A CONSERVATION INTERNATIONAL FILM

“...I covered this entire planet once.
I can always cover it again.”

HARRISON FORD IS
THE OCEAN

natureisspeaking.org

A CONSERVATION INTERNATIONAL FILM

“I have fed species greater than you.
And I have starved species greater than you.”

JULIA ROBERTS IS
MOTHER NATURE

natureisspeaking.org
Reviving Ecosystem Services While Supporting Communities: What the Social Sciences Can Teach Us About Coastal Habitat Restoration

SUSAN LOVELACE, PH.D.
SOUTH CAROLINA SEA GRANT CONSORTIUM
THE COASTAL SOCIETY
NOVEMBER 5, 2014
Agenda

Ecosystem Services as Support for Human Needs

Measuring Human and Community Needs

Learning from Integrated Research

Example Framework to assess restoration projects

Informing our choices
Changes in Ecosystem Services

Photo: NOAA
Well-being is a concept describing elements that constitute a good life. (MEA 2005; TEEB, 2010)

Health, as in personal safety or absence of disease, are both direct and indirect contributors to well-being (MEA, 2005) and are moderated by healthy oceans and coasts.

Healthy oceans and coasts support ecosystem services that contribute to well-being.
Monitoring Well-being and Changing Environmental Conditions in Coastal Communities

• NOAA National Centers for Coastal Ocean Science
• Assessing 9 indicators of well-being in 36 counties in the Gulf of Mexico and the SE Atlantic for three time-points between 2000-2009.
• Complex indicators, secondary data.

Dillard, Goedeke, Lovelace and Orthmeyer. 2013.
How does this inform our choices?

• Each community has different needs.
• Selecting projects that support weaknesses improves well-being.
Using the Social Values of Ecosystem Services in Managing Marine Protected Areas

NOAA National Centers for Coastal Ocean Science
Mission-Aransas National Estuarine Research Reserve
Using SolVES model (Sherrouse et al. 2012) to assess, map and quantify the values of the study respondents.

Loerzel, One NOAA Science Seminar October 2014
# Social Values of Services

<table>
<thead>
<tr>
<th>Wildlife or biodiversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation</td>
</tr>
<tr>
<td>Economic</td>
</tr>
<tr>
<td>Legacy</td>
</tr>
<tr>
<td>Socialization</td>
</tr>
<tr>
<td>Just because it’s here</td>
</tr>
</tbody>
</table>

*Rolston, & Coufal, 1991; Adapted by Lovelace and Loerzel, 2013*
SolVES in the Mission-Aransas NERR

- 186K acres in the Coastal Bend of Texas
- Non-regulatory
- Diverse activities
Surveys
- Targeted three groups
- Three collection methods
  - 251 completed surveys
  - Over 400 were partially completed

Social Values Allocation
- Spatial Aspects of Social Values
- Knowledge, attitudes and preferences

Summary

Aesthetics Points - 275 Total

Legend
- Aesthetics_Pts
- MA-NERR Boundary (modified)
A Spatial Analysis of Cultural Ecosystem Service Valuation by Regional Stakeholders in Florida

Florida Sea Grant

Using SolVES model (Sherrouse et al. 2012) to assess, map and quantify the values of the study respondents.


Now at UNC Greensboro, NC.
Sarasota Bay

Social Values
- Access
- Aesthetic
- Biodiversity
- Cultural
- Economic
- Future
- Historic
- Identity/Symbolic
- Intrinsic
- Learning
- Life Sustaining
- Recreation
- Spiritual
- Novel Experience
- Subsistence
- Therapeutic
- Wilderness

N=125

Study Area Final
Value Index

[Map images showing the distribution of recreation, aesthetic, and biodiversity values across the study area]
How does this inform our choices?

- Each community has different needs
- Selecting projects that support weaknesses improves well-being.
- People value different places for different reasons, this often corroborates how ecologists understand an area.
- Restoration projects that maintain or repair the ecosystem support for these values or that add to the values maintain culturally important ecosystem services.
Restoring Natural Barriers in Coastal South Carolina

ACE Basin National Estuarine Research Reserve
South Carolina Department of Natural Resources

Collaborative learning project engaging community leaders, nonprofits, and other stakeholders to identify priority oyster restoration sites within the ACE Basin.

Leffler, Keppler, Kingsley-Smith, Segars, Lovelace, Hadley 2013-14

Project reports can be found at: http://nerrs.noaa.gov/NSCIndex.aspx?ID=732
Stay in touch

The NERRS Science Collaborative is committed to sharing information about the projects we fund in the most effective way we can. Updates about this project will be communicated through nerrs.noaa.gov, webinars, conferences, and meetings. If you would like to stay in touch with this project, contact our program coordinator Cindy Tufts: cindy.tufts@unh.edu.

For information about the overall coordination of this project, contact John W. Lefler, ACE Basin NERR research coordinator, at 843.953.3923 or lefler@dnr.sc.gov.

For information about the applied science aspect of this project, contact Peter Kingsley-Smith, SC DNR Shellfish Research section manager, at 843.953.8840 or kingsley.smith@dnr.sc.gov.

For information about the collaborative aspect of this project, contact Blaek Pulley Keppler, ACE Basin NERR coastal training program coordinator, at 843.953.9024 or kepplerR@dnr.sc.gov.

What’s happening?

An interdisciplinary team led by South Carolina’s ACE Basin National Estuarine Research Reserve (NERR) has received a $585,622 grant to reduce coastal erosion, build community resiliency, improve water quality, and protect habitats through the creation of oyster reef-based living shorelines. The team will use the Collaborative Learning method to engage community leaders, nonprofits, and other stakeholders to identify priority oyster restoration sites within the ACE Basin, establish a project advisory committee, and recruit volunteers to help construct the reefs and monitor the success of the restoration efforts.

Why this project?

In South Carolina, the Eastern oyster is an ecosystem “all-star.” In addition to being a local delicacy, it filters water, creates habitat for other commercial and recreational fisheries, and plays an especially critical role as an “ecosystem engineer.”

The majority of Eastern oysters in South Carolina are intertidal and are exposed during low tide. This allows them to act as natural breakwaters that protect fringing marshes from wave action and erosion. Yet as the coast is developed, oyster reefs are lost or unable to populate disturbed areas, causing coastal erosion to accelerate. These impacts are especially apparent along the heavily trafficked Intracoastal Waterway and the state’s barrier islands, which protect the mainland from the Atlantic’s waves and storms. A potential increase in the frequency and intensity of storms and sea level rise due to climate change threatens to increase this erosion and place communities and habitats at further risk.

Widespread stakeholder concern about this issue has led South Carolina’s Department of Natural Resources (SC DNR) to launch several, highly successful Eastern oyster restoration projects that utilize scientific expertise to match the best restoration techniques to the unique habitat characteristics of specific sites. However, scarce resources have limited the impact of this work. In response to a wide range of interest groups who have expressed support, this project team aims to engage community support and contribute the scientific resources needed to bolster current Eastern oyster restoration efforts and protect the ACE Basin NERR’s coastal areas that are the most valued by the community and that need it most.

Learn more on back page...
- Water quality
- Erosion control
  - Substrate & wave action
  - High success rate
  - Diversity of sites
  - Adjacent to development
- Public vs. private land
- High human activity
  - Visible & accessible to public
- Areas that benefit Other Wharf
  - High point of interest
<table>
<thead>
<tr>
<th>Rank</th>
<th>Priority</th>
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<tr>
<td>1</td>
<td>Erosion Control</td>
</tr>
<tr>
<td>2</td>
<td>Water Quality</td>
</tr>
<tr>
<td>3</td>
<td>Accessible to Public</td>
</tr>
<tr>
<td>4</td>
<td>Benefit other Wildlife</td>
</tr>
</tbody>
</table>

Photo: SCDNR
All Photos: SCDNR
Well-Being from the Noisette Creek Saltmarsh Restoration in North Charleston, South Carolina

• Determine community perceptions of changes in ecosystem services from the restoration of Noisette Creek saltmarsh in North Charleston, South Carolina

• Potential impacts of restoring Noisette Creek ecosystems on human well-being Complex indicators, secondary data.

Robert Crimian, Masters of Environmental Studies
College of Charleston and NOAA Hollings Marine Laboratory

Currently: Coast and Ocean Partnership Coordinator, TNC
Summary

• ZCTA level social, economic, and health indicators
• Three focus groups and 25 q-sorts, using 24 paired statements inspired by focus group data

• Focus group data showed seven main themes, the most prevalent being access to the creek, sense of community, and awareness of the condition

• Three factors representing three discourses; awareness, ecosystem services, and community, emerged from the 25 q-sorts,
How does this inform our choices?

- Each community has different needs.
- Selecting projects that support weaknesses improves well-being.
- People value different places for different reasons, this often collaborates how ecologists understand an area.
- Restoration projects that maintain or repair the ecosystem support for these values or that add to the values maintain culturally important ecosystem services.
- Collaborating with the local community may provide a cultural context, important criteria, for restoration needs and locations.
- Understanding the community needs helps restoration specialists understand local community support or lack of support, and the needs for achieving community restoration associated with place.
Ecological and Societal Benefits Derived from Coastal Restoration in Southern Louisiana

Developed a method for determining which kinds of projects will most likely enhance the socioeconomic conditions of the Southern Louisiana region through physical improvement of the habitat.

Lowell Atkinson, dual Master degrees in Environmental Studies and Public Administration
College of Charleston and NOAA Hollings Marine Laboratory

Currently: South Carolina Association for Community Economic Development
Summary

• Collection, and development of a Restoration Evaluation Framework
  • Restoration Project Evaluation Matrix
  • Restoration Regime Scoring Matrix.
• Selection of the restoration projects was based on
  • funding sources,
  • geographic boundaries,
  • restoration method (dredged material placement, diversion, and artificial oyster reef), and project status
• Calculated quantitative provision estimates for ecosystem services
• Qualitative assessment was conducted to describe each project's impact on a suite of 25 ecosystem services largely agreed to constitute provisioning, regulating, supporting, and cultural benefits derived from ecological systems
Regulating services enhanced by Grand Isle and St. Bernard marsh

<table>
<thead>
<tr>
<th>Regulating Services</th>
<th>Ecosystem Function/Process</th>
<th>Number of Services</th>
<th>Short-term Benefit</th>
<th>Long-term Benefit</th>
<th>Level of Service (quantitative estimates)</th>
<th>Ecosystem Function/Process</th>
<th>Number of Services</th>
<th>Short-term Benefit</th>
<th>Long-term Benefit</th>
<th>Level of Service (quantitative estimates)</th>
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<tr>
<td>Gas regulation</td>
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<tr>
<td>Climate regulation</td>
<td>Storage and burial of organic Carbon</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>low</td>
<td>Storage and burial of organic Carbon</td>
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<td>+</td>
<td>+</td>
<td>medium</td>
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<tr>
<td>Disturbance regulation</td>
<td>Shoreline protection and stabilization</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>low</td>
<td>Shoreline protection and stabilization</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>medium</td>
</tr>
<tr>
<td>Biological regulation</td>
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<tr>
<td>Water regulation</td>
<td>Water quality for potable uses</td>
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<td></td>
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<td>Water quality for potable uses</td>
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<tr>
<td>Waste regulation</td>
<td>Water quality for non-potable uses</td>
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<td>+</td>
<td>+</td>
<td>low</td>
<td>Water quality for non-potable uses</td>
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<td>+</td>
<td>+</td>
<td>medium</td>
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<tr>
<td>Soil retention</td>
<td>Erosion control and sediment stabilization</td>
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<td>+</td>
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<td></td>
<td>Erosion control and sediment stabilization</td>
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<td>+</td>
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<tr>
<td>Totals</td>
<td></td>
<td>5 +</td>
<td>4 +</td>
<td>4 +</td>
<td></td>
<td>5 +</td>
<td>4 +</td>
<td>4 +</td>
<td></td>
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</tr>
<tr>
<td>Supporting Services</td>
<td>Ecosystem Function/Process</td>
<td>Bayou Dupont</td>
<td>Fort St. Philip</td>
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<td></td>
<td>Number of Services</td>
<td>Short-term Benefit</td>
<td>Long-term Benefit</td>
<td>Number of Services</td>
<td>Short-term Benefit</td>
<td>Long-term Benefit</td>
<td>Level of Service (quantitative estimates)</td>
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<td>Nutrient cycling</td>
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<td>Nutrient cycling</td>
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<td>+</td>
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<td>product productivity</td>
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<tr>
<td>Pollination and seed dispersal</td>
<td>Movement of plant genes via animals, wind, and water</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Habitat</td>
<td>Habitat provision/ biodiversity</td>
<td>+</td>
<td>+</td>
<td>Habitat provision/ biodiversity</td>
<td>+</td>
<td>+</td>
<td>medium</td>
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<tr>
<td>Hydrological cycle</td>
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<td>Hydrological cycle</td>
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<td>Totals</td>
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<td>4+</td>
<td>4+</td>
<td>4+</td>
<td>2+</td>
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### Restoration Regime Scoring Matrix

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<tr>
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<td>X</td>
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<tr>
<td>Basic Needs</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>Health</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Good Social Relations</td>
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<tr>
<td>Regulating</td>
<td></td>
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<tr>
<td>Security</td>
<td>X</td>
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</tr>
<tr>
<td>Basic Needs</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Health</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Good Social Relations</td>
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<tr>
<td>Cultural</td>
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<tr>
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<td>Basic Needs</td>
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<tr>
<td>Health</td>
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<tr>
<td>Good Social Relations</td>
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<tr>
<td>Supporting</td>
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<tr>
<td>Security</td>
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<td>Basic Needs</td>
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<td>Health</td>
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<td>Good Social Relations</td>
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<td>Total</td>
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<td>Total Scores</td>
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</table>

#### Comparison of projects based on costs, jobs created, wetland benefit, and O&M

<table>
<thead>
<tr>
<th></th>
<th>Bayou Dupont (BA-39)</th>
<th>Fort St. Philip (BS-11)</th>
<th>Grand Isle and St. Bernard marsh (TNC reefs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Costs</td>
<td>$28,881,365</td>
<td>$3,153,859</td>
<td>$4,280,956</td>
</tr>
<tr>
<td>Wetland Benefit (20 years)</td>
<td>233 hectares</td>
<td>110 hectares</td>
<td>134 hectares</td>
</tr>
<tr>
<td>Cost per hectare</td>
<td>$123,954 per hectare</td>
<td>$28,671 per hectare</td>
<td>$31,947 per hectare</td>
</tr>
<tr>
<td>Jobs Created</td>
<td>not available</td>
<td>not available</td>
<td>58</td>
</tr>
<tr>
<td>Operation &amp; Maintenance (O&amp;M)</td>
<td>Minimal</td>
<td>Required</td>
<td>Minimal</td>
</tr>
<tr>
<td>Description</td>
<td>no structural</td>
<td>redredging of crevasse channels every five years according to Monitoring and Annual Inspection Reports</td>
<td>only in the event of a storm or hurricane that damages or destroys the anchoring mechanism or Reefolk unit</td>
</tr>
</tbody>
</table>

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*Note: The table and text were extracted from a document discussing restoration regimes and their impact on various dimensions of well-being and ecological projects.*
How does this inform our choices?

- **Each community has different needs**
- **Selecting projects that support weaknesses improves well-being.**
- **People value different places for different reasons, this often collaborates how ecologists understand an area.**
- **Restoration projects that maintain or repair the ecosystem support for these values or that add to the values maintain culturally important ecosystem services.**
- **Collaborating with the local community may provide a cultural context, important criteria, for restoration needs and locations.**
- **Understanding the community needs helps restoration specialists understand local community support or lack of support, and the needs for achieving community restoration associated with place.**
- **Identifying community and individual needs may provide a way to assess and prioritize choices in restoration.**
How does this inform our choices?

- **Each community has different needs.**
- **Selecting projects that support weaknesses improves well-being.**
- **People value different places for different reasons, this often collaborates how ecologists understand an area.**
- **Restoration projects that maintain or repair the ecosystem support for these values or that add to the values maintain culturally important ecosystem services.**
- **Collaborating with the local community may provide a cultural context, important criteria, for restoration needs and locations.**
- **Understanding the community needs helps restoration specialists understand local community support or lack of support, and the needs for achieving community restoration associated with place.**
- **Using community and individual needs may provide a way to assess and prioritize choices in restoration practices so**


