BROWARD COUNTY FLORIDA

BROWARD COUNTY CLIMATE CHANGE ACTION PLAN

Addressing our Changing Climate

May 4, 2010

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Subject: Transmittal of the Broward Climate Change Action Plan

Dear Mayor and Fellow Commissioners,

As Chair of the Broward County Climate Change Task Force, I am pleased to present to the Board the Task Force's recommendations for a Broward Climate Change Action Plan. This Action Plan was to developed in fulfillment of the Board's charge to the Task Force to develop recommendations for a countywide climate program designed to mitigate the causes, and adapt to the consequences, of climate change, and to advise on the program's implementation.

The Action Plan reflects considerable effort on the part of the Task Force members, community participants, and experts who lent support throughout the process. In its preparation, Task Force members gave great consideration to the science of climate change, and the unique challenges confronting the Broward community with respect to effective mitigation and timely adaptation strategies. The Task Force was especially cognizant of the urgent need for immediate action. The influence of climate change is already being realized, requiring aggressive mitigation in order to reduce the magnitude of these impacts and ready adaptation to respond to the changes that are occurring now.

We are fortunate that as a Board and a community we have already made great strides toward addressing many of the identified needs captured in this Action Plan. However, additional actions will be required if we are to demonstrate real effectiveness and climate preparedness over the next several decades. These actions will serve to ensure the economic vitality of the County, the livability of our community, and the preservation of environmental resources so critical to our economy and our general quality of life.

On behalf of the Task Force members, and all those who have participated in this endeavor, I want to thank you for this opportunity to serve the County in such a meaningful capacity. We look forward to working with you as you consider proposed recommendations and in the future to assist in developing efforts to implement the plan.

It has been my pleasure to serve as Chair of the Task Force and I look forward to continuing in this capacity as we work together to implement the recommendations of the Broward Climate Change Action Plan.

Sincerely,

Kristin Jacobs

Kristin D. Jacobs

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EXECUTIVE SUMMARY

BROWARD COUNTY CLIMATE CHANGE TASK FORCE

In recognition of the widespread international scientific consensus that climate change is occurring, that greenhouse gas emissions primarily from the burning of fossil fuels may be a contributing cause and that Southeast Florida is extremely vulnerable to sea level rise and violent weather patterns, the Broward County Board of County Commissioners (Board) passed Resolution 2008-442 in June 2008 to create the Broward County Climate Change Task Force (Task Force). During the past 16 months, the Task Force and its seven subcommittees have worked diligently to fulfill their mission to develop recommendations for a coordinated countywide strategy in mitigating the causes, and addressing the local implications, of global climate change. The Task Force and Subcommittees have met regularly over the convening months to review the available information, receive presentations from respected sources and compile this information into recommendations to be brought before the Task Force for review and prioritization. This document, The Broward County Climate Change Action Plan, contains 126 recommended actions to be brought before the Board for approval and implementation. The recommendations include information on planning horizon, status of action, likely responsible County entity, potential community partners, estimated resources required, and recommended performance measures.

ADDITIONAL INFORMATION NEEDS

The Task Force determined early in their process that three types of information would be helpful to guide their recommendations. These included a projection of sea level rise that might be anticipated over time in Southeast Florida, a communitywide greenhouse gas inventory to understand the main sources of emissions in Broward County and an analysis of the vulnerability of our coastline to sea level rise should no action be taken to address sea level rise.

Sea Level Rise Projections - The Science and Technical Subcommittee assumed the task of reviewing literature on the subject of sea level rise. Rising seas will have four major impacts that need to be considered in comprehensive planning particularly as it relates to the management of public infrastructure: (1) inundation and shoreline recession; (2) increased flooding from severe weather events; (3) saltwater contamination of ground water and surface water supplies; and (4) elevated water tables. The Subcommittee determined that based upon the review of the best available technical data and scientific modeling, a projection of 3-to-9 inches of sea level rise from the 2000 level by the year 2030 should be utilized in the development of Task Force immediate and short term recommendations. They further determined that a projection of 10-20 inches of sea level rise from the 2000 level by 2060 and a projection of 24-48 inches of sea level

rise by the year 2100 should be utilized in the development of Task Force mid and long term recommendations.

Communitywide Greenhouse Gas Inventory - Concurrent with the deliberation of the Task Force, the Broward's Air Quality Program staff conducted a communitywide greenhouse gas emissions inventory. This inventory, based on emissions from 2007, served as the basis the Greenhouse Gas Reductions Subcommittee's recommendations. The use of gasoline and diesel fuel in the Transportation sector accounts for 45% of the Broward County's current emission of greenhouse gas. The Residential sector (27%) and the Commercial sector (24%) represent the bulk of emissions due primarily to the use of electricity. The need for communitywide reductions in these sectors is reflected in the Task Force recommendations. The 2007 inventory will provide for a mechanism to measure progress and improve reduction strategies in the future.

Cost of Inaction Vulnerability Assessment – The "business as usual" scenario was considered by developing an analysis of vulnerability of coastal Broward to three sea level rise scenarios. A mapping exercise conducted by the Planning and Redevelopment Division indicated areas at risk of tidal flooding due to sea level rise east of the salinity control structures will be substantially affecting households, businesses and property values. Nearly 2000 homes and 200 businesses in eastern Broward would be impacted by a one foot rise in sea level. With a two foot rise, the impact is multiplied 5-6 times with property loss increasing from an estimated loss at one foot sea level rise of $469M to $4.54B. The three foot scenario shows impacts to 11% of the population, 12% of the workforce with 17.5% loss in total taxable value. The inundation models show that the cost of inaction would be tremendous.

Local impacts related to climate change, especially sea level rise, are already occurring. Critical public infrastructure including beaches, roadways and especially stormwater drainage treatment and conveyance systems have already begun to show vulnerabilities to the current rate of rise of sea level, extreme rainfall and seasonal high tides. Coastal communities have begun to seek infrastructure improvements to address mounting drainage concerns. The predicted accelerated rate of sea level rise will further exacerbate the impact of saltwater intrusion on our source of drinking water and on coastal habitats. Climate-related challenges currently exist suggesting action to address these issues is needed today.

TASK FORCE HIGH-RANKED RECOMMENDATIONS

The Task Force Steering Committee, composed of the chairs of the seven subcommittees and the chair of the Task Force, took on the task of ranking the recommendations presented by the subcommittees into three categories:

- High -- Critical project, will not meet Task Force mission without it
- Medium -- Important project with significant outcomes, worthy of consideration and resources
- Low -- Important but mitigation and/or adaptation outcomes may not merit implementation with current resources; implement if resources allow

After the rankings and under the direction of the Steering Committee, the original 175 recommendations were consolidated into 126 total action items under 30 goal statements. The Task Force reviewed and approved 65 of the recommendations which were deemed critical to the meet the Task Force's mission. These high-ranked recommendations represent a cross-section of natural, urban, local and regional interests reflective of the diversity of the County, its collaborative nature and regional focus. They are briefly characterized below by major topic areas. Some type of action has already been taken on 52 of the 65 high ranked actions.

Create an Office of Sustainability (Sustainability/Climate Program)

A key recommendation is for Broward County to establish a Sustainability/Climate Program to oversee the implementation of County energy and climate change policies, initiatives, and sustainability programs, provide assistance in the coordination of local sustainability programs, and provide countywide coordination to local governments, through an identified point of contact, to develop climate mitigation and adaptation plans and implementation strategies, and serve as a liaison and support for multi-county climate change strategies and agencies in which Broward County participates. This Climate Change Action Plan could, in essence, serve as the work plan for the program.

Support a Regional Collaborative Climate Action Plan

Consistent with the recently ratified Southeast Florida Regional Climate Change Compact (Compact), Broward County would support the development of a Regional Collaborative Climate Action Plan. This will require the convening of a Climate Team with other local and regional entities to include participation of the regional climate change task forces, which can be shared with other communities vulnerable to the impacts of sea level rise, storm events, and related climate change pressures, and can be utilized as a tool for influencing state and federal policies and justification for appropriations related to climate change adaptation.

Collaborate on Joint Legislative Policies

Consistent with Compact, the actions plan recommends collaboration with neighboring counties to develop joint legislative policies which raise the awareness at State and Federal levels on the vulnerability of southeast Florida; and collaboration with municipalities, the Broward League of Cities, neighboring counties and other regional public and private entities to assist in the coordination, development, and implementation of a suite of planning tools and climate change

mitigation and adaptation strategies.

Amend the County Comprehensive Plan

To ensure that Broward County is prepared to address climate change adaptation measures, recommended actions include amending the Broward County and local government Comprehensive Plans, including creation of a Climate Change Element, to provide for a sustainable environment and to reflect the best available data and strategies for adapting to future climate change impacts. Similarly developing and implementing adaptive planning and zoning policies, regulations and programs to ensure appropriate land use, construction and redevelopment activities address the potential impacts of climate change, to include mitigating the impacts of sea level rise on Broward County's economy and infrastructure are proposed.

Support Everglades Restoration and Enhance the Urban Ecosystem

With two-thirds of Broward County encompassed by the Florida Everglades, it is not surprising that the highest ranked action was to support the Comprehensive Everglades Restoration Program (CERP) and other environmental restoration and mitigation initiatives in Broward County. To further our sustainable urban forest landscape practices and provide opportunities for carbon reductions, planting trees and shrubs known to sequester and store high levels of carbon in all available public and private lands, including unused properties, school and government properties and conservation lands is recommended.

Incorporate Climate Change Adaptation into Public Infrastructure Planning

With concern for sea level rise impacts in the eastern area of the County, efforts must be made to ensure that adaptation to climate change impacts are incorporated into the planning, siting, construction, replacement and maintenance of public infrastructure in a manner that is cost-effective and maximizes expected infrastructure life span, with a specific emphasis on county-owned infrastructure. Additionally, the action plan supports measures that will increase the efficiency and durability of beach nourishment along Broward's shoreline.

Protect Water Resources

The action plan includes a series of recommendations to ensure that the existing water resources and water infrastructure are protected and adequate supplies of water remain available for drinking, agriculture, and natural resources, while protecting water quality and minimizing the potential for flood damage and water shortages. These include undertaking feasibility studies of large scale regional advanced water treatment facilities to evaluate: advanced treatment of storm water or wastewater for aquifer recharge and/or Everglades rehydration; production of potable water from brackish water, treated wastewater, or storm water; and potential for realizing economies of scale. Additionally, convening a regionally-focused workshop for scientists, engineers, water managers, planners, policymakers and other

stakeholders to exchange knowledge and develop a comprehensive list of policy and planning recommendations for enhancing the resilience of Southeast Florida's water resources to the impacts of climate change is recommended.

Improve Modeling, Monitoring, and Mapping Ability

To assist in making planning decisions, actions include a series of mapping, modeling and monitoring measures. These include improved analysis and mapping capabilities for identifying areas at risk in the County that are vulnerable to sea level rise by utilizing the most recent LiDAR data; encouraging dedicated state and federal funding sources for reoccurring and continued development of local integrated modeling efforts and continuous data gathering; and collaborating with adjacent counties to establish an integrated network of early warning signs that track long-term changes across the Southeast Florida region.

Amend Zoning and Building Regulations

Additional emission-reducing actions include: promoting transit-oriented development which promotes functional, walk-able mixed use development designs and projects; supporting changes to Florida's Residential Energy Code; and encouraging greener, more efficient, and more durable construction practices locally by: encouraging all municipalities and commercial builders to adopt a policy of requiring Leadership in Energy and Environmental Design™ (LEED) or acceptable green design standards on construction of all new and renovated public buildings and commercial space; base finish floor elevation standards on projected sea level rise scenarios and flooding potential; and incorporate building design specifications that increase resistance to impacts from more frequent and more intense storm events

Create a Functional Mass Transportation System

In order to achieve the Commission's goal of a countywide reduction of greenhouse gas emissions to 80% below current levels by 2050, a series of strategies, programs, and other sustainable initiatives are proposed. With Broward County's 2007 Communitywide Greenhouse Gas Emissions inventory confirming that transportation is responsible for 45% of our emissions, creation of a functional mass transportation system that will reduce the current level of vehicle miles travelled and the amount of carbon emissions also ranked high. The proposed mass transportation system would be supported by creating a dedicated funding source for mass transit by enacting appropriate legislation; funding, supporting, and empowering the South Florida Regional Transportation Authority (RTA) to ensure the mass transit system functions on a regional level; and provide oversight to the RTA; and providing the infrastructure and support facilities to encourage and enhance the use of mass transportation. This is consistent with and furthers the Broward MPO 2035 Long Range Transportation Plan.

Develop Renewable and Alternative Energy Programs

As we seek to reduce our dependence on oil, Broward County, local municipalities and power companies should develop plans and programs to expand the market for alternative energy and energy efficient products and services to reduce greenhouse gas emissions and expand the employment base and "green" job opportunities. Additionally, evaluation of the development of a Bond-Funded Renewable Finance District program that enables homeowners to pay back the cost of renewable power systems through a voluntary special assessment is recommended.

Further, Broward County should support the expansion of renewable and alternative energy sources and remove the encumbrances to projects that support sustainability; support state legislation which is consistent with the 2008 Florida Energy and Climate Change Action Plan to establish a 20% renewable portfolio standard for 2020; and support public access to alternative fuels infrastructure

Additionally, Broward County should promote and support actions to increase the proportion of electricity generated by solar power from residential, commercial and municipal properties within Broward County's geographic boundaries; and develop permitting fee incentives for renewable and alternative energy installations.

Increase Recycling/Promote Zero Waste

Broward County and its municipalities recently began implementing single stream recycling. This action plan supports that effort and recommends a series of additional actions to substantially increase the recycling rate; promote full utilization of existing infrastructure for waste-to-energy conversion; and require landfill operators to evaluate the cost effectiveness of landfill gas-to-energy conversion. Broward County can continue to lead by example by adopting Environmentally Preferable Purchasing Policies that utilize the collective buying power of local governments to purchase products made with recycled materials and reduce packaging and toxicity.

Support Marketing and Incentives

To help mitigate the impacts of climate change on low income households, Broward County should support continued Federal, State and local agencies and utilities efforts to provide assistance programs to low income households, such as the Federal Weatherization Assistance Program, to renovate existing homes to increase energy conservation.

Provide Outreach and Education

Provide broad community outreach and education about climate change actions to include mitigation and adaptation strategies and the expected cost of inaction; and embrace allies in

promoting green public education.

CONCLUSION

Climate change, especially sea level rise, will have a significant impact on Broward County. The breadths of the topic areas covered in this Action Plan reflect the potential of climate change to impact every aspect of life here. The significant number of climate change mitigation and adaptation recommendations made reinforce the fact that action will be required to create a sustainable and climate-resilient community. While action is already being taken on many of the recommendations, substantial staff time, new personnel and financial resources would be required to implement all action items fully. Should the Board accept and approve the recommendations, new and alternative funding options would be required to proceed with many of the action items.

INTRODUCTION

The Case for Climate Change

Climate change (also known as global warming) has emerged as an issue of critical concern worldwide. In response to well substantiated and compelling scientific evidence supporting the validity and urgency of climate change (see Appendix A – Global Indicators of Climate Change) and the public's desire for action, a political environment has been created for local, state, and federal lawmakers to press for real changes in public policy related to energy consumption of fossil fuels and adaptation to climate change.

As stated in the National Academies Report "Understanding and Responding to Climate Change":

> "Climate is conventionally defined as the long-term average of weather conditions, such as temperature, cloudiness, and precipitation; trends in these conditions for decades or longer are a primary measure of climate change. The most striking evidence of a global warming trend is closely scrutinized data that show a relatively rapid and widespread increase in temperature during the past century. The rising temperatures observed since 1978 are particularly noteworthy because the rate of increase is so high and because, during the same period, the energy reaching the Earth from the Sun had been measured precisely enough to conclude that Earth's warming was not due to changes in solar irradiation. Scientists find clear evidence of this warming trend even after removing data from urban areas where an urban heat-island effect could influence temperature readings. Furthermore, the data are consistent with other evidence of warming, such as increases in ocean temperatures, shrinking mountain glaciers, and decreasing polar ice cover."

Global climate change has already begun to influence many aspects of daily life locally and globally (see Appendix B – Potential Impacts from Climate Change) and will continue to do so in the future. Impacts are not limited to changes in atmospheric and water temperature and chemistry, altered rainfall cycles and hydrology, climate instability, sea level rise and extreme weather. Climate change will affect the global economy, human health, agriculture, property, land use and infrastructure. This, in turn, will influence national and international security as competition increases for land, drinking water and food resources. Demonstrated impacts to natural habitats, wildlife ecology, and individual species will continue to occur.

Responses will be required in two major areas: (1) Mitigation of greenhouse gas emissions to

slow the impacts of climate change and (2) Adaptation to the predicted and inevitable consequences of climate change. Reducing greenhouse gas emissions will be a major challenge but a critical one to begin to reduce the rate of climate change. Adaptation will be important to address known impacts, develop strategic plans, and create climate-resilient communities.

The Response of a Concerned County

On June 12, 2007, the Broward County Board of County Commissioners adopted Resolution 2007-391 to reduce greenhouse gas emissions in Broward County and to support the U.S. Mayors' Climate Protection Agreement. By promulgating this resolution, Broward County committed to strive to meet or beat the Kyoto Protocol target of reducing greenhouse gas emission levels to 7% below 1990 levels by 2012, committed to urge the federal and state government to enact policies and programs to meet the Kyoto Protocol target of greenhouse gas emissions reductions at national and state levels, and committed to encourage city and town governments within Broward County to sign on to the Agreement. This resolution establishes the Board's commitment to climate change protection and creates a framework to guide the planning and implementation of related measures.

Consistent with the commitments under this resolution, the first Broward County action to carry out the mandate of the resolution was to convene a Climate Change Interagency Workgroup (Workgroup) for the purposes of developing a Broward County Government Operations Climate Change Report (Report). For the purposes of this Report, the Workgroup discussed and selected a goal of reducing greenhouse gas emissions to 7% below 1997 levels, by 2015. The Workgroup made this decision based on operational data available to calculate a base year emissions inventory for County operations. In efforts to reduce energy consumption from electrical and fossil fuel use, and increase the efficiency of its operations, Broward County has already taken many early voluntary greenhouse gas reduction actions and implemented various energy savings programs over the past several years. As a positive consequence of these actions, the County has already started the move toward reducing greenhouse gas emissions consistent with established climate change efforts.

Due to the wide scope of issues associated with government operations' greenhouse gas emission reductions, multiple County departments under the jurisdiction of County Administration are represented in the Workgroup. Diverse issues which need to be addressed include, but are not limited to, energy efficiency and conservation, transportation, utilities, air quality, resource recovery, recycling, protection of green spaces, water resource management, building and construction standards, alternative energy and fuels, sustainable development, and

education and outreach.

To meet the established 2015 target of 208,848 tonnes eCO2, Broward County operations must reduce an additional 51,110 tonnes eCO2 from 2007 emissions levels by 2015, an estimated 6,389 tonnes per year. In 2008, Broward County met and exceeded its annual reduction goal with an estimated reduction of 10,184 tonnes eCO2. The full progress report can be found at http://www.broward.org/NaturalResources/climatechange/govops2009report.pdf.

Creation of a Climate Change Task Force

Roughly one year after adopting communitywide greenhouse gas emissions reduction goals and consistent with a recommendation of the Broward County Water Advisory Board, the Broward County Board of County Commissioners approved Resolution 2008-442 on June 24, 2008 creating a Climate Change Task Force (Task Force) to develop recommendations for a coordinated countywide strategy in mitigating the causes, and addressing the local implications, of global climate change. The Task Force members (see Appendix C for membership) were appointed by the Board and were supported by County staff. The Task Force's duties and responsibilities as outlined in the Resolution included:

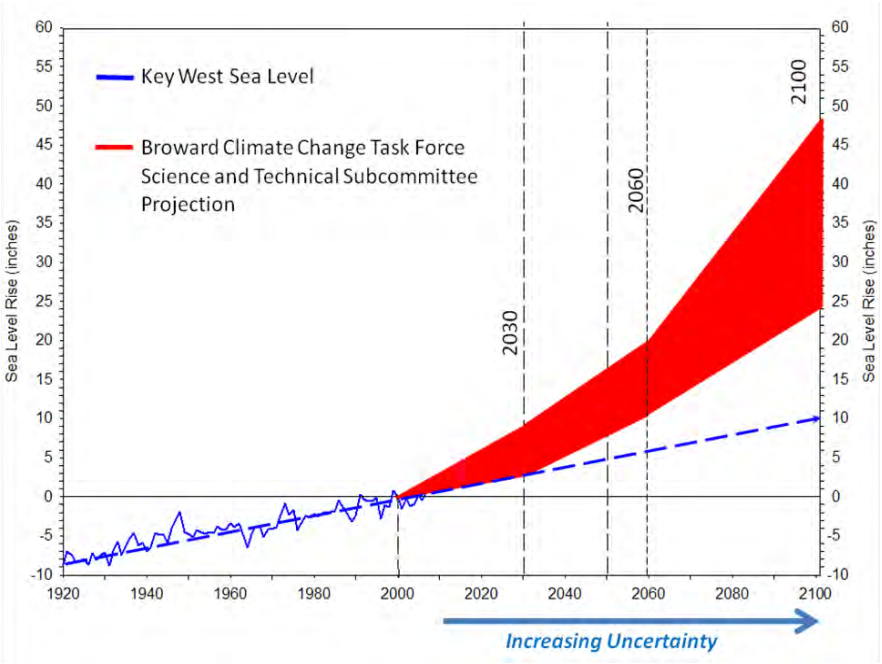
- development and implementation of projects that conserve energy and reduce greenhouse gas emissions within government operations;
- development of incentives for residences, businesses and organizations to conserve energy and reduce greenhouse gas emissions;
- development and implementation of adaptation strategies to alleviate the likely adverse consequences of climate change including rising sea levels, hurricanes and other violent weather events;
- provision of education and outreach to encourage Broward County residences, businesses and organizations to participate in the program;
- pursuit of federal and state grants, energy costs savings and other financial resources to offset program costs; and
- coordination with the Broward County Board of County Commissioners, the School Board, municipalities, other governmental agencies, business, private and public organizations, and the state of Florida in the adoption of programs to reduce greenhouse gas emissions in a cost-effective and efficient manner that preserves the County's competitiveness in the national and worldwide economy.

Seven subcommittees (see Appendix C for membership) were created and mission statements were drafted to provide guidance in the diversity of issues to be reviewed relative to climate change. Numerous Task Force and subcommittee meetings have been held since the first meeting on December 4, 2008 to gather information and formulate recommendations.

ADDITIONAL INFORMATION NEEDS

The Task Force determined early in their process that three types of information would be helpful to guide their recommendations. These include a projection of sea level rise that might be anticipated over time in Southeast Florida, a communitywide greenhouse gas inventory to understand the main sources of emissions in Broward County and an analysis of the vulnerability of our coastline to sea level rise should no action be taken to address sea level rise. The results of these analyses guided development of the final recommendations

Sea Level Rise Projections

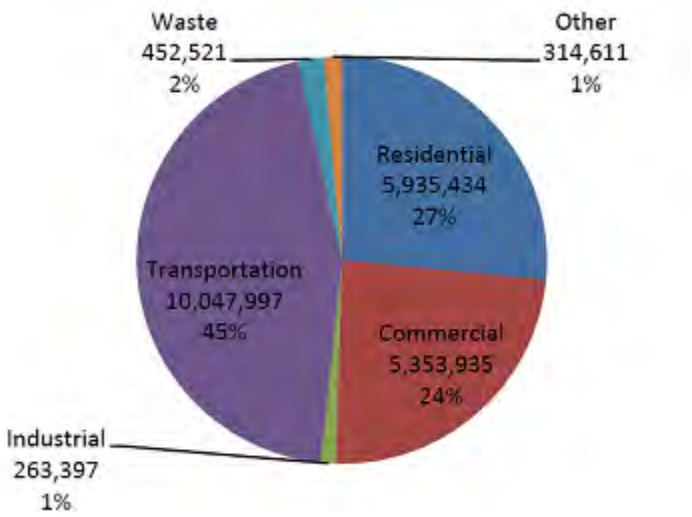


Determined by the Task Force to be n eeded early in the process was a projection of sea level rise that might be anticipated over time in Southeast Florida to guide their recommendations. Sea level rise will have four major impacts that need to be considered in comprehensive planning particularly in the planning and management of public infrastructure: inundation and shoreline recession; increased flooding from severe weather events; saltwater contamination of ground water and surface water supplies; and elevated water tables. The Science and Technical Subcommittee assumed the task of reviewing literature on the subject.

The Subcommittee determined that based upon the review of the best available technical data and scientific modeling, a projection of 3-to-9 inches of sea level rise from the 2000 level by the year 2030 s hould be utilized in the development of Task Force immediate and short term recommendations. They further determined that a projection of 10-20 inches of sea level rise from the 2000 level by 2060 and a projection of 24-48 inches of sea level rise by the year 2100 should be utilized in the development of Task Force mid and long term recommendations.

Communitywide Greenhouse Gas Emissions Inventory

Concurrent with the deliberation of the Task Force, the County's Air Quality Program conducted a communitywide greenhouse gas emissions inventory. This inventory, based on emissions from 2007, served as the basis the Greenhouse Gas Reductions Subcommittee's recommendations and will provide for a mechanism to measure progress and improve reduction strategies in the future.



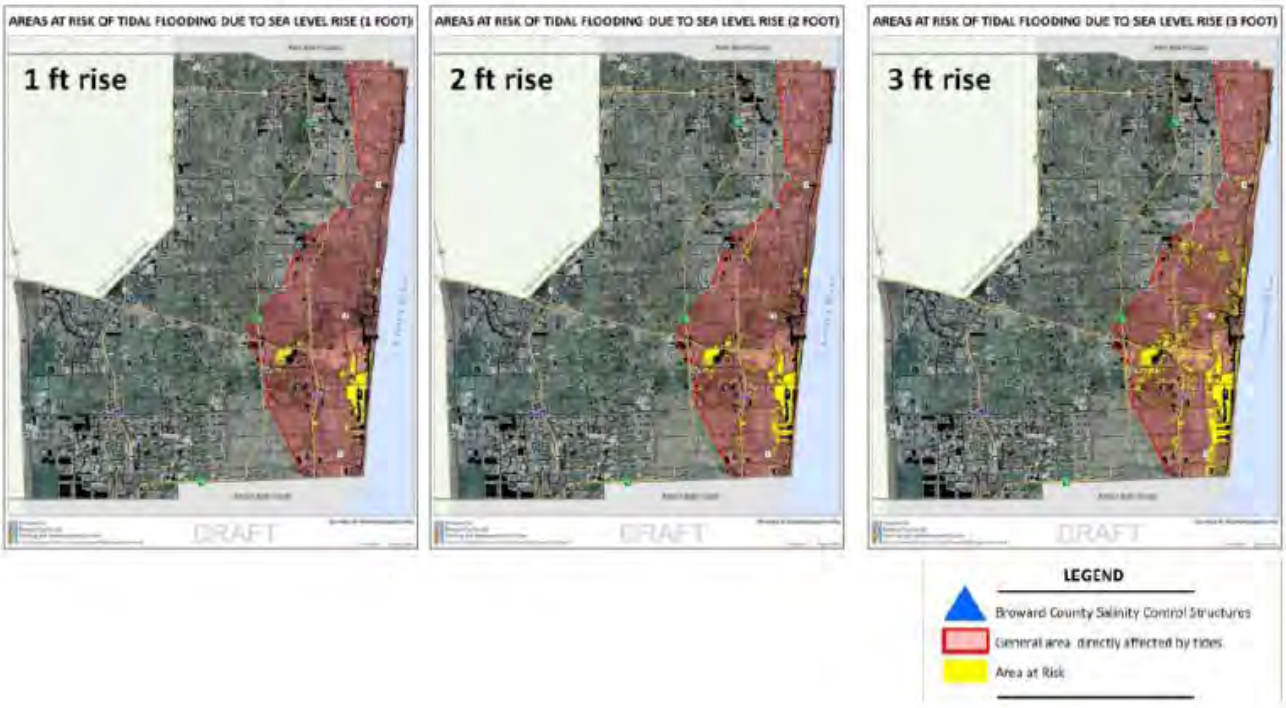
According to the inventory results, the Broward County community as a w hole emitted approximately 22,366,933 metric tons of greenhouse gas (eCO2) or 12.8 metric tons per capita. This is equivalent to the emissions from approximately 47 million barrels of oil consumed. About 45% of Broward County's current greenhouse gas emissions are related to the use of gasoline and diesel fuel in the Transportation sector. The next largest source of greenhouse gas emissions is the Residential sector, which accounts for 27% of total emissions, due primarily to the use of electricity. Residential sector is followed by the Commercial sector which contributes 24% of communitywide greenhouse gas emissions. The remaining greenhouse gas sources total less than 4% of the greenhouse gas emissions and include Waste, Industrial, and Other.

The need for communitywide reductions of greenhouse gas emissions in these sectors is reflected in the Task Force recommendations.

Cost of Inaction - Vulnerability Assessment

The "business as usual" scenario was considered by developing an analysis of vulnerability of coastal Broward to three sea level rise scenarios. A mapping exercise conducted by the Planning and Redevelopment Division indicates that potential impacts to areas at risk of *tidal flooding* due to sea level rise east of the salinity control structures will be substantial in terms of impacts to households, businesses and property values. Impacts of freshwater flooding west of the control structures were not considered as part of this exercise.

Broward County, FL – Areas at Risk of Tidal Flooding Due to Sea Level Rise (Source: Broward County)		
Potential Impacts at 1 foot Sea Level Rise	**Potential Impacts at 2 foot Sea level Rise**	**Potential Impacts at 3 foot Sea Level Rise**
1,934 households – 4,151 residents	11,686 households – 25,085 residents	90,395 households – 11% population
182 business – 1,812 employees	937 business – 6,365 employees	7,866 business – 12% of workforce
Property loss~ $469M	Property loss ~ $4.54B	Property loss ~$24.4B, 17.5% total tax value
Public Infrastructure:	Critical Infrastructure:	Critical Infrastructure: 3 hospitals, 13
Library/park/natural area	2 schools, 2 libraries, 1 WWTP	schools, 4 city halls, 6 libraries, 2 WWTP
4 major roads	5 major roads	11 major roads



Nearly 2000 homes and 200 businesses in eastern Broward would be impacted by a one foot rise in sea level. With a two foot rise, the impact is multiplied 5-6 times with property loss increasing from an estimated loss at one foot sea level rise of $469M to $4.54B. The three foot scenario shows impacts to 11% of the population, 12% of the workforce with 17.5% loss in total taxable value. The inundation models show that the cost of inaction would be tremendous. Considerable resources will need to be directed toward reduction of greenhouse gas emissions and adaptation for sea level rise to reduce impacts. While action may be costly, studies indicate that inaction is more expensive.

Local impacts related to climate change, especially sea level rise, are already occurring. Critical public infrastructure including beaches, roadways and especially stormwater drainage treatment and conveyance systems have already begun to show vulnerabilities to the current rate of rise of sea level, extreme rainfall and seasonal high tides. Coastal communities have begun to seek

infrastructure improvements to address mounting drainage concerns. The predicted accelerated rate of sea level rise will further exacerbate the impact of saltwater intrusion on our source of drinking water and on coastal habitats. Climate-related challenges currently exist suggesting action to address these issues is needed today.

RECOMMENDATION DEVELOPMENT PROCESS

The subcommittees, each chaired by a member of the Task Force, began meeting in January 2009 and initially developed a set of focal areas (Appendix D) which would guide their recommendations. After the subcommittee members received presentations on the climate change related issues and their potential impacts on Broward County, they diligently proceeded to make recommendations that would help to lead the County on the path to mitigate the causes and adapt to the consequences of climate change. Over 175 recommendations were presented by the subcommittees to the Steering Committee of the Task Force for ranking. They ranked the actions into three categories:

- High -- Critical project, will not meet Task Force mission without it
- Medium -- Important project with significant outcomes, worthy of consideration and resources
- Low -- Important but mitigation and/or adaptation outcomes may not merit implementation with current resources; implement if resources allow

After the rankings and under the direction of the Steering Committee, the original 175 recommendations were consolidated into 126 total action items. The High-ranked actions are included in the body of this action plan. The Medium- and Low-ranked actions are attached in Appendix E.

CLIMATE CHANGE TASK FORCE HIGH-RANKED ACTIONS

The 65 High-Ranked Actions are organized below by topic area with goal statements. Each action is accompanied by a brief description of the planning horizon, status of action and estimated resources required to implement the action. Appendix F provides a general implementation outline for all 126 actions with additional information related to likely responsible County agency, potential community partners, and performance measures associated with each action.

Planning Horizon is defined as **Immediate** (0-2 years), **Short term** (0-5 years), **Mid term** (0-25 years) and **Long term** (0-50 years).

Status of Action is defined as **Pending** - Proposed by the Task Force (35 actions); **Initiated** - Proposed by the Task Force and action is starting to be taken (7 actions); **In Progress** - Proposed by the Task Force, action has been taken, products are being produced (8 actions); **On-going** - Activity which was started prior to the Task Force and expected to continue regardless of the status of the recommendations (14 actions); **Complete** - Proposed action has been addressed (1 action).

Resources Required are generally described as requiring additional staff time, additional personnel, and/or additional funds. When possible, additional funds provides an estimate of needed funding in broad ranges e.g. <$10K, <$100K, $100K-$999K, >$1M, >$10M, >$100M etc.

POLICY AND COORDINATION

Goal PC-1: Create collaborative intergovernmental practices and mechanisms in Broward County that serve as a tool for the County, municipalities and other public and private entities to reduce countywide greenhouse gas emissions to 17% below 2005 by 2020 and 82% below 2003 current levels by 2050 by coordinating strategies, programs, and other sustainable initiatives that mitigate the causes and assist in adaptation to the regional consequences of climate change, with special emphasis on intergovernmental coordination of adaptation activities.

Action PC-1.1 Establish a County Office of Sustainability (Sustainability/Climate Program)
Broward County should establish a Sustainability/Climate Program to oversee the implementation of County energy and climate change policies, initiatives, and sustainability programs, provide assistance in the coordination of local sustainability programs, and provide countywide coordination to local governments, through an identified point of contact, to develop climate mitigation and adaptation plans and implementation strategies, to aid in quantifying costs and cost-benefits for climate change initiatives, and serve as a liaison and support for multi-county climate change strategies and agencies in which Broward County participates.

Planning Horizon:	Immediate
Status of Action:	Pending
Resources Required:	Additional personnel and funds (Grant funding obtained which will provide partial funding)

Action PC-1.2 Support Broward County Government Operations greenhouse gas emission reduction efforts

Broward County should continue support for the Broward Government Operations Workgroup to address baseline and carbon footprint; educate employees; identify sources for future grants; and provide/advise/encourage sustainability actions, best management practices, and energy efficiency for all Broward County government operations.

Planning Horizon:	Short term
Status of Action:	On-going
Resources Required:	Additional funds (Grant funding proposal submitted which could provide partial funding if awarded)

Action PC-1.3 Continue Climate Change Task Force into future

Broward County should support the continuation of the Broward Climate Change Task Force or its successor entity to assist and advise elected officials in the decision making process, to be comprised of County and municipal elected officials, scientists knowledgeable in the field of climate change, representatives of local Green Advisory Boards, regional transportation and planning authorities and other knowledgeable individuals and guided by a s taff liaison or sustainability coordinator.

Planning Horizon:	Short term
Status of Action:	On-going
Resources Required:	Additional staff time

Action PC-1.4 Support the development of a Regional Collaborative Climate Action Plan

Broward County should support the development of a Regional Collaborative Climate Action Plan with the neighboring counties through the convening of a Climate Team with other local and regional entities to include participation of the regional climate change task forces, which can be shared with other communities vulnerable to the impacts of sea level rise, storm events, and related climate change pressures, and can be utilized as a tool for influencing state and federal policies and justification for appropriations related to climate change adaptation.

Planning Horizon:	Short term
Status of Action:	Initiated
Resources Required:	Additional staff time

Action PC-1.5 Collaborate on legislative policies

Broward County should collaborate with neighboring counties to develop joint legislative policies which raise the awareness at State and Federal levels on the vulnerability of southeast Florida and advocate for increased state and federal funding for mitigation and adaptation projects and planning efforts in South Florida and develop a strategy to secure state and federal funding to meet strategic needs in Southeast Florida.

Planning Horizon: Immediate
Status of Action: In Progress
Resources Required: Additional staff time

Action PC-1.6 Collaborate broadly on mitigation and adaptation policies

Broward County should collaborate with municipalities, the Broward League of Cities, neighboring counties and other regional public and private entities to assist in the coordination, development, and implementation of a suite of planning tools and climate change mitigation and adaptation strategies. This should include establishing action targets and reaching agreement on one or more standardized methodologies for emissions measurement and reporting.

Planning Horizon: Mid term
Status of Action: Pending
Resources Required: Multi-partner resources

Action PC-1.7 Lead advocacy for climate change policies and legislation

Broward County should continue to demonstrate leadership in advocacy for climate change issues and legislation to the National Association of Counties, Florida Association of Counties and the Florida League of Cities, and in Washington DC and Tallahassee. Support proactive environmental and climate change public policies and standards that support adaptation funding to meet those needs.

Planning Horizon: Immediate
Status of Action: On-going
Resources Required: Additional staff time and funds

Goal PC-2: Ensure that Broward County and local government comprehensive plans including the Broward Metropolitan Planning Organization's 2035 Long Range Transportation Plan, are updated to provide for a sustainable environment and to reflect the best available data and strategies for adapting to future climate change impacts.

Action PC-2.1 Support local, regional and state planning entities in mitigation and adaptation plans

Broward County should support planning entities and programs in their efforts to develop and coordinate regional tools and planning documents which integrate regional climate change mitigation and adaptation goals into their planning processes. This includes, but is not limited to:

- Regional Planning Council (Strategic Regional Policy Plan)
- South Florida Regional Transportation Authority (Strategic Regional Transit Plan)
- Southeast Florida Transportation Council (Regional Long Range Transportation Plan)
- Broward Metropolitan Planning Organization (Long Range Transportation Plan)
- Florida Department of Transportation (Florida Transportation Plan)
- Florida Department of Community Affairs
- South Florida Water Management District
- School Board of Broward County Plans
- Port and Airport Master Plans

Planning Horizon:	Short term
Status of Action:	Initiated
Resources Required:	Additional staff time

Action PC-2.2 Update Broward County Comprehensive Plan for Climate Change and support local government efforts to update their comprehensive plans

Broward County should review the Broward County Comprehensive Plan and its elements, and revise as needed, consistent with state statutory requirements, policies and programs, to include strategies to address the impacts of climate change and support local government efforts to update their comprehensive plans. Revisions to the Plan shall include but not be limited to:

- creating a Climate Change Element or Sub-Element within the Broward County Comprehensive Plan which can be a model to other local government efforts
- determining whether there are any amendments that could make coastal areas, especially coastal high hazard areas, more resilient to the impacts of climate change, including sea level rise, and provide a map of the high risk areas
- revising Coastal Management Element of the Comprehensive Plan to include low-lying coastal areas at risk to encourage only those land uses which minimize population concentration, reduces potential risk in high hazard areas, and evaluates the possibility of limitation of redevelopment to appropriate uses
- addressing greenhouse gas reduction and energy conservation strategies that are included in the Urban Design Element, Transit and Housing Oriented Re-Development

(THOR) and NatureScape Broward program, which promote compact, transit-oriented, pedestrian-friendly development; the construction of energy efficient buildings; and address the potential effects of rising sea levels, tropical storms, storm surge, and other climate change issues.

Planning Horizon:	Immediate
Status of Action:	In Progress
Resources Required:	Additional personnel (Grant funding obtained which will provide partial funding)

Goal PC-3: Develop and implement adaptive planning and zoning policies, regulations and programs to ensure appropriate land use, construction and redevelopment activities address the potential impacts of climate change, to include mitigating the impacts of sea level rise on Broward County's economy and Infrastructure.

Action PC-3.1 Revise Land Use Plan to address mitigation and adaptation policies

Broward County should review the Broward County Land Use Plan, the Land Development Code and County Charter and revise them as needed, to include strategies to address mitigation and adaptation policies that reduce the consequences of climate change. Revisions to these guiding documents shall include but not be limited to:

- ensure consistency with and further Article I of the Charter of Broward County, Florida, Section 1.04 (P), Environmental Statement detailing Broward County Government's duty to enact policies which protect citizens' rights to a sustainable environment while encouraging a stewardship of natural resources, as approved by the voters on November 4, 2008
- require that climate change impact be a factor in determining whether or not to permit additional intensity or density in land use plan changes
- strongly discourage land use plan amendments proposing increased densities and intensities in areas at risk of frequent or continuous flooding due to sea level rise during the next 50 years. Include appropriate policies and a map of the high risk areas.

Planning Horizon:	Short term
Status of Action:	Initiated
Resources Required:	Additional staff time

Action PC-3.2 Remove barriers to limiting development in vulnerable areas
Broward County, and the municipalities within the County, should support State legislation to remove existing statutory barriers and authorize local governments to adopt land use regulations to limit development and redevelopment in areas vulnerable to sea level rise due to climate change.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time

Goal PC-4: Remove encumbrances to projects that support sustainability.

Action PC-4.1 Promote transit-oriented development
Broward County should continue to support Transit Oriented Development which promotes functional, walk-able mixed use development designs and projects by providing flexibility in development review for these projects, revising the zoning and land development codes to allow and encourage these projects, establishing incentives for this type of development, and adopting specific goals in the Comprehensive Plan to support and establish sustainable development patterns.

Planning Horizon: Immediate
Status of Action: On-going
Resources Required: Existing resources

NATURAL AND URBAN LANDSCAPE

Goal NU-1: Support the Comprehensive Everglades Restoration Program (CERP) and other environmental restoration and mitigation initiatives in Broward County.

Action NU-1.1 Support Everglades Restoration
Broward County should support the efforts of the US Army Corps of Engineers, Florida Department of Environmental Protection, the US Fish & Wildlife Service, United States Geological Survey, the National Park Service and the South Florida Water Management District to restore the Florida Everglades and continue to support state and federal funding proposals.

Planning Horizon: Mid term

Status of Action: On-going
Resources Required: Existing resources

Action NU-1.2 Coordinate with state/regional/national strategic planning efforts on climate change

Broward County should coordinate with other state, regional and national strategic planning efforts to prepare for climate variability and change, including MUSIC (US Geological Survey-Massachusetts Institute of Technology), UF-IFAS Climate Change Extension, Southeast Climate Consortium, NOAA US Global Climate Change Research Program, USDA Risk Management Agency, US Fish & Wildlife Service Climate Change Program, National Park Service, and Florida State Agricultural Response Team (SART).

Planning Horizon: Long term
Status of Action: Initiated
Resources Required: Additional staff time

Action NU-1.3 Support environmental mitigation and adaptive management initiatives

Broward County should continue to support local environmental restoration, mitigation and adaptive management initiatives.

Planning Horizon: Long term
Status of Action: On-going
Resources Required: Additional staff time

Goal NU-2: Promote sustainable urban forest landscape practices that will provide additional diversity through planting of native landscape species, allowing natural migration of plant and animal species, and promoting the planting of green areas for carbon sequestration and storage.

Action NU-2.1 Encourage urban reforestation

Broward County should plant, and encourage others to plant, trees and shrubs known to sequester and store high levels of carbon in all available public and private lands, including unused properties, school and government properties and conservation lands utilizing trees and shrubs acquired through grants, private public partnerships with the green industry, and with developers or agencies looking for opportunities to offset carbon emissions and become carbon neutral**.** Also encourage the connectivity of natural areas and green urban areas to reduce heat islands and improved energy efficiency of adjacent structures.

Planning Horizon: Mid term
Status of Action: Pending
Resources Required: Additional funds $100K-$999K (Grant funding obtained which will provide partial funding)

Action NU-2.2 Perform canopy study

Concurrent with the reforestation program, Broward County should perform a canopy study utilizing Urban Forest Effects (UFORE) or a comparable program to obtain baseline data for the County on canopy and species, incorporating existing data from municipal tree inventories and Broward County School Board UFORE data while encouraging other municipalities to apply for grants to perform tree inventories and repeating the canopy study every five years to determine progress on expansion and sustainability of the canopy. Upon completion of the tree inventory studies, determine feasibility of entering carbon markets.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional funds $10K-$100K (Grant funding applied for but not awarded)

Action NU-2.3 Continue NatureScape program

Broward County should continue to implement the NatureScape Broward program and require that all plantings consist of recommended Florida-Friendly trees, including the use of a greater diversity of seed-grown native and non-invasive, subtropical, and rare native plants in the urban landscape, that are the most salt, wind and drought tolerant; and that plants are maintained consistent with NatureScape and Florida-Friendly Landscaping™ Best Management Practices.

Planning Horizon: Mid term
Status of Action: On-going
Resources Required: Existing resources

INFRASTRUCTURE MASTER PLANNING

Goal IP-1: Ensure that adaptation to climate change impacts, especially sea level rise, are incorporated into the planning, siting, construction, replacement and maintenance of public infrastructure in a manner that is cost-effective and

maximizes expected infrastructure life span.

Action IP-1.1 Maintain beaches

Broward County should increase the efficiency and dur ability of beach nourishment along Broward's shoreline by: continuing the appropriate use of beach nourishment and sand bypassing at Port Everglades and Hillsboro Inlet; considering the targeted application of erosion control structures, such as groins and breakwaters, as appropriate given Florida's coastal geology; facilitating the installation and maintenance of native beach dune vegetation along appropriate areas of beach; revisiting redevelopment policies with the objective of providing additional coastal buffer area between developed areas and the shoreline; and considering seawalls only where beaches cannot be maintained and shore front property must be protected.

Planning Horizon: Long term
Status of Action: On-going
Resources Required: Additional funds >$100M

Action IP-1.2 Adopt adaptation standards for all new public buildings by considering climate change and sea level rise in their design

Broward County should ensure that new and replacement public and private infrastructure such as streets and bridges, water and wastewater treatment plants, hospitals, city halls, police and fire stations, and power generation facilities are designed in a manner which takes into consideration the impacts from global climate change, including rising sea level, in coordination with sustainability.

Planning Horizon: Mid term
Status of Action: Pending
Resources Required: Additional staff time

Action IP-1.3 Inventory the county-owned infrastructure at risk and assess climate change impacts

Broward County should inventory the county-owned public works infrastructure at risk from the impacts of climate change. County agencies (and agencies that receive County funding for significant infrastructure or built investments) should assess climate impacts on t he agency's/entity's responsibilities. This assessment should be incorporated into their infrastructure master planning process; or such a planning process should be initiated if it does not exist. The assessment should include the impact of sea level rise and ot her adaptation impacts on all public investments and identification of vulnerabilities in order to produce strategies for mitigation and adaptation and a d etermination as to whether, when, and where

projected impacts from climate change might be significant. Analyses should include:

- Buildings, wastewater treatment plants, water treatment plants, water and w astewater transmission lines, pumping stations, transportation and transit infrastructure, critical airport and seaport infrastructure, etc., and all master plans
- Evaluation of the costs and benefits of adaptation alternatives in the location and design of new infrastructure as well as the fortification or retrofitting of existing infrastructure
- Study of whether to build, modify or install water and wastewater transmission infrastructure in zones to allow for strategic retreat from identified areas at risk to sea level rise.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time and funds

Action IP-1.4 Coordinate transportation adaptation policies

Broward County should assist in coordinating transportation-related adaptation policies across jurisdictional boundaries and ens ure consistency among broader planning and plan implementation efforts (Florida Transportation Plan, Strategic Intermodal System Strategic Plan, the South Florida Regional Transportation Authority's Strategic Regional Transit Plan, the South Florida Regional Planning Council's Strategic Regional Policy Plan, Southeast Florida Transportation Council's Regional Long Range Transportation Plan [LRTP] and Broward Metropolitan Planning Organization LRTP).

Planning Horizon: Mid term
Status of Action: Pending
Resources Required: Additional staff time

WATER RESOURCES

Goal WR-1: Ensure that the existing water resources and water infrastructure are protected and adequate supplies of water remain available for drinking, agriculture, and natural resources, while protecting water quality and minimizing the potential for flood damage and water shortages.

Action WR-1.1 Include climate change in updates of Lower East Coast Plan

Broward County should support the inclusion of adaptation measures that address impacts from climate change in future updates of the South Florida Water Management District's Lower East

Coast Regional Water Supply Plan and other regional water management activities.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Existing resources

Action WR-1.2 Conduct studies for large-scale Advanced Water and Wastewater Treatment Plants

Broward County should undertake feasibility studies of large scale regional advanced water treatment facilities to evaluate: advanced treatment of stormwater or wastewater for aquifer recharge and/or natural systems rehydration; production of potable water from brackish water, treated wastewater, or storm water; and potential for realizing economies of scale.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional funds $100K-$999K

Action WR-1.3 Monitor and protect wellfields

Broward County should continue source-water (well field) monitoring and protection programs to mitigate water supply loss due to groundwater contamination from pollutants and saltwater intrusion.

Planning Horizon: Mid term
Status of Action: Pending
Resources Required: Additional funds $100K-$999K

Action WR-1.4 Re-evaluate reuse due to sea level rise

Broward County should work in coordination with all utilities and municipalities to re-evaluate current plans for utilization of wastewater for reclamation and reuse to address changes in water tables due to sea level rise.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time and funds

Action WR-1.5 Utility development of adaptive management strategies for water resources

Broward County and city agencies and w ater utilities should develop policies and

comprehensive plans that set short-, intermediate-, and long-range goals and establish adaptive management implementation strategies for water resources under their jurisdiction that are consistent with the recommendations of the Climate Change Action Plan and address the potential impacts of climate change, and its operational, economic, and environmental effects.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional funds $100K-$999K

Action WR-1.6 Reduce utility carbon footprint

Broward County should ensure that water and w astewater service planning and policy development considers methods for reducing utilities' "carbon footprint", including established best management practices (BMPs) that coincide with water infrastructure needs exemplified by American Waterworks Association Florida Vision 2030 as may be amended from time to time, and which have been recognized by utilities as appropriate utility responses to Climate Change.

Planning Horizon: Immediate
Status of Action: On-going
Resources Required: Additional staff time and funds

Action WR-1.7 Provide resources to implement water conservation

Broward County should continue to provide staff and financial resources to assist local governments in implementing regional water conservation strategies as a water supply demand management tool and encourage South Florida Water Management District to do the same.

Planning Horizon: Immediate
Status of Action: On-going
Resources Required: Additional funds $100K-$999K

Action WR-1.8 Develop alternative water supply strategies

Broward County work in coordination with all utilities and municipalities should develop and implement alternative water supply strategies and programs that serve to meet future demands and mitigate future water shortages.

Planning Horizon: Short term
Status of Action: In Progress
Resources Required: Additional staff time and funds

Action WR-1.9 Protect Wastewater Treatment Plants and collection systems from infiltration and inflow

Broward County should work in coordination with all utilities and municipalities to maintain infrastructure protection and adaptation through infiltration and inflow program development to prevent loss of groundwater and additional treatment requirements.

Planning Horizon: Mid term
Status of Action: In Progress
Resources Required: Additional staff time and funds

Action WR-1.10 Convene a regional workshop to enhance resilience of water resources to climate change

Broward County should convene a regionally-focused workshop at the earliest practical time for scientists, engineers, water managers, planners, policymakers and other stakeholders to exchange knowledge and develop a comprehensive list of policy and planning recommendations for enhancing the resilience of Southeast Florida's water resources to the impacts of climate change.

Planning Horizon: Immediate
Status of Action: Pending
Resources Required: Additional staff time and funds

Action WR-1.11 Require construction to include a percentage of pervious areas to enhance water resources

Broward County should incorporate laws and regulations that require a percentage of pervious areas to capture and reuse rain water or recharge the Biscayne Aquifer. This would apply to new construction, redevelopment, additions, retrofits or modifications of property.

Planning Horizon: Short term
Status of Action: On-going
Resources Required: Additional staff time

MODELING, MONITORING AND MAPPING

Goal MM-1: Provide the Task Force, its Subcommittees and the Broward County Board of County Commissioners with the best possible scientific and technical information to use in developing strategies to mitigate and adapt to the

potential impacts of climate change to include changes in sea level rise, weather patterns, temperature, precipitation and hurricane frequency and intensity.

MODELING EFFORTS

Action MM-1.1 Encourage dedicated funding for modeling efforts

Encourage dedicated state and federal funding for modeling efforts and data gathering including monitoring of scientific data that improves our knowledge climate change impacts for Southeast Florida, including the down-scaling of global climate models to enable increased awareness of climate change predictions for Broward County.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time

Action MM-1.2 Develop and support local modeling and monitoring efforts

Broward County should support recurring and continued development of local integrated models and continuous data collection to help better predict the impacts of sea level rise on groundwater levels, saltwater intrusion, and drainage infrastructure including:

- Enhanced development and application of local hydrologic models
- Use of down-scaled climate models to improve knowledge of potential climate change impacts in Broward County.

Planning Horizon: Long term
Status of Action: On-going
Resources Required: Additional funds >$1M

Action MM-1.3 Provide for long term and regional modeling

Broward County should provide and/or participate in the long-term and regional monitoring of critical parameters to support related modeling efforts including:

- evapotranspiration in the urban areas
- water quality (especially temperature)
- hydrologic, geologic, and groundwater quality and levels
- precipitation
- groundwater withdrawals.

Planning Horizon: Long term
Status of Action: Pending

Resources Required: Additional funds >$1M

Action MM-1.4 Develop a regional Vital Signs monitoring network

Broward County should participate in the development and maintenance of a regional "Vital Signs" monitoring network of basic indicators of climate change as local documentation of long-term climate changes with relevance across the Southeast Florida region. To potentially include:

- Precipitation
- Saltwater intrusion
- Air/Water temperature
- Tidal gauge measurements.

Planning Horizon: Mid term
Status of Action: Pending
Resources Required: Additional staff time

MAPPING EFFORTS

Action MM-1.5 Improve inundation mapping capabilities

Broward County should improve analysis and mapping capabilities for identifying areas of the County vulnerable to sea level rise by utilizing the most recent LiDAR data. Map potential impacts of sea level rise to the natural and built environments of Broward County at 1-foot, 2-foot, and 3-foot levels of increase and consider this information in long term planning. Acquire updated LiDAR data or state-of-the-art elevation data every 10 years to improve available information needed to make informed decisions regarding adapting to the impacts of climate change.

Planning Horizon: Short term
Status of Action: In Progress
Resources Required: Additional funds $100K-$999K

Action MM-1.6 Develop new 100 year storm maps

Broward County should set new parameters for water management by developing new 100 year storm elevation projections in the Broward County 100 year flood map for use in stormwater management permitting which reflect current and projected conditions for sea level rise as recommended by the Climate Change Task Force.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time

Action MM-1.7 Incorporate sea level rise/storm surge impacts into maps of hazard areas
Broward County should work with the Florida Division of Emergency Management and other agencies to incorporate sea level rise and increasing storm surge impacts into its efforts to remap potential hazard areas in coastal zones. Revised hazard area designations should better reflect the risks to communities associated with climate change and al low reevaluation of suitability for development in these areas.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time and funds

Action MM-1.8 Encourage FEMA to consider sea level rise in flood map updates
Broward County should request that the Federal Emergency Management Agency (FEMA) take into consideration sea level rise projections for at least a 25-year period when updating the Flood Insurance Rate Maps (FIRM) which establish base flood elevations, flood zones and flood plain boundaries.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time

REGIONAL TECHNICAL RESOURCES
Action MM-1.9 Engage technical support of federal agencies on climate change scenarios
Broward County should engage the support of federal agencies, such as NOAA, USGS, Federal Emergency Management Agency (FEMA), the U.S. Department of Interior, and the U.S. Army Corps of Engineers (USACE), that can provide technological and logistical support and work with state, county, and local planning bodies to develop regional scenarios of climate change and analyze potential changes in vulnerability.

Planning Horizon: Mid term
Status of Action: Initiated
Resources Required: Additional staff time

Action MM-1.10 Coordinate regionally to analyze sea level rise, drainage and hurricane impacts
Broward County should coordinate regionally with other Southeast Florida counties, academia,

and government agencies in the analysis of sea level rise, drainage and hurricanes impacts and the planning of adaptation measures.

Planning Horizon: Short term
Status of Action: Initiated
Resources Required: Additional staff time and funds

Goal MM-2: Develop a natural systems monitoring program, similar to "Vital Signs" following the National Park Service, to serve as a multi-parameter ecosystem monitoring program that will help track climate change effects. Expand current ongoing monitoring efforts, such as those within the Comprehensive Everglades Restoration Plan (CERP), to include specific areas of Broward County to provide a better view of how natural areas are changing over time and what forces are responsible.

Action MM-2.1 Dedicate a source of funds for monitoring

Dedicate a source of funds to collect information and establish and maintain a long-term data management system that will permit periodic adaptation in management protocols to deal with perceived changes.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional funds $100K-$999K

Action MM-2.2 Develop a vital signs status and trends monitoring program for biological communities

Broward County should develop a comprehensive adaptive status and trends monitoring program of the biotic and abiotic environment. Establish an integrated network of early warning signs at sites on terrestrial and aquatic lands to track long-term changes in biological communities and processes. Key parameters may include: rate of sea level rise; saltwater intrusion boundary and monitoring wells; landscape level vegetation patterns; percent coral cover in offshore reef zones; water temperature and pH in areas; and occurrence and range of invasive exotic plant and animal species; relative benthic cover and species diversity; size class structure of stony corals; recruitment patterns of dominant epibenthose; disease and stress status of stony corals, octocorals and sponges; and fish population dynamics. Abiotic elements shall include sedimentation on hard bottom communities and water quality. Examine and evaluate funding opportunities and sources. If funding opportunities exist, develop a strategic approach to pursue funding partnerships.

Planning Horizon: Mid term
Status of Action: Pending
Resources Required: Additional staff time

ZONING AND BUILDING CODES

Goal ZB-1: Identify measures to reduce greenhouse gas emissions through changes in building codes and practices.

Action ZB-1.1 Support Energy Code changes

Broward County should support changes to Florida's Residential Energy Code recommended within the report "Effectiveness of Florida's Residential Energy Code: 1979-2009" completed by the Florida Solar Energy Center on June 15, 2009 for the Florida Department of Community Affairs. The Report recommends that all home energy uses be covered by the Code and that additional measures be required to increase energy efficiency in new residential construction.

Planning Horizon: Immediate
Status of Action: Pending
Resources Required: Existing Resources

Action ZB-1.2 Encourage green and climate impact resistance construction practices

Broward County should encourage greener, more efficient, and more durable construction practices locally by establishing an ongoing process to address local zoning and building code requirements that recommend the following:

- encourage all municipalities (consistent with 2008 State Energy Bill HB 7135) and commercial builders to adopt a policy of requiring Leadership in Energy and Environmental Design™ (LEED) or acceptable green design standards on construction of all new and renovated public buildings and commercial space
- encourage builders to construct all new buildings to meet LEED standards or similar green building standards
- encourage each municipal building department to have at least one LEED (or similar certification) accredited official on staff within a two-year time frame
- encourage licensed personnel in each building department to have at least 8 continuing education units (CEUs) of emerging energy efficiency and renewable energy technologies with the next two year cycle

- incorporate specifications that will require accredited individuals on design teams and incorporation of green building practices
- base finish floor elevation standards on projected sea level rise scenarios and flooding potential
- incorporate building design specifications that increase resistance to impacts from more frequent and more intense storm events
- review regulations to determine if alternative building foundations are allowable such as anchoring to solid sea floor but allowed to float with rising water; or build "living floor" above service floor i.e. typical Key West home.

Planning Horizon:	Short term
Status of Action:	In Progress
Resources Required:	Additional funds $10-$100K

MASS TRANSIT/VEHICLE MILES TRAVELED

Goal MT-1: Create a functional mass transportation system that will reduce the current level of vehicle miles travelled and the amount of carbon emissions.

Action MT-1.1 Create a functional mass transportation system with a dedicated source of funding

Broward County should create a functional mass transportation system by:

- creating a dedicated funding source for mass transit, supporting existing state and federal funding efforts, and pursuing additional local transit funding opportunities
- funding, supporting, and empowering the South Florida Regional Transportation Authority (RTA) to ensure the mass transit system functions on a regional level; and provide oversight to the RTA
- providing the infrastructure and support facilities to encourage and enhance the use of mass transportation. This supports the Broward MPO 2035 Long Range Transportation Plan which includes:
    - bus rapid transit;
    - rail transit;
    - transit hubs;
    - managed lanes on roadways;
    - centralized parking facilities; and
    - improved bicycle and pedestrian facilities.

Planning Horizon: Immediate
Status of Action: Pending
Resources Required: Additional funds

Action MT-1.2 Set vehicle miles travelled reduction goal
Broward County should establish a 1% per year reduction in vehicle miles travelled (VMT) for the initial twenty (20) years and a 1.5% reduction in VMT for the next twenty (20) years thereafter as the standard to determine the success of the mass transit system.

Planning Horizon: Long term
Status of Action: Pending
Resources Required: Additional staff time

RENEWABLE AND ALTERNATIVE ENERGY

Goal RA-1: Support the expansion of renewable and alternative energy sources and remove the encumbrances to projects that support sustainability.

Action RA-1.1 Support legislation to establish a 20% renewable portfolio standard
Broward County should support state legislation which is consistent with the 2008 Florida Energy and Climate Change Action Plan to establish a 20% renewable portfolio standard for 2020. Additionally "carve out" a certain percentage of the Renewable Portfolio Standard for distributive and solar energy as "Renewable Distributive".

Planning Horizon: Immediate
Status of Action: Initiated
Resources Required: Existing resources

Action RA-1.2 Support public access to alternative fuels and electric infrastructure
Broward County should facilitate the development of infrastructure that provides public access to alternative fuels and electric charging stations, including development and adoption of interlocal agreements with County, State, municipal and private entities to share existing and proposed infrastructure that supports and promotes alternative fuel use.

Planning Horizon: Short term

Status of Action: Pending
Resources Required: Additional funds $10K-$100K (Grant funds awarded to upgrade CNG fueling infrastructure)

Goal RA-2: Promote and support actions to increase the proportion of electricity generated by alternative and renewable energy, such as solar power, from residential, commercial and municipal properties within Broward County's geographic boundaries.

Action RA-2.1 Develop permitting fee incentives for renewable and alternative energy installations

Broward County should develop an incentive program within Building Code Services by June 2010 which waives permit fees for renewable and alternative energy installations through 2015. Determine if permitting inhibits development of alternative and renewable energy installations such as solar and work to remove barriers.

Planning Horizon: Immediate
Status of Action: Pending
Resources Required: Additional staff time

RECYCLING/ZERO WASTE

Goal RZ-1: Establish policies and take administrative actions that reduce the disposal of municipal solid waste (MSW) in landfills and promote full utilization of existing infrastructure for waste-to-energy conversion.

Action RZ-1.1 Fully utilize Waste-to-Energy Plant capacity

Broward County, in collaboration with the Resource Recovery Board, should fully utilize Waste-to-Energy Plant capacity by encouraging all municipalities to redirect all non-recyclable processable municipal solid waste from landfills to local waste-to-energy plants, achieving 90% biomass conversion of MSW by 2012.

Planning Horizon: Immediate
Status of Action: On-going
Resources Required: Additional staff time

Action RZ-1.2 Require landfill cost evaluation of gas-to-energy conversion

Broward County, in collaboration with all its municipalities, should require landfills to evaluate the cost effectiveness of landfill gas to energy conversion.

Planning Horizon: Short term
Status of Action: Complete
Resources Required: Existing resources

Goal RZ-2: Reduce landfill disposal 75% by 2020, through increasing the recycling rate by 50% and converting 25% of the waste to energy using renewable energy technology.

Action RZ-2.1 Implement single-stream recycling

Broward County, in collaboration with all its municipalities, should fully implement single-stream curbside residential recycling to include transitioning to recyclables collections utilizing roll-out.

Planning Horizon: Mid term
Status of Action: In Progress
Resources Required: Additional staff time and funds $100K-$999K

Action RZ-2.2 Implement plan to increase residential, organic and commercial recycling rate to 50%

To further achieve a recycling rate of 50%, Broward County, in collaboration with all its municipalities, should consider these additional measures, including those which ensure consistency with Broward County's Comprehensive Plan proposed Solid Waste element:

<u>Residential Recycling</u>

- implement use of residential recycling incentives, such as RecycleBank / Recycle Rewards
- develop and implement actions that provide for increased on-site recycling at multi-family properties. Condominium and apartment style housing units make up 40-45% of households in Broward County
- consider and review adoption of mandatory residential participation ordinances
- expand network of municipal recycling drop-off centers to supplement curbside recycling and on-site multi-family recycling efforts
- support state and federal beverage container deposit initiatives (e.g. Bottle Bills) which include linkage of unredeemed deposits dedicated to Recovered Material Processing Facilities (MRF) and municipal recycling program recovery efforts
- expand electronics recycling recovery and services through an increase in electronics

recycling-Household Hazardous Waste joint events, electronics-only events, permanent public drop-off sites and promotion of alternate electronics recycling options (retailer take-back)

- establish 1-1-1 (once weekly garbage, recyclables and yard waste collections), or variable rate (Pay as You Throw or "PAYT") solid waste and recycling collection systems.

Organic Waste Recycling

- establish organics processing and markets infrastructure to accept green waste, woody wastes and other organics. Support current state ban on disposal of segregated yard trash loads to ensure highest and best use of yard trash including composting and mulching
- extend green waste recycling to residences through modification of municipal solid waste franchise agreements to provide separate collections of yard waste and possibly other organics (food waste and contaminated paper). Establish and support increased recycling of yard waste at residential drop-offs
- establish programs to implement food waste recycling and composting programs including food generated by supermarkets, schools, institutions or large commercial food preparation settings to appropriate facilities for composting
- direct the processing and recycling of green and woody waste generated from road and right-of-way maintenance.

Business and Institutional Recycling

- enhance or establish recycling programs at Broward County agencies, Fort Lauderdale-Hollywood International Airport, Port Everglades, Broward County Public Schools, municipal government buildings and facilities, colleges and other public institutions
- expand or establish recycling at commercial establishments through, incorporation of commercial recycling service rates into municipal franchise agreements and allowance for "right-sizing" of commercial solid waste service through revision of city ordinances (if necessary). Design County technical assistance, workshops, and outreach programs as appropriate
- extend or expand public place recycling including at parks, sports venues, tourist destinations, beaches, transportation hubs, shopping areas, streetscapes, etc.
- require food and beverage container recycling and possibly food waste recycling at all bars, restaurants and institutions with food services (schools, college campuses, hospitals and prisons).

Construction and Demolition (C&D) Debris Recycling

- require pre-processing of C&D as an element of franchise/license agreements, building permits or ordinances with possible incentives (fee rebates)
- link C&D recycling (on-site or off-site), and use of recycled building materials within a pre-disposal processing requirement with extension of LEED credits.

Planning Horizon: Mid term
Status of Action: In Progress
Resources Required: Additional staff time and funds >$1M

Action RZ-2.3 Adopt environmentally preferable purchasing policies
Broward County should adopt Environmentally Preferable Purchasing Policies that utilize the collective buying power of local governments to purchase products made with recycled materials and reduce packaging and toxicity, and provide model for business and other organizations.

Planning Horizon: Mid term
Status of Action: Pending
Resources Required: Additional personnel and funds $100K-$999K

MARKETING AND INCENTIVES

Goal MI-1: Develop plans and programs in coordination with Broward County, local municipalities and power companies to expand the market for energy efficient products and services to reduce greenhouse gas emissions and expand the employment base and "green" job opportunities.

Action MI-1.1 Expand alternative energy and green products market
Broward County should expand the market in the County for alternative energy and energy efficient products and services. A variety of strategies should be used to achieve this objective including, but not limited to, identifying barriers to the use of new technology; identifying strategies to overcome barriers; producing informational materials on the cost and benefits of alternative energy and energy efficient products; and, promoting awareness of financial incentives available through existing governmental and utility programs.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time

Action MI-1.2 Promote energy conservation retrofits
Broward County should promote the retrofitting of existing buildings with proven energy saving efficiency measures such as insulation, new windows and doors, more efficient lighting, new

efficient ventilation and air conditioning systems and high performance appliances.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time and funds (Grant funding obtained which will provide partial funding)

Goal MI-2: Support the expansion of energy conservation, renewable and alternative energy sources through public and private financing mechanism.

Action MI-2.1 Evaluate a bond-funded renewable finance district program

Broward County should evaluate the development of a Bond-Funded Renewable Finance District program or similar program that enables homeowners to pay back the cost of energy conservation, efficiency and renewable energy improvements through a voluntary special assessment.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time

Action MI-2.2 Create renewable energy offset revenue

Broward County should create renewable energy offset revenue by having a volunteer check box on property tax bill, car registration, or other billing instrument to pay for specific renewable energy programs.

Planning Horizon: Short term
Status of Action: Pending
Resources Required: Additional staff time

Action MI-2.3 Assist low income households with energy retrofit

Broward County should support continued Federal, State and local agencies and utilities efforts to provide assistance programs to low income households, such as the Federal Weatherization Assistance Program, to renovate existing homes to increase energy conservation.

Planning Horizon: Long term
Status of Action: Pending
Resources Required: Additional staff time and funds

OUTREACH AND COMMUNICATIONS

Goal OC-1: Provide broad community outreach and education about climate change actions to include mitigation and adaptation strategies and the expected cost of inaction; and embrace allies in promoting green public education.

Action OC-1.1 Participate in regional outreach campaign

Broward County should participate in a regional campaign, utilizing and enhancing existing County communication outlets, to influence and coordinate a major public outreach and education campaign using high profile media and other appropriate communication outlets, to raise general awareness of climate change impacts in Southeast Florida, with special attention to making the connections between local mitigation and adaptations practices and policy changes. This comprehensive effort will involve collaboration with neighboring counties and their respective climate change task forces, local governments within Broward County, regional and state agencies as well as federal partners.

Planning Horizon:	Short term
Status of Action:	Pending
Resources Required:	Additional personnel and funds (Grant funding obtained which will provide partial funding)

Action OC-1.2 Dedicate funding for sustained public education on transit

Create a dedicated funding source for an all inclusive sustainability public education program, develop the implementation program, and design a performance monitoring plan to ensure the success of the education program. Ensure the following specific focal components are included in the program: Alternative Fuels; Decreasing Vehicle Miles Traveled (VMT); Increase in Vehicle Efficiencies; Use of Mass Transit; History of Transportation; Pedestrian and alternative vehicle uses; and Public Capacity to bring about Change

Planning Horizon:	Short term
Status of Action:	Pending
Resources Required:	Additional funds (Grant funding obtained which will provide partial funding)

Action OC-1.3 Exchange information with stakeholders on adaptation practices

Broward County should participate in the exchange of information on resources and best

practices which address adaptations to infrastructure and transportation among government, the private sector, and other stakeholders.

Planning Horizon:	Short term
Status of Action:	Pending
Resources Required:	Additional personnel

CONCLUSION

Climate change, especially sea level rise, will have a significant impact on the Broward County. The breadths of the topic areas covered in this Action Plan reflect the potential of climate change to impact every aspect of life here. The significant number of climate change mitigation and adaptation recommendations made reinforce the fact that action will be required to create a sustainable and climate-resilient community. While action is already being taken on many of the recommendations, substantial staff time, new personnel and financial resources would be required to implement all action items fully. Should the Board accept and approve the recommendations, new and alternative funding options would be required to proceed with many of the action items.

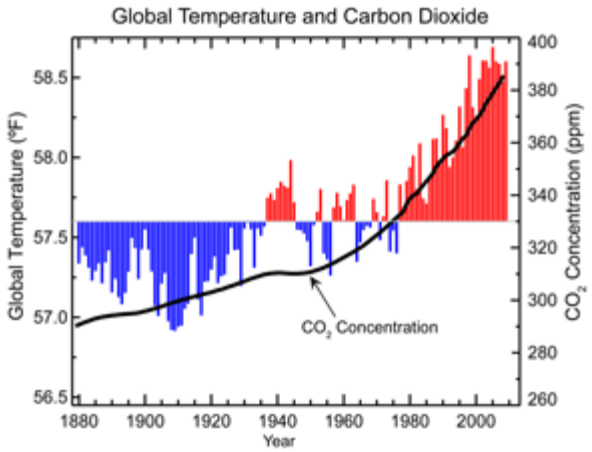
APPENDIX A
Global Indicators of Climate Change

The following information on Global Climate Change Indicators has been excerpted from the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center website http://www.ncdc.noaa.gov/indicators/ in February 2010. Additional information on the science behind climate change with specific application to Florida may be found in "Appendix 1- Climate Change Science" (pages 50-72) of Florida's Resilient Coasts: State Policy Framework for Adaptation to Climate Change: 2008 (http://www.ces.fau.edu/files/projects/climate_change/FI_ResilientCoast.pdf). A variety of internet links on climate science, climate skeptic and related climate change topics may be found at http://www.broward.org/NaturalResources/ClimateChange/Pages/links.aspx.

How do we know the Earth's climate is warming?

Thousands of land and ocean temperature measurements are recorded each day around the globe. This includes measurements from climate reference stations, weather stations, ships, buoys and autonomous gliders in the oceans. These surface measurements are also supplemented with satellite measurements. These measurements are processed, examined for random and systematic errors, and then finally combined to produce a time series of global average temperature change. A number of agencies around the world have produced datasets of global-scale changes in surface temperature using different techniques to process the data and remove measurement errors that could lead to false interpretations of temperature trends. The warming trend that is apparent in all of the independent methods of calculating global temperature change is also confirmed by other independent observations, such as the melting of mountain glaciers on every continent, reductions in the extent of snow cover, earlier blooming of plants in spring, a shorter ice season on lakes and rivers, ocean heat content, reduced arctic sea ice, and rising sea levels.

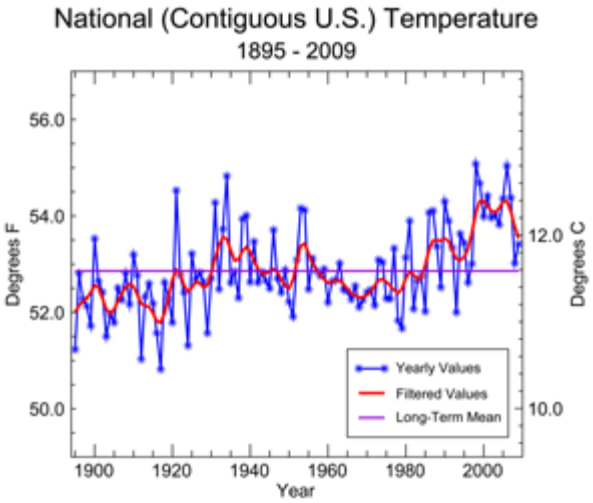
The Global Surface Temperature is Rising



Global annual average temperature measured over land and oceans. Red bars indicate temperatures above and blue bars indicate temperatures below the 1901-2000 average temperature. The black line shows atmospheric carbon dioxide concentration in parts per million.

Global average temperature is one of the most-cited indicators of global climate change, and shows an increase of approximately 1.4°F since the early 20th Century. The global surface temperature is based on air temperature data over land and sea-surface temperatures observed from ships, buoys and satellites. There is a clear long-term global warming trend, while each individual year does not always show a temperature increase relative to the previous year, and some years show greater changes than others. These year-to-year fluctuations in temperature are due to natural processes, such as the effects of El Niño's, La Niña's, and the eruption of large volcanoes. Notably, the 20 warmest years have all occurred since 1981, and the 10 warmest have all occurred in the past 12 years.

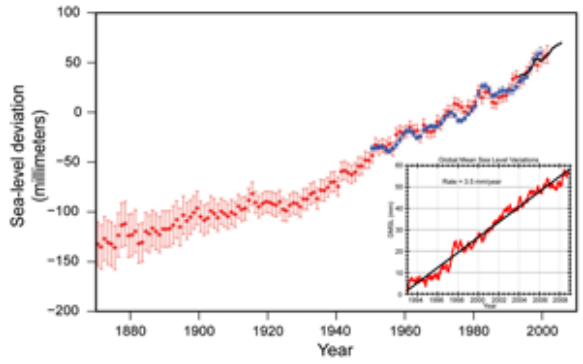
U.S. Surface Temperature is also Rising



Annual surface temperatures for the contiguous U.S. compared to the 20th Century (1901-2000) average. Calculated from the U.S. Historical Climatology Network (USHCN version 2). More information: U.S. Surface Temperature Data, USHCN v2.

Surface temperatures averaged across the U.S. have also risen. While the U.S. temperature makes up only part of the global temperature, the rise over a large area is not inconsistent with expectations in a warming planet. Because the U.S. is just a fraction of the planet, it is subject to more year-to-year variability than the planet as a whole. This is evident in the U.S. temperature trace.

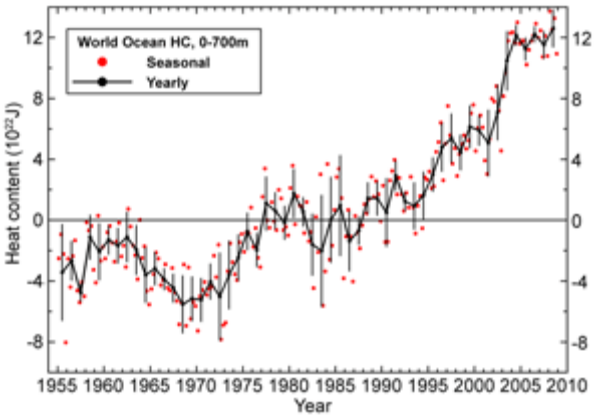
Sea Level is Rising



Annual averages of global sea level. Red: sea-level since 1870; Blue: tide gauge data; Black: based on satellite observations. The inset shows global mean sea level rise since 1993 - a period over which sea level rise has accelerated. More information: Coastal Sensitivity to Sea Level Rise (USGCRP) and Climate Change 2007: The Physical Science Basis.

Global mean sea level has been rising at an average rate of approximately 1.7 mm/year over the past 100 years (measured from tide gauge observations), which is significantly larger than the rate averaged over the last several thousand years. Since 1993, global sea level has risen at an accelerating rate of around 3.5 mm/year. Much of the sea level rise to date is a result of increasing heat of the ocean causing it to expand. It is expected that melting land ice (e.g. from Greenland and mountain glaciers) will play a more significant role in contributing to future sea level rise.

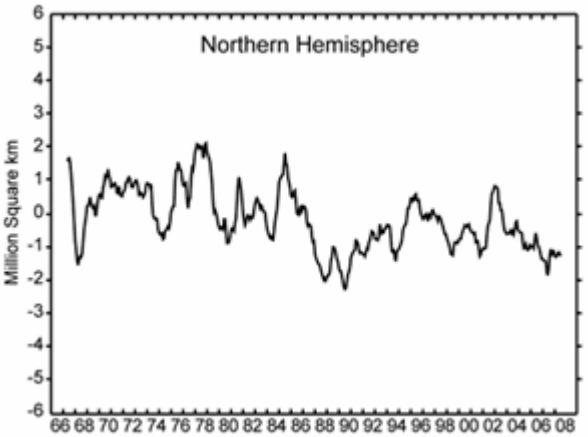
Global Upper Ocean Heat Content is Rising



Time series of seasonal (red dots) and annual average (black line) of global upper ocean heat content for the 0-700m layer since 1955. More information: *BAMS* State of the Climate in 2008.

While ocean heat content varies significantly from place to place and from year-to-year (as a result of changing ocean currents and natural variability), there is a strong trend during the period of reliable measurements. Increasing heat content in the ocean is also consistent with sea level rise, which is occurring mostly as a result of thermal expansion of the ocean water as it warms.

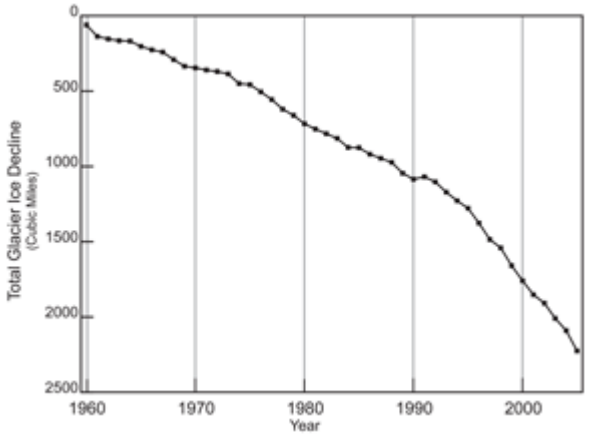
Northern Hemisphere Snow Cover is Retreating



Left: Average of monthly snow cover extent anomalies over Northern Hemisphere lands (including Greenland) since Nov 1966. Right: Seasonal snow cover extent over Northern Hemisphere lands since winter 1966-67. Calculated from NOAA snow maps. From *BAMS* State of the Climate in 2008 report.

Northern Hemisphere average annual snow cover has declined in recent decades. This pattern is consistent with warmer global temperatures. Some of the largest declines have been observed in the spring and summer months.

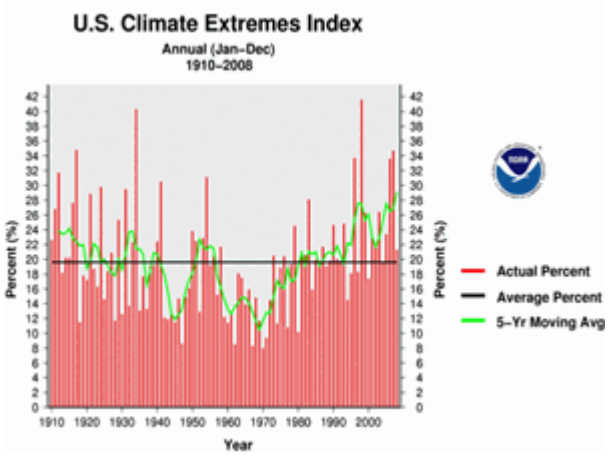
Glacier Volume is Shrinking



Cumulative decline (in cubic miles) in glacier ice worldwide. More information: Global Climate Change Impacts in the U.S.

Warming temperatures lead to the melting of glaciers and ice sheets. The total volume of glaciers on Earth is declining sharply. Glaciers have been retreating worldwide for at least the last century; the rate of retreat has increased in the past decade. Only a few glaciers are actually advancing (in locations that were well below freezing, and where increased precipitation has outpaced melting). The progressive disappearance of glaciers has implications not only for a rising global sea level, but also for water supplies in certain regions of Asia and South America.

U.S. Climate Extremes are Increasing



Annual Climate Extremes Index (CEI) value for the contiguous United States. Larger numbers indicate more active climate extremes for a year. More information: CEI.

One way climate changes can be assessed is by measuring the frequency of events considered "extreme" (among the most rare of temperature, precipitation and storm intensity values). The Climate Extremes Index (CEI) value for the contiguous United States is an objective way to determine whether extreme events are on the rise. The figure to the left shows the number of extreme climate events (those which place among the most unusual of the historical record) has been rising over the last four decades.

Tropical Cyclones and Climate Change

A peer-reviewed article appearing in the scientific journal, Nature Geoscience, in February 2010 addressed tropical cyclones and climate change. The authors find that global hurricane intensity will increase an average of 2–11% by 2100. Tropical storm frequency will decrease by an average of 6–34%. Further, storm-related rainfall will increases on order of 20% within 100 km of storm's center.

Thomas R. Knutson, John L. McBride, Johnny Chan, Kerry Emanuel, Greg Holland, Chris Landsea, Isaac Held, James P. Kossin, A. K. Srivastava & Masato Sugi. 2010. Tropical cyclones and climate change. Nature Geoscience 3, 157–163. | doi:10.1038/ngeo779.

APPENDIX B
POTENTIAL EFFECTS FROM CLIMATE CHANGE

The list of 79 significant potential effects on the human and native ecosystems from anticipated climate change was derived from review of 354 professional source documents from federal, state, local, academic and planning sources*.

Air Temperature and Chemistry

1. Elevated atmospheric carbon dioxide
2. Higher temperatures increase the rate of smog formation.
3. Increased air temperatures affect hydrology, water quality and habitats in wetlands.
4. Increased air temperatures contribute to changes in geomorphology and habitats at coastlines.
5. Increased unhealthful levels of ozone pollution
6. Increases in global surface temperatures
7. Timing of seasonal temperature changes is disrupted.

Altered Hydrology

8. Altered timing of seasonal changes
9. Changes in precipitation will contribute to erosion, flooding and runoff at coastlines.
10. Changes in rainfall patterns and amounts change agricultural yields.
11. Drought caused by increased atmospheric temperatures
12. Drought causes lower stream flows.
13. Rising sea temperatures causes increased frequency of droughts and floods.

Climate Instability

14. Higher humidity from increased atmospheric/aquatic temperatures
15. Higher maximum temperatures, more hot days and heat waves over nearly all land areas
16. Higher, stronger storm surges
17. Increase in hurricane intensity
18. Increase in precipitation including heavy and extreme precipitation events
19. Increased storm frequency and intensity
20. Rising sea temperature causes a 5 or 10% increase in hurricane wind speed.
21. Sustained climate change
22. Wildfires resulting from increased atmospheric temperatures (in combination with increased drought)
23. Altered rainfall and runoff patterns

Geomorphic Changes

24. Responses to sea level rise cause ground subsidence.
25. Sea level rise adds to soil subsidence with changes to sediment.
26. Sea level rise changes coastlines.
27. Sea level rise reduces ability of barrier islands to shield coastal areas from higher storm surges.
28. Greater instability of beaches and inlets

Habitat and Species Changes

29. Changes in precipitation will affect wetlands differently with regional increase or decrease
30. Changes to phenology of anadromous fishes
31. Climate changes affect amphibian populations' ranges, health, and phenology.
32. Climate changes affect phenology of pest and beneficial insects.
33. Conversion of wetlands to open water
34. Increased air temperatures affect animal health.
35. Increased atmospheric temperatures can push ecosystems northward in the state.
36. Increased harmful algal blooms
37. Increased numbers and altered ranges of jellyfish
38. Increased sea surface temperature results in die-offs of sponges, sea urchins, sea grasses (not mobile).
39. Increased sea temperatures can cause coral bleaching and death of corals.
40. Migration of low marsh into high marsh
41. Moth phenology shifts to earlier dates.
42. Retreating shorelines result in loss of wetlands.
43. Sea level rise causes migration/depletion of seagrass beds.
44. Sea level rise changes wetlands.
45. Shift in bird behavior phenology
46. Spread of invasive native species
47. Spread of invasive non-native species
48. Temperature increase affects biological systems decreasing biodiversity.
49. Changes in aquatic food webs
50. Changes in terrestrial food webs
51. Climate change causes major faunal range shifts.

Sea Level Rise

52. More rapid sea level rise than previously predicted
53. Sea level rise alters hydrology, water quality and habitats in wetlands.
54. Sea level rise causes erosion.
55. Sea level rise causes geomorphologic, hydrological and water quality changes at coasts.
56. Sea level rise resulting from increased temperature and expansion of water volume
57. Sea level rise resulting from the melting arctic ice sheet
58. Sea level rise results in higher high tides.

Water Temperature and Chemistry

59. Acidification of marine waters
60. Increase in hypoxia (low dissolved oxygen)
61. Increased sea surface temperature causes geomorphic, hydrologic, and ecologic changes at the coastline.
62. Increased sea surface temperatures affect coastlines.

63. Marine thermal stratification
64. Winter lake temperatures may increase.
65. Changes in nutrient supply and nutrient recycling, and food webs

Human Economy

66. Changes in estuarine water quality will affect ecosystem services.
67. Increased threats to coastal potable water supplies
68. Climate change adaptations reduce wetland ecosystem services.
69. Climate change and sea level rise will have economic consequences for
    - commercial fisheries,
    - sports fisheries,
    - coastal tourism,
    - coastal development,
    - transportation development, and
    - critical facilities.
70. Increasing population growth and wealth structure vastly raises potential financial damage a storm can inflict.
71. Highly variable temperatures will alter the state's tourist economy.

Human Health

72. Increased temperatures affect waterborne disease and parasitism.

Infrastructure

73. Additional regulation of energy providers (power plants)
74. Higher atmospheric temperatures affect infrastructure.
75. Sea level rise stresses infrastructure physically.

Land Use Changes

76. Sea level rise pushes human habitation inland.
77. Sea level rise reduces the amount of land available for conservation.

Variable Risk

78. Increased atmospheric and/or aquatic temperatures cause risk models to become obsolete.
79. Sea level rise causes risk models to become obsolete.

*Beever, III, J.W., W. Gray, D. Trescott, D. Cobb, J. Utley and L.B. Beever 2009. Comprehensive Southwest Florida/Charlotte Harbor Climate Change Vulnerability Assessment. Southwest Florida Regional Planning Council and Charlotte Harbor National Estuary Program, Technical Report 10-1, 311 pp.

APPENDIX C
CLIMATE CHANGE TASK FORCE MEMBERS, SUBCOMMITTEE MEMBERS AND CONTRIBUTING COUNTY STAFF

The accomplishments of the Broward County Climate Change Task Force would not have been possible without the dedication of its members, the Steering Committee (chairs of the subcommittees and the Chair of the Task Force), the many volunteers and County staff who committed their time and expertise to serve on the subcommittees. This appendix is organized by the categories identified in the authorizing resolution (Resolution 2008-442).

Climate Change Task Force Members

County Representatives (3)

Kristin Jacobs, Task Force Chair	County Commissioner
Peter Ross	Environmental Protection and Growth Management Deputy Director
Tony Hui	Public Works Department Director
Thomas Hutka	Public Works Department Director (replaced Tony Hui)

At Large (5)

Robert Renken	United States Geological Survey
Hector Samario	US Green Building Council
George Cavros	Environmental Attorney
Brion Blackwelder	Nova Law
Patrick J. Gleason, Ph.D.	CDM

Water Advisory Board (1)

Barry Heimlich	Broward County Water Advisory Board

School Board of Broward County (1)

Michael Garretson	School Board of Broward County

Broward League of Cities (2)

Jared E. Moskowitz	Vice Mayor Parkland; Broward League of Cities
Roseann Minnet	Mayor Lauderdale-By-The-Sea; Broward League of Cities

Hospital District (1)

Charlotte Mather	Broward Health North Broward Hospital District

Climate Change Task Force Members (cont)

Broward Sheriff's Office (1)

Major Larry Rogers	Broward Sheriff's Office

South Florida Water Management District (1)

Kim Shugar	South Florida Water Management District

Universities/Academic Institutions (2)

Jim Murley	Center for Urban and Environmental Solutions, Florida Atlantic University
Colin Hughes, Ph.D.	Florida Atlantic University

Environmental Organizations or Interests (2)

Peg McPherson	Environmental Interest
Doug Young	South Florida Audubon

Florida Power and Light (1)

Lynn Shatas	Florida Power and Light

Business and Economic Interests (3)

John Pisula	State Farm Insurance
Robert Kornahrens	Broward Workshop/Adv Roofing and Adv Green Technology
Dylan Larson	Builders Association of South Florida/Miller Legg

Florida Department of Transportation (1)

Lois Bush	Florida Department of Transportation

South Florida Regional Planning Council (1)

Carolyn A. Dekle	South Florida Regional Planning Council

Special Advisor to the Task Force (non member)

John Van Leer, Ph.D.	University of Miami

Contributing County Staff

Climate Change Task Force Support Team

Jennifer Jurado, Ph.D., Director	Natural Resources Planning and Management Division
Donald Burgess	Natural Resources Planning and Management Division
Nancy J. Gassman, Ph.D.	Natural Resources Planning and Management Division
Patti Webster	Natural Resources Planning and Management Division
Jaclynn Conner	Natural Resources Planning and Management Division
Eric Myers	Environmental Protection and Growth Management Dept
Lorraine Bertone	Natural Resources Planning and Management Division
Clint Grethen	Natural Resources Planning and Management Division
Natasha Herne	Natural Resources Planning and Management Division
Paul Krashefski	Natural Resources Planning and Management Division
Michael Owens	County Attorney's Office

Communitywide Greenhouse Gas Emissions Inventory

Maribel Feliciano, Project Mgr	Pollution Prevention Remediation and Air Quality Division
Matthew R. Anderson	Pollution Prevention Remediation and Air Quality Division
Daniela Banu	Pollution Prevention Remediation and Air Quality Division
Josie Cisneros, MPH	Pollution Prevention Remediation and Air Quality Division
Scott Strauss	Pollution Prevention Remediation and Air Quality Division
Ana E. Suarez, Ph.D.	Pollution Prevention Remediation and Air Quality Division
Laurie Thomas	Pollution Prevention Remediation and Air Quality Division

Cost of Inaction – Vulnerability Assessment

Vicki Morrow	Planning and Redevelopment Division
Erin Musgrave	Planning and Redevelopment Division
Peter Ross	Environmental Protection and Growth Management Dept

Greenhouse Gas Reductions Subcommittee Members

Subcommittee Chair
Doug Young, South Florida Audubon, Subcommittee Chair
Sandra Lee, Calvin-Giordano, member and Subcommittee minutes support

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Alon Amit, Johnson Biofuels
Valerie J. Amor, Drawing Conclusions
Devin Avery, President, SFEconomic
MaryBeth Burton, Trash to Treasure Creative Reuse Center (non-profit)
Grant Campbell, Broward County Audubon
George Cavros, Environmental Attorney
David Coddington, REP Assoc
Jill Cohen, jbc planning & design
Nancy Cross, Energy Store
Howard Dean, ICTV1.com
Alex Dejtiar, CNGAS Group
Casey Eckels, Trash to Treasure Creative Reuse Center (non-profit)
Peter Foye, Broward County Waste & Recycling Services Division
Justin Freedman, E SCIENCES INC.
Nicholas Gadbois, Cyriacks Environmental Consulting Services, Inc
Anne Goldberg, Greenman Alliance
Jeff Green, Wise Gas, Inc.
Barry Heimlich, Florida Energy Imperative
Steve Jens-Rochow, Green League of Broward
Heike Lueger, Ph.D., Carbon Solutions America
Michael Madfis, The Madfis Group
Maria Rotunda, Earthprints
Michael O'Brien, Green League of Broward
Fleming Ray, MGM International
Lynn Shatas, Florida Power and Light
John Shave
Hedvah Shuchman, Broward County Audubon
Christine Slager, Wise Gas, Inc.
Horacio Terzaghi, CNGas Group
Manuel F. Valle
Mark Westfall, City of Coral Springs

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Donald Burgess, Broward County Natural Resources Planning and Management Division
Beth Kuttner, Broward Metropolitan Planning Organization

Greenhouse Gas Reductions Subcommittee Members (cont)

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Jack Fisher, Broward County Permitting, Licensing and Consumer Protection Division
John Pipoly, Ph.D., Broward County Parks and Recreation Division, Extension Education

Renewable and Alternative Energy Subcommittee Members

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Rob Kornahrens, Advanced Green Technology, Subcommittee Chair
Kim Campanile, Advanced Green Technology, Subcommittee minutes support

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Members
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Alon Amit, Johnson Biofuels
Yannick Ayache, FL Green Energy
Brion Blackwelder, Nova Southeastern University Law Center
Yann Brandt, Advanced Green Technology
Jack Castro, Advanced Green Technology
Rosana Cordova, CRA Engineering
Nancy Cross, Energy Store
Renee Cross, City of Fort Lauderdale
Fran Davis, Fortune Studio Design
Alex Dejtiar, CNGAS Group
Norman Fisher, Clean Light Green Light
Anne Goldberg, Greenman Alliance
Jeff Green, Wise Gas, Inc
Gary Hecker, Ecology Party
Barry Heimlich, Florida Energy Imperative
Steve Holmes, Vyridian Group
David Lewis, Advanced Green Technology
Bill Lodato, Innovative Facility Solutions, Inc.
Keith London, Commissioner City of Hallandale Beach
Debra Miller, The Kids Ecology Corps
Roseann Minnet, Mayor, Lauderdale-By-The-Sea
Elaina Modlin, Geosyntec
Joshua Nichols, LEED AP, Cloudbreak Planning Group
Christian Petrie, FL Green Energy
John Pisula, State Farm Insurance
Fleming Ray, MGM International
Jamie Schlinkmann, Inergy
Lynn Shatas, Florida Power and Light
Joe Stepenovitch, IRGEnergy
Horacio Terzaghi, CNGAS Group

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Donald Burgess, Broward County Natural Resources Planning and Management Division
Jack Fisher, Broward County Permitting, Licensing and Consumer Protection Division
Armando Linares, Broward County Permitting, Licensing and Consumer Protection Division
Peter Foye, Broward County Waste & Recycling Services Division
Robert Rudolph, Broward County Natural Resources Planning and Management Division

Intergovernmental Affairs and Communication Subcommittee Members

Subcommittee Chair
Carolyn A. Dekle, South Florida Regional Planning Council, Subcommittee Chair
Isabel Cosio Carballo, South Florida Regional Planning Council, Subcommittee minutes support

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APPENDIX D

SUBCOMMITTEE FOCAL AREAS

At their initial meetings, the Broward County Task Force Subcommittees determined a set of focal areas around which they would develop their recommendations.

Built Environment Focal Areas

1. Infrastructure
    - nourished beach and dune systems
    - roads, highways, bridges, and causeways
    - electrical power plants
    - railroads
    - seaports and airports
    - waterways (canals and levees)
    - public works
2. Planning & Zoning (Process & Implementation)
    - Goals
    - policies
    - programs
    - funding
    - measures of progress and success
3. Water
    - water supply systems that draw from aquifers
    - centralized wastewater management systems
    - storm water management systems
4. Building Envelope (Structural)
    - commercial
    - residential
    - office
    - governmental
    - industrial
    - schools
    - hospitals
5. Insurance
6. Emergency Management

Economic, Social and Health Focal Areas

1. Greenhouse Gas Reduction Measures
2. Adaption Policies and Strategies
3. Mitigation of Impacts on Vulnerable Populations
4. Developing and Marketing Opportunities for Energy Efficient Products and Services

Greenhouse Gas Reductions Focal Areas

1. Built Environment
    - Energy efficient design and construction, Energy Star equipment and appliances, land use, and maintenance standards (e.g. green buildings, urban design, smart growth, landscaping)

2. Transportation
    - Mass transit, fuel efficient vehicles , alternative fuels, vehicle miles traveled
3. Consumption
    - Energy savings programs, conservation, waste reduction, recycling
4. Sequestration
    - Urban reforestation, carbon capture and sequestration

Natural Systems Focal Areas

1. Support Everglades Restoration Program (CERP) and other regional restoration initiatives
2. Determine environmental resources/natural systems that can be saved and evaluate strategies to make landscapes more hospitable for adaptations:
    - Values of natural systems (includes land and marine)
    - Exotic and nuisance species management
    - Urban landscape
    - Connectiveness of natural areas
    - Modeling may be needed
3. Review current stormwater management practices as it relates to impacts on natural systems
    - Evaluate impacts of saltwater intrusion
    - Changes in the groundwater table
    - Precipitation changes
    - Available water
    - Areas of inundation
4. Develop a “vital signs” monitoring program
    - Following model of the National Park Service
    - Long-term data to track changes and provide information to make decisions as climate change progresses

Intergovernmental Affairs and Communications Focal Areas

- Collect information and share with subcommittee (e.g. local, county, and state government policies, plans, surveys, projects, etc. known to subcommittee members and other examples found through follow-up research). This process would allow the subcommittee to gauge what is out there, compile for full Task Force, and also possibly identify what is still needed.
- Develop recommendations on how to educate people on climate change, and climate change mitigation. Website discussion was used as one example – there could be a recommendation that a government/public agency serve as clearing house to disseminate information on public events and general information. A private based organization could serve as a clearinghouse to provide information on “green” companies, products, etc.

- Develop recommendations intended to establish or promote a mechanism(s) to coordinate policy development, adoption and implementation amongst the various levels of government (state, regional, county, municipal). This type of effort could result in coordinated (or at least information sharing) updates to comp plans, local programs, funding requests, etc.

Renewable and Alternative Energy Focal Areas

Technologies – Focus on energy not fuels

- Biomass
  - Opportunities for Broward County
- Solar
  - Broward resource for solar
  - Shovel ready
- Wind
  - Wind resource studies
- Geothermal
  - HVAC Systems
- Ocean Energy
  - FAU

Next Steps

- Inventory of solar studies and roof space
  - Study by Navigant Consulting
- Wind studies on coastal buildings
- Recommendation at next Task Force meeting for shovel ready projects submitted for grants
- Research the Research

Science and Technical Focal Areas

1. Summary of Evidence
2. Sea Level Rise
   - Projections – range
   - Scientific opinion
3. Changes in Climate
   - Temperature increases
   - Weather patterns
   - Rainfall
   - Hurricanes - storm frequency & intensity
4. Uncertainties
   - Rates
   - Time
   - Magnitude
   - Data bases
   - Risks
5. Scientific Issues Associated with Successful
   - Adaptation Topography
   - Porous geology of the Biscayne Aquifer
   - Existing flood control system

APPENDIX E
MEDIUM and LOW RANKED ACTIONS

Appendix C provides the full text and G oal statements for the Medium and -Low ranked recommendations. The ranking appear directly after the action number in parenthesis. Medium is abbreviated as MED for this purpose. Actions with a Medium ranking are defined as important projects with significant outcomes, worthy of consideration and resources. Action with a Low ranking are defined as important but mitigation and/or adaptation outcomes may not merit implementation with current resources; implement if resources allow. Gaps in the numbering of the action items are a result of high ranked actions being first in the numbering system.

POLICY AND COORDINATION

Goal PC-1: Create collaborative intergovernmental practices and mechanisms in Broward County that serve as a tool for the County, municipalities and other public and private entities to reduce countywide greenhouse emissions to 17% below 2005 by 2020 and 82% below 2003 current levels by 2050 by coordinating strategies, programs, and other sustainable initiatives that mitigate the causes and assist in adaptation to the regional consequences of climate change, with special emphasis on intergovernmental coordination of adaptation activities.

Action PC-1.8 (MED) Help municipalities with climate/green initiatives

Provide guidance to help municipalities in climate/green initiatives using existing web resources and greenhouse gas inventory.

Action PC-1.9 (MED) Create opportunities for government and non-governmental agencies to collaborate on climate change adaptation

Create opportunities for government and non-governmental agencies, to include Florida's policy makers, research institutions, foundations, non-governmental organizations, water boards, and state agencies, to work together with experts in climate change adaptation to develop needed skills in applying adaptation concepts to their policy and planning efforts

Goal PC-2: Ensure that Broward County and local government comprehensive plans including the Broward County Metropolitan Planning Organization's 2035 Long Range Transportation Plan, are updated to provide for a sustainable environment and to reflect the best available data and strategies for adapting to future climate change impacts.

Action PC-2.3 (LOW) Link transportation and land use
Support linking the broad range of local and state infrastructure investments to improved and integrated transportation and land uses that encourage a reduction in vehicle miles traveled and greenhouse gas emissions , improved energy efficiency, affordable housing proximate to urban work centers, and progress toward other sustainability and quality of life measures.

Action PC-2.4 (LOW) Develop adaptation skills applied to planning
Work together with experts in climate change adaptation to develop needed skills in applying adaptation concepts to planning efforts.

Goal PC-4: Remove encumbrances to projects that support sustainability.

Action PC-4.2 (MED) Support state agency protection of coastal zone
Support the efforts of Department of Environmental Protection, Department of Community Affairs, and the state's Regional Planning Councils to jointly develop, assess, and recommend a suite of planning tools and climate change adaptation strategies for local governments so they can maximize opportunities to protect the beach and dune systems, coastal wetlands, and other coastal resources in an era of rising seas.

NATURAL AND URBAN LANDSCAPE

Goal NU-1: Support the Comprehensive Everglades Restoration Program (CERP) and other environmental restoration and mitigation initiatives in Broward County.

Action NU-1.4 (MED) Review impacts to Everglades ecosystem and support adaptive management
In the long-term, Broward County will review, in coordination with appropriate agencies, the impacts of climate change and sea level rise on the Everglades ecosystem and support adaptive management efforts to mitigate impacts.

Goal NU-2: Promote sustainable urban forest landscape practices that will provide additional diversity through planting of native landscape species, allowing natural migration of plant and animal species, and promoting the planting of green areas for carbon sequestration and storage.

Action NU-2.4 (MED) Pursue grants to increase tree canopy

Develop and maintain a grant program to help with replanting appropriate trees/plants after storms with an objective of improving our current 13% canopy as funds permit, toward the American Society of Foresters' goal of 40% average across an urban county.

Goal NU-3: Identify environmental resources/natural systems and evaluate and implement management strategies related to tolerance, mitigation and adaptation.

Action NU-3.1 (MED) Determine health of natural systems

County will determine the values of natural systems through a comprehensive analysis of the environmental health of our natural lands which may include relative maturity and vitality of canopy trees, percent coverage by invasive exotic plants, and extent of natural recruitment of desirable species, listed and locally rare species, economic and social values, and other ancillary benefits and uses.

Action NU-3.2 (MED) Complete a natural systems vulnerability or risk assessment

Complete a vulnerability or risk assessment to identify specific species, habitats, landscapes, ecosystem functions, and cultural resources that may be sensitive to climate change. Identify potential forest "refugia" that may be viable during climate disturbances and may be capable of sustaining at-risk species.

Action NU-3.3 (MED) Manage exotic species

Identify and evaluate existing programs for terrestrial, freshwater and marine exotic and nuisance species management. Develop strategies to respond to potential increases in undesirable exotic and invasive species, including triage strategies and rapid response to emerging circumstances to assist preserved natural areas in becoming more resilient to the impacts of climate change

Action NU-3.4 (LOW) Conduct management plan review

Conduct a review of required management plans for public parks, forests, and wildlife areas every 10 years (or appropriate review cycle and/or in response to newly available, peer-reviewed protocols) and conduct a climate change risk assessment for each area

Goal NU-4: Evaluate, in cooperation with appropriate agencies, water management operation strategies to lessen negative impacts to open areas, wetland mitigation areas, natural systems and to improve the ability of these systems to adapt to changes associated with climate change.

Action NU-4.1 (MED) Evaluate saltwater impacts to natural systems

Evaluate impacts to natural systems from saltwater intrusion, changes in the groundwater table and changes in annual precipitation amounts and patterns (timing and distribution) -- including habitat system and nutrient cycling changes, degradation of habitats, and colonization by invasive plant species -- and make recommendations to lessen (mitigate) these impacts or accept (tolerate) the resultant habitat change and adapt current management protocols to deal with the modified ecosystem.

Action NU-4.2 (MED) Evaluate reuse water interaction with and impacts to the natural systems

Develop criteria for stormwater, wastewater and c onsumptive use management decision matrices with regard to potential impacts on natural areas. Develop mitigation strategies to ensure sufficient freshwater is available for critical natural systems. Evaluate opportunities to use potential increased water levels for consumption to reduce potential impacts to above.

INFRASTRUCTURE MASTER PLANNING

Goal IP-1: Ensure that adaptation to climate change impacts, especially sea level rise, are incorporated into the planning, siting, construction, replacement and maintenance of public infrastructure in a manner that is cost-effective and maximizes expected infrastructure life span.

Action IP-1.5 (MED) Develop strategies for retrofitting flood control gates for sea level rise

Develop strategies, cost/benefit analyses, and schedules for raising or retrofitting flood control gates in anticipation of accelerated sea level rise and other potential effects of climate change.

Action IP-1.6 (MED) Determine if Coastal Construction Control Line Program avoids significant adverse impacts

Determine whether existing construction siting and design requirements for the Coastal Construction Control Line Program and the Coastal High Hazard area sufficiently address avoidance of “significant adverse impacts” due to climate change. If found to be i nsufficient, these programs need to be re-evaluated in light of climate change.

Action IP-1.7 (LOW) Locate power plants to accommodate sea level rise

Locate new regional power generation facilities and pow er transmission infrastructure appropriately to accommodate future climate change impacts.

Action IP-1.8 (LOW) Develop strategies for fortifying power plants

Develop alternatives for fortifying existing regional power generation facilities and power transmission infrastructure against the potential impacts of climate change including increased temperature and sea level rise.

Action IP-1.9 (LOW) Develop strategies for raising/relocating railroad tracks for sea level rise

Develop strategies, cost/benefit analyses, and schedules for raising or relocating railroad tracks in anticipation of accelerated sea level rise and other potential effects of climate change.

WATER RESOURCES

Goal WR-1: Ensure that the existing water resources and water infrastructure are protected and adequate supplies of water remain available for drinking, agriculture, and natural resources, while protecting water quality and minimizing the potential for flood damage and water shortages.

Action WR-1.12 (MED) Encourage coordination of funding strategies to implement reuse strategies

Encourage coordination of funding strategies and priorities among all levels of government and private utilities to ensure state-mandated reuse strategies can occur in a timely manner.

Action WR-1.13 (MED) Participate in a comprehensive research programs to adapt technologies for the region's water resources.

County and city agencies and water utilities should encourage and participate in comprehensive research programs to develop scientific and technical knowledge relating to the impacts of climate change and adaptation technologies for the region's water resources.

Action WR-1.14 (MED) Model the sustainable use of the Floridan aquifer

Continue to model the sustainable use of the Floridan aquifer for potable water supplies.

Action WR-1.15 (MED) Develop wastewater treatment plant digester gas to energy conversion

Pursue sustainable energy development through wastewater treatment plant digester gas-to-energy conversion and other process improvement opportunities.

Action WR-1.16 (MED) Retrofit or modify control structures with telemetry to conserve freshwater

Retrofit or modify County-operated control structures to conserve fresh water by installing additional solar powered water level monitoring and control equipment and/or modifying with flap gates and/or higher weirs to adapt to climate change impacts.

Action WR-1.17 (MED) Develop an adaptive response plan related to water resources

When advanced hydrological modeling and engineering evaluations become available from local government, South Florida Water Management District, Army Corps of Engineers, and others, develop an adaptive response plan once these potential impacts are better understood.

Action WR-1.18 (LOW) Encourage the use of centralized stormwater systems

Encourage the use of centralized stormwater systems where appropriate to discourage sprawl and deal with rising water tables where traditional drainage systems or Low Impact Development Techniques are likely to fail.

MODELING, MONITORING AND MAPPING

Goal MM-1: Provide the Task Force, its Subcommittees and the Broward County Board of County Commissioners with the best possible scientific and technical information to use in developing strategies to mitigate and adapt to the potential impacts of climate change to include changes in sea level rise, weather patterns, temperature, precipitation and hurricane frequency and intensity.

Action MM-1.11 (MED) Convene a science council to inform policy makers/elected officials of the latest data

Establish and convene a science council of leading climate scientists living locally in 2010 and at regular intervals thereafter to inform policy makers/elected officials of the latest empirical data, results of modeling efforts and the potential resultant impacts from climate change on the Southeast Florida region, particularly sea level rise, and to inform climate scientists of the policy makers' need for specific types of information and data upon which to base future decision.

ZONING AND BUILDING CODES

Goal ZB-2: Optimize the resilience of new and existing buildings to climate change-related impacts while minimizing their carbon footprint

Action ZB-2.1 (MED) Engage academia in researching better building design
Encourage public and private universities, colleges and t echnical schools in the region to develop research and educational programs for building design and construction professionals, planners, and those in other pertinent fields, focusing on the vulnerability of building structures to climate change and adaptation methodologies.

Action ZB-2.2 (MED) Promote partnerships for connecting research with applications for adaptation of the built environment
Promote partnerships and foster an environment for connecting scientific research with practical applications that will contribute to the adaptation of the built environment to the impact of climate change. To ensure practical solutions, researchers should use best available data and regularly collaborate with the professional groups specific to their topical area

Action ZB-2.3 (MED) Address local code requirements to improve resilience of structures
Establish an ongoing process to address local zoning and building code requirements and make recommendations regarding optimization for the resilience of existing and proposed structures in areas at risk to inundation and climate change.

Action ZB-2.4 (MED) Adopt the Florida State Green Building Model Ordinance
Adopt the Florida State Green Building Model Ordinance which addresses incentives for green building and adaptation for climate change.

Action ZB-2.5 (LOW) Require minimum standards for mobile homes
Replacement trailers or new trailers should meet the minimum standards of the Florida Building Code.

Action ZB-2.6 (LOW) Require new energy-efficient manufactured homes
Require that as manufactured homes are replaced, safer and more energy efficient models are used. This may require coordination between US Department of Housing and Urban Development and the Department of Community Affairs

Goal ZB-3: Incorporate appropriate energy efficient design, construction, maintenance

standards and reducing demand on utilities and production of solid wastes into all new construction and renovation projects through the use of regulation, education and incentivization resulting in a 100% reduction of carbon emissions by the year 2030.

Action ZB-3.1 (LOW) Encourage Green Practices in Florida Building Code
Convene a technical working group of practitioners in energy efficiency and renewable energy technology to identify barriers to approval/installation/industry construction practices in the current code and propose recommendations for removal of these barriers from the state code.

MASS TRANSIT/VEHICLE MILES TRAVELED

Goal MT-2: Support Broward County's proposed Bike Share/Self-Service Rental Program.

Action MT-2.1 (LOW) Promote Bike Share program
Provide support in the development and implementation of the proposed Bike Share Program in Broward County.

RENEWABLE AND ALTERNATIVE ENERGY

Goal RA-1: Support the expansion of renewable and alternative energy sources and remove the encumbrances to projects that support sustainability.

Action RA-1.3 (MED) Reverse constitutional amendment to re-instate alternative energy tax credit
Legislative tax exemptions: Review consequences and consider lobbying to reverse a constitutional amendment to effectively re-instate alternative energy incentive of a tax credit including the exemption of the cost of the home improvement.

Action RA-1.4 (MED) Mandate the use of alternative fuels in the mass transit system
Alternative Fuels for Mass Transit: Mandate the use of alternative fuels in the mass transit system, for new and replacement vehicles, and in any publicly-funded transportation projects.

Action RA-1.5 (LOW) Provide priority parking for alternative fuel vehicles
Provide free and/or priority parking for alternative fuel vehicles.

Goal RA-2: Promote and support actions to increase the proportion of electricity generated by solar power from residential, commercial and municipal properties within Broward County's geographic boundaries.

Action RA-2.2 (LOW) Develop a two-year pilot program to train students in installation of photovoltaic and thermal solar technology

Use available federal funding (e.g. Energy Efficiency and Conservation Block Grant) to support curriculum development for a two-year pilot program to train students in installation of photovoltaic and thermal solar technology, permitting and engineering, with the final exam being an actual solar installation.

Goal RA-3: Support and assess actions to determine feasibility of generation of electricity by wind, geothermal and ocean energy technologies.

Action RA-3.1 (MED) Support local alternative energy research

Support Local Research; Support the FAU Center for Ocean Energy Technology in pursuit of US DOE National Laboratory accreditation. Identify specific actions to be taken in support of the FAU Center for Ocean Energy Technology. Consider land use issues related to bringing ocean transmission lines onshore in the long term plan.

Action RA-3.2 (LOW) Initiate wind studies

Open a request for statements of interest (SOI) on development of onshore and offshore wind installations. Initiate wind studies in Broward County including adding meteorological stations to test wind speeds for distributed wind generation.

Action RA-3.3 (LOW) Remove barriers to wind projects

Determine if permitting inhibits development of onshore and offshore wind installations and work to remove barriers. Work cooperatively with municipalities to unify and be consistent regarding permitting requirements for wind projects.

Action RA-3.4 (LOW) Set a timeframe for the evaluation of geothermal resources.

Set a timeframe for the evaluation of geothermal resources .

RECYCLING/ZERO WASTE

Goal RZ-3: Achieve Zero Waste Goal by 2030.

Action RZ-3.1 (MED) Facilitate extension of U.S. EPA's WasteWise partnership
Facilitate extension of U.S. EPA's WasteWise partnership program to Broward municipalities, educational institutions and businesses.

Action RZ-3.2 (MED) Recognize EPA waste hierarchy
Officially recognize EPA Waste Hierarchy that designates priorities for handling waste: source reduction, reuse, recycling, waste-to-energy, disposal, and encourage all Broward Cities to adopt same.

Action RZ-3.3 (MED) Support extended producer responsibility
Support Extended Producer Responsibility programs that make manufacturers of certain consumer products responsible for them at the end of life. Target electronics, fluorescents, household hazardous wastes, paint, etc.

Action RZ-3.4 (LOW) Initiate reuse network
Initiate creation of a Reuse Network (thrift, consignment, exchange, creative reuse organizations) and design a targeted campaign to connect this community's service to reduced greenhouse gases and climate impact, and r aise awareness of their role in fostering environmental as well as social well-being.

Action RZ-3.5 (LOW) Create education campaign for sustainability
Create a public education campaign linking 3 R's (reduce, reuse, recycle) to need for climate action and building sustainable lifestyles and communities.

Action RZ-3.6 (LOW) Support policies that promote product stewardship principles
Support policies that promote Product Stewardship principles including product redesign for durability, reusability, non-toxicity and recyclability; packaging redesign and reduction standards.

Action RZ-3.7 (LOW) Create program to encourage backyard composting
Create program to encourage backyard composting, "leave grass clippings" community garden network and local food production and link education to reduced consumption and emissions, reduced toxins in land and water.

MARKETING AND INCENTIVES

Goal MI-3: Develop and implement Planning and Zoning policies and regulations to ensure appropriate land use, construction and redevelopment activities address the impacts of climate change.

Action MI-3.1 (MED) Create incentives/disincentives for developing climate impact sensitive lands

Consider creating incentives/disincentives for climate-impact sensitive land uses and provide market-driven Incentives for compliance which may include density bonuses, reduced impact fees, expedited permitting, permit fees, sliding-scale impact fees and rewards/awards programs in recognition of successful projects.

Action MI-3.2 (LOW) Encourage regional, private financing options

Encourage regional, cooperative interlocal agreements which promote partnerships for financing options through private sector sources.

OUTREACH AND COMMUNICATIONS

Goal OC-1: Provide broad community outreach and education about climate change actions to include mitigation and adaptation strategies and the expected cost of inaction; and embrace allies in promoting green public education.

Action OC-1.4 (MED) Develop awareness program to educate residents on renewable energy incentives

Develop and implement an incentive awareness program to educate residents and commercial property owners on local, utility, state and federal renewable energy incentives.

Action OC-1.5 (MED) Support smart landscaping education

Landscaping Outreach: Support existing county and m unicipal outreach programs and tree boards and promote new outreach programs to provide educational experiences for adult and child residents and provide the best research based educational materials regarding the role of urban forests in sequestration and storage in mitigating climate change.

Action OC-1.6 (MED) Develop a strategy for natural systems adaptation education
Implement an active communication and education strategy to help ensure the general public understands the nature of the natural system responses to climate change, the potential for decline in health of a habitat and the rationale for decisions made to tolerate or adapt to those changes. Educate residents and commercial interests on existing rules, ordinances, etc. and promote NatureScape Broward, Florida-Friendly Landscaping™, University of Florida-IFAS, Florida Yards & Neighborhoods, and Green Industry Best Management Practices along with national and international programs with appropriate non-governmental organizations such as National Wildlife Federation and Flyway Cities Initiative, National Audubon Society, The °Climate Group, American Farm Bureau Federation, and others. Public support is needed for successful implementation of adaptation strategies.

Action OC-1.7 (LOW) Educate children on resilience of communities
Develop a new generation of support focusing on the resilience of communities to the impacts of climate change through the education of our children and their children who will pass this information on to their parents and will be t he future leaders and future voters in our communities.

Action OC-1.8 (LOW) Collaborate on air quality monitoring, education and health risk outreach
The County and S tate should continue to collaborate on air quality monitoring and public information programs and expand and improve these programs to adopt standardized air health risk communication strategies; improve outreach and education; and improve coordination between federal, state, regional and local governmental agencies as well as non-governmental health care organizations

EMERGENCY MANAGEMENT AND INSURANCE

Goal EM-1: Ensure adequate planning and response for emergency management in the context of climate change.

Action EM-1.1 (LOW) Maximize the resilience of public structures
Maximize the storm-readiness and resilience of government and school structures for use as shelters in the event of storms or other emergencies.

Action EM-1.2 (LOW) Reinforce the self-sufficiency of hospitals
Reinforce the self-sufficiency of hospitals during periods of electricity outages, using green

technologies.

Action EM-1.3 (LOW) Review major trafficways to hospitals in areas at risk
Review major trafficways to hospitals in areas at risk from inundation and determine action to ensure access during periods of heavy storm activity or high tides.

Goal EM-2: Encourage a reasonable distribution of costs to maintain effective and consistent insurance coverage while taking action to discourage excessive insurance claims in areas of high risk from the impacts of climate change.

Action EM-2.1 (LOW) Lobby for creation of a National Catastrophe Fund
Lobby state and federal government to create a National Catastrophe Fund to spread the risk of natural disaster and lower insurance costs for participants.

Goal EM-3: Develop monitoring programs and plans to mitigate the impacts of climate change on households and individuals especially vulnerable to health risks attributable to rising global temperatures such as low income households and the elderly.

Action EM-3.1 (LOW) Develop plans and programs to mitigate impacts of heat waves on vulnerable populations
As global and Florida temperatures rise, public and private agencies should develop plans and programs to mitigate impacts of heat waves on vulnerable populations. Such measures could include establishment of public information call centers and media campaigns; opening cooling centers at public locations; ensuring emergency medical services have available staff with appropriate training; and distribution of bottled water.

Appendix F
Broward County, FL Climate Change Action Plan Implementation Matrix

Broward County, FL Climate Change Action Plan Implementation Matrix. This table provides additional information on all of the Climate Change Task Force (Task Force) recommended actions. The Actions are numbered using the topic area abbreviation and by goal (e.g. Action PC-1.1 is the first action under Goal PC-1 in the Policy and Coordination topic area). The Rank was determined by the Steering Committee and approved by the Task Force as **HI** - Critical project, will not meet Task Force mission without it, **MED** - Important project with significant outcomes, worthy of consideration and resources and **LO** - Important but mitigation and/or adaptation outcomes may not merit implementation with current resources; implement if resources allow. Actions to be Implemented is a short description of the action to be taken. The full description of the action items may be found in the main document and in Appendix C. Planning Horizon is defined as **Immediate** (0-2 years), **Short** (0-5 years), **Mid** (0-25 years) and **Long** (0-50 years) recognizing that some action may need to be taken today to address issues far into the future. Status of Action is defined as **Pending** - Proposed by the Task Force; **Initiated** - Proposed by the Task Force and action is starting to be taken; **In Progress** - Proposed by the Task Force, action has been taken, products are being produced; **On-going** - Activity which was started prior to Task Force and expected to continue regardless of the status of the recommendations; **Complete** - Proposed action has been addressed. Estimated Resources Required are generally described as requiring additional staff time, additional personnel, and/or additional funds. *When possible*, an estimate of the additional funds needed funding has been provided in broad ranges e.g. <$10K, <$100K, $100K-$999K, >$1M, >$10M, and >$100M. Action items may result in additional fiscal impacts not recognize here (e.g. Changes in master plans to address sea level rise may result in construction requirements which will alter future capital improvement plans).

Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
POLICY AND COORDINATION								
Goal PC-1	**Create collaborative intergovernmental practices and mechanisms in Broward County that serve as a tool for the County, municipalities and other public and private entities to reduce countywide greenhouse emissions to 17% below 2005 by 2020 and 82% below 2003 current levels by 2050 by coordinating strategies, programs, and other sustainable initiatives that mitigate the causes and assist in adaptation to the regional consequences of climate change, with special emphasis on intergovernmental coordination of adaptation activities.**							
Action PC-1.1	HI	Establish a County Office of Sustainability (Sustainability/ Climate Program)	Immediate (0-2 years)	Pending	County Administrator's Office	-	Additional personnel and funds	Sustainable programs initiated Amount of green house gases reduced (CO2 equivalents)

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action PC-1.2	HI	Support Broward County Government Operations greenhouse gas emission reduction efforts	Short (0-5 years)	On-going	All County Agencies	-	Additional funds	Amount of green house gases reduced (CO_2 equivalents) Annual reduction in electricity consumption (MWh)
Action PC-1.3	HI	Continue Climate Change Task Force into future	Short (0-5 years)	On-going	Natural Resources Planning & Management (current) Sustainability/ Climate Program (proposed)	Climate Change Task Force and subcommittees	Additional staff time	Action items successfully implemented
Action PC-1.4	HI	Support the development of a Regional Collaborative Climate Action Plan	Short (0-5 years)	Initiated	Natural Resources Planning & Management (current) Sustainability/ Climate Program (proposed)	SE FL Counties Various regional entities	Additional staff time	Completion of plan with actionable recommendations
Action PC-1.5	HI	Collaborate on legislative policies	Immediate (0-2 years)	In Progress	Natural Resources Planning & Management Intergovernmental Affairs & Prof. Stds.	SE FL Counties South Florida Water Management District	Additional staff time	Favorable legislation passed

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action PC-1.6	HI	Collaborate broadly on mitigation and adaptation policies	Mid (0-25 years)	Pending	Natural Resources Planning & Management (current) Sustainability/ Climate Program (proposed)	SE FL Counties Various regional and state entities	Multi-partner resources	Number of climate/energy/ mitigation/ adaptation policies developed or improved
Action PC-1.7	HI	Lead advocacy for climate change policies and legislation	Immediate (0-2 years)	On-going	Board of County Commissioners Intergovernmental Affairs & Prof. Stds.	-	Additional staff time and funds	Number of climate/energy/ mitigation/ adaptation policies developed or improved
Action PC-1.8	MED	Help municipalities with climate/green initiatives	Short (0-5 years)	Initiated	Natural Resources Planning & Management Pollution Prevention, Remediation and Air Quality	Municipalities	Additional staff time	Sustainable programs initiated
Action PC-1.9	MED	Create opportunities for government and non-governmental agencies to collaborate on climate change adaptation	Mid (0-25 years)	Pending	Sustainability/ Climate Program (proposed) Intergovernmental Affairs and Professional Standards	Various regional entities Various state entities	Additional staff time and funds	Number of people attending workshops, training, and education sessions

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Goal PC-2	**Ensure that Broward County and local government comprehensive plans including the Broward Metropolitan Planning Organization's 2035 Long Range Transportation Plan, are updated to provide for a sustainable environment and to reflect the best available data and strategies for adapting to future climate change impacts.**							
Action PC-2.1	HI	Support local, regional and state planning entities in mitigation and adaptation plans	Short (0-5 years)	Initiated	Board of County Commissioners All County Agencies	School Board of Broward County Various regional and state entities	Additional staff time	Number of regional plans developed
Action PC-2.2	HI	Update Broward County Comprehensive Plan for Climate Change and support local government efforts to update their comprehensive plans	Immediate (0-2 years)	In Progress	Environmental Protection & Growth Management Planning Council	League of Cities South Florida Regional Planning Council	Additional personnel	Number of elements incorporating climate change, mitigation and adaptation
Action PC-2.3	LO	Link transportation and land use	Mid (0-25 years)	On-going	Environmental Protection & Growth Management Planning Council	South Florida Regional Planning Council Fl Dept of Community Affairs	Additional staff time and funds	Completion of plan with actionable recommendations
Action PC-2.4	LO	Develop adaptation skills applied to planning	Mid (0-25 years)	Pending	Sustainability/ Climate Program (proposed)	Academic institutions	-	Implementation of Program

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Goal PC-3	**Develop and implement adaptive planning and zoning policies, regulations and programs to ensure appropriate land use, construction and redevelopment activities address the potential impacts of climate change, to include mitigating the impacts of sea level rise on Broward County's economy and infrastructure.**							
Action PC-3.1	HI	Revise Land Use Plan to address mitigation and adaptation policies	Short (0-5 years)	Initiated	Environmental Protection & Growth Management Planning Council	Municipalities	Additional staff time	Number of elements incorporating climate change, mitigation and adaptation
Action PC-3.2	HI	Remove barriers to limiting development in vulnerable areas	Short (0-5 years)	Pending	Environmental Protection & Growth Management Planning Council	FL Dept of Community Affairs South Florida Regional Planning Council	Additional staff time	Favorable legislation passed
Goal PC-4	**Remove encumbrances to projects that support sustainability.**							
Action PC-4.1	HI	Promote transit-oriented development	Immediate (0-2 years)	On-going	Environmental Protection & Growth Management Planning Council	South Florida Regional Planning Council Municipalities Various state and regional entities	Existing resources	Completion of plan with actionable recommendations

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action PC-4.2	MED	Support state agency protection of coastal zone	Short (0-5 years)	Pending	Natural Resources Planning & Management Broward County Board of County Commissioners	Various regional and state entities	Existing resources	Completion of plan with actionable recommendations
NATURAL AND URBAN LANDSCAPE								
Goal NU-1	**Support the Comprehensive Everglades Restoration Program (CERP) and other environmental restoration and mitigation initiatives in Broward County.**							
Action NU-1.1	HI	Support Everglades Restoration	Mid (0-25 years)	On-going	Board of County Commissioners	South Florida Water Management District Army Corps of Engineers	Existing resources	Progress in implementation projects initiated Funding obtained
Action NU-1.2	HI	Coordinate with state/regional /national strategic planning efforts on climate change	Long (0-50 years)	Initiated	Board of County Commissioners	SE FL Counties NOAA	Additional staff time	Number of regional plans developed
Action NU-1.3	HI	Support environmental mitigation and adaptive management initiatives	Long (0-50 years)	On-going	Board of County Commissioners	SE FL Counties Various regional entities	Additional staff time	Progress in implementation projects initiated

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action NU-1.4	MED	Review impacts to Everglades ecosystem and support adaptive management	Long (0-50 years)	Initiated	Environmental Protection & Growth Management	S FL Water Management District Army Corps of Engineers	Additional staff time	Completion of plan with actionable recommendations
Goal NU-2	**Promote sustainable urban forest landscape practices that will provide additional diversity through planting of native landscape species, allowing natural migration of plant and animal species, and promoting the planting of green areas for carbon sequestration and storage.**							
Action NU-2.1	HI	Encourage urban reforestation	Mid (0-25 years)	Pending	Environmental Protection & Growth Management Parks & Recreation	Municipalities	Additional funds $100K-$999K	Number of trees planted Amount of green house gases reduced (CO_2 equivalents)
Action NU-2.2	HI	Perform canopy study	Short (0-5 years)	Pending	Environmental Protection & Growth Management Parks & Recreation	Municipalities	Additional funds $10K-$100K	Completion of plan with actionable recommendations
Action NU-2.3	HI	Continue NatureScape program	Mid (0-25 years)	On-going	Natural Resources Planning & Management	School Board of Broward County Municipalities	Existing resources	Number of NatureScape Certified Sites Number of partner municipalities

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action NU-2.4	MED	Pursue grants to increase tree canopy	Mid (0-25 years)	Initiated	Natural Resources Planning & Management Parks & Recreation	Municipalities	Additional funds > $1M	Grant dollars received
Goal NU-3	**Identify environmental resources/natural systems and evaluate and implement management strategies related to tolerance, mitigation and adaptation.**							
Action NU-3.1	MED	Determine health of natural systems	Short (0-5 years)	Pending	Environmental Protection & Growth Management Parks & Recreation	Academic institutions Florida Fish and Wildlife Conservation Commission	Additional personnel and funds	Completion of plan with actionable recommendations
Action NU-3.2	MED	Complete a natural systems vulnerability or risk assessment	Short (0-5 years)	Pending	Natural Resources Planning & Management Parks & Recreation	Academic institutions Florida Fish and Wildlife Conservation Commission	Additional personnel and funds	Completion of plan with actionable recommendations

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action NU-3.3	MED	Manage exotic species	Short (0-5 years)	Pending	Environmental Protection & Growth Management Parks & Recreation	Academic institutions Florida Fish and Wildlife Conservation Commission	Additional personnel and funds	Completion of plan with actionable recommendations
Action NU-3.4	LO	Conduct management plan review	Mid (0-25 years)	Pending	Parks & Recreation Division	Parks and Recreation Advisory Board	Additional staff time and funds	Completion of plan with actionable recommendations
Goal NU-4	**Evaluate, in cooperation with appropriate agencies, water management operation strategies to lessen negative impacts to open areas, wetland mitigation areas, natural systems and to improve the ability of these systems to adapt to changes associated with climate change**.							
Action NU-4.1	MED	Evaluate saltwater impacts to natural systems	Mid (0-25 years)	Pending	Natural Resources Planning & Management Parks & Recreation	Academic institutions	Additional personnel and funds	Completion of plan with actionable recommendations
Action NU-4.2	MED	Evaluate reuse water interaction with and impacts to the natural systems	Mid (0-25 years)	On-going	Water & Wastewater Services Parks & Recreation	S FL Water Management District Water and/or wastewater utilities	Additional staff time and funds	Completion of plan with actionable recommendations

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
INFRASTRUCTURE MASTER PLANNING								
Goal IP-1	**Ensure that adaptation to climate change impacts, especially sea level rise, are incorporated into the planning, siting, construction, replacement and maintenance of public infrastructure in a manner that is cost-effective and maximizes expected infrastructure life span.**							
Action IP-1.1	HI	Maintain beaches	Long (0-50 years)	On-going	Natural Resources Planning & Management	Army Corps of Engineers Municipalities	Additional funds > $100M	Percentage of the beach maintained at 75 ft width
Action IP-1.2	HI	Adopt adaptation standards for all new public buildings by considering climate change and sea level rise in their design	Mid (0-25 years)	Pending	Construction Management	League of Cities Municipalities	Additional staff time	Number of climate/energy/ mitigation/ adaptation policies developed or improved
Action IP-1.3	HI	Inventory the county owned infrastructure at risk and assess climate change impacts	Short (0-5 years)	Pending	All County Agencies	-	Additional staff time and funds	Number of agencies with completed inventories
Action IP-1.4	HI	Coordinate transportation adaptation policies	Mid (0-25 years)	Pending	Planning and Redevelopment	Broward Metropolitan Planning Organization Various regional entities FL Dept of Transportation	Additional staff time	Number of climate/energy/ mitigation/ adaptation policies developed or improved

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action IP-1.5	MED	Develop strategies for retrofitting flood control gates for sea level rise	Mid (0-25 years)	Pending	Environmental Protection & Growth Management Water Management	Special Districts S FL Water Management District	Additional staff time	Completion of plan with actionable recommendations
Action IP-1.6	MED	Determine if Coastal Construction Control Line Program avoids significant adverse impacts	Mid (0-25 years)	Pending	Environmental Protection & Growth Management	Fl Dept of Environmental Protection Federal Emergency Management Agency	Existing resources	Completion of plan with actionable recommendations
Action IP-1.7	LO	Locate power plants to accommodate sea level rise	Long (0-50 years)	Pending	Sustainability/ Climate Program (proposed) Port Everglades	Florida Power and Light	-	Completion of plan with actionable recommendations
Action IP-1.8	LO	Develop strategies for fortifying power plants	Mid (0-25 years)	Pending	Sustainability/ Climate Program (proposed)	Florida Power and Light	-	Completion of plan with actionable recommendations
Action IP-1.9	LO	Develop strategies for raising/relocating railroad tracks for sea level rise	Mid (0-25 years)	Pending	Sustainability/ Climate Program (proposed)	Florida East Coast Rail Fl Dept of Transportation	-	Completion of plan with actionable recommendations

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
WATER RESOURCES								
Goal WR-1	**Ensure that the existing water resources and water infrastructure are protected and adequate supplies of water remain available for drinking, agriculture, and natural resources, while protecting water quality and minimizing the potential for flood damage and water shortages.**							
Action WR-1.1	HI	Include climate change in updates of Lower East Coast Plan	Short (0-5 years)	Pending	Natural Resources Planning & Management	South Florida Water Management District	Existing resources	Plan updated
Action WR-1.2	HI	Conduct studies for large-scale Advanced Water and Wastewater Treatment Plants	Short (0-5 years)	Pending	Public Works	Water and/or wastewater utilities	Additional funds $100K-$999K	Completion of plan with actionable recommendations
Action WR-1.3	HI	Monitor and protect wellfields	Mid (0-25 years)	On-going	Environmental Protection & Growth Management Water & Wastewater Services	Water and/or wastewater utilities	Additional funds $100K-$999K	Percent of potable water wells meeting drinking water standards
Action WR-1.4	HI	Reevaluate reuse due to sea level rise	Short (0-5 years)	Pending	Natural Resources Planning & Management Water & Wastewater Services	Water and/or wastewater utilities S. FL Water Management District	Additional staff time and funds	Plan updated

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action WR-1.5	HI	Utility development of adaptive management strategies for water resources	Short (0-5 years)	Pending	Natural Resources Planning & Management Water & Wastewater Services	Water and/or wastewater utilities FL Dept of Environmental Protection	Additional funds $100K-$999K	Completion of evaluation
Action WR-1.6	HI	Reduce utility carbon footprint	Immediate (0-2 years)	On-going	Water & Wastewater Services	Water and/or wastewater utilities	Additional staff time and funds	Amount of green house gases reduced (CO2 equivalents) Annual reduction in electricity consumption (MWh)
Action WR-1.7	HI	Provide resources to implement water conservation	Immediate (0-2 years)	On-going	Natural Resources Planning & Management Board of County Commissioners	S. FL Water Management District School Board of Broward County	Additional funds $100K-$999K	Broward County Water and Wastewater Services water consumption, gallons/day/person Number of educational programs delivered
Action WR-1.8	HI	Develop alternative water supply strategies	Short (0-5 years)	In Progress	Natural Resources Planning & Management Water & Wastewater Services	S. FL Water Management District FL Dept of Environmental Protection	Additional staff time and funds	Completion of evaluation

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action WR-1.9	HI	Protect Wastewater Treatment Plants and collection systems from infiltration and inflow	Mid (0-25 years)	In Progress	Environmental Protection & Growth Management Water & Wastewater Services	Wastewater utilities	Additional funds > $1M	Reduction in MGD of wastewater plant influent
Action WR-1.10	HI	Convene a regional workshop to enhance resilience of water resources to climate change	Immediate (0-2 years)	Pending	Natural Resources Planning & Management	S. FL Water Management District	Additional staff time and funds	Completion of plan with actionable recommendations
Action WR-1.11	HI	Require construction to include a percentage of pervious areas to enhance water resources	Short (0-5 years)	On-going	Environmental Protection & Growth Management	Municipalities FL Dept of Environmental Protection	Additional staff time	Name of new green ordinance adopted
Action WR-1.12	MED	Encourage coordination of funding strategies to implement reuse strategies	Immediate (0-2 years)	Pending	Natural Resources Planning & Management Water & Wastewater Services	Water and/or wastewater utilities Fl Dept of Environmental Protection	Existing resources	Funding obtained

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action WR-1.13	MED	Participate in a comprehensive research programs to adapt technologies for the region's water resources.	Mid (0-25 years)	Pending	Natural Resources Planning & Management Water & Wastewater Services	Water and/or wastewater utilities S FL Water Management District	Additional staff time and funds	Implementation of Program
Action WR-1.14	MED	Model the sustainable use of the Floridan aquifer	Long (0-50 years)	Pending	Natural Resources Planning & Management	United States Geological Survey S FL Water Management District	Additional funds > $1M	Modeling/ Monitoring results upon which to base resources management decision
Action WR-1.15	MED	Develop wastewater treatment plant digester gas to energy conversion	Short (0-5 years)	Initiated	Water & Wastewater Services	Water and/or wastewater utilities	Additional funds > $1M	Action items successfully implemented
Action WR-1.16	MED	Retrofit or modify control structures with telemetry to conserve freshwater	Mid (0-25 years)	On-going	Water Management	S FL Water Management District Special Districts	Additional funds > $100M	Action items successfully implemented

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action WR-1.17	MED	Develop a water resources adaptive response plan related to water resources	Short (0-5 years)	Pending	Water Management Natural Resources Planning & Management	S FL Water Management District Army Corps of Engineers	Additional staff time and funds	Completion of plan with actionable recommendations
Action WR-1.18	LO	Encourage the use of centralized stormwater systems	Short (0-5 years)	Pending	Environmental Protection & Growth Management Water & Wastewater Services	Special Districts	Additional staff time	Implementation of Program
MODELING, MONITORING AND MAPPING								
Goal MM-1	**Provide the Task Force, its Subcommittees and the Broward County Board of County Commissioners with the best possible scientific and technical information to use in developing strategies to mitigate and adapt to the potential impacts of climate change to include changes in sea level rise, weather patterns, temperature, precipitation and hurricane frequency and intensity.**							
Action MM-1.1	HI	Encourage dedicated funding for modeling efforts	Short (0-5 years)	Pending	Board of County Commissioners	SE FL Counties Various regional entities	Additional staff time	Funding obtained
Action MM-1.2	HI	Develop and support local modeling and monitoring efforts	Long (0-50 years)	On-going	Board of County Commissioners Environmental Protection & Growth Management	SE FL Counties Various regional entities	Additional funds > $1M	Completion of plan with actionable recommendations

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action MM-1.3	HI	Provide for long term and regional modeling	Long (0-50 years)	Pending	Natural Resources Planning & Management Board of County Commissioners	SE FL Counties Various regional entities	Additional funds > $1M	Modeling/ Monitoring results upon which to base resources management decision
Action MM-1.4	HI	Develop a regional Vital Signs monitoring network	Mid (0-25 years)	Pending	Environmental Protection & Growth Management	SE FL Counties S. FL Water Management District	Additional personnel and funds	Modeling/ Monitoring results upon which to base resources management decision
Action MM-1.5	HI	Improve inundation mapping capabilities	Short (0-5 years)	In Progress	Environmental Protection & Growth Management	SE FL Counties Various federal entities	Additional funds $100K-$999K	Updated maps
Action MM-1.6	HI	Develop new 100 year storm maps	Short (0-5 years)	Pending	Environmental Protection & Growth Management	Various federal entities Various regional entities	Additional staff time	Updated maps
Action MM-1.7	HI	Incorporate sea level rise/storm surge impacts into maps of hazard areas	Short (0-5 years)	Pending	Environmental Protection & Growth Management	SE FL Counties South Florida Regional Planning Council	Additional staff time and funds	Modeling/ Monitoring results upon which to base resources management decision

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Action MM-1.8	HI	Encourage FEMA to consider sea level rise in flood map updates	Short (0-5 years)	Pending	Board of County Commissioners Environmental Protection & Growth Management	SE FL Counties	Additional staff time	Updated maps
Action MM-1.9	HI	Engage technical support of federal agencies on climate change scenarios	Mid (0-25 years)	Initiated	Board of County Commissioners	SE FL Counties Various federal entities	Additional staff time	Sustainable programs initiated
Action MM-1.10	HI	Coordinate regionally to analyze sea level rise, drainage and hurricanes impacts	Short (0-5 years)	Initiated	Board of County Commissioners Environmental Protection & Growth Management	SE FL Counties Various regional entities	Additional staff time and funds	Sustainable programs initiated
Action MM-1.11	MED	Convene a science council to inform policy makers/elected officials of the latest data	Immediate (0-2 years)	Pending	Sustainability/ Climate Program (proposed) Intergovernmental Affairs and Professional Standards	League of Cities Academic institutions	Additional staff time and funds	Completion of plan with actionable recommendations

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Goal MM-2	**Develop a natural systems monitoring program, similar to "Vital Signs" following the National Park Service, to serve as a multi-parameter ecosystem monitoring program that will help track climate change effects. Expand current ongoing monitoring efforts, such as those within the Comprehensive Everglades Restoration Plan (CERP), to include specific areas of Broward County to provide a better view of how natural areas are changing over time and what forces are responsible.**							
Action MM-2.1	HI	Dedicate a source of funds for monitoring	Short (0-5 years)	Pending	Board of County Commissioners	SE FL Counties Various regional entities	Additional funds $100K-$999K	Funding obtained
Action MM-2.2	HI	Develop a vital signs status and trends monitoring program for biological communities	Mid (0-25 years)	Pending	Natural Resources Planning & Management Parks & Recreation	SE FL Counties S. FL Water Management District	Additional staff time	Modeling/ Monitoring results upon which to base resources management decision
ZONING AND BUILDING CODES								
Goal ZB-1	**Identify measures to reduce greenhouse gas emissions through changes in building codes and practices.**							
Action ZB-1.1	HI	Support Energy Code changes	Immediate (0-2 years)	Pending	Board of County Commissioners Permitting, Licensing and Consumer Protection	-	Existing resources	Annual reduction in electricity consumption (MWh)
Action ZB-1.2	HI	Encourage green and climate impact resistance construction practices	Short (0-5 years)	In Progress	Permitting, Licensing and Consumer Protection	Municipalities	Additional funds $10K-$100K	Name of new green code adopted

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Goal ZB-2	**Optimize the resilience of new and existing buildings to climate change-related impacts while minimizing their carbon footprint.**							
Action ZB-2.1	MED	Engage academia in researching better building design	Mid (0-25 years)	Pending	Permitting, Licensing and Consumer Protection Construction Management	Academic institutions	Additional staff time	Implementation of Program
Action ZB-2.2	MED	Promote partnerships for connecting research with applications for adaptation of the built environment	Mid (0-25 years)	Pending	Environmental Protection & Growth Management Public Works	Academic institutions	Additional staff time	Implementation of Program
Action ZB-2.3	MED	Address local code requirements to improve resilience of structures	Mid (0-25 years)	Pending	Permitting, Licensing and Consumer Protection	Municipalities	Existing resources	Implementation of Program
Action ZB-2.4	MED	Adopt the Florida State Green Building Model Ordinance	Short (0-5 years)	Pending	Broward County Board of County Commissioners Permitting, Licensing and Consumer Protection	-	Existing resources	Name of new green policy adopted

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Action ZB-2.5	LO	Require minimum standards for mobile homes	Mid (0-25 years)	Pending	Permitting, Licensing and Consumer Protection	Municipalities	Additional staff time	Implementation of Program
Action ZB-2.6	LO	Require new energy-efficient manufactured homes	Mid (0-25 years)	Pending	Permitting, Licensing and Consumer Protection	Municipalities	Additional staff time	Implementation of Program
Goal ZB-3	**Incorporate appropriate energy efficient design, construction, maintenance standards and reducing demand on utilities and production of solid wastes into all new construction and renovation projects through the use of regulation, education and incentivization resulting in a 100% reduction of carbon emissions by the year 2030.**							
Action ZB-3.1	LO	Encourage green practices in Florida Building Code	Short (0-5 years)	Pending	Permitting, Licensing and Consumer Protection Office of Intergovernmental Affairs and Professional Standards	League of Cities Fl Dept of Community Affairs	Additional staff time	Implementation of Program
MASS TRANSIT/VEHICLE MILES TRAVELED								
Goal MT-1	**Create a functional mass transportation system that will reduce the current level of vehicle miles travelled and the amount of carbon emissions.**							

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action MT-1.1	HI	Create a functional mass transportation system with a dedicated source of funding	Immediate (0-2 years)	Pending	Board of County Commissioners	Broward Metropolitan Planning Organization Regional Transportation Authority FL Dept of Transportation	Additional funds	Number of mass transit passenger trips, millions of trips/year
Action MT-1.2	HI	Set vehicle miles travelled reduction goal	Long (0-50 years)	Pending	Board of County Commissioners	Broward Metropolitan Planning Organization Regional Transit Authority FL Dept of Transportation	Additional staff time	Vehicle miles traveled per day, millions
Goal MT-2	**Support Broward County's proposed Bike Share/Self-Service Rental Program.**							
Action MT-2.1	LO	Promote Bike Share program	Immediate (0-2 years)	On-going	Broward County Board of County Commissioners Transportation Department	-	Multi-partner resources	Implementation of Program

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RENEWABLE AND ALTERNATIVE ENERGY								
Goal RA-1	**Support the expansion of renewable and alternative energy sources and remove the encumbrances to projects that support sustainability.**							
Action RA-1.1	HI	Support legislation to establish a 20% renewable portfolio standard	Immediate (0-2 years)	Initiated	Board of County Commissioners	SE FL Counties Environmental Non-Profits	Existing resources	Favorable legislation passed
Action RA-1.2	HI	Support public access to alternative fuels infrastructure	Short (0-5 years)	Pending	Board of County Commissioners Fleet Services	-	Additional funds $10K-$100K	Public access points to alternative fuel provided
Action RA-1.3	MED	Reverse constitutional amendment to re-instate alternative energy tax credit	Immediate (0-2 years)	Pending	Broward County Board of County Commissioners County Attorney's Office	-	Existing resources	Favorable legislation passed
Action RA-1.4	MED	Mandate the use of alternative fuels in the mass transit system	Immediate (0-2 years)	Pending	Broward County Board of County Commissioners Transportation Department	Fl Dept of Transportation Regional Transportation Authority	Additional funds > $1M	Action items successfully implemented

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action RA-1.5	LO	Provide priority parking for alternative fuel vehicles	Immediate (0-2 years)	Pending	Broward County Board of County Commissioners County Attorney's Office	Municipalities	Multi-partner resources	Implementation of Program
Goal RA-2	**Promote and support actions to increase the proportion of electricity generated by solar power from residential, commercial and municipal properties within Broward County's geographic boundaries.**							
Action RA-2.1	HI	Develop permitting fee incentives for renewable and alternative energy installations	Immediate (0-2 years)	Pending	Permitting, Licensing and Consumer Protection	Municipalities Florida Energy and Climate Commission	Additional staff time	Name of new green policy adopted
Action RA-2.2	LO	Develop a two-year pilot program to train students in installation of photovoltaic and thermal solar technology	Short (0-5 years)	Initiated	Sustainability/ Climate Program (proposed)	Academic institutions School Board of Broward County	Multi-partner resources	Number of educational programs delivered Implementation of Program
Goal RA-3	**Support and assess actions to determine feasibility of generation of electricity by wind, geothermal and ocean energy technologies.**							
Action RA-3.1	MED	Support local alternative energy research	Mid (0-25 years)	Pending	Sustainability/ Climate Program (proposed)	Florida Atlantic University	Additional personnel	Implementation of Program

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action RA-3.2	LO	Initiate wind studies	Mid (0-25 years)	Pending	Broward County Board of County Commissioners Purchasing	Municipalities	Additional funds	Completion of evaluation
Action RA-3.3	LO	Remove barriers to wind projects	Mid (0-25 years)	Pending	Broward County Board of County Commissioners Permitting, Licensing and Consumer Protection	Municipalities	Additional staff time	Favorable legislation passed
Action RA-3.4	LO	Set a timeframe for the evaluation of geothermal resources	Long (0-50 years)	Pending	County Administrator's Office	Climate Change Task Force and subcommittees	Existing resources	Completion of evaluation
RECYCLING/ZERO WASTE								
Goal RZ-1	**Establish policies and take administrative actions that reduce the disposal of municipal solid waste (MSW) in landfills and promote full utilization of existing infrastructure for waste-to-energy conversion.**							
Action RZ-1.1	HI	Fully utilize Waste-to-Energy Plant capacity	Immediate (0-2 years)	On-going	Waste and Recycling Services County Administration County Attorney	Resource Recovery Board	Additional staff time	Increase in Waste to Energy Plant intake

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Action #	Rank	Action to be Implemented	Planning Horizon	Status of Action	Likely Responsible County Entity(ies)	Potential Community Partner(s)	Estimated Resources Required	Recommended Performance Measure(s)
Action RZ-1.2	HI	Require landfill cost evaluation of gas to energy conversion	Short (0-5 years)	Complete	Waste and Recycling Services	-	Existing resources	Completion of evaluation
Goal RZ-2	**Reduce landfill disposal 75% by 2020, through increasing the recycling rate by 50% and converting 25% of the waste to energy using renewable energy technology.**							
Action RZ-2.1	HI	Implement single-stream recycling	Mid (0-25 years)	In Progress	Waste and Recycling Services	Resource Recovery Board School Board of Broward County Municipalities	Additional staff time $100K-$999K	Percent of municipalities implementing single stream recycling
Action RZ-2.2	HI	Implement plan to increase residential, organic and commercial recycling rate to 50%	Mid 0-25 years)	In Progress	Waste and Recycling Services	Resource Recovery Board School Board of Broward County Municipalities	Additional staff time and funds >$1M	Percent of solid waste recycled
Action RZ-2.3	HI	Adopt environmentally preferable purchasing policies	Mid (0-25 years)	Pending	Board of County Commissioners Purchasing	Municipalities Private Sector	Additional personnel and funds $100K-$999K	Name of new green policy adopted

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Goal RZ-3	**Achieve Zero Waste Goal by 2030.**							
Action RZ-3.1	MED	Facilitate extension of U.S. EPA's WasteWise partnership	Mid (0-25 years)	On-going	Waste and Recycling Services Pollution Prevention, Remediation and Air Quality	Municipalities	Additional staff time and funds $100K-$999K	Implementation of Program
Action RZ-3.2	MED	Recognize EPA waste hierarchy	Mid (0-25 years)	Pending	Waste and Recycling Services	Municipalities	Additional staff time and funds <$10K	Implementation of Program
Action RZ-3.3	MED	Support extended producer responsibility	Mid (0-25 years)	Pending	Board of County Commissioners Purchasing Waste and Recycling Services Pollution Prevention, Remediation and Air Quality	School Board of Broward County Municipalities	Additional staff time and funds <$100K	Implementation of Program

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Action RZ-3.4	LO	Initiate reuse network	Mid (0-25 years)	Pending	Waste and Recycling Services Pollution Prevention, Remediation and Air Quality Public Communications	Municipalities Environmental Non-Profits	Additional staff time and funds <$100K	Implementation of Program
Action RZ-3.5	LO	Create education campaign for sustainability	Mid (0-25 years)	Pending	Waste and Recycling Services Pollution Prevention, Remediation and Air Quality Public Communications	Municipalities Local media	Additional personnel and funds >$1M	Number of educational programs delivered

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Action RZ-3.6	LO	Support policies that promote product stewardship principles	Mid (0-25 years)	Pending	Waste and Recycling Services Pollution Prevention, Remediation and Air Quality Purchasing	Municipalities Private Sector	Additional personnel and funds <$100K	Implementation of Program
Action RZ-3.7	LO	Create program to encourage backyard composting	Mid (0-25 years)	Pending	Natural Resources Planning and Management Waste and Recycling Services	Municipalities Environmental Non-Profits	Additional personnel and funds <$100K	Implementation of Program
MARKETING AND INCENTIVES								
Goal MI-1	**Develop plans and programs in coordination with Broward County, local municipalities and power companies to expand the market for energy efficient products and services to reduce greenhouse gas emissions and expand the employment base and "green" job opportunities.**							
Action MI-1.1	HI	Expand alternative energy and green products market	Short (0-5 years)	Pending	Economic Development	SE FL Counties Florida Power and Light	Additional staff time	Total value of investments incentivized

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Action MI-1.2	HI	Promote energy conservation retrofits	Short (0-5 years)	Pending	Permitting, Licensing and Consumer Protection Environmental Protection & Growth Management	Florida Power and Light Florida Energy and Climate Commission	Additional staff time and funds	Energy Savings (KWh equivalents)
Goal MI-2	**Support the expansion of energy conservation, renewable and alternative energy sources through public and private financing mechanism.**							
Action MI-2.1	HI	Evaluate a bond-funded renewable finance district program	Short (0-5 years)	Pending	County Attorney's Office	Municipalities FL Dept of Community Affairs	Additional staff time	Sustainable programs initiated
Action MI-2.2	HI	Create renewable energy offset revenue	Short (0-5 years)	Pending	Board of County Commissioners	Various state entities	Additional staff time	Funding obtained
Action MI-2.3	HI	Assist low income households with energy retrofit	Long (0-50 years)	Pending	Board of County Commissioners Housing & Community Development	Municipalities	Additional staff time and funds	Annual reduction in electricity demand (MW) Number of buildings retrofitted

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Goal MI-3	**Develop and implement Planning and Zoning policies and regulations to ensure appropriate land use, construction and redevelopment activities address the impacts of climate change.**							
Action MI-3.1	MED	Create incentives/ disincentives for developing climate impact sensitive lands	Mid (0-25 years)	Pending	Broward County Board of County Commissioners Environmental Protection & Growth Management	Municipalities	Additional staff time	Implementation of Program
Action MI-3.2	LO	Encourage regional, private financing options	Mid (0-25 years)	Pending	Broward County Board of County Commissioners County Attorney's Office	League of Cities Municipalities	Multi-partner resources	Funding obtained
OUTREACH AND COMMUNICATIONS								
Goal OC-1	**Provide broad community outreach and education about climate change actions to include mitigation and adaptation strategies and the expected cost of inaction; and embrace allies in promoting green public education.**							

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Action OC-1.1	HI	Participate in regional outreach campaign	Short (0-5 years)	Pending	Public Communications Environmental Protection & Growth Management	SE FL Counties Various regional, state and federal entities	Additional personnel and funds	Number of information contacts (e.g. webinar, site visit, media, fact sheet) on mitigation issues Number of educational programs delivered
Action OC-1.2	HI	Dedicate funding for sustained public education on transit	Short (0-5 years)	Pending	Board of County Commissioners Transportation Department	Regional Transportation Authority	Additional funds	Funding obtained
Action OC-1.3	HI	Exchange information with stakeholders on adaptation practices	Short (0-5 years)	Pending	Environmental Protection & Growth Management	SE FL Counties Various regional, state and federal entities	Additional personnel	Number of other policies developed or improved
Action OC-1.4	MED	Develop awareness program to educate residents on renewable energy incentives	Short (0-5 years)	Pending	Public Communications Pollution Prevention, Remediation and Air Quality	Local media	Additional staff time and funds	Implementation of Program

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Action OC-1.5	MED	Support smart landscaping education	Short (0-5 years)	Initiated	Natural Resources Planning & Management Parks & Recreation	Local media Municipalities	Additional personnel and funds	Implementation of Program
Action OC-1.6	MED	Develop a strategy for natural systems adaptation education	Mid (0-25 years)	Pending	Parks & Recreation Environmental Protection & Growth Management	Local media Environmental Non-Profits	Additional personnel and funds	Implementation of Program
Action OC-1.7	LO	Educate children on resilience of communities	Mid (0-25 years)	Pending	Sustainability/ Climate Program (proposed) Public Communications	School Board of Broward County	Multi-partner resources	Number of educational programs delivered
Action OC-1.8	LO	Collaborate on air quality monitoring, education and health risk outreach	Long (0-50 years)	On-going	Pollution Prevention, Remediation and Air Quality Public Communications	Fl Dept of Environmental Protection Broward County Health Department (ST of FL)	Multi-partner resources	Number of educational programs delivered

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EMERGENCY MANAGEMENT AND INSURANCE								
Goal EM-1	**Ensure adequate planning and response for emergency management in the context of climate change.**							
Action EM-1.1	LO	Maximize the resilience of public structures	Short (0-5 years)	Pending	Public Works	School Board of Broward County Municipalities	Additional funds > $1M	Number of buildings retrofitted
Action EM-1.2	LO	Reinforce the self-sufficiency of hospitals	Short (0-5 years)	Pending	Sustainability/ Climate Program (proposed)	Broward Hospital Districts	-	Number of buildings retrofitted
Action EM-1.3	LO	Review major trafficways to hospitals in areas at risk	Short (0-5 years)	Pending	Emergency Management	Broward Hospital Districts Fl Dept of Transportation	Additional staff time	Completion of plan with actionable recommendations
Goal EM-2	**Encourage a reasonable distribution of costs to maintain effective and consistent insurance coverage while taking action to discourage excessive insurance claims in areas of high risk from the impacts of climate change.**							
Action EM-2.1	LO	Lobby for creation of a National Catastrophe Fund	Short (0-5 years)	Pending	Broward County Board of County Commissioners	SE FL Counties Federal Emergency Management Agency	Existing resources	Favorable legislation passed

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Goal EM-3	**Develop monitoring programs and plans to mitigate the impacts of climate change on households and individuals especially vulnerable to health risks attributable to rising global temperatures such as low income households and the elderly.**							
Action EM-3.1	LO	Develop plans and programs to mitigate impacts of heat waves on vulnerable populations	Long (0-50 years)	Pending	Emergency Management	Local media Broward County Health Department (ST of FL)	Additional personnel and funds	Completion of plan with actionable recommendations