

Canal Restoration Demonstration Project Updates

Water Quality Protection Program Steering Committee Meeting 09-30-15



Monroe County Demonstration Projects

Weed Barriers	Organic Removal	Culvert Installation	Backfilling	Pumping
<p>#266 Big Pine Doctor's Arm between Witters & Bailey Lanes</p> <p><i>Same Canal – 2 categories</i></p> <p>#1</p>		<p>#459 Geiger Key Boca Chica Ocean Shores between Boca Chica Rd & Jay Lane</p> <p>#2</p>	<p>#29 Key Largo Sexton Cove between Bunting & Pigeon Drives</p> <p>#3</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>#7</p>
<p>#287 Big Pine Atlantic Estates between Hollerich and Atlantis Drs</p> <p>#4</p>	<p>#290 Big Pine between Ave I and J</p> <p>Canal already has an existing effective weed gate</p> <p>#5</p>	<p>#277 Big Pine Tropical Bay between Watson Blvd and Sunrise Drive</p> <p>#6</p>		
		<p>#472 Geiger Key Geiger Mobile Homes</p> <p>DEP Grant Project</p>		

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

1. Restoration consisted of placing 900 Truckloads of clean fill (26,000 cubic yards) to raise canal bottom elevation from -35 feet Mean Low Water (MLW) to -7.7 feet MLW



2. Construction Process

- a) Adventure Environmental Inc. was selected Contractor at \$1.36 Million cost
- b) Clean backfill transported by trucks from Florida City
- c) Vacant lot at 11 Pigeon Drive used for staging backfill
- d) 10-20 trucks per day delivered to site
- e) Excavator loaded fill onto a conveyor belt placed over the mangrove fringe along canal shoreline
- f) Fill moved onto a 60' x 24' barge for uniform emplacement throughout the canal
- g) 10-15 barge loads placed per day



Update on Canal #29 Backfilling Demonstration Project Sexton Cove, Key Largo



Update on Canal #29 Backfilling Demonstration Project Sexton Cove, Key Largo (continued)

3. Project Events

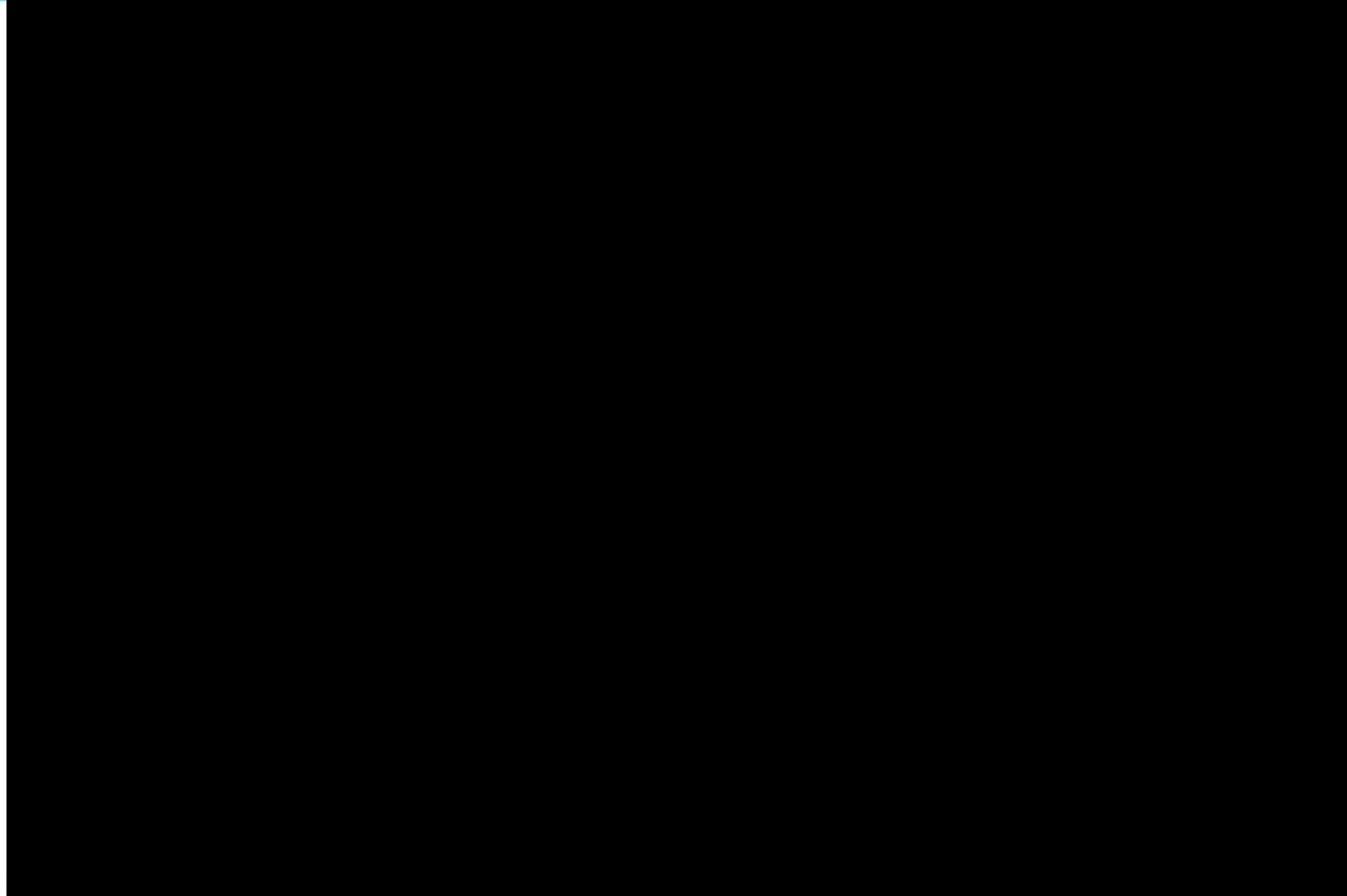
- a) Turbidity controlled within canal by on-going maintenance of turbidity curtains
- b) Crocodiles and manatees visited the site – able to maintain 50 foot radius and continue work
- c) Homeowners said construction much less disruptive than they had anticipated

4. Project Schedule

- a) Construction started March 4, 2015
- b) Base fill completed May 12
- c) Sand fill emplacement, minimum of 1 foot, May 12 - 26
- d) Substantial completion June 3, 2015
- e) Survey documented completion all except in one small area
- f) Project completed July 3, 2015**
- g) Staging area restoration
- h) 90 day post backfill survey verified no settling/compaction



Drone Flyover of Canal #29 Backfilling Project



Update on Canal #29 Backfilling Demonstration Project Sexton Cove, Key Largo (continued)

5. Benefits

- a) Dissolved oxygen impairment corrected
- b) Return of sea life
- c) Return of sea grasses



Homeowner Quotes:

- a. *“The canal is coming alive! We’ve been seeing mullet, snapper, jacks, barracuda, manatees over the past month. Today another milestone; I heard a commotion in the canal and looked out to see a school of snapper chasing a shrimp. The shrimp was jumping for all it’s worth trying to get away. After four jumps a snapper finally ate it. Then a few minutes later I saw two more shrimp jumping out of the water trying to avoid the snapper. All this happened in broad daylight about noon.”*
- b. *“Today I snorkeled in the canal, and am happy to report that I could see the bottom, all over!! AND – fish. All sizes of snapper. Schools of finger mullet. Barracuda.”*
- c. *“We have noticed lots of fish, big and small in our canal. The Manatees seem to like the more shallow water, 6 of them show up just about every day:”*

Update on Organic Removal Project Canal #266 Drs. Arm, Big Pine Key

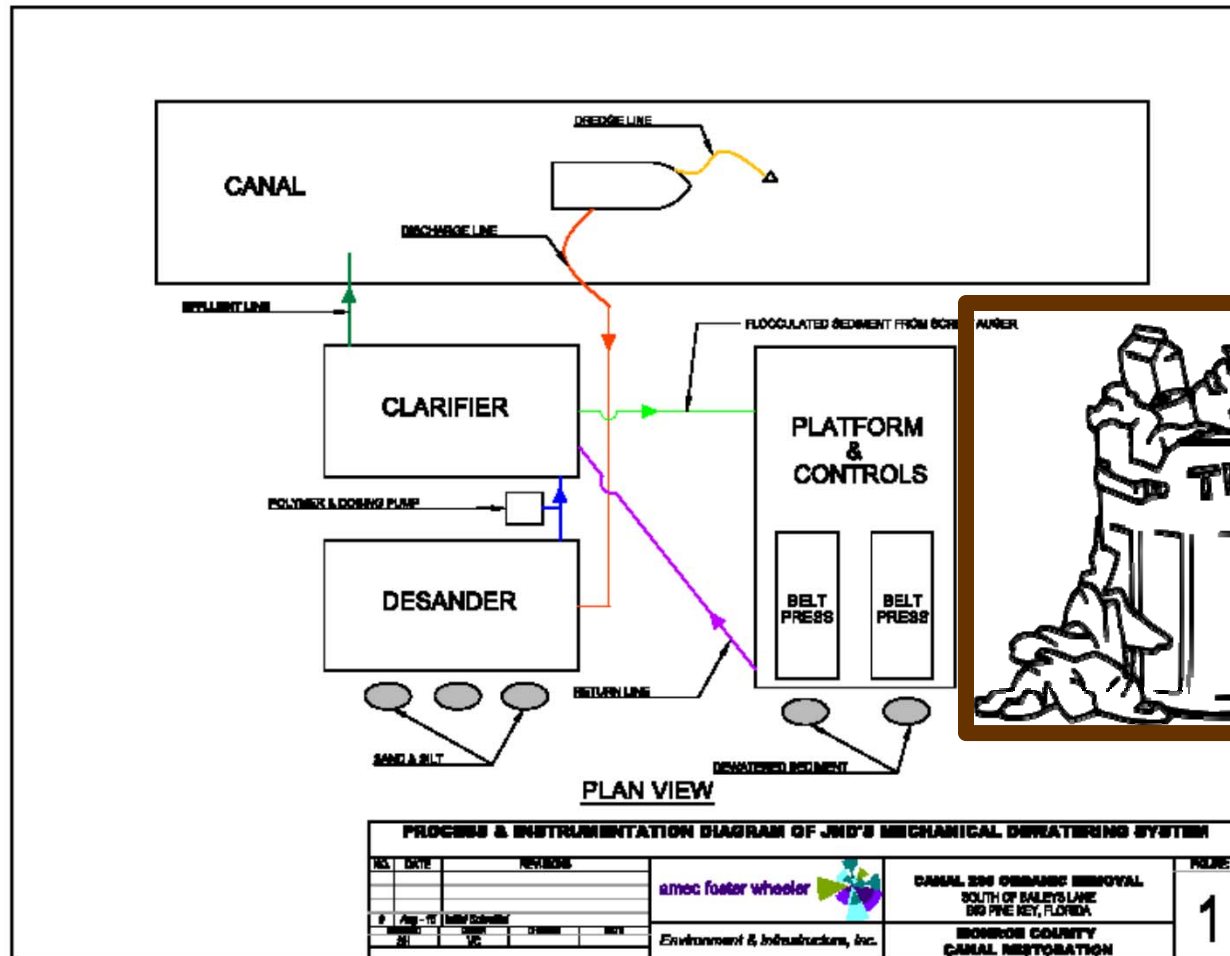
1. Restoration consists of removal of 5 feet of decayed seaweed and muck from the canal bottom from -3.4 feet MLW to -8.4 feet MLW

2. Construction Process

- a) JND Thomas, Company selected Contractor with the lowest cost of \$1.2 Million
- b) Barge operated **hydraulic vacuum dredge** removes muck
- c) Dredge spoils piped to land side staging areas
- d) Spoils **dewatered by mechanical means** using a mix tank, hydro-cyclone (desander), clarifier, and belt press
- e) Chemical amendments Watersolve 426 and 164 utilized
- f) **Local reuse of dredge spoils**



Update on Organic Removal Project Canal #266 Drs. Arm, Big Pine Key (continued)



1. 2.6 million gallons of water processed
2. 1,150 gallons of polymer used
3. 50 truckloads of dewatered muck has been removed from the site for reuse
4. 14 Dumpsters of trash also removed

Update on Organic Removal Project Canal #266 Drs. Arm, Big Pine Key (continued)

3. Project Events

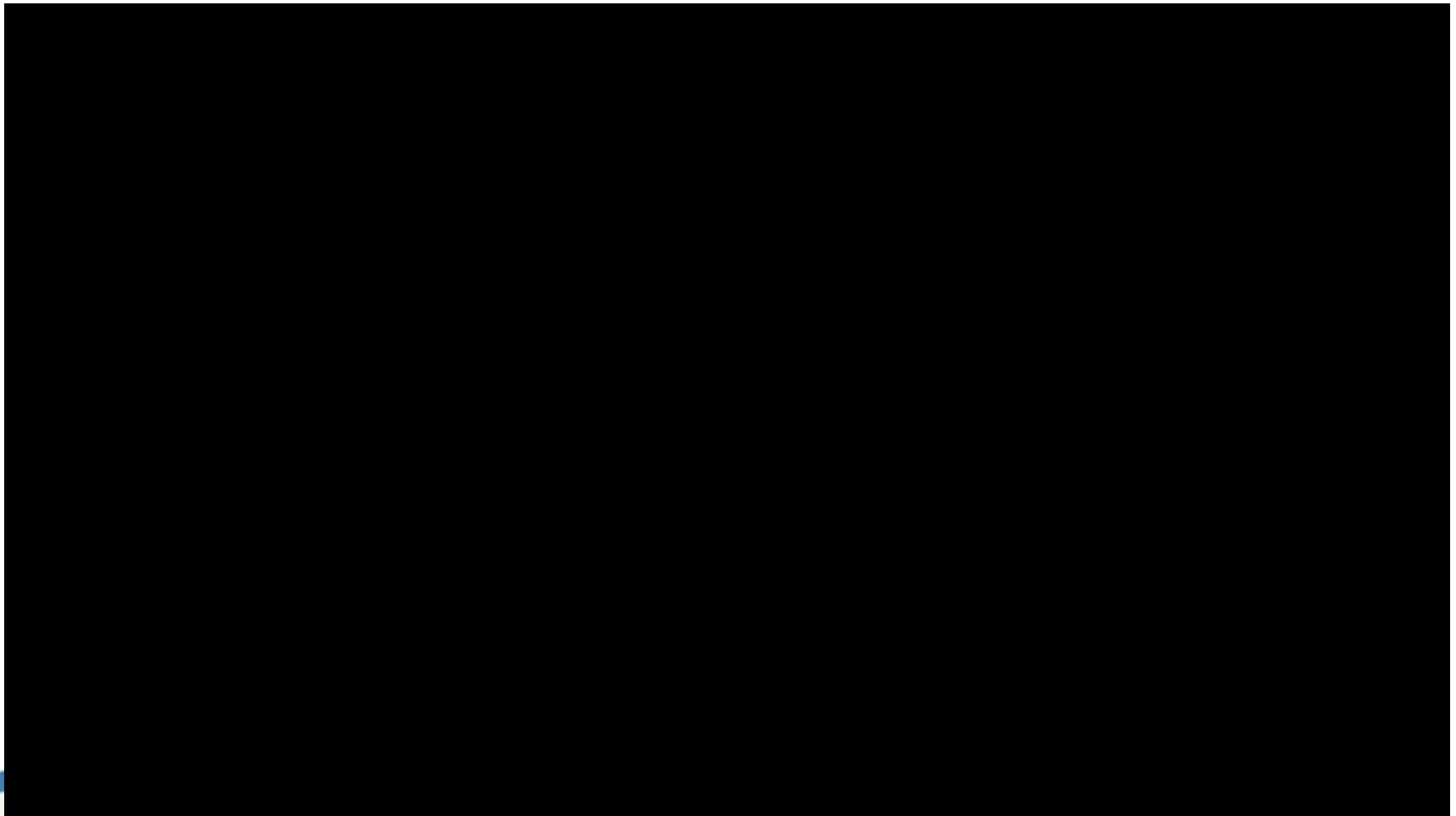
- a) Good coordination with sewer installation work
- b) Turbidity controlled within canal by on-going maintenance of turbidity curtains
- c) No manatees or key deer within project footprint – no incidents
- d) Homeowner concern about a 5 foot buffer between dredge equipment and seawalls/structures - working to resolve

4. Project Schedule

- a) Mobilization May 18, 2015
- b) **Estimated completion of dredging early October 2015**
- c) Survey required to document sediment removal to < 3 inches
- d) Placement of 6 inches of sand
- e) Demobilization and site restoration – estimated completion end of November
- f) Reinstallation of air curtain after organic removal completion



Drone Flyover of Canal #266 Doctors Arm Big Pine Key, Organic Removal Project



Site Tour of Canal #266

Doctors Arm Big Pine Key, Organic Removal Project

A. EPA Public Outreach Grant for Canal Restoration Education funded a site tour of the organic removal project at Canal #266

B. Site tour conducted August 5, 2015

- 1) Three tour sessions conducted
- 2) Over 50 people attended
- 3) Topics included:
 - Background of the CMMP and Canal Restoration Demonstration Program
 - Overview of the Canal #266 project
 - Site tour of dewatering equipment and operation
 - Site tour of dredging operation
 - Question and answers

C. Great feedback received



Update on 2nd Organic Removal Project Canal #290 between Ave I and J, Big Pine Key

1. Removal of 5 feet of decayed seaweed and muck from the canal bottom from -3.9 feet MLW to -8.9 feet MLW

2. Construction Process

- a) Same contractor as Canal #266, JND Thomas, at a cost of \$800,000. **Saved over \$200,000 combining the two projects.**
- b) **Same equipment as Canal #266**
- c) Canal #290 spoils disposed at a permitted landfill due to slightly elevated arsenic and copper levels
- d) **Using a different polymer - Prestol K274FLX**

3. Project Schedule

- a) **Estimated Construction Start early October 2015**
- b) **Estimated Construction Completion January 2016**
- c) **Weed barrier/air curtain to be upgraded by homeowners**



Update on Two Monroe County Air Curtain Installations

A. Air Curtain Installations – Canals #266 Drs. Arm & #287 Atlantic Estates, Big Pine Key

- 1) Re-advertised September 21 to obtain better pricing
- 2) Contacted more vendors
- 3) Proposals due October 29, 2015
- 4) Estimated Construction start December 2015



B. Benefits

- 1) Reduce – but not fully eliminate - additional organic loading that is depleting dissolved oxygen
- 2) Avoids allowing more seaweed to enter that produces methane and hydrogen sulfide
- 3) Increase water clarity
- 4) Improve conditions for canal homeowners and marine life



Update on Demonstration Culvert Installations

A. Canal #277 Tropical Bay Estates, Big Pine Key

- 1) Design Basis being evaluated: one dimensional flow model utilized with increase in water body turnover rate above existing conditions. Based upon Geiger Key #472 (which was 11 times over existing conditions) the design will be a 60" culvert. Dissolved oxygen increase is also related to incoming water quality which is not addressed in the flow model.
- 2) DEP will fund \$50,000 of the construction costs
- 3) Permit applications in process to be completed in October
- 4) Request for Proposals to follow
- 5) Construction start date estimated for January 2016



B. Canal #459 Boca Chica Ocean Shores Geiger Key

- 1) Access approval slowing down design



Update on Geiger Key #470 / #472 Culvert Project – Combined funding by DEP and Monroe County

1. Design Basis

- a) Increase natural tidal flushing and add dissolved oxygen to address the low levels in both canals which were below State Standards
- b) Submerged to prevent seaweed from Canal #472 impacting Canal #470
- c) Not designed to reduce historical seaweed entry or accumulation in Canal #472

2. Culvert Construction

- a) Concrete reinforced pipe 112 foot 24-inch by 38-inch
- b) Utilities constrained the size and depth of placement
- c) Installed in March/April 2015 by Charley Toppino & Sons, Inc.
- d) Previously unknown subsurface obstructions on the Canal #472 side (private property seawall supports and a concrete junction box) led to a field decision to angle the culvert
- e) Erosion prevention added (metal deflector plate and concrete barricade to direct flow away from seawall)



Update on Geiger Key #470 / #472 Culvert Project

3. Seaweed Issue – Evaluation Report

- a) Late May heavy seaweed loading caused some homeowners to state the culvert was trapping the seaweed in the canal
- b) Small eddy observed during outgoing tide
- c) Seaweed accumulation this year is exceptionally heavy
- d) During the time the culvert was open heavy seaweed accumulations observed in adjacent canals, throughout the Keys, and the Caribbean
- e) July 2 culvert plugged and July 6 seaweed removed to allow evaluation of situation
- f) Observation: Seaweed accumulation is the same, or worse, with culvert closed as it was when open



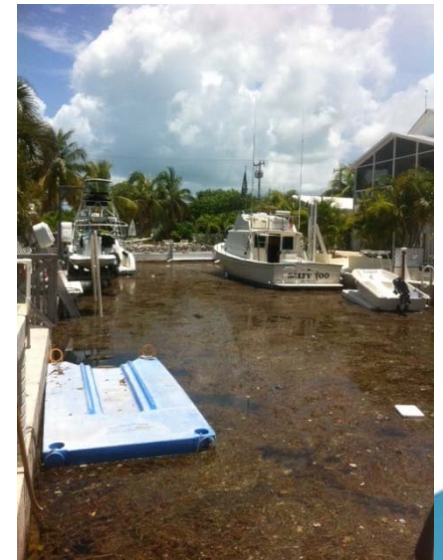
June 28 - culvert open



Water eddy



Neighboring Canal June 19

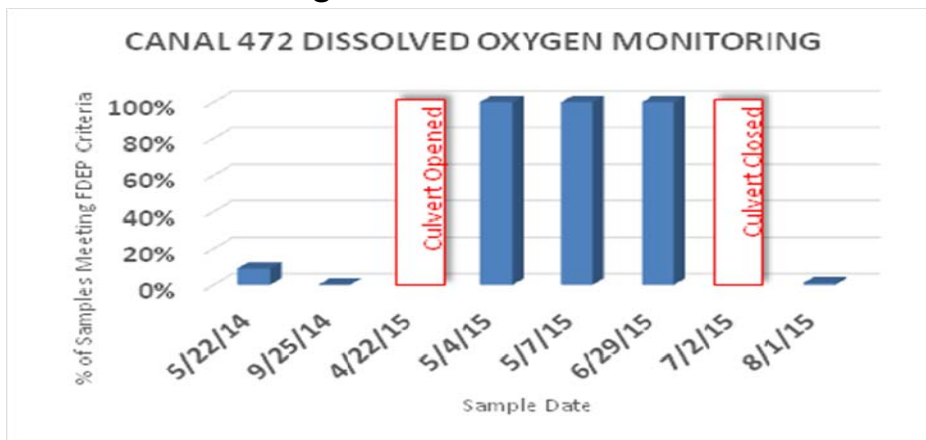


July 17 – culvert closed

Update on Geiger Key #470 / #472 Culvert Project (continued)

4. Water Quality Improvements

- a) Upon opening of the culvert the natural tidal flow immediately improved water clarity and increased fish populations in both canals
- b) FIU dissolved oxygen data at depth show the culvert improved the water quality to meet State Standards even with heavy seaweed loading as observed in June 2015



5. Next Step

Select from 6 options provided in the Report



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

1. Proposed restoration consists of using pumps to pump clean bay water to the farthest ends of canal to increase natural tidal flushing

2. Several Issues

a) Eden Pines has **50% returned approval letters from parcel owners - BOCC voted that 75% was required**

a) These letters support the project and willingness to pay for operation and maintenance (O&M) after 2 years

b) 58 lots are owned by the County – assumed a yes vote but not verified by BOCC

b) Homeowners have indicated that they have **no mechanism to fund the O&M costs after 2 years**

a) These are the highest O&M costs for any demonstration project

c) USFWS coordination for access for intake pipe continues

3. At the July 15, 2015 Canal Restoration Advisory Subcommittee meeting homeowners stated the following:

a) There are many new owners since the initial March 2014 letters were sent

b) Many did not receive the letters

c) Suggested a public neighborhood meeting (potentially in January) and redistribution of approval letters



Permitting

A. SFWMD

- Environmental Resource Permits for Restoration Projects;
- No required mitigations
- Air curtains – “*de minimus*” exemptions Section 373.406(6), F.S.
- < 60 days to obtain permits

B. FKNMS

- 30-60 days to obtain permits

C. USACE

- Backfilling and Organic Removal - Dredge and Fill permits obtained within 60-90 days with expedited review including Protected Resource Division (PRD) Consultation
- Air curtains - #266 Regional General Permit SAJ-17 with USFWS review for T&E species within Key Deer Refuge - 4.5 months; #287 needed PRD review due to weed barrier fence - still not received at > 5 months
- Culverts – Nationwide 7 – < 30 days for Geiger #472; Canal #277 will require PRD review due to red mangrove impacts – could be 6 months to 1 year without an expedited review

Permitting Issues

A. SFWMD and FKNMS

- No issues

B. USACE

- Federal Consultations
 - 1) Taking > 5 months
 - 2) Consultations are project specific

C. Future Actions Needed

- 1) WQPP Steering Committee to **request designated staff in each agency** – USACE provided the contacts
- 2) WQPP Steering Committee **request expedited reviews** of Canal #277 Culvert and Canal #287 Air Curtain
- 3) After review of each activity should be able to use the consultation for other sites with similar conditions – USACE said no – as they are project specific - need programmatic reviews
- 4) **Develop *Programmatic Biological Opinions*** for all canal water quality improvement projects

2016 EPA Grant for Water Quality Improvements in Residential Canal

A. Bench Scale Testing to Assist with Beneficial Re-Use of Organics Removed from Canal Bottoms

- 1) Soil flushing laboratory testing to remove salts



B. Alternative Technologies Evaluation to Address Accumulated Muck in Canal Bottoms

- 1) Research alternative technologies to dredging, documented history of effectiveness evaluated

C. Alternative Technology Evaluation for Water Quality Improvements in Canals

- 1) Identify technologies not currently included in the CMMP
- 2) Identify passive & less energy intensive techniques



D. Development of a Business Plan for Canal Management

- 1) Identify reliable and equitable funding mechanism

MONROE COUNTY CONSIDERATIONS

- A. Need to Develop a Funding Mechanism-
County Researching**
- B. Discussion of Regulatory Requirements for
Canal Restorations – EPA and DEP letters,
County *Finding Memo***



- C. Reevaluate Selection Process for Prioritization
and Funding of Future Restorations**

- Topic to be discussed at future *Canal Restoration Advisory Subcommittee* meeting

- D. BOCC Workshop to discuss Programmatic
Plan for future Canal Restorations**

- Anticipated January 13, 2016



**Adaptive management framework from
Canal Management Master Plan**

EPA Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
81 FORSYTH STREET
ATLANTA, GEORGIA 30308-8960

AUG 28 2015

Mr. George R Neugent
1583 Eastward Ho Lane
Marathon, Florida 33050

Dear Mr. Neugent:

Thank you for your July 28, 2015, inquiry to the U.S. Environmental Protection Agency on behalf of Monroe County seeking clarification of Monroe County's state and federal responsibility to restore the impaired canal systems as described in the Florida Keys Reasonable Assurance Document (FKRAD). Water quality monitoring of the nearshore waters (halo zone) and the inland canal systems of the Keys, confirmed pollution due to excessive nutrients and low dissolved oxygen. The failure to meet water quality standards put the Florida Keys on the Clean Water Act Section 303(d) list of impaired waters. Once on the 303(d) list, the State or the EPA is required to develop Total Maximum Daily Loads (TMDLs) to restore the waterbodies. In lieu of developing the TMDLs, Monroe County and local stakeholders contacted the EPA and State and expressed interest in pursuing a FKRAD, a commitment by a local sponsor and stakeholders to implement corrective actions to reduce pollution and restore waters. Monroe County was already in a strong leadership position through their participation in the Florida Keys National Marine Sanctuary Water Quality Protection Program that was established to address pollution from wastewater, stormwater, marinas, and other sources. After a series of technical and stakeholder meetings, the decision was made by Monroe County and local stakeholders to develop a FKRAD that was finalized in 2008 and approved by the Florida Department of Environmental Protection (FDEP) in 2012.

At the time of the FKRAD development, it was known that wastewater and stormwater management alone would not restore canal systems due to canal depths, organic loadings, canal configuration and hydrological restrictions. The EPA, FDEP and stakeholders also recognized the limitations of the FKRAD to accurately identify sources of impairment, loading rates, water quality targets, outside sources, effective corrective measures, and funding for pollution control measures. To manage these unknowns, the FKRAD included the adaptive management process. Adaptive management is the commitment to revise the FKRAD and pollution controls, if progress towards achieving water quality standards is not demonstrated. Monroe County and the stakeholders have accepted the challenges of adaptive management and shown their commitment to the environment of the Florida Keys. This is best demonstrated by the elimination of approximately 25,000 polluting septic tanks and cesspits and the implementation of state-of-the-art wastewater facilities throughout the Keys by 2016 at a cost approaching \$1 billion.

In 2013, Monroe County provided \$5 million to implement the Monroe County Canal Management Master Plan (CMMP) and pilot restoration technologies at seven canals. As a partner, the EPA has provided \$5 million towards Keys water quality and seagrass monitoring to assess FKRAD implementation; \$300,000 towards pre- and post-water quality and seagrass monitoring of the canal demonstration sites; and \$300,000 to develop the CMMP, explore alternative technologies for remediating canals, and support public outreach efforts by Monroe County. It is important that Monroe

County and its partners continue to implement the CMMP to protect water quality, aquatic life, and seagrasses for residents living along these canals.

The FKRAD was adopted as a FDEP order on February 7, 2012, and subsequently accepted by the EPA. The FKRAD states that the management actions will be completed by 2015 and water quality improvement in the halo zone and inland canals is expected by 2020. If it is determined by the FDEP or the EPA that implementation of the FKRAD is not achieving the expected water quality improvements for nutrients and dissolved oxygen, the impaired waterbodies will be reassessed and given a higher priority for TMDL development. Again, thank you for your inquiry. If you have questions or need additional information from the EPA, please contact Mr. Steven Blackburn of my staff at (404) 562-9397.

Sincerely,

James D. Giattina
Director
Water Protection Division

DEP Letter



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

BOB MARTINEZ CENTER
2600 BLAIRSTONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

JONATHAN STEVERSON
SECRETARY

September 10, 2015

Mr. George Neugent
1583 Eastward Ho Lane
Marathon, FL 33050

SUBJECT: FL Keys Restoration

Mr. Neugent,

This letter is intended to provide clarification on Monroe County's responsibilities to restore water quality in the waters surrounding the FL Keys, including inland canals, under the Secretarial adopted FL Keys Reasonable Assurance Document (FKRAD). The FKRAD was developed to address nutrient impairments in the nearshore waters. The plan was completed and implementation of the plan began in 2008. In 2011, the waters were re-assessed by DEP and some of the inland canals were found to have low dissolved oxygen (DO) which did not meet the water quality standard. This meant the canals were "impaired" and would be added to the State's list of waters that need a Total Maximum Daily Load (TMDL) determination. The original FKRAD did not include projects to specifically address DO impairments in the canals, but the department decided to delay adding them to the "impaired" waters list because the work being done under the existing plan would address the anthropogenic nutrient inputs contributing to low DO in the canals. This meant a TMDL was not necessary at that time due to on-going restoration activities. The canal restoration work that has been initiated addresses the other factors (mainly hydrologic) contributing to low DO that are not covered under the FKRAD. These efforts in conjunction with the nutrient reductions in the FKRAD provide the flexibility to postpone TMDL development; however, if water quality standards for nutrients and dissolved oxygen are not achieved under the FKRAD or through other restoration efforts, the waters will be placed on the list for TMDL development. It is the department's hope that FKRAD stakeholders will continue to meet their commitments detailed in the document and the additional restoration efforts such that water quality standards will be achieved as expected by 2020.

Sincerely,

A handwritten signature in purple ink, appearing to read "Jonathan Steverson".

QUESTIONS?

Rhonda Haag (305) 453-8774

Wendy Blondin (305) 298-9431

