A child wearing a grey cap and an orange t-shirt is seen from behind, pointing their right hand towards a world map. The map is rendered in white and light blue, set against a bright blue sky with wispy white clouds. The child is positioned in the lower right corner of the frame.

# Using Geospatial Technologies to Engage the Public in Ocean Science

**Jennifer Anne Lentz, Ph.D.**

Education Specialist at the Aquarium of the Pacific

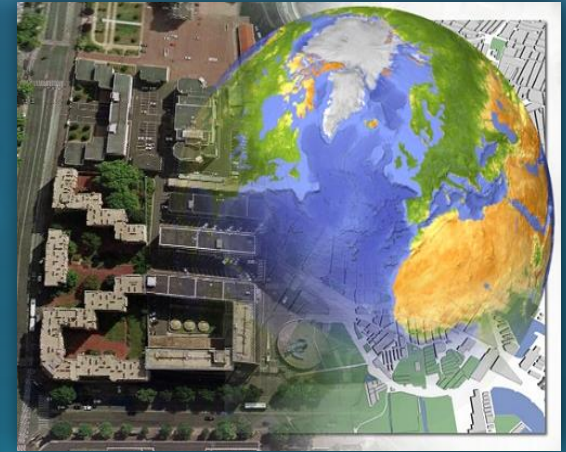
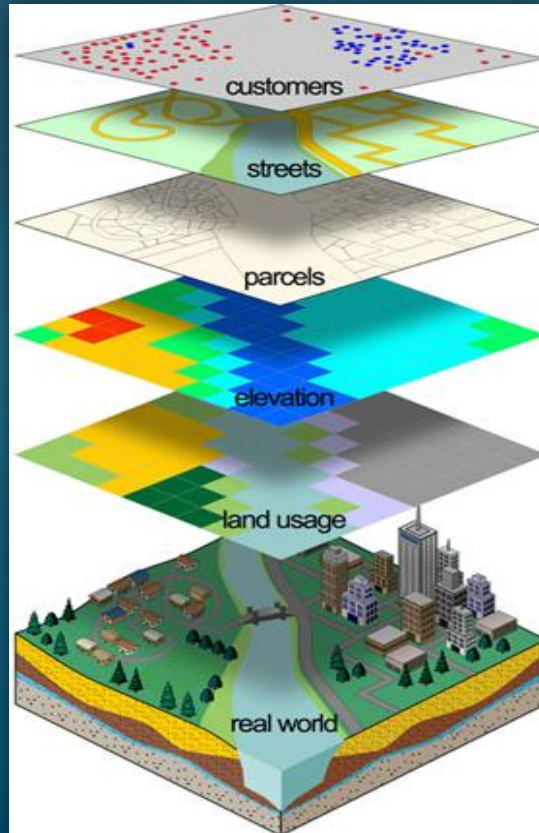
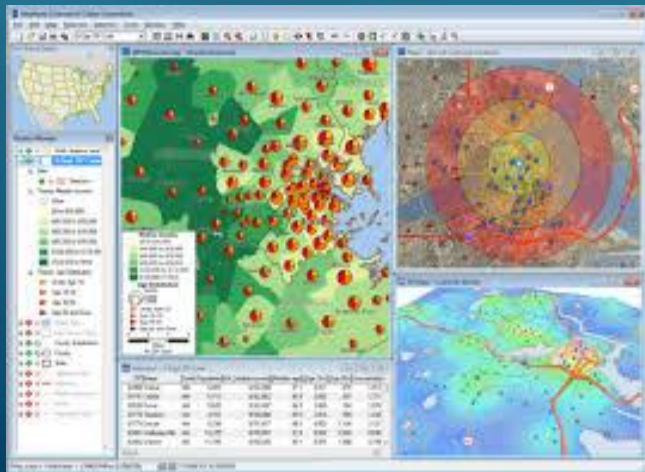
AOP MCRI Meeting Presentation

February 13<sup>th</sup>, 2015

# Geographic Information Systems



*Spatial Analysis*



*Remote Sensing*



# Geospatial Technologies



# Geospatial Technologies

Ocean Science Center

EXIT



# Science on a Sphere (SOS)

# Geospatial Technologies



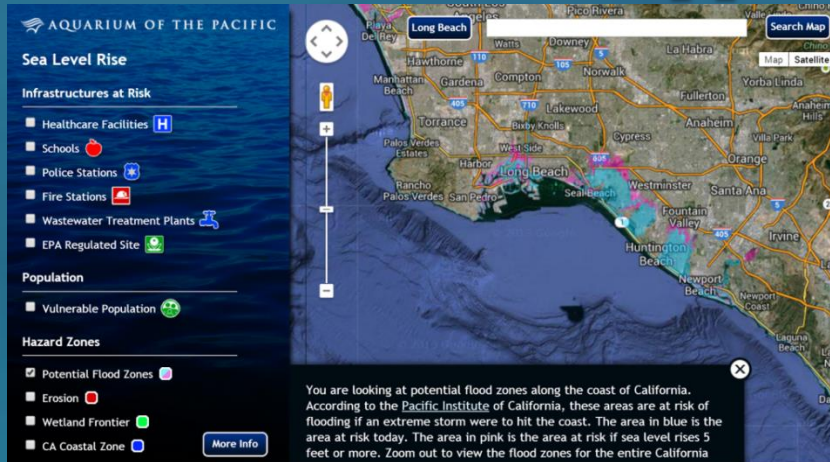
**Google Galaxy**

# Urban Observatory



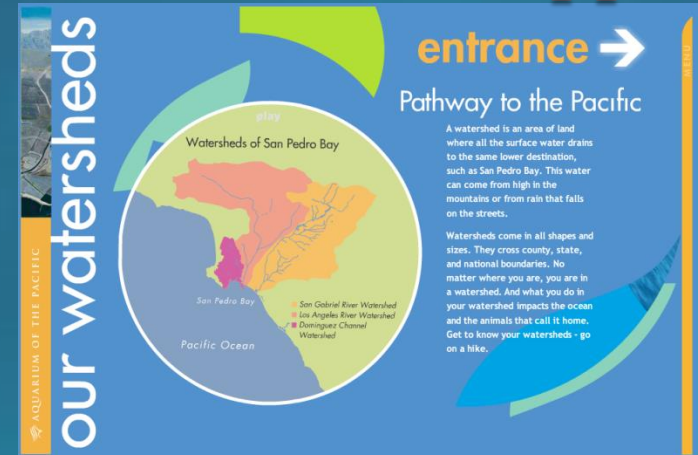
# Interactive Web Apps

## Sea Level Rise App



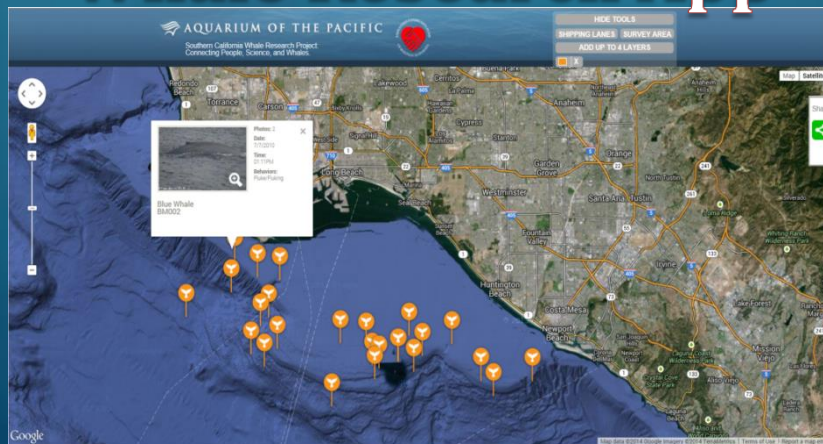
<http://www.aquariumofpacific.org/webapps/slr/>

## Watersheds App



[http://www.aquariumofpacific.org/ourwatersheds\\_site/](http://www.aquariumofpacific.org/ourwatersheds_site/)

## Whale Research App



<http://whaleproject.aquariumofpacific.org/>

## Whales: Voices in the Sea



[http://cetus.ucsd.edu/voicesinthesea\\_org/index.html](http://cetus.ucsd.edu/voicesinthesea_org/index.html)

# AOP Story Maps

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

HOME GALLERY MAP GROUPS

Sign In



## Story Maps and other GIS-related projects



AOP's CELC Story Map



AOP's Magellanic Penguins Story Map



AOP's Visions '13 Cruise Story Map



AOP, The GREEN Aquarium Story Map

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 providing Natural Capital (Nature and Nature's services) by building Social Capital (the relationships and trust among people).

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 is the most significant and vibrant gathering place where diverse cultures and the arts are celebrated and great, important topics facing our world are explored by scientists, policy-makers and stakeholders in the search for sustainable solutions.

# ArcGIS Online & Story Maps



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

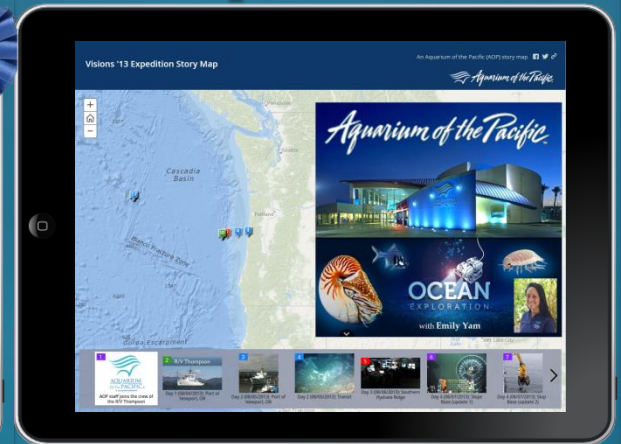
Animals



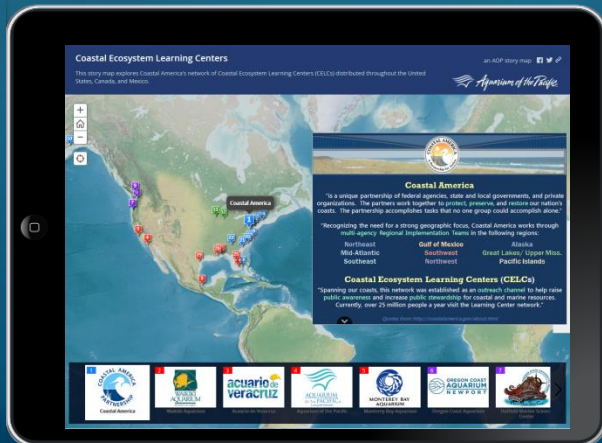
Exhibits



Experiences



Locations






Issues



# Example of a Story Map about our Animals

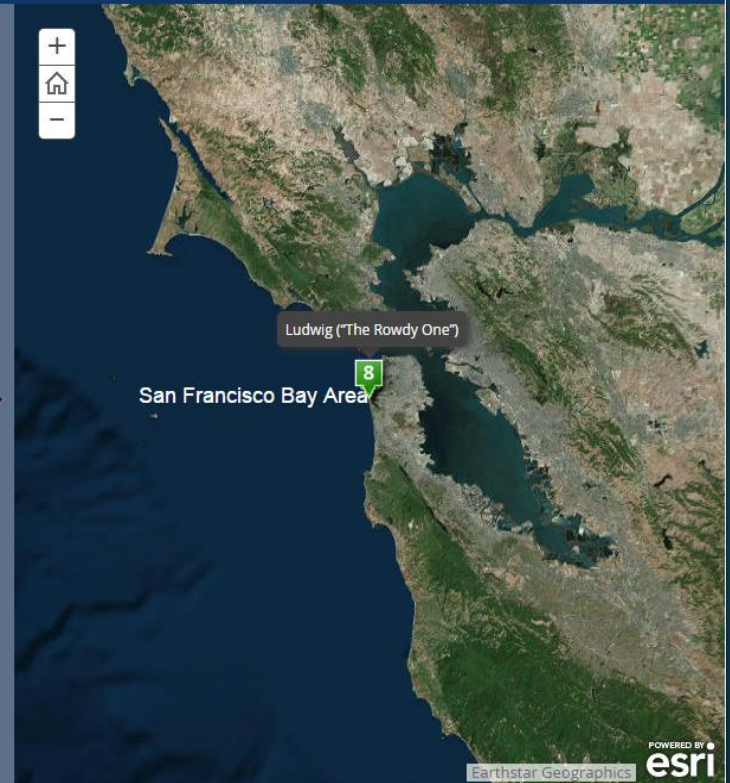
Aquarium of the Pacific's Magellanic Penguins Story Map

An Aquarium of the Pacific (AOP) story map   



Ludwig ("The Rowdy One")

Ludwig is definitely the rowdiest of the younger penguins in the group, his trainers report. They say he would rather be in the water than with humans, who he tends to shy away from. However, he's quite assertive when he wants to be. Ludwig is 1 of 4 penguins in the "San Francisco group," that were bred in captivity at the San Francisco Zoo as part of the Association of Zoos and Aquariums (AZA) "Species Survival Program."



Earthstar Geographics 



Geographic Range



Aquarium of the Pacific's "June Keyes Penguin"



Shim ("The Big One")



Noodles ("The Bruiser")



Patsy ("The Shy One")



Whatever ("The Bold One")



Floyd ("The Curious One")



Ludwig ("The Rowdy One")



Newsom ("The Baby")

# 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](http://shop.aquariumofpacific.org)

### Learn More

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



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)

# Learn More

# Example of a Story Map about our Experiences

## Visions '13 Expedition Story Map

An Aquarium of the Pacific (AOP) story map [f](#) [t](#) [e](#)



2768

Hydrate Knoll

224

Day 4 (08/07/2013): Slope Base (update 4)

9

5

Day 4 (08/07/2013): Slope Base (update 4)

We spotted a sea pig! It's a type of echinoderm. More specifically, it's a sea cucumber but it looks really, really weird. It has easily been one of the coolest animals I have ever seen!



1  
AOP staff joins the crew of the R/V Thompson



2 R/V Thompson  
Day 1 (08/04/2013): Port of Newport, OR



3  
Day 2 (08/05/2013): Port of Newport, OR



4  
Day 2 (08/05/2013): Transit Heceta Bank



5  
Day 3 (08/06/2013): Southern Hydrate Ridge



6  
Day 4 (08/07/2013): Slope Base (update 1)



7  
Day 4 (08/07/2013): Slope Base (update 2)



8  
Day 4 (08/07/2013): Slope Base (update 3)



9  
Day 4 (08/07/2013): Slope Base (update 4)

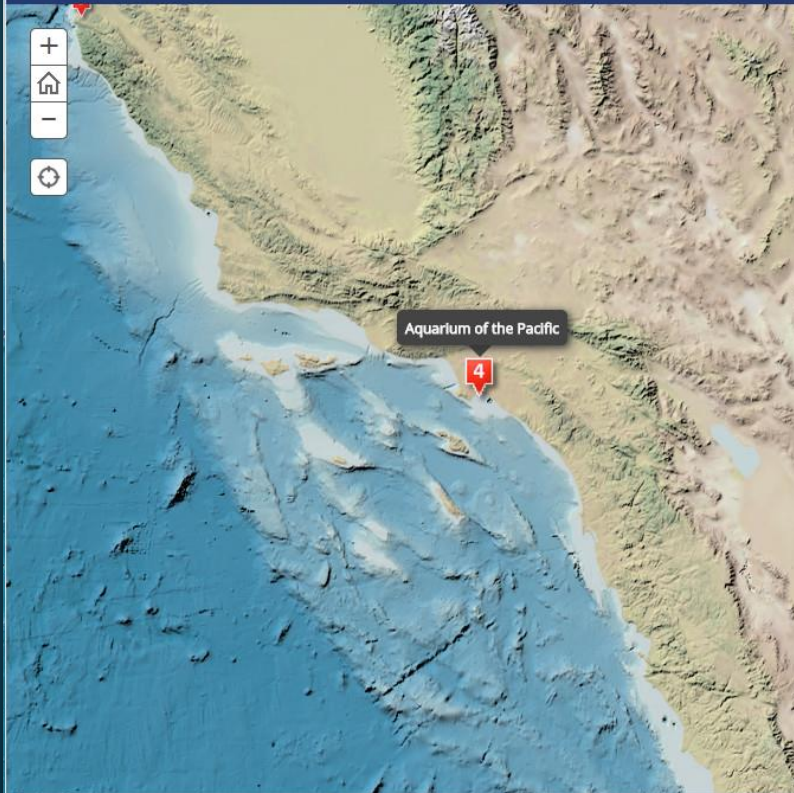
# Example of a Story Map about our Locations

## Coastal Ecosystem Learning Centers

an AOP story map   

This story map explores Coastal America's network of Coastal Ecosystem Learning Centers (CELCs) distributed throughout the United States, Canada, and Mexico.

 Aquarium of the Pacific



**Aquarium of the Pacific**

100 Aquarium Way  
Long Beach, CA 90802



Coastal America



Waikiki Aquarium



Acuario de Veracruz



Aquarium of the Pacific



Monterey Bay Aquarium



Oregon Coast Aquarium



Hatfield Marine Science Center




Seattle Aquarium



Vancouver Aquarium

# Example of a Story Map about an Issue / Topic



Aquarium of the Pacific

## Seafood Story Map

Facebook Twitter LinkedIn

### Aquaculture in the S. CA Bight

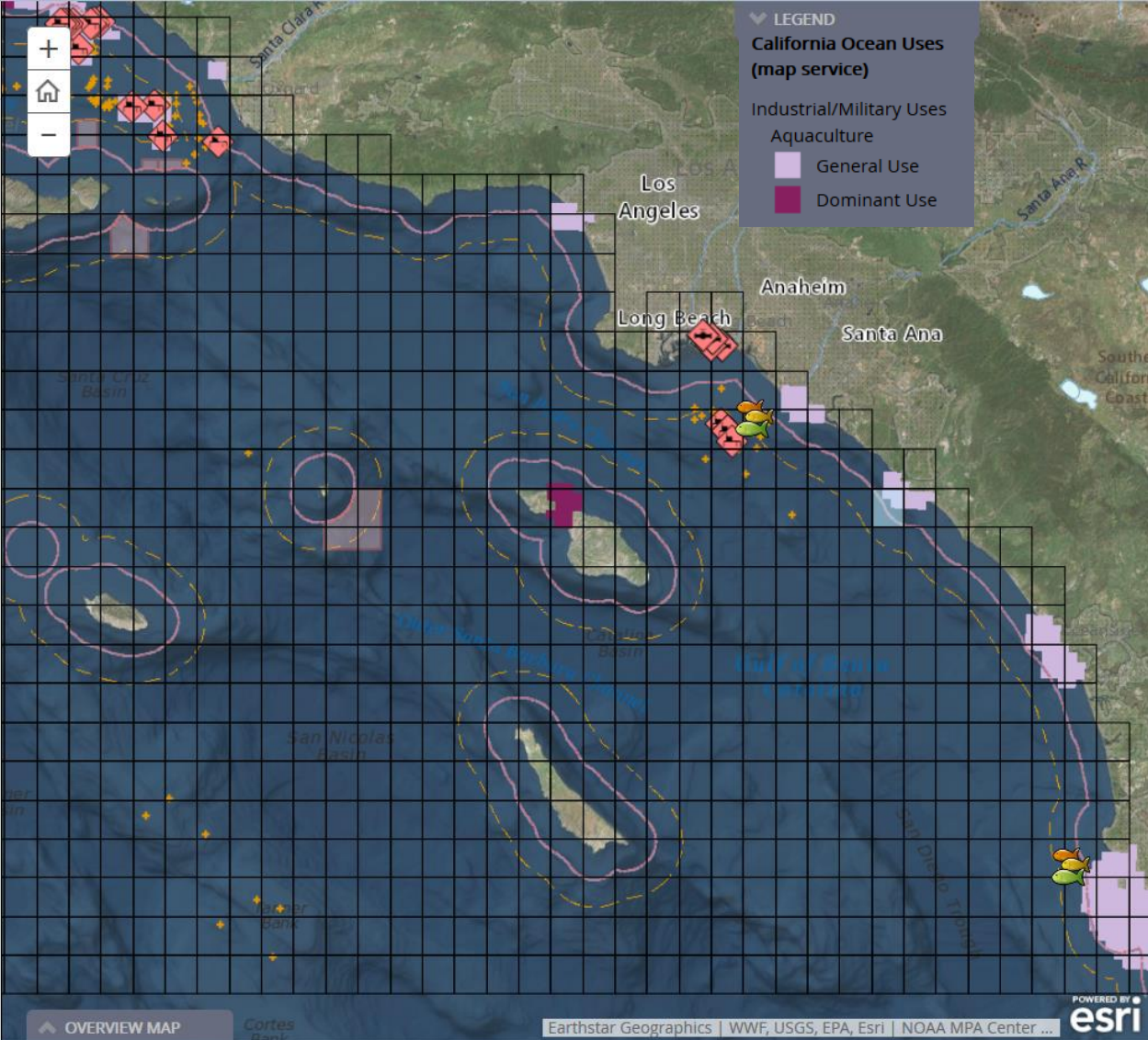
One of the uses that has been advocated is offshore finfish aquaculture. The region has strong demand for seafood. The Aquarium of the Pacific has documented that it could have a billion dollar a year industry in less than 0.1% of State waters, or less than 0.01% of Federal waters (Schubel and Monroe 2008). One that, in tandem with well-managed U.S. fisheries, would provide a safe, secure, stable supply of healthful seafood while reducing the environmental footprint of importation and without adverse impacts on the environment or on other uses of the ocean. It would also provide jobs, a source of supplemental income for fishermen, and help preserve what little is left of the region's working waterfront.

Source: Schubel and Monroe (2008). *Is Offshore Finfish Aquaculture in the Southern California Bight An Idea Whose Time Has Come?* Published by the Aquarium of the Pacific's Marine Conservation Research Institute.

Explore additional layers and information about the Southern California Bight region here ([link](#))

Facebook Twitter Share


### The Future of Seafood



Map showing California Ocean Uses (map service) with a legend for Industrial/Military Uses, Aquaculture, General Use, and Dominant Use. The map includes a grid, zoom controls, and an overview map button.

OVERVIEW MAP

Earthstar Geographics | WWF, USGS, EPA, Esri | NOAA MPA Center ...

POWERED BY 

# Ocean Exploration Story Map

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

Ocean Exploration

## 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.

### 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](#)
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## LATEST NEWS

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Meet the Siphonophore



"Wrath of Khan" Worm Found in Mussels



The Future of Science: Exploring with Remote Telepresence



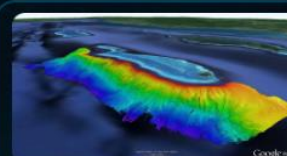
What Happens to Collected Samples?



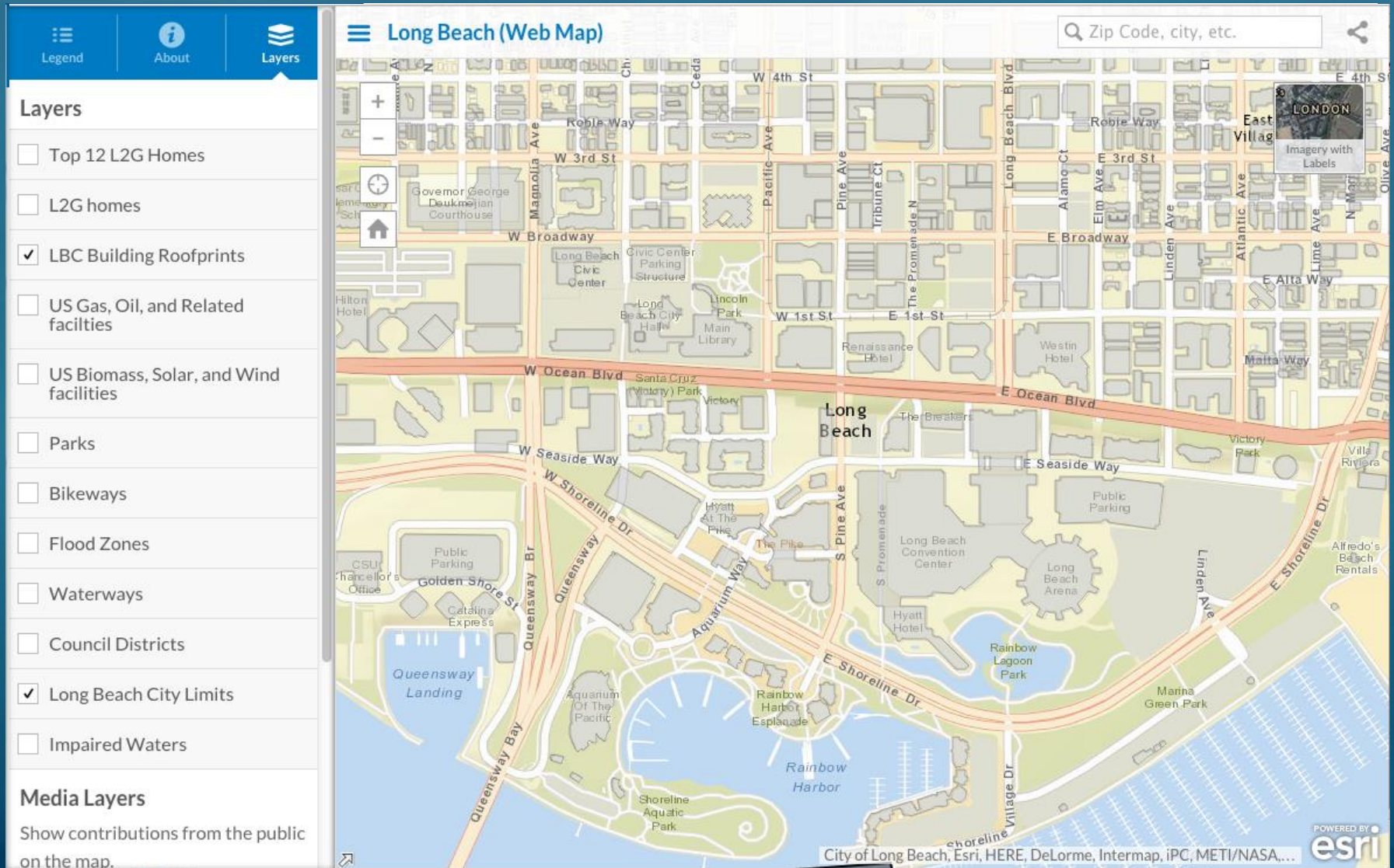
Nautilus Doodles: Science Communication Through Art



Shrinking Cups in the Deep



# Long Beach Climate Resilience

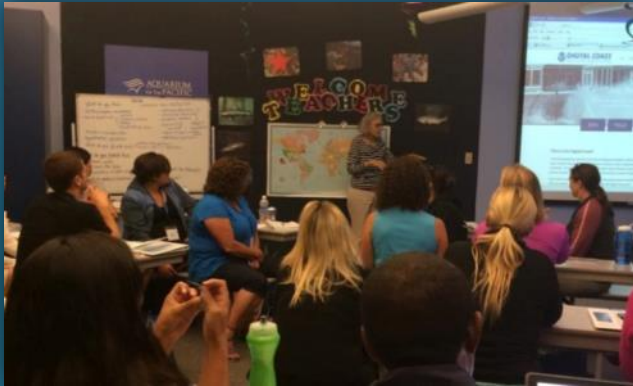




# Interpreting with Story Maps



# Introducing GIS to Teachers



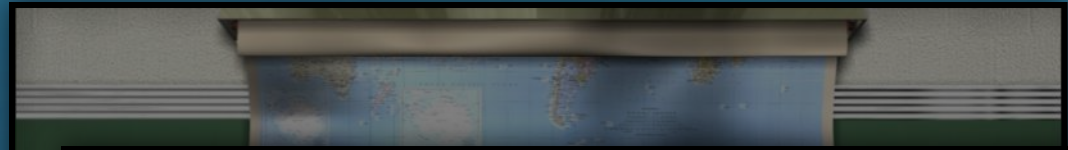
**Alie LeBeau Clarke**  
August 21, 2013 · Long Beach, CA

We talked about data and storymapping and GIS with Jennifer Lentz, so I thought you might enjoy this map of favorite field trip destinations. p.s. the AOP is missing. How is that possible? Anybody want to submit their glowing recommendation?

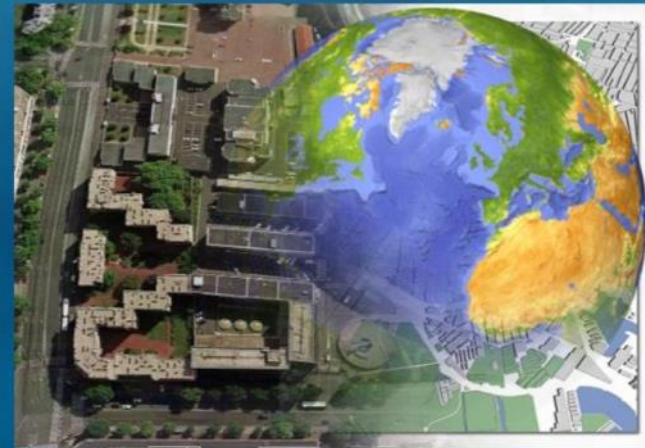


**Get Going: Mapping Teachers' Favorite Field Trip Spots**  
Teachers! Need ideas on where to take your students for beyond-school learning? See our interactive map of the best field trip spots across the U.S. Have a favorite field trip location? Submit your favorite venue and help us build a rich and dynamic...

EDWEEK.ORG



## An Introduction to GIS and Spatial Data



**Jennifer Anne Lentz, Ph.D.**  
Education Specialist at the Aquarium of the Pacific  
NASA Teacher Workshop Presentation  
October 11<sup>th</sup>, 2013

# GIS & Story Map Tutorials

## GIS Wildlife Data Tutorial

How to find, Map, & Spatially Analyze Wildlife Data in a GIS System

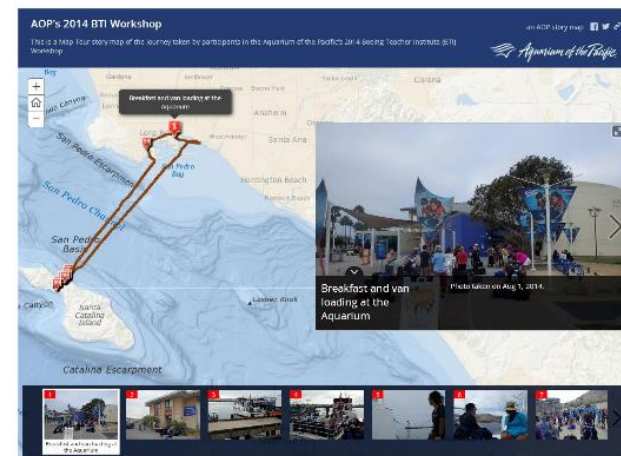


This Tutorial was Created by  
**Jennifer Anne Lentz, Ph.D.**  
Education Specialist at the Aquarium of the Pacific

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

## 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>*

# Co-hosting a Story Map Webinar



## An Ocean of Story Maps by Dawn Wright of ESRI and Jenny Lentz of the Aquarium of the Pacific

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Tue, Jan 20, 2015 11:00 AM - 12:00 PM PST

[Show in My Time Zone](#)

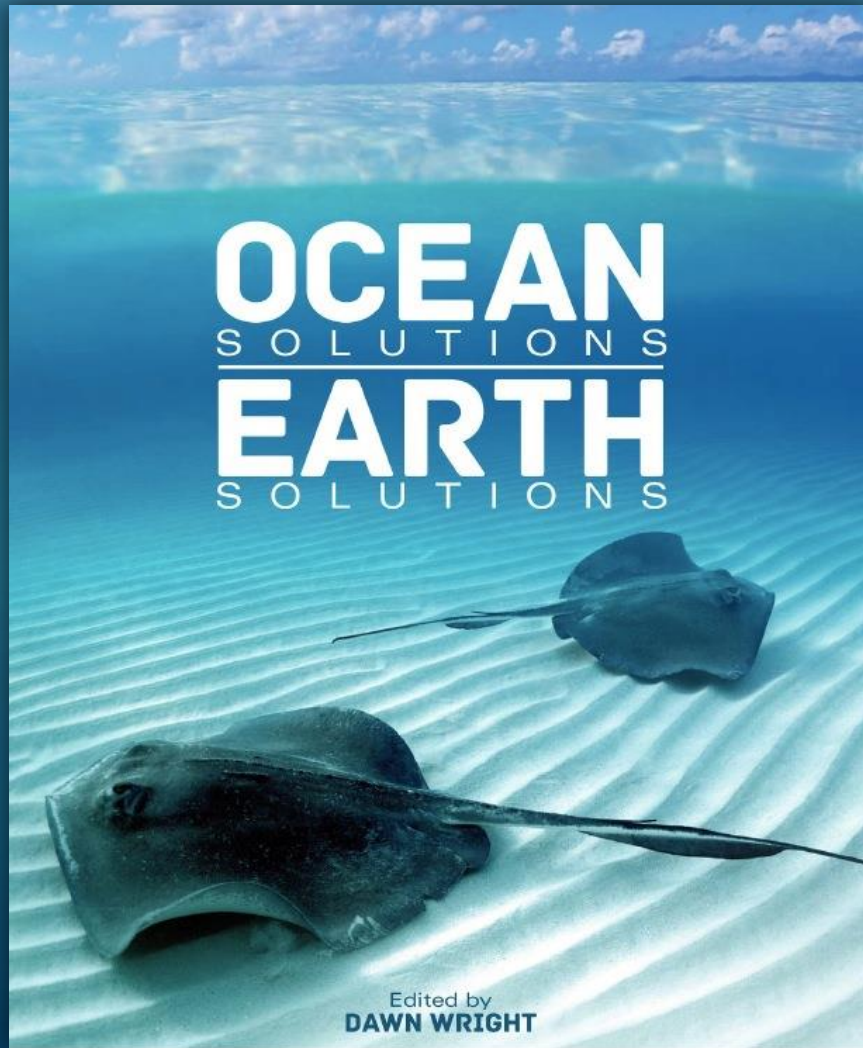
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The story map is a relatively new medium for sharing not only data, photos, videos, sounds, and maps, but for telling a specific and compelling story by way of that content. Story map apps provide the user with sophisticated cartographic functionality that does not require advanced training in cartography or GIS. Story maps are essentially web map applications built from web maps, which in turn are built from web-accessible data (including OGC WMS, WFS). Depending on the chosen complexity of a story map, it can be built in anywhere from a few minutes to a few days. With the beauty and utility of underlays such as the Esri Ocean Basemap, as well as a small tsunami of ocean content percolating up through a host of open data sites, there are powerful stories being told about coastal zone management, conservation, exploration and other forms of scientific field work. These stories are informing, educating, entertaining, and inspiring decision-makers on a wide variety of coastal issues. This presentation will take the audience on a small tour of a growing catalog of coastal and ocean story maps, many of which are accessible via MarineCadastre.gov and NOAA's Digital Coast. It will also highlight the various resources available for building and deploying story maps, and discuss the utility of this medium for presenting, not just photos and videos, but more analytical results. Learn more about Story Maps at <http://storymaps.esri.com>.

Webinar co-sponsored by [OpenChannels.org](http://OpenChannels.org).

[Read less](#)

# Chapter in Upcoming Book



## Chapter 12

### *More than Maps: Connecting Aquarium Guests to Global Stories*

*by*

*Jennifer Lentz, Emily Yam, Alie LeBeau, & David Bader*

Expected Release  
Late Spring-Early Summer 2015

