NOAA Products and the Great Lakes Environment

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Habitat Solutions NA

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Some of what we do…

- **Identify, map, and evaluate coastal margin and nearshore aquatic habitat in the Great Lakes (fisheries and wildlife)**
  - Remote sensing and geophysical tools
    - Sidescan sonar
    - Hydroacoustics
  - GIS and statistical software to spatially and temporally evaluate habitat and fisheries data
  - Wetlands, hydraulic connectivity (water level dependent)

- **Study physical processes, erosion, and sediment transport in coastal areas**
  - Coastal Hazards
    - Erosion (USACE, State Coastal Programs)
    - Flooding (FEMA)
  - Changing water levels
    - Water levels and flows (IJC International Upper Great Lakes Study)
    - Climate change impacts

- **Assess and protect Great Lakes water resources**
  - Water Quality (Great Lakes Water Quality Agreement)
  - Water Quantity (Diversions)
Some of NOAA’s products…

- **Navigation Charts** – both paper and digital (MapTech, BSB charts)
  - Research vessels (large and small)
    - Water depth, shipping channels, coastal hazards, navigation aids, facilities
    - Digital charts used for real-time navigation, course plotting
    - Wrecks and other obstructions
  - Locate survey/sampling sites
    - USCG Sweepings study
    - Side scan sonar surveys
  - Real-time data acquisition
    - Side scan sonar surveys
    - Underwater video
- **High-resolution shallow water bathymetry (LIDAR)**
  - Physical processes, erosion and sediment transport studies
    - Lakebed downcutting (erosion of cohesive clays)
    - Littoral sediment supply (linear bars)
  - Benthic and shoreline habitat
    - Aquatic macrophytes (submergent vegetation)
    - Exposed shoreline during periods of lower lake levels (shorebirds)
  - Coastal margin habitat (wetlands)
    - Water levels and flows (IJC International Upper Great Lakes Study)
    - Climate change impacts
- **Water level monitoring and regulation**
  - Coastal benchmarks (IGLD)
  - Water level gages
    - Historic and real-time monitoring of water levels
    - Short-term flooding or drawdown events (seiches)
USCG Sweepings Study

Polar plot of acoustic anomaly orientation for the western half of the Silver Bay survey site. Average orientation is east-northeast with a 55° bearing true. N = 105. Radius is normalized frequency.

Average linear density is 15.6 anomalies per line km, or one anomaly every 64 meters on average.
Maumee Bay Recon

Sidescan sonar coverage
Need Higher Resolution Bathymetry

NOAA 1-meter contour interval

Taylor et al. (1998)
Lake St. Clair
Connecting Channels

- Up to 1 m drop in lake level by 2050 (worst-case scenario)
- 22,000 ha (54,000 Ac) exposed

- Change in shoreline location
- Shallow-water areas will be exposed
- Littoral sand trapped onshore
- Wetland complexes will be hydraulically isolated and disconnected
- 43 spawning sites, 33 species
- 28 sites high and dry
- More than 60 % of shallow-water habit (< 1 meter) will be lost
Needed Improvements

Most significant and common complaint is “lack of high resolution bathymetry where we need it”

- Higher resolution bathymetry (1 meter or less), particularly in nearshore and shallow water areas
  - 15 to 20 cm resolution ideal
- More accurate coastlines – coastal change mapping lags in the Great Lakes
- Shallow water LIDAR coverages are spatially limited and difficult to access/obtain
  - Access and quality control issues
  - “Vaporware”
  - Critical data for climate change impact assessments
- More accessible charts (multiple digital formats)
- Digital corrections and updates
Comments or Questions?

George Stone, 282 feet
Sunk 1909 on Grubb Reef
Lake Erie