Casco Bay Intensified PSP Sampling Project

conducted by

MER Corp.

in cooperation with
the Maine DMR
with funding from the
Casco Bay Estuary Partnership

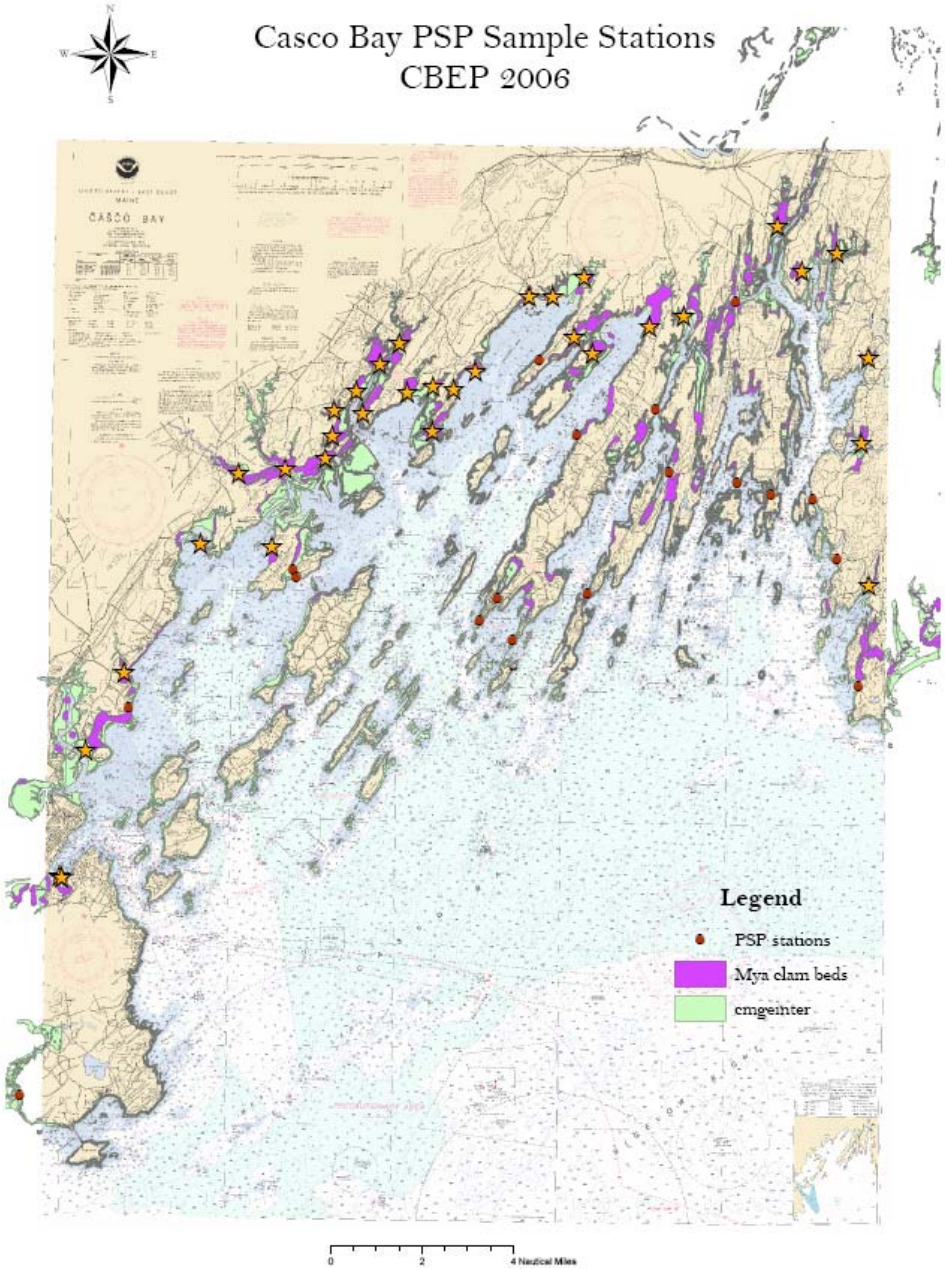
October 16, 2006

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:

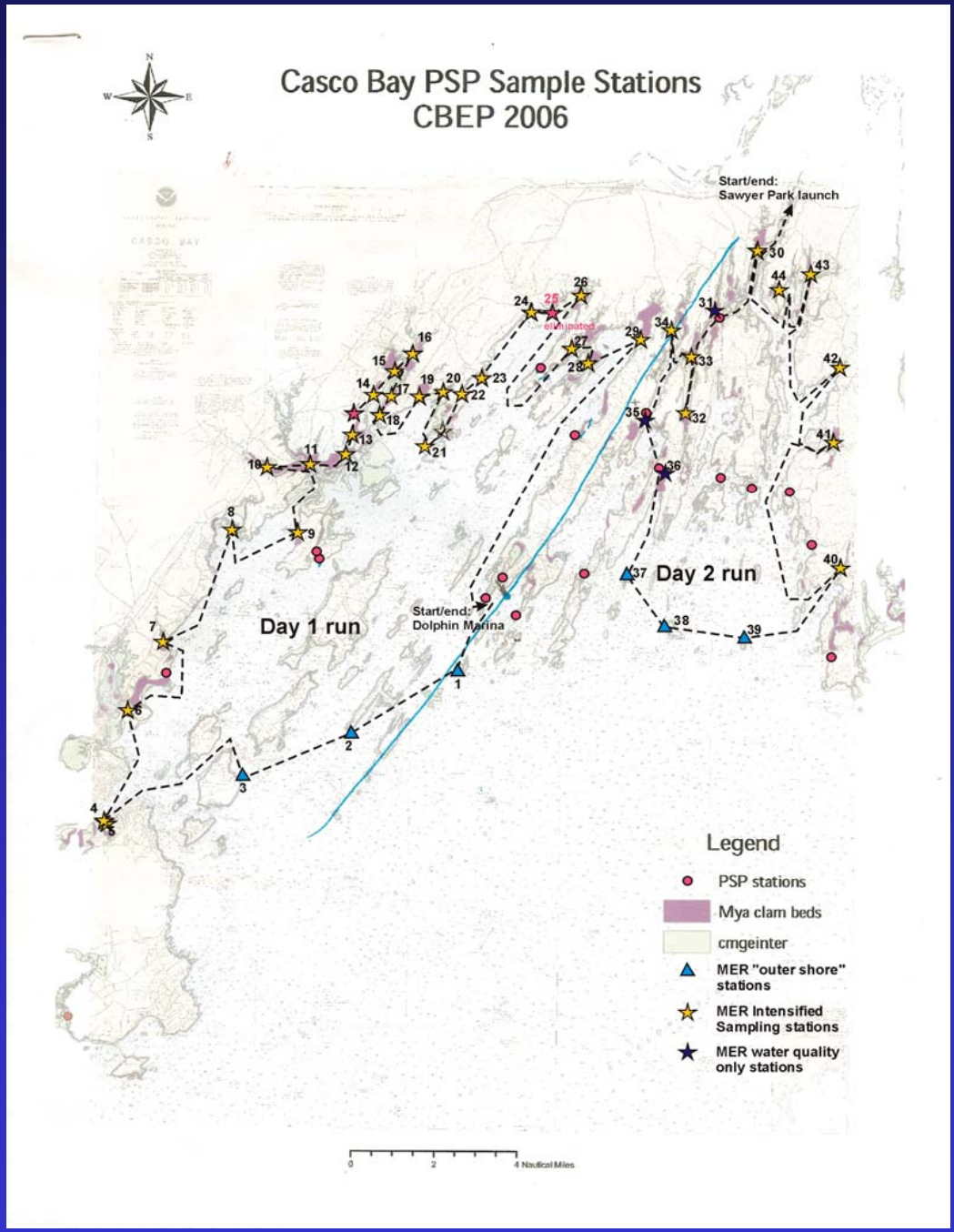
1. Samples collected subtidally or from moored buoys to allow tide level independence;
2. Increased frequency of sampling;
3. Expanded data collection included several related parameters, *e.g.* phytoplankton, water quality, nutrients [N].



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.



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.

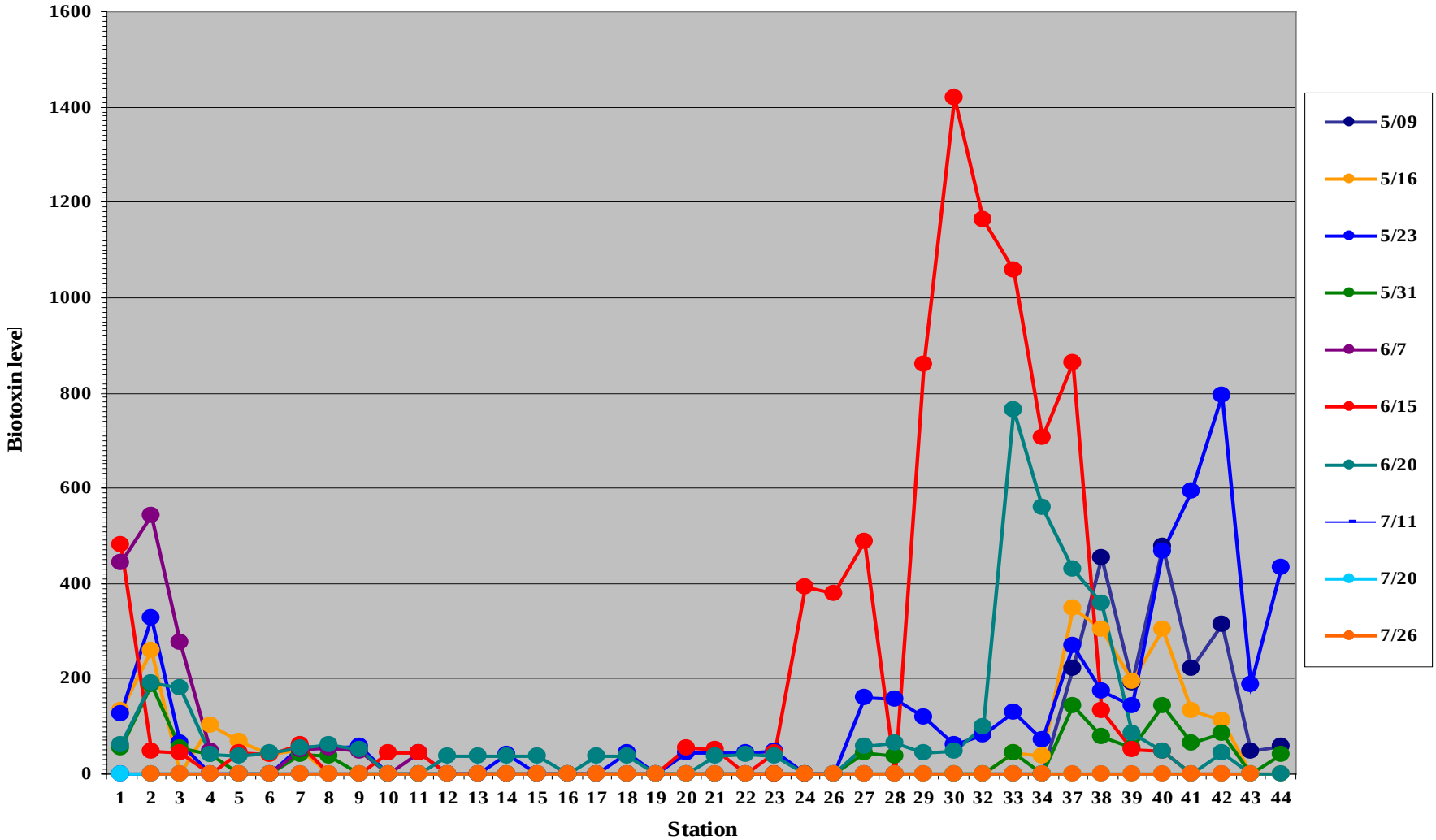
Water sample collected and ready for filtration for nutrient sample.

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

Water column profiler being deployed.

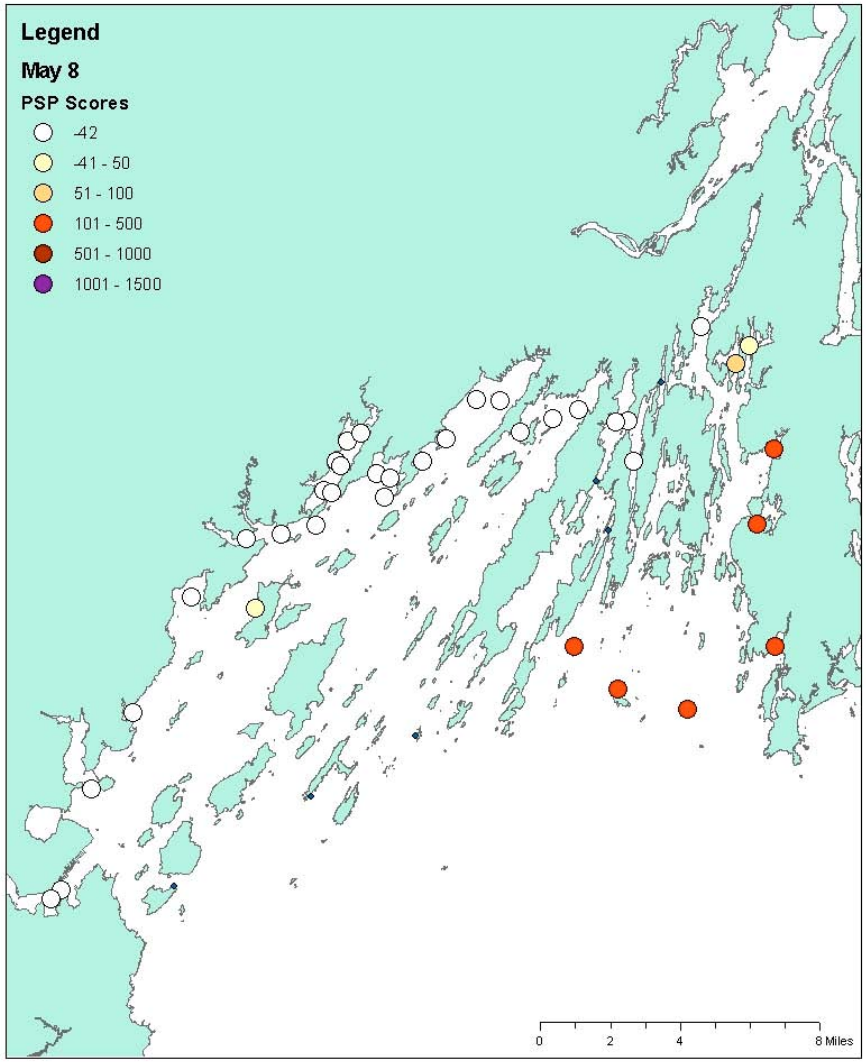
Intensive PSP Sampling Program Results

May, 9 through July 27, 2006 (weekly)



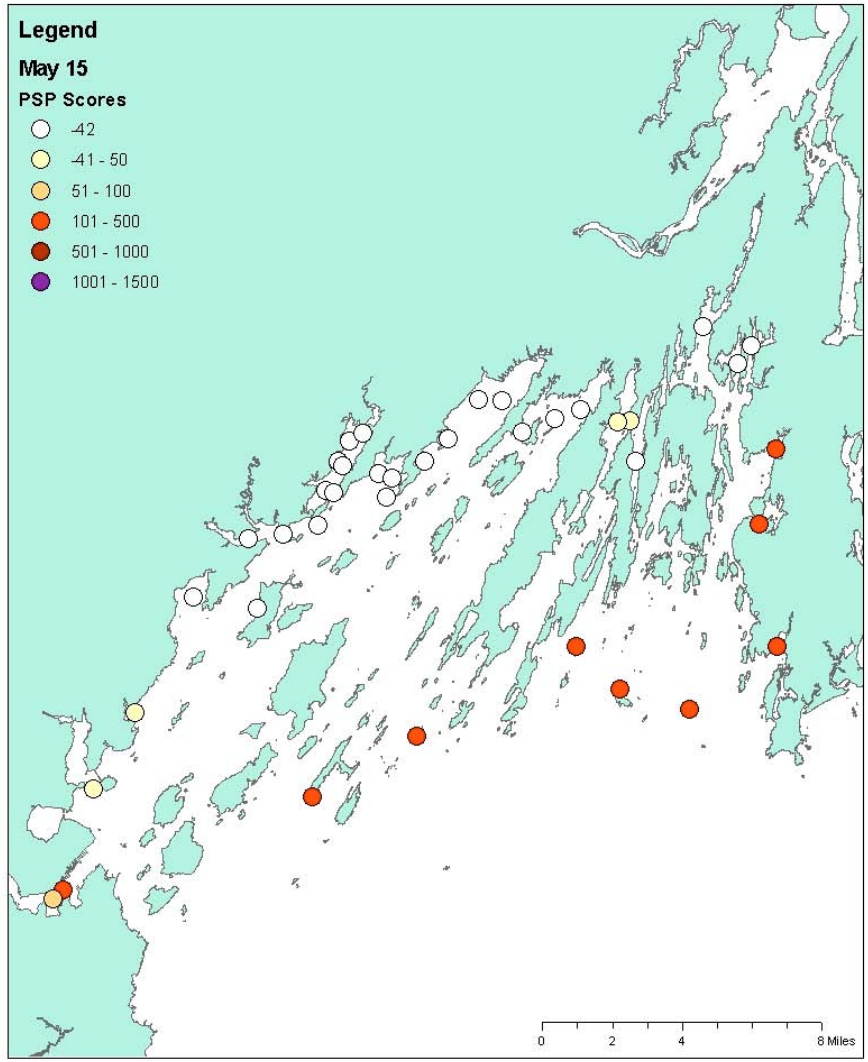
2006 CBEP / MER Project

Week of May 8



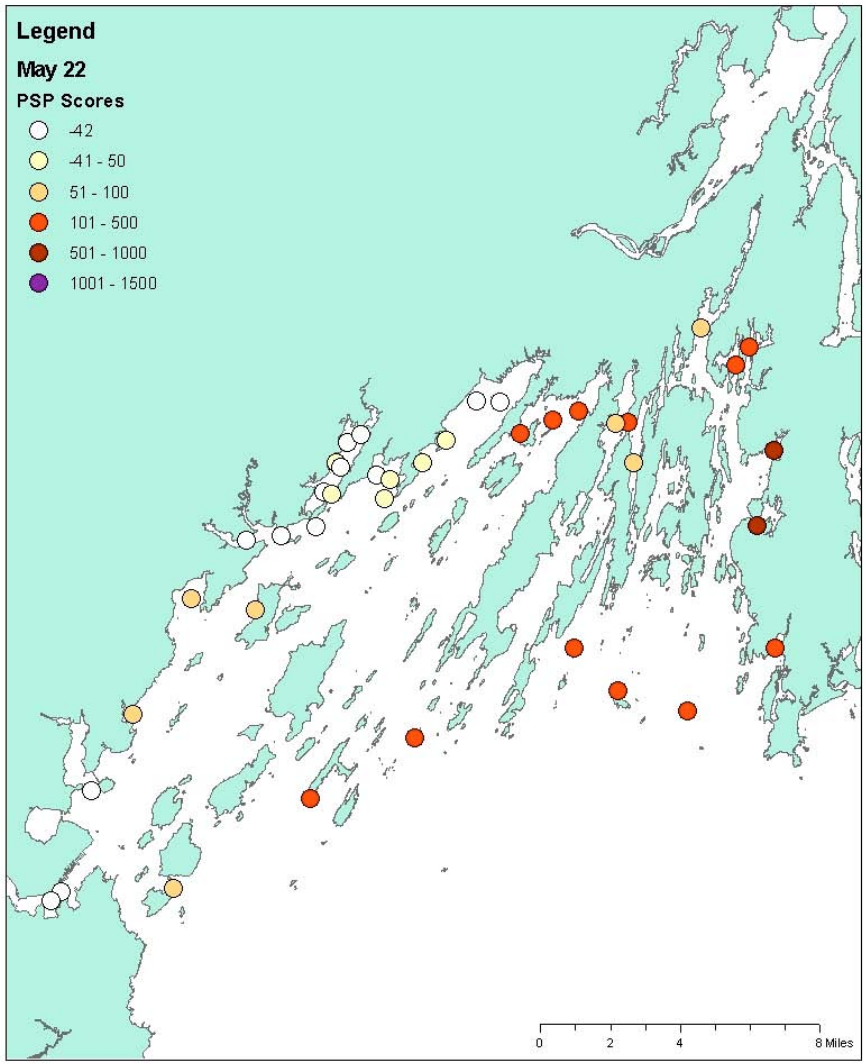
2006 CBEP / MER Project

Week of May 15



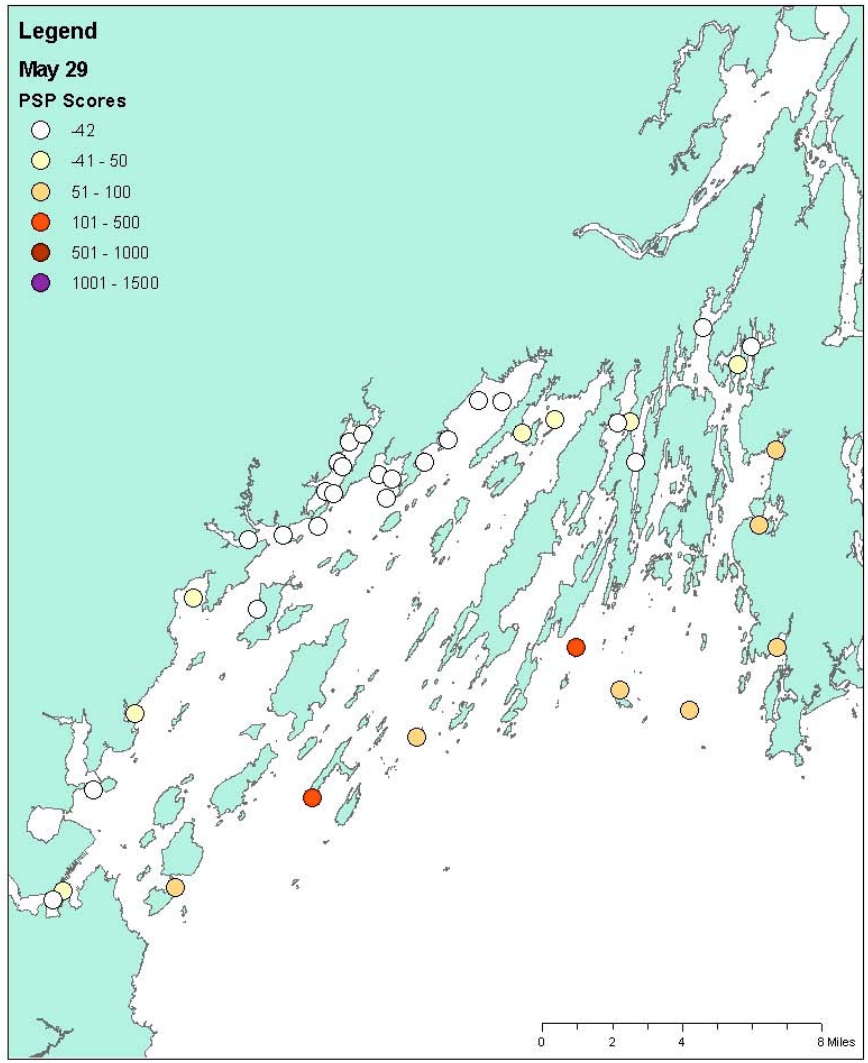
2006 CBEP / MER Project

Week of May 22



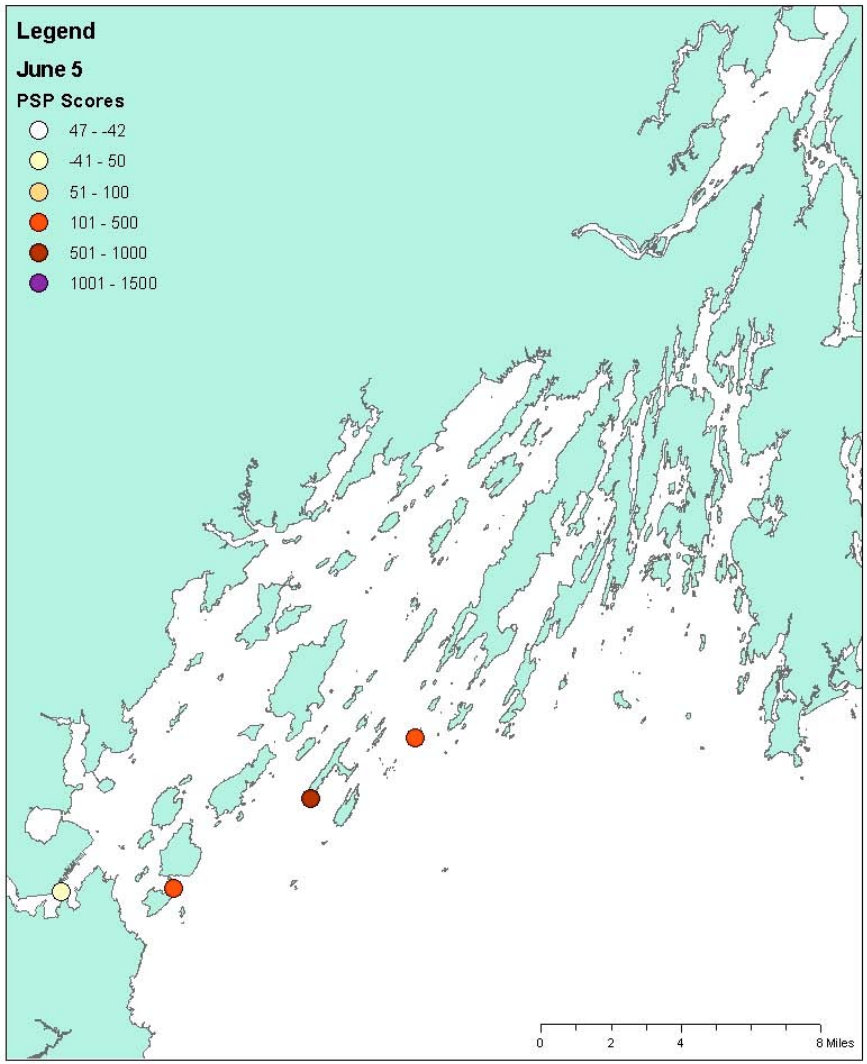
2006 CBEP / MER Project

Week of May 29



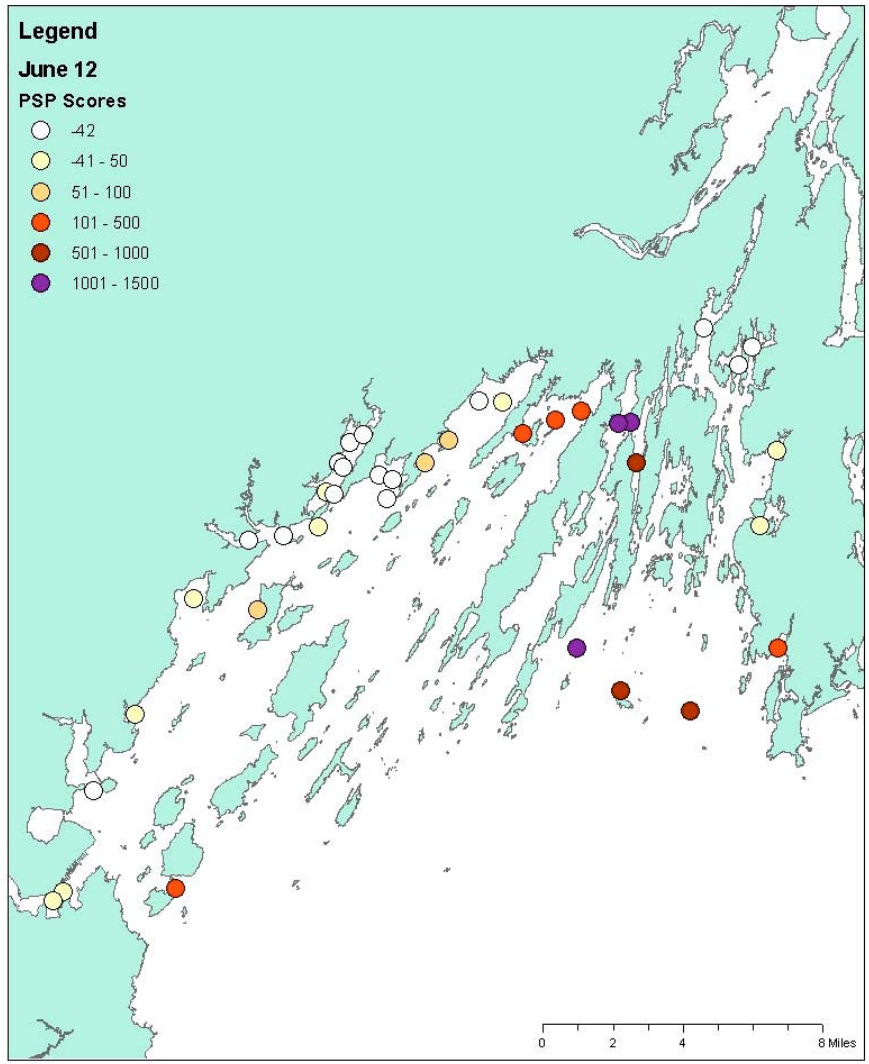
2006 CBEP / MER Project

Week of June 5



2006 CBEP / MER Project

Week of June 12



2006 CBEP / MER Project

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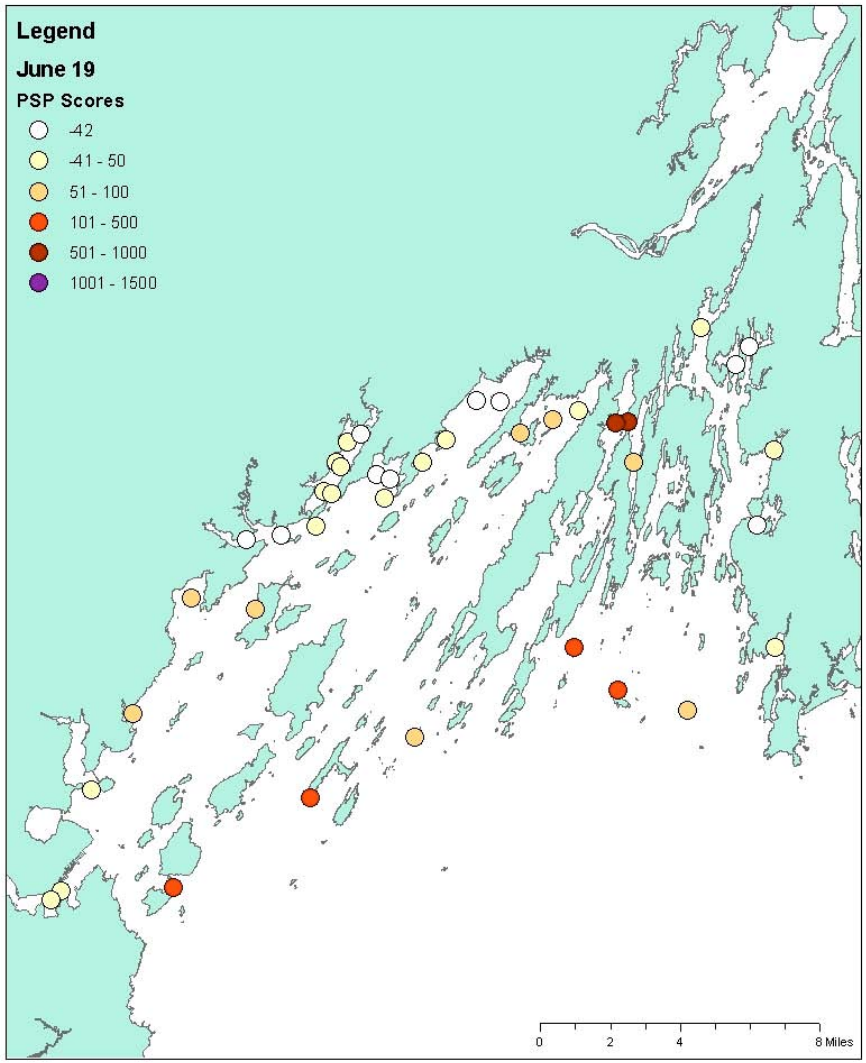
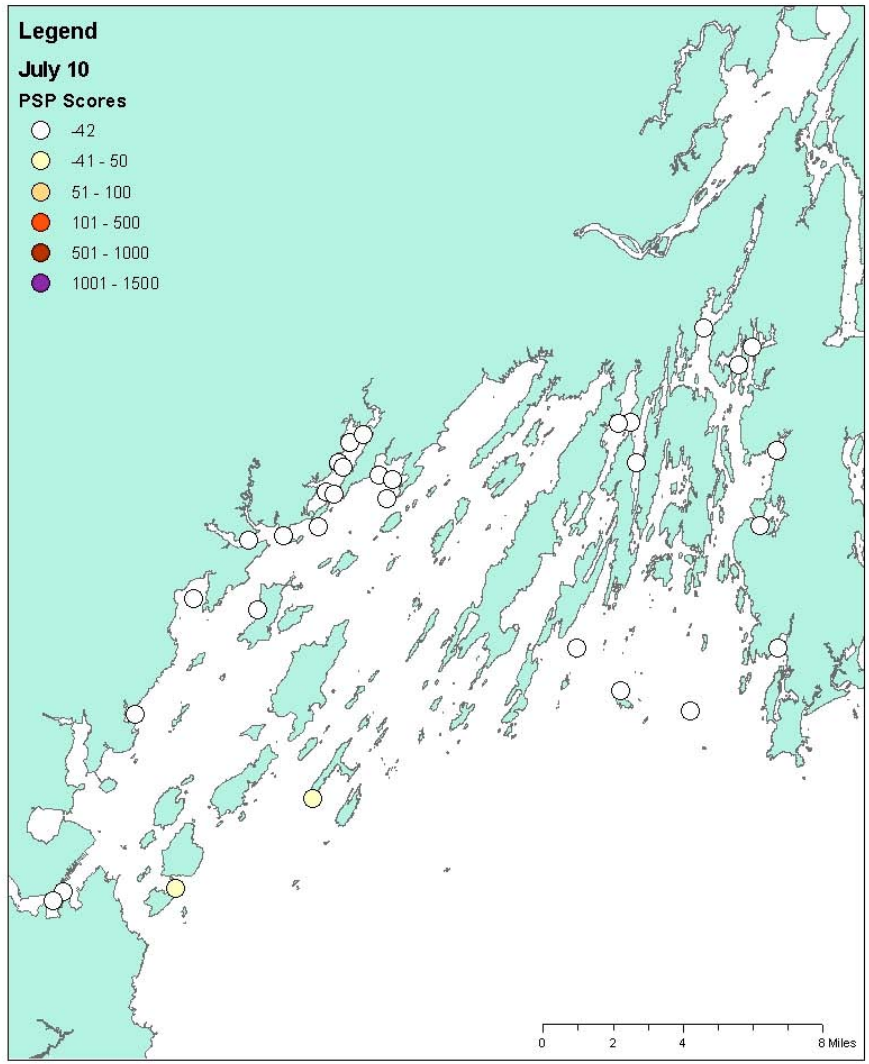


2006 CBEP / MER Project

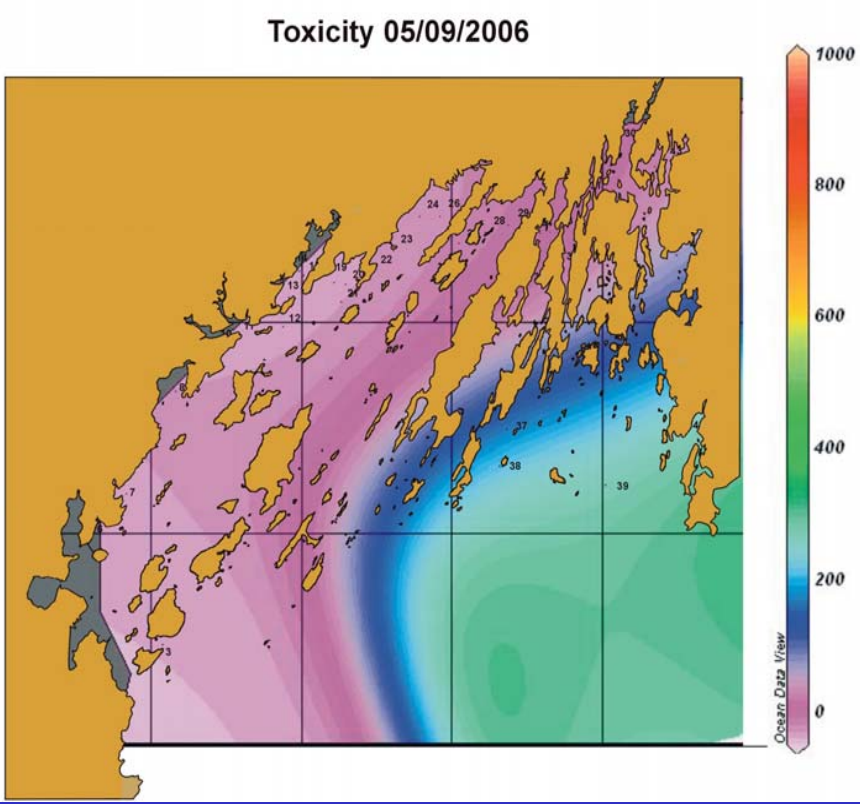
Week of July 10

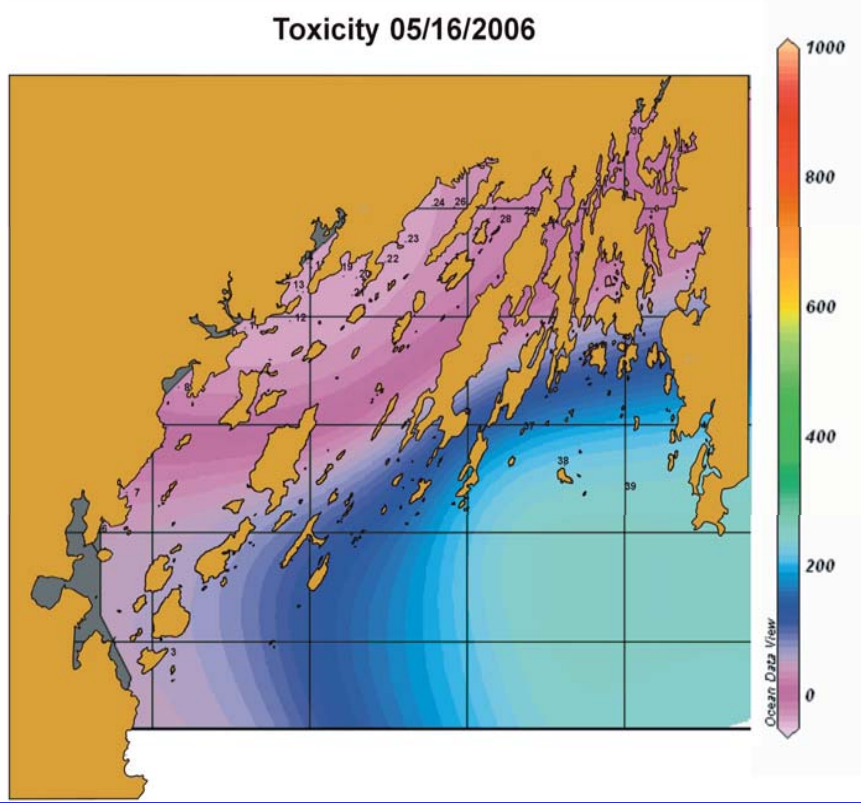


Visually presented results -

Ocean Data View Reference:

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





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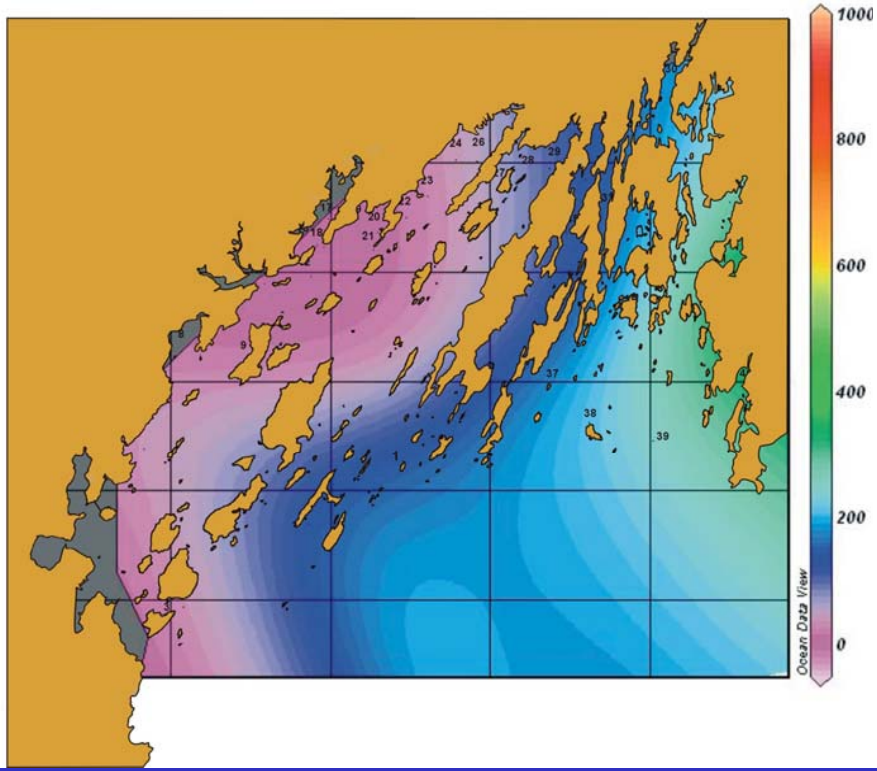

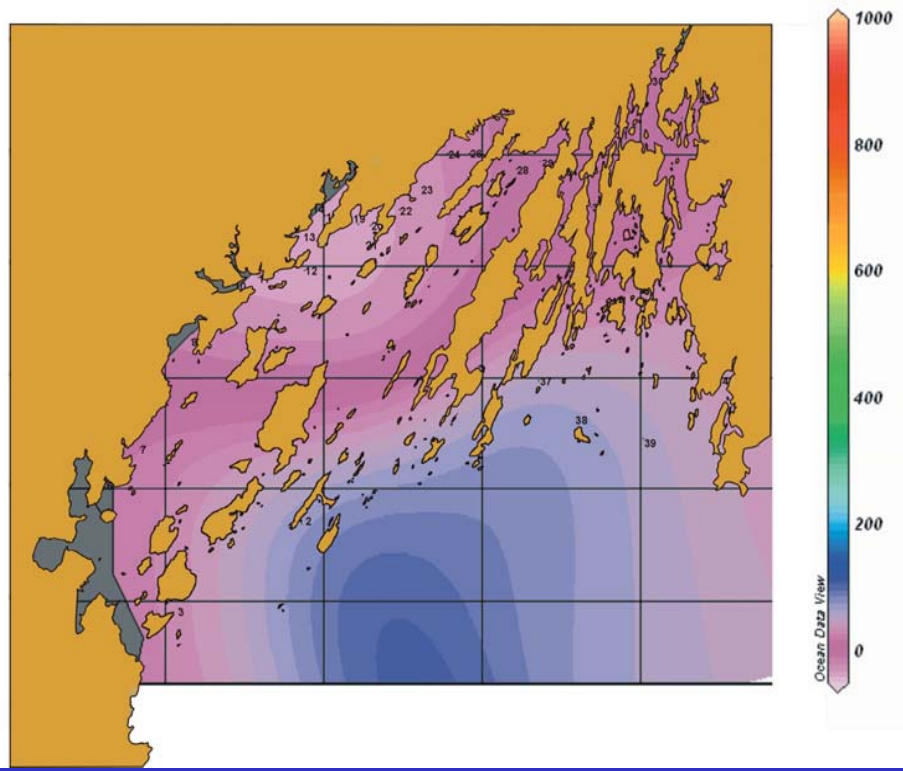

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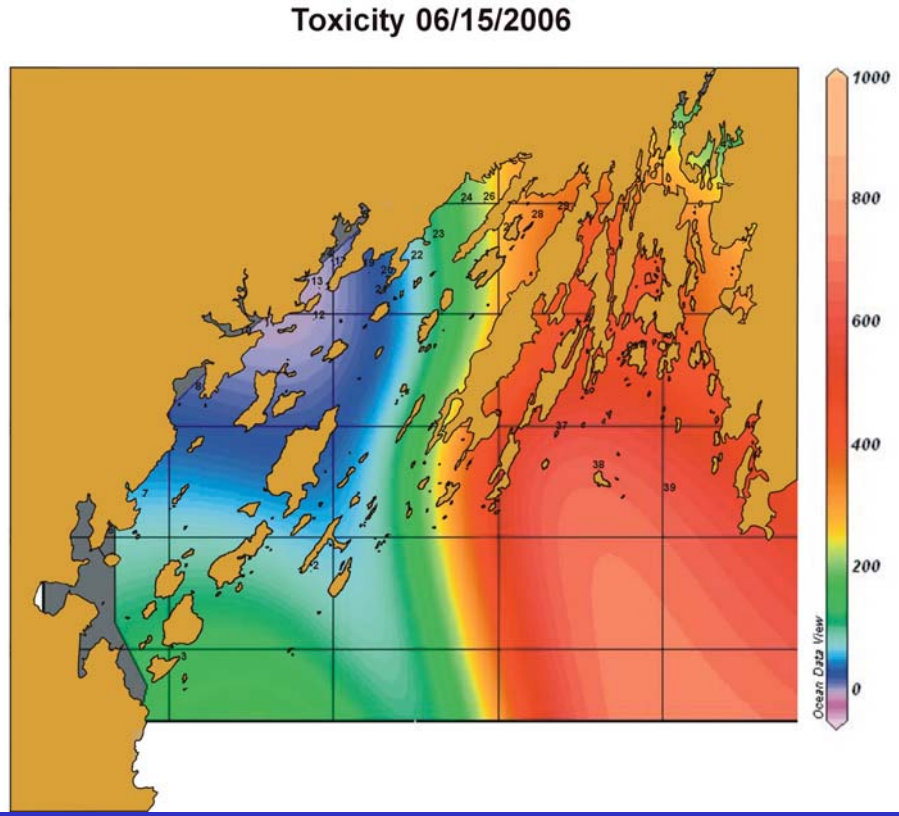

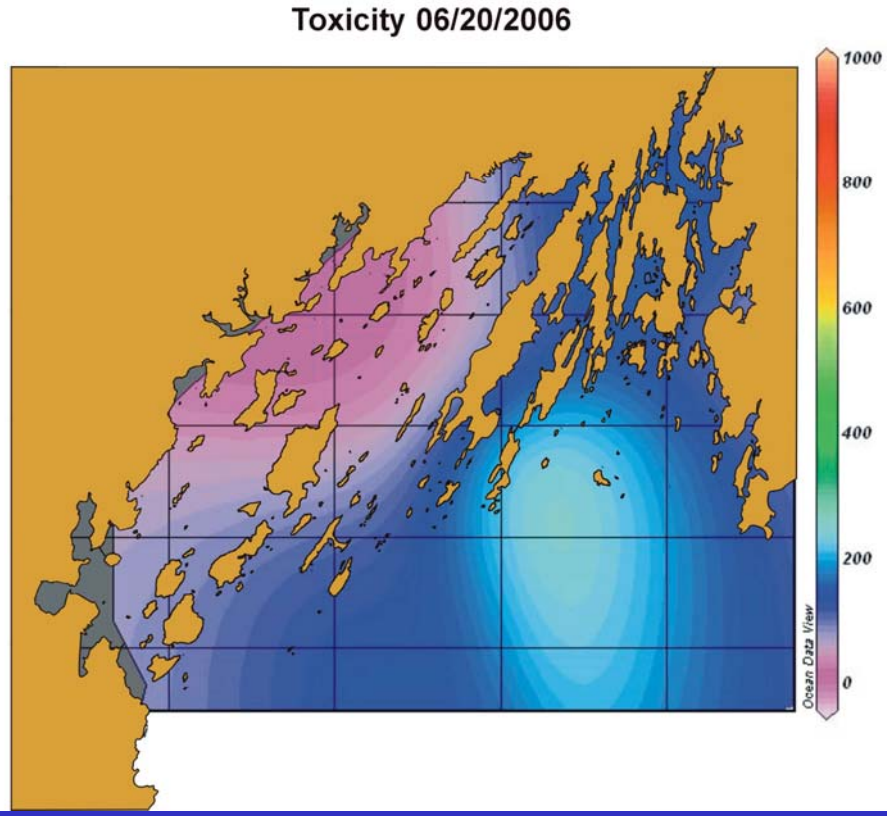

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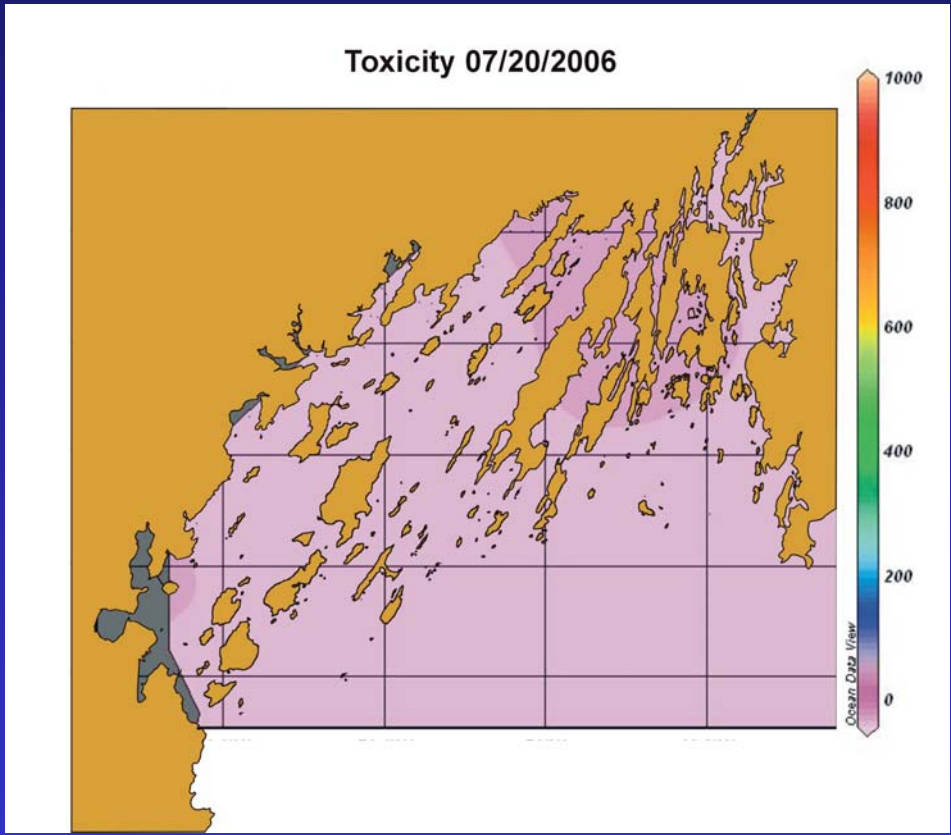
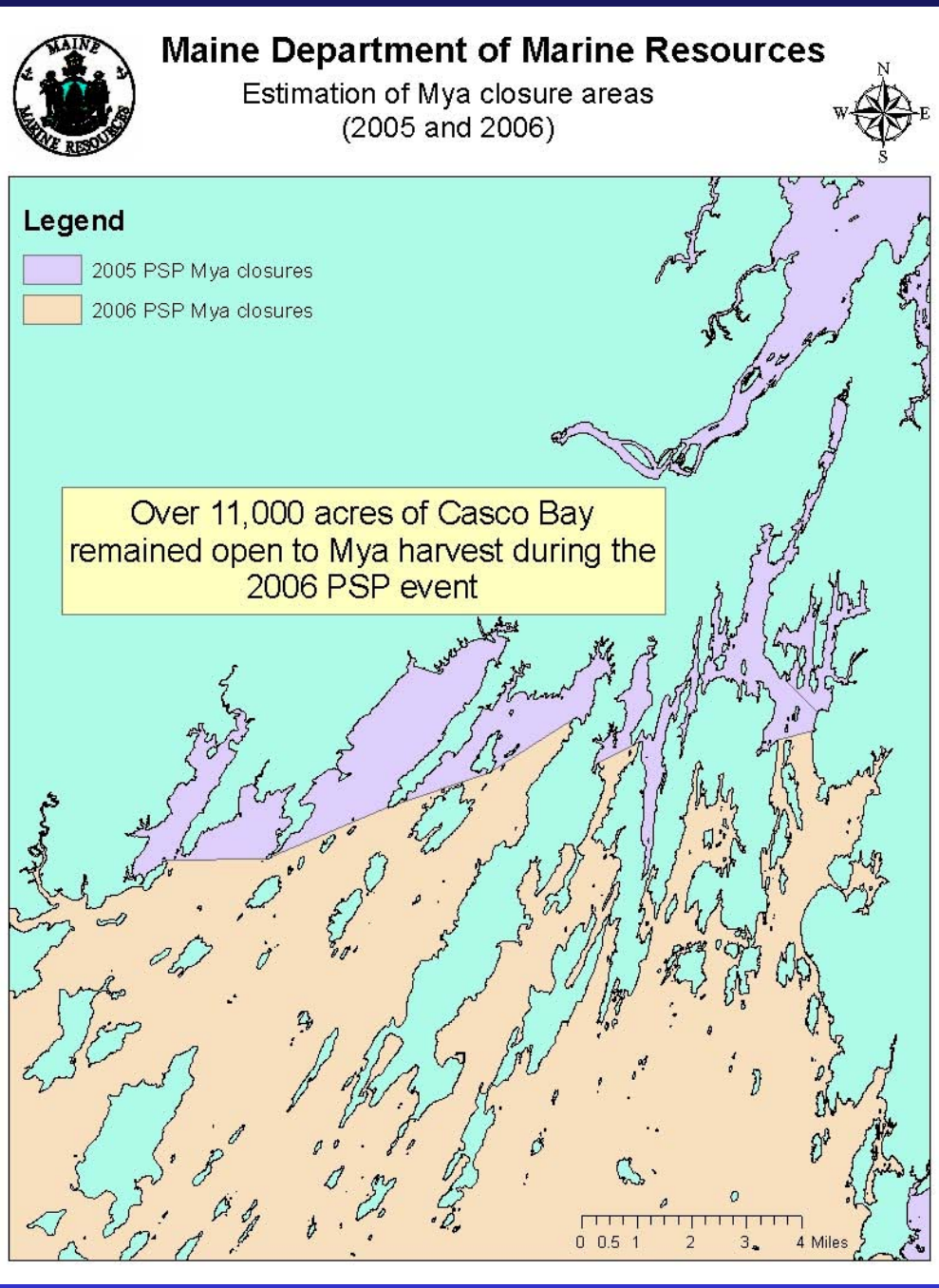
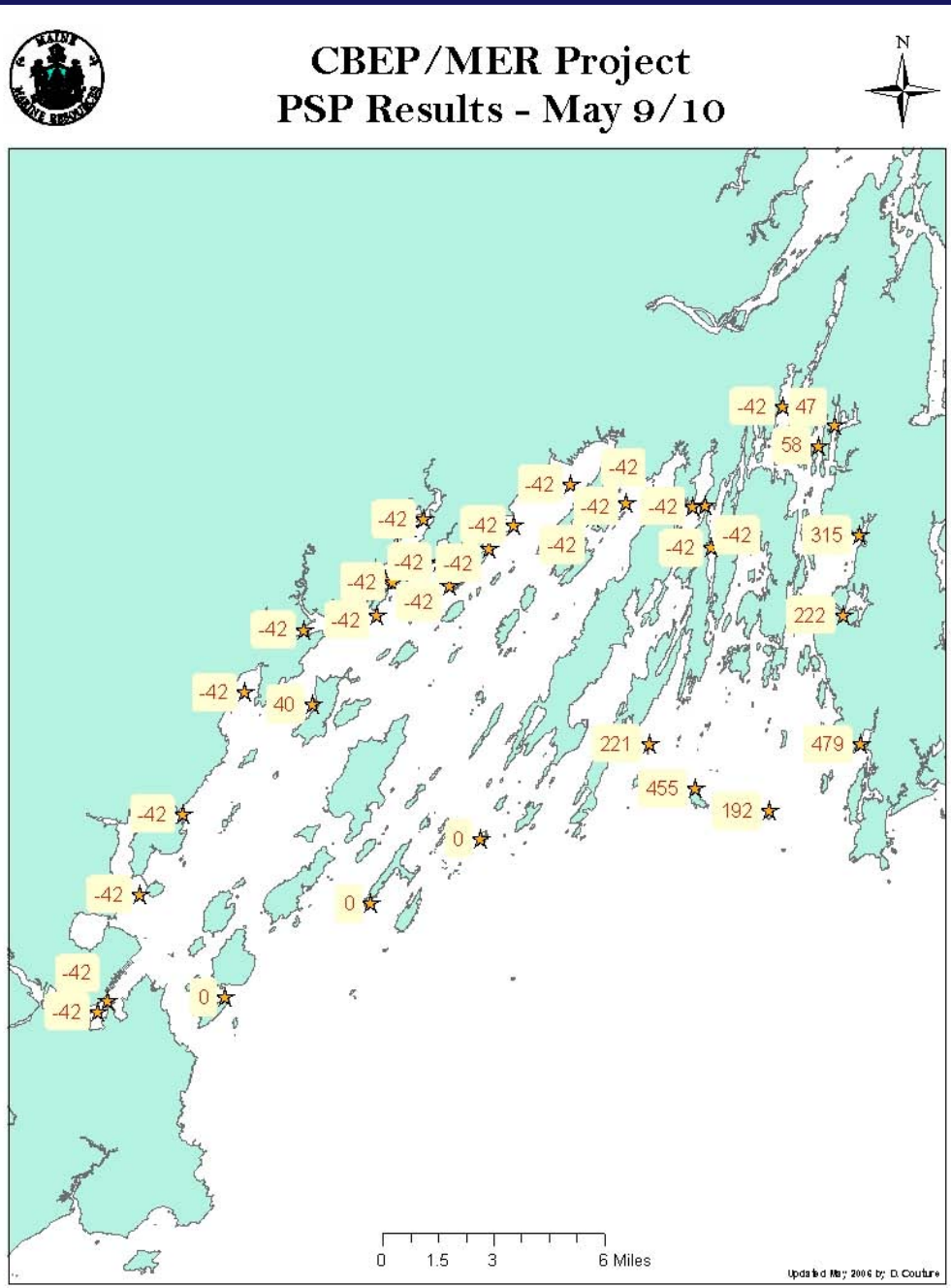


End of event



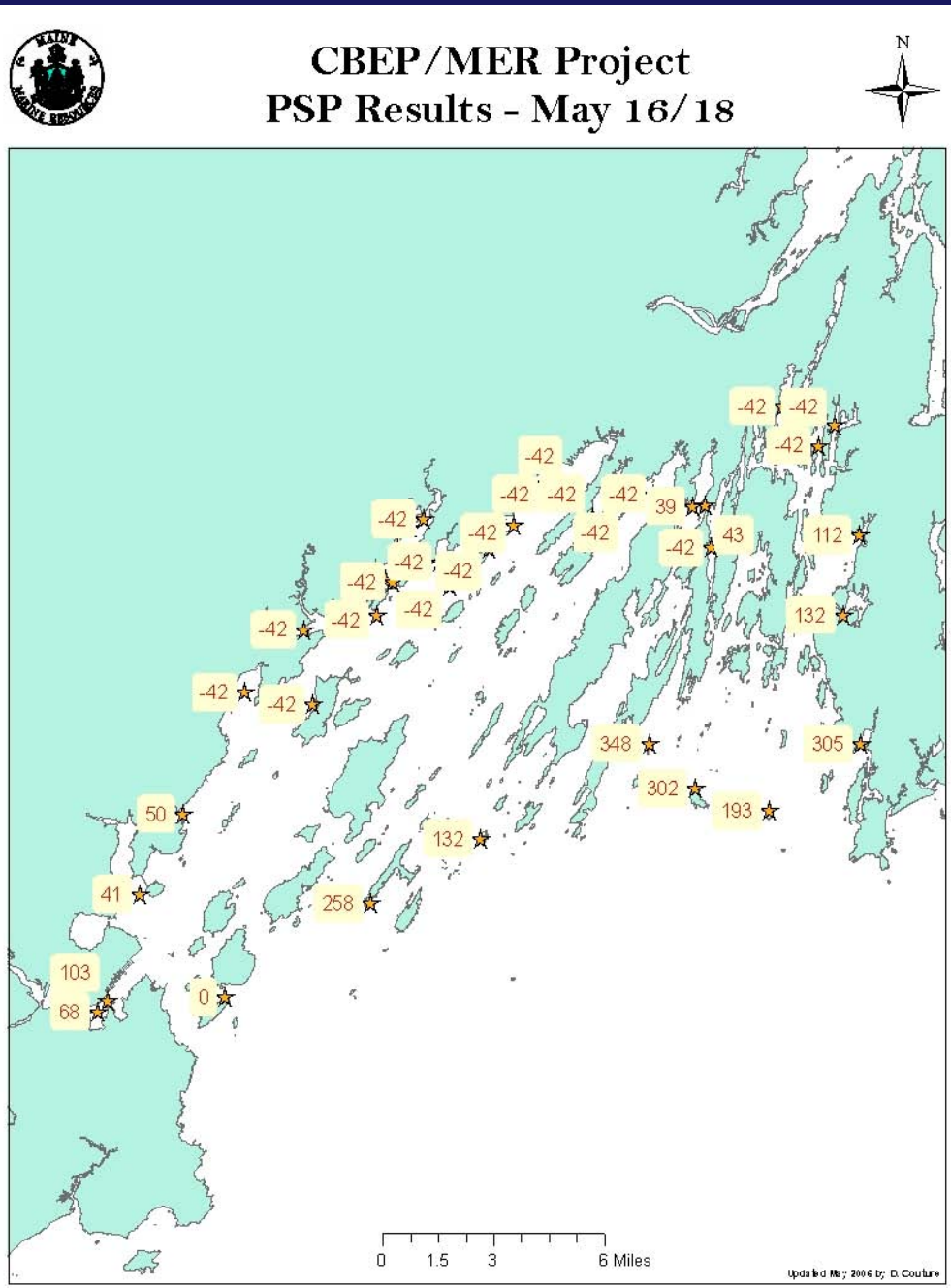
Effectiveness of Program

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



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)

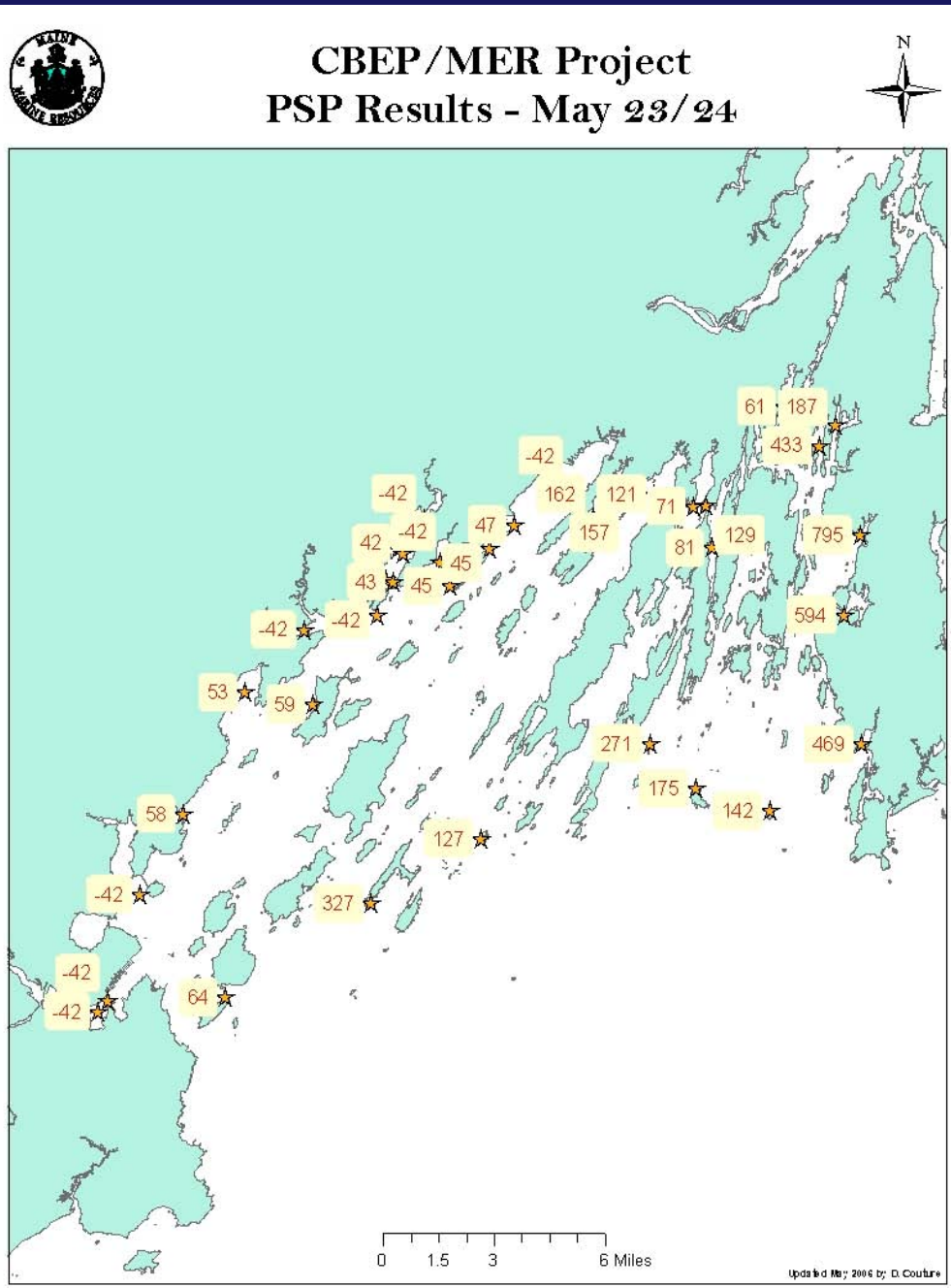
Intensified sampling allowed upper New Meadows River area to remain open (score of >79 results in PSP closure), despite high levels in lower NMR.



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).

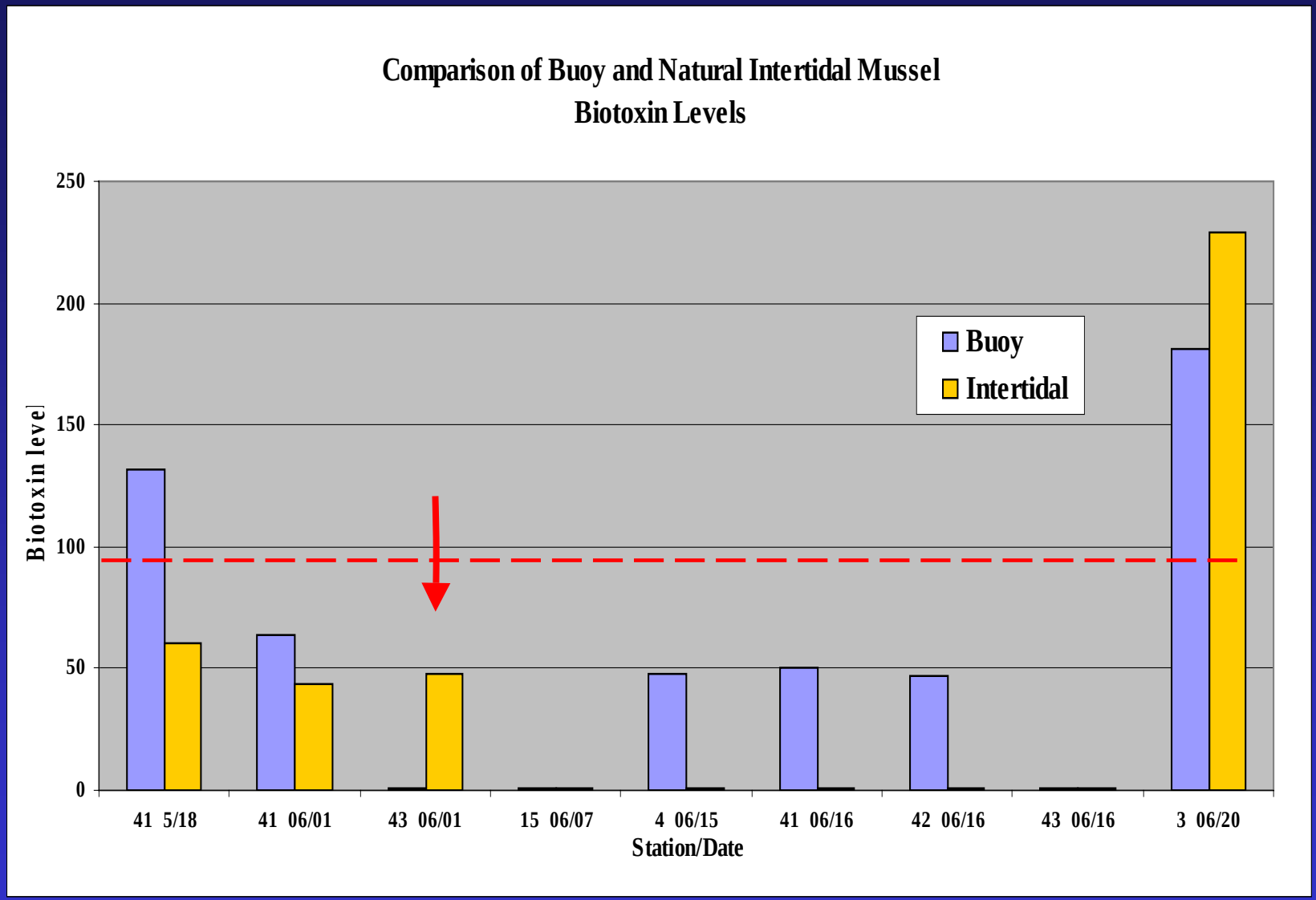


By May 23/24 all of New Meadows River area shows elevated levels of PSP while Western Casco Bay levels increase slightly, but remain comparatively low.

Note that the 157 score in Merepoint Bay would previously have resulted in closure of all of upper western Casco Bay, but the Intensified Sampling Program allowed all of the Flying Point area and the Harraseeket River to remain open to harvesting.

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
250
200
150
100
50
0
Biotoxin level
Buoy
Intertidal
41 5/18
41 06/01
43 06/01
15 06/07
4 06/15
41 06/16
42 06/16
43 06/16
3 06/20
Station/Date

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.