

Monroe County and Islamorada Canal Restoration Project Updates

FKNMS WQPP Steering Committee

September 7, 2016

protecting the Florida Keys

Since 1971, the Conservancy has helped protect more than 7,700 acres of land in the Florida Keys. We also helped create the 2,800-square-nautical-mile Florida Keys National Marine Sanctuary. This map shows the boundary of the Sanctuary and the approximate locations of the places that have been preserved through the Conservancy's efforts. The list below indicates the number of acres the Conservancy protected within each site.

1. Biscayne National Park - 517 acres
2. Cross Key - 125 acres
3. Key Largo - 4,406 acres
4. Shell Key - 256 acres
5. Lignumvitae Key - 280 acres
6. Lower Matecumbe Key - 89 acres
7. Long Key, Keys Marine Lab - 5 acres
8. Little Crawl Key - 35 acres
9. Fat Deer Key - 365 acres
10. Big Pine Key - 574 acres
11. Little Torch Key - 249 acres
12. Ramrod Key - 87 acres
13. Sugarloaf Key - 35 acres
14. Snipe Key - 463 acres
15. Saddlebunch Key - 222 acres
16. Key West - 49 acres



Florida Keys National Marine Sanctuary

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

Air Curtain	Organic Removal	Culvert Installation	Pumping	Backfilling
#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
#148 Lower Matecumbe Key	#147 Lower Matecumbe Key – Mar Celeste Am.	#120 Plantation Key Indian Waterways		#137 Plantation Key Treasure Harbor
#116 Plantation Key Tropical Atlantic Shores	#145 Lower Matecumbe Matecumbe Ocean View			#143 Upper Matecumbe Key Palm Harbor
#132 Plantation Key Plantation Lake Estates	#157 Lower Matecumbe Beach			#145 Lower Mat Matecumbe Ocean View
#145 Lower Matecumbe Key				#120 Plantation Key Indian Waterways
#147 Lower Matecumbe Key Mar Celeste				#110 Plantation Key Plantation Tropical Key

Air Curtain Installation – Islamorada Canal #137 Treasure Harbor, Plantation Key

- A. Project completed in November 2014 with design, permitting & construction costs \$64,000
- B. Islamorada funding the O&M with annual cost \$3,500
- C. HOA residents paying electric approximately \$300 monthly
 - 1. Operation of 3 compressors
- D. Lessons learned
 - 1. Additional air needed at canal entrance due to long distance from compressors



Air Curtain Installation – Islamorada Canal #145 Lower Matecumbe Key

- A. Public – Private partnership
 - 1. Local property owner
- B. Islamorada approved \$47,000 June 2016 for design and permitting - private homeowner to provide funding for construction and installation
- C. Permit applications currently being completed by AMEC FW for submittal to federal, state, and local agencies



Air Curtain Installation – Islamorada Canal #148 Lower Matecumbe Key

- A. Canal included in initial 2013 EPA monitoring grant for restoration projects
 - 1. Have base line data for the site
- B. **DEP to provide \$50,000 for construction costs approved 2016**
- C. Islamorada will provide matching funds for design and permitting
- D. Permit applications currently being completed by AMEC FW for submittal to federal, state, and local agencies
- E. Project to be completed June 2017



Monroe County Demonstration Projects

Air Curtain	Organic Removal	Culvert Installation	Backfilling	Pumping
<p>#266 Big Pine Doctor's Arm between Witters & Bailey Lanes Same Canal – 2 Categories</p> <p>#1</p>		<p>#472 Geiger Key Geiger Mobile Homes FDEP Grant Project</p> <p>#2</p>	<p>#29 Key Largo Sexton Cove between Bunting and Pigeon Drives</p> <p>#3</p>	<p>#278 Big Pine Eden Pines Colony Pine Ave</p> <p>#7</p>
<p>#290 Big Pine between Ave I and J Same Canal – 2 Categories</p> <p>#5</p>		<p>#277 Big Pine Tropical Bay between Watson Blvd and Sunrise Dr</p> <p>#6</p>		
<p>#287 Big Pine Atlantic Estates between Hollerich Dr and Atlantis Dr</p> <p>#4</p>		<p>#459 Geiger Key Boca Chica Ocean Shores between Boca Chica Rd and Jay Ln</p> <p>#8</p>		

Project #1: Backfilling Project - Canal #29 Sexton Cove, Key Largo

- A. The project was completed in July 2015 and the cost for construction was \$1,360,000
- B. Lessons learned
 1. Detailed pre- and post-construction videos of adjacent property to the canal
 2. Vacant lot and private property approval for equipment staging
 3. Impacts to residents due to closure of canal
 4. Traffic impacts to residents due to trucks (17 per day)



Projects #2 and #3: Organic Removal Projects – Canals #266 Drs. Arm and #290 The Avenues, Big Pine Key

- A. The project was completed in March 2016 and the cost for construction was \$1,901,804
- B. Lessons learned
 1. Polymer residual and toxicity concerns with OFW
 2. Vacant lot and private property approval for equipment staging
 3. Impacts to residents due to closure of canal
 4. Sloughing of muck back in the canal due to shallow elevations outside mouth of canal (permitting concerns with muck removal in OFW)
 5. Concerns with O&M being provided by residents to maintain air curtain systems
 6. Construction administration cost due to bidding requirements for GC license and bonding



Project #4: Culvert Installation Project - Canal #277 Tropical Bay Estates, Big Pine Key

- A. 60” concrete culvert to connect two sections of canal system
- B. Project was completed May 2016 and the cost for construction was \$373,957
- C. **DEP provided \$50K for the construction cost**
- D. Lessons learned
 1. Homeowner perception of seaweed movement
 2. Private property approval for culvert installation and equipment staging



Project #5: Air Curtain Installation Projects - Canals #266 Drs. Arm and #287 Atlantic Estates, Big Pine Key

- A. Project completed in June 2016 and the cost for construction was \$202,384
- B. The County is funding the O&M for \$99K for 2 years – including power
 1. Savings to homeowners per year for Canal #266 is \$688/property and Canal #287 is \$952/property
- C. Lessons learned
 1. Noise levels of compressors and distribution manifold
 2. Elevation of equipment
 3. Private property access and approval to place equipment
 4. PRD entrapment concerns, alternative design being prepared to reduce power costs and alleviate wildlife entrapment
 5. Navigation issues with shallow canal mouth depths
 6. Site obstructions (wind vane, control panel, compressor boxes)



Before



After



Before



After

Project #6: Air Curtain Installation Project - Canal #290 The Avenues, Big Pine Key

- A. County completed a \$700K organic muck removal project in March 2016
- B. Homeowner weed gate was reinstalled but is unable to prevent seaweed from entering the canal
- C. The homeowners have requested assistance from the County installing a new air curtain
- D. The County will provide match funds to design, permit, and construction
- E. Alternative design with a combination physical and air curtain barriers to address PRD concerns
- F. Evaluate elevating the compressors on 2-story home to plan for sea level rise and storm surges
- G. **DEP provided \$50K for the construction cost**
- H. Construction has to be completed by June 2017



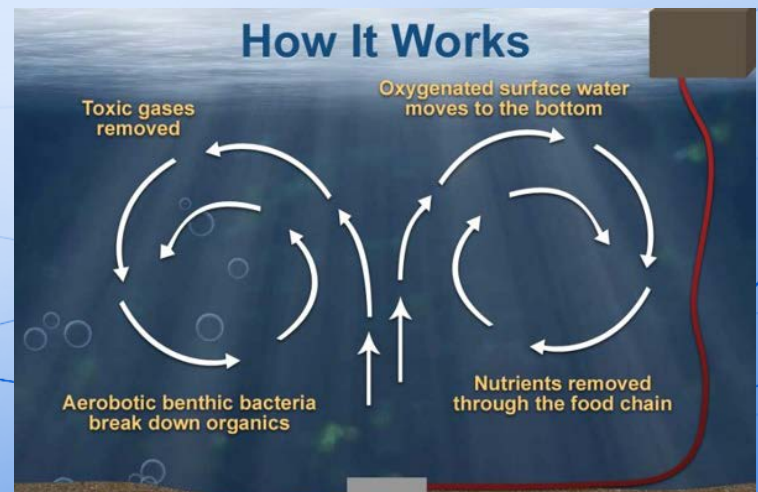
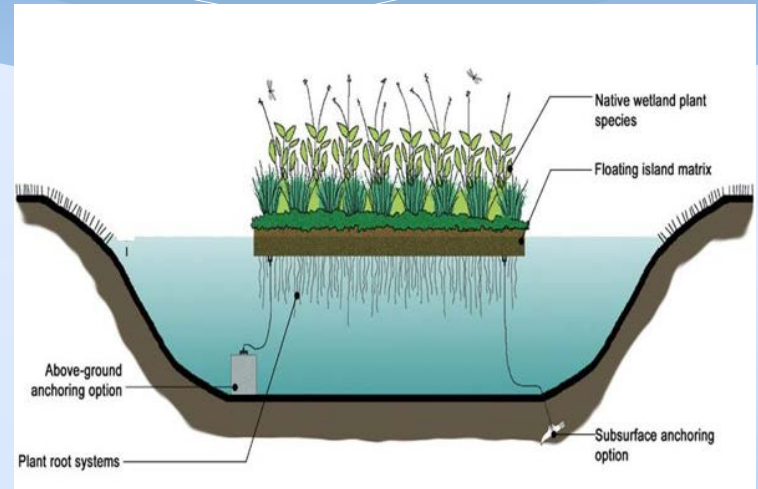
Project #7: Organic Removal, Backfilling, and Air Curtain Project - Canal #83 Rock Harbor, Key Largo

- A. Permit applications have been submitted to federal, state, and local agencies
- B. Request for Proposal (RFP) for construction was published on June 26, 2016
 1. Proposals submitted on August 18, 2016
 2. Selection committee is evaluating the proposals based on the criteria in the RFP
- C. County Policy 202.8.4 states that *“maintenance dredging in artificial waterways shall not exceed depths greater than minus (-6) feet mean low water”*
- D. Policy 202.8.6 was passed in 2015 that allowed the implementation of the 2 demonstration organic removal projects to exceed depth threshold without backfilling
 1. Water quality report after 2 years of monitoring to determine effectiveness



Project #8: Augmented Aeration Projects - Canals #48, #59, #79, #80, Key Largo

- A. Working on access agreements for staging equipment and RFP.
- B. Project may include augmented aeration such as bio bugs, macro algae, or applicable means of improving water quality
- C. Potential permitting issues
- D. A selection committee will evaluate the proposals based on criteria in the RFP



2015 EPA Grant for Water Quality Improvements in Residential Canals

- A. Task 1 - Bench Scale Testing to Assist with Beneficial Re-use of Organics Removed from Canal Bottoms
- B. Mechanical (pumping) – 4 days and 8,000 gallons of water and 615 pounds of gypsum per roll off container of dewatered sediment to remove salt to reuse the material
- C. Passive (rainfall) – 2.5 years and 114 inches of rainfall and 615 pounds of gypsum per 2 ft stockpile of dewatered sediment to remove salt to reuse the material
 - 1. Canal 266 (no other contaminants to restrict reuse) removed 63 roll offs of dewatered sediment, which would have required 504,000 gallons of water and 19.4 tons of gypsum



2015 EPA Grant for Water Quality Improvements in Residential Canals (continued)

A. Task 2 - Alternative Technologies Evaluation to Address Accumulated Muck in Canal Bottoms

Technology	Type	Effectiveness (0-5)	Ease to Implement (0-5)	Permitting (0-5)	Homeowner Disruption (-5 to 5)	Time (0-5)	Cost (-10 to 10)	Total	Rank
Aeration & Bio Augmentation	I N - S I T U	2	5	2	5	0	10	24	2
Directionally Drilled Bio-sparge		3	3	2	4	1	5	21	4
Aerobic Stabilization		2	1	5	-3	3	5	12	5
Clay Mat Cap		5	3	4	3	4	6	26	1
Sediment Amendment		2	4	5	3	5	6	24	2
Dredge & Disposal	E X - S I T U	5	3	3	0	3	0	14	Baseline
Resistance Heating		5	0	3	0	3	-8	3	8
Anaerobic Digestion		5	0	3	0	2	-3	7	6
Humification Using a fuel cell		5	0	3	0	2	-3	7	7
Chemical Oxidation		5	0	1	-2	2	-10	-4	9

2015 EPA Grant for Water Quality Improvements in Residential Canals (continued)

* Clay Mat Cap

BARGE



SHORE

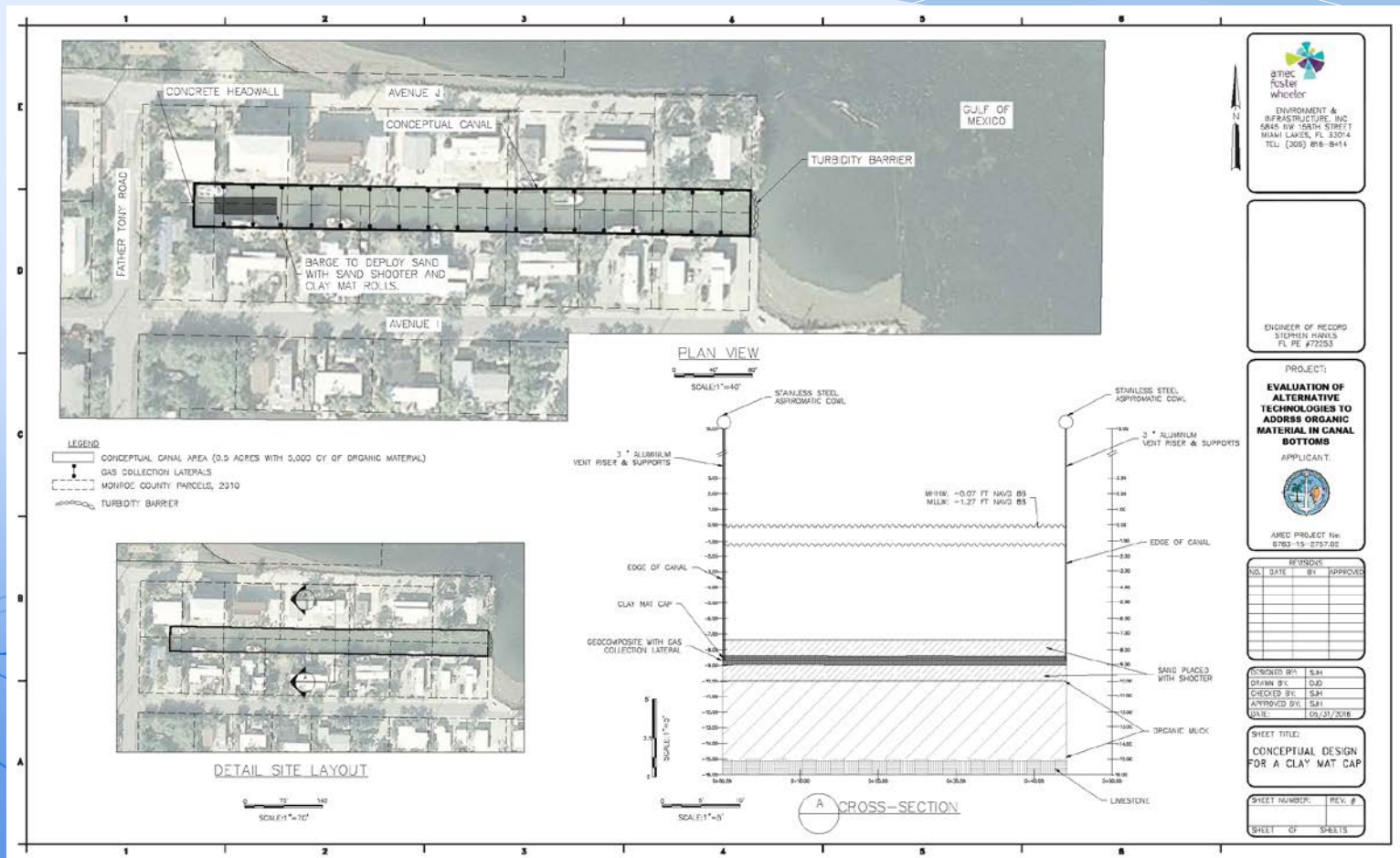


TRITON MATTRESS



2015 EPA Grant for Water Quality Improvements in Residential Canals (continued)

* Clay Mat Cap



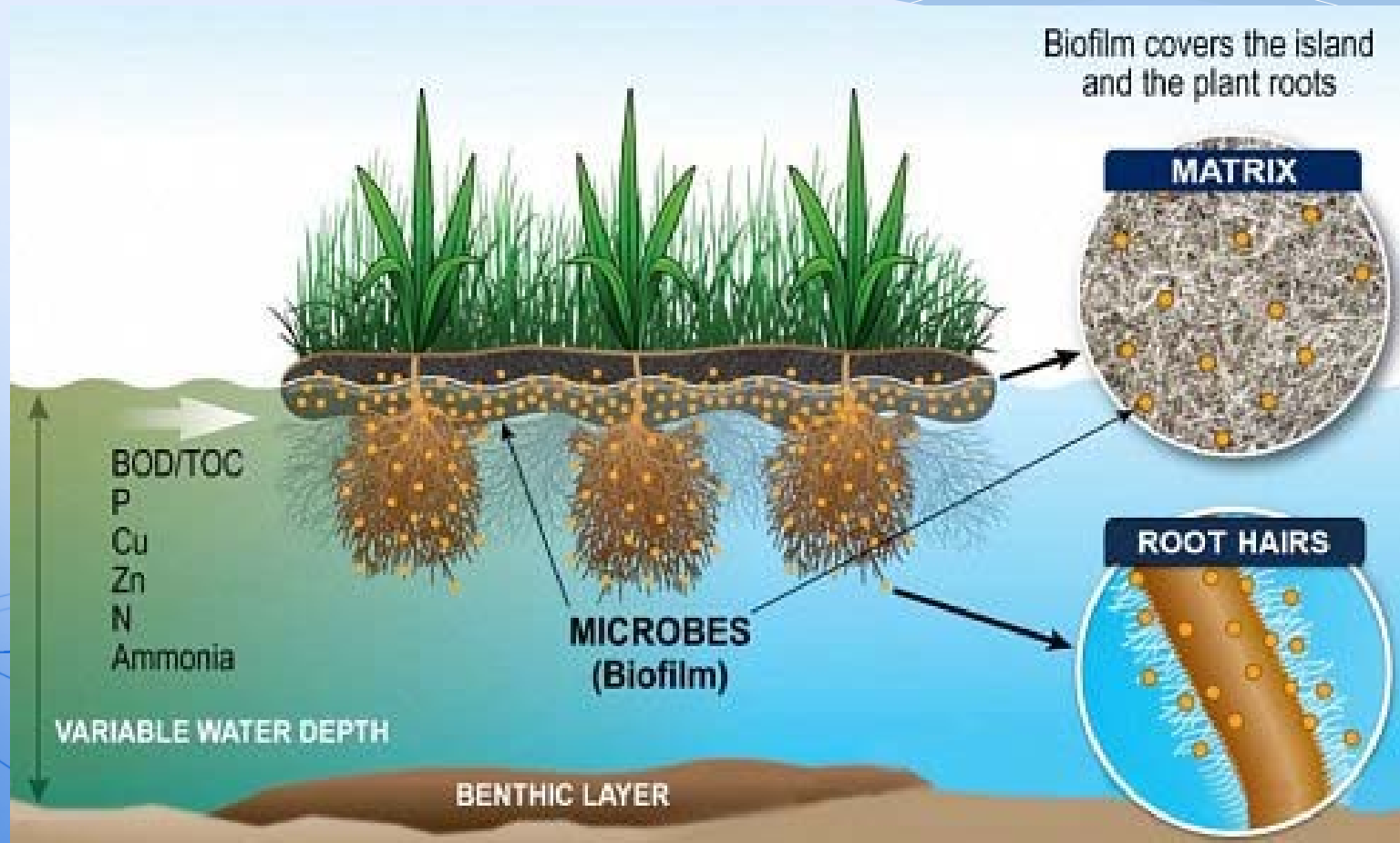
2015 EPA Grant for Water Quality Improvements in Residential Canals (continued)

A. Task 3 - Alternative Technologies Evaluation for Water Quality Improvement in Canals

Passive In-Situ Technologies	Development Status (0-5)	Effectiveness (0-5)	Ease of Implementation (0-5)	Footprint (0-5)	Ease of Permitting (0-5)	Homeowner Disruption (-5-5)	Time (0-5)	Cost (-10-10)	Total Score (-15-50)	Rank
Seagrass Planting	3	2	3	3	3	5	2	-2	19	4
Macroalgae Farming	3	3	4	4	2	5	2	10	33	2
Floating Mangrove Islands	5	3	4	4	4	5	3	6	34	1
Oyster Aquaculture	5	3	2	4	4	5	4	5	30	3
Bioremediation	2	2	5	4	4	4	2	-5	14	5
Benchmark Technology										
Circulation Pump	5	5	3	3	3	3	3	0	25	-

2015 EPA Grant for Water Quality Improvements in Residential Canals (continued)

* Floating Mangrove Islands



2015 EPA Grant for Water Quality Improvements in Residential Canals (continued)

I. Task 4 - Development of a Business Plan for Canal Management

A. Five Steps to adopt a canal restoration program:

1. Build a solid foundation of policy
2. Define the role of public/private partnerships in Canal Restoration and Operation
3. Understand the framework of regulations, both external and local
4. Finalize financial policy and tools
5. Finalize an Operational Plan

B. Short-term Recommendation for Action:

1. Continue to invest
2. Continue efforts to obtain grants and direct allocations
3. Development of the Operational Plan



EPA 2016 South Florida Initiative Grant Project

- A. EPA provided \$110,582.30 to the County to fund a portion of the CMMP Part III A to address data gaps
- B. Monroe County will provide \$60,339.45 in match funding
- C. The scope includes:
 1. Collection of expanded Dissolved Oxygen (DO) data for 180 Fair and 131 Poor raked canals
 2. Collection of sediment cores from 15 canals that have documented organic detritus bottom sediment loading greater than 0.75 feet in thickness to evaluate the potential for reusing canal sediments in their planning and cost evaluation of organic removal and backfilling
 3. Design of conceptual restoration plans for 15 canals that have demonstrated extremely poor water quality
 4. Evaluation of strategies to reduce costs

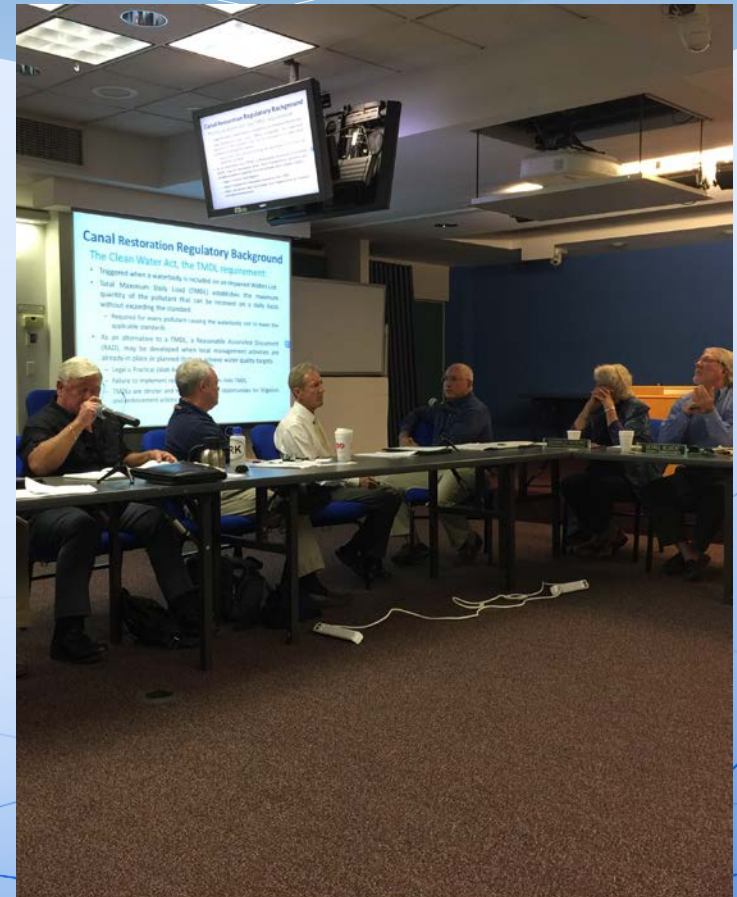
Canal Restoration Program Planning

- A. 1st BOCC Canal Workshop was held on April 11, 2016 to discuss:
1. Municipality support and participation
 2. Regulatory requirements
 3. Legal review of residential canal program
 4. RAD preferred over TMDL
 5. Resident participation
 6. Examples of successful restoration programs
 7. Funding mechanisms



Canal Restoration Program Planning

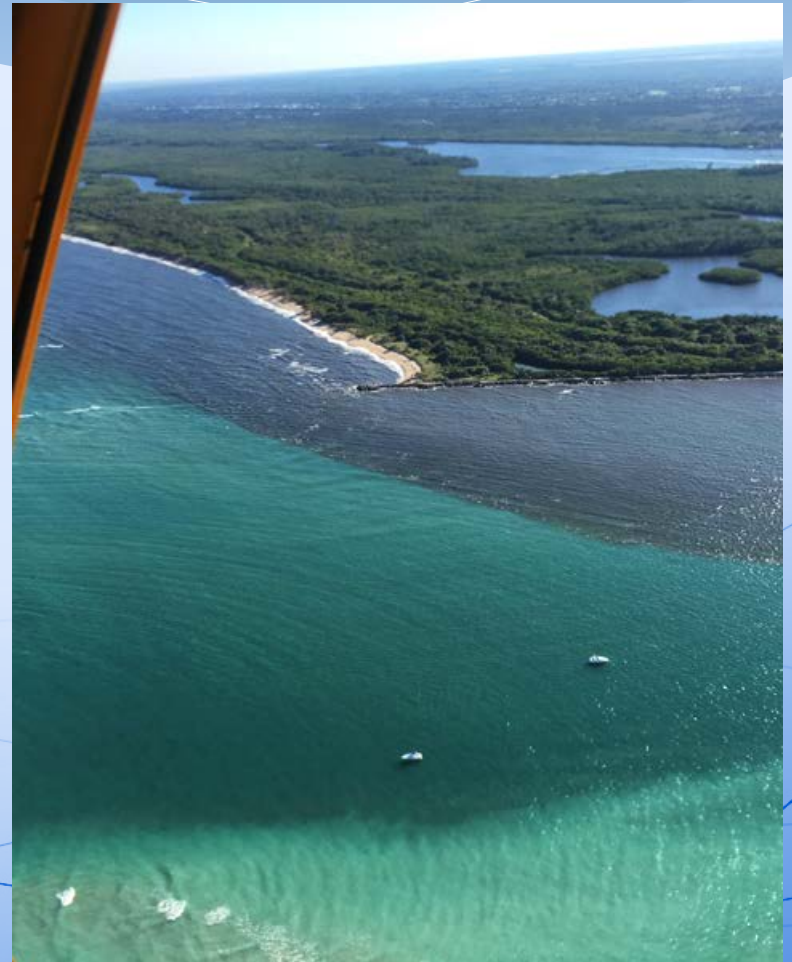
- A. 2nd BOCC Canal (Financing) Workshop set for November 14, 2016 to discuss:
 1. Establishment of local ordinances
 2. Funding mechanisms
 - i. Stormwater utility fee
 - ii. MSBU
 - iii. MSTU
 - iv. Infrastructure sales tax
 3. Funding Sources
 - i. Restore funds
 - ii. Stewardship funds
 - iii. EPA Grants
 - iv. DEP Grants
 4. Homeowner outreach
 5. Next steps
 - i. Third workshop to discuss program cost
 - ii. Implementation of program
 6. RFP advertised August 2016 for environmental and canal restoration design services



Assistance Needed from Steering Committee

A. Financial planning hurdles:

1. Tie in canal water and near shore water quality
2. Tie in water quality impacts with northern, middle, and lower keys
3. Long term monitoring
4. To include stormwater



2017 FDEP FKRAD Update

A. Water quality monitoring

1. FDEP will assemble available data
2. Stakeholders upload data to FL STORET

B. Compliance

1. Canals not directly tied to FKRAD, determine canal impairment based on the FDEP Class III – Marine Standards as discussed in 62-302.530
2. Evaluate the completion of scheduled projects in Attachment 1 of the 2011 Update Report
3. Once the FKRAD projects are complete and/or water quality targets are met, then TMDLs may be developed for the canals depending on their attainment of DO.

C. Next Steps

1. Concentrate on monitoring to evaluate achievement of water quality targets in the halo zone by 2020



Canal Financing Special Workshops

- A. Canal Financing Special Workshop Monday, November 14, 2016 at 9 am in the Marathon BOCC
- B. Steering Committee Participants:
 - 1. Billy Causey
 - 2. George Garrett
 - 3. Gus Rios
 - 4. John Hunt
 - 5. Jon Iglehart
 - 6. ..
 - 7. ..