THE WATER INSTITUTE OF THE GULF®

Restore the Earth Foundation Reforestation Social Return on Investment Report

Tensas River National Wildlife Refuge

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Produced for and funded by: The Restore the Earth Foundation

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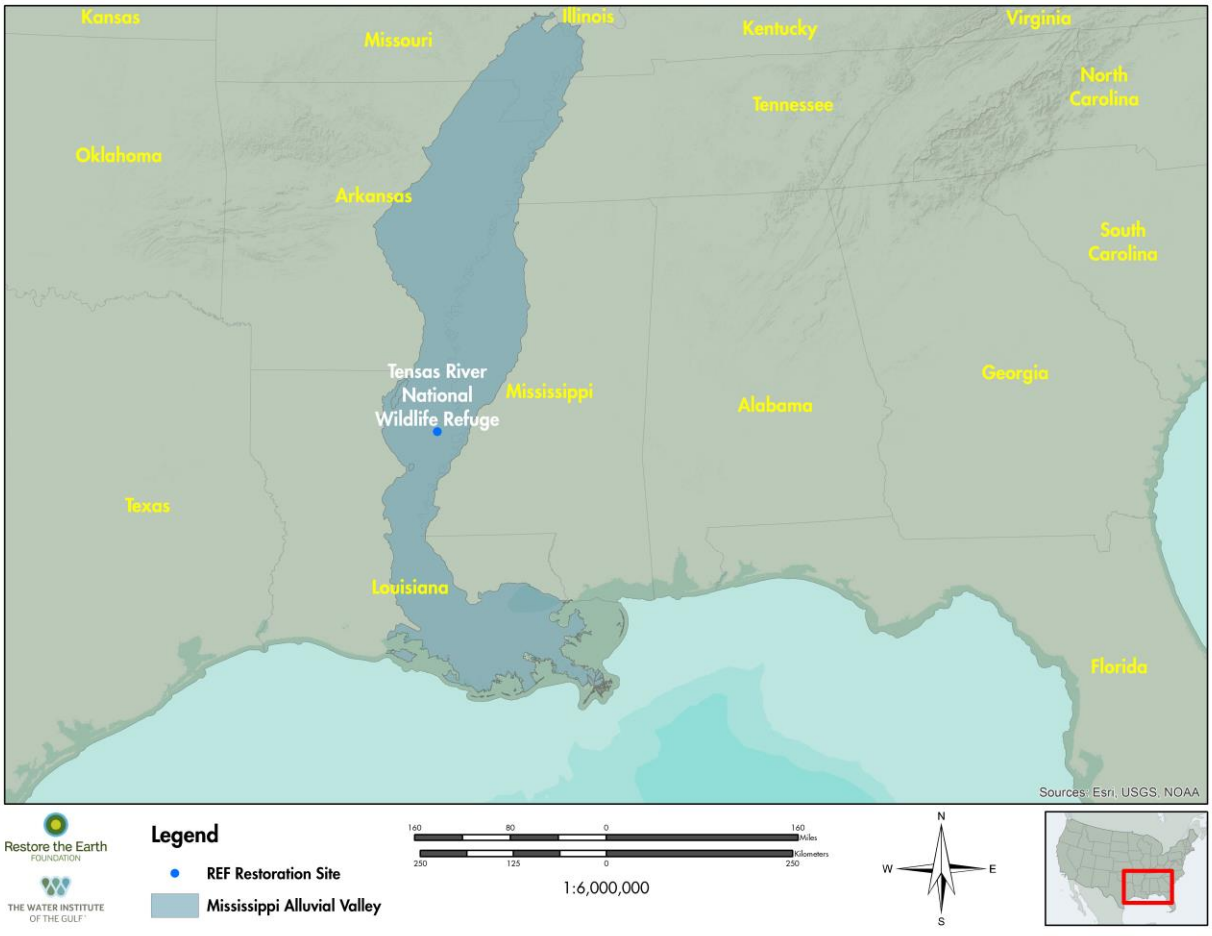
1.0 Executive Summary

This report contains a forecast of the economic, social, and environmental outcomes of a reforestation project in the central Mississippi Alluvial Valley (MAV) in northeast Louisiana. This Social Return on Investment (SROI) assessment was commissioned by Restore the Earth Foundation (Restore the Earth), a non-governmental organization that aims to generate support from corporate donors to fund forest and wetland restoration efforts in the MAV. This report looks at the reforestation of 1,943 acres of bottomland hardwood forest planted through investments by Entergy Corporation in the Tensas National Wildlife Refuge (NWR) in 2005. Although Entergy Corporation funded the on-the-ground costs of the reforestation project, this report was funded solely by Restore the Earth to provide an independent assessment of the social impacts of the project on key stakeholder groups.

Figure 1. Mississippi Alluvial Valley and Tensas River NWR location (Louisiana, USA)



Restore the Earth contracted with The Water Institute of the Gulf to research and complete this SROI report as means of assessing and valuing the intangible aspects of reforestation efforts on a variety of stakeholders impacted by this project. Research methodologies were informed by two goals: 1) Collecting data to fulfill the requirements of the social return on investment assurance by Social Value International; and 2) Populating Restore the Earth EcoMetrics™ Model, a tool developed by Restore the Earth to

collaboratively analyze the social, economic, and environmental benefits of investing in reforestation efforts. The model combines quantitative and qualitative values across numerous social, economic, and environmental categories to forecast the relative social and economic outcomes for corporations interested in investing in reforestation projects. The EcoMetrics model was built on the guiding principles of Social Value International's (SVI) SROI Methodology and the International Integrated Reporting Council's (IIRC) International Integrated Reporting Framework (IIRF). Stakeholder relationships are of primary importance to both methodologies. The SVI approach concerns an in-depth, evidence-based understanding of change for a full range of community stakeholders with recognition of both positive and negative changes as well as intended and unintended outcomes. Value in this context refers to the relative importance placed by a stakeholder group on one potential outcome over another. Assigning these valuations using SVI principles requires the use of financial proxies, as many of the identified outcomes are difficult to quantify using conventional accounting practices. The IIRC methodology is principally concerned with the creation value for funding stakeholders, and resources are allocated based on the potential benefit to the corporation and quantified using conventional accounting practices.

This report specifically presents an analysis of the data collected by The Water Institute between September 2016 and February 2017. This review is an opportunity for Restore the Earth to assess the extent to which reforestation can create social, economic, and environmental value in ongoing projects and how stakeholders perceive the project creating diverse forms of social and environmental returns. This report discusses the impacts to stakeholders as they have articulated them while also considering the various limiting factors on the projected social return on reforestation, and assesses the creation of social value for both community stakeholders and funding stakeholders. Both market and non-market social value was generated for various stakeholder groups and the relationship between these stakeholder groups can be quantified through application of the six capitals identified by the IIRC: financial, manufactured, intellectual, human, social, and natural.

1.1. SROI TYPE AND PERIOD

- This report contains a forecast of a reforestation project in the Mississippi Alluvial Valley in the state of Louisiana, U.S.A.
- The reforestation is located on public lands (federally owned)
- The Tensas River National Wildlife Refuge (NWR) is a 40-year forecast study that examines the perceived impacts of bottomland hardwood reforestation projects conducted in northeast Louisiana in 2005
- The Water Institute began research for the SROI of the Tensas River NWR in September 2016 and finished in February 2017
- The final report was drafted in February and March 2017
- Revisions based on SVI feedback were made in June 2017

1.2. AUDIENCE

The audience for this SROI report is Restore the Earth's management and staff, as well as existing and potential investors. Restore the Earth will use this study to communicate the social returns on investment in reforestation to potential funders and stakeholders.

1.3. SOCIAL VALUE CREATION

The major stakeholder groups who will benefit from the reforestation project in the MAV include:

- **Corporate Sponsors** who will benefit from an enhanced social license to operate in Louisiana and are assigned the carbon offsets for the project proportionate to their investment in the project
- **Conservation organizations** who benefit from the enhanced coastal protection and ecosystem benefits that the projects provide to the broader region
- **Recreational users, including general recreational users, hunters, fishers, wildlife viewers, and birdwatchers** who benefit from the enhanced recreational opportunities reforestation provides
- **Those employed directly by the reforestation project, including state and federal wildlife managers and local business owners** who benefit from the enhanced business opportunities resulting directly from the reforestation project work and indirectly through increasing visitation to the region
- **Communities surrounding the site and downstream/wind of it** who benefit from improved water and air quality, flood protection, and soil stabilization due to the reforestation
- **Communities that benefit from other ecosystem services such as habitat refuge and cultural value including community services and outreach organizations, indigenous communities, and educational users of the site** who benefit from an enhanced sense of community pride, the restoration of historical landscapes that can be used for cultural traditions, and an increase in education programs
- **Environmental outcomes** that benefit all stakeholder groups, but are not immediately apparent to stakeholders or may not manifest for several years and include the societal benefits of reduced nitrogen and phosphorus and the sequestration of carbon resulting from the reforestation

The SROI analysis of the anticipated outcomes for each stakeholder group shows a significant social return associated with the Tensas River reforestation. To calculate the net present value (NPV) of the Tensas River reforestation project, the costs and benefits incurred or generated at different time periods need to be summed (Social Ventures Australia Consulting, 2011). For these costs and benefits to be comparable, a discount rate was used for the NPV calculations. This research examined three forecast scenarios that bound the environmental uncertainty to some degree: conservative, realistic, and aggressive. This analysis describes the "realistic" scenario, which incorporates a discount rate of 5% to accurately account for the impacts of climate change mitigating investments.

In 2005, corporate sponsors invested $1,546,000 to complete Phases 1 and 2 of the Chicago Mill reforestation project in the Tensas River NWR. Under the realistic scenario, this investment combined with total predicted maintenance costs of $1,758,783 over the life of the project will result in approximately $109 million of net social impact over 40 years, resulting in an indicative SROI ratio of 32.99:1 (Table 1). In other words, the SROI analysis presents evidence that substantiates that for every dollar invested in reforestation in the Tensas River NWR by corporate sponsors, $32.99 in social value is returned to community stakeholders. Additionally, $10,601,889 in direct market value is created, amounting to $3.21 for every dollar invested (Table 2). In sum, with an initial investment of $1,546,000 in financial capital, the community and funding stakeholders see social and market value creation of $119,611,947 in financial, manufactured, human, social, and natural capital over 40 years (Table 3), for a total value creation ratio of 36.2:1.

Table 1. Social Return on Investment for reforestation in Tensas River NWR

Stakeholders	Real outcomes due to Tensas River reforestation project	Social Value Creation	Social Value per Stakeholder Group
Environment	Social value of carbon sequestered	$9,137,625.45	$12,755,765.70
	Improved soil formation and nutrient cycling	$651,900.44	
	Erosion control and sediment retention	$7,614.72	
	Increased waste treatment capacity,	$2,958,625.08	
Conservation organizations	Enhances habitat refuge	$11,349,707.34	$11,349,707.34
Recreational users (general recreational users, hunters, fishers, wildlife viewers and birdwatchers)	Enhanced habitats for hunting	$12,881,016.69	$20,332,131.64
	Enhanced habitats for fishing	$67,201.70	
	Enhanced habitats for general recreation	$1,200,421.15	
	Enhanced habitats for birdwatching	$6,183,492.10	
Those employed by land prior to restoration	Permanent loss of income on crop production	$(3,956,850.21)	$(5,256,754.07)
	Loss of government subsidy payed on agricultural land	$(1,299,903.86)	
Those employed directly and indirectly by the reforestation project	Direct employment for local nursery and planting services	$1,758,782.51	$4,277,499.76
	Enhanced business opportunities	$2,518,717.25	
	Enhanced habitat refuge	Shared Value with Conservation organizations	
Communities surrounding the site and downstream/wind of it that benefit from water and air quality, waste treatment, storm protection, soil stabilization, biological control	Enhanced Water Quality. Value of Marginal Nitrogen and Phosphorus Mitigation.	$18,159,176.33	$65,100,830.42
		$44,058,248.29	
	Increased atmospheric oxygen and cleaner air	$2,883,405.80	
Communities that benefit from other ecosystem services such as habitat refuge and cultural value	Sense of community pride; community gathering place	$133,522.99	$450,877.00
	Enhanced ecosystem that can be used for cultural traditions	$293,750.59	
	More educational programs and opportunities	$23,603.42	
		Total Present Value	**$109,010,057.79**
		Total Investment	**$3,304,782.51**
		Non-Market Return on Investment (dollar returned per dollar invested)	**32.99**

Table 2: Market Return on Investment for reforestation in Tensas River NWR

Stakeholders	Real outcomes due to Tensas River reforestation project	Market Value Creation	Market Value per Stakeholder Group
Corporate Sponsors	Market value of carbon sequestered	$7,376,623.25	$10,601,888.75
	Market value of nitrogen offset	$1,921,196.94	
	Market value of phosphorous offset	$902,108.56	
	Social license to operate (effects to reputation; positive impact on communities)	$401,960.00	
		Total Present Value	**$10,601,888.75**
		Total Investment	**$3,304,782.51**
		Market Return on Investment (dollar returned per dollar invested)	**3.21**

Table 3: Investment, market value, and social value delineated by IIRC shared value capital for reforestation in Tensas River NWR.

Shared Value Capital	Investment	Market Value	Non-Market Value
Financial	$1,546,000.00	$10,199,928.75	$(979,254.31)
Human	$1,758,782.51		$20,332,131.64
Social and Relationship			$11,800,584.34
Natural		$401,960.00	$77,856,596.12
Total Investment	**$3,304,782.51**		
Total Present Value		**$10,601,888.75**	**$109,010,057.79**
Market and Non-Market Return on Investment (dollar returned per dollar invested)		**3.21**	**32.99**

The SROI, however, provides more than the estimated social value per dollar invested. The report has been a concrete way to test theories about stakeholders' understanding of the way environmental reforestation projects impact their lives and livelihoods. To that end, it is important to recognize that while this case study, on the surface, represents before and after scenarios, it speaks solely to the reforestation of this specific area of the MAV and the unique uses of this specific wildlife refuge. Furthermore, the success of the reforestation is contingent upon the extent to which the environment surrounding the project remains stable enough for the trees to mature. To accommodate this environmental variability, this research utilizes three forecast scenarios that bound the environmental uncertainty to some degree: conservative, realistic, and aggressive. The focus of this analysis is on the realistic scenario, which uses a discount rate of 5% for climate change mitigating investments.

2.0 SROI Analysis

2.1. PURPOSE OF THE SROI

This report presents a Social Return on Investment (SROI) analysis of a reforestation program in the Mississippi Alluvial Valley (MAV) of Louisiana, USA conducted for Restore the Earth Foundation, a 501(c)(3) non-profit dedicated to restoring forest and wetland ecosystems. Restore the Earth Foundation works closely with public agencies and local experts to identify critical restoration projects in need of funding and utilizes its EcoMetrics model to develop the business case for each restoration project based on its benefits and returns (environmental, social, and economic). Using this business case, Restore the Earth assesses their existing network of partners as well as a consortium of potential project stakeholders including business, industry, government, local, and regional communities to determine interested parties with vested interests. Using aligned interests, paired with the business case, REF works to "unlock" funding in the form of financial or in-kind support. This report is built based on the respective interest of each potential investor – i.e. carbon offsets, community resilience, storm protection, ecosystem restoration, job creation, sustainable sourcing of raw materials, etc.

This report contains a forecast SROI analysis of a reforestation project located in the Tensas River National Wildlife Refuge (NWR), located in Louisiana's Mississippi Alluvial Valley.

This report is not an analysis of the operations of Restore the Earth or an assessment of their business model. This report does not focus on the sustainability of the operations of Restore the Earth Foundation, but rather focuses on understanding the impact that the activities undertaken by Restore the Earth will have on stakeholders. The objectives of this project were to use the SROI methodology to:

- Identify and engage key stakeholders affected significantly by reforestation – Understand what each stakeholder wants changed (objectives), what they contribute (inputs), what activities they do (outputs) and what changes for them (outcomes, intended or unintended) as a result of their involvement;
- Measure and value the social impacts of reforestation – Understand the value created as a result of the changes experienced by each stakeholder group by using indicators to measure the outcomes and financial proxies to value the outcomes; and
- Create a forecast analysis to measure and evaluate the impacts of reforestation – Articulate the key drivers of social value and identify what data are needed to best measure and evaluate the impacts of activities.

To fully measure and evaluate the impacts of reforestation, this research incorporates scientific data on the objective impacts of environmental degradation and the mitigating effects of forest restoration into the SROI evaluation. These data are directly tied to the outcomes defined by the key stakeholders and used to quantify the social value of environmental change. The SROI methodology presents these social values in terms of financial equivalents, which allows stakeholders across the board to evaluate the cost/benefit favorability or unfavourability of proposed environmental interventions. Such valuation of outcomes will allow Restore the Earth and its corporate funders to understand the internalized financial benefits and externalized societal benefits of making investments in so-called "green infrastructure" or natural capital.

This report provides a brief overview of the SROI methodology, project approach, the objectives, and activities of the reforestation and afforestation projects, and the key findings and assumptions made when

completing the analysis. Finally, this report includes a discussion of the SROI results and recommendations. The audience for this SROI report is Restore the Earth Foundation's management and staff, as well as existing and potential investors. Restore the Earth Foundation will use this study to communicate the social return on investment in restoration and reforestation projects to potential funders and stakeholders.

2.2. SROI APPROACH

SROI is a framework for measuring and accounting for the broad concept of social value, a measure of change that is relevant to people and organizations that experience it. This concept of value goes beyond what can be captured in pure, market-based financial terms, seeking to reduce inequality and environmental degradation and improve well-being by incorporating social, environmental, and economic costs and benefits into project valuation (SROI Network, 2012). For analytic purposes, SROI converts non-financial values into their financial equivalents, using both subjective and objective research to estimate those values. Restore the Earth believes that is what makes SROI different from other forms of social-impact analysis, and therefore more valuable to corporate funders and governmental agencies that have fiduciary responsibility to the public.

There are two types of SROI analysis:

- Evaluative, which is conducted retrospectively to validate a forecast or baseline SROI to understand if the impact sought was achieved
- Forecast, which is designed to understand and predict the desired impact and outcomes of a program or activity for significant stakeholders

Forecast SROIs are especially useful in the planning stages of an activity. They can help show how investment can maximize social impact and are also useful for identifying what should be measured once the project is implemented (SROI Network, 2012).

SROI was developed from social accounting and cost-benefit analysis and is based on seven principles of social value (SROI Network, 2012):

1. Involve stakeholders – Inform what gets measured and how this is measured by involving stakeholders;
2. Understand what changes – Articulate how change is created and evaluate this through evidence gathered, recognizing positive and negative changes as well as those that are intended and unintended;
3. Value things that matter – Use financial proxies in order that the value of all outcomes can be recognized including those that are not traded in markets but are affected by activities;
4. Only include that which is material – Determine what information and evidence must be included in the accounts to give a true and fair picture, such that stakeholders can draw reasonable conclusions about impact;
5. Do not over-claim – Only claim the value that organizations are responsible for creating;
6. Be transparent – Demonstrate the basis on which the analysis may be considered accurate and honest, and show that it will be reported to and discussed with stakeholders; and
7. Verify the result – Ensure appropriate independent assurance.

The SROI process works by developing an understanding of the program being analyzed, how it meets its objectives, and how it works with its stakeholders. The SROI framework accounts for a broad concept of value and focuses on answering five key questions:

Table 4. The SROI framework focuses on answering five key questions

Question	Definition
Who changes?	Taking account of all the people, organizations, and environments affected significantly
How do they change?	Focusing on all the important positive and negative changes that take place, not just what was intended
How do you know?	Gathering evidence to go beyond individual opinion
How much is you?	Taking account of all the other influences that might have changed things for the better (or worse)
How important are the changes?	Understanding the relative value of the outcomes to all the people, organizations, and environments affected

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. It takes standard measures of economic return a step further by placing a monetary value on social returns (Social Ventures Australia Consulting, 2011). Critical to the process is the development of an impact map demonstrating the impact value chain for each stakeholder group. It links stakeholders' objectives to inputs (e.g. what has been invested), to outputs (e.g. number of trees planted), through to the outcomes (e.g. increase in income through employment). The process then involves identifying indicators for the outcomes, so that we can measure if the outcome has been achieved. The next step is to use financial proxies to value the outcome.

It is then necessary to establish the amount of impact each outcome has had. Impact is defined in the SROI as an estimate of how much of the outcome would have happened without the project and the proportion of the outcome that can be isolated as being added by the activities being analyzed. The SROI uses four filters applied to each outcome to establish the impact of the activities:

- Deadweight – What would have happened anyway?
- Displacement – Were other outcomes displaced to create the outcome?
- Attribution – Who else contributed to the outcome?
- Drop-off – How much does the outcome drop-off each year?

Establishing impact is important as it reduces the risk of over-claiming and may also help identify any important stakeholders that may not have been included in the analysis.

2.3. CHALLENGES WITH APPLYING THE SROI METHODOLOGY TO ENVIRONMENTAL PROJECTS

Restoration and reforestation projects mitigate carbon emissions through sequestration of carbon and by eliminating nitrogen and phosphorus runoff from sediment loss. This process restores and rebalances ecosystems and establishes healthy natural capital buffers. Married with the direct environmental impacts, the indirect co-benefits created include improved air and water quality and quantity, job training and creation of jobs, lessening of extreme weather patterns, storm protection, pest control, increased

recreation and tourism through bird watching, hunting, and fishing, and the creation of new technology. Many of these outcomes have multiple benefits to multiple stakeholders.

Applying the SROI methodology to environmental projects such as ecological restoration and reforestation projects, however, poses unique challenges. The SROI methodology has historically be used by community organizations focused on social welfare programs which have a clearly defined period of investment and an associated commensurate period of benefits (Social Ventures Australia Consulting, 2011). With restoration projects, many of the benefits are often not readily or immediately apparent to stakeholders. For example, the assignment of carbon, nitrogen, and phosphorus offset credits provide direct benefits to corporate sponsors and their partners. However, the environmental value of carbon, nitrogen, and phosphorus for other stakeholders and society at large are generally not identified as outcomes through stakeholder engagement. To account for these more intangible assets, the environment is considered as a stakeholder, as though it were a person or an organization. The specific outcomes associated with the environment were derived from the scientific literature and research contracted by Restore the Earth. The results of this research can be considered outcomes that will accrue to various stakeholder groups in the future.

2.4. PROJECT APPROACH

The comprehensive benefits of these reforestation projects – which include social, economic, and environmental outcomes – were tracked, measured, and reported on through Restore the Earth Foundation EcoMetrics Model that is based on the guiding principles of Social Value International's SROI Methodology. The Tensas River NWR reforestation project was analyzed using the 2005 financial year investment of $1,546,000 by Entergy Corporation and assessing the benefits over a 40-year time horizon with a 5% discount rate.

The forecast SROI analysis for Restore the Earth Foundation was undertaken in six stages. The activities in these six stages include:

1. Establishing scope and identifying stakeholders
    a. define boundaries and time scale for analysis
    b. define stakeholders
2. Mapping outcomes
    a. engage with stakeholders to develop an impact map which shows the relationship between objectives, inputs, outputs, and outcomes
3. Evidence outcomes and giving them a value
    a. synthesize data from stakeholder interviews into an impact map
    b. identify relevant indicators and financial proxies to monetize the social outcomes, where possible
    c. define the investment, both direct cash investments and pro bono contributions from the various stakeholders
    d. conduct follow up interviews to verify evidence where required
    e. test assumptions with other Water Institute of the Gulf and Restore the Earth Foundation staff
4. Establish impact
    a. determine those aspects of change that would have happened anyway or area result of other factors

5. Calculate the SROI
    a. populate and use the EcoMetrics model to add up all the benefits, subtract any negatives and compare the result to the investment. This is also where the sensitivity of the results is tested.
6. Reporting, using and embedding
    a. write a detailed report which describes the methodology, assumptions made, results and recommendations
    b. complete summaries of the SROI analysis
    c. report to stakeholders, communicate and use the results, and embed the SROI process in the organization

In addition, the SROI analysis will be used to provide a baseline indicator of whether social value created by the Tensas River NWR reforestation project. The primary purpose of the baseline SROI is to identify outcomes, guide forward planning and establish what needs to be monitored and measured to demonstrate success.

2.5. WHO WORKED ON THE REPORT?

This SROI analysis and measurement and evaluation framework had input from the following individuals and organizations:

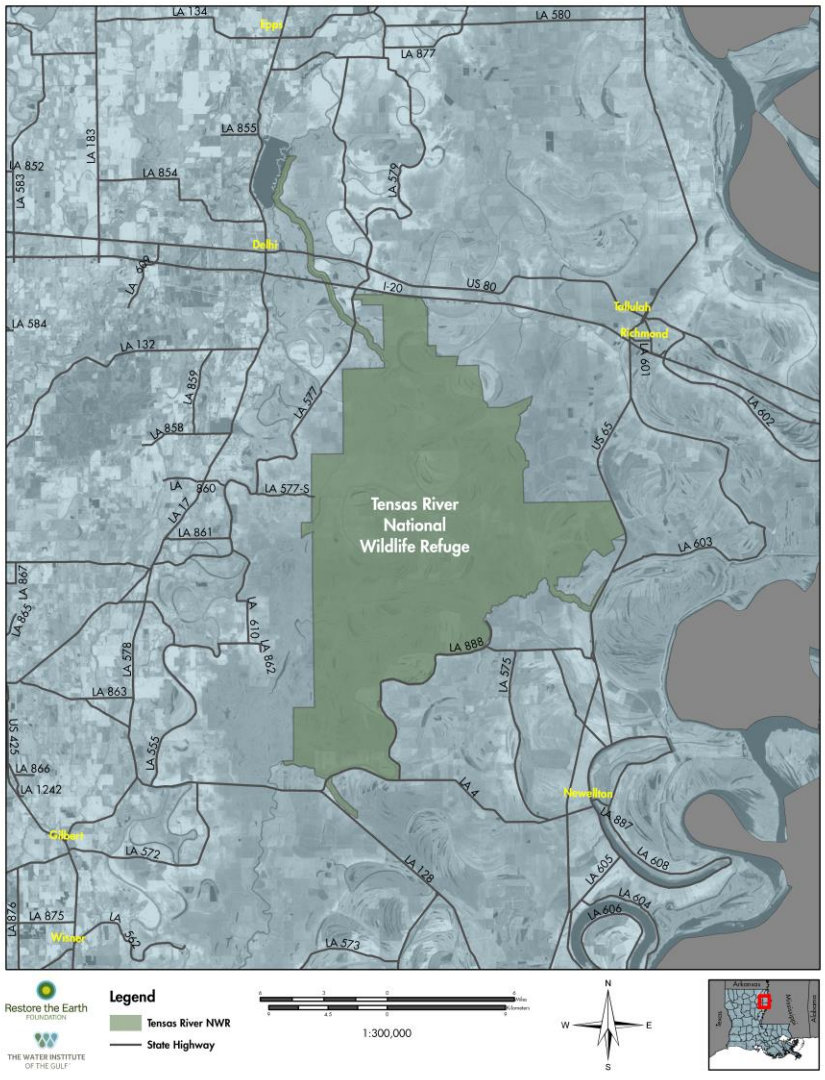
- Scott A. Hemmerling, the lead author from The Water Institute of the Gulf, spent approximately 60 days conducting the analysis, and compiling the report and assumed overall responsibility for the analysis
- Monica Barra, co-author and research associate from The Water Institute of the Gulf, spent approximately 90 days conducting stakeholder engagement, conducting the analysis, and compiling the report
- Harris Bienn, co-author and research assistant from The Water Institute of the Gulf, spent approximately 30 days conducting stakeholder engagement, conducting the analysis, and compiling the report
- Richard Landry from Restore the Earth Foundation contributed approximately 20 days reviewing the analysis and assuring consistency with the EcoMetrics model
- Ben Carpenter from Social Value International contributed approximately 5 days reviewing the analysis and assuring consistency with SVI report assurance criteria

3.0 Case Study: Tensas National Wildlife Refuge

3.1. BACKGROUND: TENSAS NATIONAL WILDLIFE REFUGE AND REGIONAL DEMOGRAPHICS

Tensas River National Wildlife Refuge (NWR) is a federal wildlife refuge area that encompasses 80,000 acres of bottomland hardwood forest. It was established in 1980 in an effort to preserve and restore the bottomland hardwood forest ecosystem that had once covered the bulk of the Mississippi Alluvial Valley. The refuge was established through the acquisition of large tracts of land that was first cleared for timber in the early-mid 20th century and later used for agricultural purposes (predominantly soybean farming) (USFWS 2009). It is staffed and maintained by U.S. Fish and Wildlife staff under the U.S. Department of the Interior. Tensas River NWR hosts approximately 78,800 visitors per year, mostly for the area's famed deer hunting (USFWS 2009). Since the 1980s, there have been several reforestation projects on the refuge, primarily transitioning agricultural land back into bottomland hardwood forest.

Figure 2. Tensas River National Wildlife Refuge



Tensas River NWR is bordered by four parishes (counties) in northeast Louisiana: Tensas, Madison, Franklin, and Richland Parishes. Total population of the four parishes as of 2010 was 58,837**.** This is a predominately rural area that is sparsely populated. Much of the region encompasses large tracts of agricultural land (formerly bottomland hardwood forest). The Tensas River NWR is an island of dense forested area in the midst of agricultural land, as one stakeholder described (Tensas interview 12/2016).

Figure 3: Prior reforestation efforts undertaken at Tensas National Wildlife Reservation

The analysis presented in this report is a 40-year forecast of the reforestation project that calculates return on investment measured predominately in terms of tree growth (with the exception of volunteer and wage labor) beginning with the first year of planting in 2005. Over this time period, provided continued maintenance as the site matures, environmental benefits will continue to accrue to each of the stakeholder groups. Some benefits, such as enhanced storm protection, wildlife habitat, and educational usage, will reach their maximum levels in 10 years while others, such as increased biomass, carbon sequestration, and nutrient cycling, will continue to increase over the full 40-year period.

Data for calculations of corporate investments, reforested acres, and statistics of recreational usage of the refuge use 2006 figures derived from four primary sources: Restore the Earth Foundation, Tensas River National Wildlife Refuge Afforestation Project (Carbonfund.org 2009), Tensas River National Wildlife Refuge Comprehensive Conservation Plan (U.S. Fish and Wildlife Service 2009), and Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation (U.S. Fish and Wildlife Service 2007). Updated figures for Tensas River NWR were provided by U.S. Fish and Wildlife staff for their Harvest Totals from September 2016 to March 2017. Updated U.S. Census information from 2010 was also used in this report.

According to Restore the Earth and the U.S. Fish and Wildlife Service, Entergy Corporation funded the restoration of 1,943 acres of bottomland hardwood forest in 2005 on the Tensas River NWR. Restore the Earth was not directly involved in these reforestation efforts, but Entergy is one of Restore the Earth's partners on future reforestation projects in the Mississippi Alluvial Valley. The figures calculated for the Tensas River NWR for this report and for the Restore the Earth's EcoMetrics™ model are based on these numbers.

3.2. IDENTIFYING STAKEHOLDERS

To begin the research for the Social Return on Investment (SROI) analysis, Restore the Earth provided a list of initial stakeholder categories to The Water Institute that attempted to capture the range of stakeholders likely to experience material social, economic, environmental, and cultural impacts and outcomes associated with reforestation practices as part of the Restore the Earth Foundation EcoMetrics Model. The Water Institute began recruiting stakeholder participants through a "snowball" methodology, wherein stakeholders recommended to The Water Institute were asked to suggest additional stakeholders to whom to reach out. Phone, email, and in-person contact was attempted with approximately 30 individuals representing 10 stakeholder groups and seven subgroups invited to contribute input and participation in the Tensas portion of the project. Stakeholders were invited to participate in the study based on their membership in one or more of these stakeholder categories and their availability and willingness to participate. Subgroups were identified through the process of identifying materially different outcomes from gathered data and representative stakeholders engaged by The Water Institute. The goal was to have at least two representative perspectives for each stakeholder category that could be engaged through qualitative and quantitative methods.

The stakeholder categories capture a diverse population impacted by the reforestation project. According to the 2010 U.S. Census, approximately 58,837 people live in Tensas, Madison, Richland, and Franklin Parishes (counties) where the project is located. Over the last decade, the population, employment, and income levels in these parishes have been growing slower than the Louisiana statewide average (Table 4).

These populations are accounted for within the stakeholder categories that encompass the public at large (affected by climate change), communities surrounding the site and downstream of the site, and communities that benefit from other ecosystem services. Current visitation to the Tensas River NWR for recreational uses (including hunting, fishing, general recreation, birdwatching, and education) totals 82,000 users per year (U.S. Fish and Wildlife Service 2009).

It should be noted that the stakeholder groups from rural areas - every group except Restore the Earth and corporate sponsors - live in small, sparsely populated communities. Most of the towns in this part of northeast Louisiana reflect a small amount of population density. For example, Tallulah, the town closest to the restoration project, had a total population of approximately 7,000 people in 2010 (part of the population also includes prisoners). It is important to keep this kind of figure in mind when considering the number of individuals directly engaged in the SROI research.

Table 5. Regional demographics for parishes surrounding the Tensas National Wildlife Refuge

Parish	Population			Employment			Per Capita Income		
	2000	2010	Percent change 2000-2010	2000	2010	Percent change 2000-2010	2000	2010	Percent change 2000-2010
Tensas LA	6,618	5,252	-20.6%	2,165	1,954	-9.7%	12,622	15,218	20.6%
Madison LA	13,728	12,093	-11.9%	4,273	3,784	-11.4%	10,114	13,089	29.4%
Richland LA	20,981	20,725	-1.2%	7,682	7,875	2.5%	12,479	18,060	44.7%
Franklin LA	21,263	20,767	-2.3%	7,273	7,529	3.5%	12,675	18,676	47.3%
Area Total	**62,590**	**58,837**	**-6.0%**	**21,393**	**21,142**	**-1.2%**	**47,890**	**65,043**	**35.8%**
Louisiana	4,468,976	4,533,372	1%	1,831,057	1,952,818	6.65%	$16,912	$23,094	36.55%
United States	281,709,873	308,745,538	10%	128,279,228	141,833,331	10.57%	$21,587	$27,334	26.62%

3.2.1. Description of stakeholder groups

In total, The Water Institute conducted meetings, focus groups, and one-on-one interviews with 15 individuals for the Tensas River NWR. Restore the Earth, volunteers involved in replanting (if any), corporate sponsors, former landowners, and tenant farmers were stakeholder groups identified that The Water Institute did not speak with in their data collection. Restore the Earth and volunteers involved with replanting were deemed "not applicable" because neither was involved with the reforestation project in 2005. The Water Institute was unable to speak directly to any corporate sponsors, former landowners or tenant farmers. As a proxy for corporate sponsors, The Water Institute consulted with Restore the Earth, which frequently partners with Entergy, on the outcomes for corporate sponsors to identify experiences of this group. Input from corporate sponsors from another SROI project based in Pointe-aux-Chenes, Louisiana was also used to identify experiences of corporate sponsors. In lieu of direct participation of former landowners, The Water Institute compiled available data on financial transactions for land acquisition from the staff of the Tensas River NWR as a proxy for former landowners. As a proxy for tenant farmers, The Water Institute was able to speak with the local Louisiana State University (LSU) Agricultural Extension agent, as well as area farmers, about the particular experiences of tenant (non-landowning) farmers and the impacts of reforestation projects upon this group. These groups are appropriate in this regard because they have experience working directly with tenant farmers, including those that may have been impacted by the transfer of land to the Tensas River NWR. Methods and justification for representation of stakeholder groups can be found in section 4.

Numerous individuals represented multiple stakeholder positions in this case study. As a result, data was coded and sorted to reflect input on particular impacts to stakeholder groups of which a participant was a member. For example, an individual could be a recreational user, local resident, and a local business owner. As such, their responses were coded and organized in accordance to their input on a particular stakeholder experience or impact. That is to say, responses from a participant who is a local business owner were sorted according to which stakeholder impact they were speaking to at a particular point in time during the research, whether that be specific to being a business owner or to other stakeholder experiences. This enabled us to maximize the breadth and depth of the data collected from individuals.

Corporate sponsors

The Tensas River NWR has relied on corporate investors to facilitate much of their reforestation initiative. These reforestation projects have also expanded the footprint of the NWR. By providing financial and natural capital investments for the reforestation, these corporate sponsors directly support local and regional environmental sustainability, enabling them to build upon their corporate reputation in the area effected as well as to provide their employees with an opportunity to connect to the environment. These corporate sponsors are beneficiaries, experiencing outcomes such as enhanced social license to operate, wherein a company is seen by a community as a good neighbor, the activities of that company are often legitimized and therefore able to continue with the consent of those affected by the activity. Corporate investors are also assigned the carbon and water offsets produced by their investments in reforestation. Entergy Corporation is the primary stakeholder this report describes.

Number of stakeholders directly engaged: 1

Method of engagement: 1 stakeholder was spoken with via phone and email.

Current landowners with property adjacent to the refuge

The reforestation of the Tensas River NWR was initiated in the early 1980s through acquiring private land, mostly marginal farmland, from local landowners. Because land has been acquired piecemeal since that time, there are still several private landowners who have property within or surrounded by parts of the Tensas River NWR. As a result of their proximity to the refuge, the value of their land has increased because of its potential value for conservation and reforestation. The recreational value of their land also increases with reforestation, which enables current landowners to lease or rent portions of their property for hunting, camping, or other recreational activities.

Number of stakeholders directly engaged: 3
Method of engagement: 1 stakeholder participated in a focus group; 2 stakeholders participated in one-on-one interviews.

Tenant farmers

Tenant farmers, farmers who rent agricultural land from landowners to farm on, are a significant group impacted by reforestation activities in the Tensas River NWR. They rely on the availability of agricultural lands to make a living and, because reforestation takes farmland out of use, tenant farmers have less farmland available to them to work from. While the land used for reforestation is largely considered marginal (i.e. not profitable agriculturally) the decreasing availability of land for tenant farmers is perceived by some to be a negative impact associated with reforestation.

Number of stakeholders directly engaged: 3
Method of engagement: 3 stakeholders participated in one-on-one interviews.

Conservation organizations

Conservation organizations represent the interests of constituencies that often reside far afield of the Tensas River NWR reforestation project. These conservation organizations include regional and national non-profit groups that work through local chapters to support environmental enhancement and restoration projects for at-risk habitats and wildlife. They often work closely with state and regional government officials on environmental projects that have wider ecological impacts. The organizational mission of many of these organizations is to create and sustain programs beneficial to both their membership and the general public. Members of conservation organizations generally differ from direct users of the site in that their outcomes are often experienced at broad ecosystem scale.

Number of stakeholders directly engaged: 2
Method of engagement: 2 stakeholders participated in one-on-one interviews.

Recreational users

Recreational users of the Tensas River NWR are major beneficiaries of the reforestation project who are likely to experience significant outcomes if the project is successful. One of the prevailing outcomes of reforestation is the enhancement of wildlife habitat associated with this forest ecosystem.

Many participants from the recreational users stakeholder groups noted that visitation would likely increase as a result of the reforestation. This is linked to the fact that the reforestation enhances habitat for wildlife, which improves hunting, fishing, birdwatching, and general recreation.

Number of stakeholders directly engaged: 7
Method of engagement: 4 stakeholders participated in a focus group; 2 stakeholders participated in one-on-one interviews.

Hunters

A significant number of visitors who frequent the Tensas River NWR are hunters. Game species commonly hunted on the Tensas River NWR include deer, waterfowl, rabbit, squirrel, and raccoon. The refuge, in addition to allowing hunting access to users with hunting permits, holds annual lottery hunts for deer as well as hunts for physically challenged hunters and for youth hunters. The reforestation adds to the total footprint of the refuge and is anticipated to become future hunting grounds.

Fishers

The Tensas River NWR also supports a fair amount of recreational fishing. The terrain is mostly forested interspersed with ponds, lakes, and small rivers that can be used for fishing. Recreational fisherman are able to fish for a variety of freshwater fish on the NWR land.

General recreation

Non-consumptive forms of recreation typically enjoyed in the Tensas River NWR include nature study, hiking, and camping. Refuge staff noted that a significant number of their non-consumptive recreational users are from out of state. It is anticipated that overall site usage for general recreation will increase with the inception of the reforestation project. During focus groups and interviews with local stakeholders, recreational users anticipated increased usage of the site for general recreation as the reforested trees grow and components of the ecosystem begin to change. This would represent a unique opportunity for visitors to experience the process of restoring the landscape to its historical state.

Birders

One category of recreational user that was distinguished by stakeholders in both focus groups and interviews was birders. Several stakeholders noted that increased opportunities for recreational birding within the refuge would accompany reforestation. As the refuge already provides significant nesting habitat for migratory birds, the addition of more acres will likely increase the amount of birds, and birdwatchers, that use the site.

State and federal wildlife managers

State and federal wildlife managers are directly impacted by changes to their workload and routines as a result of reforestation. A total of nine biologists, foresters, and wildlife managers from U.S. Fish and Wildlife Service currently manage the Tensas River NWR. The implementation of reforestation projects encompasses work on maintenance and monitoring for refuge staff, according to stakeholder

interviews. Staff also work with wildlife managers from state wildlife areas throughout the region in the development of reforestation projects.

Number of stakeholders directly engaged: 3
Method of engagement: 1 stakeholder participated in a focus group; 2 stakeholders participated in one-on-one interviews.

Local business

Local and regional businesses and workers are beneficiaries who would likely experience outcomes following the reforestation in Tensas River NWR. Local business owners, according to stakeholder interviews, anticipate that the reforestation will bring more visitors to the area. These visitors will frequent local stores, restaurants, and hotels during their visit, potentially increasing revenue and creating new employment opportunities within local communities.

Number of stakeholders: 2
Method of engagement: 1 stakeholder participated in a focus group; 1 stakeholder participated in a one-on-one interview

Communities surrounding the site and downstream/wind of the restoration that benefit from ecosystem services such as water and air quality, storm protection, and soil stabilization

The Tensas River NWR surrounds several sparsely populated parishes that are predominately rural and agricultural. Many of these parishes have small town centers where some residents live, but most residents tend to be dispersed across an area that has been largely clear-cut for timber and subsequently turned into agricultural fields. Residents in these surrounding parishes could potentially experience a number of local-scale primary impacts of reforestation, such as improved air and water quality, lowered costs of waste treatment, storm protection and water infrastructure maintenance, and changed or lowered cost of biological control. In addition to this, Big Lake Wildlife Management Area, a state protected wildlife conservation area, is directly downstream from the Tensas River NWR and benefits from these downstream/wind impacts of reforestation. Furthermore, reforestation in the Tensas River NWR helps control runoff into the Mississippi River, which borders the Tensas River NWR to the east and southeast.

Number of stakeholders directly engaged: 6
Method of engagement: 4 stakeholders participated in a focus group; 2 stakeholders participated in one-on-one interviews.

Communities that benefit from other ecosystem services

Several communities surrounding the site benefit from the increased amount of forested space the reforestation creates. As expressed in interviews, stakeholders associated the addition of reforested areas with facilitating some aspects of cultural traditions, such as hunting, and the preservation of historic sites, such as historic buildings and Indian mounds. The value of these impacts is understood broadly in terms of cultural and historical value for future generations.

Number of stakeholders directly engaged: 8

Method of engagement: 6 stakeholders participated in a focus group; 2 stakeholders participated in one-on-one interviews.

Community groups and non-profit organizations involved with NWR activities

Several members of the non-profit membership group "Friends of the Tensas River Refuge Association" participate regularly in organizing community educational and recreational events within the Tensas River NWR. This group, which currently totals six members, is a major beneficiary of the reforestation and is likely to experience significant outcomes working with community members taking part in educational and recreational activities that the reforestation supports. For this group, reforestation expands the footprint of the refuge and provides more opportunities for hunting, fishing, education, and other community enrichment opportunities that the group facilitates. As expressed in interviews, most of the members experienced a sense of accomplishment and well-being because of their participation in community activities on the refuge. Reforestation enhances their capacity to participate in these activities. It also gives them a sense of cultivating stewardship of the refuge for future generations.

Number of stakeholders directly engaged: 5
Method of engagement: 5 stakeholders participated in a focus group.

Education and research

Several regional school districts surround the Tensas River NWR. Refuge staff noted that with increased reforestation as well as increased access to reforested areas, such as boardwalks, the refuge is used more and more by local schools for educational purposes. Likewise, the Friends of the Tensas River Refuge group regularly organizes educational programs for youth groups, disabled individuals, and the elderly community. As indicated in stakeholder focus groups and interviews, reforestation has increased the availability of land for hosting these programs.

Number of stakeholders directly engaged: 1
Method of engagement: 1 stakeholder participated in a one-on-one interview.

4.0 Research Methodology

4.1. ADVISORY MEETINGS AND FIELD VISITS

In October and November 2016, The Water Institute had several advisory meetings and field visits regarding the Tensas River NWR case study. These meetings were used to delve deeper into the logistics of the project and relevant background of reforestation efforts on the Tensas River NWR. During this time, The Water Institute met with U.S. Fish and Wildlife Service refuge managers working on the Tensas River NWR. In these meetings, The Water Institute inquired into: collected data on visitor use to the Tensas River NWR; the environmental footprint of the reforestation project; the amount of jobs reforestation might bring to the area; how the project fits into an existing landscape of environmental management and reforestation practices; and recommendations on potential stakeholders with whom to speak.

Table 6. Dates of fieldwork activities between September 2016 and December 2016

Date	Meeting Type	Location	Parties Present
10/11/16	Advisory meeting	Phone meeting regarding Tensas	TWI, Lower Miss. River Joint Venture
11/16/16	Advisory meeting and field visit	Tallulah, LA	TWI, USFWS, Tensas River Refuge Association
11/17/16	Advisory meeting	Phone meeting regarding Tensas	TWI, LSU Agrotourism
12/15/16	Focus group	Tallulah, LA	TWI, Tensas River Refuge Association

4.2. OUTREACH STRATEGIES

After initial meetings and collection of stakeholder names and organizations, The Water Institute compiled a list of potential stakeholders, individuals and organizations to contact for participation in either a focus group or one-one-one phone or in-person interview. Through phone calls and emails, The Water Institute attempted to get in touch with 30 stakeholders pertaining to the Tensas River NWR reforestation. Individuals who were contacted were invited to attend one of the focus group sessions and/or to conduct a one-on-one interview.

4.3. FOCUS GROUP MEETINGS

The Water Institute conducted one focus group session on the Tensas River NWR. The Water Institute decided to use focus groups in order to create an opportunity to reach several stakeholders at the same time. Another motivation is also to foster general discussion amongst participants about the meeting topics, which often enhances and expands the extent and detail of their responses to questions.

The Water Institute worked with a volunteer organization that regularly works with the Tensas River NWR staff to host the 2-hour focus group meeting and dinner. The meeting was structured in a way to maximize the amount of time for gathering stakeholder input on the values and uses of the Tensas River NWR as well as perceived outcomes, both positive and negative, of reforestation. With a total of six attendees, The Water Institute staff facilitated a group discussion that covered the topics of: economic value, recreational value, educational value, ecological value, and flood protection value of the Tensas before and after reforestation. Discussion also included questions about changing use of the Tensas River NWR and unintended negative outcomes of the reforestation project. All collected notes and responses were recorded by The Water Institute and coded using MAXQDA qualitative coding software.

4.4. ONE-ON-ONE INTERVIEWS

The Water Institute, in consultation with Restore the Earth, created a long-form interview guide (Appendix A2) for the Tensas River NWR case study that was used for one-on-one phone and in-person conversations with stakeholders. The interview guide has five sections and approximately 50 questions. Interviews covered the following: background and use of the Tensas River NWR; quantitative attribution of economic, recreation, education, cultural, ecological, and flood protection value of the Tensas River NWR; quantitative attribution of economic, recreation, education, cultural, ecological, and flood protection value of the Tensas River NWR after reforestation; assessing monetary value of reforestation; and drop-off, deadweight, and displacement of outcomes (unintended negative outcomes). Using this

interview guide, The Water Institute mixed qualitative and quantitative questions to be able to measure perceptions of change and outcomes of reforestation projects as well as describe what those numerical attributions meant to each participant and their relative stakeholder groups.

5.0 Inputs

5.1. IDENTIFYING AND VALUING INPUTS

Financial capital inputs for the Tensas River NWR reforestation project were encompassed entirely by Entergy Corporation in the amount of $1,546,000, which includes the labor, time, land, and money necessary to complete the reforestation project. Other inputs include the time and labor to maintain the site, estimated at $1,758,783 over the life of the project. The inputs of other stakeholder categories are considered not relevant because when federal land managers and local businesses provide input to the project, it is corporate sponsors and their partners that distribute those funds and run the reforestation. In sum, the total input of capital, labor, time, and land needed to restore and maintain the reforestation site is valued (in currency) at $3,304,782.51 over the life of the project.

6.0 Analysis of outcomes

The Water Institute's qualitative research was an attempt to "ground test" the social change that accompanies the Tensas River NWR restoration project through qualitative and quantitative research among stakeholders. The following paragraphs describe changes experienced by stakeholders as they were described to The Water Institute through focus groups, meetings, and one-on-one interviews.

6.1. OUTCOMES EXPERIENCED BY STAKEHOLDERS ENGAGED IN THE QUALITATIVE PHASE OF RESEARCH

6.1.1. The Environment

The most direct and documented benefits of reforestation are ecological. These are predominately associated with the environment stakeholder group and are associated with the enhancement of environmental functions, such as water quality, air quality, soil stabilization, enhanced ecosystem functions, and the creation and maintenance of wildlife habitats. Beyond this, carbon sequestration, phosphorous and nitrogen capture are several of the outcomes of the project that are beneficial to the environment. These environmental impacts are those that are recognized by the scientific community, although the benefits may not be immediately recognized by local stakeholders. In some cases, these benefits may not manifest in ways identifiable by community residents until some point in the future. As the only stakeholder group that cannot speak for itself, the environment is unique in that its outcomes were predominately articulated by scientific research contracted by Restore the Earth, as well as secondary literature. With this in mind, it should be noted that all environmental outcomes were described by Restore the Earth first and foremost and, where needed, The Water Institute provided expert review of proposed outcomes by those working directly with Restore the Earth as well as colleagues from the ecological sciences that work at The Water Institute. Finally, it is important to note that environmental benefits are global in nature in terms of their impacts on society. The various kinds of ecological functions that reforestation provides creates a clearer, healthier environment for generations to come.

6.1.2. Corporate Sponsors

For corporate sponsors, the reforestation provides an opportunity to contribute monetary support to these environmental sustainability projects, enabling them to build upon their corporate reputation in the area affected. According to third party literature, when a company is seen by a community as a good neighbor, the activities of that company are often legitimized and therefore able to continue with the consent of those affected by the activity. This outcome can be understood as granting corporations a social license to operate by local stakeholders and communities, and fostering connections between employees and the environment. These sponsors will also potentially receive market benefits in the form of carbon and water offsets assigned to them by project sponsors.

6.1.3. Current landowners with property adjacent to the refuge

As mentioned above, the land that the Tensas River NWR is on has been acquired through the acquisition of private lands previously timbered and turned into agricultural production. This happened, and continues to happen, piecemeal, which results in several tracts of private land being encompassed by the refuge. The increase in forested areas has increased the restoration and recreational value of private land

within the refuge as well as land adjacent to the Tensas River NWR. With the prices of agricultural value for land declining in the region over the past 30 years, reforestation has become given landowners new value for their land through agreements to reforest or conserve parts of the private holdings to being able to lease lands they own to visitors interested in hunting the areas in and around the Tensas River NWR. As such, for some landowners, reforestation has become a way to extract new profitability from their land. As one stakeholder put it, "if you have land next to the NWR you have a goldmine," (Tensas one-on-one interview 11/2017).

Table 7. Current landowners with property adjacent to the refuge

Outcomes	Statements from Stakeholder Affirming Outcomes
• Increased value of property	"Economically, in a positive light, [reforestation has made] the recreational value has gone through the roof. If folks from down south that are affluent, they invest in the land for hunting. It's very much positive if you own land - it's made the value of land go up tremendously." " In the last few years recreational property - property with timber, ducks, and deer - has sold for more than farmland."

6.1.4. Tenant farmers

The parishes surrounding the Tensas River NWR have been primarily agricultural for the past 30 years. The refuge is established on former agricultural land that has been reforested through private land acquisition. While this might be a sound investment for landowners, many farmers in the region rely on the availability of farmland to rent in order to make a living. Reforestation takes available land for farming off the market, reducing available land. While most land put into reforestation is considered marginal (i.e. not productive), stakeholders noted that many regional farmers have felt that reforestation negatively impacts their ability to make a living. Coupled with an already poor regional economy, this is an important outcome for tenant farmers.

Table 8. Tenant farmers

Outcomes	Statements from Stakeholder Affirming Outcomes
• Loss of agricultural land	"Only negative is that we lost some good valuable farmland to it. A couple thousand acres or more that pulled in some of the revenue for local folks."

6.1.5. Conservation organizations

Regional and national conservation organizations are also invested in aspects of reforestation, but with a particular focus on habitat restoration. As stakeholders at the focus group noted, reforestation would enhance projects conservation groups have initiated in the area, working to strengthen and expand the footprint of vegetation that provide habitat and nesting space for migratory birds. This also serves the groups' specific wildlife and ecological conservation commitments (Tensas one-on-one interview 2/2017). From the viewpoint of wildlife conservation specifically, the Mississippi Alluvial Valley flyway creates a valuable wintering space for many species of migratory bird.

Table 9. Conservation organizations

Outcomes	Statements from Stakeholder Affirming Outcomes
• Enhances refuge habitat	"The reforestation has certainly increased the wildlife habitat."
• Supports their wildlife conservation mission	"To bring forested wetlands back is huge for migratory bird species. They need sustainable and viable forests."

6.1.6. Recreational users

The Tensas River NWR is a popular public recreational area in Louisiana, particularly for hunting and fishing activities. With reforestation, the refuge and region have increasingly become a destination for other forms of recreation, such as birdwatching, hikes, and canoeing (Tensas one-on-one interview 12/2016). As such, many of the participants The Water Institute spoke with identified the importance of this area as a space for recreational activities. This outdoor culture is shared by recreational users living adjacent to the site as well as those that drive long distances to spend time there hunting and recreating. To these stakeholders, the reforestation of parts of the Tensas River NWR provide increased spaces and opportunities for engaging in all recreational activities (Tensas focus group 12/2016). This is because the re-establishment of the native forest ecosystem impacts the diversity of wildlife and landscape within the refuge that is key to the cultural benefits of recreational use.

Table 10. Recreational users

Outcomes	Statements from Stakeholder Affirming Outcomes
• Creates increased opportunities for hunting, fishing, wildlife viewing, general recreation, and birdwatching	"Thicker vegetation brings the birds and the birders here and the photographers to photograph them." “The area has become nice to go to…an area with a more contiguous land base from a view of viewing it. Increased the habitat and the hunting has gotten better"

6.1.7. State and federal wildlife managers

State and federal wildlife managers are ultimately responsible for the long-term maintenance of the reforestation by their staff. The value of the restored habitat and resources needed to manage the Tensas River NWR are directly related to the number of recreational users and visitors to the refuge which, if the reforestation is successful, is assumed to increase, creating the need for addition wildlife management staff. While the project does not provide additional funds to the refuge to hire more staff, the successful implementation of the project could lead the refuge towards being able to leverage for future increases to staff and resources for managing the refuge as well as building critical facilities, such as access roads and boardwalks (Tensas focus group 12/2016).

Table 11. State and federal wildlife managers

Outcomes	Statements from Stakeholder Affirming Outcomes
• Creates new areas for USFWS management and monitoring	" Reforestation is an effort to speed up the natural succession of how forests grown. Gets you several more years down the road in a shorter amount of time. Hardwood typically grows slow. Long-term investment, you gotta look down the road."

6.1.8. Local business

During focus groups and interviews, other local business owners noted how reforestation on the Tensas River NWR could attract more visitors to the region, which would be expected to bring more business to local hotels, restaurants, gas stations, and other businesses (Tensas one-on-one interviews 12/2016). Third-party literature corroborates these expectations, noting that for every $1 million invested in reforestation projects, it will produce at least 18 jobs with an annual average salary of $28,080 (Garrett-Peltier 2009). However, focus group participants were hesitant to attribute too much value in this regard, as past reforestation has not made a consistent change in local economies.

Table 12. Local business

Outcomes	Statements from Stakeholder Affirming Outcomes
• Creates the potential of more visitors frequenting local businesses	"Campgrounds, hotels, gas stations. During the season they are booked every night. It might not carry someone for the entire year, but it's a nudge. Sporting goods store are popping up and doing decently well around the refuge for the past 10-20 years." "I'm not sure if there have been any direct impacts for business owners or me. I cannot say it's been more or less because of reforestation."

6.1.9. Communities surrounding the site that benefit from water and air quality, waste treatment, storm protection, soil stabilization, and biological control

Many of the communities surrounding the project site are in small, dispersed rural communities surrounded by agricultural lands. Reforestation of a portion of these areas restores the land to its natural ecosystem and, over time, contributes to increasing soil stabilization, air quality, and other ecosystem functions associated with forested ecosystems. Participants emphasized how clear-cutting of forests and subsequent development into agricultural land contributed to the degradation of the local environment, taking away green space and facilitating erosion. Reforestation would reverse these trends. Stakeholders discussed how reforestation could offset these trends, such as abating erosion and restoring hydrology, and that these benefits would increase over time as the forest grows (Tensas focus group 12/2016). For the purposes of understanding social return on investment, these outcomes are measured through cost savings and benefits of reduced erosion.

Table 13. Communities surrounding the site that benefit from water and air quality, waste treatment, storm protection, soil stabilization, and biological control

Outcomes	Statements from Stakeholder Affirming Outcomes
• Reduced erosion	"There was a lot of runoff and silt [...] it cut down erosion"

6.1.10. Communities that benefit from other ecosystem services such as habitat refuge and cultural value

Stakeholders within this category reflect the diverse cultural values that reforestation can provide. Many of the stakeholders in this community spoke to the general cultural value of having more accessible reforested land. There was a strong correlation to family histories, particularly around the use of forested land for hunting. As expressed in interviews, stakeholders expressed that reforestation enhanced these kinds of experiences that third party literature largely identifies as quality of life factors – factors that

produced more intangible social connections to the land. Stakeholders also mentioned that the Tensas River NWR, through reforestation efforts, is also able to preserve historic sites and buildings, such as archaeological sites of indigenous communities (Indian mounds) and former industrial buildings from the late 19th and early 20th century (Tensas focus group 12/2016). Finally, this category of stakeholders also acknowledged the educational value of reforestation, especially for youth in the surrounding parishes that have little experience or knowledge of the area's native ecosystems.

Community groups and non-profit organizations involved with Tensas River NWR activities

Like many of the national wildlife refuges across the U.S., the Tensas River NWR has a designated volunteer group – a "friends" group – that works with federal wildlife managers on the refuge to help organize programs to encourage use of the refuge. These include creating opportunities for youth, disabled, and elderly visitors to experience the recreational opportunities of the refuge, particularly hunting. They also hold annual events with local scouting groups and fundraisers for their organization as well as for materials refuge staff might need. During stakeholder focus groups and interviews, several members of the Friends of the Tensas River Refuge Association stated that reforestation would enhance the diversity of programming that their group can offer to the public. This is largely because reforestation projects like the one being evaluated in this report expand the footprint of public land. As one participants noted, with reforestation the land was "no longer [owned] by one big corporation and now everyone can enjoy it" (Tensas interview 12/2016). Other participants from the group also emphasized the special nature of creating opportunities for the public to have more access to using the refuge.

Education and research

Also within this category, education and research stakeholders are included because of the many uses the reforested area provides to K-12 students for environmental research about the native ecosystem of the area. Stakeholders noted an increase in taking school and youth groups to the refuge. This is connected to reforestation as well as to other things, such as the construction of paved access roads and a visitor’s center. As such, these outcomes are measured in terms of educational value within the broader category of the cultural benefits to communities.

Table 14. Communities that benefit from other ecosystem services such as habitat refuge and cultural value

Outcomes	Statements from Stakeholder Affirming Outcomes
• Sense of accomplishment and community pride	"Mom made her become a member. My grandfather brought me here as a kid, to Rainey lake. I've enjoyed the kids hunt and kill their first deer. And the handicap hunt is special. I have pictures on my phone from the first deer hunt - kids that don't have the opportunity." "[I was] raised in the area, my grandchildren are coming along and I didn't want this place to go away. I was resentful of this place for a long time till I got it figured out. I want to leave something."
• Cultural preservation value and heritage	"Cultural resources, mounds, slave ditches and slave levees all through the refuge - reforestation builds the footprint of savable lands." " I got involved for my kids and my grandkids - we have property that is surrounded by the refuge [...] our culture is southern [...]My daughters would rather hunt than breath."
• Sustained or increased opportunities for educational and research programs for k-12 and environmental researchers	"Prior to restoration it was just corporate vs. now where you have kids [out there] to learn. The opportunity was there before but it wasn't being utilized."

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Figure 4: Educational trail through bottomland hardwood forests in Tensas River National Wildlife Refuge

7.0 Theory of Change

A theory of change describes and summarizes the objectives, inputs, outputs, and outcomes of programs and activities on different stakeholder groups (Social Ventures Australia Consulting, 2011). It is additionally a pathway linking the activities of these programs and activities to short-term, medium-term, and long-term outcomes experienced by these stakeholder groups (Ireland, 2013). The theory of change described here delineates how various groups of stakeholders experience and perceive material change resulting from the inputs of the Tensas River NWR reforestation project.

Collected data was carefully analyzed to determine the changes experienced by stakeholder groups and their interrelations. As previously described, the input costs for labor, time, land, and money are accounted for within the inputs provided by corporate sponsors. This input culminates in the central input of the project: 1,943 acres of restored forest. As such, the theory of change for each stakeholder group other than corporate sponsors is derived from the relationship between the planting of these 1,943 acres of forest and the respective outcome for each stakeholder group.

The results of the qualitative portion of this research revealed that there were differences in the ways that groups of people potentially impacted by the reforestation project were able to engage with the project site. The development of the theory of change highlights these differences and identifies those outcomes unique to each stakeholder group. Based on observation, past experience, and initial data gathering, 10 general groups of relevant stakeholder groups were identified.

Table 15. Corporate sponsors

Objectives	Inputs	Outputs	Outcomes
• Successful reforestation	• Restoration costs (financial donation)	• 1,943 acres of land acquired to restore	• Enhances Entergy Corporation's reputation
• Builds company reputation	• Monitoring costs		• Carbon offsets
• Positive environmental impacts			• Nitrogen offsets
			• Phosphorous offsets

Corporate sponsorships have been key partnerships that enable the reforestation of land on the Tensas River NWR and expanding its footprint. The 1,943 acre reforestation project in the Tenses NWR is one of many past and future reforestation projects developed between corporate sponsors and USFWS in the Mississippi Alluvial Valley. For corporate sponsors in particular, the reforestation provides an opportunity to contribute monetary support to these environmental sustainability projects. To work towards this outcome, corporate sponsors invest the time and money needed to conduct the reforestation. This includes monitoring and upkeep costs in addition to purchasing trees and labor for the initial

planting. The primary outcome of this project for corporate sponsors is the enhanced reputation the company will receive from a successful project. This will allow corporate sponsors to continue to make progress towards their corporate responsibility and environmental stewardship goals, particularly in the Mississippi Alluvial Valley. When a company is seen by a community as a good neighbor, the activities of that company are often legitimized and therefore able to continue with the consent of those affected by the activity. By investing in community projects such as the Tensas reforestation, the corporate sponsors are anticipated to experience increased social acceptance as an outcome. Additionally, corporate sponsors are assigned environmental offset credits, resulting in a market return on investment for these stakeholders.

Table 16. Conservation organizations

Objectives	Inputs	Outputs	Outcomes
• Enhances refuge habitat	• 1,943 acres of public land	• Partially restored ecosystem	• More reforested public land
• Supports wildlife conservation mission		• Partially restored ecosystem	• Enhanced habitat for bird species throughout the broader Mississippi Alluvial Valley Flyway

As stakeholders at the focus group noted, the reforestation enhances efforts conservation groups have initiated in the area, working to strengthen and expand the footprint of vegetation that re-establishes native ecosystems that are vital to the general public and their specific wildlife and ecological conservation commitments (Tensas one-on-one interview 2/2017).

Table 17. Current landowners with property adjacent to the refuge

Objectives	Inputs	Outputs	Outcomes
• Enhances refuge habitat	• Utilization of ecological amenities resulting from 1,943 acres of public land	• Partially restored ecosystem	• Increased amenity value of land

For current landowners with property adjacent to the refuge or within the footprint of the Tensas River NWR, the value of their property increases due to their proximity to reforested areas. As the amount of reforested areas increases around their property and in the region, their land becomes more valuable. These values are associated with the possible value of selling their land for reforestation or leasing it for hunting purposes. With the prices of agricultural value for land declining in the region over the past 30 years, reforestation has become given landowners new value for their land through agreements to reforest or conserve parts of the private holdings to being able to lease lands they own to visitors interested in hunting the areas in and around the Tensas River NWR.

Table 18. Tenant farmers

Objectives	Inputs	Outputs	Outcomes
• Increase acres of reforested land	• Marginal farmland	• Loss of available agricultural land	• Temporary or permanent loss of jobs and/or income

For tenant farmers, reliant on the availability of agricultural land, reforestation contributes to the loss of land for farming because reforested lands are typically marginal farmland. The extent to which this land would have produced a significant amount of value for tenant farmers was perceived as largely minimal according to most of the stakeholders The Water Institute spoke with. Nevertheless, every acre reforested is an acre that might have held some agricultural value. This is significant to tenant farmers because they do not own the land, so they do not have the power to decide whether or not agricultural land will or will not be sold to be reforested. This is one of the primary negative outcomes of the reforestation as described by stakeholder groups who work with tenant farmers – local landowners and state university agricultural extension employees. As such, reforestation is perceived by many tenant farmers to exacerbate an already tenuous economic situation for them in the region. This could result in fewer jobs or people moving out of the region in search of new jobs because farming is no longer profitable (Tensas one-on-one interview 12/2016).

Table 19. Recreational users

Objectives	Inputs	Outputs	Outcomes
• Enhancement of biodiversity and wildlife for hunting, fishing, and trapping	• These stakeholders are not directly involved in providing inputs into the project. They utilize the outcomes of the reforestation project, spending time using the site after it is completed	• Enhanced habitat for recreational activity	• New areas available for hunting
• Increased opportunities for recreation			• New areas available for fishing
			• New areas available for general recreation
			• New areas and species available for birdwatching

One of the prevailing outcomes of creating 1,943 acres of forest is the enhancement of wildlife habitat associated with this forest ecosystem in the region. Many participants from the recreational user stakeholder groups noted that visitation would not drop-off but most likely increase as a result of the reforestation (Tensas focus group 12/2016). This is linked to the fact that the forest enhances habitat for wildlife, which improves hunting, fishing, birdwatching, and general recreation. While most recreation users of the Tensas River NWR are hunters and fishers, many noted that the return of the forests would encourage more general recreation users to begin to utilize the site, whether for kayaking and paddling, or hiking and camping (Tensas focus group 12/2016). The restoration of cypress habitat would also be expected to draw new bird species to the area, which would increase the usage of the site by birdwatchers.

Table 20. State and federal wildlife

Objectives	Inputs	Outputs	Outcomes
• Enhance wildlife habitat	• Time and labor	• Partially restored ecosystem	• Restoration of native ecosystems
• Gain of temporary or permanent employment	• Site maintenance	• Potential for future additional forests created	

National wildlife refuges across the U.S. are designed to protect wildlife. The staff of the Tensas River NWR has this as their priority. Reforestation enables them to achieve this goal by providing the resources to expand wildlife habitat as well as enhance existing habitat through the reforestation of agricultural fields back to their natural habitat. The primary input of refuge staff is to assist with siting, monitoring, and maintaining the reforested areas. As the reforested area increases the acreage of the refuge and land refuge staff manages, a direct outcome and change for them is an increase of habitat to work on. This might eventually transform into hiring additional staff to maintain the refuge as it increases in size through future reforestation projects.

Table 21. Local business

Objectives	Inputs	Outputs	Outcomes
• Enhanced local business due to potential increasing visitation to the Tensas River NWR	• Resources, services, and goods	• Potential for increased regional revenue	• Enhanced business and employment opportunities
• Reforestation of site	• Time and labor	• Income	• Direct employment for local nursery and planting services

The Water Institute spoke with several local business owners in the Tensas River NWR region who noted that reforestation seems to have resulted in more visitors frequenting local business, such as groceries, hotels, restaurants, gas stations, etc. during hunting seasons. Stakeholders were quick to point out that while they do notice an increase in customers at local business during hunting seasons, it is not clear how directly this is correlated to this particular reforestation project. Reforestation and the establishment of the Tensas River NWR over the past 15 years has seemed to bring more outside visitors to the region, contributing to the local economy (Tensas one-on-one interview 12/2016). Despite this, it is difficult to assess the specific economic impact of general reforestation activities, let along the precise impact of the acres this report examines. Stakeholders did note that local nurseries and labor were used for this particular reforestation project, creating jobs for the duration of the planting and initial maintenance. As a framework for assessing these values, third party literature suggests that for every $1 million invested in reforestation projects, it will produce at least 18 jobs with an annual average salary of $28,080 (Garrett-Peltier 2009). Nevertheless, this is a poor region where reforestation activities have not reversed a downward economic trend. Biologists and wildlife managers currently employed by the Tensas River NWR suggest that they will spend additional hours maintaining the reforested site, as well as future ones, which might not lead to additional income, but might give them the capacity to leverage for additional staff or funding for the refuge.

Table 22. Communities surrounding the site that benefit from water and air quality, waste treatment, storm protection, soil stabilization, and biological control

Objectives	Inputs	Outputs	Outcomes
• Improve water quality	• These stakeholders are not directly involved in providing inputs into the project. They utilize the outcomes of the reforestation project, using the natural capital the forests provide	• Partially restored ecosystem	• Enhanced water quality
• Improved air quality	• These stakeholders are not directly involved in providing inputs into the project. They utilize the outcomes of the reforestation project, using the natural capital the forests provide	• Partially restored ecosystem	• Enhanced air quality

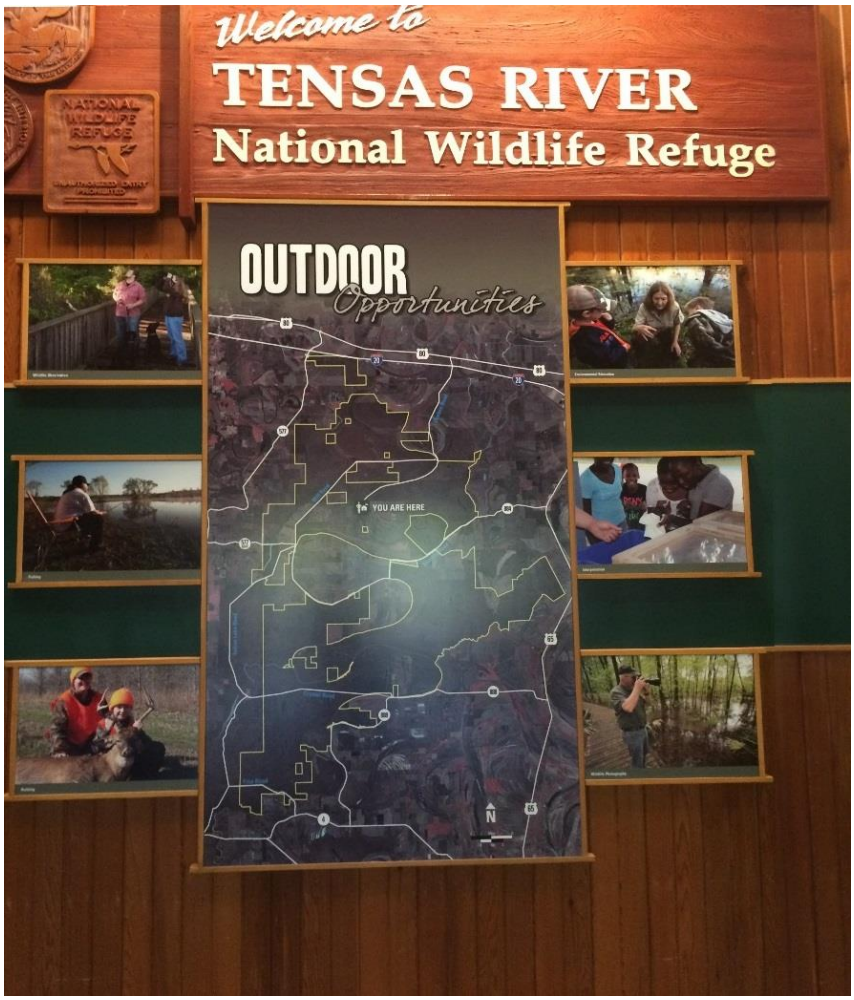
Residents living in communities surrounding the reforestation site see the greatest outcomes of the project as the enhanced air and water quality that reforestation provides. The increased biomass of trees contributes direct benefits to adjacent communities and those downstream. Along these lines, it helps to restore hydrology and water quality. It is important to remember that these were barren or marginally used agricultural used agricultural fields prior to reforestation, so by planting trees on the site these shared environmental benefits for adjacent communities grow and are enhanced over time as the forested areas mature.

Table 23. Communities that benefit from other ecosystem services such as habitat refuge and cultural value

Objectives	Inputs	Outputs	Outcomes
• Contribute to community efforts to promote sustainable local communities and environments	• These stakeholders are not directly involved in providing inputs into the project. They utilize the outcomes of the reforestation project, using the natural capital the forests provide	• Partially restored ecosystem	Cultural and historical value of family traditions tied to the forested landscape
• Sense of community pride		• utilization of 1,943 acres of forest planted	• Enhanced sense of wellbeing
• Presents educational opportunities for students to engage with reforestation projects		• Increased frequency of cultural use of the Tensas River NWR	• More educational programs and opportunities

Community groups and volunteers associated with Tensas River NWR

Like many federal wildlife refuges across the U.S., the Tensas River NWR has a non-profit membership group – a "friends" group – that works with refuge staff to organize events and help with programming for the public on the refuge. This group, while not directly involved in planting or maintenance of the reforestation project, is instrumental in amplifying and extending the benefits of the reforestation to several local and regional stakeholder groups. Through the additional 1,943 acres of reforested land, members are able to expand the scope of their programming. Coordinating and participating in these events, according to stakeholders, gives them a sense of accomplishment and wellbeing. Without consistent reforestation efforts, these outcomes could not be achieved. Through participating in group programs, many of these stakeholders developed a more personal connection toward environmental and supportive of future reforestation projects (Tensas focus group 12/2016).



Education and research

Having a restored ecosystem, and in particular being able to see the system mature over time, also provides a valuable learning experience to researchers and educators in the region. With additional reforestation projects, the Tensas River NWR has increasingly been used for school groups in the region to teach them about native forested ecosystems (Tensas focus group 12/2016). With the implementation of the reforestation project, educators and researchers would likely experience significant outcomes in the form of enhanced educational opportunities for both teachers and students as they are able to directly engage with ongoing reforestation projects. This is an educational opportunity they would not have if the project was not initiated.

Table 24. Other environmental benefits

Objectives	Inputs	Outputs	Outcomes
• More trees	• 1,943 acres of reforested land	• Carbon sequestration	• Improved air quality
• Increased biomass		• Increased Oxygen/Cleaner Air	• Reduced levels of greenhouse gasses
• Reduce the impacts of climate change		• Improved soil formation and nutrient cycling	• Increased waste treatment capacity
		• Erosion control and sediment retention	
		• Breakdown and recovery of excess nutrients and compounds	

With restoration projects such as the reforestation the Tensas River NWR, many of the social benefits of the project are not immediately apparent to stakeholders and others may not manifest for several years. For example, the environmental value of carbon, nitrogen, and phosphorus for other stakeholders and society at large are generally not identified as outcomes through stakeholder engagement. To account for these more intangible assets, the environment is considered as a stakeholder, as though it were a person or an organization. These environmental outcomes were therefore derived from the scientific literature. For every acre restored, valuable ecosystem functions are achieved, such as carbon sequestration, nitrogen and phosphate storage, erosion mitigation, and enhanced air and water quality. These biophysical functions are the result of reforestation effects and will be sustained long after the project is complete. Furthermore, these ecological functions are vital to off-setting carbon emissions. In short, investing in reforestation produces a diverse array of environmental benefits. Furthermore, these benefits not only persist over time, but are widely shared amongst stakeholder groups.

8.0 Discount Factors

8.1. COUNTERFACTUAL (DEADWEIGHT) [MIGHT THIS CHANGE HAPPEN ANYWAY?]

One-on-one interviews and surveys with stakeholders were used to assess the impacts of reforestation on various stakeholder groups. In the case off all stakeholder categories, respondents felt that the outcomes identified would not have occurred if the reforestation project did not happen. Deadweight was therefore calculated for 0% across all stakeholder categories because no stakeholder identified any changes that would have happened without the reforestation. The additional social and environmental benefits of reforestation would not have been realized without the additional acres of tree planted. Furthermore, The Water Institute, through their qualitative research with stakeholders and through reviews of third-party material, did not find any other anticipated reforestation projects for the area. Thus, the estimated levels of deadweight for all stakeholder group outcomes are 0%.

8.2. ATTRIBUTION [WHAT ELSE MIGHT CONTRIBUTE TO OUTCOMES?]

Without the reforestation project, none of the outcomes for any of the stakeholder groups would be possible. The Water Institute, through their qualitative research with stakeholders and through reviews of third-party material, did not find any other anticipated reforestation projects for the area. Therefore, no other outcomes associated with tree planting are anticipated to occur because no other project has been identified. This kind of project would be the only other factor that might create the outcomes identified by stakeholder groups. Thus, the attribution rate for all stakeholder group outcomes is 0%.

8.3. DISPLACEMENT [WHAT MIGHT BE DISPLACED BY THE OUTCOMES?]

In general, the outcomes identified by stakeholders in the qualitative phase of the research conducted by The Water Institute were not directly correlated to displacing any specific activities. As several stakeholders noted, the primary group that might experience some form of displacement would be tenant farmers. While stakeholders noted this as important to consider, there was consistent emphasis by multiple stakeholders that the farmland taken out of use by reforestation was already marginal. The Water Institute calculated the displacement rate at -200%, which factors in average annual revenue loss per acre and lost agricultural subsidies per acre. The displacement rate for all other stakeholder group outcomes is 0%.

8.4. DROP-OFF FOR STAKEHOLDER GROUPS

Across all stakeholder groups in qualitative research conducted by The Water Institute there was no anticipated drop-off in outcomes of the Tensas River NWR project area indicated as a result of reforestation. In interviews, focus group conversations, and other meetings conducted with 15 individuals from stakeholder groups associated with the Tensas reforestation, no stakeholders noted any form of reduction of anticipated outcomes as a result of reforestation. A few stakeholders noted that use of the refuge might not necessarily increase because of reforestation but, nevertheless, reforestation would not reduce visitation or any other outcomes (Tensas focus group 12/2016). In order to assess the levels of drop-off for outcomes during the qualitative portion of the research, stakeholders were asked if they anticipated a drop-off in use or the outcomes of the reforestation project for their particular stakeholder group. Since no groups anticipated drop-off, the drop-off levels for all other stakeholder group outcomes was estimated as 0%.

9.0 Attaching Values to Outcomes

For attaching values to outcomes, our goal was to find the most up-to-date, peer-reviewed materials to use for the calculation of financial proxies across outcomes. Where possible, we looked for the most regionally specific calculations beginning from the Mississippi Alluvial Valley to the southeast U.S. region and, where there was no regionally specific information, to the U.S. national level. Peer-reviewed figures from federal and state agencies were prioritized, depending on dates they were produced. Where other third-party peer-reviewed figures were more recently produced or updated, those figures were used. Reports from the U.S. Fish and Wildlife Service, self-reported data from the Tensas River NWR staff, and data provided by Restore the Earth about the Tensas reforestation were given priority for calculating values. In addition to these reports, recent research conducted by the RAND corporation on the social-economics impacts of coastal restoration have provided many of the formulas and financial proxies for non-monetary outcomes (Barnes et al. 2015). Where these criteria could not be met for peer-reviewed

proxies, recent international reports were used to make calculations, particularly for some of the more intangible values of well-being and sense of accomplishment tied to volunteerism. Those values were adjusted by The Water Institute to reflect the circumstances of Restore the Earth reforestation project.

Figure 5: Balmoral Indian Mounds at Tensas River NWR

Table 25. Financial proxies for Tensas River EcoMetrics Model

Stakeholders	Stakeholder Subgroup (if applicable)	Outcomes	Financial Proxy	Duration	Value per Unit	Quantity	Total Value	Justification
Environment		Social value of carbon sequestered	Social cost of carbon ($/acre/year)	40	$43.61 to $427.60/acre/year	1,943 acres	$9,137,625.45	Social Cost of Carbon [Carbon Sequestration Tab, Row 30 Column C, Actual Values Tab Row 46] * Total carbon sequestered over the first 5 years of the project [Carbon Sequestration Tab, Row 21 Column D]
		Improved soil formation and nutrient cycling	Soil Formation ($/acre/year)	40	$26.00/acre/year	1,943 acres	$651,900.44	Citation [13] from Assumptions tab, Row 78
		Erosion control and sediment retention	Soil Stabilization ($/acre/year)	40	$0.42/acre/year	1,943 acres	$7,614.72	Max. estimate of soil stabilized [Stabilization Tab, Row 17, Actual Values Tab Row 58] * soil stabilization value [Stabilization Tab, Row 16, Actual Values Tab Row 57]
		Increased waste treatment capacity	Waste Treatment ($/acre/year)	40	$118.00/acre/year	1,943 acres	$2,958,625.08	Midpoint of $11-$225 [Assumptions Tab Row 79]
Corporate Sponsors		Market value of carbon sequestered	Value of carbon reduction ($/acre/year)	40	$15.00 to $475.20/acre/year	1,943 acres	$7,376,623.25	Carbon Price Forecast [Carbon Sequestration Tab, Row 18 Column D, Actual Values Tab Row 44] * Total carbon sequestered over the first 5 years of the project [Carbon Sequestration Tab, Row 21 Column D]

		Market value of nitrogen offset	Nitrogen Offset Credit ($/kg N)	40	$2.52/kg N	89,872.73 kg NO3-N annual denitrification	$1,921,196.94	Value of nitrogen offset credit [Nitrogen Mitigation Tab, Row 22, Actual Values Tab Row 51] * Net Base Case Nitrate Loss [Nitrogen Mitigation Tab, Row 20] * hectare/acre conversion
		Market value of phosphorous offset	Phosphorus Offset Credit ($/kg P)	40	$6.51/kg P	18,809.83 kg P annual retention	$902,108.56	Phosphorus Offset Credit Price [Phosphorus Retention Tab, Row 17, Actual Values Tab Row 54] * Max. Phosphorus Retention in Natural Wetlands [Phosphorus Retention Tab, Row 19] * hectare/acre conversion
		Social license to operate (effects to reputation; positive impact on communities)	26% of the $1,546,000 invested in the project is returned to the corporation due to increased reputation	10	$1,546,000	0.26	$401,960.00	Surveys and interviews; Citation [1] from Assumptions tab
Conservation organizations		Enhanced habitat refuge	Refuge habitat ($/acre/year)	10	$482.00/acre/year	1,943 acres	$11,349,707.34	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab
Recreational users (general recreational users, hunters, fishers, wildlife viewers and birdwatchers)	Hunters	Enhanced habitats for hunting	Hunting consumer surplus ($/person/day)	10	$67.11/person/day	14,874 annual hunting visitors	$12,881,016.69	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab
	Fishers	Enhanced habitats for fishing	Fishing consumer surplus ($/person/day)	10	$48.67/person/day	107 annual fishing visitors	$67,201.70	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab
	General recreation	Enhanced habitats for general recreation	General recreation consumer surplus ($/person/day)	10	$42.77/person/day	2,175 annual general recreation visitors	$1,200,421.15	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab

	Bird watchers	Enhanced habitats for birdwatching	Birdwatching consumer surplus ($/person/day)	10	$38.86/person/day	13,000 annual birdwatching visitors	$6,183,492.10	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab
Those employed by land prior to restoration	Tenant Farmers	Permanent loss of income on crop production	$/acre average annual revenue lost	40	$112.10/acre/year	1,943 acres	$3,956,850.21	Surveys, interviews, and meetings; Citation [4] in Assumptions tab
		Loss of government subsidy payed on agricultural land	$/acre lost agricultural subsidy	40	$36.83/acre/year	1,943 acres	$1,299,903.86	Surveys, interviews, and meetings; Citation [4] in Assumptions tab
Those employed directly and indirectly by the reforestation project	Those employed directly by the reforestation project	Direct employment for local nursery and planting services	Direct and induced jobs created * average wage ($/year)	3	$28,080.00/year	23 jobs created	$1,758,782.51	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab
	Local Business	Enhanced business opportunities	Indirect jobs created * average wage ($/year)	10	$28,080.00/year	51 jobs created	$2,518,717.25	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab
	State and federal wildlife managers	Enhanced habitat refuge	Refuge habitat ($/acre/year)		Shared value with Conservation organizations	1,943 acres		Surveys, interviews, focus groups, and meetings.
Communities surrounding the site and downstream/wind of it that benefit from water and air quality, waste treatment, storm protection, soil stabilization,		Enhanced Water Quality. Value of Marginal Nitrogen and Phosphorus Mitigation.	Value of marginal nitrogen mitigation ($/kg N)	40	$25.27/kg N	89,872.73 kg NO3-N annual denitrification	$18,159,176.33	Value of marginal nitrogen mitigation [Nitrogen Mitigation Tab, Row 21, Actual Values Tab Row 50] * Net Base Case Nitrate Loss [Nitrogen Mitigation Tab, Row 20] * hectare/acre conversion
			Phosphorus retention social value ($/kg P)	40	$338.95/kg P	18,809.83 kg P annual retention	$44,058,248.29	Phosphorus Retention Social Value [Phosphorus Retention Tab, Row 17, Actual Values Tab Row 54] * Max. Phosphorus Retention in Natural Wetlands

biological control								[Phosphorus Retention Tab, Row 19] * hectare/acre conversion
		Increased atmospheric oxygen and cleaner air	Air quality ($/acre/year)	40	$115/acre/year	1,943 acres	$2,883,405.80	Citation [13] from Assumptions tab, Row 77
Communities that benefit from other ecosystem services such as habitat refuge and cultural value	Community services and outreach	Sense of community pride; community gathering place	Amenity value ($/acre/year)	10	$5.00/acre/year	1,943 acres	$133,522.99	Surveys, interviews, focus groups, and meetings.
	Indigenous Community	Enhanced ecosystem that can be used for cultural rituals and traditions	Cultural value ($/acre/year)	10	$11.00/acre/year	1,943 acres	$293,750.59	Surveys, interviews, focus groups, and meetings; citations from [2] and [13] in Assumptions tab
	Educational users of the site	More educational programs and opportunities	Educational value ($/person/year)	10	$7.33/person/year	227 annual education visitors	$23,603.42	Surveys, interviews, focus groups, and meetings.

9.1. TESTING OUTCOMES FOR MATERIALITY

Outcomes of the Tensas River NWR reforestation project were determined by first analyzing collected material from the qualitative phase of research (see description in section 3 "Research Methodologies"). Collected data was coded with MAXQDA data analysis software to determine frequencies, differences, and similarities of outcomes identified by participants across stakeholder categories. Only outcomes identified by stakeholder groups during the qualitative research phase were included. Once outcomes were identified by stakeholder group, third party (secondary source) literatures were consulted to validate research findings within broader third-party literature and other relevant studies. Quantities for the Environmental stakeholder were based on the 1,943 acres for the reforestation project. Duration was provided by Restore the Earth consist with its EcoMetrics model. Third-party literature was consulted to determine the value of outcomes (discussed in section 9).

Depending on the stakeholder group, causality between the outcomes was determined based on stakeholder involvement and/or relevant third-party literature. All outcomes are directly linked to the reforestation project, as no other factors or inputs were determined to have caused any of the outcomes identified by stakeholder groups and third-party literature (see Section 7 Sensitivity Analysis for a discussion of sensitives and Section 8 for discount factors for all stakeholder groups). In short, the first event in the chain of events is the reforestation, to which all identified outcomes are directly linked. That is, through the establishment of a forest ecosystem, the various outcomes are achieved specific to different stakeholder groups. Relevance was determined by the materiality of the outcome, that is, if it was a material outcome articulated by a member of a stakeholder group during the qualitative phase of the research. For the Environment stakeholder, the only group that cannot speak for itself, relevance was determined by third party literature as well as suggestions by Restore the Earth.

Table 26. Testing stakeholder outcomes for materiality and significance

Stakeholders	Stakeholder Subgroup (if applicable)	Outcome	Indicator	Outcome identified by stakeholder during qualitative phase of research	Outcome confirmed by third party materials	Significance			Relevance
						Value	Materiality	Causality	
Environment		Social value of carbon sequestered	EPA Social Cost of Carbon	No	Yes	$9,137,625.45	Yes	Social Cost of Carbon [Carbon Sequestration Tab, Row 30 Column C, , Actual Values Tab Row 46] * Total carbon sequestered over the first 5 years of the project [Carbon Sequestration Tab, Row 21 Column D]	Relevant
		Improved soil formation and nutrient cycling	Soil composition	No	Yes	$651,900.44	Yes	Citation [13] from Assumptions tab, Row 78	Relevant
		Erosion control and sediment retention	Acreage, # of trees planted	No	Yes	$7,614.72	Yes	Max. estimate of soil stabilized [Stabilization Tab, Row 17, Actual Values Tab Row 58] * soil stabilization value [Stabilization Tab, Row 16, Actual Values Tab Row 57]	Relevant
		Increased waste treatment capacity	Water composition	No	Yes	$2,958,625.08	Yes	Midpoint of $11-$225 [Assumptions Tab Row 79]	Relevant
Corporate Sponsors		Market value of carbon sequestered	Carbon Price Forecast ($/t CO2-e) Medium Case and Average Sequestered (t	Yes	Yes	$7,376,623.25	No	Carbon Price Forecast [Carbon Sequestration Tab, Row 18 Column D, Actual Values Tab Row 44] * Total carbon sequestered over the first 5 years of the project	Relevant

			CO2-e/acre/year)					[Carbon Sequestration Tab, Row 21 Column D]	
		Market value of nitrogen offset	Value of the nitrogen offset portion of a water quality credit that includes both N and P offsets.	Yes	Yes	$1,921,196.94	No	Value of nitrogen offset credit [Nitrogen Mitigation Tab, Row 22, Actual Values Tab Row 51] * Net Base Case Nitrate Loss [Nitrogen Mitigation Tab, Row 20] * hectare/acre conversion	Relevant
		Market value of phosphorous offset	Value of the phosphorus offset portion of a water quality credit that includes both N and P offsets.	Yes	Yes	$902,108.56	No	Phosphorus Offset Credit Price [Phosphorus Retention Tab, Row 17, Actual Values Tab Row 54] * Max. Phosphorus Retention in Natural Wetlands [Phosphorus Retention Tab, Row 19] * hectare/acre conversion	Relevant
		Social license to operate (effects to reputation; positive impact on communities)	Value of social license to operate	Yes	Yes	$401,960.00	Yes	Surveys and interviews; Citation [1] from Assumptions tab	Relevant
Conservation Organizations		Enhances habitat refuge	$/acre/year Refuge Habitat Non-Use Value Shared Value with Those indirectly employed by reforestation	Yes	Yes	$11,349,707.34	Yes	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab	Relevant
Recreational users (general recreational users, hunters,	Hunters	Enhanced habitats for hunting	NWR usage; Big Game Hunting (consumer	Yes	Yes	$12,881,016.69	Yes	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab	Relevant

fishers, wildlife viewers and birdwatchers)			surplus) ($/person/day)						
	Fishers	Enhanced habitats for fishing	NWR usage; Freshwater Fishing (consumer surplus) ($/person/day)	Yes	Yes	$67,201.70	Yes	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab	Relevant
	General recreation	Enhanced habitats for general recreation	NWR usage; General recreation (consumer surplus) ($/person/day)	Yes	Yes	$1,200,421.15	Yes	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab	Relevant
	Bird watchers	Enhanced habitats for birdwatching	NWR usage; Birdwatching (consumer surplus) ($/person/day)	Yes	Yes	$6,183,492.10	Yes	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab	Relevant
Those employed by land prior to restoration	Tenant Farmers	Permanent loss of income on crop production	Annual return for crop production per acre	Yes	Yes	$3,956,850.21	Yes	Surveys, interviews, and meetings; Citation [4] in Assumptions tab	Relevant
		Loss of government subsidy payed on agricultural land	Dollar value of lost subsidy	Yes	Yes	$1,299,903.86	Yes	Surveys, interviews, and meetings; Citation [4] in Assumptions tab	Relevant
Those employed directly and indirectly by the reforestation project	Those employed directly by the reforestation project	Direct employment for local nursery and planting services	Jobs created (direct and induced); number of working hours per year; wages	Yes	Yes	$1,758,782.51	Yes	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab	Relevant

	Local Business	Enhanced business opportunities	Jobs created (indirect) (# of jobs / $ million invested); number of working hours per year; wages	Yes	Yes	$2,518,717.25	Yes	Surveys, interviews, focus groups, and meetings; citation [14] from Assumption tab	Relevant
	State and federal wildlife managers	Increased and more diversified user activity. Increased habitat refuge value might result in other users coming in.	$/acre/year Refuge Habitat Non-Use Value	Yes	Yes	Shared value with Conservation organizations	Yes	Surveys, interviews, focus groups, and meetings.	Relevant
Communities surrounding the site and downstream/wind of it that benefit from water and air quality, waste treatment, soil stabilization, biological control		Enhanced Water Quality. Value of Marginal Nitrogen and Phosphorus Mitigation.	Water quality, nitrogen content, other scientific measures per advisors.	No	Yes	$18,159,176.33	Yes	Value of marginal nitrogen mitigation [Nitrogen Mitigation Tab, Row 21, Actual Values Tab Row 50] * Net Base Case Nitrate Loss [Nitrogen Mitigation Tab, Row 20] * hectare/acre conversion	Relevant
			Water quality, phosphorus content, other scientific measures per advisors.	No	Yes	$44,058,248.29	No	Phosphorus Retention Social Value [Phosphorus Retention Tab, Row 17, Actual Values Tab Row 54] * Max. Phosphorus Retention in Natural Wetlands [Phosphorus Retention Tab, Row 19] * hectare/acre conversion	Relevant

		Increased atmospheric oxygen and cleaner air	Atmospheric oxygen concentration, air quality	No	Yes	$2,883,405.80	Yes	Citation [13] from Assumptions tab, Row 77	Relevant
Communities that benefit from other ecosystem services such as habitat refuge and cultural value	Community services and outreach	Sense of community pride; community gathering place	Acres of land reforested Amenity value for local residents ($/acre/year)	Yes	Yes	$133,522.99	Yes	Surveys, interviews, focus groups, and meetings.	Relevant
	Indigenous Community	Enhanced ecosystem that can be used for cultural rituals and traditions	Acres of land reforested; Cultural value for local residents ($/acre/year)	Yes	Yes	$293,750.59	Yes	Surveys, interviews, focus groups, and meetings; citations from [2] and [13] in Assumptions tab	Relevant
	Educational users of the site	More educational programs and opportunities	National Wildlife Refuge usage; Youth hunt programs	Yes	Yes	$23,603.42	Yes	Surveys, interviews, focus groups, and meetings.	Relevant

Sources
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4) Aaron Jenkins, Brian Murray, Randall Kramer, Stephen P. Faulkner, “Valuing Ecosystem Services from Wetlands Restoration in the Mississippi Alluvial Valley” Nicholas Institute for Environmental Policy Solutions, Duke University, (February 2009).
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7) Electric Power Research Institute, "Offset Credit Stacking Background Paper for the EPRI Greenhouse Gas Emission Offset Policy Dialog Workshop #13", (November 2012)
8) "Natural Resource Credit Trading Reference," USDA Natural Resources Conservation Service, (August 2011).
9) Stephen Faulkner, Wylie Barrow, Bob Keeland, Susan Walls, David Telesco,“Effects of conservation practices on wetland ecosystem services in the Mississippi Alluvial Valley,” *Ecological Applications*, Volume 21, (2011)
10) Assumptions made by SVT Group based on the knowledge acquired through literature review where no clear value was available in the studies.
11) Douglas J. Krieger, "The Economic Value of Forest Ecosystem Services: A Review", The Wilderness Society, (March 2001)
12) Daryl Lund, et al, “Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Lower Mississippi River Basin,” USDA Natural Resources Conservation Service, (August 2013).
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16) Heidi Garrett-Peltier, Robert Pollin, “Job Creation per $1 Million Investment,” University of Massachusetts, Political Economy and Research Institute, (2009). See Table: Job Creation per $1 Million Investment; Industry: Reforestation,
17) Carbonfund.org, "Tensas River National Wildlife Refuge Afforestation Project," prepared by Erikin Ozberk and Brian McFarland (January 2009).
18) Tensas River National Wildlife Refuge Comprehensive Conservation Plan, US Dept. of the Interior, Fish and Wildlife Service Southeast Region (September 2009)
19) USFWS Tensas River NWR 2016-2017 Harvest Totals (March 2017).
20) Stephen Barnes, Craig Bond, Nicholas Burger, Kate Anania, Aaron Strong, Sarah Weilant, Stephanie Virgets, "Economic Evaluation of Coastal Land Loss in Louisiana," Louisiana State University and the RAND Corporation, (December 2015).
21) USFWS Banking on Nature (2009)
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23) Simon Cole, "The Impact of Reputation on Market Value," *World Economics*, Volume 13, Number 3 (2012)
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9.2. UNINTENDED OR NEGATIVE OUTCOMES

Methodologies were designed to capture unintended consequences or negative outcomes of past and future restoration projects and what would happen without the project. Both the facilitation guide for the focus group and the interview guide asked the following questions to account for unintended or negative outcomes:

- What is the likelihood that you will use the NWR less often as a result of reforestation?
- Why would this decrease occur?
- What recreational uses of the NWR might reforestation negatively impact?
- What other unexpected or unanticipated factors might result in a drop-off of use for the NWR after reforestation?

In Tensas River NWR, negative outcomes were framed primarily in the perceived negative economic impacts on tenant farmers. As explained in previous sections, the region around the Tensas River NWR is primarily agricultural and fairly poor. Several stakeholders pointed this out during one-on-one interviews and this is corroborated in the most recent census data (included in section 3). Within this context, the loss of potential income from agricultural lands impacts tenant farmers particularly hard because they do not own the land and therefore not subject to making decisions about land use. As one farmer noted, "some farmers that were renting land might have lost their rent. I do think some of the folks that worked that land were disappointed about losing their land" (Tensas one-on-one interview 12/2016). Another stakeholder who also works with farmers specifically pointed out this loss as the only “negative” to reforestation, "the only negative is that we lost some good valuable farmland to it. A couple thousand acres or more that pulled in some of the revenue for local folks" (Tensas one-on-one interview 12/2016). Again, it was also acknowledged by stakeholders that "the land was marginal farmland and economically" (Tensas one-on-one interview) and that the land was good for reforestation. Landowners with better farmland, as stakeholders went on, didn't sell it to the refuge for reforestation. The implication of this feedback from stakeholders is that it is unlikely that highly productive farmland was sold for reforestation. However, they also acknowledge the difference between tenant farmers and landowners and the fact that it is ultimately the decisions of landowners, not tenant farmers.

One other negative outcome came out of stakeholder focus groups and one-one-one interviews. This had to do with over-claiming the relative positive economic impacts of reforestation. While stakeholders did not frame this as explicitly negative, throughout the research period several stakeholders noted that it was difficult to say whether or not reforestation created any tangible economic boost to the regional economy. Whether through jobs, attracting more recreational visitors, or just general revenue increase, many stakeholders were hesitant to attribute a significant positive economic impact to the region as a result of reforestation. As one business owner noted, "I'm not sure if there have been any direct impacts for business owners or me. I can say it's been more or less because of reforestation" (Tensas one-on-one interview 12/2016). Stakeholders did distinguish between seasonal (hunting, non-hunting) economic changes and annual ones, however U.S. census statistics do not calculate economic changes by hunting season. While third party literature suggests that in general cases there is some economic value that can be expected and calculated, it is important to interpret these predictions as they are tempered by the inputs of stakeholders who do not see the material outcomes in the same way predictive calculations anticipate.

10.0 Sensitivity Analysis

The outcomes and assumptions used to calculate the final SROI values are subject to various risks and environmental uncertainties due to the impacts of climate change on coastal environments and communities in Louisiana. Actual results could therefore differ materially from those expressed or implied in the forward-looking outcome information. The EcoMetrics model uses three scenarios to assess a range of possible values, and help surface sensitivity to specific value drivers. This is necessary given that the confidence levels of each of the items in the model vary and exact levels are not always known due to a lack of comprehensive research into specific outcomes in coastal Louisiana. The scenario planning feature of the EcoMetrics model was used to test how much a given line item value would need to be at variance from the projection to change a stakeholder's decision as a way of evaluating risks and decisions.

Three scenarios were run to assess the potential range of values resulting from the Pointe-aux-Chenes reforestation project; conservative, realistic, and aggressive. Each scenario includes a sensitivity overview of the factors that could cause actual results to differ materially (Table 27). The conservative scenario assumes higher costs, low survivability rates of the trees, and low market and nonmarket value generation, reflecting the risk that social benefits aren't created as planned. Conversely, the aggressive scenario assumes that costs will be much lower than anticipated, that the need for replanting will be low, and that the market and nonmarket values that will be generated will be high. Use of this aggressive scenario would potentially raise ethical issues about the value of avoided problems that future stakeholders would have to pay to correct. This SROI assessment utilizes a more realistic scenario that assumes moderate costs and moderate value generation rates.

Table 27: Sensitivity overview of factors influencing materiality of results

Description	Conservative	Realistic	Aggressive	Unit	Sensitivity
General and Specific to Operations					
Discount Rate	10%	5%	0%	%	±5% range
Land Cost to Acquire	$-	$-	$-	$/acre	±25%
Restoration Cost	$3,750	$3,000	$2,250	$/acre	±25%
Sale of Land	$-	$-	$-	$/acre	±25%
WRP Payment	$-	$-	$-	$/acre	±25%
Need for Replanting Trees	30%	10%	5%	%	5-30% range
Nitrogen Mitigation					
Value of the marginal Nitrogen mitigation	$0.99	$25.27	$140.85	$/kg N	$2.2 - $313/lb N
Value of Nitrogen Offset Credit	$0.54	$2.52	$4.50	$/kg N	$1.21-$10/lb N
Phosphorus Retention					
Phosphorus Offset Credit Price	$1.69	$6.51	$11.32	$/kg P	$3.76-$25.16/lb P
Phosphorus Retention Social Value	$2.90	$338.95	$675.00	$/kg P	$6.45-$1500/lb N
Max. Phosphorus Retention in Natural Wetlands	1.4	18.7	36	kg P/ha	1.4 - 36 kg P/ha
Other					
Refuge Habitat	$482.00	**$482.00**	$485.92	**$/acre/year**	$203.63-$485.92 range
Savings on Storm protection	$464	**$619**	$774	**$/acre/year**	±25%
Air Quality	$57.5	**$115**	$173	**$/acre/year**	±50%
Waste Treatment	$11	**$118**	$225	**$/acre/year**	$11-225 range

10.1. SENSITIVITIES FOR STAKEHOLDER GROUPS

Ideally, if the reforestation takes hold and is successful with trees continuing to grow and the ecosystem becoming healthier, the outcomes for all stakeholder groups will be supported. This reflects the particular benefits of a restored ecosystem to each stakeholder group. However, the sensitivity analysis asks us to account for the "unexpected" factors that might limit the success of the outcomes of the project for various stakeholders. These are distinct from calculations of deadweight, attribution, displacement, and drop-off due to the fact that they are unexpected and therefore cannot be quantified as a discount factor to the project's overall social return on investment.

During the qualitative research The Water Institute conducted with stakeholders in Tensas River NWR, specific questions were asked about stakeholder's perspectives on the potential negative impacts of the project, limiting factors of the project's success, and if any other unexpected factors came to mind that would de-rail the anticipated outcomes of the reforestation (a portion of this is covered in Section 5).

10.2. UNEXPECTED ENVIRONMENTAL EVENTS: STAGNATION IN RECREATIONAL HUNTING

For stakeholder groups benefitting from the ecological outcomes – specifically Local Business, Recreational Users (all subgroups), State Wildlife Managers – whose outcomes are associated with the enhancement of environmental functions and the creation and maintenance of wildlife habitats, several factors were mentioned as potential limiting factors to outcomes. First, stakeholders from state and wildlife managers noted that deer hunting on the refuge has plateaued to a certain extent, meaning that the region has a stable population of recreational hunters who use the refuge annually, but that they are not attracting new hunters. As one stakeholder noted, "we're losing hunters, and not getting new ones as time goes on" (Tensas focus group 12/2016). Some stakeholders attributed this to inter-generation differences, young children not being interested in hunting. Others attributed this to the nature of hunting culture in Louisiana, wherein hunters often have a "spot" they favor to hunt at and rarely change. These factors have little to do with reforestation itself, but do limit the perceived impacts to the local economy that recreational hunting carry. To the extent that the reforestation takes hold, it is still difficult to predict with great accuracy if this project specifically will increase recreational visitation to the area.

10.3. REGIONAL ECONOMIC DOWNTURNS

For those employed directly by the restoration project or local businesses that stand to potentially benefit from increased visitation to the area because of reforestation, unexpected economic downturns might offset the relative benefits of the reforestation project for local economies. While direct jobs may be provided by corporate sponsors during the project timeframe, ancillary economies are subject to changes beyond the control of corporate sponsors. Along the lines of fluctuating economies, several stakeholders from the local business group noted that there has been a general economic downtrend in the region. As one stakeholder noted, "when I came to Tallulah, that population was 27,000 but now it's 13,000 (counting 3 prisons). Most of these towns up and down the Mississippi River are dying. Young folks are leaving. Agriculture, they are doing fewer folks on the farm, fewer jobs, and so forth. There were 5 supermarkets in Tallulah when I came here, now there are two" (Tensas one-on-one interview 12/2016). The extent to which the Tensas River NWR can replace what has been lost in regional economic downturns appears minimal from the perspective of stakeholders. While the maintenance of the reforestation can perhaps maintain current visitation, it is unclear if any increases in visitation will occur and to what extent those visits will impact the local economy.

11.0 Summary of Social Value Created

To calculate the net present value (NPV) of the Tensas River reforestation project, the costs and benefits incurred or generated at different time periods need to be summed (Social Ventures Australia Consulting, 2011). For these costs and benefits to be comparable, a discount rate was used for the NPV calculations. This research examined three forecast scenarios that bound the environmental uncertainty to some degree: conservative, realistic, and aggressive. This analysis describes the "realistic" scenario, which incorporates a discount rate of 5% to accurately account for the impacts of climate change mitigating investments. In 2005, corporate sponsors invested $1,546,000 to complete Phases 1 and 2 of the Chicago Mill reforestation project in the Tensas River NWR. Under the realistic scenario, this investment, combined with total predicted maintenance costs of $1,758,783 over the life of the project, is expected to yield approximately $109,010,058 of net social impact over 40 years, resulting in an indicative SROI ratio of 20.73:1. In other words, the SROI analysis presents evidence that substantiates that for every dollar invested in reforestation in the Tensas River NWR by corporate sponsors, $20.73 is returned to community stakeholders in social value. Additionally, $11,109,929 in direct market value is returned to corporate investors, a direct market return of $2.11 for every dollar invested.

Table 28: Social and Market Return on Investment Summary

Description	Value
Net Social Impact	$109,010,058
PV of Total Investment	$3,304,783
Social Return on Investment	32.99
Social Internal Rate of Return	115.72%
PV of Total Market Value	$10,601,889
Market Return on Investment	3.21
Market Internal Rate of Return	16.03%
PV Social + Market Value	$119,611,947

11.1. CONTRIBUTIONS

One primary goal of planting 1,943 acres of bottomland hardwood forest on the Tensas River NWR is to mitigate the effects of climate change by reducing the amount of carbon dioxide in the atmosphere. By reforesting the land with native hardwoods, this project also creates more prime black bear habitat, as well as habitat for neotropical migratory birds and migratory waterfowl. Finally, by leveraging private investment with federal funding, this project has the opportunity to set an example of how public-private partnerships can be utilized to provide the necessary resources to contribute to large-scale environmental sustainability. Stakeholder research has shown that significant market and non-market benefits will accrue

to various stakeholder groups. The SROI analysis focuses on the non-market benefits for community stakeholders while an analysis of market returns focuses on the economic returns for funding stakeholders.

11.1.1. Social Return on Investment

This SROI analysis demonstrates that bottomland hardwood reforestation in the Tensas River NWR will provide significant social benefits at both the local and regional level. The greatest social benefits accrue to communities surrounding the Tensas River bottomland hardwood reforestation site, which accounts for nearly 52 percent of the SROI. The greatest social return to these communities comes in the form of reduced phosphorus and nitrogen levels which, in excess, cause diverse environmental problems that directly affect human health and wellbeing, including air pollution, acid rain, marine and freshwater eutrophication, biodiversity loss, and the stimulation of some invasive species (Townsend et al., 2012). Environmental outcomes generating the most social value identified by stakeholders are related to (in order of SROI value):

- Water quality (value of marginal nitrogen and phosphorus mitigation): $62,217,425
- Enhanced wildlife habitat: $11,349,707
- Air quality (increased atmospheric oxygen): $2,883,406

These outcomes all represent tangible outcomes identified by several stakeholder groups, both locally and regionally. These outcomes are directly related to improved air and water quality that reforestation provides as well as the restored wildlife habitat it creates, which in effect adds nearly 2,000 acres of bottomland hardwood ecosystem to the Tensas River NWR.

The following social returns, while lower in financial value, were nevertheless some of the most consistently mentioned outcomes by stakeholders engaged by The Water Institute. While they are listed separately here in terms of their SROI calculation, it should be noted that in coastal Louisiana, the economy and local culture are heavily tied to the consumptive and recreational use of coastal ecosystems. As such, these categories are very much intersecting values in terms of everyday life for coastal residents.

Value of recreational impacts:

- Increased value of hunting: $12,881,017
- Increased value of fishing: $67,202
- Increased value of general recreation: $1,200,421
- Increased value of birding: $6,183,492

Value of reforestation to the local economy:

- Value of direct and induced jobs produced: $1,758,783
- Value to local business: $2,518,717

Community, cultural, and educational value of reforestation:

- Amenity value: $133,523
- Cultural value: $293,751
- Educational value: $23,603

Finally, research conducted by Restore the Earth revealed that certain outcomes would be anticipated to accrue to communities in the future. Many of these outcomes are intangible and thus not identified by community stakeholders interviewed as part of this research. Outcomes recognized by the scientific community, but not by local stakeholders, accrue to the environment and represent future benefits to community stakeholders. For example, forests are also an important carbon sink, removing more carbon from the atmosphere than they are emitting. Increasing the number of trees may therefore slow the accumulation of atmospheric carbon, which is a major contributor to global warming. These effects of these environmental outcomes may take several years to manifest at the local stakeholder level. As a result, these types of broad, long-term benefits of reforestation were generally not considered by local stakeholders, who tended to focus more on the immediate impacts of the project, such as economic growth, recreational benefits, and storm protection. Long-term environmental benefits can therefore be considered to accrue to each of the other stakeholder groups engaged in this research. The SROI value of these environmental benefits are calculated to be:

- Social value of carbon sequestered: $9,137,625
- Improved soil formation and nutrient cycling: $651,900
- Erosion control and sediment retention: $7,615
- Increased waste treatment capacity: $2,958,625

Table 29: Social Return on Investment for reforestation in Tensas River NWR

Stakeholders	Real outcomes due to Tensas River reforestation project	Social Value Creation	Social Value per Stakeholder Group
Environment	Social value of carbon sequestered	$9,137,625.45	$12,755,765.70
	Improved soil formation and nutrient cycling	$651,900.44	
	Erosion control and sediment retention	$7,614.72	
	Increased waste treatment capacity,	$2,958,625.08	
Conservation organizations	Enhances habitat refuge	$11,349,707.34	$11,349,707.34
Recreational users (general recreational users, hunters, fishers, wildlife viewers and birdwatchers)	Enhanced habitats for hunting	$12,881,016.69	$20,332,131.64
	Enhanced habitats for fishing	$67,201.70	
	Enhanced habitats for general recreation	$1,200,421.15	
	Enhanced habitats for birdwatching	$6,183,492.10	
Those employed by land prior to restoration	Permanent loss of income on crop production	$(3,956,850.21)	$(5,256,754.07)
	Loss of government subsidy payed on agricultural land	$(1,299,903.86)	
Those employed directly and indirectly by the reforestation project	Direct employment for local nursery and planting services	$1,758,782.51	$4,277,499.76
	Enhanced business opportunities	$2,518,717.25	
	Enhanced habitat refuge	Shared Value with Conservation organizations	

Communities surrounding the site and downstream/wind of it that benefit from water and air quality, waste treatment, storm protection, soil stabilization, biological control	Enhanced Water Quality. Value of Marginal Nitrogen and Phosphorus Mitigation.	$18,159,176.33	$65,100,830.42
		$44,058,248.29	
	Increased atmospheric oxygen and cleaner air	$2,883,405.80	
Communities that benefit from other ecosystem services such as habitat refuge and cultural value	Sense of community pride; community gathering place	$133,522.99	$450,877.00
	Enhanced ecosystem that can be used for cultural traditions	$293,750.59	
	More educational programs and opportunities	$23,603.42	
		Total Present Value	**$109,010,057.79**
		Total Investment	**$3,304,782.51**
		Non-Market Return on Investment (dollar returned per dollar invested)	**32.99**

11.1.2. Market Return on Investment

Certain outcomes of the reforestation project represent economic value internalized by project sponsors, corporate funders, and other funding stakeholders. Such market values were identified by funding stakeholders as important outcomes for their organizations. Market returns on investment were calculated separately from social returns and thus were not included as part of the SROI calculations. Funding stakeholder groups identified in this research garner additional market benefits from the success of the Tensas River bottomland hardwood reforestation project. These stakeholder groups have provided direct financial and social capital to support the reforestation project and are anticipated to experience several unique outcomes relative to their inputs. The largest outcome for corporate sponsors of the program comes in the form of enhanced reputation within local communities. This will not only allow corporate sponsors of the project to continue to operate in nearby communities, but will allow the organization to build off of this success and conduct other reforestation projects. The enhanced reputation that these funding stakeholders receive by conducting this reforestation project will result in two outcomes, one for Restore the Earth and the other for corporate funders:

- Social license for corporate entities to continue to operate in the Mississippi Alluvial Valley: $401,960

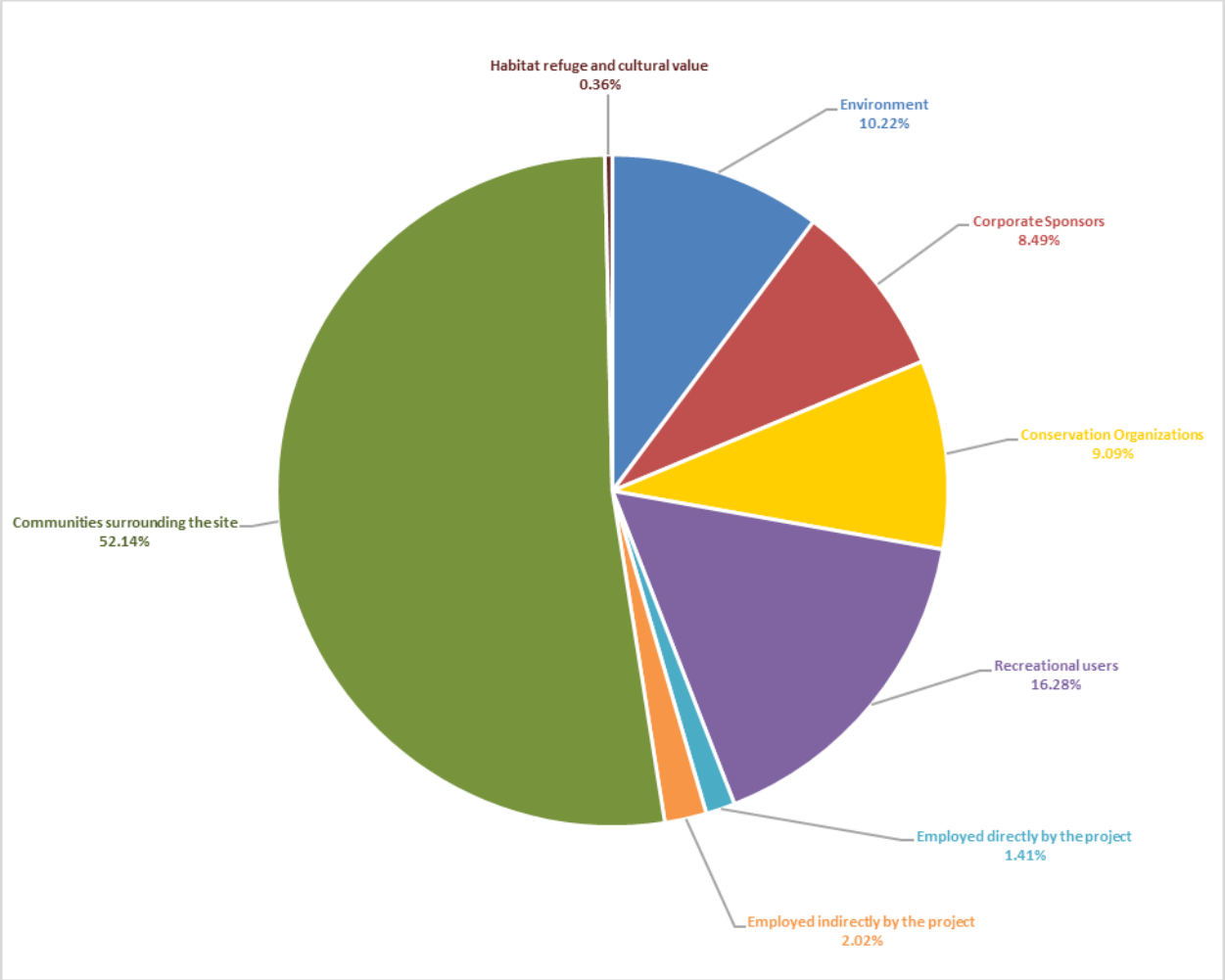
Additionally, the reforestation project will allow sponsors of the project to accumulate credits to offset an emission made elsewhere. Offsets generating the most social value for corporate sponsors of the reforestation project include (in order of SROI value):

- Carbon offsets: $7,376,623
- Nitrogen offsets: $1,921,197
- Phosphorus offsets: $902,109

Table 30: Market Return on Investment for reforestation in Tensas River NWR

Stakeholders	Real outcomes due to Tensas River reforestation project	Market Value Creation	Market Value per Stakeholder Group
Corporate Sponsors	Market value of carbon sequestered	$7,376,623.25	$10,601,888.75
	Market value of nitrogen offset	$1,921,196.94	
	Market value of phosphorous offset	$902,108.56	
	Social license to operate (effects to reputation; positive impact on communities)	$401,960.00	
		Total Present Value	**$10,601,888.75**
		Total Investment	**$3,304,782.51**
		Market Return on Investment (dollar returned per dollar invested)	**3.21**

Figure 6. Social value per stakeholder group for reforestation in Tensas River NWR



11.2. STATEMENT OF RISKS OF OVERCLAIMING

Levels of counterfactual are low for this study. Levels are low because this project is a tree planting, environmental restoration project on public land that is expected to grow and mature over time. All outcomes are directly associated with the tree planting. Few stakeholders noted any instances of displacement or drop-off of area use as a result of the reforestation. Along these lines, no stakeholders identified any situation where the outcomes (more bottomland hardwood forest) would occur/grow without this reforestation project or that any other activities would contribute to planting trees. The Water Institute and Restore the Earth Foundation do not have any knowledge of other projects for reforestation in the area in the present or future.

11.3. CONSIDERATIONS AND LIMITATIONS

With an eye towards precaution in not over-claiming the SROI of the reforestation project, the following should be considered:

- While the bulk of data presented in this report is derived directly from stakeholder input as a result of qualitative research conducted by The Water Institute, much of the data used to calculate the majority of the SROI monetary figures emanates from the Environmental stakeholder group. As such, these are figures derived from third party literature and scientific research provided by Restore the Earth and not directly mentioned by other stakeholder groups. This is important to remember when considering the financial totals on the SROI figures.

12.0 Conclusions and Recommendations

This study evaluates the integrated social returns of a reforestation project in coastal Louisiana. Integrated return is defined as the comprehensive economic, social, and environmental benefits of a project and presents a holistic depiction of the interrelatedness of factors contributing to an organization's capacity to create value over time. Integrated reporting focuses on the nature and quality of an organization's relationship with its key stakeholders including how and to what extent the organization recognizes and responds to their key stakeholder's needs and interests. In this analysis, integrated social value was quantified using Restore the Earth's EcoMetrics model, which was built on the guiding principles of Social Value International's (SVI) Social Return on Investment (SROI) Methodology and the International Integrated Reporting Council's (IIRC) International Integrated Reporting Framework (IIRF). Stakeholder relationships are of primary importance to both methodologies. The SVI approach concerns an in-depth, evidence-based understanding of change for a full range of community stakeholders with recognition of both positive and negative changes as well as intended and unintended outcomes. Value in this context refers to the relative importance placed by a stakeholder group on one potential outcome over another. Assigning these valuations using SVI principles requires the use of financial proxies as many of the identified outcomes are difficult to quantify using conventional accounting practices. The IIRC methodology is principally concerned with the creation value for funding stakeholders and resources are allocated based on the potential benefit to the corporation and quantified using conventional accounting practices.

By integrating these two frameworks, the EcoMetrics model assesses the creation of social value for both community stakeholders and funding stakeholders. In this research, both market and non-market social

value was generated for various stakeholder groups (Table 30). The relationship between these stakeholder groups can be quantified through application of the six capitals identified by the IIRC (Table 31). Financial capital increases as a corporate entity continues to benefit from additional financial opportunities generated by the value a restoration project creates for stakeholders and society. Manufactured capital increases as additional storm protection results in reduced storm damage and increased waste and water treatment capacity results in a quality of life improvement for stakeholders. An increase in intellectual capital results from the increase in corporate goodwill associated with successfully restored land and the positive association stakeholders maintain with the corporation. A corporate entity influences the formation of human capital through job creation and stimulates additional motivation toward continued stakeholder collaboration on ecosystem restoration activities. A corporate entity enhances its social license to operate, an increase in social capital, by engendering mutual trust with stakeholders and through improvements to quality of life that directly impact human health. Natural capital is created through ecosystem restoration and stakeholders benefit from increased biodiversity and improved eco-system health.

Table 31: Social and market return on investment delineated by SVI stakeholder groups for reforestation in Tensas River NWR

Stakeholders	Real outcomes due to Tensas reforestation project	Market Value Creation	Social Value Creation	Market and Social Value per Stakeholder Group
Environment	Social value of carbon sequestered		$9,137,625.45	$12,755,765.70
	Improved soil formation and nutrient cycling		$651,900.44	
	Erosion control and sediment retention		$7,614.72	
	Increased waste treatment capacity,		$2,958,625.08	
Corporate Sponsors	Market value of carbon sequestered	$7,376,623.25		$10,601,888.75
	Market value of nitrogen offset	$1,921,196.94		
	Market value of phosphorous offset	$902,108.56		
	Social license to operate (effects to reputation; positive impact on communities)	$401,960.00		
Conservation Organizations	Enhanced habitat refuge		$11,349,707.34	$11,349,707.34
Recreational users (general recreational users, hunters, fishers, wildlife viewers and birdwatchers)	Enhanced habitats for hunting		$12,881,016.69	$20,332,131.64
	Enhanced habitats for fishing		$67,201.70	
	Enhanced habitats for general recreation		$1,200,421.15	
	Enhanced habitats for birdwatching		$6,183,492.10	

Those employed by land prior to restoration	Permanent loss of income on crop production		$(3,956,850.21)	$(5,256,754.07)
	Loss of government subsidy payed on agricultural land		$(1,299,903.86)	
Those employed directly and indirectly by the reforestation project	Direct employment for local nursery and planting services		$1,758,782.51	$4,277,499.76
	Enhanced business opportunities		$2,518,717.25	
	Enhanced habitat refuge		Shared value with Conservation Organizations	
Communities surrounding the site and downstream/wind of it that benefit from water and air quality, waste treatment, soil stabilization, biological control	Enhanced Water Quality. Value of Marginal Nitrogen and Phosphorus Mitigation.		$18,159,176.33	$65,100,830.42
			$44,058,248.29	
	Increased atmospheric oxygen and cleaner air		$2,883,405.80	
Communities that benefit from other ecosystem services such as habitat refuge and cultural value	Sense of community pride; community gathering place		$133,522.99	$450,877.00
	Enhanced ecosystem that can be used for cultural rituals and traditions		$293,750.59	
	More educational programs and opportunities		$23,603.42	
	Total Present Value	**$10,601,888.75**	**$109,010,057.79**	**$119,611,946.54**
	Total Investment			**$3,304,782.51**
	Market and Non-Market Return on Investment (dollar returned per dollar invested)	**3.21**	**32.99**	**36.19**

Table 32: Social return on investment delineated by IIRC shared value capital for reforestation in Tensas River NWR.

Shared Value Capital	Real outcomes due to Tensas River reforestation project	Market Value Creation	Social Value Creation	Market and Social Value per Creation per Shared Value Capital
Financial	Market value of carbon sequestered	$7,376,623.25		$9,220,674.43
	Market value of nitrogen offset	$1,921,196.94		
	Market value of phosphorous offset	$902,108.56		
	Permanent loss of income on crop production		$(3,956,850.21)	
	Loss of government subsidy payed on agricultural land		$(1,299,903.86)	
	Direct employment for local nursery and planting services		$1,758,782.51	

	Enhanced business opportunities		$2,518,717.25	
Human	Enhanced habitats for hunting		$12,881,016.69	$20,332,131.64
	Enhanced habitats for fishing		$67,201.70	
	Enhanced habitats for general recreation		$1,200,421.15	
	Enhanced habitats for birdwatching		$6,183,492.10	
Social and Relationship	Social license to operate (effects to reputation; positive impact on communities)	$401,960.00		$12,202,544.34
	Enhances habitat refuge		$11,349,707.34	
	Sense of community pride; community gathering place		$133,522.99	
	Cultural and historical value of family traditions tied to the forested landscape		$293,750.59	
	More educational programs and opportunities		$23,603.42	
Natural	Social value of carbon sequestered		$9,137,625.45	$77,856,596.12
	Improved soil formation and nutrient cycling		$651,900.44	
	Erosion control and sediment retention		$7,614.72	
	Increased waste treatment capacity,		$2,958,625.08	
	Enhanced Water Quality. Value of Marginal Nitrogen and Phosphorus Mitigation.		$18,159,176.33	
			$44,058,248.29	
	Increased atmospheric oxygen and cleaner air		$2,883,405.80	
	Total Present Value	**$10,601,888.75**	**$109,010,057.79**	**$119,611,946.54**
	Total Investment			**$3,304,782.51**
	Market and Non-Market Return on Investment (dollar returned per dollar invested)	**3.21**	**32.99**	**36.20**

An investment of $1,546,000 in 2005 to complete Phases 1 and 2 of the Chicago Mill reforestation project in the Tensas River NWR combined with predicted maintenance costs of $1,758,783 over the life of the project is estimated to create approximately $109,010,058 of net social impact over 40 years, resulting in an indicative SROI ratio of 32.99:1. In other words, the SROI analysis presents evidence that substantiates that for every dollar invested in reforestation in the Tensas River NWR by corporate sponsors, $32.99 is returned to community stakeholders in social value. Additionally, $10,601,889 in direct market value is returned to corporate investors in the form of an enhanced social license to operate and, more directly, carbon, nitrogen, and phosphorus credits, resulting in a direct market return of $3.21 for every dollar invested.

This SROI analysis is based on stakeholder consultation, previous research conducted by Restore the Earth, and secondary research. By integrating the guiding principles of SVI with those of the IIRC, this analysis focuses on the nature and quality of an organization's relationship with its key stakeholders including how and to what extent the organization recognizes and responds to their key stakeholder's needs and interests. Overall, SROI analysis shows that restoring historic forest to the Tensas River NWR region of Louisiana provides measurable environmental and social returns. Private-public investments, like those between corporate sponsors and U.S. Fish and Wildlife Service, are a strategic way that positive environmental impacts can be achieved through federal and private partnerships. This is especially important in a region like that around the Tensas River NWR, wherein without the aid of private and federal funds, reforestation of degraded lands would be impossible. As one participant from the Friends of the Tensas River Refuge group notes, these investments in environmental sustainability and restoration are ways of protecting landscapes associated with family traditions that had been lost as land was clear-cut and turned into agricultural production: "My grandfather brought me here as a kid, to Rainey Lake [...] I took that for granted, knowing how to hunt and go to the woods. Remember the day when it was all trees? It was depressing to folks when they clear cut all those trees" (Tensas focus group 12/2016). Investing in reforestation enables those environments to be restored and protected for future generations in the Mississippi Alluvial Valley, reversing an ecologically destructive trend of land management and protecting the forested landscape for future generations.

12.1. STAKEHOLDER REVIEW AND VERIFICATION OF RESULTS

The Water Institute of the Gulf was contracted by Restore the Earth Foundation to gather data and produce the enclosed report on the Social Return on Investment for Tensas River NWR. The Water Institute recommends that Restore the Earth Foundation share the initial results of this forecast study with stakeholders involved prior to the distribution of this report and/or abridged forms of this report to potential new funders and clients. This will ensure that stakeholders have an opportunity to review the study's findings - specifically the theory of change, range of outcomes, and relative value of outcomes.

The Water Institute can provide the name and contact information of stakeholders should Restore the Earth Foundation decide to maintain contact with stakeholders in the future to review the forecast and, eventually, the evaluation of this project. It is suggested that Restore the Earth Foundation present to stakeholders in a public meeting format, in simple and clear language, the results of this study. The Water Institute also recommends conducting follow-up stakeholder engagement - via focus group and interviews - at several intervals through the 40-year forecast period so as to maintain accurate and up-to-date data for their EcoMetrics model. This will ensure that participants and the broader stakeholder community will have an opportunity to participate in and review results from this initial SROI study and from the ongoing forecasts of the EcoMetrics model.

12.2. RECOMMENDATIONS

The SROI analysis revealed a number of areas where project sponsors can improve their operations and better demonstrate the social value that the Tensas River reforestation project creates in local communities and the broader region.

- *Continued stakeholder engagement.* This SROI analysis has demonstrated the value of formally engaging with local and regional community members who are potentially going to be impacted

by the reforestation of the Tensas River project site in order to understand from their perspective what will change and how they value that change. To establish the long-term impact of the reforestation project on these local and regional stakeholders, project sponsors should continue to stay in engaged with participants from Tensas River as the project progresses and repeat the stakeholder engagement in the future.

- *Communicate the impact.* The SROI analysis reveals several impacts that bottomland hardwood forest reforestation can have on coastal residents, locally and regionally. Many of these impacts may be readily apparent to local stakeholders, such as the physical alteration of the landscape while other impacts, such as the management of carbon, phosphorus, and nitrogen, may be less apparent. It is contingent on project sponsors to communicate the results of the reforestation project to impacted stakeholders and potential investors in coastal restoration and reforestation projects to demonstrate the outcomes achieved by the project. The project sponsors should also assure that collected information be shared with the U.S. Fish and Wildlife Service managers of the Tensas River NWR.
- *Measure the outcomes of the reforestation project.* Use the methodology and lessons learned from this analysis to monitor the outcomes of the Tensas River reforestation project, using the theory of change as the framework from which to identify expected and unexpected outcomes. Project sponsors should engage with stakeholders at the start of the project and at regular intervals to understand the social value creation process over time.

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Appendix 1 – Tensas River NWR Stakeholder Survey

1. Name

2. Affiliation (if applicable)

3. What 'stakeholder' group do you belong to?
   Please indicate your primary group affiliation.
   Check all that apply.

   - ☐ Community Stakeholder (general)
   - ☐ State/Federal Wildlife Manager
   - ☐ Local Government
   - ☐ Community Services / Outreach
   - ☐ Education and Research
   - ☐ Volunteer
   - ☐ National Conservation Organization
   - ☐ Employed By Restoration
   - ☐ User - Hunting and Fishing
   - ☐ User - Recreational (paddling, photography, birdwatching)
   - ☐ Local Business
   - ☐ Landowner

4. Can you describe your primary stakeholder position?

5. Do you have a secondary stakeholder position? Please describe.

6. What are you or your organization's current hunting, fishing, or trapping uses of the NWR? *Check all that apply.*

- [ ] Deer Hunting
- [ ] Duck Hunting
- [ ] Hunting (other)
- [ ] Fishing
- [ ] Other: _____

7. How often do you or your organization use the NWR for these activities? *Check all that apply.*

- [ ] Once a year
- [ ] 2-5 times per year
- [ ] More than 5 times per year
- [ ] On a weekly basis
- [ ] Other: _____

8. What are you or your organization's current recreational uses of the NWR? *Check all that apply.*

- [ ] Business (landowner, contractor, conservation organization, small business hunting/tourism owner)
- [ ] Employment (state and federal wildlife management)
- [ ] Birdwatching
- [ ] Camping
- [ ] Boating
- [ ] Sight Seeing
- [ ] Education
- [ ] Research
- [ ] Kayaking / Paddling
- [ ] Shooting
- [ ] Other: _____

9. How often do you or your organization use the NWR for these activities? *Check all that apply.*

- [ ] Once a year
- [ ] 2-5 times per year
- [ ] More than 5 times per year
- [ ] On a weekly basis
- [ ] Other: .....

Current value of the Tensas NWR

Please answer the following questions from the perspective of your 'stakeholder' position (e.g. as a hunter, resident, business owner, etc.).

10. On a scale of 1 to 5, please rate the economic value of the NWR to you or your organization. (Including commercial fishing and hunting, local business, and tourism) *Mark only one oval.*

	1	2	3	4	5	
The NWR has no economic value.	⬭	⬭	⬭	⬭	⬭	The NWR has significant economic value.

11. If you answered 2-5, can you specify particular economic values?

.....

12. On a scale of 1 to 5, what is the recreational value of the NWR to you or your organization? (Including: Fishing, hunting, ecotourism, birding, camping, boating, etc.) *Mark only one oval.*

	1	2	3	4	5	
The NWR has no recreational value.	⬭	⬭	⬭	⬭	⬭	The NWR has significant recreational value.

13. If you answered 2-5, can you specify particular recreational values?

.....

14. On a scale of 1-5, what is the cultural value of the NWR to you or your organization? (Including: Indigenous culture, historical significance, family traditions, etc.) *Mark only one oval.*

	1	2	3	4	5	
The NWR has no cultural value.	⬭	⬭	⬭	⬭	⬭	The NWR has significant cultural value.

15. If you answered 2-5, can you specify particular cultural values?

16. On a scale of 1-5, what is the education and research value of the NWR to you or your organization? (Including: K-12 education, university education, natural and social science research, adult education) *Mark only one oval.*

	1	2	3	4	5	
The NWR has no education or research value.	⬭	⬭	⬭	⬭	⬭	The NWR has significant education and research value.

17. If you answered 2-5, can you please specify the research and education value?

18. On a scale of 1-5, what is the ecological value of the NWR to you or your organization? (Including: Habitat protection, environmental quality, restoration, and conservation) *Mark only one oval.*

	1	2	3	4	5	
The NWR has no ecological value.	⬭	⬭	⬭	⬭	⬭	The NWR has significant ecological value.

19. If you answered 2-5, can you specify the ecological value of the NWR?

20. On a scale of 1-5, what is the flood protection / water quality value of the NWR to you or your organization? (Including: Water retention, hydrological restoration, groundwater, etc.) *Mark only one oval.*

	1	2	3	4	5	
The NWR has no flood protection / water quality value.	⬭	⬭	⬭	⬭	⬭	The NWR has significant flood protection / water quality value.

21. If you answered 2-5, can you please specify the flood protection / water quality value?

Impacts of reforestation projects on value of Tensas NWR

Please answer the following questions from the perspective of your 'stakeholder' position (e.g. as a hunter, resident, business owner, etc.).

22. On a scale of 1-5, what are the economic impacts of reforestation on the NWR? (Including commercial fishing and hunting, local business, and tourism) *Mark only one oval.*

	1	2	3	4	5	
The reforestation has had no economic impacts.	⬭	⬭	⬭	⬭	⬭	The reforestation has had significant economic impacts.

23. If you answered 2-5, can you please specify the economic impacts?

24. On a scale of 1-5, what are the recreational impacts of reforestation on the NWR? (Including: Fishing, hunting, ecotourism, birding, camping, boating, etc.) *Mark only one oval.*

	1	2	3	4	5	
There are no recreational impacts to reforestation.	⬭	⬭	⬭	⬭	⬭	There are significant recreational impacts from reforestation.

25. If you answered 2-5, can you please specify the recreational impacts of reforestation?

26. On a scale of 1-5, what are the cultural impacts of reforestation on the NWR? (Including: Indigenous culture, historical significance, family traditions, etc.) *Mark only one oval.*

	1	2	3	4	5	
There have been no cultural impacts.	⬭	⬭	⬭	⬭	⬭	There have been significant cultural impacts.

27. If you answered 2-5, can you please specify the cultural impacts?

28. On a scaled of 1-5, what are the education and research impacts of reforestation on the NWR? (Including: K-12 education, university education, natural and social science research, adult education) *Mark only one oval.*

	1	2	3	4	5	
There are no education and research impacts.	⬭	⬭	⬭	⬭	⬭	There are significant education and research impacts.

29. If you answered 2-5, can you please specify the education and research impacts?

30. On a scale of 1-5, what are the ecological impacts of reforestation on the NWR? (Including: Habitat protection, environmental quality, restoration, and conservation) *Mark only one oval.*

	1	2	3	4	5	
There are no ecological impacts.	⬭	⬭	⬭	⬭	⬭	There are significant ecological impacts.

31. If you answered 2-5, can you please specify the ecological impacts of reforestation on the NWR?

32. On a scale of 1-5, what are the flood protection / water quality impacts of reforestation on the NWR? (Including: Water retention, hydrological restoration, groundwater, etc.) *Mark only one oval.*

	1	2	3	4	5	
There is no flood protection / water quality impact of reforestation.	⬭	⬭	⬭	⬭	⬭	There is significant flood protection / water quality impact of reforestation.

33. If you answered 2-5, can you please specify the flood protection / water quality impact of reforestation?

Changed use of the NWR as a result of reforestation.

Please answer the following questions from the perspective of your 'stakeholder' position (e.g. as a hunter, resident, business owner, etc.).

34. On a scale of 1-5, how has reforestation changed you or your organization's use of the NWR?
Mark only one oval.

	1	2	3	4	5	
No change.	◯	◯	◯	◯	◯	Significant changed.

35. If you marked 2-5 for above, please check which hunting, fishing, or trapping activities have changed for you or your organization: *Check all that apply.*

- ☐ Deer Hunting
- ☐ Duck Hunting
- ☐ Hunting (other)
- ☐ Fishing
- ☐ Other: .....

36. How has the frequency of you or your organization's hunting, fishing, or trapping use changed? *Check all that apply.*

- ☐ Once a year
- ☐ 2-5 times per year
- ☐ More than 5 times per year
- ☐ On a weekly basis
- ☐ Other: .....

37. If you marked 2-5 above, which recreational activities have been impacted for your or your organization by reforestation? *Check all that apply.*

- [ ] Business (landowner, contractor, conservation organization, small business hunting/tourism owner)
- [ ] Employment (state and federal wildlife management)
- [ ] Birdwatching
- [ ] Camping
- [ ] Boating
- [ ] Sight Seeing
- [ ] Education
- [ ] Research
- [ ] Paddling / Kayaking
- [ ] Shooting
- [ ] Other: .....

38. How has the frequency of you or your organization's recreational use changed? *Check all that apply.*

- [ ] Once a year
- [ ] 2-5 times per year
- [ ] More than 5 times per year
- [ ] On a weekly basis
- [ ] Other: .....

Assessing monetary values of reforestation

It costs $3,000 per acre in corporate donations to restore the site. The total coast to restore the site will be $X. With this in mind, please answer the following questions.

39. Was this a good use of corporate donations to the region?

.....

40. Was this project important enough that it was worth more than the past donations? If so, how much more?

.....

41. Do you think this project cost too much money and some of the funds should have been used for other purposes? What purposes? How much?

42. How much would you have been willing to give personally to visit the NWR prior to reforestation? *Mark only one oval.*

- ◯ No contribution
- ◯ $1
- ◯ $2 - $5
- ◯ $6 - $10
- ◯ $10 +
- ◯ Other:

43. How much are you personally willing to give to visit the NWR today, after reforestation? *Mark only one oval.*

- ◯ No contribution
- ◯ $1
- ◯ $2 - $5
- ◯ $6 - $10
- ◯ $10+
- ◯ Other:

Drop-off, deadweight, attrition

Please answer the following questions from the perspective of your 'stakeholder' position (e.g. as a hunter, LDWF, resident, member of an indigenous community, etc.).

44. On a scale of 1-5, how has reforestation decreased you or your organization use of the NWR?

Mark only one oval.

	1	2	3	4	5	
Reforestation has not decreased any uses of the NWR.	◯	◯	◯	◯	◯	Reforestation has significantly decreased some uses of the NWR.

45. If you answered 2-5 above, what hunting, fishing, or trapping uses of the NWR have you or your organization see decrease? *Check all that apply.*

- ☐ Deer Hunting
- ☐ Duck Hunting
- ☐ Hunting (other)
- ☐ Fishing
- ☐ Other: .....

46. Why has this decrease happened?

.....

47. If you answered 2-5 above, what recreational uses of the NWR have you or your organization see decrease? *Check all that apply*.

- ☐ Business (landowner, contractor, conservation organization, small business hunting/tourism owner)
- ☐ Employment (state and federal wildlife management)
- ☐ Birdwatching
- ☐ Camping
- ☐ Boating
- ☐ Education
- ☐ Research
- ☐ Sight Seeing
- ☐ Paddling / Kayaking
- ☐ Shooting
- ☐ Other: .....

48. Why has this decrease happened?

.....

49. What other unexpected or unanticipated factors that have resulted in a drop-off of use for the NWR after reforestation?

50. Considering the various kinds of outcomes of this reforestation project, what do you think were the most direct outcomes for you or your organization?

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