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CHNEP/SWFRPC Climate Ready Programs

Southwest Florida is currently experiencing climate change. The natural setting of southwest Florida coupled with extensive overinvestment in the areas closest to the coast have placed the region at the forefront of geographic areas that are among the first to suffer the negative effects of a changing climate.

More severe tropical storms and hurricanes with increased wind speeds and storm surges have already severely damaged both coastal and interior communities of southwest Florida. Significant losses of mature mangrove forest, water quality degradation, and barrier island geomorphic changes have already occurred. Longer, more severe dry season droughts coupled with shorter duration wet seasons consisting of higher volume precipitation have generated a pattern of drought and flood impacting both natural and man-made ecosystems. Even in the most probable, lowest impact future climate change scenario predictions, the future for southwest Florida will include increased climate instability; wetter wet seasons; drier dry seasons; more extreme hot and cold events; increased coastal erosion; continuous sea level rise; shifts in fauna and flora with reductions in temperate species and expansions of tropical invasive exotics; increasing occurrence of tropical diseases in plants, wildlife and humans; destabilization of aquatic food webs including increased harmful algae blooms; increasing strains upon and costs in infrastructure; and increased uncertainty concerning variable risk assessment with uncertain actuarial futures.

Maintaining the status quo in the management of ecosystems and economic activities in the face of such likely changes would result in substantial losses of ecosystem services and economic values as climate change progresses. In the absence of effective avoidance, mitigation, minimization and adaptation, climate-related failures will result in greater difficulty in addressing the priority problems identified in the SRPP, local government Comprehensive Plans, and the Charlotte Harbor National Estuary Program (CHNEP) Comprehensive Conservation and Management Plan (CCMP): hydrologic alteration, water quality degradation, fish and wildlife habitat loss, and stewardship gaps.

Climate change is an important social, economic, and community health issue facing our nation and our world. It is not solely an environmental or scientific issue. The questions and answers surrounding climate change take root in economic, physical, and social structures. The Southwest Florida Regional Planning Council (SWFRPC) has a two-decade history of addressing climate issues, beginning with its ground-breaking disaster and severe storm preparedness planning. Economic, social, community health, infrastructure and environmental issues have been addressed in the context of storm surge, wind speeds, and infrastructure resilience. Through the SWFRPC Strategic Regional Policy Plan (SRPP) and local government comprehensive plans, we have been able to make conservation management, land use, and infrastructure investment decisions that not only make the region more resilient to the impact of severe storms but place us in a better position to adapt to climate change.

The SWFRPC has a long history of capacity-building at the regional level for the growth management challenges posed by climate change. These include:

- Hurricane Preparedness Planning
- Geographic Information System Library
- Regional Wildlife Habitat Planning on a Landscape Scale
- Calusa Regional Restoration Coordination Committee
- East Gulf of Mexico Coastal Conservation Corridor Plan
- Lower West Coast Watershed Subcommittee
- Regional Greenprint
- Southwest Florida Feasibility Study that is now the Southwest Florida Watershed Assessment

The SWFRPC's guest program, the Charlotte Harbor National Estuary Program (CHNEP), has been named by the Environmental Protection Agency (EPA) as one of the initial six Climate Ready Estuary pilot programs in the nation. The SWFRPC and CHNEP have jointly undertaken and completed seven projects including:

- The Comprehensive Southwest Florida/Charlotte Harbor Climate Change Vulnerability Assessment (CRE 2007-2009) 1st Edition September 15, 2009.
- City of Punta Gorda Adaptation Plan (CRE 2008-2009) Adopted November 18, 2009.
- Charlotte Harbor Regional Climate Change Vulnerability Assessment (2009-2010) 1st Edition February 17, 2010
- Model Ordinances/Comprehensive Plan Language Development (CRE 2009-2010) Completed May 27, 2010
- Punta Gorda Comprehensive Plan Amendments (PG 2009-2010)
- Lee County Climate Change Vulnerability Assessment (Lee 2009-2010) October 6, 2010
- Lee County Climate Change Resiliency Strategy (Lee 2009-2010)

Current ongoing individual and joint climate change work by the SWFRPC and the CHNEP include:

- Climate Change Environmental Indicators (CRE 2009-2011)
- Conceptual Models of the Dynamics and Interactions of Climate Change on the Ecosystems within the Charlotte Harbor National Estuary Program Study Area (CRE 2010-2011)

- Climate Change Vulnerability Assessment and Adaptation Opportunities for Salt Marsh Types in Southwest Florida (EPA 2009-2012)

Future project proposals include

- Ecosystem Services and Climate Change
- Improving coastal storm hazard awareness, resiliency and adaptation by community outreach and education using modern electronic media

The Comprehensive Southwest Florida/Charlotte Harbor Climate Change Vulnerability Assessment

The Comprehensive Southwest Florida/Charlotte Harbor Climate Change Vulnerability Assessment examines the current climate and ongoing climate change in southwest Florida along with five future scenarios of climate change into the year 2200. These scenarios include:

1) a condition that involves a future in which mitigative actions are undertaken to reduce the human influence on climate change (Stanton and Ackerman 2007),

2) a 90% probable future predicted by the Intergovernmental Panel on Climate Change (IPCC 2007b),

3) a 50% probable future predicted by IPCC,

4) a 5% probable future predicted by the IPCC, and

5) a "very worst" future in which no actions are taken to address climate change (Stanton and Ackerman 2007). This fifth scenario also corresponds with some of the other worst case scenarios postulated by scientists who think the IPCC estimations are under-estimated (USEPA CRE 2008).

The Vulnerability Assessment also assesses significant potential climate changes in air and water and the effects of those changes on climate stability, sea level, hydrology, geomorphology, natural habitats and species, land use changes, economy, human health, human infrastructure, and variable risk projections, in southwest Florida. Among the consequences of climate change that threaten estuarine ecosystem services, the most serious involve interactions between climate-dependent processes and human responses to those climate changes.

Depending upon the method of prioritization utilized, some climate change effects will be experienced and can be compensated for in the relative near-term. Other effects with longer timelines will be more costly in habitat impact or human economic terms. There are a number of planning actions that, if

undertaken now, could significantly reduce negative climate change effects and their costs in the future while providing positive environmental and financial benefits in the near term.

There are crucial areas where adaptation planning and implementation will be needed in order to avoid, minimize and mitigate the anticipated effects to the natural and man-altered areas of southwest Florida. Some effects, such as air temperature and water temperature increases, will be experienced throughout the region. Others, such as sea level rise and habitat shifts, will occur in specific geographic and clinal locations. In the course of the project 246 climate change management adaptations were identified (Beever et al. 2009) that could be utilized to address the various vulnerabilities identified for the region. Future adaptation plans will identify the management measures best suited for each geographic location.

Monitoring of the effects and results of climate changes will be necessary to assess when and where adaptive management needs to be and should be applied. A critical goal of this monitoring is to establish and follow indicators that signal approach toward an ecosystem threshold that, once passed, puts the system into an alternative state from which conversion back is difficult to impossible. The likely effects of climate change, particularly tropical storms, drought and sea level rise, on southwest Florida ecosystems and infrastructure development are too great for policymakers, property owners, and the public-at-large to stand by and wait for greater evidence before considering strategies for adaptation. It is essential to plan and act now to avoid, mitigate, minimize, and adapt to the negative effects of climate change, and to examine the possibilities of providing benefits to human and natural systems by adapting to the changing planet.

City of Punta Gorda Climate Change Adaptation Plan

The City of Punta Gorda is currently experiencing climate change. The natural setting of the City coupled with extensive infrastructure investment in the areas closest to the coast have placed the City at the forefront of geographic areas that will be among the first to suffer the negative effects of a changing climate. Severe tropical storms and hurricanes with increased wind speeds and storm surges have already severely damaged the community. Significant losses of mature mangrove forest, water quality degradation, and barrier island geomorphic changes have already occurred in the adjacent Charlotte Harbor. Longer, more severe dry season droughts coupled with shorter duration wet seasons consisting of higher volume precipitation will generate a pattern of drought and flood impacting both natural and man-made ecosystems. Even in the lowest impact future climate change scenario predictions, the future for the City will include increased climate instability; wetter wet seasons; drier dry seasons; more extreme hot and cold events; increased coastal erosion; continuous sea-level rise; shifts in fauna and flora with reductions in temperate species and expansions of tropical invasive exotics; increasing occurrence of tropical diseases in plants, wildlife and humans; destabilization of aquatic food webs including increased harmful algae blooms; increasing strains upon and costs in infrastructure; and increased uncertainty concerning variable risk assessment with uncertain actuarial futures. In the course of the project we identified 246 climate change management adaptations that could be utilized to address the various vulnerabilities identified for the City

Currently the City of Punta Gorda is among the most progressive municipalities in the United States with regard to planning for climate change. It has adopted comprehensive plan language to address the impacts of sea level rise, and seek strategies to combat its effects on the shoreline of the City. The City of Punta Gorda has already undertaken a variety of affirmation adaptation actions that will assist in reducing the impacts form climate change and increasing resiliency to climate change effects. These include elevation of structure and improvements of drainage systems as part of the City's recovery from the impacts of Hurricane Charley; relocation of the public works facility to a location of lower hazard from natural disasters and coastal flooding, adoption of a Transfer of Development Rights program to protect historical and natural resource areas, and a completed Local Mitigation Strategy for natural disasters.

Successful climate change adaptation requires plans that respond to both the unique vulnerabilities and the priorities of the places they protect. They will also need to be flexible, to respond to changing conditions and information, as well realistic assessments of the degree of risk and cost that can be sustained.

On December 17, 2008, the Punta Gorda City Council voted unanimously to participate in the climate change project. This progressive municipality had already included climate change planning in their recently-adopted Comprehensive Plan (Objective 2.4.2 and Policy 2.4.2.1). The work of this grant built upon a Charlotte County-Punta Gorda Metropolitan Planning Organization (MPO) study addressing sea level rise implications to infrastructure.

The Punta Gorda Climate Change Adaptation Plan identifies the alternative adaptations that could be undertaken to address the identified climate change vulnerabilities for the City of Punta Gorda. These adaptations are presented in the order of prioritized agreement from the public meetings. Only the highest agreement adaptation in each vulnerability area is fully developed for potential implementation. One of the utilities of this approach is that it provides a variety of adaptation options, which the City could select for implementation, adaptive management, and subsequent monitoring.

During public workshops the citizens of the City of Punta Gorda Identified 54 vulnerabilities that combined into 8 major areas of climate change vulnerability for the city including, in order of priority:

1. Fish and Wildlife Habitat Degradation;
2. Inadequate Water Supply;
3. Flooding;
4. Unchecked or Unmanaged Growth;
5. Water Quality Degradation;
6. Education and Economy and Lack of Funds;
7. Fire;
8. Availability of Insurance.

A total of 104 acceptable and 34 unacceptable recommended adaptations were identified during the public workshops and prioritized by agreement.

The top agreed upon adaptations for each area of vulnerability include:

- Seagrass protection and restoration;
- Xeriscaping and native plant landscaping;
- Explicitly indicating in the comprehensive plan which areas will retain natural shorelines;
- Constraining locations for certain high risk infrastructure;
- Restrict fertilizer use;
- Promote green building alternatives through education, taxing incentives, green lending;
- Drought preparedness planning.

These are the recommended first adaptations for development of implementation plans by the City of Punta Gorda.

The Adaption Plan was accepted and adopted unanimously by the Punta Gorda City Council document on November 18, 2009.