

Reality Check: Climate Adaptation on the Ground in Miami-Dade County

**1st World Congress on Cities
and Adaptation to Climate Change
Bonn, Germany**

**Saturday, May 28th - 30th, 2010
1:30 PM - 3:30 PM**

**Honorable Natacha Seijas, County
Commissioner**

Susanne M. Torriente, Office of Sustainability

Nichole Hefty, Climate Change Coordinator

MIAMI-DADE COUNTY WHO ARE WE?

**Honorable Natacha Seijas, County
Commissioner**

Welcome to Miami-Dade County



Miami-Dade County Landscape

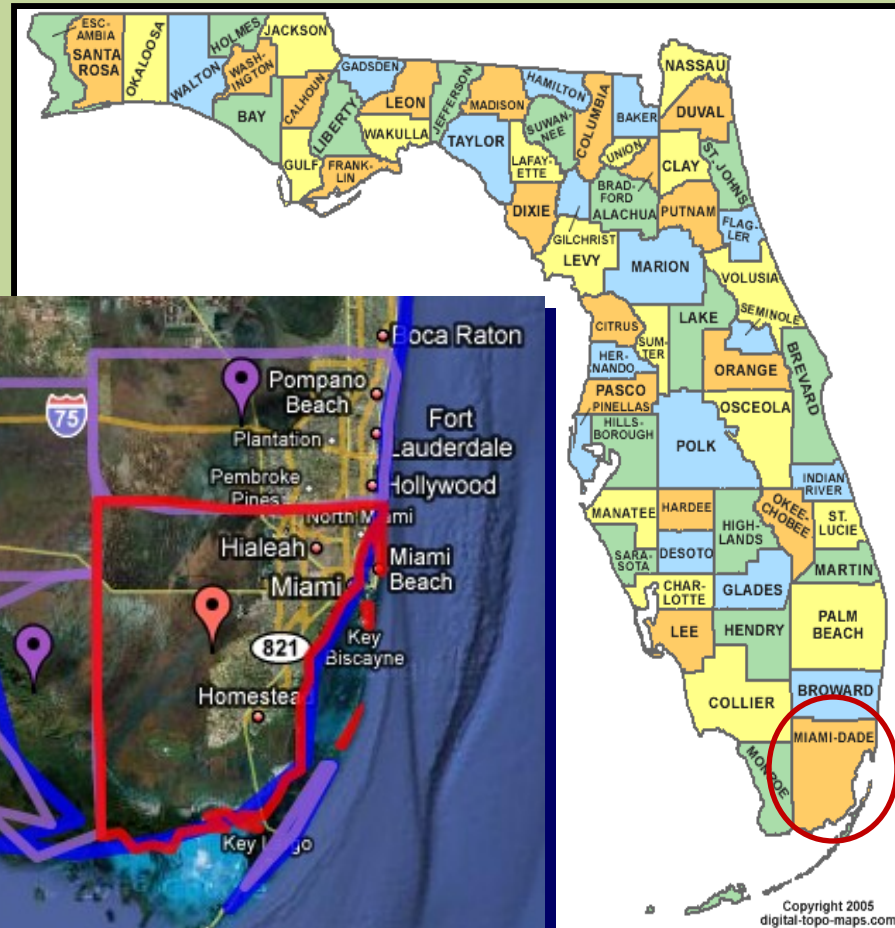
- ❑ Coastal community at sea level
- ❑ Total County land area covers 2,431 square miles



- ❑ Bounded by two national parks
 - Biscayne National Park
 - Everglades National Park

Who Are We?

- ❑ Population ~ 2.5 million now; projected to be ~ 3.2 million by 2030
- ❑ Most populous county in state of Florida
- ❑ Ninth largest county in U.S. by population
- ❑ 5,830 people per square mile within urban area
- ❑ Comprised of 35 municipalities and an unincorporated area



Who Are We?

❑ Culturally & ethnically diverse population

- ~ 50% foreign-born (2008)
- 156 nationalities
- 62% Hispanic
- 18% Non-Hispanic White
- 18% Non-Hispanic Black
- 2% Other
- 104 Languages spoken

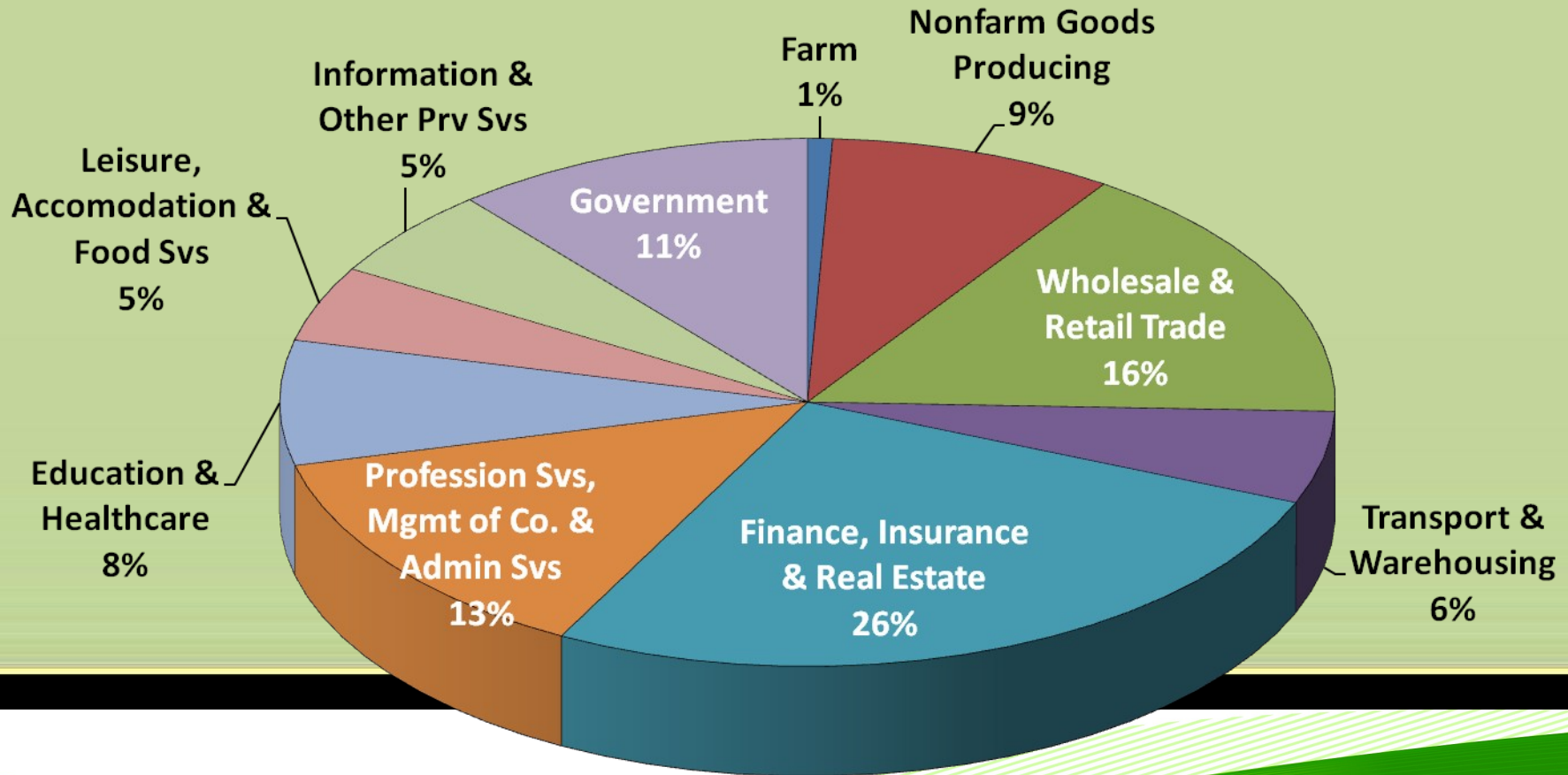
❑ Transient population

- ~ 12 million overnight visitors annually
- Many seasonal/2nd home residents
living in area part of the year



Miami-Dade Economic Drivers

Composition of Miami-Dade Gross Domestic Product



Miami-Dade Economic Engines

□ Port of Miami

- Cruise Capital of the World
- Over 4.1 million passengers
- 6.8 million tons of cargo in FY 2009



□ Miami International Airport

- #1 freight airport in U.S. and the Americas
- 2nd leading airport for international passengers in



Miami-Dade County Government

- ❑ **Two-Tier government: County & City
(35 municipalities)**
- ❑ **The Mayor is elected Countywide and is the head of the administration**
- ❑ **The Board of County Commissioners consists of 13 members elected by districts and is the legislative branch of County government**
- ❑ **State constitutional officers are also elected countywide: Clerk of Courts, State Attorney & Public Defender**
- ❑ **The County's budget ~ \$7.8 billion in fiscal**



Miami-Dade County Government



**Public
Utilities**



**Economic
Development**



Public Safety



**Environmental
Protection**



Transportation



**Public
Housing**



**Social
Services**

A LONG HISTORY OF ENVIRONMENTAL LEADERSHIP & CLIMATE ACTION

Honorable Harvey Ruvin, County Clerk

History of Sustainability Leadership

Since 1991, the Board of County Commissioners has passed 99 pieces of *sustainability* legislation covering climate protection, energy and water efficiency, alternative energy, green building, green jobs, etc.

1988

- Miami-Dade participates in the World Congress of Local Leaders for a Sustainable Future

1991

- MDC one of first local jurisdictions to regulate use and sale of stratospheric ozone depleting compounds
- MDC joins the International Council For Local Environmental Initiatives (ICLEI)

1993

- Urban CO₂ Reduction Plan adopted

2006

Climate Change Advisory Task Force (CCATF) created

History of Sustainability Leadership

2007

- Chicago Climate Exchange (CCX) Membership
- MDC becomes pilot for ICLEI's Climate Resilient Communities Program
- County Sustainable Buildings Program established

2008

- MDC commits to "Cool Counties" goals and objectives, to reduce GHG emissions by 80% by 2050

2009

- MDC Commits to reduce government electricity consumption by 20% by 2012
- The Office of Sustainability realigned and strengthened

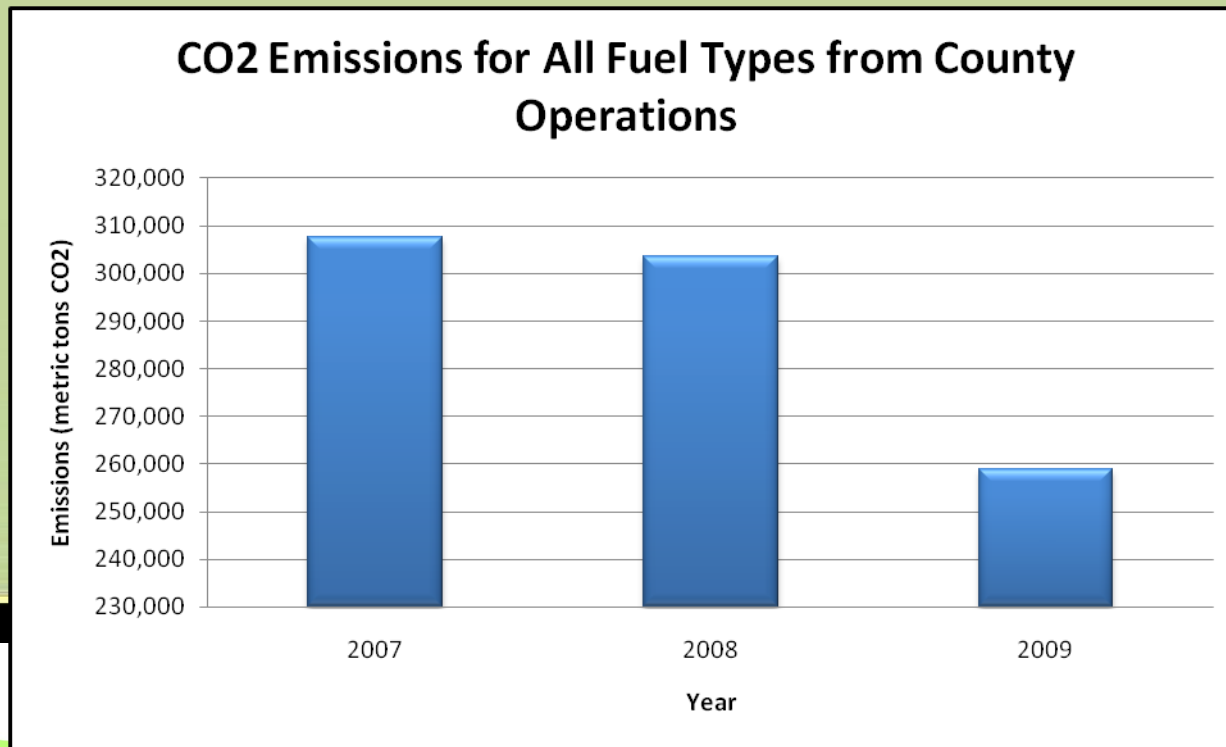
established

The Climate Change Advisory Task Force

- ❑ **Participants from the public sector, academia, environmental organizations, and the private sector**
 - ❑ **Six committees to target specific key issues**
 - Science
 - Natural Systems Adaptation
 - Built Environment Adaptation
 - Economic, Social & Health
 - Greenhouse Gas Reduction
 - Intergovernmental Affairs
 - ❑ **Conduct research and provide recommendations for action to the Board of County Commissioners**
 - 56 Recommendations to date
 - Annual Report and Supplemental Recommendations (April 2010)
- <http://www.miamidade.gov/derm/climatechange/taskforce.asp>

Chicago Climate Exchange (CCX) Membership

- ❑ Members must reduce greenhouse gas (GHG) emissions each year to levels progressively lower than established baseline
- ❑ Miami-Dade County has reduced CO₂ emissions by ~48,000 metric tons since joining CCX in 2007



Fuel data currently provisional as it is pending verification by 3rd party auditor.

CLIMATE CHANGE: HAZARDS, IMPACTS, AND CHALLENGES

Climate Change Coordinator, Nichole Hefty

Climate Change

Why is our community vulnerable?



1. Coastal community at sea level
2. Located at tip of peninsula
3. Many low-lying areas
4. Large, dense population
5. Some key economic drivers are weather dependent
 - Tourism
 - Agriculture
1. Vulnerable source of water supply

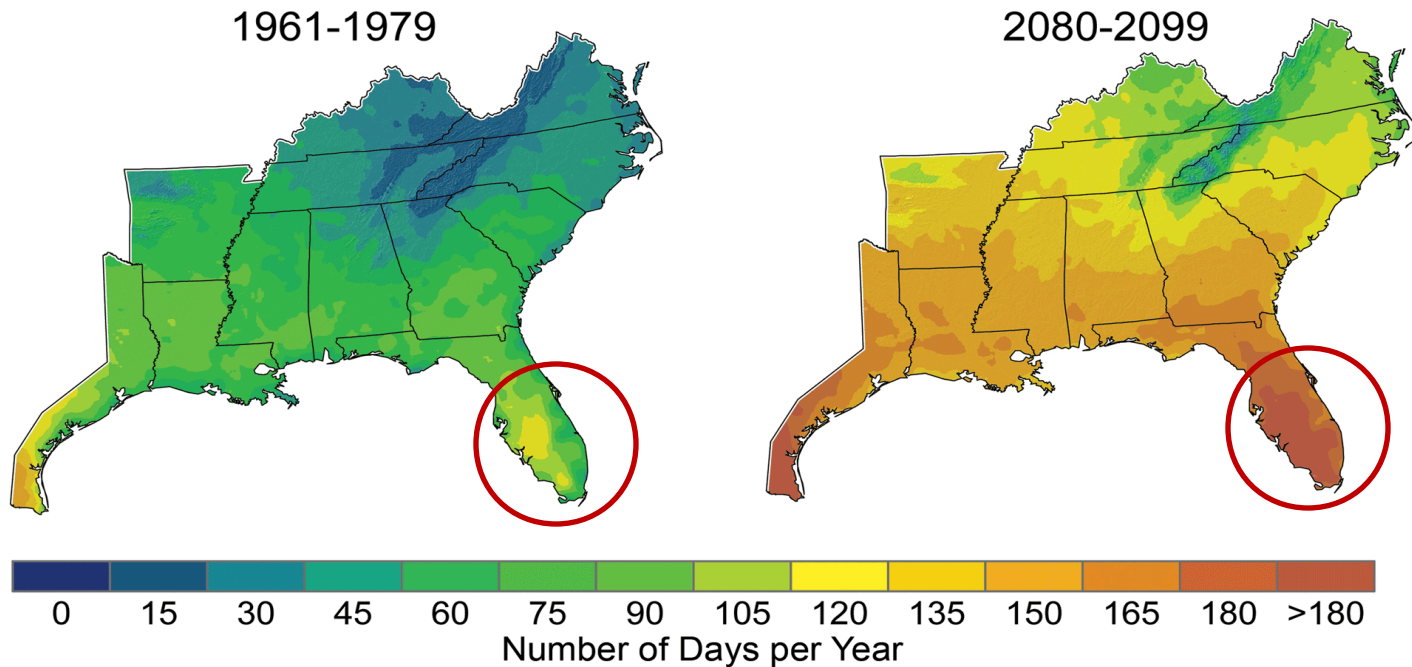


Priority Hazards for Miami-Dade County



- ☐ **Shallow coastal flooding**
- ☐ **Tropical storm damage**
 - Storm surge inundation
 - High wind impacts
- ☐ **Salt water intrusion water supply**
- ☐ **Inland flooding**
- ☐ **Erosion**
- ☐ **Sea level rise impacts on above hazards**

Changes in Temperature Patterns



CMIP3-B¹⁷

The number of days per year with peak temperature over 90°F is expected to rise significantly, especially under a higher emissions scenario⁹¹ as shown in the map above. By the end of the century, projections indicate that North Florida will have more than 165 days (nearly six months) per year over 90°F, up from roughly 60 days in the 1960s and 1970s. The increase in very hot days will have consequences for human health, drought, and wildfires.

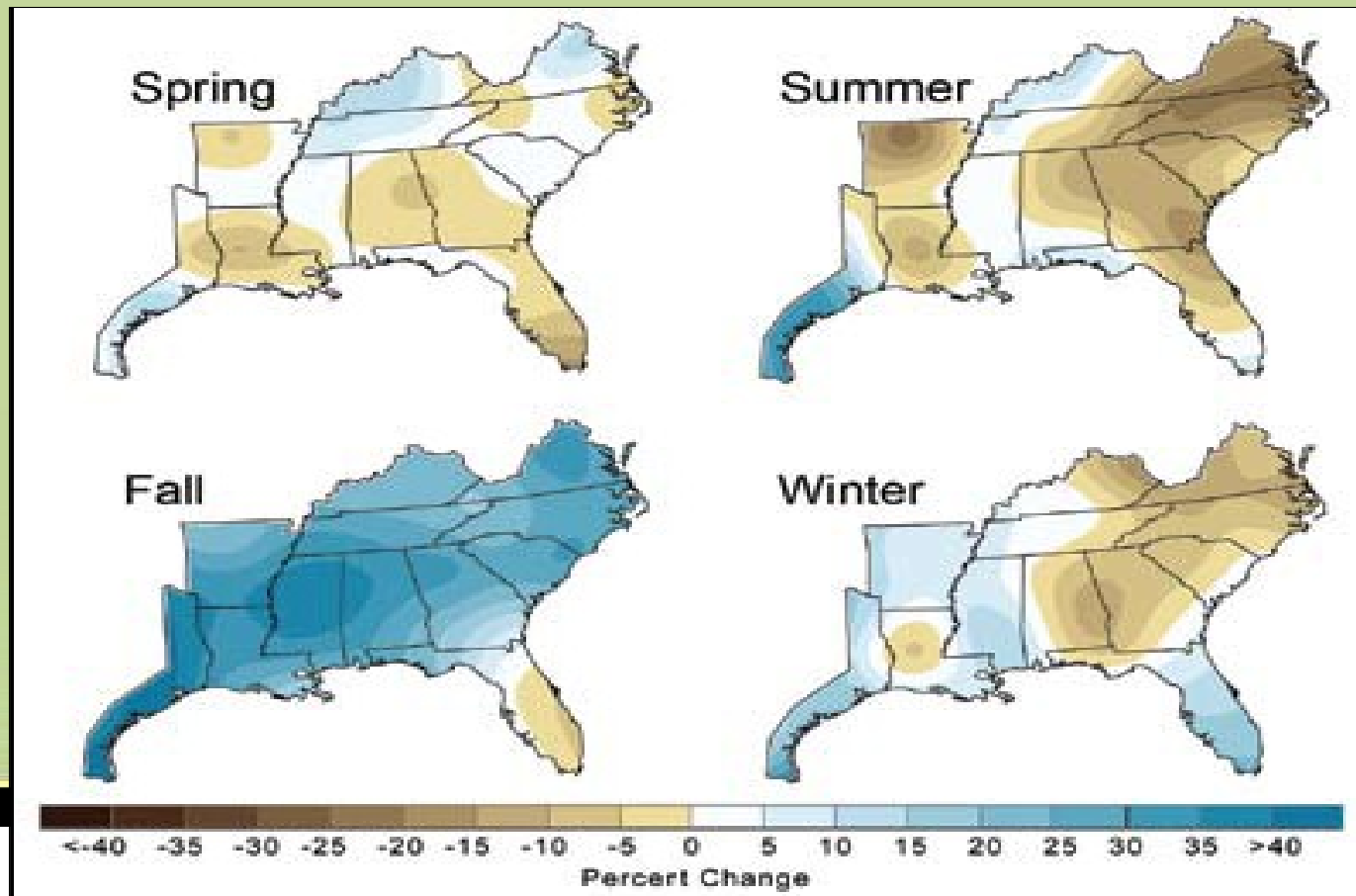
Source: Global Climate Change Impacts in the United States, Thomas R. Karl, Jerry M. Melliilo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009, p. 112.

Climate models project warming in the SE United States

- Greatest temperature increases expected during the Summer months
- Number of days over 90* is expected to increase

Changes in Precipitation Patterns

Changes in amounts and seasonality of precipitation can affect water supply and agricultural seasons and crops.



Observed Changes in Precipitation 1901 - 2007

Source: Karl et al., 2009

Changes in Tropical Cyclone Patterns

Hurricane Katrina,
Photodisk



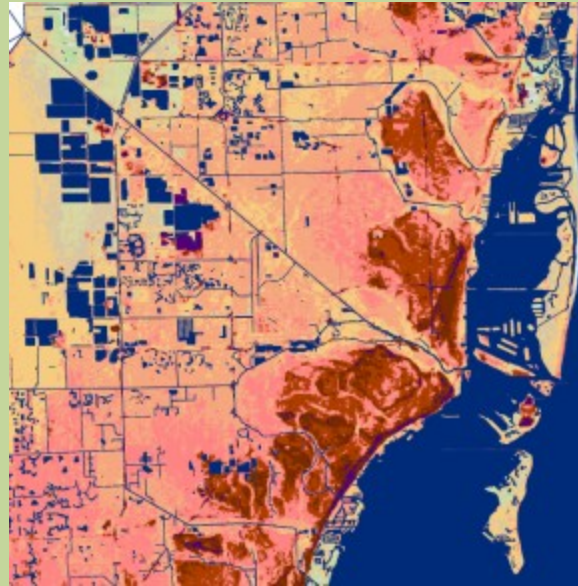
□ More intense and/or frequent hurricanes

- Storm surge inundation
- High wind impacts
- Impacts to coastal habitats
- Beach erosion
- Stormwater flooding

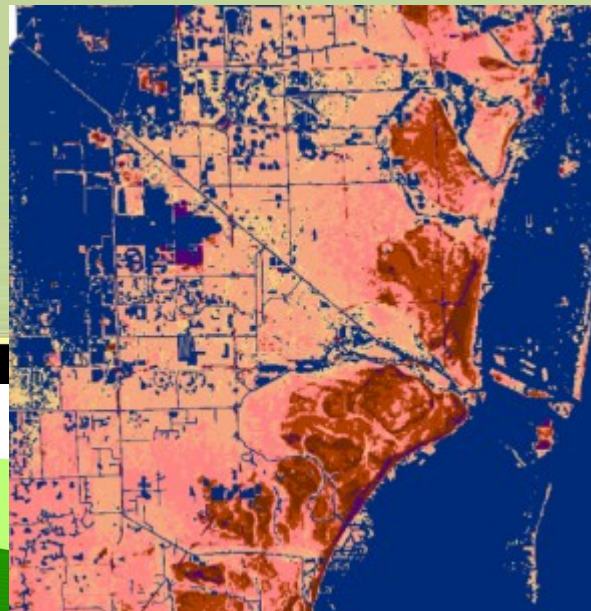


- Infrastructure damage
- Population displacement

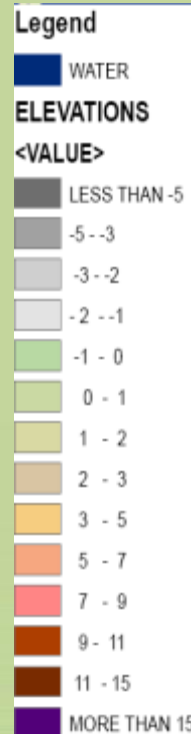
Sea Level Rise Impacts



Current Sea Level (2009)



4 Ft. Sea Level Rise



- ☐ Increased flooding & storm surges
- ☐ Population displacement
- ☐ Infectious diseases
- ☐ Infrastructure damage
- ☐ Land-use changes
- ☐ Impacts to coastal & inland wetland habitats

- ☐ Beach erosion
- ☐ Saltwater Intrusion impact on water supply and soil

Local Examples - Agricultural Impacts



- ☐ Flooding from heavy precipitation can cause widespread crop damage



- ☐ Saltwater intrusions can

change soil salinity

- ☐ New opportunities?

- ☐ January 2010 cold

weather & freeze caused
\$280+ million in losses

Local Examples - Heavy Precipitation Events

June 5, 2009

- 9.3" rain on South Beach in less than 3 hours
- Severe flooding in Downtown Miami, South Beach, & Miami Beach
- Cars seen floating in South Beach



Local Examples - High Tides

June 19th through June 24th, 2009

- Tide levels were running between 0.6 to 2.0 feet above normal
- The geographic extent of this event along the entire East Coast made the event anomalous
- Similar event in September 2009



Local Examples - Beach Erosion

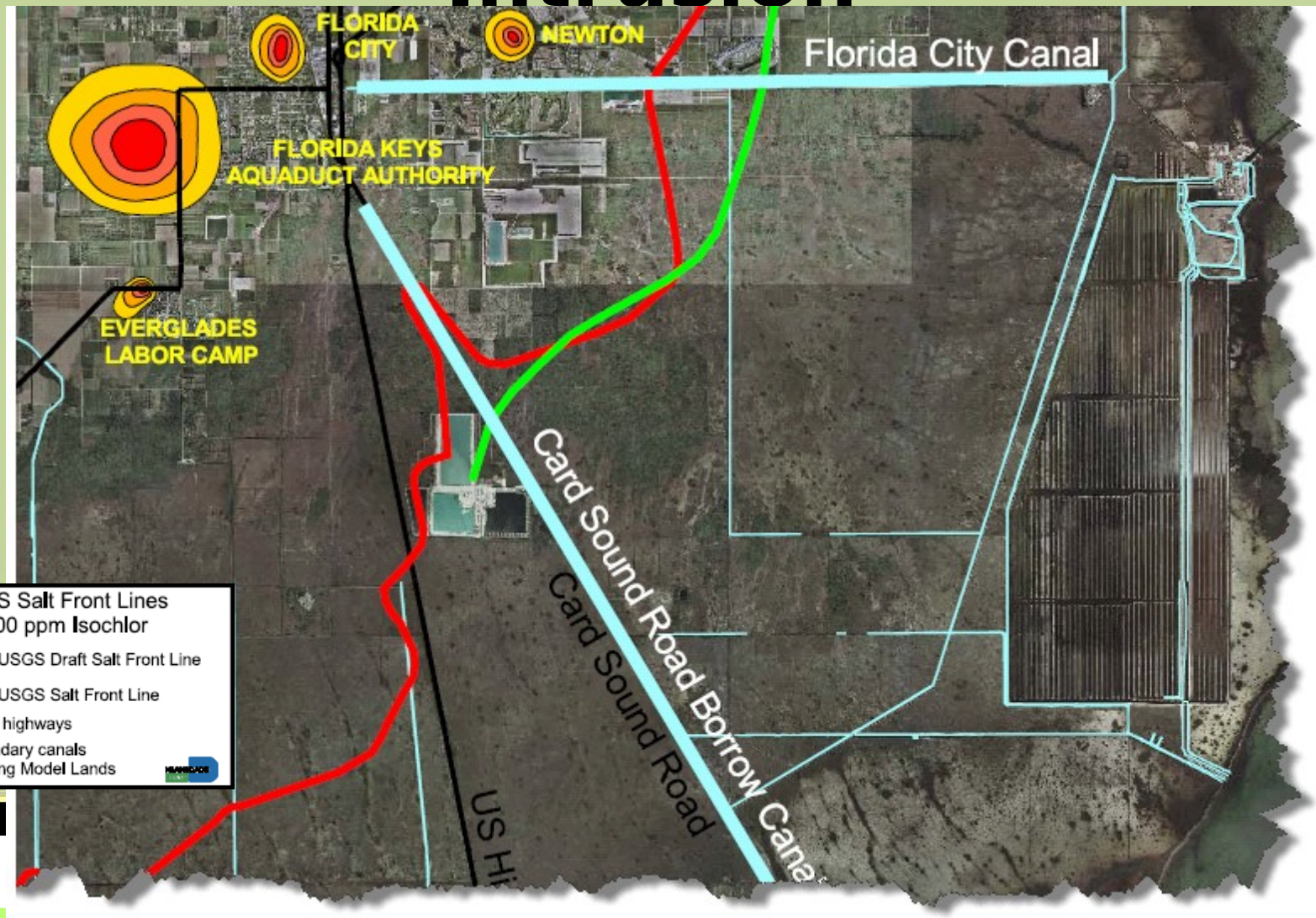


- Tourism impacts
- ☐ Decreased coastal protection
 - ☐



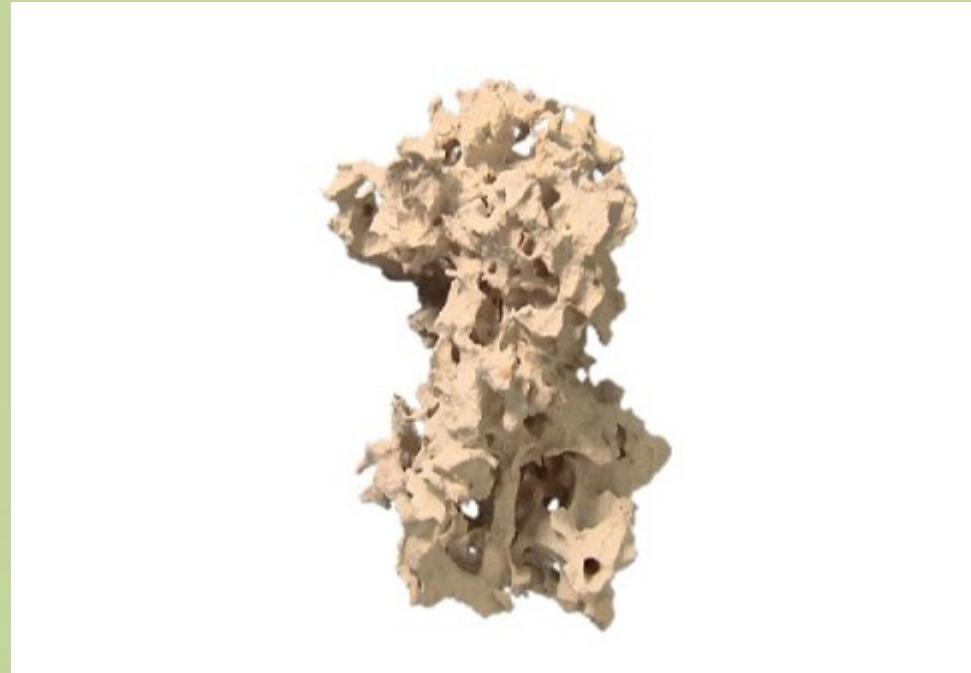
- ☐ Increased beach restoration costs
- ☐ Sand source & type issues

Local Examples - Saltwater Intrusion



Southeast Florida Substrate

- ❑ **Limestone**
- ❑ **Extremely porous**
- ❑ **Poses unique challenges**
 - Saltwater intrusion
 - Sea level rise inundation



Graphic courtesy of K. Cunningham, US Geological Survey and Dr. J. Obeysekera, S. Florida Water Mgmt. District

Saltwater Intrusion

Rising sea levels can lead to salt water intrusion into regional water supply



Over-Arching Challenges to Adaptation Planning

- ☐ Extensive breadth of issues
- ☐ Science uncertainty & timeframe
- ☐ Public denial
- ☐ Land use realities
- ☐ Turning science in to action
- ☐ Effective communication
- ☐ Costs justification

OPPORTUNITIES: STRATEGIES, PLANS AND TOOLS

**Sustainability Director, Susanne M.
Torriente**

Overview of Adaptation Strategies

❑ Federal /National Assistance and Tools

- Energy Efficiency and Conservation Block Grant (EECBG)
- EPA Smart Growth Implementation Assistance
- **ICLEI Climate Resilient Communities Pilot**
- **National Oceanic and Atmospheric Administration (NOAA) Digital Coasts Initiative**
- U.S. Geological Survey (USGS) Modeling Assistance

❑ Regional Collaboration and Partnerships

- EPA/HUD/DOT Livable Communities Program
- Comprehensive Everglades Restoration Program (CERP)
- Florida Energy & Climate Commission
- **Southeast Florida Regional Climate Compact**

❑ Local Tools & Action

- Climate Change Advisory Task Force (CCATF)
- **Comprehensive Sustainability Plan (GreenPrint)**
- Green jobs
- Sea level rise regional planning scenarios

National Oceanic & Atmospheric Administration Digital Coasts Initiative

- ❑ Perfect partnership between local government and federal agency
- ❑ Local and regional Roadmap Workshops mutually beneficial
- ❑ Case study being developed
- ❑ “White House Interagency Climate Change Adaptation Task Force Listens to South Florida” (June 2010)

<http://www.csc.noaa.gov/digitalcoasts>



ICLEI Climate Resilient Communities

❑ Miami-Dade County becomes pilot community in 2007

- Realization that adaptation was next critical step
- Long-standing partnership with ICLEI

❑ Milestone process

- Provided framework
- Milestones 2 & 3

❑ Benefits

- Facilitates collaboration
- Facilitates science into a process
- Facilitates measurement

Introducing ICLEI's Climate Resilient Communities™ Program

The Climate Resilient Communities Program assists local governments in enhancing community resiliency to the impacts and costs associated with projected climate change. The program builds upon the highly successful Five Milestones Methodology that ICLEI established for climate change mitigation. Communities participating in the program will assess vulnerabilities, establish targets and goals, and plan and take action to enhance their resilience to a changing climate.

ICLEI anticipates formally launching the Climate Resilient Communities Program in late 2010. If your local government is interested in learning more or being part of the inaugural program, please contact ICLEI's Adaptation Manager.

Climate Protection: Adaptation & Mitigation
Efforts to curb global warming emissions have become a greater imperative. However, scientific evidence indicates that even if we could freeze greenhouse gas emissions today, the world would still experience impacts for decades to come from the climate change we have already set in motion. Many of these impacts – changing temperatures and weather patterns, drought, flooding, and sea level rise – will be felt most directly at the local level, which is also where we have the best ability to prepare for these changes. For that reason, many local governments are now embracing climate adaptation as a sister strategy to their climate mitigation efforts.

The Climate Resilient Communities Program aims to:

- Increase the ability of local governments to assess their vulnerability to future changes in the climate by linking them directly to the most current climate science on future regional impacts
- Facilitate informed decision making based on climate science
- Develop tools to assist communities in prioritizing and implementing adaptation actions
- Increase the integration of climate change mitigation and adaptation planning
- Train local government staff and leaders on effective planning and implementation of adaptation strategies
- Enable peer-to-peer learning among a national network of communities
- Foster citizen support for and engagement in advancing their community's resiliency

www.icleiusa.org

ICLEI Local Governments for Sustainability



Southeast Florida Regional Climate Compact

❑ Established in 2009

- “First Regional Climate Change Summit” (October 2009)
- “SE Florida Regional Climate Change Compact” Ordinance endorsed by four SE FL counties
 - Miami-Dade, Broward, Monroe, West Palm Beach
 - 5.5 million people

❑ Regional collaboration

- Regional climate impact scenarios
- Regional climate action plan
- Policies & lobbying activities

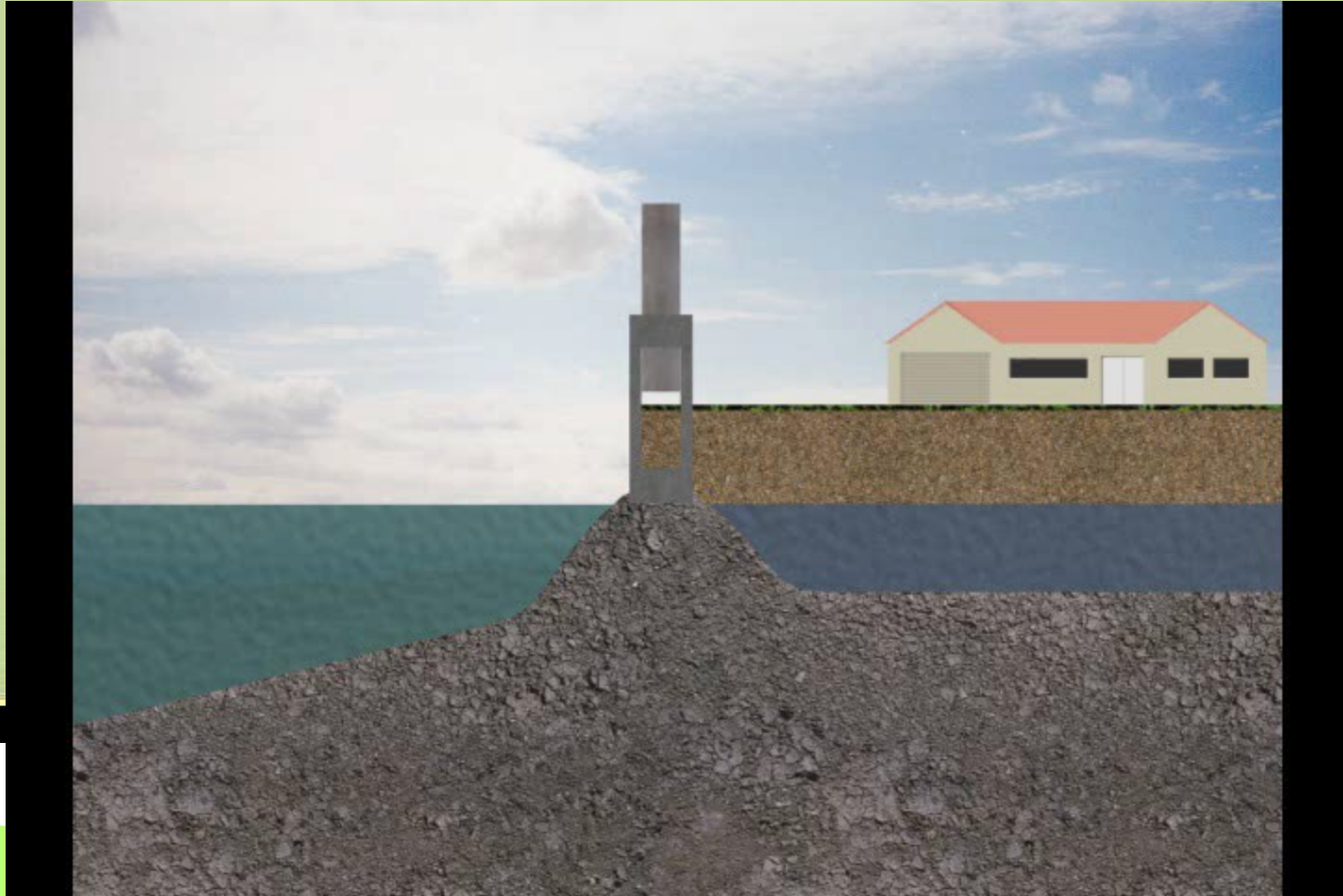
❑ Two year planning horizon

- Steering Committee
- Working groups
 - Regional Climate Action Team
 - Policy Coordination Team
 - Annual Summit Team



Adaptation in Action - Coastal Structures

Flood protection infrastructure will be impacted by future sea level rise



Adaptation in Action

❑ Canal maintenance & dredging

- 2002 – 2006: Miami-Dade County, State of Florida & Federal Emergency Mgmt. Agency
- \$132 million
- 120 miles of secondary canals

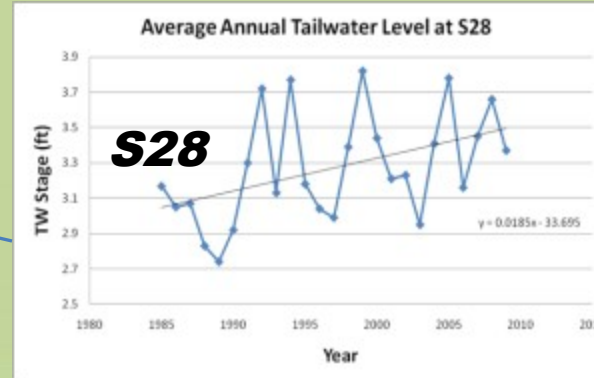
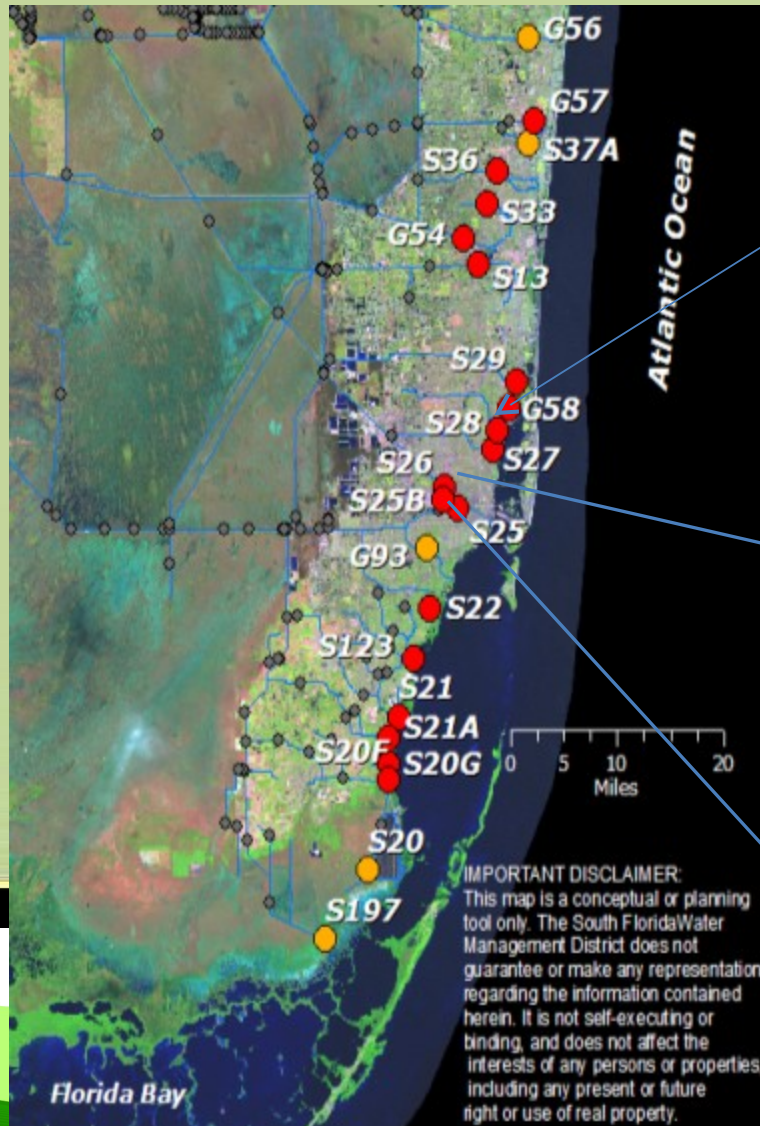


❑ Gravity coastal structure

- Vulnerability analysis conducted
- Several structures currently prioritized

projections

Adaptation in Action - Prioritizing Areas



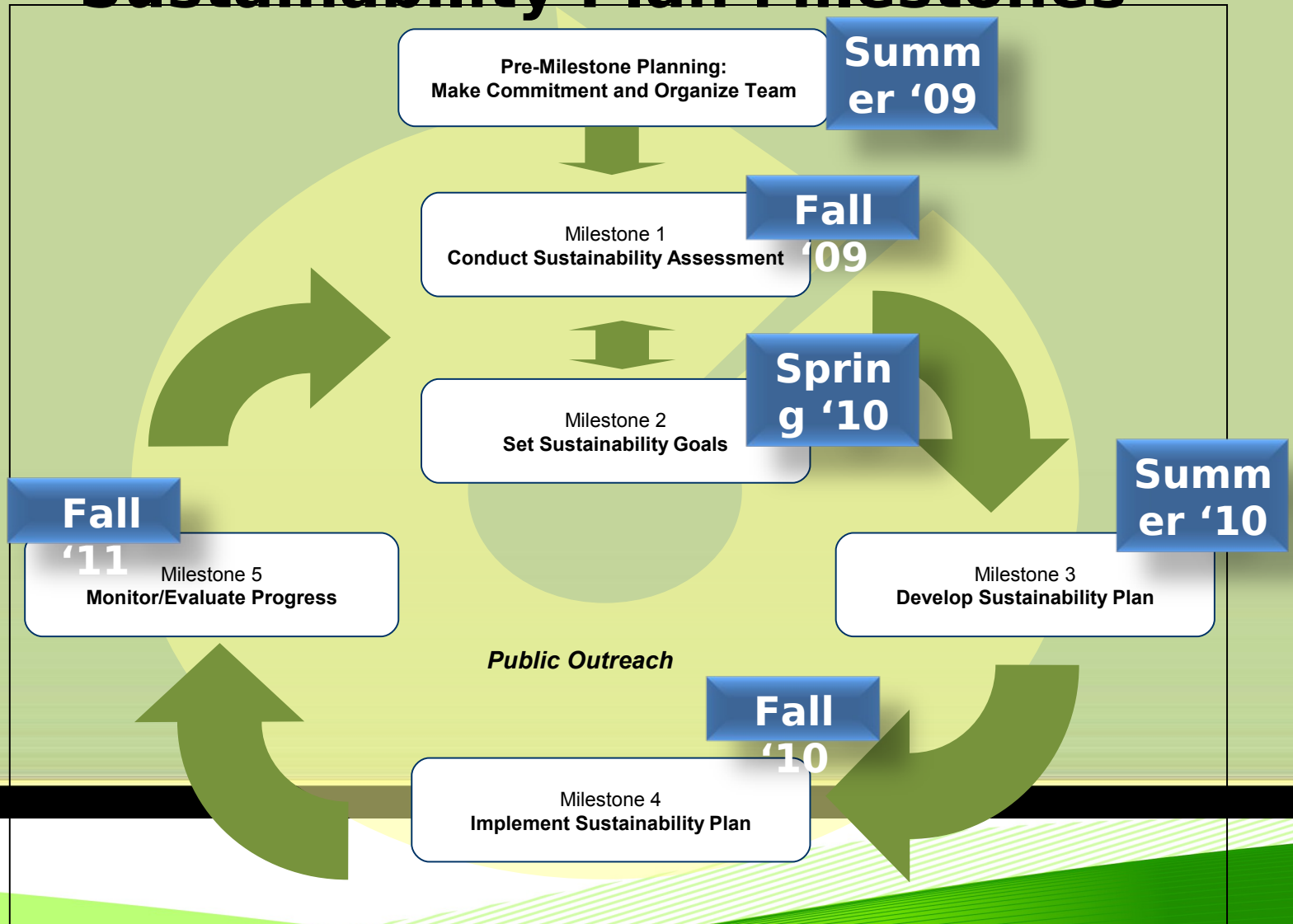
Comprehensive Sustainability Plan

- ❑ **Utilizing ICLEI and New York City model**
- ❑ **Engaging stakeholders & community**
 - Mayor's Advisory Board
 - Interdepartmental Team
 - Climate Change Advisory Task Force & other groups
- ❑ **Comprehensive coordination**
 - Existing plans (Strategic, CDMP, Water Conservation, Open Space, Long Range Transportation, Solid Waste, etc.)
 - Climate change mitigation and adaptation implementation

<http://green.miamidade.gov/home.htm>



Planning Process: ICLEI'S Sustainability Plan Milestones



Lessons Learned

- ❑ **Start with and build upon existing successful efforts**
- ❑ **GHG emissions reduction efforts must continue in earnest**
- ❑ **Local governments can effectively lead in climate adaptation efforts**
- ❑ **Strategies and plans must be flexible to adapt to new opportunities and overlapping goals**
- ❑ **Stakeholder involvement from the beginning is important**
- ❑ **Decision-makers' commitment and leadership**



Next Steps for Miami-Dade

- ☐ **Work with NOAA: Miami-Dade County case study**
- ☐ **Develop regional climate planning scenarios**
- ☐ **Complete local and regional climate action plans**
- ☐ **Complete GreenPrint and begin implementation**
- ☐ **Utilize feedback from 1st World Congress on Cities and Adaptation to Climate Change**



Tell us....

- ☐ From your perspective and experience, what are some of your adaptation planning success stories that we can learn from?
- ☐ What tools or techniques are you using and how does that translate to Miami-Dade County?
- ☐ Do you have any specific recommendations for communication?
- ☐ How do you communicate to your stakeholder to get “buy-in” on difficult decisions that are

Closing Remarks by Commissioner Seijas on behalf of Mayor Alvarez

<http://green.miamidade.gov/home.htm>