

Monroe County Canal Restoration Updates 7-10-13

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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



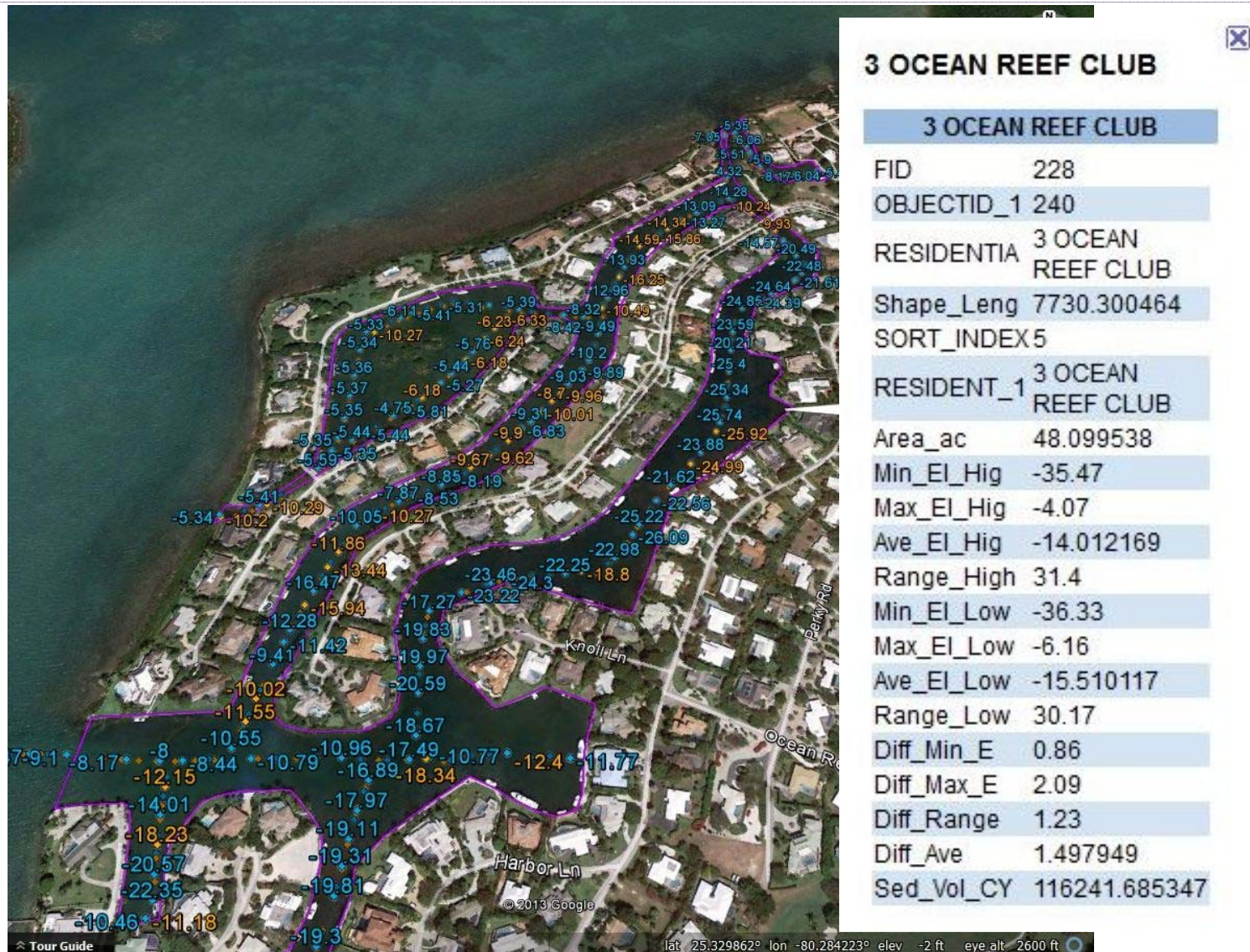
- Technical Memorandum with an overview of the work completed
- Certified Surveyor's Report with survey data in the form of Point ID, easting, northing and depth at each point (top of unconsolidated and bottom of canal)
- Canal depth statistical information (min, max, average, range, difference between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



Bathymetric Data – Aerial Image with High and Low Depth Readings



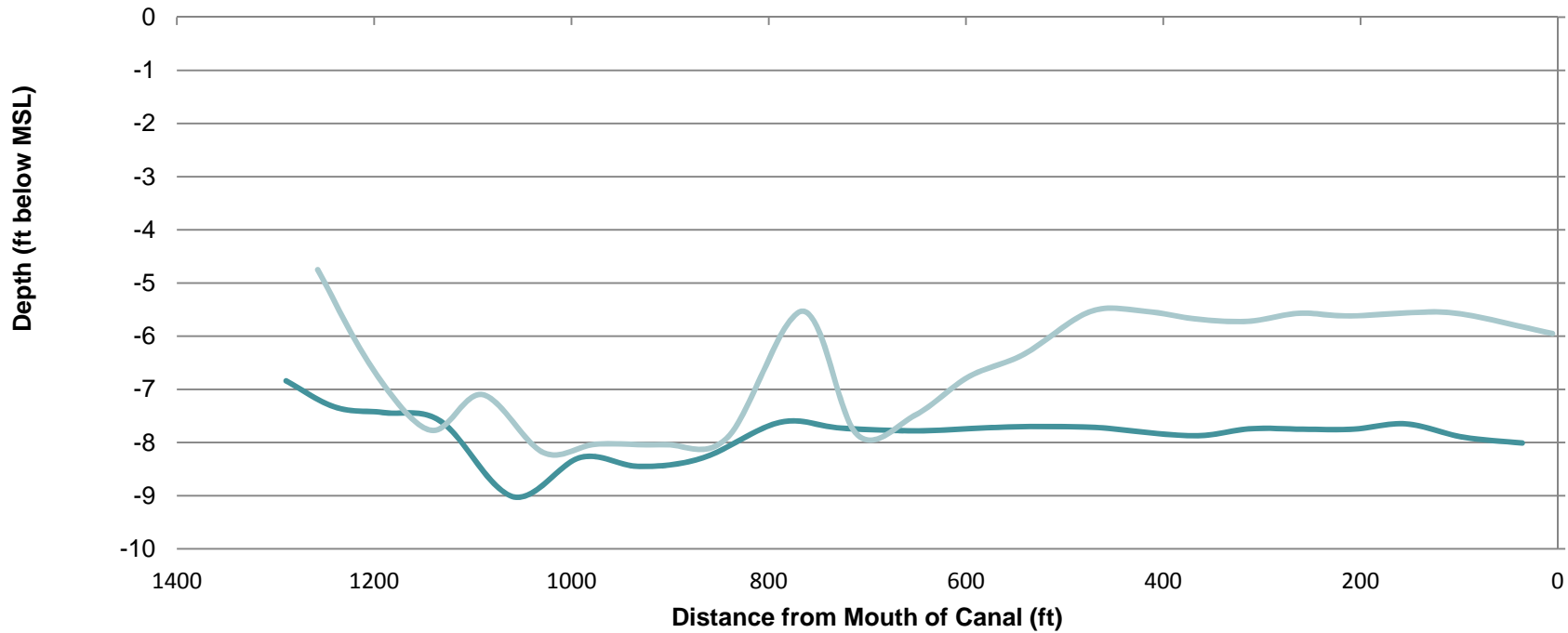
Example Google Earth Pro Map



Representative Depth Profile of a Canal



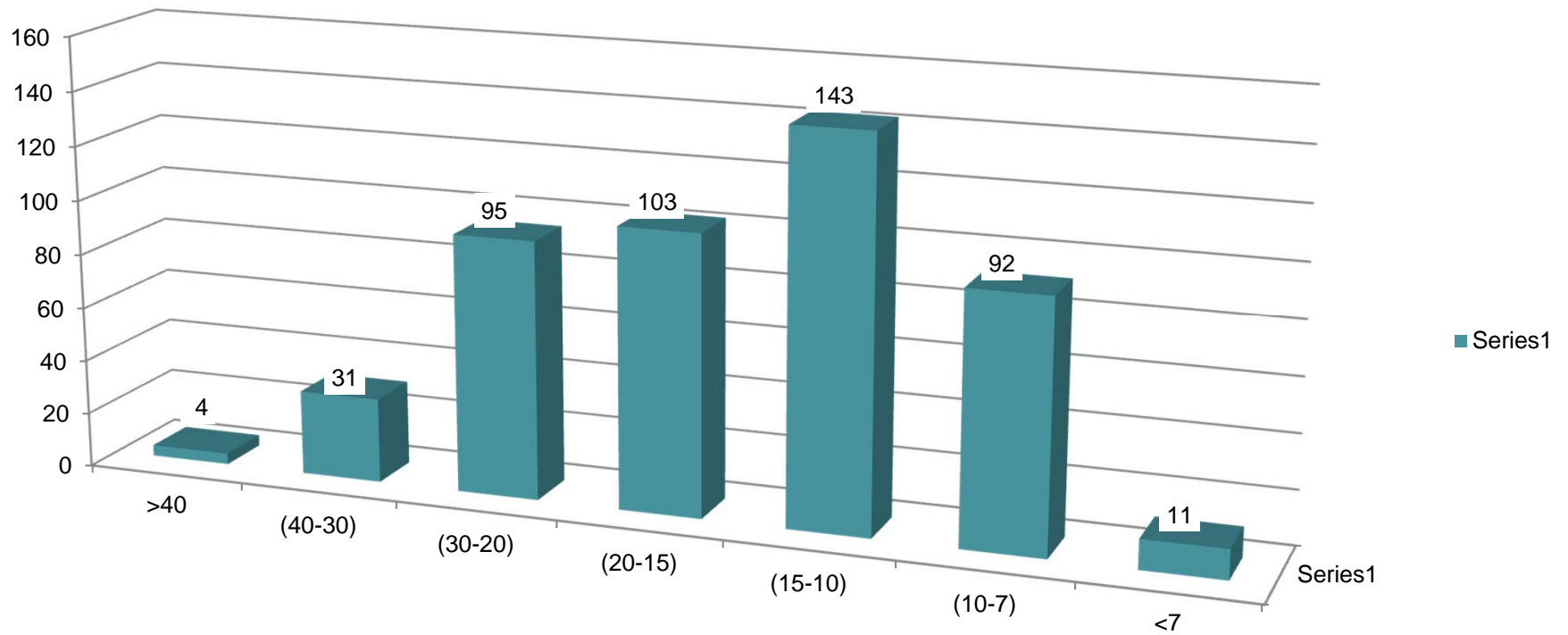
148 Lower Matecumbe Depth Profile



Summary of Maximum Canal Bottom Depths



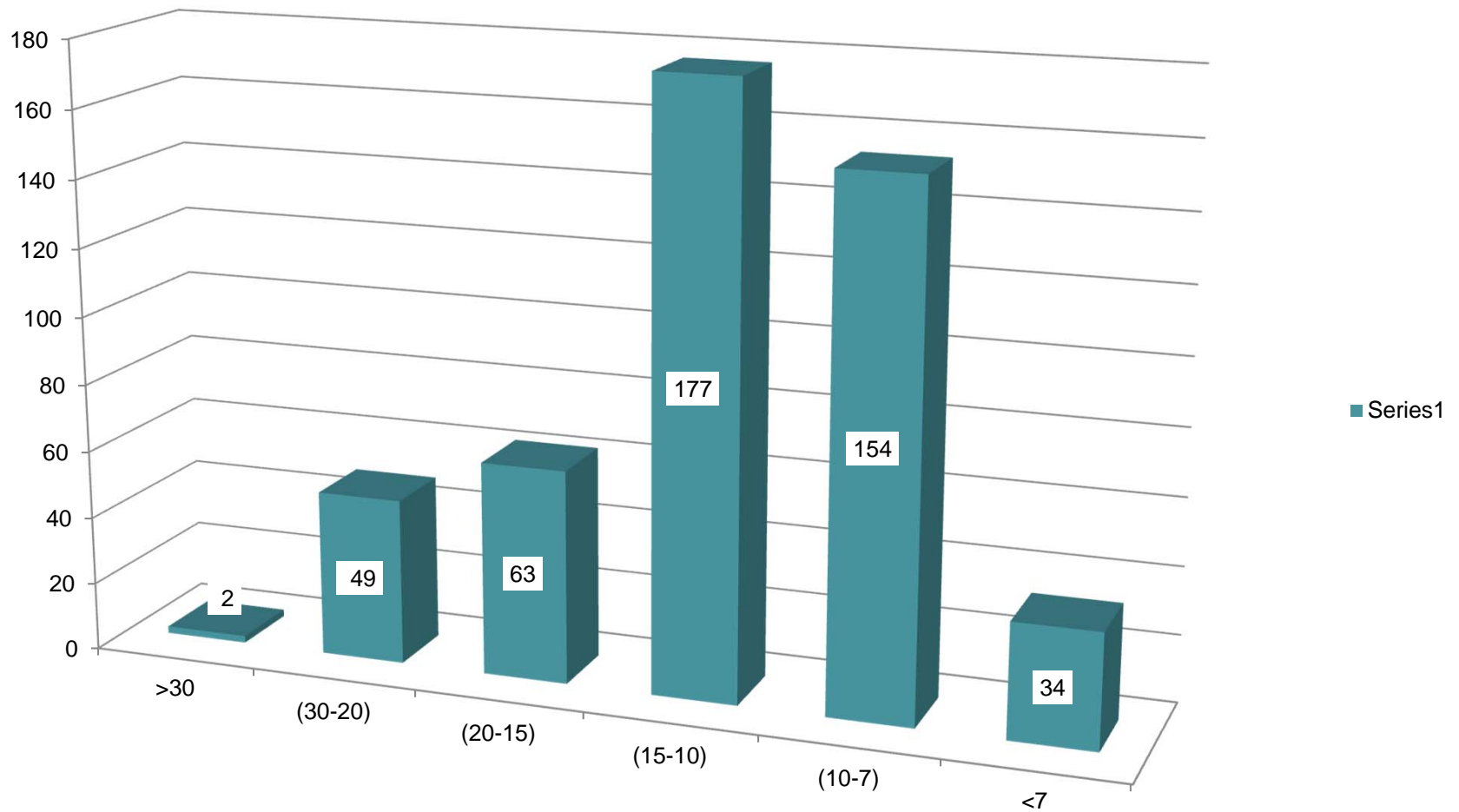
Maximum Depth Distribution in Feet



Summary of Average Canal Bottom Depths



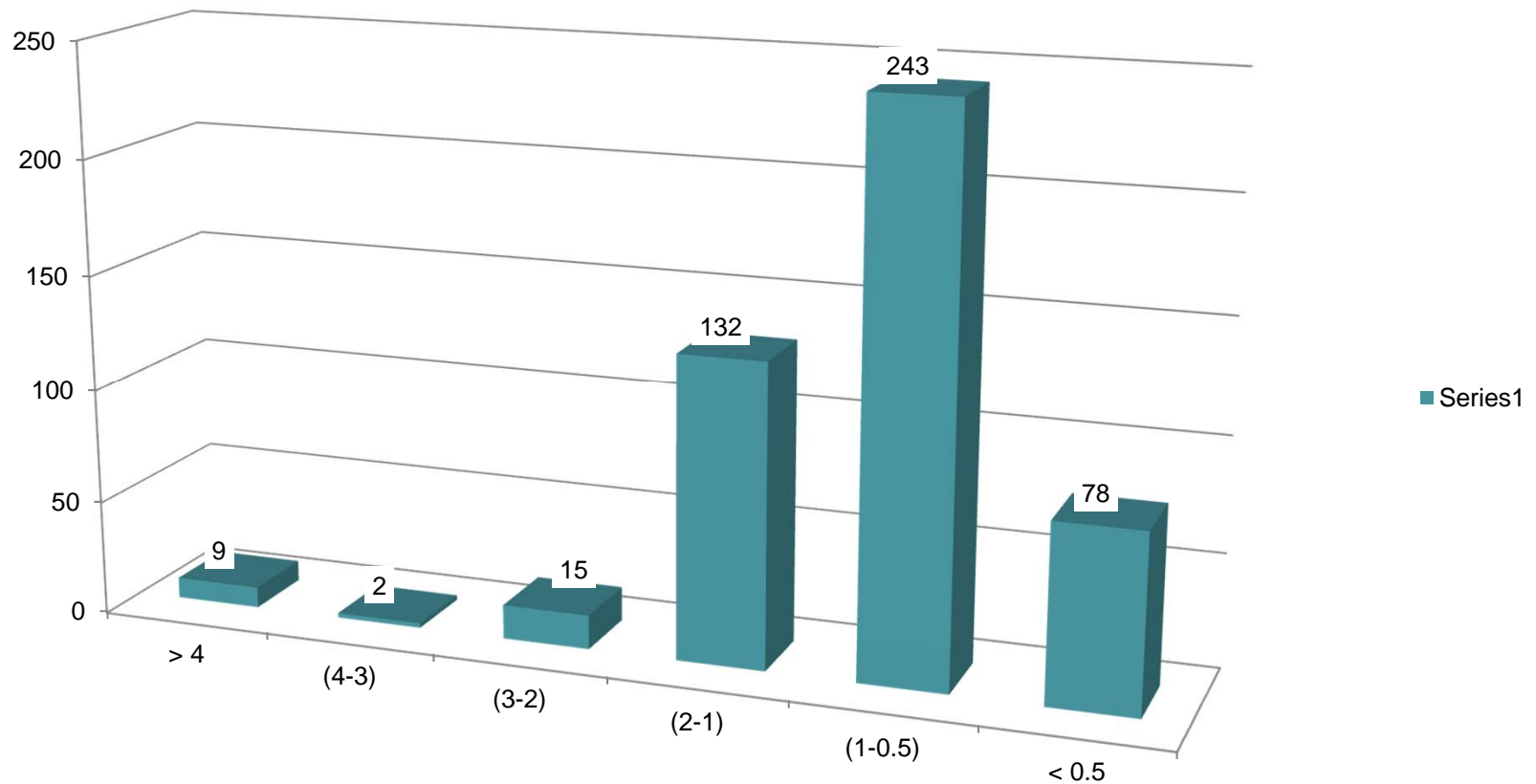
Average Depth Distribution in Feet



Summary of Average Sediment Thickness in Canals



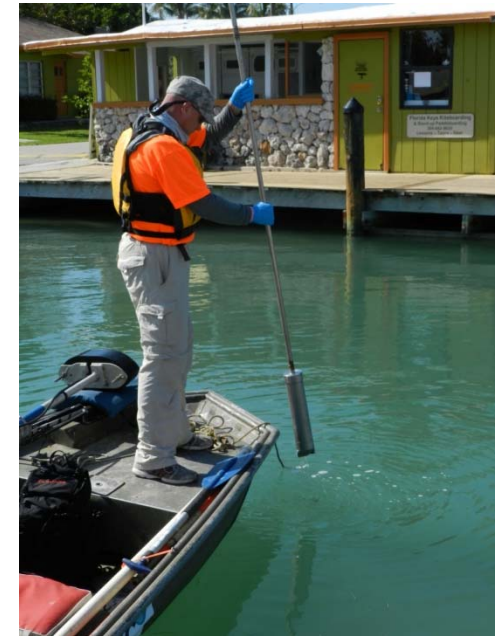
Average Sediment Thickness Distribution in Feet



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



Summary of Physical Test Data of Keys Canals Sediment Samples			
Physical Property	Average	High	Low
Solids Content (%)	34.7	51.4	11.8
Moisture Content (%)	264.7	747.2	94.6
No. 200 Sieve (%)	65.4	40.51	92.2
Organic Content (%)	13.2	4.3	28.6
Specific Gravity	2.58	2.08	2.99

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



Phase 2 Canal Management Master Plan (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





Phase 2 CMMP Updates

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

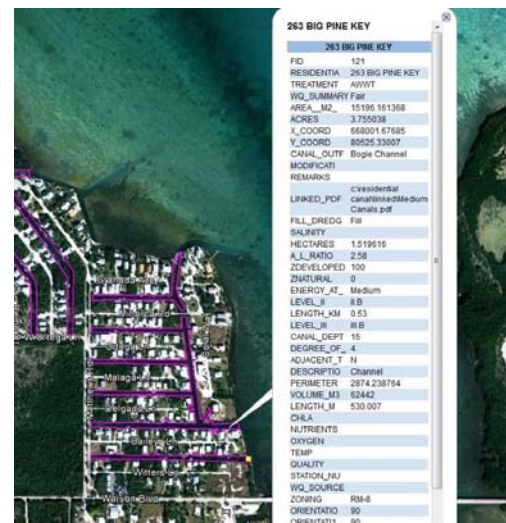
Public Involvement

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



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

Phase 2 CMMP Updates



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



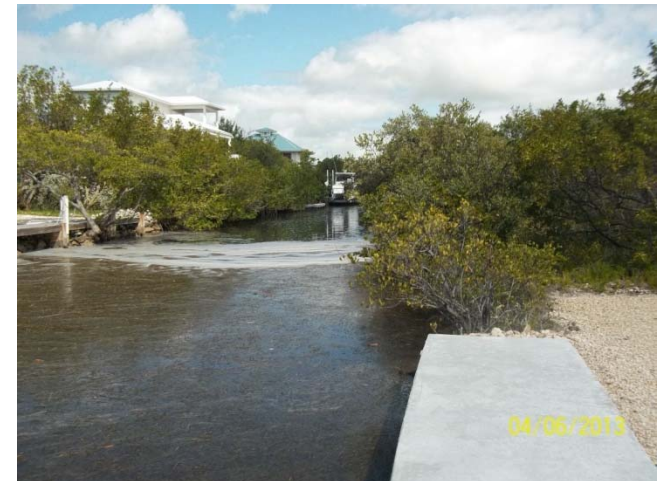
Phase 2 CMMP Updates – Canal Ranking



- 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

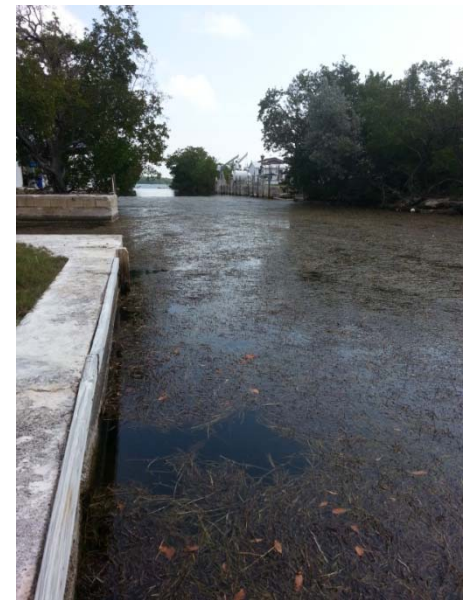
- Monroe County has a Canal Restoration web link <http://www.monroecounty-fl.gov/index.aspx?NID=598>



Canal Restoration Demonstration Projects



- Monroe County BOCC approved \$ 5 million of Unincorporated Monroe County Infrastructure tax funds for implementation of a minimum of 5 different restoration technologies
- 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



Canal Restoration Demonstration Selection Process



- Selection process similar to CMMP ranking; however, it is more focused on selecting canals that have the worst water quality, can be easily permitted and constructed, have homeowner support, and construction costs within budget
- Canals within Unincorporated Monroe County targeted due to funding source
- Marathon and Islamorada, the only two municipalities with Poor Water Quality canals, are evaluating funding sources for demonstration restorations



3 Phase Demonstration Project Selection Process Proposed



■ Phase 1 – GIS Canal Inventory Database Grouping

- Select only Poor Water Quality canals
- Rank by Homeowner and Public Benefit
- Sort by Appropriate Technology
- Elimination of canals due to any other key issues
- Selection of top 20 for field assessments



■ Phase 2 – Field Engineering Evaluation of Canals

- Site visits to evaluate permitting, access, utility impacts, and other factors that will affect design and cost
- Meet with homeowners to determine funding support
- Complete ranking sheets (currently being developed and needs approval by WQPP of criteria being utilized)
- Prepare preliminary engineering designs and costs for final design/permitting and construction bid price
- Provide top 3 ranked canals for each technology to County



■ Phase 3 – BOCC Selection of Final Demonstration Sites

Canal Restoration Permitting



- Meeting held with DEP, USACE, and FKNMS staff to discuss permit requirements and methods to expedite permits
 - Goal was to identify time and cost impacts for the demonstration projects to assist in site selection
 - Each restoration technology was discussed and key issues identified
- DEP familiar with restorations and will assist with streamlining process and applying de minimus exemptions where possible
- USACE not familiar with canal restorations
 - Discussed complete permit applications for all sites
 - Most Nationwide permits in the Keys only for Sanctuary projects
 - Benthic surveys may be required
 - NOAA Fisheries and US Fish and Wildlife Service may require consultations on permit applications
 - Discussed agency consultation backlog and long timeframes for permit approvals



Canal Restoration Permitting



- Canal Restoration Advisory Subcommittee has identified the need for each permitting agency to designate an agency contact that understands the goals of the canal restorations and the magnitude of the number of sites that may need to be permitted
- Canal Restoration Advisory Subcommittee suggested that the WQPP may want to submit a letter to the permitting agencies with the above request



Search for Alternative Sources of Backfill for Canal Filling



■ Crushed Glass

- Monroe County evaluating if glass from Waste Management's Broward County Recycling Facility is acceptable for use in the canals



- Residual glass is mixed with paper and other materials and is currently used as landfill cover – no specification available
- DEP concerned about the non-glass fraction
- Dr. Sealey from the University of Miami offered to run a lab experiment to look at content and evaluate if any impact to organisms in a live fish tank (sample coming July 10)
- Another larger size glass is also available that is currently shipped to Tampa to be recycled – specifications of size and content have been requested
- 20,000 tons/year of each type available (equates to one small canal per year backfilled)

■ Port of Miami Dredge Project

- Conference call with EPA and USACE held to discuss logistics of transporting some of the Miami dredge material to the Keys
- 5-6 million cubic yards available; preliminary review of specification is good
- Many unknowns – barge type to transport to the Keys or Miami land storage area, stockpile area in the Keys, costs
- AMEC contacted Adventure Environmental who has the correct equipment and knowledge of the project and they are preparing cost estimates

