NERRS Science Collaborative Progress Report for the Period 9/1/13 through 2/28/14

***Project Title*: Planning for Sea Level Rise: A Pilot Study to Evaluate and Improve the Development and Delivery of Habitat Vulnerability Assessments and Adaptive Conservation Designs to Coastal Decision Makers**

***Principal Investigator(s)*: Kathryn Frank, University of Florida**

***Project start date*: 11/15/11**

***Report compiled by*: Kathryn Frank**

***Contributing team members and their role in the project*: Tina Gordon (Co-PI) at the Guana Tolomato Matanzas National Estuarine Research Reserve, and Belinda Nettles (Research Assistant) at the University of Florida**

A. Progress Overview

The goal of the project is to develop an integrated sea level rise adaptation planning process that identifies potential impacts of future sea level rise on coastal habitats and species, designs ecological migration corridors, and builds governance and civic capacity for adaptation. The planning process is being piloted in the Matanzas Basin of Northeast Florida in partnership with the Guana Tolomato Matanzas (GTM) National Estuarine Research Reserve, and with the aim of documenting a transferable model for use by other reserves in the National Estuarine research Reserve System (NERRS).

The majority of the work this reporting period pertained to six project components, five of which relate to the Matanzas Basin pilot study:

(1) *Consultation with the project's **Matanzas Basin Steering Committee***

The Steering Committee held its sixth meeting on December 9, 2013. Steering Committee members reviewed the draft presentation materials for the upcoming large public workshop (on February 24, 2014) and provided feedback. The presentation included a synthesis of input from the first stakeholder workshops in Fall 2012 and Spring 2013, and new results from the project's technical analyses of future habitat conservation design and land use. Collaboration Lead Dawn Jourdan gave the presentation and Applied Science Investigators Paul Zwick and Thomas Hoctor, and Principal Investigator Kathryn Frank, attended the meeting and answered questions. The next Steering Committee meeting will be held in summer 2014 to review a draft of the final report and prepare for the final public meeting to be held in August 2014.

(2) ***Technical analyses***

Future development patterns. The technical team completed two scenarios of future land use patterns for the two-county region containing the Matanzas Basin study area. Both scenarios used the same population projection and incorporated the impacts of sea level rise on current and future development along the coast. In the first scenario, the future land use locations and densities for new population and employment were based upon the continuation of current development patterns. Population was allocated to specific locations within the two-county region through the creation of a Criteria Evaluation Matrix (CEM) that used conflict among competing land use types, and other variables, to analyze land use decisions, as part of the Land Use Conflict Identification Strategy (LUCIS). In the second scenario, future land use patterns were modified to incorporate conservation priorities (see below), and the team determined that a significant portion of future development in the study area can be accommodated within existing urban areas through in-fill of vacant residential lots and mixed-use design. In the next reporting period, the team will complete a third scenario showing future development pressures along the coast, i.e., the "no sea level rise" scenario.

Conservation priority lands. The technical team identified conservation priority lands in the study area using a multi-step analytic process. First, the team identified current and future (with sea level rise) habitat for 38 focal species within the study area using habitat models and element occurrence data from the University of Florida and the Florida Natural Areas Inventory (FNAI), and the results of the Sea Level Affecting Marshes Model (SLAMM) at 1.0 m and 2.5 m sea level rise. Next, the team completed vulnerability assessments for habitats affected by sea level rise and future, trending land use patterns (see above, first scenario). Then, the team combined the vulnerability assessments with conservation priorities from the most recent update of the Florida Ecological Greenways Network (FEGN), the Critical Lands and Waters Identification Project (CLIP), and more specific aggregated data on habitat priorities for various focal species. The result was the conservation priority lands, which account for sea level rise habitat migration, statewide conservation values, and potential development pressures.

Results from these technical analyses figured prominently in the large public workshop held on February 24, 2014.

In Fall 2013, Principal Investigator Kathryn Frank's Environmental Land Use Planning and Management class of 10 masters and doctoral students partnered with the Conservation Trust for Florida (CTF) to study a wildlife corridor running between the

Ocala National Forest and the Matanzas Basin, for the purpose of CTF possibly applying for listing the corridor as a conservation priority by the state's Florida Forever program. As part of the study, the students visited the Matanzas Basin and kayaked Pellicer Creek. The study was useful to the Matanzas project because it contributed more information about the Matanzas Basin and its geographic context.

(3) ***Visualization and communication*** *of sea level rise and technical findings*

In preparation for the February 2014 large public workshop, researchers focused on presenting the project's technical findings effectively for the audience. Several figures and maps were created to communicate the latest technical analyses, including: a schematic showing the dynamics of land use change from sea level rise, future development, and conservation priorities; a map showing current and future development in the study area; maps showing habitat vulnerability assessments for three focal species (shore birds, gopher tortoise, and black bear); a map of the conservation priority lands with arrows indicating habitat migration routes; and maps indicating areas appropriate for in-fill development.

(4) ***Collaborative workshops*** *with stakeholders*

There was one, large public, three-hour workshop on February 24, during this reporting period. The purposes of the workshop were to report the synthesized results of the stakeholder-based workshops held during the second year of the project, to present the latest technical analyses, and to receive public feedback regarding the analyses and preferences for future land conservation and development patterns. The feedback will be incorporated into the final project report and recommendations.

GTM Research Reserve staff advertised the large public workshop for residents of St. Augustine, Palm Coast, and smaller coastal communities in the study area via email, in person at various community events, and through the project's Steering Committee. This followed the typical outreach method of the GTM Research Reserve's Coastal Training Program, including setting up a workshop online RSVP system through EventBrite.com.

With Steering Committee input, the project team finalized the overall structure and content of the public workshop, including the process agenda, presentations, and interactive exercises.

Most significantly, the collaboration team developed a How will we develop? Game for six to ten players, to receive input on player's future development preferences and to educate them about growth pressures, urban design, and the land consumption associated with design choices. The game uses a board, which is a large aerial image covering about 700 acres on the urban fringe (similar to the study area, but not in the study area), with about half developed and half undeveloped. On the board, there are areas designated for conservation priorities and wetlands. The existing developed areas are suburban style. The object of the game is to work as a team to allocate 1800 new residential units by the year 2060, which is a similar growth pressure to that predicted for the Matanzas study area. The new residential units are provided as game pieces, with pieces of different development densities (number of residential units per acre) available to apply to the board. A special "town center" piece was also provided. The players have about 40 minutes to reach the allocation target. In addition to selecting the types of pieces, players can decide where the pieces go, including within existing developed areas as in-fill and redevelopment. The results of the game are documented through a photograph of the final game board with pieces and a team question sheet addressing the rationale for development patterns, issues of consensus and disagreement, what team members learned, and how the game could be improved.

Approximately 70 people participated in the workshop, including many members of the project steering committee. During the public workshop on February 24, GTM Research Reserve director and Co-Principal Investigator Michael Shirley welcomed the participants to the event. Then GTM Research Reserve Coastal Training staff led participant keypad polling to gather information about their past experience with sea level rise workshops and information, as well as their preferences for future development patterns. Identical keypad polling was conducted at the workshop conclusion, plus additional questions about workshop effectiveness. After the first keypad polling, Collaboration Lead Dawn Jourdan and Principal Investigator Kathryn Frank delivered presentations summarizing the previous workshop input and introducing the latest technical analyses, followed by audience questions and answers. Next, GTM Research Reserve Coastal Training staff facilitated the Strengths, Weaknesses, Opportunities, and Threats (SWOT) exercise to gather additional feedback about the conservation priorities map. The SWOT exercise also allowed more participant comments about the technical analyses used to generate the conservation priorities map and scenarios of future development patterns. Following a break, the remaining 30 participants formed small groups of three to nine, each with a project team facilitator, and played the How will we develop? Game. The workshop concluded with the second keypad polling.

The project team recorded participant input through keypad polling, written notes, and photographs. The team is currently processing the results for use in the conflict and readiness assessments.

(5) ***Outreach and transfer***

Jonathan Lerner, a journalist based in New York City, wrote a feature piece about the project for the national professional magazine *Landscape Architecture*. The article, "Think or Swim," was published in the November 2013 issue and described the project's three phases. The article described one of the stakeholder workshops and the role-play game. It also included some of the project's SLAMM maps and explained how the maps provide planning information.

The project website, PlanningMatanzas.org, continued to be a primary source of public outreach. Since its creation, the site has received 8,303 views, of which 7,938 are from the United States (the remainder represents 60 other countries). The project team posted presentation materials for the large public workshop. Blogs posts included information about the fourth annual State of the Reserve held by the GTM NERR, the sixth steering committee meeting, Lerner's *Landscape Architecture* article, Ann Horowitz's thesis about the threat of sea level rise on historic St. Augustine, and adaptation planning strategies for the built environment. The Facebook page automatically receives blog posts published on the project's Wordpress site (PlanningMatanzas.org). The Facebook page further enables convenient notification of new blog posts, peer-to-peer sharing of information, and community interaction via "likes" and comments.

Additional Investigator Thomas Ruppert has been developing a toolbox of planning, policy, land acquisition, and management options for local officials and planners on the basis of technical information generated by this project and input from the local meetings. Development is also underway for self-contained information modules for the groups of tools developed or recommended in this project.

One master's thesis based on the project was completed and published on the University of Florida library website. Briana Ozor's thesis studied the impacts and transferability of the Adaptive Strategies Role-Play Game developed for this project and used during the first set of stakeholder workshops. The collaboration team began writing a journal article manuscript based on this study.

On January 24, 2014, GTM Research Reserve Coastal Training Coordinator Tina Gordon presented information about the project to the Coastal Training Program Climate Change Working Group. Tina Gordon has also partnered with the Coastal Training Coordinator at the Waquiot Bay NERR to apply for a NERRS Science Collaboration transfer grant that would fund travel of at least two people from the Matanzas project to Waquiot Bay to share the project results in late 2014.

(6) *Overall **project management and reports***

The project team continued drafting two reports: (1) Matanzas Basin findings and recommendations and (ii) guidebook of the transferable planning process for use by other reserves. The drafts are currently being updated with activities from Fall 2013 and Spring 2014. The project team will continue adding to these drafts as the project progresses through the third year.

Project Principal Investigator Kathryn Frank requested and received a four-month no-cost extension for the project to allow more time for project transfer and information dissemination following completion of the project findings report and guidebook at the end of summer. The new project end date is December 31, 2014.

B. Working with Intended Users

Describe the progress on tasks related to the integration of intended users into the project for this reporting period.

Several methods for integrating users of the Matanzas Basin vulnerability assessments and habitat mitigation corridor designs have been used in this reporting period. The project team collaborated with the Matanzas Basin Steering Committee at a meeting in December 2013 and the direct connection is ongoing via Basecamp, email, and phone calls. Steering Committee members continued to express their commitment in assisting the project to bring the important issue of sea level rise to decision-makers, stakeholders, and the public. Steering Committee members are still deeply interested in technical findings and committed to their responsibilities of pre-testing workshop formats and techniques. Their guidance was very helpful in designing the February 2014 large public workshop.

The project team engaged stakeholders of the Matanzas Basin at a large public workshop in February 2014. Stakeholders participated in keypad polling, a SWOT exercise, and a board

game in order to determine stakeholder preferences for different development and conservation strategies. The information gathered at this workshop will be added to the information gathered at previous workshops and incorporated into the conflict and readiness assessments, and the future conservation and development recommendations to be presented at the last public meeting and final project report.

The partnership between the University of Florida and the Guana Tolomato Matanzas Research Reserve staff continued to flourish due to continuous communication and recognition of each group's unique expertise, resources, and relationship with the Matanzas Basin community. UF and GTM NERR team members had face-to-face communication at the December 2014 Steering Committee Meeting and the February 2014 large public workshop. UF and GTM Research Reserve team members also held conference calls and exchanged email.

Last, the public can continue to access information about the project at their convenience through the main project website, planningmatanzas.org, and the project's Facebook page, facebook.com/PlanningMatanzas. Website visitors can learn of past and upcoming project events such as the stakeholder workshops, obtain answers to questions about sea level rise and how it affects the Matanzas Basin, read descriptions of the scientific models used, learn about the importance of ecological conservation, see maps generated by the project team for the study area, and access the materials used during the workshops. The blog gets updated regularly through text and visual formats. Visitors are encouraged to provide feedback in the comments section.

What did you learn? Have there been any unanticipated challenges or opportunities?

The team has learned that some members of the well-informed public question the data inputs and methods used to generate the conservation priority land map and the future development scenarios. In some cases, there was a misunderstanding or incomplete understanding of the data inputs and methods, which we tried to address through group and one-on-one conversations at the workshop, with the option of continued discussion past the workshop. In other cases, there were concerns that the technical assumptions used could be improved upon with more detailed, study area specific data, such as modifications of future population projections and development patterns, and greater recognition of current county land use policies and development proposals. The project team values this local knowledge and will include and address it in the final project report and last public meeting. One significant finding is that the level of uncertainty concerning future

development patterns suggests greater consideration of “planning under uncertainty” principles such as “no-regrets” strategies and shorter planning horizons.

Added to the challenge of planning under uncertainty are the skills, local knowledge, and social connections needed to communicate complex technical analyses and modeling to the public in the study area. The collaboration team is developing a new method of communication and social capacity building for use at the final public meeting.

Who has been involved?

The University of Florida research team worked closely with the GTM Research Reserve director and staff on technical and community outreach matters. They have proved invaluable in setting priorities for technical analyses, understanding ecological and social features of the Matanzas Basin, connecting with the local Steering Committee, and planning and conducting the stakeholder workshops.

There are currently twelve members of the Matanzas Basin Steering Committee, and they have been regularly attending the past six meetings. These citizens, business leaders, and planners have generously committed their time and have played an active, engaged role at the meetings and in additional conversations. Approximately 70 local residents participated in our stakeholder workshop in February 2014. They collaborated with researchers during the workshop, assisting researchers in understanding the values and priorities of local residents in the Basin, and contributing other local knowledge and expertise.

Has interaction with intended users brought about any changes to your methods for integration of intended users, the intended users involved, or your project objectives?

No major changes in methods for integration of intended users, the intended users involved, or project objectives have occurred during this reporting period. Minor changes are discussed above in response to “What do you learn?”

How do you anticipate working with intended users in the next six months?

A final pubic meeting will be held for the Matanzas Basin users in August 2014. The team will identify and promote adaptation tools to bring future development and conservation strategies into fruition. The team will work with the Matanzas Basin Steering Committee to prepare for this meeting.

Reserves within the National Estuarine Research Reserve System are another group of intended users of the project results. The project team will continue to communicate with the NERRS Climate Change Committee in the next six months to identify sea level rise adaptation planning process needs across the NERRS and specific reserves that may be interested in the transferable process generated by this project. The project team is also considering presenting the project results at the next national NERRS conference in fall 2014.

The project blog and website will continue to provide public and professional outreach. There will be project updates with the direct opportunity for website visitors to provide feedback. The project team will also communicate with the media regarding opportunities for stories related to the latest technical results, project reports and guidebook, and the final meeting.

C. Progress on project objectives for this reporting period

Describe progress on tasks related to project objectives for this reporting period.

The first objective is to develop a transferable planning process for use by other NERRS reserves. The major accomplishments were beginning the conflict and readiness assessments, and continuing to draft the final reports.

The second project objective is to pilot test the planning process in the Matanzas Basin. Major accomplishments were to hold a meeting of the Matanzas Basin Steering Committee, to finalize conservation priorities and future development scenarios (assuming sea level rise impacts), and to conduct a large public workshop.

The third objective is to coordinate the Matanzas Basin process with statewide ecological greenways planning. Statewide projects conducted by project team members and related to this objective are active and ongoing through Associate Researcher Thomas Hoctor's statewide projects.

The fourth project objective is to conduct related science, social science, and applied research. One master's thesis was completed (as described above). Manuscript writing for scholarly journals is underway, including articles on the topics of the adaptive strategies role-play game (used in the stakeholder workshops and studied by the master's thesis), the use of video as a medium for outreach (based on the steering committee's video about the project's importance), and the participation of youth in planning for sea level rise (based on

several of the project's youth-oriented stakeholder workshops). Collaboration Lead Dawn Jourdan and Principal Investigator Kathryn Frank will present the use of video as a medium for outreach topic as part of an organized session, "Mixed Methods and Hybrid Epistemologies in Climate Change Research" at the annual conference of the Association of American Geographers in Tampa, Florida, in April 2014. Additionally, the technical team will write one or more articles based on their analyses.

What data did you collect?

The project team collected information about the activities and evolution of the project through archived draft documents, meeting notes, the project website blog, Basecamp posts, and email messages. The technical team collected data for conservation priorities from the Florida Ecological Greenways Network (FEGN) and the Critical Lands and Waters Identification Project (CLIP). Data for the conflict analysis and future population allocation was collected from the Florida Department of Revenue (FDOR). The collaboration team gathered data from the February 2014 large public workshop that will be used in the analysis of future scenarios and conflict and readiness assessments, along with the data gathered from the local residents' workshops in the previous reporting periods.

Has your progress in this period brought about any changes to your methods, the integration of intended users, the users involved or the project objectives?

The granted four-month no-cost extension of the project period will enable more transfer and dissemination of the project findings and guidebook.

Have there been any unanticipated challenges, opportunities, or lessons learned?

No.

What are your plans for meeting project objectives for the next six months?

The project is on schedule to meet objectives during the next reporting period (March 2014-August 2014). The project team will further synthesize and incorporate feedback from the February 2014 large public workshop. The technical team will conduct a third development scenario assuming no sea level rise, and continue analyses of conservation priorities. Additional Investigator Thomas Ruppert will complete the toolbox of planning, policy, land acquisition, and management options for local officials and planners. The collaboration team will make preparations for and conduct the next steering committee meeting and last

public meeting. Final report and journal article writing, and other forms of transfer and dissemination, will be ongoing. The team will also continue to conduct research at the NERRS level and write the guidebook for use by the NERRS.

D. Benefits to NERRS and NOAA

Via the guidebook and other transfer activities, other sites in the NERRS can use the planning process piloted in the Matanzas Basin, including the technical analyses, visualization and communication techniques, and the stakeholder and public workshop formats and materials.

E. Describe any activities, products, accomplishments, or obstacles not addressed in other sections of this report that you feel are important for the Science Collaborative to know.

None.