NERRS Science Collaborative Progress Report for the Period 3/1/14 through 8/31/14

***Project Title*: Planning for Sea Level Rise: A Pilot Study to Evaluate and Improve the Development and Delivery 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 (Graduate 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 seventh meeting on August 1, 2014, in Marineland. Principal Investigator Kathryn Frank reported a synthesis of public input from the multi-stakeholder workshop held in February, 2014. Applied Science Investigators Thomas Hoctor and Mike Volk presented new results from the project's technical analyses of future habitat conservation design and land use. Graduate Research Assistant Belinda Nettles shared her analysis of past residential development patterns for communities in the study area. Collaboration Lead Dawn Jourdan described the draft format for the final public workshop to be held on September 8, 2014 (see below), and solicited Steering Committee member participation. The next Steering Committee meeting will be held in December 2014 to review the final public workshop and the Matanzas Basin Findings report.

(2) ***Technical analyses***

Conservation Priority lands. The technical team conducted an extensive array of new analyses related to conservation impacts and priorities. The new analyses were identified in consultation with GTM Research Reserve staff, the Matanzas Basin Steering Committee, and with input from public workshops. The new work builds upon prior analyses, which included impact assessments to focal species within the overall project study area, regional scale conservation priority analyses, and a preliminary identification of conservation priorities within 1 mile of the GTM Research Reserve ("reserve scale" priorities). The results from both the original and new analyses will be used in the final public workshop.

Newly completed analyses include assessments of impacts from development and sea level rise on priority natural communities, priority surface waters, biodiversity hotspots, and marsh habitat within the study area. Additional conservation priority analyses were also completed to identify important marsh habitat adjacent to the reserve, priority habitat for individual species, and coastal to inland landscape corridors extending from the reserve inland. Finally, preliminary revisions to reserve scale priorities were completed, with the goal of aggregating multiple considerations such as marsh protection priorities and focal species habitat (the original reserve scale priorities were solely based on priority habitat for focal species). This last analysis is still being vetted with the GTM Research Reserve director and staff to determine its relevance and identify possible revisions.

Storm surge with sea level rise. Additionally, updated HAZUS models were created to identify potential impacts from storm surge within the study area. The new models constituted a revision of storm surge modeling completed earlier in the project using updated digital elevation models.

Future development patterns. The technical team completed two additional scenarios of future land use for the two-county region containing the Matanzas Basin study area (i.e., St. Johns and Flagler counties). These scenarios show future development pressures along the coast under the "no sea level rise" scenario. 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. In the second scenario, future land use patterns were modified to incorporate conservation priorities.

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

Historical development patterns. In response to public input during the multi-stakeholder workshop in February, 2014, the researchers calculated past population growth rates and created maps showing historical residential development patterns (by decade) for communities in the study area. These past trends are useful to understand how development in the study area compares to countywide trends, and how future development may occur.

Project video. To enhance a tour of the Matanzas Basin by Senator Sheldon Whitehouse of Rhode Island (see below), the project team created an eight-minute video demonstrating the values of the Matanzas Basin, and the project purpose, scope, and methods. The video will also be shown at the final public workshop, and it will be placed on the project website.

Final public workshop materials. The project team is currently finalizing posters and talking points for use at the final public workshop.

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

There were no public workshops held during the reporting period.

In preparation for the final public workshop, researchers analyzed all public input from earlier workshops to summarize local values and to conduct the conflict and readiness assessments.

The final public workshop will be held on September 8th over a four-hour period (10:00 a.m. to 2:00 p.m.) with Eventbrite online registration time slots available each half-hour from 10:30 a.m. to 12:30 p.m., in order to give participants a chance to interact with project leaders. The event will be at the Whitney Laboratory for Marine Biosciences, 9505 Ocean Shore Boulevard, in Marineland. The final workshop will have an open house format. Groups will watch the project video (see above) and move through stations to learn about the different components of the project, ask questions, and provide feedback. Project team members and Steering Committee members will show posters and talk at the stations on the following topics: project overview; local values of the Matanzas Basin; sea level rise impacts on the GTM Research Reserve; SLR impacts on communities; adaptation strategies for communities; conservation priorities for SLR adaptation and eco-protection; future development scenarios; other SLR adaptation

strategies for the GTM Research Reserve; readiness and adaptive capacity; and how the public can be involved.

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

Matanzas Basin adaptation strategies toolbox. The concept of "transfer" can apply to capacity building of pilot project stakeholders so they can use the project's findings and recommendations. As part of this type of transfer, Additional Investigator Thomas Ruppert has drafted a toolbox of adaptation strategies focused on the built environment, including planning, policy, land acquisition, and management options, for use by Matanzas area local officials, planners, and organizations. Mr. Ruppert shared the draft toolbox with the GTM Research Reserve and Steering Committee for their feedback. In addition to the toolbox of adaptation strategies focused on the built environment, the project has employed an expert on land conservation strategies to supplement the toolbox with options in support of adaptation of the natural environment, especially the GTM Research Reserve. Moreover, a third person will be hired to assemble and communicate information about complementary strategies of smart growth and sustainable development, such as urban in-fill and low-impact design. The combined adaptation strategies toolbox will be comprehensive, integrative, and oriented towards regional resiliency.

Project website. The project website, PlanningMatanzas.org, continued to be a primary source of public outreach. Since its creation, the site has received 10,300 views, of which 9,679 (94%) are from the United States; the remainder represents approximately 80 other counties. Blog posts included information about the multi-stakeholder public workshop, Senator Whitehouse's tour, and the upcoming final public workshop. The Facebook page automatically receives blog posts published on the project's Wordpress site (PlanningMatanzas.org).

Media. To publicize the upcoming final public workshop, email announcements have been sent, and a press release has been issued to numerous regional media outlets.

Senator Sheldon Whitehouse tour. On April 24, 2014, Senator Whitehouse of Rhode Island visited the Matanzas Basin study area and met with project team members and GTM Research Reserve director and staff as part of his four-day tour of the southeastern United States to view the current impacts of sea level rise and climate change. Senator Whitehouse and his assistants toured the GTM Research Reserve's Environmental Education Center in Ponte Vedra, Castillo de San Marcos in St. Augustine, Fort Matanzas

at the Matanzas Inlet, and Princess Place Preserve in Flagler County. PI Kathryn Frank presented the short video about the project (see above) and detailed technical information about current and future potential impacts of sea level rise in the area, as well as local preferences and options for adaption strategies. Additional information about Senator Whitehouse's trip can be found at http://www.whitehouse.senate.gov/news/release/sen-whitehouse-to-tour-effects-of-climate-change-along-southeast-coast. On May 13, 2014, Senator Whitehouse and Senator Nelson of Florida gave a presentation to the U.S. Senate about sea level rise in Florida. In this joint presentation, Senator Whitehouse mentioned his visit to Matanzas. Their presentation can be viewed at https://www.youtube.com/watch?v=Hwolv8mx3oU.

Speaking engagements and networking. On April 9, 2014, Collaboration Lead Dawn Jourdan and PI Kathryn Frank presented 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.

On April 17, 2014, GTM Research Reserve Coastal Training Program (CPT) Coordinator Tina Gordon presented to twenty (20) professionals of Nassau County engaged as leaders in their community on locally relevant environmental topics as part of their professional development series. CTP has participated in this event for 2 years now. This year, the CTP presentation focused on sea level rise, our current project to promote planning for sea level rise and links to natural areas conservation and ecosystem services. Participants were engaged and interested in learning more about how ecosystem services connect with the needs and economics of coastal communities.

On June 12, 2014, NOAA Coastal Service Center (CSC) conducted their Roadmap to Adapting to Coastal Risk training in Volusia County with twenty-five (25) attendees. GTM Research Reserve CTP Coordinator Tina Gordon was requested as a guest speaker to provide locally relevant information on stakeholder engagement. Information on the Planning for Sea Level Rise in the Matanzas Basin project was given in regards to stakeholder engagement on the steering committee and public workshop levels. Participants and trainers commented that they learned a lot about stakeholder engagement and collaboration from the GTM Research Reserve's model.

On June 25-26, 2014, the GTM Research Reserve hosted a NOAA Coastal Services Center workshop, Navigating Rough Seas: Planning and Facilitating Collaborative Meetings. PI Kathryn Frank attended.

On September 6, 2014, PI Kathryn Frank, Matanzas Basin Steering Committee member Margo Moehring, and Graduate Research Assistant Belinda Nettles will present the project at the annual conference of the Florida Chapter of the American Planning Association in Jacksonville, Florida. The title of the talk is "Planning for sea level rise: Case studies in the Gulf Big Bend and Northeast Florida." Ms. Moehring will include a sea level rise planning initiative of the Northeast Florida Regional Council that was inspired by the Matanzas project.

Transfer to the Waquoit Bay Reserve. The Waquoit Bay National Estuarine Research Reserve, Massachusetts, initiated and received a NERRS Science Collaborative "transfer grant" to learn about the Planning for Sea Level Rise in the Matanzas Basin project. In late fall 2014, PI Kathryn Frank, Collaboration Lead Dawn Jourdan, and GTM Research Reserve Coastal Training Program Coordinator Tina Gordon will travel to Waquoit to give presentations to Reserve staff.

Transfer to the National Estuarine Research Reserve System. The project will produce a sea level rise planning guidebook for use by reserves in the National Estuarine Research Reserve System. The guidebook will describe and evaluate the various technical, collaborative, and project management methods used in the Matanzas Basin pilot project. In order to understand the NERRS audience, the project team has prepared a draft survey to be delivered via email to the Coastal Training Program (CTP) coordinators at the reserves. The survey aims to understand the extent to which each reserve has undertaken planning for sea level rise and climate change, and their interests in planning guidance. The survey of the CTP coordinators is an alternative method to the original plan of consulting with the national NERRS Climate Change Committee, which has since become inactive.

Scholarly publications. One peer-reviewed scholarly article based on the project was published online (pre-print) at www.JCRonline.org on July 9, 2014: Linhoss, Anna C., Greg Kiker, Michael Shirley, and Kathryn Frank. Sea-level rise, inundation, and marsh migration: Simulating impacts on developed lands and environmental systems. *Journal of Coastal Research*.

Two drafts of scholarly journal manuscripts drafts based on the project are well underway: (1) "Conserving biodiversity in the face of sea level rise and land use change in the Matanzas Basin, Northeast Florida," led by Ming-Jian Zhu, Thomas Hoctor, and Michael Volk, and (2) "Confronting wicked problems with games: How small group role-

play informs planning for sea level rise," led by Kathryn Frank, Dawn Jourdan, and Briana Ozor.

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

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

On February 3, 2014, the project received a no-cost extension until December 31, 2014, for purposes of writing project-related journal articles and disseminating project-generated information.

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 have continued to work well during this reporting period:

The partnership between the University of Florida and the GTM Research Reserve involves regular communication and recognition of each group's unique expertise, resources, and relationship with the Matanzas Basin community. UF and GTM Research Reserve team members have held conference calls and exchanged email, and they had face-to-face communication at the August 2014 Steering Committee Meeting.

The project team collaborated with the Matanzas Basin Steering Committee at a meeting in August 2014 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, including through their active role in the upcoming final public workshop.

Last, the public can continue to access information about the project at their convenience through the main project website, and by directly contacting the GTM Research Reserve or the project PI.

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

The project team requested and received a no-cost extension of four months (from August to December 2014), with the original intent to use the time to write journal articles and disseminate project-generated data and reports. The project team will still use the time for these purposes, but it also turned out that the time was needed for conducting additional technical, visualization, and adaptation strategy analyses in order to respond to feedback received just prior to and during this reporting period. The feedback, and the project's flexibility in responding to it, will yield an improved product with greater buy-in from the GTM Research Reserve and other local stakeholders, as well as for transfer to the NERRS and general practice.

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 seven 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.

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 intended users, the intended users involved, or project objectives have occurred during this reporting period. Minor changes are discussed above in response to "What did you learn?"

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

A final public meeting will be held for the Matanzas Basin users on September 8, 2014. The workshop will cover the entire project scope and request feedback for post-project next steps.

A meeting between UF researchers and the GTM Research Reserve director and staff will take place at the university on September 10, 2014, in order to review the individual conservation priorities analyses and select priorities indices, and to discuss options for GTM Research Reserve to use the data and communicate it to the public after the project concludes.

A final meeting of the Matanzas Basin Steering Committee will be scheduled for early December, 2014, for the purpose of reviewing the final public workshop and the Matanzas Basin Findings Report.

The Matanzas Basin Findings Report will be issued as a user-friendly electronic document available for download from the project website. The project team will also create one or more executive summaries or fact sheets/briefs of the highlights for local leaders and citizens. The GTM Research Reserve will also receive project data, including GIS files.

Reserves within the National Estuarine Research Reserve System are another group of intended users of the project results. The project team will conduct an email survey 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 annual meeting of the NERRS in November 2014. Ultimately, the project will create a sea level rise planning guidebook based on the Matanzas pilot project for use by the NERRS.

The project blog and website will continue to provide public and professional outreach. The project team will also communicate with the media regarding opportunities for stories related to the final public meeting, and the findings report and guidebook.

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 accomplishment was to develop a draft survey for the reserves to indicate their current extent of, and interest in, planning for sea level rise and climate change.

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 conduct additional research, to engage in ad hoc outreach and transfer, and to plan the final 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 though Associate Researcher Thomas Hoctor's statewide projects.

The fourth project objective is to conduct related science, social science, and applied research. One scholarly article has been published, two journal manuscripts are near completion, and several are in early drafts. In addition, in fall 2014 a UF undergraduate student is studying the interdisciplinary teamwork of the project for the capstone of her bachelor's degree in sustainability and the built environment.

What data did you collect?

The project team collected primary information about the activities and evolution of the project though archived draft documents, meeting notes, the project website blog, Basecamp posts, and email messages.

The technical team collected numerous secondary data and information for the technical, visualization, and adaptive strategy analyses.

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?

There is nothing to add beyond what has already been described in this report.

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 complete objectives by December 31, 2014. The project team will hold the final public workshop and then synthesize and incorporate workshop feedback. The technical team will complete the third development scenario assuming no sea level rise and conservation priorities. The adaptation strategies team will complete the toolbox of

planning, policy, land acquisition, and management options for local officials and planners. The collaboration team will finish preparations for and conduct the last public workshop and final steering committee meeting. Final report and journal article writing, and other forms of transfer and dissemination, will be ongoing. The team will also continue to 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.