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A Mixed Methods Evaluation of the Coastal Roots Program

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A MIXED METHODS EVALUATION OF THE COASTAL ROOTS™ PROGRAM

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For my family,
"Fait du nerf et de la babiche -
Lâche pas la patate."

And for Dr. Patricia Rickels, who taught us to love the pursuit of knowledge.
"Per Sapientiam, Felicitas"

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ABSTRACT

Few evaluation-based studies of the LSU Coastal Roots™ program have been conducted over the 14-year life of the project. Teacher participant numbers and the scope of the program have grown since its inception, changing the face and shape of the program in each manifestation. A goal free approach to a mixed methods evaluation was employed to meet the exploratory nature of the investigation and to remain open to the myriad of possibilities within the program as it exists today. The exploratory sequential design employed qualitative methods in the early stages of the project through the collection and analysis of interview data. Themes developed from this qualitative strand were used in generating the quantitative component's survey instrument. The survey instrument was piloted, refined, and deployed online to the entire population of Coastal Roots™ teacher participants. Data collected from this strand of the evaluation was analyzed independently and in conjunction with the qualitative data collected in the early stages of the project in order to generate an image of the program that possesses both breadth and depth. Teacher implementation of the Coastal Roots™ program varied greatly across schools and parishes. Teacher interest and focus in implementing the program varied across purposes of science inquiry, skill development, curriculum use, and student development.

As Coastal Roots™ moves into the next phases of program activity, program definition and evolution should embrace and build on participant values, develop using the best practices exemplified by participants, and should work to mend the gaps defined by participants as hindrances to their work. Recommendations and suggestions for future practice stemming from this evaluation include a strengthening of program

standardization and centralization, teacher-tested resources, focus on networking, and the development of areas stressed as central by participants.

CHAPTER 1
INTRODUCTION

1.1 Problem Statement

In his influential work *Last Child in the Woods*, Richard Louv (2006) describes what he calls nature deficit disorder in modern childhood. According to this theory, children are moving ever further away from nature and the natural environment due to technology and other facets of modern society and, with that move, having diminished relationships with the natural world and the local environment – a disruption with negative implications for their mental and physical wellbeing. As discouraging as this trend is alone, it takes on a greater sense of urgency in areas such as Louisiana, which are experiencing massive ecological and environmental destruction at an alarming rate (Barras, 2006). This need for increased relationship value between the environment and society has implications for the near future of the south Louisiana region, especially in the wake of hurricanes Katrina and Rita (Blanchard & Bush, 2008).

Since its inception in 1999 and program activity commencement the following spring, the Coastal Roots™ program has sought to create a sense of environmental stewardship and social responsibility through hands-on environmental education practices (Blanchard & Bush, 2008; Bush & Blanchard, 2009). Students participate in the growth and transplanting of native trees and grasses and learn about coastal issues and related science content throughout the school year. The program consists of a wide variety of potential activities and possible manifestations in each school setting due to its largely unstructured delivery. As the ecological need for the program continues to grow and the program itself continues to expand, information about teacher use becomes useful for the purposes of program development and improvement. Information such as classroom

integration, program successes and difficulties, student engagement, and the purposes of the program in each institution are necessary for defining the program as it moves through its next generation of activity.

1.2 Rationale

Although it has been active since the spring of 2000, an intensive evaluation of the program and gross assessment of the ways in which it is implemented has not been conducted. Formative assessment and evaluation of the program is necessary for a variety of purposes (Fitzpatrick, Sanders, & Worthen, 2004; Rossi, Lipsey, & Freeman, 2004). For the Coastal Roots™ case, program definition and accountability measures are of utmost importance in the current environment of decreased educational funding as well as in the wake of an ever-growing environmental need. A broad and holistic evaluation of the program is necessary to establish the ways in which the program is utilized, how it is administered, best practices and opportunities for improvement, and the impact reaped beyond that of environmental conservation alone. This evaluation seeks to document the ways in which the program is used and the purposes it serves for its participants through an iterative sequential mixed methods evaluation design.

1.3 Purpose of the Study

The purpose of this study is to conduct a formative evaluation of the Coastal Roots™ program with an emphasis on the varieties of teacher implementation, purpose, engagement, and overall interaction with the program and the topics and causes it espouses. Since its beginning in 2000, the Coastal Roots™ program has impacted a large number of teachers throughout the state of Louisiana in promoting the purposes of environmental stewardship and ecological education (Blanchard, 2007; Blanchard &

Bush, 2008). Despite the program length and number of previous studies conducted in reference to the program, there has been no comprehensive or in-depth evaluation of the program or its multitude of potential impacts in the communities it serves (Blanchard, 2007; Blanchard & Buchanan, 2011; Blanchard & Bush, 2008; Bush & Blanchard, 2009; Coleman & Bush, 2002; Coker, Bachman, Boyd, Blanchard, Bush & Gu, 2010, Karsh, Bush, Hinson, & Blanchard, 2009; McHardy, Blanchard, & de Wet, 2009; Messina & Blanchard, 2004). The goal of this evaluation is to investigate the various aspects of the program as applied in practice and the program culture as defined by the individuals that comprise it. In order to capture a broad image of the program and its various impacts, a goal free evaluation approach was utilized within the iterative sequential mixed methods evaluation design in order to provide the broadest image of the program.

1.4 Evaluation Questions and Objectives

An extensive list of questions of concern was generated by the program staff as an initial point of departure for the focus of the evaluation. In keeping with the goal free evaluation approach mentioned above, these questions were summarized into broader, more open-ended questions that lend themselves to the exploratory approach used in the initial phases of the evaluation. The resulting evaluation questions were:

1) What does Coastal Roots™ look like in its numerous school manifestations?

2) What purpose(s) does Coastal Roots™ serve for the teacher and school?

The objectives stemming from these questions were as follows:

1) Objective 1: Describe the Coastal Roots™ teacher participants currently enrolled in the program on the following demographic characteristics:

a) Gender

b) Age

c) Location

d) School type

e) Teaching discipline

f) Number of years of teaching experience

g) Highest level of education completed

h) Additional certifications

i) Science educational background

j) Coastal Roots™ program experience and

k) Role in Coastal Roots™ programming.

2) Objective 2: Determine the frequency and methods of delivery of Coastal Roots™ themed content into the curriculum.

3) Objective 3: Describe teacher use of Coastal Roots™ workshops and program-generated resources such as the compendium, website, and handbook as well as other non-program resources.

4) Objective 4: Determine teacher use of the program activity components within the school and curriculum, including science skills in Coastal Roots™ lessons, student development, cross curriculum connections, and the overall purpose of incorporating and using various aspects of the Coastal Roots™ program.

5) Objective 5: Examine relationships and differences in program implementation as measured by the Coastal Roots™ Participation Survey's four component scores (Coastal Roots™ as Science Inquiry, Coastal Roots™ Role in the

Curriculum, Coastal Roots™ as Student Development, and Coastal Roots™ as Cross-Curricular Skills) based on the following demographic characteristics:

a) Program experience

b) Science background, and

c) Location.

1.5 Significance of the Evaluation

This evaluation will serve as one of few major assessments of the program over its thirteen-year activity. As an evaluation, the significance of the study is in its ability to generate feedback for program management and make suggestions for improved program performance. Results of this evaluation will inform program adjustments made by not only the program in question, but also other programs that exist serving similar causes or utilizing similar program structures. Furthermore, the evaluation has the potential to highlight the strengths and weaknesses inherent in the current model and inform improved practice in this program and others.

1.6 Limitations

This evaluation presents the results of only one program in one context. As mentioned above, hurricanes Katrina and Rita had a devastating impact on the region in which the program is implemented, potentially influencing program aspects such as participant buy-in and availability of resources (Bush & Blanchard, 2009). Additionally, the relationship between the local region and other factors such as local economies and cultures may also have an impact on the ways in which the program is implemented and perceived.

This evaluation also includes only the individuals who have remained in the program and does not include information derived from those who have discontinued their participation whose understandings may be of great use to the program as it looks to refine the current implementation model. Finally, although the quantitative survey component is informed by the broad qualitative data collection and analysis, there may be various points and aspects that were not observed in the interview data collection and therefore not reflected in the quantitative analysis. All efforts were made to include as many participants as possible in both phases of the mixed methods design.

1.7 Definitions of Terms

Environmental literacy. Derived from Roth's continuum (1992), environmental literacy is a component of environmental education and includes four stages of increasing environmental knowledge and relationships, beginning with environmental awareness and environmental concern and ending with environmental understanding and the hierarchy's peak at environmental action.

Stewardship. Stewardship extends service-learning's purposes of informed and reflective service in the surrounding community and further stresses components of social responsibility (McHardy, Blanchard, & de Wet, 2009).

Experiential learning. Kolb's (2001; Kolb, Boyatzis & Mainemelis, 1984) model of experiential learning seeks to provide a framework for the mechanisms by which learners learn through action and reflection. Experiential learning consists of a four part cycle, commencing with concrete action, reflection, conceptualization and applied action informed by these elements that will then feed back into the cycle at the concrete experience stage.

Can yard. Can yards are on-campus plant nurseries installed and maintained by each participating school (Blanchard & Bush, 2009; Bush & Blanchard, 2008). With the assistance of Coastal Roots™ staff, participating teachers establish the can yards on individual school properties, including planting cells and irrigation systems.

Restoration sites and trips. Participating schools attend a restoration planting trip wherein students place the native species they have cultivated into a selected planting site. The restoration site defines the species that is selected for the school and includes both coastal and inland locations (Blanchard & Bush, 2009; Bush & Blanchard, 2008).

CHAPTER 2
REVIEW OF THE LITERATURE

2.1 Overview

The Coastal Roots™ program seeks to deliver program activities and services to schools so that "students learn about nursery maintenance, plant growth, and wetland issues such as coastal land loss, the functions and importance of wetlands to southern Louisiana, how wetlands are being restored as well as other restoration and conservation information" (Bush & Blanchard, 2009, p. 818) in response to the critical issue of coastal land loss in Louisiana (Blanchard & Bush, 2008; Bush & Blanchard, 2009). Like most ecological stewardship programs across the country, Coastal Roots™ seeks to foster and build a sense of social responsibility and a closer relationship between students and nature (Cramer, 2008). These relationships and connections are developed through hands-on activities that promote the idea of ethics in the environment (Pivnick, 2004) and establishing parallels between the content of the classroom and the real-world dynamics of the environment (Messina & Blanchard, 2004).

Student attitude is a key variable in the Coastal Roots™ program's theory of change. Children's relationships to the outside world play a pivotal role in developing a sense of social responsibility, especially during developmental ages as children become more environmentally conscious as they age (O'Brien, 2007). The National Environmental Education Advisory Council (2005) stresses the immense role of student attitudes toward the environment in environmental education, listing attitude toward the environment as a critical part of the environmental education curriculum. Participation in the Coastal Roots™ program has shown to have a positive effect on student attitude, with

scores measuring attitude towards the environment and content knowledge rising after participation in the program (Karsh et al., 2009).

2.2 Program Theory

Effective environmental stewardship programs embody a number of elements in all aspects of the program's planning and implementation. In describing the successful work of a similar program in Oregon's Willamette Valley, Cramer (2008) attributes the success of the program to the overlapping combination of local influences, partnerships, content connections, informed service-learning practices, and connections to real world activities. The Coastal Roots™ program theory and structure embody elements of the Willamette Valley program, defining itself through three overall objectives:

> 1) to conduct an on-going school-based nursery program involving the growing and restorative transplanting of native plants,
>
> 2) to develop in students an attitude of stewardship toward natural resources, and
>
> 3) to provide teachers and students with instruction on relevant issues such as ecological stewardship, wetlands functions and values, habitat restoration and conservation, as well as basic geology and horticulture skills. (Blanchard & Bush, 2008, p. 68)

These three overarching objectives can be abbreviated into three succinct program components – environmental stewardship, environmental literacy, and experiential learning. The theories and processes underlying these three components form the underlying program theory of change (Figure 2.1). Each of these three components will be discussed in greater detail in the sections below. It is important to note that each of

the three components are not isolated but rather overlap theoretically with one another in generating a system of learning and social responsibility.

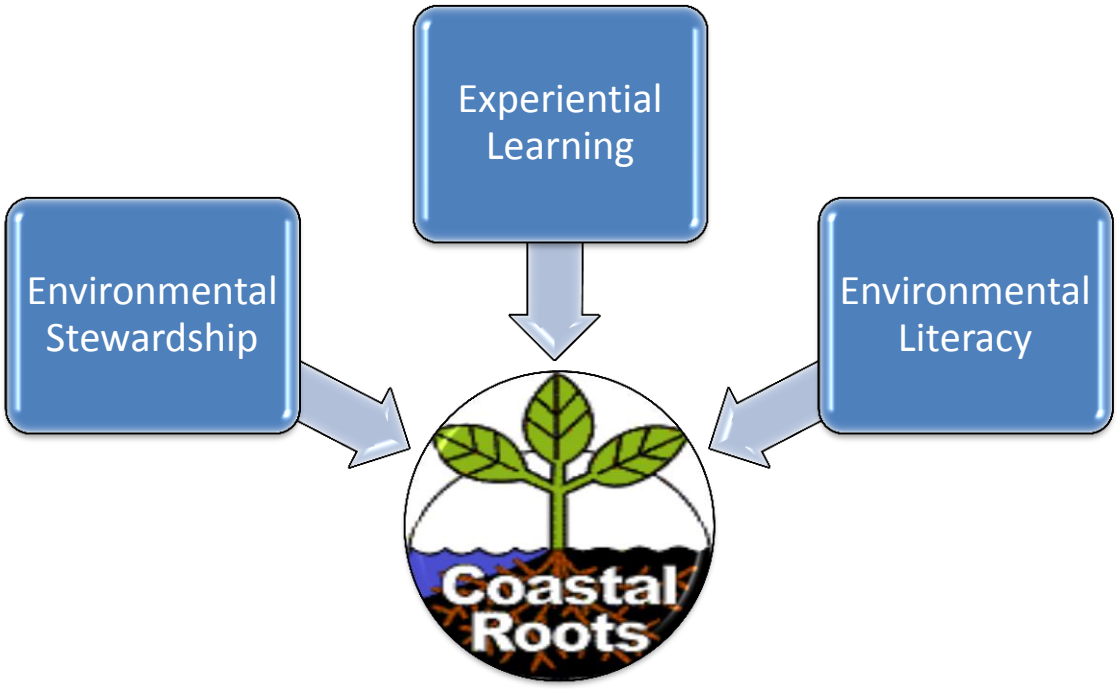

Figure 2.1: Program Theory Elements

2.2.1 Environmental Stewardship

A major component of the Coastal Roots™ program is the nurturing of an attitude of stewardship to coastal issues (Blanchard, 2007) by enabling "schools interested in a service-learning approach to learning science to participate within a structured horticultural program" (Blanchard & Bush, 2008, p. 67). The goals and underlying program theory of the environmental stewardship component of the Coastal Roots™ program theory of change combine the complementary tenets of stewardship and service-learning in program planning and implementation.

The program seeks to foster and develop not only a sense of awareness of environmental issues but also to generate a population of environmental stewards through the activities of the program (Blanchard & Bush, 2008). Thoughtful and effective stewardship education pedagogy adopts a holistic approach not only to the place and critical issue but also incorporates the temporal aspects of the issue, that is, how the issue changes and affects the environment and community through the present and future, as well as how the issue influences various components of the community and society (Worrell & Appleby, 2000). Strong stewardship programming is layered and interconnected, involving the inclusion of interdisciplinary areas such as social welfare issues, environmental issues, economic issues, cultural issues, and a myriad of other societal and environmental realms that overlap through the critical issue of concern (Smith, 2002).

Stewardship in education requires more from the teaching participant and student participants than simple participation in critical issue work. Working within this pedagogical tradition is complex and requires more thoughtful and social responsibility-oriented approaches to education and projects. Stewardship in education must be meaningful for participants while simultaneously meeting the needs of the critical issues under study (Basile & White, 2000). The pedagogy of service-learning offers insight into the structuring and function of stewardship educational programming. The National Service-Learning Clearinghouse (2013) defines service-learning as a combination of curriculum content, real world problems, service in the community, and reflection on the full experience in relation to the cause of concern. The experience must involve a learning element that discusses the content and context of the issue. Meaningful service

activities that bridge the cause and the content are conducted next and are then followed by reflection that takes the event, personal experience, and the knowledge learned in the first stages and combines them into a holistic and meaningful experience for the participant (Blanchard, 2007). The participant then sees the current situation and their place in its evolution in the future (Cramer, 2008). Using place-based learning techniques further builds on these principles by connecting the participant to their local environment and community – encouraging strong ties between participants and local issues (Cramer, 2008; Woodhouse & Knapp, 2000).

2.2.2 Environmental Literacy

The Coastal Roots™ program utilizes Roth's stages of environmental literacy as a cornerstone of its program theory (McHardy, et al., 2009). Described as a necessary element of environmental education, Roth's listing of environmental literacy stages is comprised of four levels of increasing environmental understanding and engagement, beginning with environmental awareness and moving towards environmental action. The focus of the environmental literacy continuum is literacy in the experienced sense, that is, knowledge and functional understanding of the concepts of environmental education (Roth, 1992).

Much like Bloom's taxonomy's escalating levels of demonstrated learning, Roth's continuum presents escalating levels of environmental understanding from introductory awareness to the application of learned knowledge. As illustrated in Figure 2.2 below, Roth's environmental literacy stages commence with the lowest level of environmental literacy, environmental awareness. The environmental awareness stage requires the participant to become knowledgeable and aware of the connection existing between

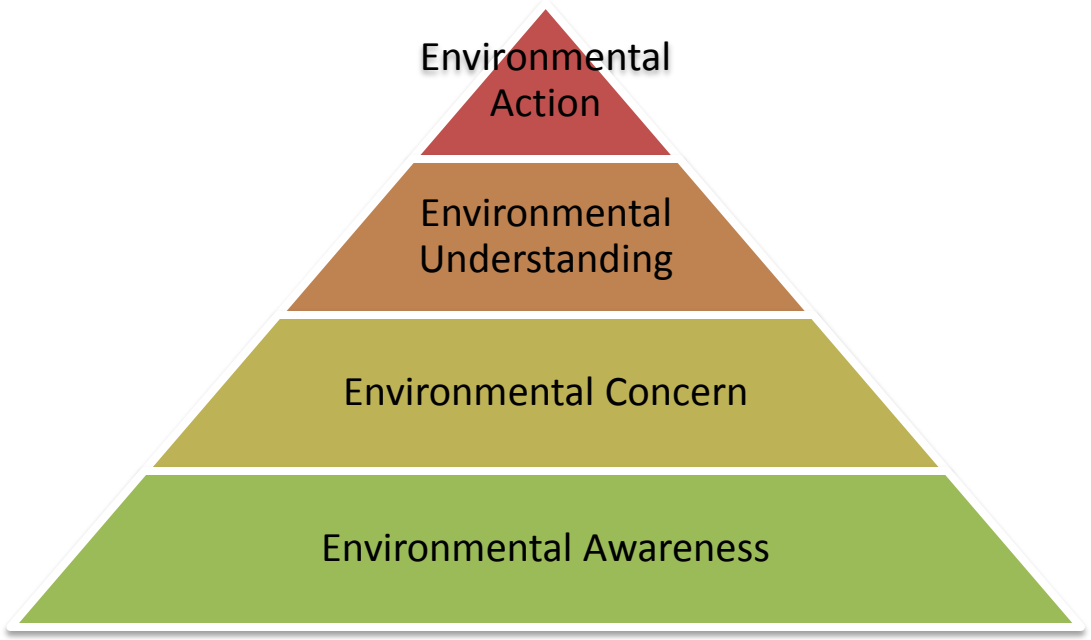

Figure 2.2: Roth's Environmental Literacy Stages (Roth, 1992)

people and the environment as well as between various entities within the interacting parties. The next stage is environmental concern, in which an affective and cognitive level of concern is made towards the issue under study and the participant espouses the need for change. The third stage, environmental understanding, involves a deeper investigation and amassing of knowledge in regards to the issue's past, present, and future. The final level of the hierarchy of environmental literacy is composed of environmental action, the stage in which the participant not only understands the issue, its causes, implications, and needed action steps, but also applies this knowledge by taking appropriate action steps (Roth, 1992). Coastal Roots' combination of classroom content covering the issue holistically combined with the application of this knowledge and skill set in the field embodies Roth's hierarchy and comprises a significant part of the program's theory of change.

2.2.3 Experiential Learning

Coastal Roots™ design to "make the program as hands-on as possible" makes experiential learning processes a central feature of the program theory (Coker et al., 2010, p. 500). The processes of experiential learning have their roots in Dewey's theories of constructivism and learning through one's own experience (Lagemann, 2002; Menand, 2001). Kolb (1984) and Kolb et al. (2001) explain and expand on these concepts through Kolb's model of experiential learning presented in Figure 2.3. Kolb's model focuses on the four elements of reflecting, acting, conceptualizing, and thinking. Throughout the learning process, the participant experiences each of the model's elements and as a result undergoes a constructivist-based learning experience. Participating in the learning

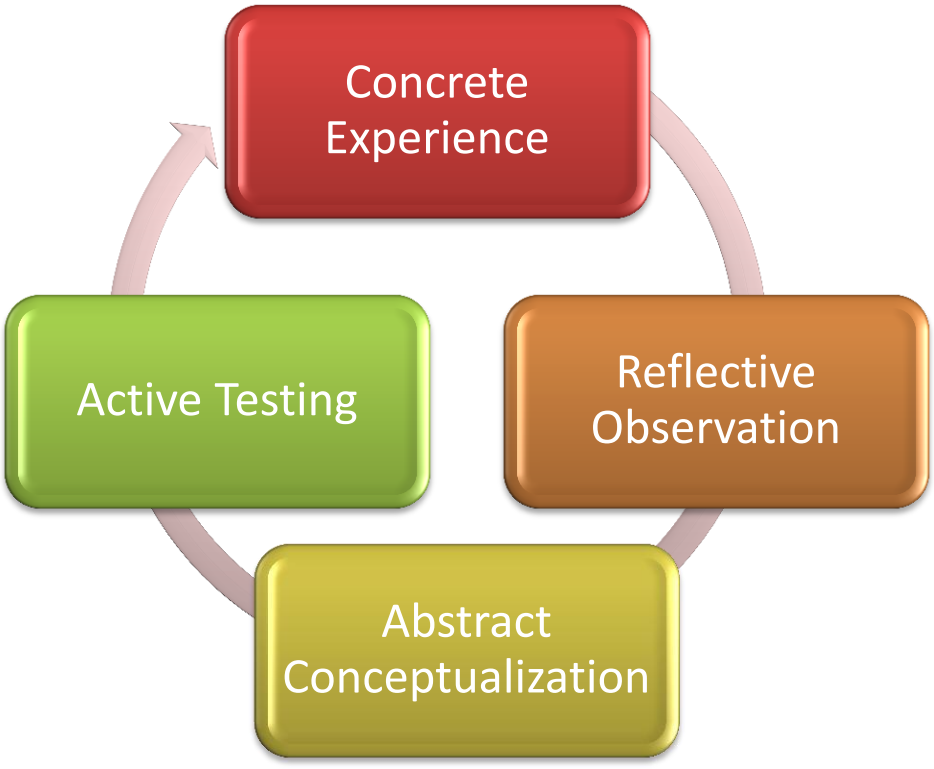

Figure 2.3: Kolb's Experiential Learning Model (Kolb, 1984)

event (the concrete experience) serves as the basis for reflection. The experience is observed and analyzed by the participant that experiences it. Reflections based on these experiences then lead to the participant's abstract conceptualization of the content and experience. The participant then applies these conceptualizations to other events and situations (active experimentation). The cycle begins again as the participant observes these active experimentation experiences, reflects upon them, develops further abstract conceptualizations, and continues to make applications through active experimentation and further repetitions of the cycle (Kolb, 1984). This cycle combined with Roth's environmental literacy continuum form the learning components of the program's theory of change (Blanchard & Buchanan, 2011)

2.3 Program Implementation

The Coastal Roots™ program was first conceived in 1999 by a coalition of environmental scientists and educators operating in connection to the Louisiana State University Sea Grant College Program looking to provide an opportunity for local students to become aware of and engage with Louisiana's coastal crisis (Blanchard & Bush, 2008; Blanchard, 2007), welcoming its first participants in January 2000 (Blanchard & Bush, 2008). Private and public schools form the participant base (Blanchard & Bush, 2008) with grades 2 through 12 sharing involvement (Blanchard, 2009). Each participating school constructs and cares for a can yard in which the flora of choice is grown before transplantation to a partner restoration site (Coker et al., 2010). Participant schools submit initial fees to support the cost of the can yard construction and supplies, with necessary guidance and support provided by the Coastal Roots™ staff (Bush & Blanchard, 2009; Coleman & Bush, 2002). Sponsoring teachers from each

school are then responsible for the continuation and maintenance of the can yard (Blanchard & Bush, 2008). Teachers enlist the help of formal science classrooms as well as school clubs and other extracurricular activities in the maintenance and care of the can yard, often tying the work to the classroom curriculum (Blanchard & Bush, 2008). A compendium of lessons and resources are provided to infuse ecological content into the classroom (http://coastalroots.lsu.edu/Compendium%20Sections/ComProgramInfo.html) but no structured curriculum is enforced in program participation, allowing teachers adaptability in their implementation of the program (Blanchard, 2009; Bush & Blanchard, 2009). Participants plant seeds in early spring and transplant the environment-ready seedlings during a restoration planting trip later in the school year (Blanchard & Bush, 2008). Plants of interest consist of native Louisiana grasses and trees, selected based on compatibility and need expressed by the restoration site (Blanchard, 2009; Bush & Blanchard, 2009). Teachers repeat the process the following school year and often build on prior grades' work (Coker et al., 2010). Support for participants plays a large role in the operations of the Coastal Roots™ program and overall project design and is provided throughout the project by program staff. Summer and winter workshops provide teachers with the opportunity to learn from structured professional development and expert feedback as well as to share learning and best practices with one another from their own classroom experiences (Blanchard, 2009).

Partnerships form another major element of the program's implementation and management. Partnerships with local restoration sites are vital to the success of environmental stewardship programs (Cramer, 2008). In addition to local partners who serve as long-term restoration sites (Blanchard 2009; Blanchard & Bush, 2008; Bush &

Blanchard, 2009), the Coastal Roots™ program also partners with similarly oriented programs and foundations in restoration efforts as well as resource sharing and education. These partnerships, such as the program's relationship with the Barataria-Terrebonne National Estuary Program (www.btnep.org), provide valuable resources and program connections (Blanchard, 2009). These community partnerships are necessary for the functioning of the program and the completion of its goals (Bush & Blanchard, 2009). The resulting program delivers student-driven learning (Cramer, 2008) and inclusion of important issues impacting the Louisiana coast within a learning situation (Blanchard, 2007), allowing them to see the effects of the environment in real time (Messina & Blanchard, 2004). The relationship between these various inputs and the intended outcomes of the Coastal Roots™ program are illustrated in the logic model in Figure 2.4 below.

2.4 Evaluation Framework: Goal Free Evaluation

Goal based evaluations (also known as objective oriented evaluation approaches) are the prominent design in educational program evaluation (Fitzpatrick et al., 2004). Designs falling within this approach focus on measuring a program's attainment of specific goals and objectives defined by the program through the program planning and development process (Stufflebeam, 2001). The program's worth is then measured against the attainment and magnitude of specific goals. Although useful in measuring specified concerns and goals, this approach leads to what Scriven refers to as evaluative "tunnel-vision with respect to the effects of the materials (or methods, etc.) – that is, a tendency to look mainly in the direction of announced goals" (1991, p. 57).

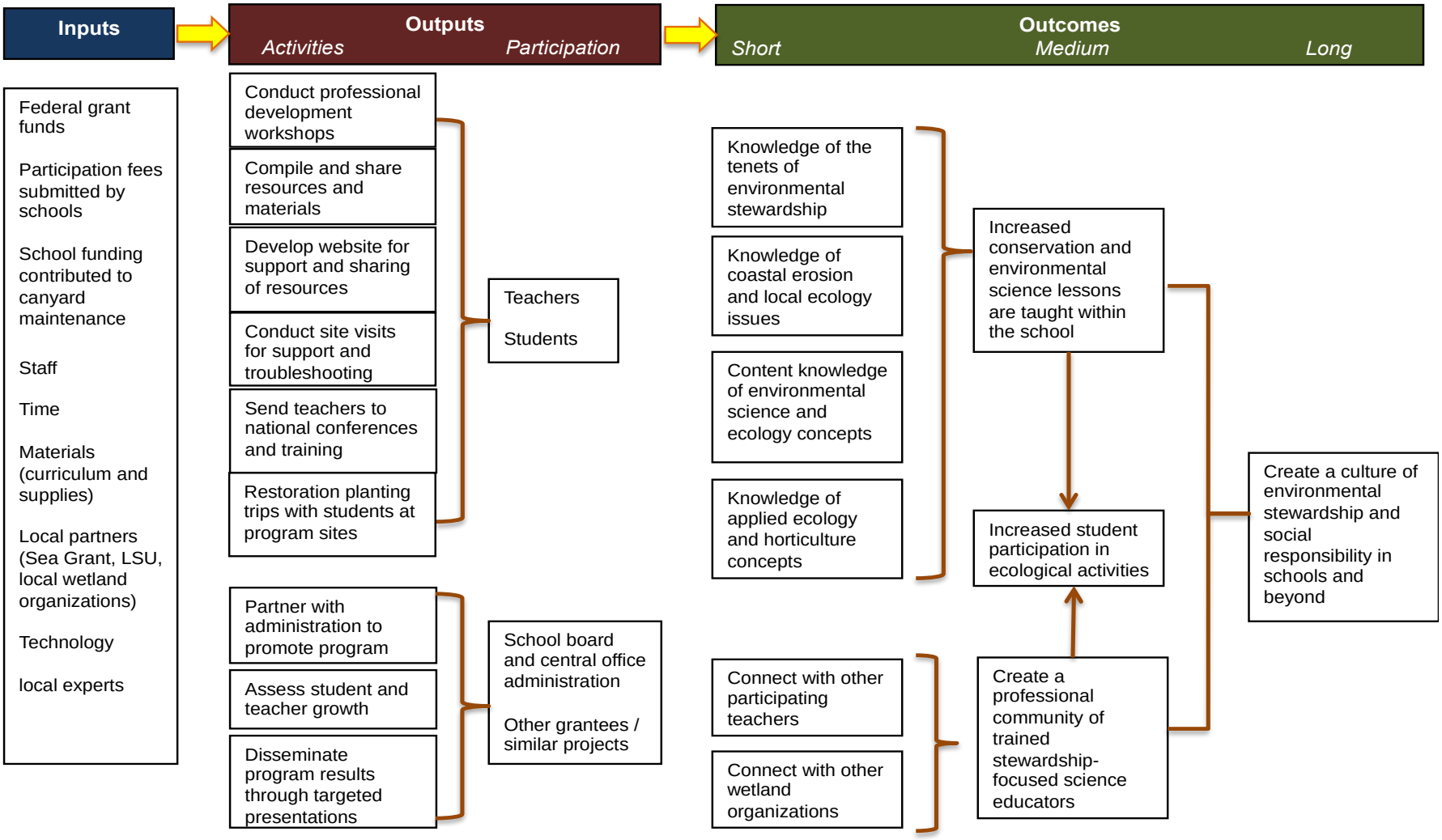

Figure 2.4: Coastal Roots™ Program Logic Model

In response to objectives based evaluation, Scriven (1991) posits the more encapsulating concept of goal free evaluation to accommodate the social nature and complex context of programs. Programs (including their staff, stakeholders, and funders) exist in a complex web of motives, contexts, and communities. As a result, the initial program theory utilized in the development of the program and its goals can become muddied as it becomes situated within this social context. The subsequent program and related activities change and in turn are changed by the social environment. The possibility for various outcomes outside of the initially planned goals emerges. These unintended outcomes – or 'unanticipated effects" (Scriven, 1991, p.56) – emerge as products of the program but due to their unintended status are neglected or missed in goal based evaluations that seek to measure only intended outcomes and effects.

Rather than focus on what a program was initially developed to attain, the goal free evaluator is more interested in "what effects this product had…whether or not they were intended" (Scriven, 1991, p. 56). The approach is exploratory in nature, seeking to generate a holistic image of what a program actually does rather than solely its attainment of specific predetermined goals. The goal free evaluator enters the evaluation generally unaware of intended outcomes and approaches the evaluation broadly in an attempt to assess the full account of program effects (Scriven, 1991). This open approach is balanced by rigorous research methods and evaluation designs, generating a comprehensive image of the program in its context. Although specific outcomes of the program are not directly incorporated into the evaluation design, successful attainment of original program goals should become apparent in the results of the goal free evaluation (Scriven, 1991). Scriven describes the process of entering an evaluation with an eye for specific predetermined program goals as an "unnecessary but also a possibly contaminating step" (Scriven, 1991, p. 56). In response to this contamination, he describes his

goal free approach as "simply, the evaluation of *actual* effects against (typically) a profile of *demonstrated* needs" (Scriven, 1991, p. 56).

Evaluation and program development are human sciences and as a result suffer from the inconsistencies and biases of human judgment. Evaluation distinguishes itself from research by its inclusion of judgment and the application of standards of value (Fitzpatrick, et al., 2004; Rossi, et al., 2004). The term value, however, is problematic in discussions of evaluative objectivity. When we discuss the concept of "value" we are making an implicit favoring of one possibility over another and measuring this favor on a subjective scale. Success or attainment of goals is determined by a subjective scale of desired outcomes (Stufflebeam, 2001). The magnitude and content of the outcome emerge as part of a subjective goal setting process – a process incorporating a specific set of individuals with their own individual biases. Therefore, it seems contradictory to use the terms "goal attainment" and "objectivity" in discussions of program value. Goals are the products of specific program designers and program design processes (either pluralistic or by a single entity) and rarely embody the complete spectrum of values of all stakeholders and program beneficiaries (Scriven, 1991).

Friedman, Rothman, and Withers (2006) describe the problem of goals through the concept of identity conflict in program design and implementation. As products of human construction, goals within a program embody the objectives and desires of various program members and can be interpreted in a variety of different ways. Each interpretation and motive for inclusion is based on an individual's desire to see a particular element of a program attained. Goals are not objective, stationary concepts but rather the product of subjective logic influenced by human emotion. Goals are laced with the intentions of various individuals and contexts and are "rooted in people's individual and collective purposes, senses of meaning, and definitions of

self" (Friedman et al., 2006, p. 202). Patton (2008) describes this as the goal paradox, the concept that goals are needed for systematic direction and planning, yet goals themselves are tied to human emotion and value systems that cannot be systematically or objectively defined.

By moving away from program specific foci to a holistic approach, goal free evaluation attempts to transform the evaluation into a more objective form. By simply looking for what is rather than aligning efforts against a specific cause or goal, evaluators can attempt to be more objective in their assessment of a program and the ways in which goals are defined and outcomes are valued. All possibilities and sources of information are given equal consideration. By definition, program staff and internal evaluators are unequipped to complete a truly goal free evaluation, necessitating the use of external evaluators. This combined effort of external teams and broad, open questioning create a more objective image of the program. A goals based approach traditionally focuses on the goals of the program staff, with little or no attention to the goals and anticipated effects of the program participants. Goal free evaluation attends to these interests by incorporating their appraisal in the exploratory research process. The purpose of this evaluation is to explore teacher values and goals within the Coastal Roots™ project and to incorporate these ideas into the continuing development of the program.

CHAPTER 3
METHODS

3.1 Purpose

The purpose of this study was to conduct a formative evaluation of the Coastal Roots™ program with an emphasis on the various manifestations of teacher implementation, purpose, engagement, and overall interaction with the program and the topics and causes it espouses. Since its beginning in 2000, the Coastal Roots™ program has influenced a large number of teachers throughout the state of Louisiana in the purposes of environmental stewardship and ecological education. Despite the program's decade of work and number of previous studies conducted through the program, there has been no comprehensive or in-depth evaluation of the program or its impacts in the communities it serves. The goal of this evaluation was to investigate the various aspects of the program as applied in practice and the program culture as defined by the individuals that comprise it. In order to capture a broad image of the program and its various impacts, a goal free mixed methods evaluation approach was utilized to provide the broadest image of the program.

3.2 Identifying and Selecting Evaluation Questions

Developing evaluation questions was a multi-part process emerging from the desire to address both the program management's informational needs as well as satisfying the broad and open-ended exploratory nature of the goal free process. The program management's concerns were collected and built into a series of broader, more open questions by maneuvering from the program's divergent questions to more open and goal free process acclimated questions.

The divergent questions provided by the staff contained 69 items (presented in Appendix D) covering a wide array of potential outcomes and concerns, but in order to cast a broad net for teacher participation and interpretation and to open the discussion to unidentified

concerns, the divergent questions were condensed to the following convergent evaluation questions and objectives:

1) What does Coastal Roots™ look like in its numerous school manifestations?

2) What purpose(s) does Coastal Roots™ serve for the teacher and school?

The objectives stemming from these questions are as follows:

1) Objective 1: Describe the Coastal Roots™ teacher participants currently enrolled in the program on the following demographic characteristics:

a) Gender

b) Age

c) Location

d) School Type

e) Teaching discipline

f) Number of years of teaching experience

g) Highest level of education completed

h) Additional certifications

i) Science educational background

j) Coastal Roots™ program experience and

k) Role in Coastal Roots™ programming.

2) Objective 2: Determine the frequency and methods of delivery of Coastal Roots-themed content into the curriculum.

3) Objective 3: Describe teacher use of Coastal Roots™ workshops and program-generated resources such as the compendium, website, and handbook as well as other non-program resources.

4) Objective 4: Determine teacher use of the program activity components within the school and curriculum, including science skills in Coastal Roots™ lessons, student development, cross curriculum connections, and the overall purpose of incorporating and using various aspects of the Coastal Roots™ program.

5) Objective 5: Examine relationships and differences in program implementation as measured by the Coastal Roots™ Participation Survey's four component scores (Coastal Roots™ as Science Inquiry, Coastal Roots™ Role in the Curriculum, Coastal Roots™ as Student Development, and Coastal Roots™ as Cross-Curricular Skills) based on the following demographic characteristics:

a) Program experience,

b) Science background, and

c) Location.

These areas of interest formed the guiding questions of the evaluation and the development of both qualitative and quantitative instruments. The above questions include inquiry into both the areas of exploration and trend investigation, making a mixed methods study approach the most useful in capturing the information needed to explore the evaluation questions posed and to collect the data necessary to meet program development and evolution needs. The iterative sequential mixed methods approach and processes of inquiry utilized to develop instruments and to analyze results in this evaluation are described in the following sections.

3.3 Mixed Methods Approach

In keeping with both the exploratory nature of the goal free evaluation approach while simultaneously meeting the complete evaluation's need for collective quantitative measures, a mixed methods design was selected to assess the application of the program in its various

contexts and manifestations. Forty-four structured interviews were conducted among Coastal Roots™ teachers focusing on a broad range of program topics, including:

1) The use of Coastal Roots™ in the classroom,
2) Material utilization,
3) Student response,
4) Administration and parent interaction,
5) Program professional development components, and
6) Teacher perception of the project as a whole.

To increase analysis diversity and generate a thorough assessment of the large array of potential data, transcribed interviews were coded by an interdisciplinary team of researchers from a variety of social science, education, and biological science backgrounds. From this analysis, a broad image of the program in action was developed. A survey was generated from the resulting qualitative thematic analysis (this process is described in greater detail in the subsequent sections).

The decision to utilize a mixed methods approach is intended to meet the exploratory nature of the evaluation and simultaneously incorporate the generalizability of quantitative methods, strengthening the overall design by creating an approach that is stronger than its parts (Creswell, 2009; Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009). The qualitative element provides an inductive approach to research that allows the evaluator to draw conclusions from themes emerging in the collected data (Rossman & Rallis, 2003). In contrast, the quantitative element provides a deductive approach to research that allows the evaluator to test various hypotheses and make generalizations about the relationship among variables that can be generalized across programs.

However, mixed methods approaches to evaluation do not simply mix approaches from the quantitative and qualitative research arenas but rather combine them in a way that is meaningful in relation to the program or process under study (Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009). Originating with the Campbell and Fisk study of 1959, the use of mixing multiple methods of inquiry within social science study began to emerge in the social science disciplines (Creswell, 2009). The late twentieth century brought significant theories of practice into discussions and intended uses of the research model (Fitzpatrick et al., 2004). Mixed methods' roots in pragmatic thought pushed for further understandings of intention and need in selecting a research approach. This origin highlights the idea that the question should guide the design in research and the researcher should build the design based on what methods are best suited to answer the question (Menand, 2001, Patton, 1990). For this reason, mixed methodologists utilize both research methodologies as a means of answering the question through whatever methods are best suited to it. Attention to this concern is addressed in not only the researcher's use of multiple methods, but in the justification for mixing and justification for the timing of each method's utilization and data interaction.

3.4 Mixed Methods Design

An iterative sequential mixed methods design was utilized in this evaluation in keeping with the goal free approach's concern with broad program exploration. Commencing with a qualitative strand of investigation. Beginning a mixed methods design with an exploratory qualitative stage is ideal in cases where the evaluator "does not know what constructs are important to study and relative quantitative instruments are not available" (Creswell & Plano Clark, 2011, p. 87). The timing and emphasis of each strand within the design is illustrated in Figure 3.1 below. The qualitative strand precedes the quantitative strand, informing the

development of the quantitative survey instrument through the themes and results produced by analysis of the interview data. The data drawn from the survey instrument in the quantitative strand was analyzed and followed by a re-investigation of qualitative data. This second qualitative stage was dictated by the quantitative results and resulted in the development of four explanatory case studies used to further illuminate the quantitative findings. In the concluding stages of the evaluation, the quantitative results were revisited in conjunction with the results of the qualitative strand.

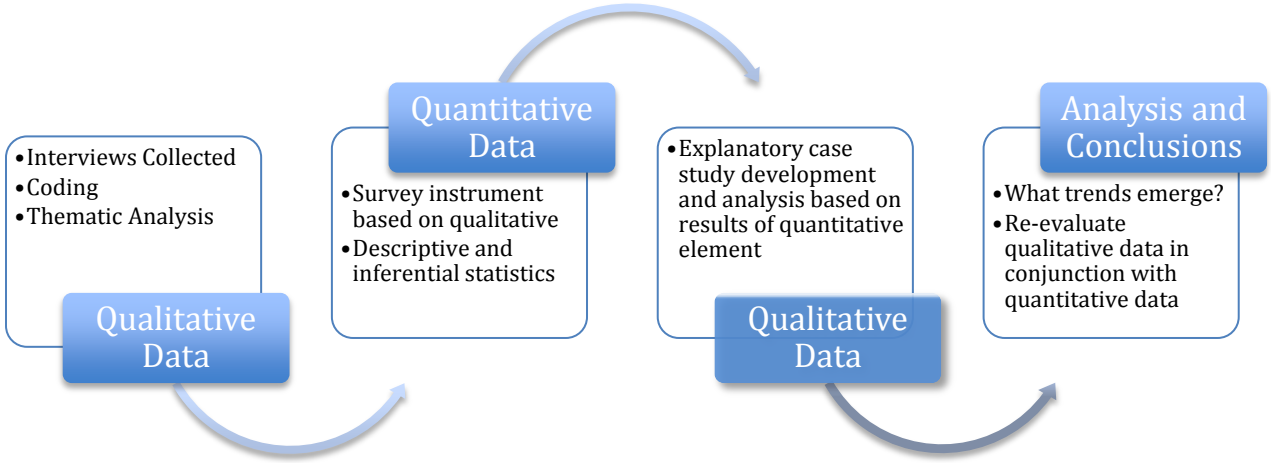

Figure 3.1: Strand Interaction (Teddlie & Tashakorri, 2009)

3.4.1 Timing

Timing in mixed methods research design refers to the point in which the various selected methods are employed, namely, the order in which qualitative data and quantitative data are collected in relation to one another (Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009). The selection of a timing scheme should coincide with analysis plans and provide data in a manner that is most equipped to answer the evaluation questions. For the purposes of this evaluation and the goal free approach being utilized, a sequential design will be employed. The

sequential mixed methods design stages the data collection procedures sequential to one another with one procedure preceding the other. In order to gather a large breadth of data, the exploratory qualitative data collection and analysis stage preceded the quantitative data collection and analysis. Results from the qualitative analysis then informed the survey instrument design in the subsequent quantitative data collection and analysis phase. The second qualitative strand followed, based on the results of the quantitative strand.

3.4.2 Level of Interaction

Mixed methods data can interact during the data collection processes of the study (interactive) or remain separate until the analysis stages at the study's completion (independent), the selection of which is made in consideration of the design and requirements of the question being studied (Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009). In keeping with the purposes of this evaluation and the iterative sequential design, the level of strand interaction is interactive due to the quantitative strand's reliance on results of the qualitative strand and the second qualitative strand's reliance on the results of the quantitative strand as well as triangulation purposes at the conclusion of the evaluation.

3.4.3 Strand Emphasis

Strand emphasis refers to the weight given to specific strands within the design, i.e., which strand is more dominant in the overall design (Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2009). For the purposes of this evaluation, emphasis is placed on the quantitative strand of the design. The qualitative work provides an image and beginning point for investigation into what is occurring within the program and within the classroom but it is the quantitative strand that allows us to examine relationships between these factors and determine the prevalence of these behaviors and beliefs within the program's participant population.

3.4.4 Overview of Data Collection and Analysis

Table 3.1 on the following page provides an overview of the complete mixed methods design proposed for this evaluation. As mentioned above, the exploratory qualitative strand leads the data collection procedures in this iterative sequential design. In-depth face-to-face interviews were conducted with 44 teachers of the Coastal Roots™ program. These interviews were transcribed and analyzed by coding and thematic analysis with an interdisciplinary team. Information from this analysis was utilized in the development of the quantitative survey instrument. The implementation of the instrument marked the commencement of the quantitative strand within the design. A census approach (including all members of the program population rather than a survey approach utilizing a sample of participants) was selected based on the availability of participant contact information, the ease of web-based distribution, and the relatively small size of the program's population. Web-based versions of the instrument were administered to the entire population of Coastal Roots™ teachers via the SurveyMonkey® online interface. Analysis of quantitative data took place independently then in conjunction with the qualitative results to deepen understandings of both and to serve triangulation purposes.

3.4.5 Population

Participants work in a variety of school types (charters, traditional public, parochial, and private) and multiple grade levels across the state. Program evaluation is interested in answering questions of interest in order to determine the efficacy and value of a program, so generalizability to other programs and events is not of particular concern to this project. As a census, the Coastal Roots™ program accessed the entire population of participating teachers. The program population was a manageable size for both the interview process as well as survey deployment and analysis. For this reason, all teacher participants were included in both data collection events and the employment of sampling strategies was not necessary.

Table 3.1 Mixed Methods Design (Creswell & Plano Clark, 2011)

Phase	Procedure	Product
Qualitative Data Collection	In-depth, face-to-face interviews, (n=44) (Throughout 2012)	Interview transcripts Recordings
Qualtitatve Data Analysis	Coding Thematic analysis Cross-thematic analysis (Fall 2012-Spring 2013)	Codes/Themes
Instrument Development	Develop survey items based on qualitative results (Summer 2013)	Web-based survey for teachers
Quantitative Data Collection	Administer web-based/paper-based surveys (n=81) (Summer 2013)	Survey data (returned n=46)
Quantitative Data Analysis	Frequencies Descriptive statistics Correlations and comparison of means	Descriptive statistics Correlations, Kruskal-Wallis Chi-Squares
Qualitative Data Analysis	Revisit qualitative data based on results of the quantitative data	Explanatory case studies (n=4)
Integration of the Quantitative and Qualitative Results	Interpretation and explanation of the quantitative and qualitative results	Discussion Implications Future research

3.5 Qualitative Data Collection and Analysis

3.5.1 Interviews

For the qualitative component, interview questions were developed by condensing the program staff's questions of interest into broader items and adding a number of open and exploratory items. The purpose of these questions was to engage the participating teachers in casual conversation regarding the use of Coastal Roots™ in their unique classroom and school environments and to describe their personal engagement and values relating to the program and its content. Questions were built around the components of teacher activities, student learning, parental and administrative support, and professional development. A listing of these questions and their relative area of program interest is provided in Appendix D. Interviews were conducted by a group of qualitatively trained doctoral students recruited from the qualitative research methods course taught through the School of Human Resource Education and Workplace Development in the spring 2012 semester as well as members of the Coastal Roots™ program staff throughout the 2012 year.

Interviewers completed a total of 44 interviews with individual teacher participants within the participants' respective classrooms. Conducting interviews within the field and within the environments in which the program takes place provided the opportunity for observation of the classroom space as well as an informal location of comfort for interviewees. Interview length varied greatly among participants, with an average length of approximately 45 minutes. Interviews were transcribed by the above-mentioned team of research volunteers and research assistants of the Coastal Roots™ program and were assembled for thematic analysis.

3.5.2 Coding and Thematic Analysis for Instrument Development

Interviews were compiled for analysis purposes and an interdisciplinary team of coders was utilized throughout the coding process. Considering the large amount of data collected from

the 44 interviews and the immense diversity of experiences possible within the program and the goal free approach, the use of an interdisciplinary team of professors and doctoral students offered the opportunity to view the data within the perspective of a variety of backgrounds and disciplines. The qualitative analysis team was trained in coding techniques and processes. The final team was comprised of individuals from the following backgrounds:

1) Education (3 members)
2) Science (3 members)
3) Social Sciences (sociology, social work, psychology) (3 members)
4) Arts (2 members)
5) Evaluation (3 members)
6) Technology (1 member)
7) English/Language Arts (2 members)
8) Training and Development (2 members)

All members received printed interview compilations and worked both independently and collaboratively to develop both preliminary and secondary codes and themes from the qualitative data provided. Inter-rater reliability was established by collectively viewing the material and developing a coding protocol then coding and analyzing the material in small groups.

Preliminary coding was conducted individually by each member of the analysis team. In the preliminary coding stage, analysis team members read through all materials in order to develop an understanding of the content. Preliminary codes and themes were developed by each member. These codes were compiled and discussed amongst the team in order to generate a concise and encompassing summary and model for developing a finalized coding scheme.

The developed coding scheme included 55 codes housed under an assortment of various themes. These themes included:

1) Emotion
2) "The land"
3) School
4) Teacher training and experience (including former work and training both in and out of education)
5) Student learning and experience (learning processes, activities, and experiences both in and out of the classroom)
6) Miscellaneous (including various items unrelated to broader themes and other codes, such as technology)

A full listing of themes and the codes that were used to develop them are presented in Appendix G.

The theme of "emotion" consisted of descriptions of student emotions or feelings as a result of their involvement in various aspects of the Coastal Roots™ program and its manifestation in their school community. The theme of "the land" included any reference to student or teacher interaction with the environment, including recreational activity and cultural references. The "school" category included interactions and activities that take place at or within the school, including interactions among teachers and administration and can yard maintenance. The "training and experience of teachers" theme included teacher training experiences both within and without the Coastal Roots™ trainings, mentions of assistance needed, positive and negative professional development content, and resource use. The theme of "student learning and experience" included learning activities and outcomes experienced by

students, such as learning activities and concepts relating to the student experience in the classroom.

Secondary coding took place after the completion of the coding guide. Members of the research team used the collective coding definitions of the completed coding guide in order to complete the secondary coding process. All interviews were recoded using the complete list of codes. Interview data that displayed a negative version or lack of presence of a specific code's content were labeled with the corresponding code but designated with a (d) to reference the data as mention of a deficit. Additional notes were also made regarding the presence of the code in parents (p), administration (a), teachers (t), or students (s). Therefore, mention of a lack of personal experience in conservation education would be marked as 4.7(d).

Analysis team members were divided into groups of three members, comprised of education, social science, and science professionals. Each group collaboratively reviewed the collected interviews and generated a consensus regarding the codes emerging from the data. Multiple coders used in the theme development and data coding discussions allowed for multiple interpretations and the utilization of codes that were selected by a majority of the coding group members, countering the individual bias and misinterpretation possibilities inherent in the subjective nature of qualitative data analysis. Furthermore, the interdisciplinary group's diverse variety of backgrounds allowed for the observation of themes among a wide range of possible content. For example, youth development and emotion codes were observed by research team members representing those backgrounds and may have been missed or misinterpreted without the inclusion of the diverse team membership. This diversity allowed the team to generate a coding scheme and analysis that best captured the complexity underlying the interdisciplinary program and its variety of manifestations.

3.6 Quantitative Data Collection and Analysis

The quantitative strand followed the initial exploratory qualitative strand of the evaluation. The quantitative element consisted of a survey instrument built from the results of the qualitative data analysis. The major themes emerging from the qualitative data defined the component sections of the survey instrument. Survey items were designed to both collect demographic and descriptive data from participants as well as provide information regarding the relationships among and trends in the themes discovered through the qualitative component of the research design.

3.6.1 Survey Components/Sections

The survey instrument was designed to include and thoroughly address all major themes emerging from the qualitative data and to provide clarification of ideas and trends appearing in the interviews. Item construction included a combination of Likert-like options, multiple choice selection, short field entries, and open-ended answer responses. Item types and content were based on the information sought and the descriptions drawn from the interview data. Item organization was based on the placement of concrete items during the initial sections of the survey instrument and then leading into abstract component sections. Care was taken to place more sensitive items towards the end of the instrument and limiting longer items in order to gain participant commitment to the survey and ease their experience through the survey. Demographic items were placed toward the end of the instrument in order to avoid distraction from content and maintain survey interest (Dillman, Tortora & Bowker, 1998). The initial draft of the survey was presented to the research team and program staff in order to address concerns in content and language. Suggestions were incorporated and the resulting instrument entered the piloting stage. The survey areas of interest included demographics, teacher educational

background, teacher participation in the Coastal Roots™ program use, can yard maintenance, stewardship, workshop and training activities, and teacher awards and grants.

Demographics: Collected demographics included school demographics, such as location, grade level, subjects taught, number of years in the teaching professions, and type of school (private, parochial, public, charter). Data collected from these survey items was used to establish general program demographics and to serve as variables in statistical analyses.

Educational Background: Educational background included teacher's degree level, major and minor areas of study, science courses taught at both the undergraduate and graduate levels, and experience in conservation and restoration education. Information provided from this component was used to assess teacher content backgrounds as they relate to the content of the Coastal Roots™ program.

Coastal Roots™ Participation: The participation component of the survey was the most in-depth component of the instrument. This component focuses on teacher participation in professional development opportunities afforded through the program, use of program materials, and the application of the program in the teacher participants' respective schools and classrooms. This component addressed number of years of participation in the Coastal Roots™ program, the manner in which teachers became involved in or recruited for the program, the organization of primary lead teachers versus partner teachers, how and when Coastal Roots™ lessons are taught, frequency of lessons, number of lessons taught, frequency of classroom use of Coastal Roots™ materials, outside sources used by teachers, cross-curricular program use, areas of science integration, manner of integration, purposes of integration, and objectives and intentions for students.

Can Yard Maintenance: This component was designed to address the large number of comments regarding can yard maintenance that were present in the interview data. Can yard maintenance varies at every location, making assessment of the issues inherent in their maintenance of high importance as the program looks to develop suggestions for improvement and refine training. The can yard maintenance component items included questions regarding maintenance responsibilities and delegation, student involvement in maintenance responsibilities, and teacher involvement in responsibilities.

Stewardship: Environmental stewardship comprises a large portion of the program's mission. For this reason, a stewardship component was considered obligatory despite little discussion by the teachers in the interview data. Stewardship survey items were designed to assess the teachers' own interpretation of the concept of stewardship as well as their history of stewardship education and coursework.

Workshop and Training Activities: The training component of the survey instrument includes items addressing teacher perception of workshop and training benefit, Coastal Roots™ lesson descriptions and assessment, issues hindering workshop and training participation, number of workshops attended, and the role of program staff in program commitment.

Awards and Grants: Several teacher participants mentioned pursuing other grants either simultaneously alongside Coastal Roots™ participation or as a result of participation in the grant program. Items in this component of the survey assess teacher grant activity, past and present external funding, awards received, and organizations responsible for funding.

3.6.2 Pilot Development and Adjustments

The pilot survey was transferred to an online format and presented to a six-member pilot study group in July 2013. The pilot study group was composed of former Coastal Roots™ teachers and science education students in order to best replicate the population of the program

without forfeiting any members of the current program population from the final survey administration. The pilot team consisted of the following:

1) Biology instructor and doctoral science education student with no K-12 or Coastal Roots™ experience
2) Science education doctoral student without classroom experience or Coastal Roots™ experience but familiarized with the project through experience conducting Coastal Roots™ interviews
3) Science education doctoral student and elementary science teacher not involved in the Coastal Roots™ program
4) Former LSU School of Human Resource and Workforce Development doctoral student/recent graduate who has worked with the program in varying capacities since 2009 but does not hold classroom experience
5) Two former Coastal Roots™ teachers who are now located in non-Coastal Roots™ participating schools.

Pilot members were provided with a link to access the survey and instructed to provide feedback regarding item wording and content as well as feedback in reference to the overall survey structure. Pilot group members completed the survey and provided feedback information within one week of receiving survey access. Pilot group participants' feedback was compiled and organized according to the concerns they described (Appendix H). Major concerns included length of the survey, concern over ambiguous wording in some items, and possible areas of item simplification. The research team reassembled and reviewed the pilot data feedback and discussed appropriate adjustments to the instrument. The final draft of the survey was approved

by all members of the research team and was transferred into the SurveyMonkey® web-based application for deployment.

3.6.3 Distribution

The web-based survey was distributed to the entire Coastal Roots™ teacher population through the SurveyMonkey® web-based survey application in July 2013. To encourage participation from participants and to compensate them for their time spent completing the survey, teachers were offered incentives for voluntary participation, including products (such as digital cameras) for their classroom by the Coastal Roots™ staff. Of the 81 teachers who were contacted to participate, 52 attempted the survey and 48 completed the full instrument.

3.7 Reliability and Validity

Reliability and validity issues were addressed through the procedures relevant to each strand type (Morse, Barrett, Mayan, Olson, & Spiers, 2008). Qualitative analysis checks for validity and reliability included inter-rater reliability, use of an interdisciplinary team, and triangulation of data (Patton, 1990). As discussed above, inter-rater reliability was attained by achieving consensus among research team participants in the qualitative data analysis as well as group development and consensus on codes used throughout the coding process. Use of an interdisciplinary team provided a wide variety of expertise, increasing the research team's ability to address multiple content area possibilities within the data. Triangulation of data includes the comparison of qualitative themes derived from a work against other data sources in order to ascertain similarities and differences (Patton, 1990). The meta-inference stage of the mixed methods process addresses triangulation by analyzing the qualitative results against those present in the quantitative data in order to observe similarities and potential contradictions. The purposes of qualitative research are not to generate generalizable conclusions, but rather to provide a context-bound analysis of a specific phenomenon.

Reliability and validity of the quantitative strand was addressed through the use of a pilot study and transparency in data handling methods and statistical analysis. Pilot study responses increased face and content validity through feedback and subsequent adjustments to the item layout and wording. Cronbach's alpha, an item reliability measure, was computed for each of the Likert-type items used in the four scoring components (items 29, 30, 31, and 32). All tests returned a Cronbach's alpha value of 0.70 or above and no response options were removed

The use of the qualitative data analysis results further extended the validity of item responses and wording by allowing the researcher to utilize the population's terminology in item construction. Transparency was achieved at all levels of the study through thorough description of data collection, data handling, and data analysis procedures. Scoring and analysis of survey data are described in depth in Chapter 4 below. Survey development is described above and the instrument can be found in Appendix A, allowing for replication of the process in future evaluations of the program.

3.8 Limitations and Biases

The use of a mixed methods design adds breadth and depth to the evaluation, yet some areas of the study are still limited in their exploration. For example, the evaluation instruments include items referring to student interaction and participation. The resulting information is limited to teacher perception of student behavior and does not capture the student experience itself. The evaluation design focuses primarily on the experience of the teacher and neglects the experience of the staff and students. Item responses may also have been influenced by the participants' knowledge of data review by the Coastal Roots™ staff. As a result, participant responses may be more positively biased than in the actual population. Finally, further research

should include the experiences of staff and students in order to generate a complete image of the program that incorporates the values and experiences of all stakeholders.

3.9 Ethical Concerns

The data collection tools and methods were submitted to the Louisiana State University Institutional Review Board in October 2013 (see Appendix B). The collection of qualitative data was approved by the Institutional Review Board in January 2012 (see Appendix C). The invitation to participate in the qualitative interview phase was offered to the population of teacher participants and was completely voluntary.

3.10 Summary

Few evaluation-based studies of the Coastal Roots™ program have been conducted over the 13-year life of the project. Teacher participant numbers and the scope of the program has grown since its inception, changing the face and shape of the program in each manifestation. A goal free approach to a mixed methods evaluation was employed to meet the exploratory nature of the investigation and to remain open to the myriad of possibilities within the program as it exists today. The iterative sequential design employed qualitative methods in the early stages of the project through the collection and analysis of interview data. Themes developed from this qualitative strand were used in generating the quantitative component's survey instrument. The survey instrument was piloted, refined, and deployed online to the entire population of Coastal Roots™ teacher participants. Data collected from this strand of the evaluation was analyzed independently. The results of this strand dictated the content and focus of the second qualitative strand's case study development and analysis. These results were then further analyzed in conjunction with the qualitative data collected in the early stages of the project and the

quantitative results in order to generate an image of the program that possesses both breadth and depth.

CHAPTER 4
RESULTS

4.1 Overview

In keeping with the initial exploratory stage of the iterative sequential mixed methods design described above, data collected from the initial qualitative stage was collected and analyzed in order to develop the Coastal Roots™ Participation Survey items (themes from this initial analysis are presented in Appendix G). The survey was distributed electronically via the SurveyMonkey® online application. Of the 81 participants included in the distribution, 48 invitees completed the survey. A second invitation was sent to non-responders after a two-week period, resulting in an additional four respondents and a total of 52 respondents. Of these 52 respondents, six were omitted resulting in a total of 46 participants. Of the six omitted participants, two participants failed to complete a majority of the survey and were therefore dropped from the data set. One respondent was not affiliated with the Coastal Roots™ program and was dropped due to her lack of association. The final three dropped participants were new members of the program approaching their first year of activity, making them unable to report on their experiences with and use of Coastal Roots™ in their classroom and school community. The final response rate was 59.74%. Survey data was uploaded from the SurveyMonkey® site and imported into the SPSS data analysis application.

Survey data was analyzed in accordance with the study research questions and objectives:

1) Objective 1: Describe the Coastal Roots™ teacher participants currently enrolled in the program on the following demographic characteristics:

a) Gender

b) Age

c) Location

d) School Type

e) Teaching discipline

f) Number of years of teaching experience

g) Highest level of education completed

h) Additional certifications

i) Science educational background

j) Coastal Roots™ program experience and

k) Role in Coastal Roots™ programming.

2) Objective 2: Determine the frequency and methods of delivery of Coastal Roots™-themed content into the curriculum.

3) Objective 3: Describe teacher use of Coastal Roots™ workshops and program-generated resources such as the compendium, website, and handbook as well as other non-program resources.

4) Objective 4: Determine teacher use of the program activity components within the school and curriculum, including science skills in Coastal Roots™ lessons, student development, cross curriculum connections, and the overall purpose of incorporating and using various aspects of the Coastal Roots™ program.

5) Objective 5: Examine relationships and differences in program implementation as measured by the Coastal Roots™ Participation Survey's four component scores (Coastal Roots™ as Science Inquiry, Coastal Roots™' Role in the Curriculum, Coastal Roots™ as Student Development, and Coastal Roots™ as Cross-Curricular Skills) based on the following demographic characteristics:

a) Program experience,

b) Science background, and

c) Location.

Survey analysis and results regarding each of the above-mentioned objectives is presented in this chapter. Qualitative data was revisited in the explanatory second qualitative strand in order to provide more information in regards to the trends and patterns occurring in the quantitative analysis. A meta-inference combining both the quantitative and qualitative results is presented in Chapter 5.

4.2 Quantitative Results

4.2.1 Objective One.

The first objective sought to describe the Coastal Roots™ teacher participants currently enrolled in the program on the following demographic characteristics: a) Gender b) Age c) Location d) School Type e) Teaching discipline f) Number of years of teaching experience g) Highest level of education completed h) Additional certifications i) Science educational background j) Coastal Roots™ program experience and l) Role in Coastal Roots™ programming.

Gender. Participants were asked to identify their gender. The majority of the respondents identified as female (n=39 or 84.8%) with males comprising the minority (n=7 or 15.2%). All participants responded to the survey item.

Age. Participants were provided the opportunity to enter their age, reporting a mean age of 44.98 with a minimum range of 26 and a maximum age of 66 (SD=10.92). These reported values were recoded into an additional variable utilizing five groups in order to best present the distribution: ages 20-29, ages 30-39, ages 40-49, ages 50-59, and ages 60-69 (presented in Table 4.1 below). One respondent did not provide a response.

Table 4.1: Age Distribution of Coastal Roots™ Program Survey Respondents

Age	*N*	Percentage
20-29	4	8.7%
30-39	9	19.6%
40-49	16	34.8%
50-59	10	21.7%
60-69	6	13.0%
No Response	1	2.2%
Total	46	100%

Location. Participants were asked to identify the parish in which their school was located. Participant reports represent 18 parishes in the southern region of Louisiana (a listing of reported parishes is presented in Table 4.2 and Figure 4.1). East Baton Rouge Parish held the highest frequency of respondents (n=10 or 21.7% of all respondents). All other responses presented a representation of 8.7% (4 participants or less). All respondents provided an answer to the location item.

Table 4.2: Location Frequencies of Coastal Roots™ Participation Survey Respondents

Parish	Frequency	Percent
Assumption	1	2.2
Calcasieu	2	4.3
Cameron	1	2.2
East Baton Rouge	10	21.7
Iberville	3	6.5
Jefferson	4	8.7
Lafayette	4	8.7
Lafourche	1	2.2
Orleans	4	8.7
Plaquemines	2	4.3
Pointe Coupee	1	2.2

Table 4.2 Continued.

Parish	Frequency	Percent
St. Charles	2	4.3
St. James	1	2.2
St. Landry	3	6.5
St. Tammany	3	6.5
Tangipahoa	2	4.3
Terrebonne	1	2.2
Vermilion	1	2.2
Total	46	100

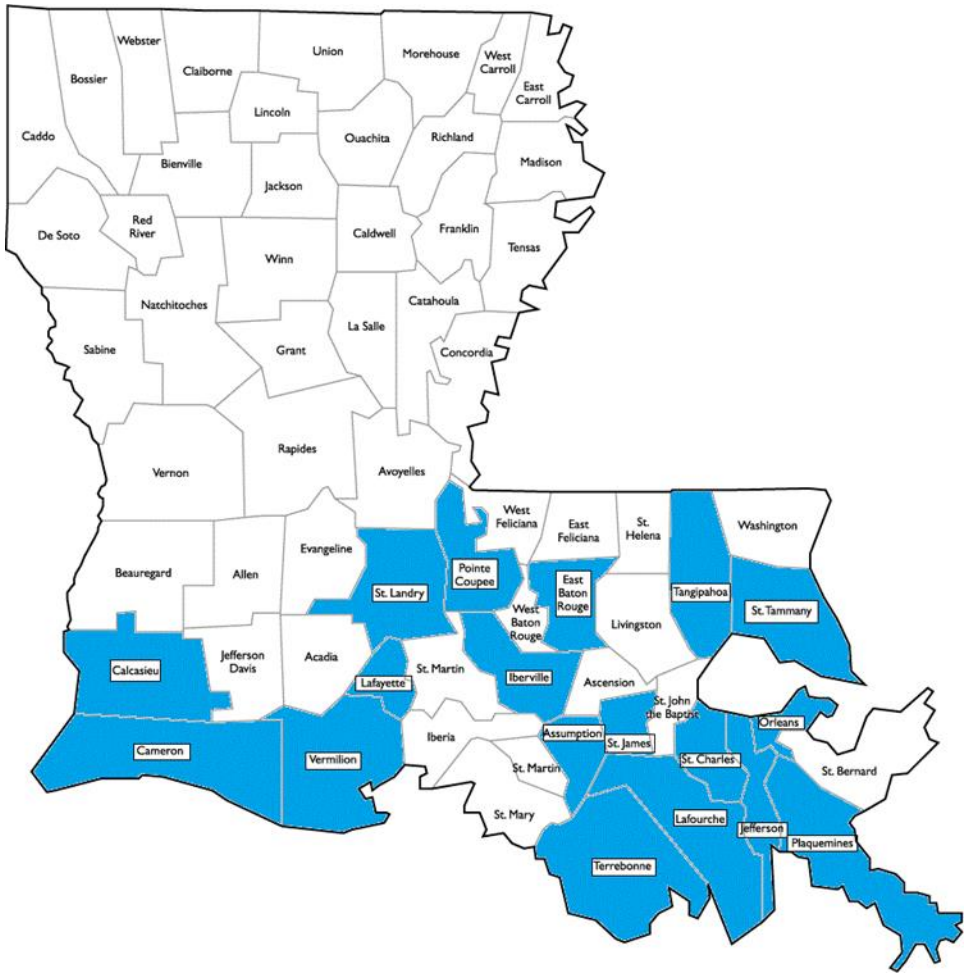

Figure 4.1: Map of Coastal Roots™ Participants by Parish

Parish responses were then used to generate two additional location variables: coastal/noncoastal location and rural/urban location. Coastal parishes were defined as those parishes bordered by coastal waterways, including Orleans, Jefferson, Terrebonne, Vermilion, Plaquemines, Lafourche, Cameron, and Calcasieu (Figure 4.2). Of the 18 parishes represented by survey respondents, 34.8% represented coastal parishes (n=16). Non-coastal parishes included Calcasieu, Lafayette, St. Landry, Pointe Coupee, Iberville, East Baton Rouge, Assumption, St, James, St. Charles, St. Tammany, and Tangipahoa parishes (n-30, 65.2%).

Figure 4.2: Map of Coastal Roots™ Participants: Coastal Parishes

Urban parishes were defined as those parishes with a population of 150,000 residents or less according to the Louisiana State Census Data Center (2012) (see Appendix J for parish populations). Coastal Roots™ participating parishes with a population greater than 150,000 residents included East Baton Rouge Parish (444,526 residents), Jefferson Parish (433,676 residents), Lafayette Parish (227,055 residents), Orleans Parish (369,250), St. Tammany Parish (239,453), and Calcasieu Parish (194,493). Representation of participants in these location categories is provided in Figure 4.3 and Table 4.3 below.

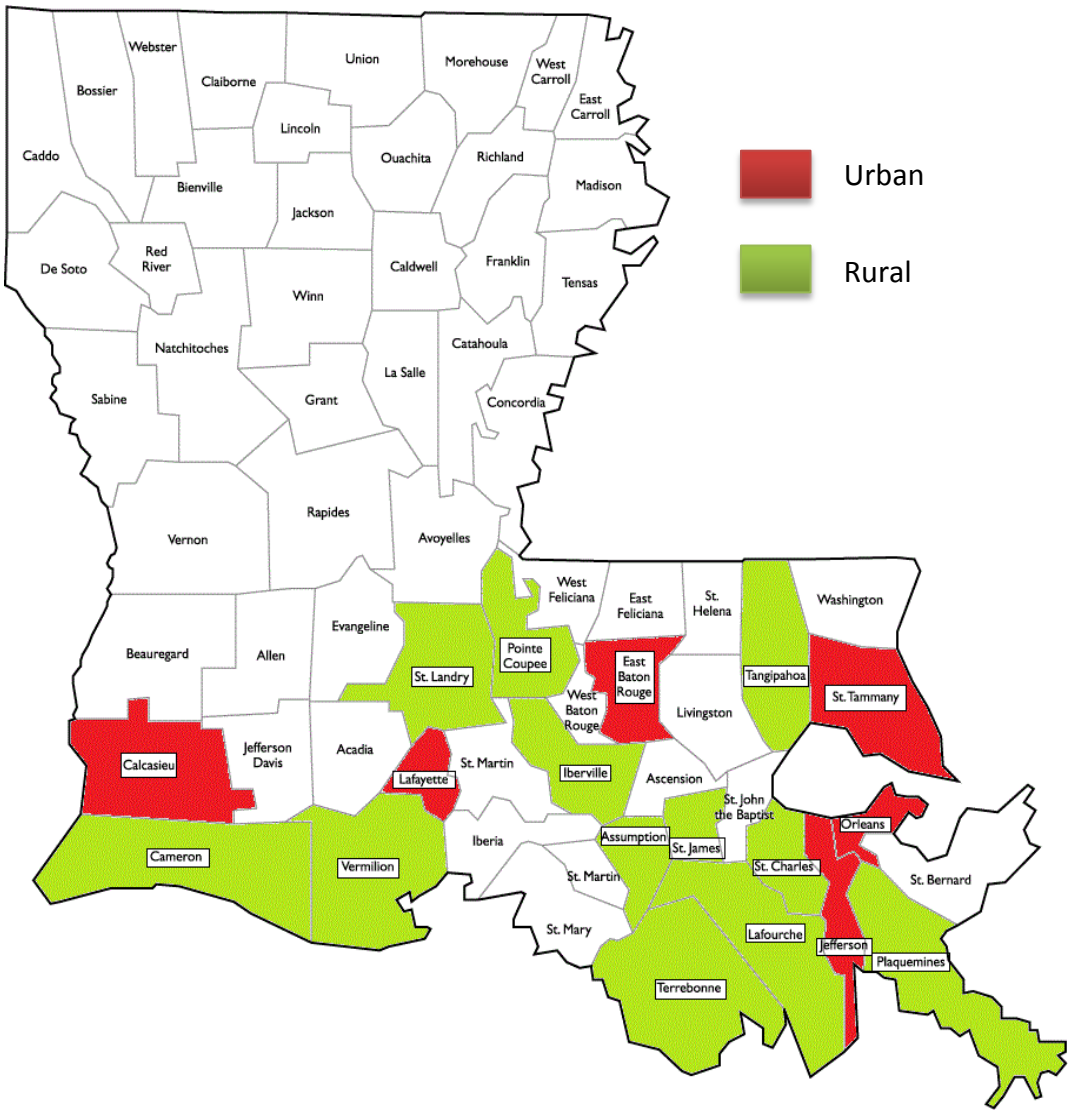

Figure 4.3: Map of Coastal Roots™ Participants: Rural and Urban Parishes

Table 4.3: Representation of Parishes in Coastal Roots™ Participation Survey by Location Type

Location Variable	N	Percent
Coastal	16	34.8%
Non-Coastal	30	65.2%
No Response	0	0%
Total	46	100%
Rural	20	43.5%
Urban	26	56.5%
No Response	0	0%
Total	46	100%

School Type. Participants were asked to respond to a number of items regarding school type. Participants were asked to select which school types best represented their school and were given the option of public, private, or parochial. Of the 46 respondents, 63% were public schools (n=29), 19.6% identified as private (n=9), and 17.4% identified as parochial (n=8). Participants were also asked whether or not their school was considered a charter school. The majority of respondents identified as non-charter schools (97.8% or n=45) while only one identified as a charter school (2.2%). In regards to school type, participants were asked to select which choice best described the school in which they currently teach from the following options: Elementary (Pre-K-5th), Middle/Junior high, PreK-8th, PreK-12, High, or Other. Participants represented a variety of school types, presented in Table 4.4 below.

Table 4.4: School Demographics of Coastal Roots™ Participation Survey Participants

School Type	Frequency	Percent
Public	29	63.0
Private	9	19.6
Parochial	8	17.4
Total	46	100

Table 4.4 Continued.

School Type	Frequency	Percent
Charter	1	2.2
Non-Charter	45	97.8
Total	46	100
Elementary	7	15.2
Middle/Junior High	9	19.6
High	10	21.7
Pre-K through 8	4	8.7
Pre-K through 12	11	23.9
Other*	6	13.0
Total	46	100%

*Other: K-8, K-12

Teaching Discipline. Participants were asked to describe their teaching assignment and which subjects they are currently teaching. Participants were asked to select which response best described their teaching assignment with the options of generalist (teaches multiple subject areas) and specialist (teaches one content area). Generalist educators (those educators who teach a variety of subjects, such as an elementary teacher who teaches all subjects at a grade level) represented 37.0 % of respondents (n=17) and specialists (those teachers who specialize in a particular discipline, such as a science teacher who teaches multiple sections of a particular discipline at the elementary or secondary level) represented 63.0% of respondents (n=29).

Participants were also asked to select the option that best described their current teaching discipline from the following options: English/Language Arts, Math, Science, Social Studies, Art/Music, and Other (Table 4.5). Disciplines reported by participants include Agriculture/Agriscience, Religion, and Technology. Respondents were given the opportunity to select more than one discipline due to the prevalence of dual appointments. These responses were recoded into a Science/Non-Science Discipline variable. The Science/Non-Science

Discipline variable combined those respondents reporting their discipline as science as well as those in the allied field of agriculture/agriscience. The majority of respondents (87%, n=40) taught some form of science with a minority (13%, n=6) teaching non-science related disciplines.

Table 4.5: Teacher Demographics of Coastal Roots™ Participation Survey Respondents

Teaching Discipline	*n*	Percent
English/Language Arts	7	15.2
Math	6	13.0
Science	37	80.4
Social Studies	6	13.0
Agriculture/Agriscience	4	8.6
Religion	1	2.2
Technology	1	2.2
Teaches Science Discipline	40	87.0%
Does Not Teach Within Science Disciplines	6	13.0%
Total	46	100%
Generalist	17	37.0%
Specialist	29	63.0%
Total	46	100%

Number of Years Teaching Experience. Participants were asked to provide the number of years they have worked in the teaching profession. Respondents reported a mean years of experience of 16.39 years (SD=9.07) with a minimum of 3 years of experience and a maximum of 47 years of experience. These reported values were recoded into an additional variable utilizing five groups in order to best present and assess the responses: 1 to 5 years of experience, 6 to 10 years of experience, 11 to 15 years of experience, 16 to 20 years of experience, and 21 years or more of teaching experience (see Table 4.6 below).

Table 4.6: Teaching Experience Distribution of Coastal Roots™ Participation Survey Respondents in Years

Years of Teaching Experience	*n*	Percentage
1 to 5 years	7	15.2%
6 to 10 years	5	10.9%
11 to 15 years	7	15.2%
16 to 20 years	15	32.6%
21 years or more	11	23.9%
No Response	1	2.2%
Total	46	100%

Highest Level of Education Completed and Additional Certifications. Participants were asked to select the response item that best reflected their highest level of education. Response options included Bachelors, Masters, Masters+30 (30 hours of graduate credit beyond the Masters degree), Doctorate, and Other. Bachelor degree holders represented the largest group, comprising 54.4% of all respondents (n=25). Masters degree holders ranked second, comprising 32.6% (n=15) of item responses. Masters+30 and doctorate degree holders represented the minority, with 8.7% (n=4) and 4.3% (n=2) respectively. No respondents selected Other.

Participants were also asked to select any awards or additional certifications that they have received. Additional certifications or awards options included National Board Certification, Presidential Award for Excellence in Mathematics and Science, National Science Teachers Association Award, Louisiana Teacher of the Year Award, Parish Teacher of the Year Award, None, and Other (see Table 4.7). National Board Certified teachers comprised 17.4% of the respondents (n=8). Parish Teacher of the Year Awardees comprised 23.9% of respondents (n=11).

Science Education Background. The Science Education Background variable consisted of participants' self-reported academic major as well as the types of classes attended in both

undergraduate and graduate work. Participants were asked to enter their academic majors. All respondents reporting a major in a science field or in science teacher education were classified as having a Science Background and all other majors and general education majors were classified as Non-Science Background. Non-Science Background respondents outnumbered Science Background respondents, comprising 60.9% of respondents (n=28) compared to 39.1% reporting Science Backgrounds (n=18).

Table 4.7: Highest Level of Education Completed and Additional Certifications by Respondents to the Coastal Roots™ Participation Survey

Highest Level of Education	*n*	Percent
Bachelors	25	54.4
Masters	15	32.6
Masters+30	4	8.7
Doctorate	2	4.3
Awards and Certifications	***n***	**Percent**
National Board Certification	8	17.4%
Presidential Awards for Excellence in Mathematics and Science	2	4.3%
National Science Teachers Association Awards	2	4.3%
Louisiana Teacher of the Year Awards	1	2.2%
Parish Teacher of the Year Awards	11	23.9%

Participants were also asked to select any undergraduate or graduate courses within the following disciplines: Environmental Science, Ecology, Botany/Plant Science, Wetland Science, Soil Science, Geology, Horticulture, Chemistry, Physics, Biology, Geography, None, or Other (see Table 4.8). These courses of interest were selected based on their relationship to Coastal Roots™ program content. Summations of each participant's total number of courses taken were tabulated as a science background indicator. Participant majors were also coded into a Science Education Background variable based on the discipline of each major. Number of undergraduate science courses in Coastal Roots™ related fields ranged from a minimum of 0 courses to a

maximum of 10 with a mean of 3.85 courses. Graduate science courses ranged from a minimum of 0 to a maximum of 8 with a mean of 1.26 courses. Total number of courses in Coastal Roots™ related fields taken ranged from a minimum of 0 to a maximum of 14 with a mean of 5.11 courses taken.

Table 4.8: Science Education Background of Coastal Roots Participation Survey Respondents

Background	n		Percent
Science Background	18		39.1
No Science Background	28		60.9
Total	46		100
Science Courses Taken	Minimum	Maximum	Mean
Undergraduate Science Courses	0	10	3.85
Graduate Science Courses	0	8	1.26
Total Courses Taken	0	14	5.11

Coastal Roots™ Program Experience and Role in Coastal Roots™ Programming. Participants were asked to provide the number of years in which they have been involved with the Coastal Roots™ program. Respondents reported a mean of 4.76 years in the program (SD=3.28), with a minimum of 1 year participation and a maximum of 14 years of program participation (see Table 4.9).

Role in Coastal Roots™ Programming was measured by respondents' role as a lead teacher (that is, lead teacher for the Coastal Roots™ project on their respective campus) and initiator of the program on the school campus. Participants were asked to select which option best represented their role in the Coastal Roots™ project in their respective schools from the following choices: Yes, I am the Lead Teacher, No, I am not a Lead Teacher, and The Duties are Equally Shared Among Two or More Teachers. Lead teachers comprised 50.0% of respondents (n=23). Teachers sharing duties evenly with other teachers within the same school comprised

45.7% (n=21) of respondents. Only 2 (4.3%) of respondents reported working in a non-lead role. Program initiators composed the largest group of respondents, with 63.0% (n=29) reporting that they were responsible for initiating the program on their campus. Respondents joining a pre-existing program comprised 23.9% of respondents (n=11), with 13.0% (n=6) reporting that they inherited the program from a former teacher.

Table 4.9: Coastal Roots™ Program Experience and Role in Coastal Roots™ Programming

Career History	Range		Mean
	Minimum	Maximum	
Total Years Teaching	3	47	16.39
Years in Coastal Roots™	1	14	4.76
Lead Teacher Roles	Frequency		Percent
Lead Teacher	23		50.0
Non Lead Teacher	2		4.3
Duties Shared Evenly	21		45.7
Program Initiation	Frequency		Percent
Instituted Program	29		63.0
Joined Pre-existing Program	11		23.9
Inherited Program from Previous Teacher	6		13.0
Total	46		100

4.3.2 Objective Two.

The second objective of the evaluation is to determine the frequency and methods of delivery of Coastal Roots™ themed content into the curriculum. To address this objective, participants were asked to respond to the items regarding when they incorporate Coastal Roots™ in their classrooms, how they incorporate the lesson, the estimated number of lessons taught per a grading period, and into which disciplines (if any) was Coastal Roots™ content integrated.

When is Coastal Roots™ Incorporated into the Curriculum. Participants were asked to select the option that best describes when they integrate Coastal Roots™ and wetland restoration lessons into their classroom curriculum from the following options: throughout the year, after standardized testing, near the time of the field trip, or other (see Table 4.10). The majority of respondents reported incorporating Coastal Roots™ themed content into the classroom throughout the year (80.4%, or n=37). Incorporation near the time of the field trip represented 8.7% of respondent responses (n=4) and after standardized testing represented 4.3% (n=2) of the responses. Other respondent-defined responses included random integration during wetlands topics (2.2%, n=1), as part of a school's Science Ambassadors club outside the classroom (2.2% or n=1), and for data collection (2.2% or n=1).

Table 4.10: Timing of Coastal Roots™ Theme Content into the Classroom

Time of Incorporation	*n*	Percent
Throughout the Year	37	80.4%
After Standardized Testing	2	4.3%
Near the Time of the Field Trip	4	8.7%
Other:		
Randomly During Wetlands Projects	1	2.2%
Throughout Year as Part of Another Program	1	2.2%
For Data Collection Purposes	1	2.2%

How is Coastal Roots™ Incorporated in the Classroom. Participants were asked to select the option that best described how Coastal Roots™ and wetland restoration lessons were incorporated into their curriculum (see Table 4.11). Respondent options included: a single condensed unit, smaller lessons dispersed throughout the year, supplement to existing lessons, limited or little classroom teaching involving Coastal Roots™ (plants maintained for field trip purpose), or other. Coastal Roots™ content as a supplement to existing lessons was the most

selected option, representing 41.3% (n=19) of participant responses. Smaller lessons throughout the year followed, representing 34.8% (n=16) of responses. Limited or little classroom teaching (maintaining plants for planting trip only) represented 10.9% (n=5) of respondent uses, followed by the option to use Coastal Roots™ as its own single condensed unit (6.5% or n=3). Other options proposed by respondents include using the content as both a single unit and throughout the year (4.4% or 2) and throughout the year as part of another program (2.2% or n=1).

Table 4.11: Type of Lesson/Unit Curricular Integration of Coastal Roots™ Themed Content into the Classroom

Type of Incorporation	*n*	Percent
Single Condensed Unit	3	6.5%
Smaller Lessons Throughout the Year	16	34.8%
Supplement to Existing Lessons	19	41.3%
Limited or Little Classroom Teaching	5	10.9%
Other:		
As a Single Unit and Throughout the Year	2	4.4%
Throughout the Year as Part of Another Program	1	2.2%

Number of Lessons per a Grading Period. Participants were asked to select which option best described how often they incorporated Coastal Roots™ into their classrooms in a single grading period. Participants were asked to select from the following options: None, 1 to 4 times per a grading period, 5 to 10 times per a grading period, 11 to 15 times per a grading period, and more than 15 times per a grading period (see Table 4.12 below). Incorporating Coastal Roots™ content 1 to 4 times per a grading period represented 63.0% (n=29) of all responses, followed by 5 to 10 lessons incorporated per grading period (28.3% or n=12), and 11 to 15 lessons incorporated per grading period (4.3% or n=2). The extremes of the spectrum – more than 15 lessons incorporated per grading period and no incorporation per a grading period – both

represented 2.2% (n=1) each. The length (in days) of each lesson was not reported. Participants were also asked to select which option best defined their grading period in from the following choices: 6 weeks, 9 weeks, and other. The majority of participants work in a 9-week grading system (82.6%, n=38).

Table 4.12: Frequency of Incorporation of Coastal Roots™ Themed Content into the Curriculum

Frequency of Incorporation per Grading Period	*n*	Percent
Never Incorporated	1	2.2%
1 to 4 lessons per grading period	29	63.0%
5 to 10 lessons per grading period	12	28.3%
11 to 15 lessons per grading period	2	4.3%
More than 15 lessons per grading period*	1	2.2%
Grading Periods Defined		
6 Weeks	5	10.9%
9 Weeks	38	82.6%
12 Weeks	1	2.2%
Semester	2	4.3%

* The 15 or more lessons respondent operated in a 9-week grading period system.

Use of Coastal Roots™ in the Instruction of Various Disciplines. Incorporation of Coastal Roots™ themed content into both science and non-science disciplines was addressed through multiple survey items. Respondents were asked to estimate how many times per a grading period Coastal Roots™ lessons were used in a variety of subject areas including: English/Language Arts, Math, Science, Social Studies, Art, Music, and Other. For each subject area, response choices included: never, 1-4, 5-10, 11-15, more than 15, and not applicable. Respondents selected science as the most used discipline for Coastal Roots™ themed lessons and activities in all categories of use (Table 4.13).

Table 4.13: Coastal Roots™ Themed Material Integration by Subject/Discipline

Subject	Never	1-5 lessons	6-10 lessons	11-15 lessons	16+ lessons	Not Applicable
English	41.3%	23.9%	4.3%	-	2.2%	28.3%
Math	41.3%	28.3%	4.3%	-	-	26.1%
Science	6.5%	45.7%	19.6%	10.9%	8.7%	8.7%
Social Studies	34.8%	23.9%	10.9%	-	-	30.4%
Art	41.3%	26.1%	-	-	-	32.6%
Music	56.5%	4.3%	-	-	-	39.1%

Other disciplines of reported use: Technology and After School Clubs

Respondents were also asked to select the science fields in which Coastal Roots™ was incorporated. Respondent item options included agriculture, biology/life science, chemistry, earth science, physics, I do not teach any form of science, and Other (see Table 4.14 below). Biology/Life Sciences represented the most popular field for Coastal Roots™ integration, with 62.9% (n=29) of respondents reporting using Coastal Roots™ in the teaching of the discipline. Earth Science followed, with a reported 52.2% (n=24) of respondents reporting use of Coastal Roots™ in discipline activities. Other disciplines included (in descending order): agriculture (30.4%), chemistry (10.9%), environmental science (10.9%), and physics (4.3%). Non-science teachers comprised 13.0% of the respondents.

Table 4.14: Incorporation of Coastal Roots™ Themed Lessons/Materials into Science Disciplines

Science Discipline in which Coastal Roots™ themed Materials/Lessons are Integrated	*n*	Percent
Agriculture	14	30.4%
Biology/Life Science	29	62.9%
Chemistry	5	10.9%
Earth Science	24	52.2%
Physics	2	4.3%

Table 4.14 Continued.

Science Discipline in which Coastal Roots™ themed Materials/Lessons are Integrated	*n*	Percent
Environmental Science	5	10.9%
Non-Science Teacher	6	13.0%

4.3.3 Objective Three.

The third objective of the evaluation is to describe teacher use of Coastal Roots™ workshops and program-generated resources. In order to investigate resource use, participants were asked to report the use of Coastal Roots™ generated materials (the compendium, handbook, and website) and to list other resources used in the teaching of Coastal Roots™ and wetlands themed lessons. In order to investigate workshop participation rates, participants were asked to estimate how often and which types of Coastal Roots™ professional development workshops they have attended during their time in the program.

Use of Coastal Roots™ Program Generated Materials. Program generated materials included the three major resources provided to Coastal Roots™ participants by the program – the compendium of lessons and activities, the handbook describing the program and providing assistance in maintenance of aspects such as the can yard, and the program-run website containing a number of various materials and resources for participants. Participants were asked to select how often they used each of the Coastal Roots™ generated materials (compendium, handbook, and website) from the following options: never, rarely, sometimes, often, and frequently. Responses by frequency of use and type of resource are listed in Table 4.15 below.

Table 4.15: Coastal Roots™ Resource Use

Compendium Use	*n*	Percent
Never	7	15.2%
Rarely	12	26.1%
Sometimes	17	37.0%
Often	9	19.6%
Frequently	1	2.2%
Total	46	100%
Handbook Use	***n***	**Percent**
Never	2	4.3%
Rarely	8	17.4%
Sometimes	24	52.2%
Often	8	17.4%
Frequently	4	8.7%
Total	46	100%
Website Use	***n***	**Percent**
Never	2	4.3%
Rarely	9	19.6%
Sometimes	26	56.5%
Often	8	17.4%
Frequently	1	2.2%
Total	46	100%

Use of Non-Coastal Roots™ Materials. The initial qualitative analysis suggested that Coastal Roots™ teachers incorporated a myriad of materials in curriculum building and lesson design. In order to investigate what resources are being used outside of the Coastal Roots™ program-provided resources, teachers were asked to report other resources used in their development and use of wetlands education in their schools. Participants were asked to select which resources other than Coastal Roots™ generated materials were used to teach wetland restoration from the following choices: Lake Pontchartrain Basin Foundation, Barataria

Terrebonne National Estuary Program, LSU AgCenter 4-H Youth Wetlands Week, JASON, LUMCON, Project Learning Tree, Project WET, Project WOW, Project Flying Wild, LDWF Native Fish in the Classroom, Internet, and Other. The most prominent resource reported by teachers was general internet searches rather than specific sites, reported as useful by 71.1% (n=33) of respondents. The Barataria Terrebonne National Estuary Program ranked second in use, with 63.0% (n=29) reporting using the program's resources in wetlands education. All responses and frequencies for each are listed in Table 4.16 below.

Table 4.16: Non-Coastal Roots™ Resource Use

Non-Coastal Roots™ Resource	Frequency	Percent
Lake Pontchartrain Basin Foundation	17	37.0%
Barataria Terrebonne National Estuary Program	29	63.0%
LSU AgCenter 4-H Youth Wetlands Week	18	39.1%
JASON	12	26.1%
LUMCON	22	47.8%
Project Learning Tree	19	41.3%
Project WET	14	30.4%
Wonders of the Wetlands	15	32.6%
Project Flying Wild	1	2.2%
LDWF Native Fish in the Classroom	12	26.1%
Internet	33	71.7%
A Wetland Reveillon	1	2.2%
Pre-AP Rice Curriculum	1	2.2%
Local People	1	2.2%

Teacher Workshop Attendance. Coastal Roots™ hosts two optional professional development workshops annually. The workshops – the Winter Workshop and Summer Institute – typically provide teachers with lessons, horticulture skill development, and general wetlands information to improve program performance. In order to investigate participation in teacher

professional development opportunities, participants were asked to report participation in workshops and perceived levels of skill improvement as a result of Coastal Roots™ programming. Participants were asked to provide the number of workshops attended for both the Winter Workshop and Summer Institutes (see Table 4.17 below). The minimum reported attendance of both the Summer Institute and Winter Workshop was one workshop attendance and the maximum number of workshops reported as attended per respondent was 8, for a mean of 2.93 (SD=1.79) Summer Institute appearances per participant and a mean of 3.63 (2.02) Winter Workshop appearances. Total workshop attendance generated a mean of 6.57 (SD=3.59) workshop attendances per participant experience in the program, with a minimum of 2 workshops and a maximum of 15.

Table 4.17: Coastal Roots™ Workshop Participation

Workshop	Minimum	Maximum	Mean
Summer Institute	1	8	2.93
Winter Workshops	1	8	3.63
Total Workshop Attendance	2	15	6.57

Respondents were also asked to select their perceived level of improvement of understanding in regards to wetlands restoration as a result of their participation in the Coastal Roots™ program from the following choices: No improvement, little improvement, some improvement, and much improvement (Table 4.18). Of the 46 survey respondents, a majority (82.6% or n=38) reported much improvement in their understanding of the topic. The remaining 8 respondents (17.4%) reported some improvement in their understanding of the topic as a result of their participation in the Coastal Roots™ program. No respondents reported little or no improvement in their understanding of the topic as a result of their participation in the program.

Table 4.18: Coastal Roots™ Participant Perceived Knowledge Development as a Result of Participation in the Coastal Roots™ Program

Level of Improvement	*N*	Percent
No Improvement	0	0.0%
Little Improvement	0	0.0%
Some Improvement	8	17.4%
Much improvement	38	82.6%

4.3.4 Objective Four.

The fourth objective of the evaluation sought to determine teacher use of the program activity components within the school and curriculum. In order to investigate the aspects of the program used by teachers, their role in the classroom and curriculum, and their intended purpose, respondents were asked to complete four matrix survey items regarding science skills in Coastal Roots™ lessons, student development, cross curriculum connections, and the overall purpose of incorporating and using various aspects of the Coastal Roots™ program. These interests were grouped into the following four scoring groups:

a) Coastal Roots™ as Science Inquiry,

b) Coastal Roots™ as Student Development,

c) Coastal Roots™ as Cross Curricular Skill Building, and

d) Coastal Roots™ Role in Curriculum.

Each sub-scale response was assigned a corresponding value and a sum of all selected responses was tabulated as the respondent's score for the corresponding survey item. The minimum, maximum, and mean scores for each of these survey items is provided in Table 4.19 below.

Table 4.19: Coastal Roots™ Participant Survey Scores

Survey Item	Minimum Score	Maximum Score	Mean Score	Standard Deviation
Coastal Roots™ as Science Inquiry	9.00	37.00	26.61	6.54
Coastal Roots™ as Student Development	20.00	32.00	30.02	2.43
Coastal Roots™ as Cross Curricular Skill	15.00	45.00	31.35	6.92
Coastal Roots™' Role in Curriculum	9.00	29.00	21.28	4.47

Survey Component Score 1: Coastal Roots™ as Science Inquiry. The Coastal Roots™ as Science Inquiry item was designed to assess how often Coastal Roots™ programing is used to accomplish a number of science inquiry-based activities. Participants were asked how often Coastal Roots was used for the following purposes: research using outside sources, learning outside of the classroom, data collection, data analysis, fieldwork, science as experience, role as a lecture topic, and environmental awareness. Respondents were asked to rank their use of Coastal Roots™ on a scale of never, rarely, occasionally, frequently, always, and not applicable. Respondents selecting the not applicable option were treated as missing values for the purposes of the item assessment. Scores of 1 (never) through 5 (always) were assigned to respondent choices. These values were summed to generate the respondent's Coastal Roots™ as Science Inquiry Score. A maximum of 40 points was possible in this item. As presented in Table 4.19, the minimum observed score for this item was 9.00 and a maximum observed score of 37.00. The mean Coastal Roots™ as Science Inquiry score was 26.61 (SD=6.54). An item-by-item analysis of all Coastal Roots™ as Science Inquiry item is presented in Table 4.20 below.

Survey Component Score 2: Coastal Roots™ as Student Development. The Coastal Roots™ as Student Development item was designed to assess the cognitive and affective outcomes respondents intended to generate in their student populations as a result of their

Table 4.20: Coastal Roots™ as Science Inquiry Survey Item Mean Scores

Coastal Roots™ as Science Inquiry Score Item	N	Mean	Standard Deviation
Research Using Outside Sources	44	2.86	1.00
Learning Outside of the Classroom	46	3.70	.87
Data Collection	43	3.47	1.01
Data Analysis	43	3.44	1.01
Field Work/Working in the Field	44	3.66	1.03
Science as an Experience	42	3.74	.91
Role as a Lecture Topic	42	2.83	.99
Environmental Awareness	46	4.22	.76
Mean Science Inquiry Item Score		3.50	.66

participation in the Coastal Roots™ program. Participants were asked to select the option that best described how important the following elements are in regards to what they want their students to gain from the Coastal Roots™ project: application of research skills, sense of belonging, content knowledge, engagement, informed citizenship, life skills such as ethics and responsibility, being a part of something bigger than oneself, and stewardship. Respondents were asked to rank the level of importance each of the above elements on a scale of not at all, very little, somewhat, and to a great extent. Scores of 1 (not at all) through 4 (to a great extent) were assigned to respondent choices. The sum of these values was used to generate the respondent's Coastal Roots™ as Student Development Score. A maximum of 32 points was possible in this item. As presented in Table 4.19, the minimum observed score for this item was 20.00 and a maximum observed score of 32.00. The mean Coastal Roots™ as Student Development score is 30.02 (SD=2.43). An item-by-item analysis of all Coastal Roots™ as Student Development item is presented in Table 4.21 below. All participants completed the Coastal Roots™ as Student Development item.

Table 4.21: Coastal Roots™ as Student Development Item Mean Scores

Coastal Roots™ as Student Development Item	*n*	Mean	Standard Deviation
Application of Research Skills	46	3.28	.81
Sense of Belonging	46	3.63	.53
Content Knowledge	46	3.63	.53
Engagement	46	3.93	.25
Informed Citizens	46	3.89	.38
Work Ethics/Responsibility	46	3.78	.59
Stewardship	46	3.93	.25
Being a Part of Something Bigger than Themselves	46	3.93	.25
Mean Student Development Item Score		3.75	.30

Survey Component Score 3: Coastal Roots™ as Cross Curricular Skills. The Coastal Roots™ as Cross Curricular Skills item was designed to assess how often Coastal Roots™ programing is used to teach a number of cross-curricular student skills and pedagogical elements. Participants were asked to select how often Coastal Roots™ was used to teach the following: critical thinking skills, problem solving skills, writing skills, observation skills, life skills, current events, relationship to location, relationship to culture, and reflection. Respondents were asked to rank their use of Coastal Roots™ for accomplishing each of the above-mentioned items on a scale of never, rarely, occasionally, frequently, always, and not applicable. Respondents who selected the not applicable option were treated as missing values for the purposes of the item assessment. Scores of 1 (never) through 5 (always) were assigned to respondent choices. These values were summed to generate the respondent's Coastal Roots™ as Cross Curricular Skill Development score. A maximum of 45 points is possible in this item. As presented in Table 4.19, the minimum observed score for this item was 15.00 and a maximum observed score of 35.00. The mean Coastal Roots™ as Cross Curricular Skill Development score is 31.35

(SD=6.92). An item-by-item analysis of all Coastal Roots™ as Cross Curricular Skill Development elements is presented in Table 4.22 below.

Table 4.22: Coastal Roots™ as Cross Curricular Skill Development Item Mean Scores

Coastal Roots™ as Cross Curricular Skill Item	*n*	Mean	Standard Deviation
Critical Thinking Skills	45	3.51	.87
Problem Solving Skills	45	3.64	.71
Writing Skills	44	2.95	.81
Observation Skills	46	3.83	.71
Life Skills	46	3.85	.97
Current Events	46	3.52	.91
Relationship to Location	46	3.76	1.04
Relationship to Culture	45	3.42	1.20
Reflection	45	3.29	1.12
Mean Cross Curricular Item Score		3.56	.76

Survey Component Score 4: Coastal Roots™ Role in Curriculum. The Coastal Roots™ Role in Curriculum item was designed to assess how important various pedagogical tactics are to respondents' inclusion of Coastal Roots™. Participants were asked to select the option that best represented how important the following are to their approach of teaching Coastal Roots™: writing activities, hands-on activities, arts-based activities, curriculum content connections, student research opportunity, and field trip opportunities. Respondents were asked to rank their use of Coastal Roots™ for accomplishing each of the above-mentioned items in their curriculum on a scale of not at all important, slightly important, moderately important, important, and very important. Scores of 1 (not at all important) through 5 (very important) were assigned to respondent choices. These values were summed to generate the respondent's Coastal Roots™ Role in Curriculum score. A maximum of 30 points is possible in this item. As presented in

Table 4.19, the minimum observed score for this item was 9.00 and a maximum observed score of 29.00. The mean Coastal Roots™ Role in Curriculum score is 21.28 (SD=4.47). An item-by-item analysis of all Coastal Roots™ Role in Curriculum elements is presented in Table 4.23 below.

Table 4.23: Coastal Roots™ Role in Curriculum Item Mean Scores

Coastal Roots ™ Role in Curriculum Score	N	Mean	Standard Deviation
Writing Projects	46	2.85	1.01
Hands-On Projects	46	4.30	.866
Artistic Activity	46	2.24	.993
Curriculum Content Connection	46	4.00	.943
Research Opportunity	46	3.65	1.32
Field Trip Opportunity	46	4.24	1.02
Mean Role in Curriculum Item Score		3.56	.75

4.3.5 Objective Five

The fifth objective of the evaluation sought to examine relationships and differences in program implementation as measured by the Coastal Roots™ participation survey's four use scores (Coastal Roots™ as Science Inquiry, Coastal Roots' Role in the Curriculum, Coastal Roots™ as Student Development, and Coastal Roots™ as Cross-Curricular Skills) based on the following demographic characteristics: a) program experience b) science background, and c) location. The number of respondents, mean, median, standard deviation, skewness, and kurtosis values are presented in Table 4.24 below.

Table 4.24: Coastal Roots™ Participation Survey Score Descriptives

Survey Item	*n*	*M*	*Mdn*	*SD*	Skewness	Kurtosis
Coastal Roots™ as Science Inquiry	46	26.61	28.00	6.54	-.776	.483
Coastal Roots™ as Student Development	46	30.02	30.00	2.42	-2.348	6.795
Coastal Roots™ as Cross Curricular Skills	46	31.35	32.5	6.92	-.381	-.290
Coastal Roots™ Role in Curriculum	46	21.28	21.00	4.47	-.563	.324

Measures of central tendency were generated and compared to ascertain the degree to which the data conforms to the statistical assumption of normality. All four scores exhibited some degree of negative skewness, suggesting a larger portion of values at the higher end of the distribution. The Coastal Roots™ as Student Development Score skewness value is relatively high, suggesting a non-normal distribution of the values with a larger proportion of values in the upper end of the distribution. In order to ascertain the level of non-normality, a Shapiro-Wilk test was conducted on all four values. The Shapiro-Wilk test of normality reported significant values (using a conservative $\alpha<.10$) for the Coastal Roots™ as Student Development score ($p<.001$) and Coastal Roots™ as Science Inquiry ($p=.054$). The kurtosis value (measure of a distribution's peak) for the Coastal Roots™ as Student Development score also demonstrated a relatively high value in relation to the other item scores. Boxplots of all four scores also uncovered outliers in the Coastal Roots™ as Science Inquiry, Coastal Roots™ as Student Development, and in the Coastal Roots™ Role in Curriculum items. For these reasons, the Kruskal-Wallis nonparametric test was utilized rather than one-way ANOVA tests in comparing scores. The Kruskal-Wallis test's ability to handle outliers, non-normally distributed data, and varying group sizes makes it a robust test ideal for the data collected in this evaluation. Pearson's correlations were conducted to explore the relationship between various variables where appropriate.

Program Experience. Participant program experience includes variables relating to participant history in the Coastal Roots™ program and their role in its implementation defined above. Pearson's correlation values were generated to examine the relationship between participants' years of participation in the Coastal Roots™ program and item scores. Resulting correlation coefficients are presented in Table 4.25 below. Although all four correlations presented minimally positive relationships between the score item and years in the Coastal Roots™ program, none of these relationships were significant at the α=.05 level.

Table 4.25: Coastal Roots™ Participation Survey Score and Years of Coastal Roots™ Experience Correlation Results

Survey Item	*R*	*p*
Coastal Roots™ as Science Inquiry	.192	.200
Coastal Roots™ as Student Development	.029	.850
Coastal Roots™ as Cross Curricular Skill	.248	.096
Coastal Roots™ Role in Curriculum	.087	.567

Science background. Participant science background includes variables relating to participant science major and science teaching discipline described above. Kruskal-Wallis independent samples non-parametric tests were conducted to explore differences in item scores between science teachers and non-science teachers as well as participants with a science education background and those without a science education background. There were no significant differences between science and non-science teachers' scores on the following items: Coastal Roots™ as Student Development (x^2=3.101, df=1, p=.078), Coastal Roots™ as Cross Curricular Skills (x^2=.448, df=1, p=.503) , and Coastal Roots™ Role in the Curriculum (x^2=1.593, df=1, p=.207). A significant difference does exist, however, between non-science

teacher's Coastal Roots™ Science Inquiry (mean rank = 7.50) and the score of science teachers on the same item (mean rank = 25.90), with a x^2 value of 9.841 (df=1) and a p-value of .002.

Kruskal-Wallis independent samples non-parametric tests were also conducted to explore mean differences in item scores between respondents with a science background and those with a non-science background. There were no significant differences between the scores of participants with a science background and those without a science background in any of the four items, including Coastal Roots™ as Science Inquiry (x^2=1.923, df=1, p=.165).

Location. Participant location included variables relating to participant location in relation to the coast and participant location in an urban or rural area. Kruskal-Wallis independent samples non-parametric tests were conducted to explore differences in item scores between coastal and non-coastal participants as well as rural and urban participants. There were no significant differences between coastal and non-coastal locations in any of the four items, however, statistically significant differences were found between rural and urban participants' scores in the Coastal Roots™ as Science Inquiry score (x^2=6.804, df=1, p=.009) and Coastal Roots™ as Cross Curricular Development (x^2=11.081, df=1, p=.001). This statistically significant difference suggests that rural participants use Coastal Roots™ more than urban participants in teaching and doing science inquiry (rural mean rank = 29.38 versus urban mean rank = 18.98) and use Coastal Roots™ more than urban participants in the teaching of cross curricular skills (rural mean rank = 31.00 versus urban mean rank= 17.73).

Further Kruskal-Wallis non-parametric tests were conducted by item to decipher any significant differences within the items between rural and urban participant scores. Analysis of urban and rural differences in scores within the Coastal Roots™ as Science Inquiry item showed no statistically significant differences between the two location types on the Research Using

Outside Sources, Data Collection, Data Analysis, and Role as a Lecture Topic items. Statistically significant differences were found, however, between rural and urban location scores in the use of Coastal Roots™ as Learning Outside of the Classroom, Field Work, Science as an Experience, and Environmental Awareness, suggesting that rural participants use Coastal Roots™ programming for these elements of science inquiry more than their urban counterparts. A breakdown of these items is provided in Table 4.26 below.

Table 4.26: Coastal Roots™ as Science Inquiry Response Differences Between Urban and Rural Respondents

Survey Item	*n*	*Mean Rank*	x^2	*df*	*p*
Learning Outside of the Classroom					
Rural	20	29.93			
Urban	26	18.56	9.436	1	.002
Fieldwork					
Rural	20	28.25			
Urban	24	17.71	8.161	1	.004
Science as an Experience					
Rural	20	27.30			
Urban	22	16.23	10.137	1	.001
Environmental Awareness					
Rural	20	29.03			
Urban	26	19.25	7.111	1	.008

Analysis of urban and rural differences in scores within the Coastal Roots™ as Cross Curricular Skills item showed no statistically significant differences between the two location types on the Critical Thinking Skills, Problem Solving Skills and Writing Skills items. Statistically significant differences were found, however, between rural and urban location scores in the use of Coastal Roots™ in developing Observation Skills, Life Skills, Current

Events, Relationship to Location, Relationship to Culture, and Reflection, suggesting that rural participants use Coastal Roots™ programming for these elements of cross curricular skill development more than their urban counterparts. A breakdown of these items is provided in Table 4.27 below.

Table 4.27: Cross Curricular Response Differences Between Urban and Rural Respondents

Survey Item	*n*	*Mean Rank*	x^2	*df*	*p*
Observation Skills					
Rural	20	28.20			
Urban	26	19.88	5.142	1	.023
Life Skills					
Rural	20	30.20			
Urban	26	18.35	9.907	1	.023
Current Events					
Rural	20	29.05			
Urban	26	19.23	6.752	1	.009
Relationship to Location					
Rural	20	30.10			
Urban	26	18.42	9.389	1	.002
Relationship to Culture					
Rural	20	29.90			
Urban	25	17.48	10.695	1	.001
Reflection					
Rural	20	30.03			
Urban	25	17.48	10.987	1	.001

4.4 Qualitative Results.

Qualitative interview data was initially used for the creation of the survey instrument. Themes collected from the data (discussed in Chapter 3 and presented in Appendix G) were used to generate a breadth of items and content in an attempt to encapsulate as many possible elements of program use and implementation. The qualitative interview data was revisited after the conclusion of the quantitative analysis as a means to further explore points of interest

emerging from the quantitative data. In order to further explore the differences between the rural and urban dynamic presented in the quantitative analysis above, four case studies were selected from the existing qualitative data. The cases were chosen for their representation of the extremes of the rural/urban dichotomy. Four school participant sites were selected for further in-depth case studies to both build upon and complement the initial interview data and provide an explanatory component to the quantitative data. A case study strategy was employed due to the desire to generate an in-depth and detail-rich look into a sample of specific contexts (Rossman & Rallis, 2003). The rich detail of a case study presentation lends itself well to the rural and urban dichotomy of interest and the selection of schools that are essentially outliers in school types (intentional selection of the most urban and the most rural of the program population) and therefore have the ability to provide the greatest presence of discrepancy in program sites through this purposeful sampling (Creswell, 1998; Yin, 2009). As such, their role in examining the processes and outcomes of programs in qualitative evaluation are valuable (Patton, 1990).

Case boundaries were determined by location and local demographics of specific selected participants of interest and those participants outside of these boundaries were omitted from potential selection, with a specific school and teacher serving as the case unit of analysis (Yin, 2009). The four case study sample schools were selected based on rural and urban parish type as defined by the Louisiana Census Data Center population data (2012). The narratives that were developed from these four participants' qualitative data are presented through four cases below.

4.4.1 Urban School Case Study #1: Coastal Roots™ as Science Applied

Urban School #1 is a K-12 institution holding a relatively high socioeconomic population located in a midsize city in south Louisiana and shares numerous connections with the local university. Marcel, the location's Coastal Roots™ participating teacher and the school's environmental science educator, became involved with the program through an education listserv

newsletter that presented the program as a positive addition to the school's middle school academic activities. School administration did not approve engagement with the program, prompting Marcel to reach out to program staff and begin the process of establishing Coastal Roots™ on campus, which is currently completing its fourth year of participation at the time of this writing. Marcel largely works alone within his school, interacting with other local teachers in varying schools who also participate in the program, including a "big buddy" program initiated with a nearby participating elementary school to assist the younger students with the physical activity required in restoration trip work. Although initially sought as a project for the school's middle school students, Marcel incorporates the program into his eleventh and twelfth grade curriculum (a program that also earns the students environmental science credits at the local university) and requires all students assigned to his courses to participate.

Prior to his move into education, Marcel was involved in reforestation work. A Louisiana native, he attributes his love of nature to a history of outdoor activity and engagement in the state's forests and waterways. As an educator, the state's environment provides a rich and accessible science environment and the potential for a large number of fieldwork possibilities. Service-learning plays a role in Marcel's classroom, including both the elementary outreach and plant nurseries taking place through his Coastal Roots™ involvement as well as food-generating plant nurseries that supply produce for the school cafeteria. Sustainability projects are also a part of his approach to the science curriculum, including ecological interests in pollution runoff and preservation activities such as litter removal and the creation of raised gardens at local elementary schools. These latter projects are assigned to the school's environmental club and draws in younger students from the school into service-learning activities outside of the classroom.

Coastal Roots™ programming in Marcel's school is not limited to wetland restoration purposes alone. The study of coastal erosion and restoration provides an ample opportunity for the intense investigative needs of the university cross-enrollment courses. Students are pushed to participate in intensive scientific inquiry, including the design of complex investigations and rigorous data collection and analysis. Students are introduced to various data collection techniques in available environments and are then encouraged to gather data and share results on topics such as soil moisture levels and plant growth rates. Marcel stresses the importance of students not only learning how to collect various forms of data but also how to generate and appreciate what he calls "good science" – all of which is accomplished through extended fieldwork in the wetland environment rather than controlled experiments within the classroom. Student involvement with the program escalates from plant measurement and care in the early months of the academic year and escalating to more complex investigations and exploration of restoration site conditions through the year using complex tools such as geospatial imagery and academic journal research. Students are able to tag previous plantings and monitor progress. Lecture plays a moderate role in the classroom, with Coastal Roots™ and other hands-on activities playing a major role in classroom activity. The importance of wetlands is stressed, but wetlands do not form a unit of the curriculum. The concepts of wetlands loss and conservation are not lost in this format, however. Marcel sites the immense role of wetlands in Louisiana's composition, economy, and overall identity and stresses the implications of wetlands loss. For Marcel, the Louisiana wetlands provide a rich "centerpiece" for studying the richness of biodiversity in ecosystems, citing the excitement of students upon realization of the immense diversity in a single soil sample.

4.4.2 Urban School Case Study #2: Creative Connections

Urban School #2 is a religious-affiliated school located in a large south Louisiana city. Gloria, a middle school science teacher and the participating Coastal Roots™ teacher, entered her school once the program had already been initiated. After a gradual introduction to the program, Gloria became more involved in the program and eventually took leadership of her school's program and the responsibilities that accompany it, such as can yard maintenance and workshop attendance. She describes her students as having immense interest despite little perceived knowledge of the phenomenon. Bringing this knowledge of the wetlands and the coastal erosion crisis serves as the impetus for her ongoing participation in the project. Her experience with coastal issues is relatively limited, including some engagement with the Christmas tree project (relocating Christmas trees to the coast to assist in rebuilding coastal barriers). Coastal Roots™ serves as the only service-learning project in Gloria's sixth grade curriculum. Classroom integration of Coastal Roots™ programming includes activities such as creating restoration themed bumper stickers and compiling cookbooks highlighting foods sourced from Louisiana wetlands. Students also compose children's books (aimed at younger age groups) that take place in the wetlands and include ecological elements of the environment then read their work to fellow students in younger grades. Science-focused activities such as creating models of water movement and the geological development of Louisiana from Mississippi River soil deposits. Other assignments include the assignment of food chain elements to students (such as predator and prey) as well as invasive elements such as toxic materials. Students are then encouraged to participate in discussions of the impact of these ecological factors on other levels of the ecosystem. Some data collection and investigation activities are drawn from the Coastal Roots™ resource guide, including plant measurement. Wetlands content enters the classroom in late March for sixth grade students who will then nurture and plant the

resulting seedlings during their seventh grade year. Students revisit and monitor growth during their eighth grade year. For Gloria, the wetlands are an important aspect of the curriculum as both an ecological concern and due to its importance as the community's home. She describes her students as immensely receptive, mostly attributed to the high level of activity in the program and possibly their minute but present knowledge of their relationship to nature in south Louisiana and a sense of responsibility she hopes to impart as part of the process.

4.4.3 Rural School Case Study #1: Community and Cultural Connections

Rural School #1 is a public school located in a census designated rural area within the Atchafalaya Basin. Sam, the school's Coastal Roots™ participating teacher, is completing his eleventh year with the program after initially joining through an interest in saving Louisiana's gulf coast. For Sam, the program's allure lay in its perceived potential to educate students about ways in which to take ownership of and save the surrounding wetlands by "giving back" through restoration activities. Sam attributes both his students and his own dedication to the cause as a result of their observations of erosion and geologic change in their community. Despite this dedication to "giving back", Coastal Roots™ is the only service-learning project taking place in Sam's classroom. Sam describes Coastal Roots™ as playing an important part in his classroom content and activities daily, especially when can yard care is considered. The Coastal Roots™ content is especially useful in Sam's curriculum as a means by which to address state mandated content regarding mankind's impact on the environment. Some experimentation takes place, such as observations of salt's effect on plant life and ecosystems. The greatest impact, however, is in the connections students make between the wetlands and their lives. Sam's students are immersed in local activities such as hunting and fishing and often comment on the environmental changes they have been able to witness in their own lifetimes, such as landloss and flooding around camps and recreational areas and the death of sea oats as a result of saltwater intrusion.

Evidence of society's attempts to counter these issues is also evident in the students' everyday lives. Motivation to learn about wetland restoration is not difficult in Sam's classroom, a phenomenon he attributes to the students' firsthand experience with the coastal crisis. The project has had a lasting impact on Sam's students not only through the joy and adventure of participating in the natural environment but also in the sense of collective action they take away from it and the improvements to the local habitat. Student responsibilities and participation vary by grade, with many students expressing interest long before their involvement commences.

Sam hopes to encourage a sense of stewardship and responsibility in his students in both the care of the school can yard to the care of the environment as a whole. Students returning from restoration plantings often express their feelings of giving and pride in class debriefings. Sam sees this impact not only in his immediate students, but also in former students who have often returned and shared their experiences with current students. Parent support is also overwhelming. Sam states, "it's as simple as just asking the students, you know, I need some chaperones for the field trip and the next day I get ten or twenty parents beatin' down the door wantin' to come…the parents, they got the boats, they got the, they're up to their knees in mud, you know, just like the rest of the students." School administration parallels parent support by providing for Sam whatever is possible for the success of the program. Sam sees the project and the cause as having an immense impact on the future on both personal and community levels.

4.4.4 Rural School Case Study #2: Educating a Community

Rural School #2 is a predominantly minority and majority low-income public elementary school located in a non-coastal community in the upper area of the south Louisiana region. Verline, the school's Coastal Roots™ participant, brings to this rural position an abundance of knowledge from her previous work as a science specialist at a magnet program. Verline inherited the Coastal Roots™ program but is pleased with the opportunity to bring the

programming to the rural school population. Verline's interest in school gardens made the Coastal Roots™ program a great fit for her curricular intentions. The school community is surrounded by three major Louisiana rivers and a significant spillway. Verline sees this location and the students' recent experience evacuating recent flooding as a strong foundation for discussing and experiencing ecological issues in Louisiana. Students are inquisitive about the environmental processes powering their experiences in recent years and demonstrate interest in learning more about the science behind recent phenomena.

Verline does not have a strong background in environmentalism or environmental sciences other than following current events related to the Louisiana issue. The can yard and other elements of Coastal Roots™ programming have played a central role in the math and science curriculum Verline is working to develop. She sees the inclusion of investigative scientific inquiry through can yard data collection as the next logical step to the horticultural responsibilities currently undertaken by students. Service-learning is not a value developed at the school and Velrine makes the assumption that the majority of her colleagues are unaware of the concept, leaving her alone in project development among teachers and administrators. Verline credits her history of grant writing and non-profit work with local farmer's markets as providing the skills necessary to handle the program alone. Student activities and engagement beyond standard classroom work is nearly nonexistent in her school, giving added value to the Coastal Roots™ program's hands-on and experiential structure. Interest within the schools has increased as other teachers become more exposed to and aware of the work Verline is accomplishing through the program. As a small school rural teacher, Verline and other science educators have found themselves assigned responsibilities including the instruction of non-science fields such as reading and social studies. Although these responsibilities are taxing,

Verline sees it as a possibility to integrate Coastal Roots™ subject matter into other subject areas. The connections between science and social studies is addressed through events such as a field trip to a Hurricane Katrina decimated area that informs students of not only nature's effect on society through weather patterns and flooding but also society's effect on nature through coastal debris and pollution. These experiences have led to additional initiatives at the school, including a litter reduction project and bringing the habits of recycling to her parish where no recycling procedures currently exist. Coastal Roots™ also provides a means for the very low-income student population to experience the environment beyond their home. Verline describes her population as secluded, stating that "they only know here… a lot of them might not have transportation, they might not have a car, a lot of them live in a trailer without electricity…" Wetland restoration plays a very minor role in the curriculum, making inclusion difficult within the confines of standardized testing expectations. As a result, Coastal Roots™ interaction can often be ancillary and conducted during student free time and in the place of electives such as physical education. Despite their physical relationship to the surrounding environment, the students are unaware of their surroundings. Verline states that although many students live along the river roads, "they did not know that that was the Mississippi River….they did not know that that was a levee." Enforcing this connection and awareness plays a large role in Velrine's use of Coastal Roots, especially in encouraging a sense of responsibility for a population she refers to as "keepers of the spillway". Verline has gone as far as soliciting water samples from individuals in various areas to test with students and demonstrate pollution and man's impact on the environment. Engaging with the environment from a service perspective is new to the student population and the resulting feelings of making a difference play a large role in student engagement. Verline's students, although only upper elementary students, are often largely

responsible for the daily activities of their home and rarely have the opportunity to engage in work beyond the scope of their own home – engagements that Verline hopes opens her students to the world beyond the boundaries of the small communities. Student interest in science is high, making the content a positive catalyst for understanding more complex issues beyond the project and shifting apathetic attitudes towards education to growing interest and participation.

Verline sees the project shifting impressions across generations. The local families are unaware of coastal issues and the science behind erosion and the implications of littering. Parental involvement is minimal, with community engagement limited to grandparents with gardening experience interested in working with the applied horticultural aspects of the project. Projects such as community directed public service announcement-type advertising is on the horizon for Verline's future Coastal Roots™ plans.

CHAPTER 5
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Meta-Inference as Discussion in Mixed Methods Research

The initial intent of this evaluation was to provide a snapshot of the Coastal Roots™ program as it is instituted in schools across south Louisiana. By utilizing an iterative sequential mixed methods design, a broad range of data was collected from teachers encapsulating a wide variety of potential outcomes and teacher-defined program values. In order to further investigate the trends emerging from the initial exploratory qualitative data, a survey instrument was generated using teacher-provided information and administered to the Coastal Roots™ teacher population. The results of these analyses presented a number of demographic trends and generated new questions. In an explanatory second qualitative stage, qualitative data was revisited in the form of case studies to shed light on the results presented in Chapter 4 above. The following stage – the meta-inferencing stage – serves as the final point of method mixing in this mixed methods design. The meta-inferencing stage is the point in which mixed methods research becomes greater than the sum of its parts, functioning as "an overall conclusion, explanation, or understanding developed through an integration of inferences obtained from qualitative and quantitative strands" (Tashakkori & Teddlie, 2008, p. 101). Manifest and latent themes from both strands are analyzed against and with each other, providing the strengths of one method to counteract the weaknesses of the other and generating a stronger conclusion. The qualitative themes, quantitative survey analysis, and qualitative comparative case studies will be analyzed together to answer the overall evaluation questions of this study:

1. What does Coastal Roots™ look like in its numerous school manifestations?
2. What purpose(s) does Coastal Roots™ serve for the teacher and school?

5.1.1 School Manifestations

Objectives one through three highlight the variety within the composition of the Coastal Roots™ program's teacher population, with a focus on demographics, teacher profiles, and methods of use within the classroom. The census strategy employed in this design provides the opportunity to generate an image of the program by accessing and incorporating the responses of a large portion of the program's population. According to the survey results, the Coastal Roots™ program population is predominantly female (84.8%) and largely over the age of 40 (only 28.3% of teacher's reported ages under 40). All participants were located in south Louisiana parishes, each parish with 4 participating schools or less per a parish with the exception of East Baton Rouge parish, which represented 10 of the 46 respondents. Coastal parishes accounted for 34.8% of respondents. Rural parishes accounted for slightly less than half, representing 43.5% of respondents. According to these frequencies, rural and urban schools are approximately equally represented in the program and program interest is not heavily concentrated in coastal parishes alone.

Interestingly, public school participants represented only 63.0% of the respondent's school types. The remaining 37.0% represent non-public schools – a proportion of non-public schools higher than the proportion present in the state as a whole. The increased prevalence of private school types, however, cannot be explained by the data collected in this evaluation. Charter schools made up small minority of respondents, represented by only 1 respondent.

Respondents represented a wide variety of teaching disciplines, including all of the four state tested content areas (math, English/language arts, science, and social studies), with 80.4% listing science as a discipline taught in their classrooms. Agriculture and agriscience represented 8.6% of the respondents, suggesting a possible connection between agriculture content needs and the content provided by Coastal Roots. The large proportion of science teachers represented in

the survey respondent group suggests an intent to engage in the program as a primarily science teaching tool. Only 37.0% of respondents classified themselves as generalists, suggesting that several of those integrating the program also teach fields outside of the science realm and take on the responsibility of the program in addition to other classroom discipline area needs and content. Despite the high prevalence of participants working in science disciplines, only 39.1% of Coastal Roots™ respondents hold a degree in science education or a science-related field.

Coastal Roots™ respondents also tended to be experienced educators, with 73.9% of respondents reporting working in the profession for 11 years or more. Novice teachers (those with less than 5 years of experience) represented only 15.2% of participants, suggesting a greater adoption of the program by more experienced educators. Similarly, nearly half of all respondents (45.6%) hold a graduate degree at the master's level or above. This trend in achievement is further emphasized by the high proportion of National Board Certified teachers (17.4%) represented in the population and the high number of participants having been designated as parish-level Teachers of the Year (23.9% of participants). Overall, program respondents demonstrated a high level of professional accreditations and accolades. Lead teachers and teachers sharing the lead teacher responsibilities accounted for 95.7% of the respondents. Of these, 45.7% report sharing duties evenly, suggesting a possible role of partnerships with colleagues as a means of supporting the project.

Coastal Roots™ content was integrated and addressed throughout the year by the majority of respondents (80.4%). This statistic is further enforced by the qualitative data, wherein teachers continuously describe the ongoing student interaction with the can yard nurseries and the interaction of Coastal Roots™ in units outside of wetlands content alone, such as using Coastal Roots™ to teach maps and geography in social studies and data collection and

measurement in math. This interaction and integration promotes program use beyond the confines of wetlands-themed curricular units and further exemplifies the program's interdisciplinary potential. These Coastal Roots™ activities are primarily used as a supplement to existing lessons (41.3% of respondents) or as smaller lessons integrated throughout the year (34.8% of respondents). This tendency also emerged from the qualitative data analysis, in which teachers repeatedly addressed using Coastal Roots™ as not only a tool for science and wetlands education, but also a way to integrate life skills and cross-curricular skills into other units. Integration into the classroom occurs 1 to 4 times per a grading period in 63.0% of respondent classrooms with 28.3% reporting using the program 5 to 10 times per grading period. This distribution suggests that Coastal Roots-based lessons are not a daily objective, but are present every few weeks or more in the classroom. Qualitative interview participants discussed Coastal Roots™ inclusion as a tool to be used when congruent with established school content and planning and is not often implemented as a curriculum or unit alone. Not surprisingly, science integration represented the highest frequencies of Coastal Roots™ inclusion, followed by social studies, math, and English. Interestingly, those teaching non-science disciplines were more likely to select the option "never" when asked about inclusion in non-science subjects rather than "not applicable", suggesting an openness to incorporating the program into those areas rather than seeing the program as incompatible with their content. Teacher incorporation of Coastal Roots™ content in disciplines such as art was not a rarity on the qualitative data, often manifest in narrative and creative work connecting the student with their environment on a personal level and experiencing the wetlands issue in an affective rather than curriculum content-based way.

Of the science disciplines incorporating Coastal Roots™ programming, earth science and biology-centered subjects dominated participant responses (52.2% and 62.9%, respectively).

Teacher interviews often cited the connection between these fields and Coastal Roots™ content, describing ecological lessons and purposes at a higher rate than others. Teacher interview discussions of Coastal Roots™ science lessons often incorporated Roth's concepts of environmental literacy described in the program theory discussion in Chapter 2. Although diverse, these lessons focused on not only the science of coastal erosion (such as how minerals and pollutants travel through the ecosystem), but also on mankind's role in the ecological and environmental problem at hand. Erosion was not discussed simply as a geological and geographical issue, but as an ecological one affected by all players within that ecosystem. The inclusion of these connections in class discussions in combination with the action of planting at the end of the academic year takes students through Roth's continuum, from environmental awareness to environmental action.

Investigation of teacher use of Coastal Roots™ generated materials as well as outside resources was also an area of interest in this evaluation. Teacher use of Coastal Roots™ materials was somewhat dismal, with 78.3% of teachers reporting using the compendium at a rate of "sometimes" or less, 73.9% using the handbook at a rate of "sometimes" or less, and 80.4% using the website at a rate of "sometimes" or less in teaching Coastal Roots™ lessons and activities. The low rate of Coastal Roots™ resource use suggests that teachers are utilizing other resources or their own programming in the teaching of Coastal Roots™ lessons and wetlands-focused units. According to survey respondents, individual internet research is the most popular non-Coastal Roots™ resource (used by 71.7% of respondents), followed by the Barataria Terrebonne National Estuary Program (used by 63.0% of respondents), LUMCON (used by 47.8% of respondents), and Project Learning Tree (used by 41.3% of respondents), and several other local and regional resources. Interview participants listed a variety of sources in their

teaching of wetlands content, many individuals citing these sources as the primary content resources, such as the Barataria Terrebonne National Estuary Program and Lake Pontchartrain Basin Foundation working in southeast Louisiana and the LSU AgCenter 4-H Wetlands Week introduced to local schools through the area 4-H clubs. Interview data combined with the resource use frequencies reported by survey participants further suggests that some schools view Coastal Roots™ as part of a larger wetlands restoration project, composed of various elements and organizations and not as a stand alone project. Despite the low reported use of Coastal Roots™ materials, however, all participants reported some or much improvement in their understanding of wetlands issues as a result of their participation in the program, with the majority (82.6%) reporting much improvement in their understanding of the topic.

5.1.2 Teacher-Defined Purpose

The second evaluation question embodies goal free evaluation's emphasis on value judgment, specifically around the concept of participant-directed program definition. The themes of science integration, life skills development, student development, and the role of the program within the school were used to generate items for the Coastal Roots™ as Science Inquiry, Coastal Roots™ as Student Development, Coastal Roots™ as Cross Curricular Skills, and Coastal Roots™ Role in Curriculum survey scores. These scores are composed of a summation of individual items generated by teacher interviewee data and were designed to represent and measure teacher use of the program in order to understand the purposes they see the program serving in their schools in order to generate participant-defined outcomes.

Despite the large percentage of science educators represented in the survey analysis, Coastal Roots™ as Science Inquiry fell behind Coastal Roots™ as Student Development and Coastal Roots™ as Cross Curricular Skills in respondent scores. Coastal Roots™ Role in Curriculum was the lowest scored item. These results suggest Coastal Roots™'s role as a tool

for student development in broad academic skills and affective domains is viewed as important – if not more important – than its role a science content resource.

Coastal Roots™ as Science Inquiry. Of the multiple areas of science inquiry and learning presented to participants in the survey, Coastal Roots™ for the purpose of teaching environmental awareness was the most frequent purpose for incorporating Coastal Roots™ in the classroom. Science as experience, learning outside of the classroom, and completing fieldwork projects followed, with role as a lecture topic and passive research representing the lowest cited purposes for incorporating Coastal Roots™ into the science classroom. The higher scores in the active and experiential aspects of science inquiry rather than the more passive areas such as lecture suggest that the program is seen as a way to incorporate activity and investigation into the learning process – an embodiment of Coastal Roots™ foundations in Kolb's experiential learning theory. Teacher interviews continuously referenced the role of Coastal Roots™ in "bringing the kids outside" and "getting their hands dirty", further stressing the appeal of the experiential learning component in teacher purposes of program implementation.

Coastal Roots™ as Student Development. Of the multiple areas of student development presented to participants in the survey, generating a sense of stewardship, being a part of something bigger than themselves, and student engagement ranked highest among participant scores for Coastal Roots™ use in this item. As evidenced by the low kurtosis value of the score's distribution, the spread of values for this item was small and the differences between these individual participants' scores was minute. Averaging only .40 points behind (out of a total of 32 possible) the above-mentioned items was the use of Coastal Roots™ in creating informed citizens, followed by developing work ethics and responsibility. Application of research skills and application of content knowledge are among the lowest scored, further

supporting the conclusion that teacher use of the program draws more from the affective elements of the program rather than the science learning aspects. This interest in engagement and stewardship as a primary purpose for Coastal Roots™ implementation echoes the program's emphasis on environmental stewardship. The stresses on stewardship and emotional connections between the environment and students is further exemplified in the qualitative data, with the concept of "emotion" comprising its own theme and body of codes, including love and enthusiasm for the project and environment, ownership, understanding the future and impact of coastal issues on society and environment, obligation, responsibility, and a sense of belonging.

Coastal Roots™ as Cross Curricular Skill Development. Cross curricular skills encompasses a variety of skills utilized in all areas of a student's academic experience, including critical thinking and making connections between content and surroundings. Life skills, observation skills, and relationship to culture topped teacher scores in this list, with writing skills and reflection serving as the lowest purposes for use. Like the Coastal Roots™ as Student Development scale scores, Coastal Roots™ as Cross Curricular Skill Development also demonstrated minute differences between scores, suggesting small differences in inclusion of these elements in program implementation.

Coastal Roots™ Role in the Curriculum. Coastal Roots™'s role in the curriculum includes items related to the inclusion of Coastal Roots™ content for the purposes of addressing pedagogical and non-affective school needs, such as hands on projects, research opportunities, and field trip opportunities. Art and writing scored lowest in this area. Field trip opportunities and hands-on-projects scored highest, further echoing the experiential components discussed above as playing a significant role in the implementation of the program and buy-in by

participants. Curriculum content connections followed closely, further stressing the value on science connections (specifically environmental sciences) detailed above.

Teacher Purposes Across Additional Variables. As demonstrated in the results of objectives 1 through 3, Coastal Roots™ participants represent a variety of backgrounds and locations, all of which may influence the role teachers see Coastal Roots™ serving in their classrooms. The participant program values represented by the scores discussed above were analyzed against the variables of location, program experience, and science background. Program experience (defined by years in the program) had no significant relationship with participant scores, suggesting that number of years of experience in the Coastal Roots™ program is not a statistically significant predictor of survey item scores and program use.

Science teaching disciplines and science educational background were selected as potential variables affecting implementation due to their connection to the content of the program. Scores showed no significant difference when science as a teaching discipline was considered, with the exception of science teachers scoring expectedly higher in the Coastal Roots™ as Science Inquiry item at the α=.10 level (although insignificant at the standard α=.05 level). Science education background also showed no statistically significant difference in participants' scores, suggesting that the variables of teacher background and discipline do not significantly impact teacher use and teacher valuing of the Coastal Roots™ program in their respective schools.

Participant relationship to the coast was also considered a possible variable affecting teacher value and use due to coastal parishes' immediate experience and exposure to coastal issues. No significant difference in scores was observed between coastal and non-coastal schools in regards to any of the four score items, however, a number of significant differences were

noted when rural versus urban school location was considered. Rural schools scored higher in both the Coastal Roots™ as Scientific Inquiry item and in the Coastal Roots™ as Cross Curricular Skills Development items. Within the Coastal Roots™ as Science Inquiry item, rural teachers scored higher than their urban counterparts in the use of Coastal Roots™ as learning outside of the classroom, fieldwork, science as an experience, and environmental awareness. In the Coastal Roots™ as Cross Curricular Skills Development item, rural participants again outscored their urban counterparts in the use of Coastal Roots™ in developing observation skills, life skills, current events, relationship to location, relationship to culture, and reflection. Initial qualitative data thematic analysis uncovered themes related to these items, but did not address differences in these occurrences based on rural or urban locations. The dichotomy between rural and urban schools emerging from the analysis of the quantitative survey data lead to the addition of four comparison case studies. In-depth investigation into these sample cases highlights these differences but also presents a number of constants across the program. School use of the program seems to not only differ between rural versus urban locations but more significantly between areas with intimate experience with the erosion issue regardless of designation as a coastal or inland area. No matter the composition or location of the school, however, participating teachers demonstrated a passion for the coastal environmental crisis and developing a sense of concern and action among their students. Although all teachers are participants of a single program and attend standard training events, each school and teacher participant has adopted a personal approach to the program and unique integration of the program in their school environment.

A common theme of all cases is the use of Coastal Roots™ programming as a means to encourage and incorporate hands on learning in the classroom. All of the presented case studies

stress an important role of hands on activities in accomplishing program objectives and in developing student interest. Deeper analysis into the teacher participant's impression of hands-on activity also sheds light on a teacher and student interest in engaging in real-world environments with the issues under study. Teacher application of this varied, from plantings and outdoor work to data collection in wetland environments. The use of outdoor activity and hands-on work exemplifies the experiential learning facet of Coastal Roots™ program theory. Students engage with the environment through structured activities and then reflect on the activities and learning situations presented.

The stress on environmental literacy is also present in all four cases, although the application varied by location. Each teacher brought students into the project by incorporating a mix of awareness and action steps into their program over the course of the school year. The methods and approaches by which these aspects were brought into the classroom, however, did seem to vary by location and school type. Environmental literacy was often complemented by another program facet – the participants' sense of the role of stewardship in the program. Both rural schools treated the Coastal Roots™ program as a connection to the immediate environment and the community, history, culture, and social factors that are encapsulated by it. Where urban schools seemed to view the issue as critical and encouraged developing a sense of responsibility, the sense of stewardship took on a stronger air of immediacy and personal impact in the rural school. Verline's collection of contaminated water samples from her community and models demonstrating the consequences of her region's actions on other areas of the state not only make a personal connection and promote a sense of stewardship toward the environment, but embody environmental literacy's focus on making connections between all aspects of an environmental issue (especially those of society's effects on the environment) with a push to action with an

inspired cause. Sam's school also shared similar views towards the environment and its role in student lives. Like Verline's students who reflected on their relatively recent evacuation of the spillway, Sam's students expressed their own observations of erosion and personal encounters with the coastal crisis. Unlike the urban schools who present the issue as a Louisiana issue affecting the state as a whole, rural schools shifted this perspective to present the content as an issue happening to them within their communities. The wetlands issue was no longer only a Louisiana issue or a strictly coastal one, but a personal and local one. Inquiry and student interest in these schools seems to stem from a quest for an explanation of personal experience rather than the exploration of an abstract phenomenon.

Rural schools and urban schools also seem to differ in their institutional culture towards the concepts of service-learning and stewardship. For both urban locations, Coastal Roots™ programming complements and joins other existing service-based programs. In both rural schools, however, Coastal Roots™ is the sole service-learning initiative. Verline goes as far as to state that she doubts her colleague's knowledge of the concept of service-learning whereas Marcel's school participates in numerous other activities such as the school gardening for cafeteria use initiative in addition to other activities taking place in other departments. Despite the relative lack of service-oriented programming in the rural school locations, the Coastal Roots™ program does seem to act as a gateway program into other like-minded programming. For example, Verline's school's participation has encouraged other teachers to participate in the program as well as inspiring her location's litter and recycling initiatives and increased grant writing activity.

Despite these similarities, each implementation of the project is vastly different and immensely diverse. Urban or rural, each teacher has adapted the program to their institutional

and community needs and created a unique project on their campuses. Teachers pursued training and resources in areas of specific interest to them (plant gardening, lab work) and materials that personalize the lessons to their locations (coastal, estuary projects, etc.). Diverse teacher backgrounds have little impact on teacher dedication to the project outside of influencing the purpose of the project on their campus.

5.2 Suggestions for Program Improvement and Future Practice

The goal free participant value-centered approach calls for recognition of participant values and shaping of a program around the ideals and purposes of the program's users and stakeholders. As Coastal Roots™ moves into the next phases of program activity, program definition and evolution should embrace and build on participant values, develop using the best practices exemplified by participants, and should work to mend the gaps defined by participants as hindrances to their work. Recommendations and suggestions for future practice stemming from this evaluation include a strengthening of program standardization and centralization, teacher-tested resources, focus on networking, and the development of areas stressed as central by participants.

Teacher implementation of the Coastal Roots™ program varied greatly across schools and parishes. As described in Chapter 4 and the discussion above, teacher interest and focus in implementing the program varied across purposes of science inquiry, skill development, curriculum use, and student development illustrated in the item scores above. All three facets of the Coastal Roots™ program theory were present in participant discussions of purpose – environmental awareness, environmental stewardship, and experiential learning – however, the degree to which these were used and teacher interpretations of them differed. A strong appreciation for the experiential role of Coastal Roots™ was present in both the quantitative and

qualitative data. The "doing" activity was viewed as not only the finale in the restoration trip, but as an ongoing activity engaging students with their work and environment throughout the school year. "Doing" and hands-on activity were not limited to planting and can yard maintenance alone, but also involved classroom science data collection and art-based activities. For these participants, Coastal Roots™ themed activities assisted them in taking science out of the books and into the realm of student action and experience – the foundations of Kolb's experiential learning theory. Further developing this area of the program by stressing and providing more opportunities and training centered on experiential learning and activity could continue to foster teacher interest and development in this facet of the program.

Science inquiry also played a strong role in teacher participation, but was dwarfed by teacher interest in the student development ideas of stewardship, responsibility, empathy, and a sense of being a part of something bigger than themselves. The universality of these elements suggests that the Coastal Roots™ project can move beyond the realm of science alone and seek to encourage participation from individuals interested in youth development and in cultivating these characteristics among their students.

These diverse uses bring the concept of standardization into the conversation. Participant discussions of program inclusion often created an impression of Coastal Roots™ activity as part of a greater school or classroom commitment to wetlands restoration and service-learning based activity rather than as a stand alone project. Coastal Roots™ is not instituted as a unique project installment but rather through the inclusion of various elements selected by participants and the omitting of items that are viewed as less useful. The lack of standardization is further conflicted by the lack of a full curriculum. The compendium provides a wealth of activities and resources for teachers to utilize in bringing Coastal Roots™ into the curriculum but does not stand as a

curriculum alone. Participant responses regarding resource use reflect the practice of using Coastal Roots™ materials for the initial stages of setting up the program (such as setting up the can yard and its maintenance), but no increased use as the participants move through the program. In addition, participants cited a number of resources beyond Coastal Roots™ as playing a large role in their wetlands work. A closer analysis of these resources and further research into what aspects of these outside sources are seen as most beneficial to teachers can provide insight into developing a curriculum and program materials that lend themselves well to the needs teachers are hoping to meet through their participation in Coastal Roots™. The shared goals of these programs with Coastal Roots™ can form the foundation for future partnerships that benefit all partners in the purposes of integrating wetlands learning into Louisiana schools.

Although the program was not discussed as playing a large role in non-science fields, non-science participants selected the option of "never" when asked how often they incorporated Coastal Roots™ into their classroom rather than the "not applicable" option. Selection of the former over the latter suggests that they do not view Coastal Roots™ as irrelevant to their curriculum but rather that another element may be preventing Coastal Roots™ use, possibly the lack of resources aimed at those subject areas. An organized and further developed curriculum aligned to those areas and modeled after successful programs whose resources are currently being used by Coastal Roots™ teachers may assist in the creation of a broad Coastal Roots™ curriculum, increased resource use, and the potential for increased implementation in the classroom and across content areas.

Another unintended outcome included the sense of community emerging from the Coastal Roots™ interviews. Participants discussed the combining of multiple grade levels in the ongoing work of their school's project, typically assigning mentor roles to older students who

then assisted younger students in can yard and restoration trip work. Teachers interacted with other teachers not only in their own school but across schools to share resources and develop a community of Coastal Roots™ educators. Communities and cultures of service-learning also developed through the introduction of the program on campuses and the connections made between Coastal Roots™ teachers and their colleagues, as evidenced in Verline's case study above. This role of Coastal Roots™ teachers as mentors and ambassadors for the causes of wetlands conservation and service-learning should not be overlooked in future professional development and program opportunities.

Teacher networking and the sharing of resources also emerged in the professional development aspects of the conversation as several participants discussed the leadership of Coastal Roots™ as a joint venture between multiple teachers sharing lead teacher duties and the repeated mention of sharing information and lessons from other teachers as a strong positive feature of the Coastal Roots™ workshops – echoing the sense of teacher communities discussed above. Teacher-generated materials created for the classroom combine the needs of classroom teachers and the trustworthiness of the experience and role of the teachers who share it. Future efforts to collect teacher-developed lessons as well as teacher commentary and evaluation of provided Coastal Roots™ resources will assist the program in the development of strong and tested resources that are trusted by the participants. Furthermore, utilizing participant-generated materials continues the collaborative nature of the goal free approach utilized in this evaluation and further strengthens the structure and connections currently existing within the program. Such connections and resources are vital to the life and success of a program and would greatly benefit the needs of Coastal Roots™ as it continues to develop a sustainable program.

Like content and resources, the stewardship element of the Coastal Roots™ program can also benefit from stronger structure and definition. The interest in stewardship and its role in relation to the coastal erosion issue is high among all teacher groups yet its definition and application are not standardized across all program sites. This lack of standardization leads to a cloudiness of program goals and ways of attaining these objectives. For many of the participants, the idea of stewardship was central to their Coastal Roots™ purposes but was not clearly defined for classroom inclusion. Adoption of structures for stewardship in learning – such as the service-learning cycle – can strengthen teacher application of these tenets in their classroom by providing an armature of theory and informed practice upon which participants can build strong lessons. These types of curriculum additions will assist Coastal Roots™ in making the abstract elements underlying the program more concrete – and therefore more easily implemented in its best form – into the classroom.

5.3 Limitations and Suggestions for Future Research and Evaluation

The mixed methods evaluation presented here sought to provide a broad snapshot of the Coastal Roots™ program in its many manifestations across south Louisiana in order to provide program staff with information that can be utilized in further program development. As such, there are many opportunities for further research and evaluation in understanding areas of best practice and new avenues for future programming and in the development of future formative and summative evaluations. Further analysis of the differences in use described through this evaluation and the development of evaluation capacity through the creation of an annual measure both have the potential to assist program staff in developing a better understanding of the mechanisms underlying the program and continued refinement of program activity.

As described above, deeper investigation into the rural and urban cases highlights not the difference between rural and urban school implementation but also the important role of proximity and personal connection to the issue. This study looked at only four cases selected for their urban versus rural classification. Further studies and comparisons looking at inland versus coastal and rural versus urban areas may provide greater understanding of the role of surrounding influences on teacher adoption and adaptation of the Coastal Roots™ program. Culture, location, and recent history also played a large role in the experiences of these cases, making generalizations to similar programs in other areas of the country or to prior and future Coastal Roots™ participants problematic. In this program, culture and location may act as confounding variables affecting the buy-in and use of the program in a way that may not be repeated in other regions or environments.

The impacts of Coastal Roots™ in the community also emerged from these cases as a previously unaddressed component of the program. Sam's high level of parental involvement and Verline's experience of educating both her students and their families give some direction for future research of the unintended effects of the program. Additionally, further investigation into the role of service initiatives in schools and the role of Coastal Roots™ on changing these institutional cultures would also add beneficial clues to the use and future development of the program to meet the needs of the populations it serves.

This evaluation is also limited in its selection of participants and focus on an individual program. Only current teachers were included in all stages of the data collection process, thereby neglecting to capture the experiences of individuals who have left the program. Former participants can potentially provide valuable information about a variety of hurdles that may be

stunting program growth in some schools or discouraging increased participation, such as administrative or community conflict.

Finally, a program should continue to evolve and should never remain static. Programs are not simply a combination of inputs and outputs on the path to a specific objective but rather function within complex systems of social and temporal contexts. As such, programs should gather feedback from their participants and stakeholders regularly in order to develop and adapt the program to its changing needs. Creating evaluation capacity within the Coastal Roots™ program is a necessary first step to creating strength and sustainability within the project in order to assist it in developing. The item scores and teacher use items used for this initial exploratory formative evaluation can serve as the foundation for an annual assessment of participant values and applications. Developing this evaluation framework and close project monitoring will provide program staff with information that not only highlights areas of need while the program has the ability to provide assistance but also allows the program to monitor the results and implications of program changes. The effectiveness of new additions or changes to program activities and resources can be compared across years and locations and provide timely information about trends across program sites and elements. It allows for continued communication between participants and staff and increases the likelihood of developing a program that truly encapsulates the needs and values of the stakeholders and communities it serves.

REFERENCES

Barras, J. (2006). Land area change in coastal Louisiana after the 2005 hurricanes – Series of three maps. U.S.G.S. Open-file report 06-1274. Retrieved Oct 11, 2013 from http://pubs.usgs.gov/of/2006/1274/.

Basile, C. & White, C. (2000). Environmental education: A walk in the park is just the beginning. *Dimensions of Early Childhood, 28*, 3-7.

Blanchard, P. B. (2007). Coastal Roots: A pre-college plant-based stewardship program to connect students with coastal issues. *Plant Science Bulletin, 53*, 138-146.

Blanchard, P. B. (2009). Linking the geologic with the biologic: Ecological stewardship as a means to teach geology related to coastal land loss. *The Earth Scientist, 25*(2), 14-21.

Blanchard, P.B. & Buchanan, T. K., (2011). Environmental stewardship in early childhood. *Childhood Education*, 84, 232-238. doi:10.1080/00094056.2011.10523184.

Blanchard, P. B. & Bush, E. (2008). The LSU Coastal Roots™ Program introduces plant based science service-learning to pre-college students. *Journal of the Louisiana State Horticulture Society, 3*, 66-75.

Bush, E. & Blanchard, P. B. (2009). Low-cost container yard for school-based restoration nurseries. *HortTechnology, 19*, 818-822.

Coleman, E. & Bush, E. (2002). Putting down roots: starting a seedling nursery for wetland replanting. Louisiana Sea Grant College Program, LSU, BR. Retrieved Sept 29, 2013 from http://nsgl.gso.uri.edu/lsu/lsuh02002.hpdf.

Coker, C. E. H., Bachman, G., Boyd, C., Blanchard, P.B., Bush, E., & Gu, M. (2010). Coastal Roots: Connecting students with sustainability in Mississippi and Louisiana. *HortTechnology, 20*, 499-502.

Cramer, J.R. (2008). Reviving the connection between children and nature through service-learning restoration partnerships. *Native Plants, 9*, 278-586. doi: 10.2979/NPJ.2008.9.3.278

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage.

Creswell, J. W. & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Dillman, D. A., Tortora, R. D., & Bowker, D. (1998, August). Principles for constructing web surveys. Paper presented at the Joint Statistical Meetings of the American Statistical Association.

Fitzpatrick, J. L., Sanders, J. R., & Worthen, B. R. (2004). *Program evaluation: Alternative approaches and practical guidelines.* Boston: Pearson.

Friedman, V. J., Rothman, J. & Withers, B. (2006). The power of why: Engaging the goal paradox in program evaluation. *American Journal of Evaluation, 27*, 201-218. doi: 10.1177/1098214006288284

Karsh, K., Bush, E., Hinson, J., & Blanchard, P. (2009). Integrating horticulture biology and environmental coastal issues into the middle school science curriculum. *HortTechnology, 19*, 813-817.

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall.

Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2001). Experiential learning theory: Previous research and new directions. In R. J. Sternberg & L. F. Zhang (Eds.), *Perspectives on cognitive, learning, and thinking styles* (pp. 227-247). NY: Routledge.

Lagemann, E. C. (2002). *An elusive science: The troubling history of education research*. Chicago: University of Chicago Press.

Louisiana Census Data Center. (2012). Estimates of resident population change and rankings for Louisiana and parishes. Retrieved January 11, 2014 from http://louisiana.gov/Explore/Demographics_and_Geography/ParishEstimates.php.

Louv, R. (2006). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill, NC: Algonquin Books of Chapel Hill.

McHardy, R. J., Blanchard, P. B., & de Wet, C. F. (2009). Ecological stewardship and gifted children. *Gifted Child Today, 32*(4), 16-23.

Menand, L. (2001). *The metaphysical club: A story of ideas in America*. New York: Farrar, Strauss, & Giroux.

Messina, L. & Blanchard, P. B. (2004). Wetlands work: Students use classroom lessons to help improve their local environment. *The Science Teacher, 71,* 44-45.

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2008). Verification strategies for establishing reliability and validity in qualitative research. *International journal of qualitative methods*, *1*(2), 13-22.

National Environmental Education Advisory Council. (2005). *Setting the standard, measuring results, celebrating successes: A report to congress on the status of environmental education in the United States*. Retrieved September 29, 2013 from http://www.epa.gov/enviroed/pdf/reporttocongress2005.pdf.

National Service-learning Clearinghouse. (2013) *What is service-learning?* Retrieved October 12, 2013 from http://www.servicelearning.org/what-is-service-learning.

O'Brien, L. M. (2007). Raising children who care for our world. *Childhood Education, 83*, 322-323. doi:10.1080/00094056.2007.10522942

Patton, M.Q. (1990). *Qualitative evaluation and research methods*. Thousand Oaks, CA: Sage.

Patton, M. Q. (2008). *Utilization-focused evaluation*. Thousand Oaks, CA: Sage.

Pivnick, J. (2004). Sowing a school garden: Reaping an environmental ethic. *Green Teacher, 38*, 7-8.

Rossi, P. H., Lipsey, M.W., & Freeman, H. E. (2004). *Evaluation: A systematic approach*. Thousand Oaks, CA: Sage.

Rossman, G. B., & Rallis, S. F. (2003). *Learning in the field: An introduction to qualitative research*. Thousand Oaks, CA: Sage.

Roth, C.E. (1992). Environmental literacy: It's roots, evolution, and directions in the 1990's. Washington, DC: Office of Educational Research and Improvement.

Scriven, M. (1991). Prose and cons about goal free evaluation. *Evaluation Practice, 12,* 55-76. doi: 10.1177/109821409101200108

Smith, G. (2002). Going local. *Educational Leadership, 60*, 30-33.

Stufflebeam, D. L. (2001). Evaluation models. *New Directions for Evaluation, 89*, 7-98.

Tashakkori, A., & Teddlie, C. (2008). Quality of inferences in mixed methods research: Calling for an integrative framework. In.M. Bergman,(Ed.), *Advances in mixed methods research*, p. 101-119. Thousand Oaks, CA: Sage.

Teddlie, C. & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Thousand Oaks, CA: Sage.

Woodhouse, J. L., & Knapp, C. E. (2000). Place-based curriculum and instruction: outdoor and environmental education approaches. Charleston, WV: ERIC Clearinghouse for Rural Education and Small Schools. (ERIC Document Reproduction Services No. ED 448 012).

Worrell, R., & Appleby, M. C. (2000). Stewardship of natural resources: definition, ethical and practical aspects. *Journal of Agricultural and Environmental Ethics, 12*, 263-277.

Yin, R. K. (2009). *Case study research: Design and methods*. Thousand Oaks, CA: Sage.

APPENDICES

Appendix A: Coastal Roots™ Teacher Survey

Coastal Roots Teacher Survey

Introduction

This study is being conducted to understand teachers' experiences in the Coastal Roots program and to learn more about utilization of the program in the classroom. The survey will cover a variety of topics, including classroom content, canyard maintenance, and stewardship. Your feedback is very important as we continue to learn more about and improve the program experience.

In order to progress through this survey, please use the following navigation buttons:

- Click the Next button to continue to the next page.
- Click the Previous button to return to the previous page.
- Click the Done/Submit button to submit your survey.

The survey should take about 30-40 minutes to complete and can be accessed at https://www.surveymonkey.com/s/ZZ8YMSD. This survey must be completed once launched.

Thank you for participating in this survey. Your participation is voluntary. Completion of this survey will serve as voluntary consent to participate in this study. Participants' identities will remain confidential and you may opt out of completing the survey at any time. If you are unsure or feel uncomfortable answering a question, you may elect to not respond to those questions. This study is approved by Louisiana State University Institutional Review Board. If you have questions regarding subjects' rights or other concerns, you may contact Dr. Mathews at irb@lsu.edu. With regard to other questions, please contact Dr. Pamela Blanchard at pamb@lsu.edu or 337-739-8506

Thank you again for your participation.

Dr. P. Blanchard & Dr. K. Machtmes

Coastal Roots Teacher Survey

Demographics

The following questions are designed to gather information about your school and teaching specialization. Please select the responses that best reflect your experience.

***1. In what parish is your current school located?**

***2. Is your current school:**

- ◯ Public
- ◯ Private
- ◯ Parochial
- ◯ Other (please specify)

***3. Is your current school considered a charter school?**

- ◯ YES, my current school is a charter school.
- ◯ NO, my current school is NOT a charter school.

***4. Which choice(s) best describes the school where you currently teach?**

- ☐ Elementary (PreK-5th)
- ☐ Middle/Junior High
- ☐ PreK-8th
- ☐ PreK-12th
- ☐ High
- ☐ Other (please specify)

***5. Which of the following best describes your teaching assignment?**

- ◯ Generalist (teaches multiple content/subject areas)
- ◯ Specialist (teaches one content area)

Coastal Roots Teacher Survey

***6. Which of the following best describe the subjects you have taught in the last three (3) years? (Check all that apply)**

- [ ] English/Language Arts
- [ ] Math
- [ ] Science
- [ ] Social Studies
- [ ] Art/Music
- [ ] Other (please specify)

***7. Which of the following best describe the subjects you are currently teaching? (Check all that apply)**

- [ ] English/Language Arts
- [ ] Math
- [ ] Science
- [ ] Social Studies
- [ ] Art/Music
- [ ] Other (please specify)

***8. Is your school science curriculum aligned with the Louisiana Grade Level Expectations (GLEs)?**

- ◯ Yes
- ◯ No

***9. Does your school plan to align with the Next Generation Science Standards?**

- ◯ Yes
- ◯ No

***10. As of this date, how many total years have you taught?**

***11. How many years have you taught your current subject/discipline?**

Coastal Roots Teacher Survey

Educational Background

The following questions are designed to gather information about your personal background with Coastal Roots-related content. Please select the responses that best reflect your experience.

***12. Which of the following best describes your education level (highest degree earned)?**

- ◯ Bachelors
- ◯ Masters
- ◯ Masters +30
- ◯ Specialist (Ed. S.)
- ◯ Doctorate
- ◯ Other (please specify)

***13. Please state your MAJOR field of study for EACH degree.**

***14. Please state your MINOR field of study. (If no minor please type "none")**

Coastal Roots Teacher Survey

***15. Did you take any UNDERGRADUATE courses in any of the following disciplines? (Check all that apply)**

- [ ] Environmental Science
- [ ] Ecology
- [ ] Botany/Plant Science
- [ ] Wetland Science
- [ ] Soil Science
- [ ] Geology
- [ ] Horticulture
- [ ] Chemistry
- [ ] Physics
- [ ] Biology
- [ ] Geography
- [ ] NONE
- [ ] Other Science Disciplines (please specify)

Coastal Roots Teacher Survey

***16. Did you take any GRADUATE level courses in any of the following disciplines? (Check all that apply)**

- [ ] Environmental Science
- [ ] Ecology
- [ ] Botany/Plant Science
- [ ] Wetland Science
- [ ] Soil Science
- [ ] Geology
- [ ] Horticulture
- [ ] Chemistry
- [ ] Physics
- [ ] Biology
- [ ] Geography
- [ ] NONE
- [ ] Other Science Disciplines (please specify)

***17. Besides Coastal Roots, do you have any previous experience with wetland restoration or conservation?**

	No Experience	Less than 1 month	1 to 6 months	>6 months to 1 year	> 1 year
Job-related	◯	◯	◯	◯	◯
Volunteer-related	◯	◯	◯	◯	◯
Required in College Course	◯	◯	◯	◯	◯

If over 1 year, please specify amount of time:

Coastal Roots Teacher Survey

Coastal Roots Participation

The following questions are designed to gather information about your experience with the Coastal Roots program. Please select the responses that best reflect your experience.

***18. How many years have you participated in the Coastal Roots program?**

***19. Which of the following best describes how you became involved in the Coastal Roots program?**

- ◯ I instituted the program at my school.
- ◯ I joined the program through a colleague at my school.
- ◯ I inherited the program from a previous teacher.
- ◯ Other (please specify)

***20. Thinking of your role with the Coastal Roots program at your school, are you the lead/primary teacher?**

- ◯ Yes, I am the lead teacher
- ◯ No, I am not the lead teacher
- ◯ The duties are equally shared among two or more teachers

If needed, please explain:

***21. Which of the following best describes WHEN you incorporate Coastal Roots and wetland restoration lessons into the curriculum?**

- ◯ Throughout the year
- ◯ After standardized testing
- ◯ Near the time of the field trip
- ◯ Other (please specify)

Coastal Roots Teacher Survey

***22. Which of the following best describes HOW you incorporate Coastal Roots and wetland restoration lessons into your classroom?**

- ◯ Single condensed unit
- ◯ Smaller lessons throughout the year
- ◯ Supplement to existing lessons
- ◯ Limited or little classroom teaching involving Coastal Roots (ie: plants are maintained for field trip purpose)
- ◯ Other (please specify)

_____

***23. Please define a "grading period" by selecting an answer below. Do you submit grades every:**

- ◯ 6 weeks
- ◯ 9 weeks
- ◯ Other (please specify)

_____

***24. Estimate the number of lessons you teach during a grading period (6 weeks, 9 weeks, etc.) that incorporate Coastal Roots content into the classroom learning.**

- ◯ None
- ◯ 1-4
- ◯ 5-10
- ◯ 11-15
- ◯ More than 15

***25. How often do you use Coastal Roots generated materials in the classroom?**

	Never	Rarely	Sometimes	Often	Frequently
Compendium	◯	◯	◯	◯	◯
Handbook	◯	◯	◯	◯	◯
Website	◯	◯	◯	◯	◯

Coastal Roots Teacher Survey

***26. Other than Coastal Roots generated materials, what other resources do you use to teach wetland restoration? (Check all that apply)**

- ☐ Lake Pontchartrain Basin Foundation
- ☐ Barataria Terrebonne National Estuary Program (BTNEP)
- ☐ 4-H Youth Wetlands Week Project
- ☐ JASON
- ☐ LUMCON
- ☐ Project Learning Tree
- ☐ Other (please specify)
- ☐ Project WET
- ☐ Project WOW (Wonders of the Wetlands)
- ☐ Project Flying Wild
- ☐ LDWF Native Fish in the Classroom
- ☐ Internet
- ☐ N/A

***27. Estimate the number of times during a grading period that you use the Coastal Roots topics in the instruction of:**

	Never	1-4	5-10	11-15	More than 15	N/A
English/Language Arts	◯	◯	◯	◯	◯	◯
Math	◯	◯	◯	◯	◯	◯
Science	◯	◯	◯	◯	◯	◯
Social Studies	◯	◯	◯	◯	◯	◯
Art	◯	◯	◯	◯	◯	◯
Music	◯	◯	◯	◯	◯	◯

Other (please specify)

***28. If you incorporate Coastal Roots into science, please identify which fields:**

- ☐ Agriculture
- ☐ Biology
- ☐ Chemistry
- ☐ Earth Science
- ☐ Physics
- ☐ I do not teach any form of science.
- ☐ Other (please specify)

Coastal Roots Teacher Survey

*29. How often is Coastal Roots used for the following?

	Never	Rarely	Occasionally	Frequently	Always	N/A
Research Using Outside Sources (Internet, Journal, etc)	◯	◯	◯	◯	◯	◯
Learning Outside of the Classroom	◯	◯	◯	◯	◯	◯
Data Collection	◯	◯	◯	◯	◯	◯
Data Analysis	◯	◯	◯	◯	◯	◯
Field Work/ Working in the Field	◯	◯	◯	◯	◯	◯
Science as an Experience (ie: Interactive Science)	◯	◯	◯	◯	◯	◯
Role as a Lecture Topic	◯	◯	◯	◯	◯	◯
Environmental Awareness	◯	◯	◯	◯	◯	◯

*30. How often is Coastal Roots used to teach the following?

	Never	Rarely	Occasionally	Frequently	Always	N/A
Critical thinking skills	◯	◯	◯	◯	◯	◯
Problem solving skills	◯	◯	◯	◯	◯	◯
Writing skills	◯	◯	◯	◯	◯	◯
Observation skills	◯	◯	◯	◯	◯	◯
Life Skills (Work Ethics, Empathy, Responsibility, etc.)	◯	◯	◯	◯	◯	◯
Current events	◯	◯	◯	◯	◯	◯
Relationship to location	◯	◯	◯	◯	◯	◯
Relationship to culture	◯	◯	◯	◯	◯	◯
Reflection	◯	◯	◯	◯	◯	◯

*31. How important are the following to your approach of teaching Coastal Roots?

	Not at All Important	Slightly Important	Moderately Important	Important	Very Important
Writing Projects	◯	◯	◯	◯	◯
Hands-On Projects	◯	◯	◯	◯	◯
Art Projects	◯	◯	◯	◯	◯
Curriculum Content Connection	◯	◯	◯	◯	◯
Research Opportunity	◯	◯	◯	◯	◯
Field Trip Opportunity	◯	◯	◯	◯	◯

Coastal Roots Teacher Survey

***32. Thinking about what you want your students to gain from this project, how important are the following:**

	Not At All	Very Little	Somewhat	To a Great Extent
Application of Research Skills	◯	◯	◯	◯
Sense of belonging	◯	◯	◯	◯
Content Knowledge	◯	◯	◯	◯
Engagement	◯	◯	◯	◯
Informed Citizens	◯	◯	◯	◯
Life Skills (Work Ethics, Empathy, Responsibility, etc.)	◯	◯	◯	◯
Being A Part of Something Bigger Than Themselves	◯	◯	◯	◯
Stewardship	◯	◯	◯	◯

Other (please specify)

Coastal Roots Teacher Survey

Canyard Maintenance

The following questions are designed to gather information about your experience with the canyard component of your school's Coastal Roots project. Please select the responses that best reflect your experience.

***33. Please select the answer(s) that best represents who participates in (is responsible for) the following activities: (Check all that apply)**

	Teachers	Students	Administration	Staff	Parents	Volunteers	N/A
Planting seeds	☐	☐	☐	☐	☐	☐	☐
Watering plants	☐	☐	☐	☐	☐	☐	☐
Watering system maintenance	☐	☐	☐	☐	☐	☐	☐
Weeding perimeter	☐	☐	☐	☐	☐	☐	☐
Weeding yellow cells	☐	☐	☐	☐	☐	☐	☐
Fertilizing plants with Osmocote	☐	☐	☐	☐	☐	☐	☐
Fertilizing plants with Miracle-Gro	☐	☐	☐	☐	☐	☐	☐
Thinning out extra plants	☐	☐	☐	☐	☐	☐	☐
Restoration planting trips	☐	☐	☐	☐	☐	☐	☐
Other canyard maintenance	☐	☐	☐	☐	☐	☐	☐

***34. Please rank the level of interaction (responsibility or participation) of STUDENTS in each of the following:**

	No Responsibility or Participation	Very Little	Some	Full Responsibility or Participation
Planting seeds	◯	◯	◯	◯
Watering plants	◯	◯	◯	◯
Watering system maintenance	◯	◯	◯	◯
Weeding perimeter	◯	◯	◯	◯
Weeding yellow cells	◯	◯	◯	◯
Fertilizing plants with Osmocote	◯	◯	◯	◯
Fertilizing plants with Miracle-Gro	◯	◯	◯	◯
Thinning out extra plants	◯	◯	◯	◯
Restoration planting trips	◯	◯	◯	◯
Other canyard maintenance	◯	◯	◯	◯

Other (please specify)

Coastal Roots Teacher Survey

***35. Please rank the level of interaction YOU (TEACHER) have in each of the following:**

	No Responsibility or Participation	Very Little	Some	Full Responsibility or Participation
Planting seeds	◯	◯	◯	◯
Watering plants	◯	◯	◯	◯
Watering system maintenance	◯	◯	◯	◯
Weeding perimeter	◯	◯	◯	◯
Weeding yellow cells	◯	◯	◯	◯
Fertilizing plants with Osmocote	◯	◯	◯	◯
Fertilizing plants with Miracle-Gro	◯	◯	◯	◯
Thinning out extra plants	◯	◯	◯	◯
Restoration planting trips	◯	◯	◯	◯
Other canyard maintenance	◯	◯	◯	◯

Other (please specify) _____

Coastal Roots Teacher Survey

Stewardship

The following questions are designed to gather information about your experiences with stewardship. Please select the responses that best reflect your experience.

***36. Please provide your definition of stewardship (in your own words, what is stewardship?)**

***37. How many stewardship-focused courses or workshops have you participated in outside of Coastal Roots?**

- ◯ None
- ◯ 1-2
- ◯ 3-4
- ◯ 5 or more

***38. If you have participated in a stewardship-focused course or workshop where did you attend? Please type NONE if you did not attend workshops outside Coastal Roots.**

Coastal Roots Teacher Survey

Workshop and Training Activities

The following questions are designed to gather information about your experiences with the Coastal Roots workshops and training activities. Please select the responses that best reflect your experience.

***39. How much has your participation in Coastal Roots improved your understanding of the topic?**

- ◯ No Improvement
- ◯ Little Improvement
- ◯ Some Improvement
- ◯ Much Improvement

***40. Please describe a favorite lesson that you have implemented using ideas/skills learned from the Coastal Roots project.**

***41. Which (if any) of the following hinder your participation in Coastal Roots training activities?**

	Baton Rouge Winter Workshop	Summer Institute	N/A
Location	☐	☐	☐
Length of Workshop	☐	☐	☐
Time of Year	☐	☐	☐
Childcare Needs	☐	☐	☐
I have not had difficulty attending Coastal Roots training activities.	☐	☐	☐

Other (please specify)

***42. Since 2006, how many Winter Workshops have you attended?**

***43. Since 2006, how many Summer Institutes have you attended?**

Coastal Roots Teacher Survey

***44. If attendance to one workshop per calendar year was mandatory, would you continue with the Coastal Roots program?**

- ◯ No, I would not continue
- ◯ Yes, I would attend at least one workshop

***45. If the Coastal Roots administration (Dr. Ed Bush and Dr. Pamela Blanchard) was unavailable to assist with the program, would you continue to offer this project at your school? Why?**

	Will not continue	Probably will not continue	May not continue	May continue	Will definitely continue
Dr. Bush Leaves but Will be Replaced	◯	◯	◯	◯	◯
Dr. Blanchard Leaves but Will be Replaced	◯	◯	◯	◯	◯
Both Leave but Will be Replaced	◯	◯	◯	◯	◯
Dr. Bush Leaves and Will Not be Replaced	◯	◯	◯	◯	◯
Dr. Blanchard Leaves and Will Not be Replaced	◯	◯	◯	◯	◯
Both Leave and Will Not be Replaced	◯	◯	◯	◯	◯

Why?

Coastal Roots Teacher Survey

Art Integration

The following questions are designed to gather information about your experience with Art Integration within your Coastal Roots lessons. Please select the responses that best reflect your experience.

***46. Which of the following Art disciplines (if any) do you include in you Coastal Roots lessons (check all that apply)**

- [ ] Dance
- [ ] Drama
- [ ] Storytelling
- [ ] Creative Movement
- [ ] Music/Songs
- [ ] Visual Arts
- [ ] N/A- I do not integrate art with lessons
- [ ] Other (please specify)

Coastal Roots Teacher Survey

*47. Please describe any Art Integration lessons that you include in your teaching.

*48. Do you discuss art concepts with your students as part of any Art Integration lesson that you conduct?

- ◯ Yes
- ◯ No

Coastal Roots Teacher Survey

The following questions are designed to gather information about your experience with the Coastal Roots program. Please select the responses that best reflect your experience.

***49. With respect to your motivation for participating in Coastal Roots, how important are the following?**

	Definitely Not True	Usually Not True	Probably True	Definitely True	N/A
Increased Job Security	◯	◯	◯	◯	◯
Promote Stewardship	◯	◯	◯	◯	◯
Personal Interest in Topic	◯	◯	◯	◯	◯
Program was Already Established in School	◯	◯	◯	◯	◯
Relates to Subject Matter	◯	◯	◯	◯	◯
Low Cost	◯	◯	◯	◯	◯
Ease of Implementation	◯	◯	◯	◯	◯

***50. In what aspects (if any) do you feel you need more assistance?**

- ☐ Canyard Maintenance
- ☐ Lesson Ideas
- ☐ Field Trip Preparation
- ☐ Grant Writing Assistance
- ☐ I do not feel that I need additional assistance.
- ☐ Other (please specify)

Coastal Roots Teacher Survey

Awards and Grants

The following questions are designed to gather information about awards and grants earned. Please select the responses that best reflect your experience.

***51. Please select any of the following awards/certifications you have received:**

- [ ] National Board Certification
- [ ] Presidential Awards for Excellence in Mathematics and Science Teaching
- [ ] NSTA Award (ie: Shell)
- [ ] NCTM Award
- [ ] Louisiana Teacher of the Year
- [ ] Parish Teacher of the Year
- [ ] None
- [ ] Other (please specify)

***52. Have you received a grant directly related to your Coastal Roots project? If yes, please provide the YEAR, AMOUNT, and ORGANIZATION providing funds. If none, type N/A/ in the box provided.**

First Grant

Second Grant

Third Grant

List all others here:

***53. Have you received a school gardening grant unrelated to your Coastal Roots project? If yes, please provide the YEAR, AMOUNT, and ORGANIZATION providing funds. If none, type N/A/ in the box provided.**

First Grant

Second Grant

Third Grant

List all others here:

Coastal Roots Teacher Survey

***54. Have you received a service learning grant unrelated to your Coastal Roots project? If yes, please provide the YEAR, AMOUNT, and ORGANIZATION providing funds. If none, type N/A/ in the box provided.**

First Grant

Second Grant

Third Grant

List all others here:

Coastal Roots Teacher Survey

Additional Demographics

***55. Please type your age.**

***56. Which of the following identifies your gender?**

- ◯ Female
- ◯ Male
- ◯ No response

Other (please specify)

***57. Please type your First and Last name in the box provided. The information submitted in this survey will be kept confidential.**

Coastal Roots Teacher Survey

Survey Completed

You have completed the Coastal Roots Teacher Survey.

Thank you for providing your feedback and sharing your experiences.

If you have any questions about your participation in this study, please contact _____.

Appendix B: Full Mixed Methods Evaluation IRB Approval

Application for Exemption from Institutional Oversight

Institutional Review Board
Dr. Robert Mathews, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/ projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

– Applicant, Please fill out the application in its entirety and include the completed application as well as parts A-F, listed below, when submitting to the IRB. Once the application is completed, please the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at http://sites01.lsu.edu/wp/ored/human-subjects-screening-committee-members/

– A Complete Application Includes All of the Following:
(A) A copy of this completed form and a copy of parts B thru F.
(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)
(C) Copies of all instruments to be used.
*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.
(D) The consent form that you will use in the study (see part 3 for more information.)
(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (http://phrp.nihtraining.com/users/login.php)
(F) IRB Security of Data Agreement: (https://sites01.lsu.edu/wp/ored/files/2013/07/Security-of-Data-Agreement.pdf)

1) Principal Investigator: Jenna M. LaChenaye **Rank:** doctoral candidate

Dept: School of HRE & WD **Ph:** 3374121023 **E-mail:** lachenaye@gmail.com

2) Co Investigator(s): please include department, rank, phone and e-mail for each
*If student, please identify and name supervising professor in this space

Krisanna Machtmes, Ph.D. (committee chair), Ohio University, machtmes@ohio.edu
Pam Blanchard, Ph.D, School of Education, LSU, Pamb@lsu.edu

IRB# E8467 LSU Proposal #_____
✓ Complete Application
✓ Human Subjects Training
✓ IRB Security of Data Agreement

3) Project Title: Mixed Methods Evaluation of the Coastal Roots Program

STUDY EXEMPTED BY:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
130 David Boyd Hall
225-578-8692 / www.lsu.edu/irb
Exemption Expires: 10/20/2016

4) Proposal? (yes or no) n **If Yes, LSU Proposal Number**

Also, if YES, either ◯ **This application completely matches the scope of work in the grant**
OR ◯ **More IRB Applications will be filed later**

5) Subject pool (e.g. Psychology students) Coastal Roots teachers

*Circle any "**vulnerable populations" to be used**: (children <18; the mentally impaired, pregnant women, the ages, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature [signature] **Date** 10/12/2013 (no per signatures)

**** I certify my responses are accurate and complete.** If the project scope or design is later changes, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted ✓ Not Exempted ____ Category/Paragraph 1

Signed Consent Waived?: Yes / No

Reviewer Mathews **Signature** [signature] **Date** 10/21/13

Appendix C: Qualitative Component IRB Approval

Application for Exemption from Institutional Oversight

Institutional Review Board
Dr. Robert Mathews, Chair
131 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu
lsu.edu/irb

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/ projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

-- Applicant,Please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at http://research.lsu.edu/ComplianceProcedures/InstitutionalReviewBoard%28IRB%29/Item24737.html

-- A Complete Application Includes All of the Following:

(A) Two copies of this completed form and two copies of part B thru E.
(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)
(C) Copies of all instruments to be used.
*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.
(D) The consent form that you will use in the study (see part 3 for more information.)
(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (http://phrp.nihtraining.com/users/login.php)
(F) IRB Security of Data Agreement: (http://research.lsu.edu/files/item26774.pdf)

1) Principal Investigator: Dr. Pamela Blanchard **Rank:** Associate Professor

Dept: ETPP **Ph:** 8-2977 **E-mail:** PamB@lsu.edu

2) Co Investigator(s): please include department, rank, phone and e-mail for each
*If student, please identify and name supervising professor in this space

Dr. Krisanna Machtmes, SHREWD, Associate Professor, Office: 225/578-7844, <machtme@lsu.edu>
Supervising the following students: Y Adams, A Attawy, C Hamburg, J Hebert, J Johnson, K Gales johnson, K Jones, R Leingang, A Mullens, B Ostarly, S Scott, L Saal, S Bond

IRB# E5945 LSU Proposal #
☑ Complete Application
☑ Human Subjects Training

3) Project Title: A Qualitative Investigation of Teachers Activity Choice and Participation in the LSU Coastal Roots Program

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb
Exemption Expires: 4/1/2015

4) Proposal? (yes or no) n **If Yes, LSU Proposal Number**

Also, if YES, either ◯ **This application completely matches the scope of work in the grant**
OR ◯ **More IRB Applications will be filed later**

5) Subject pool (e.g. Psychology students) teachers

*Circle any **"vulnerable populations" to be used**: (children <18; the mentally impaired, pregnant women, the ages, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature P Blanchard **Date** 3/26/2012 (no per signatures)

**** I certify my responses are accurate and complete.** If the project scope or design is later changes, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted ✓ Not Exempted ____ Category/Paragraph ____

Reviewer Kristin A. Gansle **Signature** _____ **Date** 03/27/2012

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
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Exemption Expires: 4/1/2015

Consent Form

1. **Study Title:** ***A Qualitative Investigation of Teachers' Classroom Integration of and Participation in the LSU Coastal Roots Program***

2. **Performance Site:** At the teacher's school or at a convenient public location near the school

3. **Investigators:** The following investigators are available for questions about this study, M-F, 8 AM to 4 PM.
   Dr. Pamela Blanchard, LSU College of Education, 225/ 578-2297
   Dr. Krisanna Machtmes, LSU School of Human Resource Education and Workforce Development, 225/578-7844

4. **Purpose of the Study:** The purpose of this research project is to understand how teachers currently participating in the LSU Coastal Roots Program integrate this environmental stewardship project into their lessons and courses at the K-12 level.

5. **Subject Inclusion:** Participating teachers in LSU Coastal Roots schools.

6. **Description of Study:** Teachers will be interviewed about how they implement and integrate the LSU Coastal Roots Program in order to teach their students about wetlands and coastal issues. Other information collected through participation in the project (for example, restoration trip information, nursery assessments, participation in professional development opportunities) will also be used in the study.

7. **Benefits:** The research will provide information on how teachers integrate an environmental stewardship program into their curriculum. In addition, perceived benefits for students, best teaching practices and resources used by teachers will be identified, as well as barriers to participation in professional development opportunities and use of resources provided by Coastal Roots.

8. **Risks:** No known risks.

9. **Right to Refuse:** Participation is voluntary. At any time, the subject may withdraw from the study with penalty or loss of any benefit to which they otherwise might be entitled.

10. **Privacy:** Results of the study may be published, but no names or identifying information will be included in the publication. Data collected during this research will be reviewed by Drs. P. Blanchard and K. Machtmes, as well as graduate students who participated in the collection of the data. Subject identity will remain confidential with these parties unless disclosure is required by law.

11. **Financial Information:** There is no cost for participation in this study, nor is there any compensation to the subjects for participation.

12. **Signatures:** The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding any study specifics to the investigator listed above. If I have questions about subjects' rights or other concerns, I can contact Dr. Robert C. Matthews, Institutional Review Board, 225/ 578-8692.

    I agree to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of this consent form.

    Signature of Subject _____ Date _____

    Printed Name _____

Brief Project Description for

A Qualitative Investigation of Teachers' Classroom Integration of and Participation in the LSU Coastal Roots™ Program

The LSU Coastal Roots™ (CR) Program is an environmental stewardship program that currently has more than 40 schools (public, private and parochial) participating in the program across 18 parishes (2011-12) in southern Louisiana. The overall goal of the *Coastal Roots*™ Seedling Nursery Program is to assist students in developing an attitude of stewardship toward our natural resources and to provide for them a constructive active learning situation in which they can explore strategies for sustaining our coastal ecosystems. Each school has a school-based can yard in which they grow native plants for a partner restoration site. Once a year students travel to their partner restoration site and transplant their crop of restoration plants. The CR Program also engages teachers and students with information and resources on critical coastal environmental issues such as ecological stewardship, wetlands functions and values, wetland loss, habitat restoration and conservation, while learning basic geologic and horticultural concepts and skills.

This research project is a qualitative investigation focused on how teachers currently participating in the LSU Coastal Roots™ Program integrate the project into their lessons and courses at the K-12 level. Generally only one or two teachers lead the CR Program at their school. These lead teachers will be asked to participate in this research project. Data will be collected through one-on-one semi-structured in-depth interviews conducted in person or via Skype with teachers who consent to participate in this research. Each interview will be audio recorded. Once collected, interviews will be transcribed, coded, and a thematic analyses will be conducted. Themes or clusters of factors that emerge from the data will help the researchers understand the experience of these educators in implementing and integrating a stewardship

project into their classroom. In order to strengthen the trustworthiness of the study findings, peer debriefing and triangulation with other sources of data resulting from participation in the CR Program will occur. Related data from program participation include, but are not limited to restoration trip information, nursery assessments, and participation in professional development opportunities.

Appendix D: Divergent Questions of Concern from Program Staff

1. What attracted you to the Coastal Roots™ Program? What were you hoping that you students gained from participation in this program?
2. What was your knowledge of wetland plants/wetland restoration before participating in Coastal Roots? (Staff looking to know more about the teachers' backgrounds to see if a certain "type" of teacher is interested in Coastal Roots.)
3. Have you ever completed any service-learning projects with your class (this year's or previous) before participating with the Coastal Roots™ Program?
4. What subject do you teach?
5. What is your current knowledge about coastal land loss?
6. Is it important for you to be involved in this program?
7. Do you think your participation will help the current declining situation?
8. Is wetlands restoration education something that can be easily integrated into your classroom curriculum? If so, do you regularly integrate it? If not, what are some strategies for integrating it?
9. Do you feel you have access to the necessary resources to successfully educate the youth on wetland restoration?
10. Where are you from? Demographic data?
11. What is the goal of learning?
12. What is the goal of instruction?
13. How do you describe your teaching role and style?
14. When/where were you trained as a teacher and what certifications do you hold?
15. What is your school's approach to collaborative planning and curriculum development?

16. What is your approach to collaborative planning and curricular development?
17. How do you utilize instructional materials in your classroom?
18. How do you utilize Coastal Roots™ instructional materials in your classroom?
19. How would you classify/describe the Coastal Roots™ materials provided?
20. Prior to Coastal Roots, had you ever been to a coastal area of Louisiana, if so describe your perceptions?
21. Prior to Coastal Roots, describe your knowledge about wetland concerns in Louisiana?
22. Besides Coastal Roots, describe other participatory learning experiences for children in your classroom.
23. How did your preparations/lessons work in support of the actual field experience?
24. Were there gaps in the preparation that you would fill next time? If so, what?
25. What were key moments in the field experience that illustrate the support preparation (or gaps)?
26. After the field experience, how have you measured the knowledge that your students have gained throughout the program? (testing, projects, conversations, Science Fair, Social Studies Fair)
27. Do your students express their knowledge and experience from the Wetlands programs in other ways? (journals, games, art, music, hobbies)
28. How much time do you spend planning lessons and activities related to Coastal Wetlands? (are we just talking about Coastal Wetlands, or are other wetlands types included?)

29. Do you ever integrate your Wetlands lessons with other curriculum areas (such as Language Arts, Social Studies, Art, or Math)? If so, describe what that looks like. (If you don't do this, would you like some ideas & lesson plans for how to do this?)
30. What do you do to prepare your students for a trip to the wetlands? Is this a new experience for most of them? How do they respond? (curiosity, fear, excitement, indifference. . .) How do you address concerns (Parents/Lawyers) about safety?
31. What kinds of support materials do you use? Where does this material come from" What do you wish you had access to?
32. Is your school administration (as well as other teachers, parents, etc.) supportive of your participation in the Coastal Roots™ program? Besides money, what other support would you like?
33. What benefits are you hoping your students gain from taking part in Coastal Roots?
34. How did you originally envision Coastal Roots™ being integrated in your classroom?
35. How is Coastal Roots™ integrated in your classroom?
36. Are Coastal Roots™ lessons taught independently of other subjects/lessons or are they integrated into your current curriculum?
37. What types of activities accompany your lectures?
38. How receptive are the students to your teachings about wetland restoration?
39. How do you measure what the students learn from your teachings about wetland restoration?
40. What type of support do you feel that you need for this program to run effectively in your classroom?

41. Is your school administration supportive in your efforts to teach your students about wetland restoration?
42. How does the administration show their support?
43. Are the parents supportive in your efforts to teach your students about wetland restoration?
44. How do the parents show their support?
45. How did your preparations/lessons work in support of the actual field experience?
46. Were there gaps in the preparation that you would fill next time? If so, what?
47. What were key moments in the field experience that illustrate the support preparation (or gaps)?
48. After the field experience, how have you measured the knowledge that your students have gained throughout the program? (testing, projects, conversations, Science Fair, Social Studies Fair)
49. Do your students express their knowledge and experience from the Wetlands programs in other ways? (journals, games, art, music, hobbies)
50. Why is it important students learn about Wetland Restoration?
51. How much classroom time do you use to teach about Wetland Restoration?
52. How are lessons about Wetland Restoration integrated in to other lessons you teach?
53. What resources/tools do you use to teach your students about Wetland Restoration?
54. How do you show/tell them about how this will affect them in the future?
55. How are you prepared to teach your students lessons about Wetland Restoration? What training have you had that gives you the knowledge to teach about Wetland Restoration?
56. What additional training do you need and why?

57. How do you get parents involved?
58. What benefits are you hoping your students gain from taking part in Coastal Roots?
59. How did you originally envision Coastal Roots™ being integrated in your classroom?
60. How is Coastal Roots™ integrated in your classroom?
61. Are Coastal Roots™ lessons taught independently of other subjects/lessons or are they integrated into your current curriculum?
62. What types of activities accompany your lectures?
63. How receptive are the students to your teachings about wetland restoration?
64. How do you measure what the students learn from your teachings about wetland restoration?
65. What type of support do you feel that you need for this program to run effectively in your classroom?
66. Is your school administration supportive in your efforts to teach your students about wetland restoration?
67. How does the administration show their support?
68. Are the parents supportive in your efforts to teach your students about wetland restoration?
69. How do the parents show their support?

Appendix E: Qualitative Interview Protocol

Teacher Activities

- What attracted you to the Coastal Roots™ Program?
- Did you have prior interest or knowledge of wetlands conservation prior to this project?
- Have you ever completed any service-learning projects with this class or another before participating with the Coastal Roots™ Program, and if so, what type of project was it?
- What types of activities do you include in your lessons related to the wetlands?
- What percentage of your time do you spend on the Coastal Roots™ Program in general, and specifically on coastal wetland material and activities?
- How do you integrate your wetlands lessons with other subjects?
- Why is it important students learn about wetland restoration?
- What resources/tools do you use to teach your students about Wetland Restoration?

Student Learning

- How receptive are students to instruction about wetland restoration?
- How do they respond? (curiosity, fear, excitement, indifference. . .)
- What benefits are you hoping your students gain from taking part in CR?
- What were your original goals of integrating CR into your classroom? Have these goals changed over time?
- What do you do to prepare your students for a trip to the wetlands?

Parental and Administrative Involvement and Support

- How do you get parents involved?
- Are the parents supportive in your efforts to teach your students about wetland restoration?

- How do you explain to parents and students about how this will affect them in the future?
- How does your school administration (& other teachers, parents, etc.) support your participation in the CR program? Besides money, what other support would you like?

Professional Development

- What training have you had that gives you the knowledge to teach about wetland restoration?
- What additional training do you need and why?
- How often have you participated in professional development provided through the LSU Coastal Roots™ Program (i.e., Summer Institute, Winter Workshop)? What do you gain from this participation? Please describe any barriers to participation in these Coastal Roots™ PD activities.

Appendix F: Coastal Roots™ Evaluation Consent Form

1. **Study Title:** ***A Mixed Methods Evaluation of Teachers' Classroom Integration of and Participation in the LSU Coastal Roots™ Program***

2. **Performance Site:** At the teacher's school or at a convenient public location near the school

3. **Investigators:** The following investigators are available for questions about this study:
   Dr. Pamela Blanchard, LSU College of Education, 225/ 578-2297
   Dr. Krisanna Machtmes, LSU School of Human Resource Education and Workforce Development, 225/578-7844

4. **Purpose of the Study:** The purpose of this research project is to understand how teachers currently participating in the LSU Coastal Roots™ Program integrate this environmental stewardship project into their lessons and courses at the K-12 level.

5. **Subject Inclusion:** Participating teachers in LSU Coastal Roots™ schools.

6. **Description of Study:** Teachers will be interviewed about how they implement and integrate the LSU Coastal Roots™ Program in order to teach their students about wetlands and coastal issues. Other information collected through participation in the project (for example, restoration trip information, nursery assessments, participation in professional development opportunities) will also be used in the study.

7. **Benefits:** The research will provide information on how teachers integrate an environmental stewardship program into their curriculum. In addition, perceived benefits for students, best teaching practices and resources used by teachers will be identified, as well as barriers to participation in professional development opportunities and use of resources provided by CR.

8. **Risks:** No known risks.

9. **Right to Refuse:** Participation is voluntary. At any time, the subject may withdraw from the study with penalty or loss of any benefit to which they otherwise might be entitled.

10. **Privacy:** Results of the study may be published, but no names or identifying information will be included in the publication. Data collected during this research will be reviewed by Drs. P. Blanchard and K. Machtmes, as well as graduate students who participated in the collection of the data. Subject identity will remain confidential with these parties unless disclosure is required by law.

11. **Financial Information:** There is no cost for participation in this study, nor is there any compensation to the subjects for participation.

12. **Signatures:** The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding any study specifics to the investigator listed above. If I have questions about subjects' rights or other concerns, I can contact Dr. Robert C. Matthews, Institutional Review Board, 225/ 578-8692.

    I agree to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of this consent form.

Signature of Subject _____ Date _____

Printed Name _____

Appendix G. Table of Themes Developed from Initial Qualitative Analysis

Emotion		
1.1	Love/ Enthusiasm	Emotions/ Feelings of students as a result of being involved in the Coastal Roots™ project. Can either be stated by students or observed by teachers.
1.2	Ownership	
1.3	Pride	
1.4	Something Bigger than Yourself	
1.5	The Future – impact	
1.6	Obligation/Responsibility	
1.7	Curiosity	
1.8	Fear/Concern	
1.9	Belonging/Engagement	

The Land		
2.1	Hunting/Fishing	Interactions between students and the land. These can be personal interactions or impact or cultural ties.
2.2	Outdoors	
2.3	Economic Impact	
2.4	"Louisiana"	
2.5	Familiar with Terrain	

School		
3.1	Multiple grades involved	Anything going on at the physical school location. It can involve staff, students, or plants.
3.2	Teacher Partnerships	
3.3	Garden on Campus	
3.4	Academic Club Involved	
3.5	Can Yard Maintenance	
3.6	Administration	
3.7	Peer teaching	
3.8	Funding	
3.9	Technical Difficulties	

Training/Experience (teachers)		
4.1	CR Resources	Anything that enhances the knowledge of the teachers. This includes previous experience, current resources, and even knowledge needs.
4.2	Networking	
4.3	Pedagogy Tips/ Activities	
4.4	Personal Interest	
4.5	Attend CR Workshops	
4.6	Other Programs/ Workshops	
4.7	Content Knowledge	
4.8	Other Resources	
4.9	Prior Fieldwork	
4.10	Colleagues as Resource	
4.11	Dr.'s Blanchard & Bush	

Learning/Experience (students)		
5.1	Fieldwork	Anything the students learn from the experience and approaches teachers take in order to help the students gain knowledge. Includes both lecture and more hands-on approaches for learning. Includes both tangible and intangible information. Fieldwork – research outdoors; Investigation – scholarly research
5.2	Investigation	
5.3	Science as "Experience"	
5.4	Role as Lecture Topic	
5.5	Subject Integration	
5.6	Ability to Make a Difference	
5.7	Environmental Awareness	
5.8	Hands-on	
5.9	Desire to Learn	
5.10	Life Skills	
5.11	Arts integration	

Other		
6.1	Students are the Future	Other recurring ideas that emerged, typically having a positive impact on the program's success by encouraging buy-in or demonstrating the determination of the teacher.
6.2	Parental Involvement	
6.3	Opportunity for Schools	
6.4	Other Service Projects	
6.5	Environmental Disaster	
6.6	Preparation Steps	
6.7	Community Outreach/PR	
6.8	Spirituality	
6.9	Stewardship	
6.10	Technology	

Appendix H: Pilot Survey Feedback/Concerns

Pilot Participant	Concern	Action
M	started 8:26, ended 8:49	Length acceptable - no changes
M	Do they know what can yard means?	CR teachers are familiar - comment omitted
M	Intro about doing it: says you can't stop, then says you can opt out or not answer questions anytime. If a question is not answered, you cannot progress though ...	Set up so that teachers can withdraw at any time
M	When people see 30-40 minutes, they will NOT want to take it ... 15 minutes or less is best.	Consolidate some questions, include compensation to encourage participation
M	Several places you go from describe to describes ... 5, 6, 10, 17 ... consistent	Made suggested adjustment
M	15 short time frames ... might want to expand some, depends on what you want	Time frames adjusted
M	27 and 28 - what is rare, occasionally, freq, always ???? allowing them to determine that ...	Accept that frames are teacher determined
M	32 and 33 - rank? not really ranking ...	Adjusted
M	39 doesn't make sense to me ... wasn't sure about what was wanted	Compared to others - comment omitted
M	43) asking about leaving ... planting the seed that you will not be there and maybe they should rethink what they want to do ...	Rework to focus on the role of staff
XW	Q 21 First of all I think maybe we should add the recipient to whom they submit the grades. Secondly maybe they need more than the two options,	Adjust based on population
XW	or if you want to keep the two options, maybe you want to provide one sentence of information here? From the transcriptions that I am working on, I don't think all of the teachers know the content or terms of CR correctly.	Adjust/check terminology - build terms into questions
XW	Q#27, I like the layout. Maybe you want to put a box there to indicate more ways to use CR?	Open fields added where appropriate

XW	It actually took me 34 minutes. I thought I could finish it earlier since I am thinking myself as a public school teacher. But I was typing in the two questions' content (above) and my feedback when I was doing the survey, in case i forget it after the survey. So taking out that time, I would say 25 minutes.	Acceptable time limit - no changes necessary
XW	Progress bar helpful? I like it, but when I was working on the page of Q31-33, it took me 7 minutes to think of all the questions and the progress is still 38%, which was a little depressing to me, because if I were a real public school teacher, the bar is both helpful and also depressing since it indicates there's still a long way to go. Maybe we can change it into 1/5, 2/5...5/5? Because in that way the numbers of percentages are not in that kind of specific details and it makes an illusions that it's about to finish soon. I am saying this because I don't want teachers to get frustrated and drop the survey halfway.	Increase motivation and participation through compensation. Little ability to make changes to the interface.
B	It took me 25 minutes to complete- its very thorough!	Acceptable time limit - no changes necessary
B	I couldn't really see the progress bar because it was at the top of the survey and I had to scroll all the way to the bottom to complete it- so the progress bar may not be necessary.	No adjustment necessary
B	Would it be possible to combine questions 31 and 32? They seem very similar...	Wording adjusted within confines of question fidelity
B	Question 43 seemed very similar to question 46....	Wording adjusted within confines of question fidelity
B	Would it be possible to have drop down choices for questions 50-52? It just seemed like a lot of the same type of information on one page, so I was thinking if there was a drop down as to what type of grant and then they could fill in the rest of the information with the specifics... just a thought...	Consolidation of items to reduce tedious entry
J	Q 39: The "I have not had difficulty" option is difficult to answer. What would the "N/A" choice mean in this case? Suggest rewording or making this a separate question.	Wording adjusted
J	Q 46: Suggest changing "art integration lesson" to "Art/Coastal Roots™ integration lesson."	Neutral - omit to open question option

J	Q 39: Might the need for CE credits be a factor to consider?	Incorporation in professional development - CE does not account for momentous can yard work
J	Q 29: What does "curriculum content connection" mean? Unless this is a standard phrase used by educators, is there a clearer way to say what you mean here?	Standard educator phrasing. Teachers will be familiar. Omit due to participant's unfamiliarity with education.
J	Q 27-28: Suggest adding the phrase "at your school" at the end of the question.	Adjusts where applicable
J	Q 26: Would Geology be considered part of Earth Sciences? Would Horticulture be considered part of Agriculture?	Omit - teachers are familiar with content groupings.
J	Q 24: Suggest you add to the list the Atchafalaya Basin Foundation and the Natural Resources Defense Council.	Pulling information from interviews. Based on qualitative element of mixed methods design.
J	Q 23: How confident are you that every teacher will know what you're referring to by "compendium" and "handbook"? I ask this because in some of the interviews I've done, the two terms have not been used carefully. Might be a good idea to provide parenthetical definitions here.	Review interviews for terminology and make adjustments.
J	Q 19: I am not familiar with the standardized testing calendar, but if standardized testing happens more than once per year, this answer choice will present a dilemma.	Omitted - happens once per year. Participant is unfamiliar with terms.
T	Wow that is the longest survey I have ever done!	Acceptable by majority - no change, add compensation.
T	A lot of redundancy on the questions.	Wording differentiation to avoid double barreled and loaded items. Needed to differentiate nuances in program use. Based on qualitative analysis.
T	Too many boxes to add N/A to.	Based on interview data, NA will apply to a minority of participants.

T	Way to many different Likert scales	Needed for holistic analysis - part of breadth of evaluation. Shortened where possible without damaging study integrity.
T	Very wordy could have cut it in half and have same results.	Wording differentiation to avoid double barreled and loaded items. Needed to differentiate nuances in program use. Based on qualitative analysis.
D	very easy to navigate through the questions	Positive - no change necessary
D	questions were very clear and easy to understand	Positive - no change necessary
D	30 minutes to complete the survey	Acceptable time
D	I did not refer to the progress bar while completing the survey.	Neutral

Appendix I: IRB Certificate for Human Subjects Research

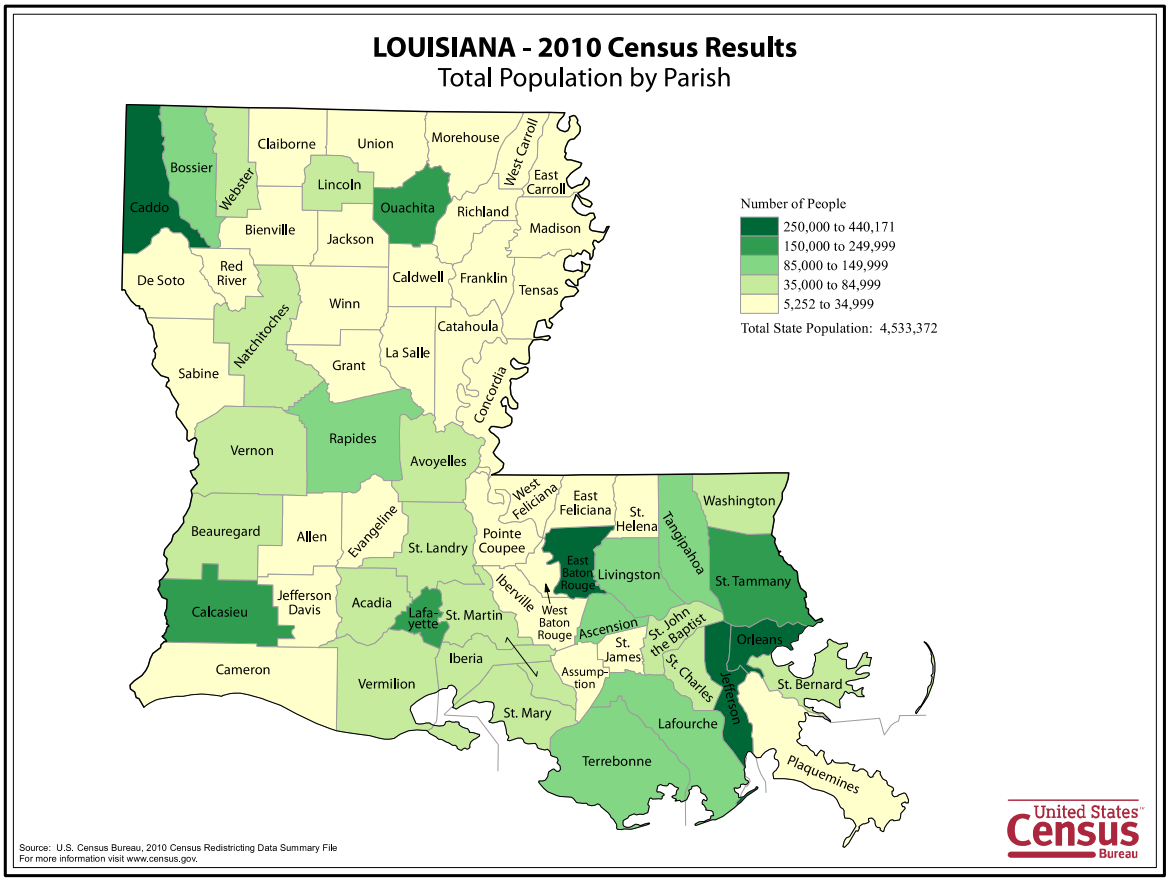
Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Jenna LaChenaye** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 01/16/2013

Certification Number: 1079924

Appendix J: Louisiana Population by Parish



(Louisiana Census Data Center, 2012)

VITA

Jenna LaChenaye was born in rural Avoyelles Parish, Louisiana. She completed an Honors Baccalaureate Bachelor of Science degree in Education and an Honors Baccalaureate Bachelor of Arts degree in Sociology from the University of Louisiana in 2008, where she completed an undergraduate honors thesis examining the diversity/multicultural education program and its representation of the local Louisiana communities. She received a Master of Science degree in Sociocultural and International Education Development Studies from Florida State University in 2009, where her research focused on the experiences of Louisiana's native French speakers in English-only schools and the evaluation cultural competency issues following Hurricanes Katrina and Rita in south Louisiana. She completed her Doctor of Philosophy degree in Human Resource Education and Workforce Development in 2014 at Louisiana State University with a focus on research methodology and evaluation.