USE OF BIOMONITORING DATA BY NJDEP

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Division of Water Monitoring and Standards
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Designated Uses: Establish Water Quality Goals

• Aquatic Life
• Recreation
• Fish Consumption
• Shellfish Harvesting
• Drinking Water Supply
• Industrial Water Supply
• Agricultural Water Supply
Types of Biological Data & Sources
Biological Data Utilized by the Department & Sources

• **Benthic Macroinvertebrates:**
  - ✓ BFBM
  - ✓ Volunteers: 2012 Integrated Report used data from
    - Raritan Headwater Watershed Association
    - Musconetcong Watershed Association
• **Fish** (Fish IBI): BFBM, Div. Fish & Wildlife (DFW)
• **Endangered and Nongame species** (DFW)
Biological Data Utilized by the Department & Sources, continued

- Chlorophyll a (Lake and stream): BFBM, Regulated Community and their contractors

- Diatoms: BFBM, Nonprofit Research Agencies (Academy of Natural Science of Drexel Univ.)

- Estuarine & Marine benthic invertebrates: EPA, Research Agencies (Rutgers Univ.), Regulated Community and their contractors
Coastal Benthic Invertebrate Metric

Applies to -

SE: Estuarine Saline Waters
SC: Coastal Saline Waters

- Biological index in place for NY/NJ Harbor waters developed by USEPA’s REMAP program.
- Additional indices under development for other estuarine and near-shore ocean waters.
Marine Bio Metric

• Indices under development for near-shore ocean waters
• Based upon benthic marine invertebrates
• Near completion
Uses of Biological Data
Integrated Water Quality Assessment

- **Data Currently Used:**
  - Chemical/physical Water Quality
  - **Biological** *(macroinvertebrates, Fish IBI, Coastal Benthic Invertebrate communities)*
  - Assess the Degree of Aquatic Life Designated Use Support
  - New Ocean Metric will be used to de-List the ocean for DO in The 2014 303(d) List.

7/1/2013
Water Quality Assessment

Improvements to Nutrient Impact Assessment

• Methodology to assess the narrative nutrient criteria
  - Objectionable algal densities
  - Nuisance aquatic vegetation
  - Detrimental changes to the composition of aquatic ecosystems
Assess Nutrient Impacts

• To Assess Compliance with Narrative Nutrient Criteria – Nutrient Impact Assessment (NIA)

  • Benthic Macroinvertebrate status
  • Time-series DO & pH data (minimum DO & DO diurnal swing)
  • Periphyton Chlorophyll a (threshold = 150 mg/sq. meter seasonal avg.)
Permit Evaluations for Ocean Discharges

• A determination is made as to whether a discharge will cause unreasonable degradation of the marine environment.

• The process must consider ten criteria of which one is:
Permit Evaluations for Ocean Discharges, continued

The Department must review –

- The composition and vulnerability of the biological communities which may be exposed to such pollutants, including –
  - the presence of unique species or communities of species,
  - the presence of species identified as endangered or threatened pursuant to the Endangered Species Act,
  - or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain.
Stream Classifications: Trout Status

- **Trout Production**: Use by trout for spawning or nursery purposes during their 1st year.
- **Trout Maintenance**: Support trout throughout the year.
- **NontROUT**: Not designated for trout maintenance or trout production.

Classifications based on fish monitoring by DFW
Stream Classifications: Category One Waters Selection
Category One Designation

- Exceptional ecological significance
- Exceptional water supply significance
- Exceptional fisheries resources
Exceptional Ecological Significance

Nonimpaired aquatic community (benthic invertebrates, BFBM)

Excellent fish community (BFBM)

Aquatic-Dependent T&E species present
Exceptional Fisheries Resources

- Waterbodies that support **trout production** and classified as FW2-TP
- Waterbodies approved for unrestricted shellfish harvesting
New Initiatives in Standards Development & WQ Assessment Using Biological Data
New Initiatives

• Evaluate Natural Conditions
  • Attain better understanding of natural ranges of DO, Temp, pH
  • Explore conditions wherein biological condition show no impairment
New Initiatives

NJ Nutrient Criteria Enhancement Plan:

• (Stressor – Response studies)
  ➢ Stressor = Nutrients
  ➢ Response = Chlorophyll a; diatom, invertebrate, and/or fish communities

• Establishing Reference Conditions
Ridge Valley & Highlands: Chl a vs TP, summer only, all TP values < 0.065mg/l
Reference Condition: Paleolimnology

- Diatoms can be very sensitive to nutrient levels.
- Allows us to build inference models for TP & TN in waterbodies.
- Paleolimnology: inference model from top & bottom of lake cores.
- Assess historical reference conditions in natural lakes.
Questions?