Proposed Timeline

13-14 Feb	Generate mature draft
1 Mar	Circulate initial draft to MS and stakeholders for comment
14-30 Apr	Prepare draft GD for submission to IRCC9
1 Jul	IRCC formally circulate draft for MS comment
Late 2017/early 18	CSBWG5 meeting, consider external input and comments
Apr/May	Prepare Edition 1.0.0 for submission to IRCC10
Sep	Formal submission to IHO Council2
Oct	IHO Council2 approval
1 Jan 2019	CSBGD Edition 1.0.0 released
Late 2018/early 19	CSBWG6 meeting, commence work on Edition 2.0.0

Crowdsourced Bathymetry Data Pipeline Infrastructure Update

Jennifer Jencks & Adam Reed

Feb 13, 2017

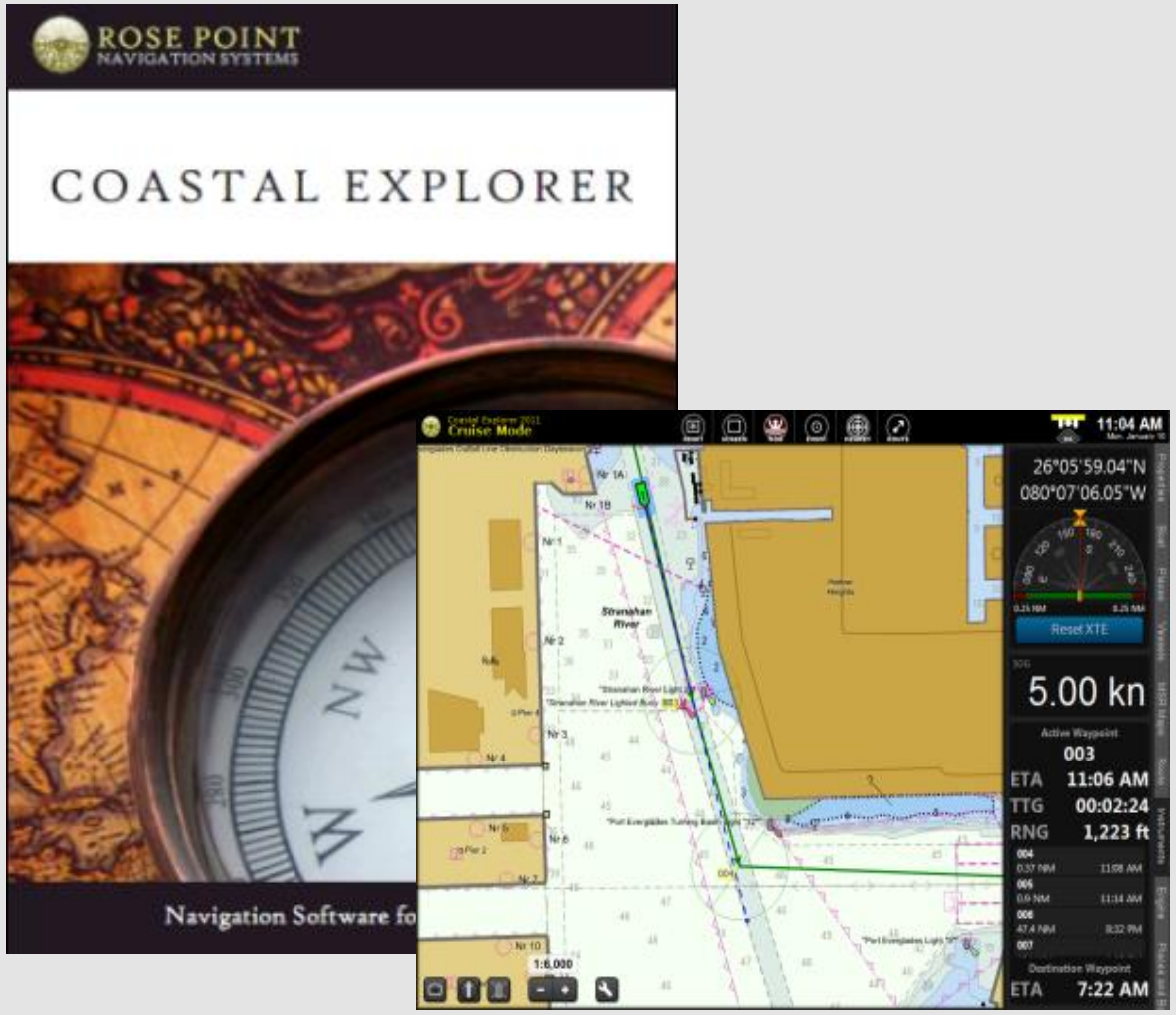
CSBWG4

Objective

To enhance the IHO DCDB infrastructure and interface to ultimately allow the public to ***upload, discover, display and download*** CSB data via a web-based interface.

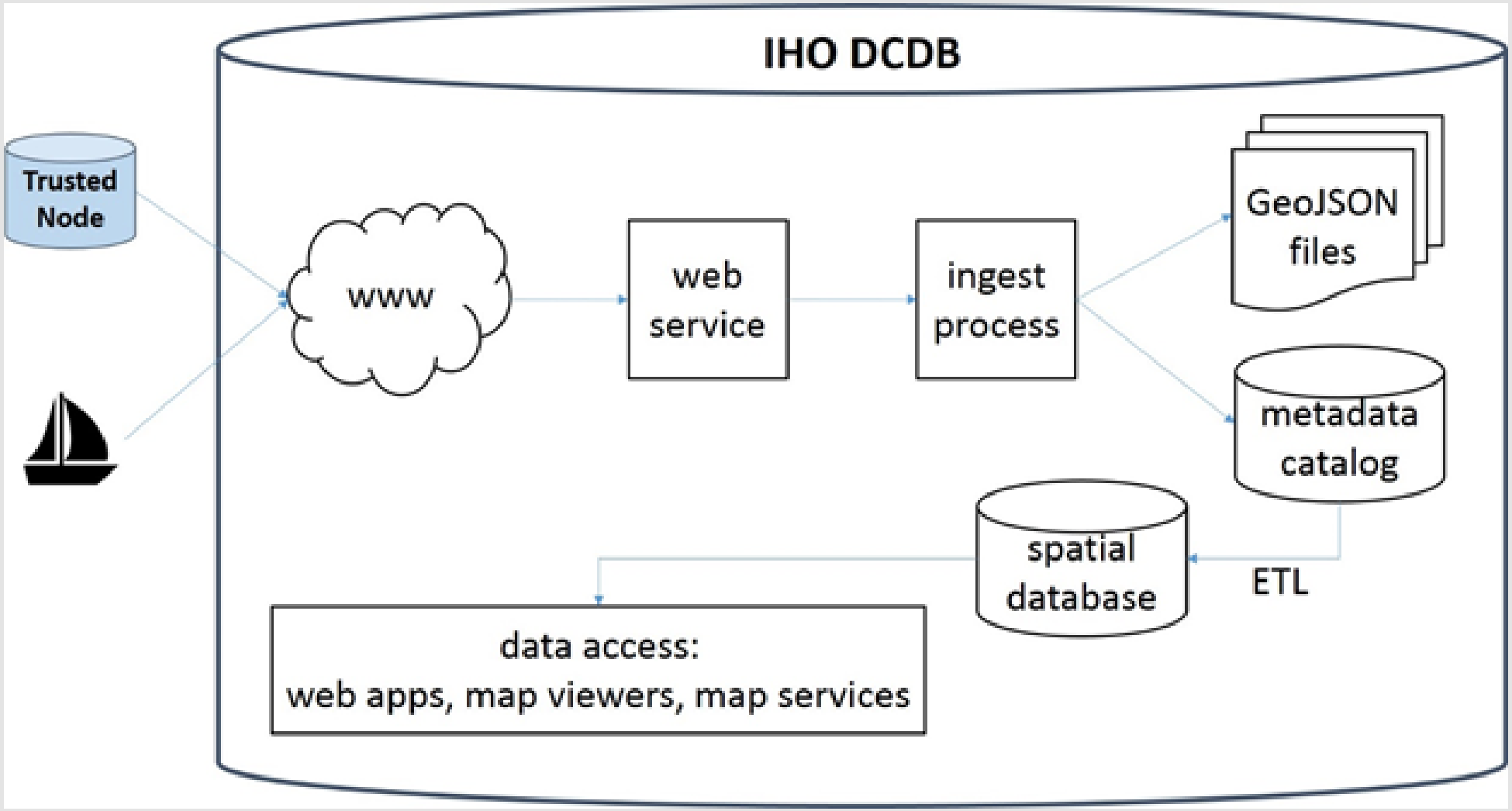
Rose Point Pilot Project

- NOAA and the DCDB have teamed with Rose Point Navigation Systems
- Mariners are given an option to enable CSB logging allowing a modified electronic charting system log file to record position, depth and time.
- Mariners can choose to be anonymous or to submit metadata about vessel and equipment
- A modified log file gets submitted via HTTP post that contains a JSON metadata string



www.rosepointnav.com

Project Flow



Jan - Mar 2017: Dedicated software developers

- Harden the current data ingest system
- Automatically load CSB data streams into new CSB spatial database and archive
- Improve display and discovery of IHO CSB data via map viewer
- Enable delivery of CSB data to the public
- Identify a point storage technology we can dynamically generate point data results

Map Display

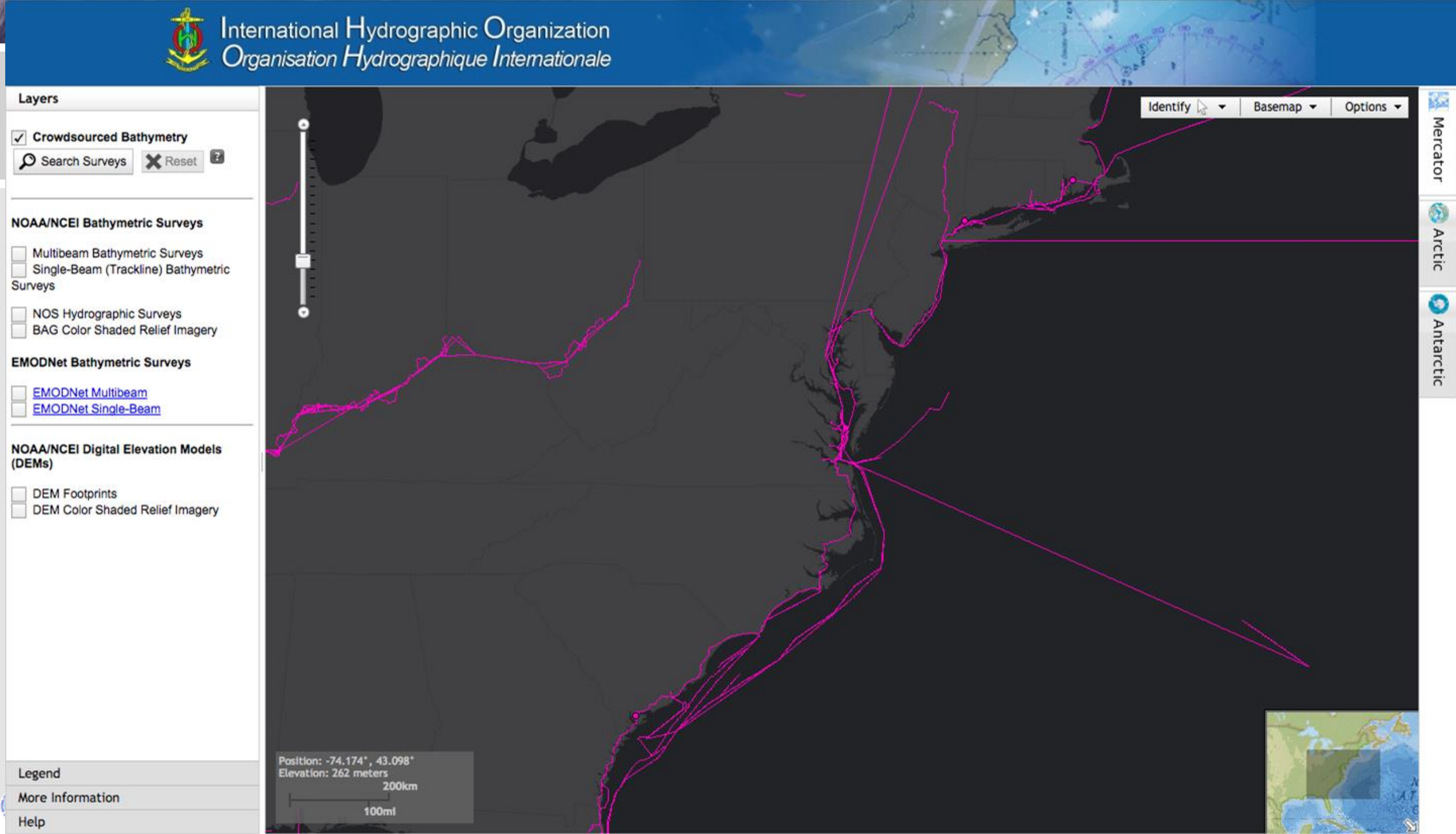
Line Generalization:

- To accommodate millions of points in a trackline, the team implemented a line generalization algorithm that generates the trackline for the map but loads far less points into the database.
- This fixed memory errors that were limiting the loading of data.

Map Display

Segmentation of lines

- To eliminate two points (that should not be connected) from being connected the concept of multiple separate lines being generated and stored was implemented.
- This scenario could occur when a ship recording data turned off it's recorder for an extended length of time and then turned it back on.
- To filter out bad points determined (and will apply) variables for line segmentation


International Hydrographic Organization
Organisation Hydrographique Internationale
Layers
Crowdsourced Bathymetry
Search Surveys
Reset
NOAA/NCEI Bathymetric Surveys
Multibeam Bathymetric Surveys
Single-Beam (Trackline) Bathymetric Surveys
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BAG Color Shaded Relief Imagery
EMODNet Bathymetric Surveys
EMODNet Multibeam
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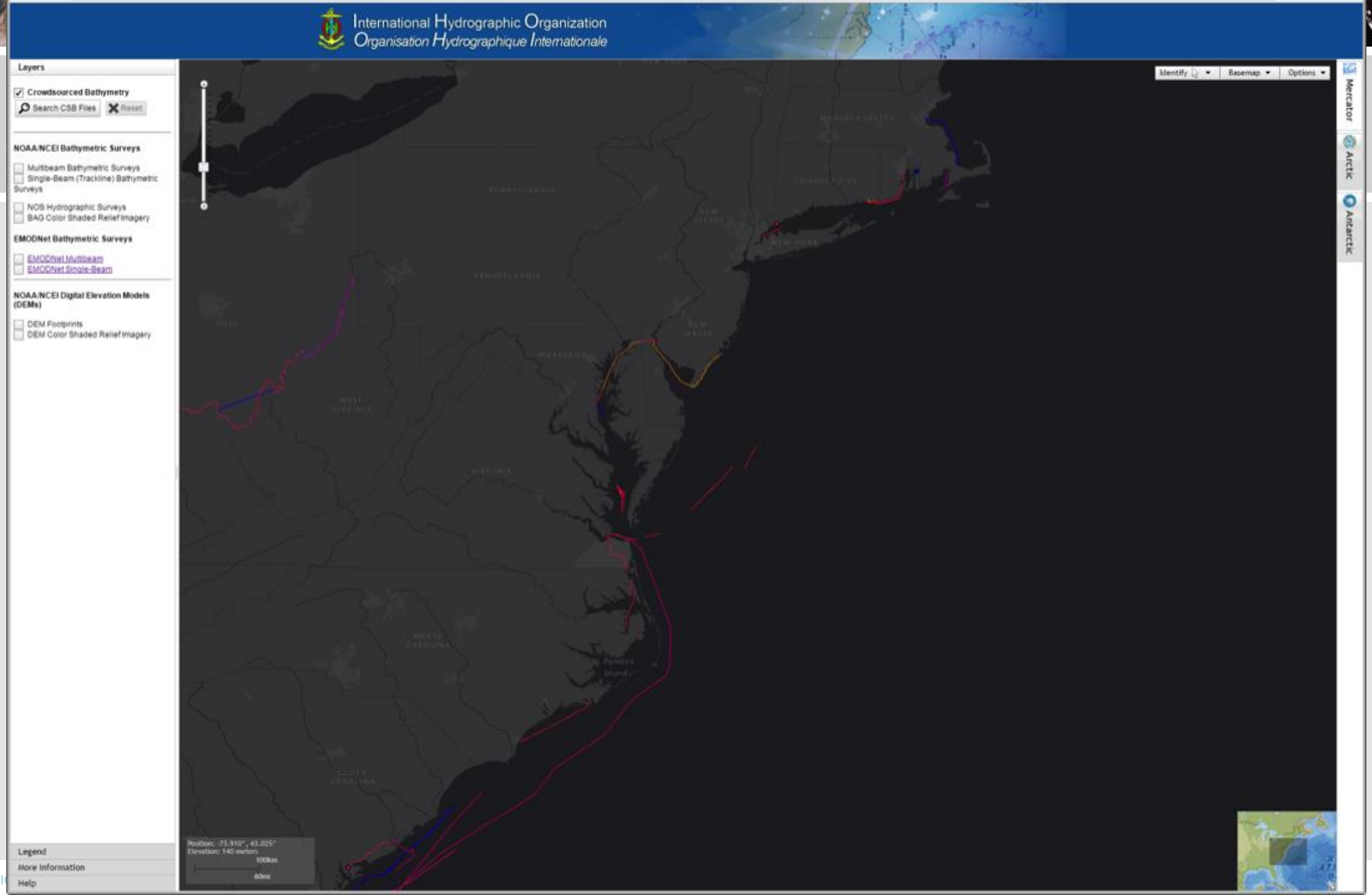
NOAA/NCEI Digital Elevation Models (DEMs)
DEM Footprints
DEM Color Shaded Relief Imagery
Legend
More Information
Help
Identify
Basemap
Options
Mercator
Arctic
Antarctic
Position: -74.174°, 43.098°
Elevation: 262 meters
200km
100mi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Organisation Hydrographique Internationale
Layers
Crowdsourced Bathymetry
Search CSB Files
Reset
NOAA/NCEI Bathymetric Surveys
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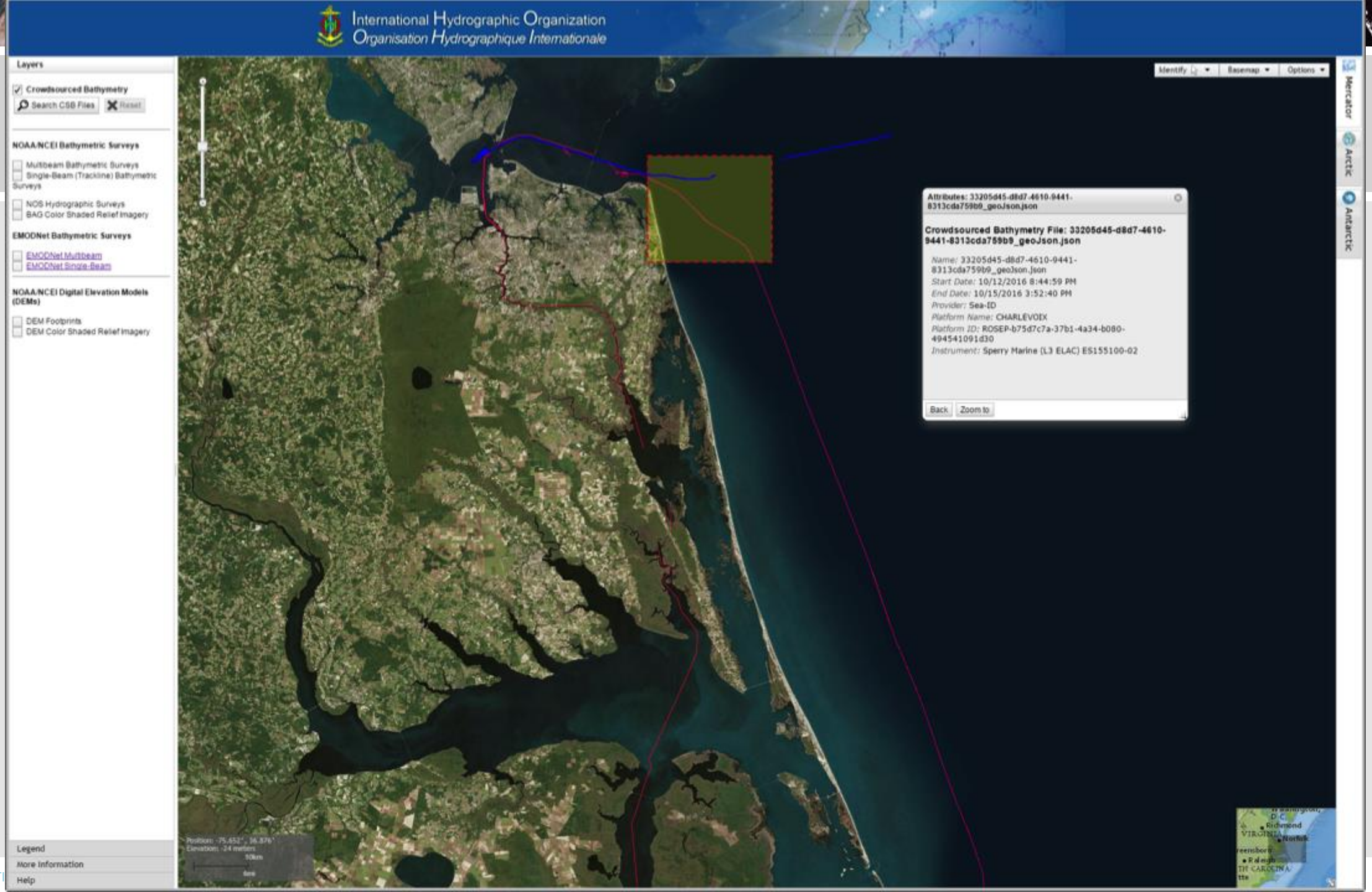
Legend
More Information
Help
Identify
Basemap
Options
Mercator
Arctic
Antarctic

Enable delivery of CSB data

Enable basic delivery of data that will contain full GeoJSON files or other submission format (XYZT)

- Filter criteria passed from CSB viewer to data delivery system: data extract by platform and sensor, date/time, data provider (trusted node), etc
- System packages whole, original files
- Include metadata with data download packages, i.e., with everything included in the GeoJSON.
- Errors (archive extract, packaging issue, etc.) reported to user and data manager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Layers
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Search CSB Files
Reset
NOAA/NCEI Bathymetric Surveys
Multibeam Bathymetric Surveys
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DEM Footprints
DEM Color Shaded Relief Imagery
Legend
More Information
Help
Identify
Basemap
Options
Mercator
Arctic
Antarctic
Attributes: 33205d45-d8d7-4610-9441-8313cda759b9_geoJson.json
Crowdsourced Bathymetry File: 33205d45-d8d7-4610-9441-8313cda759b9_geoJson.json
Name: 33205d45-d8d7-4610-9441-8313cda759b9_geoJson.json
Start Date: 10/12/2016 8:44:59 PM
End Date: 10/15/2016 3:52:40 PM
Provider: Sea-ID
Platform Name: CHARLEVOIX
Platform ID: ROSEP-b75d7c7a-37b1-4a34-b080-494541091d30
Instrument: Sperry Marine (L3 ELAC) ES155100-02
Back
Zoom to

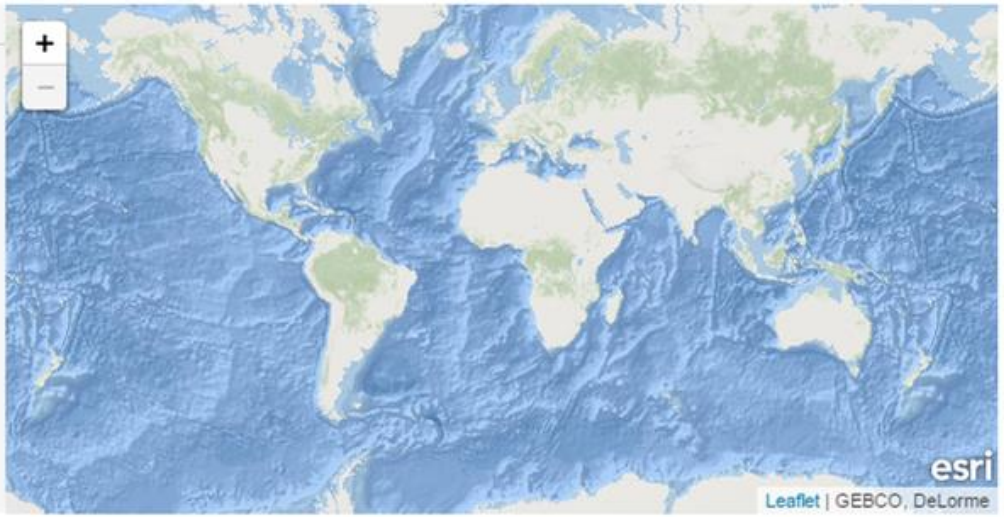
NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Request Summary | CSB 3 | Help

Search Criteria

CSB IDs : 1c3cdd1f-1346-45de...
Start Year : Not specified
End Year : Present
Ships : All
Sensors : All
ExternalId : All
Provider : All

Top : Not Specified
Left : Not Specified
Bottom : Not Specified
Right : Not Specified



Survey & File Statistics

Filesize (approximate)
58.1 MB

Files
3

File Data Types

→ Request Summary

Data Available	Name	Ship	Sensor	Unique ID	Provider	☑
›	33205d45-d8d7-4610-9441-8313cda759b9_geoJson.json	CHARLEVOIX	Sperry Marine (L3 ELAC) ES155100-02	ROSEP-b75d7c7a-37b1-4a34-b080-494541091d30	Sea-ID	☑
›	c7c4e1a8-2440-4389-bf26-dd5d8b31a416_geoJson.json	Enemy Glory	Sperry Marine (L3 ELAC) ES155100-02	ROSEP-6b39318b-0ff0-4732-a2b2-3c5dbd53d1c2	Sea-ID	☑
›	1384666e-83cb-4e35-bfa0-aafa7d32d7f9_geoJson.json	FOO BARGE	Sperry Marine (L3 ELAC) ES155100-02	ROSEP-1d034f00-89ec-4bef-bc34-fb20c578c0ef	Sea-ID	☑

10 | 25 | 50 | 100

Working on this week

- Break line segments - finishing touches
- Prepend date to processed filenames
- Generate tracklines from files that do not contain time (based on order of files)
- Harden delivery system

Next up

- INGEST: Enable ability to add new Trusted Nodes to the ingest pipeline without the need for software programmer time.
- DELIVERY: Have portions of a file delivered to get only the data a user wants (e.g., draw a box around data I want and get only the portion of the file within the box).
- DISPLAY: Identify a point storage technology we can dynamically generate point data results
  - CSB would then be displayed as tracklines or points

Next Year

- INGEST: Scale up number of contributors/trusted nodes
- DELIVERY: Enable option for user to choose delivery format(s)
- DISPLAY: Enhance point data display (ie: Heat maps?)
- TBD...

Thank you

Thank you to our partners:

- International Hydrographic Organization
- NOAA National Centers for Environmental Information
- NOAA Office of Coast Survey
- National Geospatial Intelligence Agency
- Rose Point Navigation Systems
- Sea ID
- Professional Yachting Association
- General Bathymetric Chart of the Oceans (GEBCO)

EXTRA SLIDES

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- General Bathymetric Chart of the Oceans (GEBCO)

Data formats

- XYZT from ECS
- Metadata string
- Converted to GeoJSON

```
{
    "platform":
    {
        "uniqueID":"ROSEP-e8c669f8-df38-16e5-b86d-9a79606e9478",
        "type": "Ship",
        "name": "SS Dinghy",
        "length": 65,
        "lengthUnitOfMeasure": "meters",
        "IDType": "IMO",
        "IDNumber": "1008140"
    }
}
```

```
lat,lon,depth,time
47.666520,-122.098525,21.49,20161017T234638Z
47.666518,-122.098525,11.98,20161017T234739Z
47.666517,-122.098527,14.63,20161017T234839Z
47.666515,-122.098527,17.16,20161017T234935Z
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47.666505,-122.098522,20.18,20161017T235141Z
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47.666585,-122.098460,20.21,20161018T000236Z
47.666417,-122.098443,18.32,20161018T000337Z
47.666417,-122.098443,15.27,20161018T000438Z
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47.666490,-122.098562,10.06,20161018T000638Z
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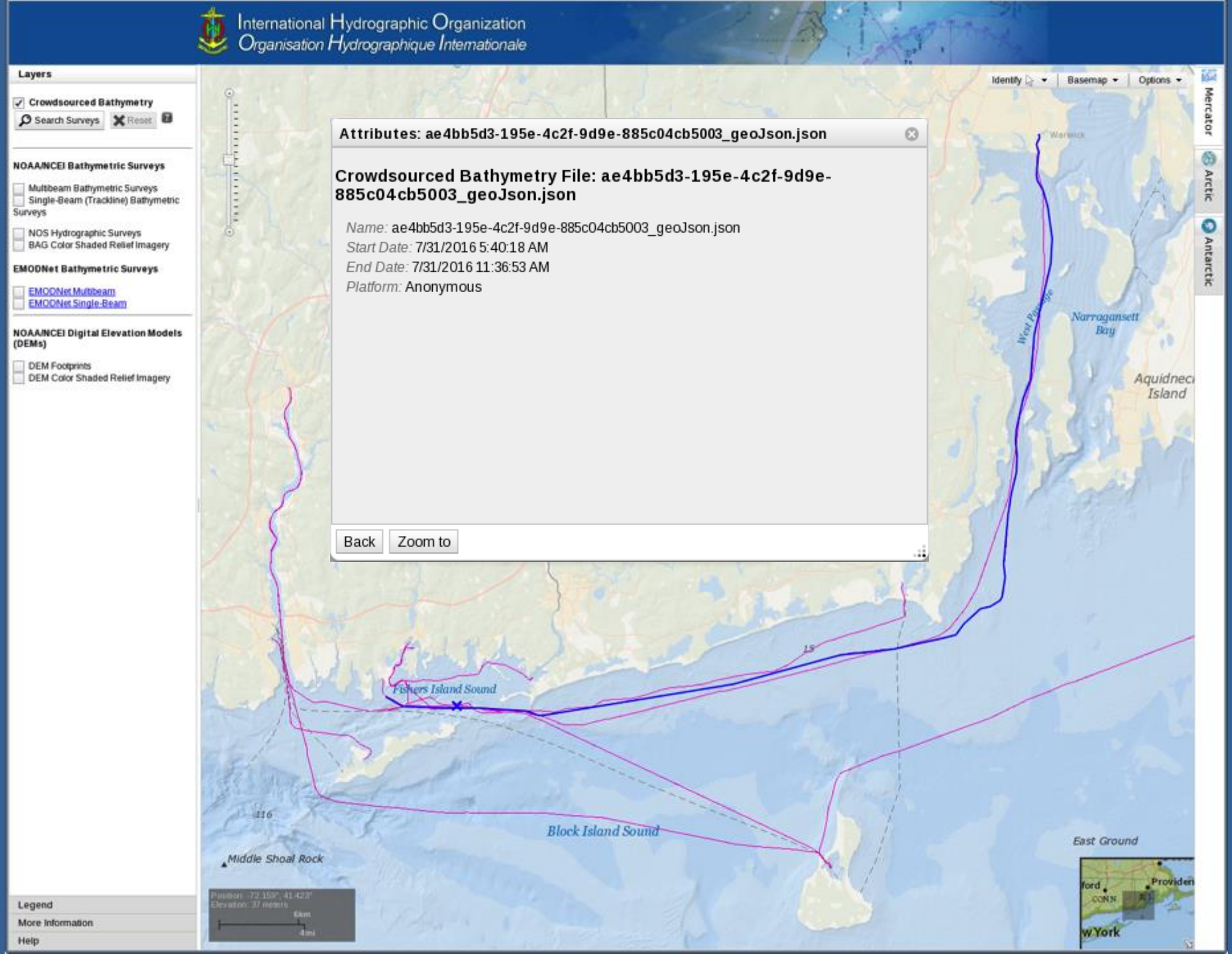
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Name: ae4bb5d3-195e-4c2f-9d9e-885c04cb5003_geoJson.json
Start Date: 7/31/2016 5:40:18 AM
End Date: 7/31/2016 11:36:53 AM
Platform: Anonymous
Back
Zoom to
Warwick
Narragansett Bay
Aquidneck Island
Fishers Island Sound
15
116
Block Island Sound
Middle Shoal Rock
East Ground