INCORPORATING LOCAL KNOWLEDGE INTO ECOLOGICAL
RESTORATION ASSESSMENTS:
CASE STUDIES FROM COASTAL LOUISIANA

National Conference on Ecosystem Restoration
New Orleans, LA
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THE WATER INSTITUTE
OF THE GULF®
INCORPORATING LOCAL KNOWLEDGE INTO ECOLOGICAL RESTORATION ASSESSMENTS

- Ecological restoration and other activities that interact with environmental systems have typically relied on scientific analysis to predict the impacts of these projects, and have operated on the assumption that good science could reveal and remedy potential problems.

- Because environmental management is fundamentally a human activity, however, effective predictions of human impacts demand equal attention to the social, political, cultural, and economic systems in which environmental management takes place.

- Ultimately, for coastal protection and restoration to proceed in a socially just manner, the coastal planning process will need to strike an effective balance between science-driven processes and engagement with residents and stakeholder groups who are especially vulnerable to risk as well as those who are likely to be affected by policy actions.
INCORPORATING LOCAL KNOWLEDGE INTO ECOLOGICAL RESTORATION ASSESSMENTS

Methodological advances that allow for the input of qualitative local knowledge into mathematical models have provided tangible ways to evaluate potential shortcomings of ongoing and planned restoration and protection projects.

- Understanding Where and Why Ecological Restoration Matters – Utilizing Participatory Mapping Techniques
- Understanding What Changes – Locally Grounded Valuation Techniques
- Working with Competency Groups to Develop Natural and Nature-based Defense Assessment and Solution Tools
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UNDERSTANDING WHERE AND WHY ECOLOGICAL RESTORATION MATTERS – UTILIZING PARTICIPATORY MAPPING TECHNIQUES

Goal:
• To assess the capacity of ecosystem based approaches to provide additional non-structural protection to enhance resilience in some of Louisiana’s most vulnerable coastal communities.

Activities:
• Gather and disseminate data on the ecological and cultural function of coastal ecosystems through community and science-based workshops.

Product:
• Producing graphics and informative brochures for the wider public on the value of ecosystems services for enhancing coastal resilience
In spring 2016, the Water Institute hosted several community mapping workshops in Delcambre and St. Bernard, LA. We asked residents to geographically identify and evaluate places of ecological, cultural, economic, and protective significance. Workshops will address what residents feel is under threat, and how coastal ecosystems can increase resilience of coastal communities. Qualitative and geospatial data were integrated with findings from the October 2015 workshops to create the final report and booklet.
Site selection criteria

- Two different coastal ecosystem transects – Vermillion/Iberia and St. Bernard Parishes
- Places that encompass significant economic and cultural diversity
- Communities that largely reside outside of structural flood and storm surge protection projects
- Areas that potentially benefit from the protection services ecosystems can provide

Methods

- Collaboration with community leaders to invite participants and host workshops
- Participatory mapping with a demographic cross-section of coastal communities
- Comparative coastal case studies
- Qualitative coding and analysis of mapping practices and discussions from workshops
- Peer review of findings and draft publications with community leaders and representatives
Workshop Approach

- Conducting research in place, where the community members are
- The public was invited to identify locations of value, threat, and restoration potential, both regionally and locally
- Water Institute staff were on hand to interview and speak with residents about the locations they identified
- Information was gathered on the respondent’s age, occupation, and zip code
UNDERSTANDING WHERE AND WHY ECOLOGICAL RESTORATION MATTERS – UTILIZING PARTICIPATORY MAPPING TECHNIQUES

“Sometimes we go fishing or boating around in Vermilion Bay...you eat the fish that folks come in with...shrimping, crabbing....in the Intracoastal we get a lot of travelers and they stop in Delcambre as a destination...we get people from all over...tourism and ecotourism....”
Delcambre workshop participant, April 2016

COMMUNITY IDENTIFIED PLACES OF VALUE
DELCAMBRE, LOUISIANA
UNDERSTANDING WHERE AND WHY ECOLOGICAL
RESTORATION MATTERS – UTILIZING PARTICIPATORY
MAPPING TECHNIQUES

COMMUNITY IDENTIFIED PLACES OF VALUE
SAINT BERNARD, LOUISIANA

“My great-grandpa owned all of Woodland...I own 80 acres here but it's 80 acres of water now...it was wetlands where my grandpa trapped and had a grocery store, bar room, and a seafood dock...right here.”

St. Bernard workshop participant, May 2016
UNDERSTANDING WHERE AND WHY ECOLOGICAL RESTORATION MATTERS – UTILIZING PARTICIPATORY MAPPING TECHNIQUES

COMMUNITY IDENTIFIED THREATS AND CHALLENGES
DELCAMBRE, LOUISIANA

"Storm surge comes up Bayou Tigre and up the canal and up and down the town roads. Rita was a tidal wave. Ike was a gradual rise. I remember picking up people on roofs, and the next day I took pictures with the National Guard who flew over. Afterwards I couldn’t talk..."

Delcambre workshop participant, April 2016

TOP 5 LOCATIONS OF CONCERN

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>FREQUENCY</th>
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<tbody>
<tr>
<td>Local bayous and canals</td>
<td>23</td>
</tr>
<tr>
<td>Area schools</td>
<td>19</td>
</tr>
<tr>
<td>Vermilion Bay</td>
<td>15</td>
</tr>
<tr>
<td>Town of Delcambre &amp; Port of Delcambre</td>
<td>14</td>
</tr>
<tr>
<td>Avery and Jefferson Islands</td>
<td>6</td>
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</table>
UNDERSTANDING WHERE AND WHY ECOLOGICAL RESTORATION MATTERS – UTILIZING PARTICIPATORY MAPPING TECHNIQUES

COMMUNITY IDENTIFIED THREATS AND CHALLENGES
SAINT BERNARD, LOUISIANA

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<tr>
<td>Fishing villages</td>
<td>29</td>
</tr>
<tr>
<td>Bistrol/Chandeleur Sound</td>
<td>23</td>
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<tr>
<td>Coosayevon</td>
<td>14</td>
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<tr>
<td>Lake Iery + Big Mar</td>
<td>13</td>
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<tr>
<td>MRGO</td>
<td>12</td>
</tr>
<tr>
<td>Bayou La Louvre + Bayou Terre Aux Boisuls</td>
<td>11</td>
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“I shrimp for a living. And I shrimp out here where there are times when I don’t even get a slack tide and the reason for that is because we lost all these little islands [Chandeleur Islands] and the tide just doesn’t slow down...it just comes in and goes back out...we don’t get a slack tide in the bayou.”

St. Bernard workshop participant, May 2016
UNDERSTANDING WHERE AND WHY ECOLOGICAL RESTORATION MATTERS – UTILIZING PARTICIPATORY MAPPING TECHNIQUES

SYNTHESIS AND REPORTING
UNDERSTANDING WHERE AND WHY ECOLOGICAL RESTORATION MATTERS – UTILIZING PARTICIPATORY MAPPING TECHNIQUES

FORESTED WETLANDS

SYNTHESIS AND REPORTING

HOW CAN RESTORATION HELP BUILD COMMUNITY RESILIENCE?

A community perspective. The restoration and maintenance of natural wetlands provides valuable stormwater and wildlife protection for lower-latitude coastal communities. They serve as refuges from hurricanes and frequent flooding events. Floodwater storage and naturally-wide swales that potentially flooding communities. Seasonal flooded wetlands are simply connected to a floodplain, providing floodbuffering and flood storage. Typically, these floodplains are far lower latency and more susceptible to flooding than coastal wetlands. Natural community, cultural conservation, and environmental recreation are far more than just the preservation of natural wetlands. Finally, many of the benefits that follow this topic are also shared by coastal communities and can be applied to the maintenance of seasonal wetlands. These benefits are also shared by coastal communities and can be applied to the maintenance of seasonal wetlands.
UNDERSTANDING WHERE AND WHY ECOLOGICAL RESTORATION MATTERS – UTILIZING PARTICIPATORY MAPPING TECHNIQUES

Synthesis and Reporting:
Linking community identified area of value and threat to habitat types present within those areas has the potential to assist in prioritizing ecosystem-based restoration options in those locations.

[Diagram showing ecosystem-based restoration options and community identified values and threats]
Methodological advances that allow for the input of qualitative local knowledge into mathematical models have provided tangible ways to evaluate potential shortcomings of ongoing and planned restoration and protection projects

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UNDERSTANDING WHAT CHANGES – LOCALLY GROUNDED VALUATION TECHNIQUES

Goal:
• To collaboratively analyze the social, economic, and environmental benefits of investing in reforestation efforts and assess the social value of restoration projects in the Mississippi Alluvial Valley (MAV) of Louisiana.

Activities:
• Conduct a forecast Social Return on Investment (SROI) analysis designed to understand and predict the impacts and outcomes of restoration activities on key stakeholders.

Product:
• Technical report that went through rigorous third party review and assurance by Social Value International.
In fall 2016, the Water Institute and the Restore the Earth Foundation conducted research to 'ground test' the anticipated social change that would accompany the Pointe-aux-Chenes cypress reforestation project through qualitative and quantitative research with stakeholders. This research explored the social impacts and outcomes experienced by stakeholders as they were described to The Water Institute through focus groups, meetings, and one-on-one interviews.

SOCIAL RETURN ON INVESTMENT (SROI) ON REFORESTATION PROJECTS IN THE MISSISSIPPI ALLUVIAL VALLEY
UNDERSTANDING WHAT CHANGES – LOCALLY GROUNDED VALUATION TECHNIQUES

Methods
• Collaboration with community leaders to invite participants and host workshops
• Identification of all potentially impacted stakeholders
• Participatory mapping with a relevant cross-section of stakeholders
• Comparative case studies
• Qualitative coding and analysis of mapping practices and discussions from workshops
• Incorporation of results into a Social Return on Investment framework, assuring that the project sponsor incorporates all potential outcomes (positive and negative) into their project valuation

SOCIAL RETURN ON INVESTMENT (SROI) ON REFORESTATION PROJECTS IN THE MISSISSIPPI ALLUVIAL VALLEY
Qualitative Research Approach

- The Water Institute conducted **focus group** sessions for Pointe-aux-Chenes WMA and the Tensas River NWR. Focus groups were used to create an opportunity to reach several stakeholders at the same time.
- Each participant completed a short informational **survey** that gave us a more direct sense of how each stakeholder used the Pointe-aux-Chenes WMA and the Tensas River NWR.
- The Water Institute created a long-form interview guide that was used for one-on-one **interviews** with stakeholders.

**SOCIAL RETURN ON INVESTMENT (SROI) ON REFORESTATION PROJECTS IN THE MISSISSIPPI ALLUVIAL VALLEY**
Interviews focused on understanding how reforestation of the Pointe-aux-Chenes WMA and the Tensas River NWR impacted local and regional communities, including:

- Economic value, particularly for regional businesses;
- Recreational value, specifically in terms of hunting, fishing, paddling, birding, and other non-consumptive uses;
- Cultural value, pertaining to local culture and history;
- Education and research value, for the general public, k-12, and university researchers;
- Ecological value, specifically in terms of habitat restoration; and
- Water quality and flood control.

### Outcomes

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<thead>
<tr>
<th>Outcomes</th>
<th>Statements from Stakeholder Affirming Outcomes</th>
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<tbody>
<tr>
<td>Community services and outreach</td>
<td>• Increased sense of community pride</td>
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<td>“People would start to feel more pride and sense of value for the land that had a lot of love for. It could lift people out of depression. I think if it were reforested it would bring back life to the community.”</td>
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<tr>
<td>Indigenous communities</td>
<td>• Use of reforested areas for cultural rituals and traditions</td>
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<td>“We had this huge discussion with anthropologists about cypress trees, and I have cypress baskets from my grandfather that are over 100 years old. I know how to make cypress baskets but we don’t have cypress like we used to have […] I would be so excited to be able to work with them to get our trees for our baskets. That is so important. We have baskets in all kinds of museums all over the country - there are so few.”</td>
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<tr>
<td>Education and research</td>
<td>• Sustained or increased opportunities for educational and research programs for k-12 and university students and environmental researchers</td>
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<td></td>
<td>“To me this is a great area to educate people and that is more of what we need to do. Education is so important not only on a local level but so many people in this world don’t know what is going on down here [land loss].”</td>
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<tr>
<td>Those employed directly by the reforestation project</td>
<td>• Direct employment for local nursery and planting services</td>
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<td>“It [the reforestation] will give me work and help the locals. I hired 4 or 5 locals to help with the plantings. That will be for 4 or 5 years.”</td>
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<td>Those indirectly employed by the reforestation project:</td>
<td>• Creates the potential of more visitors frequenting local businesses</td>
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<tr>
<td>Local business</td>
<td>“Those marshes come in good, now you put people to work. You bring in green jobs […] you are putting people back to work and out of the oil fields.”</td>
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<tr>
<td>Those indirectly employed by the reforestation project: State and federal wildlife managers</td>
<td>• Creates new areas for LDWF management and monitoring</td>
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<td></td>
<td>“We have 3 of us working at this WMA […] [reforestation] would re-work priorities for management.”</td>
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</table>
SROI puts a value on the amount of change (impact) that takes place as a result of the program and looks at the returns to those who contribute to creating the change. It estimates a value for this change and compares this value to the investment required to achieve that impact, resulting in an SROI ratio:

- An investment of $15,467,764 in the 2016 financial year creates approximately $218,076,777 of net social impact over 40 years, resulting in an SROI ratio of 14:1
- $25,664,585 in direct market value is returned to investors, a direct market return of $1.66 for every dollar invested.

**SOCIAL RETURN ON INVESTMENT (SROI) ON REFORESTATION PROJECTS IN THE MISSISSIPPI ALLUVIAL VALLEY**
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WORKING WITH COMPETENCY GROUPS TO DEVELOP NATURAL AND NATURE-BASED DEFENSE ASSESSMENT AND SOLUTION TOOLS

Goal:
• Develop collaborative approaches through participatory modeling with communities potentially produce innovative solutions or tools for reducing coastal risk

Activities:
• Competency Group methods rely on controversy to prompt local residents to engage with science, bringing scientists and concerned public together
• Attendees: Commercial fisherman, marina owners, charter fisherman, land manager, Louisiana Sea Grant extension agent, ecologists, engineers
• Host a series of monthly meetings facilitated by social scientists

Competency Group Meeting #3, May 29, 2018
In spring 2018, the Water Institute of the Gulf began an ongoing project to co-design and ‘ground test’ a suite of advance ecological and hydrodynamic models for Breton Sound, developed in partnership with local resource users and TEK experts in Saint Bernard, Louisiana, a community that will be directly impacted by the large-scale sediment diversion that are part of the state’s Master Plan. This research explores using collaborative approaches to modeling with communities to produce innovative solutions or tools for reducing coastal risk.
WORKING WITH COMPETENCY GROUPS TO DEVELOP NATURAL AND NATURE-BASED DEFENSE ASSESSMENT AND SOLUTION TOOLS

Research Methods:

1. Engage with local communities and resource users to gather traditional ecological knowledge (TEK) in order to better understand hazards and solutions.

2. Work with a competency group consisting of local community members, resource users, scientists, and engineers to co-develop an ecosystem model that is informed by TEK.

3. Using the model developed by the competency group, run scenarios to identify optimal natural and nature-based solutions.
Scenarios summarized the hand-written notes from maps for all groups:

- **Projects (Nature-based):**
  - Marsh terracing
  - Marsh creation
  - Reforestation
  - Ridge restoration
  - Sand nourishment

- **Future Conditions:**
  - TS/Hurricane conditions
  - Sea level rise
  - Allowing more sediment into freshwater diversions
  - Alter weather patterns (rainfall and drought)
Overall concerns of residents were used to help guide modeling efforts:

- Wetland area for future generations
- Hydrological restoration
- Proposed sediment diversion operation
- Subsidence rates
- Water quality
WORKING WITH COMPETENCY GROUPS TO DEVELOP
NATURAL AND NATURE-BASED DEFENSE
ASSESSMENT AND SOLUTION TOOLS

Next Steps:

• Ecosystem model runs with combinations of projects and scenarios
• Discuss the model run output at the next competency group meeting
• Develop a methodology manual to be used to guide future research
• Write manuscripts about our results
INCORPORATING LOCAL KNOWLEDGE INTO ECOLOGICAL RESTORATION ASSESSMENTS

Conclusions:

• Integrate local knowledge with accumulated technical scientific knowledge to fully understand the complex linkages of environmental change, key ecosystem services, and community resilience, vulnerability, and wellbeing.

• The methods presented here represent advances in rigorous, replicable, and accessible forms of collecting local knowledge to assess and monitor the social value of ecological restoration, providing information to agencies and communities about social and cultural factors that need to be considered in the restoration planning process.

• Qualitative data analysis successfully classifies differences in the ways stakeholder groups potentially impacted by ecological restoration projects engage with the project sites, and identifies a suite of outcomes unique to each stakeholder group. Identifying these outcomes is integral to defining both the specific objectives and variables needed to develop a comprehensive assessment and monitoring framework.

• Ensuring that key stakeholders are identified and consulted early and often in the ecological restoration planning process will allow decision-makers to identify the most socially beneficial courses of action for local, regional, and national interests.
THANK YOU

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