

Monroe County Canal Restoration Updates 7-10-13

Prepared by Wendy Blondin, AMEC



Phase 1 Canal Management Master Plan (CMMP)



- Monroe County in association with AMEC was awarded a grant from DEP in March 2012 to prepare a Canal Management Master Plan for the Keys Canals.
- The grant had to be completed by June 22, 2012.
- It was determined that a canal management process would be developed addressing restoration of all the Keys canals. However, this grant would be for a Phase 1, covering only a small subset of the canals (23).
- All work was over sighted the WQPP Canal Subcommittee



Phase 1 CMMP Overview



- Collate available information and summarize plan objectives
 - Review reports and publications
 - Review existing canal inventory and ID deficiencies
 - Define plan objectives
- Identify priority issues and establish consensus based goals for each issue
- Develop ranking process for determining the highest priority canals for restoration
- Select a short list of “hot spot” canals to rank
- Prepare conceptual designs/costs for top 3 ranked canals
- Identify grant opportunities for funding of restorations
- Establish an Adaptive Management Process
- Prepare a final CMMP report – submitted June 21, 2012.



Phase 2 CMMP Updates



- Monroe County in association with AMEC was awarded a grant from EPA to complete the Canal Management Master Plan (Phase 2) for the Keys Canals.
- The grant was awarded to Monroe County in October 2012 and AMEC's task order with Monroe County was approved by the BOCC in November 2012.
- A Phase I CMMP was completed by AMEC in June 2012 which developed a management process for addressing restoration of the Keys canals. Phase 1, due to the short time frame of the grant schedule, was only applied to a small subset of the canals (23).



Overview of Phase 2 CMMP

- Overall scope and objective of the Phase 2 CMMP is to complete the CMMP process developed during Phase 1 throughout the entire Keys.
- The CMMP process is to develop a basic conceptual framework for canal restoration and management including prioritization and development of feasible strategies to improve water quality.



- Task 1 – Review Previous Efforts and Revise as Needed for Phase 2
 - Completed with deliverable submitted January 17, 2013
 - Basic management process remained the same
 - Field canal condition forms and scoring criteria forms revised from Phase 1

- Task 2 – Review and Update Previous Objectives and Management Goals
 - Completed February 18, 2013
 - No changes from Phase 1
 - “The objective of the CMMP is to provide an ecologically sound and economically feasible funding and implementation strategy for improving and managing the environmental quality of canal systems in the Florida Keys. The plan will provide flexible and cost-effective solutions that improve canal management practices throughout the Keys and satisfy the existing and future needs of the community. It must address affordability and equity issues, reflect key stakeholder concerns, and satisfy environmental and regulatory criteria and guidelines.”

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



Phase 2 CMMP Updates

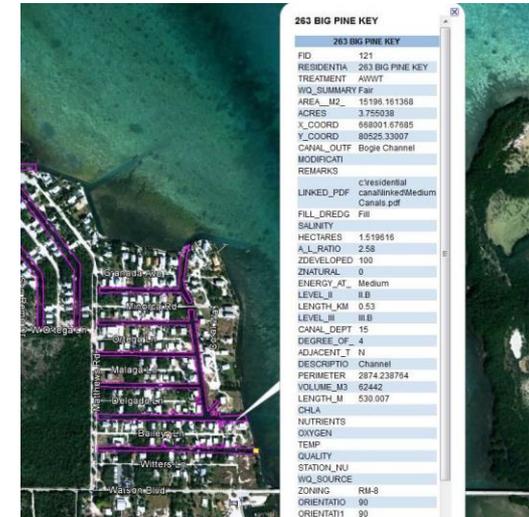


■ Task 3 – Prepare Updated CMMP Database

- Deliverable submitted May 20, 2013
- GIS Canal attribute table contains
 - Physical canal info (length, area, perimeter, number of mouths, outfall, # of convolutions)
 - Sewer connection status, % developed, # of parcels, monitoring stations
- Updated attributes included in the database
 - Tidal Range
 - WBID Dissolved Oxygen impairments
 - Existing water quality treatments
 - Field survey results from 2013 surveys
 - Applicable restoration technologies and bathymetry data being added

■ Task 4 – Update Adaptive Management Process

- Scheduled completion date August 20, 2013



- Task 5 – Prepare Keys-Wide Canal Ranking
 - Site visits of canals to assess site conditions and collect water quality data are complete
 - Dissolved oxygen, turbidity and biological indicators have been utilized to assign a water quality summary for each canal of Good, Fair or Poor which is added to the attribute table
 - A homeowner questionnaire was developed and distributed to obtain information on canal conditions and homeowner potential funding support for water quality improvements



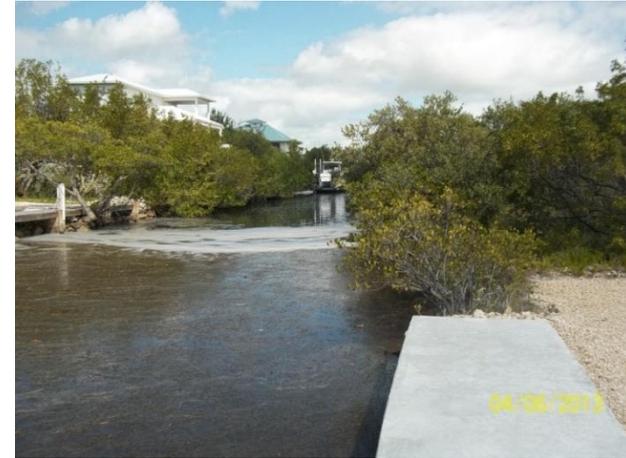
Phase 2 CMMP Updates – Canal Ranking



- Ranking of canals for prioritization for water quality improvement using scoring criteria sheet is on-going

- Scoring Sheet Criteria (Approved by Canal Restoration Advisory Subcommittee)
 - Water and Habitat Quality
 - Potential for a restoration to provide improvement within a canal
 - Potential for a restoration to provide improvement to nearshore zone
 - Implementability
 - Homeowner and public benefit
 - Homeowner funding not currently on scoring sheet for CMMP (will be addressed when funding is available)

- Scheduled completion date August 20, 2013



Phase 2 CMMP Updates

- Task 6 – Develop List of Suitable Water Quality Improvements
 - Weed barriers, organic removal, culverts, backfilling, pumping and other technologies being considered
 - Scheduled completion date August 20, 2013

- Task 7 - Prepare Keys-Wide CMMP
 - Draft due August 20, 2013; Final September 30, 2013
 - Prioritize water quality problems in the Keys canals
 - Provide recommendations for appropriate remedial measures in each canal

- Monroe County has a Canal Restoration web link
<http://www.monroecounty-fl.gov/index.aspx?NID=598>



Update on DEP Grant for Canal Bathymetry



- Monroe County in association with AMEC was awarded a grant from DEP to complete a Bathymetric Survey of the Keys Canals
- A single beam dual frequency echo sounder was used in conjunction with a GPS to survey profiles of the canal centerlines at ~ 50 foot intervals
- 200 KHz frequency providing reflectance at the ~ top of the unconsolidated sediment layer
- 24 KHz frequency providing reflectance at the ~ canal bottom layer



Update on DEP Grant for Canal Bathymetry



- Surveying started in Ocean Reef on Feb 25 and ended in Key West on June 11
- Final deliverable submitted June 13, 2013
- All but 20 of the 502 canals and 164.2 of the 170 miles of canals were surveyed for depth and unconsolidated sediment
- The majority of the 20 canals not surveyed were inaccessible from open water by a survey boat due to the canal mouths being blocked

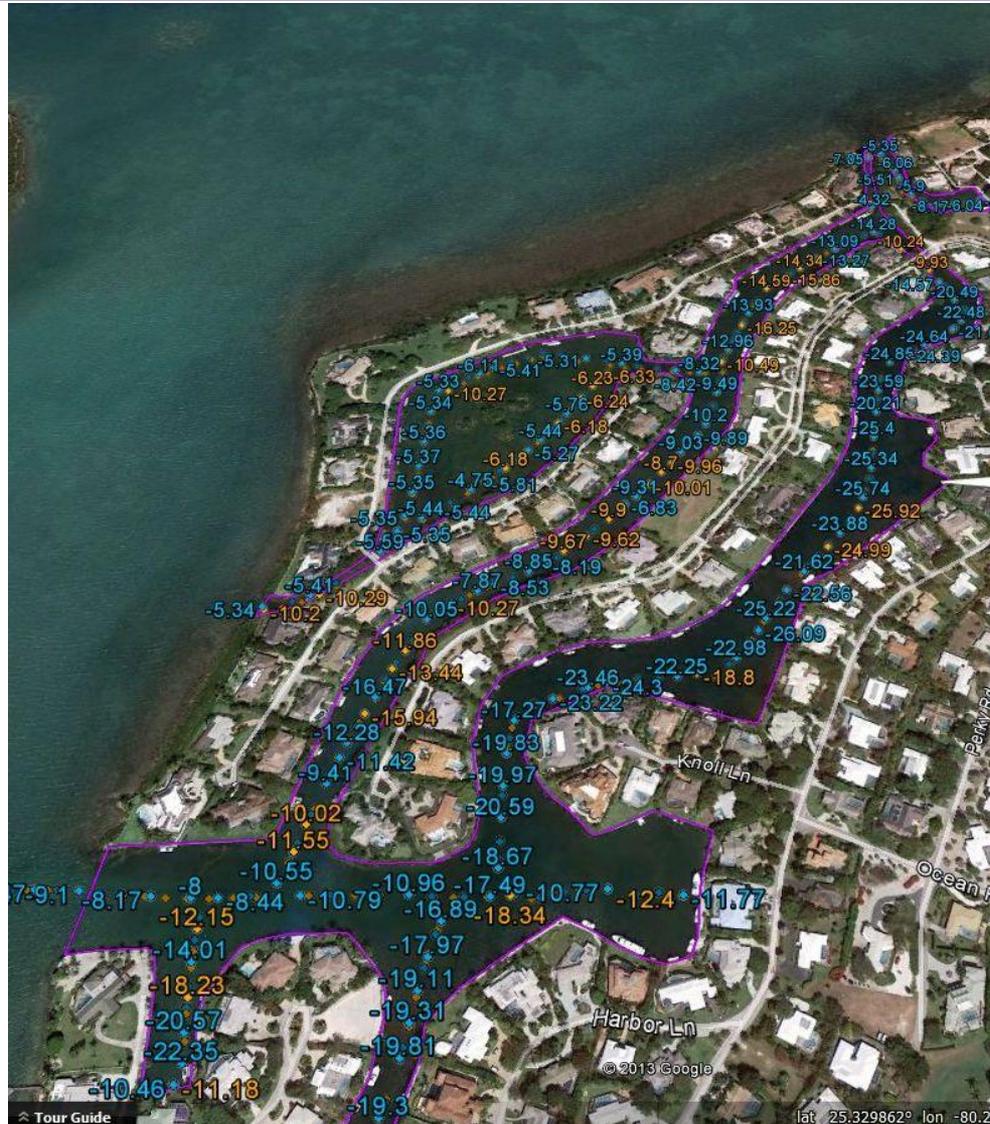


Bathymetry Data Deliverables

- Technical Memorandum with an overview of the work completed
- Certified Surveyor's Report with survey data in the form of Point ID, easting, northing and depth at each point (top of unconsolidated and bottom of canal)
- Canal depth statistical information (min, max, average, range, difference between high and low)
- Canal profiles
- GIS layers and Google Earth Pro layers of the bathymetry data linked to each canal



Example Google Earth Pro Map

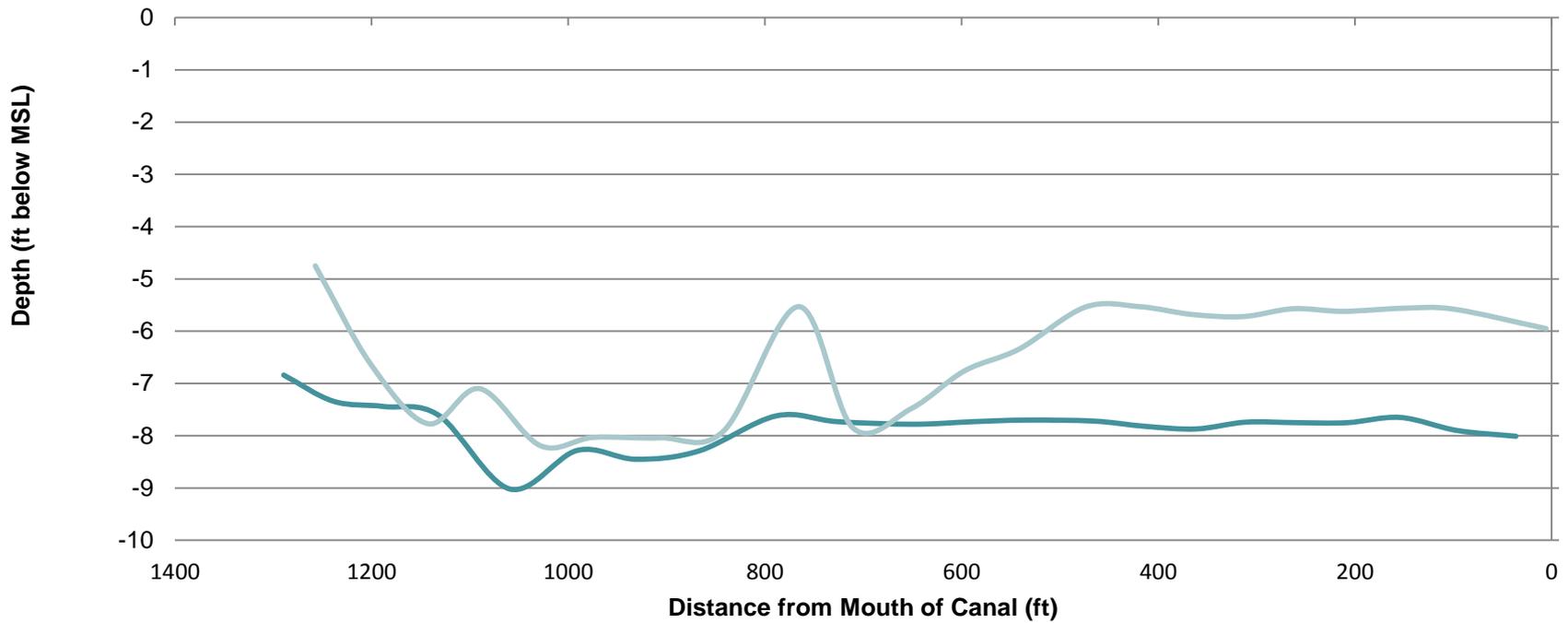


3 OCEAN REEF CLUB

3 OCEAN REEF CLUB	
FID	228
OBJECTID_1	240
RESIDENTIA	3 OCEAN REEF CLUB
Shape_Leng	7730.300464
SORT_INDEX	5
RESIDENT_1	3 OCEAN REEF CLUB
Area_ac	48.099538
Min_EI_Hig	-35.47
Max_EI_Hig	-4.07
Ave_EI_Hig	-14.012169
Range_High	31.4
Min_EI_Low	-36.33
Max_EI_Low	-6.16
Ave_EI_Low	-15.510117
Range_Low	30.17
Diff_Min_E	0.86
Diff_Max_E	2.09
Diff_Range	1.23
Diff_Ave	1.497949
Sed_Vol_CY	116241.685347

lat 25.329862° lon -80.284223° elev -2 ft eye alt 2600 ft

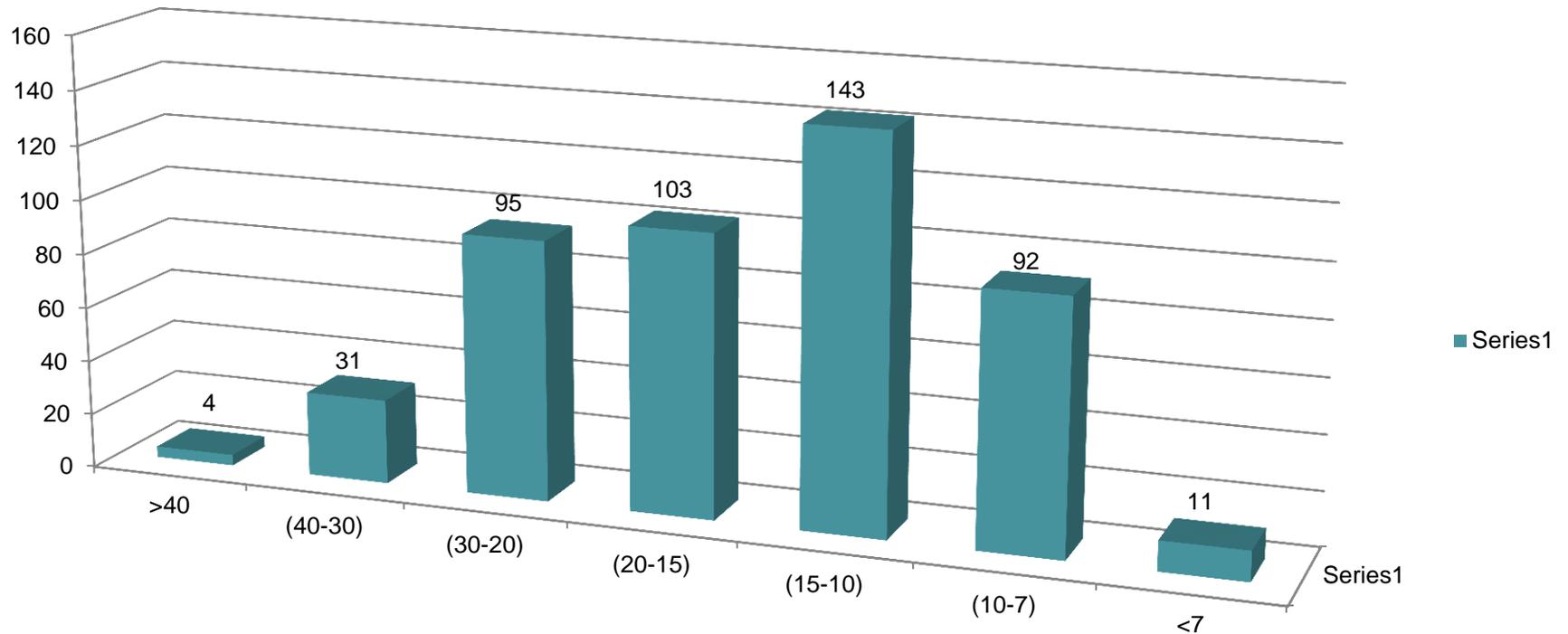
148 Lower Matecumbe Depth Profile



Summary of Maximum Canal Bottom Depths



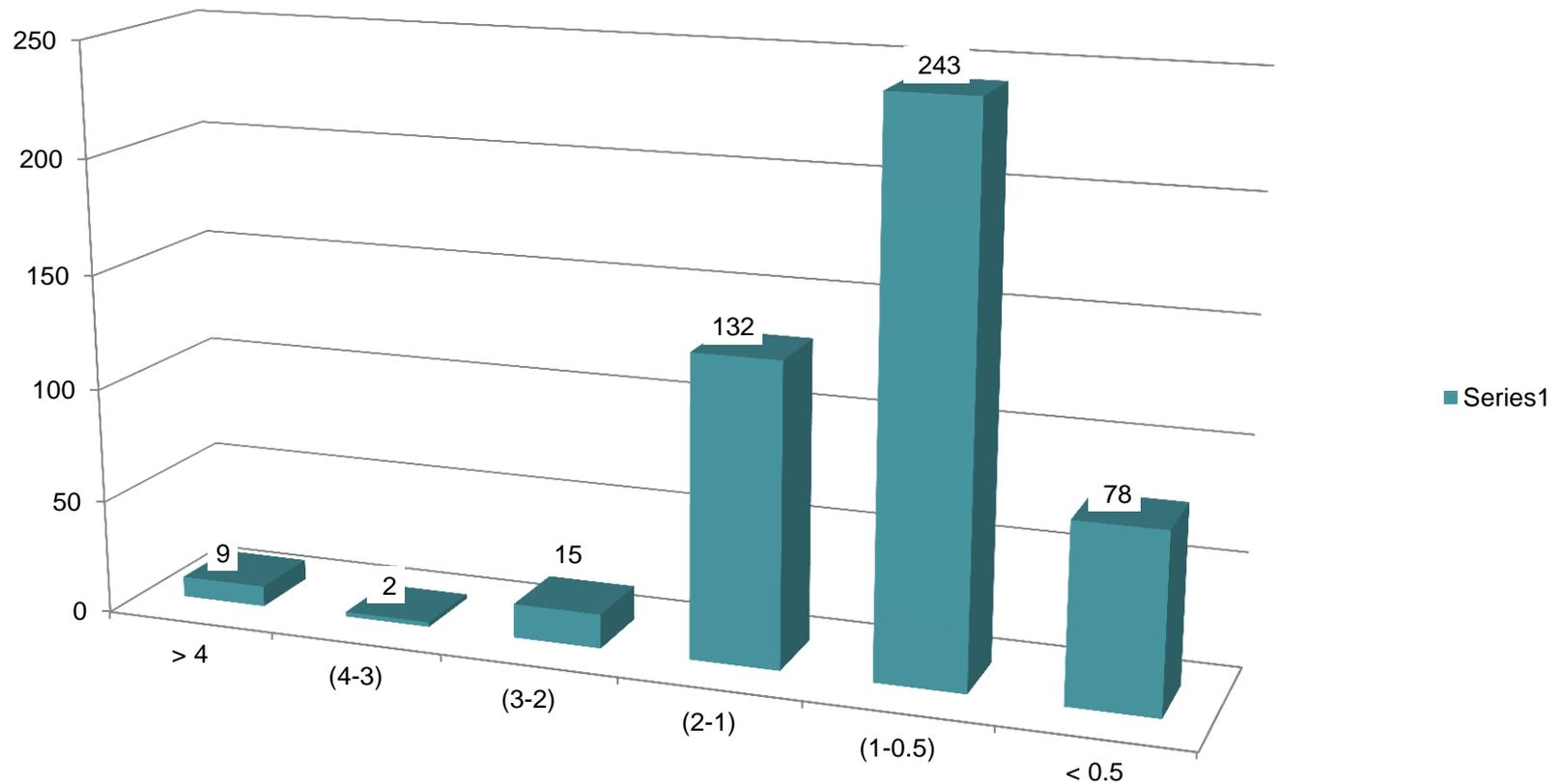
Maximum Depth Distribution in Feet



Summary of Average Sediment Thickness in Canals



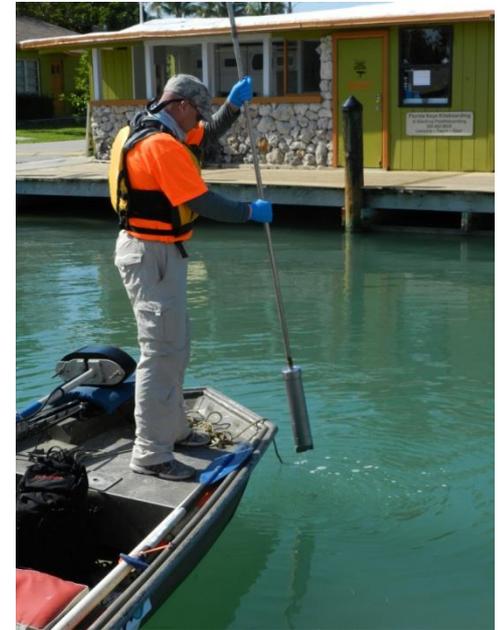
Average Sediment Thickness Distribution in Feet



Update on DEP Grant Sediment Characterization – Sample Collection



- Ten sediment samples collected and submitted for physical and chemical characterization to evaluate remedial measures
 - Samples collected from:
 - 33 Key Largo – South Blackwater Sound - Gulf
 - 82 Rock Harbor – Lobster Lane – Oceanside
 - 145 Lower Matecumbe – Cortez Drive – Oceanside
 - 152 Lower Matecumbe – Gulf View Drive – Gulf
 - 183 Marathon – 120th Street Gulf
 - 198 Marathon – Yellowtail Drive – Gulf
 - 266 Big Pine Drs Arm – Baileys/Witters Lanes - Gulf
 - 282 Big Pine - Gordon Drive - Gulf
 - 300 Big Pine – Avenue D - Gulf
 - 372 Cudjoe Key – Coxon Ln off of Spanish Main Drive -Oceanside



Update on DEP Grant Sediment Characterization – Sample Collection

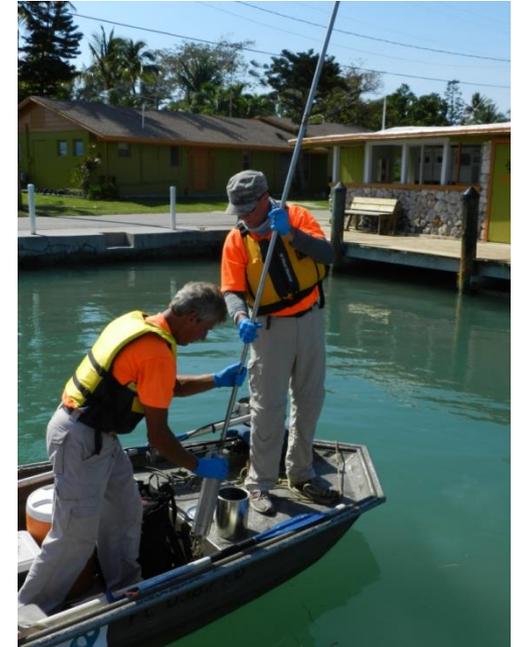


■ Physical Testing

- Moisture/Solids Content
- Grain Size Distribution/200 Mesh Sieve Distribution
- Organic Content
- Specific Gravity
- Settling Rate

■ Chemical Testing:

- Organochlorine Pesticides and PCBs
- Chlorinated Herbicides
- Metals (As, Ba, Cd, Cr, Cu, Pb, Se, Ag, Hg)
- Polynuclear Aromatic Hydrocarbons
- Total Petroleum Hydrocarbons
- TCLP metals if needed based upon total metal concentrations



Update on DEP Grant Sediment Characterization

- Sediment Characterization Report submitted May 31, 2013
- Materials ranged from undecomposed organics to silty clay
- Physical testing done for future engineering designs for material handling and dewatering



Update on DEP Grant Sediment Characterization



- Seven of the ten sample results exceeded the Arsenic DEP Residential SCTL of 2.1 mg/kg (2.2 to 11.0 mg/kg)
- One sample result exceeded the Copper DEP Residential SCTL of 150 mg/kg (170 mg/kg)
- Other metals, TRPH, Pesticides, PCBs, Herbicides, and PAHs were either non-detectable or below DEP standards
- Disposal options were provided depending upon concentrations (no restrictions, mixing with clean fill, commercial site disposal, risk assessment, Class I landfill)



“Waterways” Filming of Bathymetric Surveying

- The producer of the FKNMS/NPS/EPA educational television show “Waterways” requested to videotape the canal bathymetry surveying
- The filming was performed in April 2013
- Editing is underway with late August the likely release date



Canal Restoration Demonstration Projects



- Monroe County BOCC approved funding of \$ 5 million for implementation of a minimum of 5 different restoration technologies throughout unincorporated Monroe County
- Monroe County obtained quotes to perform the first task in this process which was selection of the demonstration sites
- AMEC was the lowest responsive bidder and was awarded a task order to work closely with Monroe County and the Canal Restoration Advisory Subcommittee to select the demonstration canals



Canal Restoration Demonstration Objectives

- The objectives are to obtain realistic permitting, scheduling, and cost information to be utilized for future restoration planning and grant application purposes

- The technologies under current consideration include:
 - **Removal of accumulated organics** from within canals
 - **Weed gates, air curtains** or other physical barriers to minimize additional organic accumulation in the canals
 - **Culvert connections** to facilitate flushing
 - **Pumping systems** to facilitate flushing, and
 - **Backfilling** to remove deep stagnant zones.
 - Other technologies have been proposed by interested parties, and may be considered at a later time as directed by Monroe County.



3 Phase Demonstration Project Selection Process



- Phase 1 – GIS Canal Inventory Database Grouping
- Phase 2 – Field Engineering Evaluation of Canals
- Phase 3 – BOCC Selection of Final Demonstration Sites



