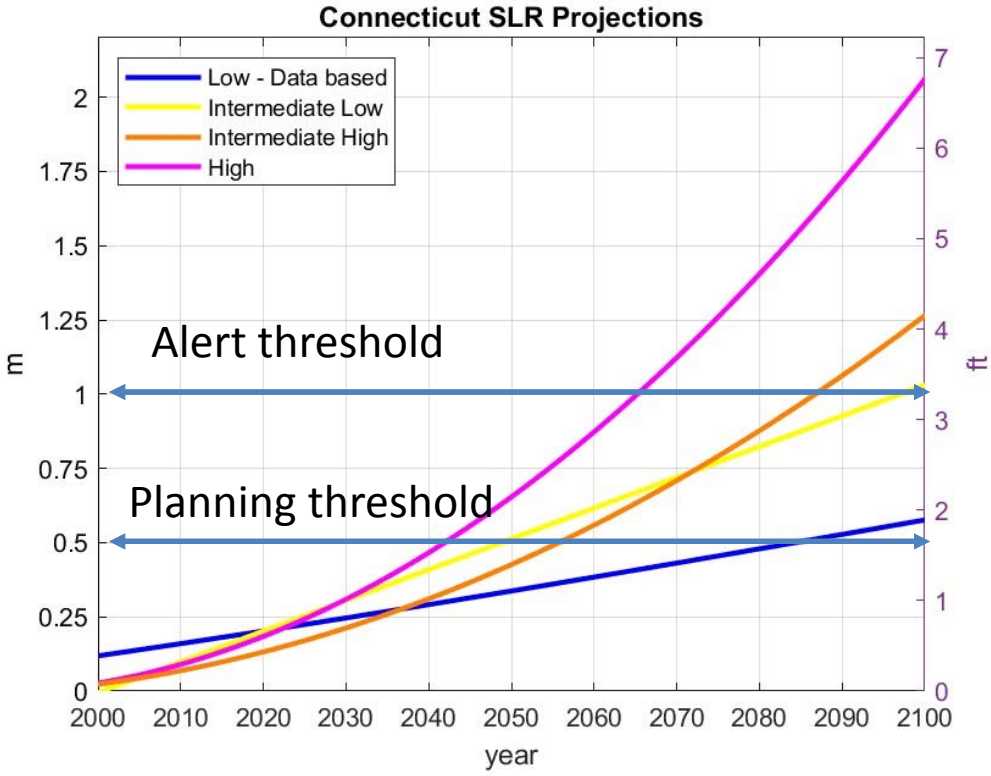
Multi-scale Assessment of the Connecticut's Coastal Vulnerability

Yaprak Onat, PhD.
Connecticut Institute for Resilience and Climate Adaptation

The Connecticut Association of Flood Managers Conference
10/30/19

CT Sea Level Rise Projections

- Plan for sea level rise of 20 inches by 2050.
- Scientific basis for projections revisited every 10 years.
- Senate Bill No. 7/Public Act 18-82 “An Act Concerning Climate Change Planning and Resiliency”.



O’Donnell, 2018

https://circa.uconn.edu/sea-level-rise/

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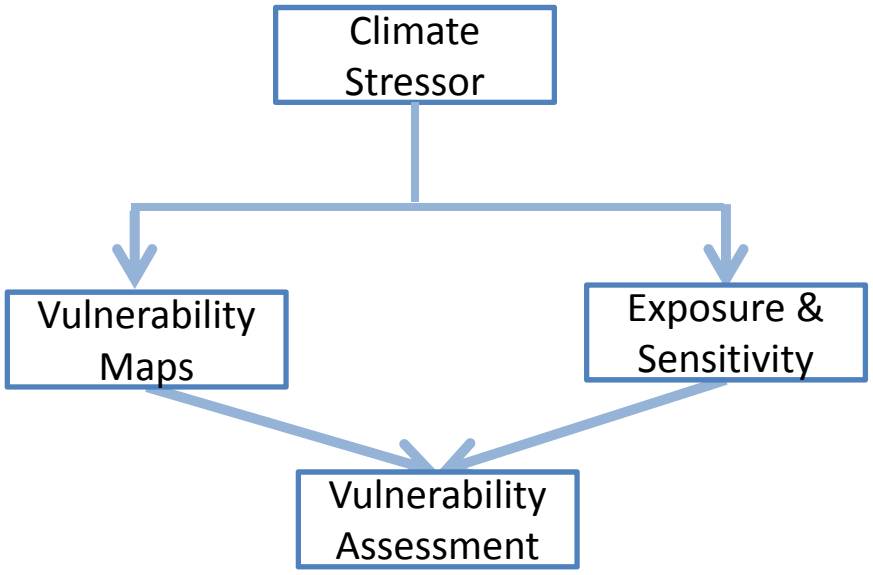
The Vulnerability Assessment

- Build public awareness
- Strategically allocate limited resources
- Identify impacts to community assets
- Inform & prioritize projects



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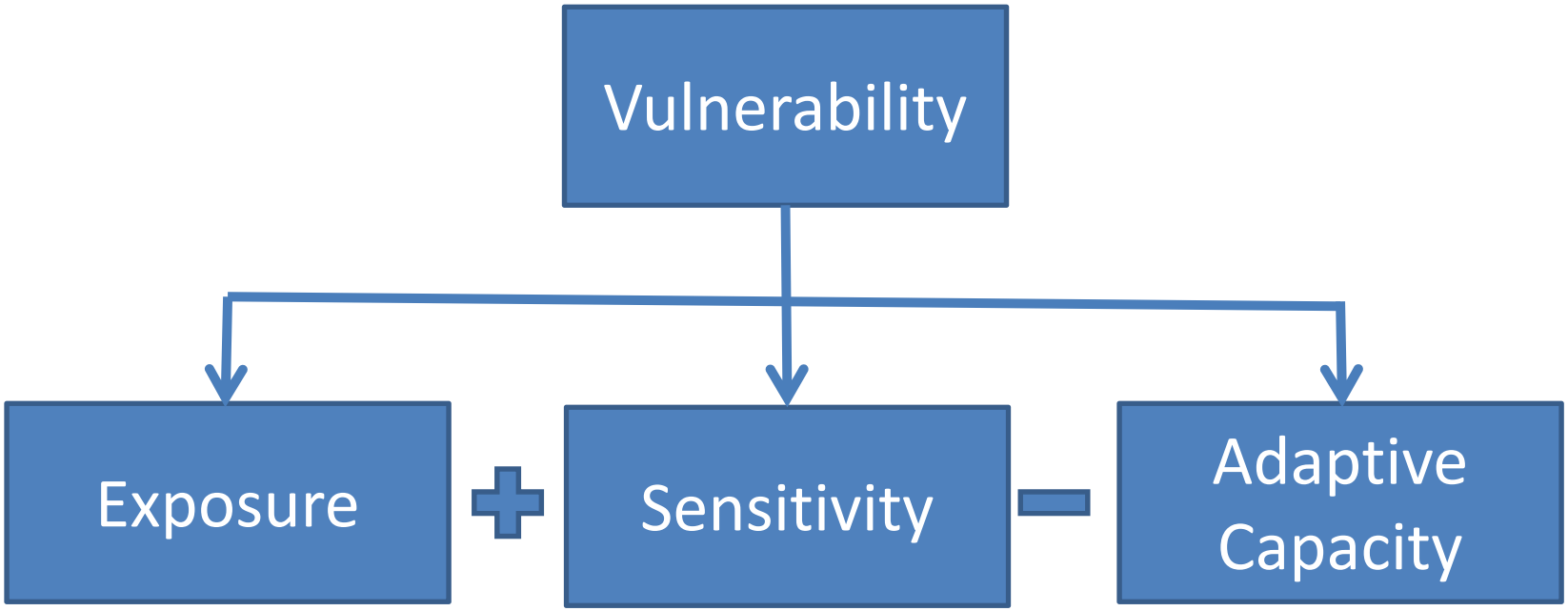
The Vulnerability Equation



When and Where
Duration

Degree of Impact
Level of Stress

Ability to Cope

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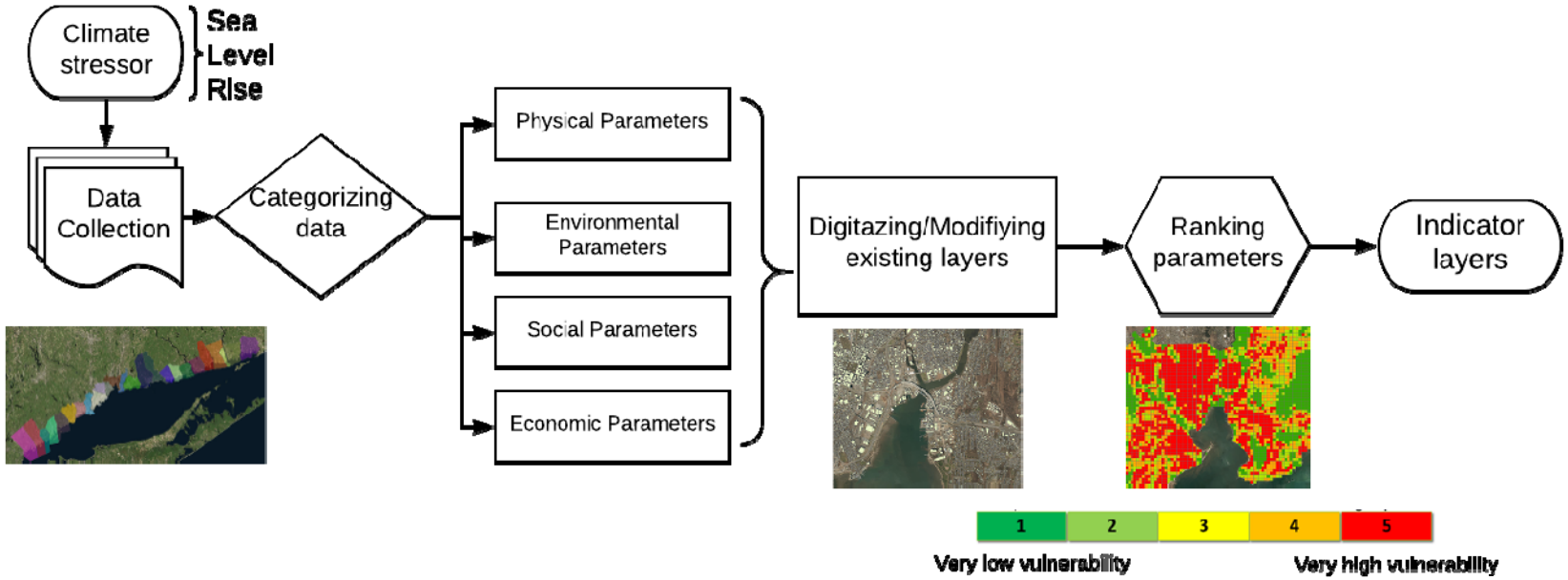
Methodology



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Input Layers: Indicators

1. Sea level rise
2. Wave power
2. Wind speed
3. Storm surge
4. Tidal range
5. Foreshore slope
6. Hydraulic connectivity
7. Coastal elevation
8. Geology
9. Soil drainage
10. Soil flooding
11. Shoreline change rate
12. Erosion susceptibility
13. Hydrology
14. Aquifer protection areas
15. Aquifer type/potential
16. Salt-water limit
17. Marsh habitat
18. Critical habitat
19. Coastal Forests
20. Engineering frontage
21. Roads
22. Railways and Stations
23. Airports
24. Critical infrastructure
25. Buildings
26. Pipeline & submerged cables
27. Population density
28. Elderly and young population
29. Median household income
30. Health insurance
31. Disable population
32. Employed population

Output Layers: Exposure

Coastal Exposure

- Physical Impact
- Salt-water intrusion impact
- Erosion impacts
- Natural habitat impacts
- Critical facilities and infrastructure
- Social impacts

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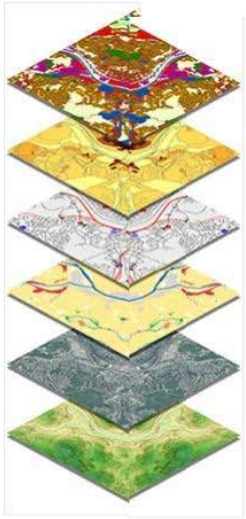

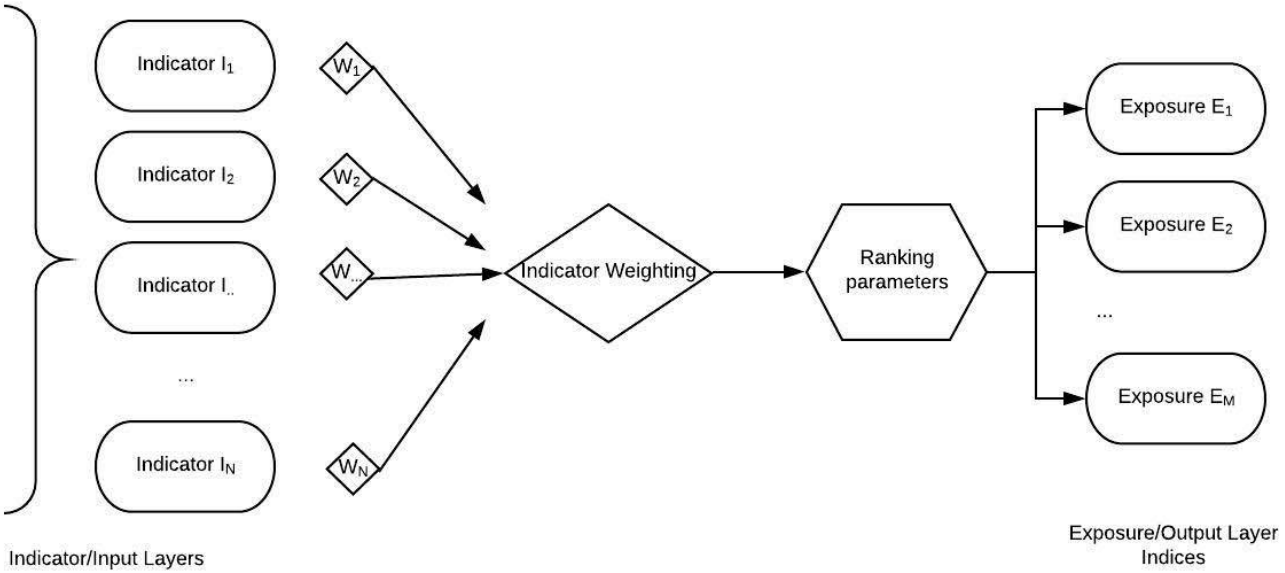

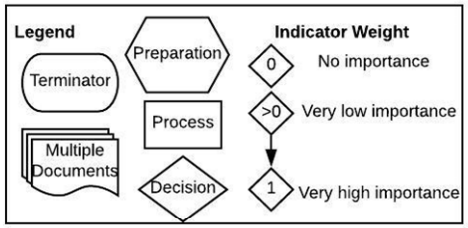

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CVI Calculation

- Initial application developed by Gornitz 1991 and improved by Thieler-Hammar Klose 2001
- USGS widely used layer

Used USGS 7 layers

- Elevation
- Geology
- Landform
- Vertical land movement
- Shoreline displacement
- Tidal range
- Wave height

- Application of 32 layers
- Defining Exposure, Sensitivity and Adaptive Capacity

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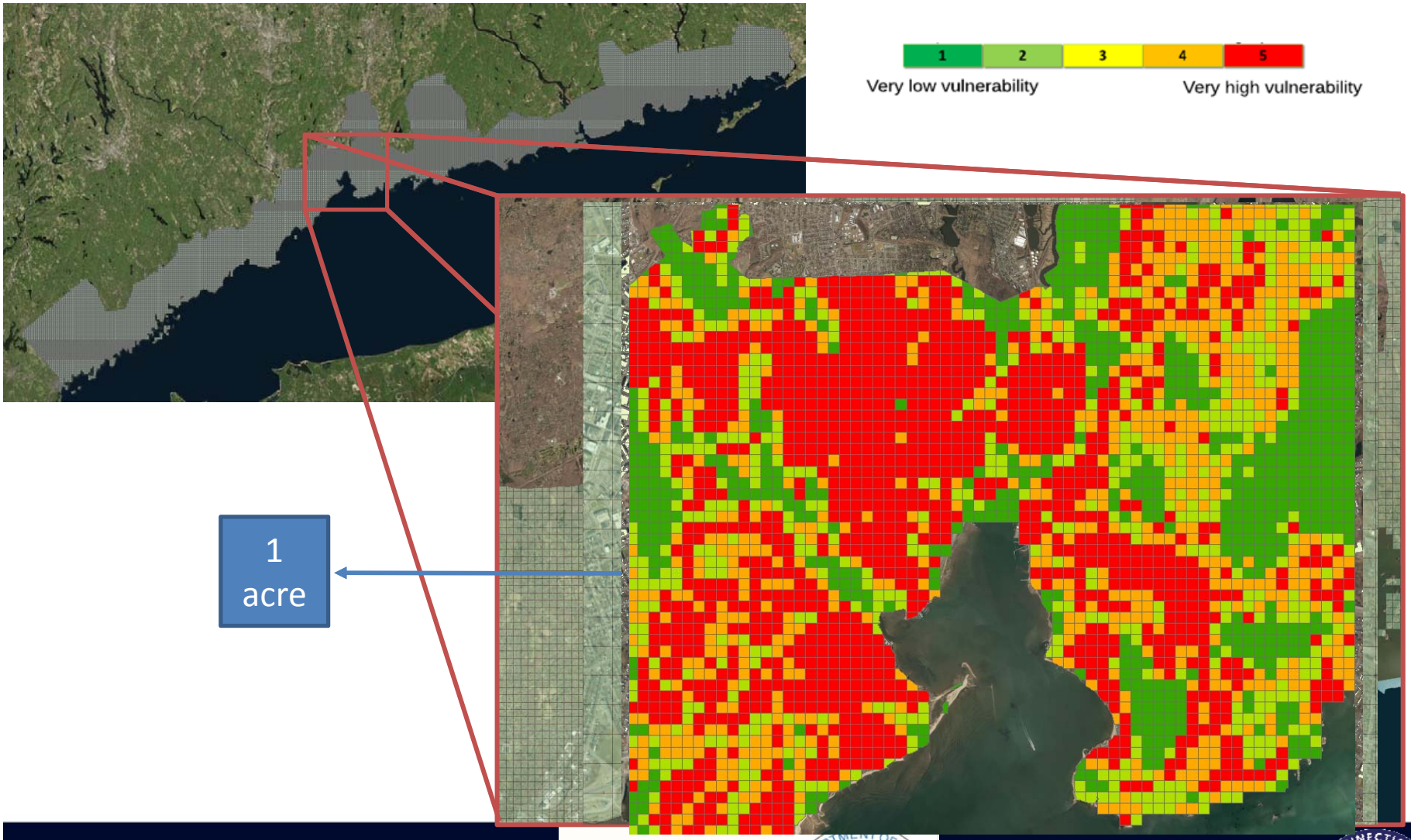
Design of Coastal Vulnerability Index



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CONNECTICUT ENERGY ENVIRONMENT

Stage 1: Statewide / CT Coast Towns

Vulnerability Assessment

Area of Interest

Connecticut

Assessment Type

- (•) Individual Layers
- ( ) Output Layers
- ( ) Overall

Select a Layer

Select an input layer to examine.

Aquifer Protection Ar

Base Layer

- (•) Satellite
- ( ) Street Map

Vulnerability Assessment

The vulnerability assessment can help you make real decisions. This is not really a description I can write right now, as I don't have the background knowledge. However, we can fill this in later.

Other Resources

Click on the links below to learn more.

- Methodology
- Sources

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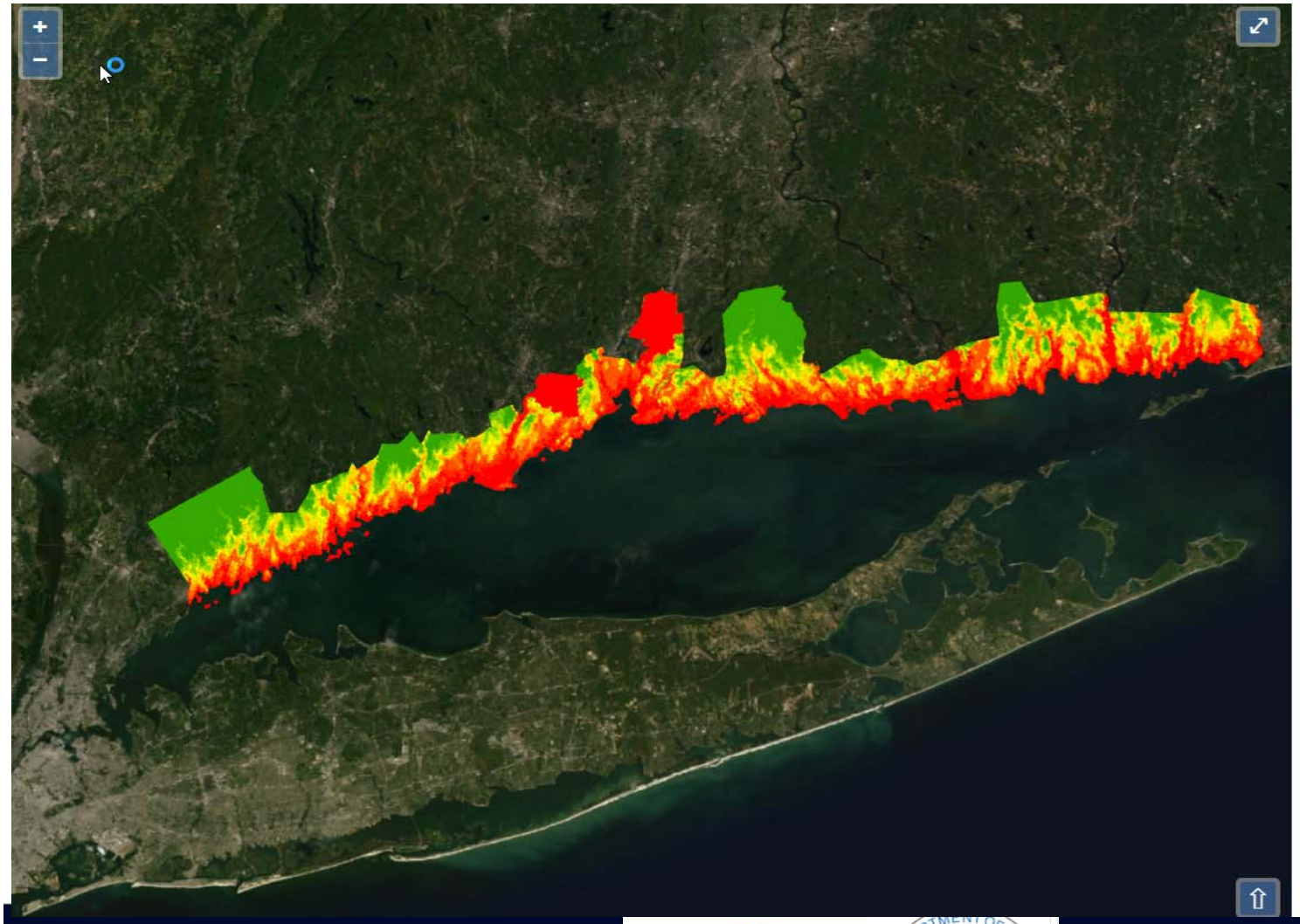
Connecticut Energy Environment

Stage 1: Statewide / CT Coast Towns

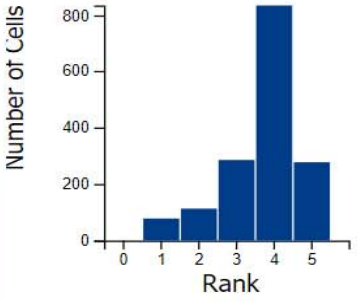


Back

Elevation

This data table defines the Connecticut coastal vulnerability given due to land elevation. The number of people have been divided in five categories: ranking from 1 (less vulnerable) to 5 (most vulnerable).

Selected Area Stats



Statistic	Value
Mean Rank	4.07
Standard Deviation	1.00
Min Rank	1.00
Max Rank	5.00
Data Cell Count	1588
Total Cell COunt	1588

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Stage 2: Regional/COG Analysis

Vulnerability Assessment

Area of Interest

South Central

Assessment Type

- (•) Individual Layers
- ( ) Output Layers
- ( ) Overall

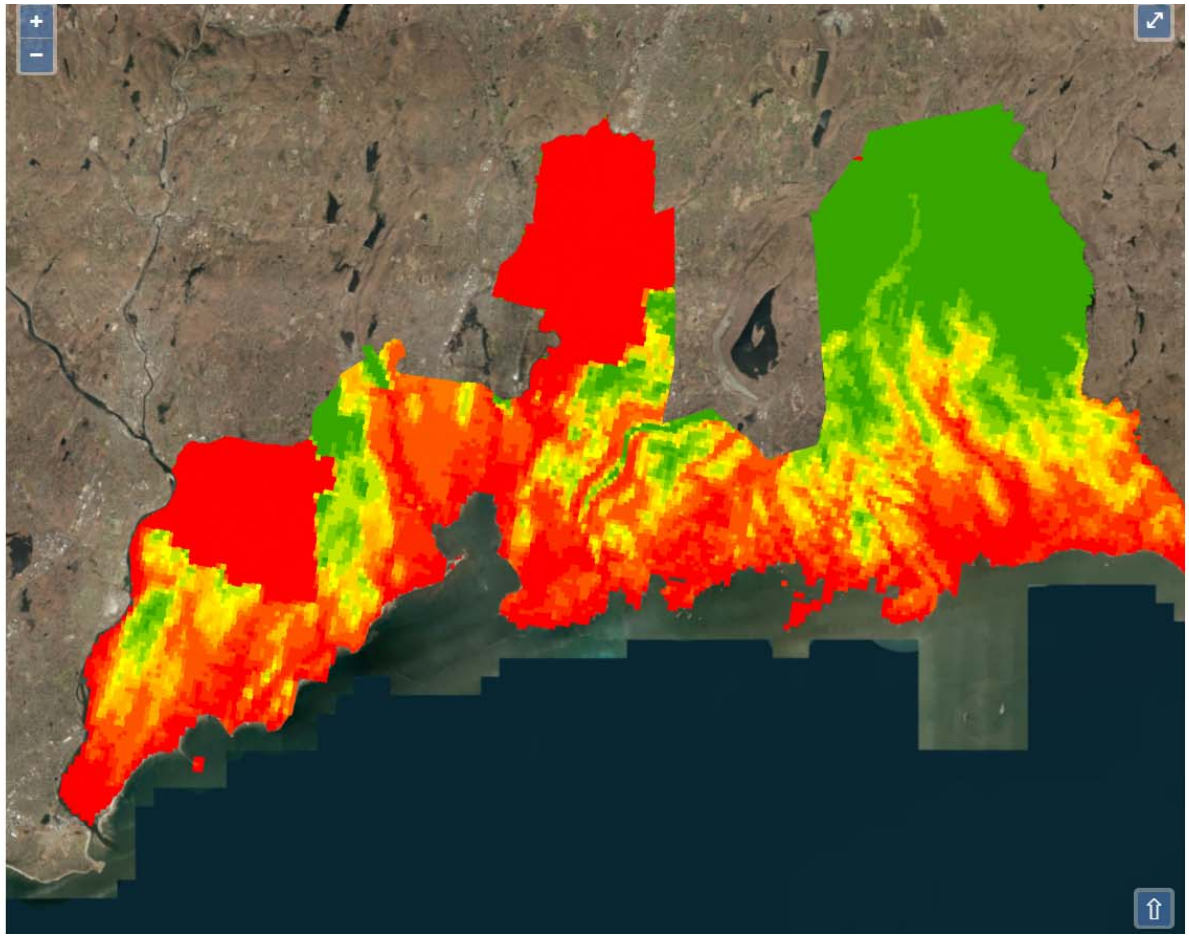
Select a Layer

Select an input layer to examine.

Elevation

Base Layer

- (•) Satellite
- ( ) Street Map



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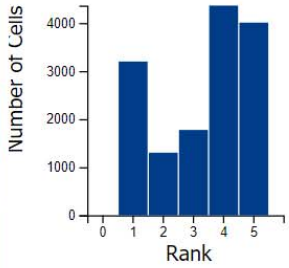

Statistic	Value
Mean Rank	3.55
Standard Deviation	1.54
Min Rank	1.00
Max Rank	5.00
Data Cell Count	14647
Total Cell COunt	14647

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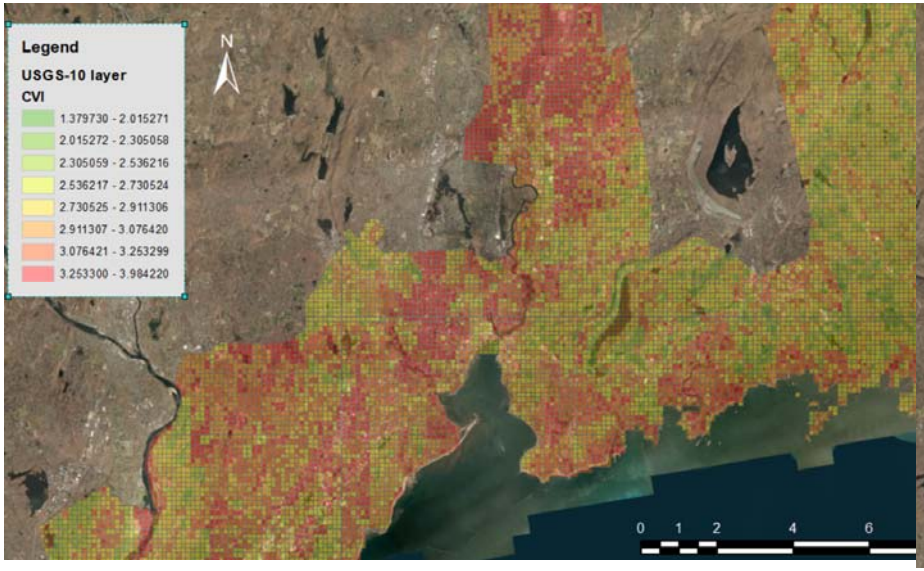
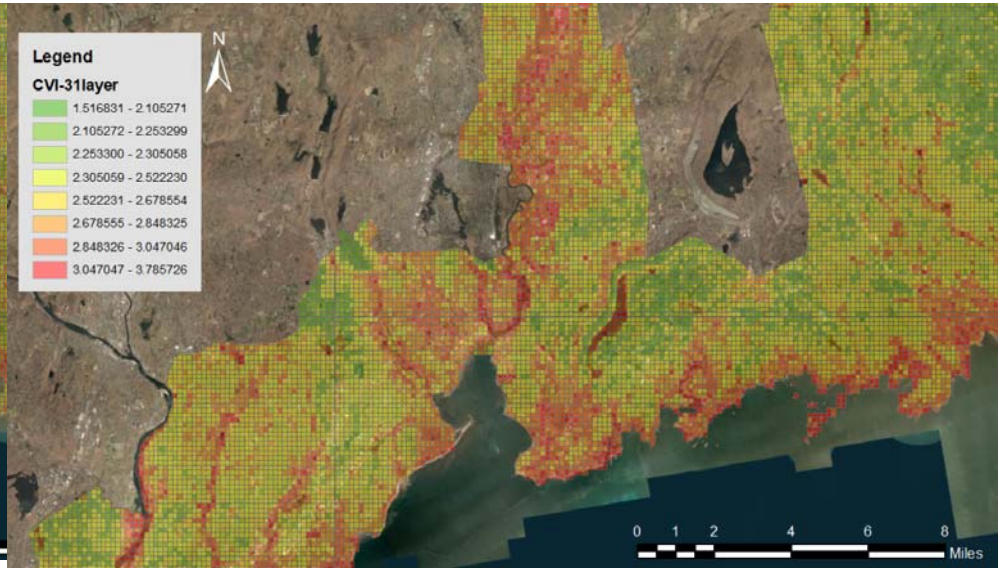
Stage 3: Town/Political Scale





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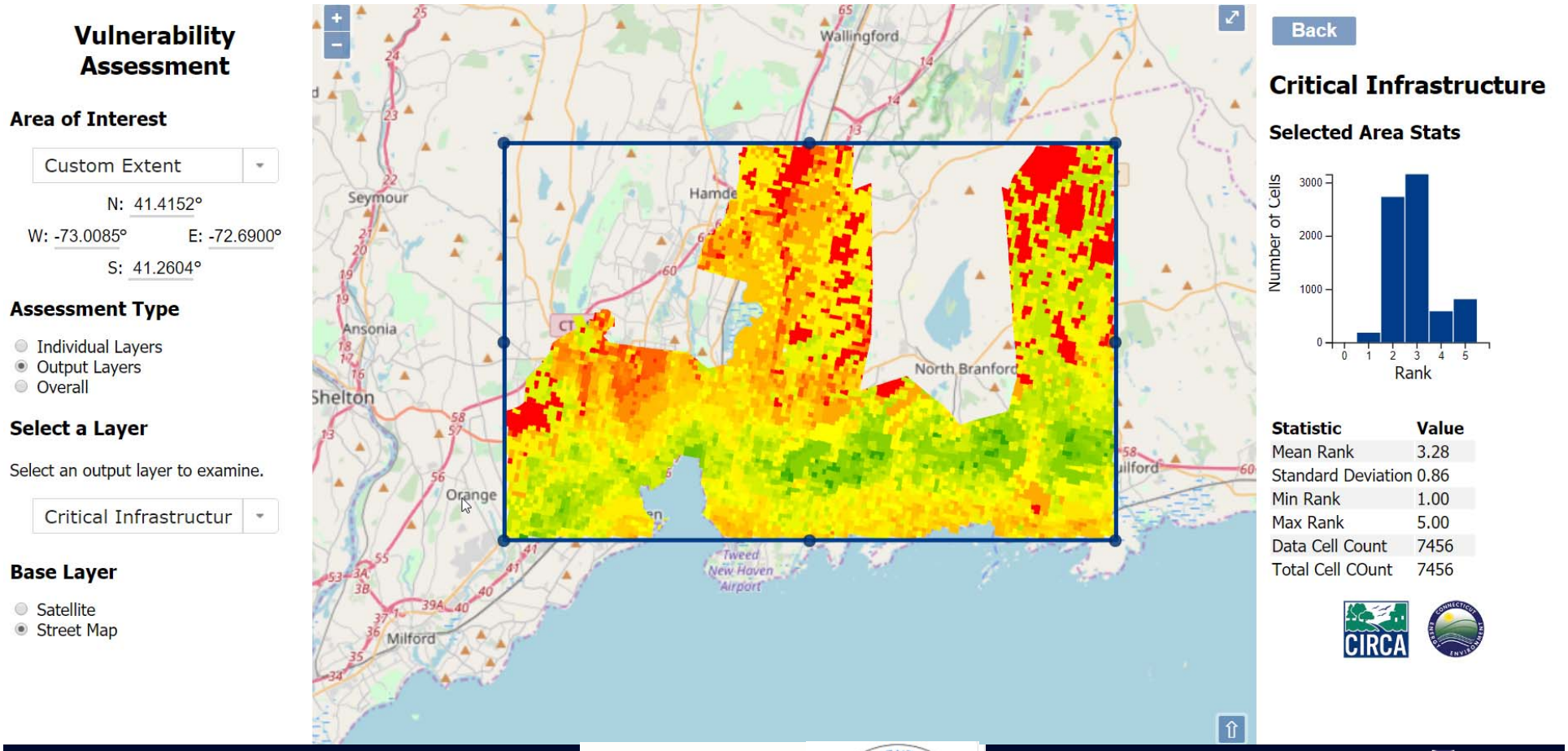
Stage 4: Customized/Weighted Analysis



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- Building it as a tool that is robust, customizable and multi-scale
- Improves the understanding of vulnerability and adaptive capacity.
- A tool for public engagement and builds awareness
- Informs & prioritizes projects to strategically allocate limited resources

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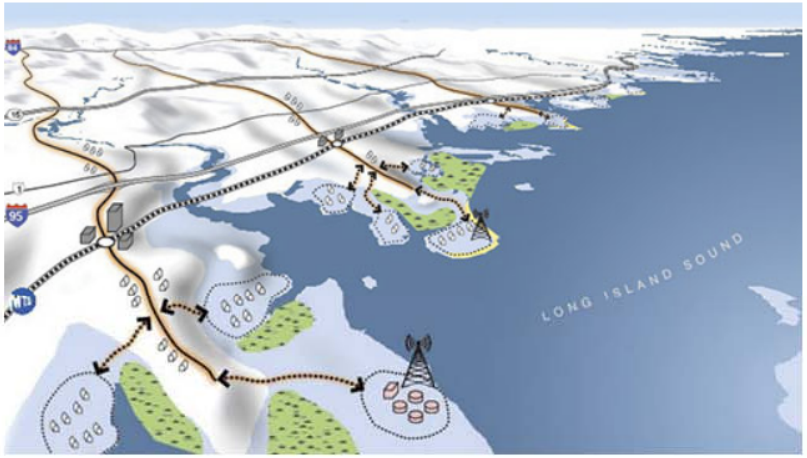
Resilient Connecticut Climate Adaptation Summit

Tuesday, November 12, 2019
9:00 am – 4:00 pm



Located at Fairfield University

Register by November 1, 2019

REGISTER NOW

Location Details

Please join CIRCA for the first annual Resilient Connecticut Summit. Commissioner Katie Dykes from Connecticut's Department of Energy and Environmental Protection will provide a welcome and Shaun O'Rourke, Rhode Island Chief Resiliency Officer will give a keynote address entitled, *Resilient Rhody: Building Climate Resilience in Rhode Island.*

WELCOME ADDRESS

Commissioner Katie Dykes from Connecticut's Department of Energy and Environmental Protection will provide a welcome.

KEYNOTE ADDRESS

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ENERGY ENVIRONMENT

Afternoon Breakout Session Topics:

Track Topics and Timing	1:30 - 2:30 (Session A)	2:45 – 3:45 (Session B)
Track 1 **Regional resilience planning**	Resilient Transit Oriented Development	Integrated Flood Risk Planning
Track 2 **Climate and public health**	Drinking Water Vulnerability	Climate and Health in Connecticut
Track 3 **Technical tool development**	Vulnerability Assessment Demonstration and Application	Zones of Shared Risk Charette

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