COASTAL VULNERABILITY MODEL

Natural Capital Project Annual Meeting, Tuesday March 24, 2015

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AGENDA

- 9:00-9:15 (15 mins) Get settled
- 9:15-9:45 (30 mins) A brief introduction to model theory and application
- 9:45-10:30 (45 mins) Guided run of the model and discussion of the inputs
- 10:30-11:00 BREAK
- 11:00-11:30 (30 mins) Review model outputs and sneak-peek at visualization web app
- 11:30-12:10 (40 mins) Hands-on exercise
- 12:10-12:30 (20 mins) Open discussion


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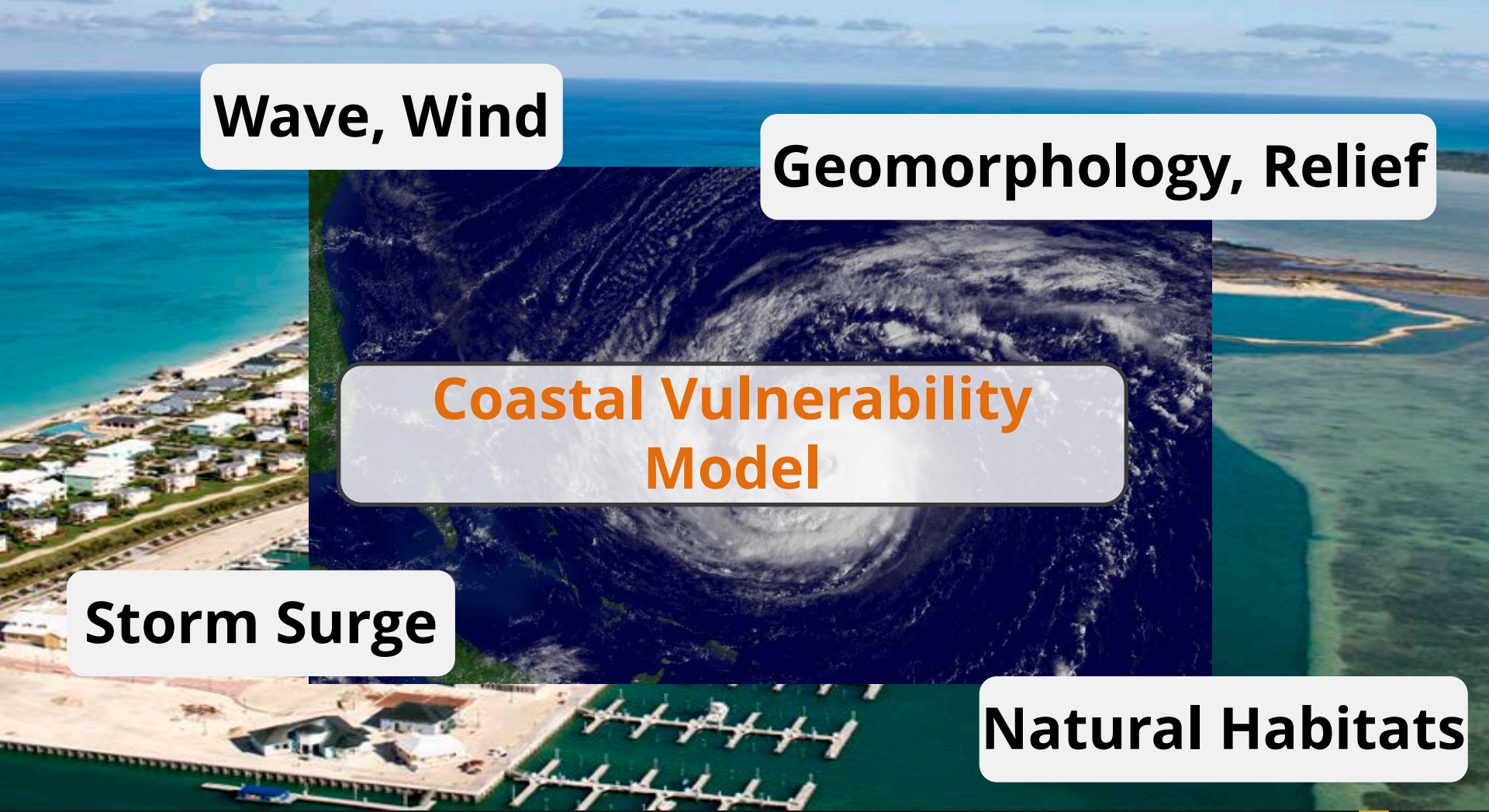

Wave, Wind
Geomorphology, Relief
Coastal Vulnerability Model
Storm Surge
Natural Habitats

QUESTIONS

Are there areas in my region that are more exposed to impacts of high waves and winds than other areas?

Where are people and infrastructure most exposed to coastal hazards in my region?

Are there natural factors that can reduce these impacts?

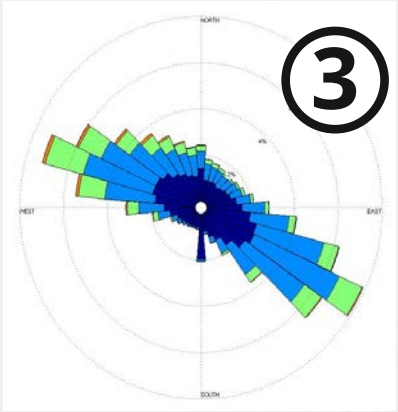
COASTAL EXPOSURE INDEX

1

GEOMORPHOLOGY

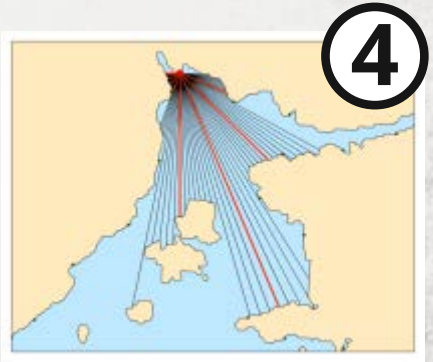
2

HABITATS



3

WIND EXPOSURE



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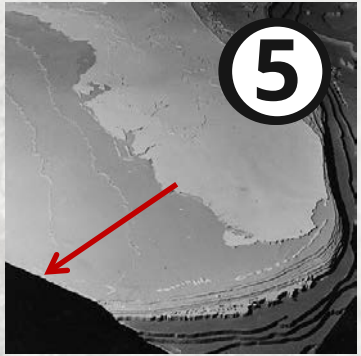
WAVE EXPOSURE



5

SURGE POTENTIAL

6

RELIEF

7

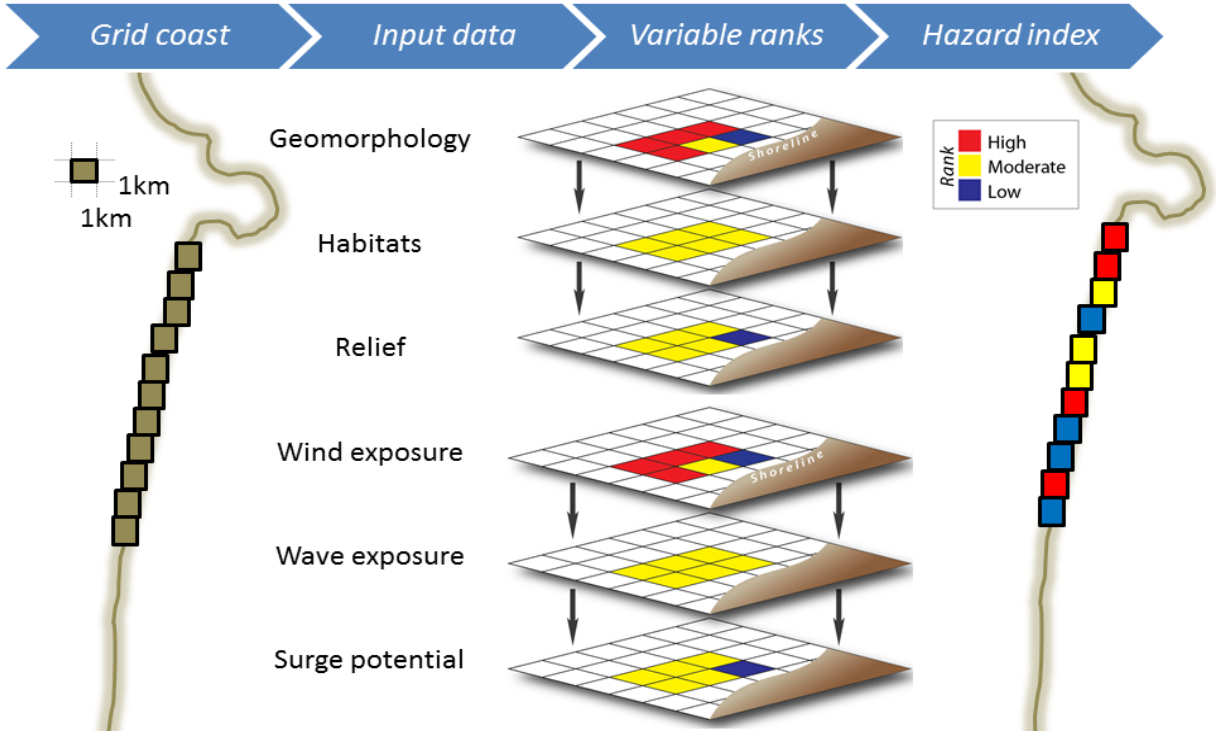
SEA-LEVEL RISE

COASTAL EXPOSURE INDEX

Rank	Very Low	Low	Moderate	High	Very High
	1	2	3	4	5
Geomorphology	Rocky; high cliffs; fiord; fiard	Medium cliff; indented coast	Low cliff; glacial drift; alluvial plain	Cobble beach; estuary; lagoon; bluff	Barrier beach; sand beach; mud flat; delta
Relief	> 90th Percentile	> 75th Percentile	Average value	< 25th Percentile	< 10th Percentile
	Coral reef:				
Wind Exposure	< 10th Percentile	< 25th Percentile	Average value	> 75th Percentile	> 90th Percentile
Wave Exposure	< 10th Percentile	< 25th Percentile	Average value	> 75th Percentile	> 90th Percentile
Surge Potential	No exposure	< 25th Percentile	Average value	> 75th Percentile	> 90th Percentile

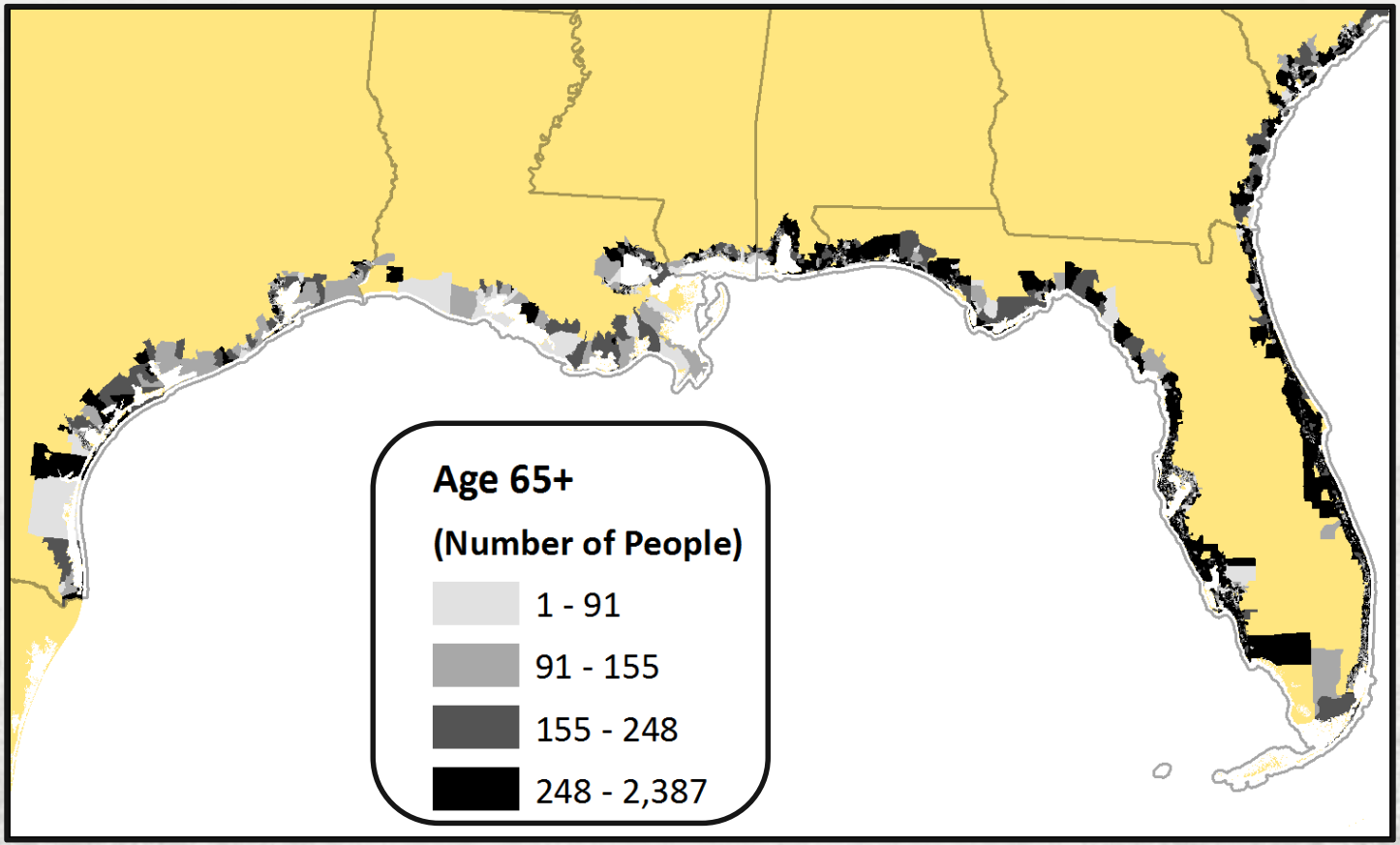
Qualitative assessment of vulnerability based on mixture of relative and absolute rankings

COASTAL EXPOSURE INDEX

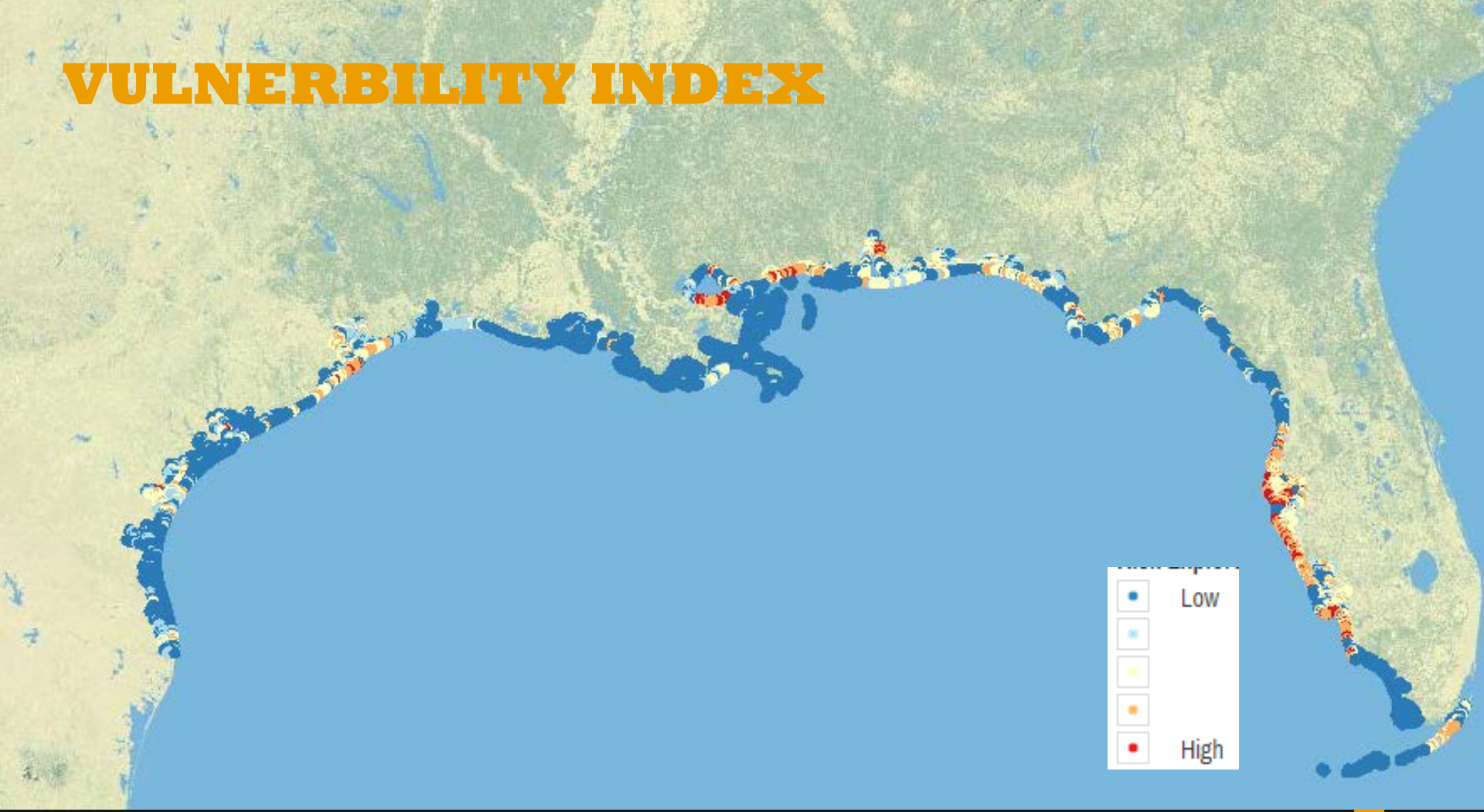


$$EI = (R_{Geomorphology} R_{Relief} R_{Habitats} R_{SLR} R_{WindExposure} R_{WaveExposure} R_{Surge})^{1/7}$$

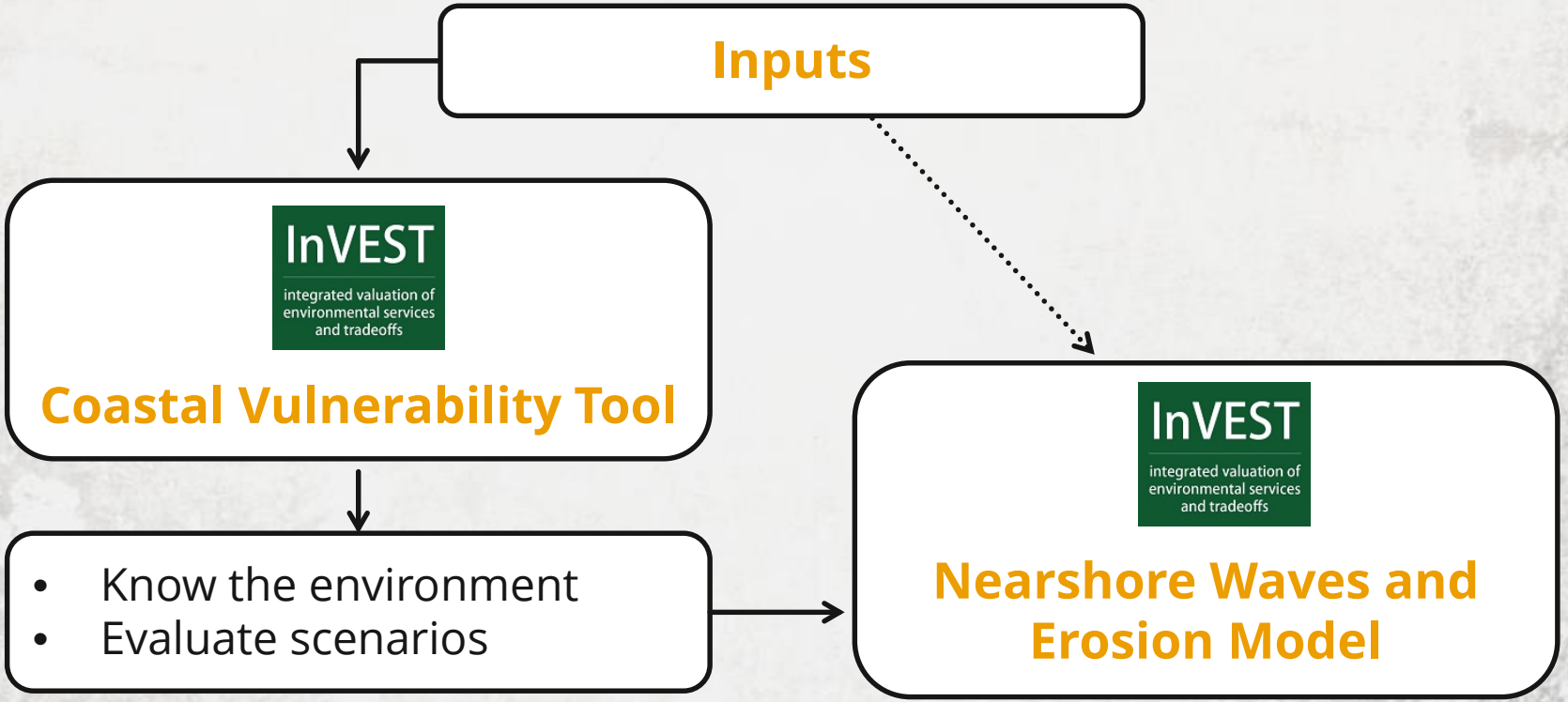
LINK TO SOCIAL METRICS



VULNERBILITY INDEX

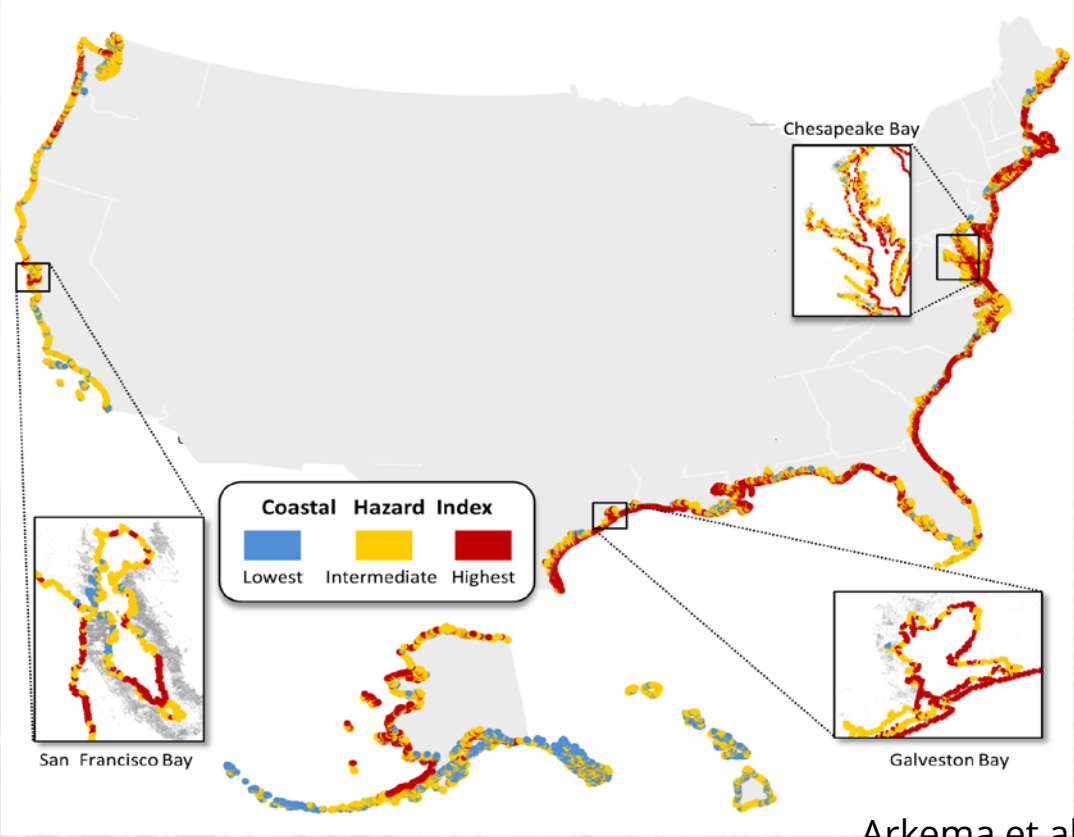


COASTAL PROTECTION TOOLBOX

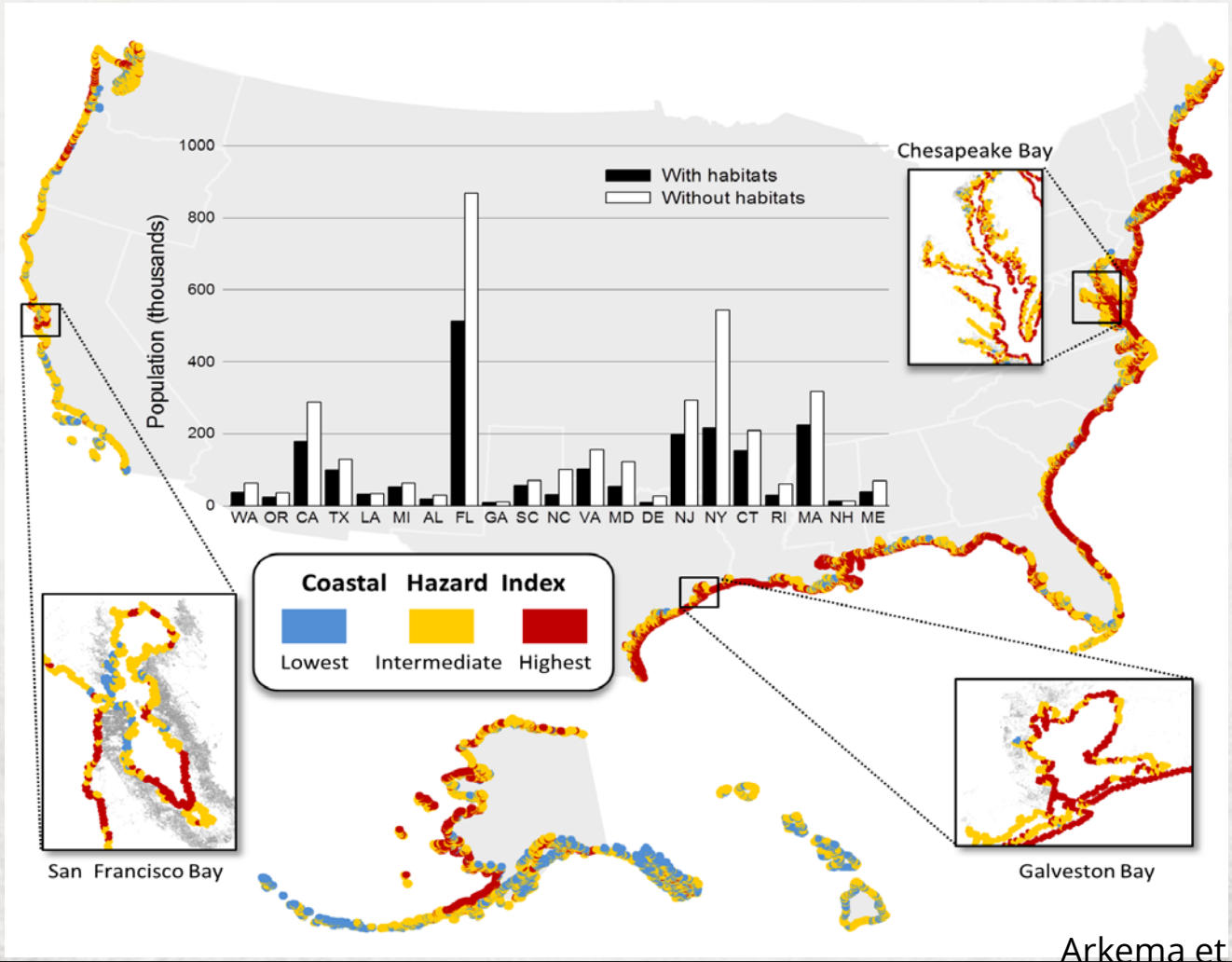


CLIMATE ADAPTATION AND COASTAL RESILIENCE

WHERE AND TO WHAT EXTENT DO EXISTING HABITATS REDUCE RISK OF PEOPLE AND INFRASTRUCTURE TO COASTAL HAZARDS NOW AND IN THE FUTURE?



Arkema et al. 2013, Nature Climate Change



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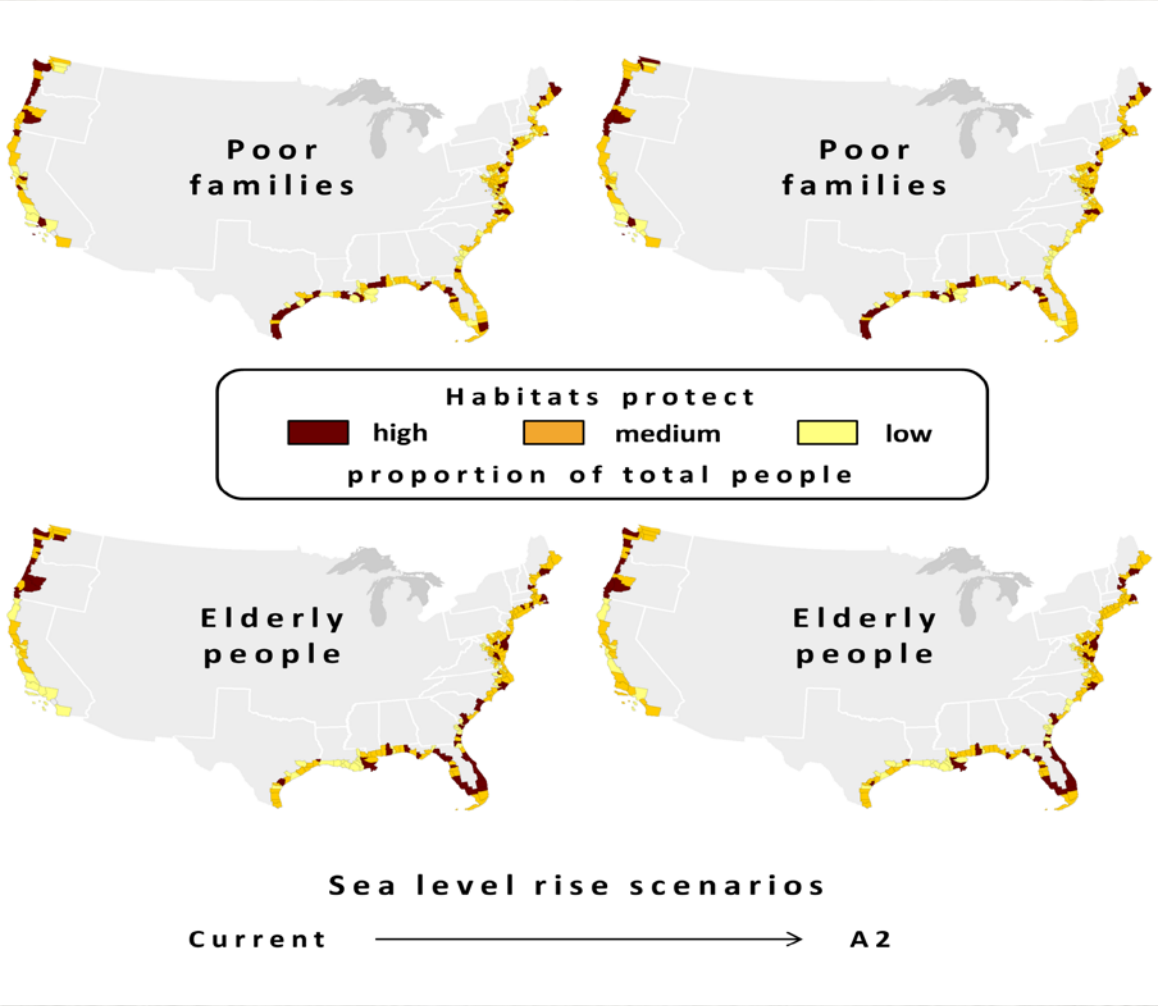
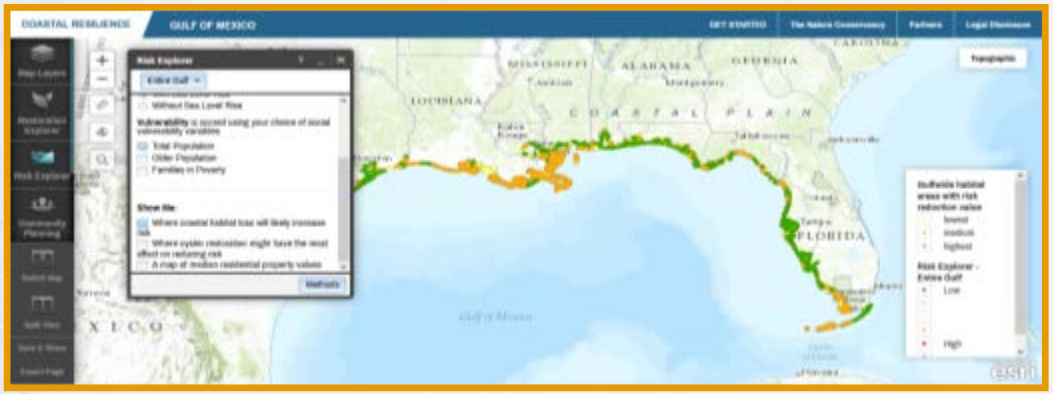
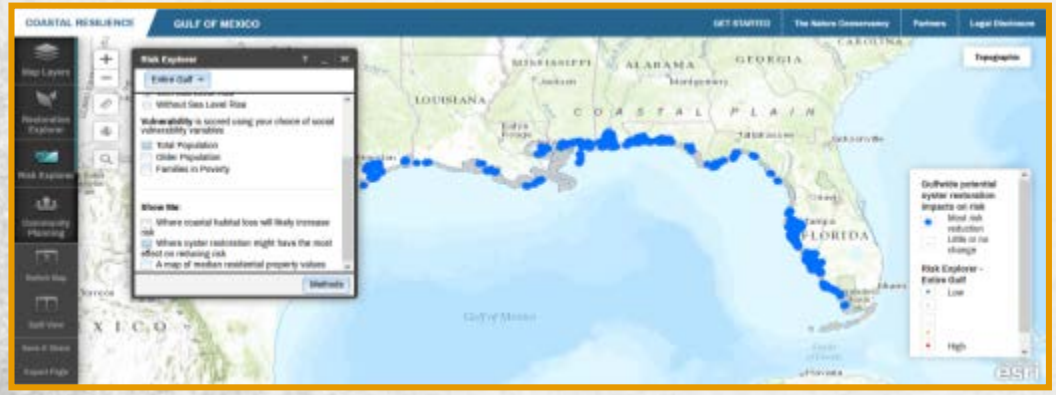

Poor families
Poor families
Habitats protect
high
medium
low
proportion of total people
Elderly people
Elderly people
Sea level rise scenarios
Current
A2

INFORMING HABITAT RESTORATION
AT REGIONAL AND LOCAL SCALES





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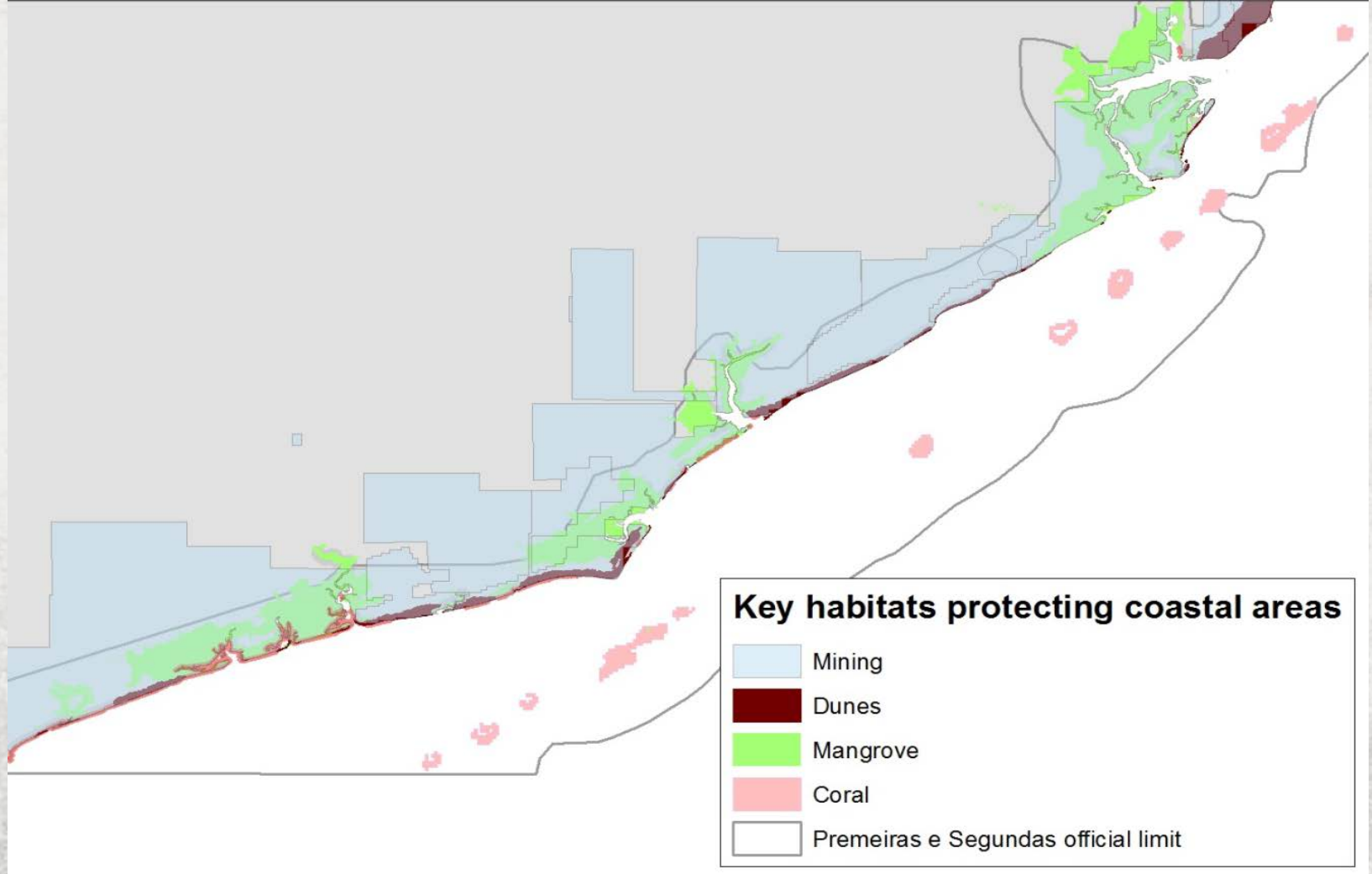
DEVELOPMENT PLANNING: HEAVY SANDS MINING IN A MULTI-USE PROTECTED AREA

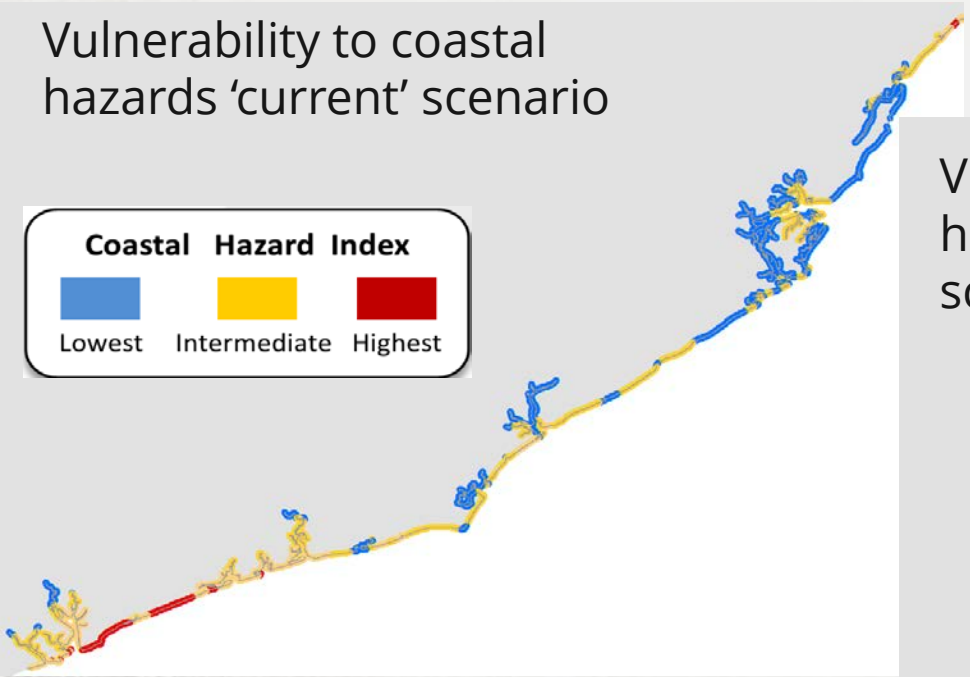
HOW COULD LOCATING MINING INFRASTRUCTURE AND OPERATIONS STRATEGICALLY REDUCE IMPACTS TO ECOSYSTEMS AND REDUCE RISK TO INVESTMENTS?


Key habitats protecting coastal areas
Mining
Dunes
Mangrove
Coral
Premeiras e Segundas official limit

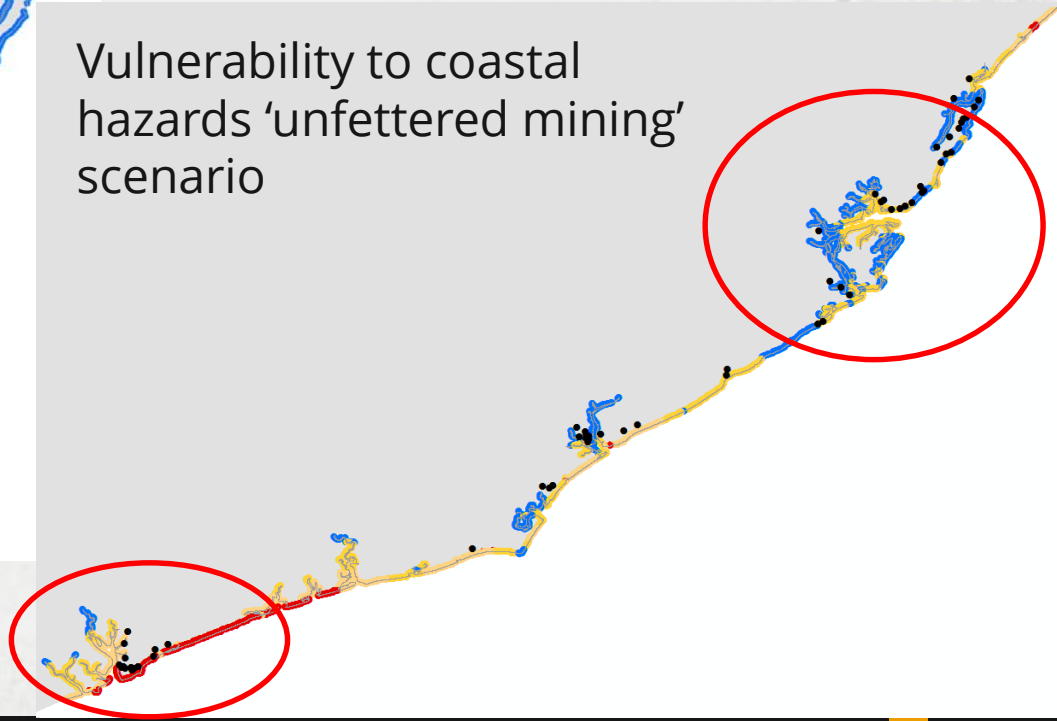
MODEL RESULTS

COASTAL VULNERABILITY: 'UNFETTERED MINING' SCENARIO

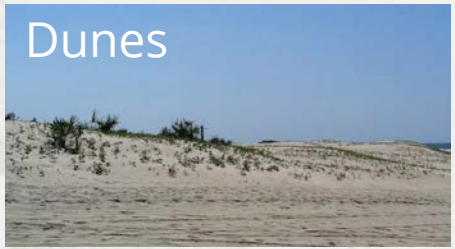
Vulnerability to coastal hazards 'current' scenario

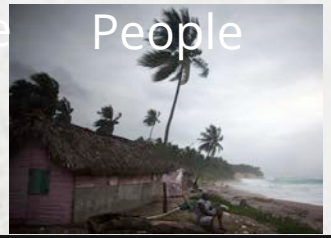


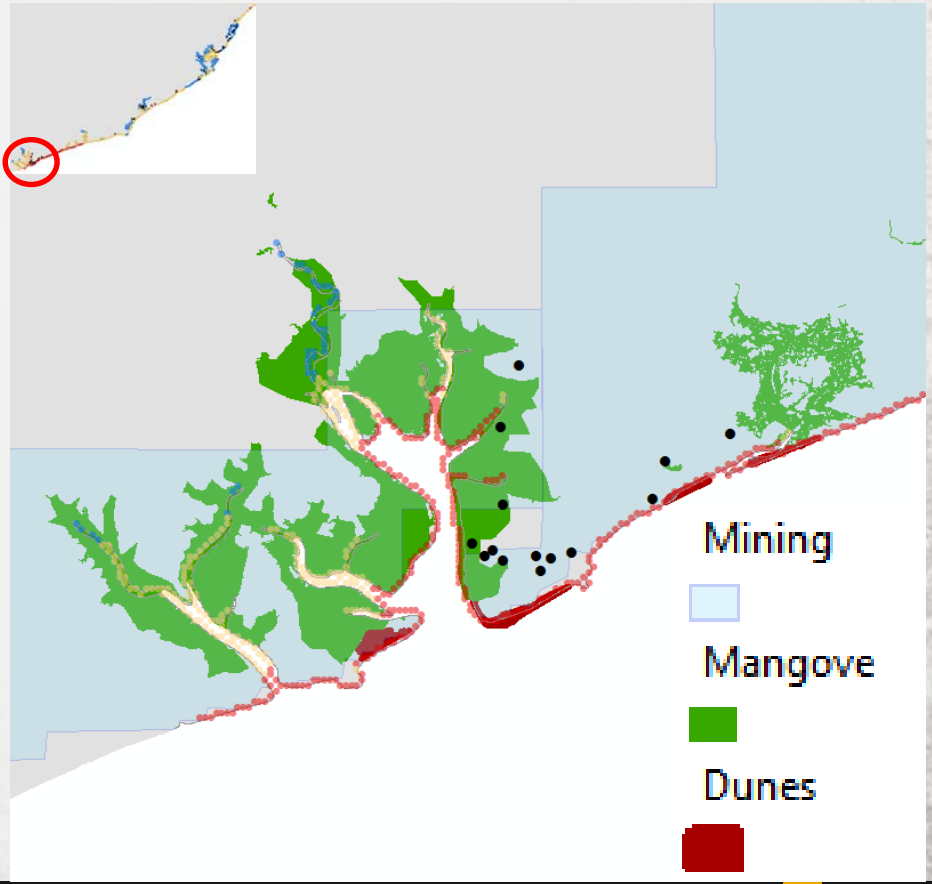
Vulnerability to coastal hazards 'unfettered mining' scenario



CAN WE AVOID HEAVY SANDS MINING WHERE IT MAY INCREASE RISK TO COASTAL HAZARDS?





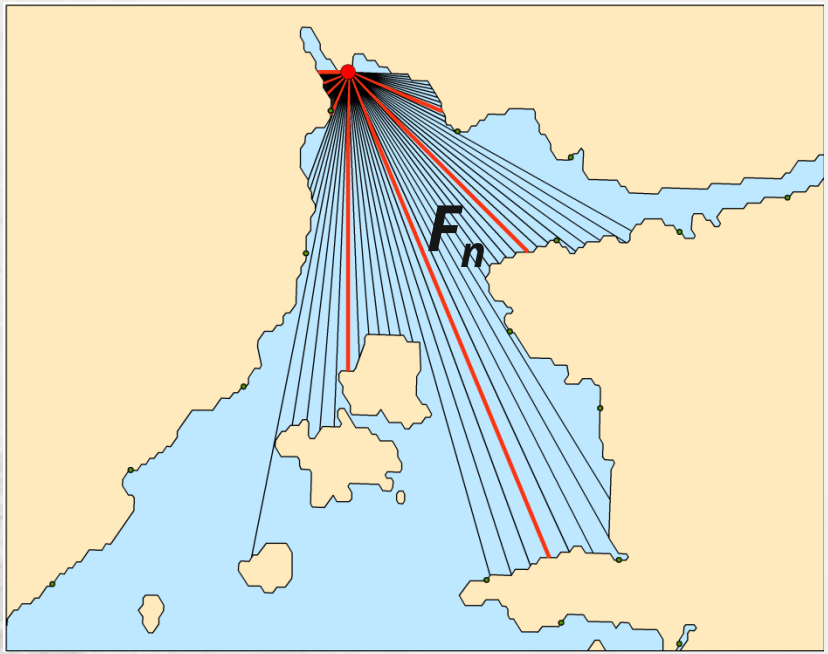


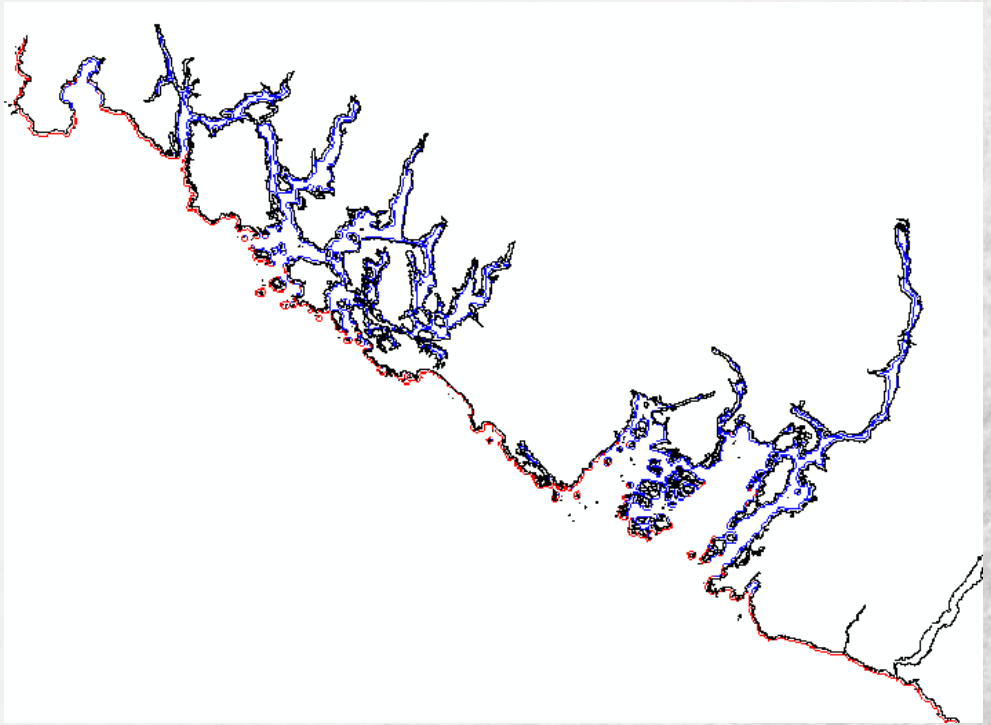
RESOURCES FOR HELP!

Marine ‘Sandbox’
Weds (3/25) 1:30-3:00 pm

MODEL DEMO

FETCH DISTANCE





EXPLORING MODEL OUTPUTS

DEMO OF A WEB VISUALIZATION TOOL

http://vulpes.sefs.uw.edu/ttapp/cv-dash.php