Geospatial Tools To Support Disaster Planning, Response, And Recovery

For Hampton Roads Housing Recovery Workshop

May 14, 2015

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The Role of Geographic Information Systems in Disaster Planning, Response, and Recovery

- Helpful data sources frequently in GIS formats
- Centralized data and information repository
- Offers computational techniques to evaluate sizeable datasets across large geographic areas
- Data and analytical findings can be shared in various formats
- GIS web applications can display real-time data
- Need subject matter experts to provide input on most appropriate ways to analyze/evaluate data!

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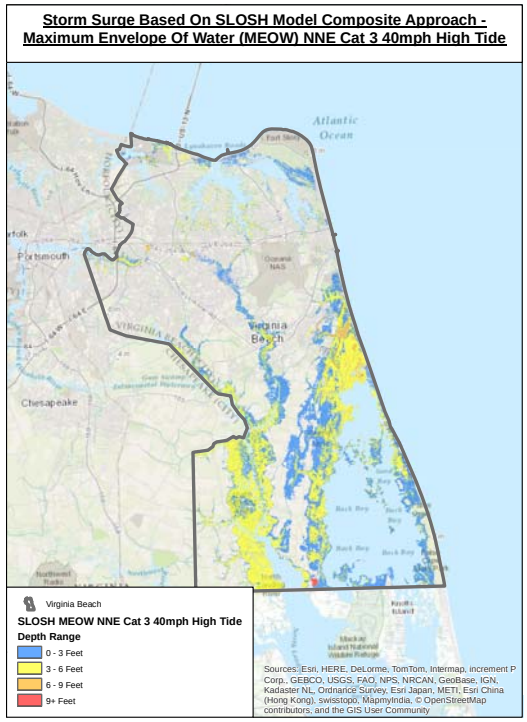
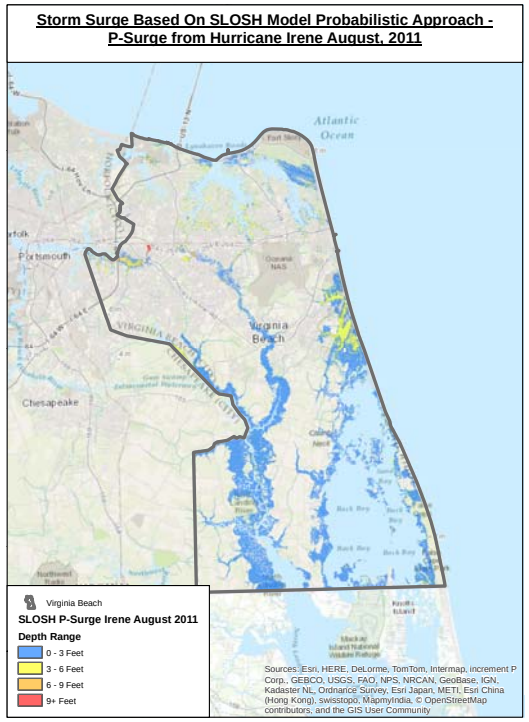
Geospatial Data Sources – Hurricane Storm Surge Models from National Weather Service

- Sea, Lake and Overland Surges from Hurricanes (SLOSH) Model
- Two main types: composite vs. single storm probabilistic/deterministic models





MEOWs and P-Surge more relevant to a single storm

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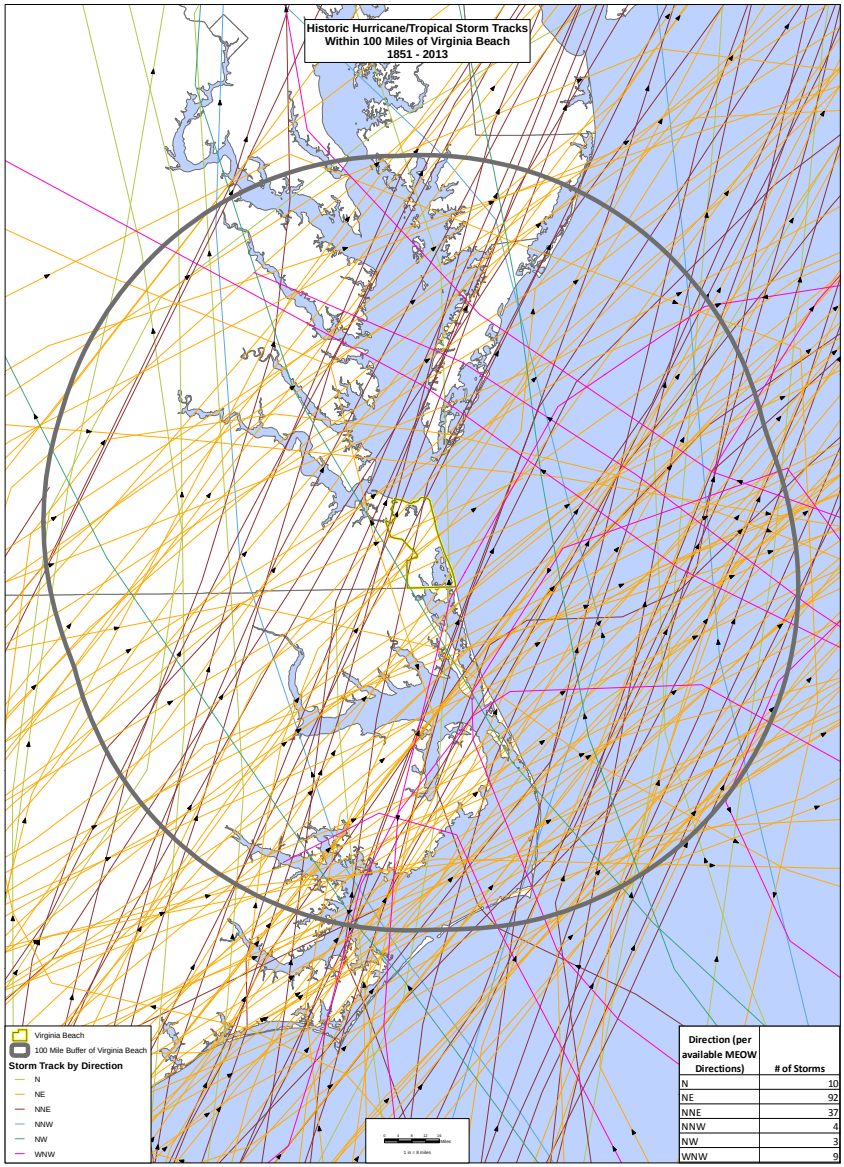
Historical Storm Tracks

- According to NOAA historical storm tracks dataset, between 1851 – 2013, over 150 tropical storms across region
- Approx. 80% tracked NE or NNE (orange and brown tracks)
- History isn't necessarily a predictor of future, but does tend to repeat itself



Evaluating Residences within Track-Specific Max. Envelopes of Water (MEOWs)

- Next to storm magnitude, track/direction of storm extremely important
- SLOSH MEOW NNE Cat 3 40mph @ High Tide had 3,776 residences within extent

MEOW	# Potentially Inundated Residences
wnw_cat3_50_1	44,166
wnw_cat3_40_1	43,573
wnw_cat3_30_1	41,135
wnw_cat3_50_0	36,670
wnw_cat3_40_0	35,540
nw__cat3_30_1	35,058
wnw_cat3_20_1	35,048
nw__cat3_40_1	32,044
wnw_cat3_30_0	30,952
par_cat3_10_1	29,344
nnw_cat3_30_1	27,923
n___cat3_10_1	27,876
nw__cat3_40_0	27,839
nw__cat3_50_1	27,822
nw__cat3_10_1	23,874
wnw_cat3_10_1	23,725
nw__cat3_50_0	22,628
par_cat3_30_1	22,496
par_cat3_20_1	20,747
nnw_cat3_30_1	20,469
nw__cat3_30_0	20,216

For Illustrative/ Workshop Purposes Only

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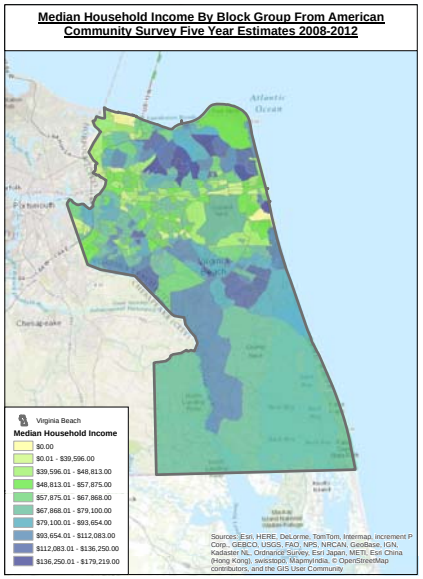
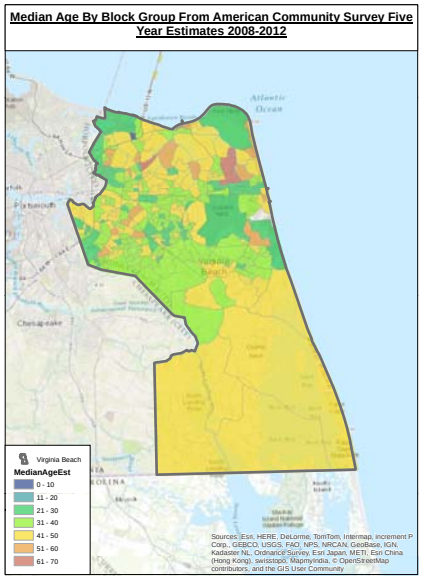
Geospatial Data Sources – Who's Impacted

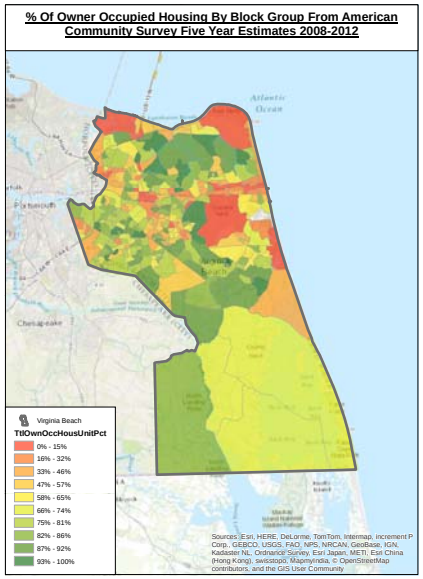
Demographics Related to Disaster Planning and Recovery



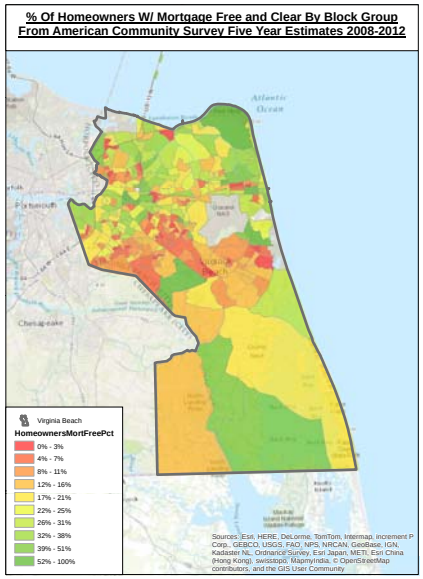
Median Household Income



Median Age



Housing Tenure – Rent vs. Own



Mortgage Free and Clear

- Quantities and characteristics of residents, property owners, businesses

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Geospatial Data Sources – What's Impacted

Geographic Data from Municipal Departments

Housing Data from Real Estate Assessor's Office

Code = "FOUNDATION"
CodeDescrip = "Full Slab"

Roadway, Water Distribution, Stormwater and Sewer Infrastructure from Public Works and Public Utilities Depts.

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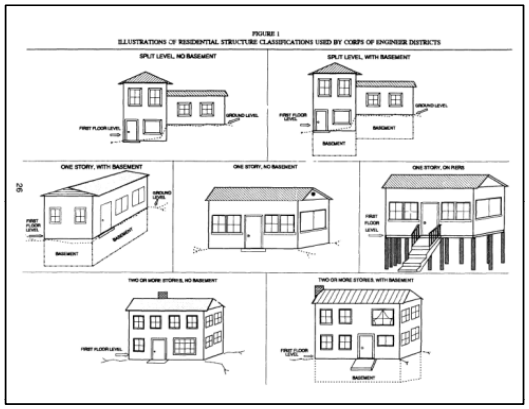
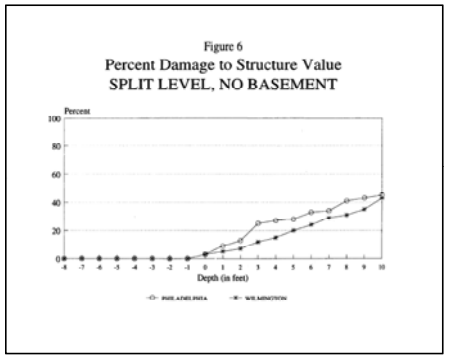
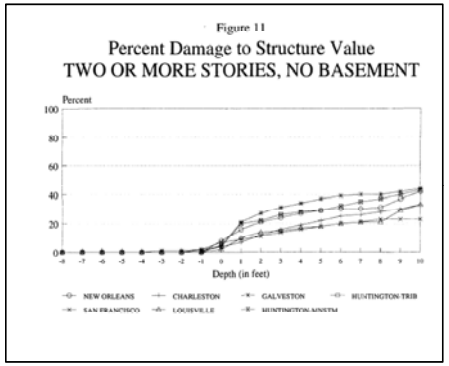
Tying it All Together: Analytical Techniques

U.S. Army Corps of Engineers' Depth to Damage Curves

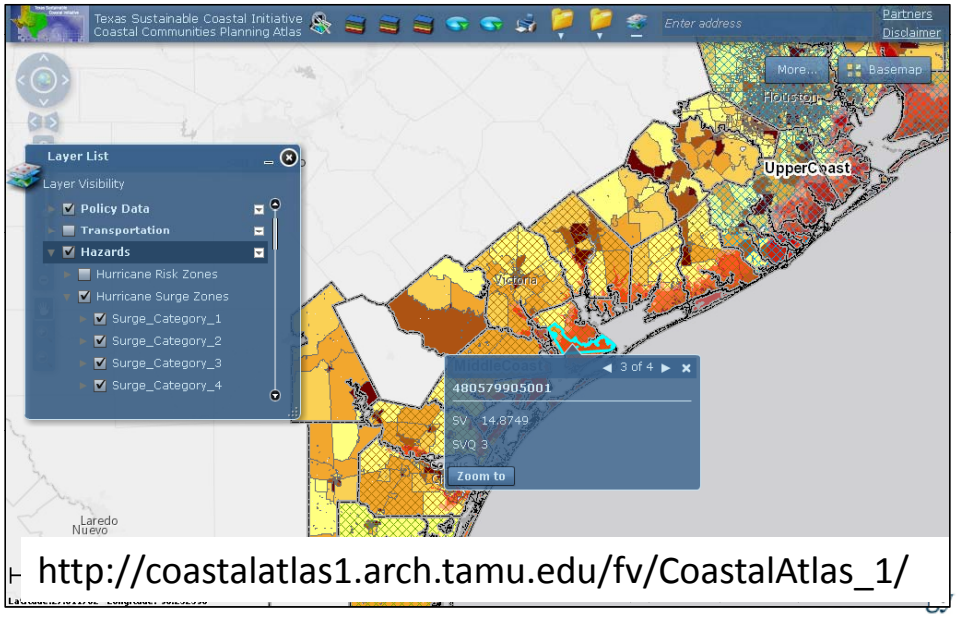






Susan Cutter's Social Vulnerability Index

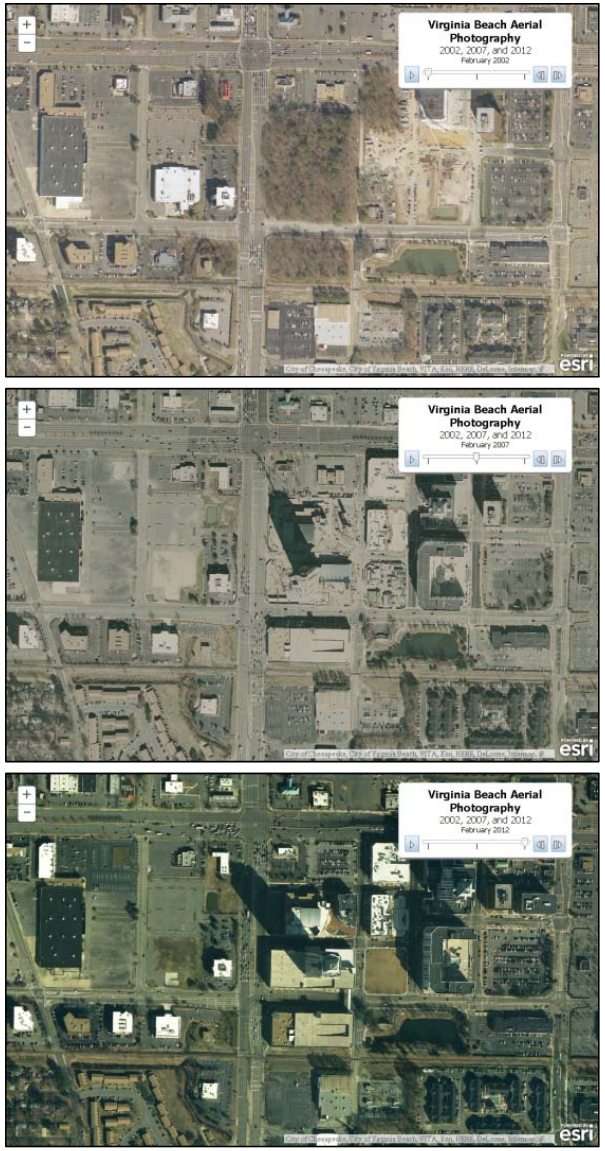
- Social vulnerability equates to greater potential for loss
- Considers over 30 variables, including age, race, household size, income, employment status, density of housing, housing tenure, etc.



http://coastalatlas1.arch.tamu.edu/fv/CoastalAtlas_1/

Additional Considerations

- Can be utilized by mobile devices (for viewing and entering information)
- GIS provides excellent tools for evaluating change and progress
- Capabilities bolstered by input/involvement from well-informed users representing multiple backgrounds



Virginia Beach Town Center 2002, 2007, and 2012

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