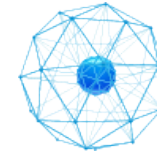


# Google Oceans

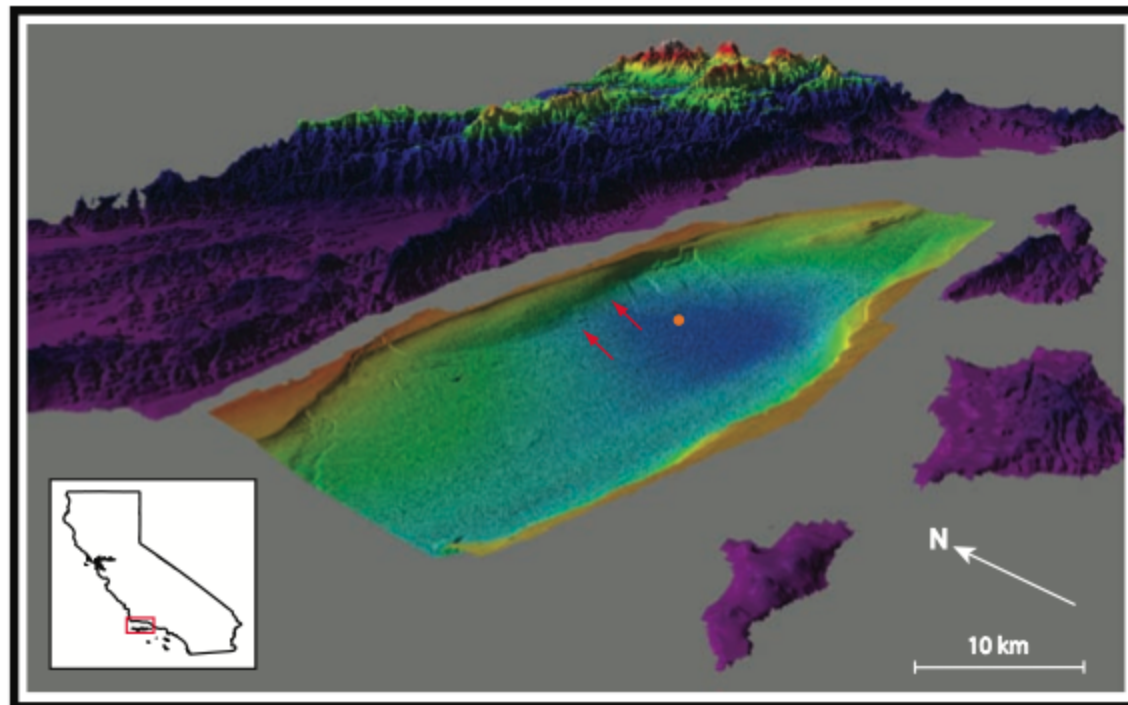


2013-May-16  
Kurt Schwehr  
schwehr@google.com



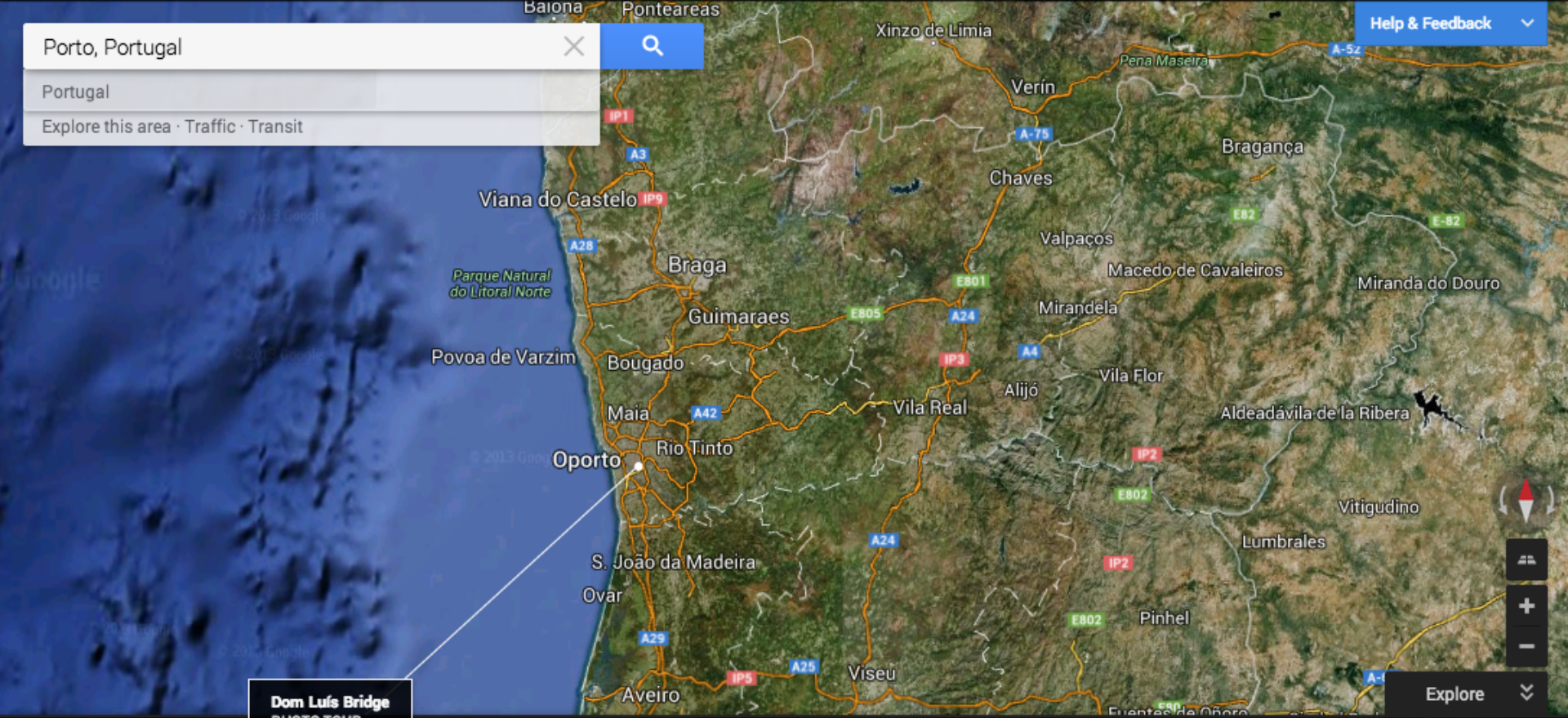
**Oceans**  
Challenges and Opportunities





**Figure 2.** The Santa Barbara Basin (red box in the inset) is a part of the California Borderlands and is located south of the Transverse Ranges in California. The motion on the San Andreas Fault System has created a closed basin that is partially shielded from the flushing action of the California Current. Rapid deposition on steep slopes combined with frequent large earthquakes has resulted in a number of slides in the recent Holocene sediments. The study areas are marked with red arrows: the Gaviota slide on the left and the slope crack on the right. The bathymetry is from the MBARI EM300 multibeam survey [Eichhubl *et al.*, 2002]. Also shown is the location of ODP Site 893 (orange circle).

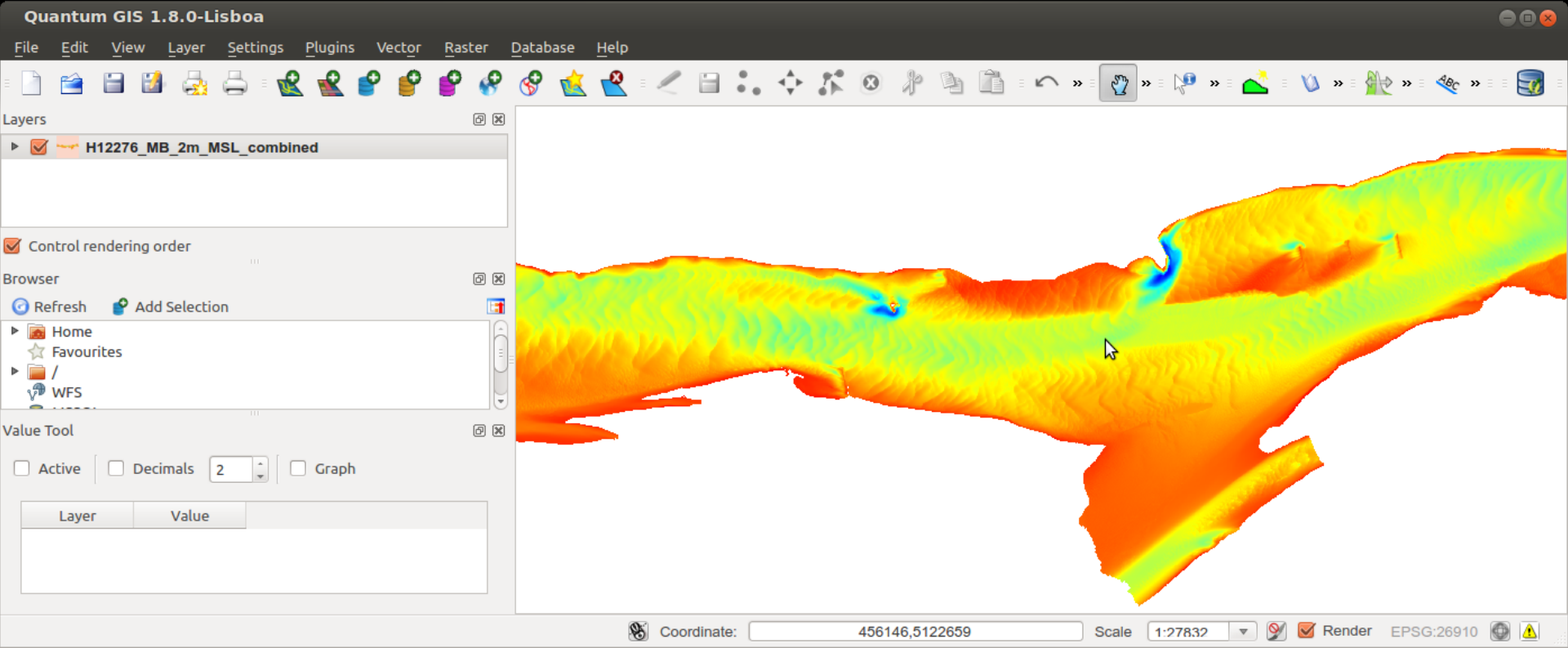
Porto, Portugal
Portugal
Explore this area · Traffic · Transit

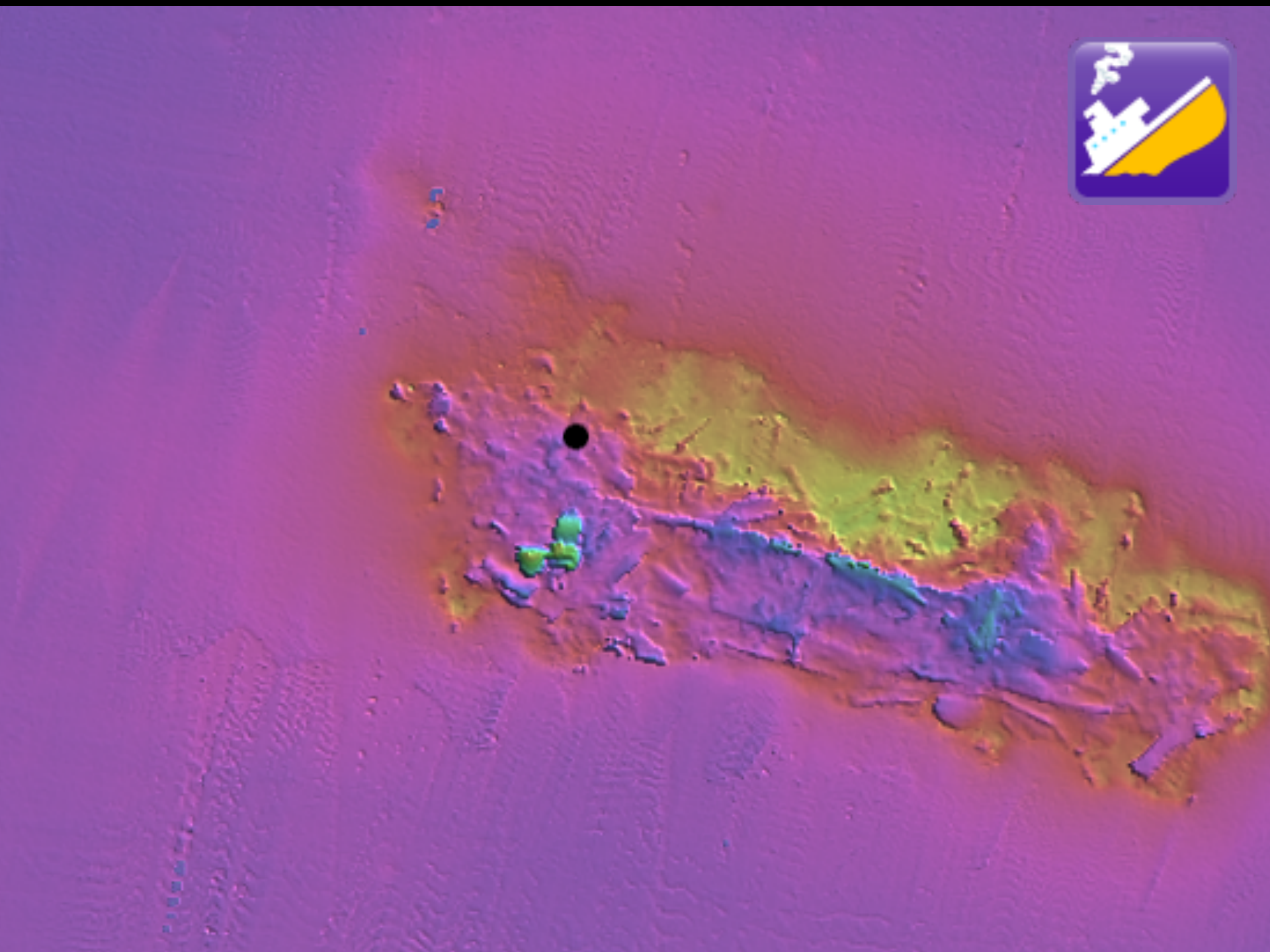


Dom Luís Bridge PHOTO TOUR



# Bathymetry grid from NOAA





# Heron Island Resort

Google

heron island resort



jaustin@google.com

Get directions

My places



## Heron Island Resort

Heron Island, QLD 4680, Australia  
+61 7 4972 9055 · heronisland.com

3 reviews

"Massacred Turtle hatchlings! Nothing prepares you for the heartbreak of ..."



[Directions](#) [Search nearby](#) [Save to map](#) [more](#)

Ad · [Why this ad?](#)

## Heron Island Resort

Official Web. [Island Resort & Spa](#).  
4\* Beach Suites & Villas. Book Now!  
[www.heronisland.com/](#)

[See your ad here](#)

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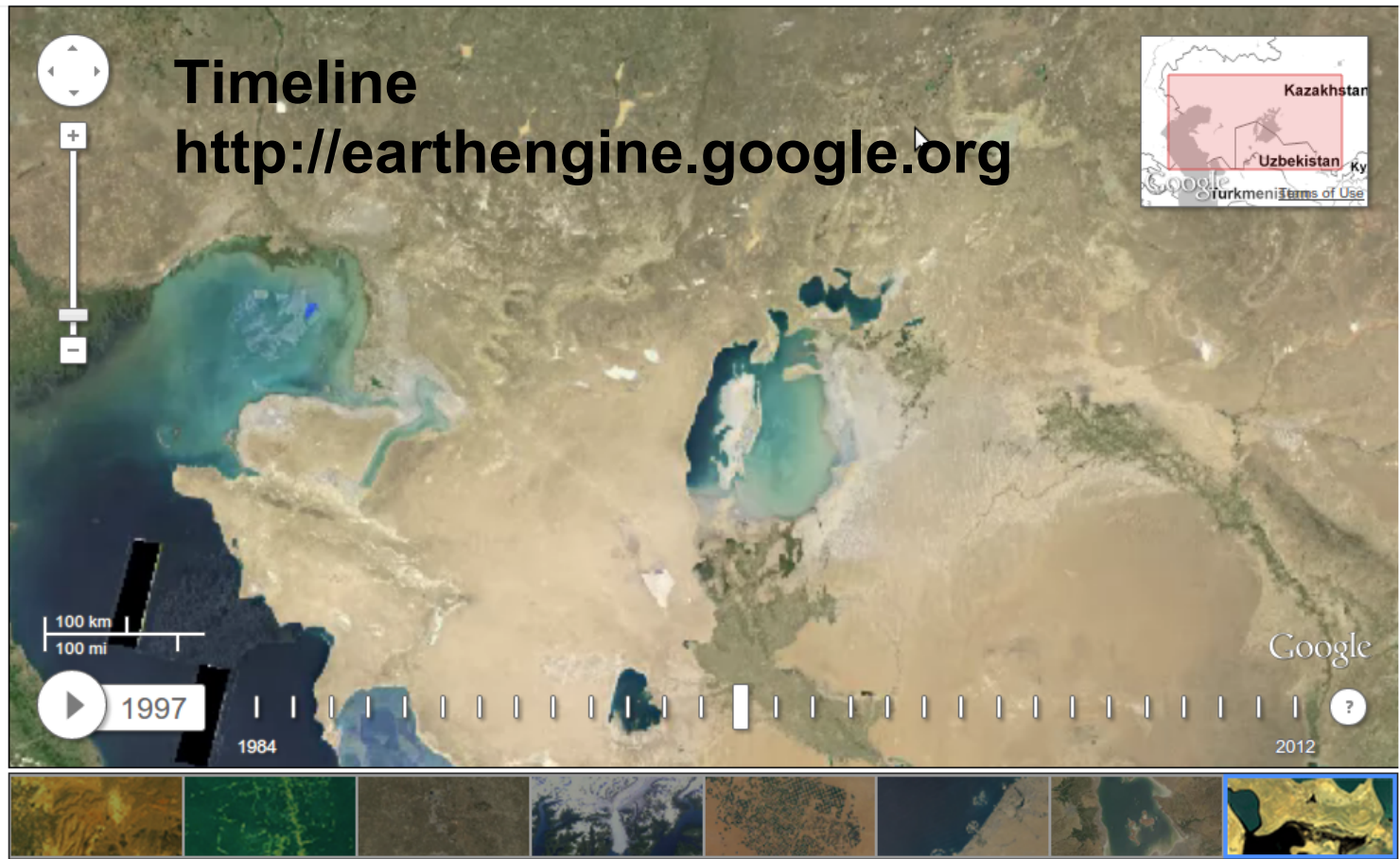


Search anywhere (e.g. "Las Vegas") to see its timelapse...



Earth Engine > Landsat Annual Timelapse 1984-2012

Home Data Catalog Workspace



Now viewing: Drying of the Aral Sea

Share this view

Explore a global timelapse of our planet, constructed from Landsat satellite imagery. With water diverted to irrigation, the inland Aral Sea has shrunk dramatically. Many areas were completely dry by 2009. Each frame of

Region: Viewport

Data +

- Hand-drawn points and polygons
- Computed layer: Apply Mask
- Model, trained Dec 5, 2012 at 4:17pm (99.27%)
- Model, trained Dec 5, 2012 at 4:14pm (99.07%)
- cart (96.89%)
- fmb (96.88%)
- Model, trained Dec 5, 2012 at 4:00pm (98.99%)
- Threshold 128
- Alpha mask
- Raw map

Add data Add computation

Classes +

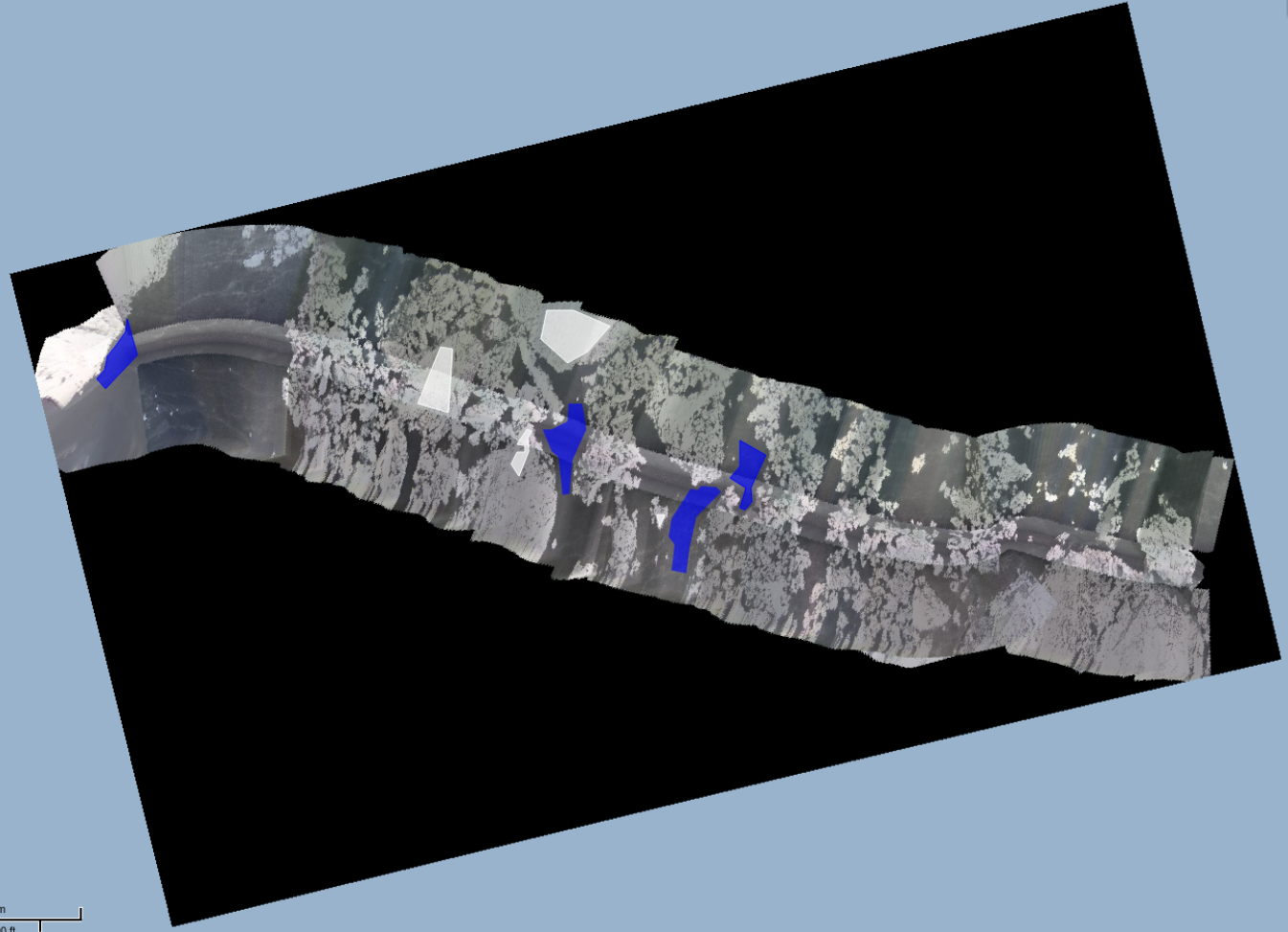
- Ice - 5 polygons
  - Water - 4 polygons
  - null - 1 polygon
- Add class Get palette

Analysis: Train a classifier

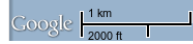
Classifier Resolution (m)

Random Forests 5

Train classifier and display results



Map Satellite





Region: Viewport

- Data +
  - Hand-drawn points and polygons
  - Computed layer: Apply Mask
  - Model, trained Dec 5, 2012 at 4:17pm (99.27%)
  - Model, trained Dec 5, 2012 at 4:14pm (99.07%)
  - cart (96.89%)
  - fmb (96.88%)
  - Model, trained Dec 5, 2012 at 4:00pm (98.99%)
  - Threshold 128
  - Alpha mask
  - Raw map

Add data Add computation

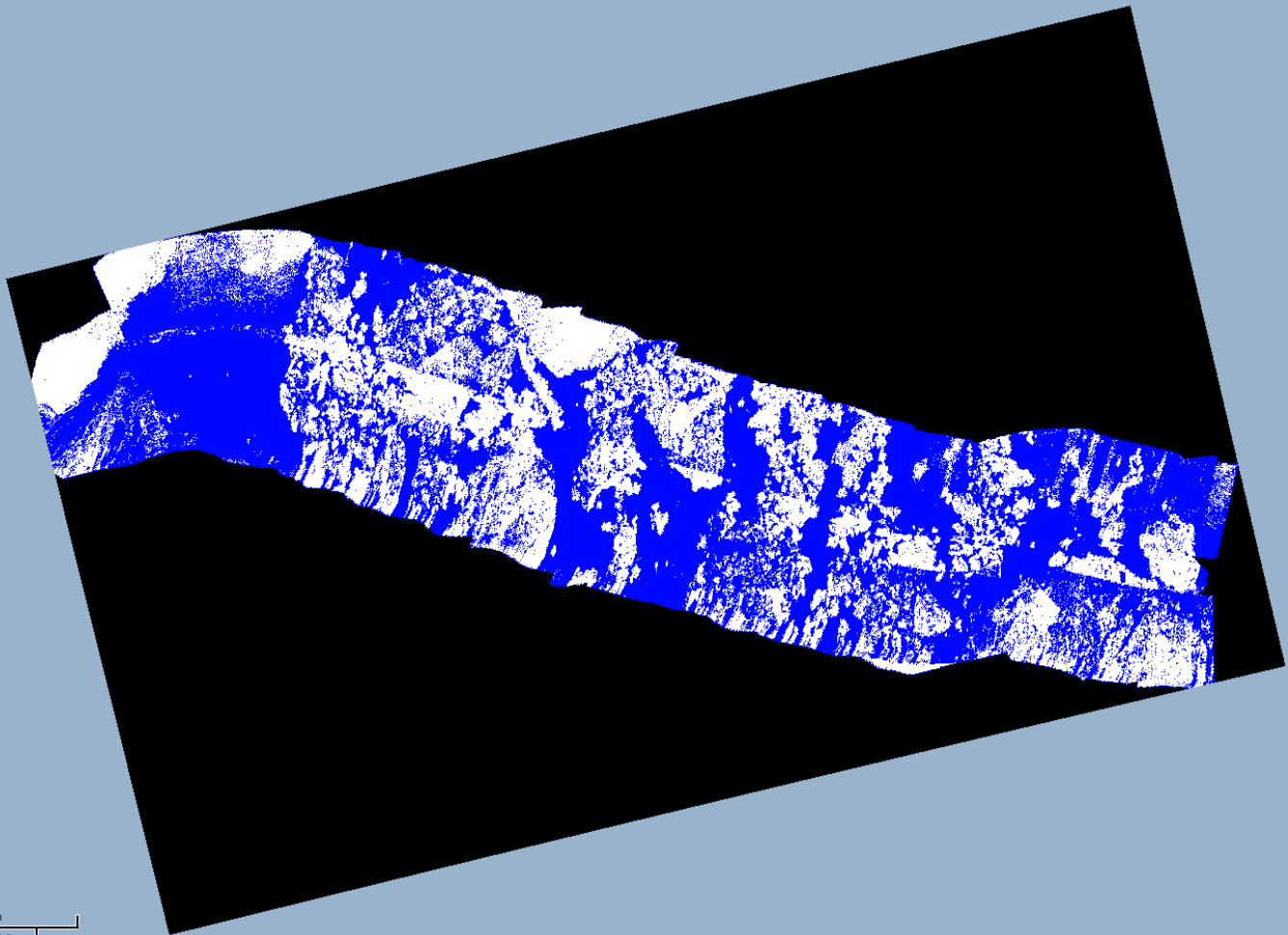
- Classes +
    - Ice - 5 polygons
    - Water - 4 polygons
    - null - 1 polygon
- Add class Get palette

Analysis: Train a classifier

Classifier Resolution (m)

Random Forests 5

Train classifier and display results



# Marine data collaboration platform for the ocean community

A fast and visual way to search ocean data



Visual Search

Table View

Device Data

Easy Download

Ocean Community

Q&A

Take a Tour

Sign Up, it's free



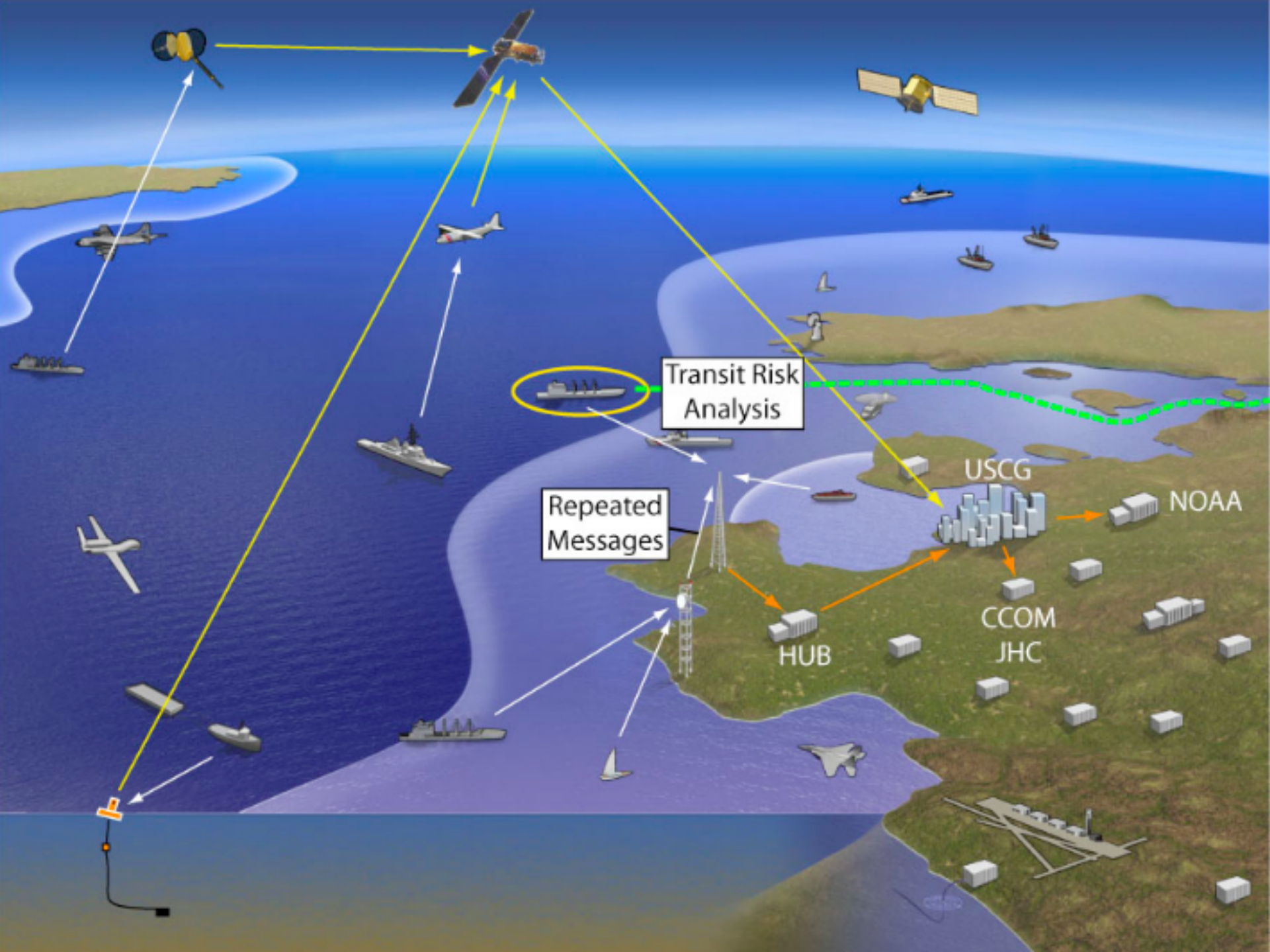




Image © 2009 DigitalGlobe  
Image © 2009 Commonwealth of Virginia

2.42 km

©2009



Image © 2009 DigitalGlobe  
Image © 2009 Commonwealth of Virginia

2.42 km

© 2009

<b>Table Size</b>	69.2 GB
<b>Number of Rows</b>	374,601,235

COMPOSE QUERY









Query History

Job History

AIS Demo Strata



▼ io

-  ais123
-  ais5
-  mmsi\_prefix
-  **pos123**
-  pos123\_20130214
-  pos123\_tiny
-  position
-  ships
- ▶ strata\_sq\_pos
- ▶ publicdata:samples

## Table Details: pos123

Schema Details Query Table

### Table Info

<b>Table ID</b>	ais-demo-v1:io.pos123
<b>Table Size</b>	69.2 GB
<b>Number of Rows</b>	374,601,235
<b>Creation Time</b>	7:43pm, 22 Apr 2013
<b>Last Modified</b>	4:11pm, 25 Apr 2013

### Preview

Row	id	repeat_indicator	mmsi	nav_status	rot_over_range	rot	sog	position_acc
1	1	0	366880370	0	false	0.0	0.10000000149	
2	1	0	367010390	0	true	-731.386474609	7.80000019073	
3	1	0	367010390	0	true	-731.386474609	7.80000019073	
4	3	0	636090339	5	false	0.0	0.10000000149	
5	1	0	867029470	0	true	-731.386474609	0.20000000298	

## New Query

```
1 SELECT zone, COUNT(zone) AS num_reports
2 FROM (
3     SELECT INTEGER(rcvr_dir_to/10) * 10 AS zone
4     FROM [io.pos123]
5     WHERE x < 180.1 AND rcvr="r003669946")
6 GROUP BY zone
7 ORDER BY zone;
```

**RUN QUERY**

Query complete (2.8s elapsed, 9.67 GB processed)

## Query Results 5:25am, 16 May 2013

Row	zone	num_reports	
1	-170	4877315	
2	-160	7545864	
3	-150	6601628	
4	-140	4934789	

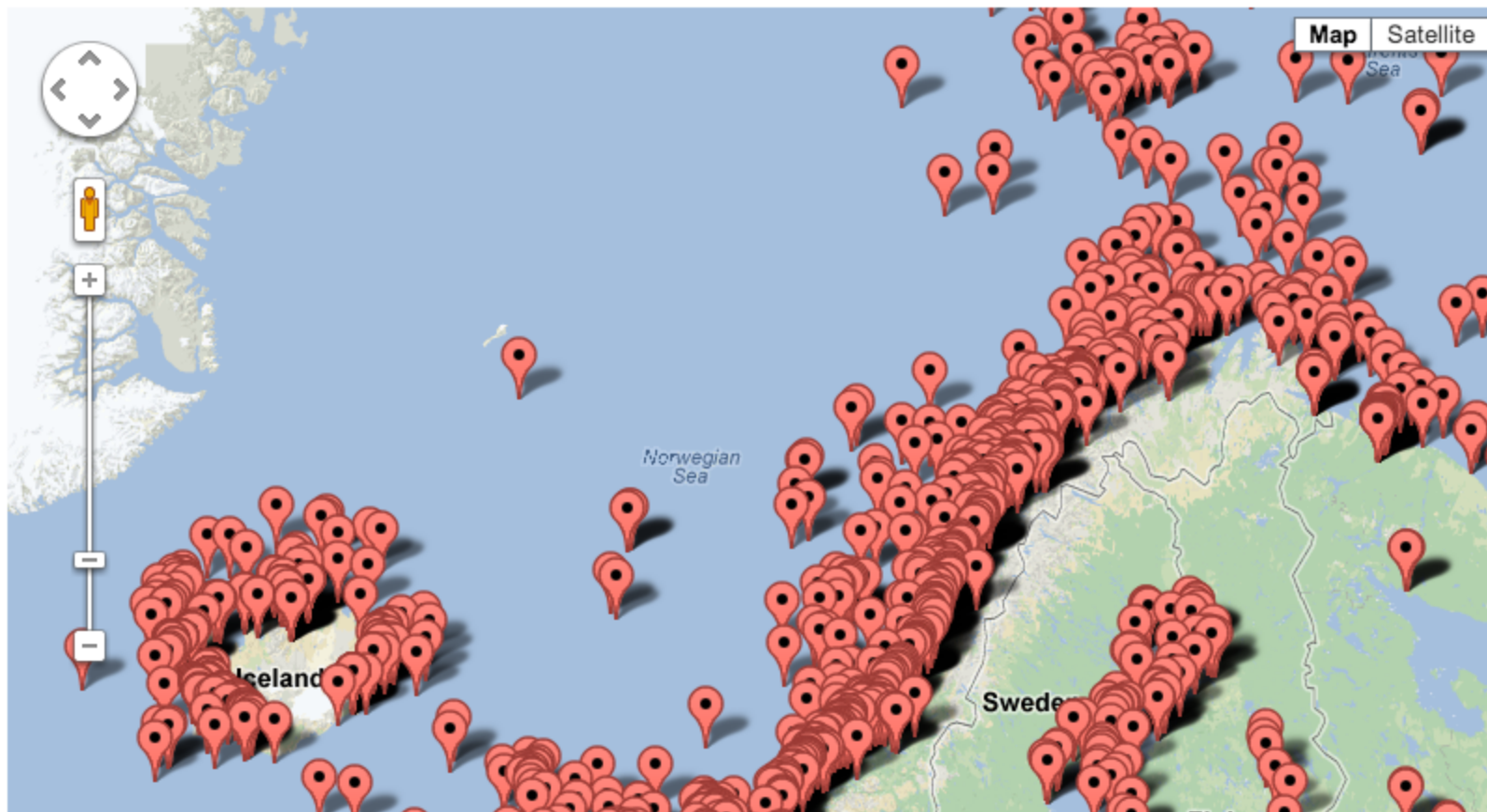


# BigQuery + JavaScript Example

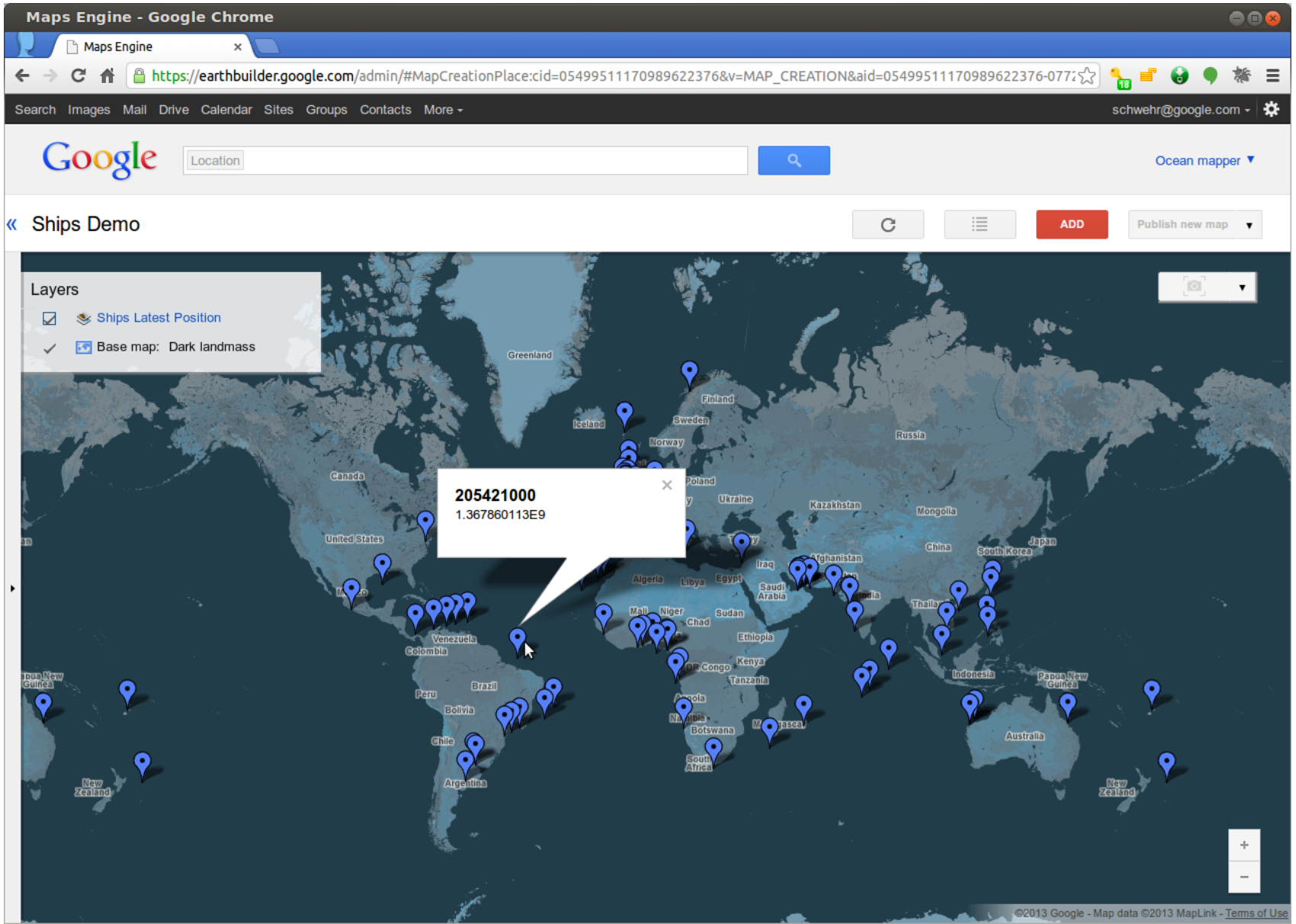
BigQuery client initiated

```
SELECT
  latest_report.mmsi as ship,
  LEFT(FORMAT_UTC_USEC(latest_report.last_sighting),19) as latest_sighting,
  location.x,
  location.y
FROM [sq_pos.pos123_20121124] AS location
JOIN
(SELECT mmsi, MAX(time_microsec) AS last_sighting FROM [sq_pos.pos123_20121124] WHERE mmsi > 100000000 GROUP BY mmsi)
AS
latest_report
ON
latest_report.mmsi = location.mmsi AND location.time_microsec = latest_report.last_sighting;
```

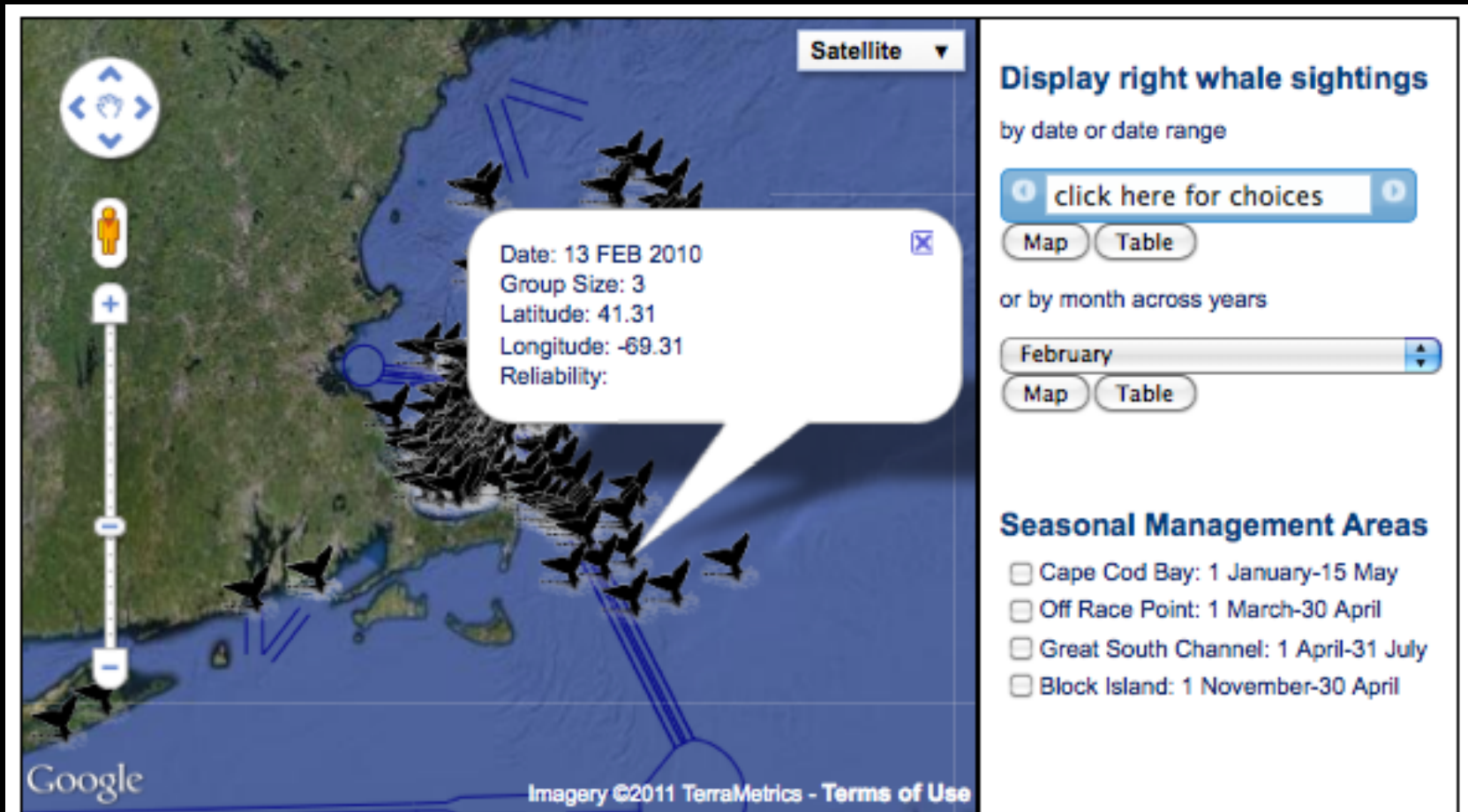
Run Query



# Maps Engine Platform



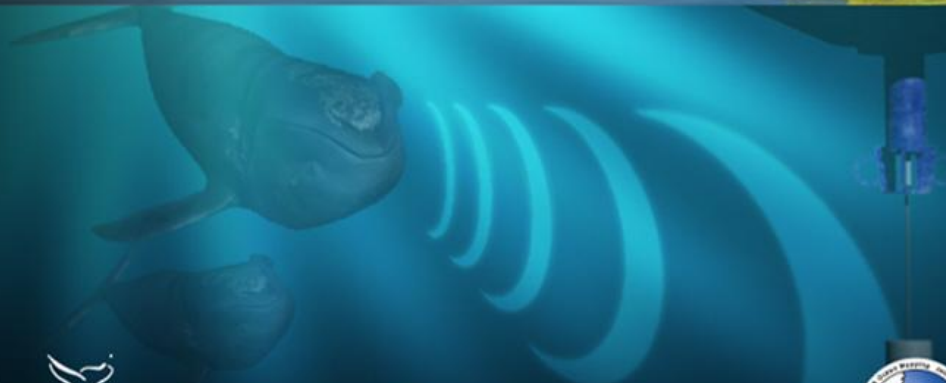
# Right whales - Boston, MA



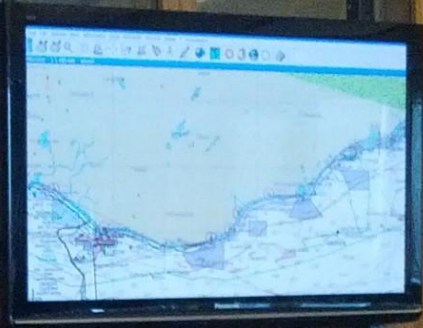
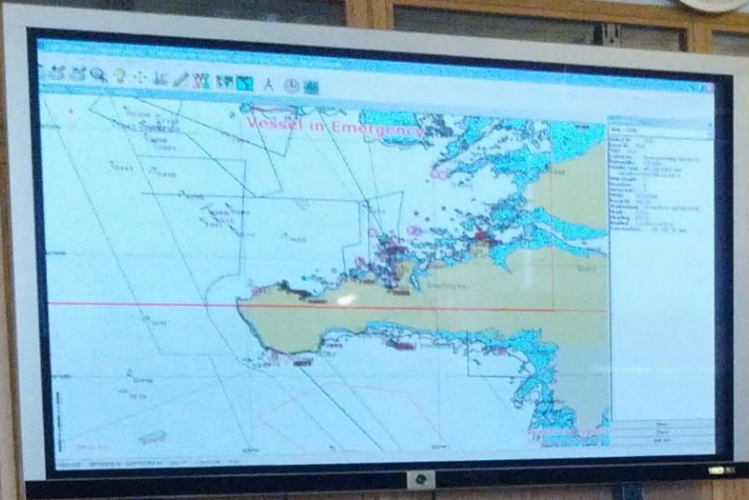
Interactive map of right whale sightings collected by the Sighting Advisory System between 2002 and present. Click on a symbol for more information on each sighting. Use the + and - to zoom in and out. Also, see more sightings made by the aerial survey team, mapped on [OBIS](#).

Stellwagen Bank National Marine Sanctuary

# WhaleALERT





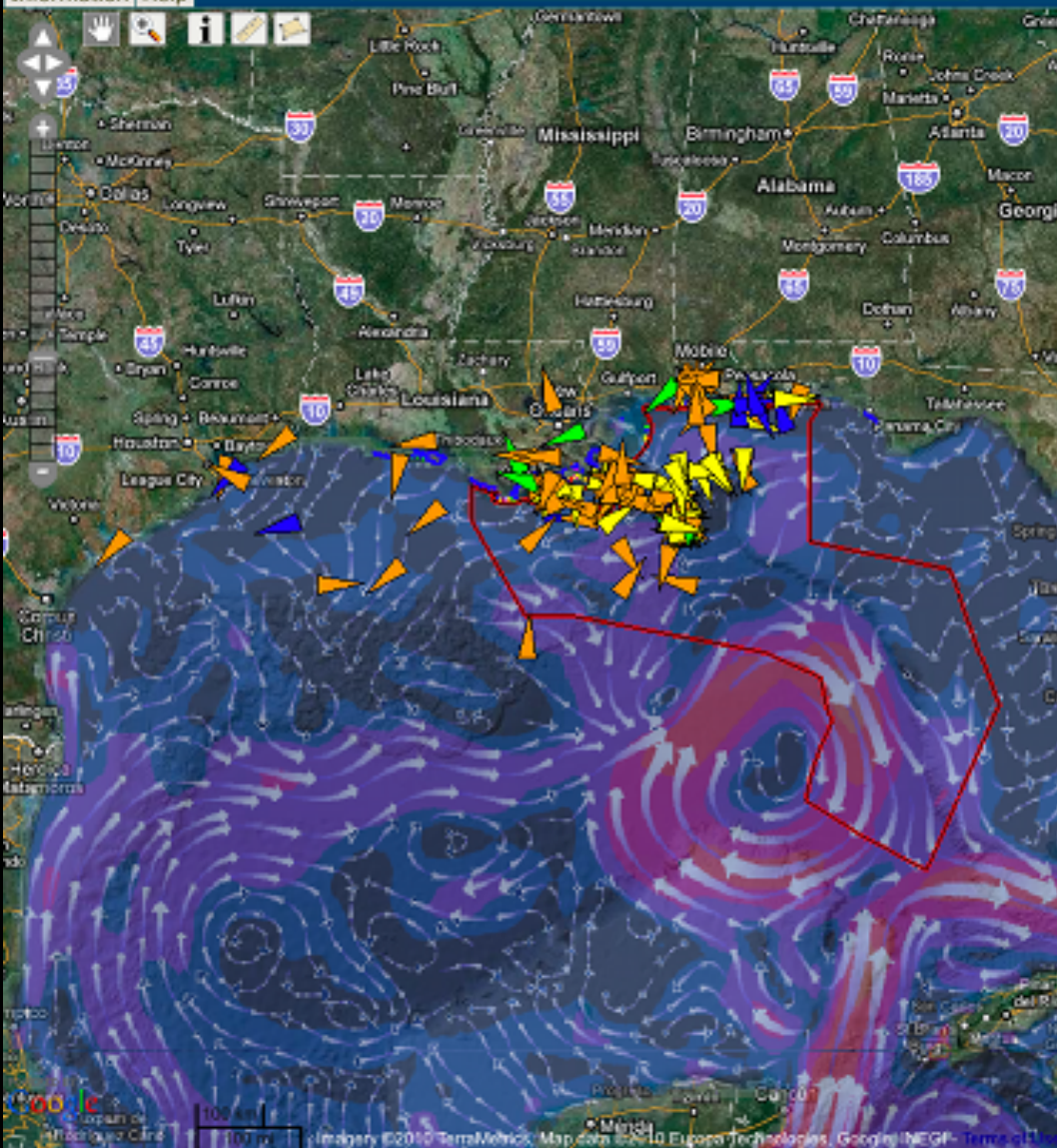


## WWW.GEOPATFORM.GOV/GULFRESPONSE

Environmental Response  
Management Application (ERMA)

Information Help

Find



Layers Legend Zoom

## Current Weather

## NCOM Surface Water Currents w/Speed



Last Update: Sun Jun 13 8:00 PM EDT

## BP Deepwater Horizon Oil Spill

## NMFS Emergency Fishery Closure 07-Jun-10

NMFS Emergency Fishery Closure

## Cumulative 6/12/2010

- Heavy Oiling
- Moderate Oiling
- Light Oiling
- Very Light Oiling
- Heavy Tarballs
- Moderate Tarballs
- Light Tarballs
- Negligible Tar Balls
- No Oil Observed

## Cumulative 6/12/2010

- Heavy Oiling
- Moderate Oiling
- Light Oiling
- Very Light Oiling
- Heavy Tarballs
- Moderate Tarballs
- Light Tarballs
- Negligible Tarballs
- No Oil Observed

## Wellhead Surface Location

Pipeline Hole Location

## Charts, Surveys, Ships

## AIS Response Vessel Snapshot

- Response
- Research

Scale: 1: 7M Zoom Level: 6 Location: 34.95800°, -92.63672°

**Follow ups**