



# Emancipating Data: Using GIS to Serve the Public

Allen Carroll



## My background

- 27 years at National Geographic
- Most of them telling stories with maps
- Two years ago, joined Esri to head a **story maps** team



## What is a story map?

- Story maps combine maps with other content (text, photos, videos) to tell stories
- They combine the traditional allure of maps with web and mobile apps
- They inform, educate, entertain, and inspire people about the world.

# storymaps.esri.com

## Storytelling with Maps



### A gallery of Esri story maps

Esri publishes story maps with three goals: To showcase interesting and important topics; to explore techniques and best practices for map-based storytelling; and to help enable people to make their own story maps.

Search maps



Geography of Gaza Strip



Thanksgiving Dinner



Treasure Hunt: Mountains



Treasure Hunt: Cities



Superstorm Sandy Impact



Precinct Results



Palm Springs Shortlist



Piping Plovers



Ten Worst Hurricanes

### About story maps

Story maps combine intelligent Web maps with Web applications and templates that incorporate text, multimedia, and interactive functions. Story maps inform, educate, entertain, and inspire people about a wide variety of topics.

### Resources & links

- > [Storytelling with Maps Blog](#)
- > [Download story templates](#)
- > [Maps by the Esri community](#)
- > [Workflows & Best Practices](#)
- > [Storytelling white paper](#)
- > [Designing Pop-ups](#)
- > [Video: A map for every story](#)
- > [About the Story Maps team](#)
- > [Follow us on Twitter](#)

### Contact us

Email us at [storymaps@esri.com](mailto:storymaps@esri.com)

## Why are we Making Story Maps?

- To showcase interesting geographic information
- To develop new ways to tell stories with maps
- To show how GIS has emerged from the back office
- To liberate enslaved data

# Why are we Making Story Maps?



**Liberating  
data**

## Why are we Making Story Maps?

- To showcase interesting geographic information
- To develop new ways to tell stories with maps
- To show how GIS has emerged from the back office
- To liberate enslaved data
- To enable thousands of people to create and publish their own story maps

# A growing community of storytellers

## Storytelling with Maps



**Maps by the Esri community**

More and more organizations are creating their own maps and adapting storytelling templates to tell their stories. This rotating gallery features some of the most interesting of these uses. If you've developed your own story maps, please let us know!



Banff Heritage Tour



Ruins of Carthage



Solar Radiation Viewer



Pew Oceans North ...



1927 St. Louis Tomado



Norway Trip



Tauranga Property ...



Amherst Biennial 2012



Staffanstop then and ...

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# Why do people use GIS?

## Asset Management

Collect, Organize,  
& Exchange Data



## Planning & Analysis

Transform Data  
Into Actionable  
Information



## Field Mobility

Get Information  
Into and Out of  
the Field



## Operational Awareness

Disseminate  
Information Where  
and When it is  
Needed



## Constituent Engagement

Get Feedback and  
Make Informed  
Decisions



- Your managers
- Congress
- Other agencies
- Citizens

# What is the mission of the NTSB?

NTSB is an independent federal agency, charged by Congress to

- Investigate transportation accidents,
- Determine probable cause, and
- Issue safety recommendations

**Issue safety  
recommendations**

**Emancipate  
data**

**Engage  
constituents**



## How are story maps made?

- Well-defined story concept



- Intelligent web map



- Storytelling app

# Intelligent Web Maps...

- Integrating Services (Data, Maps, Models . . . )

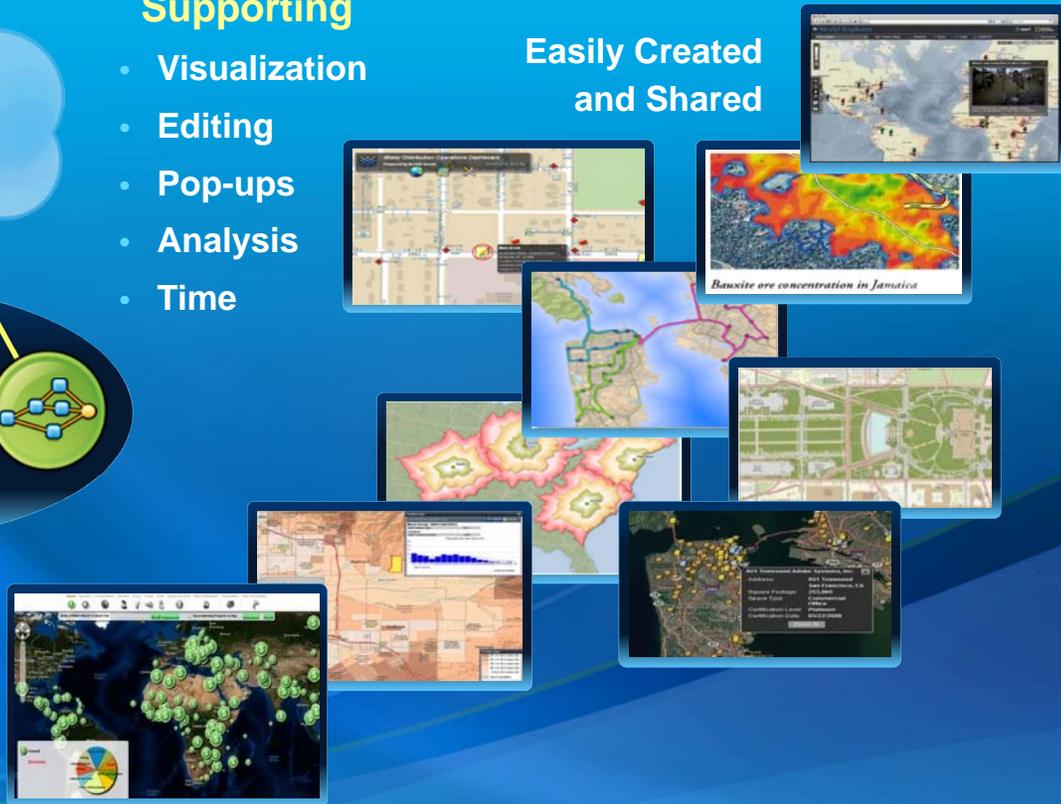
## Intelligent Maps



## Supporting

- Visualization
- Editing
- Pop-ups
- Analysis
- Time

## Easily Created and Shared



- Simplifying GIS . . .
- . . . Connecting and Providing Open Access

...enabled in apps that can be used everywhere



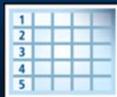
- ... Enhancing Access and Collaboration

# How we make story maps

## Raw Materials



Map services



Tabular data



Desktop map



Base map



Multimedia content



Text

## Web Maps on ArcGIS Online



## Apps



## Audience



Web



Tablet



Mobile

# A growing collection of apps

## Storytelling with Maps

esri

### Story map templates

Templates provide an easy way to publish your own story map (without having to write code). Each template uses a distinct story-telling technique. You supply the web map and the words. File downloads include the web files you will need, plus a readme file explaining configuration.

Search maps

- **Storytelling Shortlist**  
A story map template that enables users to discover and browse points of interest.  
Details and Download >
- **Storytelling Playlist**  
A storytelling template that organizes point data sets from a CSV file into an organized interactive list  
Details and Download >
- **Storytelling Map Tour**  
A story map template combining an interactive map, a photo and text panel, and a thumbnail carousel  
Details and Download >
- **Storytelling Map Matrix**  
A storytelling template that enables users to display a gallery of maps from an ArcGIS Online group  
Details and Download >

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## How are we enabling people to make their own story maps?

- **ArcGIS Online: Create, mash up, and refine, maps to publish into templates**
- **Storytelling templates: Download source code; includes config sections and read-me files**
- **All source code for all our stories is freely available**
- **We'll be making this process even easier**

[storymaps.esri.com](http://storymaps.esri.com)

# Some recent story maps

## Titanic

**Geography, class, and fate: Passengers on the *Titanic***  
A century ago the *Titanic* collided with an iceberg in the North Atlantic and sank. Mapping travelers' hometowns reveals the immigrant status of most third-class passengers, who also suffered the highest fatality rate.

Select a class to view survival rates and home towns  
Click on locations for passenger lists and destination cities  
Click a passenger for more information  
Survived Died  
Miss Alice Phillips  
Hometown: Ilfracombe, Devon, England  
Intended Destination: New Brighton, Pennsylvania, USA  
Boarded the *Titanic* in: Southampton

## Piping plover

**Feeding the Olets: A Year in the Life of a Piping Plover**  
Piping Plover that is the same as one that almost never. These birds are on the rocks, with one in 1000 adults left. From Great Lakes to Georgia, they travel a long way, and they are not always where you expect them to be. Watch their journey to learn more.

## Civil War

**Battlefields of the Civil War**  
A chronology of the major battles of the American Civil War. Many of the sites include links to detailed battle maps by the Civil War Trust, which works to preserve endangered battlefields.

Search battle or state name  
December 26, 1861 to May 9, 1862  
January 3, 1862  
January 16, 1862  
January 18, 1862  
January 19, 1862  
February 6, 1862  
February 7 - 8, 1862  
February 11, 1862  
February 20 - 21, 1862

**A walking tour of the National Mall**  
It's a tourist mecca, a jogging track, a public demonstration site, and home to several of the world's greatest museums. Take a virtual tour of the nation's front yard.

## National Mall Walking Tour

## Feeding the World

**Feeding the world: Can global crop production meet future demands?**  
Crop production will have to double by 2050 to feed the world's growing and increasingly affluent population. This challenge will be difficult for our generation, according to the University of Minnesota's Institute on the Environment.

1 Current Crop Yields  
Agricultural yields vary widely around the world due to climate, management practices, and the use of fertilizers and pesticides. The map shows average yields for 15 major crops.

storymaps.esri.com

# Titanic passengers

## First class vs. steerage

### Geography, class, and fate: Passengers on the *Titanic*

A story map  

A century ago the *Titanic* collided with an iceberg in the North Atlantic and sank. Mapping travelers' hometowns reveals the immigrant status of most third-class passengers, who also suffered the highest fatality rate.

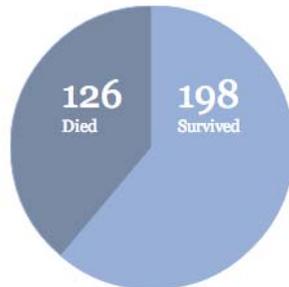


Select a class to view survival rates and home towns

Click on locations for passenger lists and destination cities

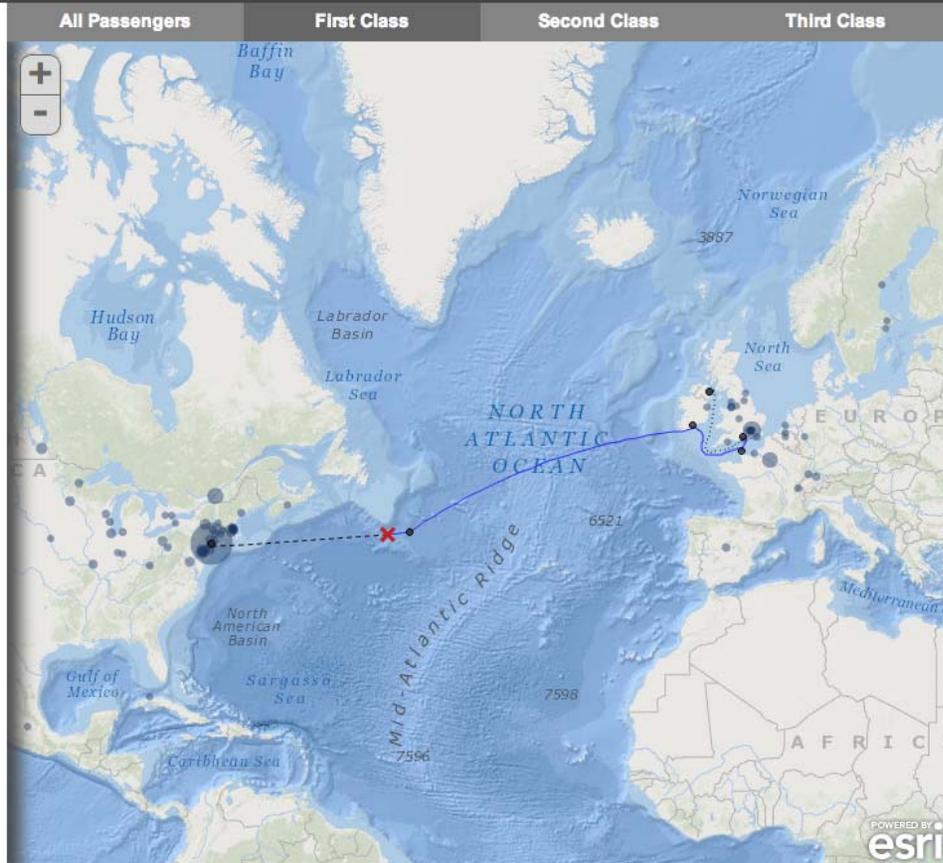
# 324

First class passengers



Totals do not include *Titanic's* crew of nearly 900 people.

Source: Wikipedia's list of [Titanic passengers](#)



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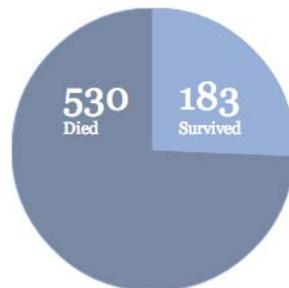


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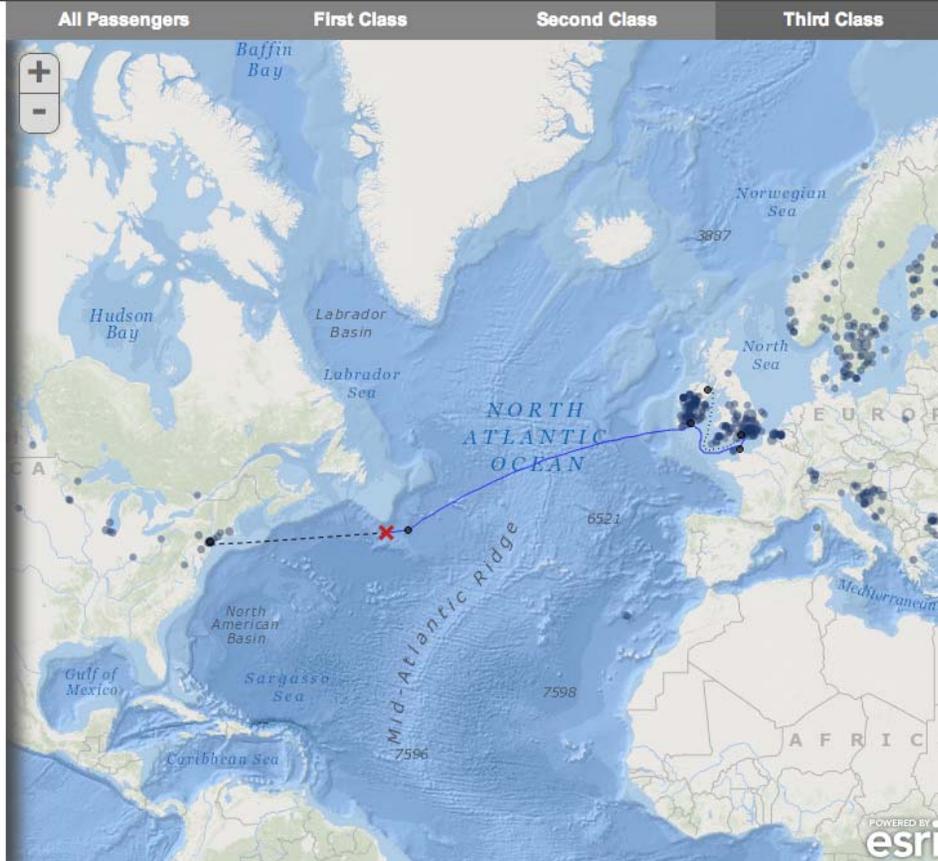
# 713

Third class passengers



Totals do not include *Titanic's* crew of nearly 900 people.

Source: Wikipedia's list of [Titanic passengers](#)



# Titanic passengers

## Fate of a family

**Geography, class, and fate: Passengers on the *Titanic*** A story map [f](#) [t](#)

A century ago the *Titanic* collided with an iceberg in the North Atlantic and sank. Mapping travelers' hometowns reveals the immigrant status of most third-class passengers, who also suffered the highest fatality rate.



**Select a class** to view survival rates and home towns

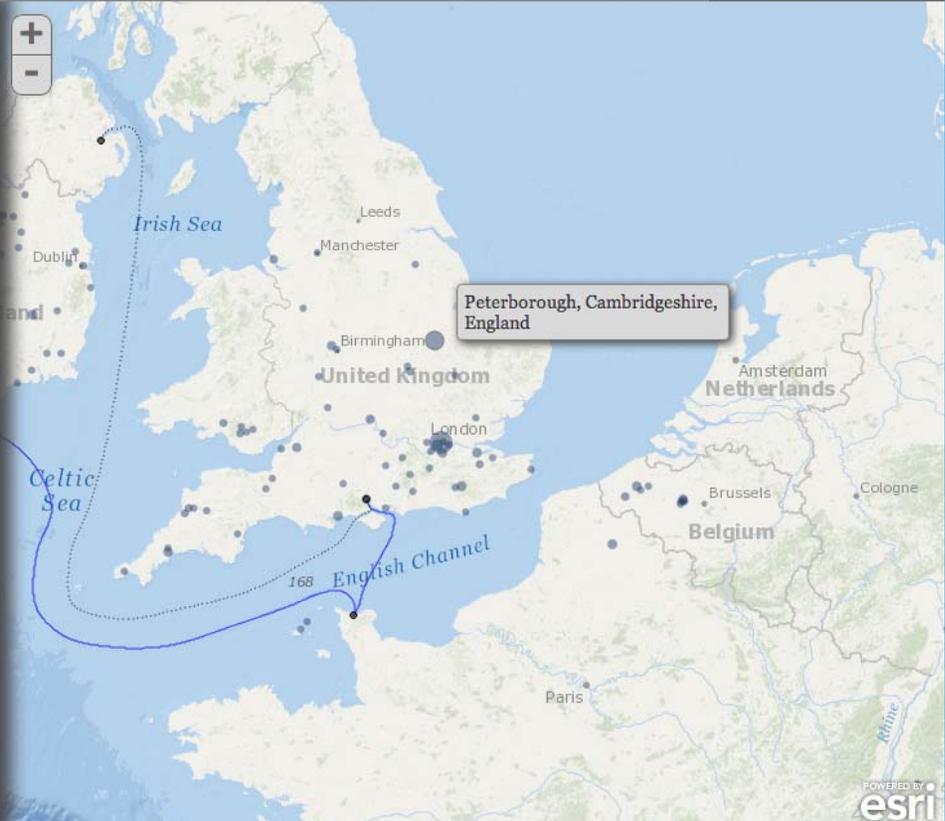
**Click on locations** for passenger lists and destination cities

**Click a passenger** for more information

	Survived	Died
Master Anthony Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Master Thomas Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Miss Constance Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Miss Dorothy Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Miss Elizabeth Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Miss Stella Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mr. Douglas Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mr. Frederick Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mr. George Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mr. John Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mrs. Annie Sage	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Source: Wikipedia's list of [Titanic passengers](#)

**All Passengers** **First Class** **Second Class** **Third Class**



The map displays the route of the Titanic from Southampton, England, through the English Channel, and into the North Atlantic. Hometowns of passengers are marked with dots, color-coded by class: blue for First Class, green for Second Class, and red for Third Class. A tooltip for Peterborough, Cambridgeshire, England is shown. The map includes labels for the Irish Sea, Celtic Sea, English Channel, and various European cities and countries.

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A story map [f](#) [t](#)

esri

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Survived
  Died

Master Anthony Sage	<input checked="" type="checkbox"/>
Master Thomas Sage	<input checked="" type="checkbox"/>
Hometown: Peterborough, Cambridgeshire, England Boarded At: Southampton Intended Destination: Jacksonville, Florida, USA Age: 4 Class: Third Outcome: Died Lifeboat: none listed	
Miss Constance Sage	<input checked="" type="checkbox"/>
Miss Dorothy Sage	<input checked="" type="checkbox"/>
Miss Elizabeth Sage	<input checked="" type="checkbox"/>
Miss Stella Sage	<input checked="" type="checkbox"/>
Mr. Douglas Sage	<input checked="" type="checkbox"/>
Mr. Frederick Sage	<input checked="" type="checkbox"/>
Mr. George Sage	<input checked="" type="checkbox"/>

Source: Wikipedia's list of [Titanic passengers](#)

All Passengers
First Class
Second Class
Third Class

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# Ten worst hurricanes

...assuming they were to strike today

**TopTen most damaging U.S. hurricanes of all time** A story map [f](#) [t](#)

What were the worst hurricanes ever? What would happen if they hit today? A NOAA study examined these questions, and came up with this rogue's gallery of mega-storms.

- 10 Hurricane Katrina - 2005
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1

**2nd most damaging hurricane**

Category: **3**

Damage in 2005: **\$81 billion**

Estimated damage today: **\$81 billion**

Deaths: **1,836**

Hurricane Katrina was an extraordinarily powerful and deadly storm that carved a wide swath of catastrophic damage. Katrina was one of the deadliest and most destructive Atlantic hurricanes in U.S. history, with at least 1,836 fatalities and total property damage of approximately \$81 billion.

LEGEND ▾

POWERED BY

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- 2
- 1

**The Great Miami Hurricane - 1926**



**Most damaging hurricane**

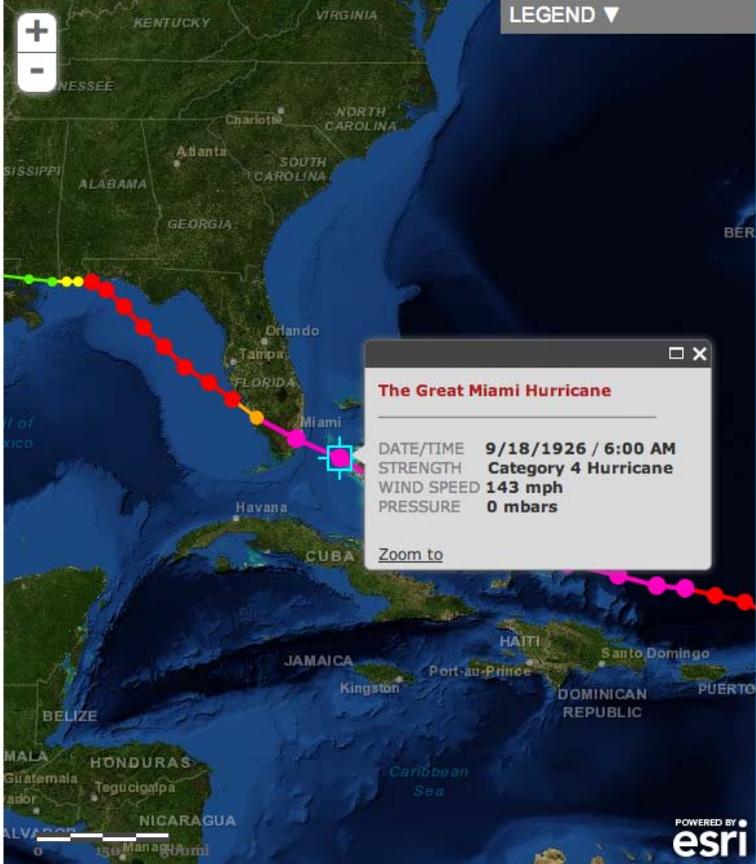
Category: **4**

Damage in 1926: **\$105 million**

Estimated damage today: **\$157 billion**

Deaths: **372**

The Great Miami Hurricane was a category 4 storm when it struck Miami on September 18th of 1926, virtually destroying the city. Storm tides in Miami ranged from 7.5 to 11.7 feet. At Miami Beach the tides ranged from 10.6 feet on the ocean side and 6.4 feet on the bay side. The hurricane also caused significant damage in the Florida panhandle, Alabama, and



**LEGEND** ▾

**The Great Miami Hurricane**

DATE/TIME **9/18/1926 / 6:00 AM**

STRENGTH **Category 4 Hurricane**

WIND SPEED **143 mph**

PRESSURE **0 mbars**

[Zoom to](#)

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# IUCN Red List of endangered species



## A gallery of Amazing Species



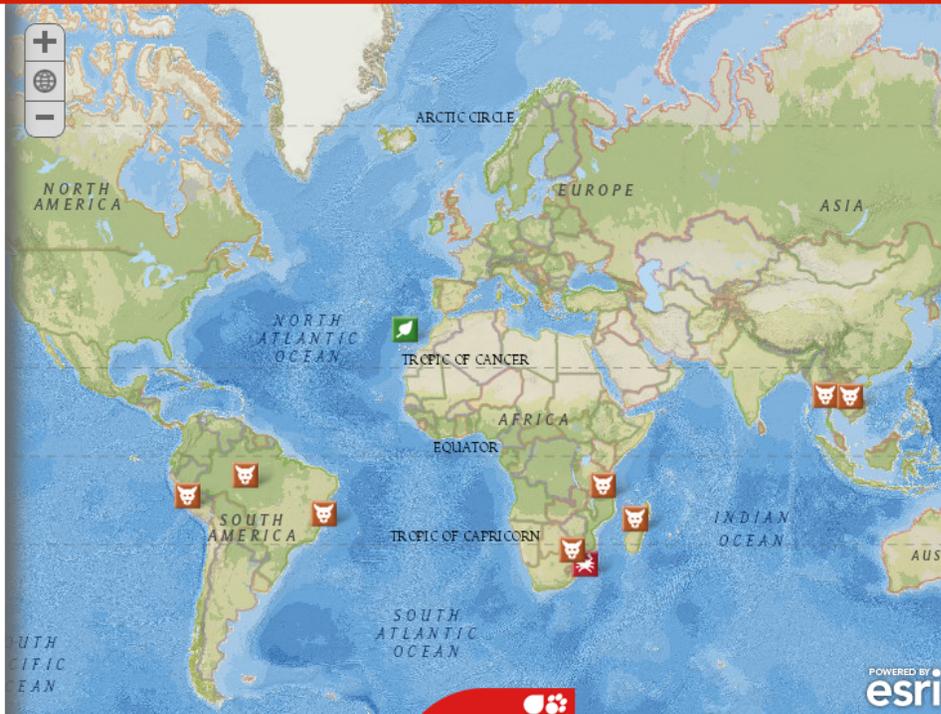
The IUCN Red List of Threatened Species™ is a rich information source on more than 60,000 species of animals, plants and fungi. The small selection of species on this map represents the IUCN Red List's breadth of geography and diversity.

Move the slider icon

The IUCN Red List of Threatened Species™ is widely recognized as the most comprehensive, objective global approach for evaluating the conservation status of the world's species. The IUCN Red List objectively assesses species and their risk of extinction based on measurements of population size and/or geographic range, and their trends in the past, present and/or future. Species listed as Critically Endangered, Endangered and Vulnerable are collectively described as 'Threatened'.

### VULNERABLE SPECIES

- Andean Bear
- Blue River Crab
- Canary Island Dragon Tree
- Fossa
- Giant Armadillo
- Grey-faced Sengi
- Julliana's Golden Mole
- Kitti's Hog-nosed Bat
- Maned Sloth
- Sun Bear



NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	<b>&lt; VULNERABLE &gt;</b>	DANGEROUS	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT		EN	CR	EW	EX

POWERED BY  
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# IUCN Red List of endangered species



## A gallery of Amazing Species



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### CRITICALLY ENDANGERED SPECIES

- Alaotran Gentle Lemur
- Boreal Felt Lichen
- Brazilian land snail
- Darwin's Fox
- Day Gecko
- Demonic Poison Frog
- Epirus Grasshopper
- Gollath Grouper
- Hiroia
- Kipunji
- Lord Howe Island Stick Insect
- Luristan Newt
- Mountain Pygmy-possum
- Northern Muriqui
- Northern Sportive Lemur
- Red Wolf
- Salpa Antelope



# IUCN Red List of endangered species

...and view individual species

**A gallery of Amazing Species**

The IUCN Red List of Threatened Species™ is a rich information source on more than 60,000 species of animals, plants and fungi. The small selection of species on this map represents the IUCN

© N J Singh

Map showing the distribution of the Saiga Antelope in Central Asia, with red outlines indicating its range.

NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT	VU	EN	<b>CR</b>	EW	EX

**Saiga Antelope**

SCIENTIFIC NAME: *Saiga tatarica*

"The Saiga Antelope is listed as 'Critically Endangered' on the IUCN Red List of Threatened Species. Saigas have a distinctive appearance, with an unusual swollen nose that filters out airborne dust during the dry summer, and warms cold air before it enters the lungs during the winter. This species is found in isolated populations in south-eastern Europe, Central Asia and western Mongolia.

Despite once numbering over one million in the mid-1970s, intense hunting pressure has reduced the global population to some 50,000 individuals. Saiga may be hunted for meat or for their horns, which are highly valued in traditional Chinese medicine due to alleged curative properties. As only males bear horns, selective

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# How could story maps work for NTSB?

- Example: Bird strikes

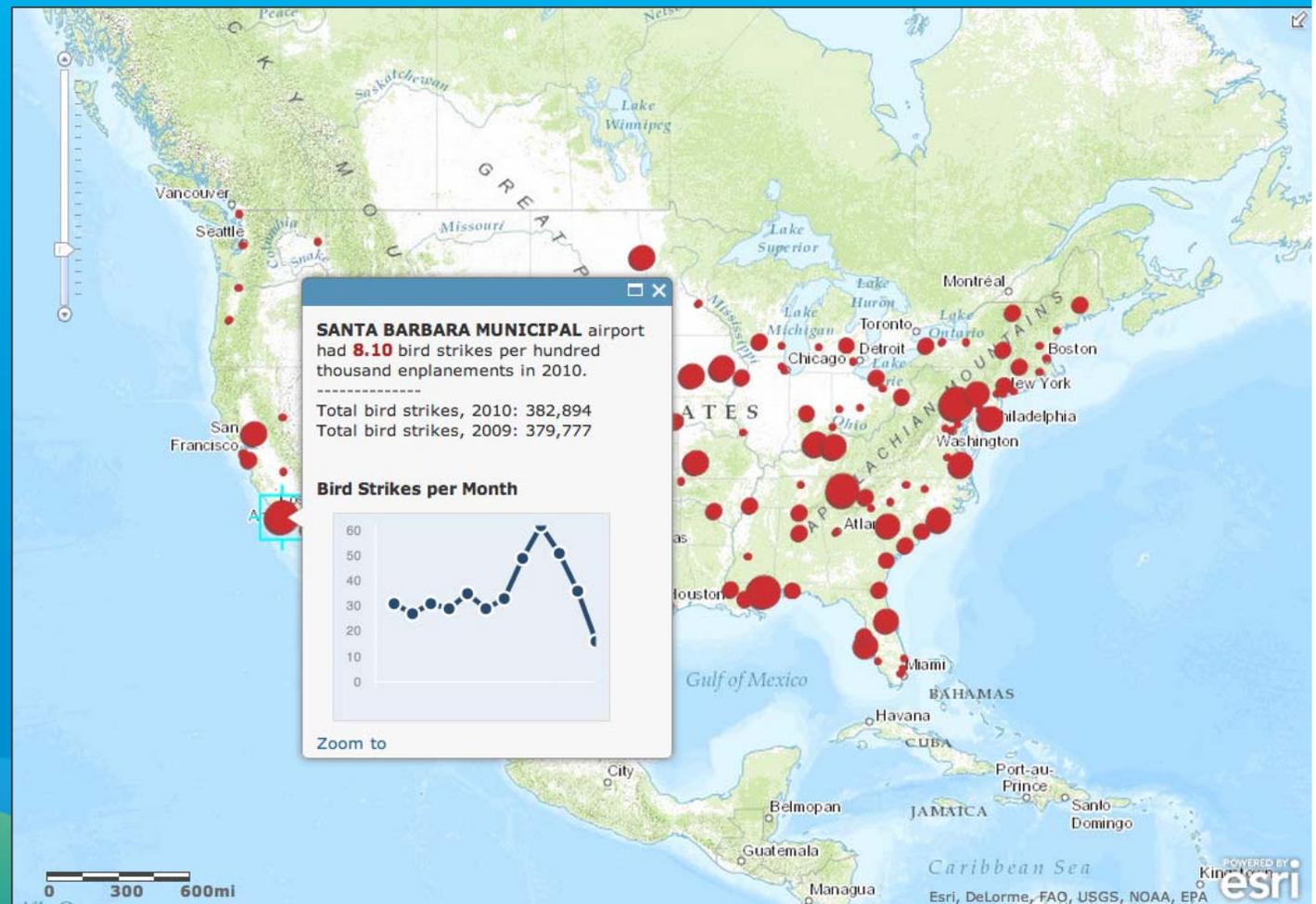
Bird strikes  
per 1000  
emplanements



# How could story maps work for NTSB?

- Example: Bird strikes

Show bird strikes by month

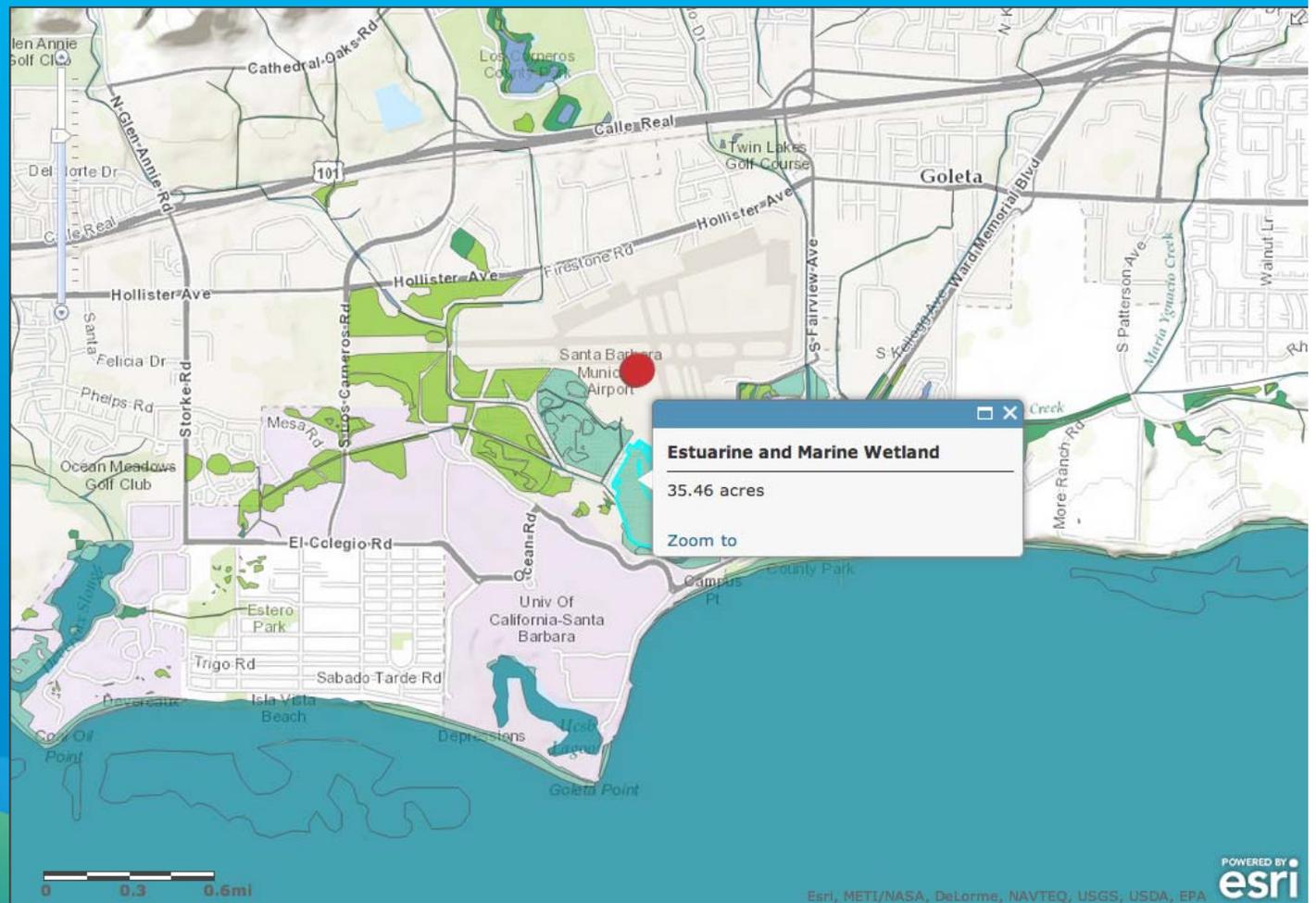


# How could story maps work for NTSB?

- Example: Bird strikes

Show proximity of some airports to wetlands...

Santa Barbara, California

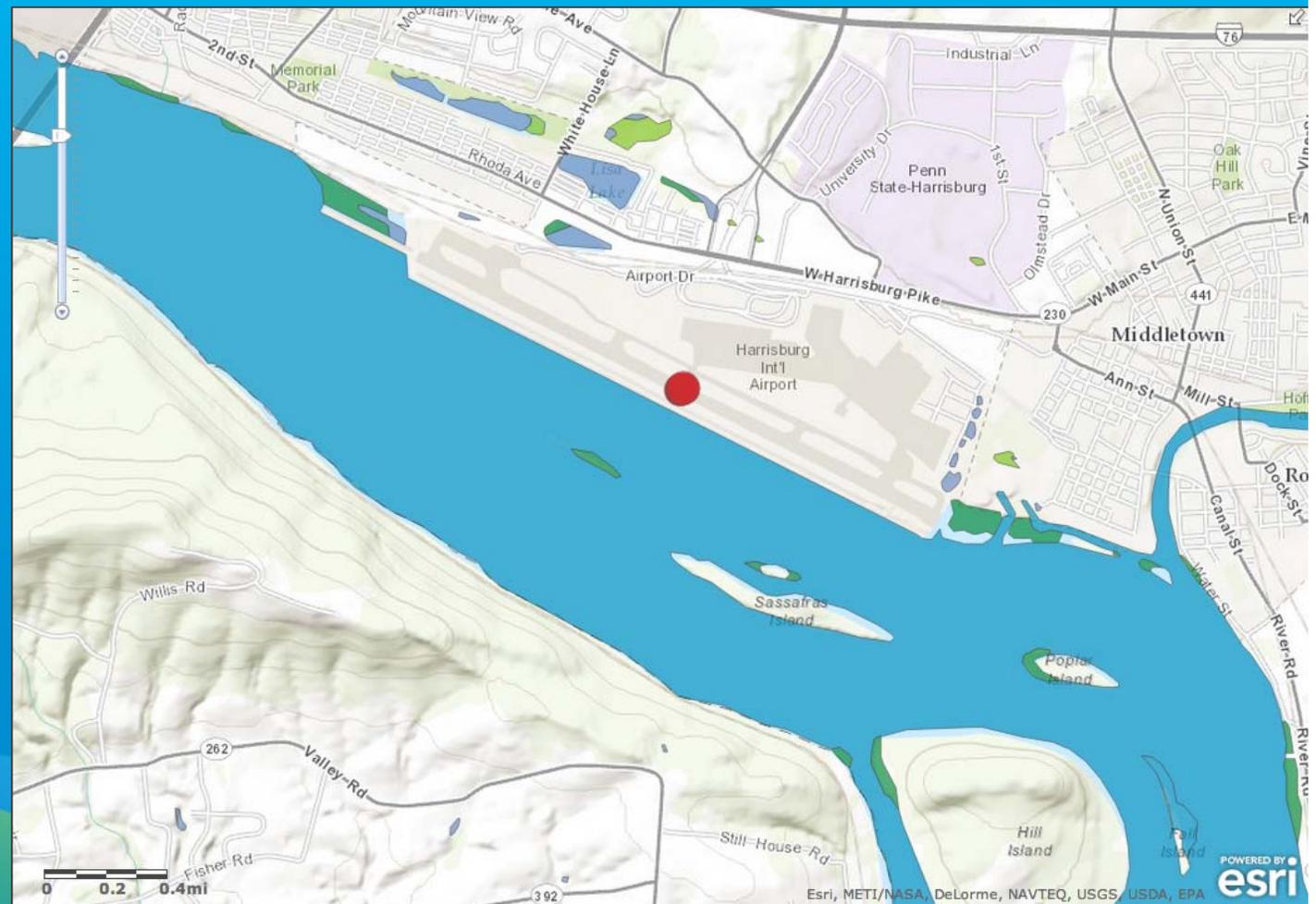


# How could story maps work for NTSB?

- Example: Bird strikes

...or rivers

Harrisburg,  
Pennsylvania



**Liberate your data!**





# esri

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