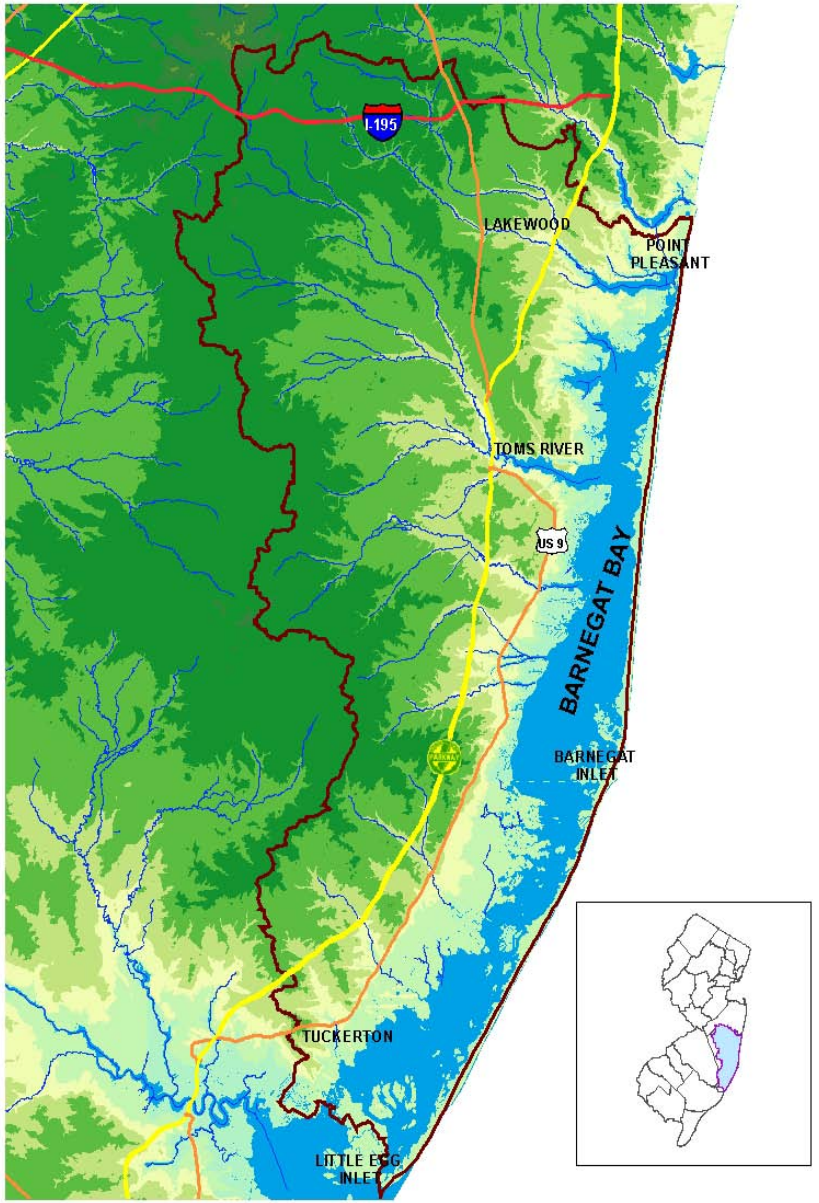
Assessment Of Designated Use Support Within Barnegat Bay, NJ

Division of Water Monitoring and Standards

NJDEP

2015 Delaware Estuary Science & Environmental Summit

January 26, 2015



Outline

- Background
- Assessment
  - Compare to the existing Surface Water Quality Standards
  - Compare to thresholds used by other estuary programs in Northeast.

Sampling

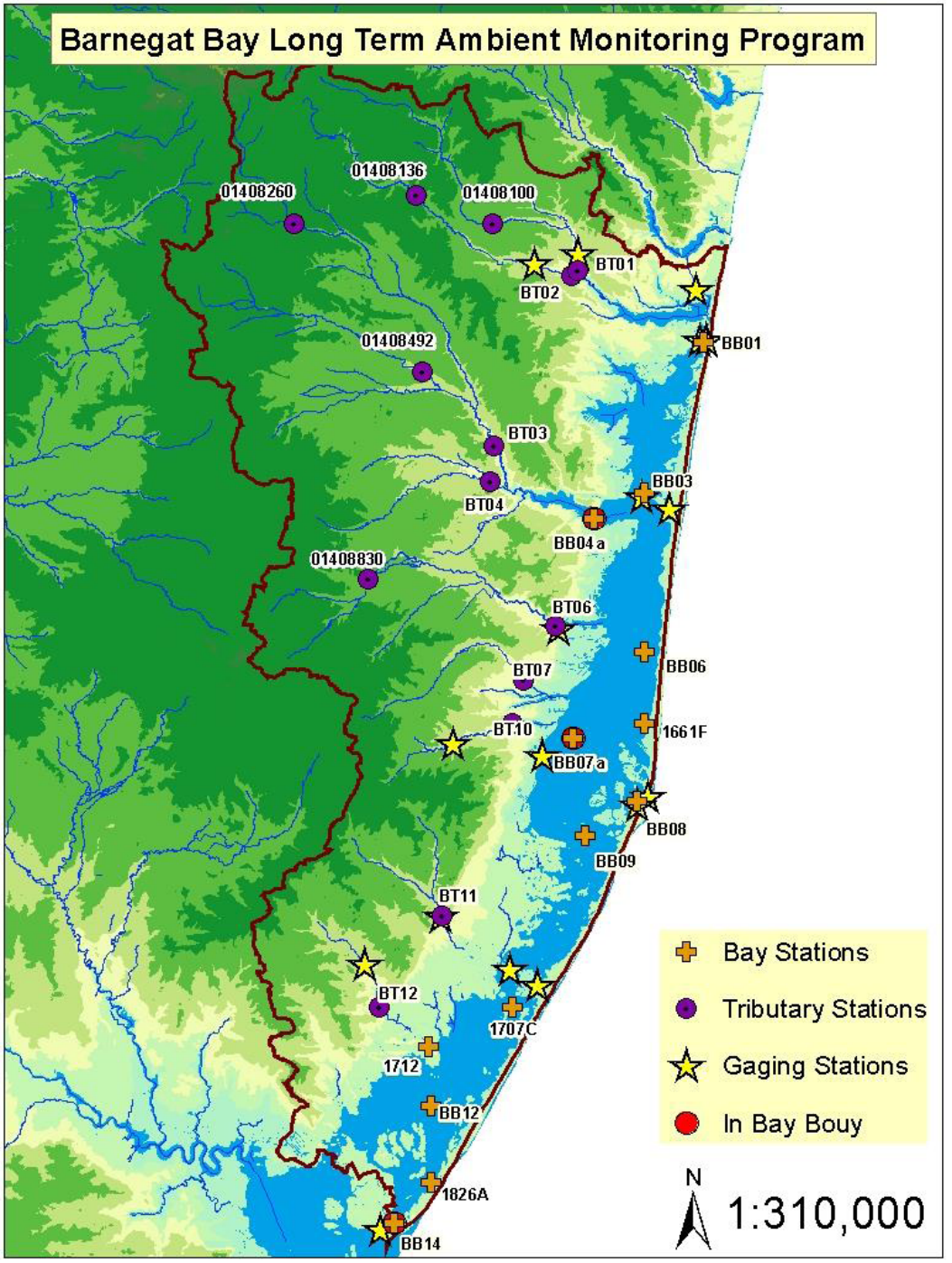
- Data Collections during the Target Monitoring Program
  - June 2011 to June 2013
  - Tributary and Bay stations
  - Water Quantity and Quality
- Ongoing Long Term Ambient Monitoring
  - Began July 2013
  - Aim for 5 years
  - Document the change

Long Term Ambient Monitoring

What's Different:

- Sampling Locations
- Sampling frequency
- Parameters

http://www.nj.gov/dep/barnegatbay/docs/BB2QAPPRevision3.pdf

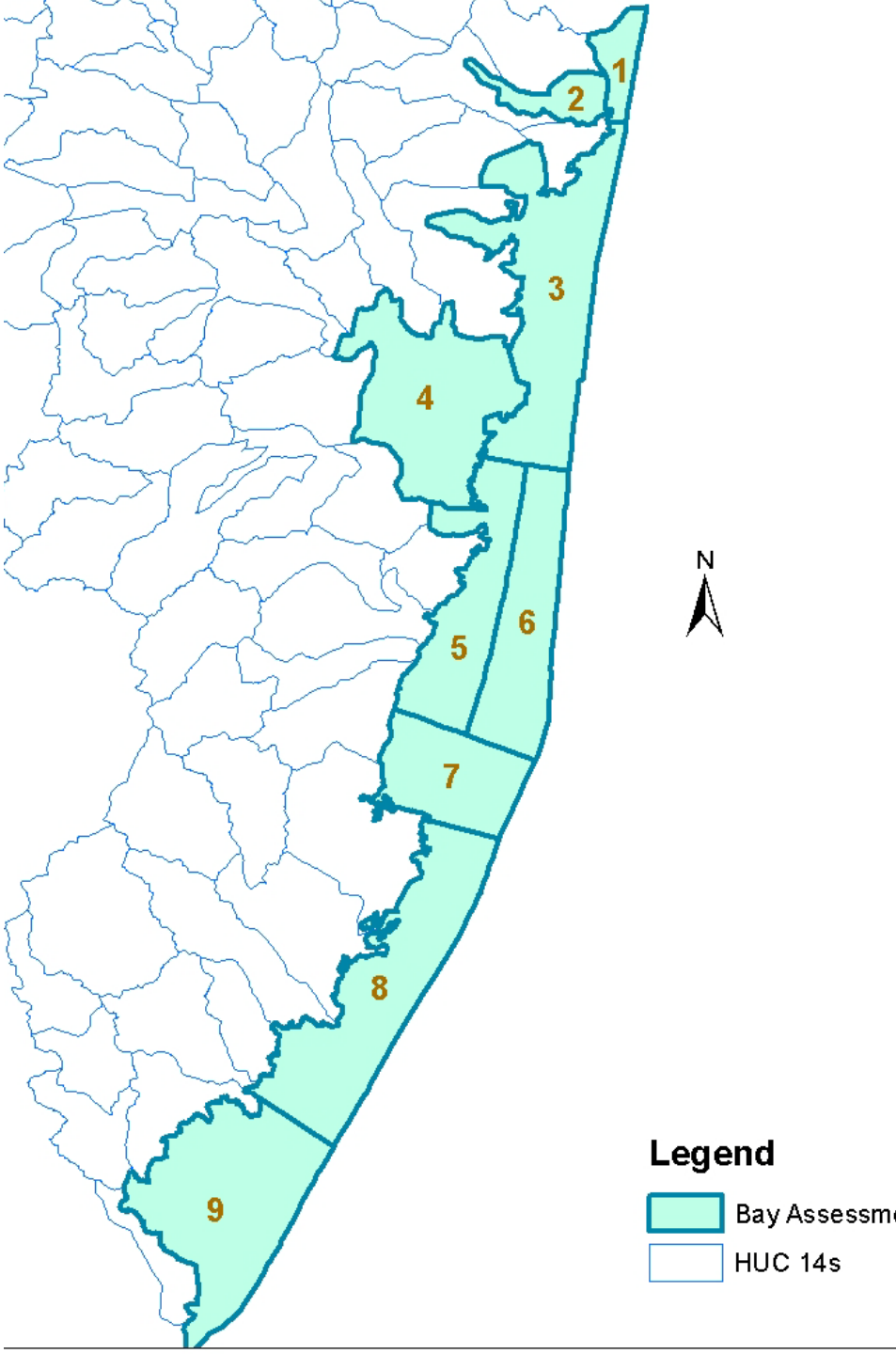


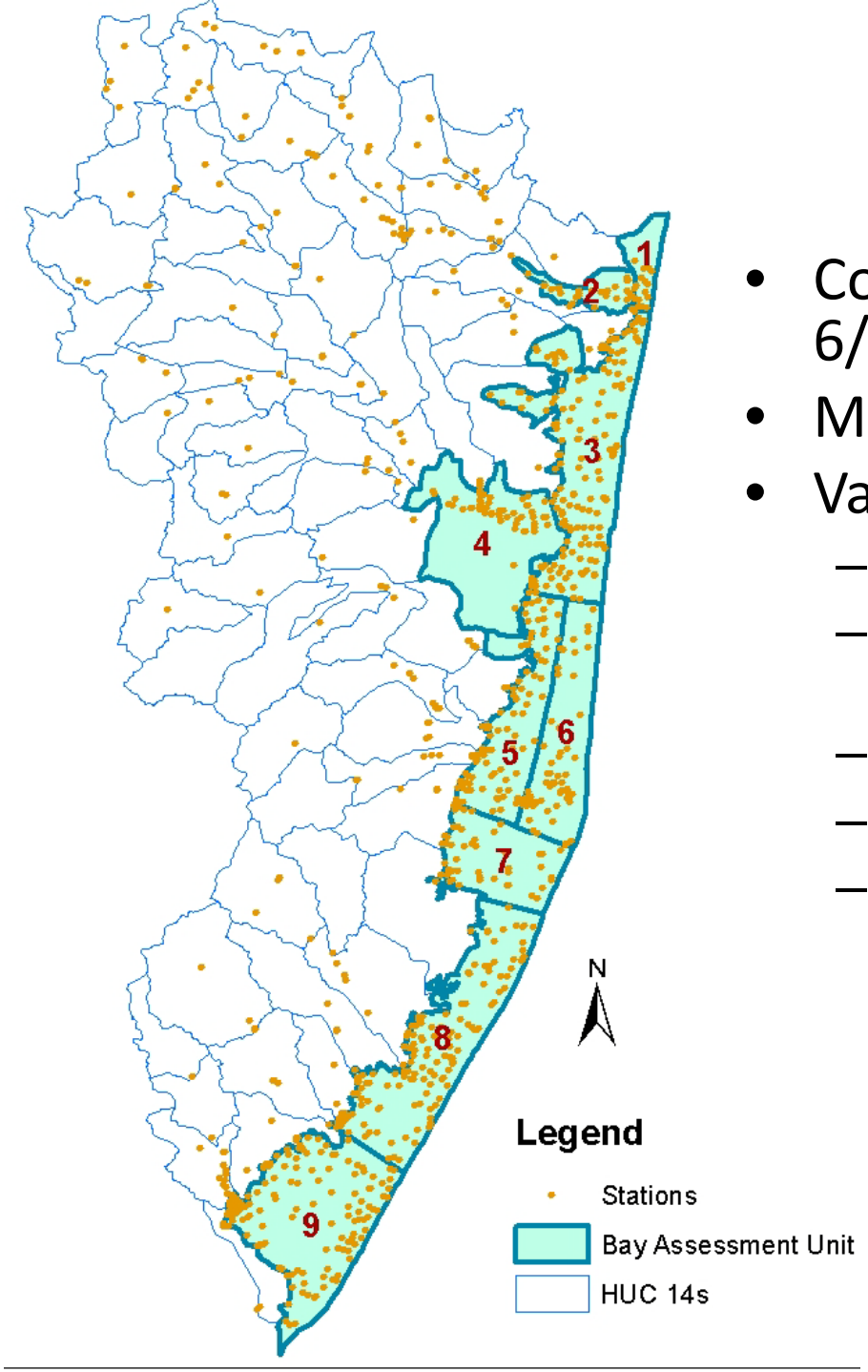
Typical 305(b) Integrated Report Assessment

- Approved methods (http://www.state.nj.us/dep/wms/bwqsa/generalinfo.htm)
- Compare the data collected at the stations to the applicable Surface Water Quality Standards (SWQS)
- Designated use assessment is determined based on the assessment results of associated parameters.

Assessment Units

- SubWatersheds
  - HUC14s
- Bay
  - Water Quality Similarity
  - Hydrodynamic features





Data

- Collected between 1/1/2008 to 6/31/2013
- More than 1000 sampling stations
- Various Sampling Organizations
  - BTMUA
  - Monmouth County Health Department
  - Pineland
  - USGS
  - NJDEP
    - OS Research Projects
    - BFBM
    - BMWM
    - BB

Surface Water Quality Standards

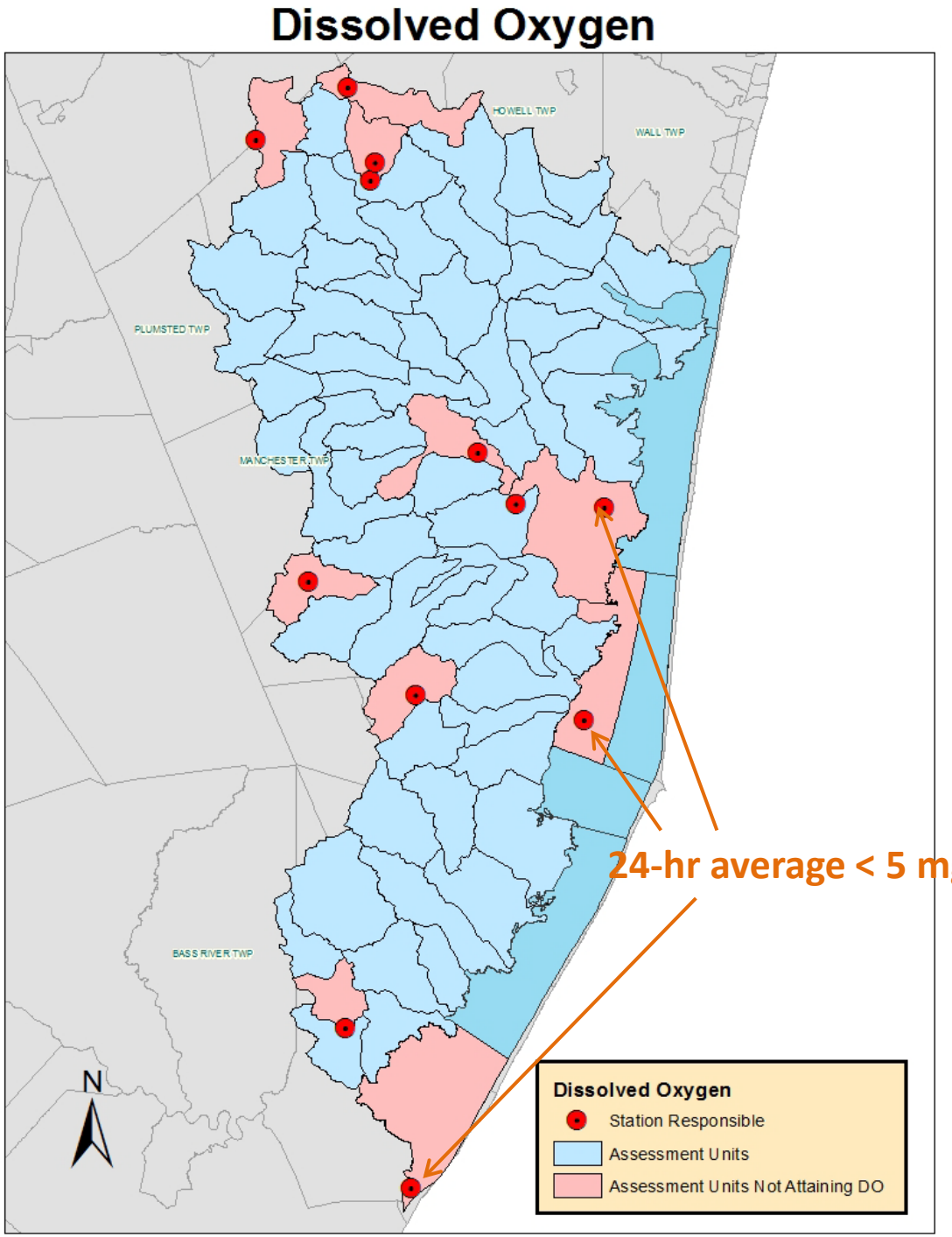
Conventional	Trout Maintenance	Non Trout	Pinelands	Estuary Saline 1	S Jersey pH
Phosphorus (river/lake) (mg/l)	0.1/0.05	0.1/0.05	0.1/0.05		
Nitrate (mg/l)	10	10	2		
Temperature[1]	25	31	31	29.4	
Temperature-7 day avg	23	28	28		
pH high	8.5	8.5	5.5	8.5	7.5
pH low	6.5	6.5	3.5	6.5	4.5
pH high - Industry	9	9			9
pH low - Industry	5	5			5
Dissolved Oxygen	5	4	85% DO Sat	4	
Dissolved Oxygen-24 avg	6	5		5	
Turbidity	50	50	20	30	
Turbidity-30 day avg	15	15		10	
TSS (mg/l)	25	40	40		
TDS (mg/l)	500	500	100		
TDS-Agriculture (mg/l)	2000	2000	2000		
Chloride (mg/l)	250	250	250		
Sulfate (mg/l)	250	250	250		
Enterococci high (#cells/100 ml)				104	
Enterococci geomean (#cells/100 ml)				35	
E. Coli high (#cells/100 ml)	235	235	235		
E. Coli geomean (#cells/100 ml)	126	126	126		
Fecal Coliform geomean (#cells/100					

STANDARD:

Dissolved Oxygen (mg/L)

Minimum DO > 4

24-hr average DO > 5

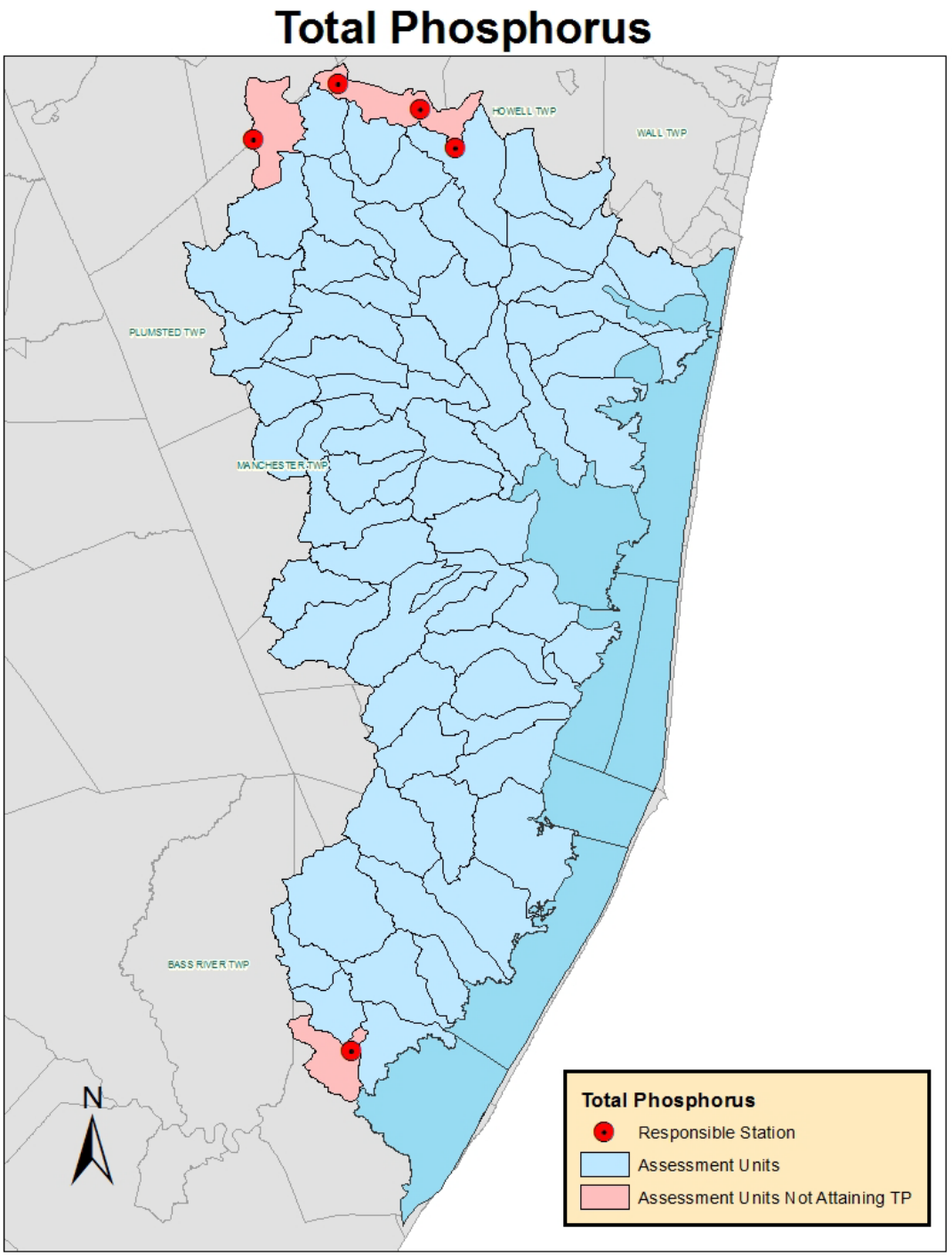


STANDARD:

Total Phosphorus (mg/L)

Lake < 0.05

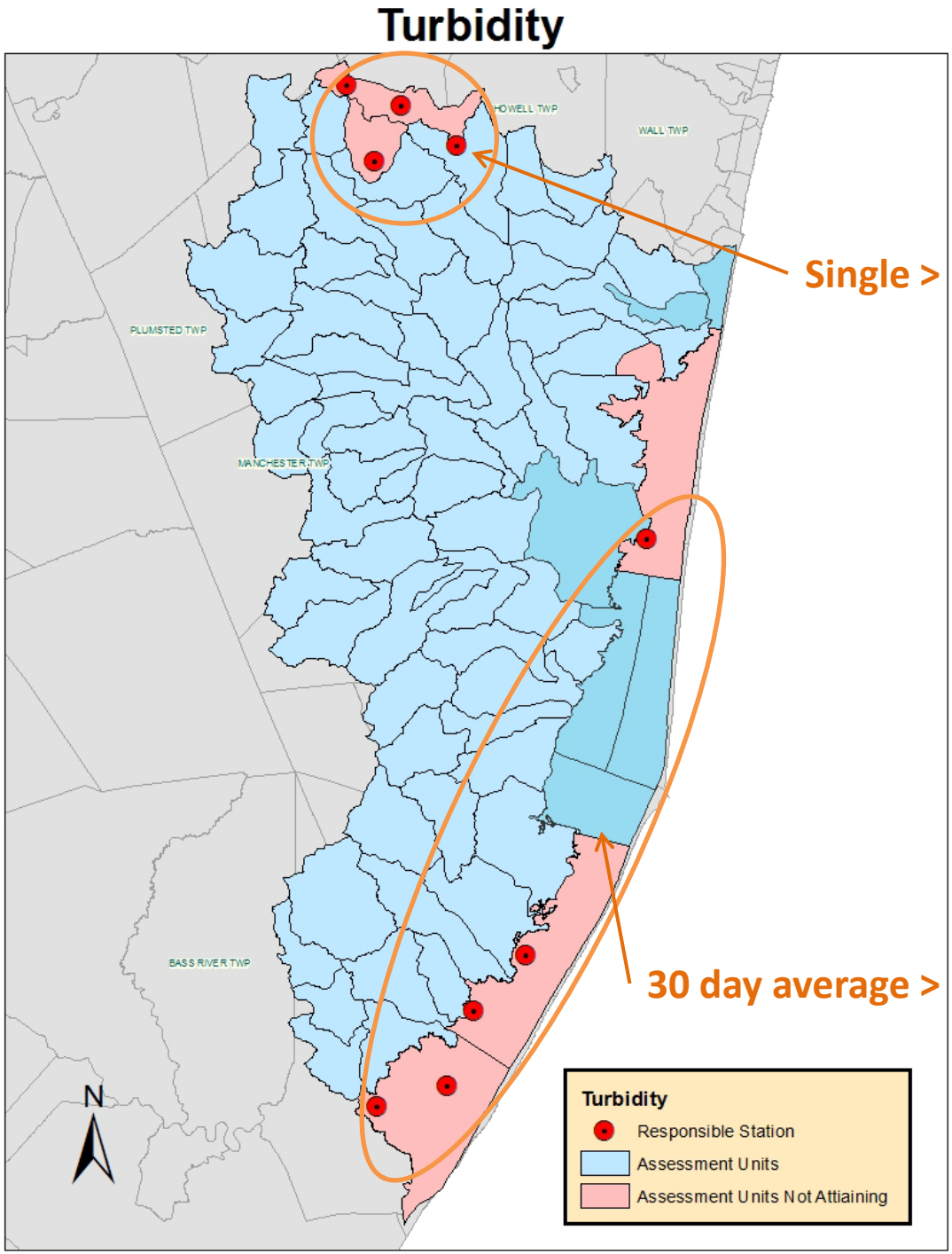
Stream < 0.1



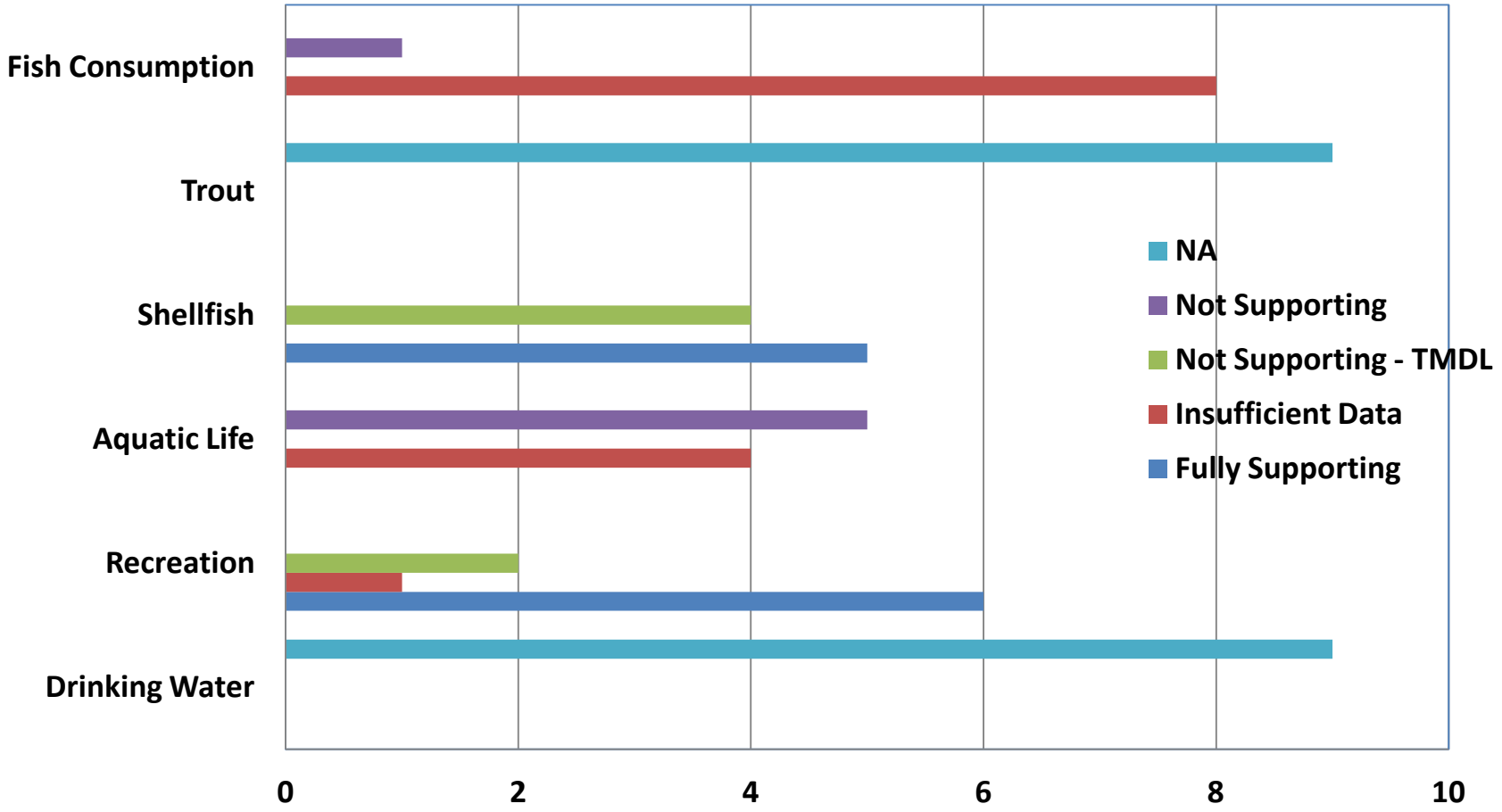
Standard:

Turbidity (NTU)

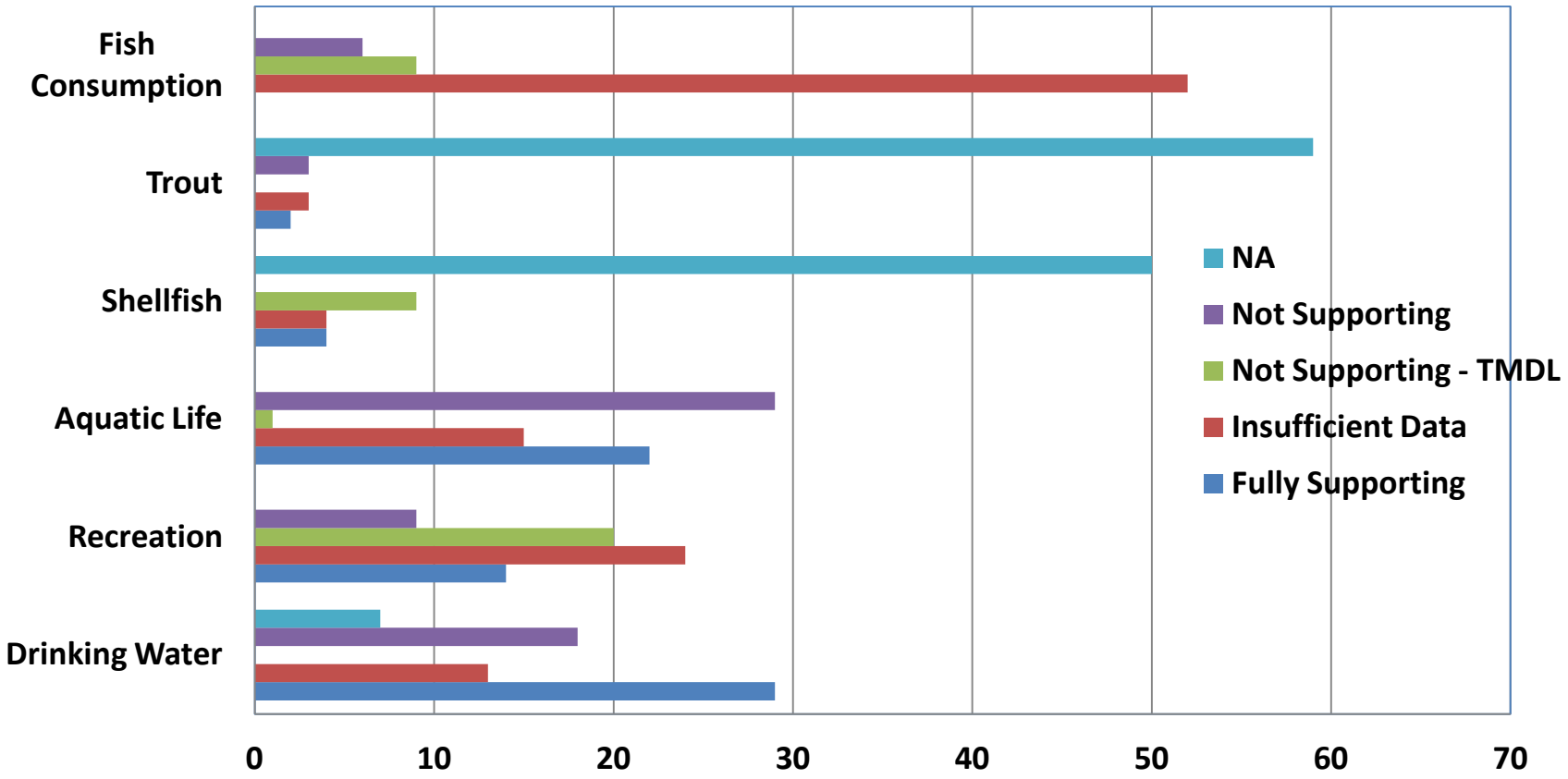
- Single sample < 50
- FW, <30 SE
- 30-day average < 15
- FW, < 10 SE



Overall Summary of Designated Use Assessment for the Bay



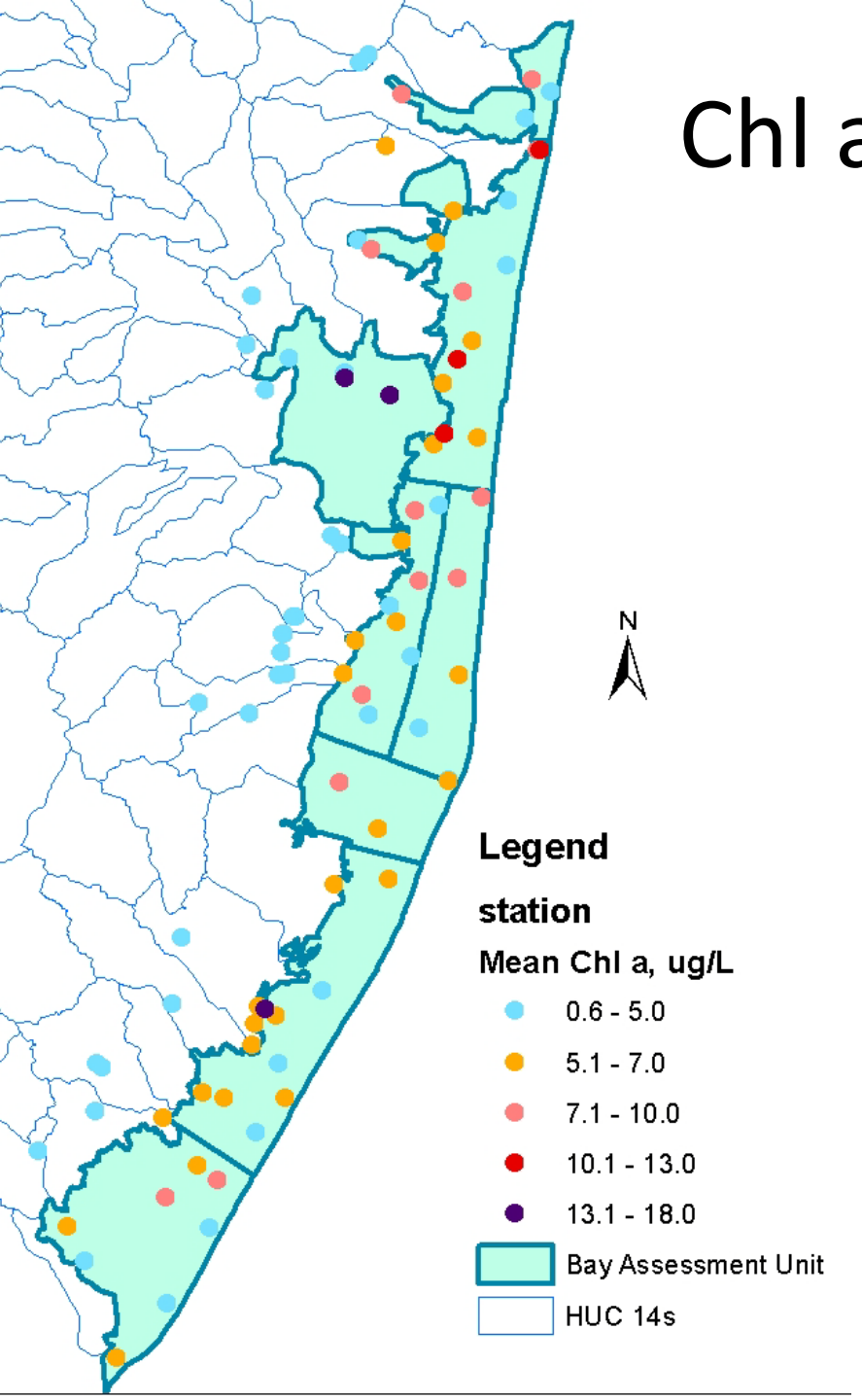
Overall Summary of Designated Use Assessment for the Tributaries

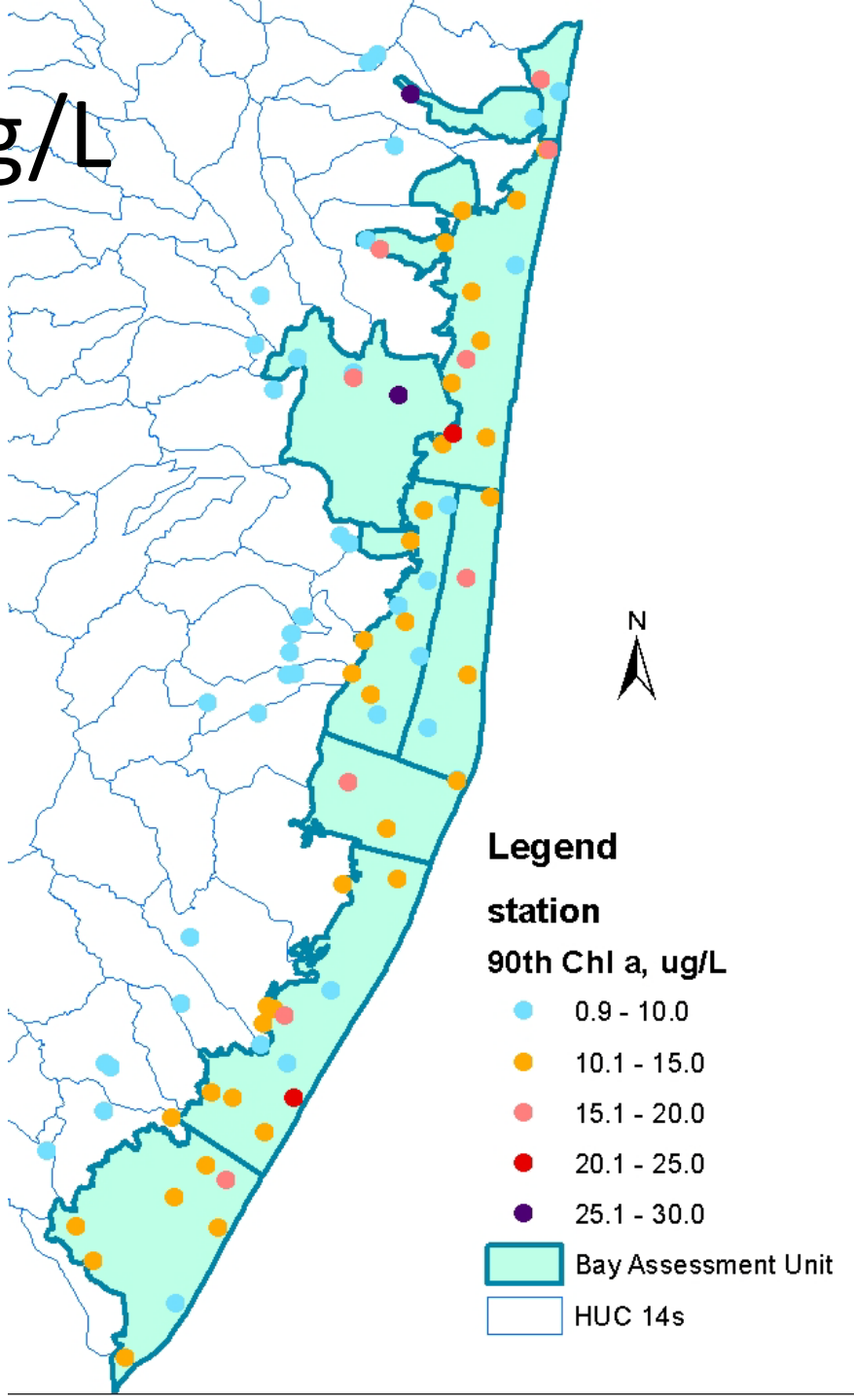


Comparisons to Water Quality Thresholds Used by Other Estuary Programs

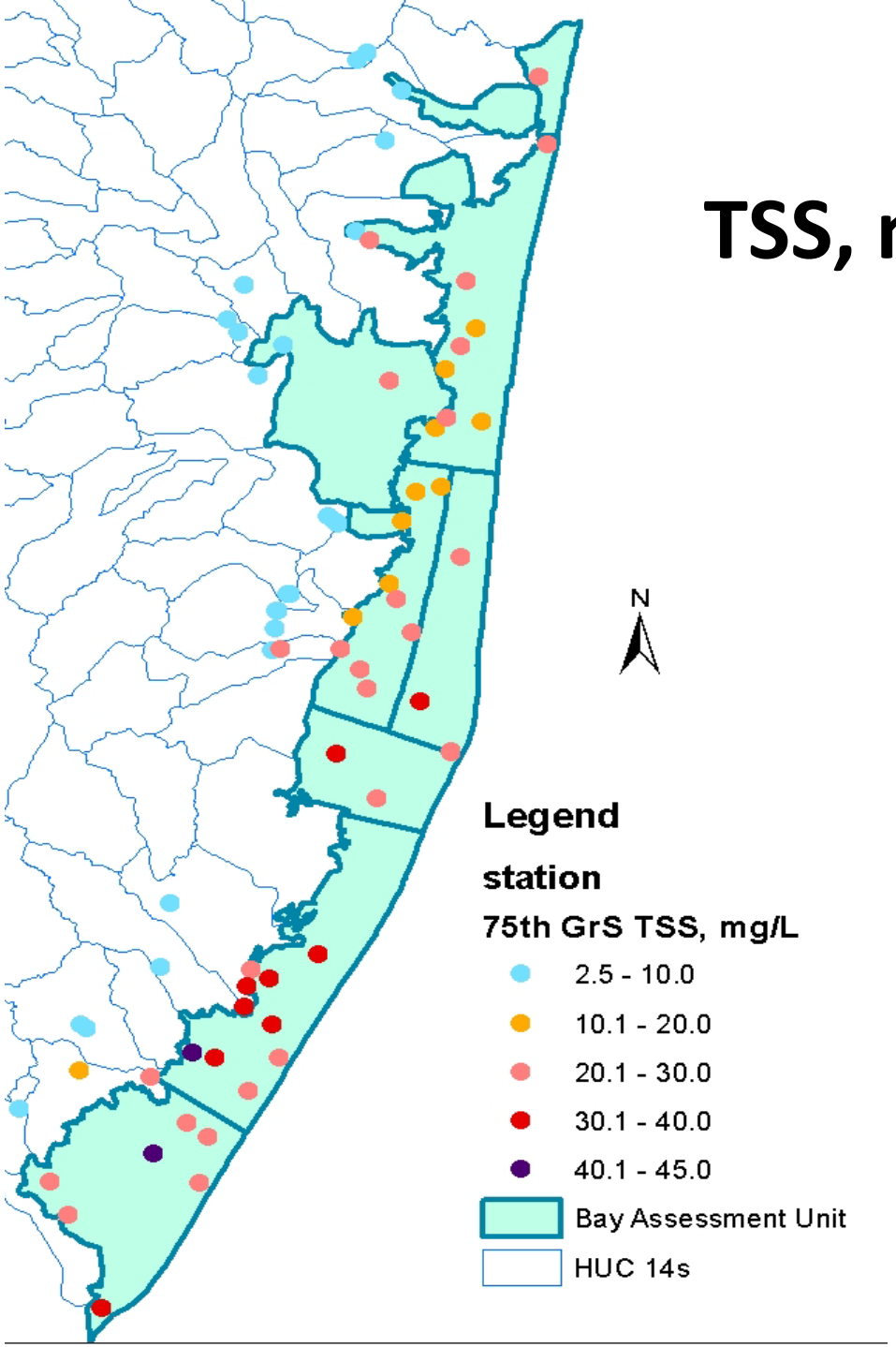
- Massachusetts Back Bays
- New Hampshire Great Bay
- Delaware Inland Bays
- Chesapeake Bay
- Long Island Sound

Chl a, ug/L

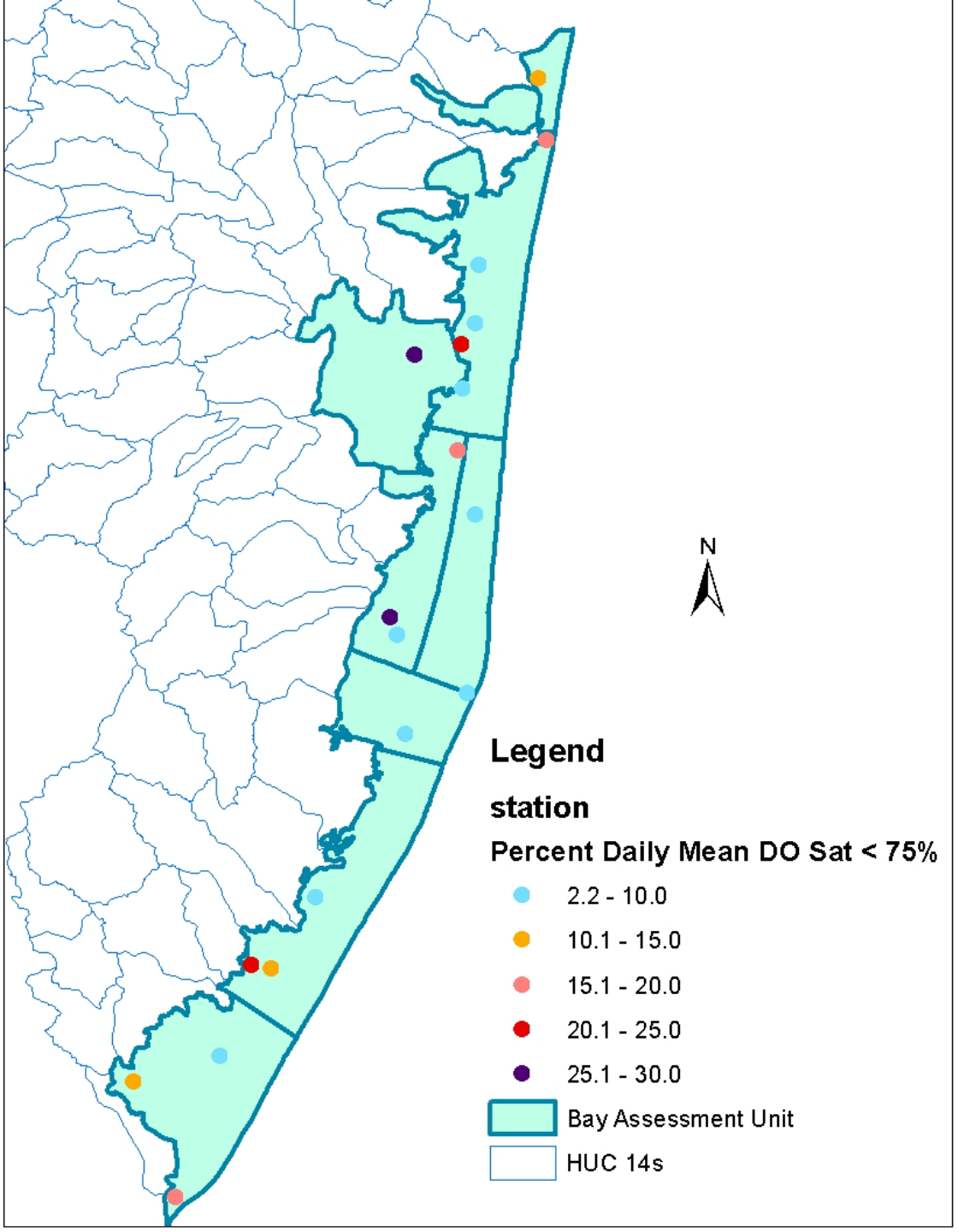

N
Legend
station
Mean Chl a, ug/L
0.6 - 5.0
5.1 - 7.0
7.1 - 10.0
10.1 - 13.0
13.1 - 18.0
Bay Assessment Unit
HUC 14s


N
Legend
station
90th Chl a, ug/L
0.9 - 10.0
10.1 - 15.0
15.1 - 20.0
20.1 - 25.0
25.1 - 30.0
Bay Assessment Unit
HUC 14s

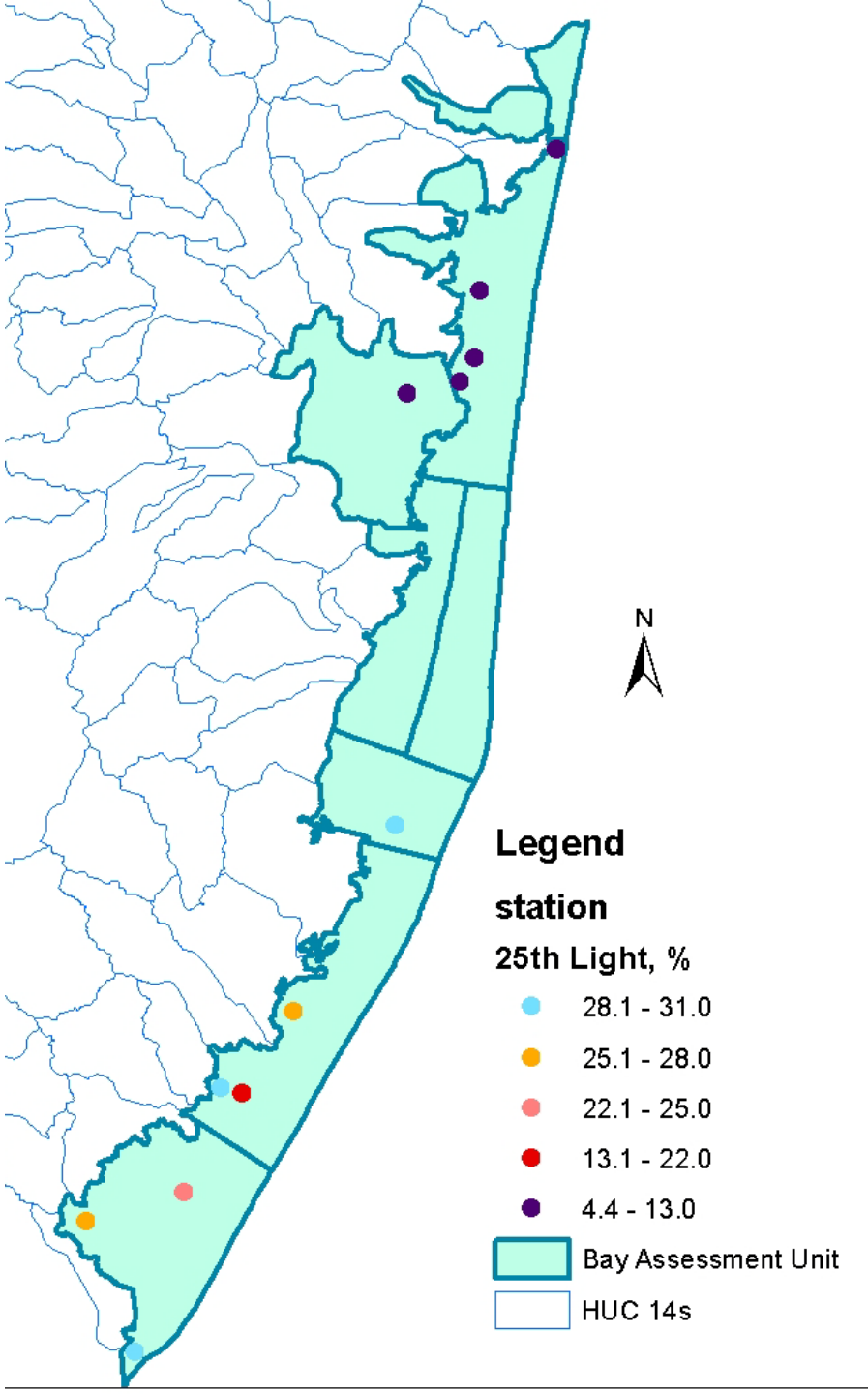
TSS, mg/L


N
Legend
station
75th GrS TSS, mg/L
2.5 - 10.0
10.1 - 20.0
20.1 - 30.0
30.1 - 40.0
40.1 - 45.0
Bay Assessment Unit
HUC 14s

Daily Mean DO Saturation, %



Light, %

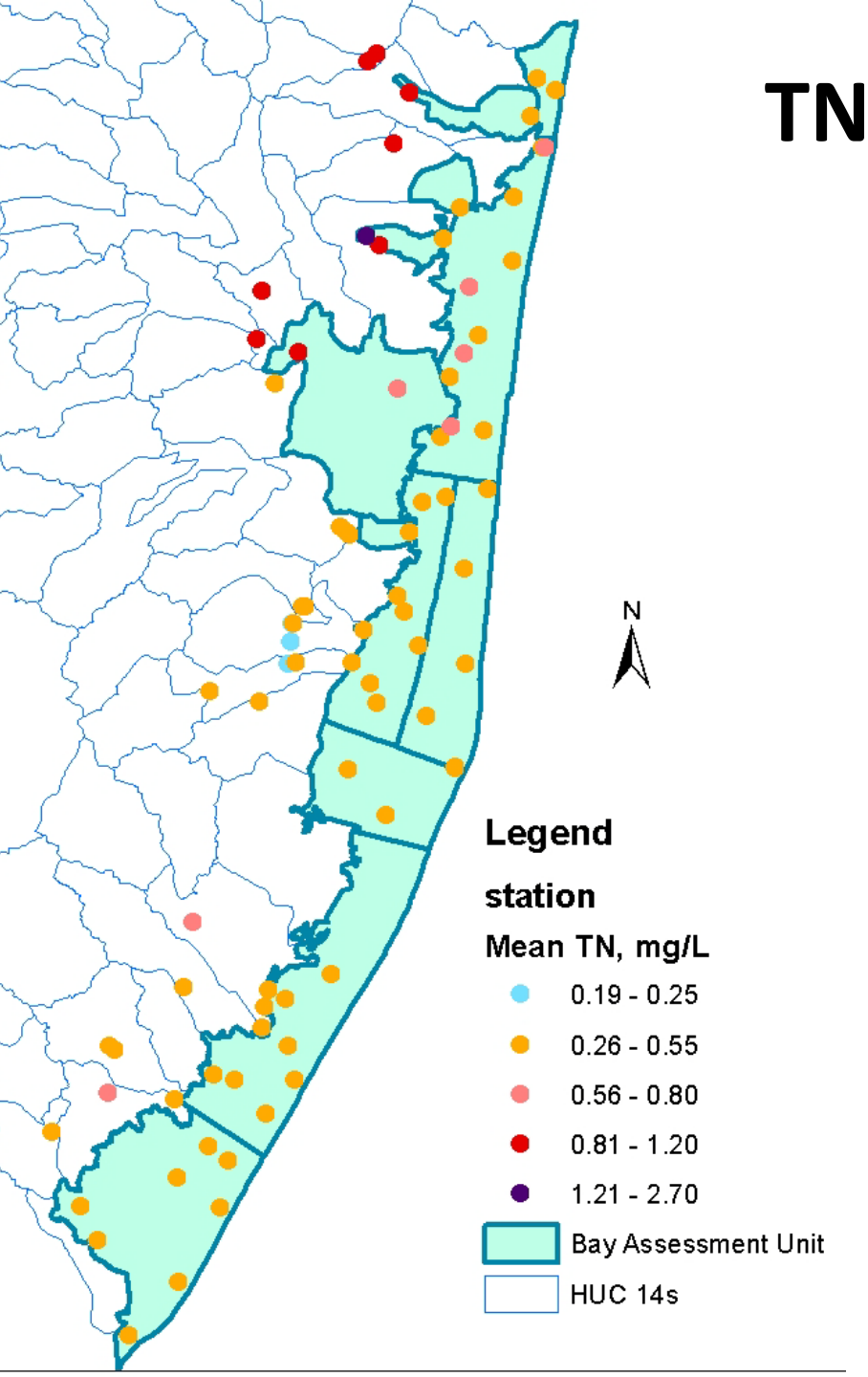

N
Legend
station
25th Light, %
28.1 - 31.0
25.1 - 28.0
22.1 - 25.0
13.1 - 22.0
4.4 - 13.0
Bay Assessment Unit
HUC 14s

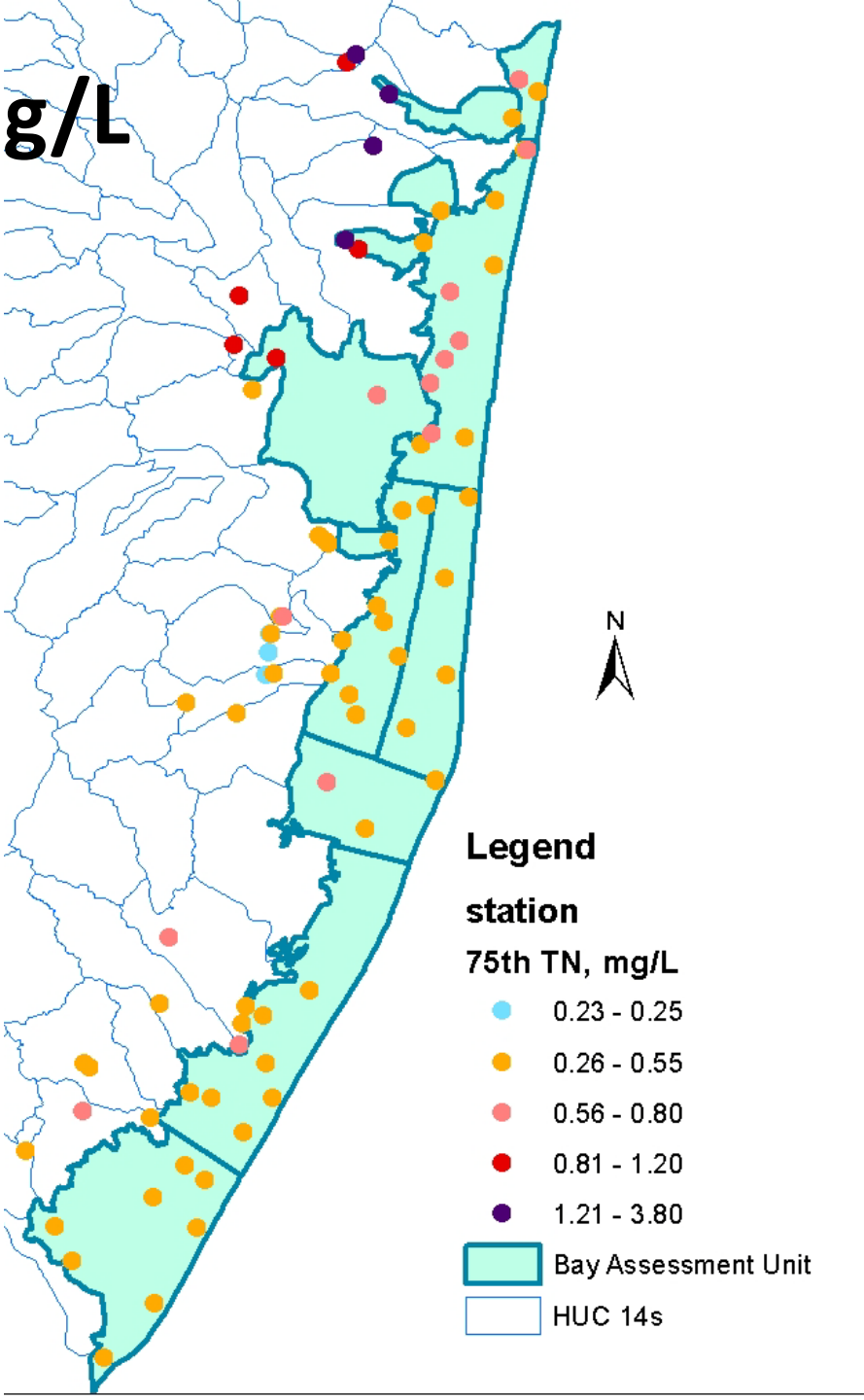
Future Work

- Construct and calibrate the fully functional dynamic model
- Link with the outcomes of BB research projects and develop the numeric narrative criteria or narrative criteria translators that will be appropriate for BB
- Identify the needed measures to restore the ecological health of the Bay.
- Continue the on-going long term monitoring

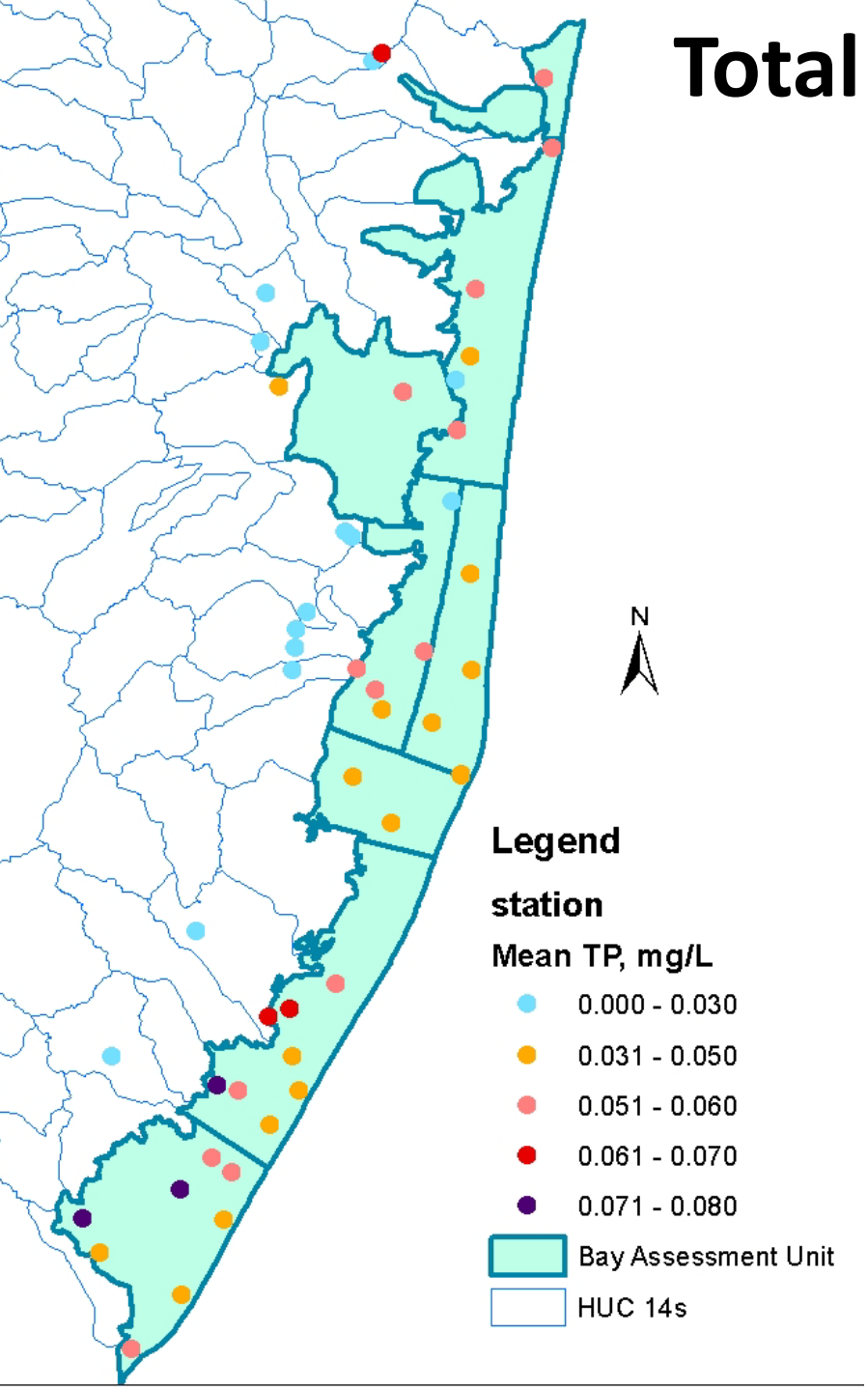

THANK YOU
Questions?

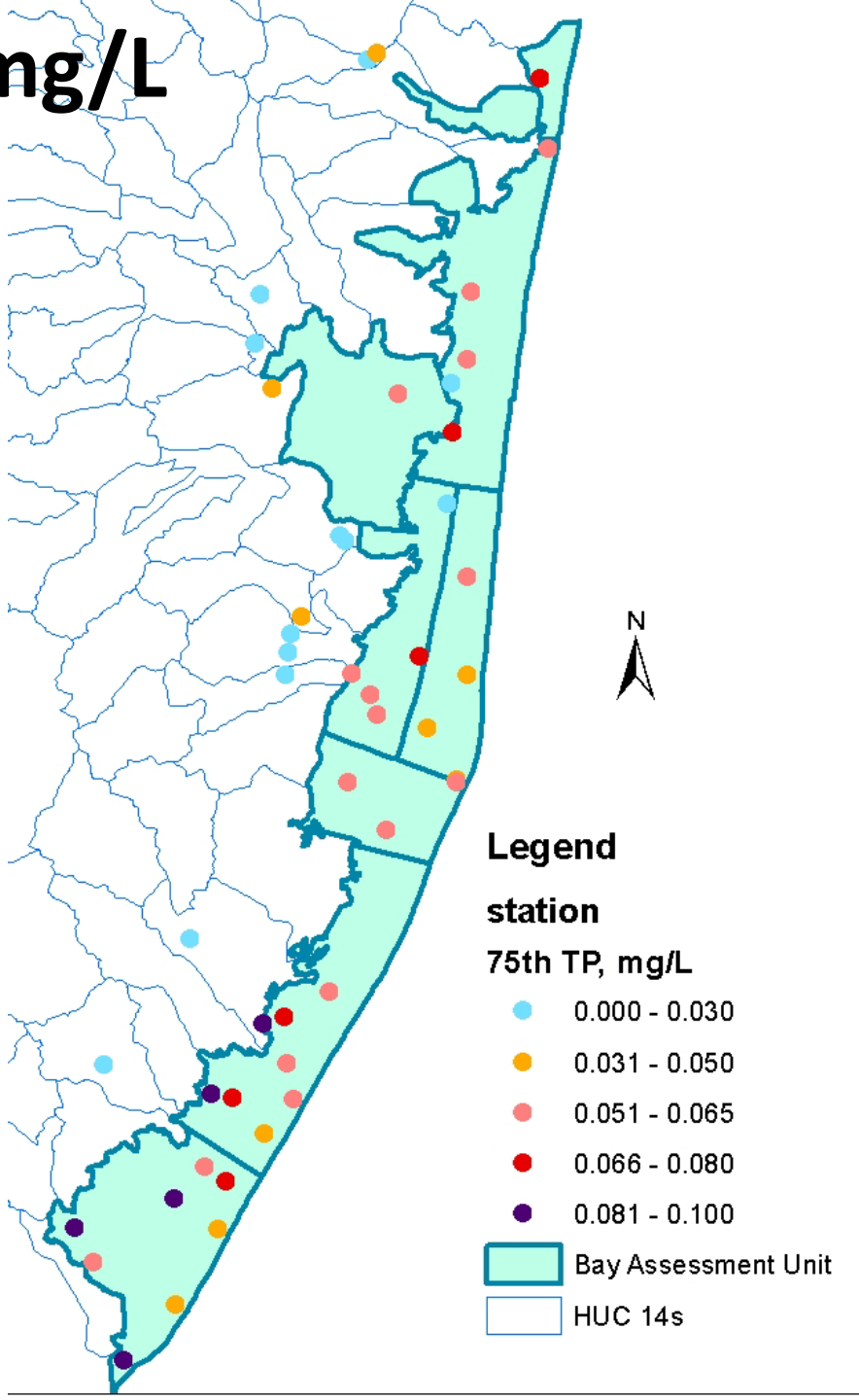
TN, mg/L


N
Legend
station
Mean TN, mg/L
0.19 - 0.25
0.26 - 0.55
0.56 - 0.80
0.81 - 1.20
1.21 - 2.70
Bay Assessment Unit
HUC 14s


N
Legend
station
75th TN, mg/L
0.23 - 0.25
0.26 - 0.55
0.56 - 0.80
0.81 - 1.20
1.21 - 3.80
Bay Assessment Unit
HUC 14s

Total P, mg/L


N
Legend
station
Mean TP, mg/L
0.000 - 0.030
0.031 - 0.050
0.051 - 0.060
0.061 - 0.070
0.071 - 0.080
Bay Assessment Unit
HUC 14s


N
Legend
station
75th TP, mg/L
0.000 - 0.030
0.031 - 0.050
0.051 - 0.065
0.066 - 0.080
0.081 - 0.100
Bay Assessment Unit
HUC 14s