Climate Change Planning in a State Agency

Beth Stys
Florida Fish and Wildlife Conservation Commission
Fish and Wildlife Research Institute
Resolution

The Board of the Florida Fish and Wildlife Conservation Commission hereby declares on this 12th day of September in the year 2007:

WHEREAS, the Florida Fish and Wildlife Conservation Commission is a constitutionally created governmental agency dedicated to the cause of fish and wildlife conservation for the benefit of Florida residents and visitors, and

WHEREAS, a growing body of science indicates there has been a global rise in temperatures over the past half-century, and

WHEREAS, human activities are at least partially responsible for global climate change, and

WHEREAS, global climate change can affect Florida’s fish and wildlife and their habitats, and

WHEREAS, global climate change creates an intensified hydrological cycle, resulting in an increase in extreme precipitation, flooding and droughts, and

WHEREAS, global climate change can disrupt Florida’s unique natural systems and affect unique species of the fish and wildlife that depend on these systems, and

WHEREAS, global climate change can cause ocean temperatures and levees to rise thereby altering coastal wetlands, estuaries and barrier islands, and increasing saltwater intrusion, and

WHEREAS, the mostly subtropical non-native invasive plants and animals in Florida will spread unchecked by warming trends, hurricanes, and hydrological changes, and

WHEREAS, the State of Florida includes 53,927 square miles of land, 19,500 miles of rivers and streams, over 7,700 lakes, reservoirs and ponds, 663 miles of beaches, 2,276 statute miles of tidal shorelines, and more coastline than any other state, except Alaska, and

WHEREAS, owing to its geographic location, subtropical to temperate flora and fauna, peninsular configuration and low topography, Florida and its fish, wildlife and ecosystems are likely to be more affected than other states to changing sea levels, climatic extremes, and warming trends, and

WHEREAS, Florida’s fish and wildlife resources and boating generate over $30 billion in economic impact and over 398,000 jobs for Florida’s economy, and

WHEREAS, all Floridians depend on healthy fish, wildlife and ecosystems which are of critical economic importance to the State of Florida.

NOW THEREFORE, be it resolved by the Florida Fish and Wildlife Conservation Commission in a duly constituted and assembled meeting:

1. That we do hereby express our deep concerns to the potential effects of ongoing global climate change on the fish and wildlife resources of the State of Florida.

2. That we hereby encourage and support science and management that will effectively assess the future effects of global climate change on Florida’s fish, wildlife and ecosystems.

3. That we hereby direct the staff of the Commission to engage with other experts from government, academia, industry and conservation organizations to develop recommendations for conserving fish and wildlife in the face of global climate change.

4. That we support state, federal and international programs that will reduce or abate human-induced causes of global climate change.

5. That we do hereby record the sentiments of this resolution forevermore in the minutes and records of the Florida Fish and Wildlife Conservation Commission.

DONE AND RESOLVED at St. Petersburg, Florida this 12th day of September, 2007.

[Signatures]

Chairman Rodney Barco
Commissioner Ronald M. Bergeron
Commissioner Kenneth W. Whiles
Commissioner Kelly Barrow
Commissioner Richard A. Danielson
Commissioner Brian S. Yohey
Commissioner D. H. Sikes
Climate Summit

Florida's Wildlife: On the Frontline of Climate Change
October 1-3, 2008 • Rosen PLAZA, Orlando

Goal Statement
Florida's wildlife will face unprecedented consequences associated with climate change. With this forecast, presenters and workshop participants will identify key research needs, improve awareness of impacts on wildlife, and develop ideas to optimize species conservation for integration into Florida Fish and Wildlife's comprehensive climate change strategy.
Participants

- State and Federal fish and wildlife leaders, managers, biologists, researchers, and academia
- Non-governmental organizations, land managers, state, regional, county, and local governments.
- Game and non-game wildlife organizations and enthusiasts
- Media and educational personnel
Structure

- Hunting and Fishing
- Inland aquatic and semi-aquatic ecosystems
- Invasive organisms on biodiversity in future climates
- Marine, estuarine and coastal ecosystems
- Native terrestrial species, communities and ecosystems
- Natural resource management and land-use planning
Major Findings - Needs

- Customize predictive models to Florida
- Develop integrated data and monitoring
- Build broad support and action
- Nurture a coordinated state response
- Manage the landscape for wildlife resiliency
- Protect landscape corridors
- Review priorities in light of a dynamic environment
- Build on strategic and funding opportunities
- Provide inspired leadership in the face of uncertainty
FWC Climate Change Planning

- Development of CC Steering Team
  - Developed Agency CC Structure
  - Assisted with Planning Process
FWC Climate Change Structure

Climate Change Steering Committee
October 2008

Administrative Group
January 2009

Workgroup Leads
February 2009

Research & Monit. Workgroup
March 2009

Adaptation Workgroup
March 2009

Policy & Opportunity Workgroup
March 2009

Operations (Shaw Group) Workgroup
March 2009

Communication & Outreach Workgroup
March 2009

Agency Strategic Plans

Divisional Work (Operational) Plans
Workgroups and Sub-teams

- Research and Monitoring and Adaptation WG
  - Sub-teams followed summit break-out groups
    - Terrestrial
    - Marine
    - Freshwater
    - Hunting and Fishing
    - Natural Resource Mgmt
    - Invasive Species
Manager’s Model Process

- Developed:
  - Desired Future Condition
  - Fundamental Objectives
  - Enabling Objectives

- Workgroups
  - Tasks
  - Actions
  - Timelines
Florida sustains connected and resilient natural systems that contain diverse fish and wildlife communities and offer optimal adaptation to climate change. This condition is achieved by having a forward-looking adaptive management system, collaborative approach with partners, full internal and external understanding and support for climate change issues and being a leader in reducing carbon emissions within FWC operations.
Fundamental Objectives

- **F.O. 1** To ensure sustainable benefits to people in Florida, FWC uses a forward-looking, adaptive, science-informed approach to manage impacts of climate change on fish and wildlife resources.

- **F.O. 2** FWC effectively coordinates and collaborates with partners and stakeholders to achieve agency climate change objectives.

- **F.O. 3** FWC has effective internal and external communications on climate change.
Enabling Objectives

E.O. 1.1 FWC knows and understands the impacts of climate change on fish and wildlife resources.

E.O. 1.2 FWC has an infrastructure that ensures a forward-looking, adaptive and science-based approach to climate change impacts on fish and wildlife resources.

E.O. 1.3 FWC is able to anticipate changes to fish and wildlife resources resulting from climate change.

E.O. 1.4 FWC goals, objectives and management actions incorporate new knowledge about climate change.

E.O. 1.5 Floridians continue to benefit from sustainable fish and wildlife resources as climate change occurs.
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<th>C</th>
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<tr>
<td>22</td>
<td>E.O. 1.2. FWC has an infrastructure that ensures a forward-looking, adaptive and science-based approach to climate change impacts on fish and wildlife resources.</td>
<td>Action 1.2.2: Develop an effective approach to incorporate climate change adaptation recommendations into revisions of the State Wildlife Action Plan (FWLI).</td>
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<td>23</td>
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<td>Task 1.2.2a. Synthesize current knowledge of proposed climate change impacts for Florida fish and wildlife.</td>
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<td>Task 1.2.2b. Work with FWLI staff to determine Action Plan objectives and how climate change adaptation should be addressed to meet those objectives.</td>
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<td>25</td>
<td></td>
<td>Task 1.2.2c. Identify approaches to climate change adaptation that are consistent with action plan objectives and develop strategies for implementing those.</td>
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<tr>
<td>26</td>
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<td>Task 1.2.2d. Promote the enhancement of coordinated conservation as much as, or even instead of, a focus on climate change adaptation.</td>
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Climate Change Certification Course

- 100 participants
- 9 guest speakers, online forum, projects
- Best project wins trip to TWS in Hawaii!
Month 8: Lessons from ocean protected areas and their adaptation strategies

Dr. Paul E. Jaselskis, Assistant Professor, Warner College of Natural Resources, Colorado State University

Month 7: Climate Change Impacts - adjoining on Florida Species

Dr. Cameron Davis, Associate Professor, Tropical Biology and Conservation

Month 6: Climate Change Impacts - Adapting to Climate Change

Patty Green, Senior Researcher, National Wildlife Federation

Month 5: Climate Change Impacts - Understanding the Basics

Dr. U.S. Fish and Wildlife Service, Senior Biologist, Houston National Wildlife Refuge

Month 4: Climate Change Impacts - Climate Change

Dr. John McPherson, Associate Professor, North Carolina State University

Month 3: Climate Change Impacts - Understanding the Basics

Dr. U.S. Fish and Wildlife Service, Senior Biologist, Houston National Wildlife Refuge

Month 2: Climate Change Impacts - Adapting to Climate Change

Patty Green, Senior Researcher, National Wildlife Federation

Month 1: Climate Change Impacts - Understanding the Basics

Dr. John McPherson, Associate Professor, North Carolina State University

Required Reading:

Factors of Strategic Importance for the Long-term Growth of the National Wildlife Refuge System in Light of Climate Change

Dr. Paul E. Jaselskis, Assistant Professor, Warner College of Natural Resources, Colorado State University

Dr. Jaselskis received his doctoral degree in Ecology from the University of Florida in 2001. He is a Professor of Natural Resources at the University of Florida and a member of the Center for Climate Change Research and Education. He has also served as a consultant for various federal and state agencies on various conservation issues.

Dr. Jaselskis has been involved in numerous research projects related to climate change and conservation, including the development of conservation strategies for species at risk. He has also worked on developing indicators for environmental health and sustainability, and has contributed to policy development for climate change adaptation and mitigation.

In his current role, Dr. Jaselskis leads the Climate Change Research and Education program at the University of Florida, focusing on research and education related to climate change and conservation. He has also served as a member of the National Science Foundation's Climate Change and Natural Resource Management program.

Dr. Jaselskis has published extensively in peer-reviewed journals and has presented his research at numerous conferences and workshops. He has also received several awards for his research and contributions to the field of conservation science.
Team Panther – Katherin Haley

Q. What do you do for FWC? And how long have you worked here?
A. I started working for FWC in 2002 immediately after I graduated from Oregon State (M.S. working with burrowing owls) to start a burrowing owl research project. For the past several years, I have worked as the program coordinator for Florida’s Wildlife Legacy Initiative.

Q. What is your favorite Florida species? Favorite habitat type? And why?
A. Easy question. Burrowing owls, of course! They are fascinating and adaptable critters. My favorite habitat is a tougher question because Florida has so many amazing landscapes. I spend most of my recreational time at the beach and I especially love the dunes.

Q. If you were doing what you’re now, in ten years, how would your position be different, having incorporated climate change planning?
A. Climate change would be an additional filter for how we identify priorities – specifically what to work on and where to work.

Q. Why did you enroll in the climate change course?
A. I enrolled so I could better understand some of the complexities of incorporating climate change into our work. I also want to be able to explain to others why we need to start thinking about the impacts climate change can have on fish and wildlife.

Q. Are you taking any personal actions to decrease your carbon footprint? Additionally, are you familiar with these opportunities?
A. I continually think about ways to reduce, reuse and recycle. I bought the most fuel efficient car I could find for my needs. I buy local and organic foods when feasible – last year we split a 1/2 pig with another family.

We minimize our energy use at home – e.g., efficient light bulbs, keep temp set high, buy energy star appliances, landscape with native plants and xeriscape, etc. There’s always more to do but I hope these little things add up.

Q. What is your biggest concern regarding climate change?
A. My biggest concern is that fish and wildlife needs won’t be given enough attention or resources. I think climate change could be a repeat of the issues we have with habitat loss and degradation. In the past, fish and wildlife needs were primarily addressed through permitting and mitigation – on the “back end”. FWC has made some great progress in recent years being incorporated into land use planning – on the “front end”. We need to do the same for climate change.
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<th>Replies</th>
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National Strategy

- National Fish, Wildlife, and Plants Climate Adaptation Strategy

- The overarching goal of the National Fish, Wildlife and Plants Climate Adaptation Strategy is to provide a nation-wide unified approach—reflecting shared principles and science-based practices—to safeguard the nation’s biodiversity, ecosystem functions and sustainable human uses of fish, wildlife and plants in a changing climate.

  - Marine systems
  - Coastal systems
  - Forested systems
  - Grassland, Shrublands, and Desert systems
  - Inland Water systems

www.wildlifeadaptationstrategy.gov
State Wildlife Action Plan

- Climate Change added as a Priority Goal
  - Incorporated into State Wildlife Grant (SWG) proposal review

- Interim Revision – Oct. 2011
  - Climate change chapter
  - Built on Summit findings
  - Focus on Sea level Rise (SLR)
  - Vulnerability Assessments
State Wildlife Grant Funded Projects

- Developing Climate Change Adaptation Strategies for Florida
- Alternative Futures Under Climate Change for the Florida Key’s Benthic and Coral Systems
- SLRP - The Development and Implementation of the FWC Sea Level Rise Program
- Predicting and Mitigating the Effects of Sea-Level Rise and Land Use Changes on Imperiled Species and Natural Communities in Florida
- Assessing Stakeholder and Public Perceptions of Ecosystem Service Changes Resulting from Sea Level Rise to Inform Incentive-based Conservation Program Design
INTEGRATING CLIMATE CHANGE VULNERABILITY ASSESSMENTS INTO ADAPTATION PLANNING

A CASE STUDY USING THE NATURESERVE CLIMATE CHANGE VULNERABILITY INDEX IN FLORIDA

Natalie Dubois, Anthony Caldas, Judy Boshoven & Aimée Delach

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Considering Climate Change in State Wildlife Action Planning, Florida

Vulnerabilities and Adaptation Actions for Future Scenarios

Save something wild.
Climate Change Vulnerability Index

- Rapid Assessment Tool
- Excel Workbook
- Complementary to NatureServe Conservation Status Ranks
- Designed for use by US states, federal land managers, others
Climate Change Vulnerability Index

- Based on peer-reviewed literature
- Uses down-scaled climate data
- Requires distribution and life history info
- Can handle missing data and uncertainty
Climate Change Vulnerability Index

- Exposure (2)
  + temperature and moisture
- Indirect exposure (4)
  + SLR, barriers, landuse
- Species sensitivity (15)
  + dispersal, niche, disturbance
  + diet, genetics, ...
- Response (4)
  + range, protected areas
### Section C: Sensitivity
(Generally applies across the range of a species)

Mark an “X” in all boxes that apply.

<table>
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<tr>
<th>Effect on Vulnerability</th>
<th>Greatly increase</th>
<th>Increase</th>
<th>Somewhat increase</th>
<th>Neutral</th>
<th>Somewhat decrease</th>
<th>Decrease</th>
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</table>

### Factors that influence vulnerability
(* at least 10 required)

1. Dispersal ability
2. Predicted sensitivity to temperature and precipitation changes
   a) Predicted sensitivity to changes in temperature
      i) Macro sensitivity
      ii) Micro sensitivity
   b) Predicted sensitivity to changes in precipitation, hydrology, or
      i) Macro sensitivity
      ii) Micro sensitivity
   c) Dependence on a specific disturbance regime likely to be impact
   d) Dependence on ice, ice-edge, or snow-cover habitats
3. Physical habitat specificity
4. Reliance on interspecific interactions
   a) Dependence on other species to generate habitat
   b) Dietary versatility (animals only)
   c) Pollinator versatility (plants only)
   d) Dependence on other species for propagule dispersal
   e) Forms part of a mutualism not covered by 4a-d
5. Migrations and movements (animals only)
6. Genetic factors
   a) Measured genetic variation
   b) Occurrence of bottlenecks in recent evolutionary history (use only
7. Phenological response to changing seasonal temperature and pre
<table>
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<th>Common name</th>
<th>Broadrange</th>
<th>Restricted</th>
<th>Inland</th>
<th>Coastal</th>
<th>Aquatic</th>
<th>Terrestrial</th>
<th>Abrupt</th>
<th>Rare</th>
<th>A-at Info</th>
<th>Little Info</th>
<th>Hunted</th>
<th>Lisened</th>
<th>Exotic</th>
<th>Extinct</th>
<th>Not Vulnerable</th>
<th>Spatial data</th>
<th>SGON</th>
<th>None-SGON</th>
<th>Charismatic</th>
<th>Non-Charismatic</th>
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## Species Selection Attributes

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<td>Abundant</td>
<td>Non-SGCN</td>
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<tr>
<td>Rare</td>
<td>Charismatic</td>
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<td>Non-charismatic</td>
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<td>Little_info</td>
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Index Scores - CCVI

- Index Scores
- CCVI
- Extremly Vulnerable
- Highly Vulnerable
- Moderately Vulnerable
- Not Vulnerable/Presumed Stable
- Not Vulnerable/Increase Likely

[Graph showing various species with index scores and categories]
Spatial Resiliency Planning (SRP)
Alternative Futures/Scenario Planning

- Scenarios varied across 4 dimensions:
  - Climate change
  - Human population change
  - Land & water planning policies
  - Availability of public resources

- 50 years into the future
  - 2010, 2040, and 2060
Scenario Dimensions
SRP Process

- Identify and map potential habitat
  - Loss or gain
- Impact patterns based on current land use
  - 5 selected scenarios
- Species and land management experts
  - Potential wildlife management actions
Climate Change Vulnerability Course

CSP3184 – Climate Change Vulnerability Assessments

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**Description**

This course is based on January 2011 publication “Scanning the Conservation Horizon – A Guide to Climate Change Vulnerability Assessment”. The guidance document is a product of an expert workgroup on climate change vulnerability assessment convened by the National Wildlife Federation in collaboration with the U.S. Fish and Wildlife Service. This course is designed to guide conservation and resource management professionals in two essential elements in the design of climate adaptation plans. Specifically, it will provide guidance in identifying which species or systems are likely to be most strongly affected by projected changes and understanding why these resources are likely to be vulnerable, including the interaction between climate shifts and existing stressors.

**Objectives:**

Participants will understand how to design and interpret natural resource-related climate management actions to help build resiliency and adaptation. Specifically, participants completing the course will be able to:

- Understand vulnerability assessment in the broader context of adaptation planning and other relevant contexts.
- Evaluate the different factors influencing vulnerability and how they can affect the outcome of vulnerability assessments.
- Identify and critiquing/evaluating the approaches for conducting a vulnerability assessment and choose among the options.
- Design a vulnerability assessment applicable to their needs.
- Evaluate and interpret the results of vulnerability assessments and recognize next steps.
- Communicate the purposes, methods, and results of vulnerability assessments to others.
- Develop (elements of) a vulnerability assessment workplan/statement of work, including level of effort.

**Student Requirements:** Participants should have a basic knowledge of principles of conservation biology.

**Target Audience:** The target audience includes conservation practitioners from Federal and State fish, wildlife agencies and other conservation managers who work on natural resource issues and need to determine which resources are most vulnerable when setting priorities for conservation action.

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<tr>
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Climate Change Vulnerability Assessment Course

- Partnering
  - USFWS & NWF
- Bringing it Local
  - St. Petersburg, FL
  - Jan. 10-12, 2012
Questions