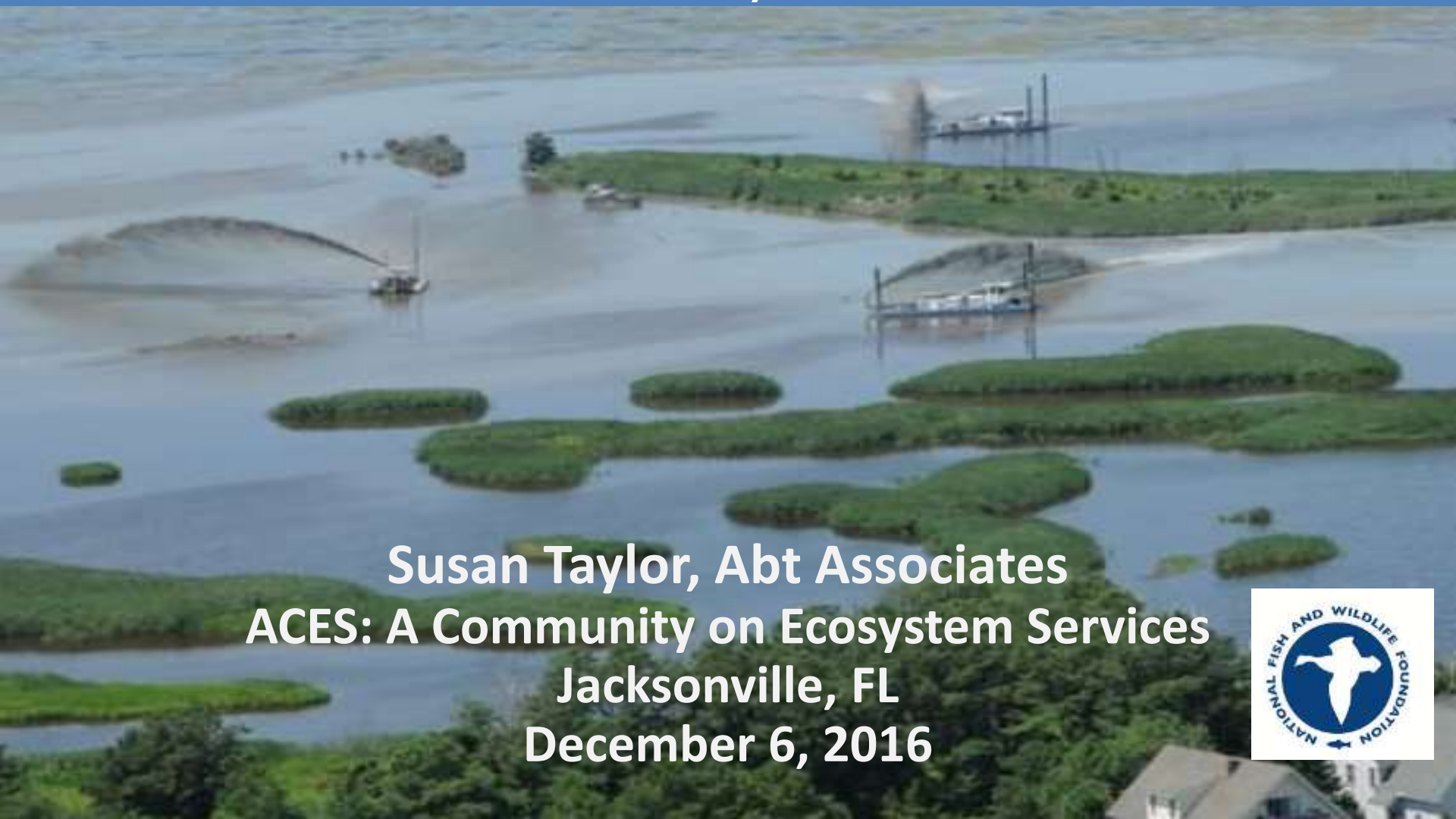




Developing and Using Socio-Economic Metrics to Measure Project Benefits and Ecosystem Services after Hurricane Sandy



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Measuring Success – Socio-Economic Metrics



- **Objective: Develop socio-economic metrics and assign to each project**
- Classify 167 projects (project activity, project outcome)
- Develop resilience framework to organize and assign metrics
- Identify methodologies and data for measures



Challenges

- *Lack of clear measures for change in resilience*
- *Far less work to date on social and economic benefits*



Resilience Framework



Project Types

- **Restoration Projects**
- **Community Planning**
- **Advance Understanding**



Resilience Categories

- **Human Health and Safety**
- **Physical Infrastructures**
- **Economic Resilience**
- **Community Competence and Empowerment**





Resilience Framework



Human Health and Safety: Reduced risks or threats of injury, casualty, or sickness related to flooding and environmental hazards

Property and Infrastructure Protection/Enhancement: Reduce the risk of impacts on the physical elements of a community

Community Competence and Empowerment: Improve resilience related-behavior of institutions, communities and individuals

Economic Resilience: Direct and indirect impact on the improvement in a community's economic sectors to withstand and recover from disasters



Resilience Framework & Metric Development



- Causal mapping to develop socio-economic metrics and link to ecological metrics
- *Resilience Goals* defined for each *Resilience Category* (e.g., Health & Human Safety)
 - *Reduce # ppl at risk for injury, causality, or other health effects from a flood event*
 - *Reduced # ppl at risk to negative effects from environmental hazards (contaminated water, soil, mosquito-borne disease, and wildfire)*





Metric Framework & Applicability



	Resilience Category	
	Resilience Goal 1	Resilience Goal 2
Outcome 1	<i>Metrics, increasing LOE</i>	
Outcome 2		
Outcome 3		
:		
:		

Metrics to measure success available by:

- Resilience goal
- Project Outcome
- Project Activity

Goal: Reduced risk from negative effects from environmental hazards → Outcome: Reduced soil contamination → Measure: reduction in # households exposed to toxic pollutant



Example: Prime Hook NWR



- *2 Project Activities:* Marsh Restoration & Beach/ Dune Restoration
- *Goals & Outcomes:*
 - Provide storm surge protection
 - Provide other ecosystem services for communities connected to the refuge
 - Develop BMPs
 - Ecotourism



Metric Assignment-*Marsh Restoration*





Socioeconomic Monitoring: Core Metrics



Health & Human Safety

- Households benefiting from reduced likelihood of West Nile Virus transmission
- Households with improved access to seafood
- Households in the area potentially affected by a project
- Households exposed to smoke and particulate matter
- Households exposed to water-borne disease
- Households exposed to risk of injury, casualty, or other health effects from a flood event
- Households exposed to risk of negative effects from contaminated water, soil, mosquito-borne disease, and wildfire

Property & Infrastructure Protection and Enhancement

- # of residential, commercial, cultural, and heritage properties benefiting from improvement
- # of properties exposed to flood event
- Reduction in total residential and commercial property value expected to be damaged in floods
- Reduction in miles of transportation infrastructure exposed to a flood event
- Reduction in # of users potentially affected due to exposed transportation infrastructure
- Reduction in # of critical service and utility facilities exposed to a flood event
- Reduction in # of users or customers potentially affected due to disruption of critical services or utilities



Socioeconomic Monitoring: Core Metrics



Community Competence & Empowerment

- # of partnerships
- Improved best practices transferred
- # of educational, outreach, and volunteer events
- # of rec. sites with new or improved amenities and access
- # of sites with enhanced activities/programs
- # of researchers, volunteers, and students engaged in project

Economic Resilience

- Avoided cost of beach re-nourishment/ navigational waterways dredging
- Number of businesses or tourism and recreational properties within project's vicinity
- # of commercial fishing/shellfishing permits holders affected by project
- # of recreational fishing/shellfishing sites and areas in project's vicinity
- # of recreational sites with new or improved amenities and accessibility
- # of recreational users living within distance of using the site
- # of related businesses affected
- % of local economic output affected
- Reduction in # of acres exposed to flood hazard or increased salinity
- Reduction in # of boat launches, warehouses, fishing vessels, and aquaculture leased bottom exposed to damage or disruption
- Reduction of % of local economic output potentially exposed to damage or disruption



Final Thoughts



- Scope of Sandy projects transferable
- Metrics developed and organized in framework that allows pick and choose, various level of efforts
- Metrics and methodologies being tested in ongoing evaluation



http://www.nfwf.org/hurricanesandy/Documents/DOI_NFWF_Hurricane_Sandy_Socio-Economic_Metrics_Report.pdf