Ecosystem Services and Coastal Community Vulnerability

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Discussion Plan

- Overview of Vulnerability Assessment Approaches and Gaps Identification
- Conceptual Approach/Description of Methods
- Example Results
- Future Steps

Vulnerability Assessment Approaches

- Social Vulnerability Index (SoVI)
  - 29 demographic variables at county level (e.g., per capita income, median house value, percent poverty)
  - 27 at tract level
- Surging Seas
  - Mapping tool with social and economic vulnerability for selected areas
  - Economic vulnerability consisting of number of businesses, employees according to Census
  - Social vulnerability according to SoVI
- Coastal Vulnerability Index (Nature Conservancy)
  - Specific work conducted for Suffolk County, Long Island (southern shore)
  - Combines various tools (Coastal Vulnerability and Assessment Tool (CVAT), SoVI, HazUS (flood losses))
  - Generates a Community Vulnerability Index combining social vulnerability and Index of Critical Infrastructure and Facilities

Identified Gaps and Considerations

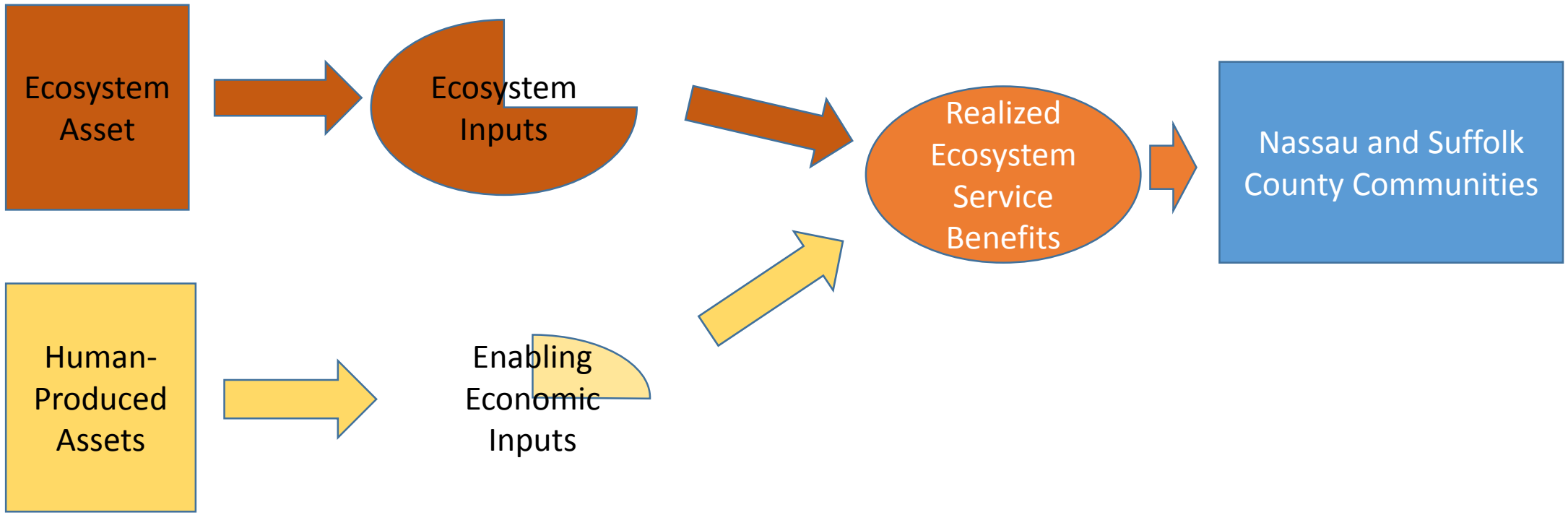
- Ecosystem service losses not included as characteristic of vulnerability
- Economies may rely on availability of and accessibility to ecosystem service flows
- Communities vary in concentration and type of economic and ecosystem assets
- Storms will affect both undeveloped land cover (impacting ecosystem asset) and developed land cover (impacting economic assets)

Research Objectives

- Characterize role of ecosystem assets and ecosystem services in community economic vulnerability
- Investigate interdependencies between economic assets and ecosystem assets
- Consider acute versus chronic impacts from community reliance on economic and ecosystem assets

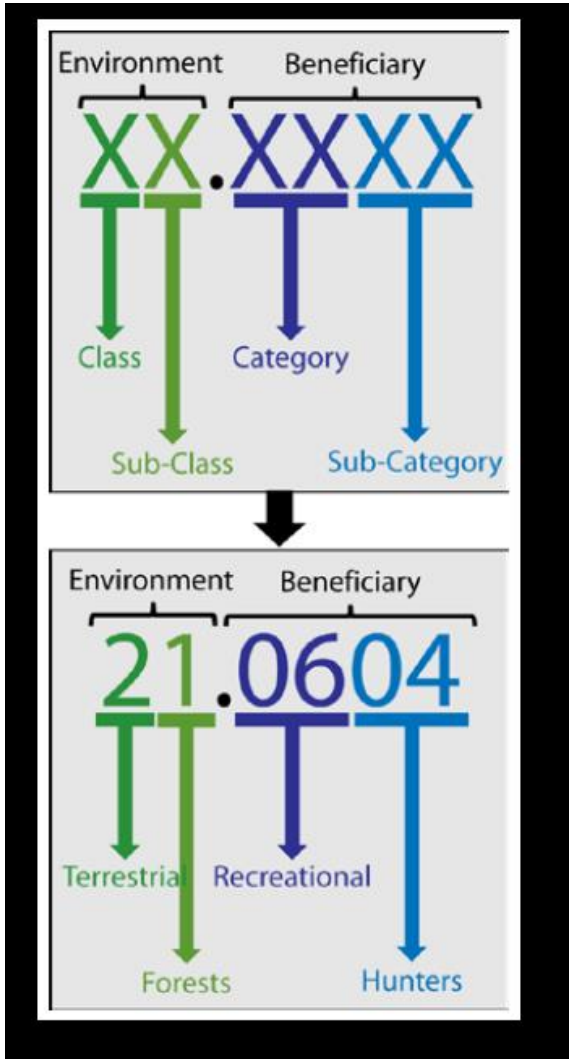
Study Location

Conceptual Framework



Identification of Potential Beneficiaries

- Used FEGS-CS accounting approach developed by USEPA
- Integrates land classification with user groups and potential ecosystem service flows
- Assists in determining type of “enabling” economic assets required



Land Classification/Beneficiary Matrix

	14. Estuaries and Near Coastal and Marine	26. Barren
Experiences and Viewers (.0601)	Presence of the environment Viewscapes Fauna Flora	Presence of the environment Viewscapes Fauna Flora
Anglers (.0604)	Fish	
Waders, Swimmers, Divers (.0605)	Presence of the environment Water	
Boaters (.0606)	Presence of the environment Water	
Resource-Dependent Businesses (.0206)	Presence of the Environment	Presence of the Environment

- What are economic assets involved in this interaction?

Economic Assets, Ecosystem Services, and Hazard Analysis

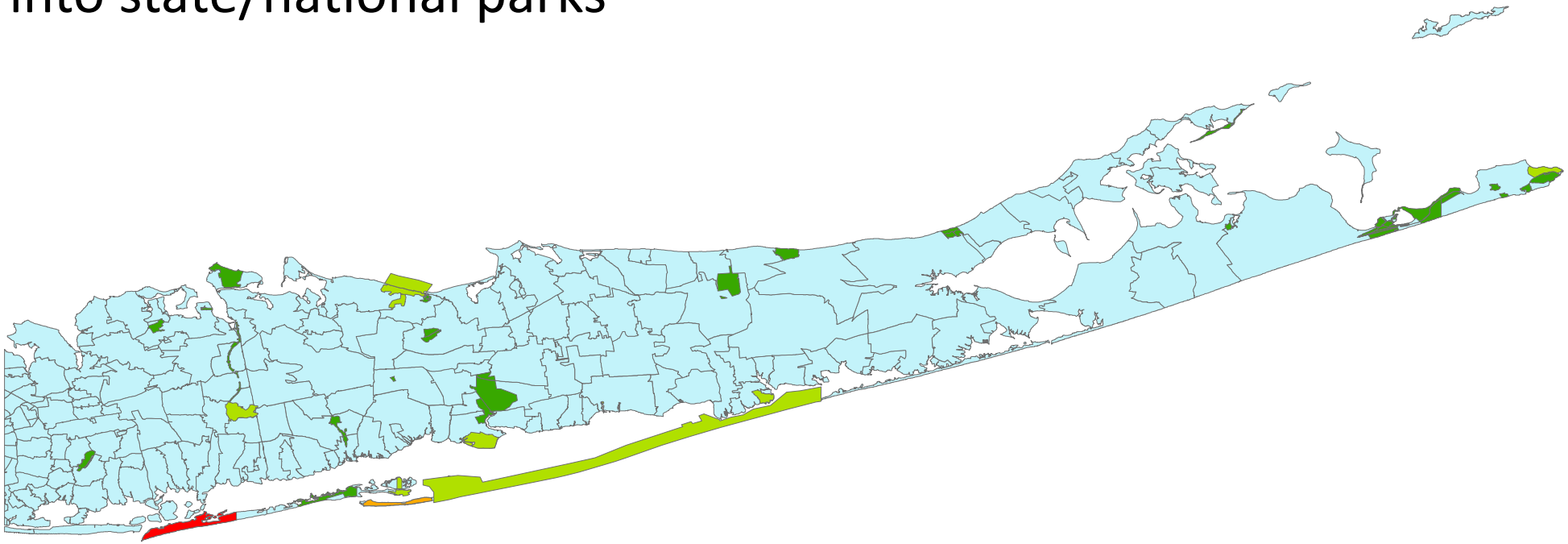
- Focused on two land cover classes
- Evaluation of link between enabling economic assets, environment that provides ecosystem service flow, and storm surge impacts
- First phase → evaluation of enabling economic assets
  - Boat ramps
  - Marinas
  - Accommodations
  - Retail establishments

Identification of Enabling Economic Assets

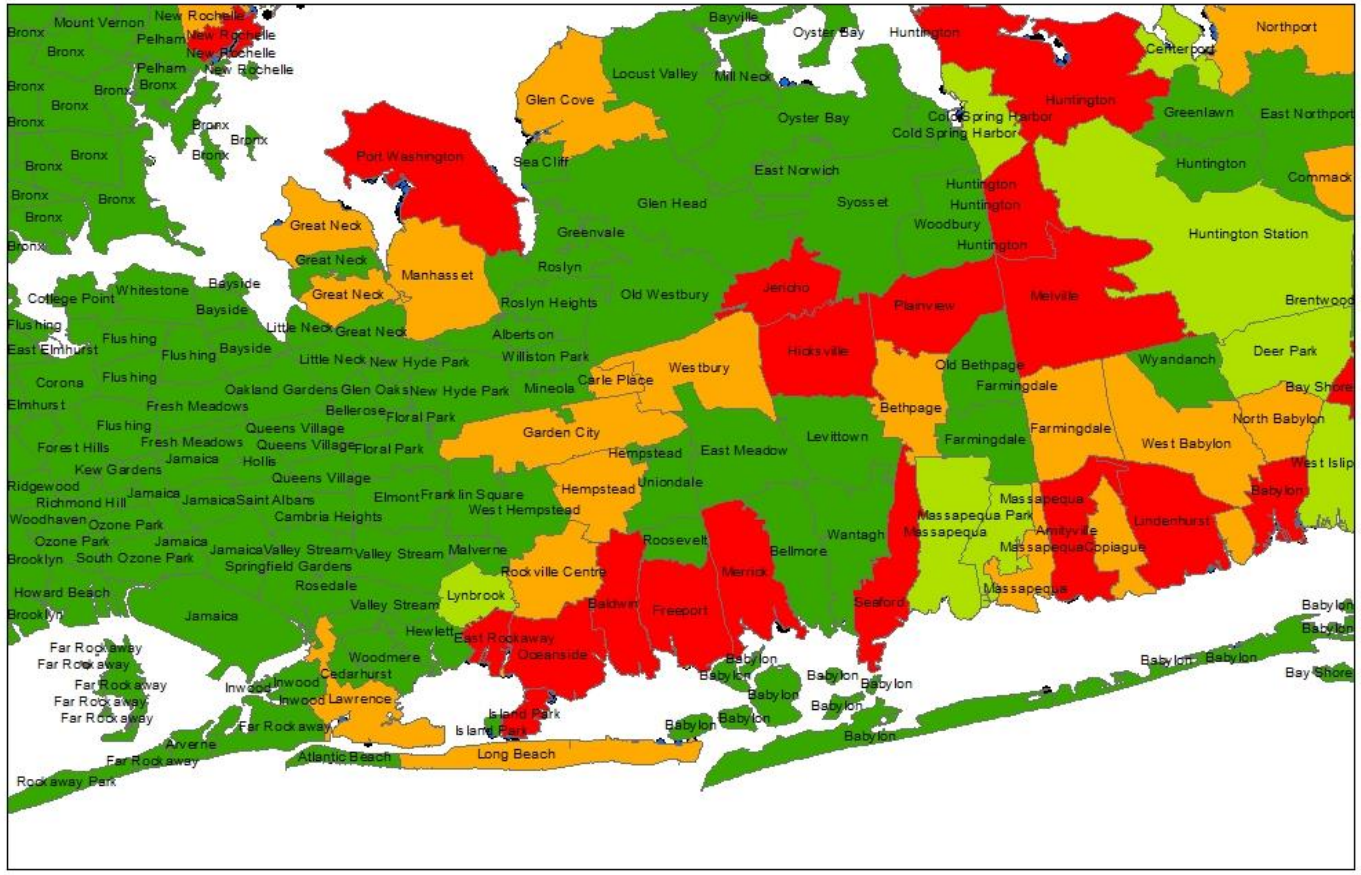
- NY Rising Community Reconstruction Program
  - NY Rising Community Reconstruction Plan process established in 45 communities
  - Plan included evaluation of community assets and vulnerabilities
  - Included identification of natural assets and economic assets
  - Plans available at stormrecovery.ny.gov
- Evaluation of similar assets across Nassau and Suffolk counties
- Are economic assets concentrated in specific communities?

Environmental Assets

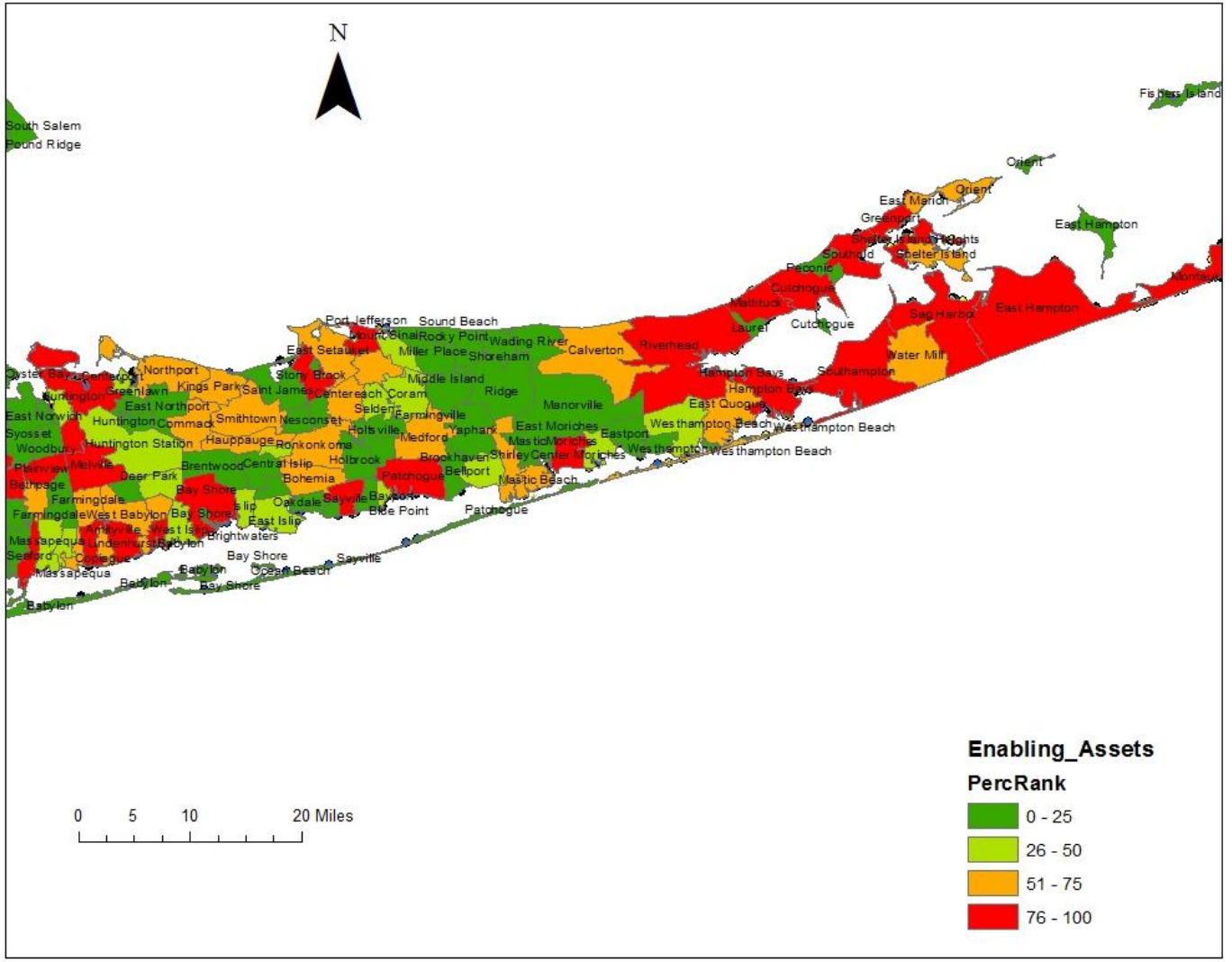
- Land cover types that are source of ecosystem services
- Example results: Barren land/beaches and forested areas organized into state/national parks



Nassau County Enabling Economic Assets



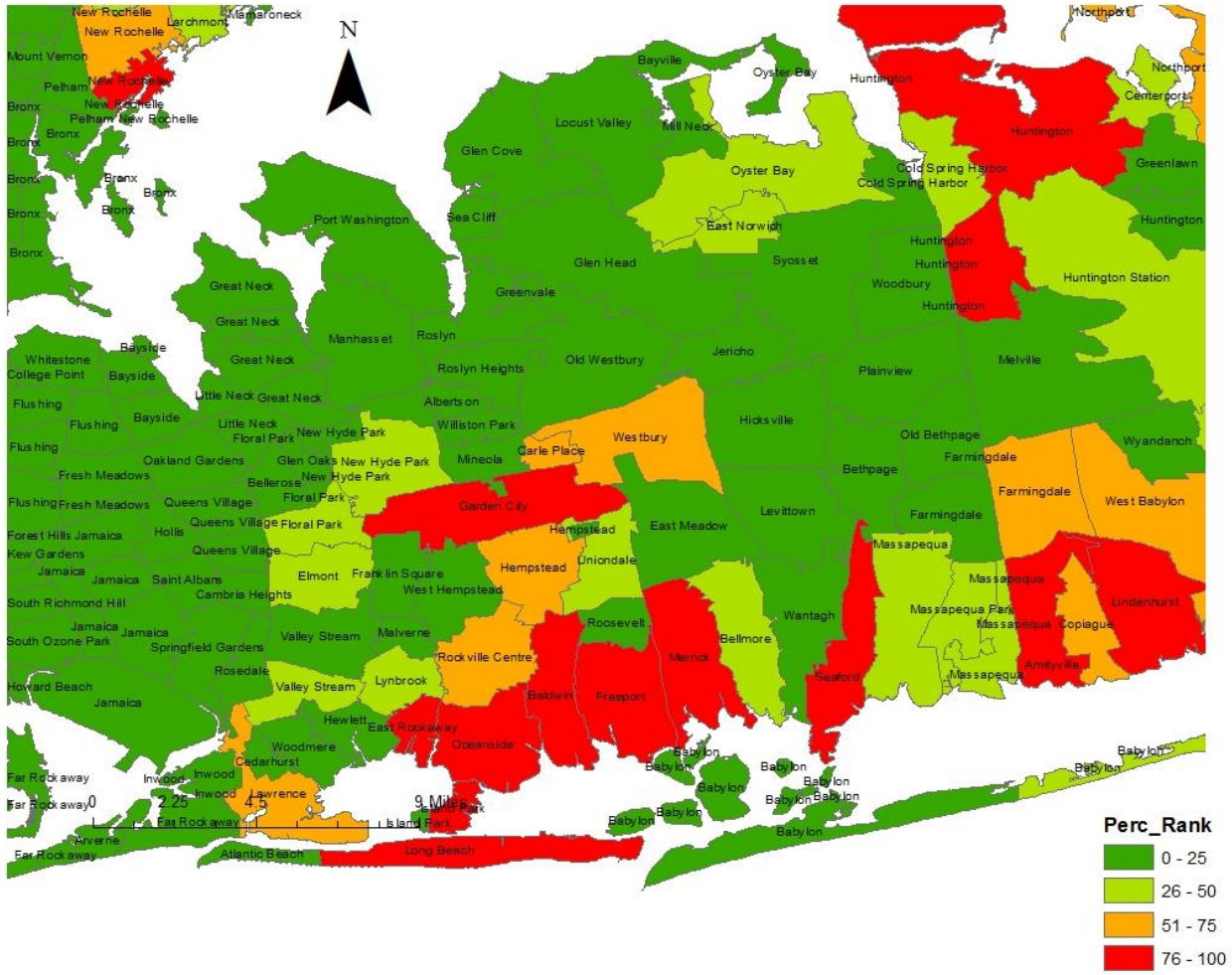
Suffolk County Enabling Economic Assets



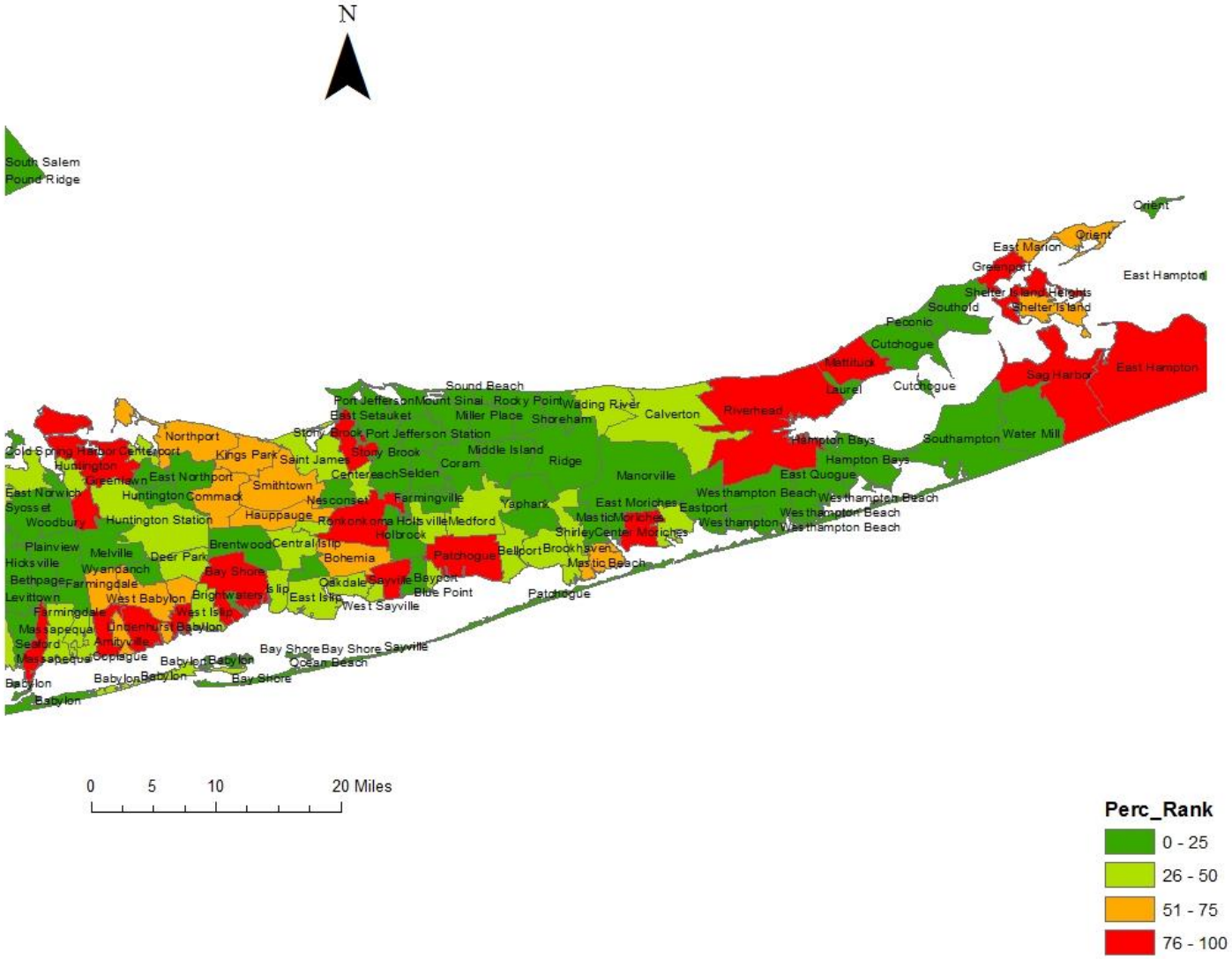
Applying Storm Scenario

- How does combination of storm surge and location of environmental assets potentially interrupt flow of ecosystem services?
- Selected environmental assets at risk from Category 3 storm surge
- Evaluated number of economic assets at zip code level within 5 miles of “at risk” environmental asset

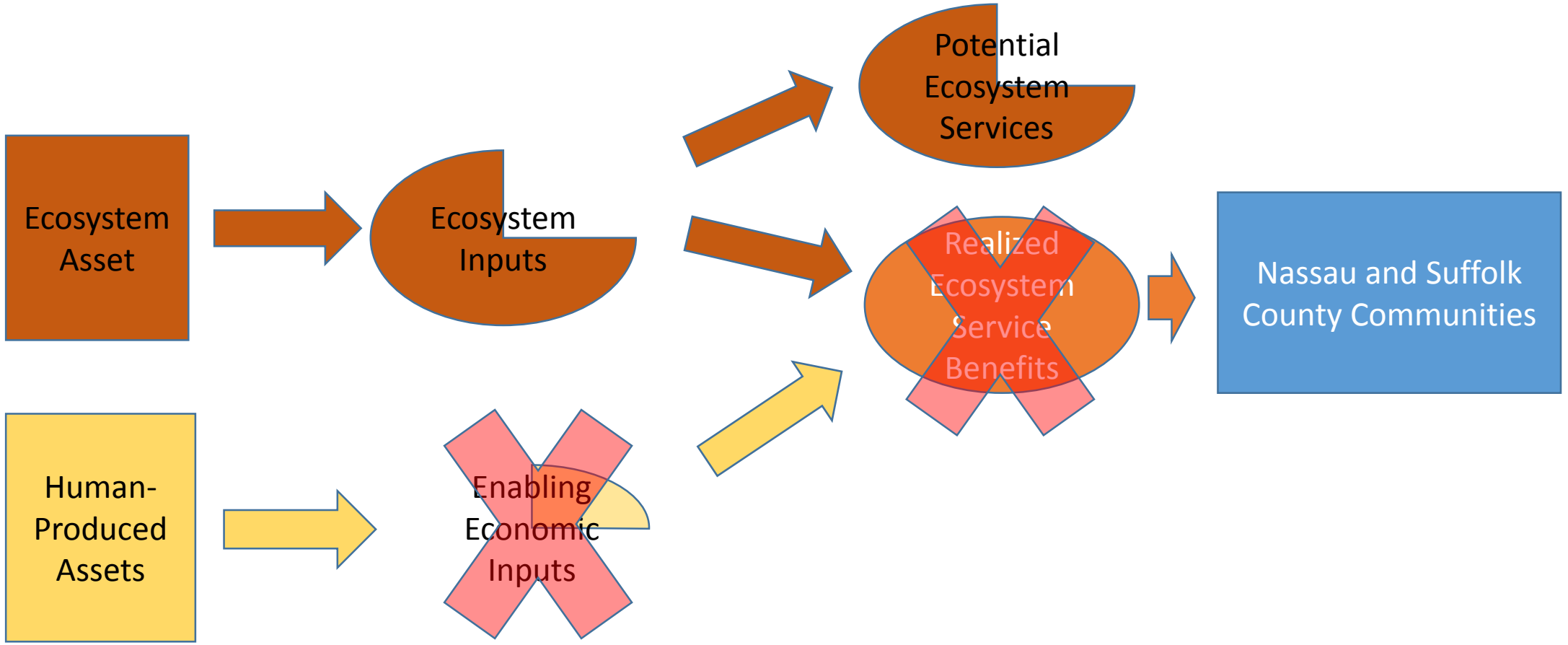
Nassau County – Parks, EEA, Storm Surge



Suffolk County – Parks, EEA, Storm Surge



Post-Storm Flows



Ecosystem Assets

- Second phase focuses on ecosystem asset
  - Changes in extent and condition of different land cover types after various storm scenarios
- Comparison of duration of impacts from losses of complementary assets
  - Time frame for rebuilding manmade assets
  - Options for restoring ecosystem assets (if feasible/desirable)
    - Beach nourishment?
    - Dune reconstruction?
  - Structural economic consequences of no intervention

Conclusions

- Economic assets associated with recreational use of ecosystem asset are clustered in certain zip codes/areas of Nassau and Suffolk Counties
  - Both ecosystem asset (extent and condition of land cover) and associated economic assets are at risk from storm surge
  - Some of these zip codes are also vulnerable according to other criteria (e.g., SoVI)
- Disruption of ecosystem service flows to (at least) two types of beneficiaries
  - Recreational users of various types
  - Resource-dependent businesses
- Provides an additional information layer for community resilience planning purposes

Future Steps

- Refine economic asset analysis based on NAICS data
- Valuation of service losses from disruption (tailored to each beneficiary category)
- Location of beneficiaries and assignment of indirect and direct vulnerability to communities
- Consideration of duration of loss for different asset categories

Questions?

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