

DARRP

DAMAGE ASSESSMENT, REMEDIATION, & RESTORATION PROGRAM

DIVER Application: Accessing Project and Environmental Data

2018 Gulf of Mexico Oil Spill & Ecosystem Science Conference

Ben Shorr and Nick Eckhardt

NOAA - NOS - Office of Response & Restoration

Mike Peccini & Marti Goss

NOAA - NMFS – Office of Habitat Conservation

Dan Hudgens, Ann Jones, Neal Etre

IEc Inc.



Overview

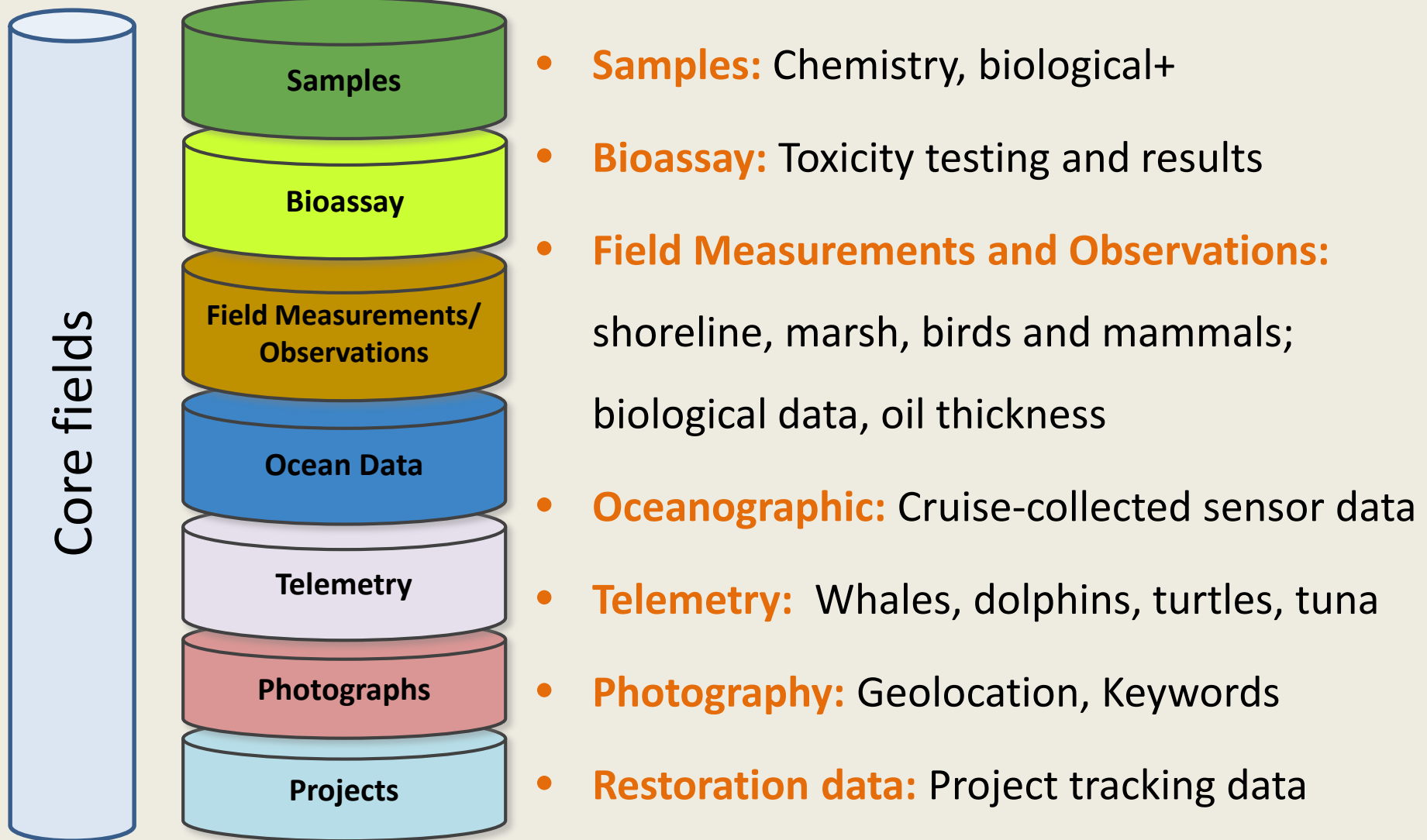
DIVER

(Data Integration, Visualization, Exploration, and Reporting)

DIVER is a **data warehouse** and **query** application. The DIVER approach **integrates standardized** datasets so users can query across data holdings and download information and results.

Common Data Models

Data type specific models



Public DIVER website

Public facing DIVER website for case/project data



NOAA manages data associated with the evaluation and restoration of environmental injuries from hazardous waste releases, oil spills, marine debris, and vessel groundings in its role as a steward for the nation's coastal and marine resources. [Use NOAA's tools to search, visualize, and download data.](#)

Choose An Application

DIVER Explorer ERMA



Go Directly To These Popular Data

Deepwater Horizon Restoration Projects

The restoration projects associated with the Deepwater Horizon oil spill are focused on restoring natural resources in the Gulf of Mexico. These data provide information on locations, project status, and monitoring data. [More information...](#)

[Search Data in DIVER](#)

Deepwater Horizon Natural Resource Assessment Data

The NOAA repository for environmental data related to the Deepwater Horizon Natural Resource Damage Assessment. [More information...](#)

[Search Data in DIVER](#)

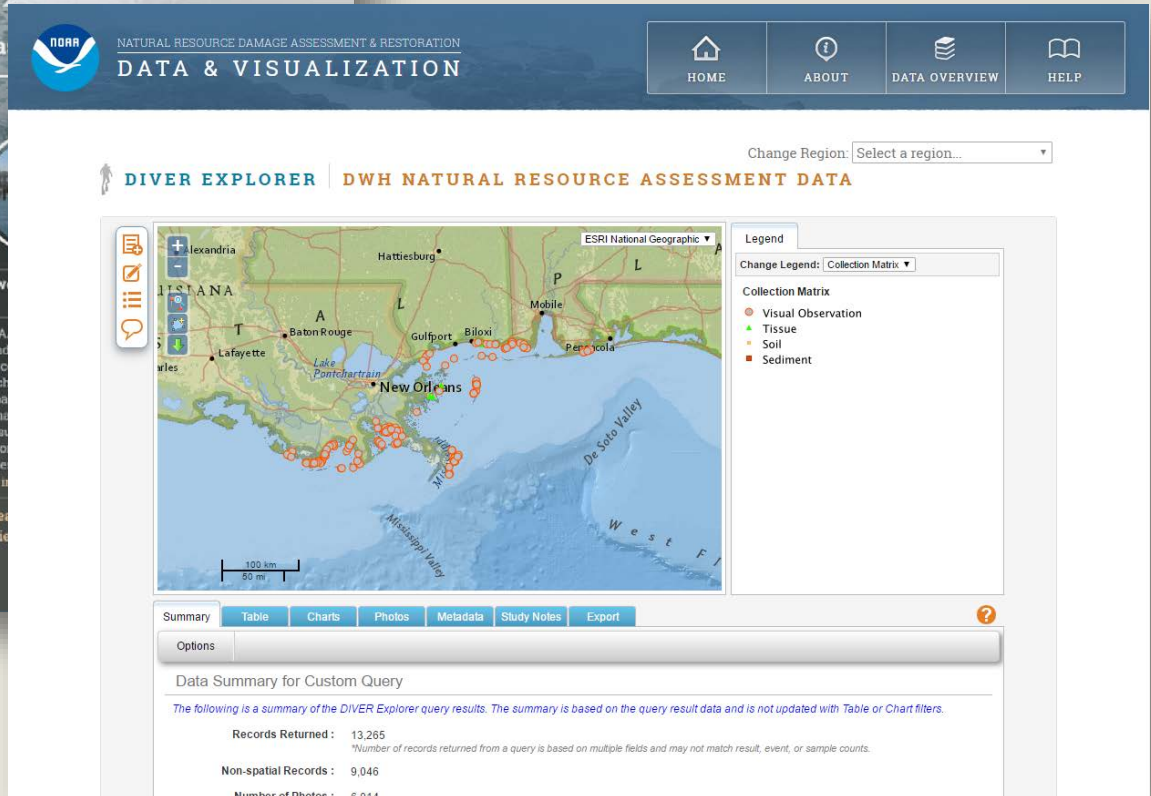
[View Maps in ERMA](#)

Hudson River Watershed

Explore over forty years of compiled and standardized sediment and tissue chemistry data from the Hudson River and tributaries, including long-term monitoring of PCBs in fish, birds and mammals. [More information...](#)

[Search Data in DIVER](#)

[View Maps in ERMA](#)



Change Region:

DIVER EXPLORER | DWH NATURAL RESOURCE ASSESSMENT DATA

Legend

Change Legend:

Collection Matrix

- Visual Observation
- Tissue
- Soil
- Sediment

Summary Table Charts Photos Metadata Study Notes Export

Options

Data Summary for Custom Query

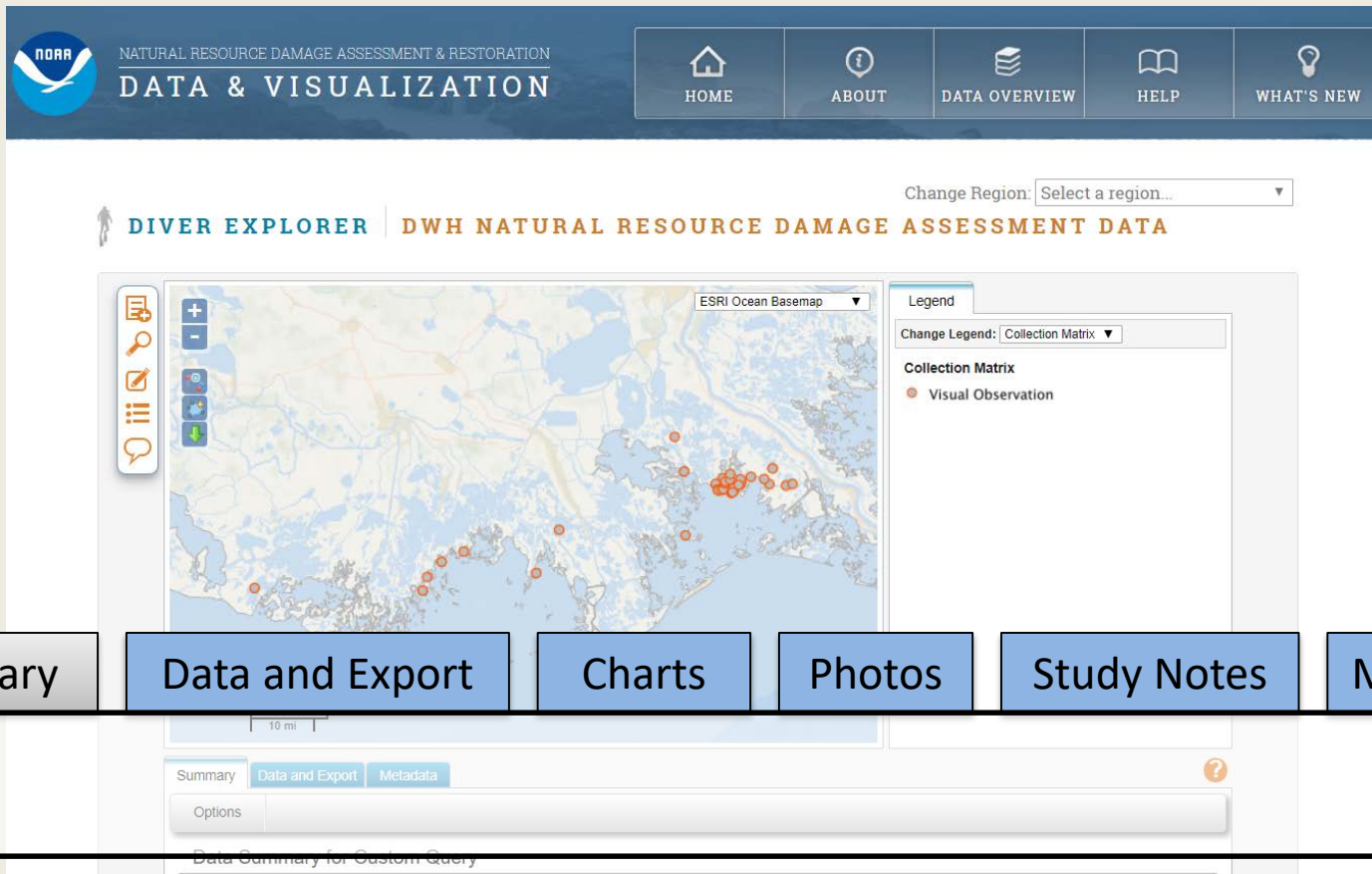
The following is a summary of the DIVER Explorer query results. The summary is based on the query result data and is not updated with Table or Chart filters.

| | |
|---|--------|
| Records Returned : | 13,265 |
| *Number of records returned from a query is based on multiple fields and may not match result, event, or sample counts. | |
| Non-spatial Records : | 9,046 |
| Number of Photos : | 6,014 |

<https://www.diver.orr.noaa.gov>

DIVER Explorer: Query Result

DIVER Explorer is a query tool. Filter, map and download. Dashboard display.



The screenshot displays the DIVER Explorer web application interface. At the top, the NOAA logo and the text "NATURAL RESOURCE DAMAGE ASSESSMENT & RESTORATION DATA & VISUALIZATION" are visible. A navigation bar includes links for HOME, ABOUT, DATA OVERVIEW, HELP, and WHAT'S NEW. Below this, the "DIVER EXPLORER" title is followed by "DWH NATURAL RESOURCE DAMAGE ASSESSMENT DATA". A "Change Region:" dropdown menu is set to "Select a region...". The main area features a map of the Gulf of Mexico with orange dots representing "Visual Observation" data points. A legend on the right shows "Collection Matrix" with "Visual Observation" as a red dot. Below the map, a row of tabs includes "Summary", "Data and Export", "Charts", "Photos", "Study Notes", and "Metadata". The "Data and Export" tab is currently selected. Below the tabs, there is a "Summary" section with a "Data and Export" sub-tab and a "Metadata" sub-tab. A "Options" dropdown menu is visible below the sub-tabs. The bottom of the screen shows a "Data Summary for Custom Query" section.

NOAA NATURAL RESOURCE DAMAGE ASSESSMENT & RESTORATION DATA & VISUALIZATION

HOME ABOUT DATA OVERVIEW HELP WHAT'S NEW

Change Region: Select a region...

DIVER EXPLORER DWH NATURAL RESOURCE DAMAGE ASSESSMENT DATA

ESRI Ocean Basemap

Legend

Change Legend: Collection Matrix

Collection Matrix

Visual Observation

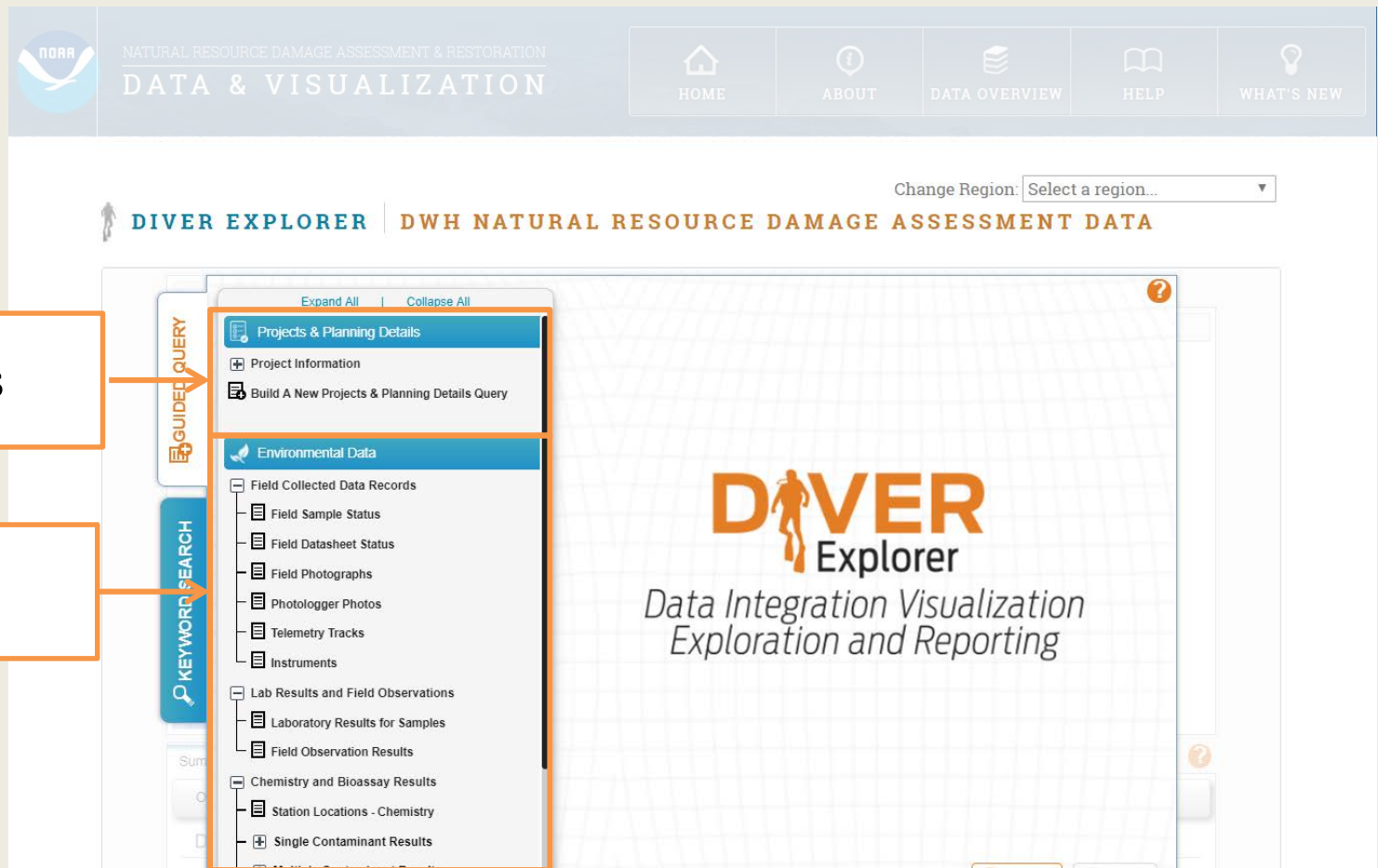
Summary Data and Export Charts Photos Study Notes Metadata

Options

Data Summary for Custom Query

DIVER Explorer

Guided Queries and Build New Query



NOAA NATURAL RESOURCE DAMAGE ASSESSMENT & RESTORATION DATA & VISUALIZATION

HOME ABOUT DATA OVERVIEW HELP WHAT'S NEW

Change Region: Select a region...

DIVER EXPLORER | DWH NATURAL RESOURCE DAMAGE ASSESSMENT DATA


Project Queries







Environmental Data Queries



DIVER Explorer
Data Integration Visualization
Exploration and Reporting



DIVER Explorer



Query Filters

Guided Query: Field Collected Data Records » Field Datasheet Information 

Region  Case/Activity  Data Category  Workgroup  Collection Form  New Filter 

Fields:  
[Expand All](#) | [Collapse All](#)

Values:  

Selected Values (2):  

Collection Form

- Collection Study Name

- Cruise Log

- Data Classification

- Data Source

- Source Type

☒ Field Data

- Collection Matrix

- Collection Method

- Habitat Type

- Observation ID

☒ Location/Date/Time

- County/Parish

- Month

Fields

Fiddler Crab Abundance

Fiddler Crab and Periwinkle Plot Characteristics

Fiddler Crab

Fiddler Crab Burrow Counts and Periwinkle Abundance

Herbaceous Light-Adapted Fluorescence and Chlorophyll Content DataSheet 2011

Herbaceous Light-Adapted Fluorescence and Chlorophyll Content DataSheet Fall 2011

Herbaceous Marsh Cover Plot Datasheet

☒ **Herbaceous Marsh Cover Plot Datasheet 2011**

Herbaceous Marsh Cover Plot Datasheet Fall 2011

Herbaceous Marsh Cover Plot Datasheet Fall 2012

Herbaceous Marsh Cover Plot Datasheet Fall 2013

Values

Selections

 31



DATES | SPATIAL

 CANCEL

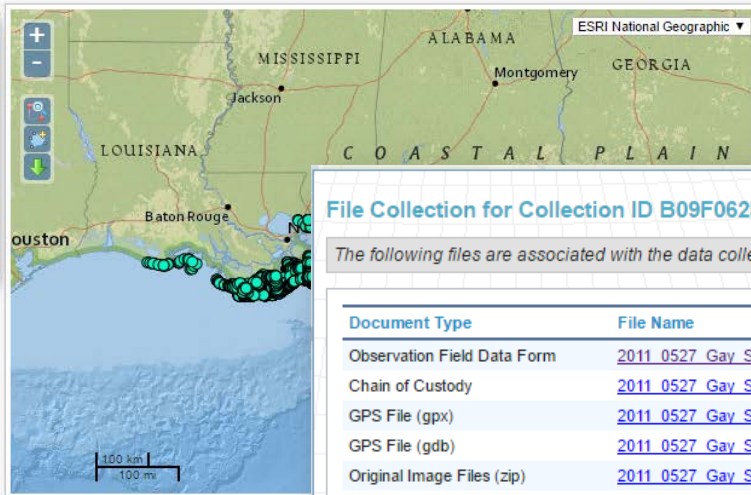
 RUN



DIVER: Data Access



DIVER EXPLORER / DEEPWATER HORIZON



File Collection for Collection ID B09F062D9874

The following files are associated with the data collection

| Document Type | File Name |
|-----------------------------|-----------------------|
| Observation Field Data Form | 2011_0527_Gay_Sara_DM |
| Chain of Custody | 2011_0527_Gay_Sara_DM |
| GPS File (gpx) | 2011_0527_Gay_Sara_DM |
| GPS File (gdb) | 2011_0527_Gay_Sara_DM |
| Original Image Files (zip) | 2011_0527_Gay_Sara_DM |
| Photo Logger Document | 2011_0527_Gay_Sara_DM |
| Other Document | 2011_0527_Gay_Sara_DM |
| Readme Notes | 2011_0527_Gay_Sara_DM |

Summary Table Charts Me

Columns Filters Additional

7,983 of 7,983 rows displayed

| # | Collection Form |
|---|---------------------------------------|
| 1 | Herbaceous Marsh Cover Datasheet 2011 |
| 2 | Herbaceous Marsh Cover Datasheet 2011 |
| 3 | Herbaceous Marsh Cover Datasheet 2011 |
| 4 | Herbaceous Marsh Cover Datasheet 2011 |
| 5 | Herbaceous Marsh Cover Datasheet 2011 |
| 6 | Herbaceous Marsh Cover Datasheet 2011 |
| 7 | Herbaceous Marsh Cover Datasheet 2011 |

Find forms, pl

the selected r

Zoom to Center Longitude

Find Additional Sample Data
Display all related information based on "Sample ID"

Find Additional Collection Data
Display all related information based on "Trip ID"

Display Photo
View the image associated with this record

Find File Collections
Display links to all File Collections for this record

| | |
|-----------------------|--------------------------------------|
| Not Defined | Not Defined |
| Spartina alterniflora | Spartina alterniflora (no available) |
| Not Defined | Not Defined |
| Spartina alterniflora | Spartina alterniflora (no available) |
| Not Defined | Not Defined |

NRDA Chain of Custody Form

Deepwater Horizon/MC252 Non-Analytical Sample Data

EVENT / FILE NAME: 2011_0527_Gay_Sara_DM

| | | | |
|---|----------------------|---------------------|--|
| Work Plan ID: Coastal Vegetation Assessment | Observation Team # 2 | Number of Pages: 13 | Type of Observation: (See key) B <input checked="" type="checkbox"/> SL <input checked="" type="checkbox"/> SAV <input type="checkbox"/> T/M <input type="checkbox"/> F <input type="checkbox"/> R <input type="checkbox"/> WC |
| Date of Observation(s): 05/27/2011 | | | |

Team #2

OP AREA: N Barataria Bay
LAUNCH: Myrtle Grove Marina-Myrtle Grove, LA
BOATS: Bayboat (Unnamed)
- Chris
Airboat (LA032FR)
- Jude
SITES: H-01 (29.44099573, -89.90380579)
H-02 (29.44007827, -89.90544911)

MEMBERS: [List of names]

Spring 2011 v2 - Herbaceous

Shoreline TWG Coastal Wetland Vegetation Plan

05/27/2011 JEB/DM 05/27/11

Date: 05/27/2011 Time: 10:00 Site ID: H-01 Team ID: 2

Data Recorder/Affiliation: Sara Gay/GMI-NOAA

Other Team Members/Affiliation: Robin Paulos/GMI-NOAA, Gary Jacob/Shaw-OCPR, Lily Hassan/Shaw-OCPR, Dorcas Miller/Jentrix-PP, Leah Murphy/Jentrix-PP

Site / Station Verification

| | | |
|------------------------------|---|---|
| Vegetation Transect Markers: | | |
| Shoreline Stake | Present <input checked="" type="checkbox"/> Absent <input type="checkbox"/> | If absent, was it replaced? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Inland Stake | Present <input checked="" type="checkbox"/> Absent <input type="checkbox"/> | If absent, was it replaced? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

Station Markers:

| | | |
|----------------------------------|-------------|----|
| C1: Number of Stakes - Absent: 4 | Replaced: 4 | NA |
| C2: Number of Stakes - Absent: 4 | Replaced: 4 | NA |
| C3: Number of Stakes - Absent: 4 | Replaced: 4 | NA |
| P1: Number of Stakes - Absent: 6 | Replaced: 6 | NA |
| P2: Number of Stakes - Absent: 6 | Replaced: 6 | NA |
| P3: Number of Stakes - Absent: 6 | Replaced: 6 | NA |

Point Data for Vegetation Transect Shoreline Change

Bearing to Inland Stake: 350° (Obtained from Site Set-up Datasheet)

Bearing Inland Stake to Shoreline Stake: 170° (Add 180° to Bearing to Inland Stake if the bearing is between 0° and 180° and subtract 180° if the bearing is between 180° and 360°)

Transect Length: 20 meters (Obtained from Site Set-up Datasheet)

Distance from Inland Stake to Marsh Edge: 18.2 meters

>10% Oil beyond 30m: Yes ☐ No ☒ (If beyond 30 m at site establishment, or if evidence of seeping, circle yes or no. If no oiling beyond 30m, circle NA)

Photos

Upon arrival:

Offshore (1-2 m) looking inland (center of photo left of cover plots): 100-0005

Offshore (1-2 m) looking inland (center of photo across point between cover and productivity plots): 100-0004

Offshore (1-2 m) looking inland (center of photo right of productivity plots): 100-0003

During data collection:

At shoreline stake:

looking inland: 100-0006 looking right: 100-0007 looking left: 100-0008

At inland stake:

looking shoreward: 100-0017 looking right: 100-0018 looking left: 100-0019 looking inland: 100-0020

Upon departure:

Offshore (1-2 m) looking inland (center of photo left of cover plots): 100-0035

Offshore (1-2 m) looking inland (center of photo across point between cover and productivity plots): 100-0034

Offshore (1-2 m) looking inland (center of photo right of productivity plots): 100-0033

Keyword Search

GUIDED QUERY

KEYWORD SEARCH

🌐 Search Data

periwinkle
✕

🔍 SEARCH

📄 Filter Results

Field: clear

☐ Collection Form
☐ Collection Study Name
☐ Collection Workplan
☐ Common Name: Species

Value: clear

Data Category: clear

Environmental Data

☐ Photographs
☐ Visual Observations

Keyword Search

Search for DIVER data using keywords! Filter and sort the search results, then choose to run or edit a data query directly from the table.

| Search 1 |
|-----------------------|
| Field |
| Collection Form |
| Collection Form |
| Collection Form |
| Collection Study Name |
| Collection Workplan |
| Common Name: Species |

Edit Query

Field: Collection Form

Value: Fiddler Crab and Periwinkle Site Visit/Set Up

Type: Environmental Data

Data Category: Visual Observations

Detail Level: Overview

returned: 6

| |
|----|
| 94 |
| 01 |
| 48 |
| 35 |

Overview - High level information about the available data, including activity name, data classification, stations, and types of data collected.

Field Record - Unique records for each piece of data collected in the field, such as individual samples, datasheets and photographs.

Result - Fields associated with the results of sample lab analysis or measurements taken in the field.

Change Region: 

DIVER EXPLORER

DWH NATURAL RESOURCE DAMAGE ASSESSMENT DATA

Custom Query:

Region Fields:

Expand All

Collection For

Collection Stud

Cruise Leg

Cruise Name

Data Category

Data Classification

Data Source

Source Type

Field Data

Collection Matrix

Collection Method

Habitat Type

Observation Type

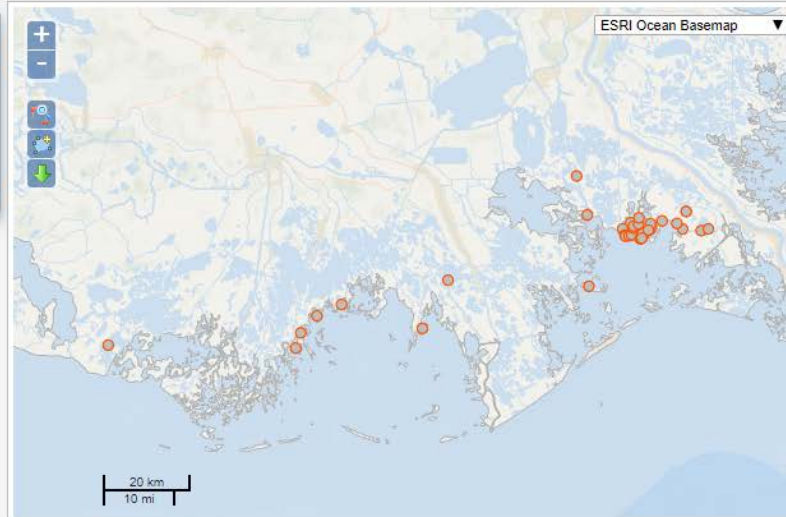
Organism ID

Primary ESI

SCAT Segment

SCAT Survey ID

Sample ID



Legend

Change Legend:

Collection Matrix

☒ Visual Observation

Summary

Data and Export

Metadata

Options

Data Summary for Custom Query

The following is a summary of the DIVER Explorer query results. The summary is based on the query result data and is not updated with Table or Chart filters.

Detail Level : Data are presented at the level.

Data Category : Visual Observations

Data Rows : 48

Overview - High level information about the available data, including activity name, data classification, stations, and types of data collected.**Field Record** - Unique records for each piece of data collected in the field, such as individual samples, datasheets and photographs.**Result** - Fields associated with the results of sample lab analysis or measurements taken in the field.

CLEAR

RUN

GUIDED QUERY

KEYWORD SEARCH



DATES



SPATIAL

DIVER EXPLORER | DWH RESTORATION PROJECTS



NOAA manages data associated with hazardous waste releases, oil spill response, and other threats to the nation's coastal and marine resources.



Deepwater Horizon Restoration Projects

The restoration projects associated with the Deepwater Horizon oil spill are focused on restoring natural resources in the Gulf of Mexico. These data provide information on locations, project status, and monitoring data. [More information...](#)

➔ Search Data in DIVER



Summary

Options

Restoration

Number of

Number of

Summary

ID

1

2

3

4

5

6

7

8

9

10

11

12

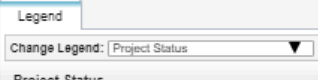
13

14

15

16

17



Project Details for Louisiana Oyster Cultch Project

Overview

Components

Activities

As-Built

Monitoring

Env Compliance

Budget

Contacts

Documents

owned by the Grand Isle Port Commission and leased by LDWF. Louisiana State University plans to construct an additional building at this site prior to construction of the hatchery facility; this building is not part of this Early Restoration Project. The footprint of the hatchery building is proposed to be approximately 8400 sq ft. Parking will be available onsite. Oyster hatchery activities currently housed at the LDWF Research Lab in Grand Isle, Louisiana will all or in part be relocated to the new hatchery building once it is constructed.

Project Modifications:

The above project description was revised from the description provided in the Phase I Early Restoration Plan to reflect that the leaseholder changed from Louisiana State University to the Louisiana Department of Wildlife and Fisheries (2014 Q1).

The above project description was revised from the description provided in the Phase I Early Restoration Plan to reflect a change in the street name of the oyster hatchery facility from 133 Port Drive to 133 LSU Drive (2014 Q3).

The above project description was revised from the description provided in the Phase I Early Restoration Plan to reflect that LSU Sea Grant will provide technical direction for oyster hatchery activities and may choose not to relocate all of the oyster hatchery activities to the new facility (2014 Q3).

Component(s):

- [Oyster Cultch Placements](#)
- [Oyster Hatchery](#)

Trustee Implementation Group(s):

- Louisiana

Implementing Trustee(s):

- Louisiana Coastal Protection and Restoration Authority (CPRA)
- Louisiana Department of Wildlife & Fisheries (LDWF)

Restoration Type(s):

- Oysters

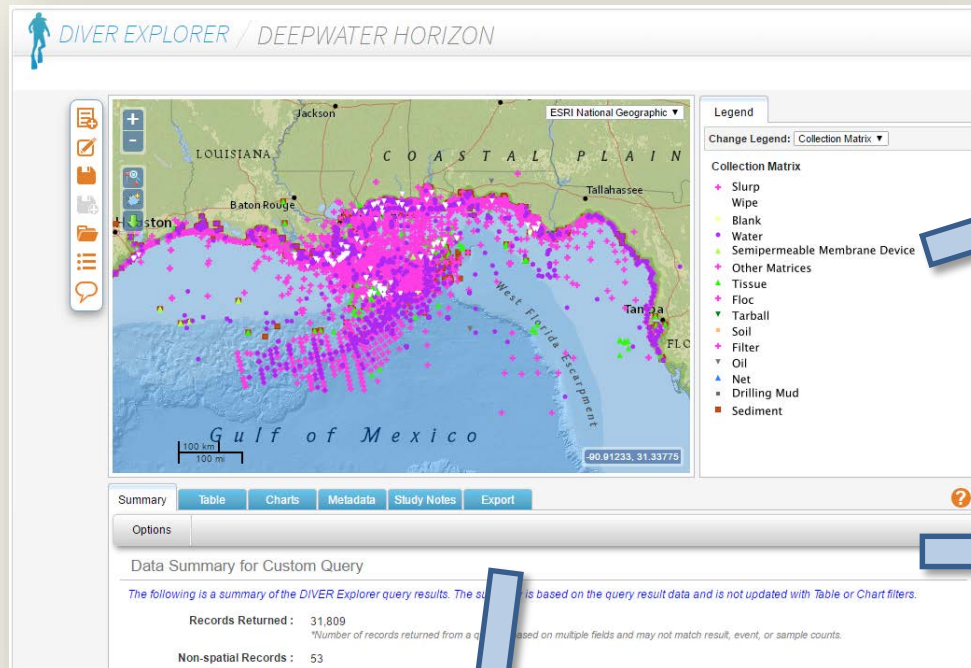
Restoration Phase:

Early Restoration Phase 1

Site Location(s):



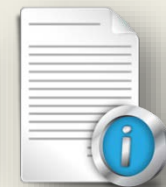
DIVER Explorer: Export Packages



Mapping/GIS



Metadata & Study Notes



Data Packages



Expanded Data Services



Additional Data Dashboards



DEEPWATER HORIZON NRDA DATA

On April 20, 2010, an explosion on the Deepwater Horizon MC252 drilling platform killed 11 workers and caused the rig to sink and leak oil into the Gulf of Mexico. The magnitude of this spill is something our nation had not seen before, causing significant impacts to wildlife and the fishing community along the large coastal areas of Louisiana, Mississippi, Texas, Alabama, and Florida.

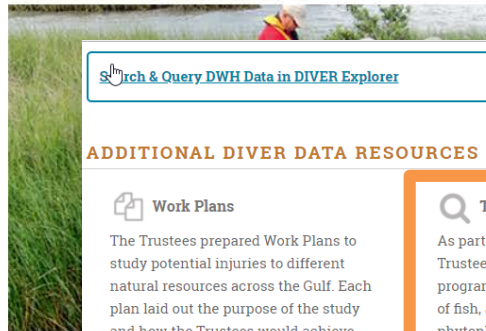
The Oil Pollution Act authorizes certain federal agencies, states, and Indian tribes—collectively known as natural resource trustees—to evaluate the impacts of the Deepwater Horizon (DWH) oil spill on natural resources. These trustees are responsible for studying the effects of the spill through a process known as [Natural Resource Damage Assessment \(NRDA\)](#). As part of this process, scientists work together to identify potential injuries to natural resources and lost recreational uses, such as boating and beachcombing, resulting from the spill.

DIVER (DATA INTEGRATION VISUALIZATION EXPLORATION)

DIVER serves as the public NOAA repository for data related to the DWH Trustees' NRDA effort. The site also includes historical (pre-2010) contaminant chemistry data for the onshore area, chemistry data collected during the [response](#) efforts and by the responsible party, British Petroleum, and are accessed through a query and mapping interface called DIVER Explorer.

Categories of Trustee NRDA data include:

- Photographs of the emergency response, the oiled animals, plants, fish, and beaches;
- Telemetry information collected from remote sensing devices such as transmitter data;
- Field observations such as notes about the condition of animals found in the spill and evidence of wildlife impacts;
- Instrument data such as water temperatures and salinity collected during the spill; and
- Sample results of laboratory analysis on tissue, sediment, oil, and water.



[Search & Query DWH Data in DIVER Explorer](#)

ADDITIONAL DIVER DATA RESOURCES

Work Plans

The Trustees prepared Work Plans to study potential injuries to different natural resources across the Gulf. Each plan laid out the purpose of the study and how the Trustees would achieve their assessment goals. Study designs reflected input from experienced scientists and resource managers who specialize in studying oil spills and natural resources in the Gulf. Most data collected under these Work Plans are available in DIVER and ERMA, or through the National Centers for Environmental Information archives.

[Download Work Plans](#)

Toxicity Studies

As part of the injury assessment, the Trustees undertook a toxicity testing program covering more than 40 species of fish, aquatic invertebrates, phytoplankton, reptiles, and birds. The program tested effects on those coastal and marine creatures from dispersants and DWH oil from the well or the field, including both floating slick oil and oiled sediments collected at different times post-spill. A full review of the program is available as a technical report ([Morris et al. 2015](#)). The results of these studies are available to the public.

[Search & Export Toxicity Data](#)

Data Packages

In addition to data available through DIVER Explorer, NOAA compiled DWH-related data packages and links to external data sources. These data packages and links cover a wide variety of topics, including raw data from recreational use surveys, links to marine mammal and sea turtle data sources, and instrument data from research cruises.

[Download Data Packages](#)

RELATED SITES



NOAA's Office of Response and Restoration compiled links to relevant data sources and references regarding the response, assessment, and restoration phases. Data sources include records of the spill trajectories, archive locations for plankton and marine mammal tissue samples, and extensive NOAA photo collections. The site includes a compilation of literature documenting the environmental impacts of the Deepwater Horizon Spill.



Gulf Spill Restoration is a website maintained by NOAA on behalf of the Deepwater Horizon Natural Resource Damage Assessment Trustees. The site provides updates on the Trustees assessment and restoration activities. The Trustees are now in the process of implementing the programmatic restoration plan. The plan will set the course of restoration for the

Toxicity Data Dashboard



NATURAL RESOURCE DAMAGE ASSESSMENT & RESTORATION

DATA & VISUALIZATION



HOME



ABOUT



DATA OVERVIEW



HELP



WHAT'S NEW

DEEPWATER HORIZON NRDA DATA

[Back to DWH NRDA](#)

NOAA'S DEEPWATER HORIZON TRUSTEE TOXICITY TESTING PROGRAM RESULTS

Build a New Toxicity Query

[RESET QUERY](#)

Filter: Species: Common

To: Northern white shrimp/white shrimp

Pacific Bluefin Tuna

Red drum

Red-joint fiddler/redjointed fiddler

Filter: Endpoint Class

To: Cardiac

Deformity

Growth

Hatching

Filter: - Select Field -

- Select Field -

RUN Added Stressors

Endpoint Class

Expt #

We Life Stage

Mixing Method

Renewal Regime

Sel Species: Common

Species: Latin

Test Duration

Ab Test Substance

To: [Select a field to filter]

To access the data of interest. Click **Run Query** to view matching studies and export experimental data and related files.

Data Structure for Querying

Toxicity Data Dashboard

DEEPWATER HORIZON NRDA DATA

[Back to DWH NRDA](#)

NOAA'S DEEPWATER HORIZON TRUSTEE TOXICITY TESTING PROGRAM RESULTS

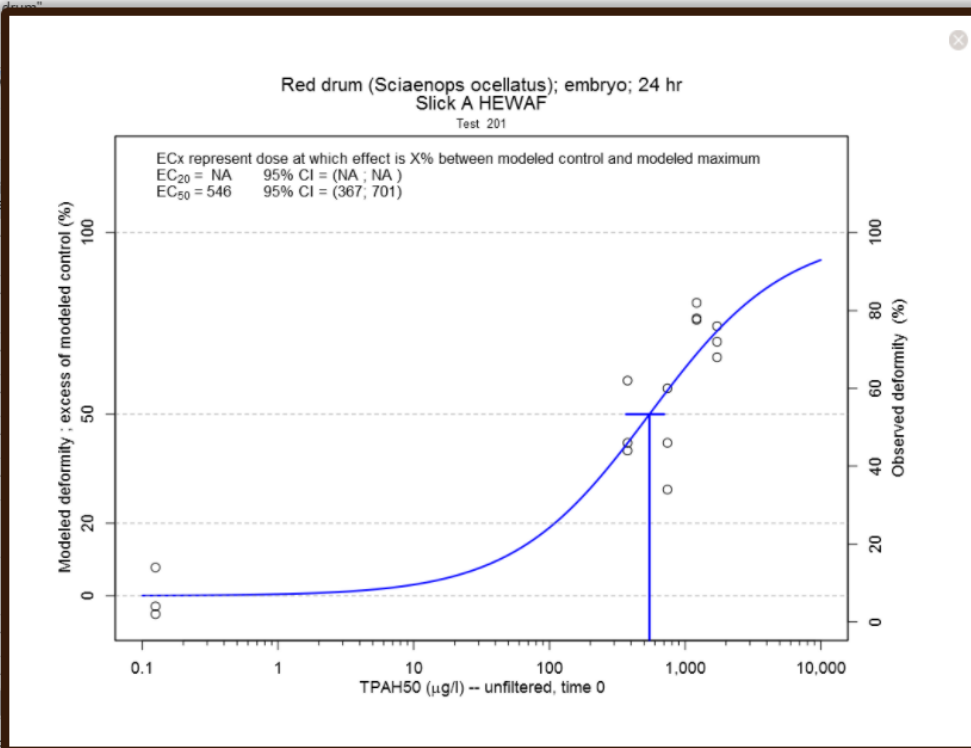
Query Results

[< EDIT QUERY](#)
[EXPORT DATA FOR THESE STUDIES](#)

Species: Common = "Red drum"
Endpoint Class = "Cardiac"

Study Summary

| Expt # | Test Substance | Model |
|--------|---------------------------|-------|
| 200 | Weathered Source (Oil) | HEWA |
| 200 | Weathered Source (Oil) | HEWA |
| 201 | Slick A (Oil) | HEWA |
| 201 | Slick A (Oil) | HEWA |
| 202 | Slick A (Oil) | CEWA |
| 202 | Slick A (Oil) | CEWA |
| 204 | Dispersant (COREXIT 9500) | DISP |
| 204 | Dispersant (COREXIT 9500) | DISP |
| 636 | Slick A (Oil) | HEWA |
| 636 | Slick A (Oil) | HEWA |



| Parameter Units | Parameter Analyte | Qua Coc |
|-----------------|-------------------|--------------|
| g/L | toxpah50 | INT. MA. SUP |
| g/L | toxpah50 | INT. MA. |
| g/L | toxpah50 | Not Def |
| g/L | toxpah50 | Not Def |
| g/L | toxpah50 | MA. |
| g/L | toxpah50 | MA. |
| g/L | corexit | Not Def |
| g/L | corexit | Not Def |
| g/L | toxpah50 | AVC |
| g/L | toxpah50 | AVC |

Showing 1 to 53 of 53

Note: Reported statistical results are for experiments that were designed for concentration-response analysis. Some experiments produced data that were not amenable

DEEPWATER HORIZON NRDA DATA

[Back to DWH NRDA](#) →

NOAA'S DEEPWATER HORIZON TRUSTEE TOXICITY TESTING PROGRAM RESULTS

Export Data

[< EDIT QUERY](#)[< BACK TO RESULTS](#)

Species: Common = "Red drum"
Endpoint Class = "Cardiac | Deformity | Growth"

Select Download Types

Results

- ☒ Treatment mean results for each available time point and endpoint (bio_mean.csv)
- ☐ Individual replicate results for each available time point and endpoint (bio_rep.csv)
- ☒ Effect and Lethal Concentrations (EC/LCx) from modeled concentration-response curve (bio_stat.csv)
- ☐ Details of modeled concentration-response curve (bio_stat_detail.csv)
- ☒ Matched bioassay and analytical chemistry results (bio_chem.csv)
- ☐ Analytical chemistry and calculated results (full_chem.csv)

Supplemental Data

- ☐ Field-collected sample information (field_samp.csv)
- ☐ Test conditions (test_cond.csv)
- ☐ UV exposure doses (uv_doses.csv)
- ☐ Water quality measurements (water_quality.csv)
- ☐ Chemistry notes (chem_notes.csv)

Metadata

All exports contain the following files for selected studies: Study Notes (study_notes.txt), Study References (study_ref.csv), Field Definitions (field_definitions.csv), Qualifier Definitions (qual_definitions.csv), and Metadata (DWH_Tox_ISO19115.html and DWH_Tox_ISO19115.xml).

[EXPORT DATA](#)

In process and next steps

- Transitioning data holdings to NOAA NCEI Archive
 - Data Attribution (data source- data packages)
 - Digital Object Identifiers (discrete data package)
- Expanding Data Models and data exchange
 - Restoration Monitoring Data
 - Biological data model and templates
 - Linkage with other data systems (e.g. GRIIDC) and data models (e.g. IOOS; Marine Mammals; Telemetry)
- Creating Data Services – exposing millions of environmental data records directly (ERDDAP)

DIVER Tools and Processes

(nerd-lite slide)

- **ETL Process:** Pentaho Analytics
 - Data Integration; Schemas; PostgreSQL/PostGIS;
- **Portal:** Liferay; PostgreSQL; Drupal
- **Explorer Query Tool**
 - Custom Java API and query engine
 - MapServer/OpenLayers
 - Dojo Toolkit Javascript library
 - MDX query language – Pentaho Community Edition
 - PostgreSQL/PostGIS (AWS RDS);
 - Redshift (AWS)

A light gray, stylized cloud graphic with a black outline, containing text.

***FedRAMP
Cloud-based
Infrastructure***

Acknowledgements (partial!)

- Amy Merten: former Spatial Data Branch Chief
- Dan Hudgens, Jim Anderton, Neal Etre, Ann Jones: IEc Inc.
- DIVER Development Team (DWH and beyond)
Kate Doiron & Jerry Bower (Lead Developer)
- NMFS Restoration Center
Marti Goss, Mike Peccini, Jamey Redding
- Spatial Data Branch: NOS Office of Response and Restoration
Matt Dorsey, Nick Eckhardt, Mike Greer, Jay Coady, Robb Wright, Jill Bodnar, George Graettinger, Rachel Fox, Michele Jacobi, Zach Winters-Staszak, Kevin Kirsch
- DWH Scientists, Principal Investigators and DWH NRDA
Trustees and partners who contributed data, queried data, and made this possible.