LIS Seafloor Mapping Initiative

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CT Coastal Management

• Operating Principle:
  – Balance human uses/needs with protection, preservation & restoration of the natural functions & benefits of coastal environments.
CT Coastal Management - Context

• Cross Sound Cable:
  – Electrical transmission line
  – Information provided failed to adequately identify submerged bedrock.
    • **Result:** Permittee unable to comply with conditions requiring cable to be buried at a suitable depth.
CT Coastal Management - Context

• Islander East Pipeline:
  – Proposed natural gas pipeline
  – Detailed benthic information provided, but only for proposed route.
  – Passed through areas of sensitive resources (e.g., shellfishing)

• Result: CT DEEP unable to determine if route was better or worse than adjacent or alternative options.
CT Coastal Management - Context

• Key Point:
  – Resource Managers need accurate, relevant information (scope & extent) to enable the best possible decision-making.
  – If not, then decisions are prone to be:
    • Reactionary on a project-by-project basis
    • Missing the key or greatest possible context
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- LIS Cross Sound Cable Settlement Agreement:
  - Compliance issues with 2 CT cable permits in LIS created $6M fund for research/restoration projects;
  - Led by bi-state, multi-agency Steering Committee
    - CTDEEP, NYDEC, EPA LISS, CT & NY SeaGrants, NYDOS
    - Priority Goal: provide data products for resource management & infrastructure siting in LIS
  - 2004 - 2009; (asst’d discussions/workshops)
  - 2009 - now (implementation planning & execution)
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• Milestone: Collaborative Partners Identified (2010)
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• Milestone: Identified Target Areas (2011)
  – Engage stakeholders to determine where in LIS to target mapping efforts and why;
  – Technique adapted/improved from earlier efforts in CA;
    • CT process subsequently used/improved in WA
  – Divided map of LIS into a grid & surveyed experts to:
    • Identify critical **areas**
    • Identify the dominant **issue** & provide supporting **details**
    • Assign a **priority**
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• Milestone: Identified Target Areas (2011)

Highest Priority Areas for Benthic Mapping in LIS
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• Milestone: Identified Target Areas (2011)
  – Share core issues of:
    • Planning, Regulatory, Resource Management
  – Details supporting issues are:
    • Have Knowledge Gaps
    • Represent Significant Natural Areas
    • Relevant to Infrastructure
    • Have High Use/Potential for Use Conflicts
  – Timeframe to address:
    • Need for data soon (1-2 years)
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  - Define and implement technical components for a mapping program focusing on:
    - Assess implementation strategies
    - Report on methods, analysis, results and conclusions/recommendations

| Acoustic Intensity / Seafloor Topography | Benthic Habitats & Ecology |
| Sediment Texture & Grain Size           | Physical Environments     |
| Sedimentary Environments                | Data Management System    |
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Acoustic Data:
- Compilation of previous NOAA data & new NOAA & Stony Brook surveys
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Acoustic Data:
- Provides depth & backscatter data
- Derived products – TRI, slope, rugosity
- Most of the remaining data products directly or indirectly depends on this
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Acoustic Data: Shallow water mapping was also conducted by URI using an interferometric (vs beam forming) sonar.
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Sediment Texture & Environments:

- Provides detailed bottom composition description (e.g., gravel, sand, mud, silt, etc.) and dynamics (e.g., erosion, deposition, etc.)

- Also provided rapid sediment chemistry (TOC, N, Pb, Zn, Cu)
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Sediment Texture & Environments:

– Sub-bottom profiling used to develop sediment environments

Example – depositional layers

Example – non-deposition/erosion
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Ecological Characterization:

– Backscatter data utilized for sample site selection
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Ecological Characterization:

– Characterized benthic habitats for infauna and epifauna using the SEABOSS and Kraken2

SEABOSS

Kraken2 ROV
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Ecological Analysis:
– Stony Brook University focused sampling assessment
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Seafloor Classification & Ecological Analysis:

- Generated numerous data products including individual species distribution, biogenic features, species richness and diversity maps.
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Ecological Analysis:

- Seasonal analyses showed areas with ecological stability and others with seasonal change.
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Ecological Analysis:

– Seasonal analyses showed ecological stability and change

Stable hard substrates

Seasonally variable soft substrates

Connecticut Department of Energy and Environmental Protection
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Physical Oceanography:

– Data on temperature, salinity, currents, bottom stress, etc., based on observations and modeling.
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Data Management:

– Leveraged an existing NSF funded system at LDEO to store and share results: [http://www.marine-geo.org/portals/lis/](http://www.marine-geo.org/portals/lis/)
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• Post Pilot:
  – Fall/Winter 2014 - 2016:
    • SC evaluated processes/deliverables with input from outside reviewers;
    • SC & teams made adjustments to both implementation strategies and data products;
    • Notable exception – acoustic data collection in ELIS area by NOAA in Fall 2015 to fill in large gap areas from earlier surveys

  – 2016 going forward:
    • Developing work plans for Phase II eastern LIS area
    • Initiate (or continue) data collection/analysis activities
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• Outcomes:
  – Overall, SC feels pilot was successful
    • Generated useful data and examples of how data can be visualized and synthesized
    • Demonstrated that teaming approach can be an effective way to approach a complex, large scale effort
  – Areas for improvement
    • Better definition and application of data standards
    • Improved coordination and communication (between teams as well as between teams and SC)
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• Outcomes:
  – Report and Appendices:
    • [http://tinyurl.com/LISCableFundPilotReport](http://tinyurl.com/LISCableFundPilotReport)
    • [http://tinyurl.com/LISCableFundPilotReportApps](http://tinyurl.com/LISCableFundPilotReportApps)
  – YouTube Video from ROV Dives:
    • [https://www.youtube.com/watch?v=tz_QX4R2hg0](https://www.youtube.com/watch?v=tz_QX4R2hg0)
  – Stefaniak et al. 2014:
Questions?

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