



How to use GIS in your K-12 Classrooms

by Jennifer Lentz, Ph.D.

Education Coordinator at the Aquarium of the Pacific

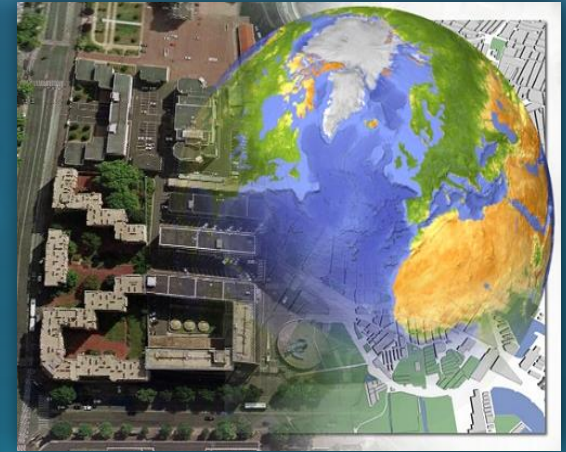
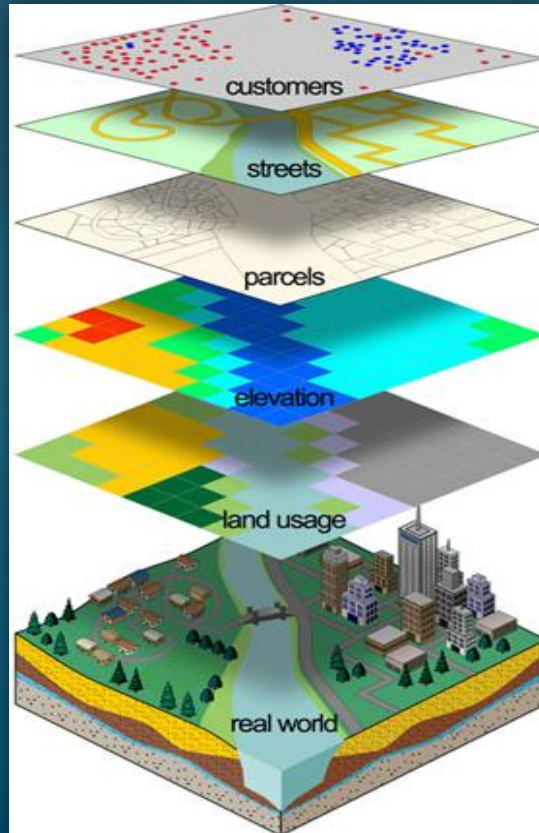
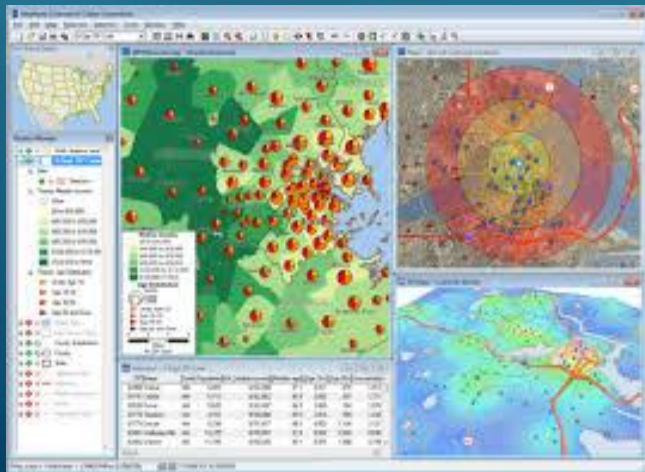
Boeing Teacher Institute (BTI) Presentation

July 28, 2016

Geographic Information Systems



Spatial Analysis

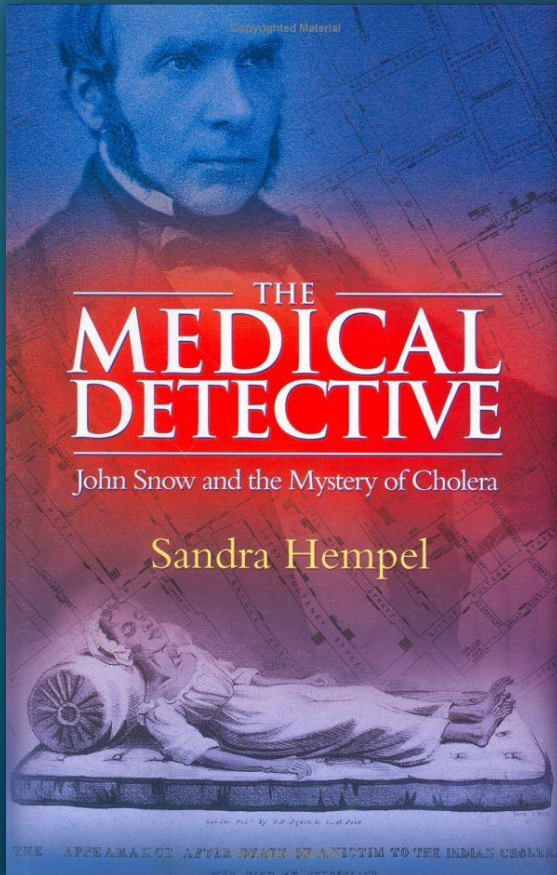


Remote Sensing



Dr. John Snow (1813-1858)

“Father of **Modern Epidemiology**”



ST. JAMES, WESTMINSTER.

The **GOVERNORS** and **DIRECTORS** of the **POOR**
HEREBY GIVE NOTICE,
That, with the view of affording prompt and Gratuitous assistance to Poor Persons resident in this Parish, affected with Bowel Complaints and

CHOLERA,

The following Medical Gentlemen are appointed, either of whom may be immediately applied to for Medicine and Attendance, on the occurrence of those Complaints, viz.—

Mr. FRENCH, 41, Gt. Marlborough St.
(Opposite, Bow's Court, Mansell Street)

Mr. HOUSLEY, 28, Broad Street.

Mr. WILSON, 16, Great Ryder St.

Mr. JAMES, - 49, Princes Street.

Mr. DAVIES, 25, Brewer Street.

SUGGESTIONS AS TO FOOD, CLOTHING, &c.

Regularity in the Hours of taking Meals, which should consist of any description of wholesome Food, with the moderate use of sound Beer.

Abstinence from Spirituous Liquors.

Warm Clothing and Cleanliness of Person.

The avoidance of unnecessary exposure to Cold and Wet, and the wearing of Damp Clothes, or Wet Shoes.

Regularity in obtaining sufficient Rest and Sleep.

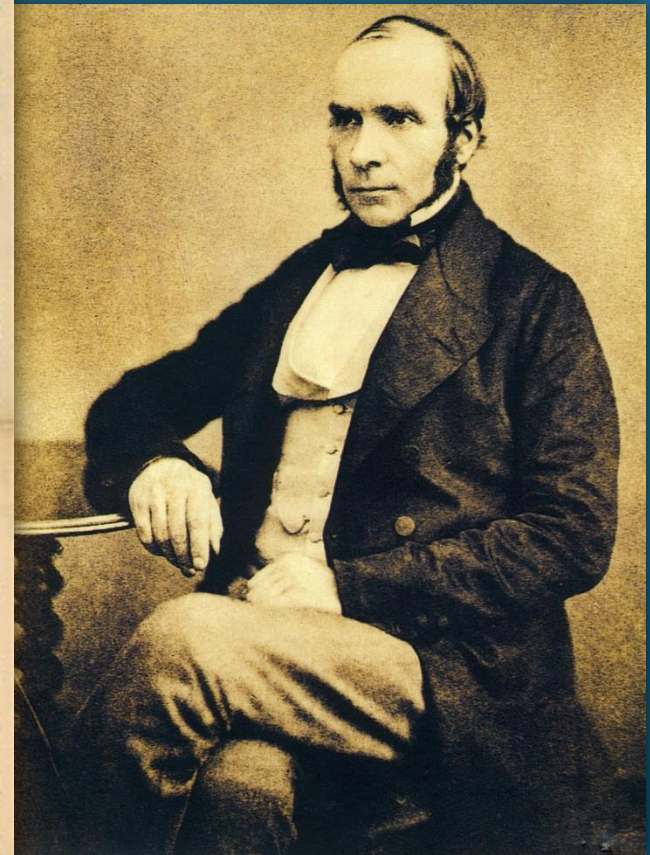
Cleanliness of Rooms, which should be aired by opening the Windows in the middle of each day.

By Order of the Board,
GEORGE BUZZARD,
Clerk.

FRENCH'S OFFICE, Palace Street,
204 November, 1831.

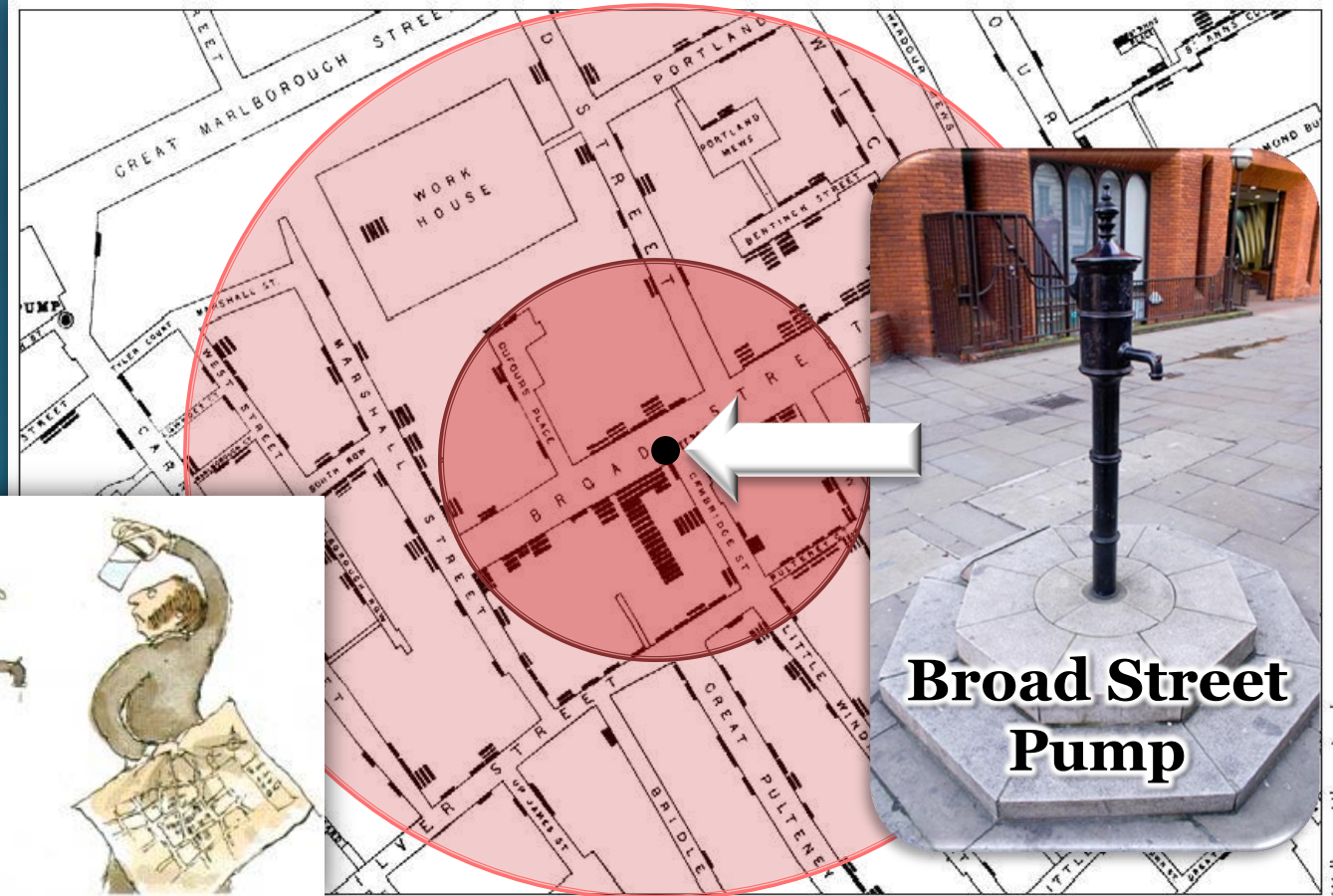
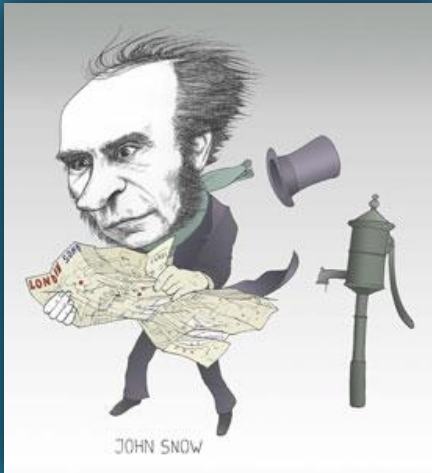
If it is requested that this Paper be taken care of, and placed where it can be easily referred to.

PRINTED BY J. JOHNSON, ST. PAULS CHURCH-YARD, LONDON.



Dr. John Snow (1813-1858)

“Father of **Medical Geography**”



Street map of cholera deaths in Soho in 1853 from John Snow's *On the Mode of Communication of Cholera*

Modern GIS Applications

Crime Analysis



Ecologic & Climate Science



Medical Geography & Spatial Epidemiology



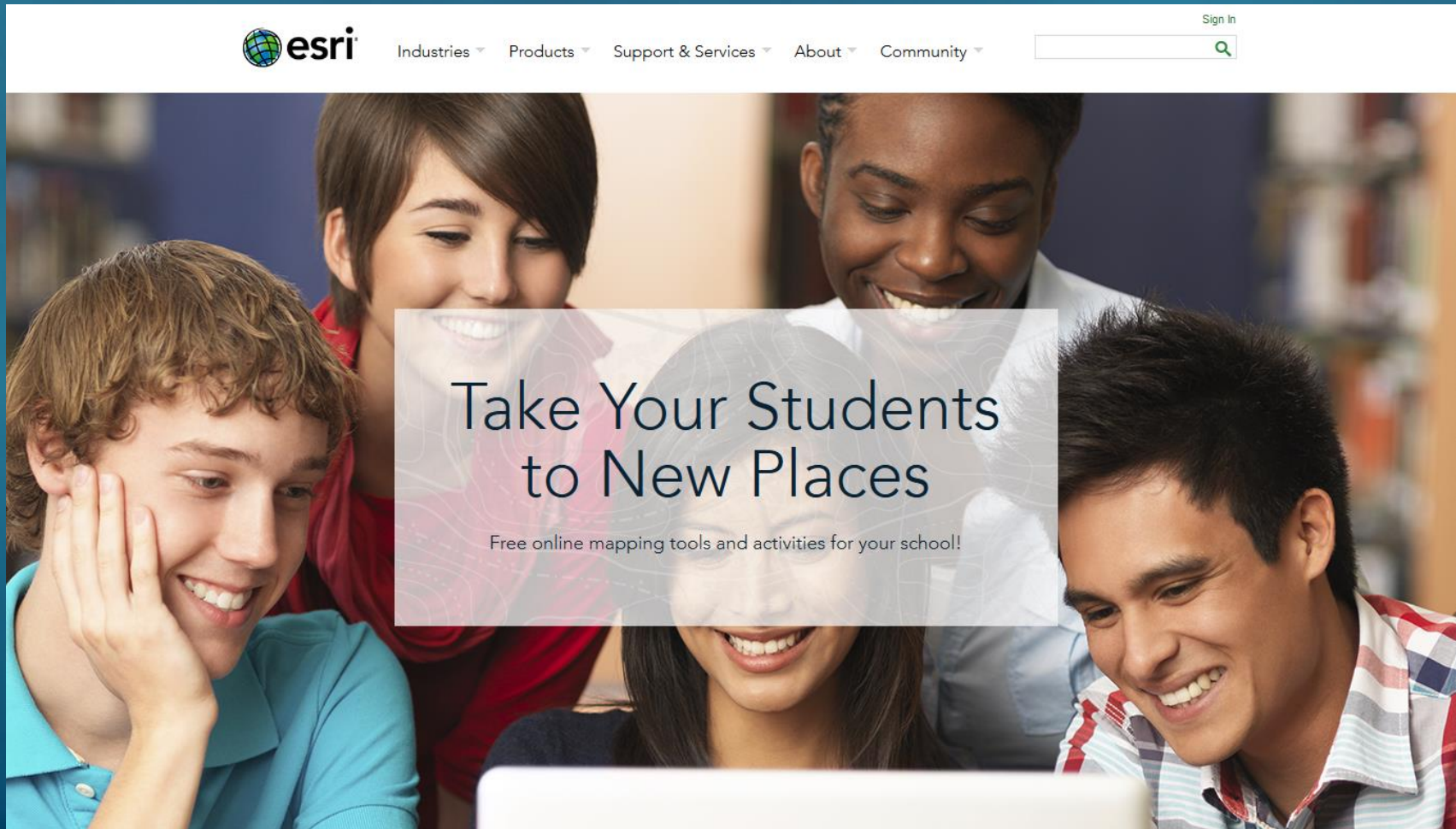
Bring GIS into your K-12 Classrooms



<http://video.esri.com/watch/4500/connected-take-your-students-to-new-places>

GIS in K-12 Schools

The Whitehouse's ConnectEd Initiative



esri

Industries ▾ Products ▾ Support & Services ▾ About ▾ Community ▾

Sign In

Take Your Students
to New Places

Free online mapping tools and activities for your school!

ConnectED Initiative

Free ArcGIS Online Accounts available for
ALL K-12 Schools in the United States!



Free ArcGIS Online School Account

US K12 schools can request a free account for instruction. ([Terms and conditions](#))

Request a Free US School Account X

Organization <input type="text" value="To select, begin typing."/>	Department <input type="text"/>
Street Address <input type="text"/>	City <input type="text"/>
State <input type="text" value="- Select -"/>	ZIP Code <input type="text"/>
School Website <input type="text"/>	School Phone <input type="text"/>
Contact First Name <input type="text"/>	Contact Last Name <input type="text"/>
Contact Email <input type="text"/>	<input type="checkbox"/> Agree to Terms and Conditions

Sign up online at: <http://www.esri.com/connected>
(or use the form in your binders)

ConnectED Initiative

ArcGIS Online provides **Project-based Learning**
in line with **NGSS** standards



These sites include...

- Teacher Stories
- Student Videos
- Case Studies
- Resources
- Lessons Plans

<http://www.esri.com/connected/>

& <http://edcommunity.esri.com/>

Instructional GIS Materials for K-12

GeoInquiries

15 min activities for
Elementary – High School



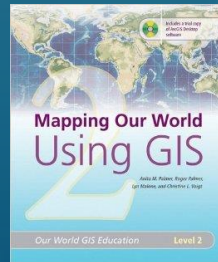
Story Maps

For All Ages & Audiences
Can be used as Lessons or Assignments



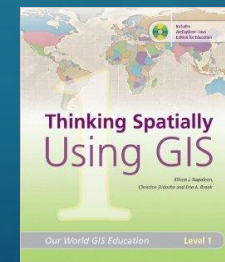
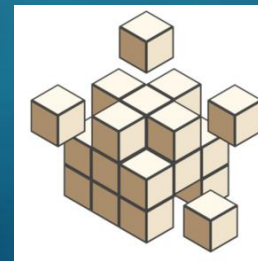
Mapping our World

45-90 min activities for
Middle School



Thinking Spatially

30-60 min activities for
Elementary School (4-6 grade)



and more!

GeoInquiries

Designed to be Fast (15 min), Easy-to-Use, Standards-based Inquiry Activities designed to be presented by the instructor from a single computer/projector classroom.

GeoInquiry Collections



Earth Science
Middle school



US History
High school



Advanced Human Geography
High school

GeoInquiries currently available for public field testing



Grade 4 Interdisciplinary
Elementary



Advanced Environmental Science
High school

These activities do NOT require logging in & can be done with or without an ArcGIS Online (AGOL) account

<http://edcommunity.esri.com/geoinquiries/>



GeoInquiries
(Middle School)

Earth Science

1. Topography and our national heritage
2. Remote sensing
3. Mining the world's most used minerals
4. Rock types tell stories
5. North American landforms
6. Cracked plates (tectonics)
7. The earth moves under our feet (earthquakes)
8. Plate type effect on volcanoes
9. Mountain building
10. A river runs through it (freshwater)
11. Ocean features
12. Fluid Earth: winds and currents
13. How's the weather?
14. Tropical storms
15. Climate change

Tropical Storm GeoInquiry

Tropical storms

Target audience – Earth Science, grades 6-9 Time required – 15 minutes

Activity Use hurricane track information to understand factors that encourage the formation of hurricanes.

Science Standards MS-ESS2-5 – Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

Learning Outcomes

- Students will use the tracks of hurricanes in 2005 to compare wind speed to the air pressure within the hurricane and sea surface temperature.
- Students will determine the impact of air pressure and sea surface temperature on hurricane strength.

Map URL: <http://bit.ly/earthgeoinquiry14>

Engage

Where and how do tropical storms form?

- Click Modify Map, and then click the Contents button.
- Check the box next to Hurricanes Wind Strength to turn the layer on.
- Click any point on the trails of these hurricane.
- ? What information is stored for each point along the way? [Information about air pressure, wind speed, and ocean temperature is stored.]
- All hurricanes start as tropical depressions (TD).
- Use the Filter Tooltip instructions to filter Hurricane Wind Strength – Category - Is - TD.
- Where do most Atlantic storms reach TD status? [Most become TD east of the Caribbean.]

Explore

How does air pressure relate to wind speed in hurricanes?

- The 2005 Atlantic storms caused \$160 billion in damage and 3,913 deaths. Winds cause property damage by blowing off roofs or collapsing buildings, but they also push the surface of the water into a storm swell. Homes and small buildings do not stand a chance against storm-driven ocean swells. Winds are generated by greater differences in air pressure and the geographic size of the low pressure.
- Hover on the Hurricane Wind Strength layer name, click the right drop-down arrow, and then click Show Table.
- In the Hurricane Wind Strength table, click the WIND_KTS (wind speed in knots) column header.
- Click Sort Ascending to arrange the wind speed values in increasing order.
- ? As you scroll down the table, how does the pressure column change relative to wind speed? [They are inversely proportional to each other.]

Explain

What determines the path a storm takes?

- ? Are there areas where lower pressures do not have as strong of winds? [Winds are generally much smaller over land.]
 - ? Why do wind speeds slow down over land? [Rougher land surfaces provide friction, slowing winds down. Also, the heat of evaporated water condensing into clouds is cut off over land.]
 - Close the Hurricane Wind Strength table.
- more ▶

Elaborate

Where do tropical storms get such strength?

- Click the Hurricane Strengthening Zone bookmark.
- Turn on the Sea Temperature 05 layer.
- Click the Sea Temperature 05 title, and then click the AvSeaTemp05 subtitle to expand this layer's legend.
- ? At what temperature do storms consistently pick up energy? (You can also click the dots to verify temperatures.) [Hurricanes may be sustained at lower temperatures, but most storms really grow above 28°C.]

Evaluate

What other areas of the world have good conditions for tropical storms?

- Use the Filter Data toolbox instructions to identify one of the names of the storms.
- Click each dot, and on a whiteboard, create a table of wind speeds and pressure.
- Create a graph of wind speed vs. pressure. [Wind speed should be on the x axis. The pressure should be on the y axis—the resulting graph will go down to the right.]
- ? What type of relationship do these two variables have? [This is an inverse relationship.]
- Click the Home button to zoom out to the entire world.
- ? List two other areas in the world that would be possible targets for tropical storms. [China, Philippines, Indonesia, and Australia are all possible targets.]

FILTER DATA

- Hover on the layer name, click the drop-down arrow, and choose Filter.
- Build the expression Name - Is - Unique.
- Scroll down to choose a unique hurricane name.
- Click Apply Filter, and then click Zoom To.

BOOKMARK

- At the top of the map, click the Bookmarks button.
- Choose your bookmark; the map will take you there.

Next Steps

DID YOU KNOW? ArcGIS Online is a mapping platform freely available to U.S. public, private, and home schools as a part of the White House CONNECTED Initiative. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at <http://connected.esri.com>.

THEN TRY THIS...

- Add a U.S. states layer, perform analysis, and aggregate hurricane wind strength by states.
- Color the new layer based on how many hurricanes have crossed the state borders.

TEXT REFERENCES

This GIS map has been cross-referenced to material in the weather sections of chapters from middle-school texts.

- Earth Science by Glencoe McGraw Hill – Chapter 16
- Earth Science by McDougal Littell – Chapter 3D
- Earth Science by Holt – Chapter 16
- Earth Science by Prentice Hall – Chapter 17

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Tropical Storm GeoInquiry



Tropical storms

Target audience – Earth Science, grades 6-9

Time required – 15 minutes

Activity

Use hurricane track information to understand factors that encourage the formation of hurricanes.

Elaborate

Where do tropical storms get such strength?

- Click the Hurricane Strengthening Zone bookmark.
- Turn on the Sea Temperature 05 layer.
- Click the Sea Temperature 05 title, and then click the AvSeaTemp05 subtitle to expand this layer's legend.
- ? At what temperature do storms consistently pick up energy? (You can also click the dots to verify temperatures.) *Hurricanes may be created at lower temperatures, but most storms reach the sea above 28°C/1*

Browser address bar: <http://bit.ly/earthgeo inquiry14> Search []

ArcGIS Tropical Storms

Modify Map Sign In

Details Basemap Share Print Measure Bookmarks Find address or place []

Legend

Hurricanes 2005



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Tropical Storm GeoInquiry



Tropical storms

Target audience – Earth Science, grades 6-9

Time required – 15 minutes

Activity Use hurricane track information to understand factors that encourage the formation of hurricanes.

Science Standards MS-ESS2-5 – Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

Learning Outcomes

- Students will use the tracks of hurricanes in 2005 to compare wind speed to the air pressure within the hurricane and sea surface temperature.
- Students will determine the impact of air pressure and sea surface temperature on hurricane strength.

Map URL: <http://bit.ly/earthgeoenquiry14>

Engage

Where and how do tropical storms form?

- Click Modify Map, and then click the Contents button.
- Check the box next to Hurricanes Wind Strength to turn the layer on.
- Click any point on the trails of these hurricane.
- ? What information is stored for each point along the way? [Information about air pressure, wind speed, and ocean temperature is stored.]
- All hurricanes start as tropical depressions (TD).
- Use the Filter Tooltip instructions to filter Hurricane Wind Strength – Category - Is - TD.
- Where do most Atlantic storms reach TD status? [Most become TD east of the Caribbean.]

Explore

How does air pressure relate to wind speed in hurricanes?

- The 2005 Atlantic storms caused \$160 billion in damage and 3,913 deaths. Winds cause property damage by blowing off roofs or collapsing buildings, but they also push the surface of the water into a storm swell. Homes and small buildings do not stand a chance against storm-driven ocean swells. Winds are generated by greater differences in air pressure and the geographic size of the low pressure.
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- ? What type of relationship do these two variables have? [This is an inverse relationship.]
- Click the Home button to zoom out to the entire world.
- ? List two other areas in the world that would be possible targets for tropical storms. [China, Philippines, Indonesia, and Australia are all possible targets.]

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- Scroll down to choose a unique hurricane name.
- Click Apply Filter, and then click Zoom To.

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- Where do most Atlantic storms reach TD status? *[Most become TD east of the Caribbean.]*

ArcGIS Tropical Storms

1

Modify Map

Sign In

The screenshot displays the ArcGIS web application interface. At the top, the title 'ArcGIS Tropical Storms' is visible. On the right side of the header, the 'Modify Map' button is highlighted with a red box, and a red '1' is placed next to it. Below the header, there is a navigation bar with buttons for 'Details', 'Basemap', 'Share', 'Print', 'Measure', and 'Bookmarks'. A search bar is located on the right side of this bar. The main map area shows a world map with red lines representing hurricane tracks, primarily concentrated in the Atlantic and Caribbean regions. The map includes a scale bar at the bottom left and a 'POWERED BY esri' logo at the bottom right. The left sidebar contains a 'Legend' section with the title 'Hurricanes 2005' and a red line indicator.

Where and how do tropical storms form?

- Click Modify Map, and then click the Contents button.
- Check the box next to Hurricanes Wind Strength to turn the layer on.
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- Where do most Atlantic storms reach TD status? *[Most become TD east of the Caribbean.]*

ArcGIS ▾ Tropical Storms

New Map ▾ Sign In

Details Add Basemap Save Share Print Measure Bookmarks Find address or place

Contents

- Hurricane Wind Strength
- Hurricanes 2005
- Sea Temperatures 05
- Topographic

0 1000 2000mi

POWERED BY esri Esri, FAO, NOAA

Where and how do tropical storms form?

- Click Modify Map, and then click the Contents button.
- 3** → Check the box next to Hurricanes Wind Strength to turn the layer on.
- Click any point on the trails of these hurricane.
- ? What information is stored for each point along the way? *[Information about air pressure, wind speed, and ocean temperature is stored.]*
- All hurricanes start as tropical depressions (TD).
- Use the Filter Tooltip instructions to filter Hurricane Wind Strength – Category - Is - TD.
- Where do most Atlantic storms reach TD status? *[Most become TD east of the Caribbean.]*

The screenshot shows the ArcGIS web interface. At the top, there's a search bar with the text "Find address or place" and a magnifying glass icon. Below the search bar is a toolbar with icons for "Save", "Share", "Print", "Measure", and "Bookmarks". On the left side, there's a "Contents" panel with a list of layers: "Hurricane Wind Strength" (checked and highlighted with a red box), "Hurricanes 2005" (checked), "Sea Temperatures 05" (unchecked), and "Topographic" (unchecked). The main map area shows a world map with a focus on the Atlantic Ocean. Red lines represent hurricane tracks, starting from the Caribbean and moving across the Atlantic towards North America. The map is labeled with "NORTH AMERICA", "SOUTH AMERICA", "EUROPE", "AFRICA", "ASIA", and "AUSTRALIA". At the bottom left, there's a scale bar showing 0, 1000, and 2000 miles. At the bottom right, there's a logo for "POWERED BY esri" and "Esri, FAO, NOAA".

Where and how do tropical storms form?

- Click Modify Map, and then click the Contents button.
- 3** → Check the box next to Hurricanes Wind Strength to turn the layer on.
- Click any point on the trails of these hurricane.
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- Use the Filter Tooltip instructions to filter Hurricane Wind Strength – Category - Is - TD.
- Where do most Atlantic storms reach TD status? *[Most become TD east of the Caribbean.]*

ArcGIS Tropical Storms New Map Sign In

Details Add Basemap Save Share Print Measure Bookmarks Find address or place

Contents

- 3** Hurricane Wind Strength
- Hurricanes 2005
- Sea Temperatures 05
- Topographic

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Where and how do tropical storms form?

- Click Modify Map, and then click the Contents button.
- Check the box next to Hurricanes Wind Strength to turn the layer on.
- 4** → Click any point on the trails of these hurricane.
- ? What information is stored for each point along the way? *[Information about air pressure, wind speed, and ocean temperature is stored.]*
- All hurricanes start as tropical depressions (TD).
- Use the Filter Tooltip instructions to filter Hurricane Wind Strength – Category - Is - TD.
- Where do most Atlantic storms reach TD status? *[Most become TD east of the Caribbean.]*

ArcGIS Tropical Storms

New Map Sign In

The screenshot shows the ArcGIS Online interface for a map titled "Tropical Storms". The map displays the Atlantic Ocean with numerous green circular markers representing hurricane tracks. A tooltip window is open over a specific point, titled "This is hurricane DELTA". The tooltip text reads: "Winds are blowing at 35.00 knots an hour. It is an E storm at 1,000 mB of pressure and is traveling over seas around 45 celcius." A red number "4" is placed next to the point being highlighted. The interface includes a top navigation bar with "Details", "Add", "Basemap", "Save", "Share", "Print", "Measure", and "Bookmarks" buttons. A search bar is located on the right. The left sidebar shows the "Contents" panel with "Hurricane Wind Strength" checked. The bottom of the map features a scale bar (0 to 2000 miles) and the Esri logo with "POWERED BY esri" and "Esri, FAO, NOAA".

Where and how do tropical storms form?

- Click Modify Map, and then click the Contents button.
- Check the box next to Hurricanes Wind Strength to turn the layer on.
- Click any point on the trails of these hurricane.
- ? What information is stored for each point along the way? *[Information about air pressure, wind speed, and ocean temperature is stored.]*
- All hurricanes start as tropical depressions (TD).
- 5** → Use the Filter Tooltip instructions to filter Hurricane Wind Strength – Category - Is - TD.
- Where do most Atlantic storms reach TD status? *[Most become TD east of the Caribbean.]*

ArcGIS Tropical Storms

New Map  Sign In



The screenshot shows the ArcGIS Online interface. The top navigation bar includes 'Details', 'Add', 'Basemap', 'Save', 'Share', 'Print', 'Measure', and 'Bookmarks'. A search bar is on the right. The 'Contents' panel on the left shows the 'Hurricane Wind Strength' layer checked and highlighted with a red box and the number '5'. The map displays a world view with a dense trail of green circular points representing hurricane tracks across the Atlantic and Caribbean. A tooltip for 'hurricane DELTA' is open, displaying wind speed (35.00 knots), pressure (1,000 mB), and temperature (45 celcius). A scale bar at the bottom left indicates 0, 1000, and 2000 miles. The bottom right corner features the Esri logo and 'POWERED BY esri' text, along with 'Esri, FAO, NOAA'.

Where and how do tropical storms form?

- Click Modify Map, and then click the Contents button.
- Check the box next to Hurricanes Wind Strength to turn the layer on.
- Click any point on the trails of these hurricane.
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- 5** → Use the Filter Tooltip instructions to filter Hurricane Wind Strength – Category - Is - TD.
- Where do most Atlantic storms reach TD status? *[Most become TD east of the Caribbean.]*

The screenshot shows the ArcGIS interface with a map titled "Tropical Storms". The "Contents" panel on the left shows the "Hurricane Wind Strength" layer checked. A "Filter: Hurricane Wind Strength" dialog box is open, displaying the "Create" tab. The dialog contains the following elements:

- A "Create" tab and a close button (X).
- Buttons: "+ Add another expression" and " Add a set".
- Text: "Display features in the layer that match the following expression".
- Expression field: "AD_TIME" selected in a dropdown, followed by "is" in another dropdown, and an empty text input field.
- Radio buttons: "Value" (selected), "Field", and "Unique".
- Checkbox: " Ask for values" with a dropdown arrow.
- Buttons: "APPLY FILTER", "APPLY FILTER AND ZOOM TO", and "CLOSE".

In the background, a map of the Atlantic Ocean is visible with hurricane tracks. A tooltip for "Hurricane DELTA" is partially visible, showing details like "traveling at 35.00 knots" and "storm at 1,000 mB of". The map includes a scale bar (0 to 2000 miles) and the Esri logo.

Where and how do tropical storms form?

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- 5** → Use the Filter Tooltip instructions to filter Hurricane Wind Strength – Category - Is - TD.
- Where do most Atlantic storms reach TD status? *[Most become TD east of the Caribbean.]*

The screenshot shows the ArcGIS Online interface with a map titled "Tropical Storms". The "Contents" panel on the left shows the "Hurricane Wind Strength" layer checked. A "Filter: Hurricane Wind Strength" dialog box is open, displaying the expression "Category is TD". The "APPLY FILTER" button is highlighted with a red box. The background map shows the Atlantic Ocean and parts of North and South America. A tooltip for "Hurricane DELTA" is visible over the map.

ArcGIS Tropical Storms

New Map Sign In

Details Add Basemap

Contents

- Hurricane Wind Strength
- Hurricanes 2005
- Sea Temperatures 05
- Topographic

Filter: Hurricane Wind Strength

Create

+ Add another expression Add a set

Display features in the layer that match the following expression

Category is TD

Value Field Unique

Ask for values

APPLY FILTER APPLY FILTER AND ZOOM TO CLOSE

Hurricane DELTA

ing at 35.00 knots an
storm at 1,000 mB of
traveling over seas
us.

AUSTRALIA

POWERED BY esri

Esri, FAO, NOAA

Esri.com Help Terms of Use Privacy Contact
Esri Report Abuse

0 1000 2000mi

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ArcGIS **Tropical Storms** New Map Sign In

Details Add Basemap Save Share Print Measure Bookmarks

Contents

- Hurricane Wind Strength
- Hurricanes 2005
- Sea Temperatures 05
- Topographic

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Tropical Storm GeoInquiry



Tropical storms

Target audience – Earth Science, grades 6-9

Time required – 15 minutes

Activity Use hurricane track information to understand factors that encourage the formation of hurricanes.

Science Standards MS-ESS2-5 – Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

Elaborate

Where do tropical storms get such strength?

- Click the Hurricane Strengthening Zone bookmark.
- Turn on the Sea Temperature 05 layer.
- Click the Sea Temperature 05 title, and then click the AvSeaTemp05 subtitle to expand this layer's legend.
- ? At what temperature do storms consistently pick up energy? (You can also click the dots to verify temperatures.) *[Hurricanes may be sustained at lower temperatures, but most storms really grow above 28°C.]*

Evaluate

ArcGIS Tropical Storms

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Details Add Basemap Save Share Print Measure Bookmarks Find address or place

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ArcGIS Tropical Storms New Map

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0 1000 2000mi

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Elaborate

Where do tropical storms get such strength?

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ArcGIS Tropical Storms

New Map ▾ Sign In

The screenshot shows the ArcGIS web interface for a map titled "Tropical Storms". The interface includes a top navigation bar with "Details", "Add", "Basemap", "Save", "Share", "Print", "Measure", and "Bookmarks" options. A search bar is present on the right. On the left, a "Contents" panel lists layers: "Hurricane Wind Strength" (checked), "Hurricanes 2005", "Sea Temperatures 05" (unchecked), and "Topographic". The main map area displays a world map with a red box highlighting a "Strengthening zone" bookmark in the Atlantic Ocean. A red number "6" is placed over the map near this zone. Numerous yellow dots representing sea temperature data points are scattered across the Atlantic and Caribbean regions. A scale bar at the bottom left indicates 0, 1000, and 2000 miles. The bottom right corner features the Esri logo and text "POWERED BY esri" and "Esri, FAO, NOAA".



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- 7 Sea Temperatures 05
- Topographic

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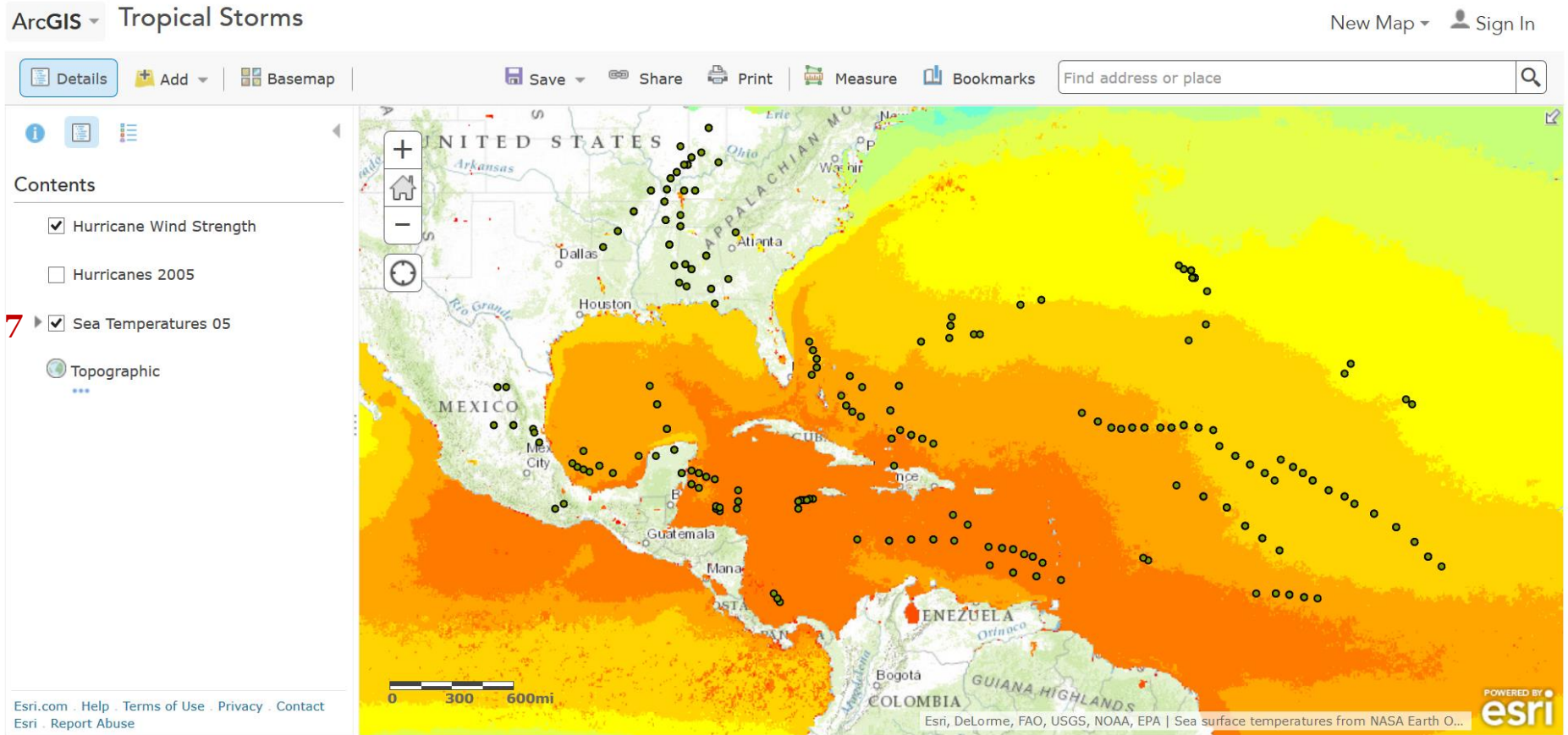
Esri, DeLorme, FAO, USGS, NOAA, EPA



Elaborate

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Elaborate

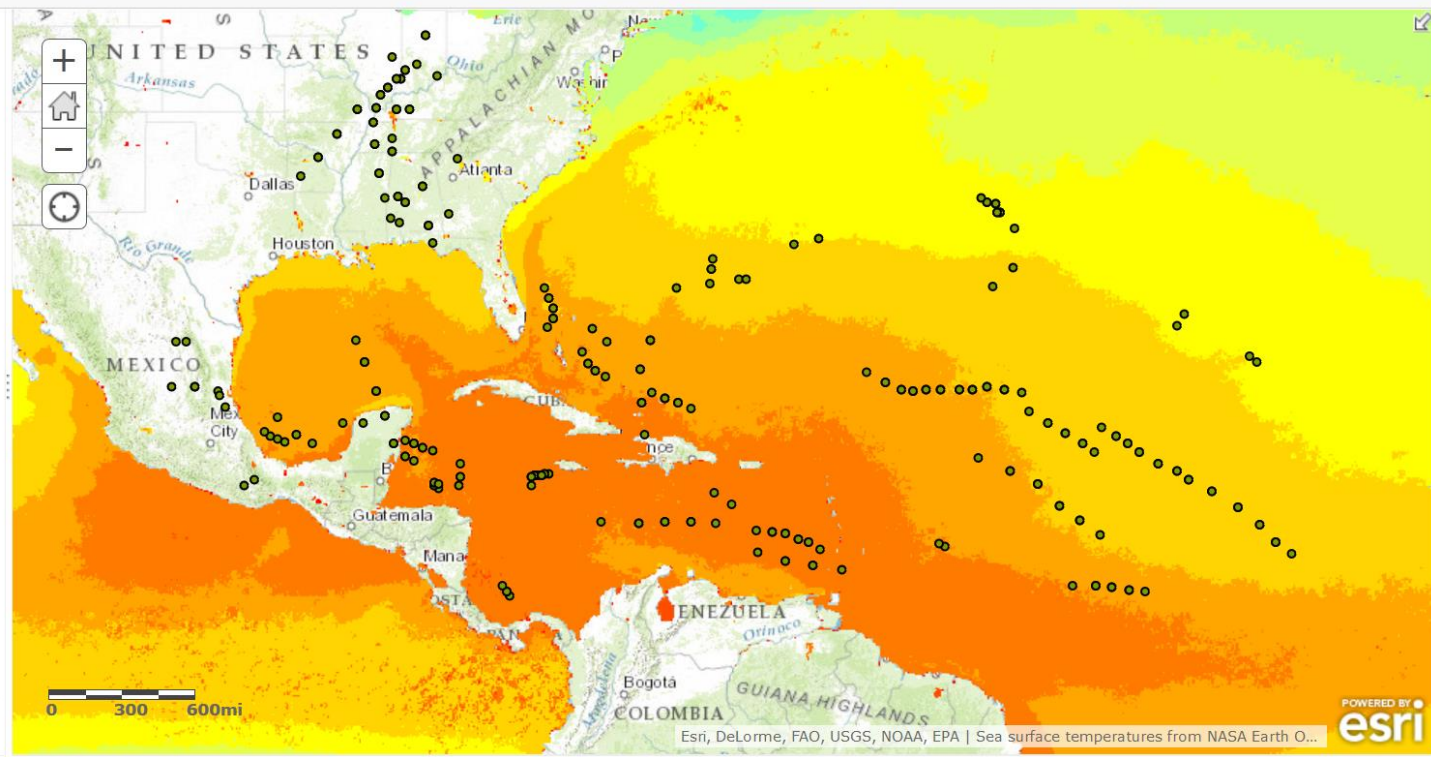
Where do tropical storms get such strength?

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Contents

- Hurricane Wind Strength
- Hurricanes 2005
- 8** **Sea Temperatures 05**
- Topographic





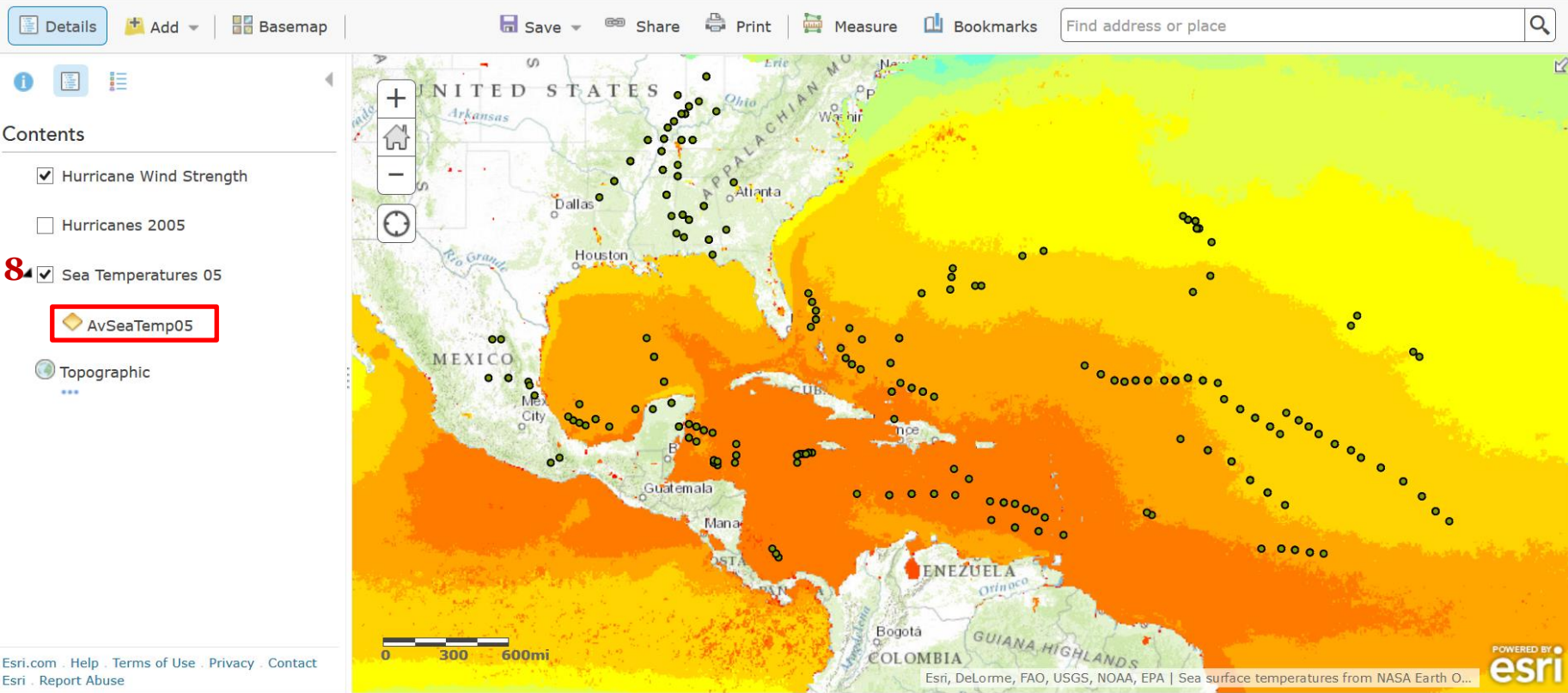
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ArcGIS Tropical Storms

New Map Sign In



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ArcGIS Tropical Storms

New Map Sign In

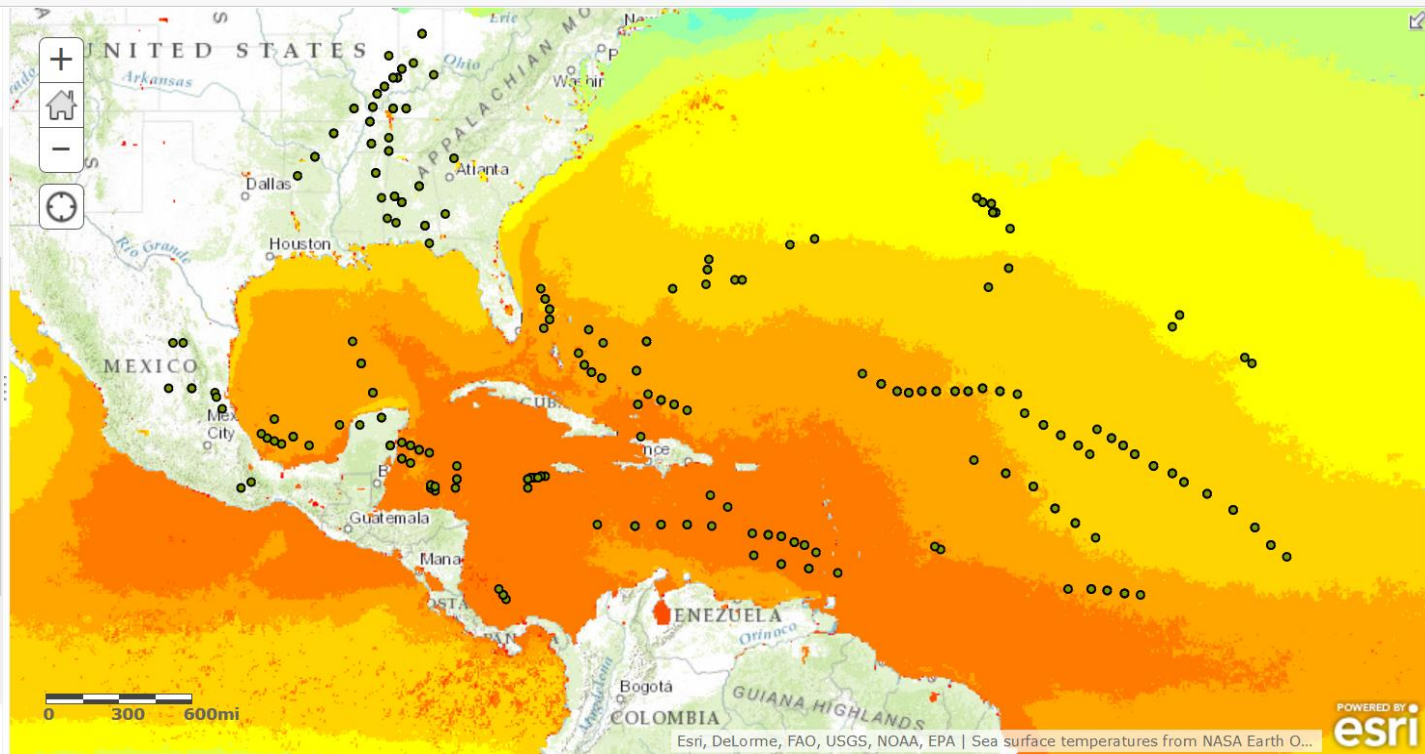
Details Add Basemap Save Share Print Measure Bookmarks Find address or place

Contents

AvSeaTemp05

- 1 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 12
- 13 - 14
- 15 - 17
- 18 - 20
- 21 - 23
- 24 - 25
- 26 - 27
- 28
- 29 - 30
- 31 - 33
- 34 - 37

9





GeoInquiries
(High School)

US History

1. The Great Exchange
2. The 13 Colonies - 1700s
3. The War Before Independence (American Revolution)
4. The War of 1812
5. Westward, ho! (Trails west)
6. The Underground Railroad
7. From Compromise to Conflict
8. A nation divided: The Civil War
9. Native American Lands
10. Steel and the birth of a city (natural resources)
11. World War I
12. Dust Bowl
13. A day that lived in infamy (Pearl Harbor)
14. Operation Overlord - D-Day
15. Hot spots in the Cold War



GeoInquiries
(High School)

Advanced Human Geography

1. Distance, transportation, and scale
2. Understanding Globalization
3. World Population
4. USA Demographics
5. You claim it, you name it! (Toponyms)
6. Language and Religion
7. Sacred space - sacred place
8. Migration - On the Move
9. Borders, boundaries, and barriers
10. Farming, vegetation and the rural landscape
11. Agricultural Patterns
12. The Human Development Index
13. Comparing country development
14. What's the range?
15. Urban areas and edge cities

4



ELEMENTARY

GeoInquiries (Grade 4)

Interdisciplinary

1. Biomes and ecosystems
2. Time zones
3. Street maps
4. Settlement patterns: people and water
5. Exploring Elevation with Lewis and Clark
6. Discovering map scale
7. Where does the water go? (watersheds)
8. Climate
9. Seismic events: natural hazards
10. Mississippi River exploration
11. Expansion of the United States
12. Public lands and national parks
13. Weather forecasting
14. Energy production
15. Natural resources and regions



GeoInquiries
(High School)

Advanced Environmental Science & Biology

1. Population dynamics
2. Megacities
3. Down to the last drop
4. Dead zones (water pollution)
5. The Beagle's Path
6. Primary productivity
7. Tropical Deforestation
8. Marine debris
9. El Nino (and climate)
10. Slowing malaria
11. Altered biomes
12. Spinning up wind power
13. Resource consumption and wealth
14. The human journey
15. Investigating biodiversity

Map-based Inquiry Lessons

Mapping Our World

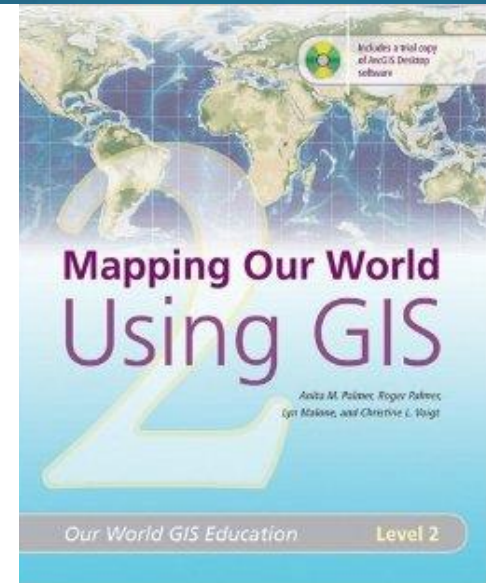
Provide structured lessons in geography, social studies, and environmental science using ArcGIS Online software

Recommended grades: 6-12

Time per lesson: 45-90 minutes

Lessons available at edcommunity.esri.com/MOW include the following:

- Geographic Inquiry
- Geology
- Climate
- Population
- Boundaries
- Forces of Nature



These activities do NOT require logging in
& can be done with or without an ArcGIS Online (AGOL) account

<http://edcommunity.esri.com/MOW/>

Map-based Inquiry Lessons

Thinking Spatially Using GIS

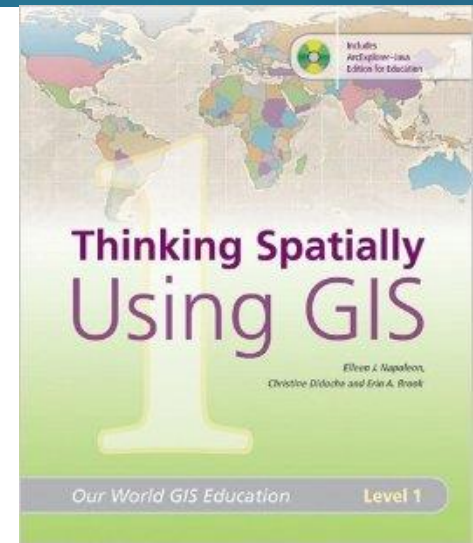
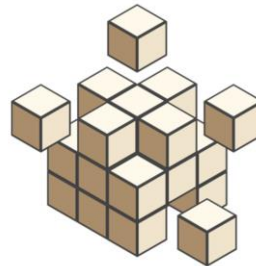
Provide structured lessons in elementary geography using ArcGIS Online software

Recommended grades: 4-6

Time per lesson: 30-60 minutes

Lessons available at edcommunity.esri.com/TSG include the following:

- World Exploration
- The Animal Kingdom
- People and Patterns
- US Tornadoes



These activities do NOT require logging in
& can be done with or without an ArcGIS Online (AGOL) account

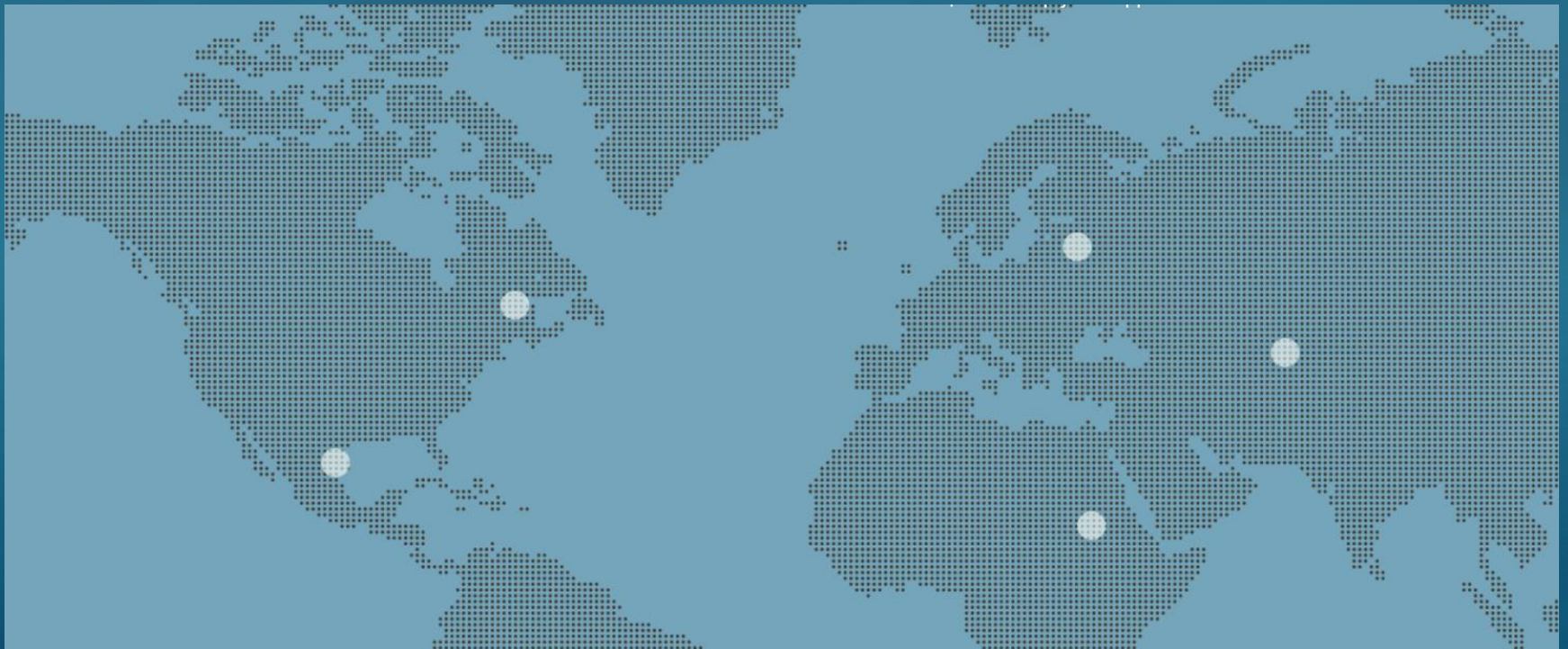
<http://edcommunity.esri.com/TSG/>

Map-based Inquiry Lessons

Story Maps

story map it (verb):

“to actively engage your audience with your data, analysis, and projects”



<http://storymaps.arcgis.com/>

Story Maps work on Multiple Platforms

Aquarium of the Pacific's Magellanic Penguins Story Map

Computers & Laptops

An Aquarium of the Pacific (AOP) story map

Magellanic Penguins

Spheniscus magellanicus

Geographic Range

- Breeding range
- Non-breeding range

1 Magellanic Penguin Geographic Range

2 Aquarium of the Pacific's June Keyes Penguin Habitat

3 Shim ("The Big One")

4 Noodles ("The Bruiser")

5 Paty ("The Shy One")

6 Whatever ("The Bold One")

7 Floyd ("The Cynical One")

8 Ludwig ("The Rowdy One")

9 Newsom ("The Baby")

10 Jeremy ("The Sweet One")

11 Henry ("The Wise Elder")

12 Avery ("The Teenager")

Story Maps work on Multiple Platforms

Aquarium of the Pacific's Magellanic Penguins Story Map

Computers & Laptops

An Aquarium of the Pacific (AOP) story map

Magellanic Penguins
Spheniscus magellanicus

geographic Range
Breeding range
Non-breeding range

Aquarium of the Pacific's Magellanic Penguins Story Map

Heidi ("The Playful One")

Heidi is 1 of 2 Magellanic Penguin Aquarium residents in June 2013. First-time residents of the Aquarium's June 11 incubated both eggs. Photo Credit

7:33 PM

9:41 AM

List Map Media

14 Kate ("The Flirt")

Kate is the flirtatious female of the bunch. She has paired up with Avery and will follow him around, but Robbie is also interested in her. She loves to catch fish in the water and do speed swims around the water tank. Her trainers call her a "highly southern belle." Kate is 1 of 4 penguins in the "Brazilian group," that were found beached and stranded off Niteroi, Brazil. They were rehabilitated and deemed non-releasable. They were sent to live at the Aquarium of the Pacific in the Spring of 2011, as yearlings.

9 10 11 12

wig ("The Rowdy One") Newsom ("The Baby") Jeremy ("The Sweet One") Henry ("The Wise Elder") Avery ("The Teenager")

Tablets

Smart Phones

Story Maps cover Core Content



Sustainable Cities

A story map     esri

We are Living in
The Age of Humans

Innovation in U.S. Cities

Cities across the country are seeking creative ways to adapt to climate change and to reduce the negative effects of urban life on natural systems. Explore the following maps for a small sampling of advances in sustainability.



<http://arcg.is/1uGgg6X>

Story Maps cover Core Content

Living on the Edge: The Extremes of Human Inhabitation

brought to you by a planet mapper   

Living on the Edge

The Hottest

The Coldest

The Rainiest

The Driest

The Highest

The Lowest

The Most Remote



photo credit

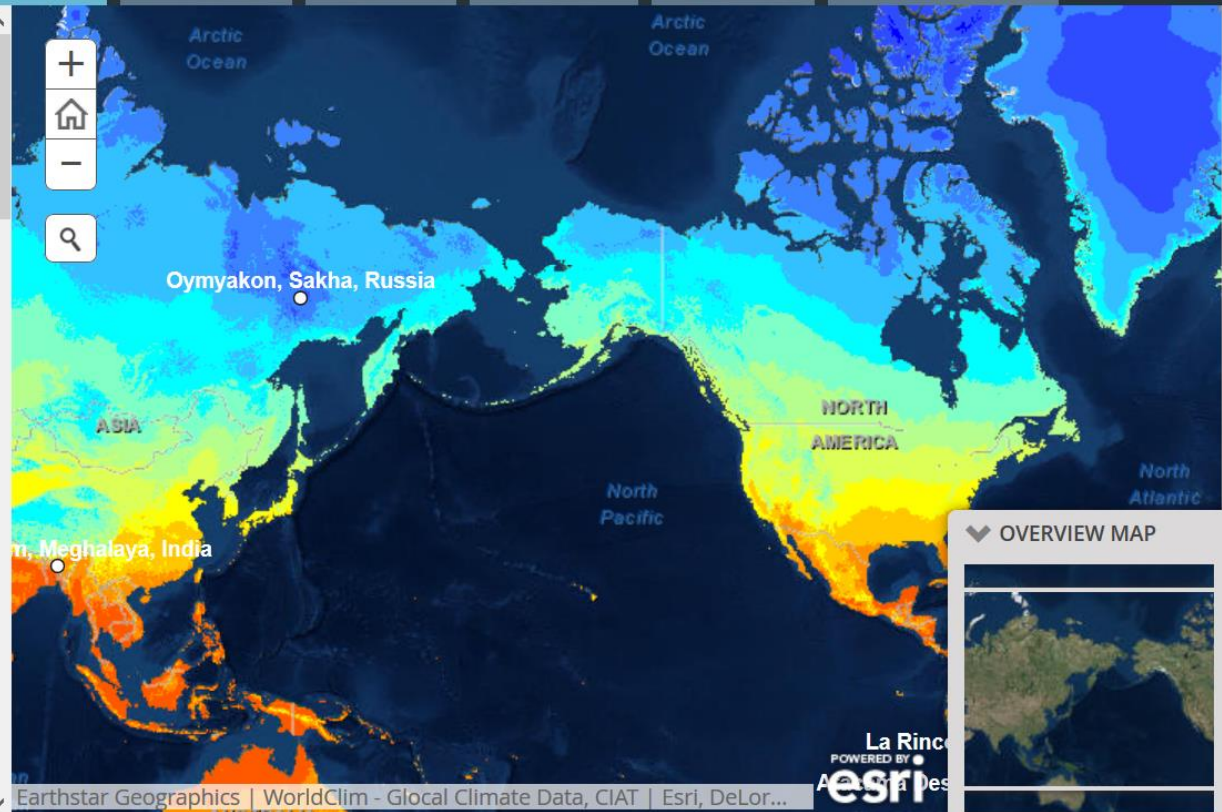
Oymyakon, Russia

Mean annual temperature: 4.2°F
(-15.4°C)

Lowest recorded temperature: -90°F
(-67.8°C)

Population: 547

There's chilly, there's cold, and then there's Oymyakon. Several hundred miles from the Arctic Circle, this village in Siberia is nicknamed the "**Pole of Cold.**" The valley it's nestled in, far from the temperature-moderating effects of a sea, looks cold. Arctic winters in Oymyakon...





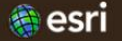
<http://arcg.is/1eQCUYp>

Story Maps cover Core Content

The Assassination of Abraham Lincoln

April 14 marks the 150th anniversary of the assassination of Abraham Lincoln. This map tour recounts the bizarre saga of John Wilkes Booth and his co-conspirators.

A story map   



1865: Booth in Washington

1865: Booth in Washington Booth boarded in the National Hotel at the corner of 6th Street and Pennsylvania Avenue NW. The site is now occupied by the Newseum. Booth, a prominent actor, was admired by Lincoln. Library of Congress

- 1865: Booth in Washington
- March 4, 1865: Lincoln's second inaugural
- March 17: Kidnapping plan foiled
- April 14, morning: The Kirkwood House
- April 14, morning: Ford's Theatre
- April 14, late afternoon: Stalking Ulysses S. Grant
- April 14, evening: Booth waits for Lincoln
- April 14, 10:13 p.m.: The president is shot
- April 14, 10:15 p.m.: Seward attacked and wounded
- April 14, 10:28 p.m.: Lincoln is shot

<http://arcg.is/1NTUPL3>

Story Maps cover Core Content

A Story Map by JMT    Prologue 

Mapping Segregation in Washington DC Legal Challenges to Racially Restrictive Covenants

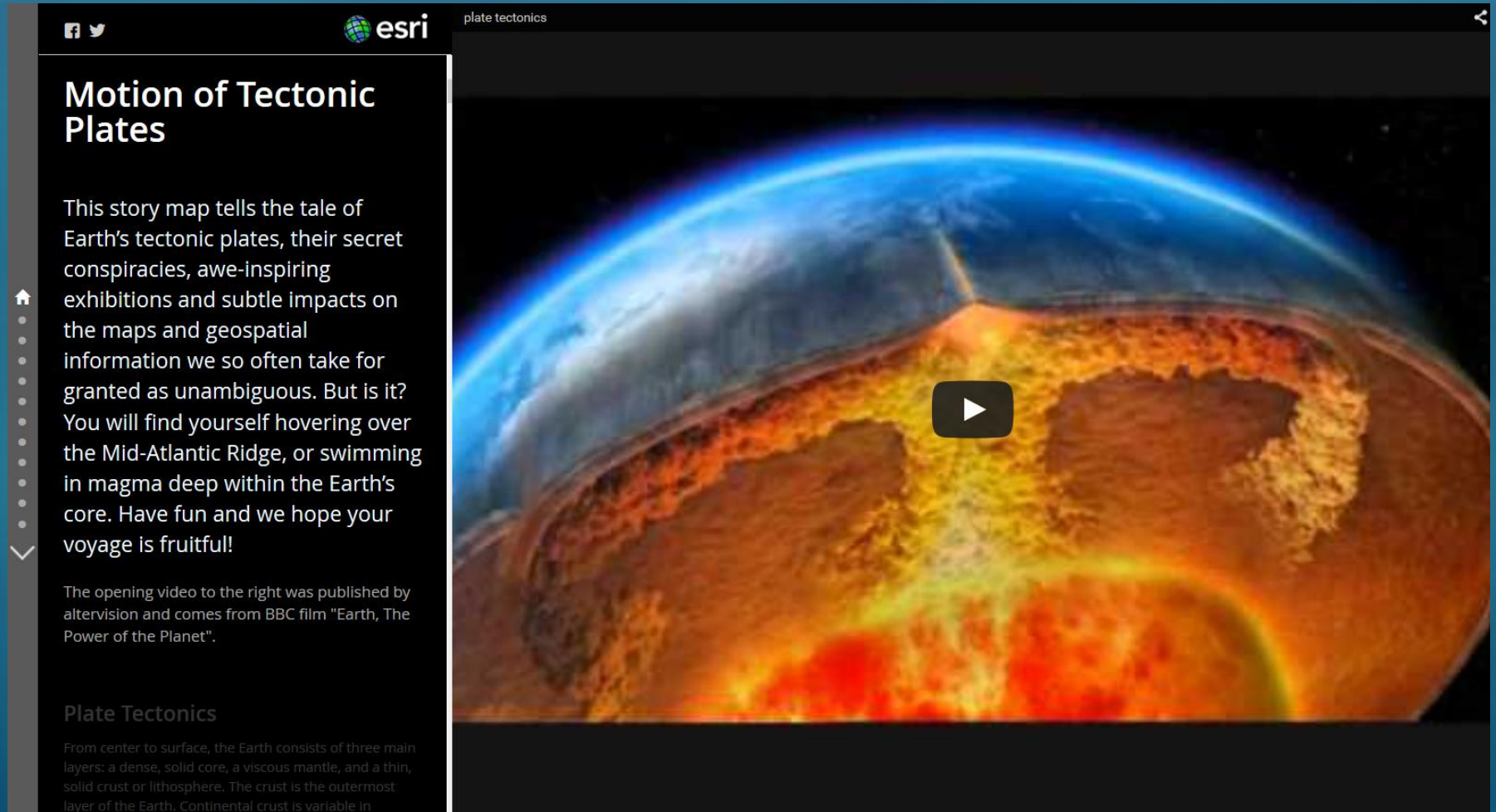
The rise of segregation in DC during the first half of the 20th century coincided with a period of rapid population growth. The exodus of African Americans from the South accelerated as Jim Crow took hold during the 1890s, and DC offered unique educational and employment opportunities.

However, restrictive deed covenants confined much of DC's rapidly expanding black population to substandard, overcrowded



<http://arcg.is/1dLq259>

Story Maps cover Core Content



The screenshot shows an Esri Story Map interface. At the top left, there are social media icons for Facebook and Twitter, followed by the Esri logo. The title 'Motion of Tectonic Plates' is prominently displayed. Below the title is a paragraph of introductory text. To the left of the text is a vertical navigation menu with a home icon at the top, a series of dots, and a downward arrow at the bottom. Below the text is a section titled 'Plate Tectonics' with a short paragraph. On the right side of the interface, there is a video player showing a cross-section of the Earth's interior, with a play button in the center. The video title 'plate tectonics' is visible at the top of the player area.

Motion of Tectonic Plates

This story map tells the tale of Earth's tectonic plates, their secret conspiracies, awe-inspiring exhibitions and subtle impacts on the maps and geospatial information we so often take for granted as unambiguous. But is it? You will find yourself hovering over the Mid-Atlantic Ridge, or swimming in magma deep within the Earth's core. Have fun and we hope your voyage is fruitful!

The opening video to the right was published by *altermision* and comes from BBC film "Earth, The Power of the Planet".

Plate Tectonics

From center to surface, the Earth consists of three main layers: a dense, solid core, a viscous mantle, and a thin, solid crust or lithosphere. The crust is the outermost layer of the Earth. Continental crust is variable in

<http://apl.maps.arcgis.com/apps/MapJournal/?appid=df5f94c0050b4075adfbba54fb13eae6>

The Aquarium's Story Maps website

The screenshot shows the website's navigation bar with links for Home, Gallery, Map, Scene, and Groups, along with a Sign In button and a search icon. The main banner features the Aquarium of the Pacific logo, a nautilus shell, a fish, a submersible, a crab, and a world map puzzle, with the text 'OCEAN EXPLORATION' and 'Story Maps Website'. Below the banner is a section titled 'Story Maps and other GIS-related projects' containing four project cards: 'AOP's Magellanic Penguins Story Map', 'AOP's Southern California Steelhead Story Map' (marked '1st PLACE'), 'AOP, The GREEN Aquarium (working draft)', and 'BTI 2014 Workshop (working draft)'. The bottom section contains the aquarium's mission statement and a paragraph about its role as a community gathering place.

Home Gallery Map Scene Groups Sign In

AQUARIUM OF THE PACIFIC
A non-profit institution

OCEAN EXPLORATION

Story Maps Website

Story Maps and other GIS-related projects

- Penguins**
Story Map
AOP's Magellanic Penguins Story Map
- Steelhead**
Story Map
AOP's Southern California Steelhead Story Map
- The GREEN Aquarium**
Story Map (working draft)
AOP, The GREEN Aquarium (working draft)
- BTI 2014 Workshop**
Story Map (working draft)
BTI 2014 Workshop (working draft)

The Aquarium of the Pacific's mission is to instill a sense of wonder, respect, and stewardship for the Pacific Ocean, its inhabitants, and ecosystems. Our vision is to create an aquarium dedicated to conserving and building Natural Capital (Nature and Nature's services) by building Social Capital (the interactions between and among peoples).

The Aquarium of the Pacific (AOP) is the fourth most-attended aquarium in the nation. It displays over 12,000 animals in more than 50 exhibits that represent the diversity of the Pacific Ocean. Each year more than 1.5 million people visit the Aquarium. Beyond its world-class animal exhibits, the Aquarium offers educational programs for people of all ages from hands-on activities to lectures by leading scientists. Through these programs and a variety of multimedia experiences, the Aquarium provides opportunities to delve deeper into ocean science and learn more about our planet. The Aquarium of the Pacific has redefined the modern aquarium. It is a community gathering place where diverse cultures and the arts are celebrated and a place where important topics facing our planet and our ocean are explored by scientists, policy-makers and stakeholders in the search for sustainable solutions.

<http://aop.maps.arcgis.com>

Using Story Maps to help guests learn more about our...

Animals



Exhibits



Experiences



Locations



Issues



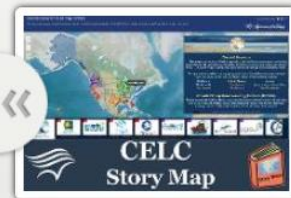
Example of a Story Map about our Exhibits

HOME GALLERY MAP SCENE GROUPS

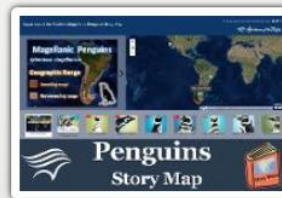
Sign In



Story Maps and other GIS-related projects



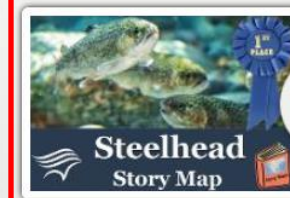
AOP's CELC Story Map



AOP's Magellanic Penguins Story Map



AOP's Seafood Story Map



AOP's Southern California Steelhead Story Map

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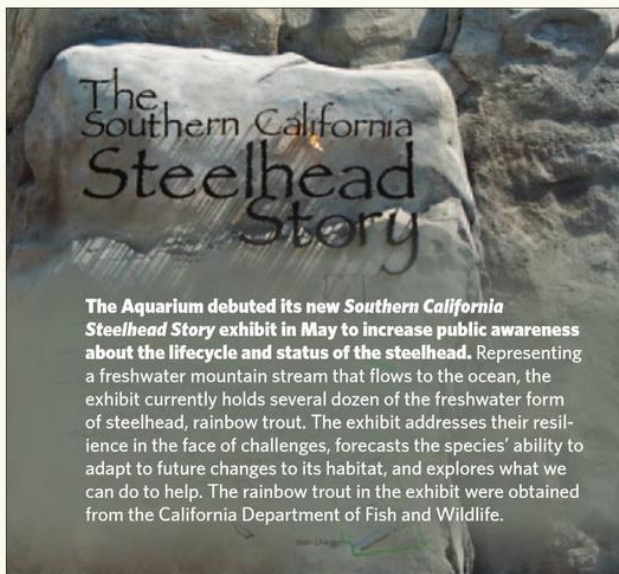
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Example of a Story Map about our Exhibits

an AOP story map



Southern California Steelhead



Species Overview

Steelhead are members of the salmon family that includes all salmon species, trout, and char. Southern California steelhead are the only members of the salmon family native to Southern California. They are anadromous fish, that is, they hatch and live for a part of their life cycle in fresh water, migrate to the ocean where they spend to mature, and return to a freshwater stream, usually the one where they were hatched, to spawn. Unlike their salmon relatives, they usually do not die after spawning.



Example of a Story Map about our Exhibits

an AOP story map

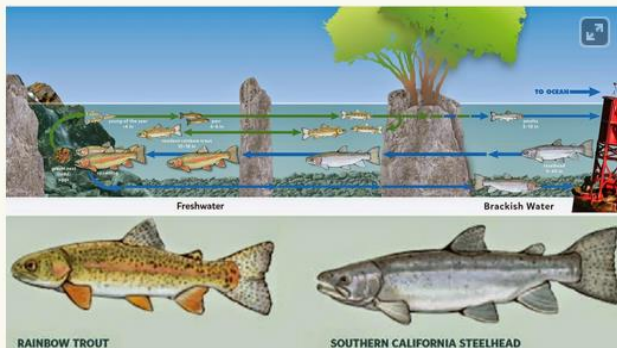


Southern California Steelhead

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Steelhead is the name given to ocean-going rainbow trout. Steelhead are born and remain in freshwater for 1-3 years as juveniles, then migrate to the ocean and stay for 1-4 years while growing into adults. When rivers are typically swollen in winter, adults migrate to freshwater to spawn, usually in the stream where they were born. Steelhead belong to a family that includes all salmon, trout, and char. Unlike salmon, which spawn only once, adult Steelhead often return to the ocean after spawning and repeat the spawning migration the next year.



The image on the right is a painting by Ben Lovejoy titled "A Steelhead's Journey" (<http://www.steelheadrecovery.org/images/lovejoy-painting-large.jpg>)



Example of a Story Map about our Exhibits

an AOP story map



Southern California Steelhead

Historical Southern California Steelhead Populations

At one time steelhead spawned in the majority, if not all, of California's coastal rivers.



"Ventura River Steelhead Anglers, 1909" (NMFS's 2012 Southern California Steelhead Recovery Plan, page 5)

The map on the right shows the **historical distribution** of Southern California Steelhead populations.

Southern California steelhead can tolerate warm water and have a complex yet flexible life history that increases their resistance to environmental change. Steelhead are at risk of extinction, but restoring water quality and quantity, and removing or modifying man-made barriers to migration in certain Southern California streams would increase their chances of survival.

Present Day Southern California Steelhead Populations

Over the last 100 years the Southern California Steelhead population has declined 99% and some runs are extirpated. Southern California Steelhead are



Esri, GEBCO, DeLorme, NaturalVue | Copyright: © 2010 MDA Info...

Example of a Story Map about our Exhibits

an AOP story map



Southern California Steelhead

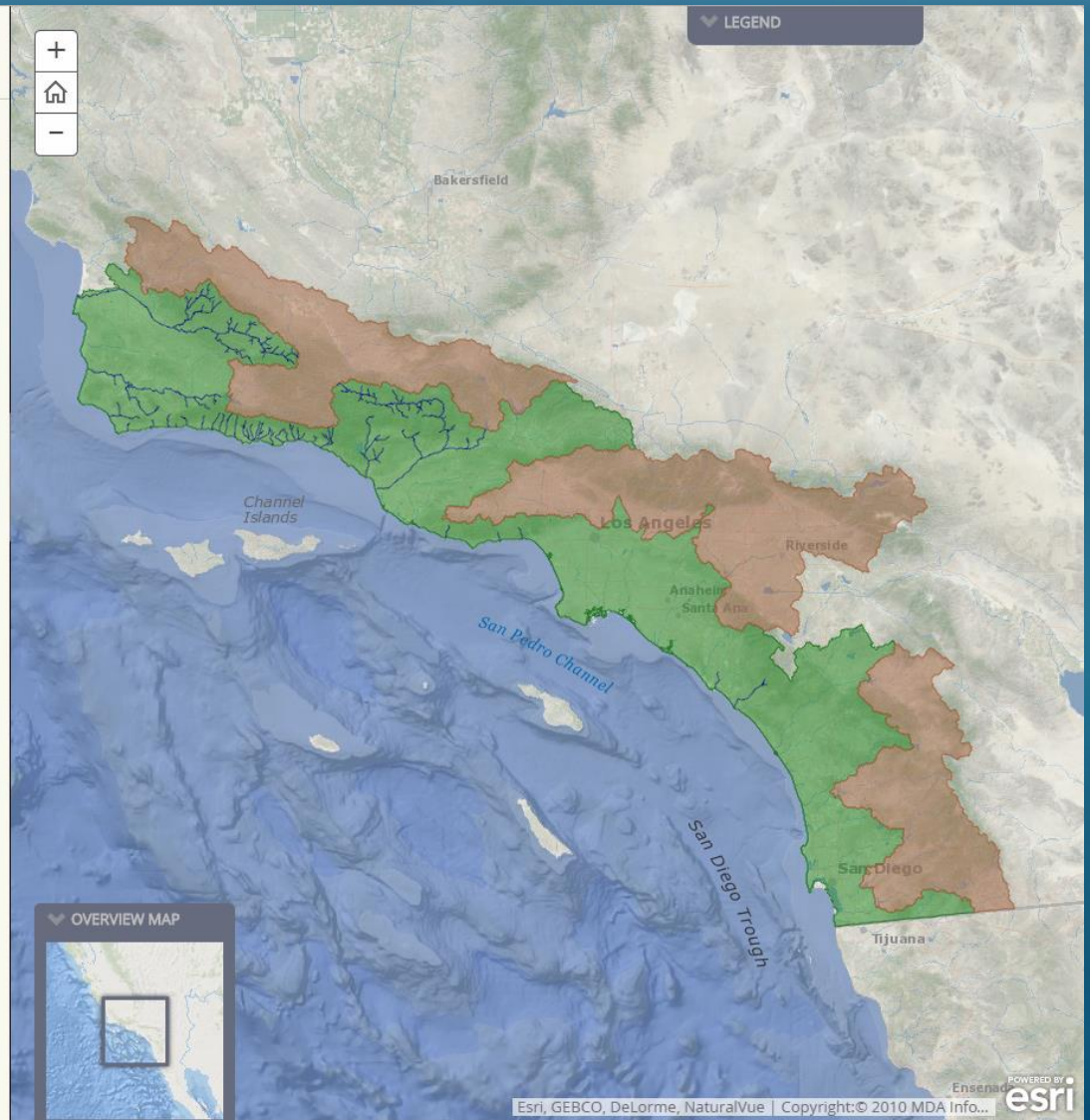
Present Day Southern California Steelhead Populations

Over the last 100 years the Southern California Steelhead population has **declined 99%** and some runs are extinct. Southern California Steelhead are now listed as endangered under the U.S. Endangered Species Act. The southern California population has declined from about 40,000 steelhead to less than 500. This decline was in large part the result of manmade infrastructure (like dams, concrete lined washes, etc).

The map on the right shows the **current steelhead population range**, the **historical range** which is now anthropogenically blocked, and the locations of **major dams**.



"Bradbury Dam, Santa Ynez River" (NMFS's 2012 Southern California Steelhead Recovery Plan, page 9)



POWERED BY esri
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Example of a Story Map about our Exhibits

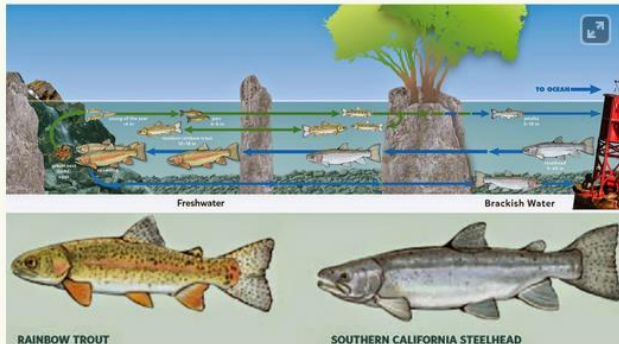
an AOP story map



Southern California Steelhead

At the Aquarium

The Aquarium's steelhead exhibit transports visitors along a mountain path, allowing them to view these fish in three areas, representing the species' journey from freshwater to brackish water, and finally to the ocean. Through this exhibit, the Aquarium hopes to reveal the secrets of a little-known fish that lives amongst us in our urban environment and inspire conservation of this unique animal.



Upper Elevation Habitats

The places where adults spawn, eggs hatch, and young fish develop (0-1 year).



Example of a Story Map about our Exhibits

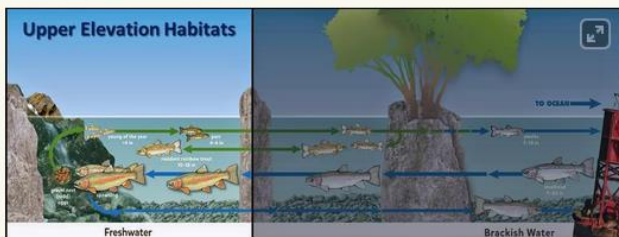
an AOP story map



Southern California Steelhead

Upper Elevation Habitats

The places where adults spawn, eggs hatch, and young fish develop (0-1 year).



The first segment of the Aquarium's steelhead exhibit represents the **Upper Elevation Habitats** and is filled with **juvenile rainbow trout** (< 4 inch long).



Mid-Elevation Habitats

The places where young fish continue to grow. Some will stay in fresh water for life and remain as rainbow trout. Others will migrate to the ocean and become steelhead.



LEGEND

OVERVIEW MAP



CSUMB, Esri, DeLorme, NaturalVue | Copyright: © 2010 MDA Inf...

POWERED BY
esri

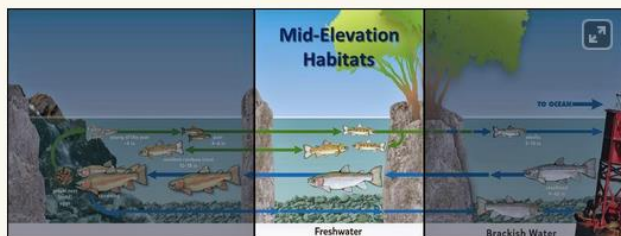
Example of a Story Map about our Exhibits

an AOP story map    

Southern California Steelhead

Mid-Elevation Habitats

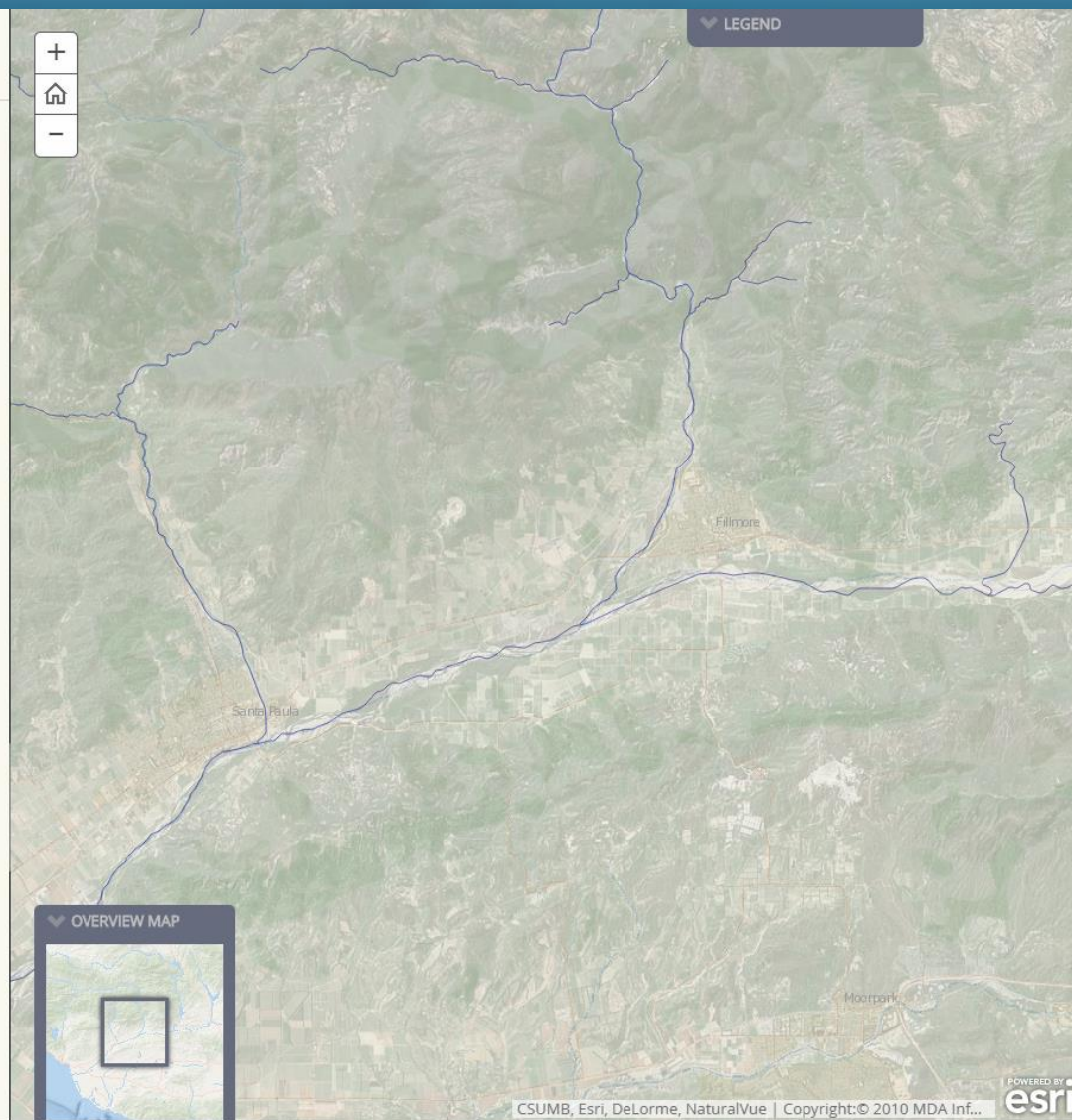
The places where young fish continue to grow. Some will stay in fresh water for life and remain as rainbow trout. Others will migrate to the ocean and become steelhead.



The middle segment of the Aquarium's steelhead exhibit represents the mid-elevation habitats and is filled with the resident rainbow trout (10-18 inch long)



Estuarine Habitats



Example of a Story Map about our Exhibits

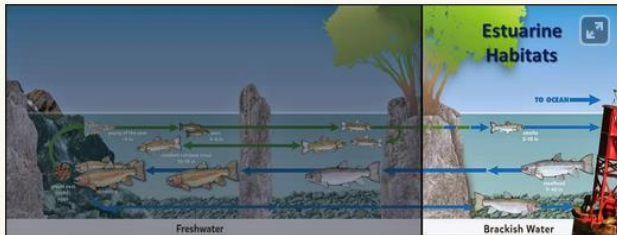
an AOP story map



Southern California Steelhead

Estuarine Habitats

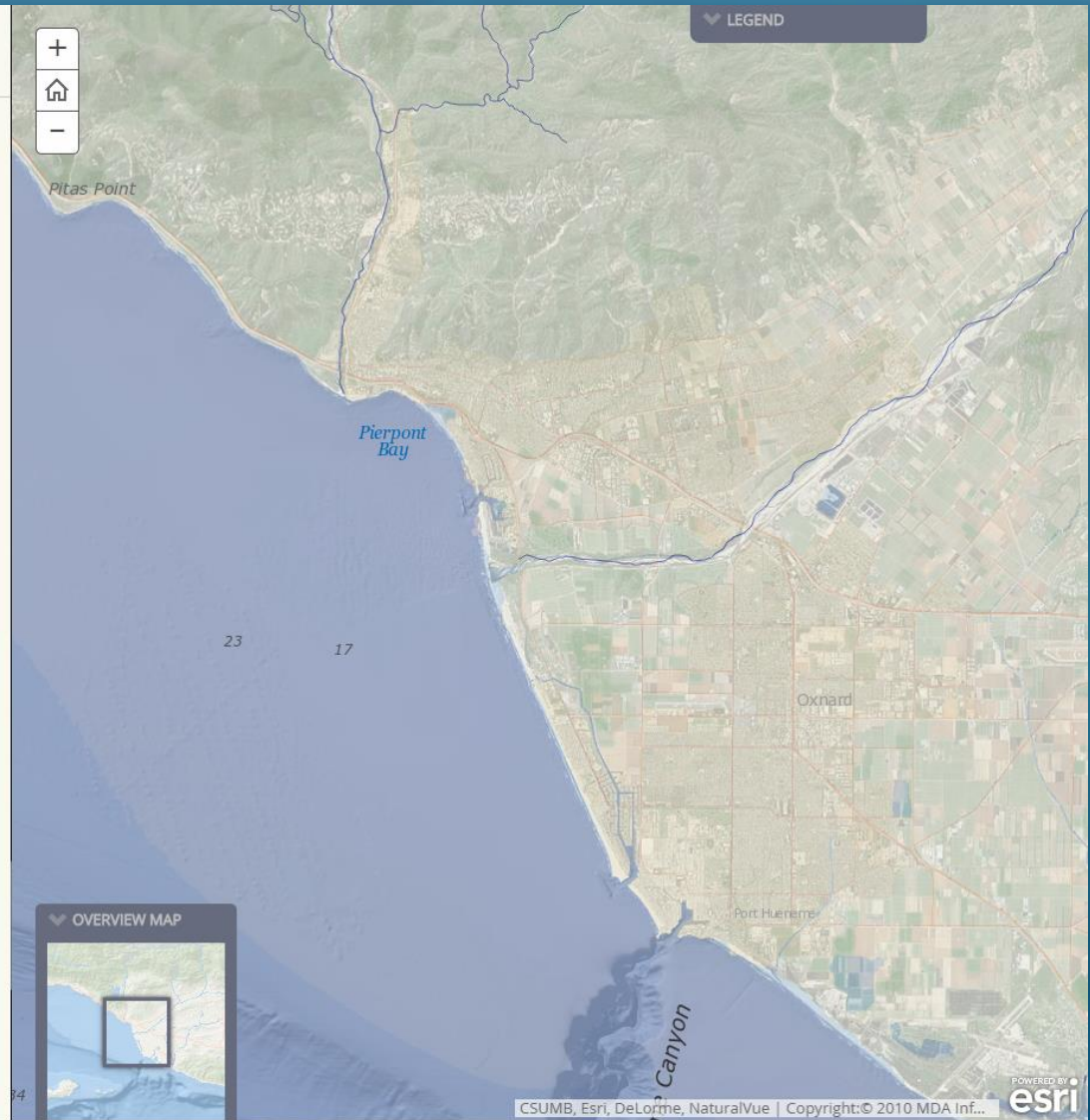
The places where most young fish grow and develop in preparation for their journey to the ocean where they become steelhead and the places to which they later return from the ocean on their way back upstream to spawn.



The last segment of the Aquarium's steelhead exhibit represents the estuarine habitats and is filled with the smolts (5-10 inch), which will hopefully turn into steelhead (9-40 inch) someday.



[Read More](#)



Example of a Story Map about our Exhibits

an AOP story map



Southern California Steelhead

Steelhead

Historian John G. "Tom" Tomlinson, Jr., in collaboration with the Aquarium of the Pacific, has written a book documenting the local history of the Southern California Steelhead, including historic photos, postcards, fishery data, newspaper clippings, and rainfall statistics.

This book gathers historical information about this fish species and describes its resilience in the face of the region's changing watersheds, rainfall levels, and manmade infrastructure.

Against the Currents is available for sale in the Pacific Collections gift store or online at shop.aquariumofpacific.org

Learn More

Watch "Southern California Steelhead: Against All Odds" by California Trout

Southern California Steelhead: Against All Odds
from California Trout

SOUTHERN CALIFORNIA STEELHEAD: Against All Odds

19:26 HD vimeo

available online at: <http://vimeo.com/79393289>

More information about southern California Steelhead can be found online at:

- The Aquarium's Online Learning Center "Southern California Steelhead" page
- National Marine Fisheries Service (NMFS) [Steelhead profile](#)
- The [Recovery Plan for Southern California Steelhead](#) (Jan. 2012)

AGAINST THE CURRENTS
THE UNLIKELY STORY OF THE SOUTHERN CALIFORNIA STEELHEAD

Southern California Steelhead Recovery Plan Summary

Learn More

AQUARIUM OF THE PACIFIC
SOUTHERN CALIFORNIA STEELHEAD

NOAA Fisheries Office of Protected Resources
Steelhead Trout (*Oncorhynchus mykiss*)


Example of a Story Map about an Issue / Topic

HOME GALLERY MAP SCENE GROUPS


Sign In



Story Maps and other GIS-related projects




Ocean Exploration Story Map
Ocean Exploration Story Map (working draft)



Sea Level Rise App



Watersheds Online Exhibit App



Whale Research App

The Aquarium of the Pacific's mission is to instill a sense of wonder, respect, and stewardship for the Pacific Ocean, its inhabitants, and ecosystems. Our vision is to create an aquarium dedicated to conserving and building Natural Capital (Nature and Nature's services) by building Social Capital (the interactions between and among peoples).

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Example of a Story Map about an Issue / Topic

An Aquarium of the Pacific (AOP) story map



Ocean Exploration



The **Exploration Now** program, which is run out of the **Inner Space Center** in Rhode Island, promotes awareness of the need to advance the field of deep sea exploration by connecting the public to research vessels as they explore the deep sea.

- <http://explorationnow.org/about>



The map on the right shows the location of the Inner Space Center, and the current location and status of each of the 5 vessels (as of Dec. 2014).

Inner Space Center

Mission

The Inner Space Center is an innovative leader in advancing ocean science exploration, research, and literacy.

Vision

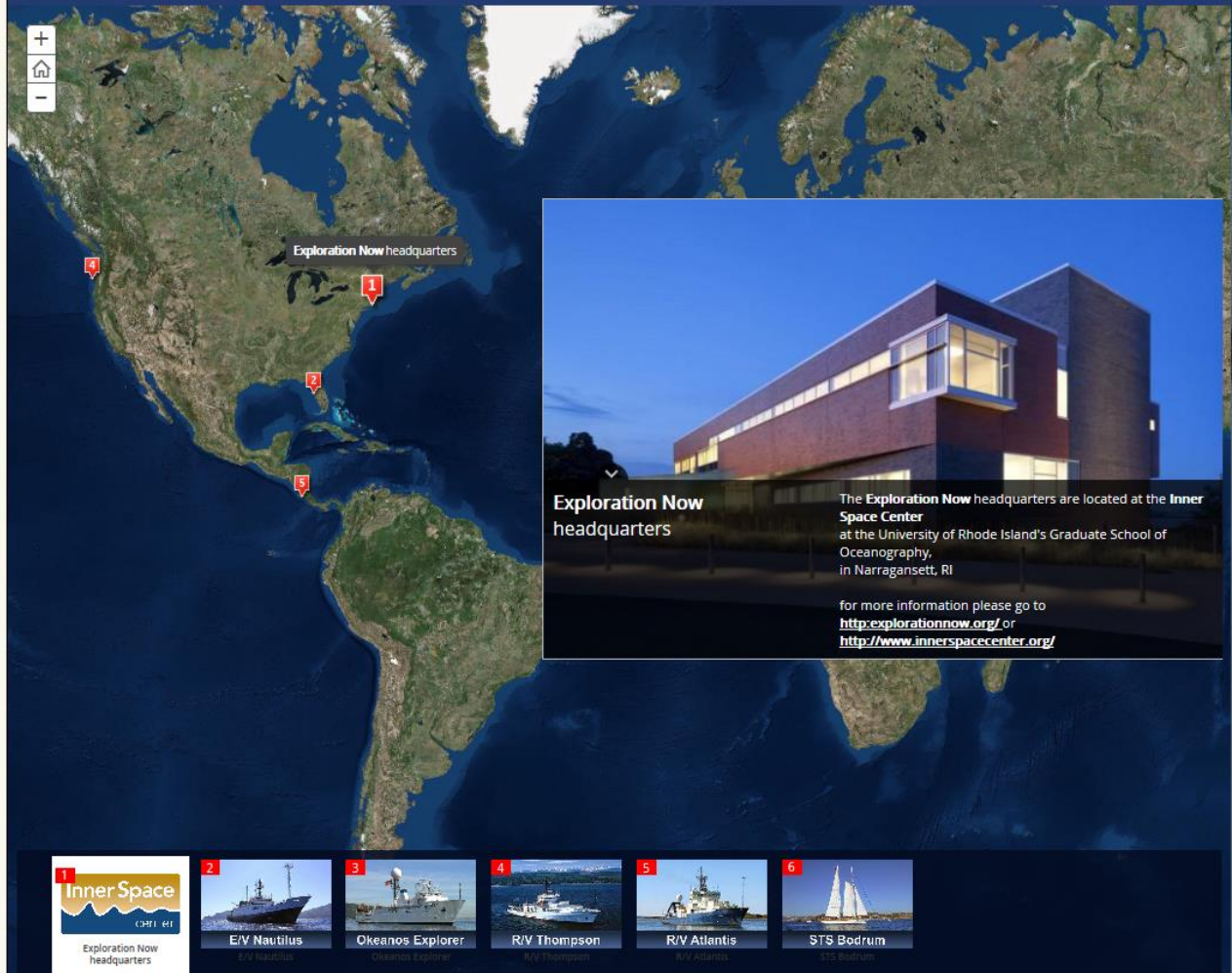
The Inner Space Center uses cutting edge technology, including telepresence, for ocean science research, exploration, and education. The ISC generates accessible

Exploration Now

an AOP story map



This map shows the current locations and status of all the ships in the Exploration Now Program



Example of a Story Map about an Issue / Topic

An Aquarium of the Pacific (AOP) story map



Ocean Exploration

Research Submersibles



An ROV is a remotely operated vehicle used by research teams as a submersible. ROVs are tethered to ships. They are controlled by a remote either on ship or land. They are powered by the ship. For the purpose of ocean exploration, the ROVs we follow have high definition video cameras that record the live streaming video.



Facebook Twitter Share

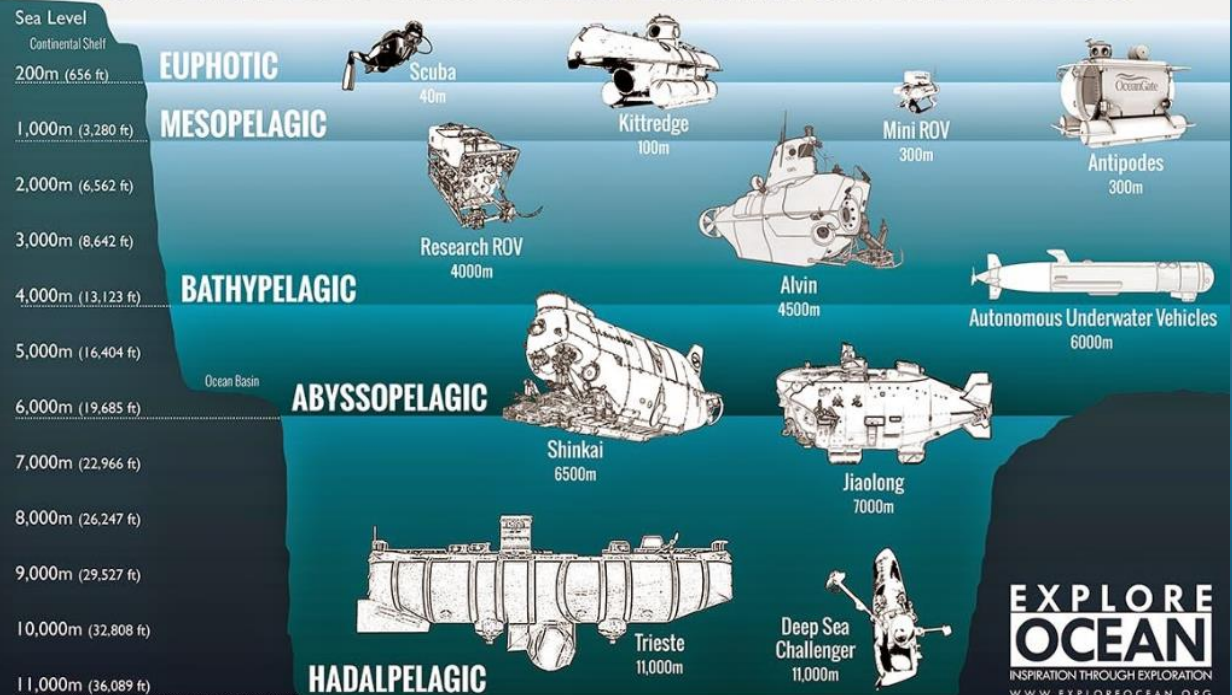
E/V Nautilus



The Exploration Vessel (E/V) Nautilus, is a 64-meter research vessel operated by the Ocean Exploration Trust

The Ocean Exploration Trust was founded in 2008 by Titanic-discoverer and National Geographic Explorer-in-Residence Dr. Robert Ballard to engage in pure ocean exploration.

OCEAN DEPTHS & EXPLORATION METHODS



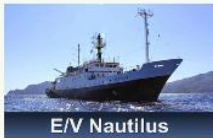
EXPLORE OCEAN
INSPIRATION THROUGH EXPLORATION
WWW.EXPLOREOCEAN.ORG

Example of a Story Map about an Issue / Topic

An Aquarium of the Pacific (AOP) st...    

Ocean Exploration

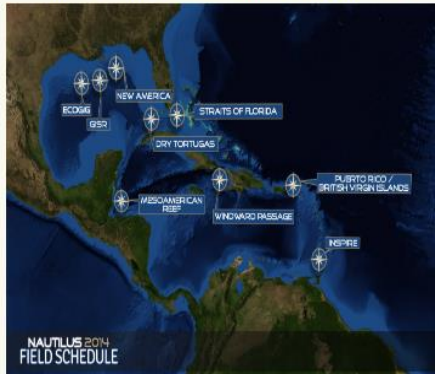
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Map of the 2014 Nautilus Expeditions




Their international programs center on scientific exploration of the seafloor. In addition to conducting scientific research, their expeditions are made available to explorers on shore via live

NAUTILUS LIVE

Explore the ocean LIVE with Dr. Robert Ballard and the Corps of Exploration



[MAIN](#) [THE EXPEDITION](#) [PHOTOS & VIDEOS](#) [THE TECH](#) [THE SCIENCE](#) [THE TEAM](#) [LATEST NEWS](#) [EDUCATORS](#) [JOIN US](#) 

LATEST NEWS

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Meet the Siphonophore



"Wrath of Khan" Worm Found in Mussels



The Future of Science: Exploring with Remote Telespresence



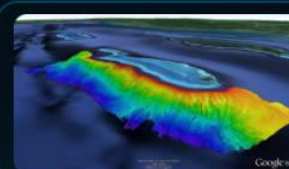
What Happens to Collected Samples?



Nautilus Doodles: Science Communication Through Art



Shrinking Cups in the Deep



Create Your Own Story Map

- **1. Create a FREE ArcGIS Online Organization Account**
by filling out this form: <https://esri.app.box.com/connectedrequest>



Free ArcGIS Online School Account
US K12 schools can request a free account for instruction. ([Terms and conditions](#))

Request a Free US School Account X

Organization <input type="text" value="To select, begin typing."/>	Department <input type="text"/>
Street Address <input type="text"/>	City <input type="text"/>
State <input type="text" value="- Select -"/>	ZIP Code <input type="text"/>
School Website <input type="text"/>	School Phone <input type="text"/>
Contact First Name <input type="text"/>	Contact Last Name <input type="text"/>
Contact Email <input type="text"/>	<input type="checkbox"/> Agree to Terms and Conditions

- **2. Download & Install the “Snap2Map” App**

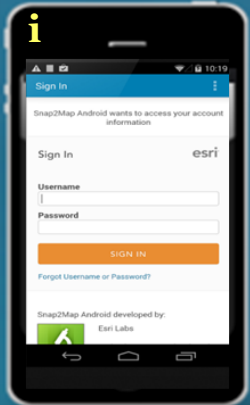


Create Your Own Story Map

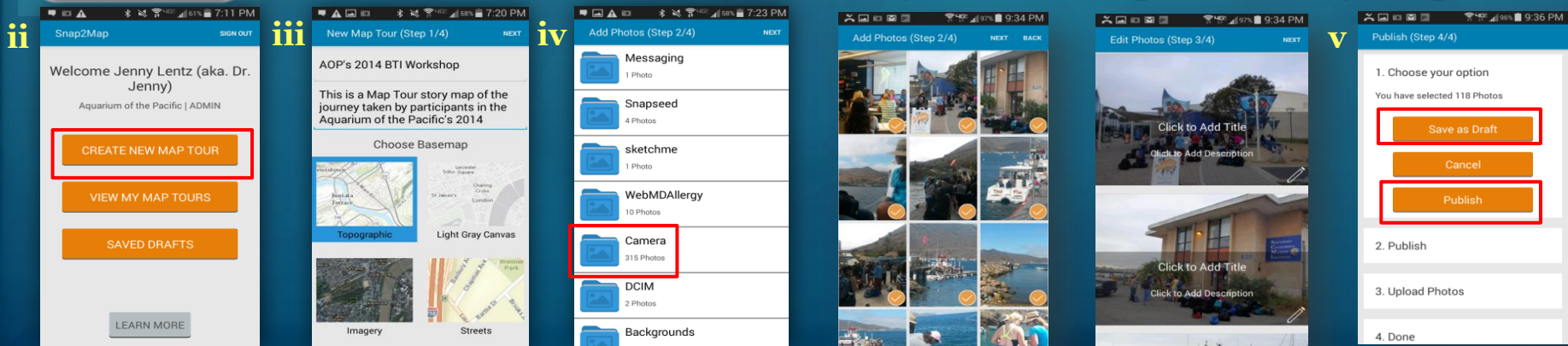
- 1. Create a **FREE ArcGIS Online Organization Account**
- 2. Download & Install the **“Snap2Map” App**
- **3. Collect Data on your Smart Device**
 - Make sure your smart-device’s **Location settings** are turned on
 - This includes making sure your **camera’s geotagging** feature is ON

Create Your Own Story Map

- 1. Create a **FREE ArcGIS Online Organization Account**
- 2. Download & Install the **“Snap2Map” App**
- 3. **Collect Data on your Smart Device**
- 4. **Open the Snap2Map App**




- i. Sign in to your ArcGIS Online Organization Account
- ii. Select **“Create New Map Tour”**
- iii. Fill in the **Title, Description, &** select a **Basemap**
- iv. Select the **folder & photos** to be included in your Story Map
- v. **Save and Publish** your newly created Map Tour Story Map!



BTI 2014 Map Tour Story Map

Home Gallery Map Scene Groups Sign In

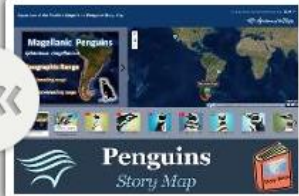


AQUARIUM OF THE PACIFIC
A non-profit institution

OCEAN EXPLORATION


Story Maps Website

Story Maps and other GIS-related projects




Penguins
Story Map

AOP's Magellanic Penguins Story Map




Steelhead
Story Map

AOP's Southern California Steelhead Story Map



The GREEN Aquarium
Story Map (working draft)

AOP, The GREEN Aquarium (working draft)



BTI 2014 Workshop
Story Map (working draft)

BTI 2014 Workshop (working draft)


The Aquarium of the Pacific's mission is to instill a sense of wonder, respect, and stewardship for the Pacific Ocean, its inhabitants, and ecosystems. Our vision is to create an aquarium dedicated to conserving and building Natural Capital (Nature and Nature's services) by building Social Capital (the interactions between and among peoples).

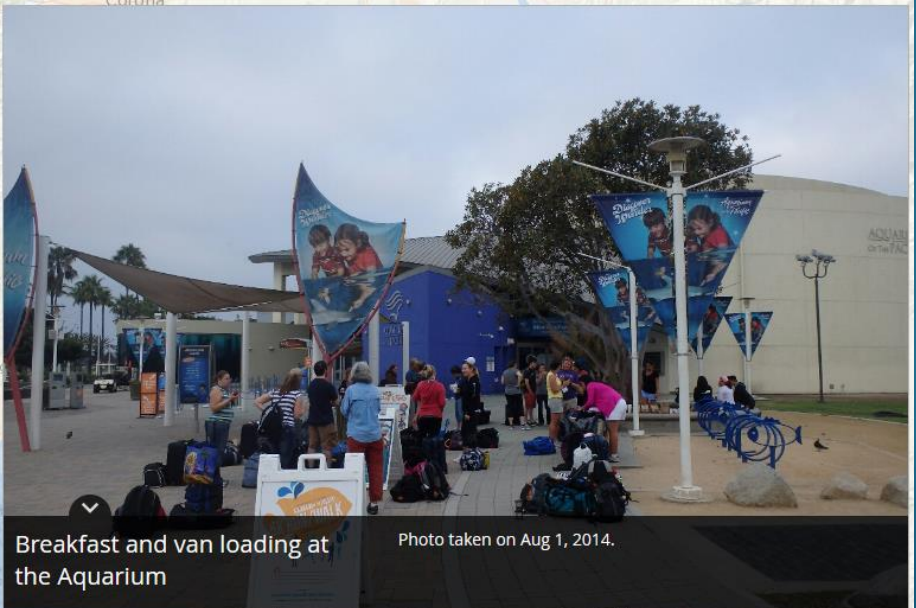
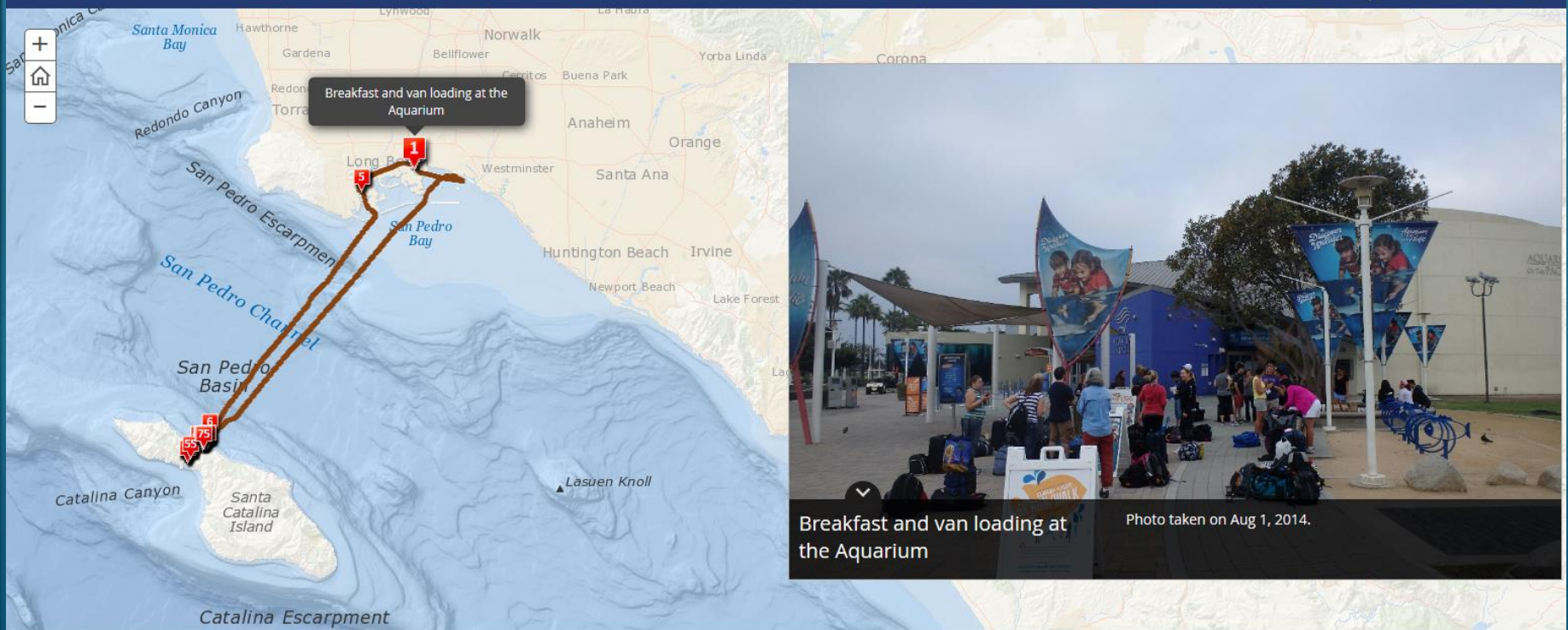
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BTI 2014 Map Tour Story Map

AOP's 2014 BTI Workshop

This is a Map Tour story map of the journey taken by participants in the Aquarium of the Pacific's 2014 Boeing Teacher Institute (BTI) Workshop

an AOP story map   



1
Breakfast and van loading at the Aquarium



Catalina

Carlsbad Canyon

Map Tour Story Map Tutorial

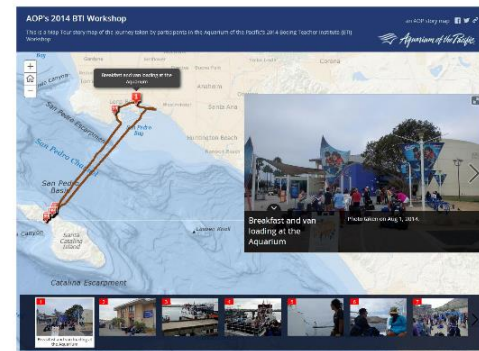
Story Map Tutorial and links FREE GIS Lesson Plans for K-12 Classrooms

available online at:

[http://JenniferALentz.info/
Teaching/Tutorials/
CreatingMapTourStoryMaps_2014.pdf](http://JenniferALentz.info/Teaching/Tutorials/CreatingMapTourStoryMaps_2014.pdf)

Creating “Map Tour” Story Maps

How to create a Map Tour Story Map quickly and easily using your smartphone or tablet, and your ArcGIS Online Organization Account



This Tutorial was Created by
Jennifer Anne Lentz, Ph.D.
Education Specialist at the Aquarium of the Pacific

*This tutorial, and other teaching-related materials by Dr. Lentz are available online at:
<http://JenniferALentz.info/Teaching.html>*

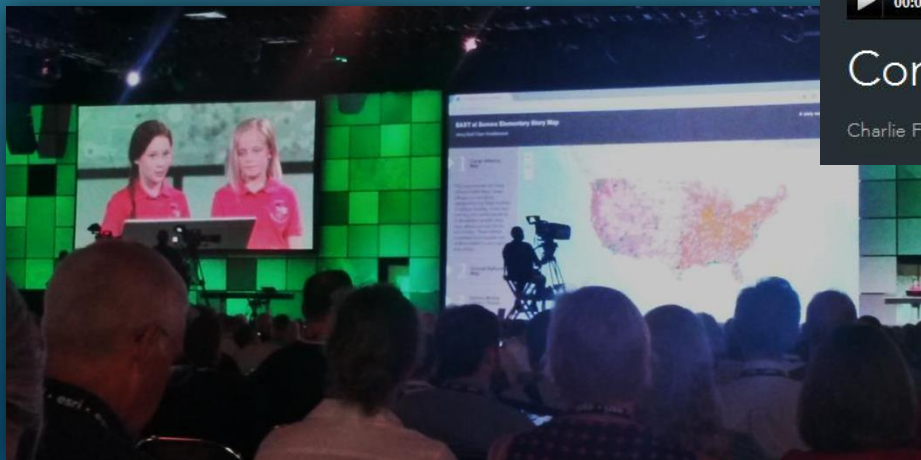
This PowerPoint Presentation,
as well as other presentations and handouts are available online at:
<http://JenniferALentz.info/Teaching/>

So Easy 4th Graders Can Do It!



Connecting GIS with Education

Charlie Fitzpatrick introduces the amazing work by students at Sonora Elementary in Springdale, Arkansas.



Watch Kylie & Rikki demo their GIS work
online at:

[http://video.esri.com/watch/3665/
connecting-gis-with-education](http://video.esri.com/watch/3665/connecting-gis-with-education)

“GIS Kids Are Super!” blog post (<http://blogs.esri.com/esri/ucinsider/2014/07/15/gis-kids-are-super/>)

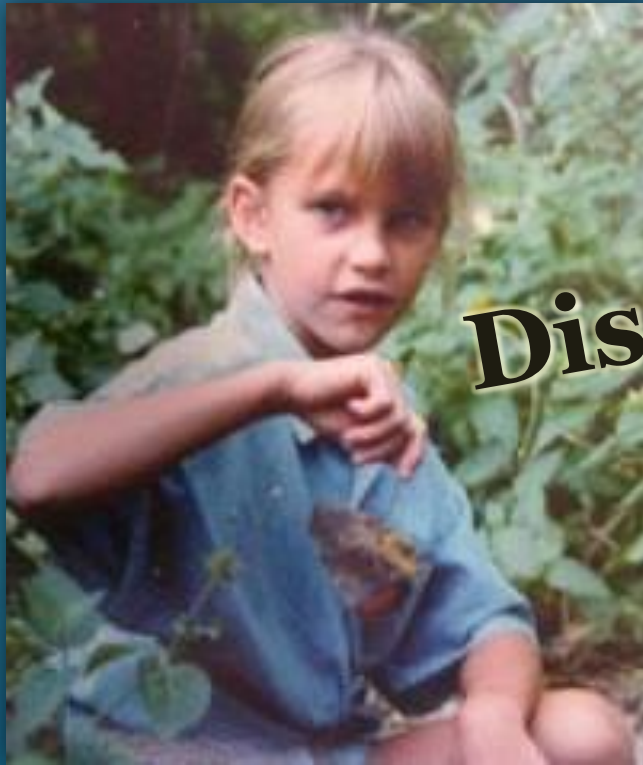
Connecting GIS with Education



<http://video.esri.com/watch/3665/connecting-gis-with-education>



My Background



Discover

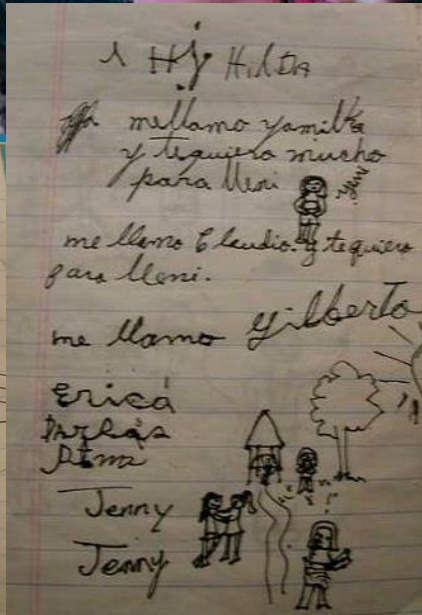
Wonder

Learn

Explore



My Background



My Background

“Education Specialist” at the Aquarium of the Pacific



My Background

Bachelor of Arts (BA) degree from **Hamilton College**
with an Interdisciplinary Concentration in **Environmental Studies**

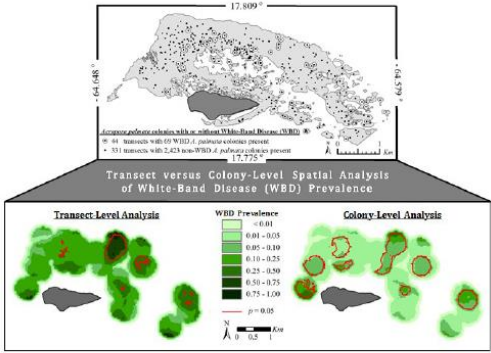


My Background

Ph.D. from **LSU's** Department of Oceanography and Coastal Sciences with a GIS Minor

A Dissertation Defense
Department of Oceanography and Coastal Sciences

Developing a Geospatial Protocol For Coral Epizootiology



Transect versus Colony-Level Spatial Analysis of White-Band Disease (WBD) Prevalence

WBD Prevalence

0.00 - 0.05
0.05 - 0.10
0.10 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00

$p = 0.05$

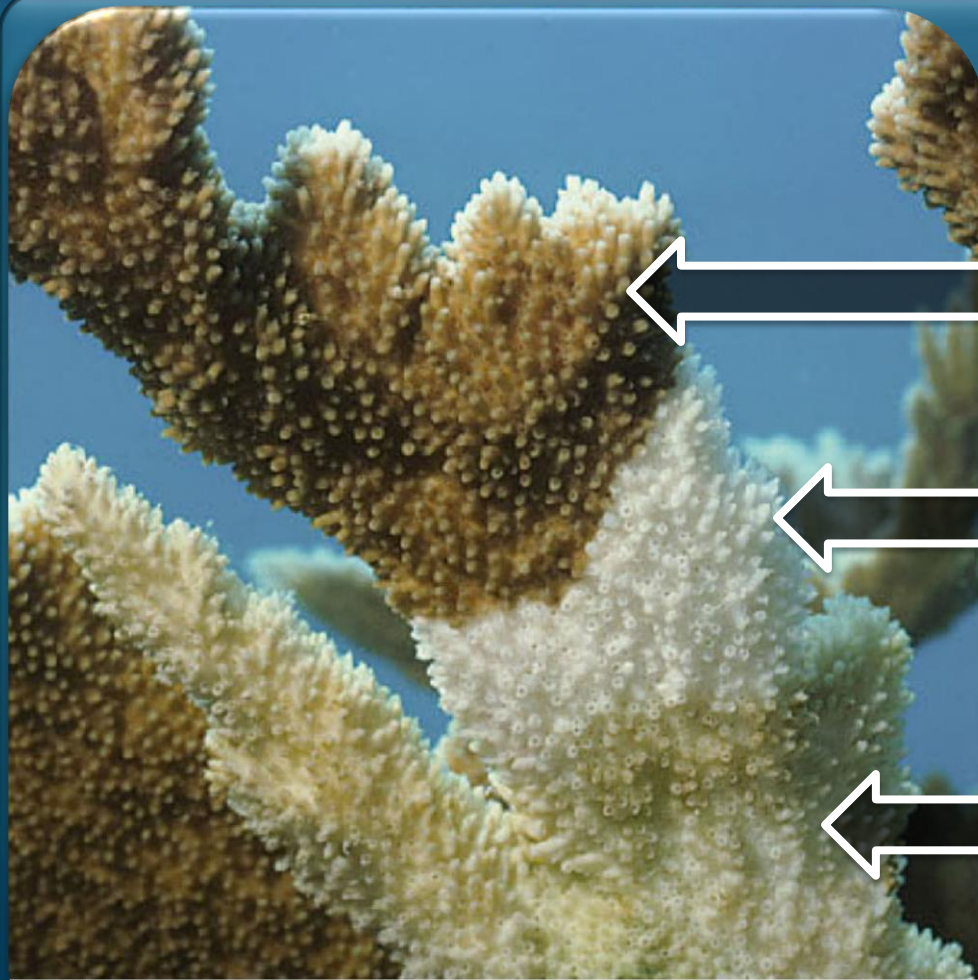
by
Jennifer Anne Lentz
B.A., Hamilton College, 2005

Thursday, March 29th, 2012 at 1:00pm

Dalton J. Woods Auditorium
Energy, Coast, and Environment Building
Louisiana State University, Baton Rouge, Louisiana



Coral Reef Diseases



Healthy Tissue

Active WBD

**Recently Dead tissue
killed by WBD**

Fig.4.19: WBD; Caribbean *Acropora palmata* infected with WBD-I.
Sutherland et al, 2004

Coral Reef Diseases

95% decline in Caribbean *Acropora* corals

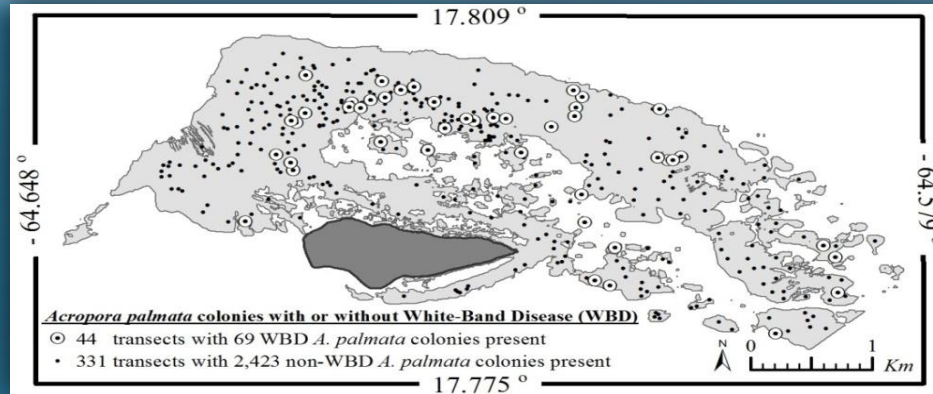
Past



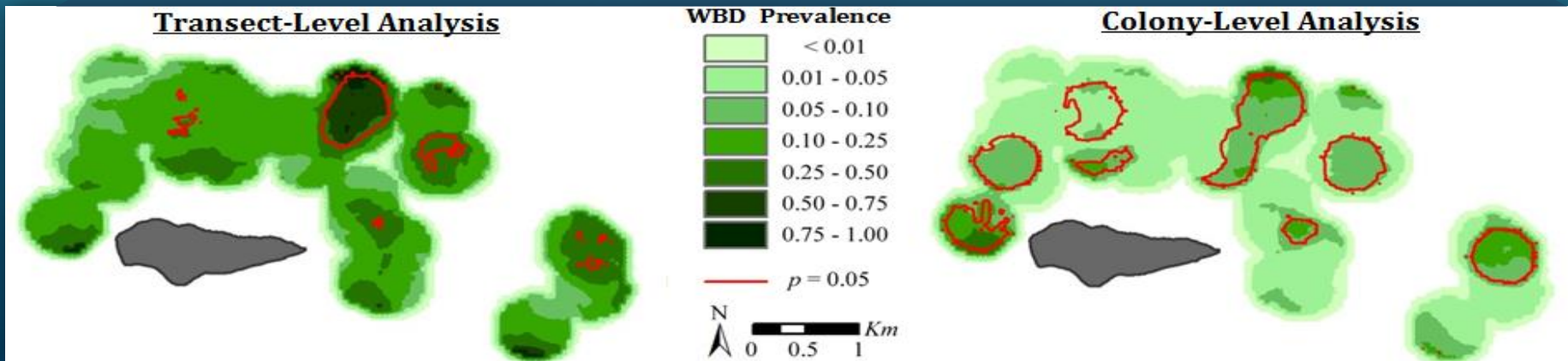
Present



Coral Reef Diseases



Transect versus Colony-Level Spatial Analysis of White-Band Disease (WBD) Prevalence



Home Range & Habitat Use

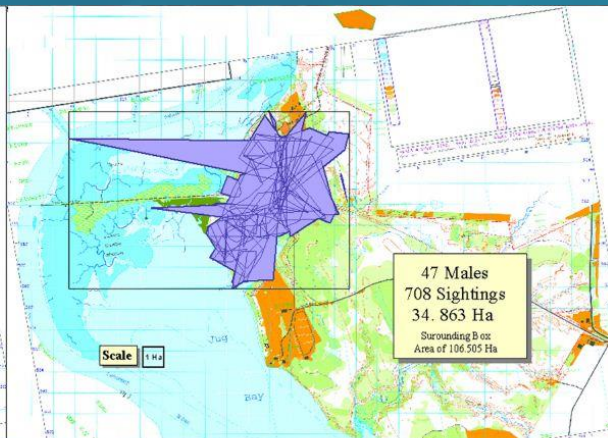
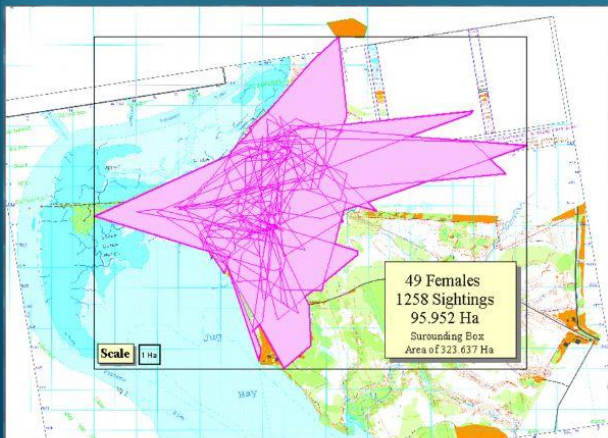


Fig. 6. Combined home ranges based on the Minimum Convex Polygon method. The home range of each individual turtle is depicted as a thin lined polygon; the total area used by each gender is depicted by a thick lined, shaded polygon.