Assessment of the Aquatic Life Designated Use in New Jersey Coastal Waters under Sections 305 (b) and 303(d) of the Clean Water Act

New Jersey Department of Environmental Protection
Water Monitoring and Standards

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Assessing New Jersey's Waters

- ***Water Quality Inventory Report*** **or the 305(b) Report-** Assesses the overall quality of state waters (support of designated uses and attainment of water quality standards).
- ***List of Water Quality Limited Waters*** **or the 303(d) List-** a list of waterbodies for which required technology-based effluent limits are not stringent enough to achieve the state's surface water quality standards.
- Publish every 2 years
- Federal Rule: 40 CFR 103.7
- State Rule: N.J.A.C. 7:15-6

Integrated Water Quality Report

- Close association between the two reporting requirements.
- 305(b) report presents the water quality status of all waters of the state
- 303(d) list represents a subset of these waters.
- Both efforts utilize shared data sets.
- In 2000, USEPA encouraged states to integrate the two into an ***Integrated Water Quality Monitoring and Assessment Report*** .

Designated Uses Identified Under New Jerseys SWQS's

- **Aquatic Life**
- Recreation
- Fish Consumption
- Shellfish Harvest
- Drinking Water Supply
- Industrial Water Supply
- Agricultural Supply

Coastal Biological Assessments

- Every two years, the Department produces an Integrated Assessment Report.
- This report identifies where waters are impaired (do not support uses that they should be able to support.)
- One use is the ability of the water to support healthy, natural communities of biota.
- Tools available for fresh waters, no comparable tool for marine waters.

Coastal Biological Assessments (cont.)

- Most recent biological data collected to date under the National Coastal Assessment Program
- NCA has been limited to estuarine waters
- No consistent dataset exists on benthic community in ocean waters.
- No validated metric or benthic index is available to assess coastal conditions (w/ exception of NY-NJ Harbor).

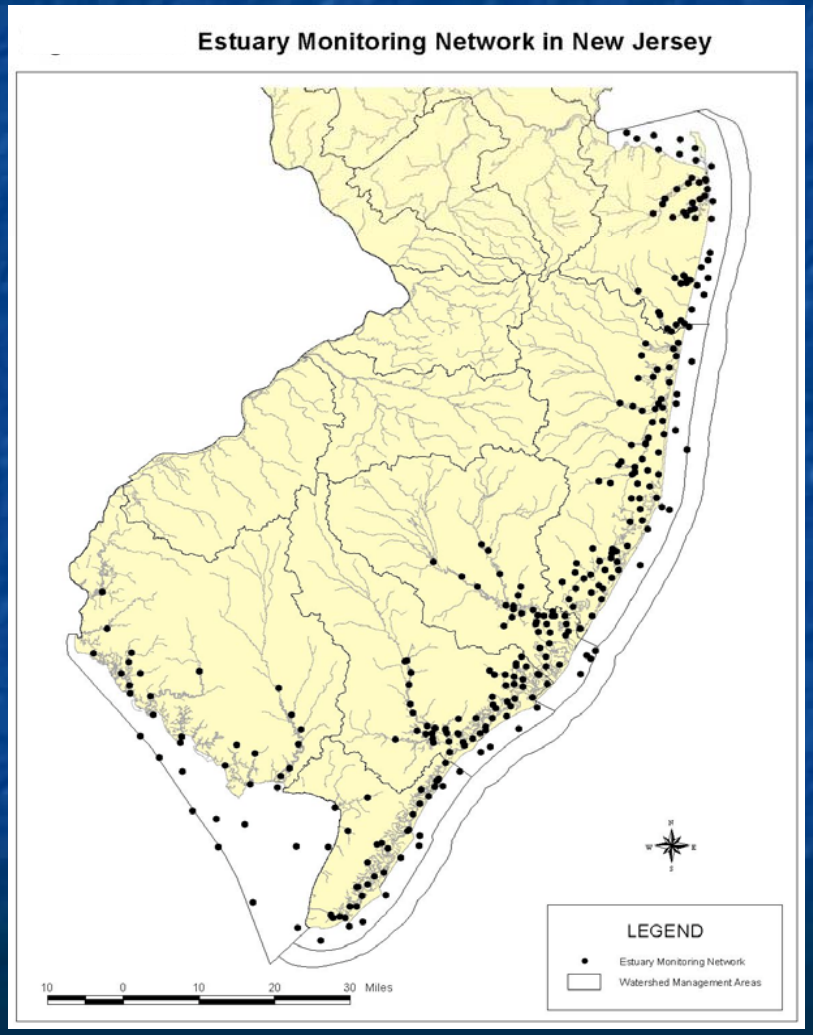
Coastal Aquatic Life Use Assessment Method

The Department currently assesses the Aquatic Life Designated Use by indirect methods, using dissolved oxygen (DO) measurements.

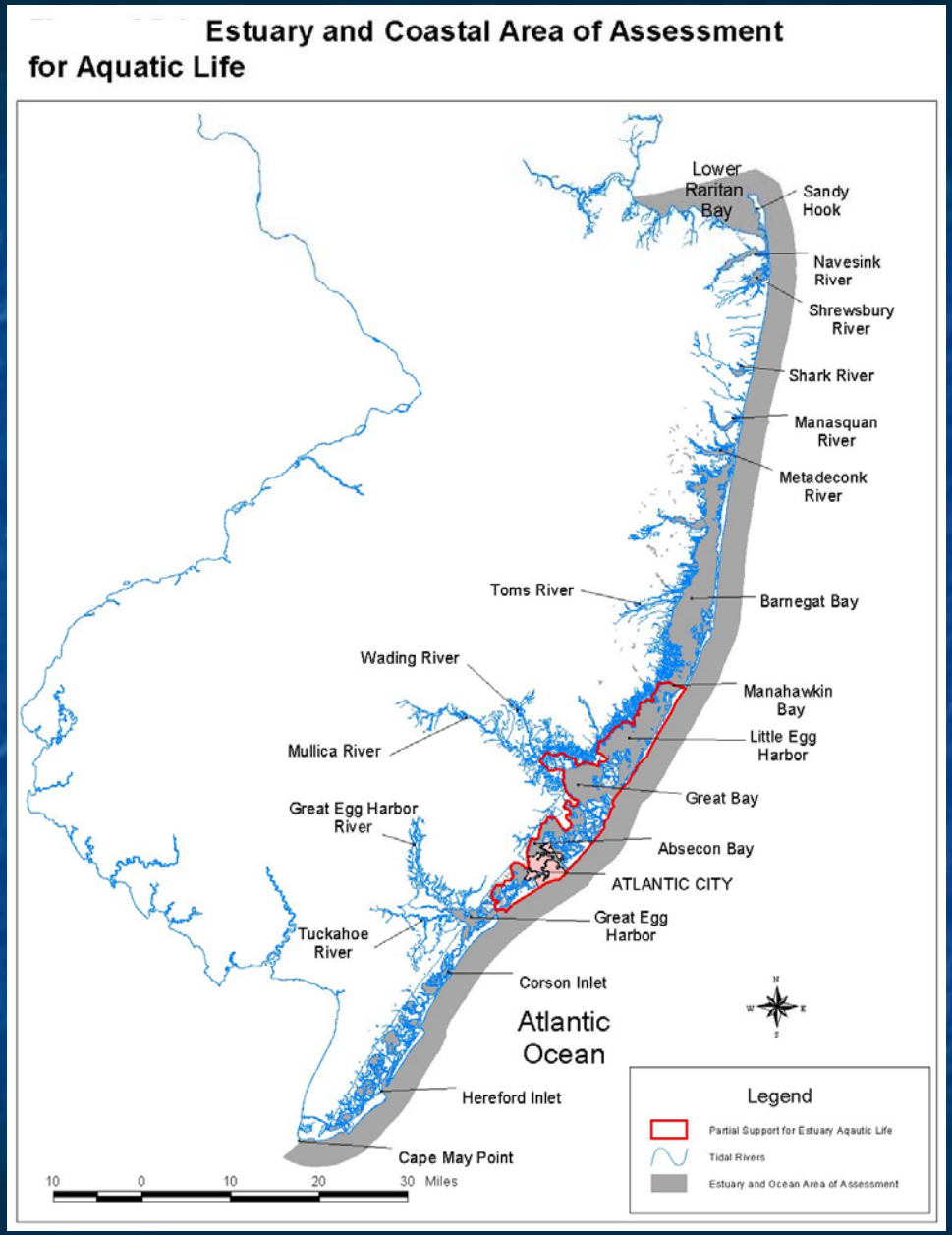
Assessment Methods Using DO levels.

Use Support Assessment	Dissolved Oxygen
Full Attain	DO >5 mg/l (SC) DO >4 mg/l (SE2, SE1) DO >3 mg/l (SE3)
Non Attain	DO <5 mg/l (SC) DO <4 mg/l (SE2, SE1) DO <3 mg/l (SE3)

Estuarine Waters Data Source



- Data collected by NJDEP's Bureau of Marine Monitoring
  - quarterly DO at approximately 170 sites in NJ's estuaries
  - within the Raritan Bay, Sandy Hook Bay
  - back-bay waters from Navesink estuary south to eastern tip of Cape May
- NCA randomly selected sites
  - Stations sampled once



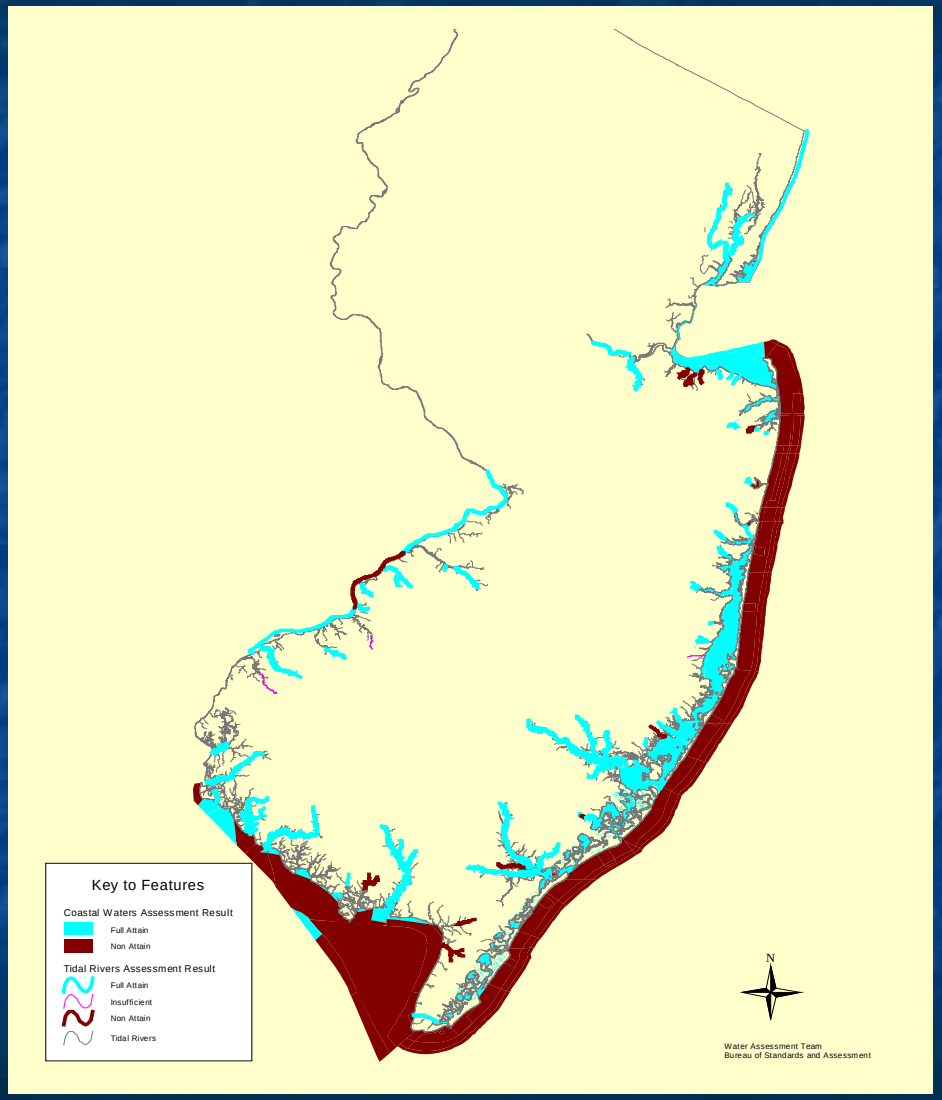
Estuary Aquatic Life Assessment Results

- NJ's estuaries from southern Raritan Bay south to Cape May had sufficient DO except within a cluster of shallow estuaries within Atlantic and Ocean Counties
- Of the total 616 sq. m. of estuary assessed
  - 294 sq. m. fully supporting
  - 322 sq. m.do not support the use

Ocean Waters Data Source

- Water column DO recorded by EPA helicopter
  - 10 transects extend east along coastline: Sandy Hook to Cape May
  - Samples taken at 1, 3, 5, 7, 9 mile points along ea. transect
  - Only data from 1 and 3 mile points were utilized = within NJ's 3 mile jurisdiction
  - Samples are collected 8X - 10X during critical summer period
  - At ea. site: 1 sample collected at 1 m below surface & 1 m above ocean floor

Open Ocean Assessment



- **Based on bottom waters, all 454 square miles of ocean bottom are in non attainment.**
- **This low DO cell forms off the coast during the summer months and breaks up in the fall.**

REMEMBER:

- DO concentrations only provide a surrogate indicator of aquatic life designated use attainment.
- Do not provide an assessment of actual biological conditions.
- In open waters, fish can avoid areas with low DO, and many crustaceans and other benthic inhabitants are naturally tolerant of temporary low DO conditions.
- The Department does not have data to characterize the status of the benthic community in these waters, therefore, the significance of temporary DO conditions below 5 mg/l to aquatic life uses is unclear.

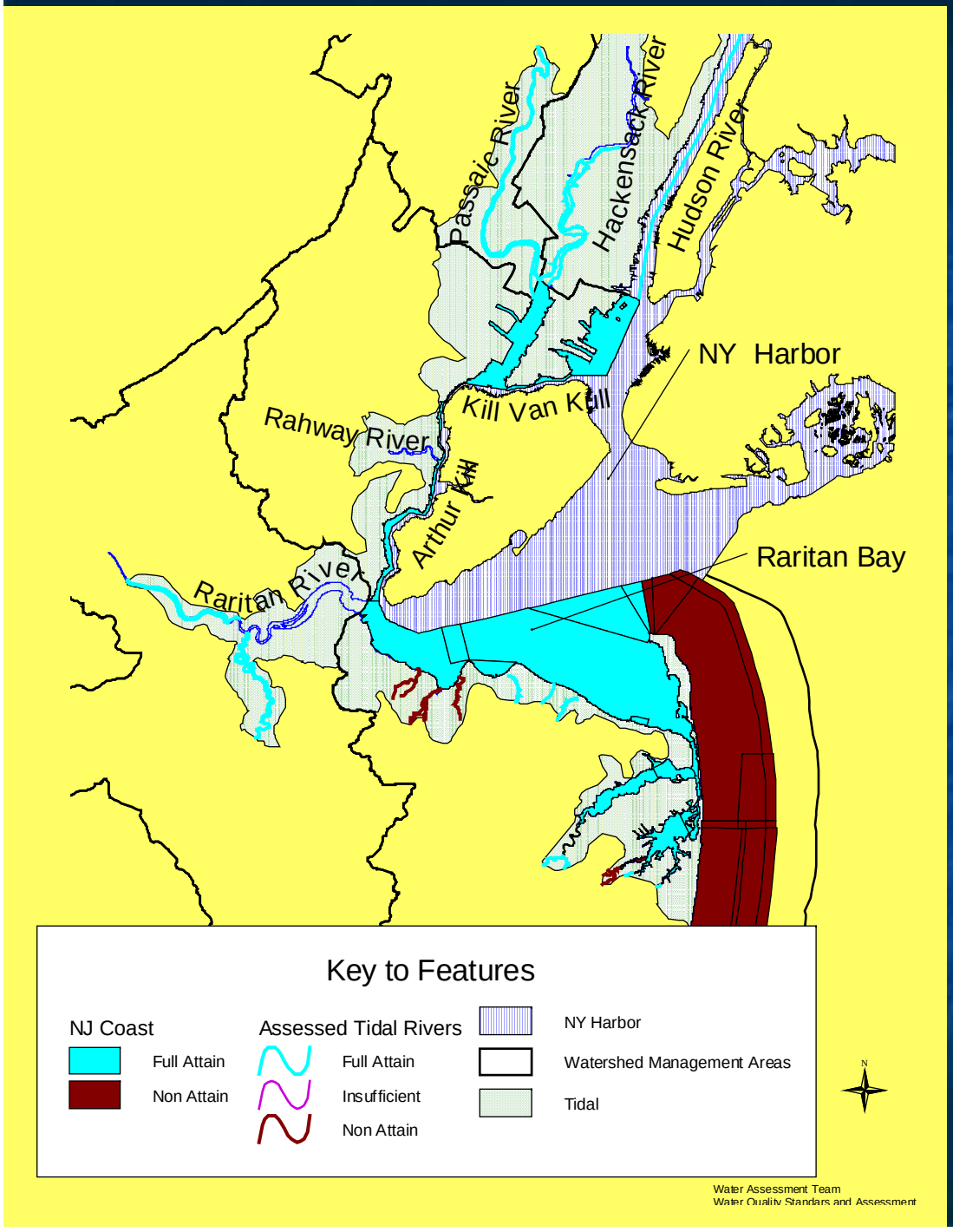
Ocean Source and Cause Assessment

- **Cause:** Occurrences of low DO on the ocean has been attributed to combination of natural processes and anthropogenic nutrient inputs
  - Ocean waters naturally stratify as they warm in summer
  - Phytoplankton bloom/dieoff reduces DO levels nr ocean floor
  - Rate, timing & extent of phytoplankton cycles may be worsened by nutrient inputs from near shore waters

- **Sources**: Low DO in near shore waters may be attributed to O_2 demand from -
  - river inputs (sum of pt source + stormwater runoff)
  - offshore STP inputs (15 outfalls in NJ coastal waters)
  - atmospheric contributions (nutrients)

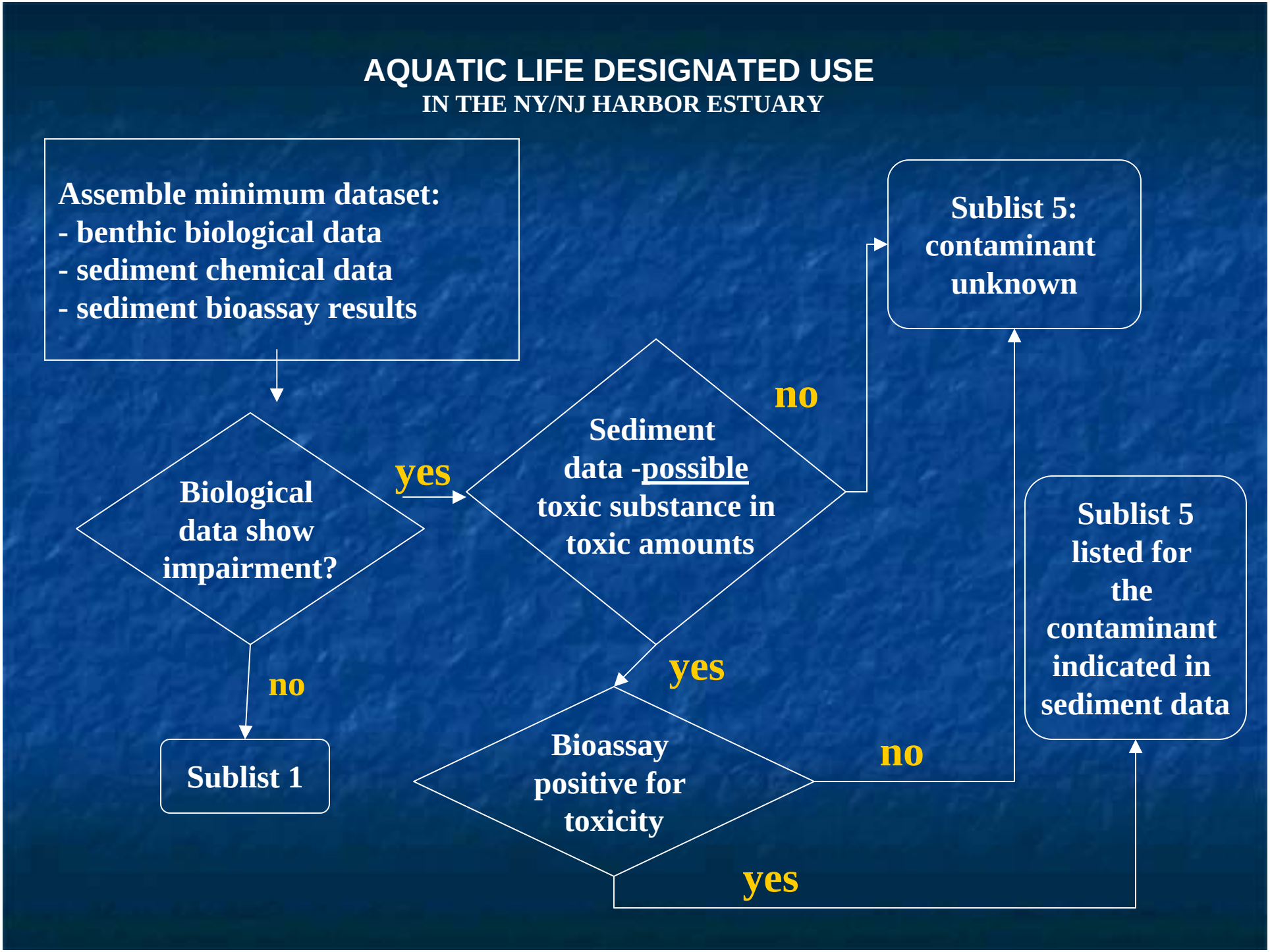
Types of Data

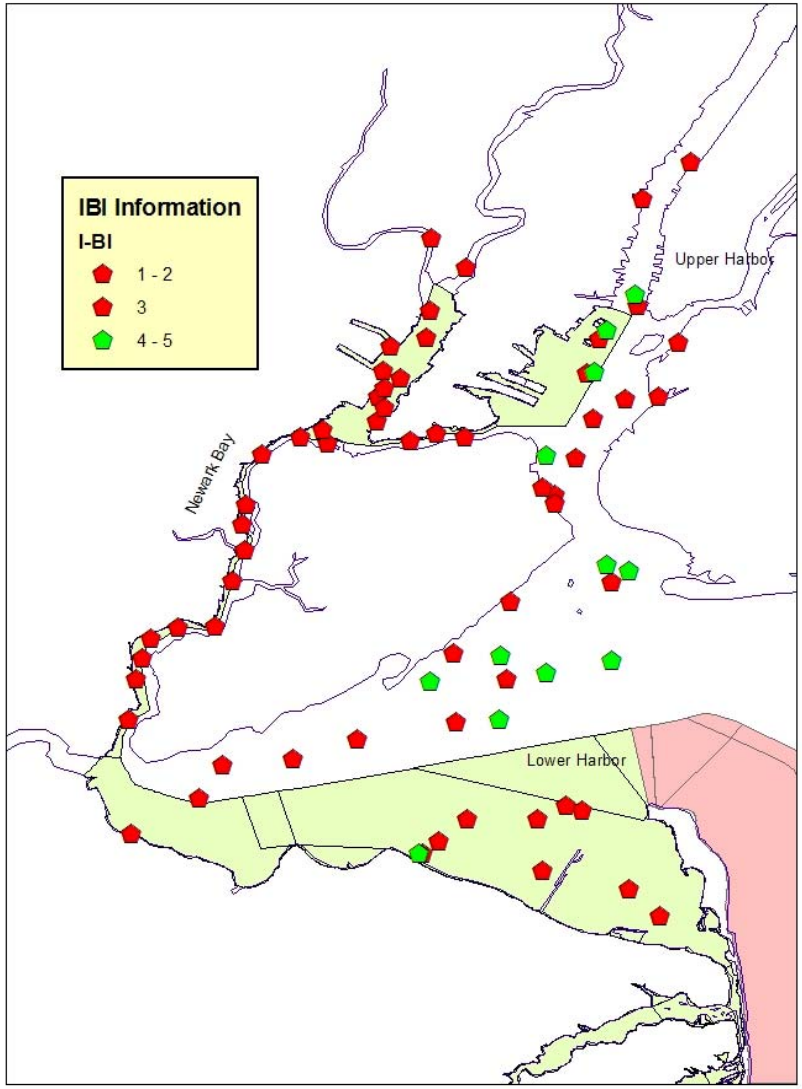
- **Water column profile** (DO, pH, salinity, temperature, depth, transmittance, and clarity)
- **water quality parameters** (nutrient load - P and N species; chlorophyll a content; total suspended solids (TSS)
- **surficial sediment**, top 2-3 cm, (chemical contaminants - organics and trace metals; sediment toxicity; total organic carbon; and grain size)
- **benthic macroinvertebrate community structure** (richness and abundance)
- **fish/shellfish (community structure** - richness and abundance; total lengths; pathological examination; chemical contaminants - organics and trace metals)
- **habitat** (general habitat-type; presence/absence: exotic species, submerged aquatic vegetation, and anthropogenic debris or perturbation).



- **USEPA's REMAP Program enables the Department to use benthic organisms, water chemistry and sediment data to assess aquatic life in the NY-NJ harbor estuary rather than just dissolved oxygen levels.**

AQUATIC LIFE DESIGNATED USE
IN THE NY/NJ HARBOR ESTUARY





The Department is looking to develop a similar biological index for the back bay areas and open ocean waters to better assess the conditions of aquatic life in these areas.

Future Assessments

- Estuarine waters- a couple of benthic indices exist, work is needed to evaluate and to establish which one would be most appropriate.
- For ocean waters, no index of benthic (or pelagic) community structure is generally recognized.
- Research is needed to establish an appropriate index for NJ's nearshore ocean waters.
- If these tools existed, the Department could assess where impairments existed and target resources to address impairments.