

STATE OF FLORIDA RESPONSE TO ASWM QUESTIONS ON WETLANDS AND CLIMATE CHANGE
7-7-10

1. What effects, threats, or changes resulting from climate change does your state see as its chief concerns and vulnerabilities?
 - a. Rise of sea level, with the associated following effects and threats:
 1. Adverse effects on drinking water supplies (from saltwater intrusion into coastal wellfields and aquifers)
 2. Flooding of private property, which will, in turn, lead to significant expenditures to construct public infrastructure, retrofit private and public property, and loss of governmental revenue (property tax reductions from the loss of coastal properties)
 3. Adverse impacts to natural systems, including:
 - 1) Inundation of coastal marshes, coastal swamps (mangroves), the Everglades, and other wetlands along the Gulf and Atlantic coasts, which will cause changes in vegetative composition and community structure, including a greater potential for invasion of non-native species
 - 2) Adverse impacts to submerged resources, including seagrass and corals
 4. Accelerated coastal erosion of private and public lands
 - b. Changes in weather patterns, with the effects of:
 1. Stronger hurricanes and other tropical systems, with effects on natural systems, private property, and health and safety of residents
 2. More severe freezes, with effects primarily on Florida's agriculture industry (fruit and vegetable production)
 3. Increased evaporation of surface waters, resulting in lower river flows, lower lake levels during drier periods, and lower groundwater levels; and
 4. Increased energy demand (more air conditioning and heating requirements)
 5. Shifts in geographic ranges of land plants and animals, and changes in algal, plankton, and fish abundance resulting from increase water temperatures and changes in salinity, oxygen levels, and circulation
 - c. Increased human health risks resulting from sea-surface warming (marine-borne illnesses, shellfish poisoning, and harmful algal blooms)
 - d. Increased costs for goods and services (particularly if new taxes are imposed on carbon use)
 - e. Increased public and private business opportunities (new green industries, goods, and services)
 - f. Potential use of existing or acquisition of additional public lands to mitigate the effects of climate change
2. What steps, if any, has your state taken to address climate change issues as relates to wetlands?
 - a. Florida engaged in a two year climate planning effort through the Governor's Energy and Climate Action Team. This twenty-eight member stakeholder group produced the Florida Energy and Climate Action Plan that included a chapter on adaptation issues and strategies. In addition to planning steps, Florida has comprehensive rules governing all types of construction, alteration, operation, maintenance, removal, and abandonment of surface water management systems in uplands and wetlands. Permits are issued for

a fixed construction duration (typically 5 years), and with a life-of-the-system operation and maintenance phase. To date those rules do not contain clear language that specifically addresses climate change issues. However, the evaluation of those permits requires that reasonable assurance must be provided that the authorized system will function and operate as permitted for the duration of the system. For example, a coastal wetland mitigation project should be evaluated to determine if it will offset wetland impacts (for the functions of a wetland being altered) essentially forever. However, because projections of significant sea level rise as a result of climate change are a relatively recent phenomenon, staffs have probably not considered how the functions of such systems may be affected in 50 or more years as a result of sea level rise. A need likely exists to give clear guidance to staff to ensure that the permitting of future projects takes this into account. Implementation of the large scale Comprehensive Everglades Restoration Plan (CERP) has been considering climate change implications at both a programmatic and policy level for some time (see http://www.cerpzone.org/documents/cgm/cgm_016.00.pdf).

- b. The Department of Environmental Protection's Division of Water Resources Management recently completed a Framework for Action: Water Management and Climate Change in Florida (April 29, 2009):



Climate Change
Framework.pdf

- c. Agencies have begun collaborative efforts to understand and predict the changes that lie ahead. For example, in 2008, the Florida Fish and Wildlife Fish Commission (FWC) convened a summit of stakeholders and experts to evaluate changes that can be expected, and actions to take, related to: hunting and fishing; inland aquatic and semi-aquatic ecosystems; invasive organisms; marine, estuarine, and coastal ecosystems; native terrestrial species, communities, and ecosystems; and natural resource management and land-use planning. The summary of that workshop is available at http://www.myfwc.com/docs/Conservation/ClimateChange_SummitRept.pdf. More information related to FWC's climate efforts is accessible at: http://www.myfwc.com/CONSERVATION/ClimateChange_index.htm. Other actions being undertaken by the FWC are:
- 1) Revising their state wildlife action plan to integrate climate change.
 - 2) Working with Massachusetts Institute of Technology on developing sea level rise scenarios and their potential impacts on coastal habitats.
 - 3) Developing an agency wide sea level program (to cut across multiple agency programs).
 - 4) Participate in the Associated for Fish and Wildlife Agencies climate change committee (see <http://www.teaming.com/states/florida.html>).
 - 5) Providing state input on a national adaptation strategy being coordinated by the US Fish and Wildlife Service.
 - 6) Developed five climate change workgroups with multi section participation. The workgroups are focusing on: adaptation, research and monitoring, policy development, communication and outreach, and reducing carbon footprint.

- d. Florida State University studied this issue in 2007, and produced a report: “Adaptive Response Planning to Sea Level Rise in Florida and Implications for Comprehensive and Public-Facilities Planning, “ (see: http://www.gulfofmexicoalliance.org/working/coastal_resil/slr_comm_response.pdf). It contained recommendations for many state agencies, including the Florida Department of Community Affairs and the Florida Department of Transportation.
 - e. In response to Subsection 253.034(8), F.S. (2008), Florida’s Division of State lands in the Department of Environmental Protection contracted for a study of the carbon sequestration potential of its public lands. The results of this study are very preliminary in nature and raise more questions than provide answers. In particular, this study noted that freshwater wetlands, coastal wetlands such as mangrove swamps, and even seagrasses, have to potential to provide carbon sequestration, but the study was unable to provide reasonable quantifiable estimates of the potential for these habitats because scientific methodologies for doing so are still in their infancy. The study can be accessed at: http://www.ecoassetsolutions.com/pdf/FDEP_Carbon_Storage_and_Sequestration_Report_070209.pdf.
3. From where does your state get its scientific information for climate change and wetlands issues? What kind of data are you currently gathering or planning to gather?
- a. Experts, governmental agencies, (state, federal, regional, and local), organizations, the scientific academic community and the Internet.
 - b. There is no one clearinghouse for data, nor is there a single entity that is collecting data for the state. Such information is being assimilated by disparate groups of governmental and private entities.
4. What role does your state see for wetlands in the overall strategy for adapting and responding to climate change?
- a. Since policy direction has not been defined, it is not yet possible to articulate a “State” position on this question. Clearly wetlands have many roles—existing and potential:
 - 1) Wetlands can be sinks for carbon sequestration. The Everglades is one large area which could be a large sink, although it, too, will be subject to changes in ecological condition as sea level rises, likely converting much or some of the current freshwater marsh “river of grass” to an estuarine (likely mangrove) system; even that, too, in time may be further inundated to the point that wetlands will be converted to open waters in some areas. With these changes, it is impossible to predict the long-term capacity of the Everglades in being a carbon sink.
 - 2) Coastal wetlands can provide at least temporary buffers from rising water levels by breaking the force of waves and storm surges. However, in time, the wetland buffers will either slowly migrate landward as shorelines erode (where not prohibited by other physical impediments), or will disappear. Overall, a net loss of wetland acreage can be expected, as wetland “migration” will be prevented by development and the desire of landowners to “protect their property.”

- 3) Wetlands, like terrestrial forests and other undeveloped areas, support vegetation which can assimilate CO₂ and transform it into O₂. However, in contrast to protocols for terrestrial carbon sink valuations, the carbon sink values of wetlands is an area where additional research and study is needed.
5. Do you have any case study examples of wetlands/wildlife habitat protection/management to also protect wetland carbon stores?
 - a. Many wetlands in Florida are “protected” in a variety of ways—many wetlands are currently in state, federal, regional, and local ownership, where their role in sequestering carbon is likely to continue, although few, if any, are owned specifically or even primarily for that purpose; in general, we are not aware of any lands that were purchased to serve as a “carbon sequestration bank” in Florida..
 - b. Many wetlands in Florida are encumbered through perpetual conservation easements, typically obtained as part of mitigating for wetland impacts from associated development. The lands encumbered by these CEs will continue having a role in sequestering carbon, although few, if any, were encumbered specifically or even primarily for that purpose; in general, we are not aware of any “carbon sequestration bank” in Florida.
6. Do you have any initiatives pertaining to climate change impacts and invasive species?
 - a. As discussed above, links to the Florida Fish and Wildlife Conservation Commission (FWC) may be accessed at: http://www.myfwc.com/docs/Conservation/ClimateChange_SummitRept.pdf; it contains a section on invasive species considerations. More information related FWC climate efforts: http://www.myfwc.com/CONSERVATION/ClimateChange_index.htm
7. Does climate change play a role in your state’s day-to-day implementation of regulation?
 - a. For the most part, no, although it is possible that climate change considerations are a part of the CERP project discussed above.
 - b. Some local governments are beginning to incorporate climate change considerations into their land planning and land use maps, as well as into their process for approving building plans. Miami-Dade County, for example, has established a Climate Change Adaptation Task Force to address issues such as rising seas and the intrusion of salt water into the County’s drinking water system (see, e.g. http://www.miamidade.gov/derm/climate_change.asp and <http://philanthropy.philipblumberg.info/miami-dade-climate-change.html>).
8. What sorts of activities would you like to be doing, given enough support?
 - a. Clearly, we need to establish climate policy to guide efforts at all levels of state, federal, regional, and local government, and in private enterprise, in conjunction with efforts to begin measuring the impacts of climate change on citizens and the environment:
 1. The State Department of Community affairs and all local governments in Florida (particularly coastal counties and municipalities) need to start addressing the

fate of existing and future development in land use and zoning plans and decisions; to date it appears very few local governments are doing this.

2. Local and regional governments need to start planning for the effects of rising sea level on drinking water supplies and infrastructure.
 3. State and local governments will need to start addressing adaptations that will be required to existing and future roads, stormwater management systems, and gravity-feed sewerage systems to address sea-level rise.
 4. Long range plans need to be developed by state and local governments to address the potential for constructing shoreline stabilization, levees, and purchases/relocation of lands that will be vulnerable to inundation.
 5. State, federal, regional, and local regulations will need to be amended to require considerations of the effect of sea level rise on the future projected conditions of dredge and fill activities, mitigation, stormwater management systems, drinking water supplies, and sewerage infrastructure.
9. Overall, what types of support do you need to move forward with your efforts to comprehensively look at these issues?
- a. Clear policy direction and increased efforts to assess impacts to address issues, such as, needed infrastructure modifications, offsetting the loss of local revenues related to low-lying residential and commercial areas that are abandoned or relocated, and for planning, mapping, and retrofitting.
 - b. As is described below, the State cannot do everything. Much of what needs to be done will need the support of other governmental agencies, private organizations, and private citizens. For example:
 - 1) Local governments will need to amend their Land Development Master Plans to identify areas where stricter standards will have to be employed to establish new standards for development in areas subject to sea level rise, to require modifications of existing structures to address the rise in sea levels, and to perhaps exclude development in those areas. In addition to structural modifications in design are concerns with addressing such things as elevating roads, modifying gravity fed sewage and septic systems, and retrofitting stormwater management systems.
 - 2) Local, state, and federal agencies will need to partner to partner to develop maps that identify future flood prone areas, as well as areas elevations of land and future water levels.
 - c. Private organizations, such as the Florida Wildlife Federation (FWF) have, and will need to, enlist support of volunteers and partners to make a difference. For example, the FWF's current focus is on developing coalitions (particularly those engaging outdoors men and women as well as agriculture, forestry and bio-fuels/biomass interests) as part of a team to convince policymakers that comprehensive climate and energy legislation is needed sooner, rather than later and to seek support for comprehensive climate

legislation. The FWC also working with a broad range of other advocacy groups to accomplish their goals, such as working to generate media (news features, letters, newspaper editorials) in key regions of the state to influence opinion leaders and policymakers on the issues of a cap on carbon and a renewable energy portfolio standard among other policy goals. Additional information on the FWF's initiatives are available at: <http://www.fwfonline.org/campaigns/climate/index.htm>. A letter they



EF Status Report
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have written is attached:

10. Who is your state's primary contact person for climate change and wetland issues?

- a. The lead entity in Florida for Climate Change Issues resides with the Florida Energy and Climate Commission within the Executive Office of the Governor: http://www.myfloridaclimate.com/climate_quick_links/florida_energy_climate_commission. However, in the interim, you may continue to coordinate with me, Douglas Fry (850-245-8480, Doug.Fry@dep.state.fl.us) on climate change issues that affect wetlands and other surface waters.