

MEETING M I N U T E S
Monroe County Climate Change Advisory Committee
May 17, 2012, Marathon Government Center, BOCC Chambers

Members Present

Annalise Mannix (Chair)
Chris Bergh (Vice Chair)
Harry Appel
Bob Glazer
Bill Hunter
Don Riggs
Chuck Sherman

Members Not Present

John Forrer
Tom Genovese
Kelly McKinnon
David Tuttle

Advisory Agency Representatives:

TJ Patterson, FL Keys Electric Cooperative

BOCC

Sylvia Murphy, Liaison
George Neugent

Staff present

Dent Pierce, Public Works
Alicia Betancourt & Doug Gregory, UF Extension
Michael Roberts, Growth Management,
Environmental Resources
Rosa Washington & Colleen Murphy, Solid Waste
Bill Grant, Public Works

Guests

John Albert, Waste Management
Greg Sullivan, Waste Management
Steve Diddy, Engineered Compost Systems
Bill Townsend, South Dade Soil & Water
Conservation District (SDSWCD)
Wendy Lobos, SDSWCD
Cooper McMillan, SDSWCD
Karen Sussman
Rudy Krause
Barbara Nevins
Carrie Backlund

Annalise Mannix, Chair, called the meeting to order at 12:08 pm.

The agenda (Attachment 1) was adopted and the minutes from the March 15 meeting was adopted without change.

Organics Composting Potential for Monroe County

Doug Gregory gave an overview of the issue, explaining the charge from the BOCC March meeting that the Committee provide input regarding potential yard waste composting proposals. Two proposals were to be presented, one from Waste Management and another from the South Dade Soil and Water Conservation District.

The Waste Management proposal was introduced by John Albert and followed by a presentation by Steve Diddy, Business Development Director of the Engineered Compost Systems (ECS) (See attachment 2). Steve noted that ECS had designed 50 facilities throughout North America. He gave an overview of the composting process and explained the various systems or approaches to large scale composting of organic material such as yard and food waste, wastewater biosolids, etc. He noted that aeration and biofiltration were important to control odors.

The Waste Management proposal was to install an aerated static pile bunker type composting facility at the Key Largo Transfer Station as that was the only location of sufficient size to accommodate such a system which requires about 5 acres of land. It would be able to handle about 30,000 tons of waste a year, sufficient for Monroe County's needs.

Chris Bergh asked how the leachate from the compost piles were handled and whether it could be recycled. Steve Diddy responded the leachate had extremely high BOD (biological oxygen demand) and could not easily be recycled. Chris also asked about the freshwater demands for managing the compost piles, noting that freshwater access could be limited or expensive. He questioned if saltwater could be used in the composting process. Steve answered that saltwater was not feasible and that freshwater use did need to be evaluated.

Bob Glazer inquired about the potential effects of our local, sometimes heavy, rain events during the summer. Steve noted that the compost piles could be easily covered in anticipation of rain or as part of the ongoing process.

Don Riggs inquired if it was feasible to co-locate the composting facility with the existing and proposed wastewater plants. Steve indicated it was possible and helpful for incorporated the wastewater biosolids into the composting process but it depended on the amount of available land.

John Albert indicated that the overall costs of the proposed composting system would be equal to or a little less than the current haul-out costs. He also noted that composted mulch can be sold at this time for \$16/ton.

The South Dade Soil & Water Conservation District (SDSWCD) proposal was presented by Bill Townsend (see Attachment 3). They were proposing for the County to use an in-vessel composting system that could produce compost more quickly than other methods with much less odor since the compost is completely contained within the “In-Vessel Composting Container”. Similar composting systems have been installed in Homestead and Boca Raton. They had previously conducted a 3-week In-Vessel Composting trial at the Key Largo K-8 School in cooperation with the MC Recycling Program. They have been selling their Homestead compost made from wastewater biosolids to the agriculture industry for \$23/ cubic yard. Palm fronds compost nicely if they are fully shredded. Typically, yard waste needs to be ground to about ¼” pieces and mixed with other organics.

The SDSWCD proposal is to do a 6-month pilot study in the County and compost as much organic waste as can be collected, including yard waste, restaurant waste and fish waste. They can generate 24 cubic yards of compost a day with their 96 cubic yard container. If successful they said it would be possible to locate 2 of the in-vessel containers at each of the three County Transfer Stations so compost can be readily available throughout the Keys.

Colleen Murphy noted that the County typically handles about 26K tons of yard waste and about 17K tons food waste a year.

Chris Bergh expressed appreciation that the options presented seemed to be quite feasible for Monroe County. He said part of the decision on which system to use should be based on potential greenhouse gas emissions and resilience to sea level rise.

Annalise Mannix suggested the Committee develop a motion and supporting resolution for a recommendation to the County (Attachment 4). After some discussion it was decided to develop the motion during the break.

Break 1:45 – 2:10 pm

After the break, the following motion was adopted by the Committee with instructions to staff to develop it as a Committee Resolution to convey the motion to the BOCC.

The motion was:

The CCAC recommends that the Board of County Commissioners implement a local program for community composting to enhance waste diversion in Monroe County. This program should consider the following: Greenhouse Gas Emission Reduction, The cost and benefits for local reuse, collocation and co-benefits with wastewater systems, expanding local capacity to reuse material, local jobs, minimal water consumption and sea level rise projections for compost site.

The motion passed unanimously.

Review & Discuss Draft Climate Action Plan Revisions

The Committee discussed the recent revisions to the draft climate action plan and found them acceptable (Attachment 5--Draft Monroe County Community Climate Action Plan, May 2012 Version 4.5). It was decided to drop the items “Status of Action” and “Resources Required” and for staff to come back to the Committee in June with the draft action items in final form. Subsequently the document should be largely completed by the September CCAC meeting. It was discussed and concluded to keep the document in the current format with descriptions following each action item.

Alicia Betancourt noted that the newer action items added in the last two meetings have not yet been assigned a priority.

Bob Glazer recommended a new Solid Waste Action Item under Goal 1:

Action S-1.5: Monroe County should create an action plan to handle storm related solid waste.

The action plan should include means for composting as much debris as possible as well as its use in the waste-to-energy plant.

Bob Glazer also recommended that Action s-1.4 be modified to include the following: and reevaluate existing ordinances to remove restrictions that may discourage recycling. So Action S-1.4 will read:

Action S-1.4: Implement ordinances that encourage economic opportunities for recycling/reuse business ventures

Meeting adjourned at 3:40 pm

Attachment 1 = CCAC May 17, 2012 Agenda

Attachment 2 = WM/ECS-- "Monroe County Yard Waste Composting"

Attachment 3 = SDSWCD-- "Proposal for Monroe County Organic Waste Recycling"

Attachment 4 = CCAC Recommendation to BOCC

Attachment 5 = Draft Monroe County Community Climate Action Plan, May 2012 Version 4.5

Monroe County Climate Change Advisory Committee
Meeting
May 17, 2012
Marathon BOCC Meeting Room, 12:00 p.m. – 4:00 p.m.



- I. Review and Approval of Meeting Agenda and March Minutes– Mannix (12:00 - 12:20)
- II. Overview of Organics Waste Management and March BOCC Meeting – Gregory/Washington (12:20 - 12:30)
- III. Review and Discussion of Organics Waste Management Proposals
 - a. Waste Management – Greg Sullivan / John Albert (12:30 – 1:00)
 - b. South Dade Soil & Conservation District - Cooper McMillan/Bill Townshend/Sonny Clayton (1:00 – 1:30)
- BREAK (1:30 – 1:45)
- IV. Review & Discuss Draft Climate Action Plan Revisions – Mannix (1:45 – 4:00)
 - a. Completion of Solid Waste & Recycling, Policy Coordination and Natural Systems Sections
- V. Other Business (if needed)

Appointed Members:

Harry Appel
Chris Bergh (Vice Chair)
John Forrer
Tom Genovese

Bob Glazer
William Hunter
Annalise Mannix (Chair)
Kelly McKinnon

Don Riggs
Chuck Sherman
David Tuttle

Staff / Office:

Nat Cassel / County Attorney
Doug Gregory & Alicia Betancourt / Extension Service
Rhonda Haag / Sustainable Program Manager
Michael Roberts / Growth Management
Rosa Washington & Colleen Murphy / Solid Waste

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What Could Go Wrong?



Odors

- No/Poor BMP (moisture, C/N, porosity, density)
- Inadequate primary and secondary aeration
- No/Poor primary and secondary process control
- No/Poor fugitive emission capture
- Inadequate control of non-fugitive emissions (biofiltration)
- No/Poor capture and control of leachate
- No/Poor process control during curing

Biofiltration



Typical Compost Systems

Static Pile

Turned Windrow

Aerated Static Pile

- Open (piles, mass bed, bunker)
- In-Building (mass bed, bunker)
- Fabric Covered (piles, bunker)

In-Vessel

- Containerized (vessels 40-50 yd³)
- Stationary (vessels 400-1,000 yd³)

Passively Aerated



Open ASP—Mass Bed



1st & 2nd (Static) Mass Beds



Open ASP—Bunker Walls



1st - Bunkers
2nd - Turned Mass-Bed



In-Building ASP



Covered ASP's



In-Vessel



Stationary Vessels

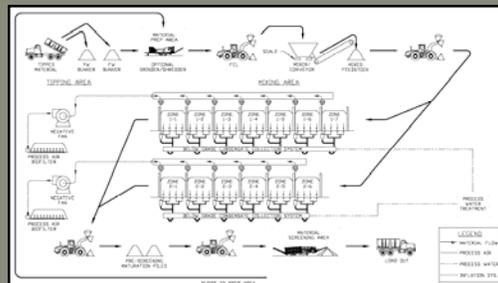
Containerized Vessels



Preliminary Site Plan



Facility Process Flow



Engineered Compost Systems



Steve Diddy
Business Development Director
steve@compostsystems.com
Office: 206-634-2625
Cell: 360-280-8985

SOUTH DADE SOIL & WATER CONSERVATION DISTRICT



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May 16, 2012

PROPOSAL FOR MONROE COUNTY ORGANIC WASTE RECYCLING

The South Dade Soil and Water Conservation District (SDSWCD), a governmental subdivision of the State of Florida has been active in working with Monroe County Florida Keys schools, hotels, restaurants, municipalities and homeowners in the pursuit of its mission "To provide leadership in implementing conservation programs and technology that facilitate enhancement, sustainment and stewardship of our natural resources and environment".

The SDSWCD being the closest Soil and Water Conservation District to Monroe County, where no Soil and Water Conservation District exists, is available to assist Monroe County in conservation measures that will be directed towards the protection of the sensitive environment that exists in the Florida Keys. With 28 years of successful composting experience that includes:

1. Installation of a complete in-vessel composting facility at Broken Sound Club in Boca Raton, Florida to compost all of the food waste from four restaurants and the green waste from two golf courses, and the re-use of the compost on the golf courses eliminating the high cost of commercial fertilizers.
2. A five-year contract with the City of Homestead, Florida to in-vessel compost their waste water residuals, eliminating the high cost of landfilling their biosolids as well as the environmental hazards.
3. Developing the protocol for composting Miami-Dade waste water residuals into a Class AA certified *Florida Organix* fertilizer that received national EPA Awards.
4. Successfully completing an EPA grant to prove "In-Vessel Composting of Organic Waste Products and Re-use On Site", composting the food waste and green waste from the City of Miami Mandarin Oriental Hotel, Homestead Air Reserve Base, The Breakers Resort in Palm Beach, Florida and the animal waste and green waste from Zoo Miami.

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5. A successful three-week pilot test of in-vessel composting food waste and yard waste at Key Largo K-8 School.

Many other successful SDSWCD in-vessel composting projects with dairies, poultry growers, and a cotton gin operator in South Carolina offer Monroe County the benefit of working with the SDSWCD to create a solid waste disposal system that is both environmentally and economically advantageous. There is no need to re-invent the wheel with additional costly tests, pilot projects and consultant fees. Composting is being done around the world today with excellent results; in-vessel systems offer economically and environmentally viable options for the Florida Keys.

To ensure the protection of the extremely sensitive local environment, reduce costs and carbon footprint, a safe system of in-vessel composting organic waste products produced in the Florida Keys can be implemented. This will substantially reduce the total volume of solid waste to be transported out of the County.

In response to the need for improved organics disposal options, the SDSWCD proposes a comprehensive Monroe County in-vessel composting program for organic waste:

- a) Monroe County would utilize the expertise of the SDSWCD through an inter-governmental agreement between the two government agencies. The SDSWCD will provide, on an hourly and mileage basis of \$75.00 per hour and \$0.51 per mile, not to exceed a total of \$50,000.00, a comprehensive proposal, including the evaluation of the volumes of organic waste produced at each individual in-vessel composting site and at each transfer station, using weights produced by the Monroe County Solid Waste Department.

A preliminary estimate of equipment requirements and costs are presented following this section of the proposal; this is presented based on prior experience. Meetings with County Solid Waste staff and a tour of County transfer stations will provide additional guidance for development of the comprehensive in-vessel composting proposal.

- b) The proposed agreement would authorize the SDSWCD to initiate the design of in-vessel composting installations at each of the Monroe County transfer stations. The installations will be designed for the maximum volume per day during the highest peak days of the Florida Keys tourist season.
- c) The SDSWCD will provide the Monroe County Solid Waste Department with the option of a turn-key operation contract with the SDSWCD for management of the in-vessel composting equipment at any or all of the transfer stations.

- d) Alternatively, the SDSWCD will train the personnel of WMI, Monroe County or other designated entity to operate the in-vessel composting equipment and manage operations of the three composting facilities.
- e) Items “b” and “c” will assure that the in-vessel composting facilities are operated by trained, certified personnel.
- f) Residents and businesses will be required to separate their organic waste products into approved compostable plastic bags or compost collection bins, provided by the Monroe County Solid Waste Department for a bi-weekly organic waste collection service that will be delivered to the nearest transfer station for in-vessel composting.
- g) Businesses may purchase and operate an in-vessel composting system for their own organic waste products on site and will be exempt from any solid waste disposal fee for this recycled organic waste; residents may also choose to compost at home, thereby avoiding collection fees.
- h) Monroe County BOCC may opt to enact enforcement measures to ensure that residents and businesses opting out of the County program are not disposing of compostable organic materials in the trash.
- i) Monroe BOCC may also enact an ordinance that will require organic waste products produced in the Florida Keys to be in-vessel composted at the three transfer stations, private businesses or residences. This ordinance will allow the Monroe County Solid Waste Department to create an RFP for the collection and transfer of organic waste products from residential and small businesses to the nearest transfer station. A normal tipping fee will be charged by the Monroe County Solid Waste Department for all organic waste products delivered to the transfer stations.
- j) This project is capable of producing in excess of 25,000 tons of Class AA compost every year– a highly desirable, readily usable and marketable product. Disbursement of the finished product will be determined by chosen management options.

The percentage of food and yard waste in the 2009 solid waste stream (most recent FL DEP certified figure) is 33%. Monroe County statistics indicate that the percentage is between 25-40%, dependent upon weather events and development trends. At this time, SDSWCD is using 33% for preliminary estimates of the number and cost of in-vessel composters. Once an inter-government agreement is signed, the SDSWCD will prepare complete cost projections for composting installations, equipment, and operating expenses at each transfer station.

Any turn-key operation contracts will be mutually agreed upon between the individual in-vessel composting installation owners and the SDSWCD or between Monroe County Solid Waste Department and the SDSWCD or other chosen entity for any or all of the transfer stations.

A provision shall be included in this agreement to cover any unforeseen situations such as weather events, loss of power, equipment failures, etc. during which time all organic waste products will be collected and transferred to the nearest disposal site outside of the affected area. This could be another Florida Keys transfer station or an agreement with Miami-Dade County Solid Waste Department for transfer to the South Dade Landfill or the M-D Resource Recovery Facility (incinerator) under a temporary, emergency agreement.

This proposal will protect the income of the Monroe County Solid Waste Department with the collection of transfer station tipping fees and the recycling of all organic food and yard waste products as Class AA compost. It also provides for huge cost savings in the hauling of heavy organic waste products, as much as 60% water. Eliminating long-distance hauling of organic waste (nearly 400 miles round-trip) also reduces the associated carbon footprint and the costly maintenance to roads and bridges.

With an accompanying single stream recycling program that will recycle clean paper, cardboard, metal, glass and plastic, Monroe County can soon become a ZERO WASTE COUNTY.

The SDSWCD offers these preliminary estimates for consideration based on the Florida DEP 2009 Monroe County MSW and Recycling Data Summary:

2009 total tons of solid waste/year	=	130,881 tons
County's annual waste disposal fee	=	\$80.37/ton
Total waste disposal cost	=	\$10,518,906/year
2009 Food and yard waste total	=	43,191 tons/year
2009 Food and yard waste percentage	=	33%
Potential avoided waste disposal fees	=	\$3,471,261

Estimated in-vessel composting equipment costs:

Two 96 c.y. capacity in-vessel composters = \$595,000
(vessels, conveyors, hoppers, hammer mills, mixers,

Delivery and installation = 58,000

Ground preparation and electrical = 110,000

Estimated cost for each transfer station = 763,000

**Estimated total cost for in-vessel
Composters at 3 transfer stations \$2,289,000**

Notes:

1. Without information on the number of individual in-vessel composting sites that might be encouraged to operate and the volume of material that they would produce for composting, we have not subtracted any volume from the total of 130,881 tons/year.
2. With the potential savings of \$3,471,261 in disposal fees, the estimated Return On Investment (R.O.I.) for equipment (\$2,289,000) would be less than one year; this does not include operating expenses or any additional collection expenses.
3. In addition, Monroe County Solid Waste Department could receive significant funds from sales of the compost. Finished product is estimated at approximately 60% of organic waste total (due to shrinkage during composting). Compost is valued at approximately \$48/ ton in bulk loads; total value of compost could exceed \$500,000 (25,915 tons of compost X \$20/ton), especially if sold in bags.
4. This proposal can be environmentally and economically advantageous for all participants- the County, businesses and residents.

Prepared by: Morgan Levy, SDSWCD Administrator and Bill Townshend, SDSWCD Project Manager



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MONROE COUNTY CLIMATE CHANGE ADVISORY COMMITTEE

May 17, 2012

Presentation By The South Dade Soil And Water Conservation District: Environmental and Economic Advantages Of In-Vessel Composting In The Florida Keys

I. Evaluating the present solid waste disposal system in the Florida Keys

The Solid Waste Element of the Monroe County Comprehensive Plan Update, May 2011 includes the following important statement:

“Solid Waste management is a critical issue in the Florida Keys. ...the unique setting of the Keys makes waste management even more difficult. While landfilling has been the predominant means of waste disposal nationwide, our nation is becoming increasingly conscious of what is being thrown away and where it is going. An increasing awareness of the hazards of landfilling some types of waste of the potential for reuse of other materials, and the imminent closure of landfills around the country have brought about this change in attitudes towards solid waste management. Now, methods of processing and disposal are evolving that are changing the business of solid waste management.”

The high cost of disposal plus the environmental sensitivity of the Florida Keys is a current problem that needs a good solution.

The South Dade Soil And Water Conservation District (SDSWCD) has had 28 successful years of composting experience. See the attached “Know Your District” paper. The SDSWCD can provide consulting services to the Monroe County Solid Waste Department at a very fair and reasonable cost to plan and operate a 6-month In-Vessel Composting Pilot Project at the Key Largo Transfer Station, utilizing the organic waste from commercial operations, restaurants, hotels, fisheries whose waste is presently going to this transfer station. No residential waste would be included in this pilot project

Proposal For Consulting Services And Pilot Project
By
The South Dade Soil And Water Conservation District (SDSWCD)

The SDSWCD will provide consulting services for Monroe County Solid Waste Department on an as-needed basis, but specifically for the immediate need to prove an alternate method of organic waste disposal that will be both economically and environmentally sound. The SDSWCD will utilize its 28 years of composting experience in providing this consulting service at the rate of \$75.00/hour, plus \$0.51/mile plus 20% overhead.

This pilot project must resolve the high cost of present waste disposal that was originally \$59.00/ton but increased in 2011 to \$80.37/ton, a 27% increase in less than five years. Logic tells us that this cost will continue to increase with the high cost of oil continuing to rise.

This pilot project must also address the extreme environmental sensitivity that must be protected in the Florida Keys. With no landfill space available and incineration not available within close proximity, composting to produce a valuable soil amendment that can be re-used throughout the Florida Keys appears to be a viable solution. The absence of enough land area to do the aerated compost pile system, plus the environmental hazard of leachate from these piles contaminating the surface and sub-surface waters and the vermin attraction of birds, rats, and other local animals rules out that system.

The SDSWCD, after a tour of the three transfer stations, recommends that the pilot project be located at the Key Largo Transfer Station. This would include:

1. A survey of the commercial establishments that are presently serviced by this transfer station to determine the volume of organic waste (food waste, yard waste, soiled cardboard waste, seaweed waste) that would be available. Each commercial establishment will be given the option of installing their own in-vessel composting system for re-use on their own property. The SDSWCD will train each participating commercial establishment in how to carefully source separate their organic waste and place it in special containers or compostable plastic bags.
2. The results of this survey will be used to prepare a full cost proposal to the Monroe Solid Waste Department for all of the equipment that will be required to in-vessel compost the required volume of organic waste.
3. With the approval of the full cost proposal by the Monroe County Solid Waste Department, the SDSWCD will then order the approved in-vessel composting equipment with funds provided by Monroe County Solid Waste Department in a Lease-To-Own Agreement.
4. Local waste haulers will bid on the bi-weekly collection of only organic waste from the participating commercial establishments for delivery to the Key Largo Transfer Station In-vessel composting facility.
5. The SDSWCD will operate the Key Largo in-vessel composting pilot project under the same consulting agreement terms, providing the Monroe County Solid Waste Department with accurate information on all operating costs and information that will include the volume of organic waste that has been composted, the temperatures reached for each batch of compost, the lab analyses of each compost batch that has been analyzed and the market that has been established for the finished compost.

6. All yard waste not needed as a carbon bulking source in this in-vessel composting process will be shredded into mulch for re-use in the Florida Keys to build up the organic content of the sandy, water-leaching poor quality soils. The SDSWCD's research shows that palm waste, when properly shredded, makes the longest lasting mulch.
7. The Monroe County Solid Waste Department will decide, with the help of the SDSWCD, how to market the finished compost.
8. The advantages of in-vessel composting in the Florida Keys are:
 - a) All organic waste is treated and re-used in the Florida Keys, saving the huge costs of transporting it out of the Florida Keys.
 - b) All waste is contained in the vessel with no odors, vermin attraction or leachate.
 - c) The organic waste will be composted in temperatures in excess of 131 degrees F for four consecutive days, destroying all harmful pathogens and weed seeds.
 - d) The finished compost will be an excellent replacement for commercial fertilizer that has tripled in cost in the last two years. Chemical fertilizers leach out with irrigation and rain, no longer providing nutrients to the plants and polluting the surrounding waters. This is especially prevalent in the Keys with the sandy coral rock surfaces.
 - e) The compost holds water and releases its nutrients slowly, requiring less irrigation and fewer nutrient applications.
 - f) The compost has been shown to clean up contaminated soils by reducing runoffs, as well as preventing erosion when used near pathways and highways. Monroe County can help to minimize its footprint on the ecological landscape to preserve it for future generations.
 - g) This in-vessel composting process, if properly managed, can add four or more permanent jobs to the area.

The SDSWCD suggests that this pilot project at the Key Largo Transfer Station be initiated during the slow summer months when the volume of waste is at its lowest. This will allow for the startup period not to overwhelm the separation, collection, composting and mulching operations. As the volumes gradually increase, so will the efficiency of the pilot project.

The SDSWCD is ready to begin this project as soon as it is approved.

SOUTH DADE SOIL & WATER CONSERVATION DISTRICT

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KNOW YOUR LOCAL SOIL AND WATER CONSERVATION DISTRICT OVERVIEW

- South Dade Soil and Water Conservation District (SDSWCD), 1450 N. Krome Avenue, Suite 104, Florida City, FL 33034: Phone: (305) 242-1288; Fax: (305) 242-1292;
- e-mail: southdadeswcd@southdadeswcd.org;
- Website: www.southdadeswcd.org
- The SDSWCD, a non-profit 501-C-3 governmental subdivision of the State of Florid, has been successfully involved in conservation projects since 1982.
- 1984 to present time, SDSWCD has been involved in the composting and distribution of waste-water residuals (biosolids) from the Miami-Dade County Water and Sewer Department (MDWASD). Marketed and distributed Class B and Class A biosolids.
- 1991 First Place Region 4 and Second Place National EPA Award for *Beneficial Reuse of Wastewater Residuals*. SDSWCD designed the wastewater residual protocol for MDWASD to compost sludge and has been marketing the sludge to South Florida agriculture growers: row crops, groves and nurseries to present time.
- 1992 Lead effort to stop the burning of Hurricane Andrew yard waste. Obtained FEMA funding for Miami-Dade County Solid Waste Department to grind the yard waste into mulch. Distributed 4.5 million cubic yards of free mulch to local agricultural interests. FEMA reported that it was the most cost-effective disaster relief program they had.
- 1993-97 Instructed 2,000 Miami-Dade County school students per year on water conservation in program funded by the South Florida Water Management District, ending with field trip to Everglades for the students.
- 1995 Contracted with Fort Lauderdale Housing Authority to provide 400 water-saving showerheads and 800 sink aerators, reducing water consumption from 6 gpm to 2.5 gpm.
- 1995-96 Successfully conducted a two-year *Clean Organic Waste (C.O.W.) Compost* pilot project for Miami-Dade Solid Waste Department, using separated organic food waste from Morrison's Cafeteria and the University of Miami Cafeteria. Built a composting site at the University of Florida Tropical Research and Education Center in Homestead, FL with a mixing pad, four composting pads, two of which were aerated and two were static, a leachate pond. Tested compost provided 30% increase in yields, prevented root disease and conserved water.

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- 1997 Provided a no-cost plan to South Florida Water Management District (SFWMD) to remove and control exotic plants from the *Frog Pond*, a 5,000 acre tract of land adjacent to Everglades National Park by leasing parcels to farmers. Received a five-year management contract of *Frog Pond* instituting Best Management Practices (BMP's), funding hydrology and soil research by University of Florida while providing \$40,000.00 per year to SFWMD from leases of farmable land.
- 1999 Received grant to plant 268 trees in Richmond Heights, an underserved, historic African American neighborhood. Local residents were encouraged to participate.
- 2002 SDSWCD began contacting the 31 municipalities in Miami-Dade County to create *Conservation Partnerships* with them. This encourages the municipalities to participate in conservation practices and to initiate their own conservation programs.
- 2003 Contracted with SFWMD to remove 2 miles of old chain-link fence and install new chain-link fence on State road 9336 bordering the *Frog Pond*, creating an aesthetic entrance to Everglades National Park.
- 2005 Partnered with South Florida Resource Conservation and Development Council in an EPA grant to provide 900 water-saving showerheads in Florida City to low-income families.
- 2006-07 Participated in a Farm Pilot Project Coordination (FPPC) project to compost cow manure at a 1,000 milking herd dairy by providing an in-vessel aerobic composter, composting the cow manure and marketing the composted cow manure as *Florida Organix*, an excellent soil amendment, to nurseries for potting mix. Became a distributor for BW Organics, Inc. the manufacturer of the in-vessel aerobic composter and started marketing it to all large producers of organic waste such as dairy farmers, poultry farmers, universities and schools, super markets, recreation parks, etc.
- 2006-07 Received a Community Based Organization (CBO) Grant from Miami-Dade Department of Environmental Resource Management (DERM) for *Teaching the Public New Conservation Habits While Reducing the Solid Waste Stream*. Planted eleven Xeriscape Gardens around the county, made eleven Conservation Presentations that included giving away 400 *Earth Machine* home composters, 1200 water-saving showerheads, 2,000 *Citizen's Conservation Guides*, sample CFL light bulbs and a few trees at no cost to the recipients.
- 2009 -2010 Obtained a \$50,000.00 EPA Grant to prove, "On Site In-Vessel Composting of Organic Waste and Re-Use On Site". Successfully included ZooMiami, City of Miami, Homestead Air Reserve Base and The Breakers Resort in Palm Beach. Final report went out to approximately 3,000 Soil and Water Conservation District in U.S.
- 2010 Performed a successful three-week in-vessel composting test of food waste and green waste at Key Largo K-8 School.
- 2010 U.S. Composting Council's *Hi Kellogg Award For Lifetime Achievements In Composting* to Bill Townshend, SDSWCD Program Director.
- 2011- 2012 Installed a complete in-vessel composting system for Broken Sound Country Club in Boca Raton, Florida where they have four restaurants and two golf courses. In the first year of composting the organic waste they composted approximately 500,000 pounds of food waste and 1,200,000 pounds of green waste.

All of the finished compost was re-used on the two golf courses, reducing the solid waste disposal fees and the commercial chemical fertilizer costs.

- 2012 Signed contract with NEFCO to distribute Class AA biosolids south of Highway 80.
- 2012 Signed a contract with the City of Homestead to install a complete drying and in-vessel composting system to compost their biosolids cake from the centrifuge. This will save the city approximately \$144,000.00 in biosolids disposal to a landfill, with a return on the entire investment in 2.5 years.
- Pending contracts:
 - a) Homestead Air Reserve Base
 - b) Baptist Homestead Hospital
- Negotiations In Progress:
 - a) University of Miami
 - b) Monroe County

Board of Supervisors

The Board of Supervisors are elected by the public to set policy, establish goals and projects and approve all major expenditures. In the case of the SDSWCD, the Board is also required to investigate sources of income, since the District is not funded by the State of Florida, or by Miami-Dade County. The Board Members are all volunteers, serving our community with no salaries, perks or benefits.

The South Dade Soil & Water Conservation District's Board of Supervisors meets on the third Thursday of every month at the USDA Florida City Service Center, 1450 North Krome Avenue, Suite 102, Florida City Florida at 9:30 am.



S. Cooper McMillan, Chairman

- Past Chairman and founding member, Ag Practices Board, Miami-Dade County
- Family farming in this area beginning in 1918
- Lychee and Avocado Grower
- FSA County Committee Community Member



Louise King, Supervisor

- Owner of Royal Grove Nursery
- Tropical Fruit Growers of South Florida Inc. - President
- Agricultural Recovery Management, Chairman



Dr. Thomas Lee Davenport, Supervisor

- Research Scientist trained in plant/water relations
- Well versed in all aspects of plant physiology, Horticulture and Hydrology of Florida
- Lychee and Avocado Grower
- Associate Professor Emeritus at University of Florida Tropical Research and Education Center, Homestead, Florida



John C. DeMott, Supervisor

- Past President, Dade County Chapter, Florida Nursery Growers Association
- District Representative - Miami-Dade County Agricultural Practices Advisory Board
- Committee member - National Woody Landscape Plant Crop Germplasm
- Ornamental horticulture production
- Aquaculture Production
- Florida resident since 1951

District Staff



Morgan Levy, SDSWCD Administrator

Email: mlevy@southdadeswcd.org

- Resident of Miami-Dade County since 1926
- U.S. Naval Air Force, 1942-47, fighter pilot
- University of Colorado, Civil Engineering
- West Dade Federation of Homeowners Associations
- Founder Dade Coalition for Good Government, Founder
- South Florida Resource Conservation & Development Council
- Airport West Chamber of Commerce, 1999 Achievement of the Year Award



William Townshend, SDSWCD Project Manager

Email: btownshend@southdadeswcd.org

- Over 20 years of developing food, yard, manure and paper composting techniques
- U.S. Composting Council ~ 2009 HI Kellogg Award Winner for Outstanding Service to the Composting Industry
- Designed Miami-Dade County AA Biosolids composting process
- Hurricane Andrew mulching project - 1993-95 mulched 4.5 million tons of clean hurricane debris and returned it to agricultural lands, avoiding \$90 million in tipping fees, while eliminating pollution from burning
- C.O.W. Project 1994-96 - Biological, chemical & physical enhancement of clean

organic waste, in conjunction with University of Florida Tropical Research and Education Center and Dade County Solid Waste Department

- Florida Pilot Project Commission - SDSWCD project at Butler Oaks Dairy, Lorida, Florida - Project Manger developing in-vessel composting of cow-manure on-site to remove phosphorus from Okeechobee Watershed Pilot



Robert Perez, MIL LAB Team Leader

Email: rperez@southdadeswcd.org

- Electronics Engineer with minor in Environmental Science
- Formerly staff scientist and technical supervisor for FDOT, air, soil, and groundwater sampling.
- Bilingual English/ Spanish
- US Air Force Reserve, Combat Engineer, US Army Certification in water and wastewater treatment and engineering, including reverse osmosis certification.



Donald Grimsley, NURSERY BMP LAB

Email: don@southdadeswcd.org

- Nicholson H.S. Valedictorian, Bradenton, FL 1985
- MCC, Assoc. Science Degree 1987
- Civil and agricultural engineering contractor 1985-2005
- Agricultural Engineering Consultant Nursery BMP Lab.



L.T. "Sonny" Clayton,

Mobile Irrigation Lab Team Member

Email: sonny@southdadeswcd.org

- B.A. in Business Administration from Florida Memorial University 1972
- Chairman of the Planning and Zoning Board of Florida City.
- Member of several community organizations.
- Retired from Scotts after 34 years of specializing in lawn and garden needs.



Wendy Lobos, MBA

Chief Financial Officer

Email: southdadeswcd@southdadeswcd.org

- Masters of Business Administration 2007 from NOVA Southeastern University
- BA in Political Science with minor in Spanish Literature SUNY Cortland 1997
- Former Councilwoman for City of Homestead
- Former Member of the Audit Committee for Miami Dade County School Board



South Dade Soil & Water Conservation District

1450 N. Krome Avenue, Suite 104

Florida City, FL 33034

southdadeswcd@southdadeswcd.org

www.southdadeswcd.org

Tel: 305-242-1288

Fax: 305-242-1292

Attention Large Food Operations At Universities, Recreation and Theme Parks

Your Garbage Is Gold!

Don't pay to have it dumped in a landfill.

You can turn it into a valuable organic soil additive that will enhance your landscaping, saving your costs on chemical fertilizers and the irrigation required.

Permit the South Dade Soil and Water Conservation District to show you how to do this with an in-vessel aerobic composter at your site. One person can be instructed on how to divert your organic food waste and paper into a easy to operate in-vessel composter that will produce an organic product that your organization can put to good use.

What you will save on garbage hauling fees, chemical fertilizers and irrigation can pay for the in-vessel aerobic composter in just a few years. The savings will then begin to mount up while you are also recycling your food waste and protecting our environment.

Check out the South Dade Soil and Water Conservation District website at www.southdadeswcd.org to find out the many ways your organization can conserve water, improve water quality, and enhance and sustain our valuable natural resources, the water, the soil and the air.

IN-VESSEL AEROBIC COMPOSTING
TURNS YOUR ORGANIC WASTE PRODUCTS
INTO
GOLD!

- COW MANURE
- HOG MANURE
- HORSE MANURE
- POULTRY LITTER
- SEWAGE SLUDGE
- FOOD WASTE
- YARD WASTE
- ANIMAL WASTE AND CARCASSES

Can be speedily and efficiently composted to produce a valuable, saleable product with no additional heating source required. Recycling at its best.

South Dade Soil and Water Conservation District
1450 N. Krome Avenue, Suite 104, Florida City, FL 33034
recommends & delivers

B W Organics, Inc. In-Vessel Aerobic Composters.

Call: (305) 242-1288.....Fax: (305) 242-1292

e-mail: southdadeswcd@southdadeswcd.org

Check our website: www.southdadeswcd.org

(OVER)

 South Dade Soil & Water Conservation District
450 E. Krome Ave., Suite 104
Florida City, FL 33033



Monroe County Climate Change Advisory
Committee
May 17, 2012
Presentation by: Bill Townshend

SDSWCD..... 

- A non-profit, governmental subdivision of the State of Florida.
- Has 29 years of experience in composting bio-solids and various organic wastes.
- Winner of EPA National Awards, Hi Kellogg Award from the US Composting Council, and several individual achievement awards including a park in Doral being named for the District Administrator Morgan Levy, for his contributions to his community.



 **2009 EPA Grant**



• In 2009 we obtained a \$50,000 EPA Grant to prove, "On Site In-Vessel Composting of Organic Waste and Re-Use on Site." Successfully included Zoo Miami, City of Miami, Homestead Air Reserve Base, Key Largo Elementary School, and The Breakers Resort in Palm Beach. EPA sent the final report to approximately 3,000 Soil & Water Conservation District in U.S.

2012 Current Projects

› Charlotte Airport in North Carolina



› National Archives in Washington D.C.



2012 Current Projects

› City of Homestead



› Broken Sound Club in West Palm Beach



Monroe County Comprehensive Plan May 2011

› "Solid Waste management is a critical issue in the Florida Keys. ...the unique setting of the Keys makes waste management even more difficult. While landfilling has been the predominant means of waste disposal nationwide, our nation is becoming increasingly conscious of what is being thrown away and where it is going. An increasing awareness of the hazards of landfilling some types of waste of the potential for reuse of other materials, and the imminent closure of landfills around the country have brought about this change in attitudes towards solid waste management. Now, methods of processing and disposal are evolving that are changing the business of solid waste management."



In-Vessel Composting Pilot Project



- › Key Largo Transfer Station
- › Duration: 6 months.
- › Compost organic waste from commercial operations, restaurants, hotels, and fisheries.
- › No residential waste would be used in pilot project.



Goals of Pilot Project

- › Prove an alternate method of organic waste disposal that will be both economically and environmentally sound.
- › Address the extreme environmental sensitivity that must be protected in the Florida Keys.
- › Resolve the present high cost of waste disposal which has increased 27% in less than five years.
- › Produce a valuable soil amendment that can be re-used throughout the Florida Keys.



Key Largo Transfer Station Pilot Project

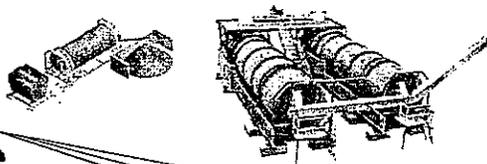


- › Survey commercial establishments.
- › Train participating commercial establishments to source separate.
- › Prepare a full cost proposal to the Monroe Solid Waste Department based on survey results.



Key Largo Transfer Station Pilot Project

- › With proposal approval, local waste haulers will bid on the bi-weekly collection of only organic waste.
- › The SDSWCD will operate the Key Largo in-vessel composting pilot project.
- › The information provided to the Monroe County Solid Waste Department will include: volumes composted, temperatures reached for each batch, lab analyses of each batch, and the market established for finished compost.



Benefits of In-Vessel Composting in the Florida Keys



- › All organic waste is treated and re-used in the Florida Keys, saving the huge costs of transporting it out of the Florida Keys.
- › All waste is contained in the vessel with no odors, vermin attraction or leachate.
- › The organic waste will be composted in temperatures in excess of 131 degrees F for four consecutive days, destroying all harmful pathogens and weed seeds.
- › The finished compost will be an excellent replacement for commercial fertilizer that has tripled in cost in the last two years. Chemical fertilizers leach out with irrigation and rain, no longer providing nutrients to the plants and polluting the surrounding waters. This is especially prevalent in the Keys with the sandy coral rock surfaces.



Benefits of In-Vessel Composting in the Florida Keys

- › The compost holds water and releases its nutrients slowly, requiring less irrigation and fewer nutrient applications.
- › The compost has been shown to clean up contaminated soils by reducing runoffs, as well as preventing erosion when used near pathways and highways. Monroe County can help to minimize its footprint on the ecological landscape to preserve it for future generations.
- › This in-vessel composting process, if properly managed, can add four or more permanent jobs to the area.



Preliminary Estimates

- ▶ The SDSWCD offers these preliminary estimates for consideration based on the Florida DEP 2009 Monroe County MSW and Recycling Data Summary:
- ▶ 2009 total tons of solid waste/year = 130,881 tons
- ▶ County's annual waste disposal fee = \$80.37/ton
- ▶ Total waste disposal cost = \$10,518,906/year
- ▶ 2009 Food and yard waste total = 43,191 tons/year
- ▶ 2009 Food and yard waste percentage = 33%
- ▶ Potential avoided waste disposal fees = \$3,471,261



Preliminary Estimates

- ▶ Estimated in-vessel composting equipment costs:
- ▶ Two 96 c.y. capacity in-vessel composters (vessels, conveyors, hoppers, hammer mills, mixers) = \$595,000
- ▶ Delivery and installation = \$58,000
- ▶ Ground preparation and electrical = \$110,000
- ▶ Estimated cost for each transfer station = \$763,000
- ▶ Estimated total cost for in-vessel Composters at 3 transfer stations = \$2,289,000



Notes to the Estimated Figures

- ▶ Without information on the number of individual in-vessel composting sites that might be encouraged to operate and the volume of material that they would produce for composting, we have not subtracted any volume from the total of 130,881 tons/year.
- ▶ With the potential savings of \$3,471,261 in disposal fees, the estimated Return On Investment (R.O.I.) for equipment (\$2,289,000) would be less than one year; this does not include operating expenses or any additional collection expenses.
- ▶ In addition, Monroe County Solid Waste Department could receive significant funds from sales of the compost. Finished product is estimated at approximately 60% of organic waste total (due to shrinkage during composting). Compost is valued at approximately \$48/ton in bulk loads; total value of compost could exceed \$500,000 (25,915 tons of compost X \$20/ton), especially if sold in bags.
- ▶ This proposal can be environmentally and economically advantageous for all participants - the County, businesses and residents.



South Dade Soil & Water conservation District

Our Mission

The mission of the South Dade Soil & Water Conservation District is to provide leadership in implementing conservation programs and technology that facilitate enhancement, sustaniment and stewardship of our natural resources and environment.

Board of Directors

Cooper McMillan, Chair
Family farming in this area since 1918
Avocado and Lychee Grower

Louise Kling, Vice-Chair
Owner of Royal Grove Nursery
Tropical Fruits Grower

Dr. Thomas Lee Davenport
Research Scientist
Lychee and Avocado Grower

John C. DeMott
MDC Ag Practices Board
Ornamental Horticulture and
Aquaculture Production



Questions? Contact Us

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Fax: (305) 242-1292
southdadeswcd@southdadeswcd.org
www.southdadeswcd.org



A RESOLUTION OF THE MONROE COUNTY CLIMATE CHANGE ADVISORY COMMITTEE RECOMMENDING IMPLEMENTATION OF IN-COUNTY COMPOSTING FOR YARD WASTE AND OTHER ORGANIC MATERIAL

WHEREAS, Monroe County, Florida, encompasses the uniquely beautiful natural environment of the Florida Keys; and

WHEREAS, the Monroe County Board of Commissioners (BOCC) is dedicated to preservation of the natural environment, conservation of energy and natural resources, encouraging residents and visitors to be good stewards of the environment; and

WHEREAS, the BOCC established a target goal for the county to reduce greenhouse gas emissions and associated energy costs for county operations by 20% by the year 2020 relative to the 2005 baseline inventory as established by the Extension Service; and

WHEREAS, the purpose of the Monroe County Climate Change Advisory Committee (Climate Committee) shall be to make recommendations to the BOCC regarding appropriate mitigation and adaptation policies needed to address climate change issues; and

WHEREAS, the BOCC, at their March 2012 meeting, requested the Climate Committee to provide input on a potential in-county yard waste composting proposal and the Climate Committee reviewed proposals from Waste Management and the South Dade Soil and Water Conservation District at their May 17, 2012 meeting; and

WHEREAS, proposals reviewed by the Climate Committee indicated that in-county composting of yard waste and other organics was feasible; and

WHEREAS, the transport of yard waste and organics both increases transportation related greenhouse gas emissions and prevents its use as compost within the county as a soil amendment; and

WHEREAS, compost would reduce the need for artificial fertilizers and pesticides, can be used as fill and can be sold to the public; and

WHEREAS, a local compost facility could be co-located with and complement current wastewater efforts.

NOW, THEREFORE, BE IT RESOLVED BY THE MONROE COUNTY CLIMATE CHANGE ADVISORY COMMITTEE:

Section 1. The Monroe County Climate Change Advisory Committee unanimously recommends that the Monroe County Board of County Commissioners evaluate and implement a community composting program for yard waste and other organics to reduce both waste haul out costs and the consequent greenhouse gas emissions.

Section 2. The community composting program should include interested municipalities and should be designed to meet the following criteria: minimal greenhouse gas emissions, maximum

benefits for local reuse, potential co-benefits with wastewater systems, minimal water consumption, the potential for job creation and potential resilience to sea level rise.

PASSED AND ADOPTED UNANIMOUSLY by the Monroe County Climate Change Advisory Committee, present as indicated below, at a regular meeting held on the 17th day of May 2012.

BY: _____
Chair Annalise Mannix

Climate Change Advisory Committee

Harry Appel, present
Vice-Chair, Chris Bergh, present
John Forrer, absent
Tom Genovese, absent
Robert Glazer, present
William Hunter, present
Chair Annalise Mannix, present
Kelly McKinnon, absent
Don Riggs, present
Chuck Sherman, present
David Tuttle, absent

Draft Monroe County Community Climate Action Plan
May 2012 Version 4.5

0. **INTRODUCTION**
1. **POLICY COORDINATION (P)**
2. **IDENTIFY AND MONITOR RISKS AND VULNERABILITIES (M)**
3. **EDUCATION AND BUSINESS DEVELOPMENT (E)**
4. **NATURAL SYSTEMS (N)**
5. **BUILT ENVIRONMENT (B)**
6. **WATER AND WASTE WATER (W)**
7. **RENEWABLE ENERGY (R)**
8. **SOLID WASTE AND RECYCLING (S)**

0. INTRODUCTION

The purpose of the Monroe County Community Climate Action Plan (MCAP) is to outline a course of action for the County government and communities of Monroe County for a coordinated countywide strategy to minimize climate change impacts and to increase the sustainability of the communities within the Florida Keys. The MCAP is an attempt to mitigate future impacts by reducing community-wide greenhouse gas (GHG) emissions to 20% below 2005 levels by 2020 and to identify local adaptation needs for protection against future sea level rise.

The MCAP has been designed to support three primary functions:

- Provide clear guidance to County staff regarding when and how to implement key provisions of the plan,
- Inspire residents and businesses to participate in community efforts to address climate change issues, and
- Demonstrate Monroe County's commitment to climate change mitigation and adaptation.

The scope of the MCAP is to reduce GHG emissions and adopt mitigation and adaptation strategies in municipal and community-wide activities. GHG reductions and Climate strategies will be achieved in the areas of building and community energy use, waste diversion, water conservation, natural areas, and transportation. The plan contains strategies, objectives, measures, and actions that will direct the County's efforts.

The timeframe for the MCAP extends from the date of adoption through December 31, 2020. Over the coming decade, the County will facilitate considerable changes both within its operations and throughout the community.

Overview of Climate Change

In the southeastern U.S. annual average temperature has risen 2°F since 1970, with the greatest seasonal increase in the winter months. There has been a 30 percent increase in fall precipitation over most of the region but a decrease in fall precipitation in South Florida. Summer precipitation has decreased over almost the entire region. The percentage of the Southeast in moderate to severe drought increased over the past three decades. There has been an increase in heavy downpours. The power of Atlantic hurricanes has increased since 1970, possibly associated with an increase in sea surface temperature.

Continued warming is projected, with the greatest temperature increases in summer. The number of very hot days is projected to rise at a faster rate than average temperatures. Average annual temperatures are projected to rise 4.5°F under a lower emissions scenario and 9°F under a higher emissions scenario with a 10.5°F increase in summer and a much higher heat index. (See the full report for information on the emissions scenarios.) Sea level rise is projected to accelerate, increasing coastal inundation and shoreline retreat. The intensity of hurricanes is likely to increase, with higher wind speeds, rainfall intensity, and storm surge height and strength.

(United States Global Change Research Program. August, 2011.

http://www.globalchange.gov/publications/reports/scientific_assessments/us-impacts/regional-climate-change-impacts/southeast)

Priority Rankings of Recommended Action Items

Priorities:

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

Planning Horizon:

- Immediate** (0-2 years), **Short term** (0-5 years),
- Midterm** (0-25 years) and **Long term** (0-50 years).

1: POLICY DEVELOPMENT

Goal P-1: Leadership-Create collaborative community and intergovernmental practices in Monroe County that serve as a tool for the County, municipalities, and other entities to address climate change mitigation and adaptation needs.

Action P-1.1: Develop an implementation strategy for the Monroe County Community Climate Action Plan.

Monroe County should assign a working group of employees the task of developing an implementation strategy for the Community Climate Action Plan for adoption by the BOCC. This should include measurable objectives, specific department/personnel assignments and cost estimates.

Priority: High Planning Horizon: Immediate

Action P-1.2 Provide resources and leadership to the South Florida Climate Change Compact to advance mitigation and adaptation efforts to address the potential negative impacts related to climate variability and change.

Monroe County is the most vulnerable partner within the Compact with respect to climate change induced sea level increases. Not only is our primary source of drinking water threatened by SLR but our very homes, businesses and infrastructure are also directly at risk to SLR. The County should continue to actively support the development of a Regional Collaborative Climate Action Plan

with the neighboring counties through the Southeast Florida Regional Climate Compact to address the impacts of sea level rise and other related climate change impacts.

Priority: High

Planning Horizon: Immediate

Action P-1.3: Provide advocacy and leadership for adoption of climate change policies and legislation with local, state, and federal entities.

Encourage all agencies, utilities and franchisees operating within Monroe County to adopt climate change mitigation plans to minimize greenhouse gas emissions and adaptation plans to minimize potential impacts of sea level rise. Monroe County should collaborate with local municipalities and other public and private entities to coordinate, develop, and implement a suite of planning tools to address climate change mitigation and adaptation strategies.

Monroe 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.

An example of such an effort might be to work with local utilities to research incorporation of “smart metering”, “smart load management” devices and the potential benefits of solar power as distributed generators and electric cars as household storage systems. The electric utilities could consider implementation of aggressive “demand-side” energy conservation incentive programs. Similarly, the Florida Keys Aqueduct Authority could be encouraged to implement innovation measures for increasing their energy efficiencies and reducing water withdrawals for consumptive uses.

Priority: High

Planning Horizon: Immediate

Action P-1.4: Maintain and support a Monroe County Sustainability Office.

Monroe County should maintain and support a Sustainability Office to provide an identified point of contact for the County’s sustainability related issues. Activities of the office should include oversight of energy efficiency and climate change policies, initiatives, and sustainability programs, countywide coordination to local governments, development of climate mitigation and adaptation plans and implementation strategies, and to serve as liaison and support for multi-county climate change strategies and agencies in which Monroe County participates.

The office should identify governmental and community adaptation needs, educate employees; identify sources for future grants; and provide/advise/encourage sustainability actions, best management practices, and energy efficiency for Monroe County government operations and the communities within the County.

A mechanism needs to be developed to direct a percentage of the savings from energy efficiency measures and grant monies to fund the Sustainability Office with minimal dependence on ad-valorem taxes.

Priority: High

Planning Horizon: Immediate

Action P-1.5: Provide staff and resources to an inter-departmental task force to 1) address energy efficiencies and adaptation needs for BOCC government operations and 2) development of an implementation strategy for the Monroe County Community Climate Action Plan.

Monroe County should provide support for an active Energy Reduction Task Force to effect the target reduction adopted by the BOCC in 2010 of at least a 20% reduction in energy consumption and greenhouse gas emissions below 2005 levels by 2020. This goal is to be accomplished through completion of a Governmental Operations Climate Action Plan for operations under the purview of the BOCC. In addition, Monroe County will need to assign a working group of employees the task of developing an implementation strategy for the Community Climate Action Plan for adoption by the BOCC.

Priority: High Planning Horizon: Immediate

Action P-1.6: Maintain a community BOCC Climate Change Advisory Committee

Monroe County should maintain an advisory committee to assist and advise elected officials and the Office of Sustainability on climate related issues. An advisory committee similar to the existing one is an ideal forum for community coordination in the important area of addressing climate change needs in Monroe County.

Priority: High Planning Horizon: Immediate

Goal P-2: Comprehensive Plan-Integrate climate change planning into Monroe County's Comprehensive Plan and climate change adaptation and mitigation strategies into the Land Development Regulations.

Action P-2.1: Revise Monroe County Comprehensive Plan to address strategic planning related to climate change mitigation and adaptation needs.

The Monroe County Comprehensive Plan should include strategies to address the impacts of climate change. Adaptive management principles should be used to continually review and revise climate mitigation and adaptation policies, objectives, and Land Development Regulations. Revisions to the Plan should include:

- Creating a Climate Change Element within the Monroe County Comprehensive Plan which can be a model to other local government efforts.
- Address greenhouse gas reduction and energy conservation strategies that promote compact, bicycle and pedestrian-friendly development; increase public transportation; reduce reliance on automobiles, the construction of energy efficient buildings; and address the potential effects of rising sea levels, and other climate change issues.
- Consider climate change impacts as a factor in determining appropriate levels of development in vulnerable areas.
- Include climate change mitigation and adaptation in all relevant elements of the Comprehensive Plan including; future land use, transportation, infrastructure, coastal management, conservation, recreation and open space, intergovernmental coordination, and capital improvements.

Priority: High

Planning Horizon: Immediate

Action P-2.2: Advance livable communities as identified in the Communi-Keys Master Plan through adoption of LDR policies.

Monroe County should continue to support the livable communities concept 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 Monroe County Comprehensive Plan to support and establish sustainable development patterns (www.monroecounty-fl.gov/DocumentView.aspx?DID=173).

Priority: Low Planning Horizon:

Action P-2.3: Create policies for future development to incorporate sea level rise inundation vulnerabilities for the life expectancy of the infrastructure.

1. Require one or two feet of freeboard (depending on the life expectancy of the structure) on all structures typically designed to the NFIP 100-year flood elevation. (This also provides significant discount on flood insurance)
2. Require all new commercial buildings to be elevated to NFIP standards plus 1 or 2 feet of freeboard, or elevate flood proofed buildings to a minimum of 2 feet above the road elevation.
3. All new and significantly renovated roads parks, pump stations, filled lots, towers, etc. shall have the grade elevated to above the land's projected sea level for the expected life of the infrastructure.
4. All stormwater infrastructures shall be designed with the assumption that MHW and MLW is the highest projected sea level during the expected life of the infrastructure.
5. All flood proofed buildings shall be designed for buoyancy based on the highest projected sea level during the life expectancy of the structure.
6. All new residential homes and commercial structures shall have 50% of the lot filled to the level of the highest projected sea level for the life expectancy of the structure
7. All new commercial parking lots shall be designed, at a minimum, to the level of the highest projected sea level for the life expectancy of the structure.

Priority: High

Planning Horizon: Immediate

Action P-2.4: Incorporate “Adaptation Action Area” designation into local comprehensive plans and regional planning documents to identify those areas deemed most vulnerable to sea level rise and other climate change impacts.

"Adaptation action area" or "adaptation area" means a designation in the coastal management element of a local government's comprehensive plan which identifies one or more areas that experience coastal flooding due to extreme high tides and storm surge, and that are vulnerable to the

related impacts of rising sea levels for the purpose of prioritizing funding for infrastructure needs and adaptation planning.” §163.3164(1), F.S. (2011),

Adaptation Action Areas will include the built environment as well as natural areas and be used as a development tool to guide policies and regulations that will serve to reduce future risk and economic losses associated with sea level rise. Adaptation Action Areas will account for both existing and needed infrastructure. Vulnerable natural areas can be protected by directing development to non-vulnerable areas.

Priority: High

Planning Horizon: Immediate

2: IDENTIFY AND MONITOR RISKS AND VULNERABILITIES

Monroe County should take advantage of all available tools and resources to complete their task of determining where the impacts of climate change will first occur, and what should be done to assure sustainability.

Goal M-1: Coordinate with peer organizations and assure availability of up-to-date scientific and technical information.

Action M-1.1: Encourage and participate in long-term regional modeling.

Monroe County should participate in the long-term and regional modeling efforts including: tide gauges; hydrologic, geologic, and groundwater quality and levels; water quality (including temperature); precipitation; and groundwater withdrawals.

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

Priority: High

Planning Horizon: Immediate

Action M-1.2: Seek technical support from state and federal agencies and universities for development of climate change scenarios appropriate for Monroe County.

Monroe County should engage the support of state and federal agencies (e.g., FDEP, FDOT, SFWMD, NOAA, USGS, FEMA, USFWS, USACE), and universities 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.

Priority: High

Planning Horizon:

Goal M-2: Identify the most vulnerable areas and facilities that will be affected by sea level rise in Monroe County.

Action M-2.1: Improve inundation mapping and modeling.

Improve current analysis and mapping capabilities to identify small areas of the county vulnerable to sea level rise by utilizing the best available LiDAR (Light Detection and Ranging) elevation data, GIS, aerial photography and other appropriate data, including direct observation at spring high tides. Initial analyses should focus on levels of sea level rise projected by the Southeast Florida Regional Climate Change Compact Counties, Technical Working Group report, “A unified sea level rise projection for South Florida”, April 2011. Those projections included a range of sea level rise of 3-7 inches by 2030 and 9-24 inches by 2050. Similar ranges have been adopted by the USACOE and the SFWMD.

Priority: High

Planning Horizon:

Action M-2.2: Use improved inundation mapping to identify the sections of roadways, and critical structures that will be affected by sea level rise projections.

Now that airports, hospitals, schools etc. have been mapped, expand the mapping of potential sea level rise impacts to the natural and built environments. Identify critical elements of our residential and business community infrastructure (natural areas, county roads, community centers, shopping areas, etc.) that will be affected by the increased flooding caused by sea level rise impacts during regular and extreme high tides.

Priority: High

Planning Horizon:

Goal M-3: Create a countywide sea level rise monitoring and adaptation process.

Action M-3.1: Develop a monitoring program to evaluate and observe climate change impacts and responses on the natural and built environments within Monroe County.

An ongoing monitoring program to document climate change related impacts on the built and natural area is needed to identify best management practices for improving adaptation responses to protect both the natural and built environments. Particular emphasis, obviously, will be on monitoring the amount and rate of sea level rise, but temperatures, rainfall and drinking water availability are also important. Monroe County should seek data being collected by other agencies and supplement it, where needed, with in-house monitoring.

Priority: High

Planning Horizon:

Action M-3.2: Develop plans with service providers for the delivery of routine and emergency services to areas impacted by each of the current SLR projections.

Maintain a database of critical roads and infrastructure vulnerable to sea level rise according to the various sea level rise projections. To maintain maximum functionality within the communities of Monroe County as sea levels increase, Monroe County needs to provide leadership to the business community in developing strategic plans for the delivery of routine and emergency services.

Priority: Medium

Planning Horizon:

Action M-3.3: Create a framework to evaluate vulnerabilities and prioritize them for adaptation actions.

Effective adaptation options will be limited, as will the funding necessary to implement them. Some vulnerability will severely impact the residential quality of life and sustainability of business. These should be prioritized and adaptation options should be planned.

Priority: Medium

Planning Horizon:

3: EDUCATION AND BUSINESS DEVELOPMENT

Goal E-1: Increase awareness and understanding of climate change impacts and adaptation.

Action E-1.1: Promote climate change education to community leaders and the public regarding the potential negative impacts of climate change and sea level rise on the County's built and natural environment and the available mitigation and adaptation strategies that would minimize those impacts.

An active communication and education strategy is needed to help the general public understand the need for mitigation and adaptation responses to climate change. Natural and built system responses to climate change both differ and can be similar. The potential for declines in the local environment and the need for rational responses are critically needed. A first step would be to educate residents and commercial interests on existing rules, ordinances, etc., and promote Florida-Friendly Landscaping (<http://www.floridayards.org>) along with national and international programs with appropriate non-governmental organizations. Information is needed, as well, for residents and business owners to learn the potential impacts of sea level rise on the existing built environment and the county's roadways, properties and critical infrastructure.

Priority: High

Planning Horizon:

Action E-1.2: Require climate change adaptation training for contractors to learn green building practices and to protect the natural shoreline against sea level rise.

The Monroe County Building Department should consider training requirements for contractors to remain informed of the best management practices for green building practices and protection of private property against sea level rise effect while maximizing protection of the natural shoreline.

Priority: Low

Planning Horizon:

Action E-1.3: Develop education programs to highlight the differences between storm surge and SLR and the appropriate hazard mitigation & adaptation techniques for each.

Storm surge and sea level rise are related subjects in that both can and will cause flooding but they result from different natural phenomena and have relatively different impacts. It is important for people to understand the similarities and differences in developing adaptations to both while recognizing that while sea level rise is a gradual and permanent phenomenon whereas storm surges are infrequent and temporary but extreme events.

Priority: Medium

Planning Horizon:

Goal E-2: Business & Workforce Development--Expand local green workforce and business opportunities through training and business development initiatives.

Action E-2.1: Develop or encourage green workforce development within the County.

Local tradesmen and contractors need training in green technologies if appropriate construction techniques are to be implemented. Green industries grow the local economy. Therefore, green job training and retraining must be priority issues for the County.

Monroe County should look for technical training opportunities to enhance the local workforce. This enhancement can be accomplished directly through collaboration with the FKCC and the MC School Board to develop green job training. Funding opportunities exist to support curriculum development to train students in energy management and installation of renewable energy systems.

Local green workforce enhancement can also be accomplished indirectly by requiring green job skill development for the appropriate county employees in Engineering, Project Management and Public Works, by requiring green credentials and outcomes into RFP proposals.

Priority: Medium

Planning Horizon: Short term

Action E-2.2: Enhance Sustainable Business Development.

Initiate a Sustainable Business Development effort to encourage growth of green businesses. This could include evaluation of opportunities to provide incentives for green business development and to create economic and similar other incentives to encourage environmental (green) businesses to relocate to the county. Coordinate and partner with local chambers of commerce to establish “green” initiatives.

Priority: Medium

Planning Horizon: Short term

4: NATURAL SYSTEMS

Goal N-1: Vulnerability-- Identify vulnerability of natural resources (i.e. natural areas, species, groundwater) to coastal hazards and climate change impacts including storms, sea level rise, drought and rainwater flooding.

Action N-1.1: Coordinate with state/regional/national strategic planning efforts to evaluate the vulnerabilities of the natural environment to climate change impacts.

Monroe County should coordinate with other state, regional and national strategic planning efforts to prepare for climate variability and change. For example, the SE Florida Climate Change Compact's regional Climate Action Plan, the Florida Fish and Wildlife Conservation Commission/Fish and Wildlife Research Institute's species vulnerability, the U.S. Fish and Wildlife Service/Landscape Conservation Cooperative scenario planning (specifically related to the Keys Wildlife Refuges activities), the Florida Keys National Marine Sanctuary management planning, the South Florida Water Management District water supply planning, and the NOAA "Coastal and Marine Spatial Planning" under auspices of the National Ocean Policy.

Priority: Medium

Planning Horizon:

Action N-1.2: Evaluate and support protection and restoration programs in potential climate change affected natural habitats.

Key habitats include the Keys' freshwater lenses (groundwater), freshwater wetlands and coastal/intertidal wetlands to stave off saltwater intrusion driven by SLR, storm surges and highest tides of the year and to absorb/filter storm water. Restoration may include filling or plugging ditches, installing culverts to allow storm surge to run off, and fire management (Create or maintain high frequency, low intensity fire regime in fire-dependent uplands and wetlands of the lower Keys to stave off succession from pine/herbaceous vegetation to broadleaf vegetation dominance).

Priority: High

Planning Horizon:

Goal N-2: Resilience-Increase the resilience of the natural and urban landscapes to climate change through implementation of mitigation and adaptation strategies.

Action N-2.1: Support the recommendations of the Florida Reef Resilience Program's "Climate Change Action Plan for the Florida Coral Reef System 2010-2015" through participation in recommended management, education and research areas, as appropriate.

Protection of the marine environment surrounding Monroe County is critical to maintaining a productive fishing and tourist economy. The Florida Reef Resilience Program's Climate Action Plan's vision is to achieve: 1) increased resilience to global climate change impacts via active management of local reef impacts; 2) enhanced communications and awareness about climate change impacts on reefs and reef users; and 3) targeted research about those impacts. More detailed information is available at: <http://frrp.org/SLR%20documents/FL%20Reef%20Action%20Plan-WEB.pdf>

Priority: High

Planning Horizon:

Action N-2.2: Maintain Land Development Regulations that protect high quality natural areas from conversion to other land uses.

This should include specific mention of the Tier System, requirements for removing invasive plants prior to issuance of certificates of occupancy, etc. It is important to minimize the fragmentation and degradation of existing natural areas. See language for P 2.4 Provides a bulwark against slr and storm surges,,,, account for “grey” infrastructure (e.g. seawalls, stormwater management systems, etc.) improvements in the protection and restoration of natural processes, natural areas and native species as well as protection and restoration of existing “green infrastructure” (i.e. natural areas in general and reefs, wetlands, beach/dune systems and barrier islands in particular) and by directing development and growth to non-vulnerable areas.

Priority: High

Planning Horizon:

Action N-2.3: : Ensure that Monroe County Land Authority places a high priority on purchasing natural areas for conservation purposes and supporting efforts of federal, state, municipal and private interests in purchasing natural areas for conservation purposes.

Protecting green infrastructure protects both the built environment from storms and provides corridors for migration of habitat as sea level rises.

Priority: High

Planning Horizon:

Action N-2.4: Identify, protect, restore and enhance sites where ‘green infrastructure’ (e.g. mangroves, natural beaches, freshwater wetlands, coastal berms), alone or in combination with built infrastructure, protects people and the built environment from coastal hazards and climate change impacts including storms, sea level rise, drought and rainwater

Priority: High

Planning Horizon:

SEE IF AN ADAPTATION GOAL CAN BE INSERTED AND ALIGNED WITH SOME OF THE ABOVE NATURAL ACTION ITEMS 1.1 ETC

5: BUILT ENVIRONMENT

Goal B-1: Landscape-Promote the conservation of native species and sustainable landscape practices.

Action B-1.1: Promote Florida-Friendly Landscaping (<http://www.floridayards.org>) or similar landscape programs.

Florida-Friendly Landscaping promotes resilient landscapes that require minimal fertilizer and pesticide applications and is more adaptable to natural rain cycles, thus also minimizing the need for artificial irrigation. Native landscaping is a good mitigation and adaptation practice for landscapes within the built environment.

Priority: Low

Planning Horizon:

Action B-1.2: Encourage the planting and proper long-term maintenance of native flora and discourage establishment and spread of invasive exotics species.

This will increase carbon sequestration and to help reduce energy costs. Review current buffer requirements to encourage a balance of trees, understory, shrubs, and groundcover. Reduce pea-rock and turf grass on rights of way whenever possible and replace with native ground cover, plants, and trees.

Priority: Low

Planning Horizon:

Action B-1.3: Support programs for rapid identification and removal of invasive exotic species.

Develop strategies to respond to potential increases in undesirable exotic and invasive species. Emphasize prevention of new invasions through education, early detection of and rapid response to new invasions and control of well-established invasive species populations that have particular impacts on climate change vulnerability (e.g. Australian pines are bad in any natural area but on dunes they promote coastal erosion which can reduce resilience of the dune itself and therefore everything landward of the dune, to waves, storm surges and rising sea levels. The Florida Keys Invasive Exotics Task Force needs to review their existing policies and activities in context of climate change and sea level rise (<http://www.floridainvasives.org/Keys/>).

Priority: Low

Planning Horizon:

Action B-1.3: Encourage creation of new community gardens and produce markets.

Community gardens and produce markets are great ways to encourage healthy eating. Monroe County should adopt policies to encourage community gardens by reducing barriers and cost. Look for opportunities to use public spaces for establishment of community gardens and produce markets.

Priority: Low

Planning Horizon:

Action B-1.4: Determine and provide incentives for the preservation and use of eco-system functions (e.g. hammocks, mangroves, wetlands, aquifers) via amendments to the land use policies and regulations during new development and re-development.

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Priority: Low

Planning Horizon:

Goal B-2: Built Adaptation-Incorporate adaptation to climate change impacts, especially sea level rise and storm surge in building codes, the planning of developments and provision of services, as appropriate.

Action B-2.1: Develop and implement adaptive planning and zoning policies, regulations and programs to ensure that appropriate land use, construction and redevelopment activities address the potential impacts of sea level rise on Monroe County’s infrastructure.

Monroe County will ensure that new, renovated and replacement residential and commercial buildings are designed in a manner which takes into consideration the impacts from global climate change, including rising sea level and storm surge, to assure resilience and sustainability.

Establish an ongoing process to review local and regional zoning and building code requirements implemented by other counties, determine their applicability to Monroe County, and adopt as a local code when appropriate regarding the need for resilience of existing and proposed structures in areas at risk to inundation and climate change.

Priority: Medium

Planning Horizon:

Goal B-3: Built Mitigation-Identify measures to reduce greenhouse gas emissions through changes in building codes and practices.

Action B-3.1: Support and develop Energy Code and Land Development Regulation changes to increase energy efficiency and storm readiness of new and remodeled residential and commercial structures.

Monroe 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 (www.fsec.ucf.edu/en/publications/pdf/FSEC-CR-1806.pdf). 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.

Priority: High

Planning Horizon:

Action B-3.2: Develop and adopt policies to promote renewable energy systems and projects that achieve net-zero or maximum energy efficiency exceeding the Florida Building Code requirements.

Homeowners, businesses and builders need guidance and assistance in creating homes and offices that minimize the use of non-renewable energy. The creation of net-zero buildings is the right goal for Monroe County residents that can only be facilitated by appropriate policies and assistance from local governments, their departments, and the local utilities.

Implement expedited permitting processes, such as checklists, to minimize time delays in the permitting, construction and inspection aspects associated with energy-related projects.

Develop an incentive program within the Monroe County Building Department permit fee schedule to reduce permit fees for renewable and alternative energy installations for pilot a minimum of 2 years. Identify and reduce any permitting issues that may inhibit development of renewable energy installations.

Priority: Medium

Planning Horizon:

Action B-3.3: Incorporate green construction practices.

Incorporate energy efficient design, construction, maintenance and waste reduction standards through the use of regulation, education and incentives. Monroe 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:

1. Adopt a municipal green building ordinance similar in scope to the Florida State Green Building Model Ordinance which addresses incentives for green building and adaptation for climate change (www.southernbuildings.org/resources/pdfs/Model_Green_Building_Ord.pdf).
2. Encourage builders to construct all new and renovated buildings to meet green building standards to be developed in the green building ordinance;
3. Encourage each municipal building department to have at least one "green" accredited official on staff within a two-year time frame;
4. Encourage licensed personnel in each building department to have continuing education units (CEUs) of emerging energy efficiency and renewable energy technologies with the next two-year cycle;
5. Incorporate RFP specifications that will require accredited individuals on design teams and incorporation of green building practices.

Priority: Medium

Planning Horizon:

Action B-3.4: Reduce impervious surfaces to reduce storm water runoff.

Impervious surfaces have proven to reduce storm water runoff in the built environment and need to be expanded to reduce pollution to the near shore environment. Ongoing consideration is needed for incorporation of impervious asphalt and concrete in appropriate situations.

Priority: Medium

Planning Horizon:

Goal B-4: Transportation - Encourage the use of public transportation, ride sharing, and a shift to fossil fuel efficient and electric commuter vehicles through the provision of the appropriate infrastructure. This goal has an adaptation element – ‘to build resilience into our transportation infrastructure,’ and a mitigation element ‘to reduce the current level of vehicle miles travelled thus the amount of carbon emissions.

A resilient vehicle transportation infrastructure is a must in Monroe County to maintain our quality of life while adapting to sea level rise. Early identification of areas that require improvements and integrating them into the current planning process will help to sustain our neighborhoods and economy. Early identification of needed improvements also minimizes needed expenditures and enables the County to take advantage of state and federal funds.

The overall vision is to have a functional mass transportation system and ride sharing program throughout Monroe County for island to island travel and low-carbon transportation alternatives for travel within each of the island communities. As the shift to alternative fuel vehicles occurs, most cars will include electric engines, either wholly or as a plug-in hybrid. Commuter parking areas with electric charging stations at each island community center will help facilitate a transition to electric vehicles for both “drive down” tourists and residential commuters.

Ground level commuter parking areas should be raised several feet equal to or higher than the height of the adjacent US1 highway to protect against SLR, and where possible storm surge. As the shift to electric vehicles occurs these small limited distance vehicles will be less likely to be used for storm evacuation.

As an alternative to removing multiple vehicles per household from a storm’s path (burdening evacuation times) we should encouraging the use of one conventional fueled vehicle for the entire family while leaving the commuter vehicle in these relatively safe commuter parking areas.

The more the County is able to encourage mass transit use, the less people will be dependent on cars, which will result in a reduction in CO₂ emissions. Economic and energy savings for travelers will occur because dependency on oil for personal transportation will be reduced.

Action B-4.1: Encourage a functional county wide public transportation system and coordinate transportation-related adaptation policies across jurisdictional boundaries.

1. Pursue funding opportunities for public mass transit, at the local, state and federal level.
2. Coordinate with the municipalities and the South Florida Regional Transportation Authority to improve the mass transit system functions on a regional level to allow Keys residents effective mass transit within the entire county and to the mainland.
3. Encourage vehicle ride sharing where mass transportation is not practical.
4. Provide the infrastructure and support facilities to encourage and enhance the use of mass transportation and ride sharing.
 - a. Establishing commuter-parking facilities in each island community.
 - b. Provide electric charging stations (preferably solar powered) at each of these parking facilities.
 - c. Raise parking facilities above high water levels.

Priority: High

Planning Horizon:

Action B-4.2: Enhance bicycle and pedestrian safety, and promote their use to reduce miles driven.

1. Develop a countywide bicycle/pedestrian plan integrated with the FDEP Overseas Heritage Trail and the commuter parking areas.
2. Provide more bicycle routes and bike racks throughout the County.
3. Provide bicycle and pedestrian ways for connecting residential areas to recreational areas, commuter parking, schools, shopping areas and employment areas.
4. Promote a bike share program.

Priority: Medium

Planning Horizon:

Action B-4.3: Promote the infrastructure and encourage use of alternative fuels and alternative fuel vehicles.

Alternative fuels such as biodiesel, propane, and eventually hydrogen can reduce dependence on fossil fuels but such alternatives need government support or encouragement. Grant funding should be sought to fund evaluation pilot projects. One method of encouraging the needed transition is for the local governmental entities to acquire and use such fuels whenever possible. Other possible approaches include:

1. Encouraging the establishment of alternative fueling/charging stations.
2. Working with the MC School Board and FKCC to create / expand training programs.
3. Introducing alternative fueled vehicles when replacing county vehicles. Encourage municipalities to do so as well.

Priority: Medium

Planning Horizon:

Action B-4.4: Encourage creation of a Florida Keys Electric Highway.

The installation of fast-charging stations throughout the Florida Keys along US 1 would facilitate the increase use of electric vehicles by both residents and tourists. The creation of a Florida Keys Electric Highway would greatly complement the current designations of the Florida Keys Scenic Highway and the Overseas Heritage Trail. Promote electric vehicles or shuttle services for within island transportation and provide leadership by adopting electric vehicles in the Monroe County fleet. Encourage accessible “plug in” locations for electric vehicles in new development projects or major renovations. Install electric fast-charging stations at all the major county facilities

Priority: Medium

Planning Horizon:

Action B-4.5: Develop elevated/raised commuter parking at multimodal transportation hubs to provide support for increased mass transit usage and to protect parked vehicles from SLR and storm surge.

The Livable CommuniKeys Plans envision Community Centers throughout the Keys where commercial activity will be centralized. The centers lend themselves to bicycling and walk able communities, and provide a focal point for commuter parking. These commuter parking areas should be elevated (with fill) above the projected sea level rise. Where possible, they should also be elevated higher to protect against storm surge. Such elevated areas will provide safe parking for

short range commuter vehicles that will not be used for evacuation, thus encouraging the transition to alternative fuel vehicles.

Elevated commuter parking areas are defined as areas where the parking level is raised to heights equal to or above that of the adjacent US1 roadway and are sufficient in size to provide reasonable access for the nearby community. Multimodal infrastructure (e.g., raised commuter parking) and support facilities (e.g., electric charging stations) are needed to encourage the use of electric vehicles for on-island transportation and the use of mass transportation for inter-island transportation. Sites throughout the County along the US1 corridor are needed to provide commuter parking at ground levels equivalent to the adjacent highway to provide protection from anticipated sea levels and the concomitant increases in extreme tides and storm surges.

Priority: High

Planning Horizon:

Action B-4.6: Establish video conferencing facilities to allow residents and employees to participate in advisory and commission meetings without having to drive long distances.

The three primary county meeting facilities (Murray Nelson, Marathon, and Harvey Government Centers), will be equipped and staffed to provide Keys-wide video teleconferencing by the public and county employees during BOCC (and other) meetings. This action would significantly reduce miles traveled within the county and travel costs for both residents and employees. The time saved would also increase government and business productivity.

Priority: Medium

Planning Horizon:

6: WATER RESOURCES & WASTEWATER

Goal W-1: Drinking Water-Support conservation strategies for protection of water resources.

Action W-1.1: Advocate for sustained implementation of the Comprehensive Everglades Restoration Plan projects that increase the flow of freshwater into lower east coast aquifers and Florida Bay.

This action will increase the resiliency of our drinking water supply by helping to curtail saltwater intrusion into the Biscayne Aquifer, the primary source of drinking water for the Florida Keys and will improve the resiliency and quality of the Florida Bay ecosystem.

Monroe County should review, in coordination with appropriate agencies, the impacts of climate change and sea level rise on the Everglades and support adaptive management efforts to mitigate impacts.

Priority: High

Planning Horizon:

Action W-1.2: Support climate change and conservation strategies of FKAA and SFWMD to protect the existing freshwater supply for Monroe County.

Monroe County should support the inclusion of adaptation measures that address impacts from climate change in future updates of the FKAA Water Plan (http://www.fkaa.com/alt_supply_plan.htm), the South Florida Water Management District's Lower East Coast Regional Water Supply Plan (<http://www.sfwmd.gov/portal/page/portal/xweb%20-%20release%203%20water%20supply/water%20supply%20planning>) and other regional water management activities to ensure that Monroe County's source of potable water supply is conserved and protected.

Priority: High

Planning Horizon:

Action W-1.3: Provide support to implement water conservation measures.

Monroe County should provide resources to assist local governments, SFWMD and FKAA in implementing regional water conservation strategies as a water supply demand management tool. (do you want to include the recommendation that county staff enforce water restrictions?)

Increase the scope and fully promote government and public water-use audits to establish a baseline and identify efficiency and conservation opportunities utilizing state-of-the-art leak detection technology among other strategies.

Work with the Monroe County Health Department to encourage and facilitate gray water use.

Require that new and replacement toilets, showerheads, and other water fixtures purchased by the County must be low-flow consistent with EPA's *WaterSense* (www.epa.gov/WaterSense) or *Energy Star* (www.energystar.gov) programs.

Promote partnerships and consistent conservation policies and reduced per-capita-use goals with all users within the County including homeowner's and condominium associations.

Priority: High

Planning Horizon:

Action W-1.4: Endorse partnerships with FKAA and all county wastewater utilities to implement energy efficiency measures.

It takes a lot of energy to treat and distribute water. It is important for our wastewater and water systems to reduce energy consumption and greenhouse gas emissions.

Priority: High

Planning Horizon:

Action W-1.5: Require installation of a rain detection device on all automatic or timer-controlled irrigation systems to cease irrigation during periods of rainfall.

Irrigation of landscape should be curtailed during rainy periods. Rain-detection systems should be installed in any automatic (timer controlled) irrigation system.

Priority: Medium

Planning Horizon:

Goal W-2: Water Quality Protection-Implement measures to protect nearshore water quality.

Action W-2.1: Protect Wastewater Treatment Plants and collection systems from infiltration and inflow.

Monroe 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 reduce the need for additional treatment requirements.

Priority: Medium

Planning Horizon:

Action W-2.2: Complete conversion of wastewater systems in the Keys to Advanced Wastewater Treatment (AWT).

Advanced wastewater treatment is necessary to protect nearshore water quality from septic tank and cesspit pollution.

Priority: Medium

Planning Horizon:

Goal W-3: Alternative Water Supply-Encourage the Development/Expansion of Alternative Water Supply Systems (AWS) for the Florida Keys.

Action W-3.1: Evaluate the reclamation and reuse of treated wastewater relative to potential benefits in addressing climate change impacts.

Monroe County should work in coordination with all utilities and municipalities to evaluate current plans for utilization of treated wastewater for reclamation and reuse. Reuse reduces total water withdrawals from the aquifer well fields. Wastewater infrastructure should utilize the most energy efficient technology available and feasible. The County should also evaluate technologies to better utilize wastewater byproducts to produce renewable energy.

Priority: Medium

Planning Horizon:

Actions W-3.2: Encourage the conversion of abandoned septic tanks to non-potable rainwater collection cisterns in accordance with Florida Department of Health procedures.

A very substantial number of stormwater-sequestering containers exist throughout the Florida Keys in the form of soon-to-be-abandoned septic tanks are a valuable resource for reducing overall water consumption at minimal cost. Rainwater harvesting should be fully encouraged to diminish stormwater effects and to increase the supply of secure, widely distributed fresh water.

Priority: Medium

Planning Horizon:

Action W-3.3 Support legislation and ordinances that encourage rain water harvesting.

Recognition of the potential and encouragement of the practice of rainwater harvesting to supplement non-potable and potable water supply should be encouraged by all levels of government. While decreasing demand through water efficiency and conservation are the primary means to protect the aquifer and reduce the associated energy consumption, harvesting rainwater can and should be fully exploited to increase the supply of water.

Priority: Medium

Planning Horizon:

Action W-3.4: Work with FKAA to plan for the eventual expansion of the reverse osmosis plant in Florida City to increase the capacity to treat brackish water from the Floridan Aquifer.

As salt water intrusion into the Biscayne Aquifer continues with SLR the need for RO treated water from the Floridan Aquifer will increase and expansion of the existing facility may be the most cost-effective means of maintaining the water supply for Monroe County in the mid-range time frame.

Priority: Medium

Planning Horizon:

Action W-3.5: Work with FKAA to evaluate the long-range feasibility of developing new or upgrading/expanding existing desalination plants in the Keys.

In the long-term time horizon, advances in SLR may require that more of the Monroe County's water supply be provided by desalination. Technological improvements probably will make desalination more cost effective.

Priority: Medium

Planning Horizon:

7: RENEWABLE ENERGY

Goal R-1: Support the expansion of renewable energy sources and remove the barriers to projects that support sustainability.

Action R-1.1: Support legislation to establish a minimum 20% renewable portfolio standard.

Monroe 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 support a "carve out" of a certain percentage of the Renewable Portfolio Standard for distributive and solar energy as "Renewable Distributive."

Priority: High

Planning Horizon:

Action R- 1.2: Implement a Property Assessed Clean Energy Program for Monroe County residents and businesses.

In 2010, the State of Florida established the framework for dependent special districts, municipalities and county governments to implement low-interest PACE (Property Assessed Clean Energy) financing programs to advance implementation of renewable energy, energy efficiencies, and hurricane mitigation measures on homes and businesses through HB 7179, amending Chapter 163, F.S. A PACE program in Monroe County would significantly create local jobs, increase property values and reduce greenhouse gas emissions within the county.

Priority: Medium

Planning Horizon:

Action R-1.3: Require solar water heating systems and incentivize the installation of electrical generating renewable energy systems on all new construction.

This effort could involve collaborations with utilities or other agencies.

Priority: Medium

Planning Horizon:

Action R-1.4: Encourage the electrical utilities, Florida Keys Electric Cooperative and Keys Energy Services to adopt practices to increase use of renewable energy.

The current fuel source percentages for Keys Energy electrical output consists of about 50-65% natural gas, 10-25% coal, and 11-13% nuclear with the remainder coming from pooled resources (taken from Florida Municipal Power Agency, *3 Phase Times* newsletter, March 2010). The current fuel source percentages for the Florida Keys Electric Cooperative electrical output consists of about 72% natural gas, 21% nuclear, 6% coal, 1% oil, 0.1% solar (T.J. Patterson, personal communication).

The utilities should be encouraged to implement incentive programs to increase the use of renewable energy within the county and minimize the use of fossil fuels, especially coal, as a fuel source. Of all the available fossil fuels used for electrical generations, coal emits the most greenhouse gases. Recognize and support local utilities which build their own renewable energy facilities such as Florida Keys Electric Cooperative's Simply Solar program (<http://www.fkec.com/Green/SimpleSolar.cfm>).

Priority: Medium

Planning Horizon:

Action R-1.5: Encourage local alternative energy studies to evaluate their feasibility in achieving the County's greenhouse gas emissions goals.

Solar energy is well documented as a viable source of renewable energy but national wind studies indicate the wind potential for Monroe County is limited and wave or hydro turbine technologies are still at the research and development stages. A more detailed evaluation of wind potential in Monroe

County is needed because many residents believe our proximity to the prevailing ocean breezes may make both onshore and offshore wind energy feasible. Work cooperatively with municipalities and other agencies to develop consistent permitting requirements for renewable energy projects.

Priority: Medium

Planning Horizon:

8: SOLID WASTE AND RECYCLING

An overview of the waste to energy process.

Waste to energy is based on the use of waste as a renewable fuel source even though a large part of the waste could be directly recycled. Burning municipal solid waste does emit carbon dioxide and other pollutants but the biomass portion is derived from plant material and considered part of the natural carbon cycle. A description of waste to energy process can be found at the EPA site below: <http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>. In 2005 the EPA enacted rules to control hazardous waste pollutants from waste combustion and waste to energy plants are regulated under that rule, see: (<http://www.epa.gov/osw/hazard/tsd/td/combustion.htm>).

The following excerpt on waste to energy is from Wikipedia: <http://en.wikipedia.org/wiki/Waste-to-energy>

In thermal Waste to Energy technologies, nearly all of the carbon content in the waste is emitted as [carbon dioxide](#) (CO₂) to the atmosphere (when including final combustion of the products from pyrolysis and gasification; except when producing bio-char for fertilizer). Municipal solid waste ([MSW](#)) contain approximately the same mass fraction of carbon as CO₂ itself (27%), so treatment of 1 metric ton (1.1 short tons) of MSW produce approximately 1 metric ton (1.1 short tons) of CO₂.

In the event that the waste was [landfilled](#), 1 metric ton (1.1 short tons) of MSW would produce approximately 62 cubic metres (2,200 cu ft) [methane](#) via the [anaerobic](#) decomposition of the [biodegradable](#) part of the waste. This amount of methane has more than twice the [global warming potential](#) than the 1 metric ton (1.1 short tons) of CO₂, which would have been produced by combustion. In some countries, large amounts of [landfill gas](#) are collected, but still the global warming potential of the landfill gas emitted to atmosphere in e.g. the US in 1999 was approximately 32 % higher than the amount of CO₂ that would have been emitted by combustion.^[15]

In addition, nearly all biodegradable waste is [biomass](#). That is, it has biological origin. This material has been formed by plants using atmospheric CO₂ typically within the last growing season. If these plants are regrown the CO₂ emitted from their combustion will be taken out from the atmosphere once more.

Such considerations are the main reason why several countries administrate WtE of the biomass part of waste as [renewable energy](#).^[16] The rest—mainly plastics and other oil and gas derived products—is generally treated as [non-renewables](#).

Goal S-1: Create a Solid Waste/Recycling Action Plan to achieve zero waste by 2025.

Strategies to reduce solid waste disposal are an essential piece of reducing the emissions that cause global warming. Recycling, composting, and reducing overall consumption serve to decrease upstream, energy intensive production processes. Monroe County should adopt a goal to achieve Zero Waste by 2025. Zero Waste means that all discarded material is recycled, composted, or reused as waste-to-energy. The County has already increased recycling from 6% to 21% of total solid waste through 2010. With waste to energy credits the County has already reached a cumulative 70-75% level of recycling.

While substantial progress has been made further reductions in solid waste generation clearly need more effort and may need to include amendments to the County Comprehensive Plan and the renegotiation of the solid waste pick-up and haul-out contracts.

The Solid Waste/Recycling Action Plan should consider adoption of existing programs and criteria, including concepts such as EPA's Waste Hierarchy and their WasteWise Partnership Program: EPA's WasteWise partnership program -- <http://www.epa.gov/epawaste/partnerships/wastewise/index.htm> EPA Waste Hierarchy -- <http://www.epa.gov/wastes/nonhaz/municipal/wte/nonhaz.htm>

The Action items listed below under this goal are suggested for inclusion in a Solid Waste/Recycling Action Plan.

Action S-1.1: Revise County solid waste disposal structure to enhance waste diversion.

Revise the County solid waste disposal rate structure in order to maintain and enhance incentives, outreach programs, and other activities designed to increase recycling and composting. Renegotiate franchise arrangements and haulout contracts, where necessary, to maximize the efforts to reduce solid waste shipments to the mainland. [Link to rate structures](#)

Priority: High Planning Horizon: Immediate

Action S-1.2 Adopt progressive, phased in, zero waste programs designed to be end user friendly for residents and businesses.

Provide support for partnerships with municipal solid waste operation to maximize efficiency. Utilize existing data from successful programs in Florida to guide BOCC/ staff development of a Solid Waste and Recycling Action Plan. Consideration of a variety of source reduction programs need to be assessed not only for both financial and environmental costs and benefits.

[Link to sample programs;](#)

Zero Waste 10-year Bridge Plan as developed by Eco-cycle in Colorado (www.ecocycle.org)

Priority: High Planning Horizon: Immediate

Action S-1.3: Develop and track the Solid Waste Action Plan through key performance indicators.

Track solid waste GHG emissions including waste to energy and waste transport emissions. Evaluate performance and progress of measures in the County Solid Waste/Recycling Action Plan. Evaluate reduction achievements in the Comprehensive plan.

Action S-1.4: Implement ordinances that encourage economic opportunities for recycling/reuse business ventures and reevaluate existing ordinances to remove restrictions that may discourage recycling.

Support regional bottle bills and inexpensive disposal options.
Incorporate business opportunity measures in the County Solid Waste/Recycling Plan.
Incorporate reduction goals into the Comprehensive plan.

Action S-1.5: Monroe County should create an action plan to handle storm related solid waste.

The action plan should include means for composting as much debris as possible as well as its use in the waste-to-energy plant.

Goal S-2: Implement specific recycling plans for the residential, business, institutional and construction sectors.

We are 5 years now from base line of 2005 and are at a 21% recycling rate countywide. (For annual recycling rates in Monroe County and throughout the state visit the FDEP Solid Waste Management in Florida website: http://www.dep.state.fl.us/waste/categories/recycling/SWreportdata/10_data.htm.. To further improve recycling rates, Monroe County should consider the following Action Items, including those which ensure consistency with Monroe County's Comprehensive Plan Solid Waste element (www.monroecounty-fl.gov/DocumentView.aspx?DID=32).

More on the latest statewide recycling information can be found in the following 2010 75% *Recycling Goal Report to the Legislature*:
http://www.dep.state.fl.us/waste/quick_topics/publications/shw/recycling/75percent/75_recycling_report.pdf

Action S-2.1: Develop goals, objectives and policies to expand local capacity to process recycled materials and promote development of reuse, recovery, and light manufacturing activities.

Expanding local capacity to process and use recycled materials has the potential to reduce the GHG emissions associated with transporting materials elsewhere as well as create local jobs in the waste management sector. The County should adopt goals which expand the types of materials that are collected for local reuse and recycling, in order to increase waste diversion. [Link to examples](#)

Incentive programs need to be designed to decrease the export of waste out of the County, increasing climate change mitigation efforts. Expanding local capacity to process recycled materials has the potential to reduce the GHG emissions associated with transporting materials elsewhere as well as create local jobs in the waste management sector. The County's goal should be to expand the types of materials that are collected for local reuse, in order to increase waste diversion.

Priority: Medium

Planning Horizon:

Action S-2.2 Consider a Pay-As-You-Throw residential solid waste program.

A pay-as-you-throw program will encourage residents to recycle and to conduct at-home yard waste and composting to avoid user fees for excessive solid waste or organics. An accompanying educational effort can greatly assist residents adapt to the program. The County can use the composted material in conjunction with construction debris for fill in sea level rise adaptation efforts. [Link to PAYT programs](#)

Priority: High

Planning Horizon:

Action S-2.3 Evaluate the use of existing transfer stations for a community compost program.

Food and yard waste are around 40-45% of our County's waste stream. Monroe County should determine best composting and/or fuel production methods for managing organic waste and evaluate programs for adoption in Monroe County.

Conduct a feasibility study that results in recommendations regarding the design of a rebuilt Transfer Station and material recovery facility as well as recommendations regarding what types of waste processing equipment and material recovery systems to incorporate.

Explore Waste Prevention, Recycling and Composting Option from 30 US Cities:

<http://www.epa.gov/epawaste/conserva/downloads/recy-com/toc.pdf>

Compost Use in Florida (IFAS Contributor)

http://www.dep.state.fl.us/waste/quick_topics/publications/documents/compost.pdf

Priority: High

Planning Horizon: Immediate

Action S-2.4 Develop a program for mandatory recycling for commercial (i.e. non-residential) businesses, government, agencies, and organizations.

In 2009 only 14% of commercial units/properties in Monroe County participated in scheduled recycling.

http://approd.dep.state.fl.us/www_rcra/reports/WR/Recycling/2009AnnualReport/AppendixG/Monroe.pdf

In 2010 only 19% of commercial units/properties participate in scheduled recycling;

http://approd.dep.state.fl.us/www_rcra/reports/WR/Recycling/2010AnnualReport/AppendixB/13B.pdf

Information on waste management for public buildings can be found at:

<http://www.dep.state.fl.us/waste/categories/hazardous/pages/state.htm>.

The following measures should be implemented.

1. Provide a range of container sizes and types for all commercial recycling accounts, priced accordingly to minimize the amount of solid waste generated. Pricing must provide comparisons for equivalent size/type/ collection frequency of recycling containers versus trash collection.
2. Commercial recycling and trash collection rates will be incorporated into all franchise agreements.
3. Provide education about tax credits to businesses for recycling of all end-of-life products like furniture, appliances, fixtures, electronics to appropriate end of product life handlers and recyclers.
4. Expand low cost hazardous and electronic waste program for commercial users with convenient drop off locations and hours.
5. Provide comprehensive commercial recycling education opportunities.

Priority: HIGH

Planning Horizon:

Action S-2.5: Develop goals, objectives and policies to increase recycling of recoverable waste from all construction sites throughout Monroe County. The DEP has best management practices, reports and legislation related to C & D recycling;
<http://www.dep.state.fl.us/waste/categories/recycling/cd/canddmain.htm>

1. Encourage pre-processing of C&D in franchise/license agreements, building permits or ordinances with possible incentives (fee rebates).
2. Incentivize C&D recycling (on-site or off-site), and the use of recycled building materials.
3. Develop a partnership with in-county recycling companies to keep most construction debris in county for use in adaptation efforts to combat sea level rise.

Priority: Medium

Planning Horizon:

Goal S-3: Expand efforts to eliminate waste at its source.

Action 3.1: Institute a ban or fee for single-use plastic bags and establish a fee on paper shopping bags at retail locations. [Link to Silver Spring MD or other example policies](#)

Action 3.2 Adopt County Environmentally Preferable Purchasing (EPP) policies to addresses this issue for government operations. [Link to Example or provide MC one](#)

Educate local businesses and NGO's about EPP.

Evaluate options and opportunities for extending producer responsibility for product waste at the local level. These opportunities include expansion of retail businesses engaging in take-back programs and education programs.

Support policies at the state level that provide incentives for efficient product design, reduced product and packaging waste, and elimination of toxics in the discard stream through mandatory compliance programs.

In collaboration with the Chamber of Commerce and other business associations, enhance outreach and education to local businesses about the waste embodied in products and packaging and support local manufacturers' efforts to reduce packaging.