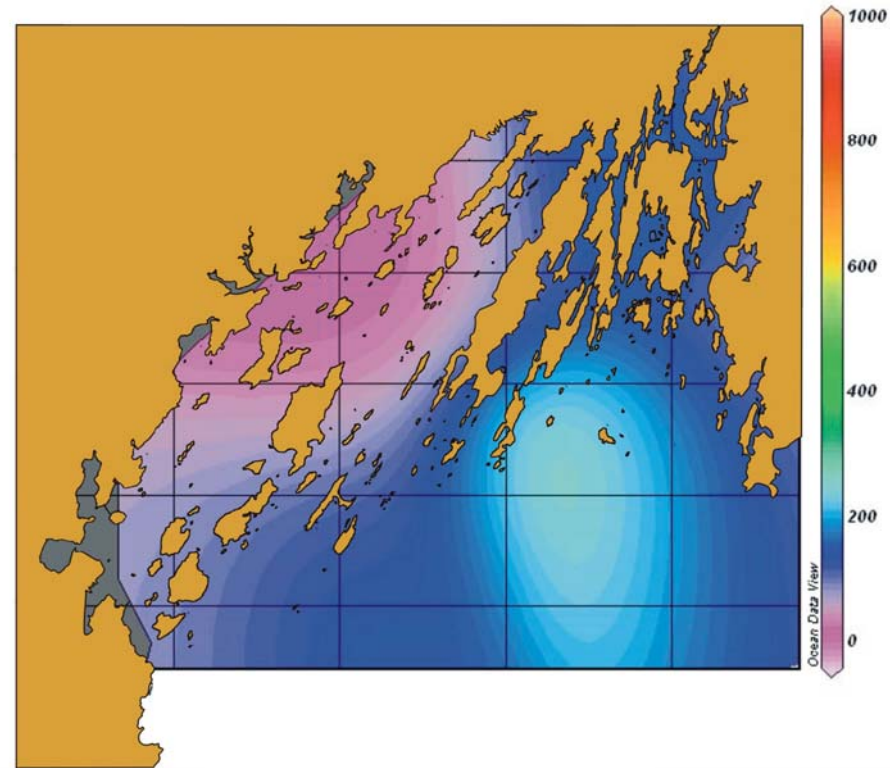
Ocean Data View Reference:

Schlitzer, R., Ocean Data View, <http://www.awi-bremerhaven.de/GEO/ODV>, 2004

Toxicity 06/15/2006



Toxicity 06/20/2006

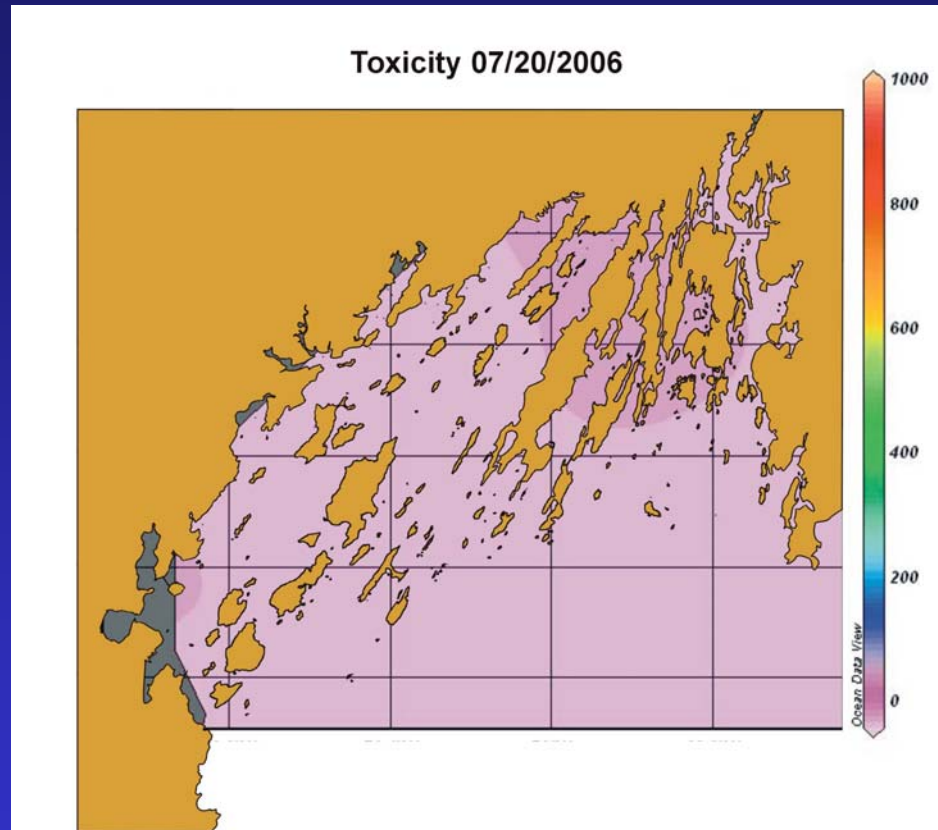




# Visually presented results -

Ocean Data View Reference:

Schlitzer, R., Ocean Data View, <http://www.awi-bremerhaven.de/GEO/ODV>, 2004

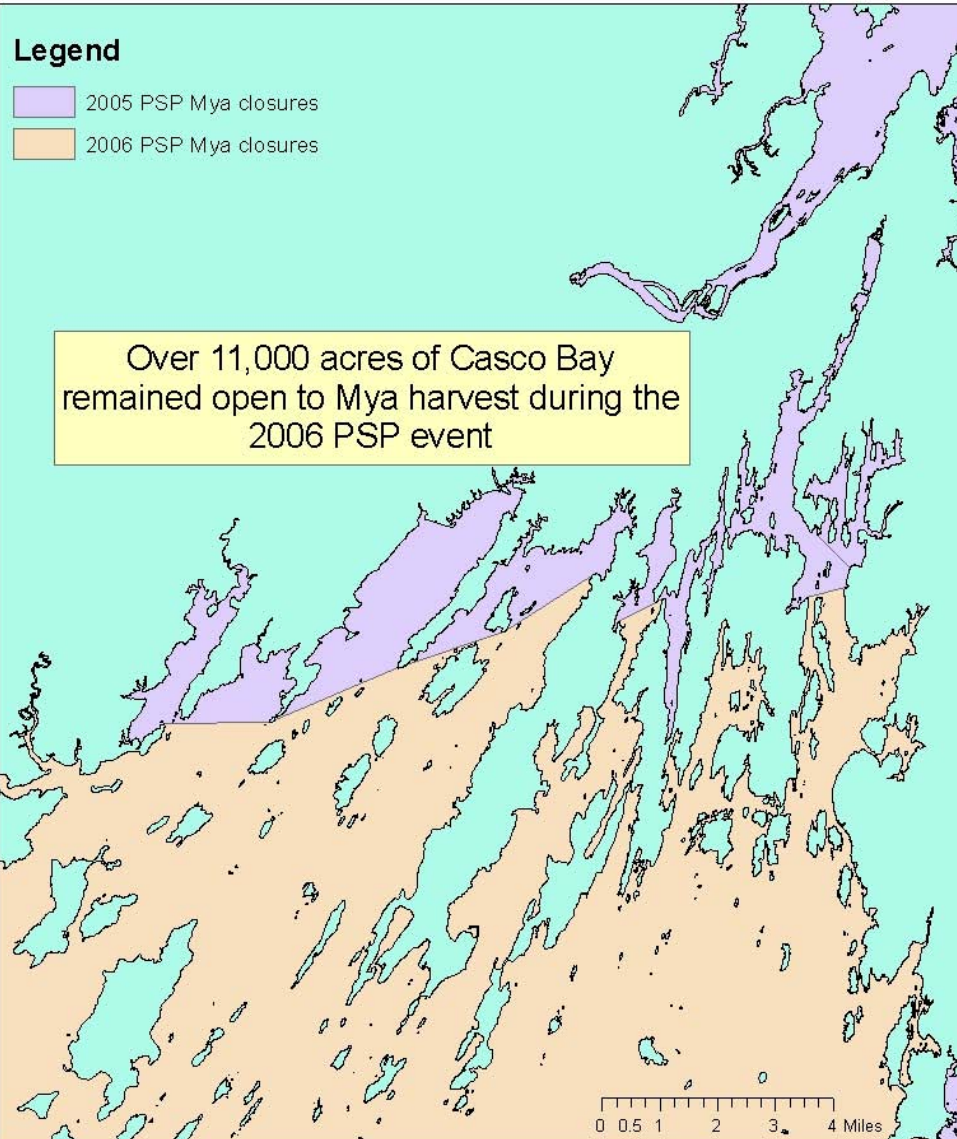


End of event



## Maine Department of Marine Resources

Estimation of Mya closure areas  
(2005 and 2006)

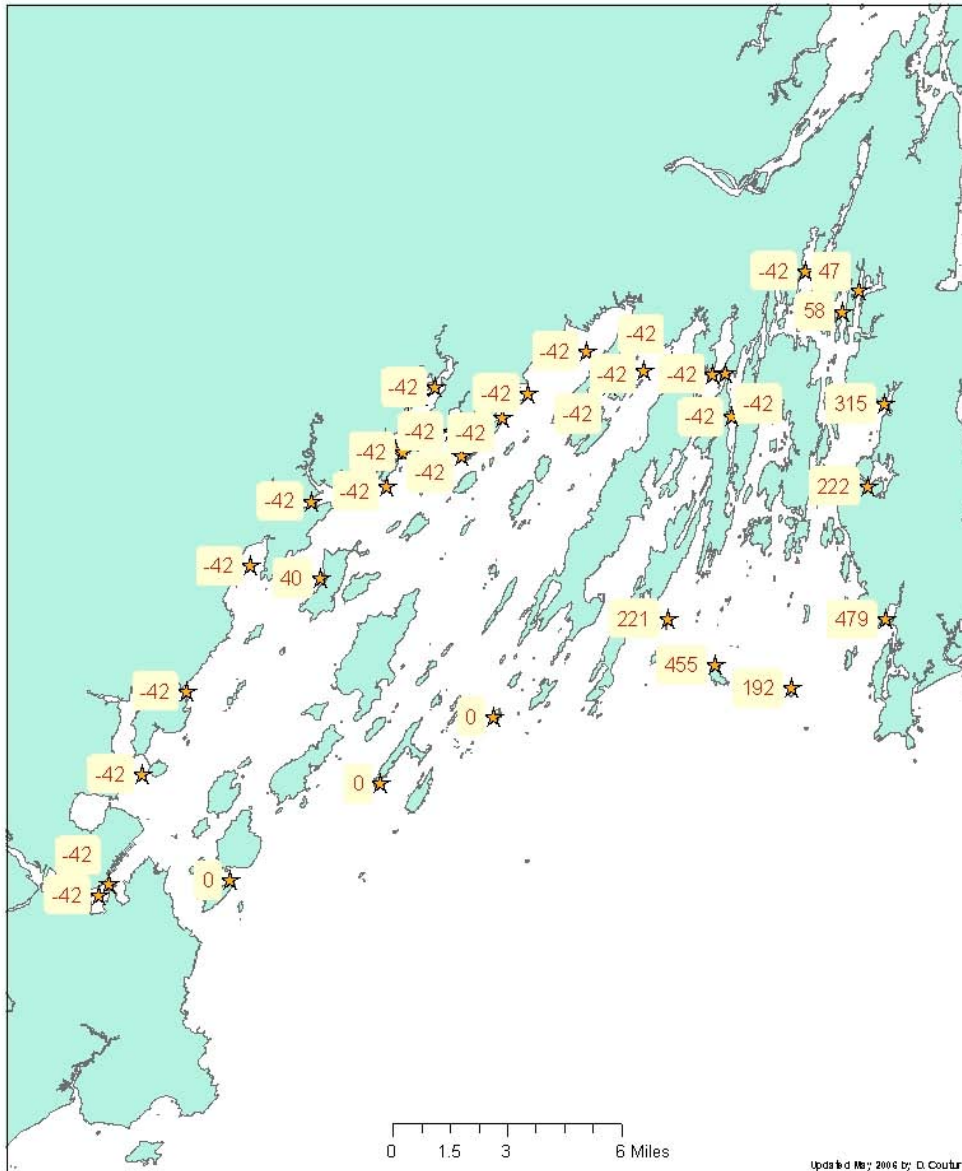


## Effectiveness of Program

**11,000 acres of surface area remained open to shellfish harvesting in 2006 compared to 2005**



# CBEP/MER Project PSP Results - May 9/10



Updated May 2006 by D. Couture

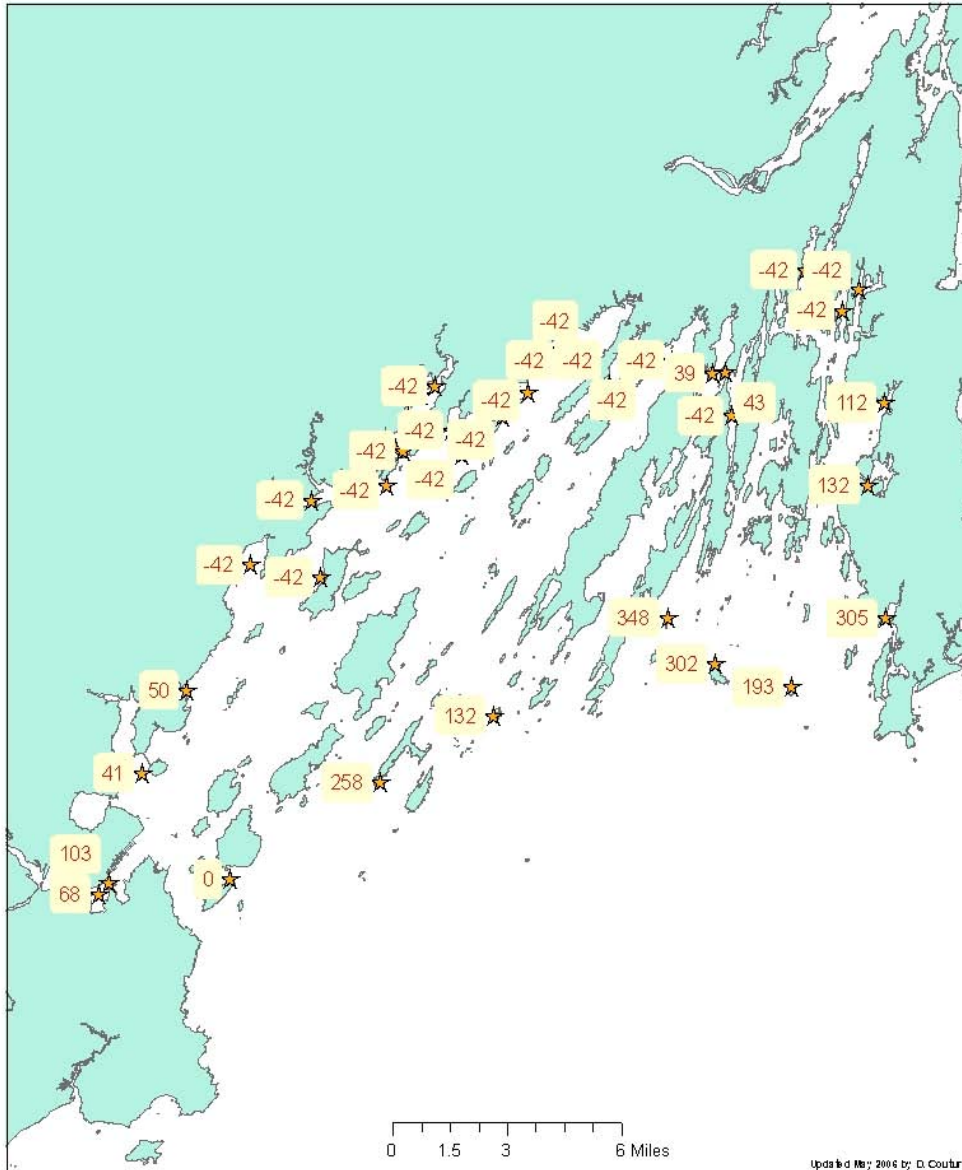
**Note -42 levels (indicating no PSP) in most of western Casco Bay, but elevated levels along New Meadows River and on outer eastern islands (0's at western outer island stations indicate no sample taken due to weather)**

**Intensified sampling allowed upper New Meadows River area to remain open (score of >79 results in PSP closure), despite high levels in lower NMR.**





# CBEP/MER Project PSP Results - May 16/18



**One week later:**

**Again, levels in western Casco Bay remain low as levels along New Meadows River begin to decline.**

**Note elevated levels at all offshore stations in Casco Bay (0 at Cushing Island station caused by improperly selected mussel bag).**

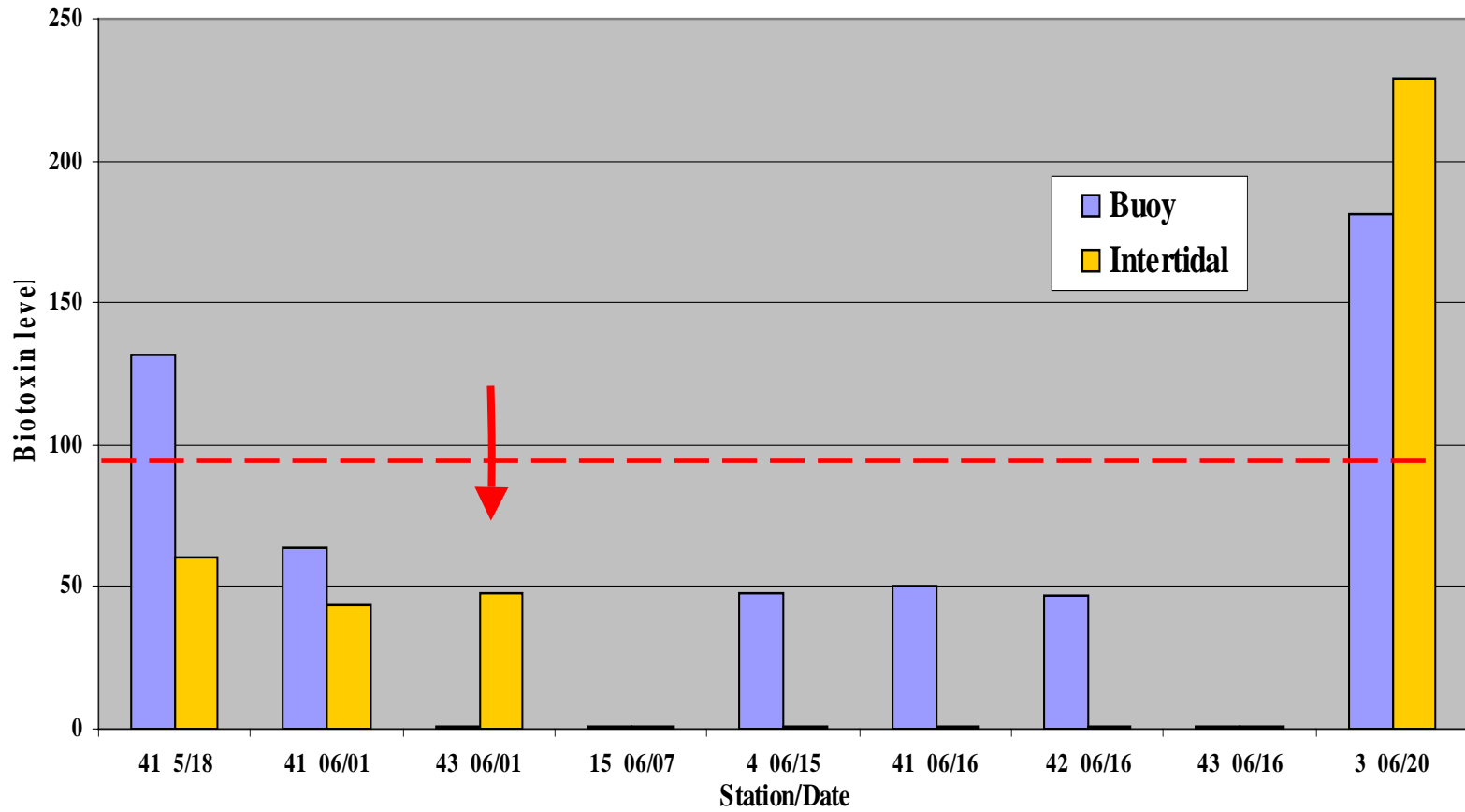


## **Additional results of the 2006 experience:**

- 1. Mussel sampling initially planned from existing mussel beds proved impractical; buoy-suspended mussels bags allow quick, efficient sampling;**
- 2. Now considering the possibility of two types of bags on each buoy: 1) long-term color-coded bags all deployed at same time early in the program to detect cumulative PSP toxin levels and 2) weekly set bags to detect weekly-interval PSP toxin level increases;**
- 3. Intensified sampling program proved highly effective at keeping shellfish growing areas open for harvesting that would otherwise be closed;**
- 4. Comparison of toxicity results from buoy deployed mussels and adjacent intertidal mussels in all but one case indicates former accumulate more toxin, thus may prove a more conservative measure from a Public Health protection point of view;**



## Comparison of Buoy and Natural Intertidal Mussel Biotoxin Levels



## **Ideas developed through experience to-date: (Continued)**

- 5. Program received generally positive response from commercial shellfish harvesters, with only one apparent tampering problem having been encountered;**
- 6. DMR has secured funding to continue and expand the sampling effort carried out in Casco Bay in 2006 through 2008;**
- 7. Boat-based sampling of buoy-deployed mussel bags has proven itself an effective and efficient alternative to shoreside-based sampling;**
- 8. DMR is preparing to expand the CBEP *boat-based sampling program* to other areas along the coast in the 2007 season.**

## *Acknowledgement*

*Funding for this project was provided by the Casco Bay Estuary Partnership (CBEP). The project was carried out in close cooperation with the Maine Department of Marine Resources Biotoxin Unit with assistance from Friends of Casco Bay in nutrient sample collection technique.*

*Special thanks go to Karen Young, Executive Director of Casco Bay Estuary Partnership, Darcie Couture, Alison Sirois, and Anne Barrett of DMR, and Peter Milholland of Friends of Casco Bay.*