



# OBIS-SEAMAP

*marine megavertebrate geo-archive*

<http://seamap.env.duke.edu>

## *Whale Matching with Photo ID App on OBIS-SEAMAP*

April 13<sup>th</sup>, 2012

The OBIS-SEAMAP Team

Marine Geospatial Ecology Lab

Nicholas School of the Environment and Earth Sciences  
Duke University

# *Introduction to OBIS-SEAMAP*

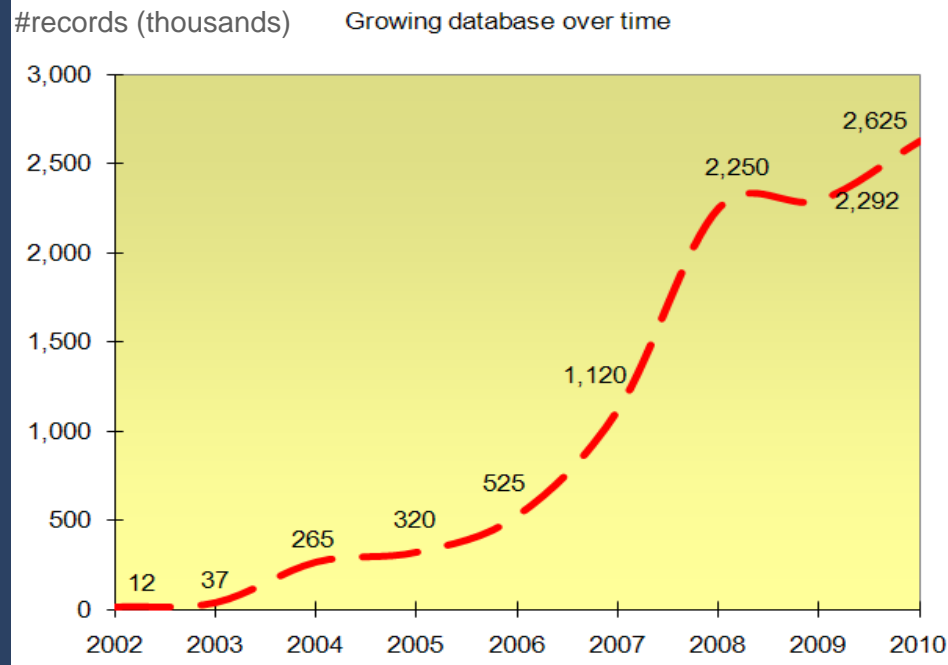
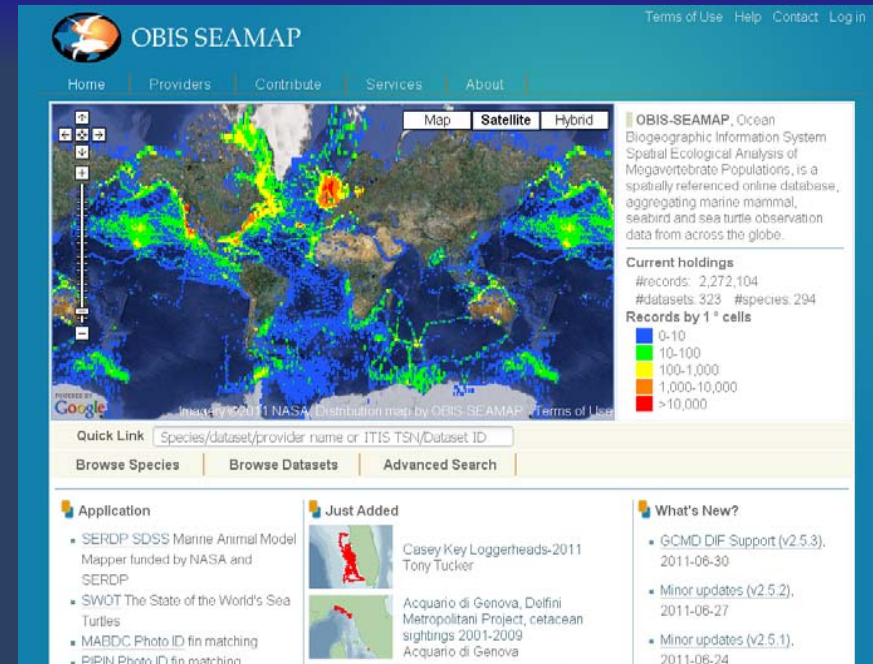
Mesoplodon densirostris #9  
Tursiops truncatus #6  
Tursiops truncatus #39  
Tursiops truncatus #40  
Mesoplodon densirostris #25  
Kogia sima #39  
Stenella frontalis #2  
Kogia sima #34  
Mesoplodon densirostris #10  
Kogia sima #27  
Globicephala macrorhynchus #1

# OBIS-SEAMAP

Online global biogeographic database with advanced mapping and visualization tools for marine mammals, seabirds and sea turtles.

Steadily growing in the past 10 years.

Funded by NSF, NOPP, Alfred P. Sloan Foundation.

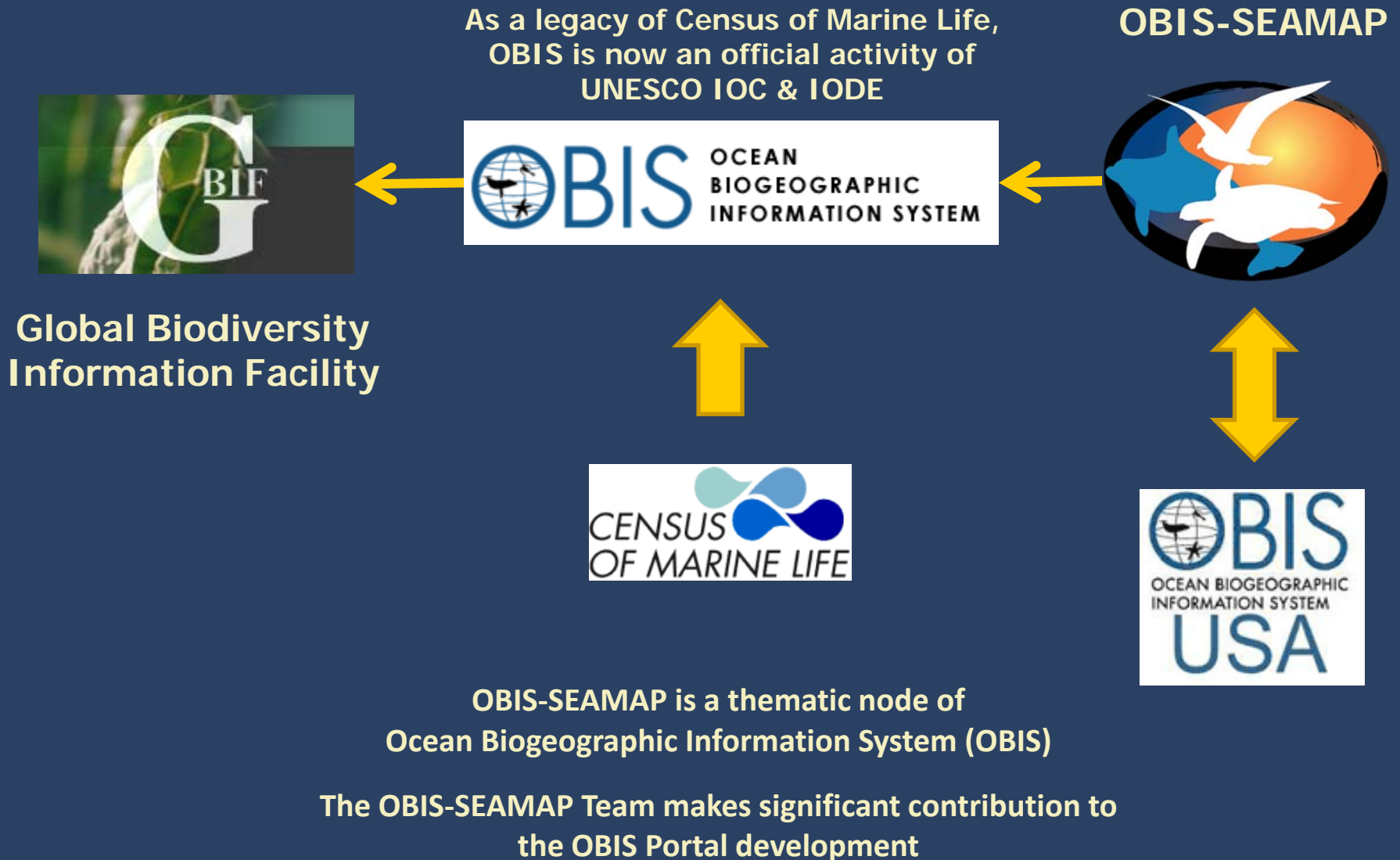


320 datasets  
1935 – 2012  
>2,800,000 records





# OBIS-SEAMAP Partnership



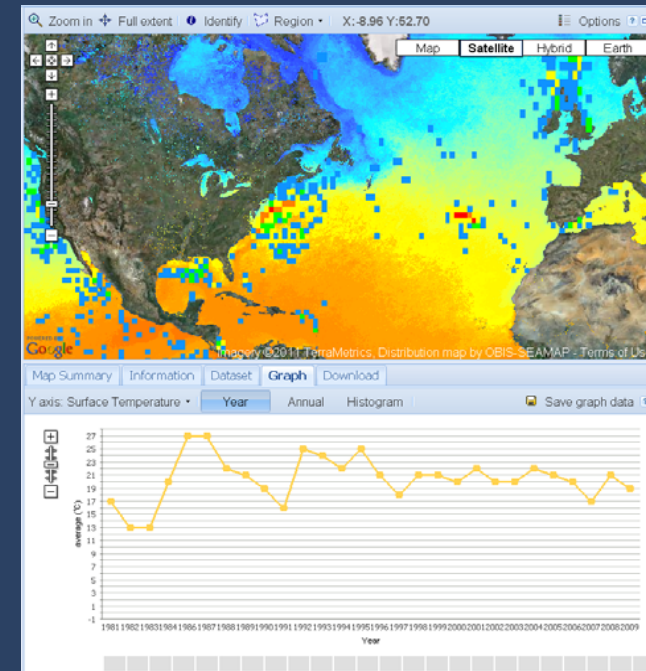
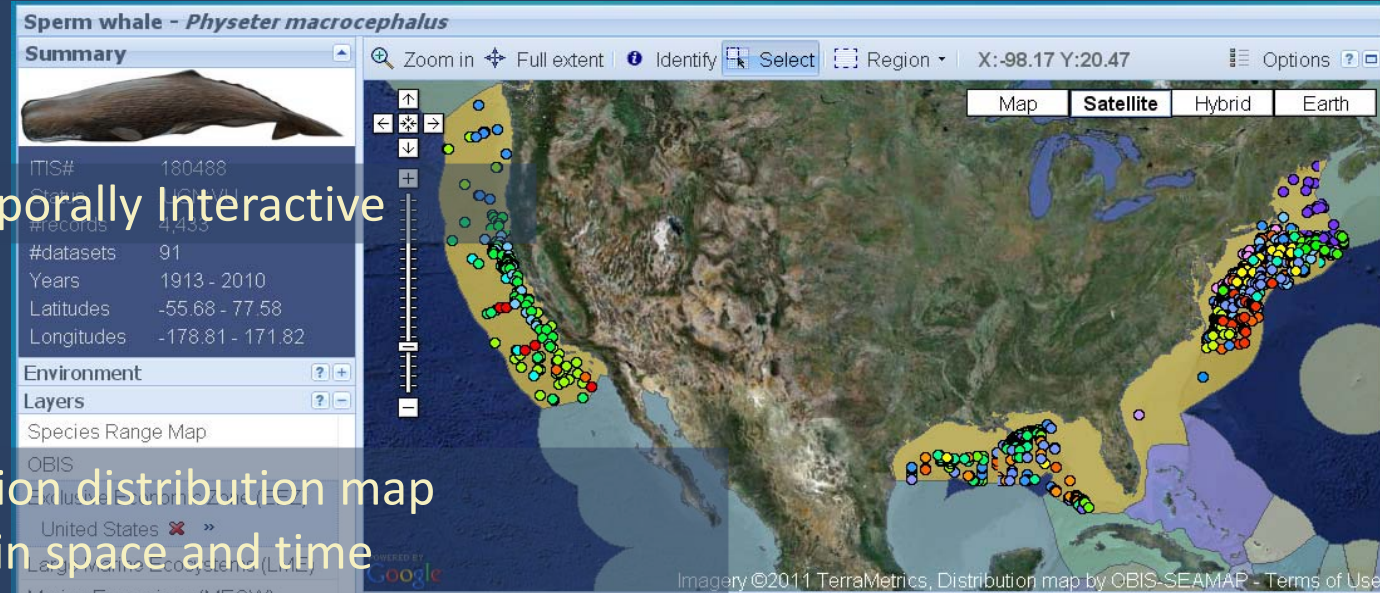
# SEAMAP Online Interface

## Concepts

Spatially & Temporally Interactive

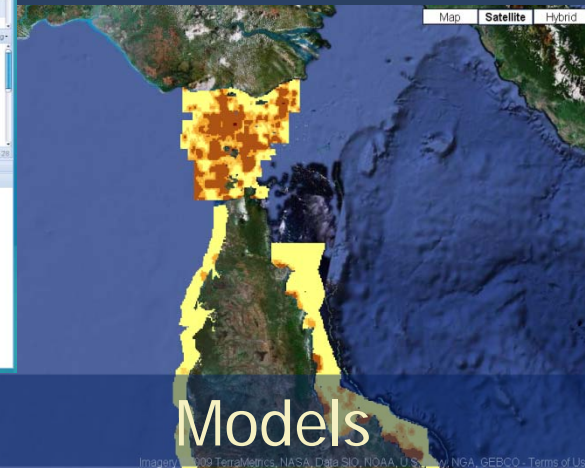
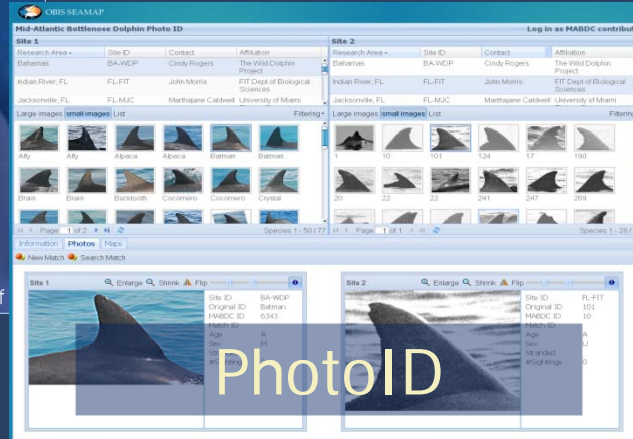
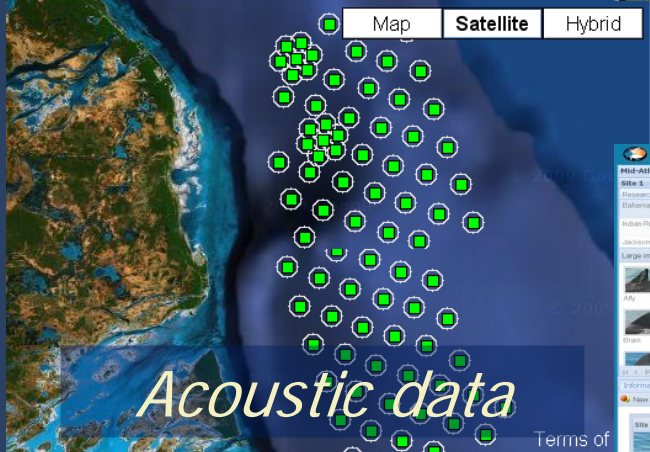
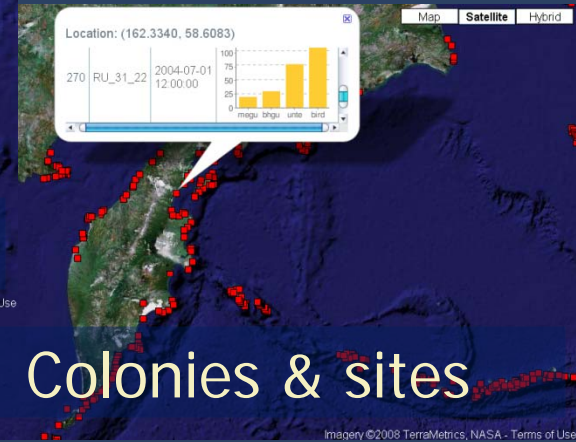
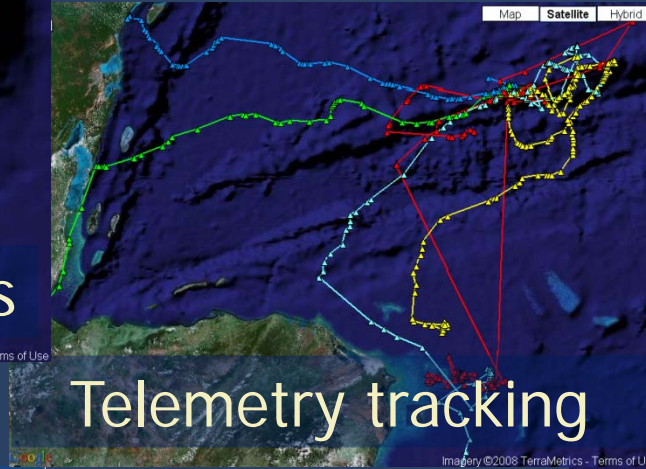
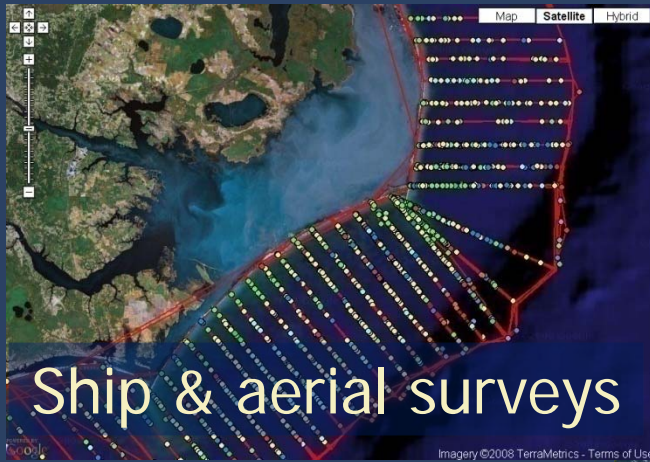
## Highlights

- Multi-resolution distribution map
- Explore data in space and time
- Multi-faceted search options
- Download what you see
- Association with oceanographic variables
- Histograms of oceanographic variables
- Advanced features for telemetry data
- Customized features for datasets
- Advanced visualization tools
- Time series / seasonal graphs
- Toward marine spatial planning





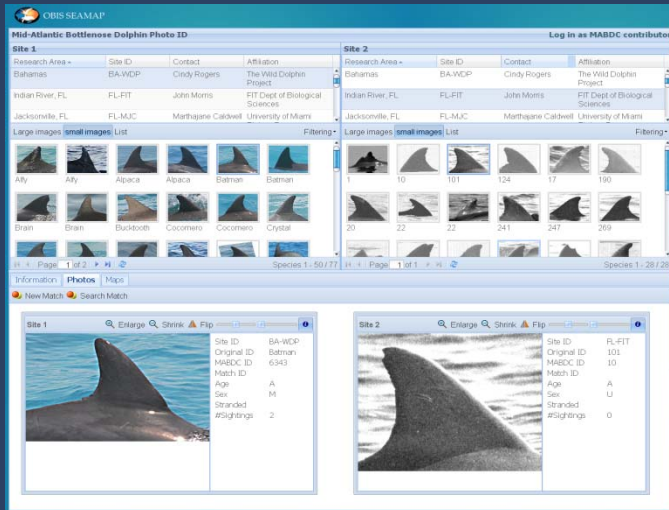
# Data Types



## Specialized Applications (1)

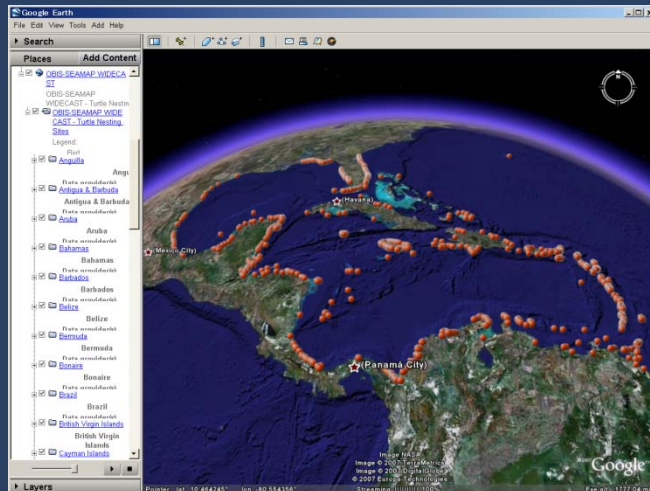
# Photo-ID

Online interface for images and data from photo-identification catalogs to facilitate collaboration among Photo-ID researchers; Started with Mid-Atlantic Bottlenose Dolphin Photo-ID Catalog (MABDC) and expanding to other Photo-ID catalogs.



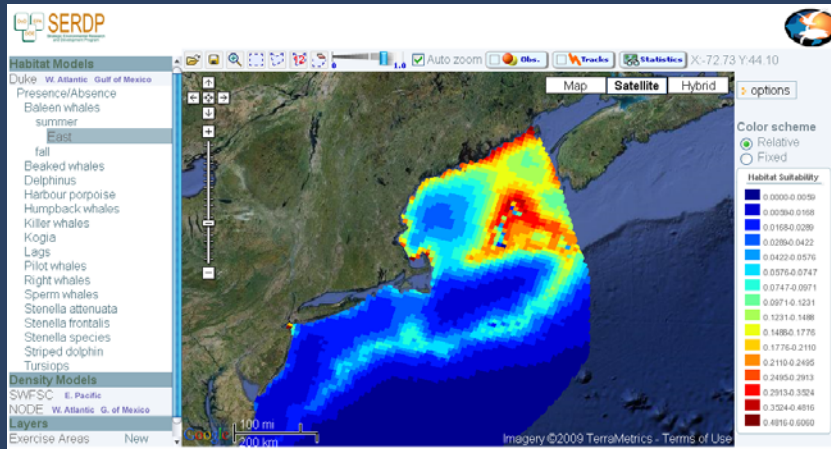
# Turtle nesting data

Sea turtle nesting data from the State of the World's Sea Turtles (SWOT) and Wider Caribbean Sea Turtle Conservation Network (WIDECAST) covering all over the world;  
Genetic sample locations are included.



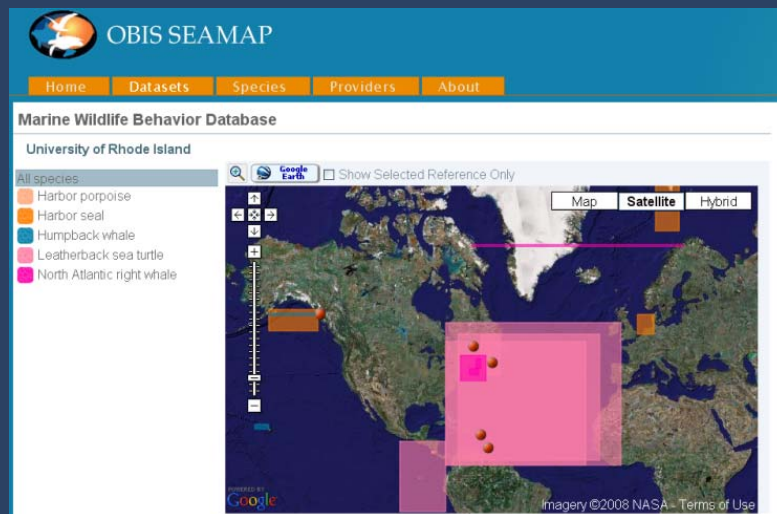


# Specialized Applications (2)



## Habitat modeling

Spatial Decision Support System for Strategic Environmental Research and Development Program (SERDP) presenting statistically predicted habitat models for marine mammals



## Wildlife behavior

Collection of geo-referenced references dealing with marine wildlife behavior researches



*To learn more...*

*To learn more about the general features of OBIS-  
SEAMAP, go to :*

[http://seamap.env.duke.edu/seamap2.5/help/SEAMAP2\\_5\\_General\\_v1.pdf](http://seamap.env.duke.edu/seamap2.5/help/SEAMAP2_5_General_v1.pdf)

(This link is also available on the OBIS-SEAMAP web site)

# *PhotoID Application on OBIS-SEAMAP*



# Objectives

- Share the data and images through the Internet among Photo-ID researchers in the same area
- Provide friendly, efficient tools for the identification of the same animal observed in multiple sites
- Facilitate Photo-ID studies and researches on dolphin ecology, conservation etc.
- Develop a common framework that can be easily implemented to different Photo-ID catalogs (i.e. different areas, different species) with minimum modification and cost.



- ✓ Mid-Atlantic Bottlenose Dolphin Photo-ID Catalog (MABDC)
- ✓ Pacific Islands Photo ID Network (PIPIN) Catalog for Spinner Dolphins
- ✓ California Dolphin Online Catalog (CDOC)
- ✓ California Current Transient Killer Whale (CCTKW) Matching
  - *Bottlenose dolphins in Gulf of Mexico, Bulgaria??*



# *Functionality*

- Browse whale images with search functionality
- Compare whale images between sites / groups side by side
- For better comparison, manipulate the images by zooming, flipping, rotating or overlaying images
- Map the sightings of whales
- Get a potential match through the workflow for contributors' review

# Fin Matching Flow (1)

OBIS SEAMAP

California Current Transient Killer Whale Matching

Site 1  Site 2

Image size ▾ Sort by ▾ Filtering ▾ Image size ▾ Sort by ▾ Filtering ▾

Page 1 of 1 No images found Page 1 of 1 No images found

Information Fin Matching Maps Help

**Dataset credit**

NOAA Southwest Fisheries Center  
Center for Whale Research

**Abstract**

The California Current Transient Killer Whale Matching has been developed to provide a comprehensive, readily -available, digital photo-identification database about coastal transient killer whales via the Internet and is comprised of data from multiple research groups operating along the coastline of California, Oregon and Washington.

SEAMAP ID	838
Seabirds	0
Marine mammals	58
Sea turtles	0
Total	58
Date, Begin	2010-04-08
Date, End	2012-03-17

Click to log in and you'll be forwarded to the login page.

After logged in, you'll be taken back to this page with "Logged in as *your account*" in the title bar.

- ✓ Access the online PhotoID App at <http://seamap.env.duke.edu/photoid/cctkw>
- ✓ Log in with your CCTKW account.

# Fin Matching Flow (2)

OBIS SEAMAP

California Current Transient Killer Whale Matching

Logged in as efujioka

Site 1  Site 2

Image  Filtering  Sort by

CWR (WA; David Ellifrit)

SWFSC (CA; John Durban)

No images found

Page 1 of 1

Information Fin Matching Maps Help

The OBIS-SEAMAP Terms of Use requests you to contact the data provider(s) for use of the OBIS-SEAMAP data in any publication, product, or commercial application.

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Date, Begin	2010-04-08
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From the site dropdown, select a site / group you would like to browse the images for.

The fin images of the whales observed in the selected site / group will be displayed below.

- ✓ First thing to do is to select a site / group from the site dropdown.
- ✓ The sites / groups are listed as “group\_id (research area; primary contact)”



# Fin Matching Flow (3)

OBIS SEAMAP

California Current Transient Killer Whale Matching

Logged in as efujioka

Site 1 CWR Site 2

Image size Sort by Filtering Image Filtering

CA177 CA54 T12A T132 T36

T36B T36B1 T49A T49A2 T49B

Images 1 - 23 / 23 Page 1 of 1 No images found

Information Fin Matching Maps Help

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Seabirds 0  
Marine mammals 58  
Sea turtles 0  
Total 58  
Date, Begin 2010-04-08  
Date, End 2012-03-17

Select a different site / group for "Site 2" so that you can compare the images between Site 1 and 2.

- ✓ As you are comparing the images between two sites / groups, do the same thing for "Site 2".

# Fin Matching Flow (4)

OBIS SEAMAP

California Current Transient Killer Whale Matching

Logged in as efujioka

Site 1 CWR Site 2 SWFSC

Image size Sort by Filtering

Larger (400xauto)  
• Large (160x120)  
Small (80x60)  
List (with details)

CA177 CA54

Images 1 - 23 / 23

Image size Sort by Filtering

Site ID SWFSC CCTKW ID  
Contributor ID CA10 Match ID  
Sex M Age #sightings 1

Site ID SWFSC CCTKW ID  
Contributor ID CA122 Match ID  
Sex Age #sightings 1

Images 1 - 35 / 35

Information Fin Matching Maps Help

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<http://seamap-dev.env.duke.edu/photoid/cctkw#shington>

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Marine mammals	58
Sea turtles	0
Total	58
Date, Begin	2010-04-08
Date, End	2012-03-17

To view larger images, choose “Large” or “Larger” from [Image size] dropdown.

Choose “List” to see images with animal characteristics such as IDs, age, sex, #sightings.

- ✓ By default, fin images are presented as small thumbnails.
- ✓ You can change the image size to “Large” or “Larger”.
- ✓ “List” option presents image thumbnails with animal characteristics.

# Fin Matching Flow (5)

OBIS SEAMAP

California Current Transient Killer Whale Matching

Logged in as efujioka

Site 1 CWR Site 2 SWFSC

Image size Sort by Filtering

Image size Sort by Filtering

Contributor ID  
CCTKW ID  
Match ID

Fin features  
Condition:  
☐ OR  
☒ AND  
☐ NOT

☒ Adult male  
☐ Sprouter  
☐ Leading edge  
☐ Top of fin  
☒ Trailing edge, upper half  
☐ Trailing edge, lower half

Sex  
☐ Male ☐ Female ☐ Unknown

Age  
☐ Adult ☐ Calf ☐ Unknown

Photo attributes  
Quality ☐ 1 ☐ 2 ☐ 3  
Distinctiveness ☐ 1 ☐ 2 ☐ 3

Apply Filter

Information Fin Matching Maps Help

Submit as Potential Match Browse Matches

Site 1

Enlarge Shrink Flip

Site ID CWR  
CCTKW ID  
Contributor ID T132  
Match ID  
Matches  
-- Potential (pending) --  
Age  
Sex

Set up criteria in the filtering panel to get whales of your interest (e.g. adult male whales having a trailing edge at the upper half).

You can also pin-point the whale with its ID.

- ✓ If you are interested in animals with particular characteristics, or already know the ID of a whale, use the filtering function to get it fast.



# Fin Matching Flow (6)

California Current Transient Killer Whale Matching Logged in as efujioka

Site 1 CWR Site 2 SWFSC

Image size Sort by Filtering Image size Sort by Filtering

CA177 CA54 T12A T132 T36 CA10 CA20 CA44 000

T36B T36B1 T49A T49A2 T49B


Page 1 of 1 Images 1 - 23 / 23 Page 1 of 1 Images 1 - 4 / 4

Information **Fin Matching** Maps Help

Submit as Potential Match Browse Matches

Site 1


Enlarge Shrink Flip



Site ID CWR  
CCTKW ID  
Contributor ID T132  
Match ID  
Matches  
-- Potential (pending) --  
Age  
Sex  
Stranded  
#Sightings 1

Site 2

Enlarge Shrink Flip



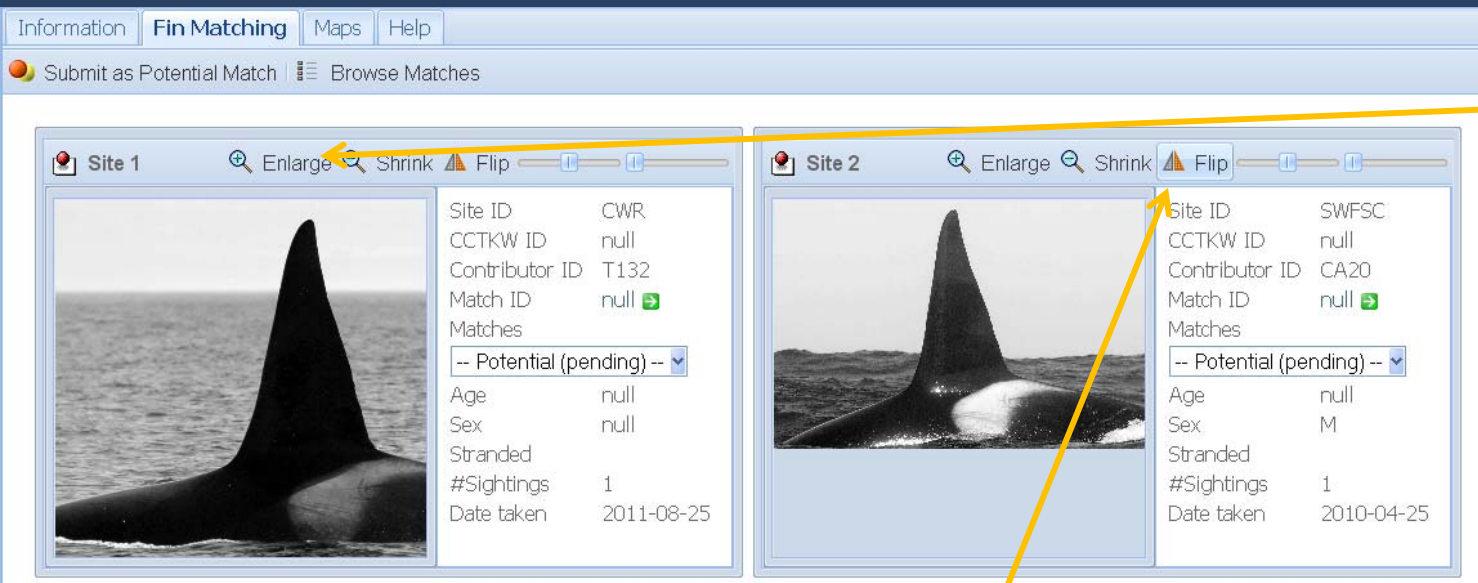
Site ID SWFSC  
CCTKW ID  
Contributor ID CA20  
Match ID  
Matches  
-- Potential (pending) --  
Age  
Sex M  
Stranded  
#Sightings 1

Think whale T132 from CWR and CA20 from SWFSC are identical?

Then, choose the images to compare them with convenient features such as "Enlarge", "Flip" or "Transparency".

- ✓ When you have found potentially identical whales from the two sites / groups while browsing images, choose the images.
- ✓ [Fin Matching] tab is a workplace to compare the images with convenient features.

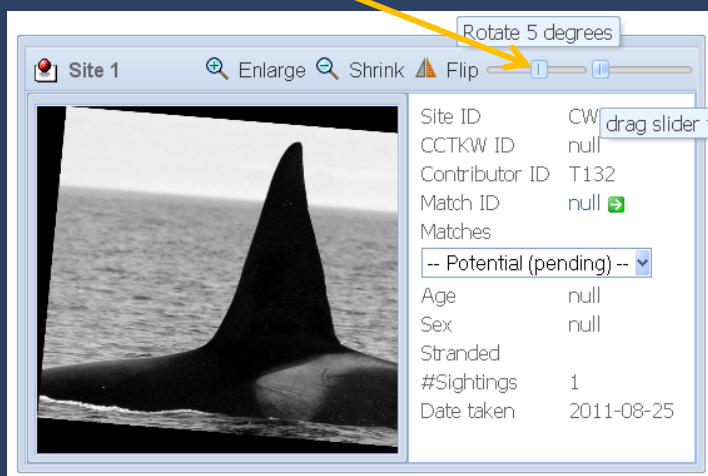
# Fin Matching Flow (7)



Adjust the image size by clicking "Enlarge" or "Shrink".

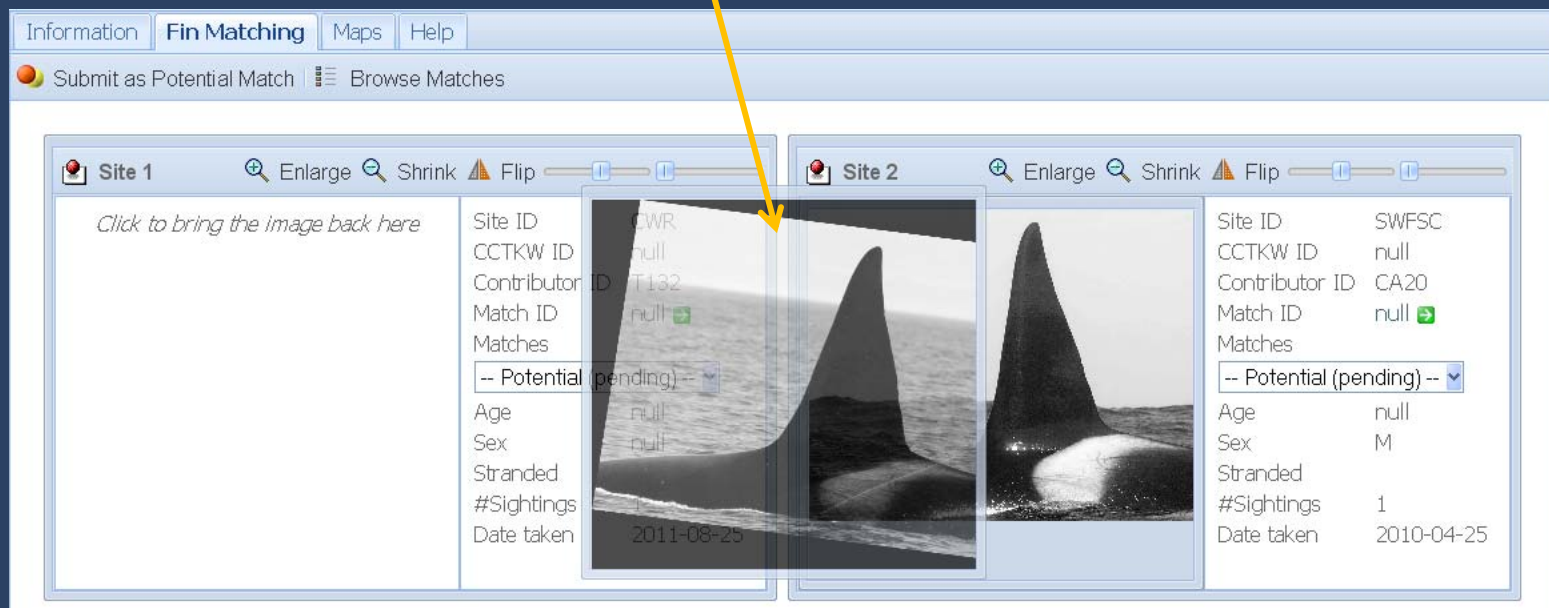
You can rotate the image so that the fins in the two images are similarly tilted.

If the two images are on a different side, flip one of them.

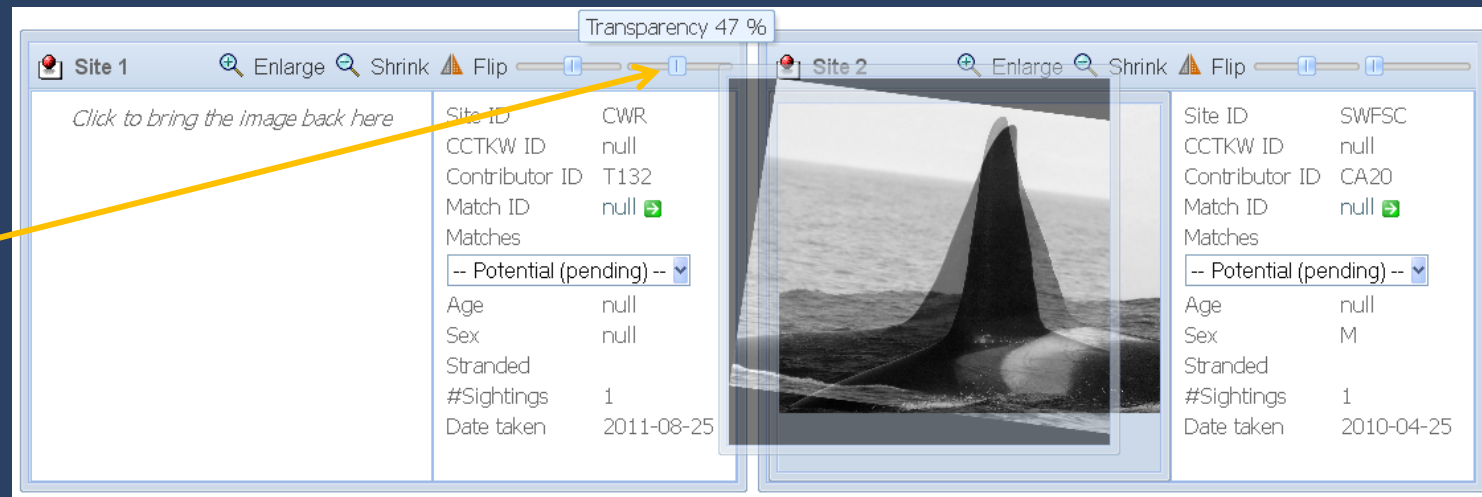


# Fin Matching Flow (8)

Grab any part of the image window to move it over the other one. While doing this, the window gets transparent so that you can oversee the two images.



You can also make the transparency permanent.



# Fin Matching Flow (9)

Switch to [Maps] and see the sighting locations on the map, color-coded by whale.

Icons on the map is also clickable when [Identify] button is pressed.

A clickable list of sighting records is at the left.

CCTKW ID	Contributor ID	Date
CWR (1)		
★	T132	2011-08-25
SWFSC (1)		
★	CA20	2010-04-25

- ✓ The map shows the sighting locations of the animals.
- ✓ Visualizing the sighting locations also helps to validate the potential match.



# Fin Matching Flow (10)

OBIS SEAMAP

California Current Transien

Site 1 All sites

Image size Sort by

CA177 CA54 T36B T36B1

Page 1 of 2

Information Fin Matching

Submit as Potential Match

Browse Matches

Search Enter Reference# or Match ID and hit return

Ref# NEW State Draft Updated on 2012-04-11

Site ID CWR Catalog ID Contributor David Ellifrit Status To be notified History

Site ID SWFSC Catalog ID Contributor John Durban Status To be notified

Submit these two as a potential match?  
Upon submission, a notification will be sent to the above contributors and the CCTKW curator (jdurban), cc'ed to you (efajloka).

You are acting as ☐ David Ellifrit or ☐ John Durban

Submit Cancel

Page 1 of 1 Matches 1 - 1 / 1

Site 1

Enlarge Shrink Flip

Site ID CWR  
CCTKW ID  
Contributor ID T132  
Match ID  
Age  
Sex  
Stranded  
#Sightings 1

Site 2

Enlarge Shrink Flip

Site ID SWFSC  
CCTKW ID  
Contributor ID CA20  
Match ID  
Age  
Sex M  
Stranded  
#Sightings 1

[Submit as Potential Match] brings up a Match-up dialog.

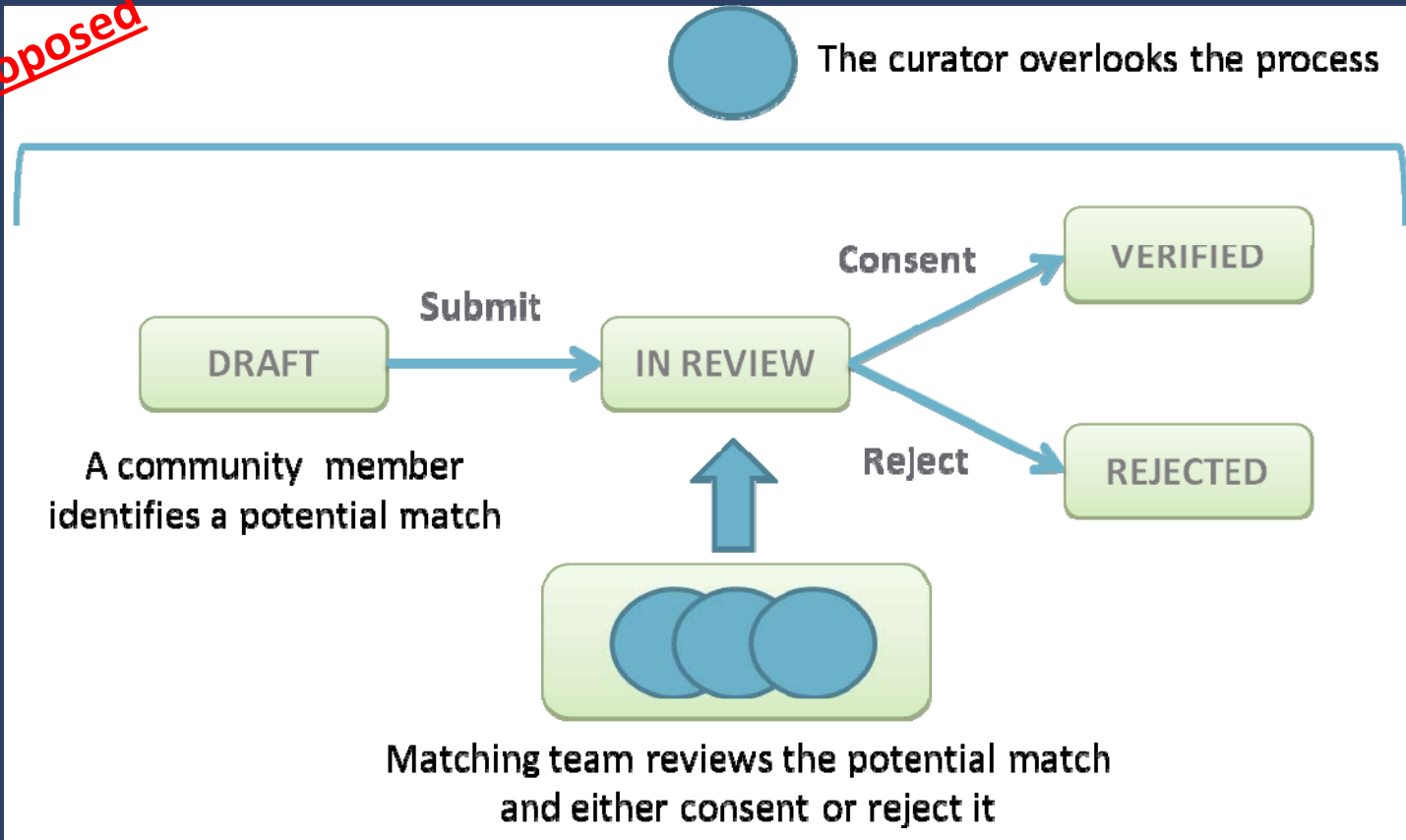
Review the information in the dialog and click [Submit] to initiate the workflow.

A notification email is sent to the matching team.

- ✓ Once you are convinced that the two whales are identical, pass around the information to the matching team for their review and consent.
- ✓ This initiates the workflow which mainly goes through a series of notification emails.

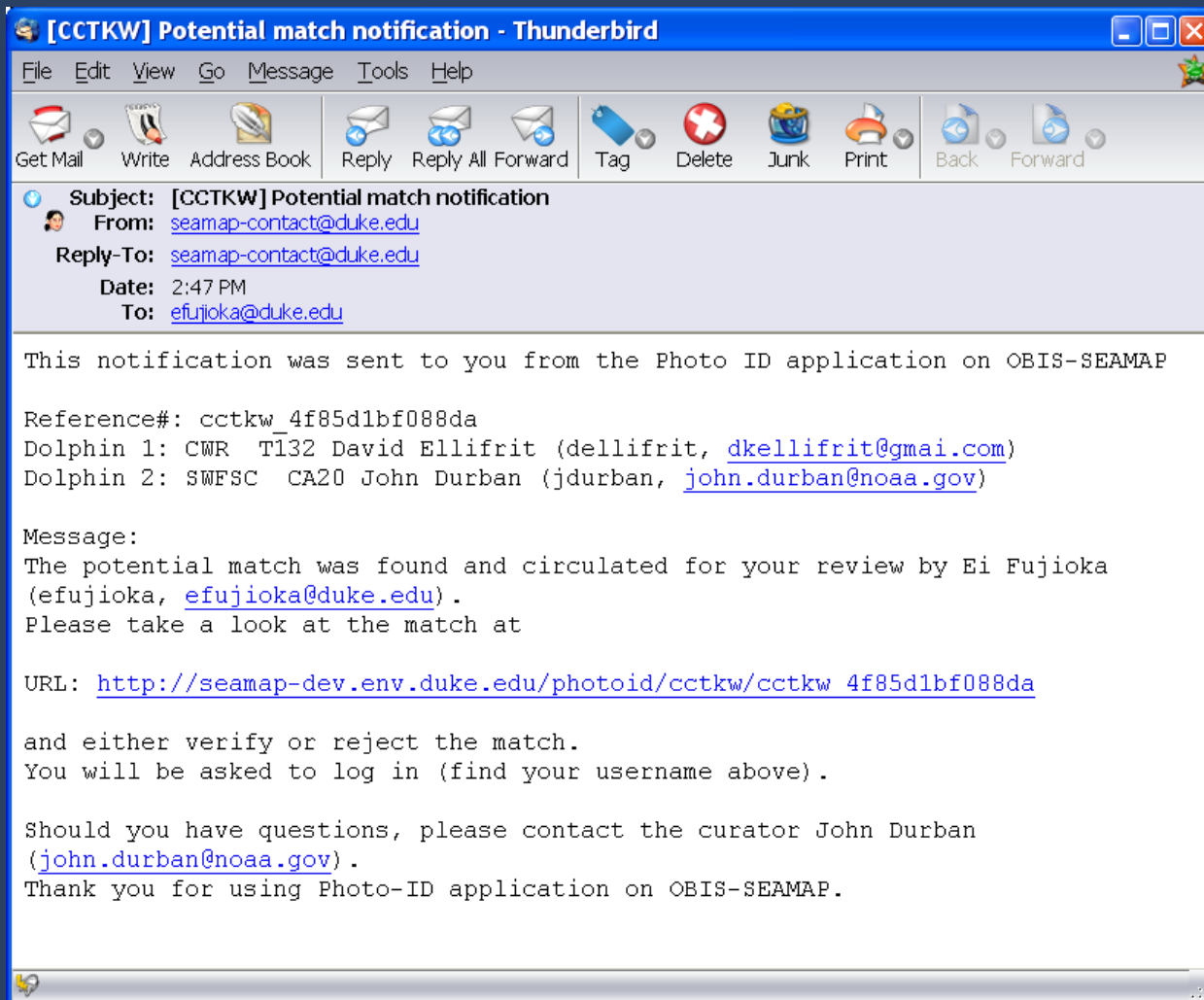
# Fin Matching Flow (11)

**Proposed**



- ✓ When a potential match is found and submitted online, it's put in a 'Draft' state.
- ✓ A notification email is sent to the matching team. The match is put in a 'In Review' state.
- ✓ The matching team goes online and reviews the potential match; each member gives a consent or reject the match; If they all agree, the match is put in a 'Verified' state.
- ✓ Upon consent or rejection, the database is updated with a common unique identifier for the matching whale, and a notification email is sent to the matching team and the contributor PI's.

# Fin Matching Flow (12)



- ✓ In a notification email is the detail of the action and a link to the workflow for your review.

# Fin Matching Flow (12)

The screenshot displays the 'Browse Matches' window in the OBIS SEAMAP application. The window is divided into several sections:

- Search:** A text box with the placeholder 'Enter Reference# or Match ID and hit return'.
- Match Details:** A table showing a match between two sites. The first site (CWR) has a contributor 'David Ellifrit' and a status of 'Notified'. The second site (SWFSC) has a contributor 'John Durban' and a status of 'Notified'. Both status fields are highlighted with red boxes. A yellow arrow points from the 'Notified' status of the second site to the 'Consent' button.
- Text Box:** A large text box containing the following text: 'Please consent or reject the this potential match. Fin images and detailed information at the second half of the browser window. Upon consent or rejection, a notification will be sent to the above contributors and the CCTKW curator (jdurban), cc'd to you (efujicka). You are acting as ☐ David Ellifrit or ☐ John Durban. Below this text are two buttons: 'Consent' and 'Reject'. A yellow arrow points from the 'Consent' button to the right.
- Bottom Section:** Two side-by-side image viewers labeled 'Site 1' and 'Site 2'. Each viewer shows a whale fin image and a list of metadata: Site ID, CCTKW ID, Contributor ID, Match ID, Matches (a dropdown menu showing '-- Potential (pending) --'), Age, and Sex.

Clicking the link in the notification email brings up the application with the workflow dialog.

Note the status is changed from 'Draft' to 'Notified'.

Click [Consent] if you agree that these two whales are identical.

- ✓ A click on the link in the notification email brings up the application with whales in question and workflow dialog already presented.
- ✓ Review the potential match and consent or reject it.



# Fin Matching Flow (13)

OBIS SEAMAP

California Current Browse Matches

Site 1 Select a site

Search Enter Reference# or Match ID and hit return

Ref# cctkw\_4f85d1bf088d State Verified Updated on 2012-04-11 Match ID 1

Site ID CWR Catalog ID Contributor David Ellifrit Status **Consent** History

Site ID SWFSC Catalog ID Contributor John Durban Status **Consent** History

This potential match has been verified by all the contributors. No more action is necessary.

Page 1 of 1

Matches 1 - 1 / 1

Site 1

Site 2

Site ID CWR CCTKW ID null Contributor ID T132 Match ID 1 Matches -- Potential (pending) -- Age null Sex null

Site ID SWFSC CCTKW ID null Contributor ID CA20 Match ID 1 Matches -- Potential (pending) -- Age null Sex M

When all the matching team gives a consent, the workflow is complete and the match becomes official with a Match ID issued.

- ✓ When all the matching team gives a consent, the match becomes official and is given a Match ID.

# More benefits (1)

OBIS SEAMAP

CCTKW Killer whale sightings  
California Current Transient Killer Whale Matching Initiative

Dataset Summary

SEAMAP ID	838
Seabirds	0
Marine mammals	58
Sea turtles	0
Total	58
Date, Begin	2010-04-08
Date, End	2012-03-17
Latitudes	36.57 - 48.50
Longitudes	-123.20 - -121.91
Platform	Boat
Data type	Photo ID
Effort	N/A
Updated	2012-04-05

Map Summary

#records	58
#animals	58
#species	1

Environment Layers

Map

Zoom in Full extent Identify Region X:-121.47 Y:36.16

Legend Options

Map Satellite Hybrid

Imagery ©2012 TerraMetrics, Distribution map by OBIS-SEAMAP - Terms of Use

Information Species **Animal** Graph Download

Image size Sort by Clear selection

CA10 CA122 CA122A CA122B CA122C CA126 CA155 CA177

CA20 CA21q CA26 CA44 CA54 CA54 N152 N25

T12A T132 T36 T36B T36B1 T49A T49A2 T49B

T49B1 T51 T63 T73B T73C T75 T75A T75B

Page 1 of 2 Images 1 - 50 / 58

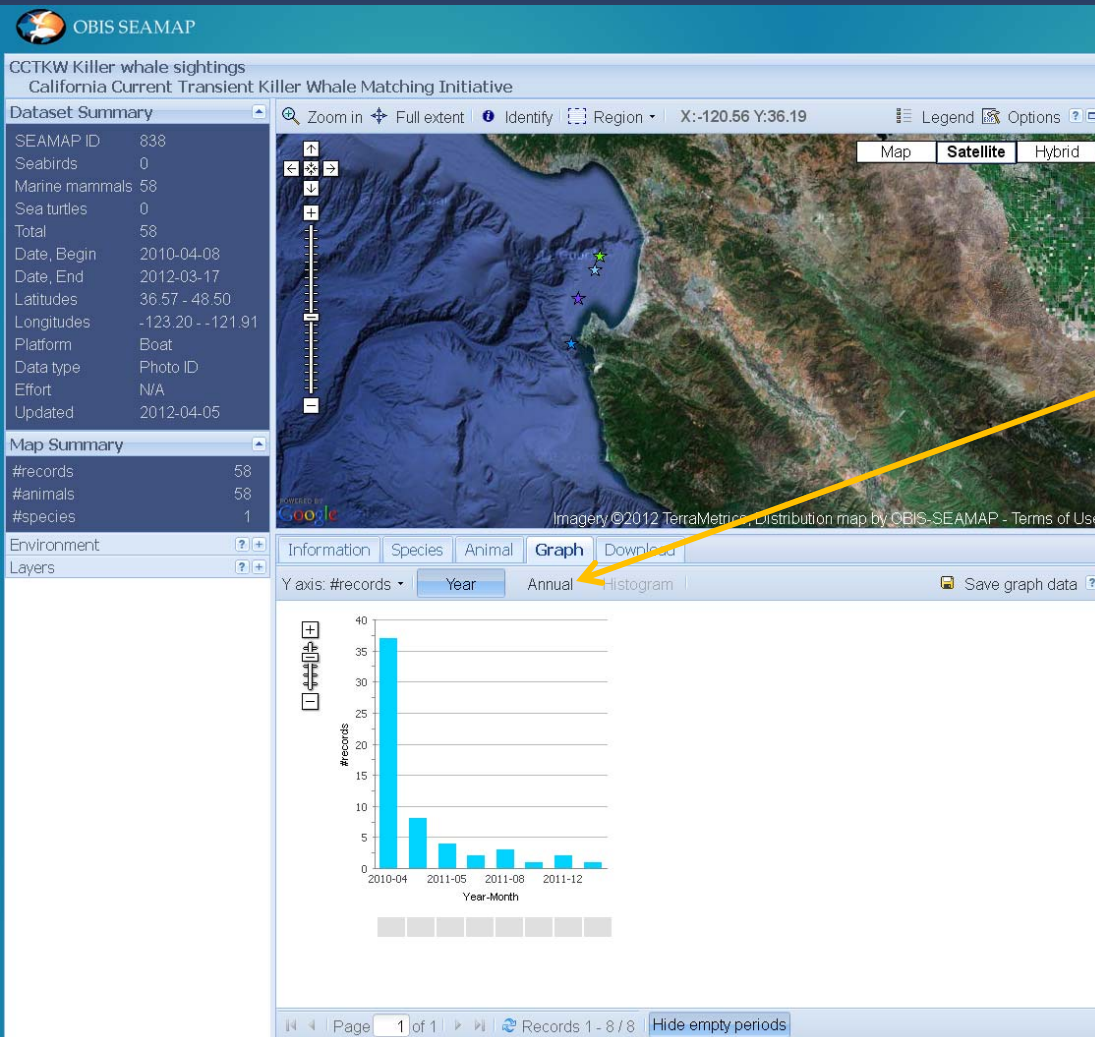
All sightings are mapped, color-coded by dolphin.

Fin images are displayed in [Animal] tab. Selecting one or several of them updates the map to show the sightings of the particular whale(s).

- ✓ Sighting data from CCTKW database is registered as an OBIS-SEAMAP dataset with all advanced mapping & visualization tools available.

✓ <http://seamap.env.duke.edu/dataset/838> (not yet published)

# More benefits (2)



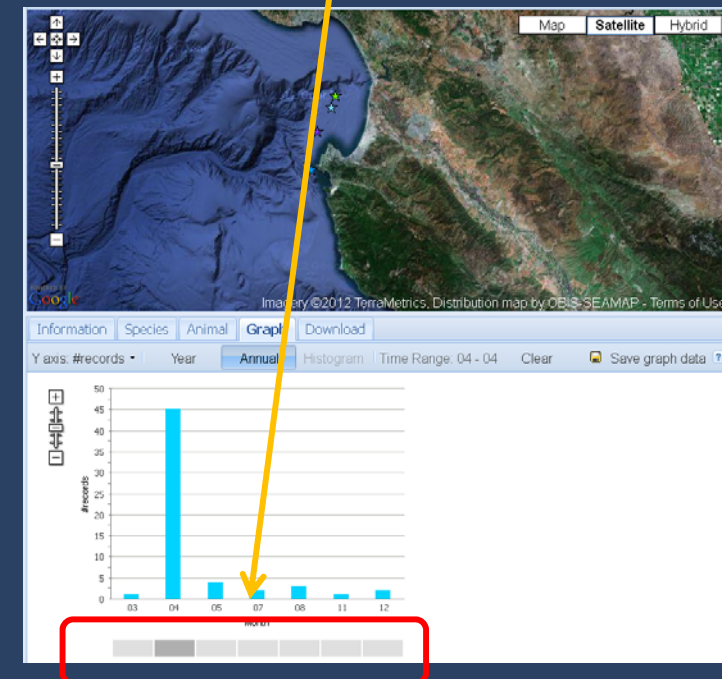
- ✓ One of the advanced tools is the interactive time-series graphing.

The time-series graph visualizes #sightings over time.

The time period is selectable among years, months or days with the navigation bar.

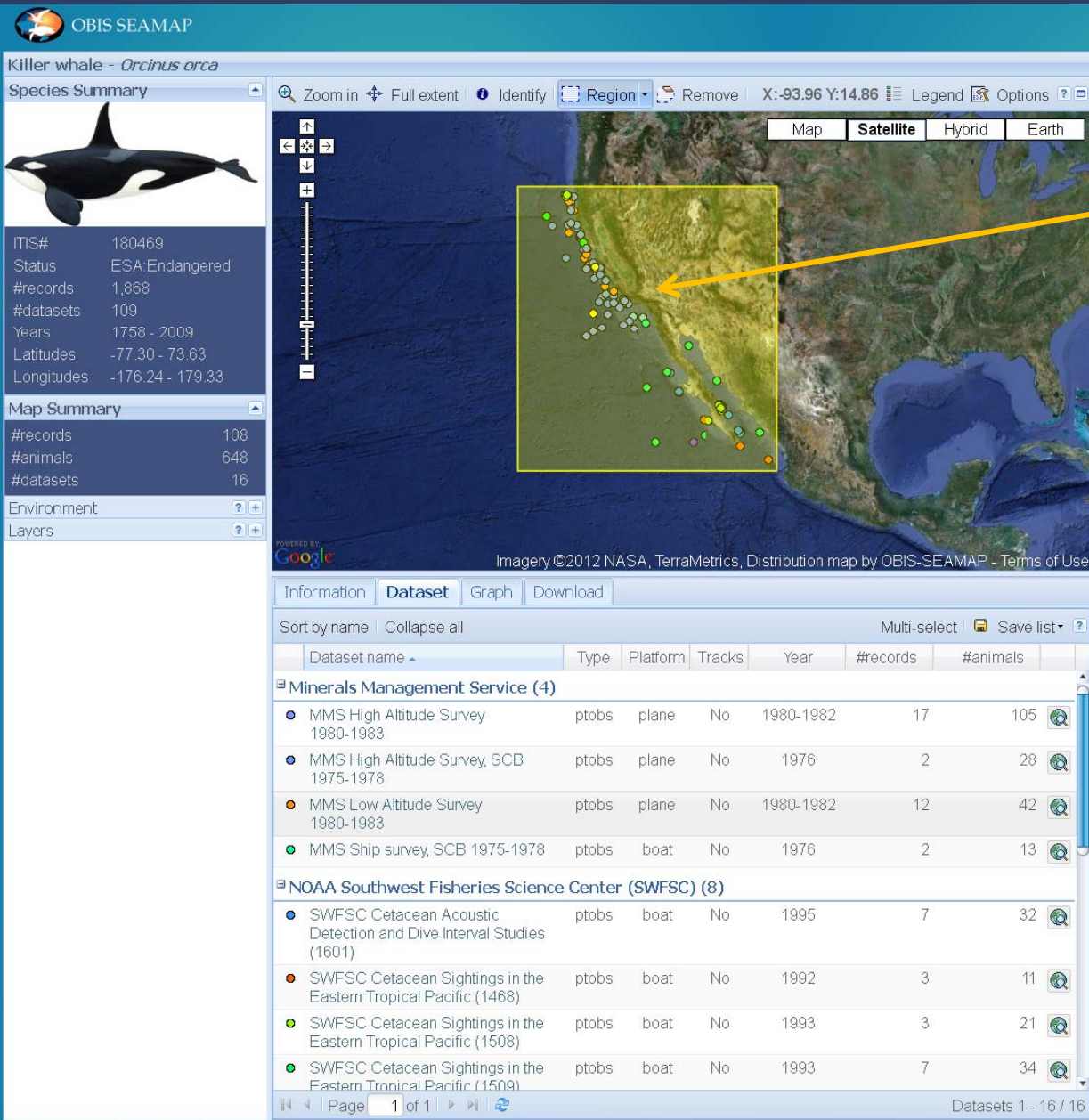
You can even switch to seasonal changes (four seasons or 12 months).

You can also specify your time period of interest (e.g. winter) and the map shows the sightings in that period.





# More benefits (3)



You are able to extract killer whale sightings along the west coasts from any OBIS-SEAMAP datasets.

✓ Sighting data from CCTKW are explored with other killer whale sightings from all the OBIS-SEAMAP datasets. (CCTKW sighting data will be published upon approval and are not visible in the above screen shot)





# OBIS-SEAMAP

*marine megavertebrate geo-archive*

<http://seamap.env.duke.edu>

*Thank you*

The OBIS-SEAMAP Team

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Stenella frontalis #2  
Kogia sima #34  
Mesoplodon densirostris #10  
Kogia sima #27  
Globicephala macrorhynchus #1