

# Canal Restoration Advisory Subcommittee Update

Water Quality Protection Program Steering Committee  
Meeting  
March 11, 2015



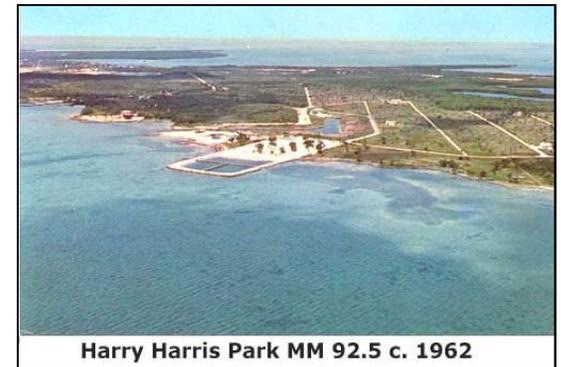
# Canal Construction in the Florida Keys

- Dredge and fill activities created 170 miles of canals, with 312 miles of waterfront property
- Many canals dug 10 - 20 feet to maximize fill material
- Most canals are long dead-end networks with little or no tidal flushing
- Canal development initiated before ecologists and resource managers were aware of the implications



# Impacts of Canal Development

- Increased population growth in a sensitive area initially without storm water and waste water systems
- Destroyed shoreline habitat especially mangroves
- Added nutrients, turbidity and sediment to canal waters causing long-term water quality degradation
- The canals discharge directly to near shore Outstanding Florida Waters in the FKNMS, where DEP adopted a “zero-degradation” policy for marine waters



# Why is Canal Restoration Needed?



Key Colony Beach

**“Good”  
Water  
Quality  
Canals**



Duck Key



Key Haven



Conch Key



Sugar Loaf

# This is Why Restoration is Needed



Upper Keys – accumulated seaweed

**“Poor”  
Water  
Quality  
Canals**



Middle Keys – trapped seaweed



Summerland– trapped seaweed



Lack of flushing

# Clean Water is Critical to the Economy of the Florida Keys

1. The **coral reef tract** in the Florida Keys is the third largest barrier reef in the world, and the only living barrier reef adjacent to continental US
2. More than **two million individuals per year** visit the Florida Keys to enjoy water related activities, including snorkeling, diving, and fishing
3. These water related activities support **70 percent of tourism** in the Florida Keys
4. The Florida Keys reef environment generates more than **70,000 jobs** and **\$6 billion dollars** in economic activity annually



# Clean Water is Critical to the Economy of the Florida Keys (continued)

1. The Keys are considered the “fishing capital of the world,” generating hundreds of world records and billions of dollars of economic impact
2. Coral reef areas and seagrass beds provide **critical nursery and feeding habitat** for many commercially and recreationally valuable fish and shellfish species, such as grouper, snapper, stone crab, and spiny lobster
3. **Coral reef and seagrass health is directly linked to near shore marine water quality.** Both corals and seagrasses thrive in areas where water is clear, low in nutrients, and high in dissolved oxygen



# Regulatory Drivers For Canal Restoration

## 1. Many of the Keys canals exhibit poor water quality

- Do not meet the Class III marine surface water quality standards for nutrients and dissolved oxygen in DEP Chapter 62-302, F.A.C.
- Recreational use and propagation and maintenance of healthy fish populations



## 2. Florida Keys Reasonable Assurance Document (FKRAD)

- Developed in 2008 by DEP in cooperation with local governments to address water bodies that do not meet the State's water quality standards
- Outlined extensive waste water and storm water restoration activities to address the nutrient impairments as an alternative to the establishment of Total Maximum Daily Loads
- The FKRAD 2011 Update recognized that additional canal restorations would be needed, in addition to *the* wastewater and stormwater pollutant reductions, to achieve the Class III Dissolved Oxygen Standard



## 3. Ramifications of continued impairment

- State and Federal mandated management practices

Photos courtesy of cudjoewastewater.com

# Water Quality Protection Program (WQPP) Canal Restoration Advisory Subcommittee

- The WQPP recognizes the need to improve the water quality of the Keys canals
- Canal Restoration Advisory Subcommittee created to specifically address canal water quality restoration
- Canal Restoration Advisory Subcommittee Members

Federal: EPA, NOAA

State: DEP, FWC

County: George Neugent

Cities: All 5 represented

Other: Florida Keys Environmental Fund

Advisory: Rhonda Haag - County

Advisory: Wendy Blondin - Amec Foster Wheeler



# Canal Water Quality Improvement Stakeholders

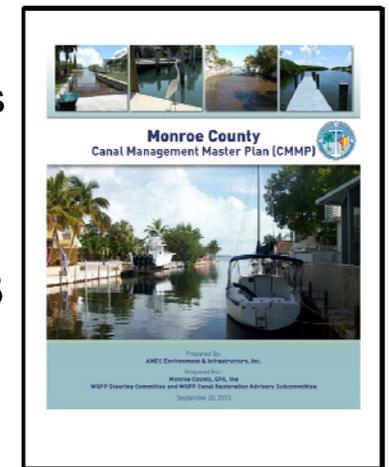
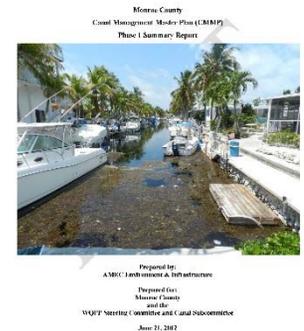
1. Federal, state, and local governments: USEPA, NPS, USACE, NOAA, FKNMS, FDEP, SFWMD, FWC, FCAA, FDH, Monroe County, Village of Islamorada, City of Marathon, City of Key Colony Beach, City of Layton, and City of Key West.
2. Not for profit organizations: The Nature Conservancy
3. Informed Citizens: Today's participants, HOA's, and long term residents.



# Canal Management Master Plan (CMMP)

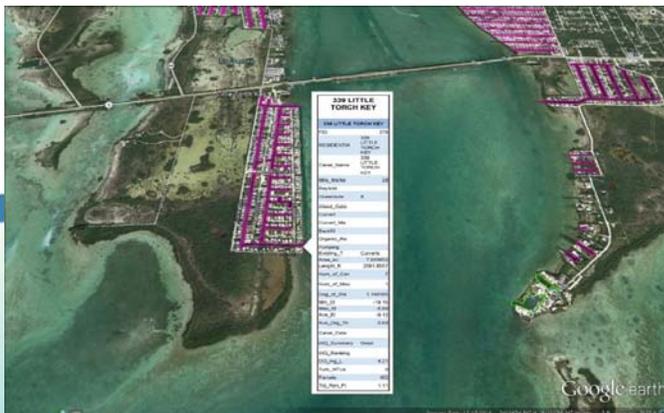
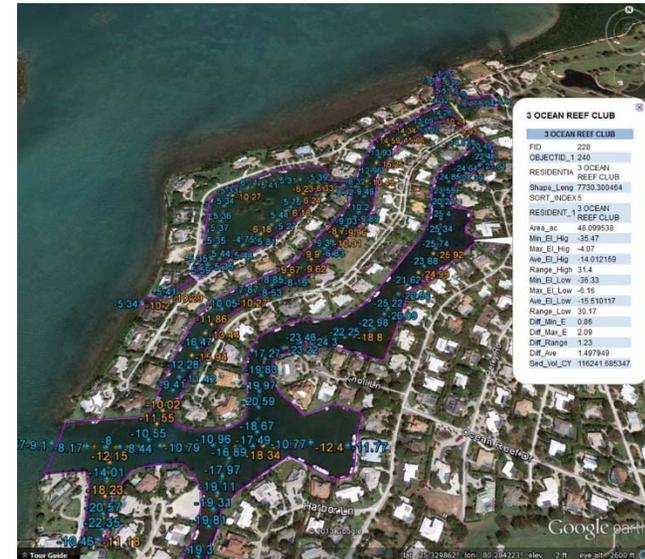
- Preparation of a *Canal Management Master Plan* was the first recommendation of the Subcommittee
- The CMMP was to **prioritize canal restoration projects** focused on remediating canal depth, geometry, seagrass wrack, and flushing characteristic and to **identify funding sources**
- **Phase 1 of the CMMP was funded by DEP in March 2012**
  - Created the framework of the plan: goals, objectives, ranking process
  - Funding expiration in June allowed inclusion of only a subset of canals
- **Phase II of the CMMP was funded by EPA in October 2012** through Special Studies Program and completed September 2013
  - Assessed all 502 residential canals and completed the ranking and prioritization as well as recommendation of treatment technologies

amec



# CMMP: Mapping of Residential Canals

- Creation of a canal specific nomenclature that numerical identifies each canal within the County
- Bathymetric survey of over 500 residential canals in Monroe County
- Development of a user-friendly free downloadable Google Earth database containing canal specific information
- Availability of canal specific information



# Identified Canal Management Issues and Goals

## Water Quality – Eutrophication and DO-Related Issues

- Restore and maintain water quality conditions in canal systems to levels that are consistent with the State water quality criteria for Class III waters

## Water Quality – Organic Material (e.g. Weed Wrack)

- Reduce the entry and accumulation of seagrass leaves and other 'weed wrack' in affected canals

## Sediment Quality

- Reduce the incidence of anoxia and problematic sulfide levels and sediment toxicity in affected canals

## Habitat Quality

- Protect aquatic and benthic canal habitats that currently support native flora and fauna, and improve water and sediment quality in other canals to levels that are capable of supporting them

## Public involvement

- Create and maintain a constituency of citizens involved in the canal management process



# Water Quality Assessment

## Site visits and assess canal conditions

- Visually assess **physical characteristics** of the canals from every neighborhood within Monroe County
  - Length, depth, tidal flushing, seaweed loading
- **Collect water quality data** (dissolved oxygen, turbidity, salinity, pH)
- **Observe biological characteristics**
  - Positive - presence of stony corals, seagrasses or abundance of fish
  - Negative - blue green algae (diatoms), pungent odors, murky water



# CMMP Water Quality Classification

## Water Quality Summary Classification Criteria

DO Conditions	Biological Conditions	Water Quality Summary
> 4.0 mg/L	Positive	Good
> 4.0 mg/L	Negative	Fair
3.0 - 4.0 mg/L	Positive	Fair
3.0 - 4.0 mg/L	Negative	Poor
< 3.0 mg/L	Negative or Positive	Poor

## Canal Classifications

Total # Canal Systems	502
Good	171
Fair	180
Poor	131
Not Classified	20

# Recommended Restoration Technologies: Removal of Accumulated Organics

**Cause of Impairment:** Buildup of organic material

**Prescribed Technique:** **Organic Removal**

- Removal of decomposed weed wrack material present at the bottom of a canal which is depleting the dissolved oxygen
- Logistical limitations
  - Large volume of suspended sediment and extracted water that requires stabilization
  - Space requirements for dewatering
  - High cost associated with technology
- 2015 modifications to the Monroe County Comprehensive Plan allow for organic material removal below -6 feet MLW on a trial basis for two demonstration projects



Geo Tube Dewatering system

# Recommended Restoration Technologies: Weed Gates, Air Curtains or Other Physical Barriers

**Cause of Impairment:** Influx of seaweed

**Prescribed Technology:** **Air Curtain**

- Designed to prevent floating, wind-driven seaweed from entering into man-made canals
- The gates are placed at a canal mouth
- Can be comprised of physical barriers or air curtains
- Benefits:
  - Ease of permitting
  - Versatility
  - Low Cost of Implementation

Homeowner Constructed



Homeowner Constructed



Engineered Air Curtain

# Recommended Restoration Technologies: Culvert Connections

**Cause of Impairment:** Lack of tidal flushing / stagnant water

**Prescribed Technology:** **Culverts**

- Installed between canals or between canals and thin strips of land separating bodies of water
- Improve natural tidal flushing
- Success based on canal specific hydrology and location relative to adjacent canal
- Considerations:
  - Low maintenance costs
  - Proven success



# Recommended Restoration Technologies: Backfilling Deep Canals to Shallower Depths

**Cause of Impairment:** Extremely deep (>20 feet deep) stagnant pockets

**Prescribed Technology:** **Backfilling**

- Placement of clean backfill material up to an elevation of 6 to 8 feet below mean sea level
- Promotes flushing, reduces/eliminates stratification and create a conducive habitat for marine life
- Logistical limitations
  - Turbidity caused by placement of backfill material
  - Canal access for staging and emplacement of backfill
  - High cost associated with technology

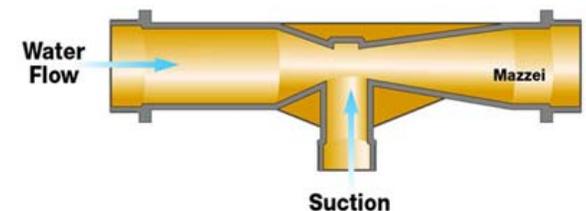


# Recommended Restoration Technologies: Pumping Systems

**Cause of Impairment:** Lack of flushing due to canal configuration

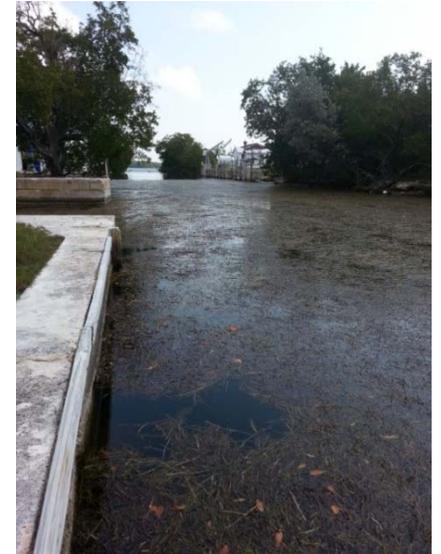
**Prescribed Technology:** **Pumping**

- Pumps installed to promote water circulation within a canal and enhance tidal flushing
- Water can be pumped from clean near shore areas to the back end of stagnant canals
- Careful design required to prevent adverse secondary effects such as re-suspension of sediments or bottom scouring
- Tidal studies and hydraulic modeling required to design systems



# Where Do We Start?

- The Canal Restoration Advisory Subcommittee recommended that the first step to implement the CMMP was a **Canal Restoration Demonstration Program**
- Purpose of the Demonstration Projects:
  - Implement CMMP technologies
  - Evaluate the effectiveness of the technologies
  - Obtain realistic permitting, scheduling, and cost information
- Monroe County funded **\$5 Million** for canal demonstration projects in Unincorporated Monroe County
- The Village of Islamorada funded \$100,000 to join in the demonstration program



# Canal Restoration Demonstration Selection Process

- Only canals identified by the CMMP with *Poor Water Quality* were selected
- CMMP *Ranking* Number utilized to prioritize canals
- Needed broad *homeowner support*
- Construction *costs* within budget
- Demonstration Project Ranking Sheets developed based upon:
  - Ease of Permitting
  - Ease in Implementation



# Canal Restoration Demonstration Selection Process (continued)

- Ranking performed for each applicable restoration technology
- Process approved by the *Canal Restoration Advisory Subcommittee*, the County and the Village
- Stakeholder meetings held and over 700 homeowner approval letters sent canal property owners
- Unincorporated Monroe County and the Village each selected their demonstration projects
  - Monroe County – 7 projects
  - Village – 1 project



# Monroe County Demonstration Projects

Weed Barriers	Organic Removal	Culvert Installation	Backfilling	Pumping
<p>#266 Big Pine Doctor's Arm between Witters &amp; Bailey Lanes</p> <p><i>Same Canal – 2 categories</i></p> <p><b>#1</b></p>		<p>#459 Geiger Key Boca Chica Ocean Shores between Boca Chica Rd &amp; Jay Lane</p> <p><b>#2</b></p>	<p>#29 Key Largo Sexton Cove between Bunting &amp; Pigeon Drives</p> <p><b>#3</b></p>	<p>#278 Big Pine Eden Pines Colony Pine Ave</p> <p>Not Included in current permitting scope – access issue caused delay, evaluating redesigns</p> <p><b>#7</b></p>
<p>#287 Big Pine Atlantic Estates between Hollerich and Atlantis Drs</p> <p><b>#4</b></p>	<p>#290 Big Pine between Ave I and J</p> <p>Canal already has an existing effective weed gate</p> <p><b>#5</b></p>	<p>#277 Big Pine Tropical Bay between Watson Blvd and Sunrise Drive</p> <p><b>#6</b></p>		
		<p>#472 Geiger Key Geiger Mobile Homes</p> <p>DEP Grant Project</p>		

# Islamorada Village of Islands Top 10 Canals and Approved Canals for Demonstration Funding

	Weed Barriers	Organic Removal	Culvert Installation	Pumping	Backfilling
1	#137 Plantation Key Treasure Harbor	#148 Lower Matecumbe Key Mate-Lido Beach	#157 Lower Matecumbe Beach	#120 Plantation Key Indian Key Waterways	#116 Plantation Key Tropical Atlantic Shores
2	#148 Lower Matecumbe Key Mate-Lido Beach	#147 Lower Matecumbe Key Mar Celeste Am.	#120 Plantation Key Indian Waterways		#137 Plantation Key Treasure Harbor
3	#116 Plantation Key Tropical Atlantic Shores	#145 Lower Matecumbe Matecumbe Ocean View			#143 Upper Matecumbe Key Palm Harbor
4	#132 Plantation Key Plantation Lake Estates	#157 Lower Matecumbe Beach			#145 Lower Mat Matecumbe Ocean View
5	#145 Lower Mat Matecumbe Ocean View				#120 Plantation Key Indian Waterways
6	#147 Lower Matecumbe Key Mar Celeste				#110 Plantation Key Plantation Tropical Park

# Update on Canal #29 Backfilling Demonstration Project Sexton Cove, Key Largo between Pigeon and Bunting Drives

**1. Restoration consists of placing 25,000 cubic yards of clean fill to raise canal bottom elevation to -7.7 ft MLW from -35 ft**

## **2. Update on Permitting Process**

- a) SFWMD ERP submitted 9-24-14 obtained 10-29-14
- b) FKNMS Permit submitted 10-14-14 obtained 11-11-14
- c) USACE Permit submitted 9-24-14 obtained 12-31-14 (with Federal Consultation)
- d) Special Use Permit for Temporary Construction Staging and Monroe County Building Permits obtained 2-25-15



## **3. Update on Contractor Selection**

- a) Proposal opening held January 6, 2015
- b) Adventure Environmental Inc. selected
- c) NTP issued 3-2-15
- d) Construction Cost \$1,360,000



# Canal #29 Backfilling Demonstration Project - Sexton Cove, Key Largo (con't)

## 4. Construction Process

- a) Clean backfill transported by trucks from Florida City
- b) 10-20 trucks per day estimated
- c) Vacant lot at 11 Pigeon Drive used for staging backfill
- d) Excavator or bobcat will load fill onto a conveyor belt
- e) Fill moved onto a 60'x24' barge for uniform emplacement throughout the canal
- f) Turbidity curtains required at canal mouth to isolate construction disturbance from Outstanding Florida Waters
- g) Canal will be closed to boat traffic during construction
- h) REMEMBER – these are demonstration projects, meant to test time, techniques, and costs.



## 5. Project Schedule

- a) **Construction started March 4, 2015**
- b) 90+ days estimated completion time



# Update on Organic Removal Projects

## Canal #266 Drs. Arm & #290 Avenue J, Big Pine Key

### 1. Restoration consists of removal of decayed seaweed and muck from the canal bottoms

- a) Canal #266 8,300 cubic yards from -3.4 to -8.4 feet MLW
  - a) Removing 5 ft of muck
- b) Canal #290 4,700 cubic yards from -3.9 to -8.9 feet MLW
  - a) Removing 5 ft of muck



### 2. Update on permitting status

- a) SFWMD ERP submitted 11-13-14 obtained 12-04-14
- b) FKNMS Permit submitted 11-18-14 obtained 12-22-14
- c) USACE Permit submitted 11-13-14 obtained 1-02-15 (with Federal Consultation)
- d) Special Use Permit for *Temporary Construction Staging* approved at Feb 18, 2015 BOCC meeting
- e) Comp Plan Amendment final approval received Feb 27, 2015



# Construction and Schedule for Organic Removal – Canal #266 Drs. Arm & #290 Avenue J (con't)

## 3. Update on Contractor Selection and Schedule

- a) Proposal opening held January 14, 2015
- b) Lowest cost for both canals was \$1,839,905  
(Canal #266 only \$1,202,163 and Canal #290 only \$849,840)
- c) Negotiating a contract with JND Thomas
- d) Anticipate contract award in April 2015
- e) Project initiation expected in May 2015



## 4. Construction Methodology

- a) Hydraulic vacuum dredge removes sediment
- b) Dredge spoils piped to land side staging areas
- c) Spoils dewatered using a mix tank, hydro-cyclone, clarifier, and belt press
- d) Reuse of dredge spoils at a local facility being evaluated



# Update on Demonstration Projects for Culvert Installation in Canals #459 Geiger Key and #277 Big Pine

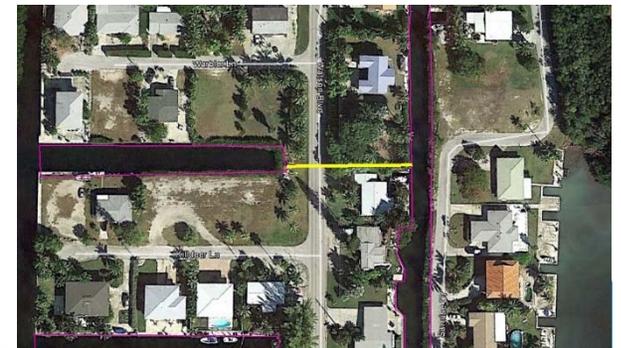
## 1. Canal #459 Boca Chica Ocean Shores between Boca Chica Rd & Jay Lane, Geiger Key – 1<sup>st</sup> ranked canal

- a) Access approval slowing down design



## 2. Canal #277 Tropical Bay, between Watson Blvd and Sunrise Drive, Big Pine Key – 2<sup>nd</sup> ranked canal

- a) Design is more complex due to multi-finger construction of canal and homeowner concern of entry of seaweed
- b) Original culvert design connected main canal to open bay but seaweed entry required a redesign
- c) Hydraulic modeling completed connecting main canal to a small dead end finger canal
- d) Final design/permitting to be completed in March 2015
- e) Request for Proposals scheduled for April 2015
- f) Construction start date estimated for June/July 2015



# Geiger Key #472 Culvert Installation Project – DEP Funding Agreement - Boca Chica Rd btw Venus and Mars Lanes

- 1. Project consists of installation of a concrete culvert underneath Boca Chica Road to create tidal connection between two dead end canals (#472 and #470)**
- 2. Deign and Permitting**
  - a) Completed in June 2014 under a separate DEP Grant
- 3. Update on Contractor Selection and Schedule**
  - a) Project went out for bid September 2014
  - b) Monroe County approved a contract with Charley Toppino & Sons, Inc., the lowest bidder, at the December 2014 BOCC meeting
  - c) Monroe County approved funding \$121,350 of the total cost
  - d) DEP Grant is funding \$78,291
  - e) Remaining Grant funds are for Construction Engineering Services



# Geiger Key #472 Culvert Installation (con't)

## 4. Construction Methodology

- a) Install a 112 foot 24-inch by 38-inch submerged elliptical concrete culvert at a depth of approximately 4.5 feet below ground surface
- b) Placement is above existing sewer pipe
- c) One lane of Boca Chica Road will always remain open and traffic will be directed by flagmen and signage
- d) Remove and replace a portion of the concrete seawalls
- e) Cofferdams, dewatering pumps, and turbidity barriers will be installed around the in-water work areas to prevent sediment transfer and wildlife impacts
- f) All impacted areas will be restored to pre-construction conditions.

## 5. Update on Project Schedule

- a) Start of installation March 9, 2015
- b) Anticipate project construction completion March 27, 2015



# Update on Canal #278 Pumping Demonstration Project - Eden Pines, Big Pine Key

**1. Restoration consists of pumping clean bay water to the farthest ends of the Eden Pines canal system to increase natural tidal flushing**

**2. Design requires access from USFWS**

- a) Discussed two alternative conceptual designs with USFWS at a Sept 2014 meeting
- b) A revised conceptual design was prepared after the meeting
- c) Design distributed to homeowners for review in Feb 2015
- d) Conceptual design to be presented at next Canal Restoration Subcommittee meeting

**3. Overview of Conceptual Design**

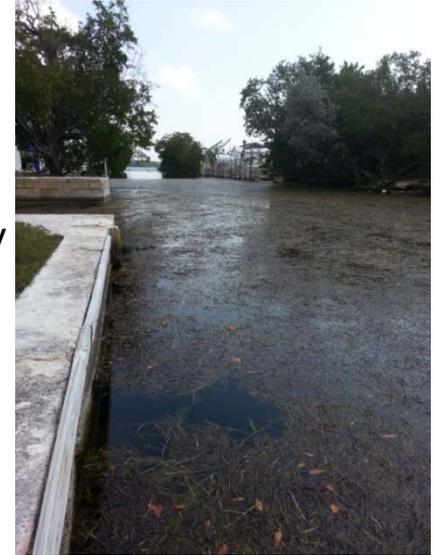
- a) Pump intakes south side of Watson Boulevard culverts
- b) Two pumps installed in a wet well – est. capacity 1200 gpm
- c) Water pumped to northern and eastern fingers of the canal
- d) Likely pump only during the outgoing tide
- e) Venturi aeration pump located at the Watson Blvd Bridge crossing to assist with water quality treatment at initial startup until adequate flushing has occurred



# Update on Demonstration Projects for Air Curtains Canals #266 & #287 Big Pine Key & #137 Plantation Key

## 1. Three demonstration projects for air curtains

- a) **Air Curtain Alone** – Canal #287 Atlantic Estates between Hollerich and Atlantis Drives, Big Pine Key
- b) **Air Curtain Combined with Organic Removal** – Canal #266 Doctors Arm between Wiitters and Baileys Lanes, Big Pine Key
- c) **Air Curtain Combined with Aerators** - #137 Treasure Harbor, Plantation Key, Islamorada



## 2. Effectiveness Monitoring will Compare Results

## 3. Canals #287 and #266 in Big Pine

- a) Final design and permitting underway
- b) Construction start date estimated for June/July 2015

## 4. Canal #137 Treasure Harbor - System Installed Nov 2014



# Islamorada Village of Islands Demonstration Project Update - Canal #137 Treasure Harbor

- **#137 Treasure Harbor Plantation Key**
  - Weed Barrier Air Curtain and Aerator Upgrade
- **Bidding/Selection of Contractor Completed in June 2014**
  - Obtained 3 quotes from various vendors
  - Selected VERTEX as low bidder
- **Permitting**
  - Permit applications submitted by August 1, 2014
  - **SFWMD** – “*de minimis*” exemption received August 13, 2014
  - **USACE General Permit SAJ-17** received October 3, 2014 SAJ-2014002190
  - **FKNMS Permit** received September 9, 2014 FKNMS-2014-129



Homeowner's site visit & review of plans

# Islamorada Village of Islands Demonstration Project - Canal #137 Treasure Harbor

- **Pre-Construction Meeting**

- Held October 15, 2014 on-site
- Reviewed plans, schedules and permit requirements

- **Phase 1 – Land Side Work**

- Compressor Installation and Electric Hookup
- 8 high flow (21 cfm) compressors placed inside two compressor cabinets for the air curtain
- 1 large Lake compressor in a separate cabinet for basin aerator upgrade
- Installation completed on October 30, 2014



# Islamorada Village of Islands Demonstration Project Construction - Canal #137 Treasure Harbor

- **Phase 2 In-Water Work – Air Curtain**
  - Diffuser installation and pipe laying
  - 20 Teflon coated membrane air diffuser disks mounted on 10 emitter assemblies set in an arc at canal mouth
  - Self weighted tubing installed from air curtain to HOA park – location of compressors
  - Air Curtain installation completed November 3-4, 2014
- **Phase 3 In-Water Work – Basin Aerators**
  - 6 Airstations, each comprised of 5 diffusers, installed throughout basin
  - Elevated 18 inch base
  - Basin Aerator installation completed November 4, 2014



# Demonstration Project Costs - Treasure Harbor System Construction and Maintenance

Air Curtain Installation	Total Bid Price	
VERTEX	\$28,597.00	Selected
Engineered Environmental Solutions	\$50,603.00	
Aquadisplays, Inc.	\$53,620.00	
Aquadisplays, Inc. Alternate Design Bid	\$41,965.00	
Electrical		
Caputo Electric, Inc.	\$1,250.00	Selected
Additional Basin Aerator Installation		
VERTEX	\$9,214.00	Selected
Two Years of Maintenance		
VERTEX	\$7,321.20	Selected
<b>TOTAL PROJECT COST:</b>	<b>\$46,382.20</b>	

**Note: Additional demonstration project costs have been or will be incurred for: Demonstration Project Selection, Design, Permitting, Homeowner Coordination, Surveying and Construction Engineering Inspection Services**

# Next Steps for Canal Restoration

## 1. Public Outreach and Education

- Video production of demonstration projects
- Other components of EPA Outreach Grant
  - Web-based permitting guidance for homeowners
  - Field trip to a restoration site



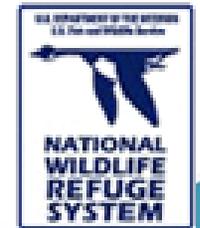
## 2. Complete demonstration projects, evaluate effectiveness, and modify restoration implementation process as needed

## 3. Seed money from DEP and EPA funded the initiation of the canal restoration program. The County and Municipalities will sustain progress into the future.



# Next Steps for Canal Restoration (con't)

4. Identify additional sources of funds to implement more restorations
  - Homeowner led restorations
  - **RESTORE Act Local Pot funds awarded to Unincorporated Monroe County and Islamorada**
5. Continue successful Partnership of Local, State, and Federal agencies and staff



US Army Corps of Engineers





Questions?

# Update on EPA Grant for Public Outreach to Homeowners for Canal Restoration



**Water Quality Protection Program  
Steering Committee Meeting  
March 11, 2015  
Monroe County BOCC Room, Marathon**

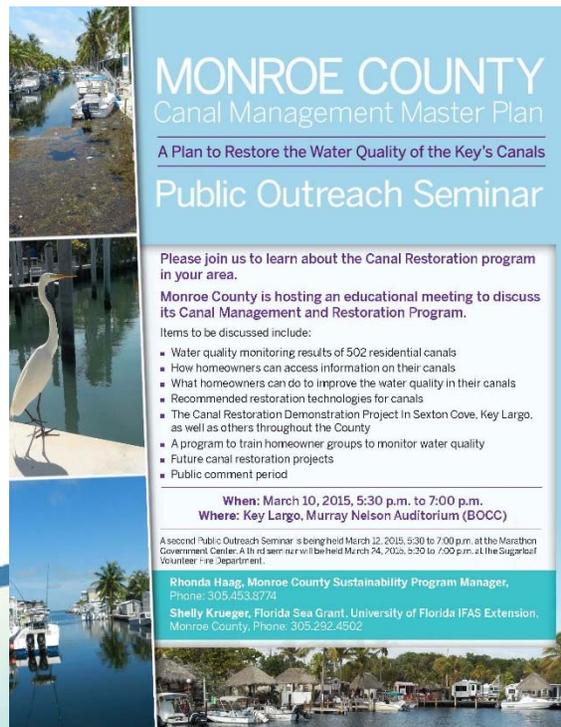
**Rhonda Haag – Monroe County**



# Public Outreach to Homeowners Related to Canal Water Quality Improvements

## 1. Public Outreach Seminars

- Preparation of seminar materials for future web based access
  - Power Point presentation
  - Poster boards detailing the demonstration projects
- Conduct three outreach seminars – Upper, Middle and Lower Keys



**MONROE COUNTY**  
Canal Management Master Plan  
A Plan to Restore the Water Quality of the Key's Canals  
Public Outreach Seminar

Please join us to learn about the Canal Restoration program in your area.  
Monroe County is hosting an educational meeting to discuss its Canal Management and Restoration Program.  
Items to be discussed include:

- Water quality monitoring results of 502 residential canals
- How homeowners can access information on their canals
- What homeowners can do to improve the water quality in their canals
- Recommended restoration technologies for canals
- The Canal Restoration Demonstration Project in Sexton Cove, Key Largo, as well as others throughout the County
- A program to train homeowner groups to monitor water quality
- Future canal restoration projects
- Public comment period

**When:** March 10, 2015, 5:30 p.m. to 7:00 p.m.  
**Where:** Key Largo, Murray Nelson Auditorium (BOCC)

A second Public Outreach Seminar is being held March 12, 2015, 5:30 to 7:00 p.m. at the Marathon Government Center. A third seminar will be held March 24, 2015, 5:30 to 7:00 p.m. at the Sugarloaf Volunteer Fire Department.

**Rhonda Haag, Monroe County Sustainability Program Manager,**  
Phone: 305.453.8774  
**Shelly Krueger, Florida Sea Grant, University of Florida IFAS Extension,**  
Monroe County, Phone: 305.292.4502



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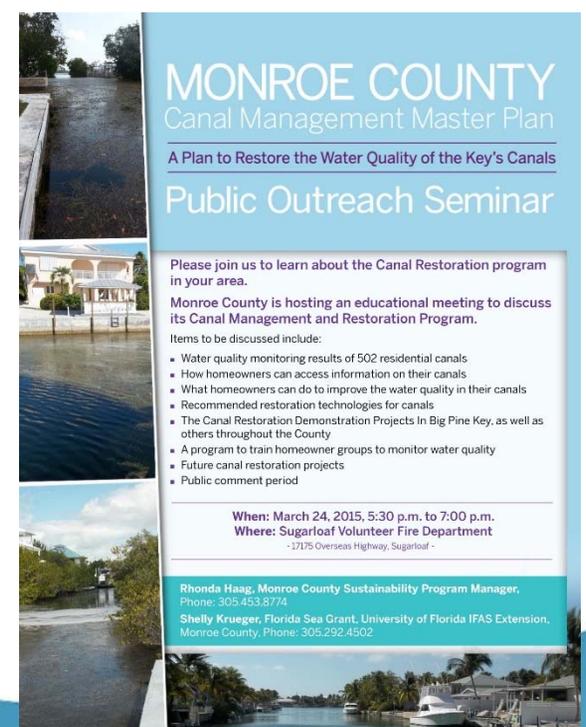
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- 2798 Overseas Highway, 2<sup>nd</sup> floor, Marathon, FL 33950 -

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- Water quality monitoring results of 502 residential canals
- How homeowners can access information on their canals
- What homeowners can do to improve the water quality in their canals
- Recommended restoration technologies for canals
- The Canal Restoration Demonstration Projects In Big Pine Key, as well as others throughout the County
- A program to train homeowner groups to monitor water quality
- Future canal restoration projects
- Public comment period

**When:** March 24, 2015, 5:30 p.m. to 7:00 p.m.  
**Where:** Sugarloaf Volunteer Fire Department  
- 17175 Overseas Highway, Sugarloaf -

**Rhonda Haag, Monroe County Sustainability Program Manager,**  
Phone: 305.453.8774  
**Shelly Krueger, Florida Sea Grant, University of Florida IFAS Extension,**  
Monroe County, Phone: 305.292.4502

# Public Outreach Seminar Agenda

- 1) Introduction and Need for Canal Restoration
- 2) Overview of the *Canal Management Master Plan*
- 3) *Best Management Practices* for Homeowners
- 4) Recommended Improvement Techniques
- 5) Canal Restoration Demonstration Projects
- 6) Florida Keys Water Watch
- 7) Where do we go from here?
- 8) Interactive Computer Session on Finding Your Canal Information





# Public Outreach to Homeowners on Canal Water Quality Improvements (con't)

## 3. Canal Demonstration Project Site Visit

- a) Public attendance at one of the demonstration projects during construction
- b) Educational materials provided
- c) Construction methodology, permitting requirements, and water quality improvement goals will be discussed

