

FEMA Analytics for Recent Event Responses

MOTF Analytics Briefing

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August 20th, 2014



FEMA

Outcome Based Results

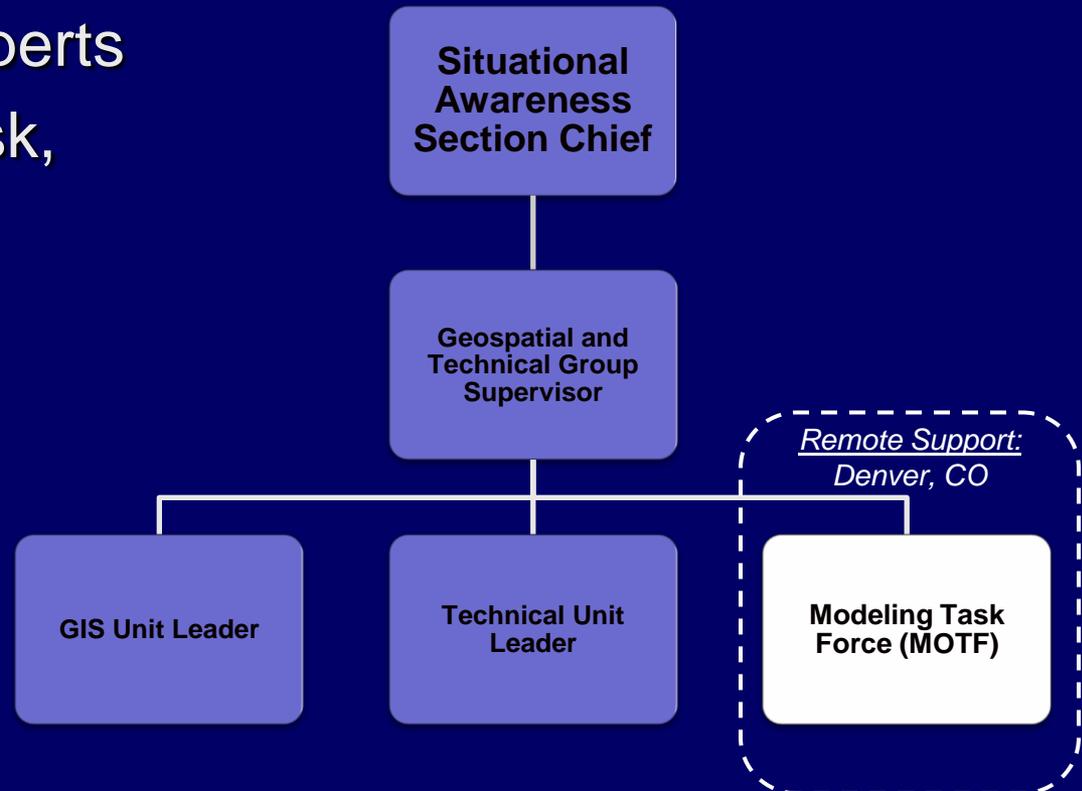
- FEMA's Modeling Task Force (MOTF)
 - On-call, distributed analysis
 - Real-time analysis to affect decisions
 - Some pre-analysis
- Ground-Truthing
 - Field Observations
 - Imagery based assessments
- Applications
- Sandy, Moore, Colorado examples



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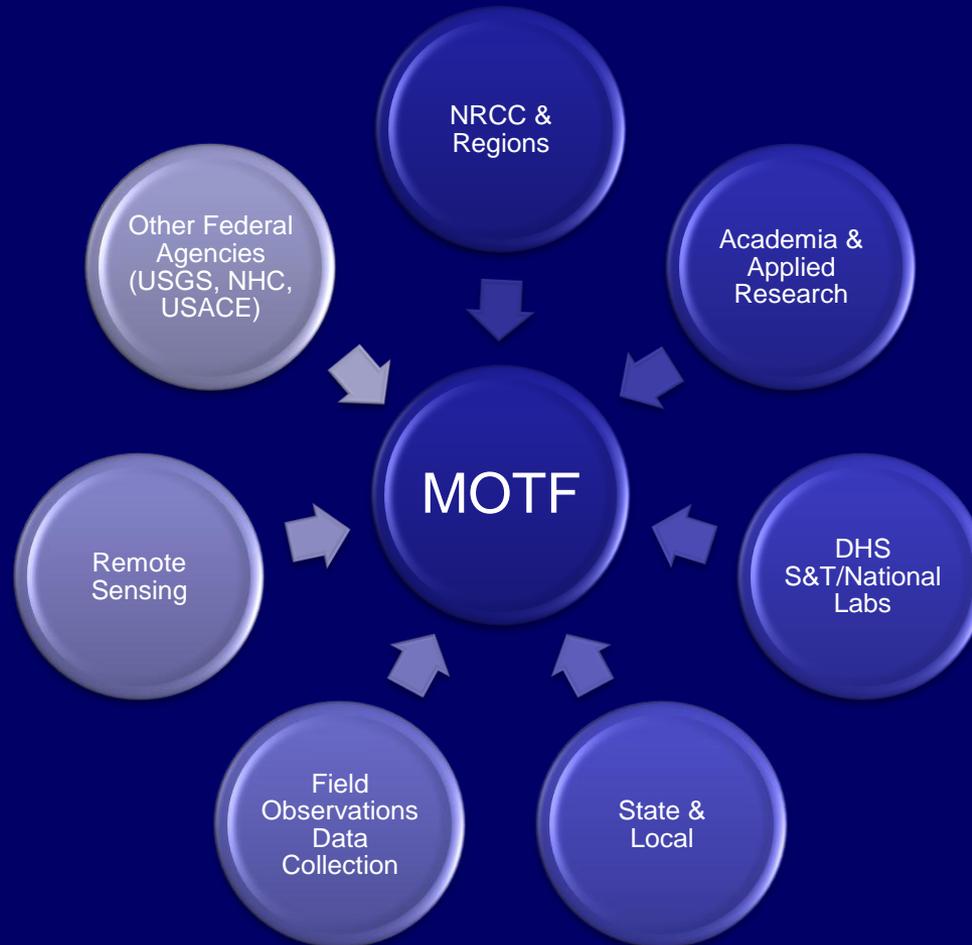
MOTF Aligns to NRCC Organization

- Mitigation Directorate, Risk Analysis Division
- Two Regions – IV and VIII
- Three Subject Matter Experts
- Eight Analysts – GIS, Risk, Vulnerability



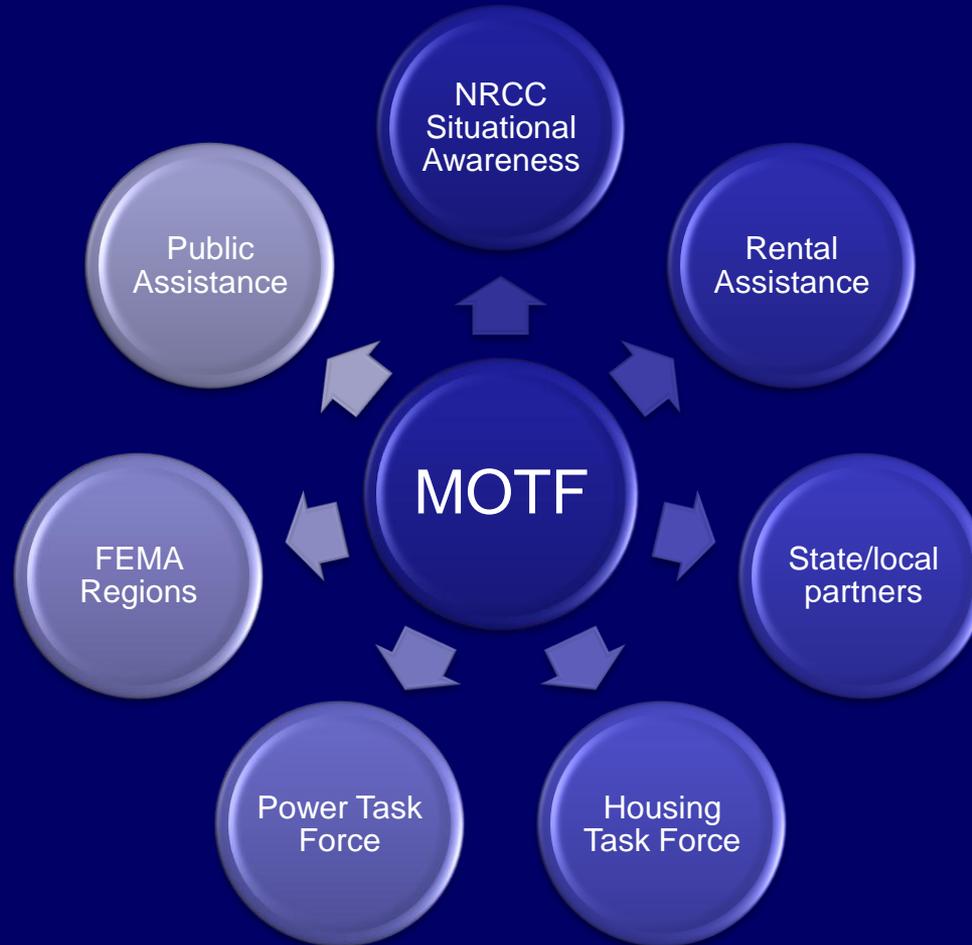
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MOTF Inputs



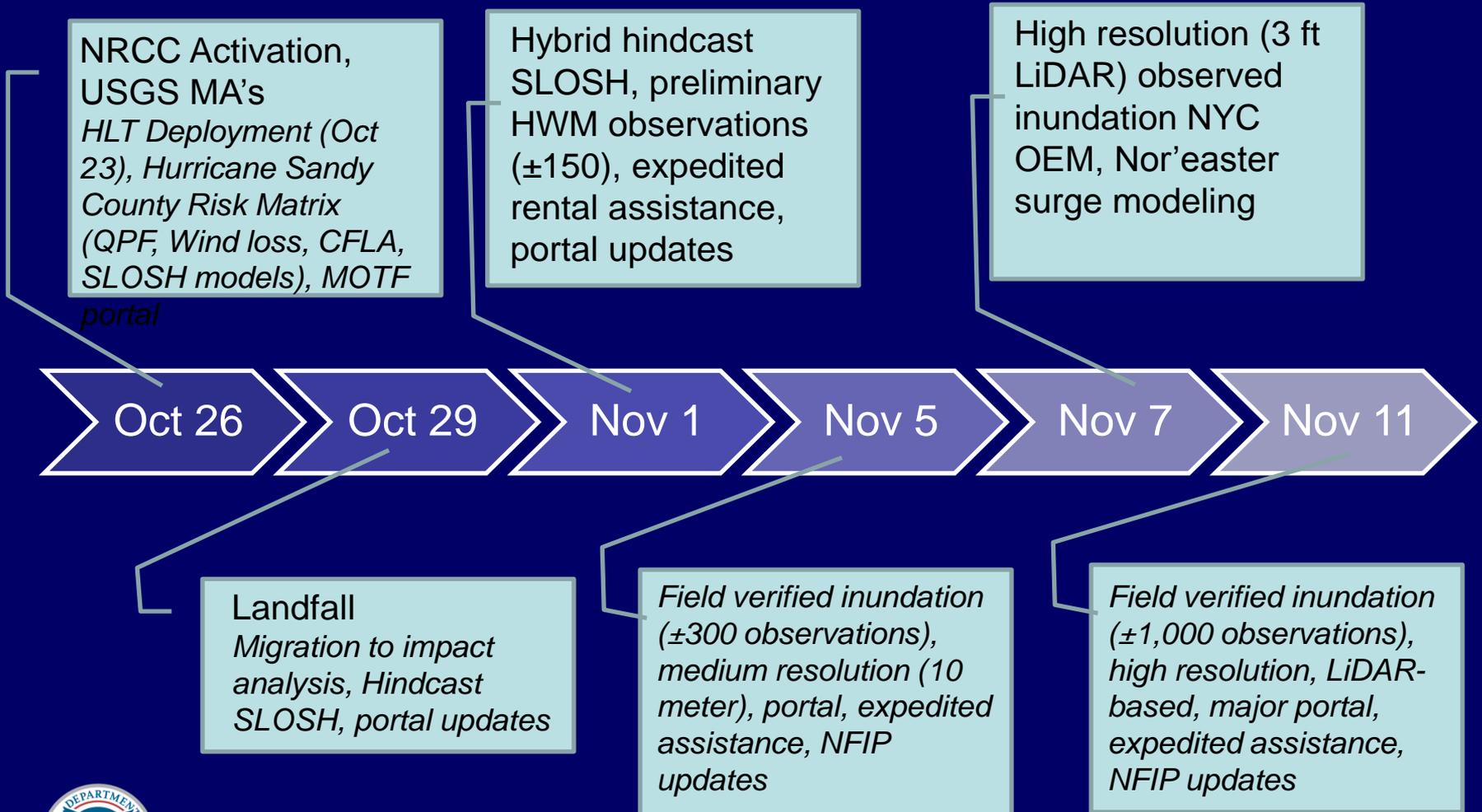
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MOTF Outputs



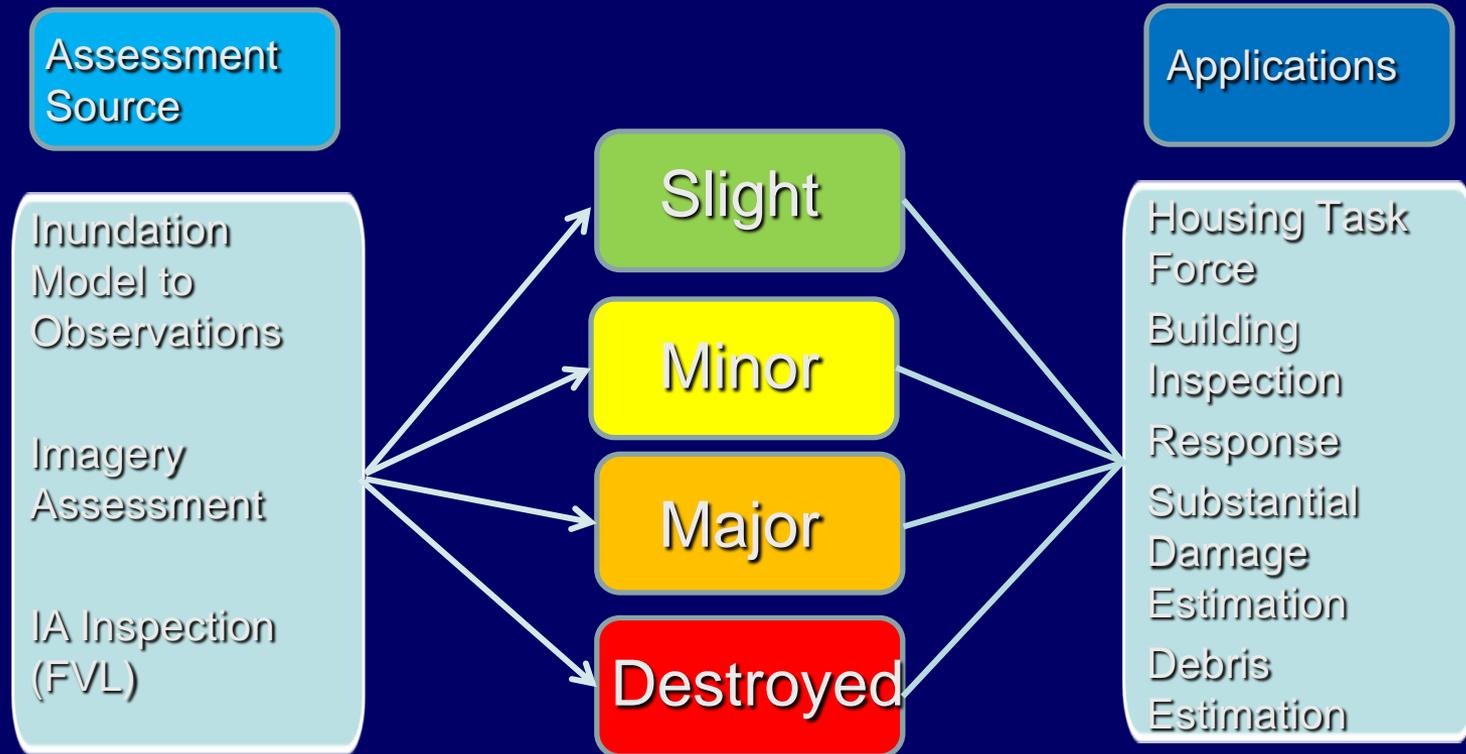
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Hurricane Sandy MOTF Timeline



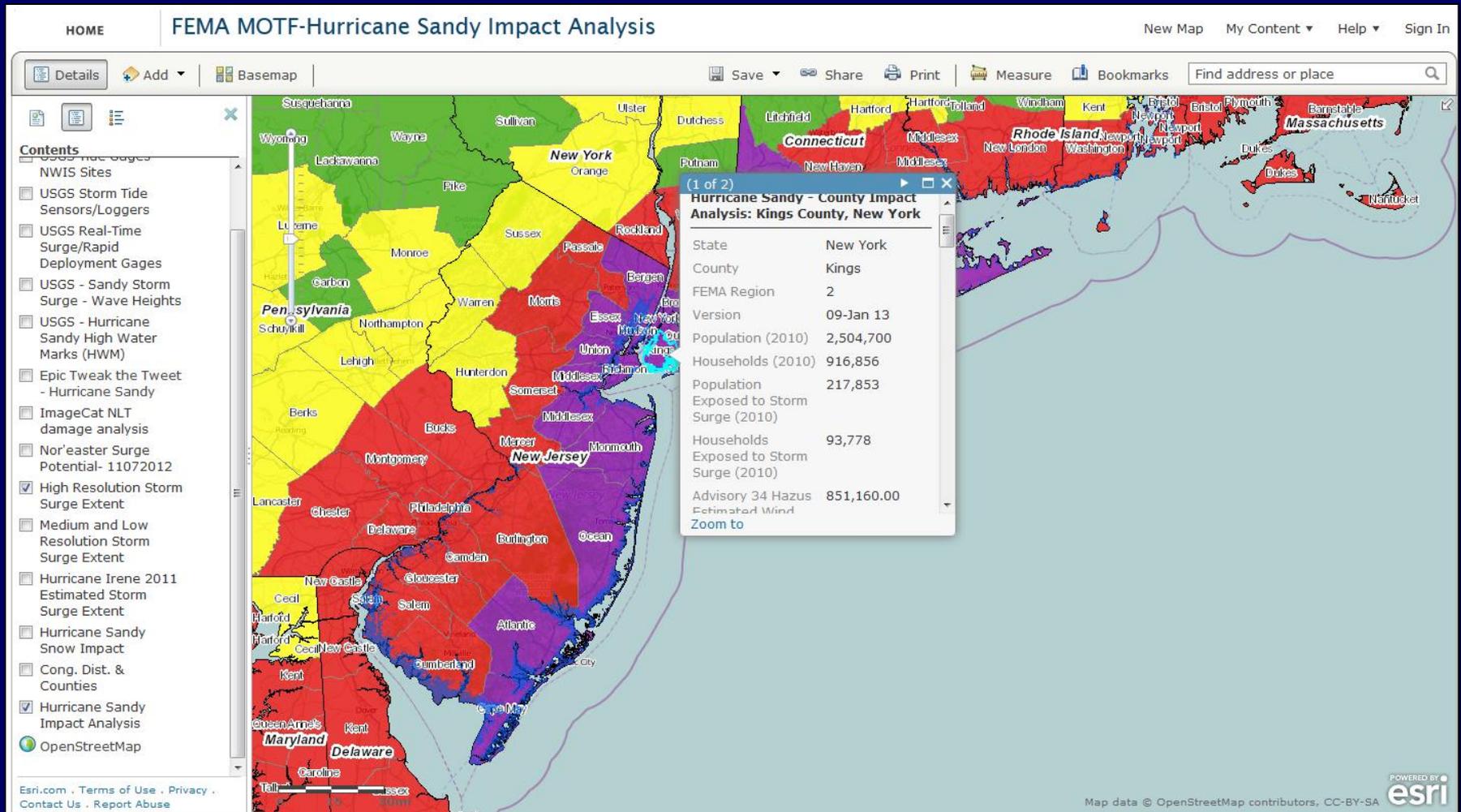
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Individual Assistance Damage Levels



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Hurricane Sandy County Impact Analysis



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Extensive
metadata and
download
link:

<https://content.fema.gov/gisdata/>



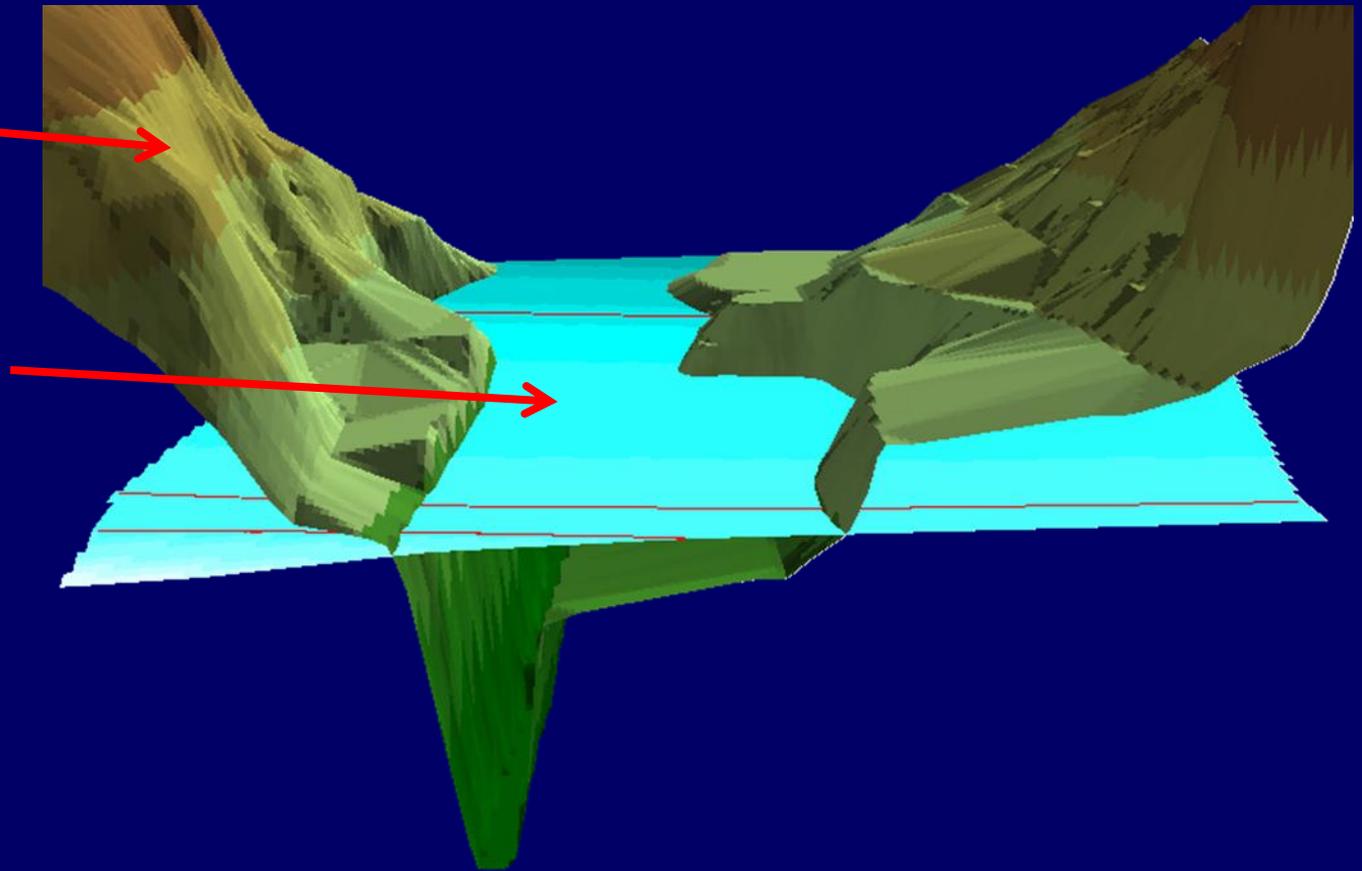
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A screenshot of a Windows Internet Explorer browser window. The address bar shows the URL: http://fema.maps.arcgis.com/home/item.html?id=307dd522499d4a44a33d7296a5da5ea0. The page title is "FEMA MOTF-Hurricane Sandy Impact Analysis". The page content includes a map of the Northeastern United States (Vermont, Maine, New York, Pennsylvania, Massachusetts, Ohio, Maryland, New Jersey, West Virginia, Delaware, Virginia, North Carolina) with a red dot indicating the location of the impact analysis. Below the map is a description of the FEMA Modeling Task Force (MOTF)-Hurricane Sandy Impact Analysis, including contact information for the MOTF E-mail (FEMA-MOTF@fema.dhs.gov) and the MOTF FTP Site (http://184.72.33.183/GISData/MOTF/). The page also lists Storm Surge Products and provides specific data for New Jersey: State: New Jersey, HWM: Through November 11, 2012, and Projection: NAD83 (Geographic). The browser interface includes a search bar, navigation tabs (HOME, GALLERY, MAP, GROUPS, MY CONTENT), and a search box.

FEMA-MOTF@fema.dhs.gov

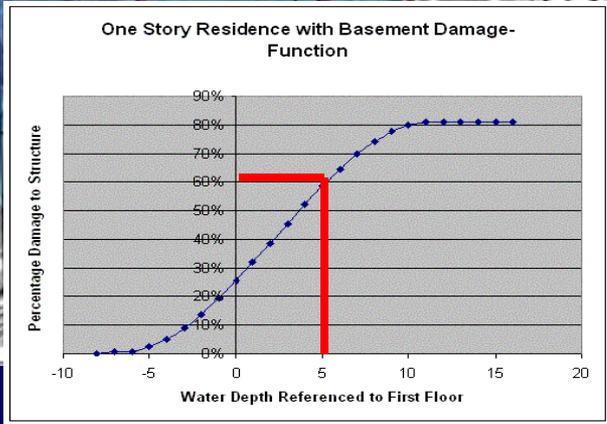
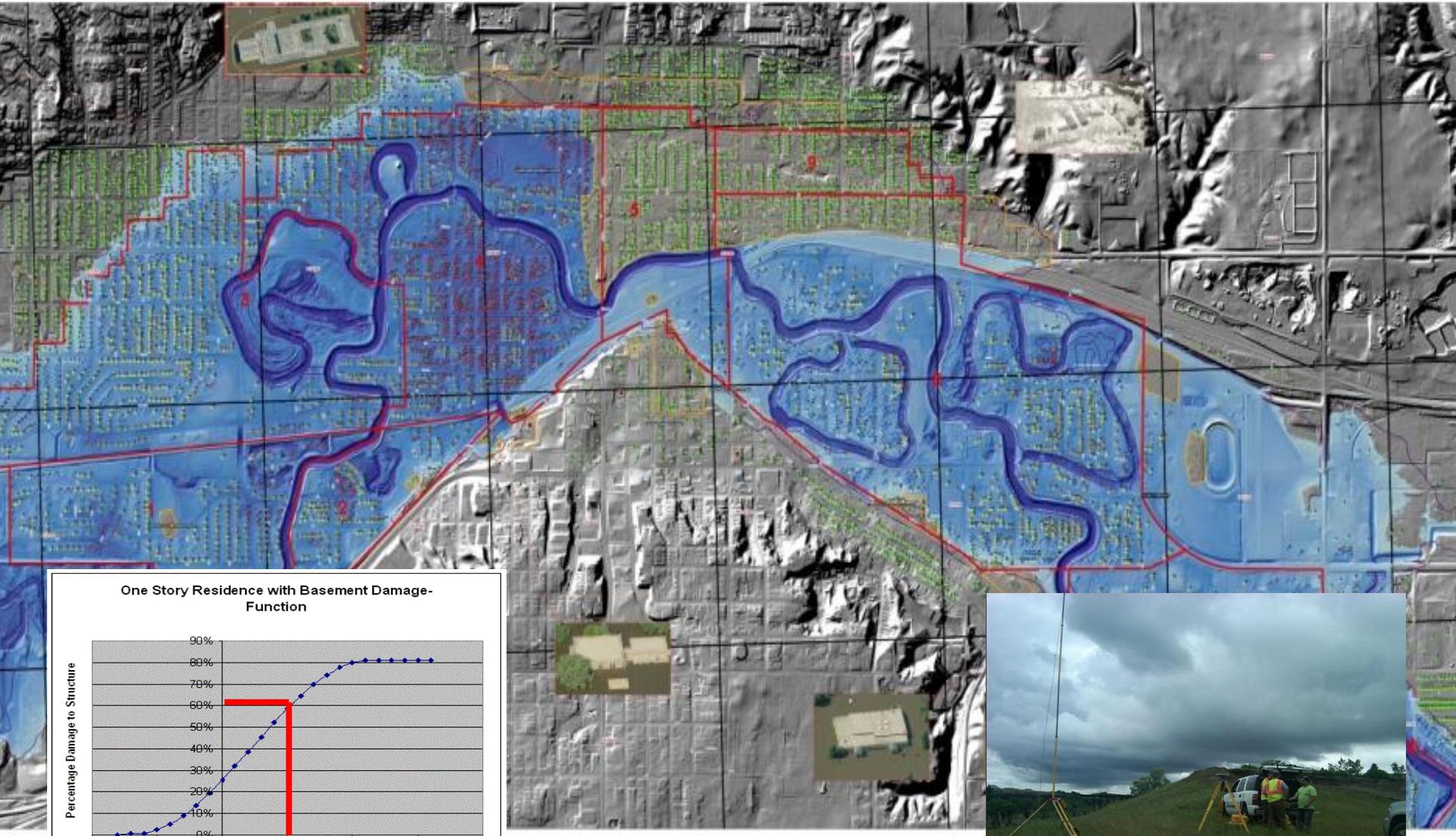
Rapid Inundation Assessment

- Obtain 3D terrain
- Develop flood surface from model and/or field observations
- Subtract terrain from flood surface

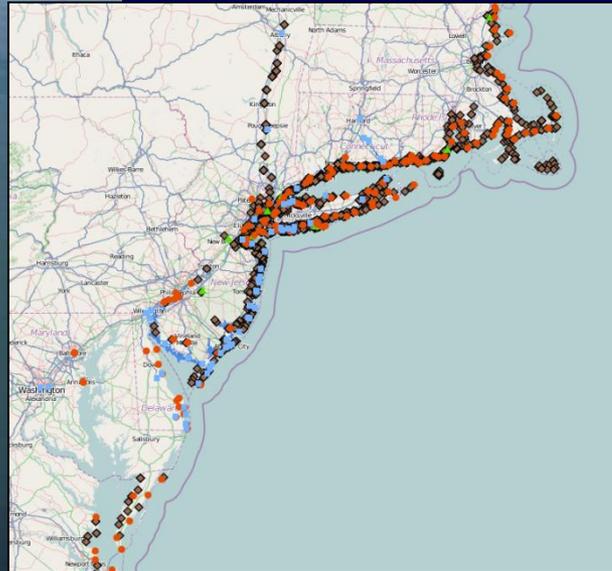
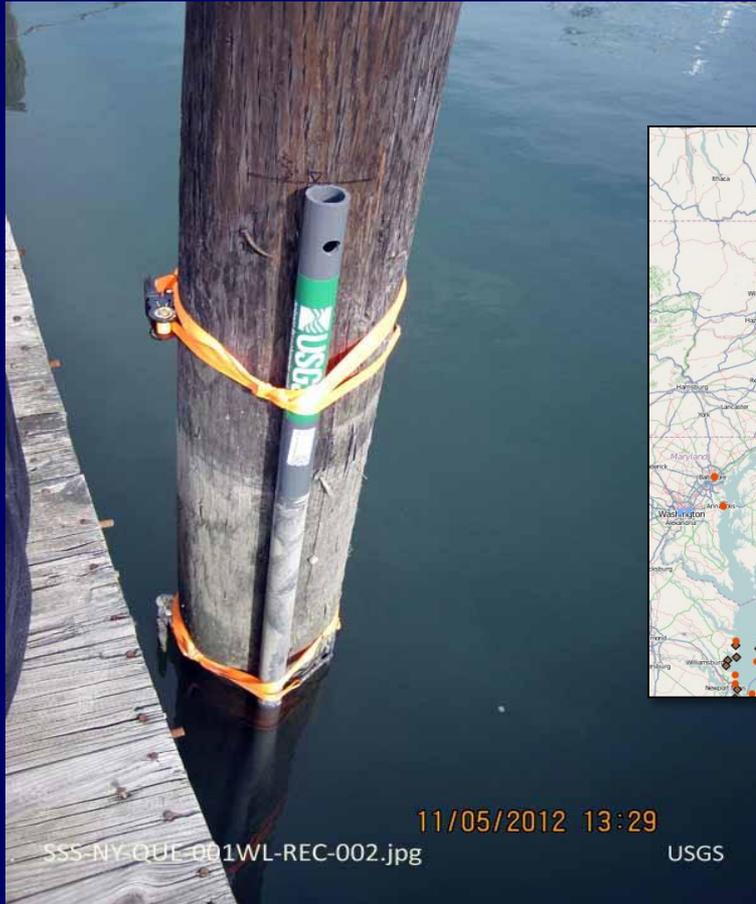


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Minot, ND 2011- Rapid Situational Awareness



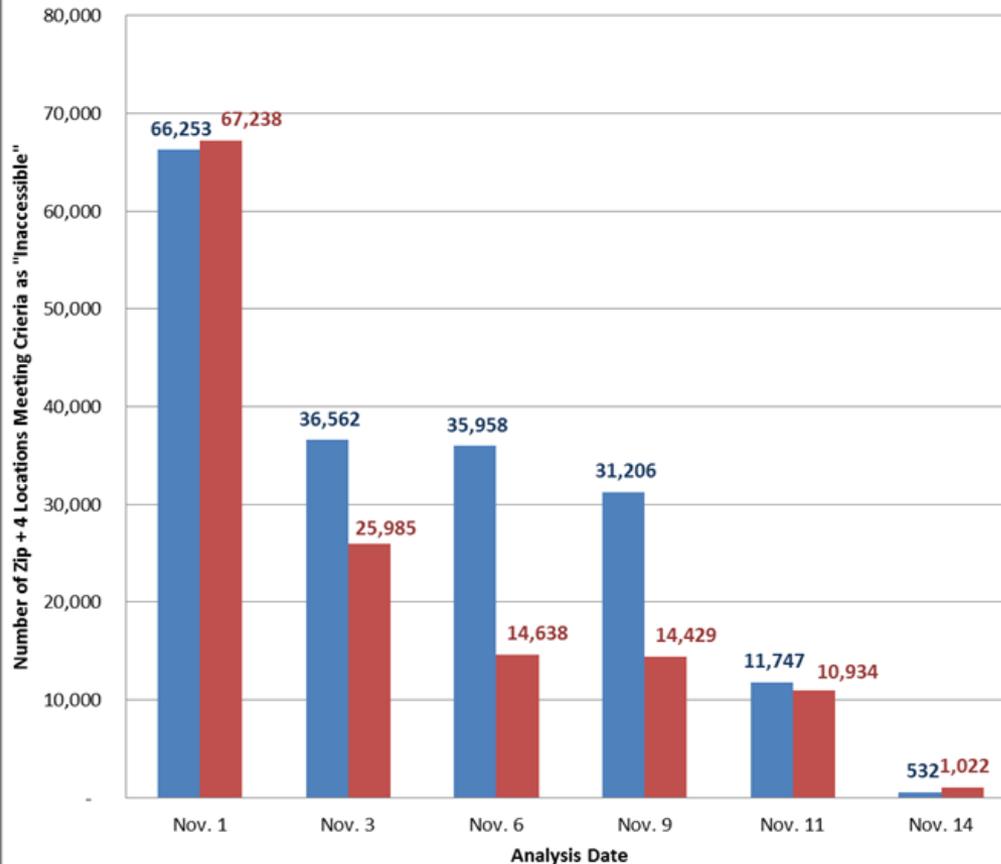
Sandy, 2012: Field Observed Flood Surface



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Recovery Over Time of Inaccessible Zip + 4

Zip + 4 Locations for NY and NJ Meeting Inaccessibility Criteria



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- New York Zip + 4 Locations
- New Jersey Zip + 4 Locations

This figure displays the number of Zip + 4 locations that met the criteria of "inaccessible" in order to expedite rental assistance under FEMA's Individual Assistance (IA) program .

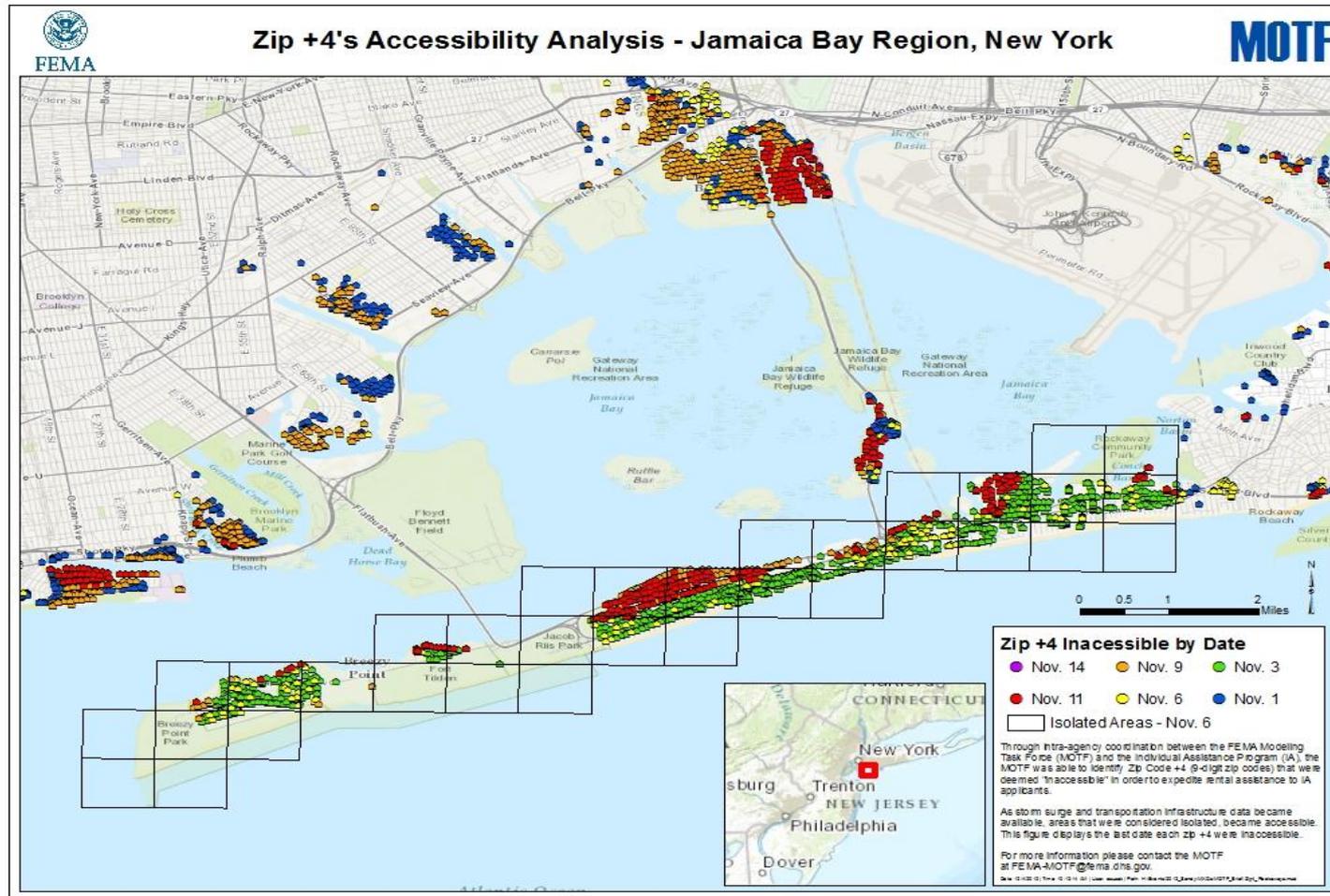
Modeling Task Force (MOTF)

December 3, 2012
FEMA-MOTF@fema.dhs.gov



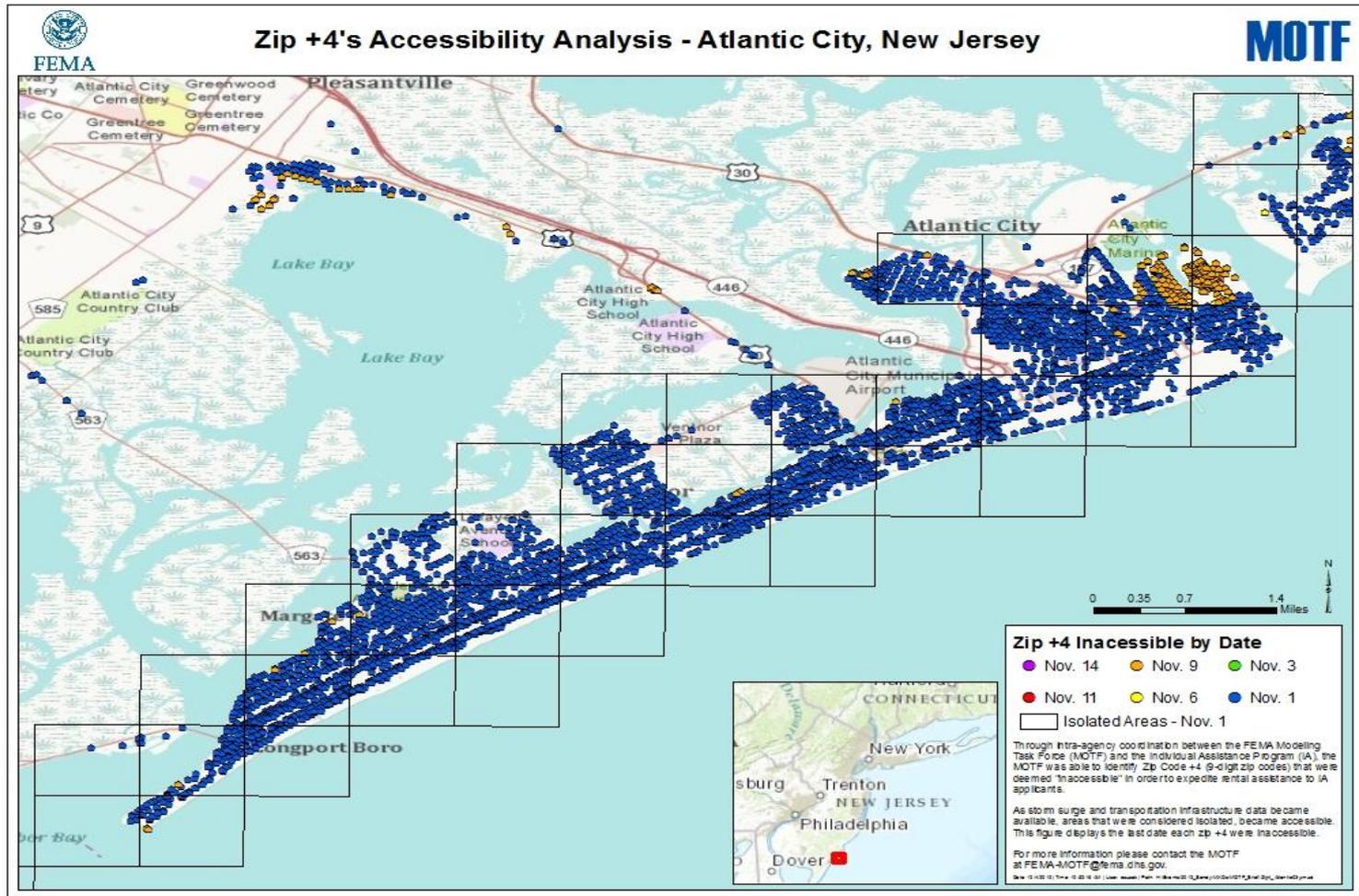
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Recovery of Inaccessible Zip + 4



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Recovery of Inaccessible Zip +



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Sandy Expedited Assistance Summary

- 300K household IA applicants
- Over \$130M rental assistance to 44K households (~\$1,300 each)
- ~1% to second homes
- 44K households averaged \$8K in assistance (3x greater than event average)
- \$4.6M in inspection savings (\$105 ea)



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FEMA GeoPlatform

Providing geospatial data and analytics in support of e



Advisory Base Flood Elevations Map



FEMA MOTF-Hurricane Sandy Impact Analysis



FEMA is a partner of the FGDC's

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.

AT&T 11:56 53%

Gallery Highest Rated

- FEMA MOTF-Hurricane...**
FEMA MOTF-Hurricane Sandy Impact Analysis
- USA Topo Maps**
This map features detailed USGS topographic maps for the United States at multiple scales.
- Baltimore, Maryland in...**
City of Baltimore, Maryland in Community Map

AT&T 11:58 53%

Gallery Search

Cancel

Maps

- FEMA MOTF-Hurricane...**
FEMA MOTF-Hurricane Sandy Impact Analysis
- FEMA Region IV Coastal...**
FEMA Region IV Coastal Flood Loss Atlas v3.01 - Click on Counties to access Atlas data
- FEMA MOTF-Hurricane...**
FEMA MOTF-Hurricane Sandy Impact Analysis
- FEMA MOTF-Hurricane...**
FEMA MOTF & CIKR
- FEMA MOTF-Hurricane...**
FEMA MOTF-Hurricane Sandy Impact Analysis
- FEMA MOTF: Southeast...**
FEMA MOTF loss analyses for a repeat

- asiskarte - Sommer -...**
Siskarte für das Gebiet des Landkreis Cham mit amtlichen Daten (Sommer)
- Heat wave risk of Europ...**
The share of green (vegetated) and blue (water) areas within cities (2006) and how they influence the urban heat island ef...
- Carte interactive des mil...**
Cartographie détaillée des milieux naturels du territoire de la Communauté métropolitaine de Montréal (CMM). In...
- Sonnenterrass...**
Sonnenterrassen Flood Insurance Risk In Sandy Affected

www.geoplatform.gov

that incorporate your maps

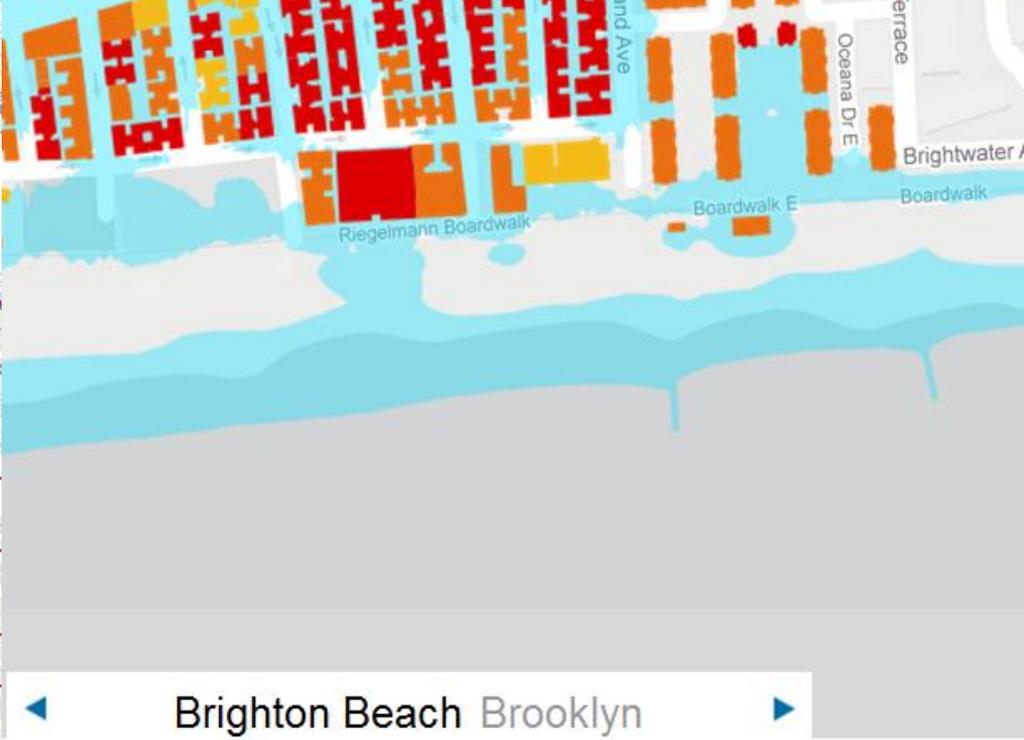
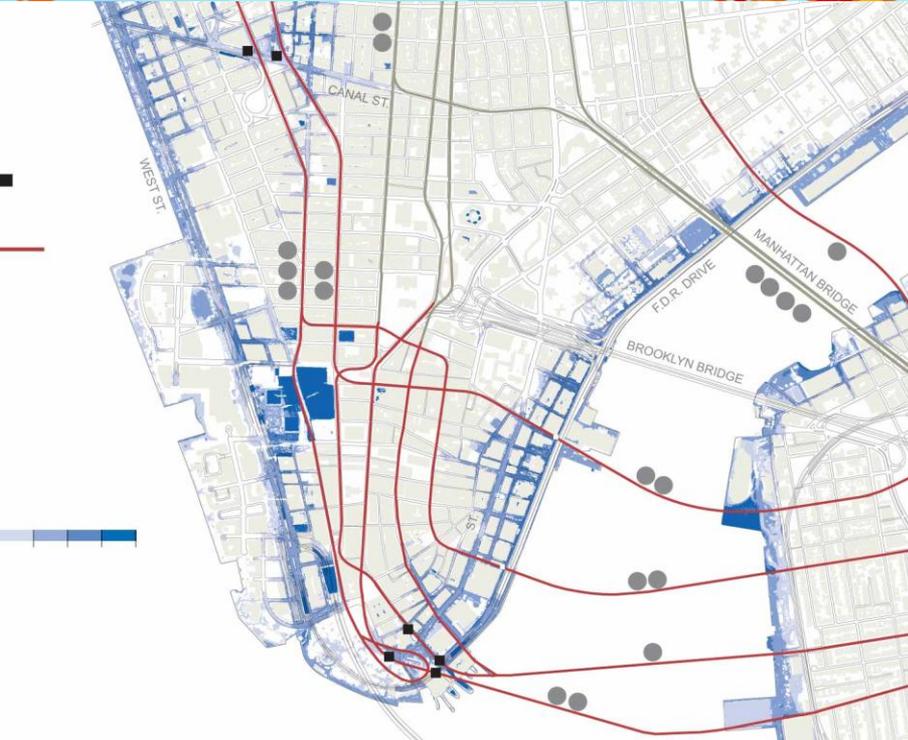
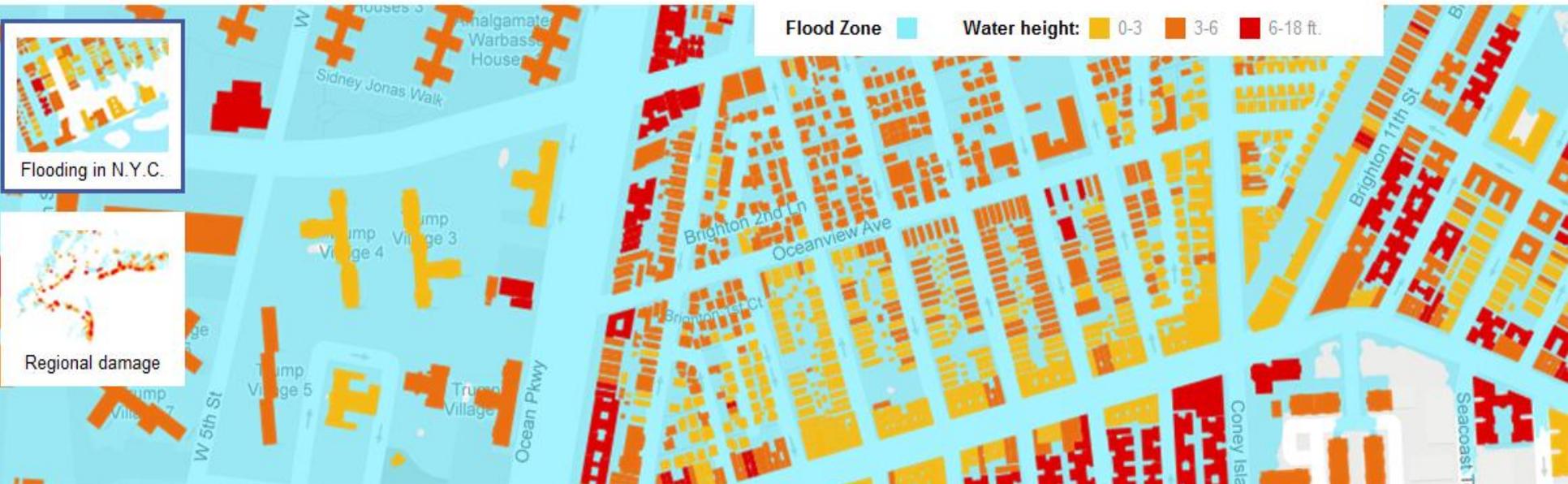
Surveying the Destruction Caused by Hurricane Sandy



Flooding in N.Y.C.



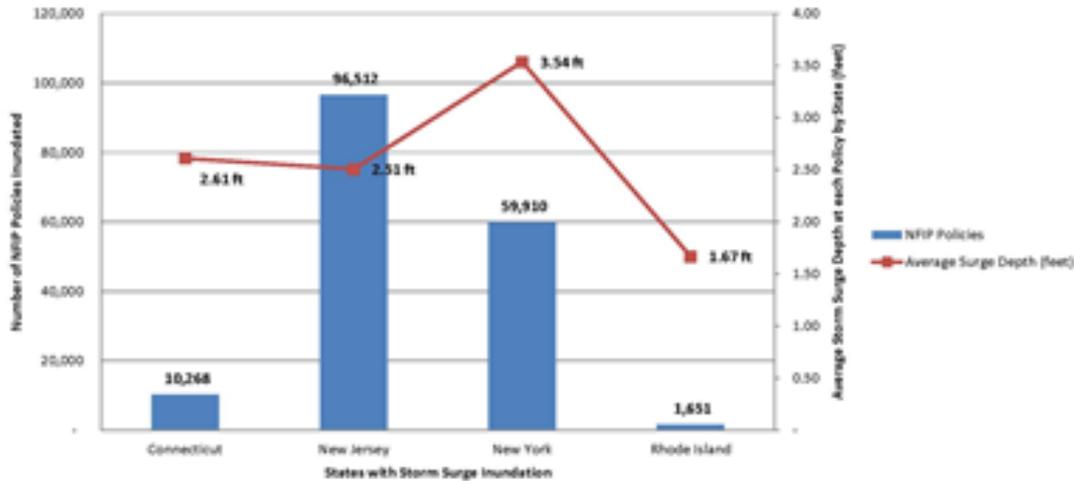
Regional damage



◀ Brighton Beach Brooklyn ▶

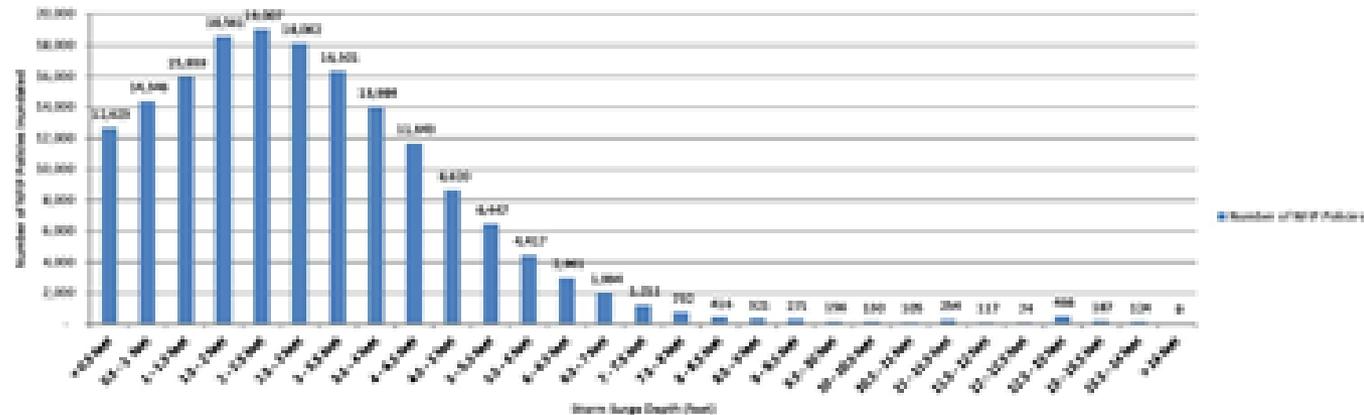
Analysis for NFIP Impacts

NFIP Policies Inundated and Average Storm Surge Depth



- Flood depths assigned to 200,000+ policies
- Integrated into request to increase borrowing authority –
 - \$9.7 billion

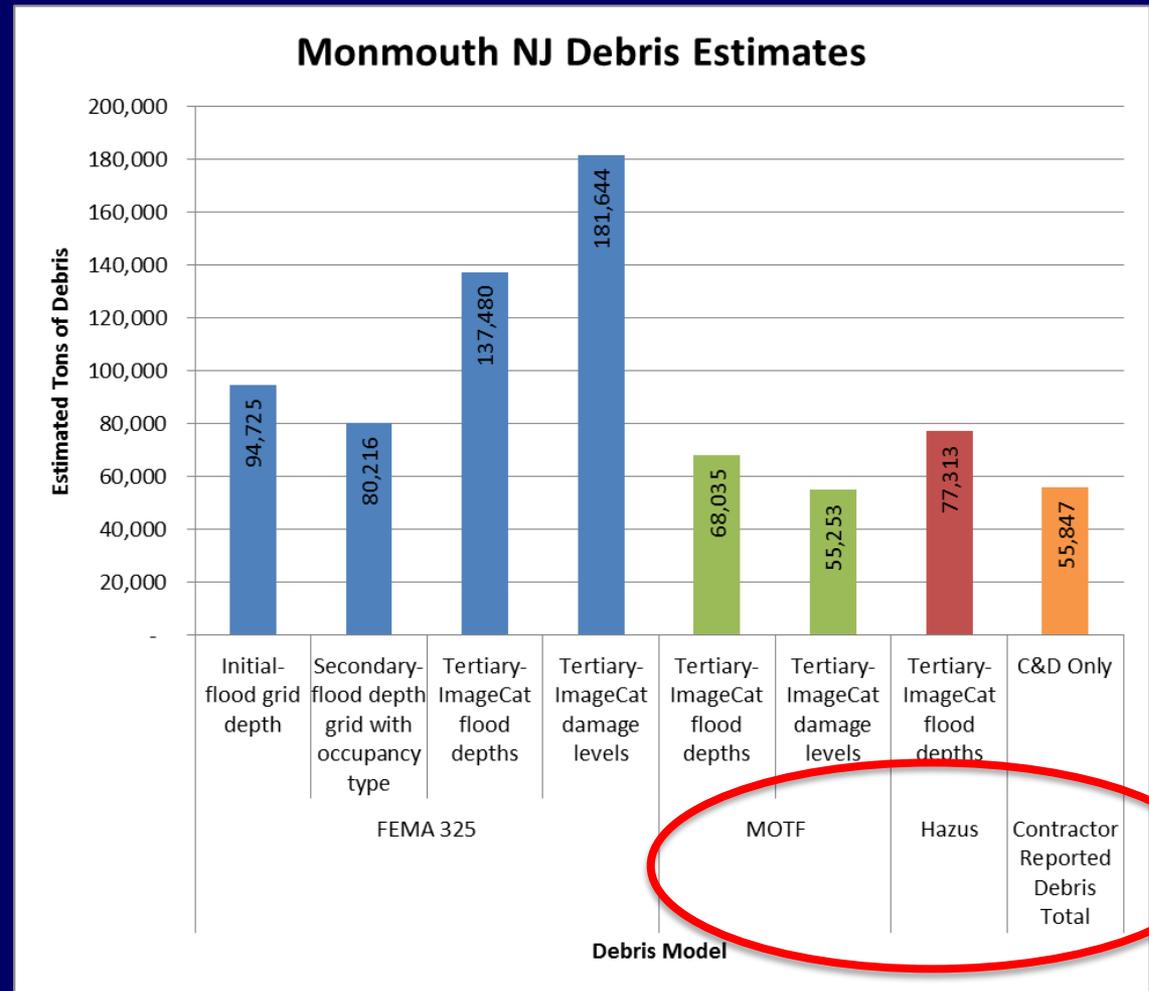
NFIP Policies Inundated and Storm Surge Depth



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Debris Model Case Studies

- MOTF methods integrate damage assessments and parcel data



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FEMA MOTF/NGA Damage Assessment

Moore, Oklahoma

Damage Level

- Affected
- Destroyed
- Major
- Minor
- Pending Further Assessment

NOAA\NWS Damage Points

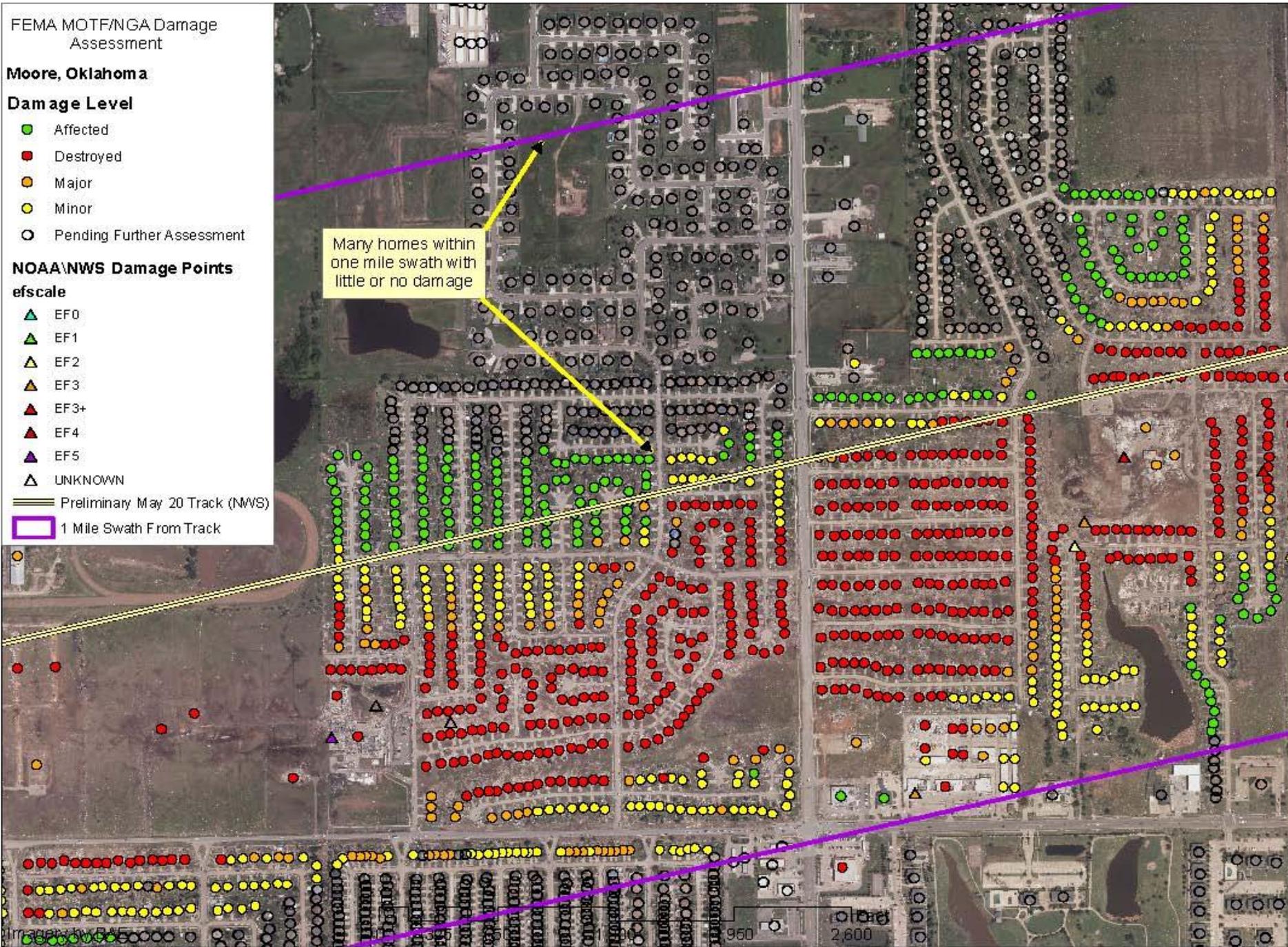
efscale

- ▲ EF0
- ▲ EF1
- ▲ EF2
- ▲ EF3
- ▲ EF3+
- ▲ EF4
- ▲ EF5
- ▲ UNKNOWN

== Preliminary May 20 Track (NWS)

▭ 1 Mile Swath From Track

Many homes within one mile swath with little or no damage



Preliminary Damage Assessment Sources

- National Geospatial Agency (NGA): screen captures from live TV, satellite and aerial imagery
- Civil Air Patrol (CAP)



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CO 2013 Flooding FEMA Individual Assistance (IA) Inspections



On ground inspection of damaged applicant households

- Full Verified Loss (Real and Personal Property)
- High watermark (>10,000)
- Dwelling and Foundation type
- Square footage



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Accessibility Constraints

Boulder County: areas of Allenspark, Jamestown, Lyons and Wallstreet.

Larimer County: areas of Crescent Lake, Estes Park, Fish Creek, and Glen Haven.



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Impact Assessments-County Totals

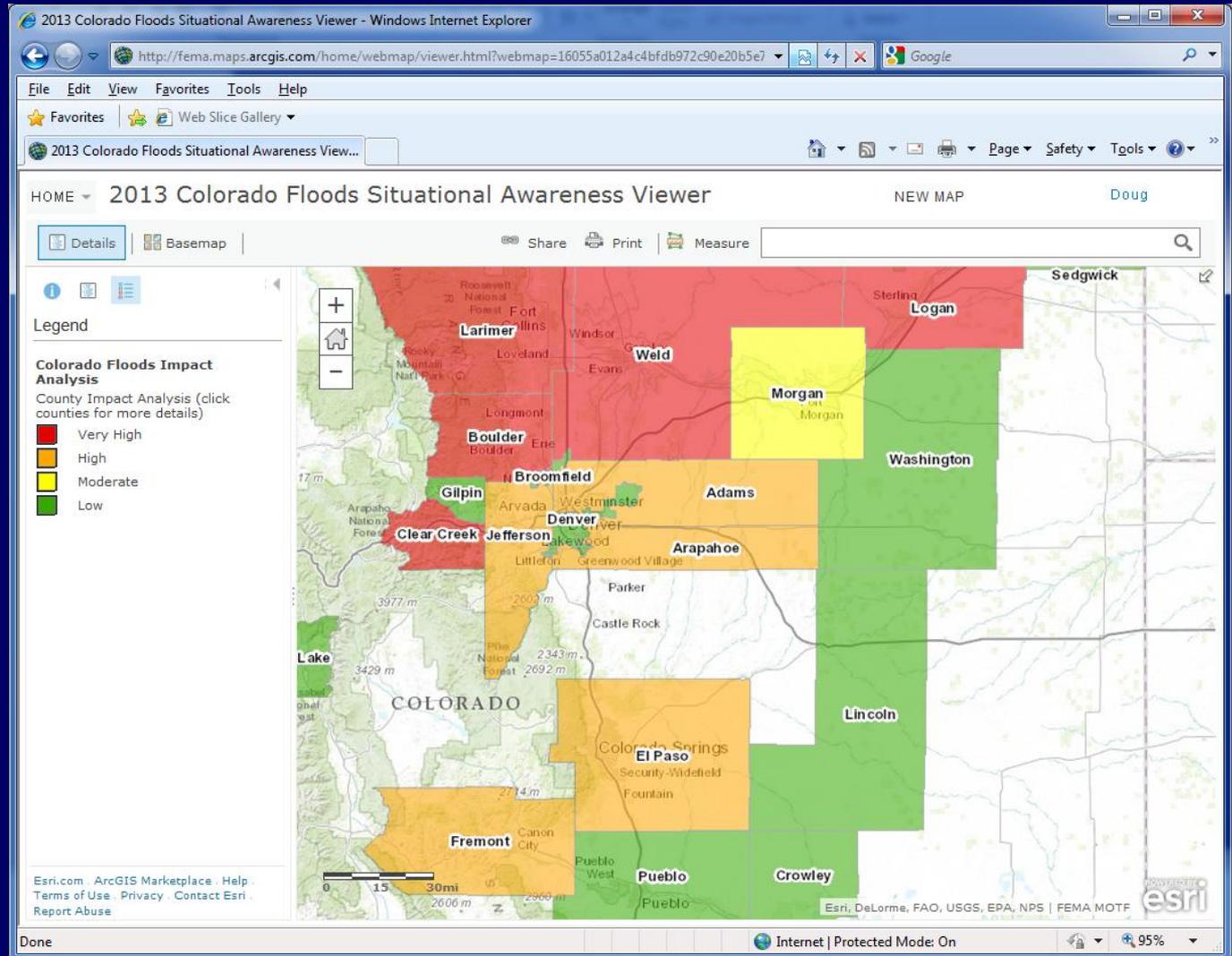
County	Affected	Minor	Major	Destroyed	Total Damaged Households	Loss Ratio (% of Households with Damages)
Boulder	7,320	2,580	602	86	10,588	8.93%
Arapahoe	1,841	282	15	-	2,138	0.97%
Larimer	1,115	376	117	39	1,647	1.39%
Weld	635	218	203	204	1,260	1.43%
El Paso	649	372	12	1	1,034	0.45%
Adams	646	99	10	-	755	0.50%
Jefferson	532	80	18	-	630	0.29%
Clear Creek	93	18	2	-	113	2.80%
Logan	68	24	7	11	110	1.35%
Fremont	42	6	-	-	48	0.28%
Morgan	9	8	4	1	22	0.21%



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FEMA's GeoPlatform

- Publish and update layers
- Feeds for other viewers
- User map functions



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MOTF Community Impact Summaries

138
communities
25 damage
data
attributes
Sample at
right:

Community	Number of Households	IA Applicants	Total Damaged Households	Loss Ratio (% of Households with Damages)
JAMESTOWN	115	111	43	37.39%
LYONS	851	924	265	31.14%
BOULDER	40,985	7,917	6,086	14.85%
UNINCORPORATED BOULDER COUNTY	21,456	4,379	3,050	14.22%
ESTES PARK	2,866	746	317	11.06%
WARD	63	11	5	7.94%
EVANS	6,171	567	382	6.19%
FREDERICK	2,743	202	142	5.18%
UNINCORPORATED WELD COUNTY	11,368	778	487	4.28%
UNINCORPORATED LARIMER COUNTY	27,924	2,607	1,164	4.17%
UNINCORPORATED CLEAR CREEK COUNTY	2,595	154	105	4.05%
MILLIKEN	1,821	138	69	3.79%
MANITOU SPRINGS	2,515	165	81	3.22%
UNINCORPORATED LOGAN COUNTY	2,391	105	62	2.59%
NEDERLAND	605	32	14	2.31%
LONGMONT	32,655	1,263	711	2.18%
DACONO	1,510	44	32	2.12%
FIRESTONE	3,134	101	64	2.04%
AURORA	121,198	2,829	2,221	1.83%
SUPERIOR	4,482	81	68	1.52%
LOUISVILLE	7,576	117	83	1.10%



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Community Rating System (CRS) Performance Audit

Communities with higher floodplain standards are rewarded with flood policy discounts.

CRS Class	Credit Points	Premium Reduction	
		Inside SFHA	Outside SFHA
1	4,500+	45%	10%
2	4,000-4,499	40%	10%
3	3,500-3,999	35%	10%
4	3,000-3,499	30%	10%
5	2,500-2,999	25%	10%
6	2,000-2,499	20%	10%
7	1,500-1,999	15%	5%
8	1,000-1,499	10%	5%
9	500-999	5%	5%
10	0-499	0	0



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NFIP Impact Summaries

Fort Collins
(Class 4,
30%
discount)
5 claims
(\$20K)

Community	NFIP Policies	NFIP Claims	NFIP Estimated Claims	Average Claim
BOULDER	1,907	929	\$ 18,536,086	\$ 19,953
UNINCORPORATED BOULDER COUNTY	776	389	\$ 16,480,313	\$ 42,366
UNINCORPORATED LARIMER COUNTY	603	194	\$ 8,898,746	\$ 45,870
COLORADO SPRINGS	2,291	104	\$ 851,984	\$ 8,192
UNINCORPORATED WELD COUNTY	273	75	\$ 4,074,060	\$ 54,321
LYONS	69	66	\$ 3,718,102	\$ 56,335
ESTES PARK	99	58	\$ 1,276,667	\$ 22,012
LONGMONT	250	53	\$ 3,872,251	\$ 73,061
UNINCORPORATED JEFFERSON COUNTY	483	32	\$ 827,010	\$ 25,844
AURORA	306	30	\$ 343,290	\$ 11,443
MANITOU SPRINGS	148	21	\$ 269,220	\$ 12,820
LOVELAND	104	19	\$ 1,581,823	\$ 83,254
JAMESTOWN	15	12	\$ 1,745,154	\$ 145,429
UNINCORPORATED LOGAN COUNTY	61	10	\$ 134,073	\$ 13,407
UNINCORPORATED EL PASO COUNTY	705	8	\$ 89,199	\$ 11,150
ARVADA	522	7	\$ 30,963	\$ 4,423
STERLING	290	7	\$ 511,287	\$ 73,041
UNINCORPORATED MORGAN COUNTY	60	7	\$ 76,587	\$ 10,941
FIRESTONE	11	6	\$ 58,962	\$ 9,827
CITY AND COUNTY OF DENVER	1,130	5	\$ 29,800	\$ 5,960
FORT COLLINS	407	5	\$ 20,153	\$ 4,031



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City of Longmont Project Audit

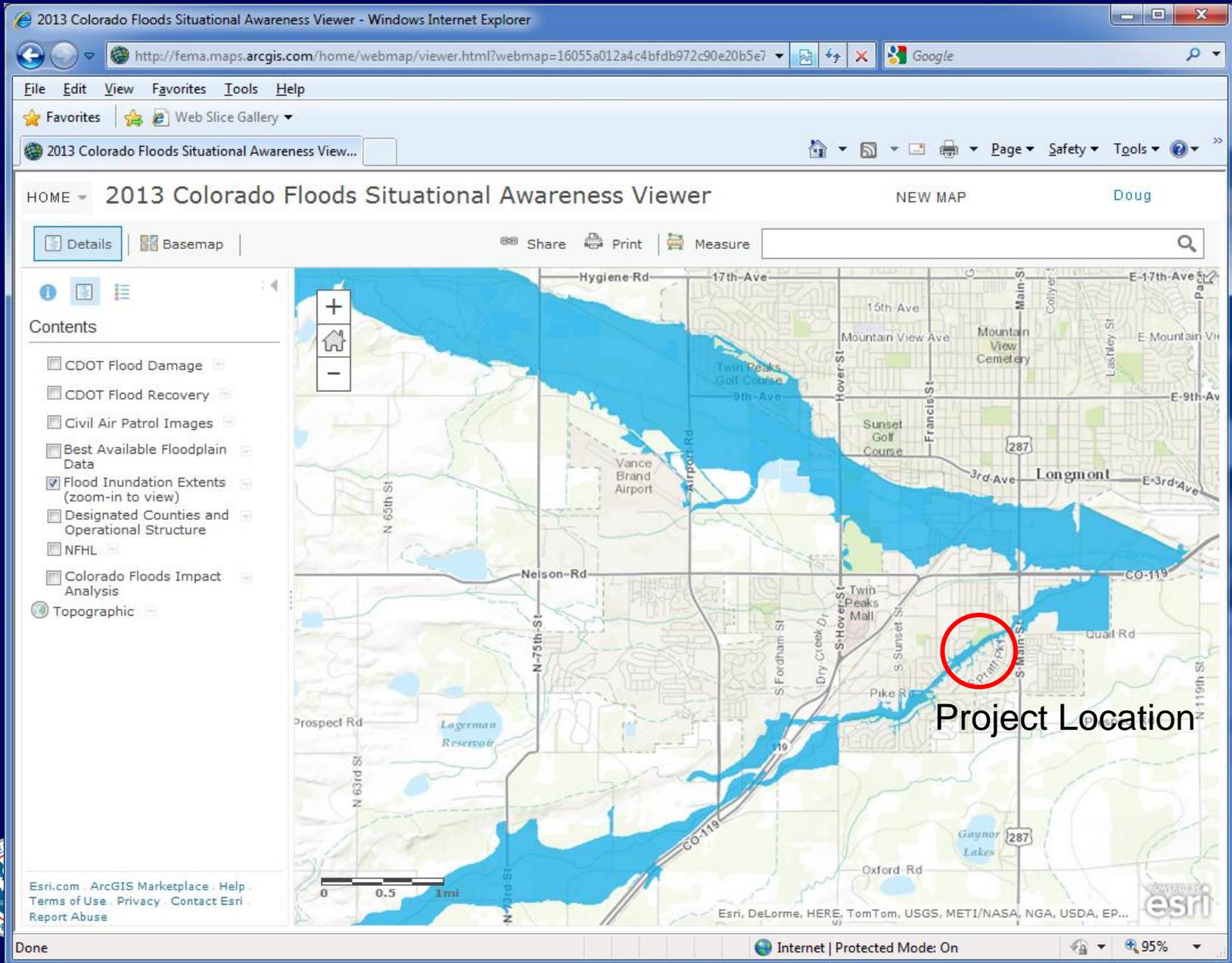
Pre Disaster Mitigation (PDM) project loss avoidance.

- \$4.4M (\$3M from FEMA)
- FY 2010
- Left Hand Creek
- culvert upgrades at South Pratt Parkway and South Main Street



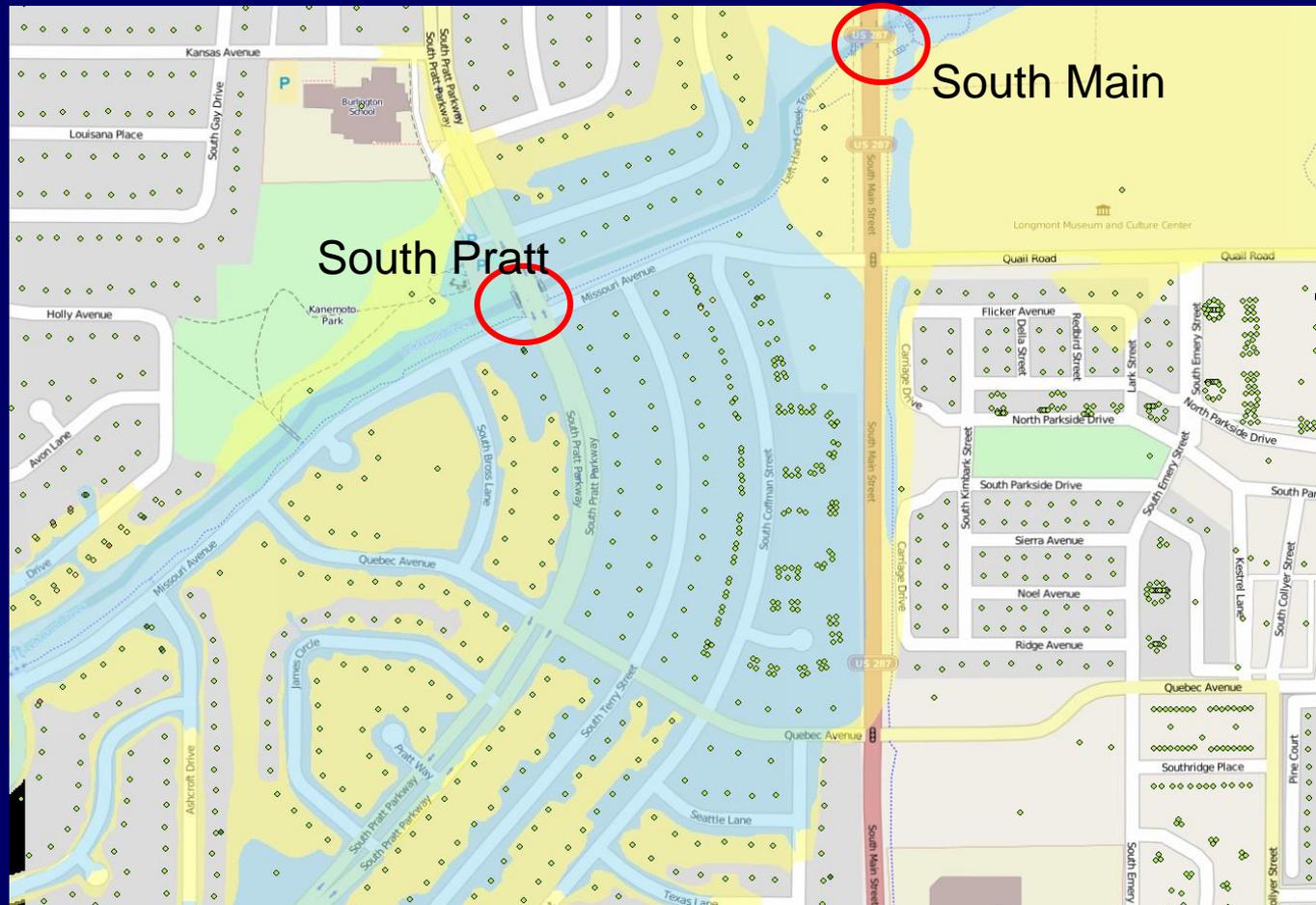
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City of Longmont PDM Project Location



Project Area Exposure and Impacts

- 138 parcels (282 addresses)
- \$202M assessed value
- Event resulted in 18 IA applicants
- 4 with minor building damages (\$3.2K)



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Questions?

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FEMA-MOTF@fema.dhs.gov