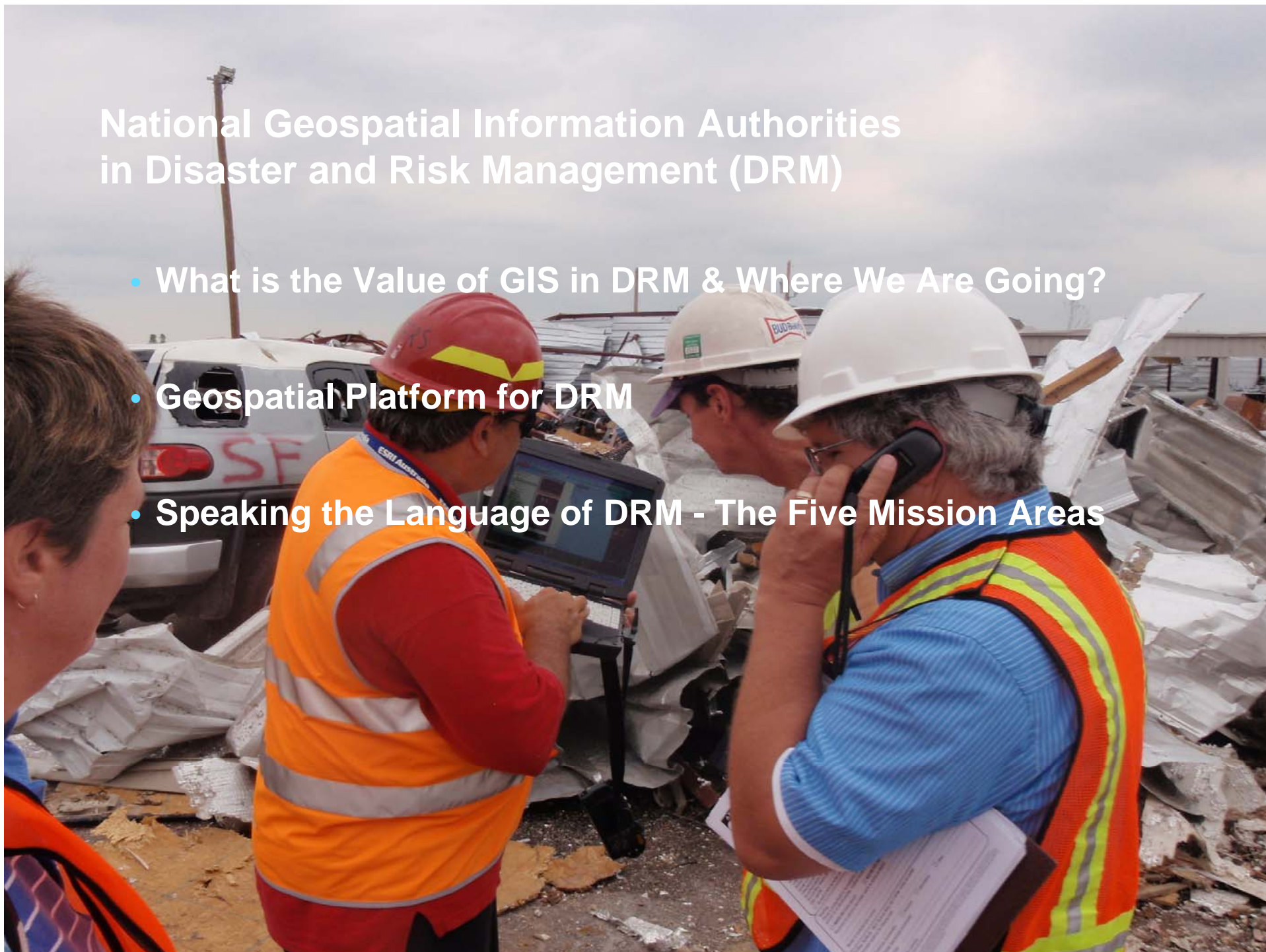


Geospatial Platform for Urban Hazard & Disaster Management

Mark Cygan
Global Industry Manager for
Map, Chart, Data Production and SDI

National Geospatial Information Authorities in Disaster and Risk Management (DRM)

- What is the Value of GIS in DRM & Where We Are Going?
- Geospatial Platform for DRM
- Speaking the Language of DRM - The Five Mission Areas



Chengdu Forum on UN-GGIM

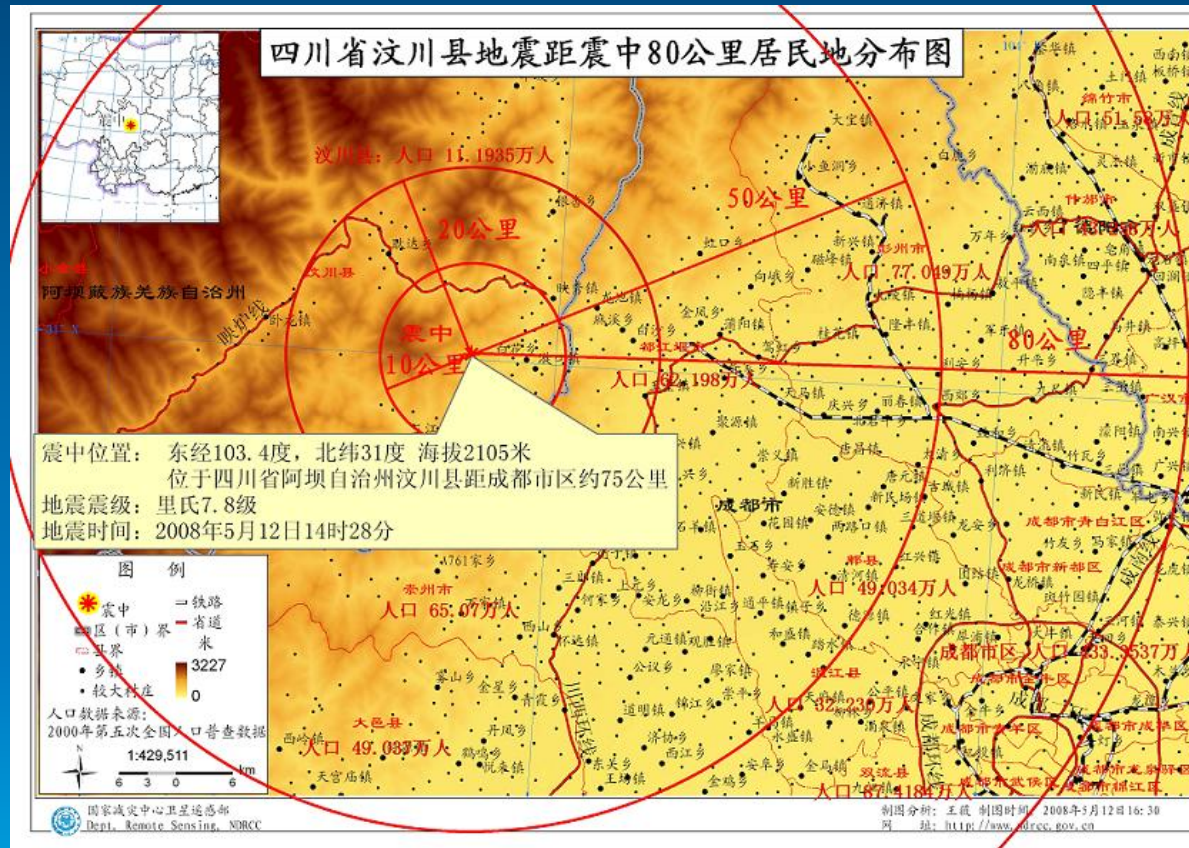
Urban Hazards

China 2013 YTD

- 1700 Lives Lost
- 376 Million People Affected
- 517 Billion Yuan (\$84.5 Bn)
- Examples:
 - 13 October 2013 - Typhoon Fitow, Fujian Province, China - 6700 Buildings collapsed or severely damage
 - 15 October 2013 - Earthquake – Cebu, Philippines – 144 dead
 - 16 October 2013 – Typhoon Wipha, Tokyo, Japan – 17+ dead

Wenchuan Earthquake – 12 May 2008

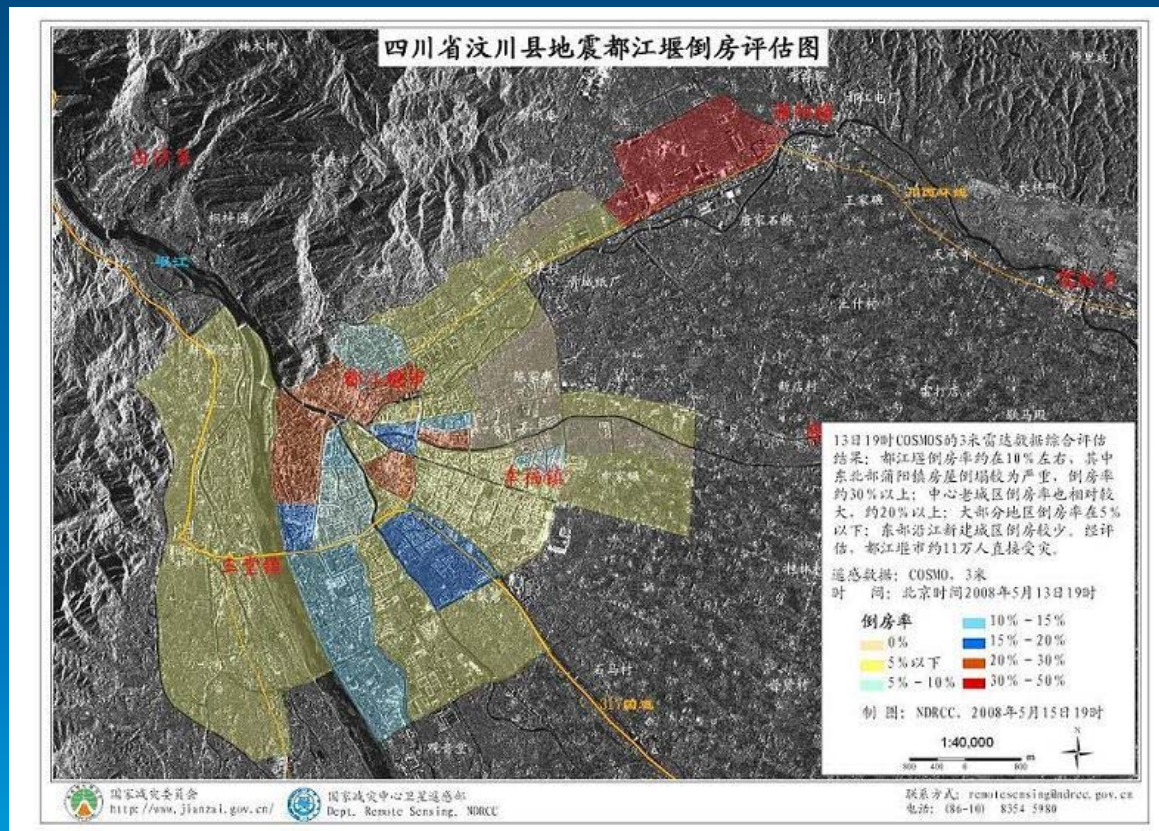
Ministry of Civil Affairs – Disaster Reduction Center



Resident distribution map within 80 kilometers of epicenter of Wenchuan earthquake

Wenchuan Earthquake – 13-19 May 2008

Ministry of Civil Affairs – Disaster Reduction Center



Status of collapsed buildings in Dujiangyan in the Wenchuan earthquake

Wenchuan Earthquake – 18 May 2008

Sichuan Bureau of Surveying and Mapping - Sichuan Geomatics Center



Sichuan Spatial Information System and Website – Blood Collection Locations

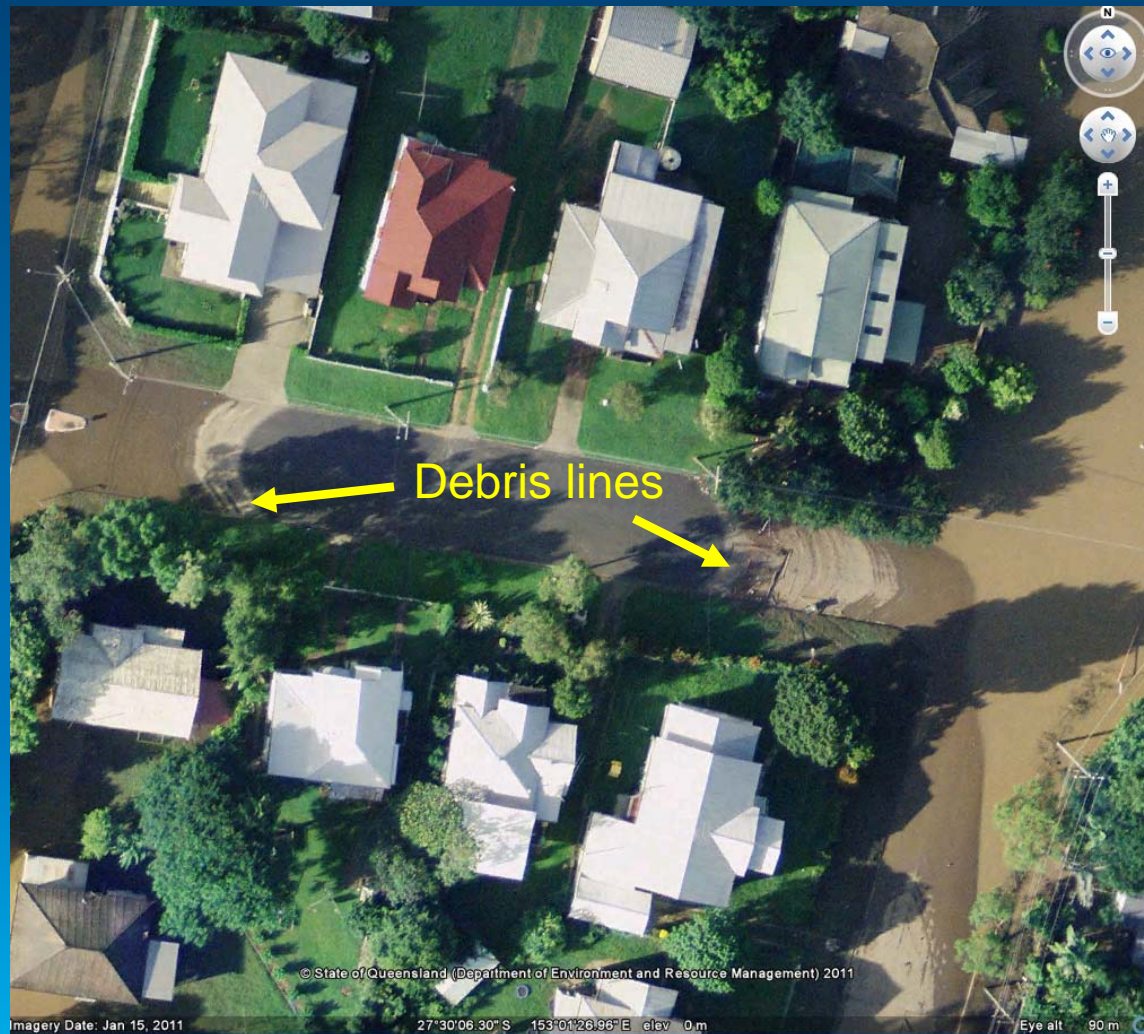
Queensland, Australia – Flooding and Cyclone 2011

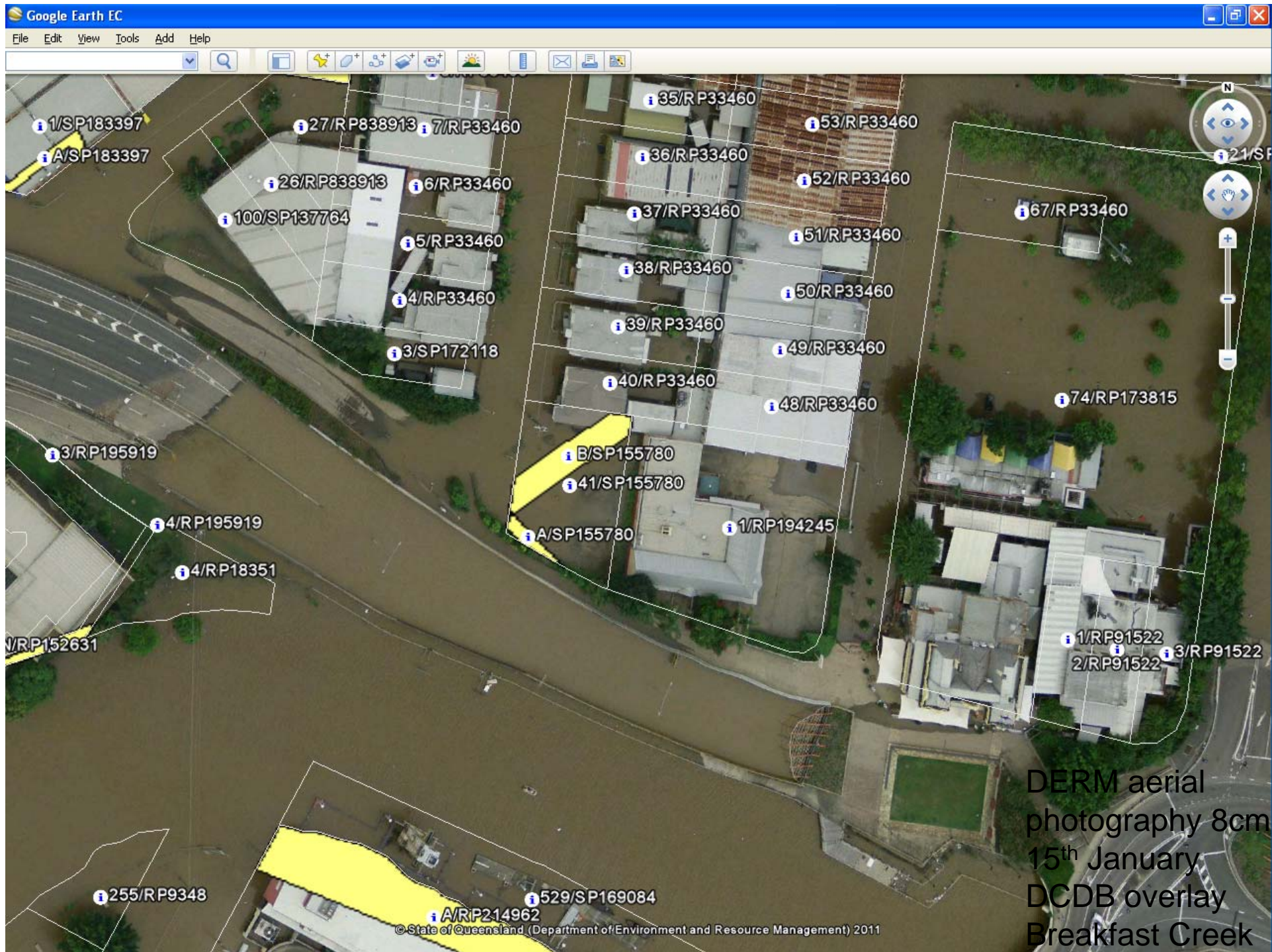




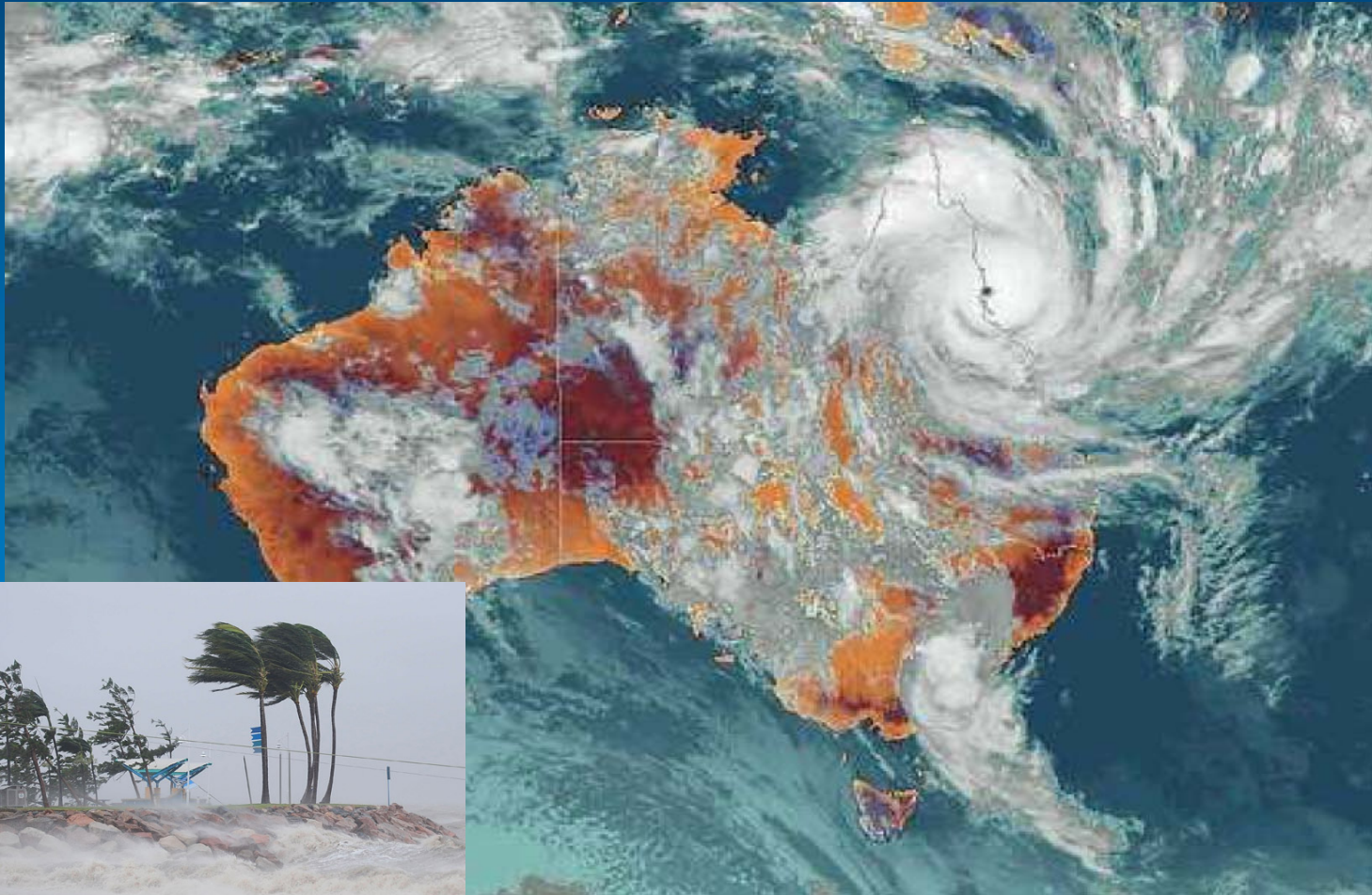
Queensland DNRM Spatial Information Group
Preliminary Flood Line Extent

Queensland - Flood Line Mapping

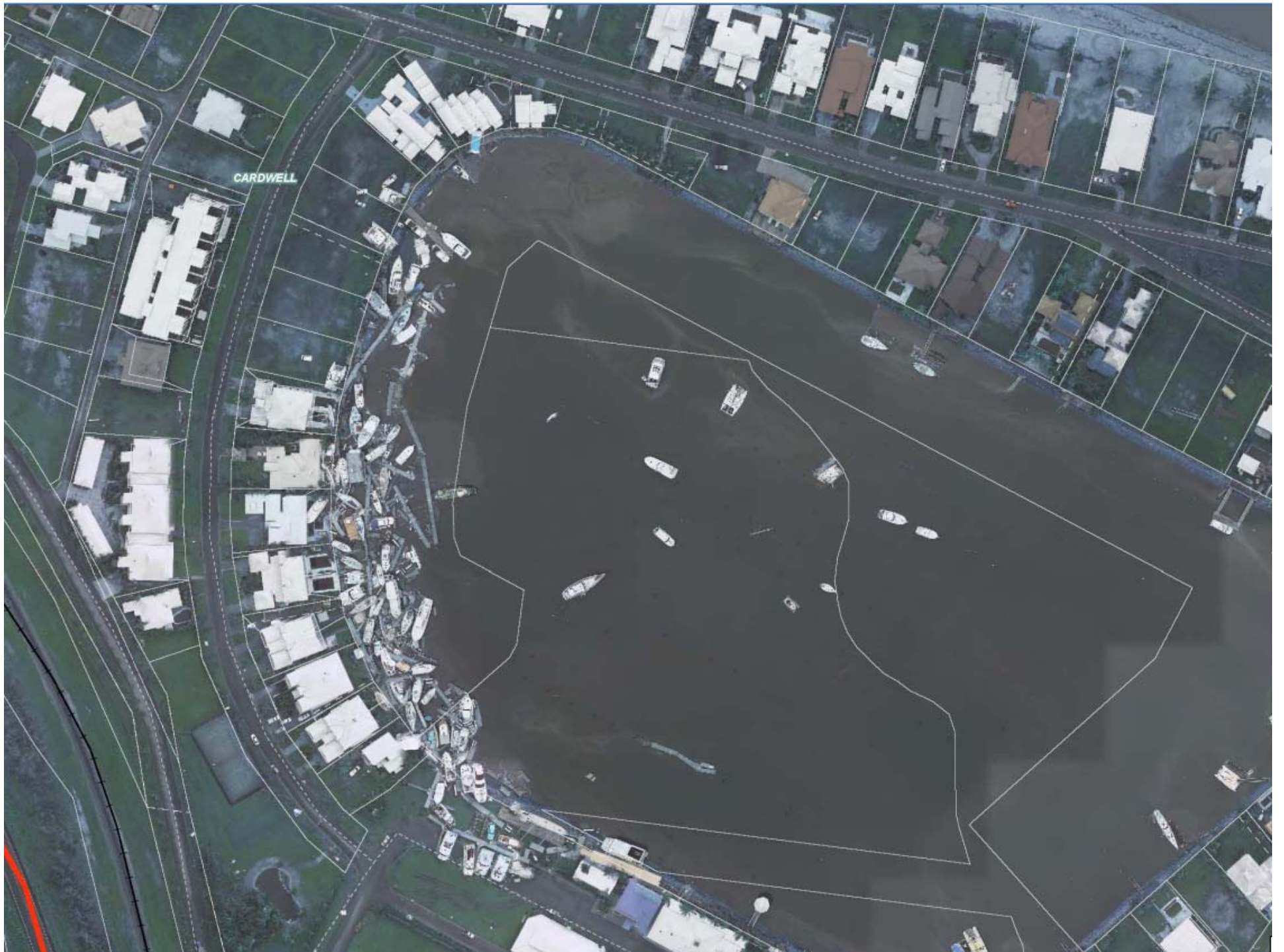




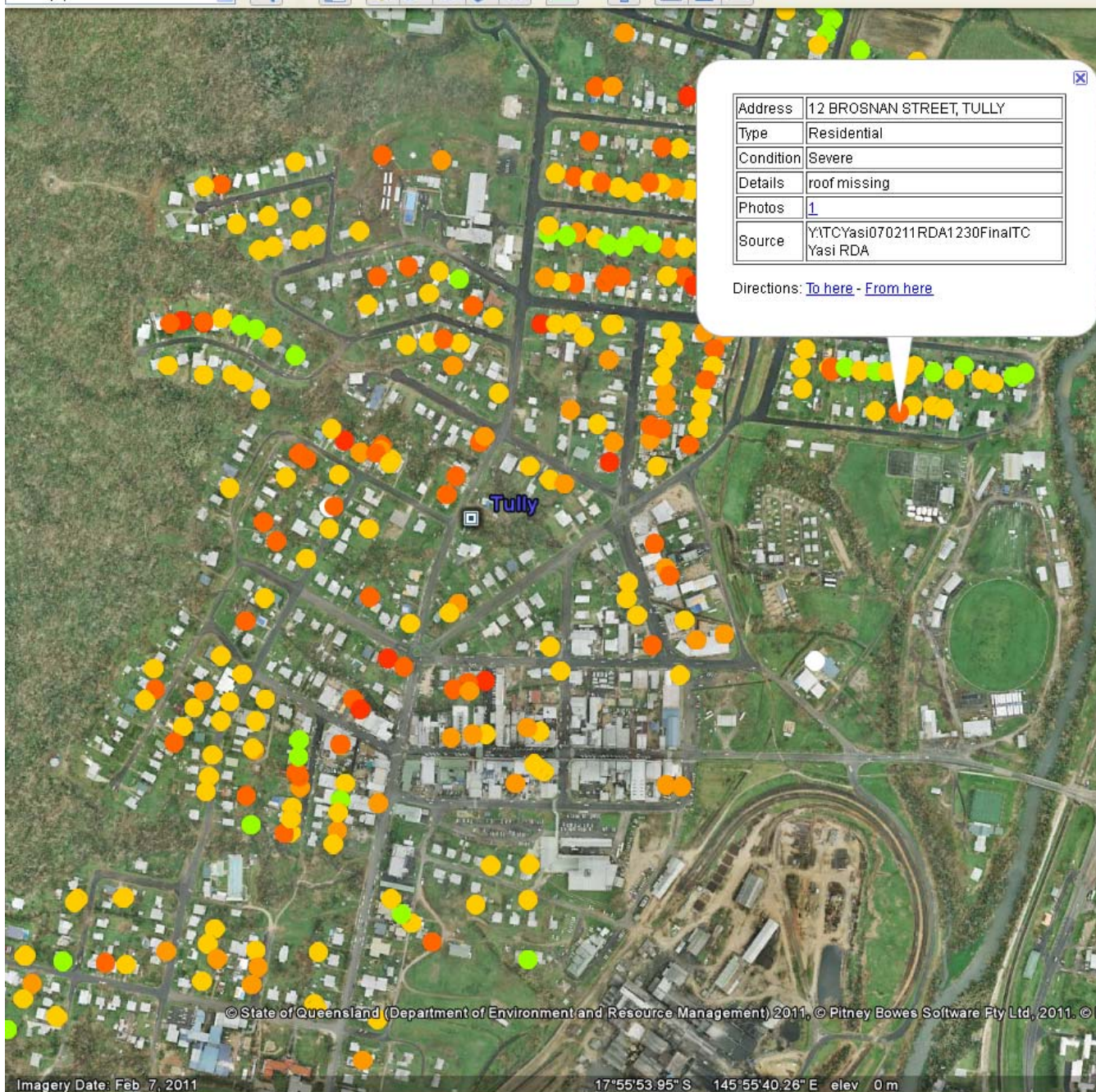
Cyclone Yasi – Category 5 – 3 February 2011











Queensland DNRM Spatial Information Group

New Products

- **Produced 450 map products**
 - Imagery
 - Town before & after maps
 - Catalogues & key maps
 - International Charter products
 - Basin inundation maps
 - Disaster relief arrangement maps
 - 2/3 state (river systems) has been mapped at 1:50,000 scale showing flood hazard lines
- **All products available on web sites**

<http://www.derm.qld.gov.au/mapping/flood/index.html>

Queensland DNRM Spatial Information Group

Benefits

- **Imagery and Resultant Flood Lines are Critical to:**
 - Relief claims
 - Insurance processing
 - Metrics for affected properties and infrastructure
 - Planning and reconstruction
 - Commission of Inquiry
- **Set New Benchmarks for Spatial Information in Disasters:**
 - Establishing spatial records of the events
 - On-line access & web service delivery
 - Seeking community feedback
 - Proactively releasing this above (CC-BY licensing)

Changing Government Business Models

- **First Utilization of Cloud Computing**
- **Importance of Spatial Information & Foundation Data sets**
- **Spatial Information Group recognised as lead in support for surveying, mapping, GIS, imagery coordination & data acquisition services**
- **Easy Access to Data - All data and imagery available for State and Local government's use**
- **SI Group has delivered web service feeds to Govnet**
 - **Cadaastre**
 - **Flood lines**
 - **Post flood & cyclone imagery**
- **Single Point of Truth Concept Reinforced – One authoritative set of data across Government was critical for recovery**

Best Practices: Geoinformation for DRM

Joint Board of GIS, UN-SPIDER and ISPRS



Joint Board of Geospatial Information Societies

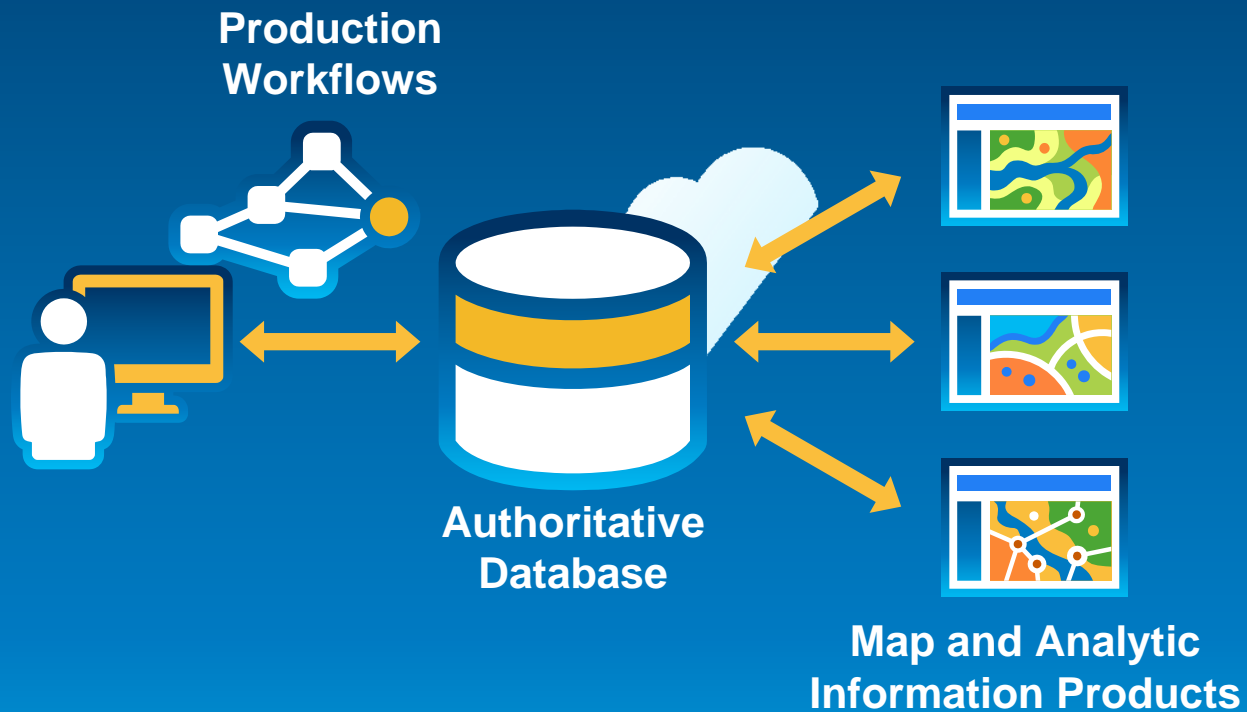
United Nations Office for Outer Space Affairs

Geoinformation for Disaster and Risk Management *Examples and Best Practices*



GIS Technology Provides a Modern Platform

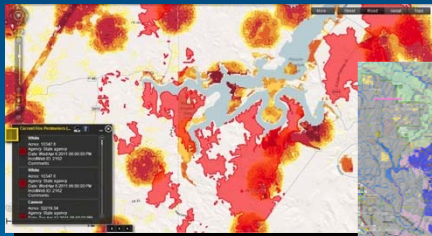
Collect Once, Use Many Times



Leveraging a Common Geo Database for Multiple Products and Services

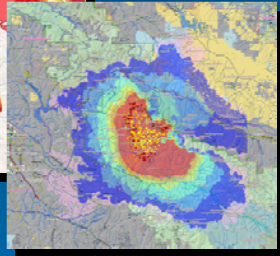
GIS in Disaster and Risk Management

Fire



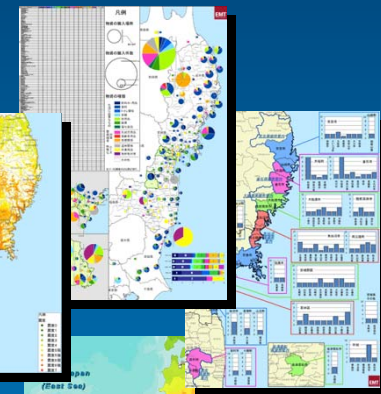
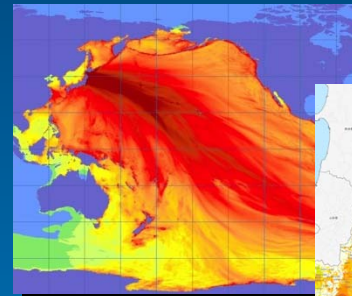
Texas

Fire Simulation



California

Tsunami Forecast, Earthquake Damage Assessment



Tohoku, Japan

Drought Status



USACE

Situational Awareness (COP)



Flooding

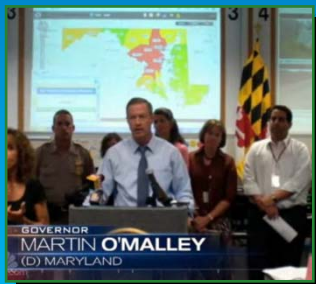


North Dakota

Quake Tracking



Severe Weather



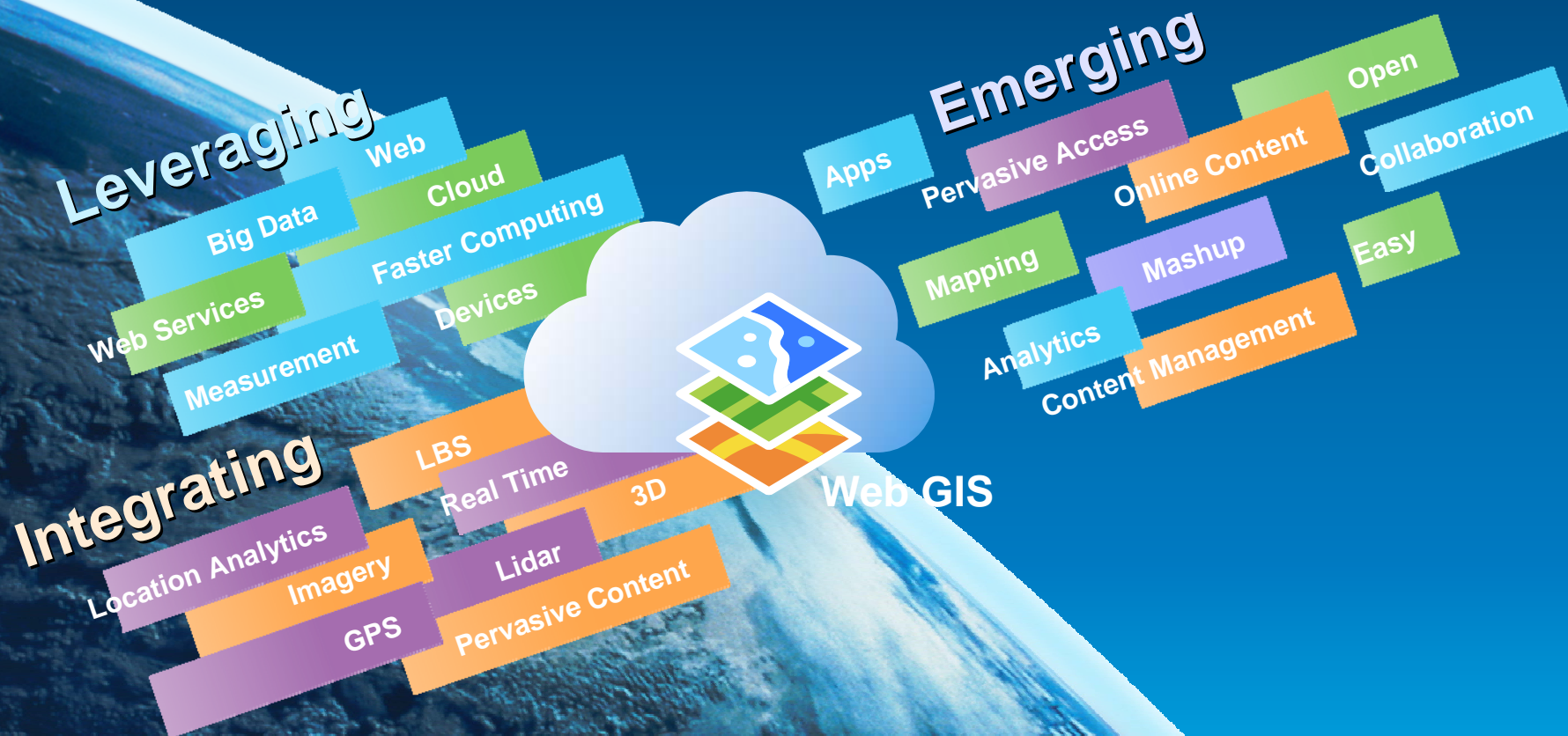
Recovery Planning



International Committee of the Red Cross

GIS Is Being Transformed

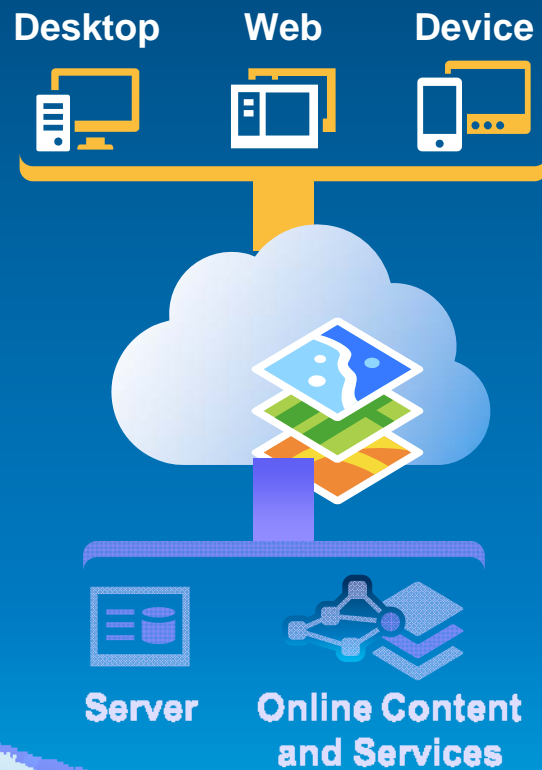
Into a Web GIS



Making GIS Easier, Always Available, and More Social

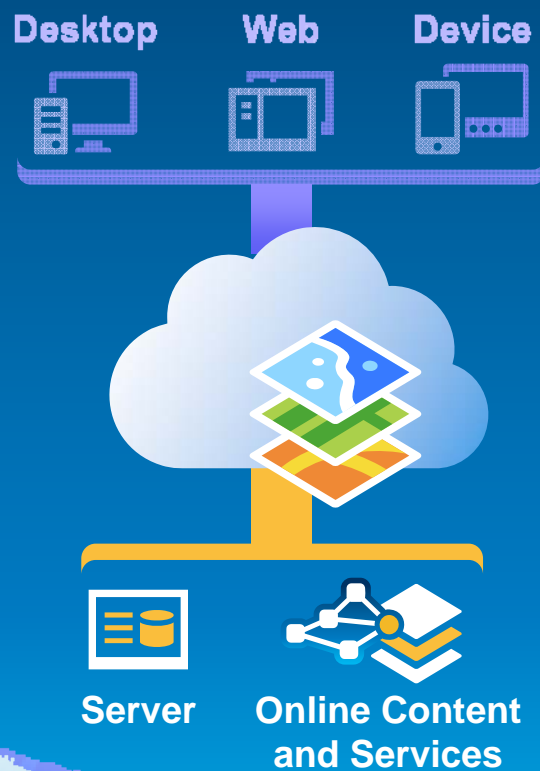
Web GIS – Accessible from Any Client

Simple
Integrated
Open



Web GIS – Powered by Services

Simple
Integrated
Open



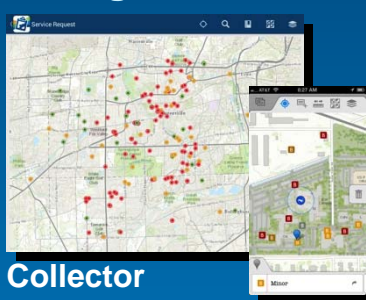
Web GIS Apps Empower Everyone

Focused and Easy to Use on Any Device

View / Query

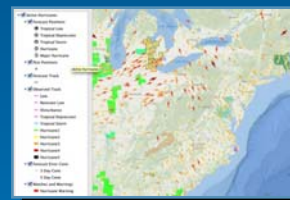


Editing / Collection

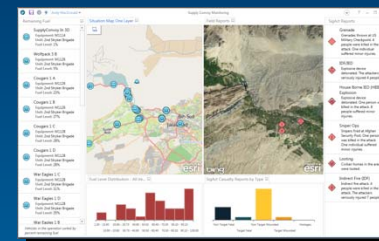


Collector

Mapping

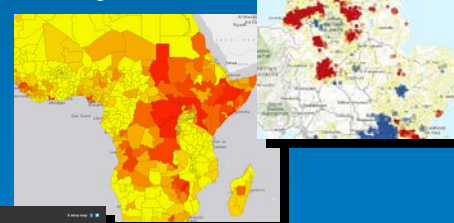


Awareness



Dashboard

Analysis



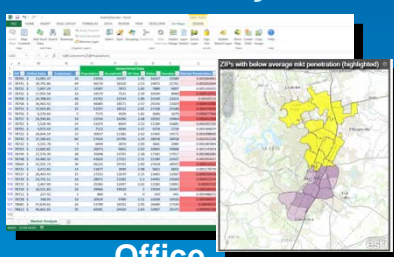
Story Maps



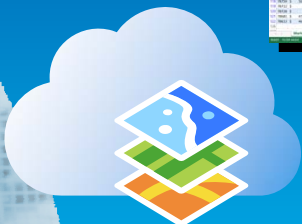
Visualization



Location Analytics



Office

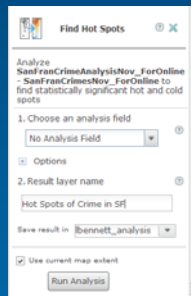


Enabling You to Extend the Power of GIS

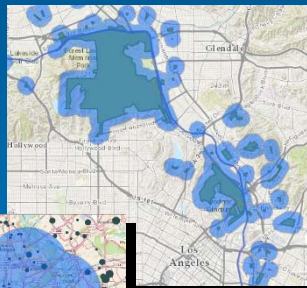
Web GIS Enables Spatial Analytics

Leverage Cloud Infrastructure

Find Hot Spots

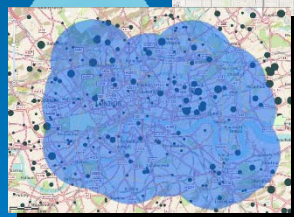


Summarize Within



Enrich Layer

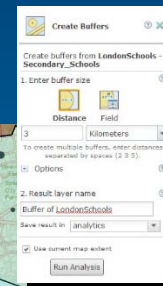
Create Buffers



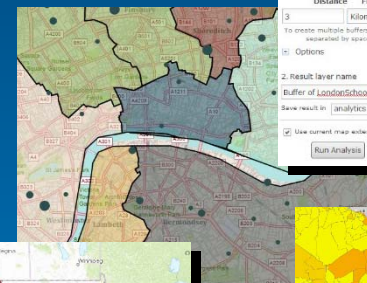
Aggregate Points



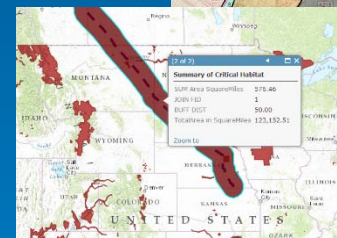
Merge Layers



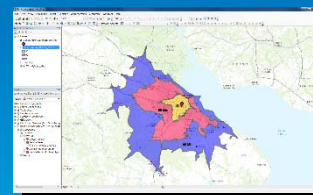
Field Calculator
Extract Data



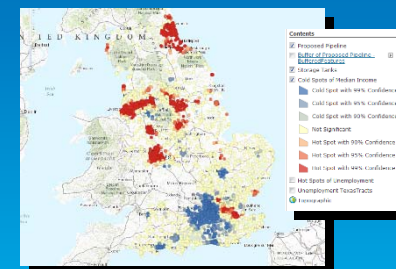
Overlay Layers



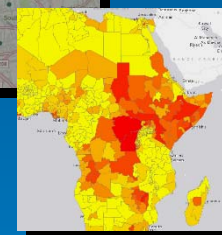
Dissolve Boundaries



Drive-Time Areas



Find Nearest



Enabling New Approaches

Web GIS Connects Everyone

Knowledge
Workers



Executive
Access



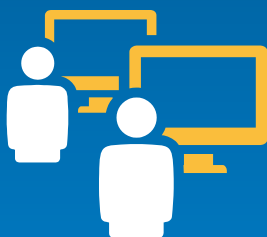
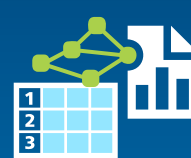
Public
Engagement



Work
Anywhere



Enterprise
Integration



Geospatial
Professionals



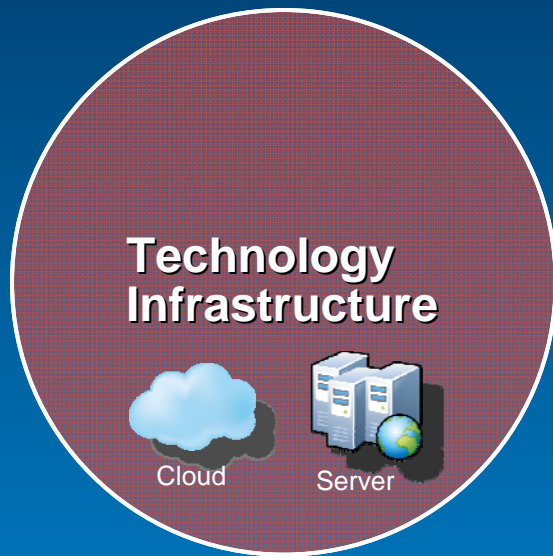
Making GIS Available Across
Organizations and Society



More than a Picture...

We need a **Platform.**

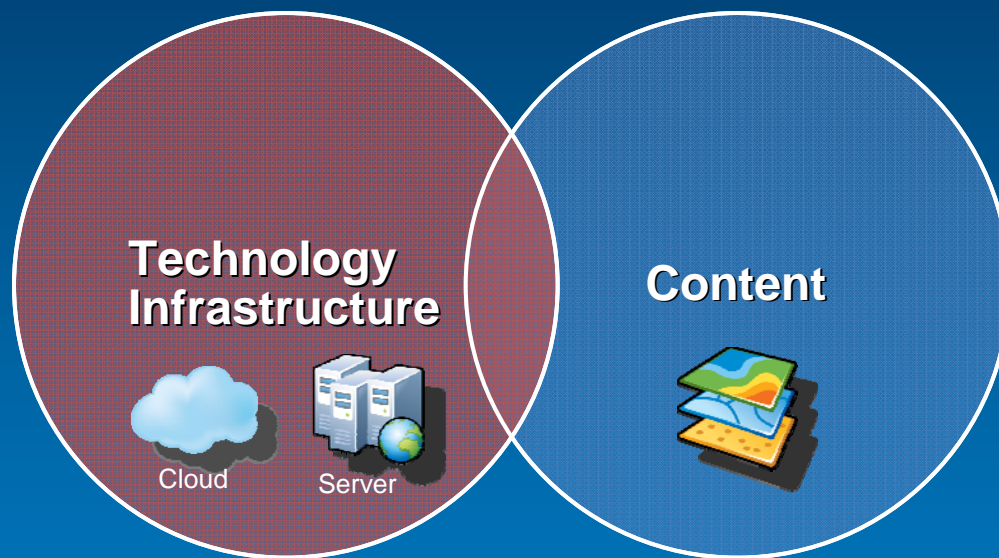
Geospatial Platform



Infrastructure

Flexible. Scalable.

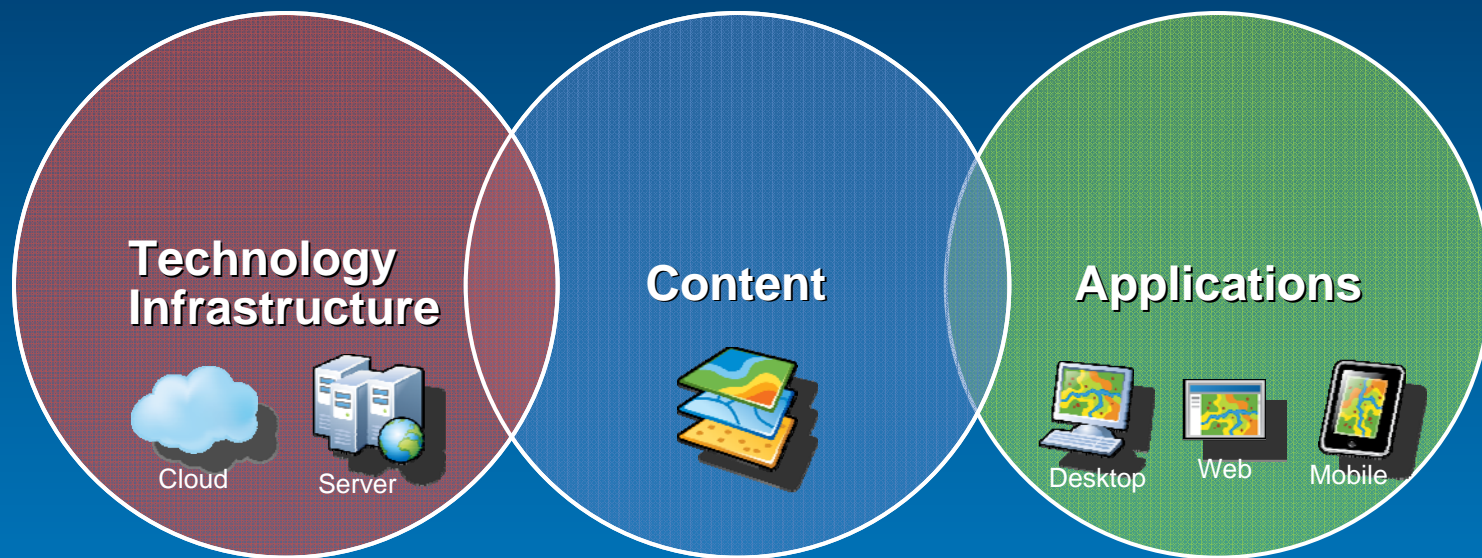
Geospatial Platform



Content

Yours. Partners. Open Data.

Geospatial Platform



Applications

Simple. Relevant. Focused.

Geospatial Platform - 2nd HLF of UN-GGIM

February 2013 – Doha, Qatar



Indonesia – NSDI and One Map



President Susilo Bambang Yudhoyono Cabinet Meeting

Geospatial Platform

The screenshot displays the Geospatial Platform website. At the top left is the logo, which consists of a globe icon and the text "GEOSPATIAL PLATFORM". To the right of the logo is a navigation bar with links for "Resource Center", "Show: Web Content Only", "Help", and "Sign In". Below this is a secondary navigation bar with links for "HOME", "GALLERY", "MAP", "GROUPS", and "MY CONTENT", followed by a search bar containing the text "Find maps, applications and more...".

The main content area features a large green banner with the text "Welcome to the Geospatial Platform" and a sub-header "Featured Map:". Below the banner is a map titled "EPA Cleanup sites" showing various locations marked with colored dots. To the left of the map, the text reads: "The Geospatial Platform provides shared and trusted geospatial data, services, and applications for use by government agencies, their partners and the public".

Below the banner are three main sections, each with a right-pointing arrow icon:

- Featured Maps:** Includes a globe icon with a magnifying glass and the text: "Explore featured maps and apps from all levels of government."
- Collaborate in Groups:** Includes an icon of three people and the text: "Work in public and private groups with others who share your interests and ideas."
- Build Your Own Map:** Includes a map icon on a tablet and the text: "Create a map you can view anywhere on any device and share with anyone."

At the bottom, there is a section titled "About the Geospatial Platform" with a right-pointing arrow icon. The text describes how federal agencies collect and manage geospatial data and how the platform provides access to this data. To the right of this text is the "fgdc" logo, which stands for the Federal Geographic Data Committee.

Geospatial Platform

GEOPLATFORM.gov

Home | Overview | Data | Maps | Communities | Resources | Model Player | Tools | Sign In | Register | Help

Collaborate

Discover

Share

Search

Type a search term above to search the content of the site.

Top Searches

- Geospatial
- FGDC
- Data
- Maps

Explorer

Look for popular datasets and find out what can be done with various datasets. If you're looking for a specific dataset or other use the search feature or browse datasets by category.

Developer

Find a journey to develop your own datasets, resources on data formats, and find examples of what others have done and how they've done it.

Publisher

Upload and explore your datasets here to share with other FGDC members and agencies. You retain ownership of all datasets you publish to the Geospatial Catalog and can use your data.

Recent Data Updates

Science Update
The knowledge above used to search Science Applications ...

DOE Reports
DOE reports from a recent data release of project information including from DOE-sponsored ...

DOE Green Energy
The DOE Green Energy research bibliography includes and full-text technical reports ...

Featured Events

HRUS Meeting
District of Columbia - United States - Wed, Jan 14 - 12:00:00

Geospatial Data
Virginia - United States - Tue, 2013-05-14 11:00 to 12:00

Democrat
District of Columbia - United States - Wed, Jan 14 - 12:00:00

News

Internet Research News Release: Science Applications
WASHINGTON, D.C.

LandSat Images Provide the Gold Standard for New Earth Applications
WASHINGTON — Images from Landsat satellites are used

ThermoFisher Scientific Established
As part of our continuing efforts to increase our

Geoplatform.gov site

Five Mission Areas

Disaster and Risk Management

Prevention



Protection



Mitigation



Response



Recovery



Prevention



Protection



Mitigation



Response



Recovery



“A **secure** and **resilient** nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the **threats** and **hazards** that pose the greatest **risk**.”

-The National Preparedness Goal (PPD-8)

Complex Challenge

Disaster Management



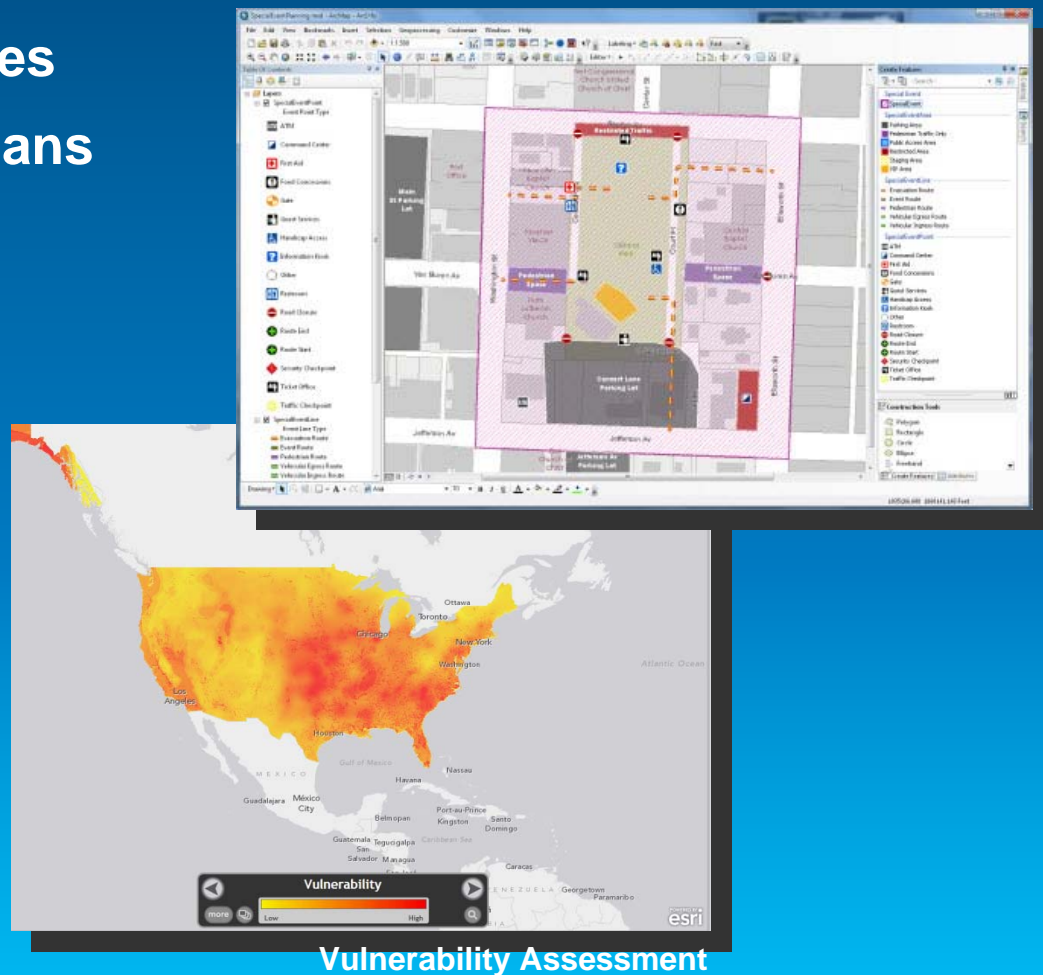
Common Workflows

Roadmap for Apps

Planning

- **Modeling and Risk Assessment**
- **Special Events**
- **Training and Exercises**
- **Aligning with your Plans**

Special Event Planning



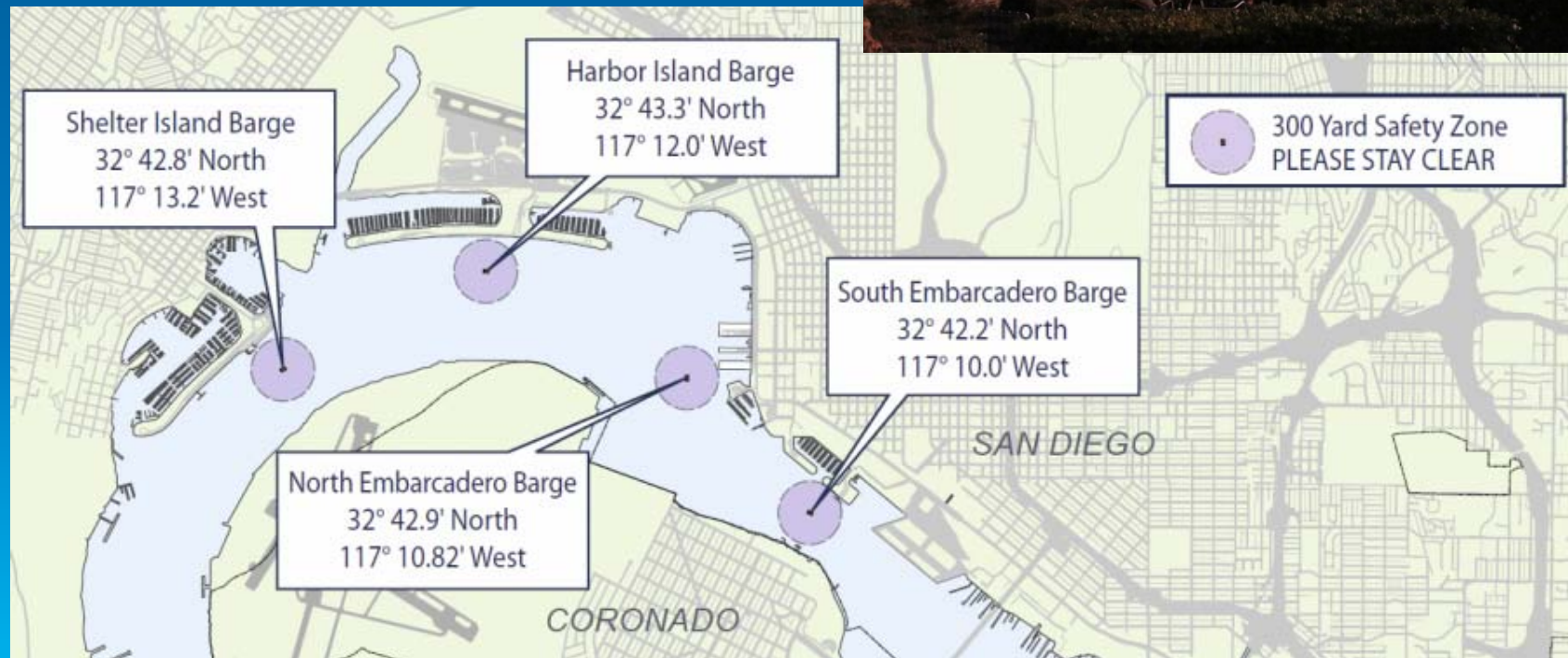
Big Bay Boom

2-5 July 2013



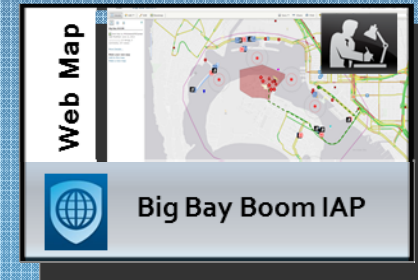
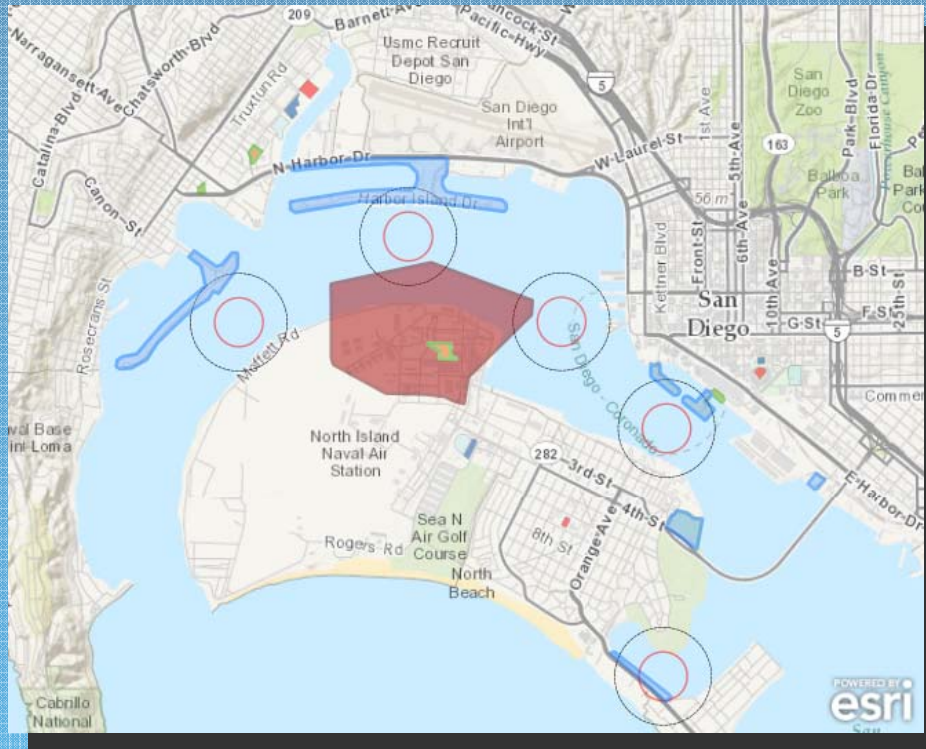
Significant Activity: July 4th, 2013

Firework Barge Locations
300 yard safety zone

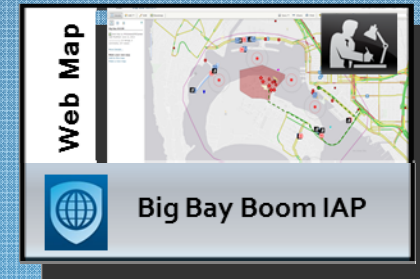


The Operations Map

Live map 

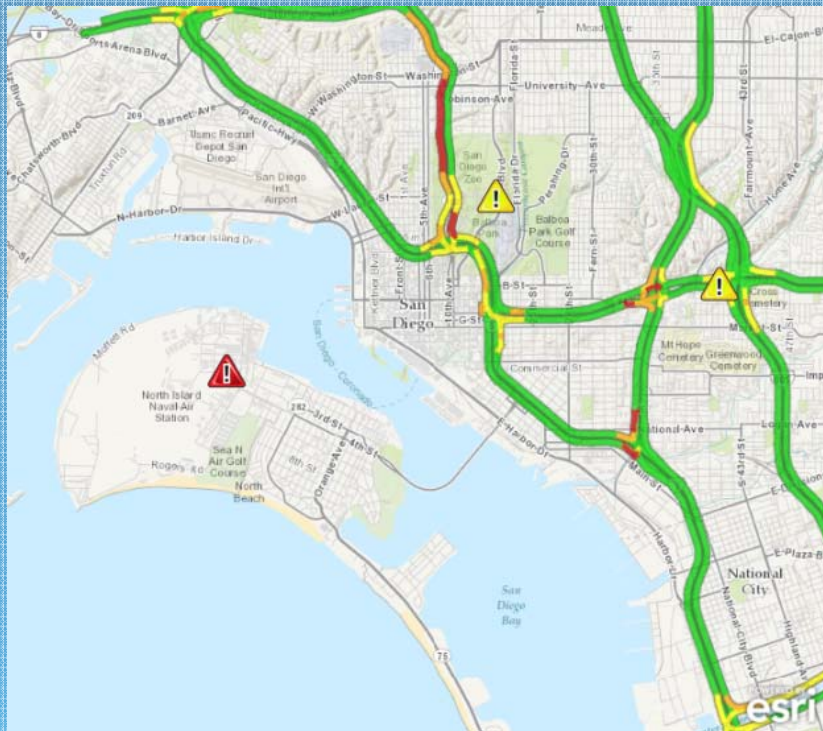


Field Operations



Current Situation

Live map 



World Traffic


North America


North America Traffic Incidents

Traffic Incidents Detailed

 critical

 major

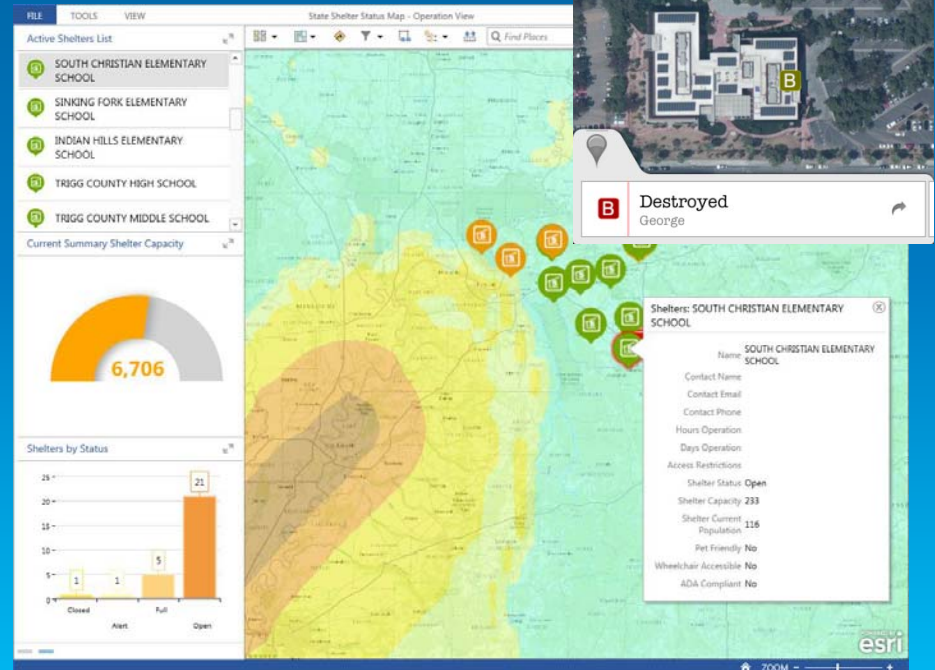
 minor

 low impact

Operations

- Situational Awareness
- Incident Management
 - Damage Assessment
 - Search and Rescue
- Shelter Management
- Emergency Support Functions (ESF)

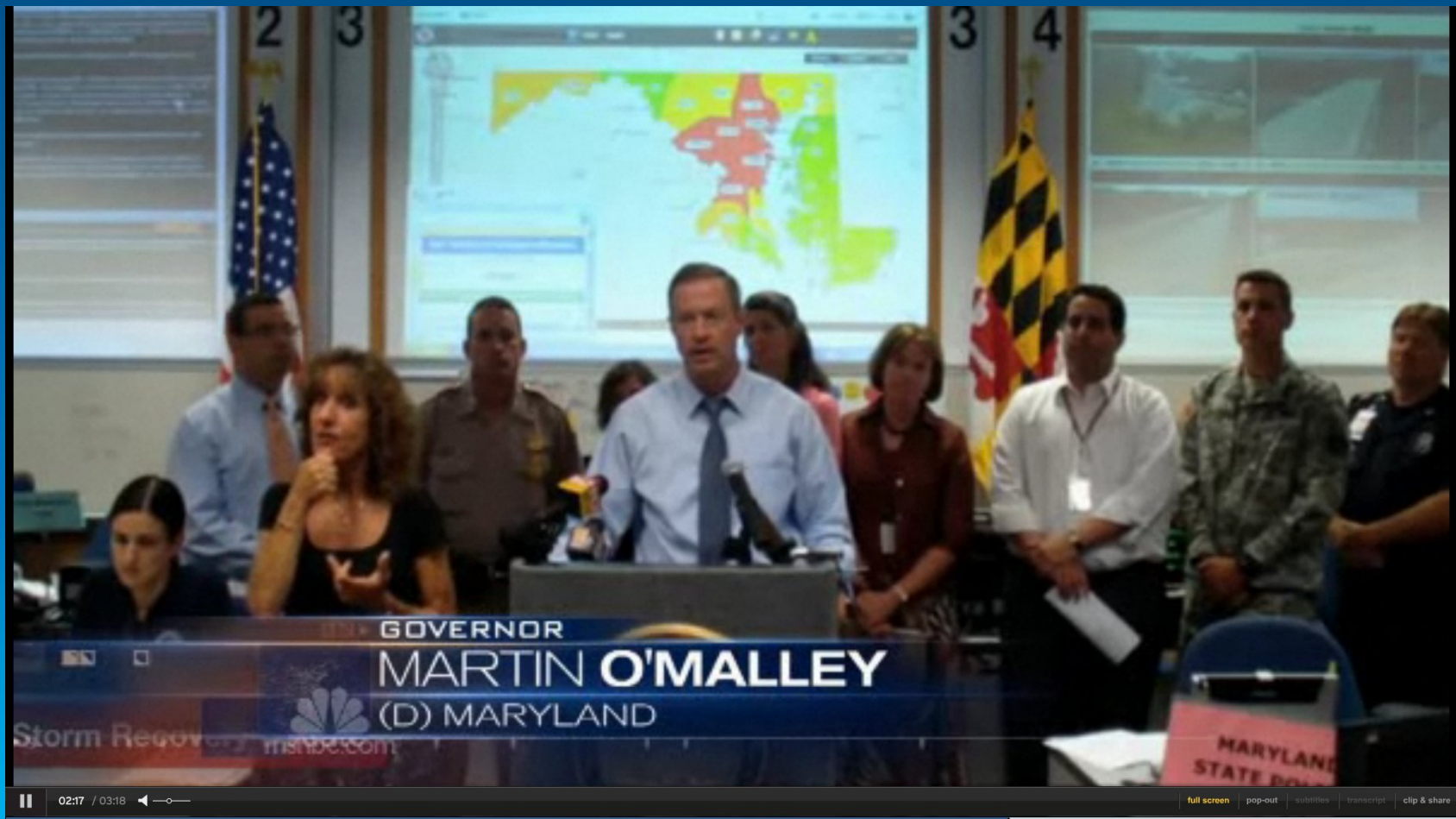
Shelter Management



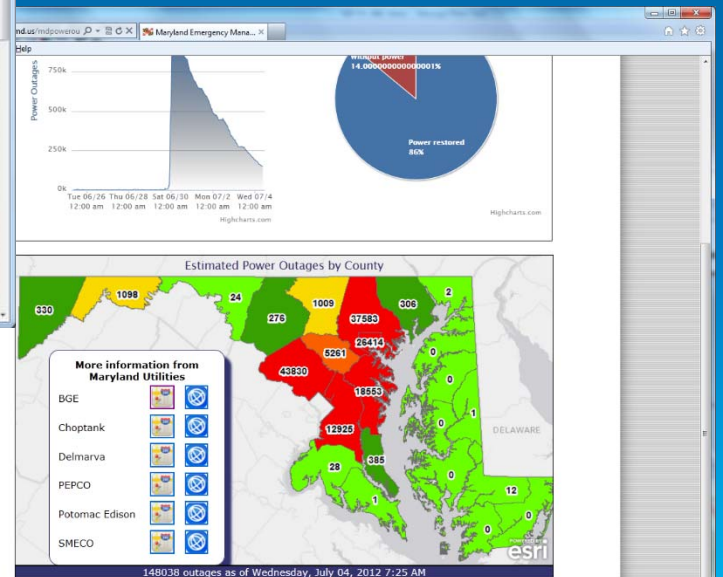
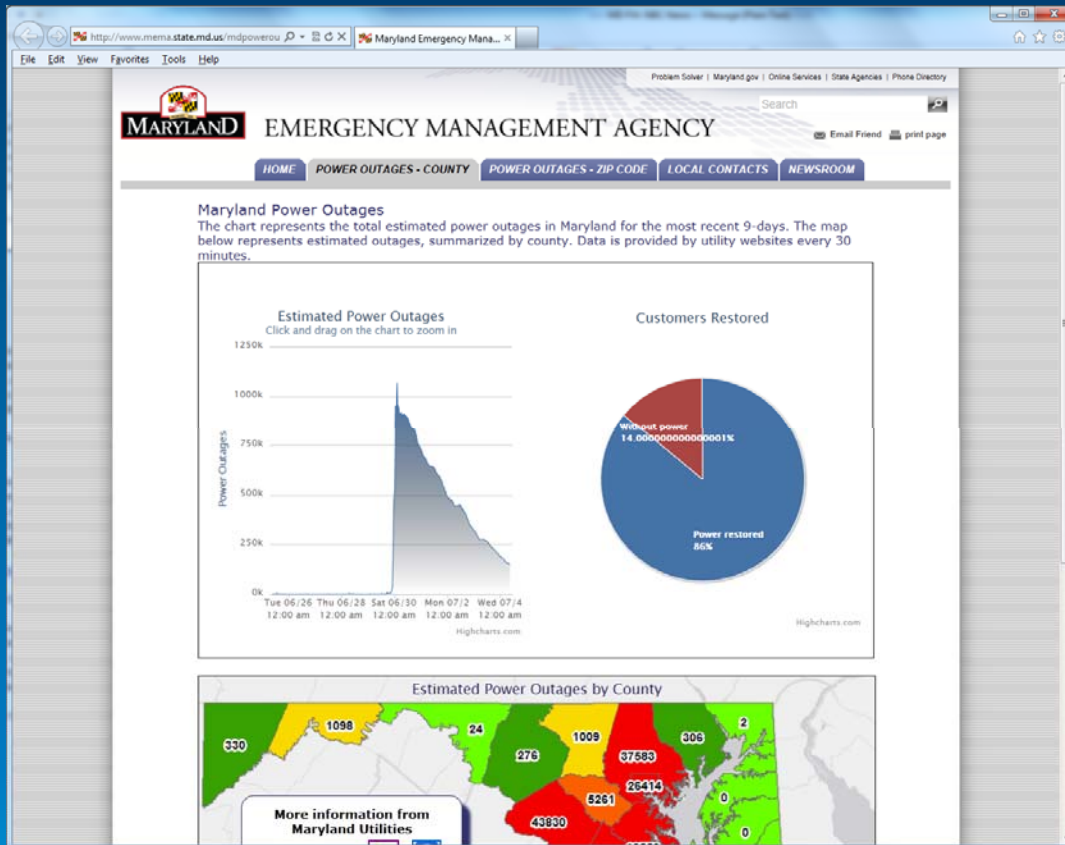
Damage Assessment



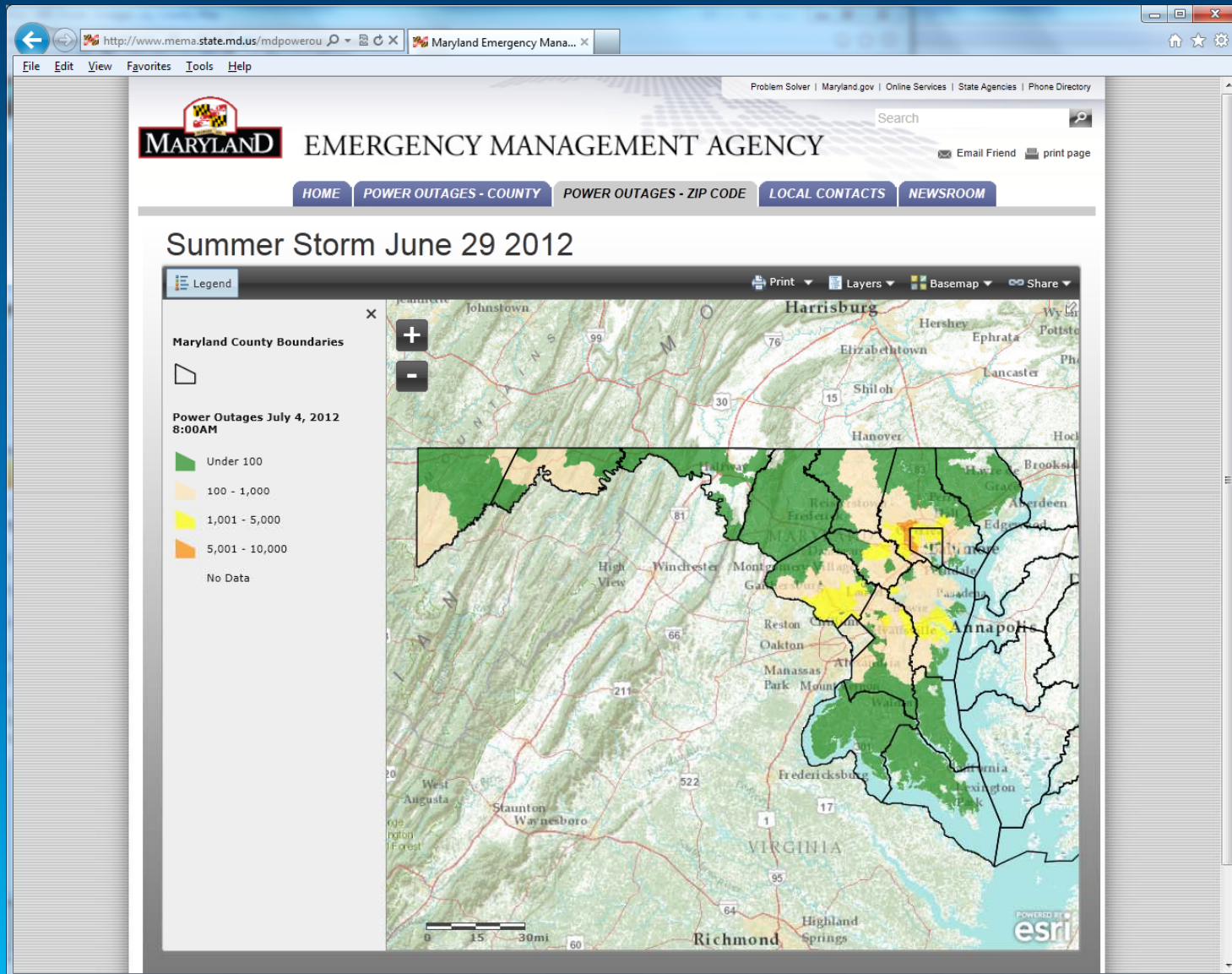
Maryland Governor O'Malley on NBC Nightly News (7/2) Standing in front of OSPREY, their Flex COP



Maryland EMA Public Dashboard on Power Status



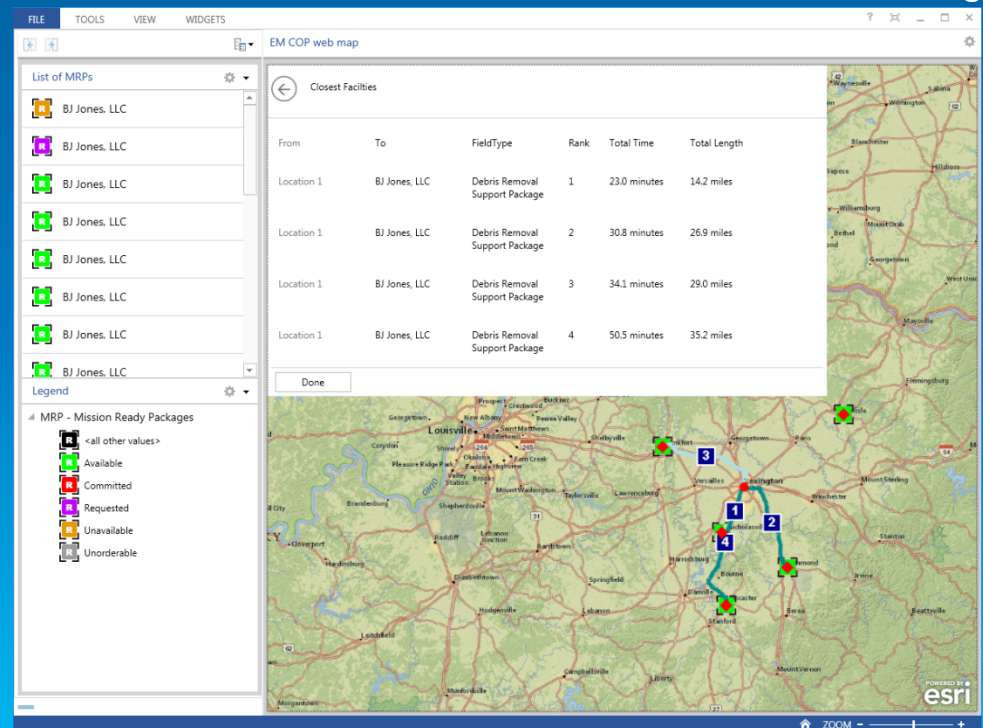
Maryland Power Outages by Zip Code



Logistics

- Catalogue and Management of Resources
- Ordering and Routing Supplies and Equipment
- Food and Aid Distribution
- Mutual Aid Request

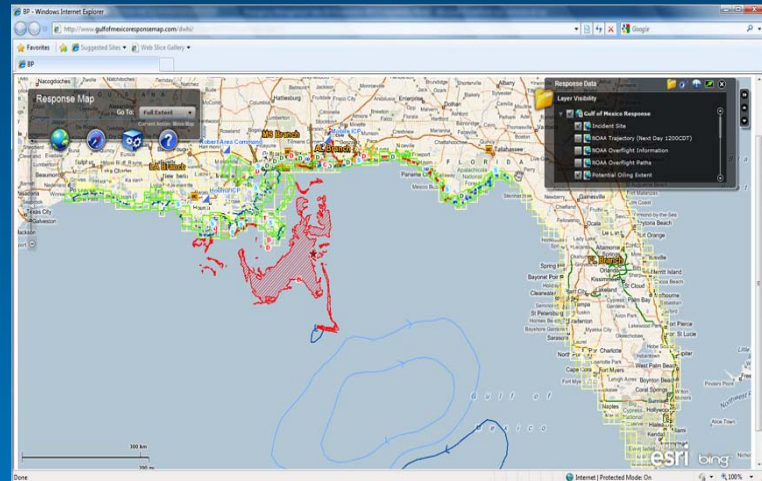
Resource Routing



Gulf of Mexico Oil Spill

Mission Specific Access

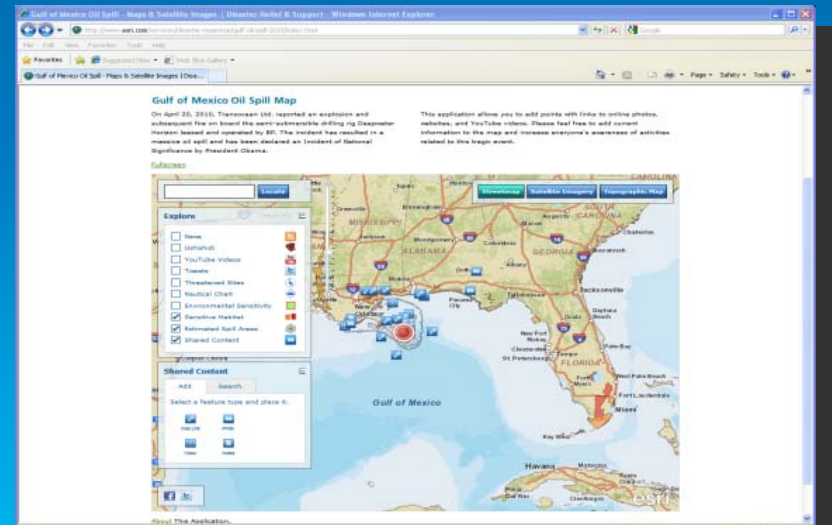
Emergency COP



Economic Impacts



Crowd Sourcing



Command

- Public Information Briefings
- Elected Official Internal Briefings
- Multi-level Government Coordination

Briefing Book

Hurricane Sandy Briefing


Cover | 1 of 5 | Introduction

Hurricane Sandy

Hurricane Sandy was a hurricane that devastated portions of the Caribbean and the Mid-Atlantic and Northeastern United States during late October 2012, with lesser impacts in the Southeastern and Midwestern states and Eastern Canada. Sandy, classified as the eighteenth named storm and tenth hurricane of the 2012 Atlantic hurricane season, was a Category 2 storm at its peak intensity. While it was a Category 1 storm off the coast of the Northeastern United States, the storm became the largest Atlantic hurricane on record (as measured by diameter, with winds spanning 1,100 miles (1,800 km)). Preliminary estimates of losses due to damage and business interruption are estimated at \$65.6 billion (2012 USD), which would make it the second-costliest Atlantic hurricane, behind only Hurricane Katrina. At least 253 people were killed along the path of the storm in seven countries.

In the United States, Hurricane Sandy affected 24 states, including the entire eastern seaboard from Florida to Maine and west across the Appalachian Mountains to Michigan and Wisconsin, with particularly severe damage in New Jersey and New York. Its storm surge hit New York City on October 29, flooding streets, tunnels and subway lines and cutting power in and around the city. Damage in the US is estimated at over \$63 billion (2012 USD). Hurricane Sandy was a major storm that impacted an area the size of Europe. The Red Cross mobilized more than 14,400 trained disaster workers to date - 90 percent of them volunteers - to help people affected by the storm. Today, nearly 3,000 workers are still on the job, providing food, water, shelter and relief supplies. The Red Cross has also deployed more than 300 of its emergency response vehicles and is also utilizing rental cars, trucks and other vehicles to help.

Category 2 Hurricane: Sandy



Hurricane Sandy near peak intensity on October 25, 2012

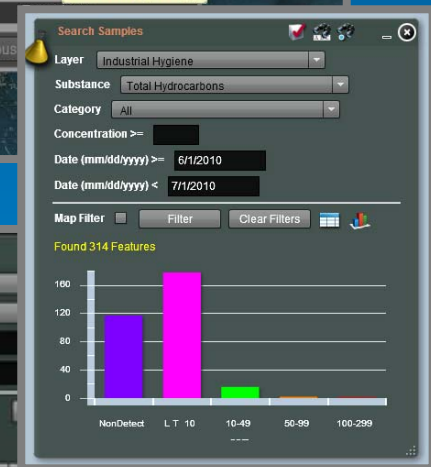
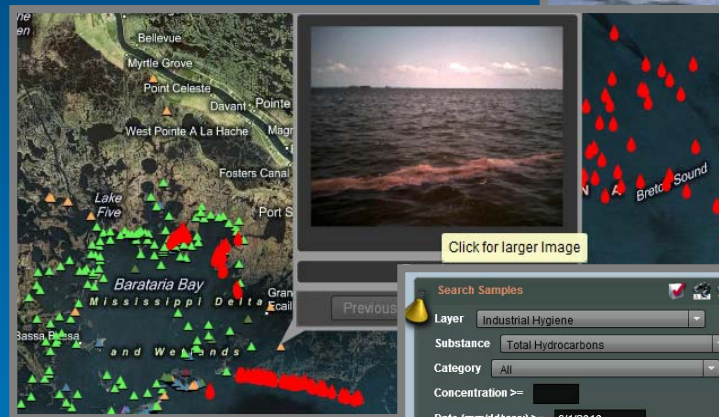
Contents

- 1. Hurricane Sandy Background
- 2. Impact Analysis
- 3. Response and Assistance
- 4. Damage Assessment
- 5. Damage in New Jersey

US - Gulf of Mexico Oil Spill

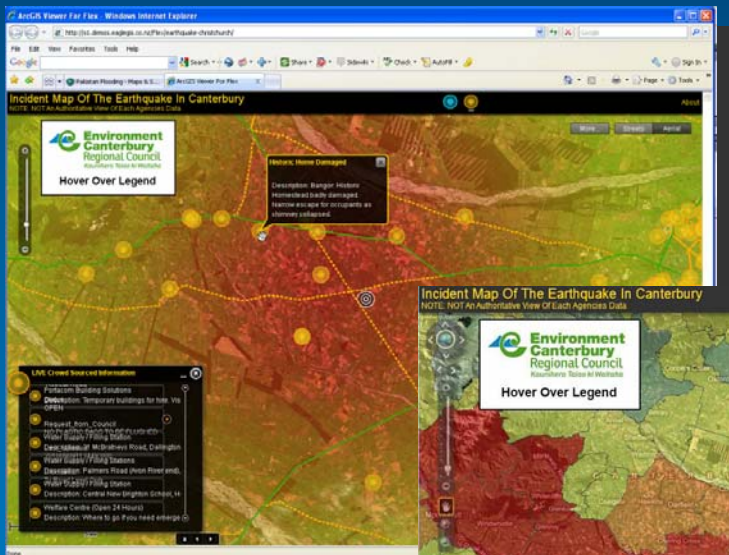
Data Management and the Cloud

- Response tracking/time series
- Shoreline cleanup
- Environmental sampling
- Boom retrieval
- Field observations
- Before and after photos
- Overflight photos
- Wildlife

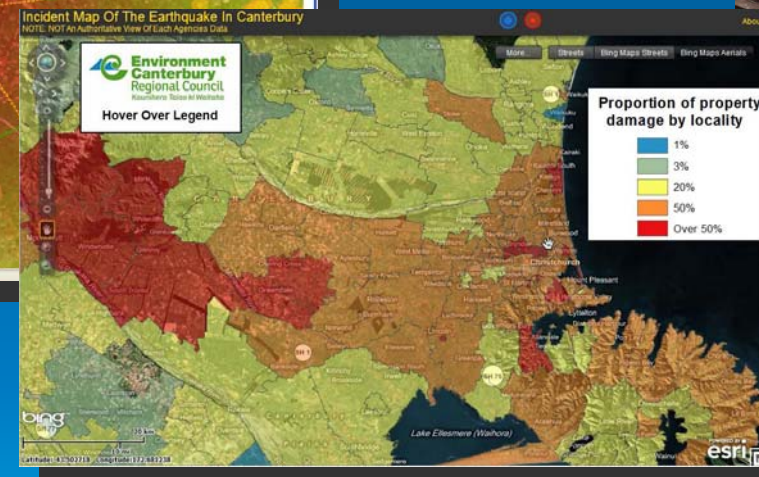


Christchurch, New Zealand Earthquake

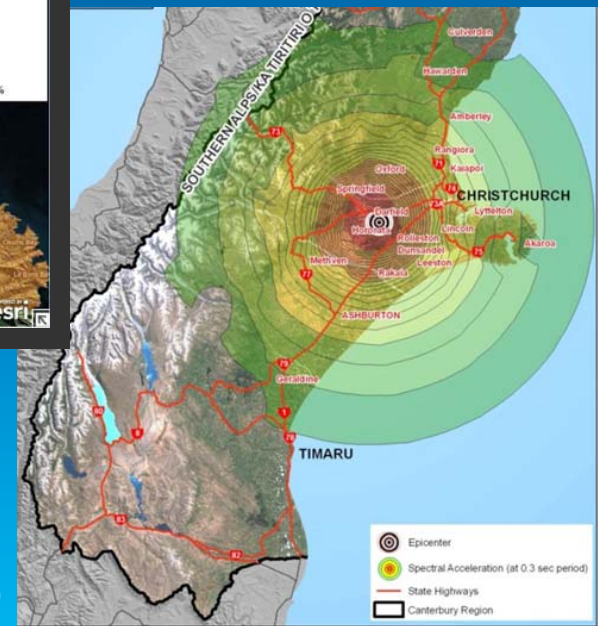
Field Mobility



Social Media



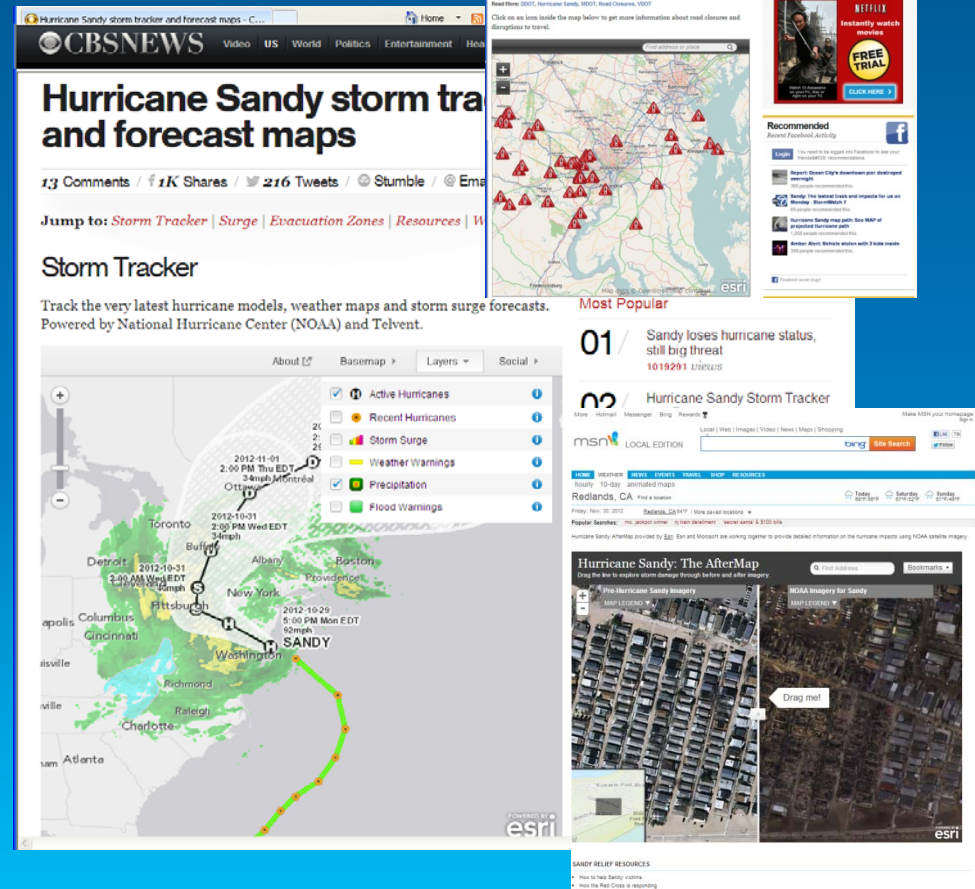
Damage Assessment



Shake Map

Public Information

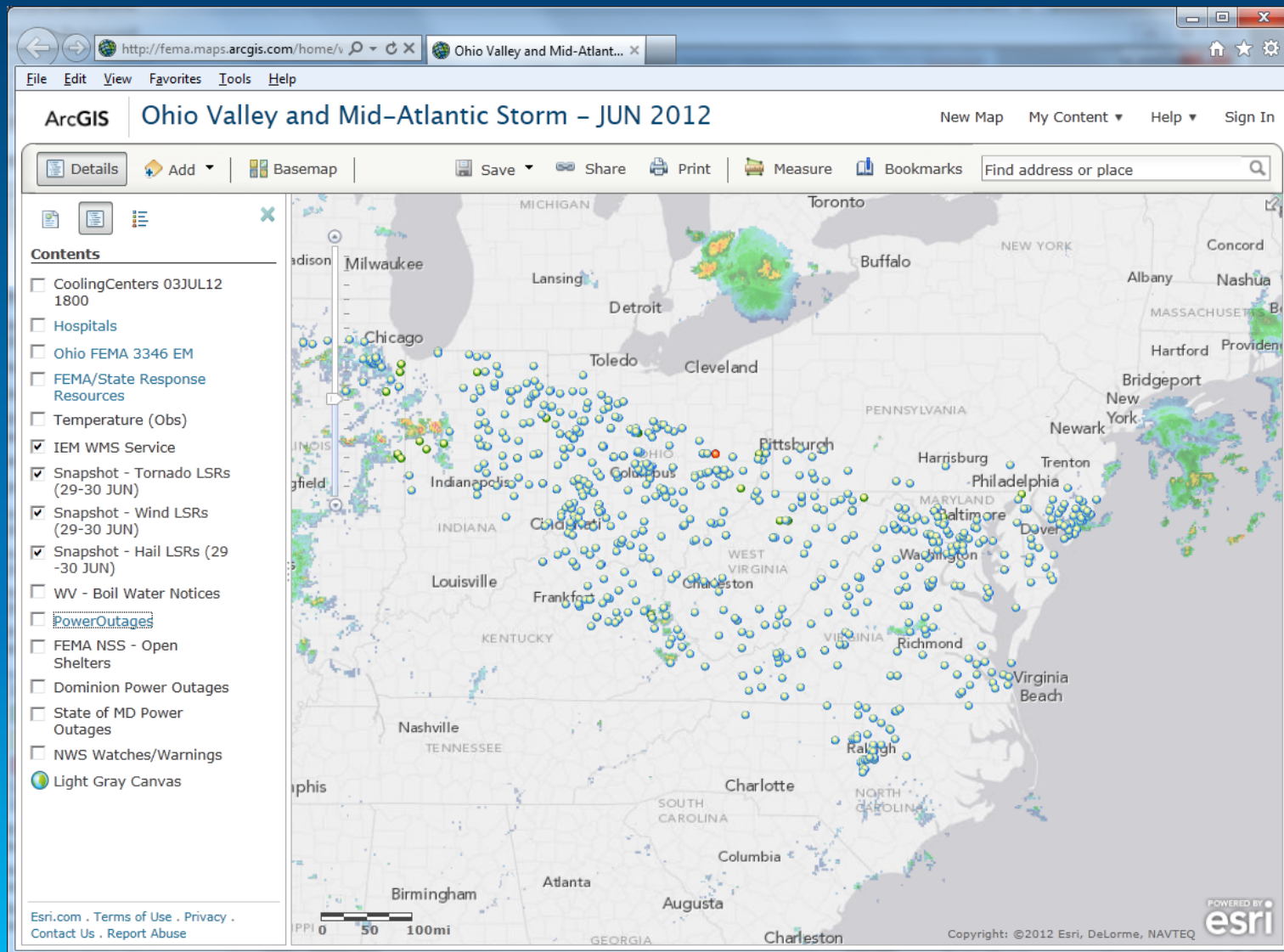
- Public Information Briefings
- Public Web Notifications
- Story Telling



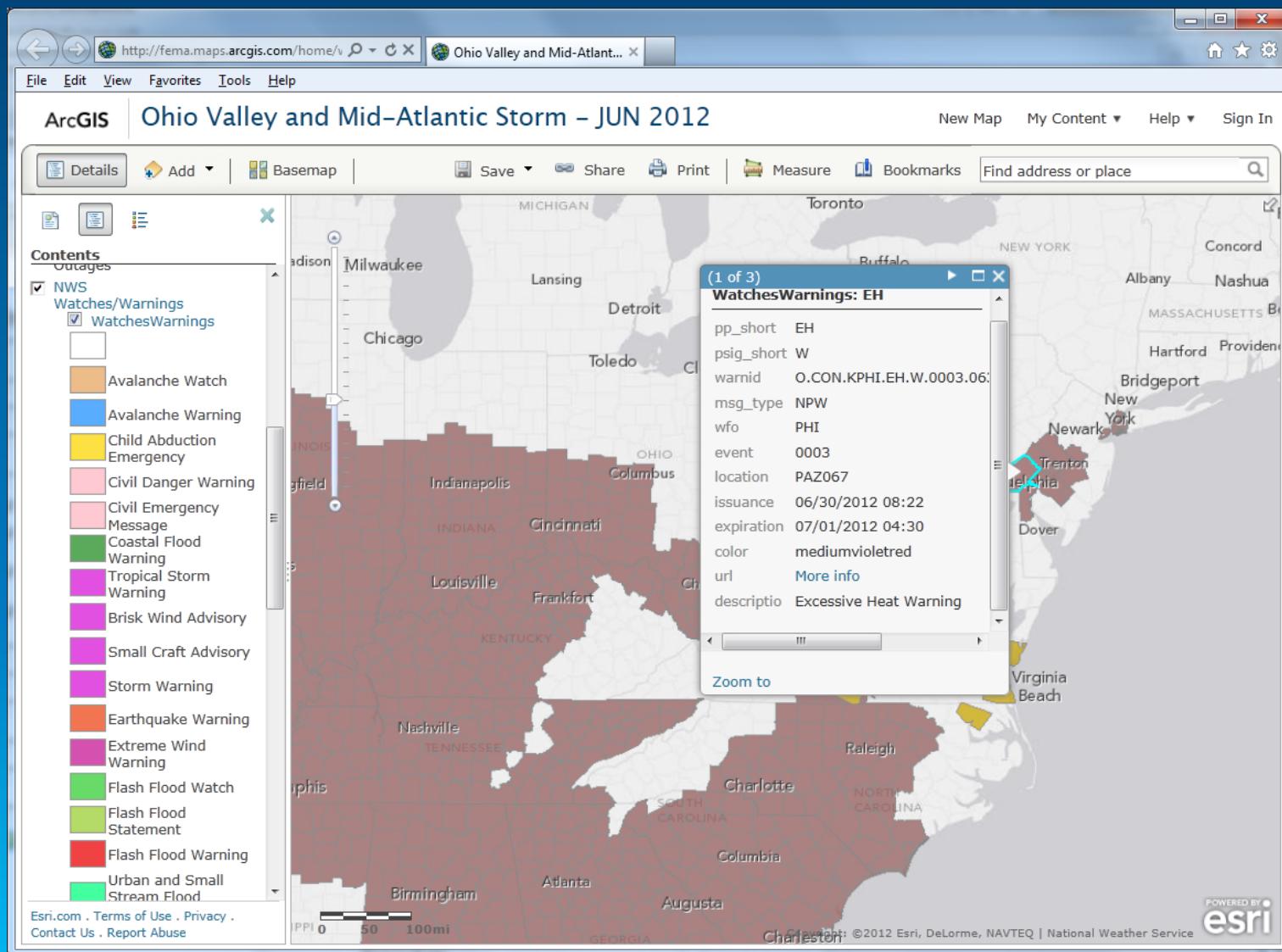
Public Information – US-FEMA Administrator Fugate Tweets a Link to Web Maps – June 2012



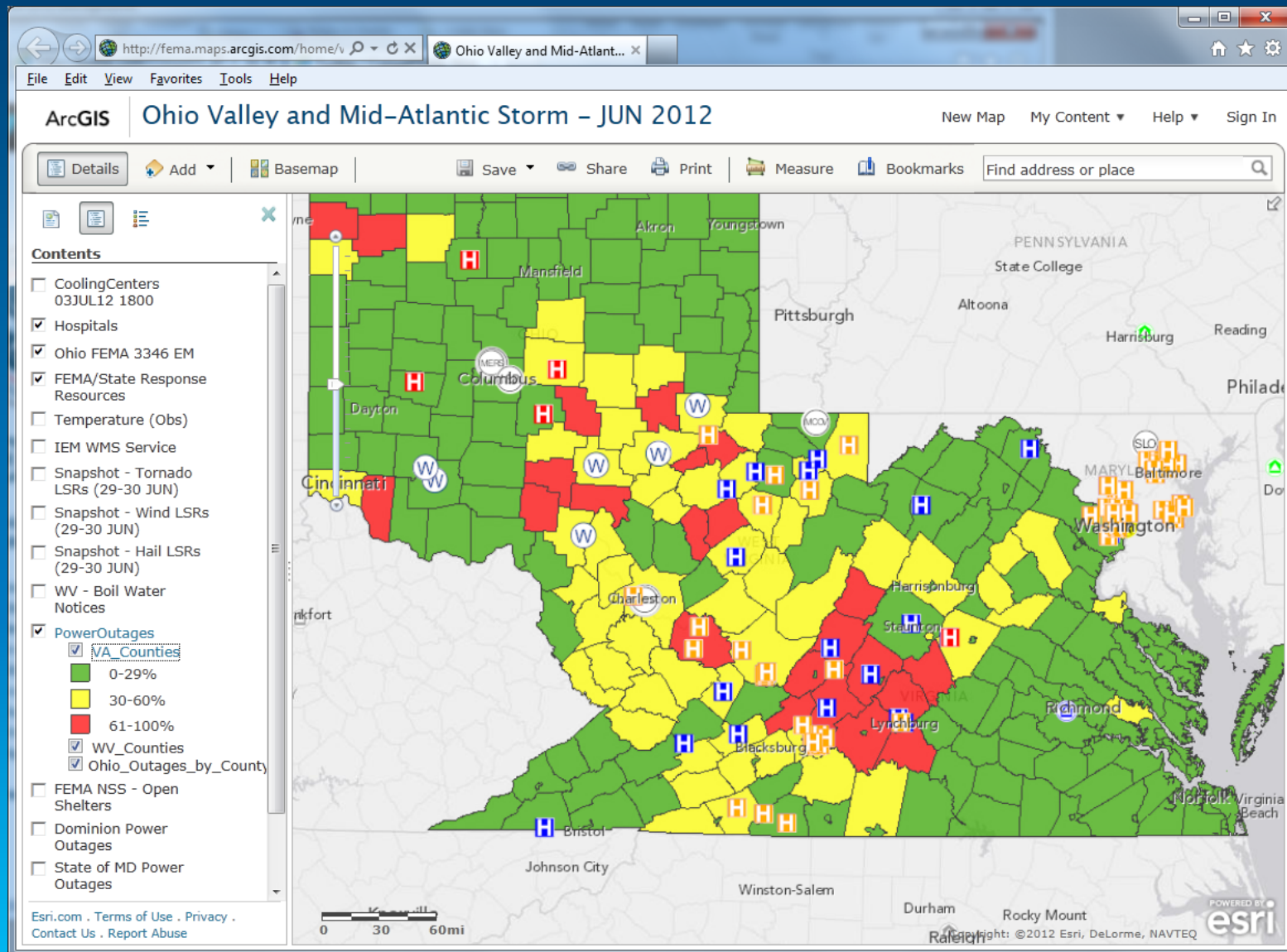
Public Information - Derecho Storm Reports



Public Information - Excessive Heat Warnings



Public Information - Power Outage Status



- Dashboard / Situational Awareness
- Mobile Data Collection / Field Support
- Briefings
- Planning
- Crowdsourcing
- Social Media Integration
- Paper Map Production
- Public Information

Hurricane Sandy

Lessons Learned



Key Trends During Hurricane Sandy

- **Collaboration and Information Sharing**
- **Delivering Focused Maps and Apps**
- **Social Media and the Crowd**
- **Storytelling with Maps**

Collaboration & Information Sharing



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GALLERY

MAP

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Find maps, applications and more... 



FEMA GeoPortal Online



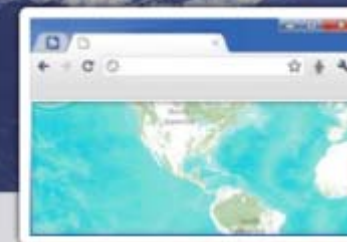
Hurricane Sandy Housing
Task Force



CR Completed Surveys



FEMA MOTF-Hurricane
Sandy Impact Analysis



Best Available Flood
Data: Tiled and Feature

Make a Map »

Create a map that can be viewed in a browser, desktop or mobile device.
Share it on a blog, via email, or embed it in a website.

ArcGIS Online for Developers »

Build custom web and mobile applications that incorporate your maps and data.

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FEMA Featured Content

Maps Web Apps Mobile Apps



[Open Details](#)

Impact Analysis

FEMA MOTF-Hurricane Sandy Impact Analysis

FEMA MOTF-Hurricane Sandy Impact Analysis

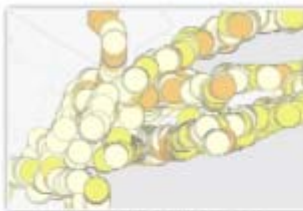
Web Map by FEMA.MOTF

Last Modified: November 27, 2012

★★★★★ (4 ratings, 0 comments, 23,354 views)



Hurricane Sandy-Remote Sensing Collection Planning



Hurricane Sandy-Damage Assessments



Shelters, Warming Centers, and Recovery Centers



Power Task Force Overview



Hurricane Sandy



Disaster Overview



Waldo Canyon Fire - Colorado Springs, CO

1 2 3 4 5 6 7 8 9 10

Find...

The most viewed items in the organization

Items recently added by the organization's users

The organization's groups

HOME

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Find maps, applications and more... 



American Red Cross Geospatial Technology



Disaster Services, Geospatial Technology Unit

Make a Map »

Create a map that can be viewed in a browser, desktop or mobile device. Share it on a blog, via email, or embed it in a website.

ArcGIS Online for Developers »

Build custom web and mobile applications that incorporate your maps and data.

Delivering Focused Maps & Apps





EMERGENCY MANAGEMENT AGENCY

Search

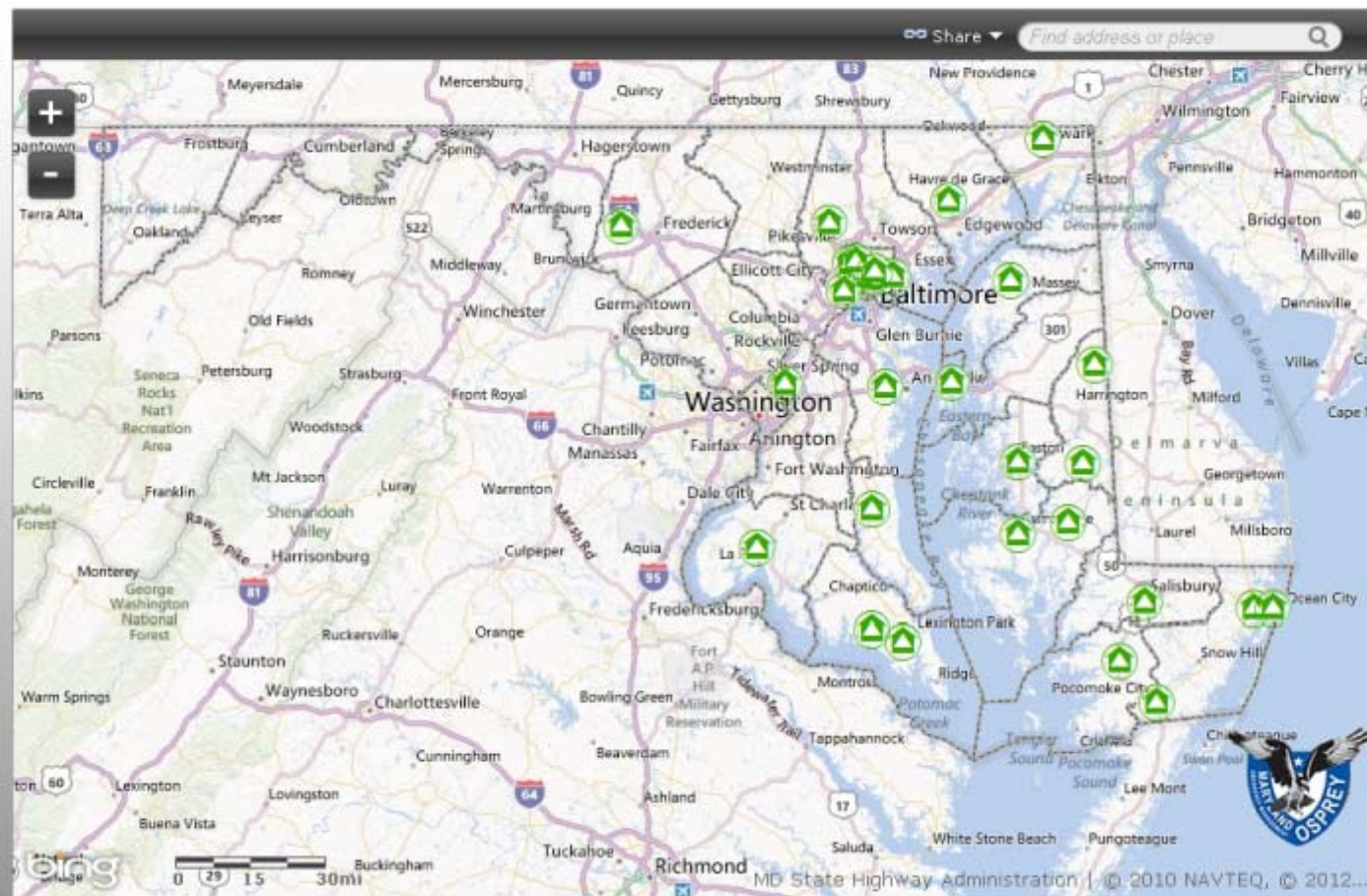
Email Friend print page

HOME POWER OUTAGES - COUNTY POWER OUTAGES - ZIP CODE OSPREY LOCAL CONTACTS NEWS

[View Maryland Evacuation Information](#)

Hurricane Shelter Map

Use the following map to identify emergency shelters in your jurisdiction and areas that are currently under mandatory evacuation





City of Baltimore: Storm Maps

City of Baltimore: Storm Maps is a collection of storm related web maps for the community of City of Baltimore. Find out more about Storm related events in the City of Baltimore by viewing the gallery below.



FEMA MOTF-Hurricane Sandy Impact Analysis-
Baltimore



Weather Warnings



Active Hurricanes



Flood Plain Map



Inundation Zone



MD State Storm Surge Map



Current Weather and Flooding Details Map



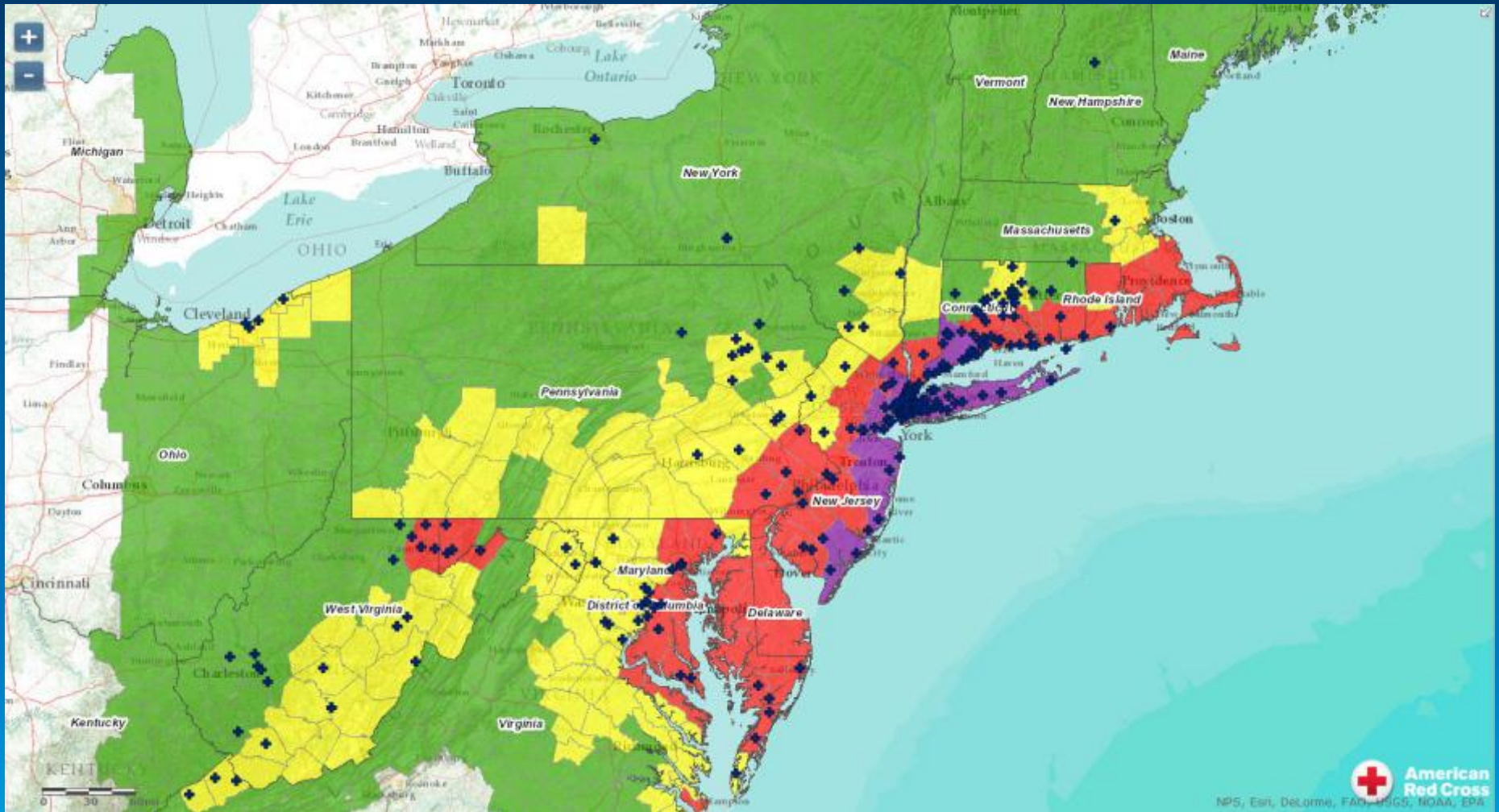
Traffic Signal Zones

EGIS Maps

For more maps, web map applications, and GIS data visit the [City of Baltimore EGIS Website](#), [Open Baltimore](#), or [CityView](#).

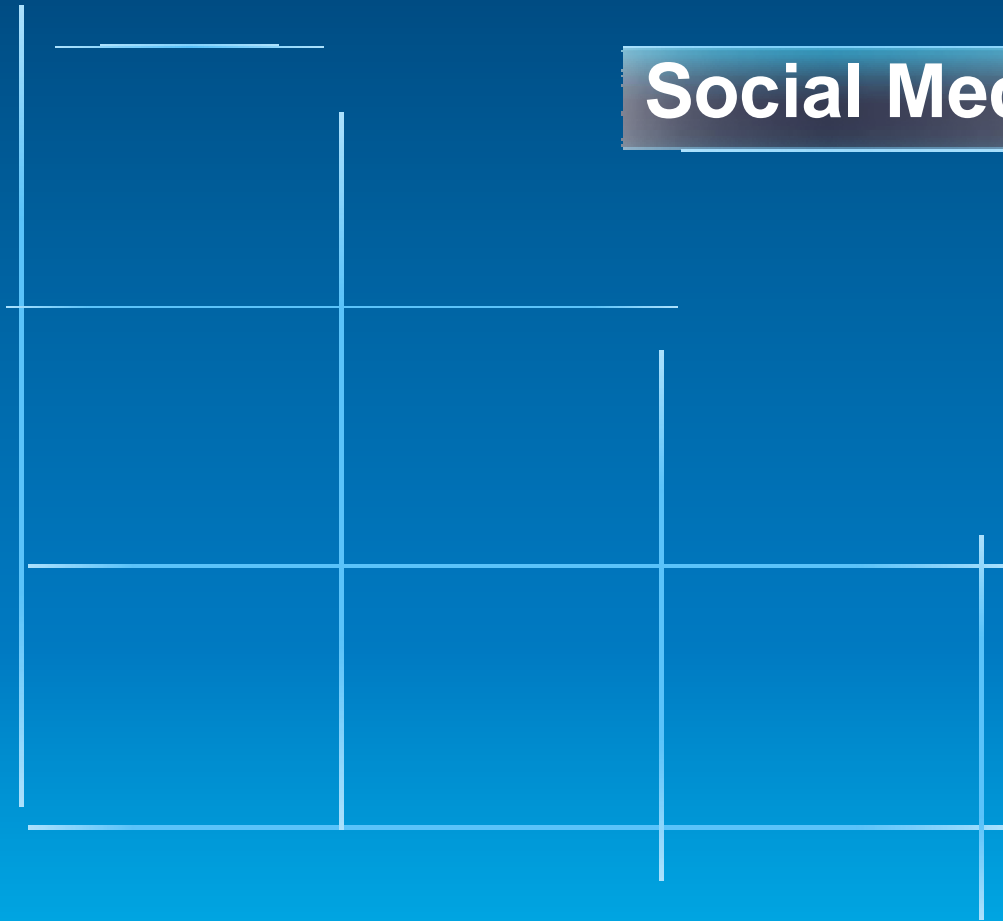
Also, you can stay up to date by following us on [Facebook](#) and [Twitter](#).

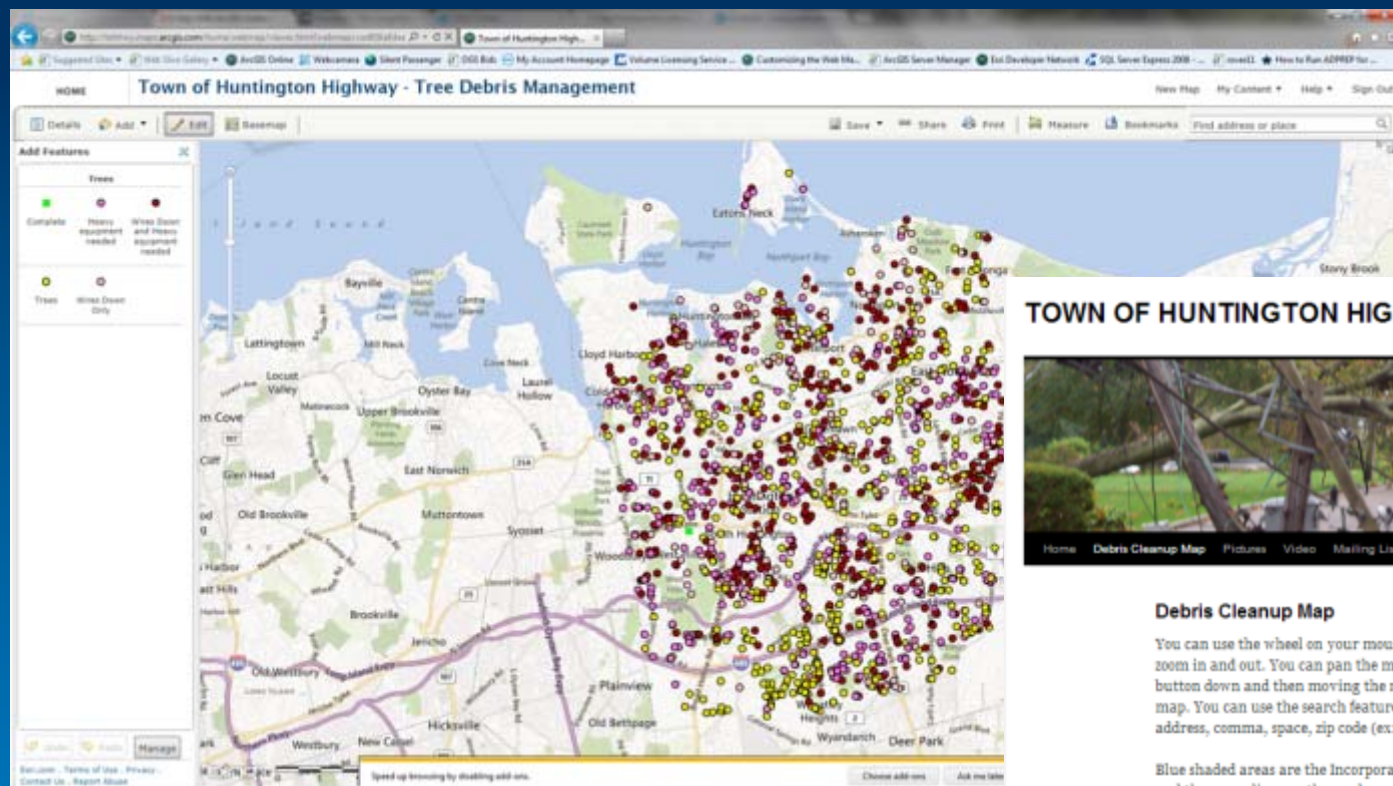
Email us for additional maps and comments:
gis@baltimorecity.gov



100%

Social Media & the Crowd





TOWN OF HUNTINGTON HIGHWAY OFFICE

Storm Debris Clearing
Information

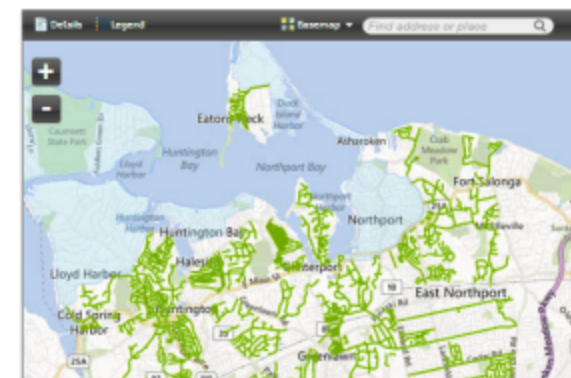


Debris Cleanup Map

You can use the wheel on your mouse or the plus and minus signs on the map to zoom in and out. You can pan the map by left clicking and holding the left mouse button down and then moving the mouse in the direction you want to pan the map. You can use the search feature on the map to find an address. Enter the street address, comma, space, zip code (ex: 123 Anytown La., 11743).

Blue shaded areas are the Incorporated Villages (they do their own debris clearing) and the green lines on the roads represent streets that we have done the first debris clearing on. We hope to update this map every two days. These maps are created using cached tiles so you may need to clear the cache in your browser in order to see an updated map. We would like to thank ESRI, Inc. for their unselfish support of this effort.

Map updated 11-29-12 at 8:30 am. Next expected update will be in the AM on 12-1-12



AT&T 3:48 AM 82%

Intro

Enter New Report



In addition to official damage survey efforts, the **State of Rhode Island** is soliciting help in reporting precise geographic locations of all storm related structural damage.

This website does not link to relief efforts or emergency services for our citizens. Those in need of Disaster Assistance can register with FEMA at <http://www.disasterassistance.gov> or by calling **800-621-FEMA (3362)**

- If you have a life threatening situation please contact your emergency service provider.
- If you haven't already, contact your insurance company.

AT&T 3:49 AM 82%

Rhode Island EMA

maps.esri.com/AGSJS_

Search

Intro

Location

Accept

120 Houston Ave, Narragansett

Use GPS

Use Map

Accuracy: 500 meters



AT&T 3:50 AM 81%

Rhode Island EMA

maps.esri.com/AGSJS_

Search

Location

Attributes

Submit

Damage - select all that apply

Major Structural Damage ☐ NO

Minor Structural Damage ☒ YES

Debris blocking road ☒ YES

Downed Power Lines ☐ NO

Fuel Spillage ☐ NO

Broken Gas Line ☐ NO

AT&T 3:50 AM 81%

Rhode Island EMA

maps.esri.com/AGSJS_

Search

Intro

Follow-up

Thank you, your request has been submitted.

If you would like follow-up correspondence, please provide your name, phone number or email address:

Full Name:

Phone Number:

Email Address:

Request follow-up

Uploading of pictures can take several minutes

Find a place

Places

Link

About

Legend

Basemap

Layers

Social

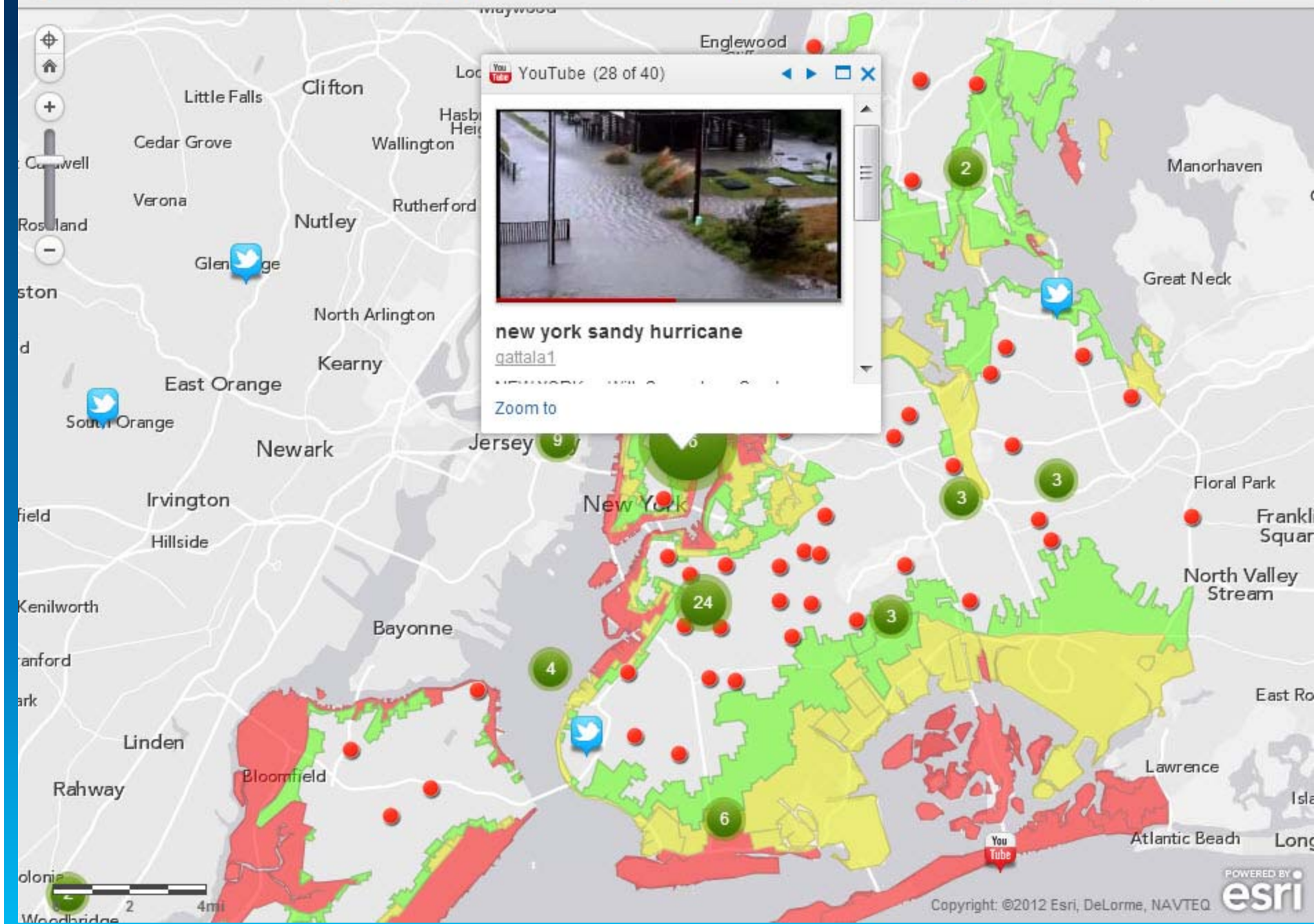
YouTube (28 of 40)



new york sandy hurricane

[gattala1](#)

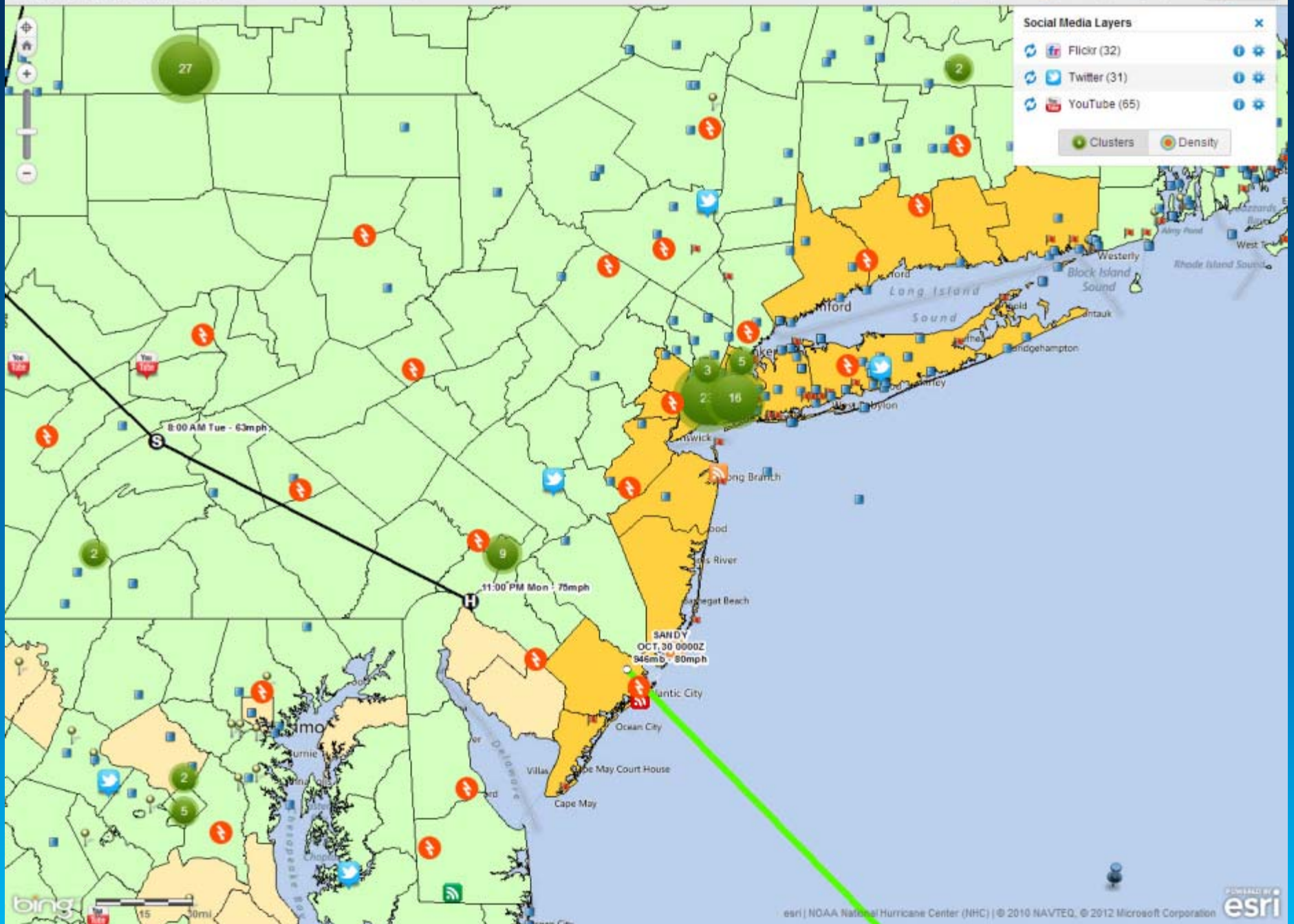
Zoom to



Social Media Layers

- Flickr (32)
- Twitter (31)
- YouTube (65)

Clusters Density



Storytelling with Maps



TopTen most damaging U.S. hurricanes of all time

A story map

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

9

8

7

6

5

4

3

2

1

The Great Miami Hurricane - 1926



Most damaging hurricane

Category: **4**

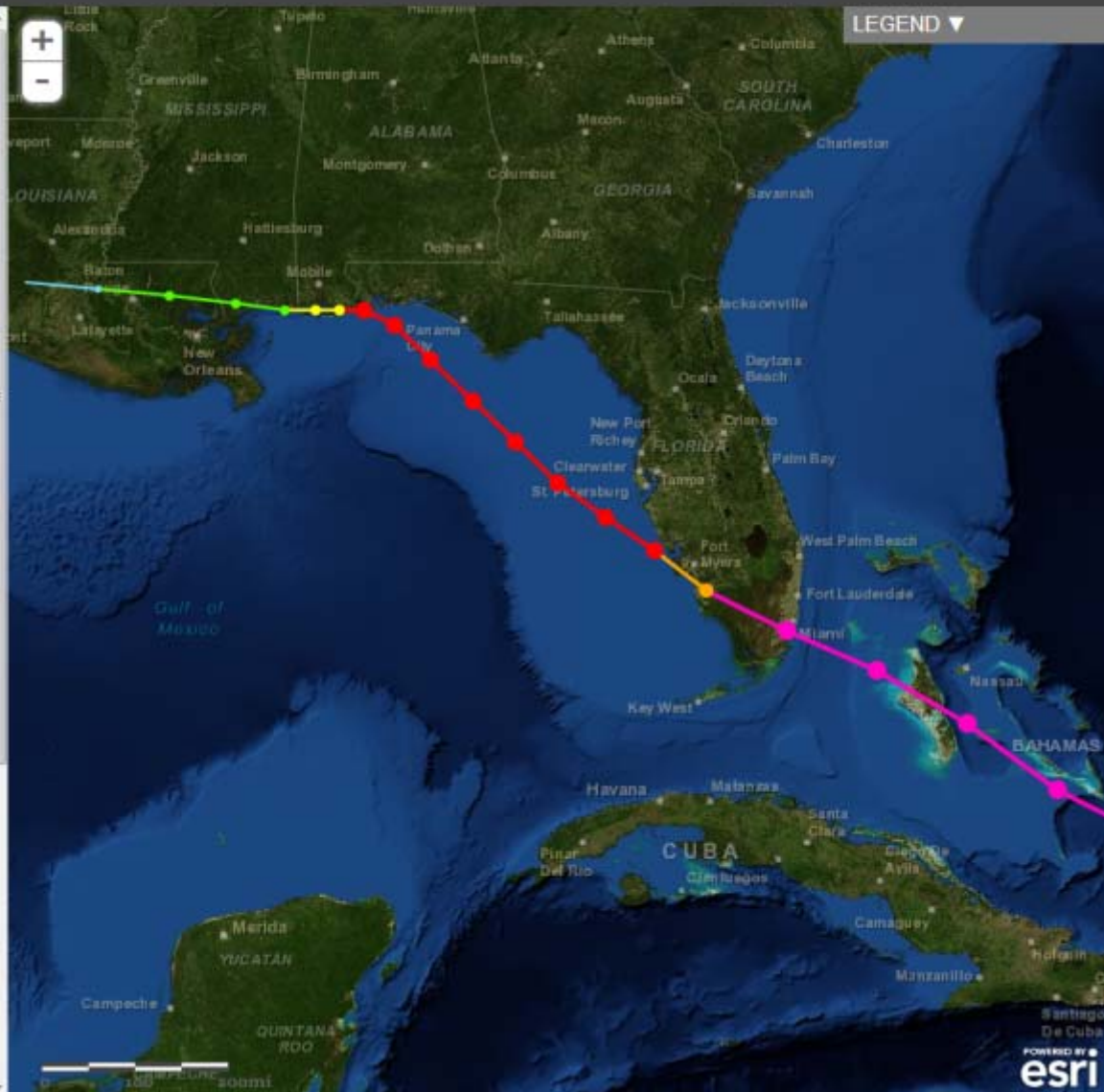
Damage in 1926: **\$105 million**

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 the Bahamas. Deaths from the hurricane totaled 372, with damage estimated at \$105 million.

What would happen if this storm hit today?
The National Oceanic and Atmospheric Administration has rated the Great Miami storm as the most damaging U.S. Atlantic hurricane of all time. If an identical storm



Hurricane Sandy Before x Hurricane Sandy: The After x

tmappsevents.esri.com/website/swipe_sandy/

ArcZone ArcGIS Online Industry Kiosk A4EM Org FEMA Org UN Org Evac Planning UNEP Live CleanBookmarks Imported From Fire... Kentucky Hazards a...

Hurricane Sandy: The AfterMap


Drag the line to explore storm damage through before and after imagery.


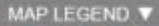
+

-

Pre-Hurricane Sandy Imagery

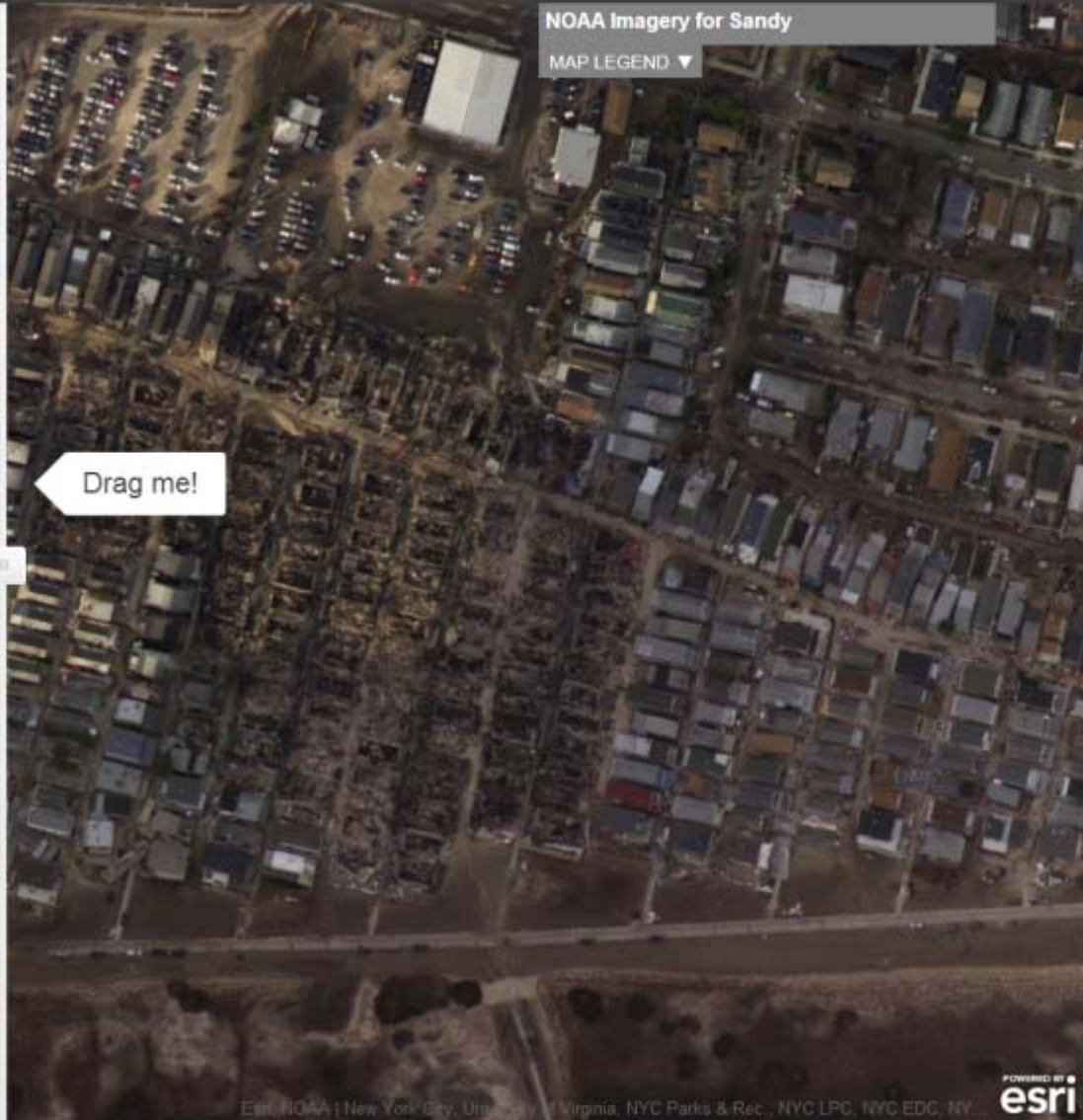
MAP LEGEND ▾

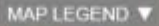




NOAA Imagery for Sandy

MAP LEGEND ▾





Drag me!

Powered by esri

Esri, NOAA | New York City, University of Virginia, NYC Parks & Rec., NYC LPC, NYC EDC, NY...

Esri Impact Map for Superstorm Sandy

A collection of dynamic maps showing impacted counties provided by FEMA with Esri demographic data. Select a demographic map using the tabs. Click any county to view demographic information.

Over 64 Years Age

Home Ownership

Median Home Value

Household Income

Diversity

Local Impact & Population Older Than 64

Click the map to see which percentage of the population is over 64 years old and explore age breakdowns in the affected area.

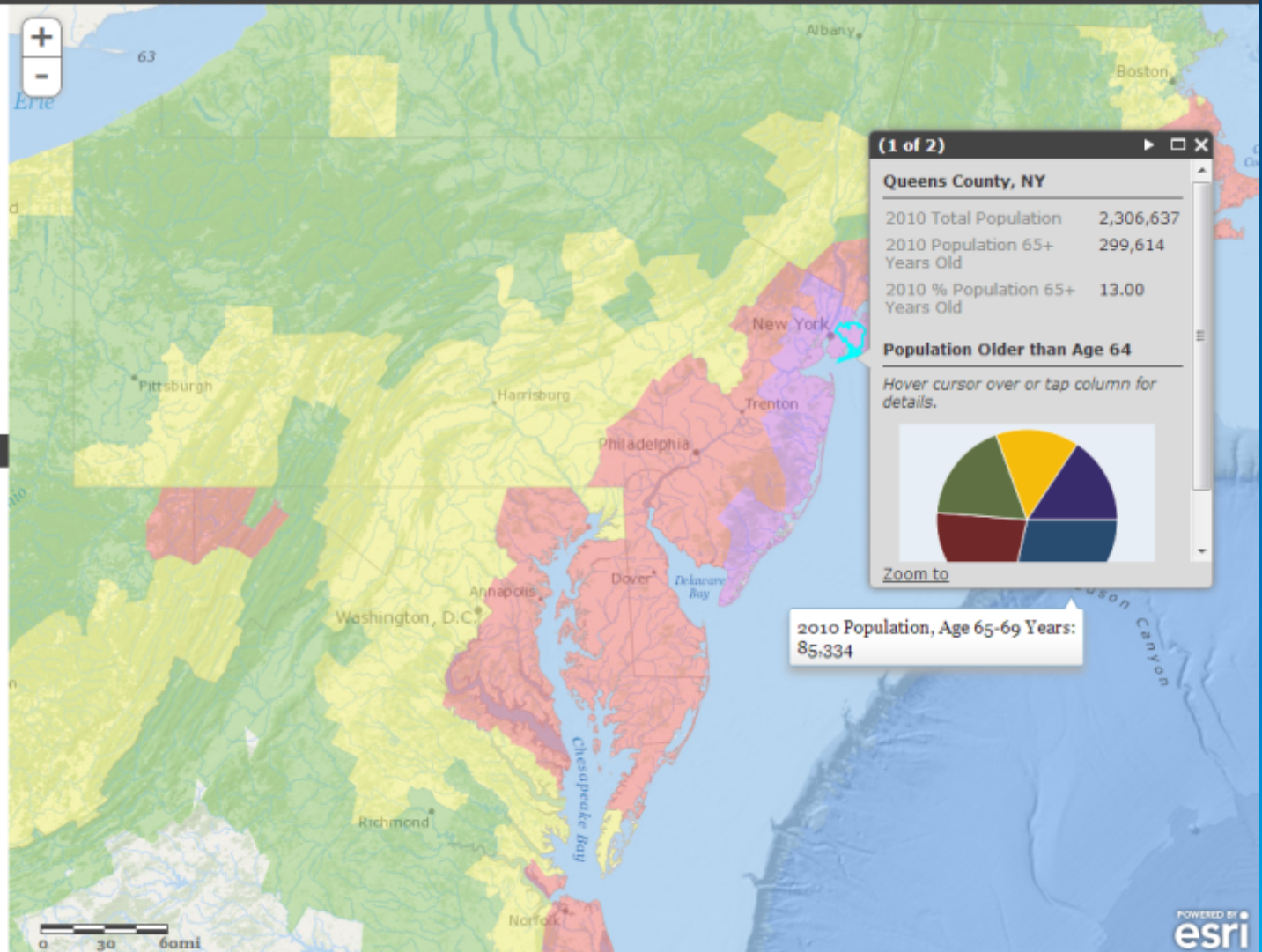
For more information about this data [click here](#).

LEGEND

Impact Analysis

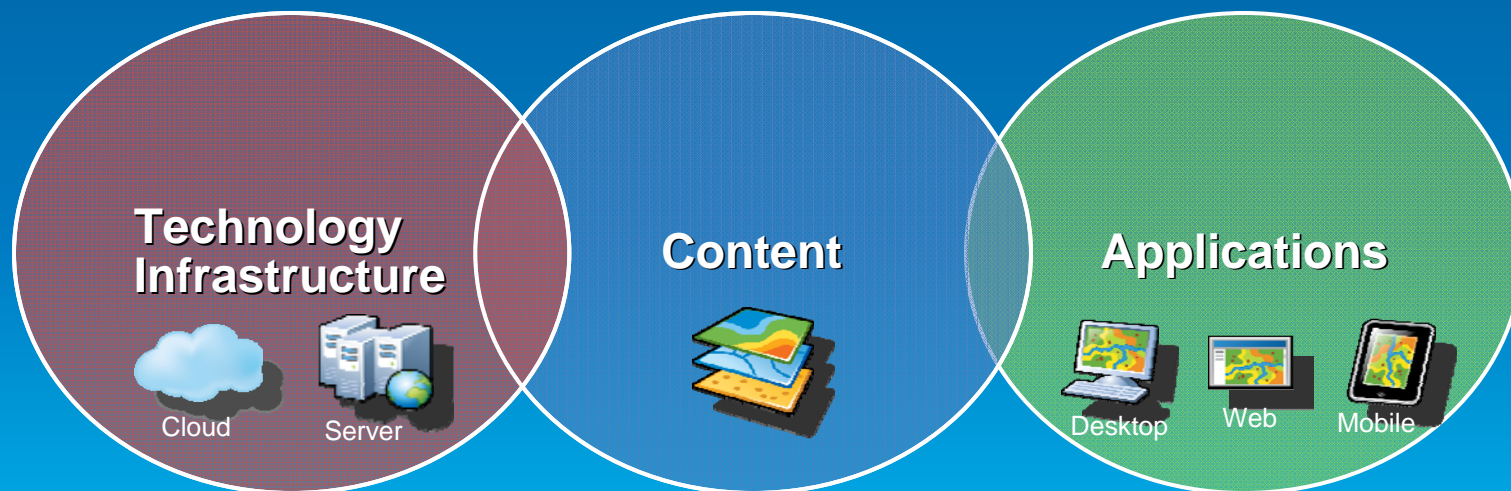
Impact Area

- Very High
- High
- Moderate
- Low



Geospatial Platform

- Technology infrastructure
- Relevant content
- Through simple & focused apps
- Aligned to common workflows
- Supporting any mission, anytime, to anyone, on any device





esri

**Disaster
Response**

- **Global Response**
- **Corporate Citizenship**
- **Support Affected Organizations**

esri.com/disaster



Our Purpose and Mission

Provide support for our...

- Users
- Partners
- Esri Personnel

...helping them Prepare, Respond, Recover

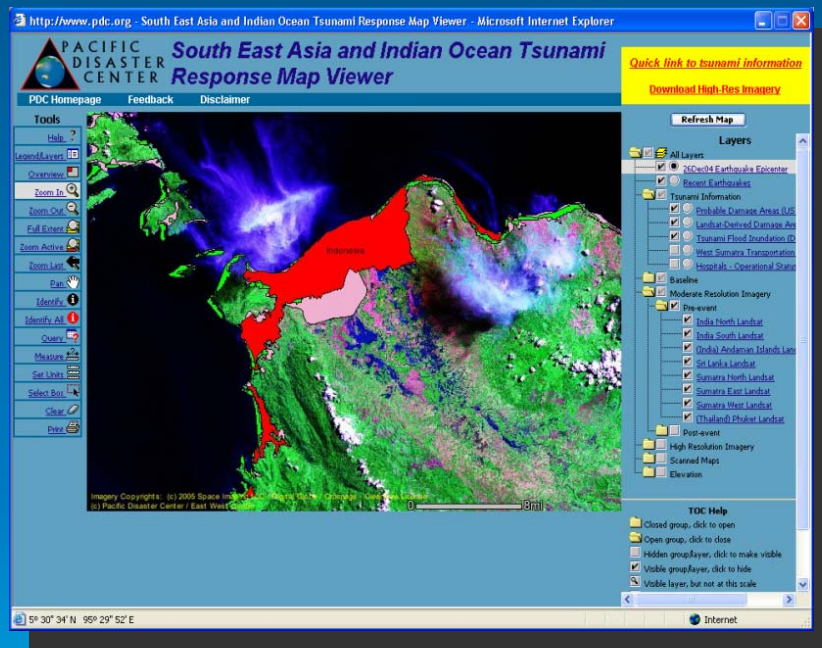


Key Messages about the Disaster Response Program

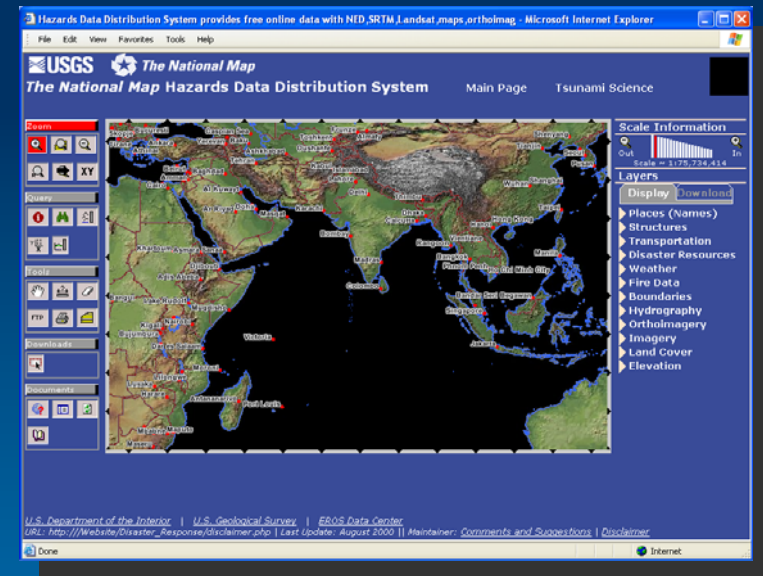
- Many of our users don't know we are here to help
- Make requests through the portal
 - This is monitored 24/7/365
- Can be for replacement software, new software, 24/7 tech support (through Premium Support)
- Can also assist (in a limited way for free) with project work

Indian Ocean Tsunami

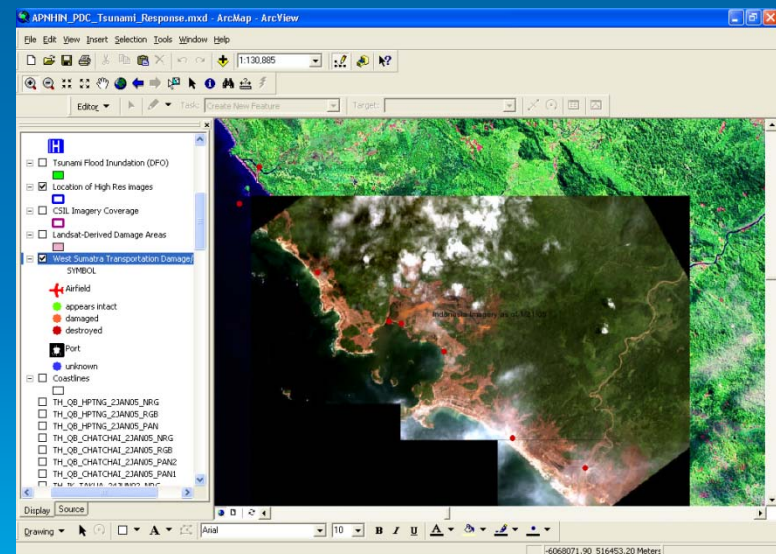
Operationalize Data and the Web



Supporting the Pacific
Disaster Center



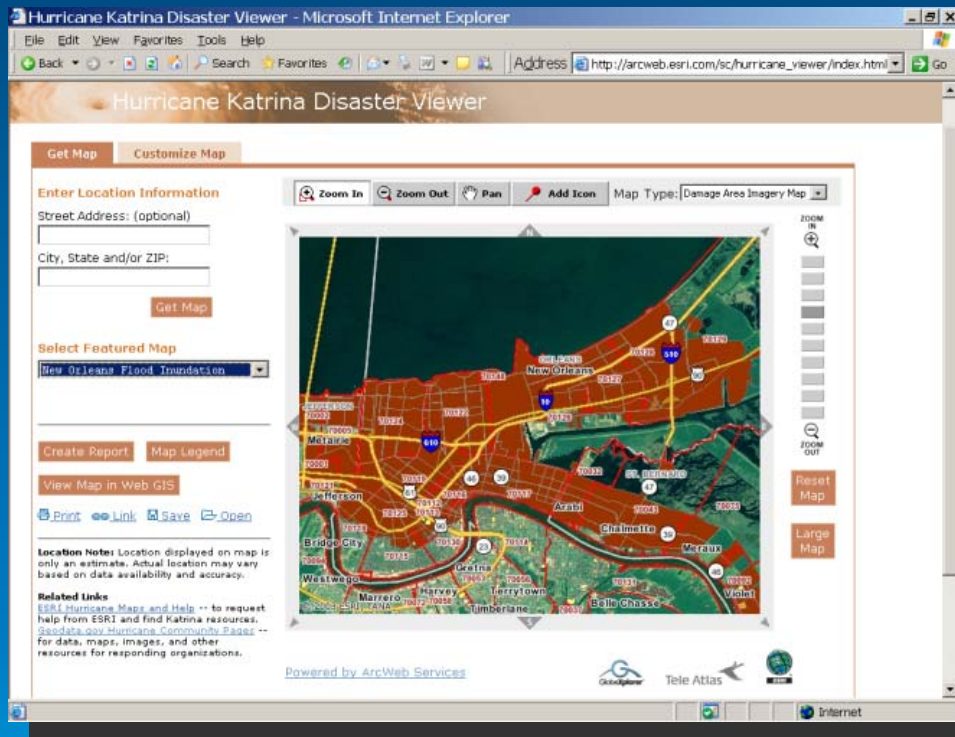
Supporting USGS



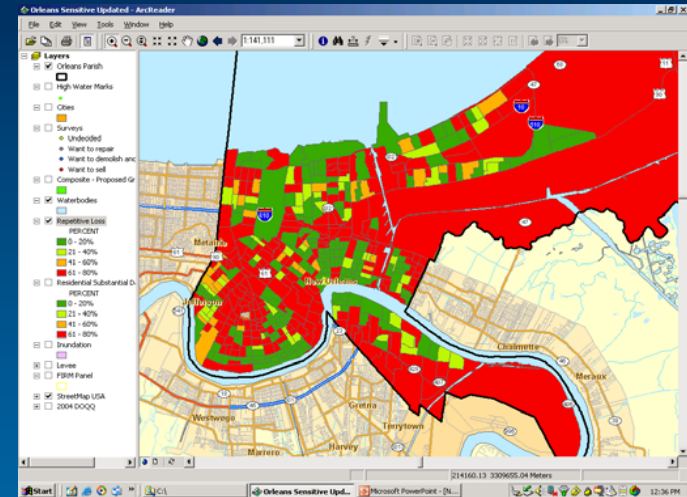
Collected, Processed and
Provided Data and Imagery

Hurricane Katrina

Collaboration and Planning



Katrina Viewer



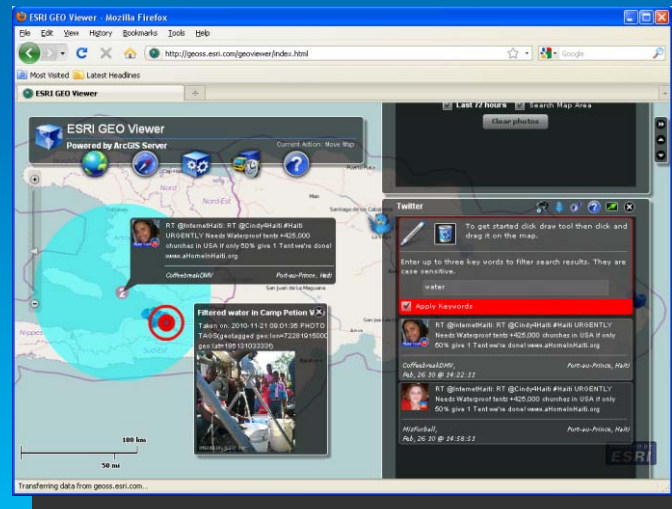
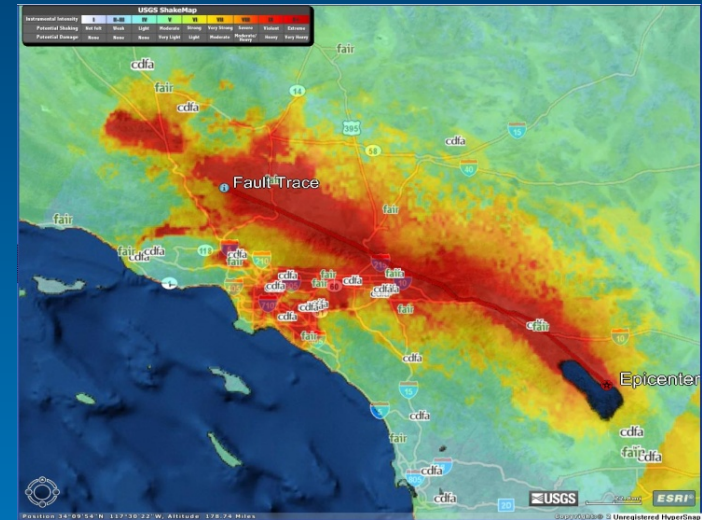
Damage Assessment



Onsite Support

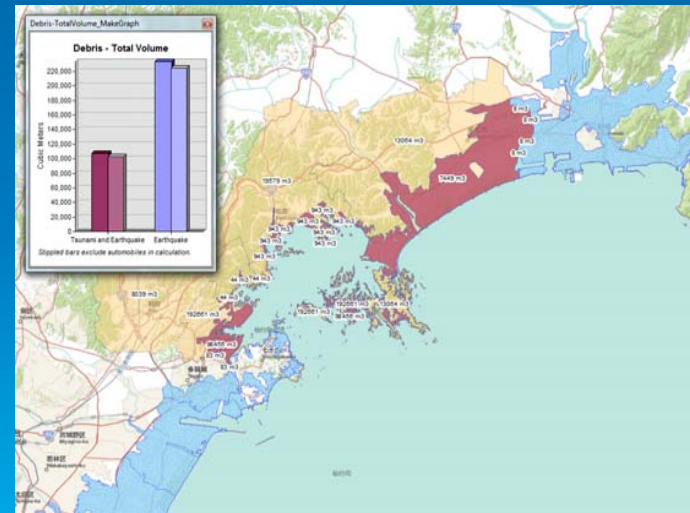
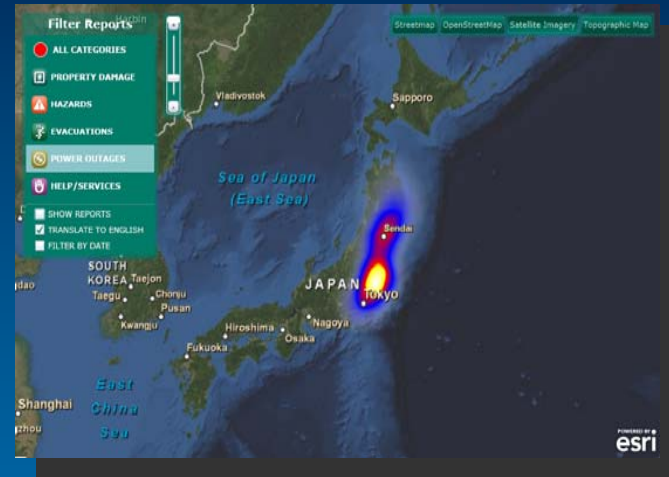
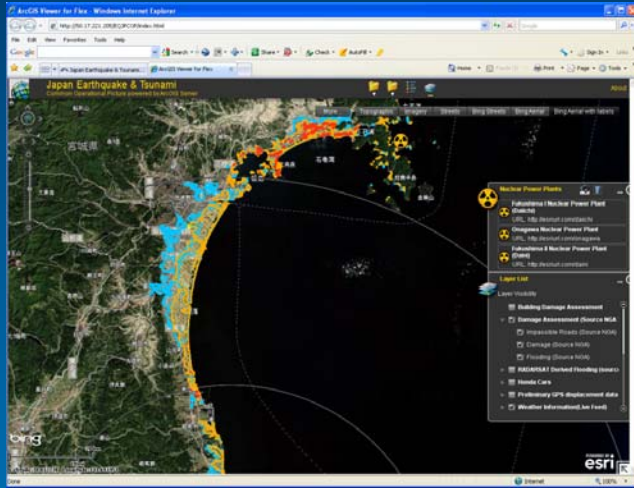
Haiti Earthquake

Social Media and the Crowd



Japan Quake and Tsunami

Public Engagement and Analysis



Debris Removal



Understanding our world.

Mark Cygan | Industry Manager

Map, Chart and Data Production & SDI

mcygan@esri.com | @Mark_Cygan