Stream Assessment Report for Rocky Creek, Channel A & Channel G, Hillsborough County, Florida

Date Assessed: August 2, 2011 – February 24, 2012
Assessed by: David Eilers, Brian Rosegger, Kristopher Caldwell, Robert Herzog, Daniel Dickinson, Cora Bartolo
Reviewed by:

List of Figures:

Figure 1. Photograph of the Spillway on Channel G near Veterans Expressway taken August 2, 2011
Figure 2. Photograph of the typical conditions found on Rocky Creek above the weir
Figure 3. Bathymetric Contour Map Overview for Rocky Creek above the Weir
Figure 4. Rocky Creek above the Weir Bathymetric Contour Inset Map Figure 1
Figure 5. Rocky Creek above the Weir Bathymetric Contour Inset Map Figure 2
Figure 6. Rocky Creek above the Weir Bathymetric Contour Inset Map Figure 3
Figure 7. Photograph of the typical shoreline morphology of Channel A
Figure 8. Bathymetric Contour Map Overview for Channel A from the Salinity Barrier to the Weir
Figure 9. Channel A from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 1
Figure 10. Channel A from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 2
Figure 11. Channel A from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 3
Figure 12. Channel A from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 4
Figure 13. Photograph of Rocky Creek between Channel A and Channel G showing the typical characteristics of the creek
Figure 14. Bathymetric Contour Map Overview for Rocky Creek between Channel A and Channel G
Figure 15. Rocky Creek between Channel A and Channel G Bathymetric Contour Inset Map Figure 1
Figure 16. Rocky Creek between Channel A and Channel G Bathymetric Contour Inset Map Figure 2
Figure 17. Rocky Creek between Channel A and Channel G Bathymetric Contour Inset Map Figure 3
Figure 18. Photograph of the typical conditions of Channel G
Figure 19. Bathymetric Contour Map Overview for Channel G from the Salinity Barrier to the Weir
Figure 20. Channel G from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 1
Figure 21. Channel G from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 2
Figure 22. Channel G from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 3
Figure 23. Channel G from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 4
Figure 24. Photograph of the Main Channel of Lower Channel A
Figure 25. Bathymetric Contour Overview Map for Lower Channel A
Figure 26. Lower Channel A Bathymetric Contour Inset Map Figure 1
Figure 27. Lower Channel A Bathymetric Contour Inset Map Figure 2
Figure 28 Lower Channel A Bathymetric Contour Inset Map Figure 3
Figure 29 Lower Channel A Bathymetric Contour Inset Map Figure 4
Figure 30. Photograph of the typical channel and environment of Rocky Creek below the Channel G salinity barrier
Figure 31. Bathymetric Contour Overview Map for Rocky Creek below the Channel G Salinity Barrier
Figure 32. Rocky Creek below the Channel G Salinity Barrier Bathymetric Contour Inset Map Figure 1
Figure 33. Rocky Creek below the Channel G Salinity Barrier Bathymetric Contour Inset Map Figure 2
Figure 34. Rocky Creek below the Channel G Salinity Barrier Bathymetric Contour Inset Map Figure 3
Figure 35. Rocky Creek below the Channel G Salinity Barrier Bathymetric Contour Inset Map Figure 4
Figure 36. Typical Vegetation Community of Rocky Creek above the Weir
Figure 37. Vegetation Assessment Region Map for Rocky Creek above the Weir

Figure 38. Photograph of the Typical Vegetative Cover of Rocky Creek above the Weir
Figure 39. Typical shoreline vegetation community of Channel A from the salinity barrier to the weir.
Figure 40. Map of the Vegetation Assessment Regions for Channel A from the Salinity Barrier to the Weir
Figure 41. Photograph of the typical vegetation communities along Rocky Creek between Channel A and Channel G
Figure 42. Map of Vegetation Assessment Regions for Rocky Creek between Channel A and Channel G
Figure 43. Photograph of the typical vegetation community of Rocky Creek between Channel A and Channel G. Pictured here are *Salvinia minima*, *Nuphar advena*, *Lemna spp*., *Paspalum repens*, *Colocassia esculenta*, *Crinum Americana*, and *Schinus terebinthifolus*.
Figure 44. Photograph of the typical vegetation communities of Channel G
Figure 45. Map of Vegetation Assessment Site Regions for Channel G from the Salinity Barrier to the Weir
Figure 46. At the time of the assessment, Channel G was experiencing a period of low flow coming over the weir. The result was a large bloom of floating aquatic vegetation due to nutrient rich stagnant waters.
Figure 47. Typical shoreline vegetation community of Lower Channel A
Figure 48. Map of Vegetation Assessment Site Regions for Lower Channel A
Figure 49. Photograph of the typical shoreline vegetation communities of Rocky Creek below the Channel G salinity barrier
Figure 50. Map of the Vegetation Assessment Site Regions for Rocky Creek below the Channel G Salinity Barrier Part 1
Figure 51. Map of the Vegetation Assessment Site Regions for Rocky Creek below the Channel G Salinity Barrier Part 2
Figure 52. Graph of Water Quality Index for Rocky Creek above the Weir
Figure 53. Graph of Water Quality Index for Channel A from the Salinity Barrier to the Weir
Figure 54. Graph of Water Quality Index for Rocky Creek between Channel A and Channel G
Figure 55. Graph of Water Quality Index for Channel G from the Salinity Barrier to the Weir
Figure 56. Graph of Water Quality Index for Channel A below the Salinity Barrier
Figure 57. Graph of Water Quality Index for Rocky Creek below the Channel G Salinity Barrier
Figure 58. Graph of Chlorophyll-a uncorrected for pheophytin for Rocky Creek above the Weir
Figure 59. Graph of Chlorophyll-a uncorrected for pheophytin for Channel A from the Salinity Barrier to the Weir
Figure 60. Graph of Chlorophyll-a uncorrected for pheophytin for Rocky Creek from Channel A to Channel G
Figure 61. Graph of Chlorophyll-a uncorrected for pheophytin for Channel G from the Salinity Barrier to the Weir
Figure 62. Graph of Chlorophyll-a uncorrected for pheophytin for Channel A below the Salinity Barrier
Figure 63. Graph of Chlorophyll-a uncorrected for pheophytin for Rocky Creek below the Channel G Salinity Barrier
Figure 64. Graph of Secchi Disk Depth for Rocky Creek above the Weir
Figure 65. Graph of Secchi Disk Depth for Channel A form the Salinity Barrier to the Weir
Figure 66. Graph of Secchi Disk Depth for Rocky Creek between Channel A and Channel G
Figure 67. Graph of Secchi Disk Depth for Channel G from the Salinity Barrier to the Weir
Figure 68. Graph of Secchi Disk Depth for Channel A below the Salinity Barrier
Figure 69. Graph of Secchi Disk Depth for Rocky Creek below the Channel G Salinity Barrier

List of Tables

Table 1. Rocky Creek above the Weir Morphological Data (Area, Depth and Volume)
Table 2. Channel A from the Salinity Barrier to the Weir Morphological Data (Area, Depth and Volume)
Table 3. Rocky Creek between Channel A and Channel G Morphological Data (Area, Depth and Volume)
Table 4. Channel G from the Salinity Barrier to the Weir Morphological Data (Area, Depth and Volume)
Table 5. Rocky creek below the Channel G Salinity Barrier Morphological Data (Area, Depth and Volume)
Table 6. Channel G below the Salinity Barrier Morphological Data (Area, Depth and Volume)
Table 7. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Rocky Creek above the Weir
Table 8. Emergent Zone Vegetation Assessment Results for Rocky Creek above the Weir
Table 9. Emergent Zone Vegetation Assessment Results for Rocky Creek above the Weir Continued
Table 10. Emergent Zone Vegetation Assessment Results for Rocky Creek above the Weir Continued
Table 11. Floating Leaved Zone Vegetation Assessment Results for Rocky Creek above the Weir
Table 12. Submerged Zone Vegetation Assessment Results for Rocky Creek above the Weir
Table 13. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Channel A from the Salinity Barrier to the Weir
Table 14. Emergent Zone Vegetation Assessment for Channel A from the Salinity Barrier to the Weir
Table 15. Emergent Zone Vegetation Assessment for Channel A from the Salinity Barrier to the Weir Continued
Table 16. Floating Leaved Zone Vegetation Assessment for Channel A from the Salinity Barrier to the Weir
Table 17. Submerged Zone Vegetation Assessment for Channel A from the Salinity Barrier to the Weir
Table 18. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Rocky Creek between Channel A and Channel G
Table 19. Emergent Zone Vegetation Assessment for Rocky Creek between Channel A and Channel G
Table 20. Emergent Zone Vegetation Assessment for Rocky Creek between Channel A and Channel G Continued
Table 21. Floating Leaved Zone Vegetation Assessment for Rocky Creek between Channel A and Channel G
Table 22. Submerged Zone Vegetation Assessment for Rocky Creek between Channel A and Channel G
Table 23. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Channel G from the Salinity Barrier to the Weir
Table 24. Emergent Zone Vegetation Assessment for Channel G from the Salinity Barrier to the Weir
Table 25. Emergent Zone Vegetation Assessment for Channel G from the Salinity Barrier to the Weir Continued
Table 26. Floating Leaved Zone Vegetation Assessment for Channel G from the Salinity Barrier to the Weir
Table 27. Submerged Zone Vegetation Assessment for Channel G from the Salinity Barrier to the Weir
Table 28. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Lower Channel A Main and Canals
Table 29. Emergent Zone Vegetation Assessment for Lower Channel A
Table 30. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Rocky Creek below Channel G Salinity Barrier Main and Canals
Table 31. Emergent Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Main Channel. Percent Occurrence is for Main Channel and Canals.
Table 32. Emergent Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Main Channel Continued. Percent Occurrence is for Main Channel and Canals.

Table 33. Emergent Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Canals. Percent Occurrence is for Main Channel and Canals.
Table 34. Emergent Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Canals Continued. Percent Occurrence is for Main Channel and Canals.
Table 35. Submerged Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Main Channel. Percent Occurrence is for Main Channel and Canals.
Table 36. Water Quality Parameters (Laboratory) for Rocky Creek above the Weir
Table 37. Water Quality Parameters (Laboratory) for Channel A from the Salinity Barrier to the Weir
Table 38. Water Quality Parameters (Laboratory) for Rocky Creek between Channel A and Channel G
Table 39. Water Quality Parameters (Laboratory) for Channel G from the Salinity Barrier to the Weir
Table 40. Water Quality Parameters (Laboratory) for Channel A below the Salinity Barrier
Table 41. Water Quality Parameters (Laboratory) for Rocky Creek below the Channel G Salinity Barrier
Table 42. Water Chemistry Data Based on Manta Water Chemistry Probe for Rocky Creek above the Weir
Table 43. Water Chemistry Data Based on Manta Water Chemistry Probe for Channel A from the Salinity Barrier to the Weir
Table 44. Water Chemistry Data Based on Manta Water Chemistry Probe for Rocky Creek between Channel A and Channel G
Table 45. Water Chemistry Data Based on Manta Water Chemistry Probe for Channel G from the Salinity Barrier to the Weir
Table 46. Water Chemistry Data Based on Manta Water Chemistry Probe for Channel A below the Salinity Barrier
Table 47. Water Chemistry Data Based on Manta Water Chemistry Probe for Rocky Creek below the Channel G Salinity Barrier

Introduction

This assessment was conducted to update and enhance ecological data for the Lower Rocky/Brushy Creek Watershed, primarily the lower sections of Rocky Creek below Veterans Expressway, Channel A above and below the salinity barrier, Channel G above and below the salinity barrier, and the section of Rocky Creek between Channels A & G. This project is part of the Hillsborough County Lake Assessment Program, which in 2009 was expanded to include streams, in conjunction with Tampa Bay Estuary Program (TBEP) and the Southwest Florida Water Management District (SWFWMD) as an effort to collect baseline data for a cooperative project to remove the salinity barriers and restore tidal flow to the Lower Rocky Creek system. This project is funded by Hillsborough County and the Southwest Florida Water Management District's Northwest Hillsborough, Hillsborough River and Alafia River Basin boards. The goal of the stream assessment project is to provide additional data on the river reaches where Stream WaterWatch volunteer stream monitor sites exist and, where appropriate, the greater stream or river reach. These data will then be provided via the Hillsborough County and City of Tampa Watershed Atlas (HCTWA at: www.hillsborough.wateratlas.usf.edu) for use by scientists, government agencies and citizens who volunteer for the Hillsborough County Stream WaterWatch volunteer stream monitoring program.

The Stream Assessment project is a collaborative effort between the University of South Florida's Center for Community Design and Research and Hillsborough County Stormwater Management Section. The project has, as its primary goal, the rapid assessment of all the streams and river reaches within the county over a five-year period. The product of these investigations will provide the county, riparian property owners and the general public a better understanding of the general health of Hillsborough county rivers and streams, in terms of shoreline development, water quality, stream morphology (bottom contour, volume, area, etc.) and the plant biomass and species diversity. These data are intended to assist the county and its citizens to better manage streams and stream-centered watersheds.

Background

Rocky Creek extends from its headwaters in Lake Carlton in northwestern Hillsborough County to its mouth in Old Tampa Bay via Channel A and Channel G, a distance of approximately 18 miles. In its upper reaches, Rocky Creek is a flow though system involving Lake Carlton, Rock Lake, Josephine Lake, Pretty Lake and Lake Armistead. Downstream from the lake system is the confluence of Rocky creek and Brushy Creek south of Gunn Highway. Brushy Creek has its headwaters east of Highway 589 in Hillsborough County 9 miles upstream from the confluence with Rocky Creek.

The lower portions of the Rocky Brushy Creek Watershed have seen extensive alterations since 1966-1970 with a series of dragline canals, as well as salinity barriers and weirs since 1978. Channel A was dredged in the late 1960's as part of a large-scale agricultural drainage system designed by the Soil Conservation Service known as the Upper Tampa Bay Watershed Project. Channel A intercepts Rocky Creek just south of Linebaugh Avenue and flows west and then south to Old Tampa Bay.

The first section of the report provides the results of the overall morphological assessment of the stream. Primary data products include: a contour (bathymetric) map of the stream, area, volume and depth statistics, and the water level at the time of assessment. These data are useful for evaluating trends and for developing management actions such as plant management where depth and stream volume are needed.

The second section provides the results of the vegetation assessment conducted on the stream. These results can be used to better understand and manage vegetation in the stream. A list is provided with the different plant species found at various regions along the stream. Potentially invasive, exotic (non-native)

species are identified in a plant list and the percent of exotics is presented in a summary table. Watershed values provide a means of reference.

The third section provides the results of the water quality sampling of the stream. Both field data and laboratory data are presented. The water quality index (WQI) is used to develop a general stream health statement, which is calculated for both the water column with vegetation and the water column if vegetation were removed. These data are derived from the water chemistry and vegetative submerged biomass assessments and are useful in understanding the results of certain stream vegetation management practices.

The intent of this assessment is to provide a starting point from which to track changes in the stream, and where previous comprehensive assessment data is available, to track changes in the stream's general health. These data can provide the information needed to determine changes and to monitor trends in physical condition and ecological health of the stream.

Figure 1. Photograph of the Spillway on Channel G near Veterans Expressway taken August 2, 2011

Section 1: Stream Morphology

Bathymetric Map[1]**.**

Table 1 through 6 provide the stream systems morphologic parameters in various units. The bottom of the stream was mapped using a Lowrance LCX 28C HD Wide Area Augmentation System (WAAS)[2] enabled Global Positioning System (GPS) with fathometer (bottom sounder) to determine the boat's position, and bottom depth in a single measurement. The result is an estimate of the stream's area, mean and maximum depths, and volume and the creation of a bottom contour map (**Error! Reference source not found.**). Besides pointing out the deeper fishing holes in the stream, the morphologic data derived from this part of the assessment can be valuable to overall management of the stream vegetation as well as providing flood storage data for flood models.

Table 1. Rocky Creek above the Weir Morphologic Data (Area, Depth and Volume)

Parameter	Feet	Meters	Acres	Acre-Ft	Gallons
Surface Area (sq)	**504,577.54**	**46,876.79**	**11.58**		
Mean Depth	**6.23**	**1.90**			
Maximum Depth	**14.44**	**4.40**			
Volume (cubic)	**2,318,364.27**	**65,648.77**		**53.22**	**17,342,689.27**
Gauge (relative)	**2.72**	**0.83**			

As seen in Figures 3 through 6, the morphology of Rocky Creek above the weir is characterized by a predominately natural meandering stream with low relief banks. Stream width in the region averages 12.5 meters from bank to bank. The bottom depth of this region rapidly fluctuates with several undercut banks, deep erosion holes and depositional sediment bars. Much of the region contains native wetland trees, such as *Fraxinus spp.* and *Salix spp.*, growing standing in the water, as well as depositional tufts of decaying organic debris, fallen branches, and floating litter. This area of Rocky Creek is buffered by densely vegetated riparian zone on both banks. The vegetation communities will be discussed further in Section 2 of this assessment report.

[1] A bathymetric map is a map that accurately depicts all of the various depths of a water body. An accurate bathymetric map is important for effective herbicide application and can be an important tool when deciding which form of management is most appropriate for a water body. Stream volumes, hydraulic retention time and carrying capacity are important parts of lake management that require the use of a bathymetric map.

[2] WAAS is a form of differential GPS (DGPS) where data from 25 ground reference stations located in the United States receive GPS signals form GPS satellites in view and retransmit these data to a master control site and then to geostationary satellites. For more information, see end note 2.

Figure 2. Photograph of the typical conditions found on Rocky Creek above the weir

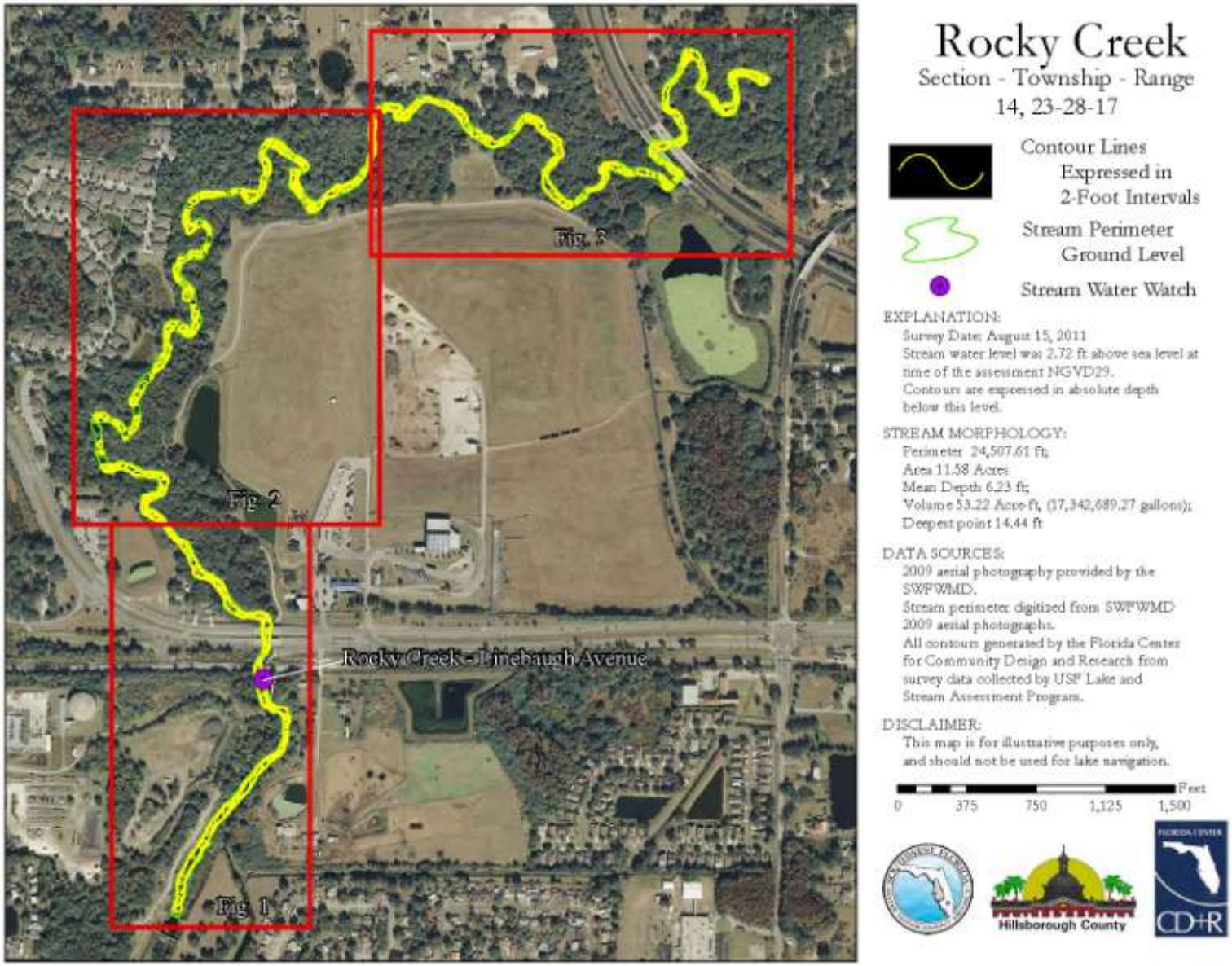


Figure 3. Bathymetric Contour Map Overview for Rocky Creek above the Weir.

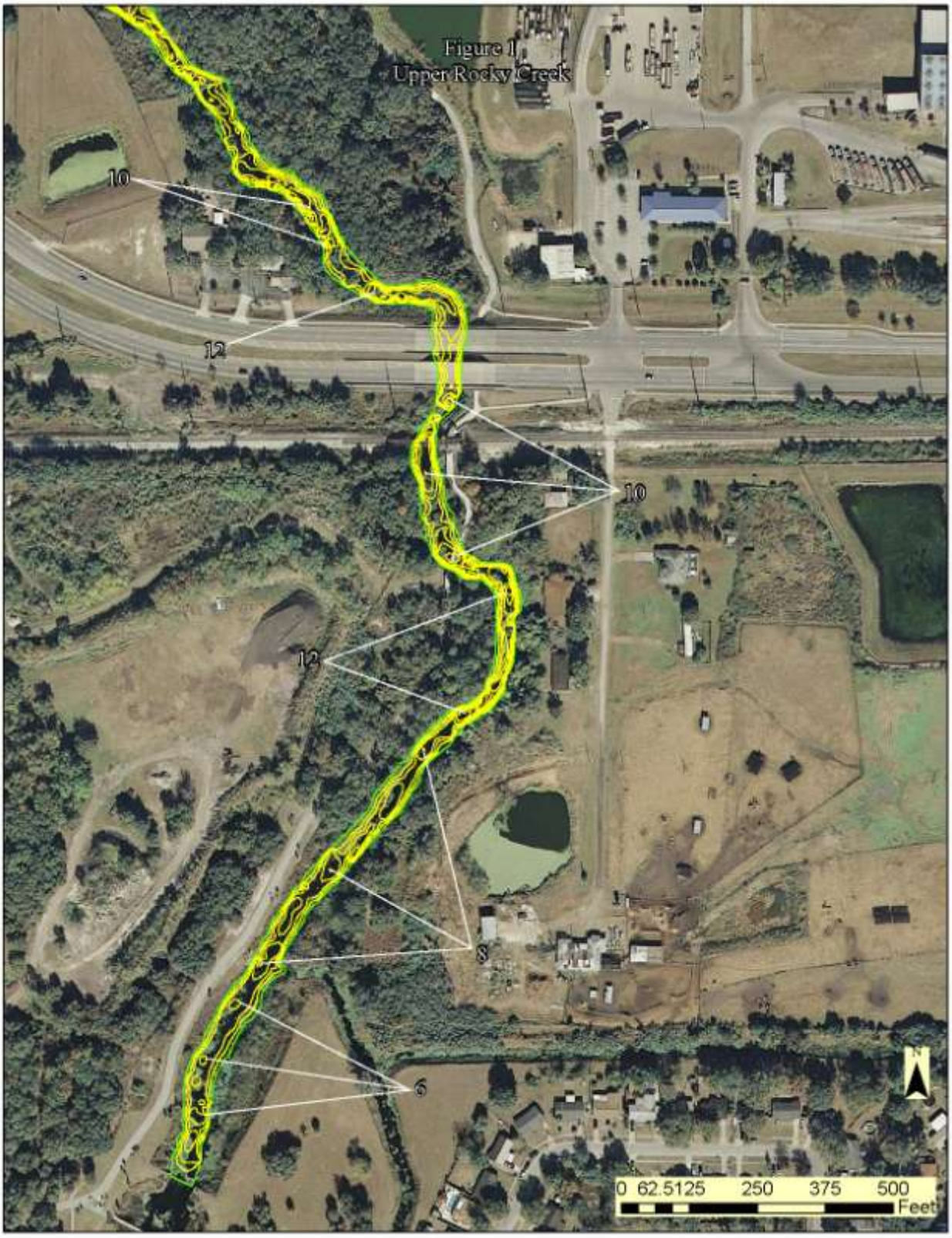


Figure 4. Rocky Creek above the Weir Bathymetric Contour Inset Map Figure 1

Figure 5. Rocky Creek above the Weir Bathymetric Contour Inset Map Figure 2

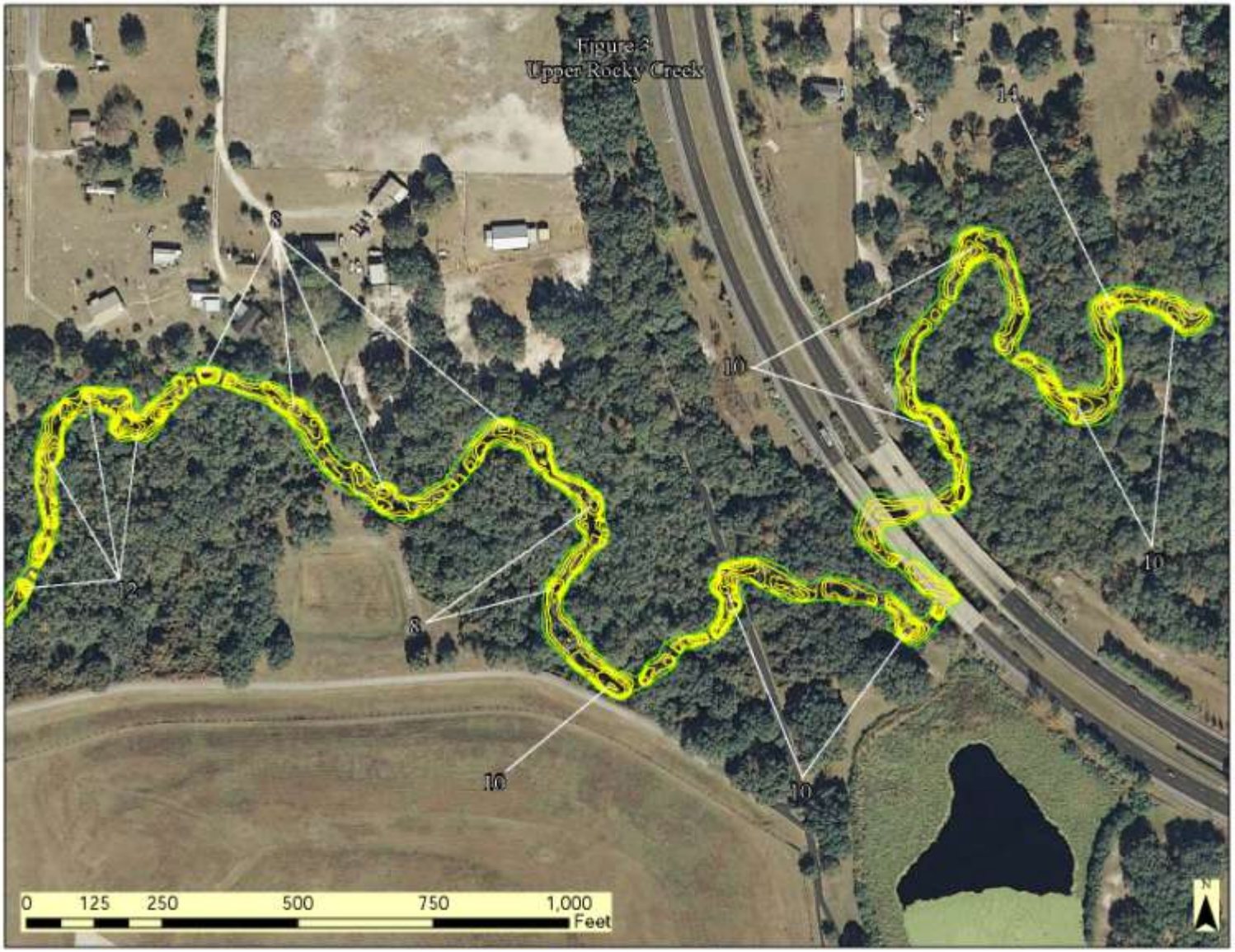


Figure 6. Rocky Creek above the Weir Bathymetric Contour Inset Map Figure 3

Table 2. Channel A from Salinity Barrier to the Weir Morphologic Data (Area, Depth and Volume)

Parameter	Feet	Meters	Acres	Acre-Ft	Gallons
Surface Area (sq)	2,083,329.12	193,547.61	47.83		
Mean Depth	6.46	1.97			
Maximum Depth	10.34	3.15			
Volume (cubic)	9,981,473.75	282,643.86		229.15	74,667,126.28
Gauge (relative)	6.54	1.99			

Channel A is a man-made dragline canal characterized by tall steep banks with little vegetation to buffer stormwater during flooding events. The stream width in Channel A averages a near uniform 50 meters from bank to bank with few areas of variation. As seen in Figures 6 through 10, the bathymetric contours of Channel A are characterized by a steep, narrow littoral zone and a flat bottom at the center of the channel at approximately 10 feet of depth at the time of the assessment. The exception to this depth is located at the north end of Channel A directly below the weir, where sedimentation has resulted in several sediment deposits (Figure 10). This sedimentation area continues downstream to approximately the confluence with Lower Rocky Creek.

Figure 7. Photograph of the typical shoreline morphology of Channel A

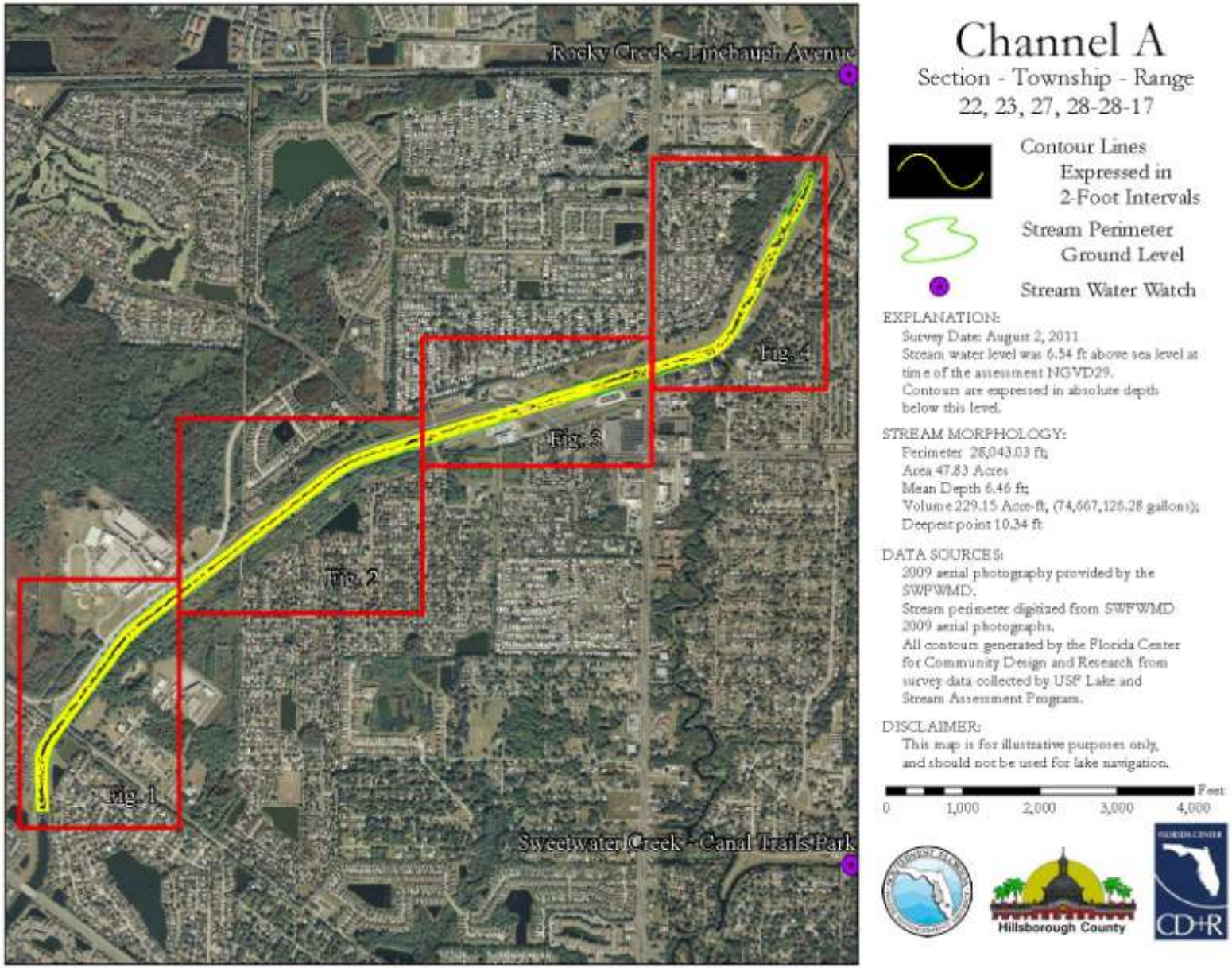


Figure 8. Bathymetric Contour Map Overview for Channel A from the Salinity Barrier to the Weir

Figure 9. Channel A from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 1

Figure 10. Channel A from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 2

Figure 11. Channel A from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 3

Figure 12. Channel A from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 4

Table 3. Rocky Creek between Channel A and Channel G Morphologic Data (Area, Depth and Volume)

Parameter	Feet	Meters	Acres	Acre-Ft	Gallons
Surface Area (sq)	673,462.21	62,566.69	15.46		
Mean Depth	4.54	1.38			
Maximum Depth	8.81	2.69			
Volume (cubic)	2,047,266.84	57,972.14		47.00	15,314,725.61
Gauge (relative)	3.15	0.96			

As seen in Figures 11 through 14, the morphology of Rocky Creek between Channel A and Channel G is characterized by a predominately natural meandering stream with low relief banks. Stream width in the region averages 22 meters from bank to bank. The bottom depth of this region averages 4.54 feet but rapidly fluctuates with several undercut banks, deep erosion holes and depositional sediment bars. Much of the region contains native wetland trees, such as *Fraxinus spp.,* as well as depositional tufts of decaying organic debris, fallen branches, and floating litter. This area of Rocky Creek is buffered by a vegetated riparian zone on both banks. The vegetation communities will be discussed further in Section 2 of this assessment report.

Figure 13. Photograph of Rocky Creek between Channel A and Channel G showing the typical characteristics of the creek.

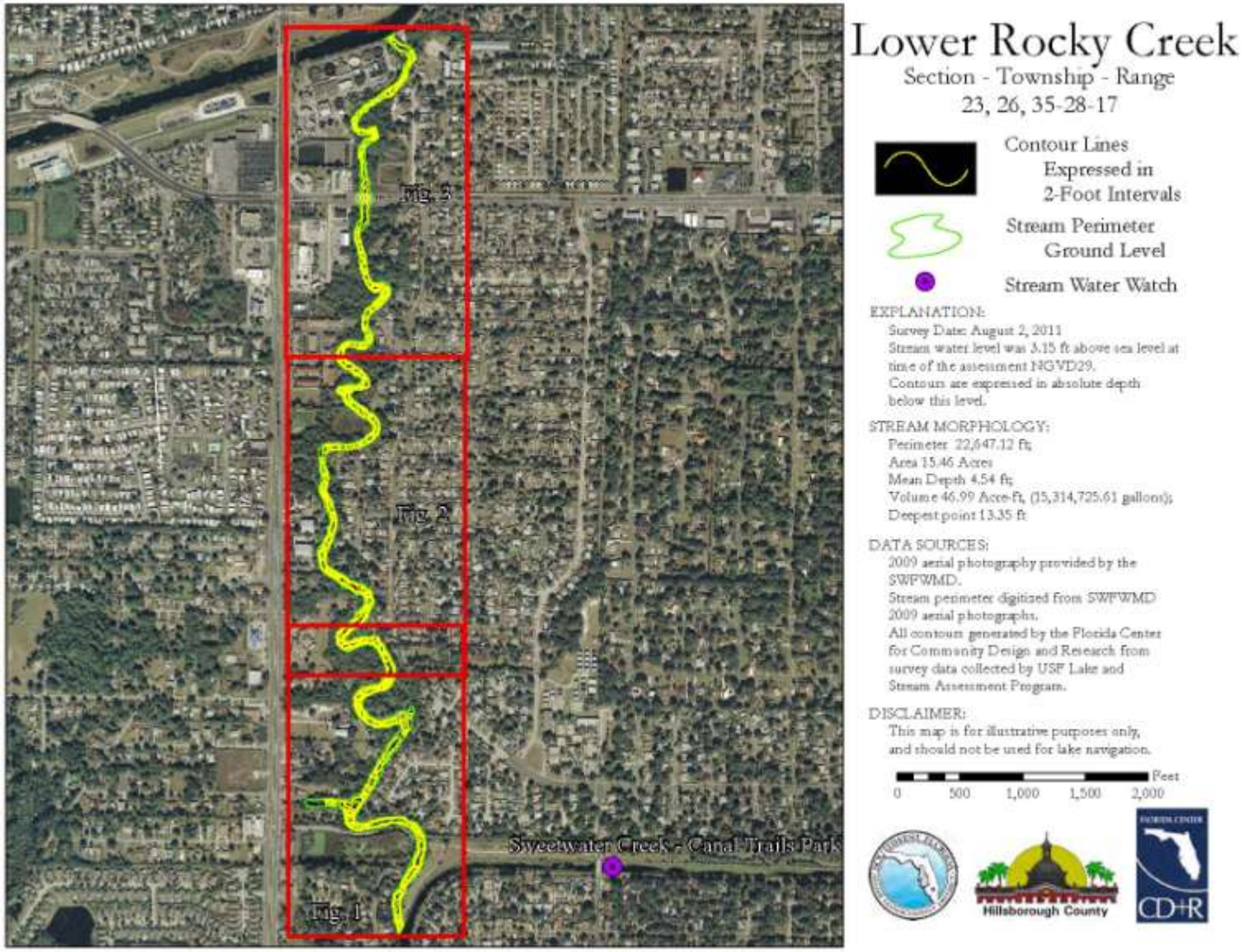


Figure 14. Bathymetric Contour Overview Map for Rocky Creek between Channel A and Channel G.

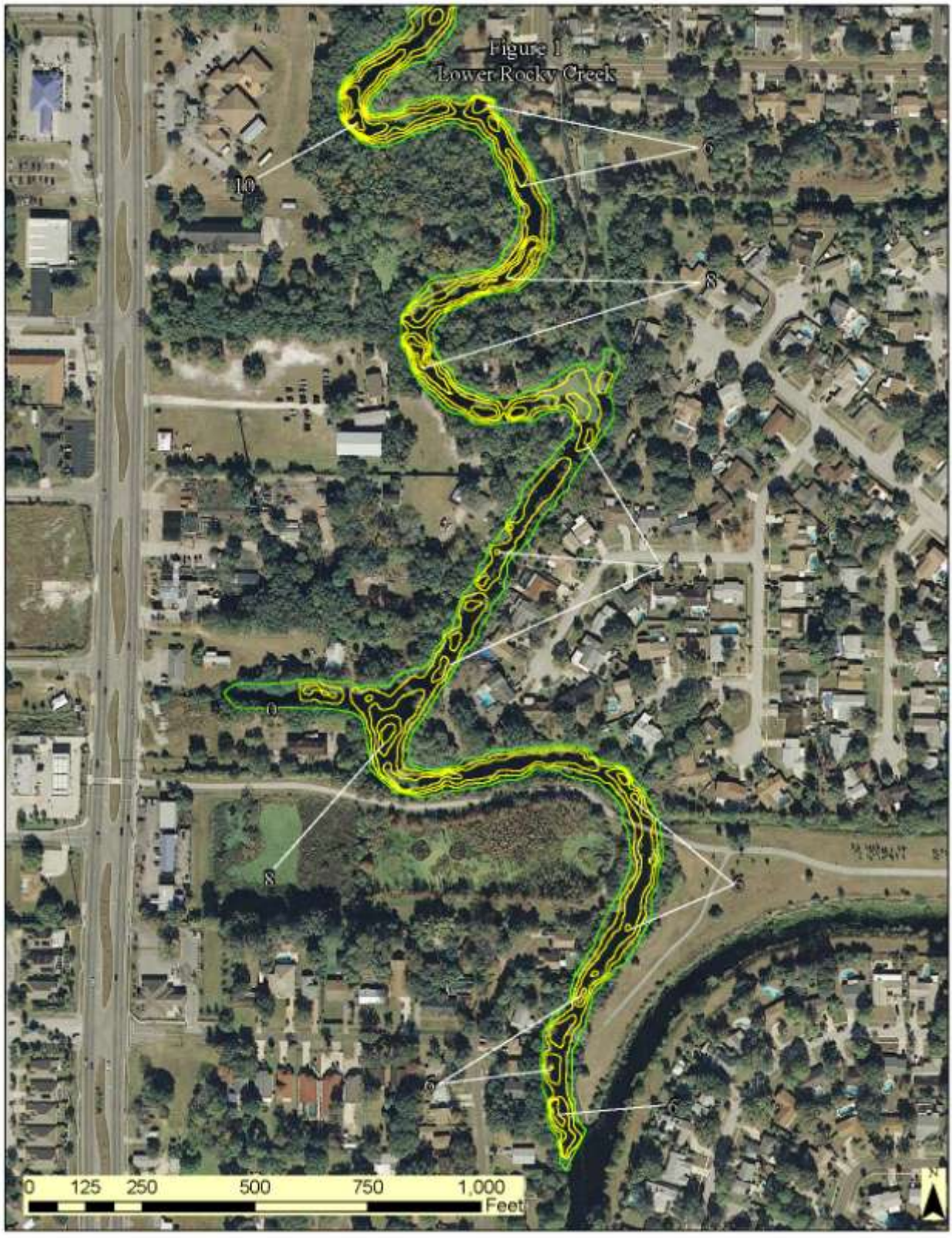


Figure 15. Rocky Creek between Channel A and Channel G Bathymetric Contour Inset Map Figure 1

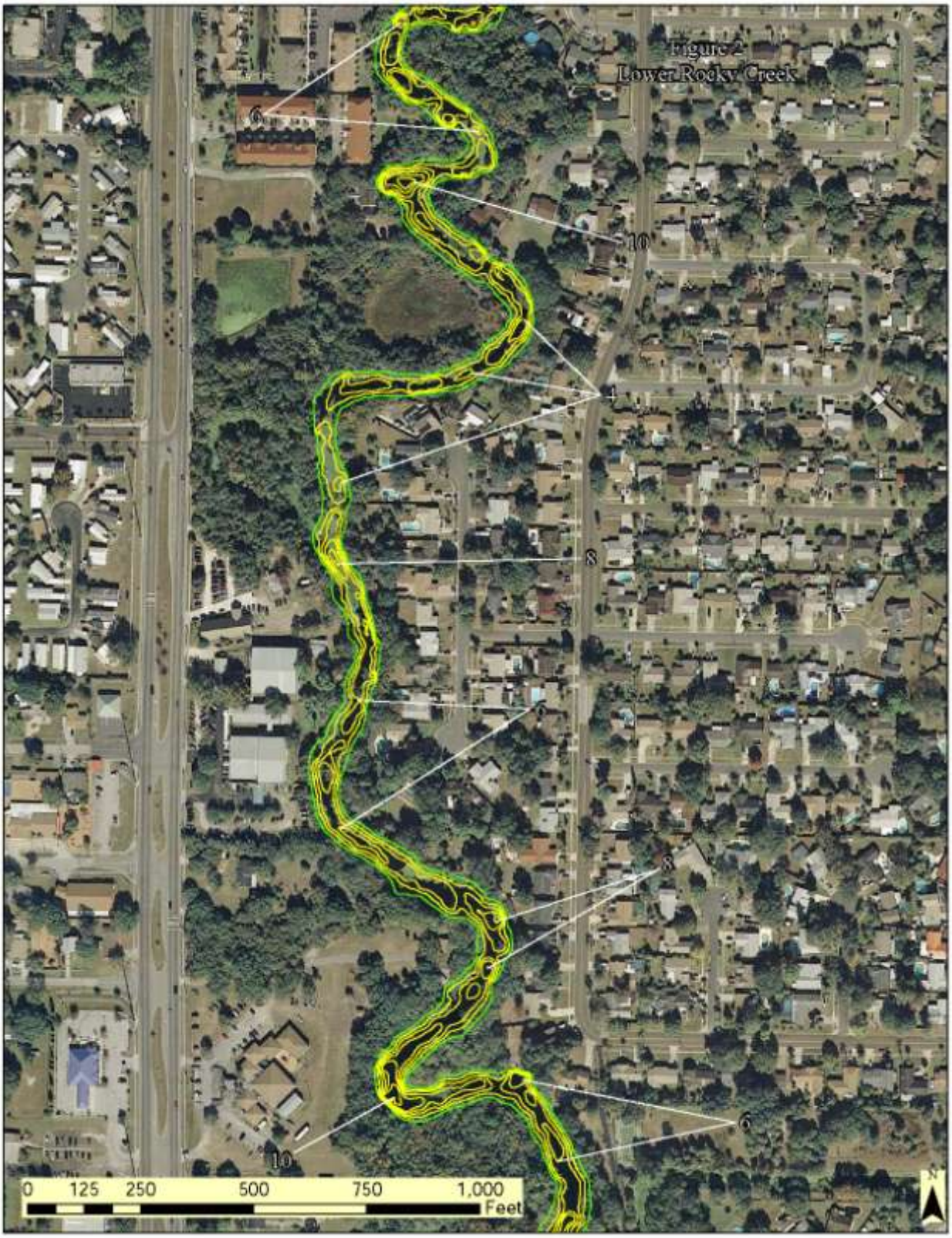


Figure 16. Rocky Creek between Channel A and Channel G Bathymetric Contour Inset Map Figure 2

Figure 17. Rocky Creek between Channel A and Channel G Bathymetric Contour Inset Map Figure 3

Table 4. Channel G from the Salinity Barrier to the Weir Morphologic Data (Area, Depth and Volume)

Parameter	Feet	Meters	Acres	Acre-Ft	Gallons
Surface Area (sq)	789,416.63	73,339.20	18.12		
Mean Depth	4.38	1.34			
Maximum Depth	8.81	2.69			
Volume (cubic)	2,501,850.03	70,844.50		57.44	18,715,267.59
Gauge (relative)	2.62	0.799			

Channel G is a man-made dragline canal characterized by tall steep banks with moderate vegetation to buffer stormwater during flooding events. The stream width in Channel G averages approximately 21 meters from bank to bank with some variation. As seen in Figures 15 through 19, the bathymetric contours of Channel G are characterized by being fairly shallow with a mean depth of 4.38 feet. Sedimentation deposits are common in Channel G allowing for a significant amount of submerged aquatic vegetation to be present during the assessment. The vegetation communities of Channel G will be discussed in detail in Section 2 of this assessment report.

Figure 18. Photograph of the typical conditions of Channel G

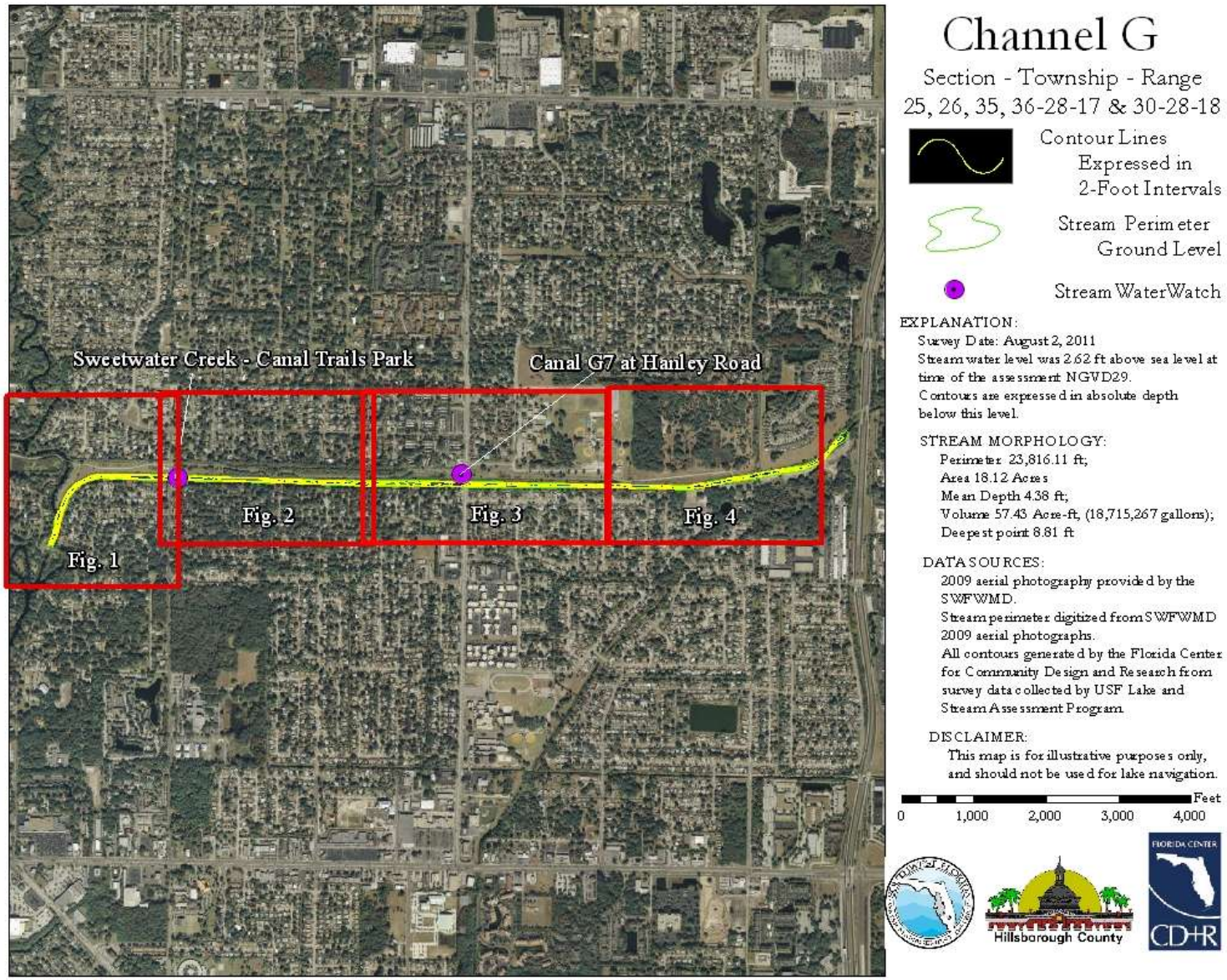


Figure 19. Bathymetric Contour Overview Map for Channel G from the Salinity Barrier to the Weir

Figure 20. Channel G from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 1

Figure 21. Channel G from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 2

Figure 22. Channel G between the Salinity Barrier and the Weir Bathymetric Contour Inset Map Figure 3

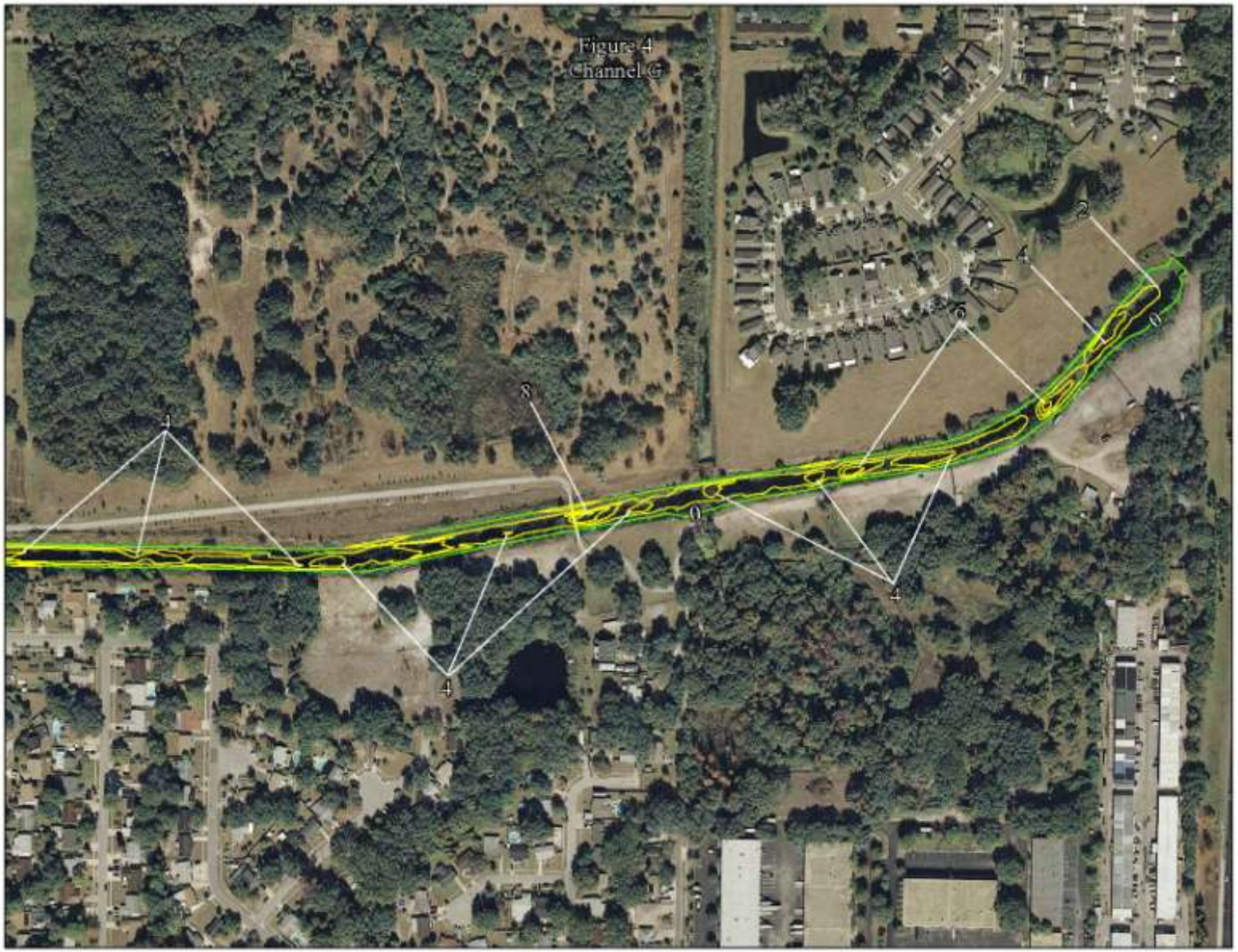


Figure 23. Channel G from the Salinity Barrier to the Weir Bathymetric Contour Inset Map Figure 4

Table 5. Channel A below the Salinity Barrier Morphologic Data (Area, Depth and Volume)

Parameter	Feet	Meters	Acres	Acre-Ft	Gallons
Surface Area (sq)	3,231,242.75	300,192.27	74.18		
Mean Depth	4.09	1.25			
Maximum Depth	10.25	3.12			
Volume (cubic)	8,906,370.16	252,200.32		204.46	66,624,737.2
Gauge (actual)	2.44	.74			

Channel A below the salinity barrier is a man made channel dissecting Cabbagehead Bayou to Upper Tampa Bay. The channel is typical of dragline canals being nearly straight with uniform steep banks and little littoral zone for the colonization of aquatic vegetation such as seagrasses and other macrophytes. The mean depth of the system is 4.09 feet with the deep center of the main channel averaging around 8 feet. The width of Lower Channel A is approximately 200 feet at high tide. There are five residential canals connecting to Lower Channel A lined by seawalls.

Figure 24. Photograph of the main channel of Lower Channel A.

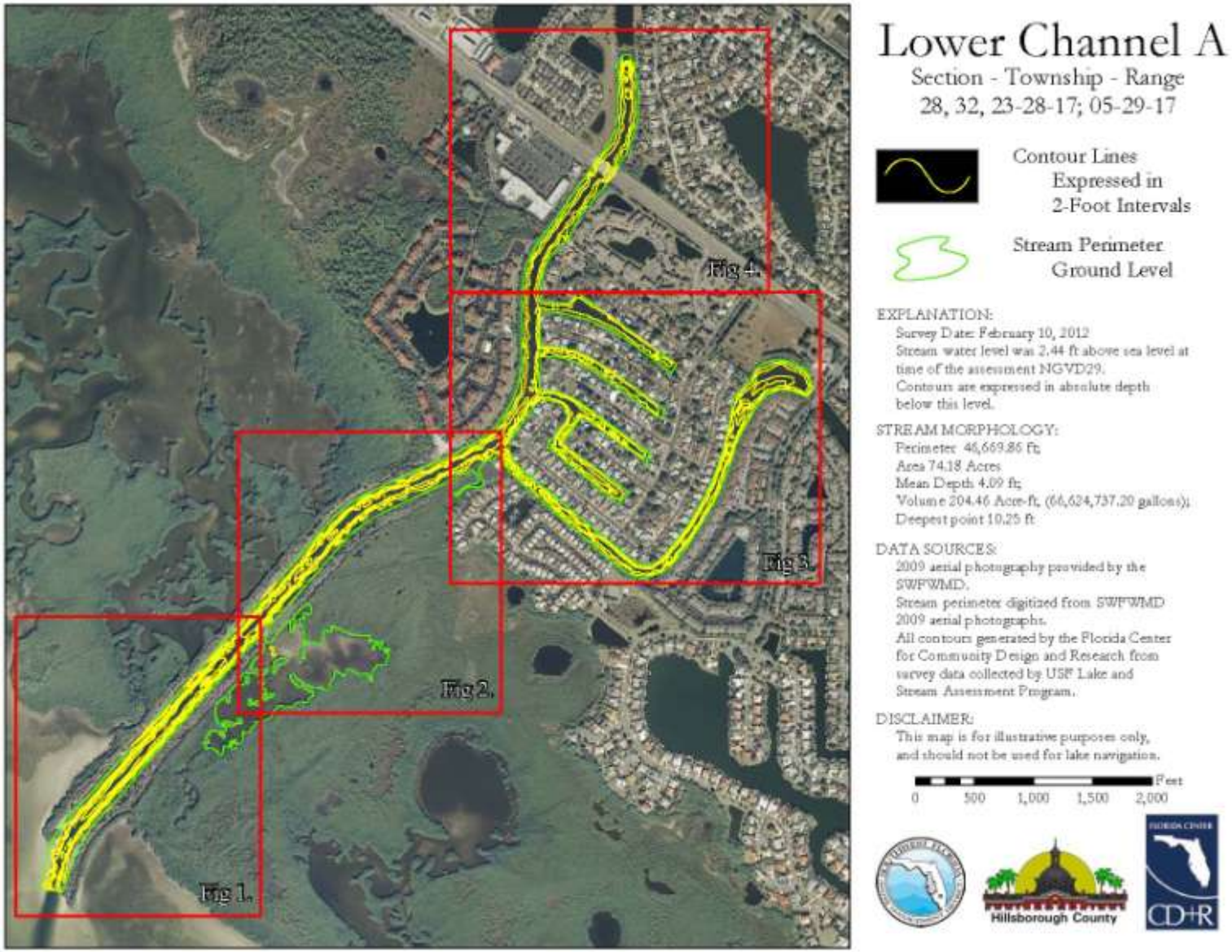


Figure 25. Bathymetric Contour Overview Map for Lower Channel A

Figure 26. Lower Channel A Bathymetric Contour Inset Map Figure 1

Figure 27. Lower Channel A Bathymetric Contour Inset Map Figure 2

Figure 28. Lower Channel A Bathymetric Contour Inset Map Figure 3

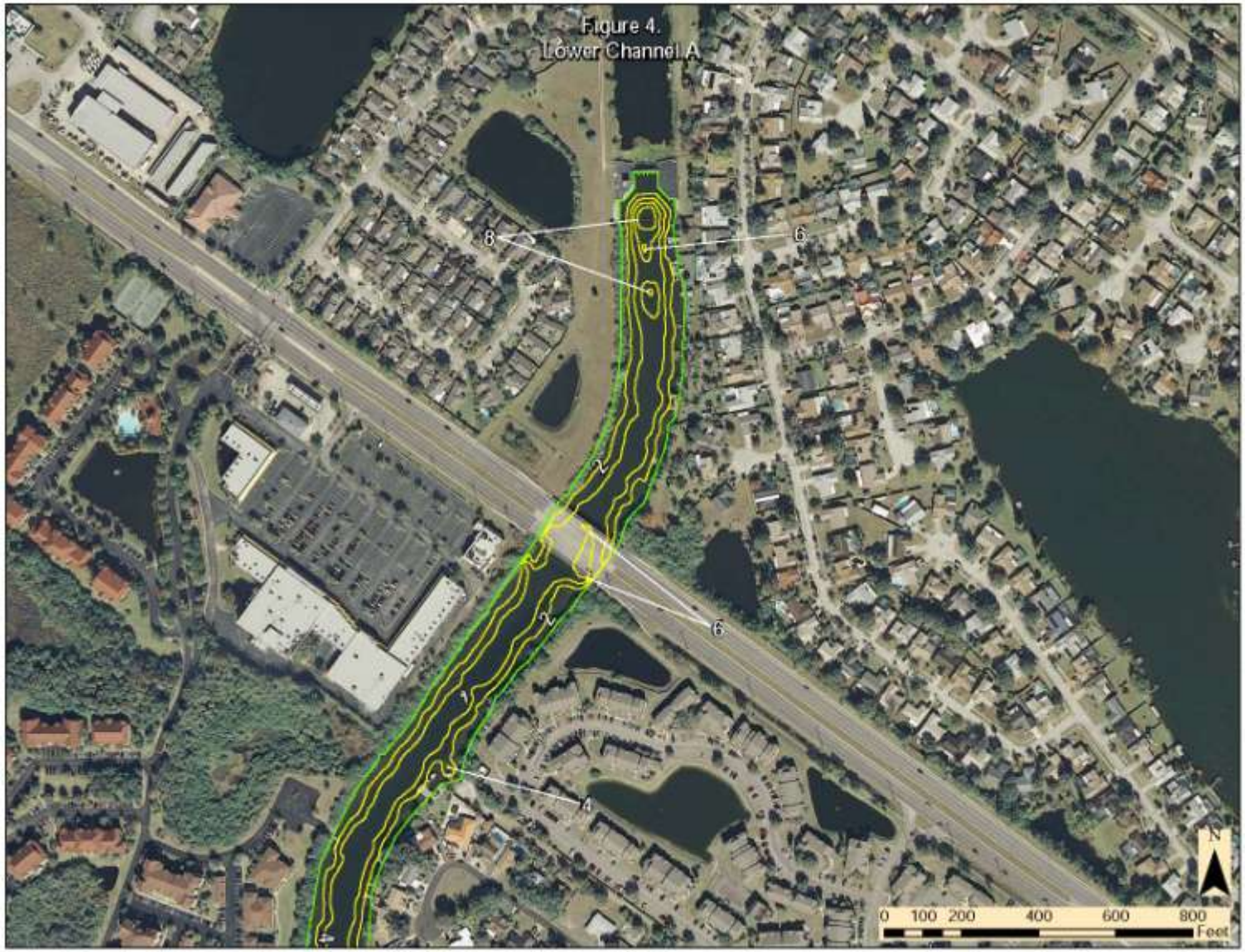


Figure 29. Lower Channel A Bathymetric Contour Inset Map Figure 4

Table 5. Rocky Creek below the Channel G Salinity Barrier Morphologic Data (Area, Depth and Volume)

Parameter	Feet	Meters	Acres	Acre-Ft	Gallons
Surface Area (sq)	4,450,271.01	413,443.71	102.16		
Mean Depth	3.60	1.10			
Maximum Depth	11.43	3.48			
Volume (cubic)	12,968,750.74	367,234.13		297.72	97,013,664.87
Gauge (actual)	0.263	0.08			

Rocky creek below the Channel G salinity barrier is a dynamic system characterized by varying freshwater flows during the rainy season and a tidal saltwater dynamic all year. This region was once the natural streambed and mouth of Rocky Creek, but the channel has largely been straightened for stormwater management. In addition, the area has experienced a large network of residential canals being constructed. Much of the constructed area has been fortified by seawalls to prevent erosion.

Figure 30. Photograph of the typical channel and environment of Rocky Creek below the Channel G salinity barrier

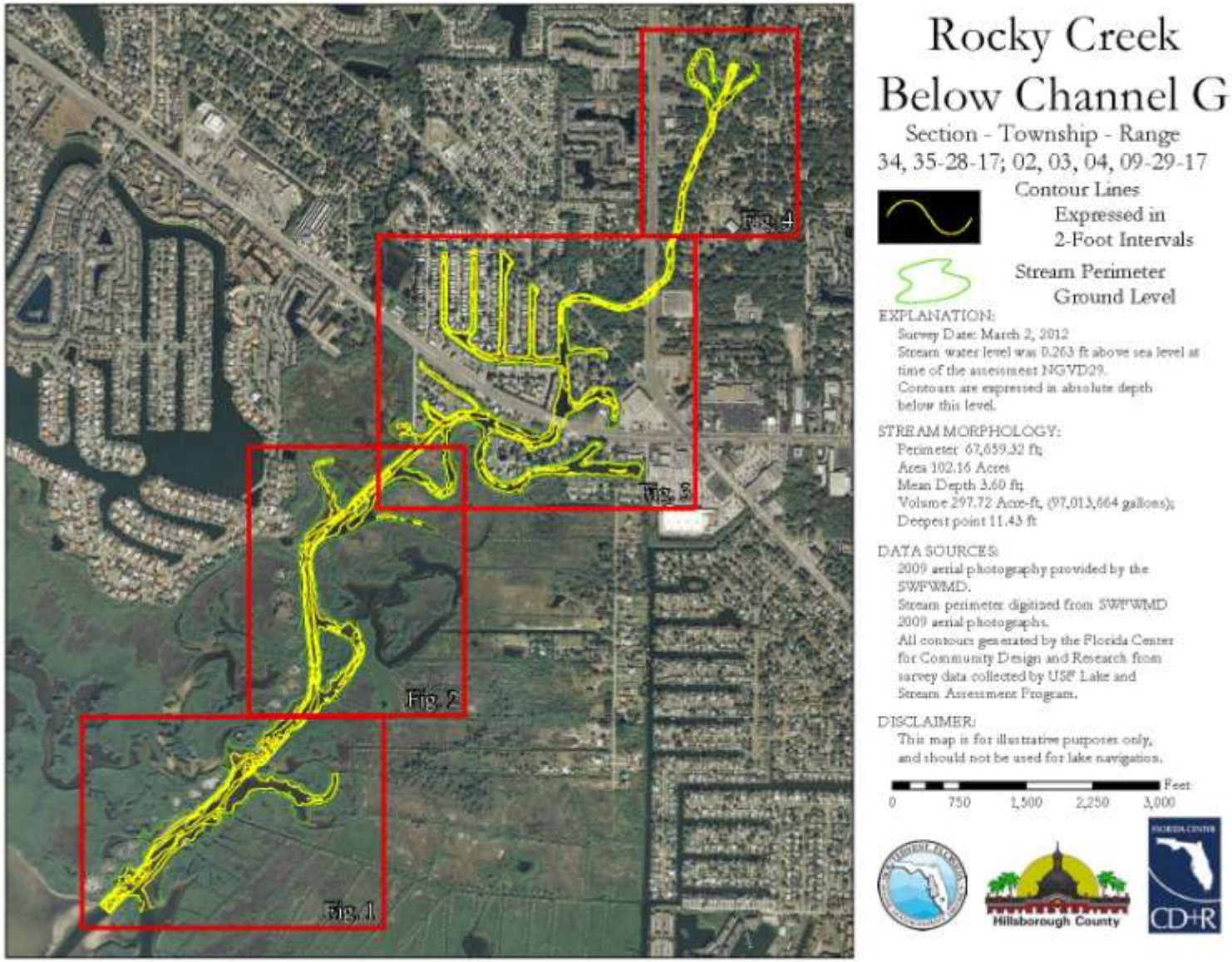


Figure 31. Bathymetric Contour Overview Map for Rocky Creek below the Channel G Salinity Barrier

Figure 32. Rocky Creek below the Channel G Salinity Barrier Bathymetric Contour Inset Map Figure 1

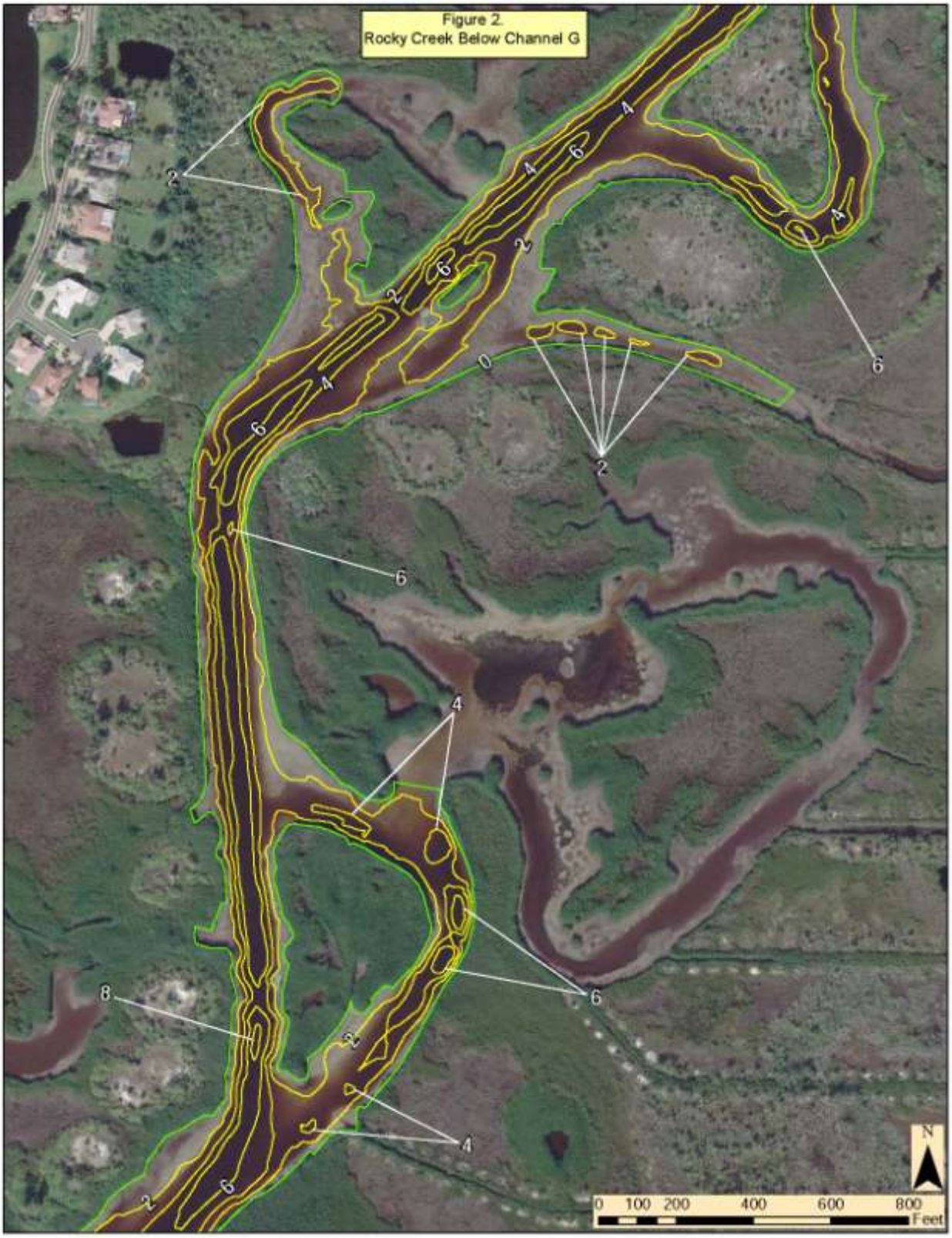


Figure 33. Rocky Creek below the Channel G Salinity Barrier Bathymetric Contour Inset Map Figure 2

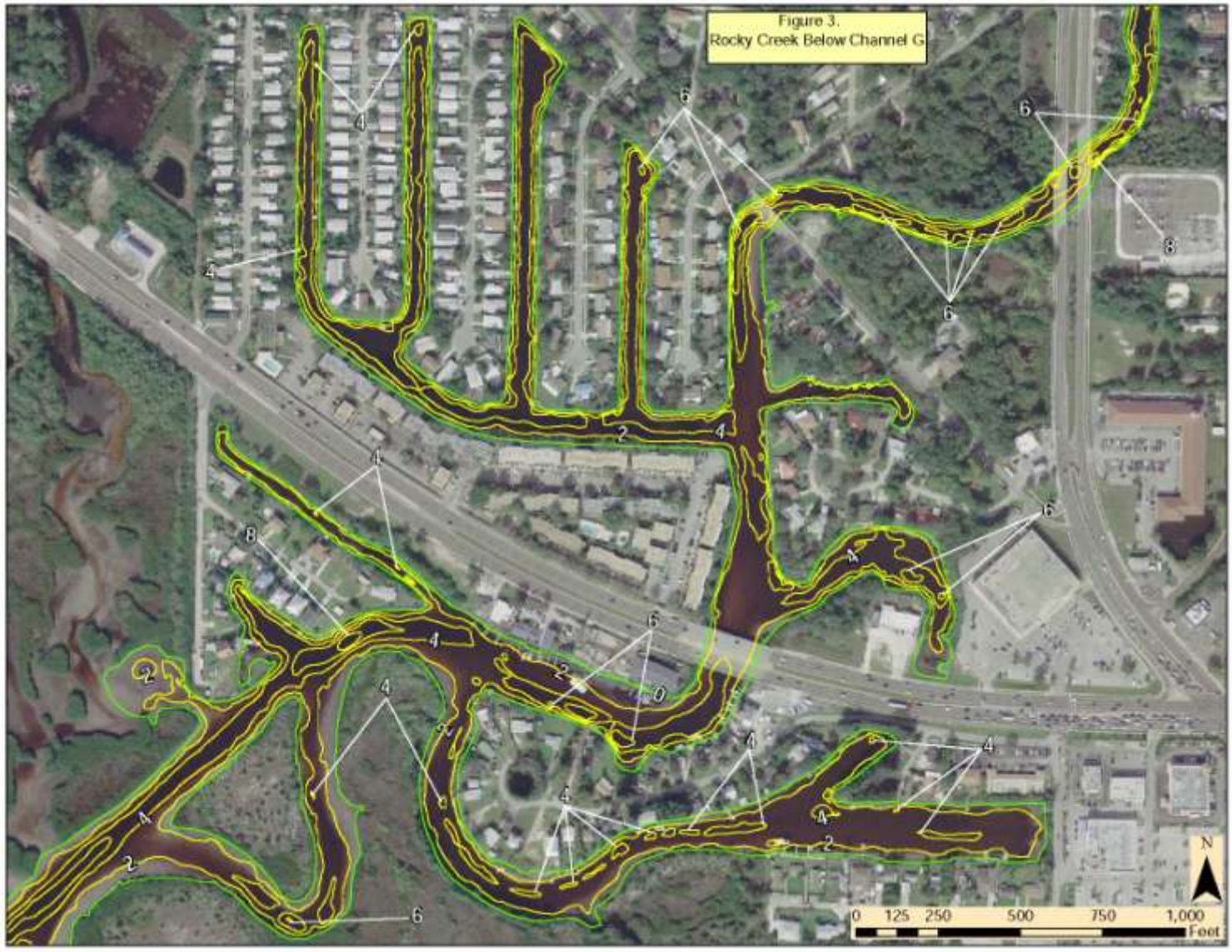


Figure 34. Rocky Creek below the Channel G Salinity Barrier Bathymetric Contour Inset Map Figure 3

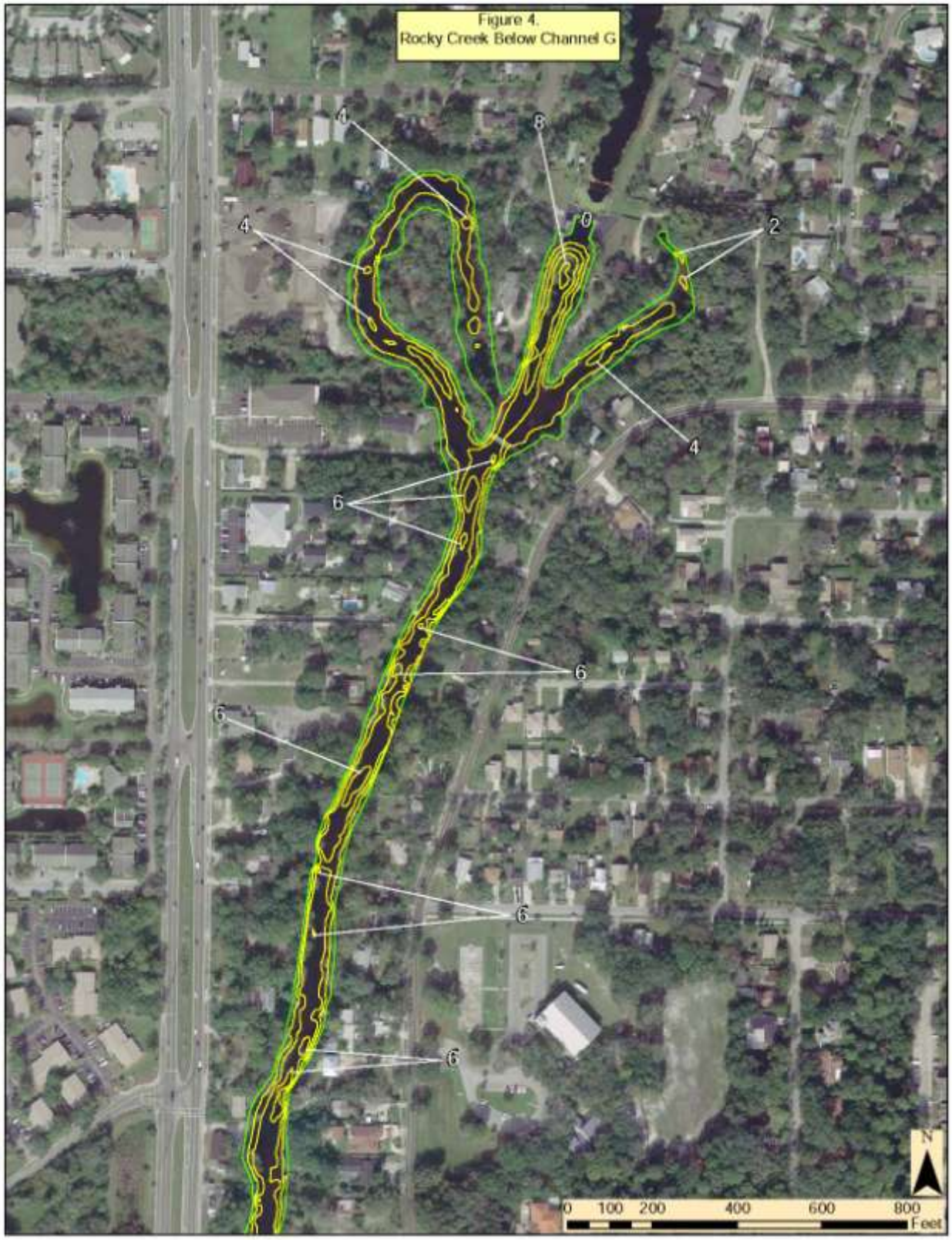


Figure 35. Rocky Creek below the Channel G Salinity Barrier Bathymetric Contour Inset Map Figure 4

Section 2: Stream Ecology (Vegetation)

The stream's apparent vegetative cover and shoreline detail are evaluated using the latest stream aerial photograph as shown in and by use of WAAS-enabled GPS. Submerged vegetation is determined from the analysis of bottom returns from the Lowrance 28c HD combined GPS/fathometer described earlier. As depicted in **Error! Reference source not found.**7, 40, 42, 45, 48, 50, 51, vegetation has been assessed for in ~250 meter regions measured from the center of the stream. The vegetation assessment regions are set up from the downstream extent and work to the upstream extent. The region beginning and ending points are set using GPS and then loaded into a GIS mapping program (ArcGIS) for display. Each region is sampled in the three primary vegetative zones (emergent, submerged and floating)[3]. All species encountered in the region are noted as the boat travels slowly upstream. The latest high resolution aerial photos are used to provide shore details (docks, structures, vegetation zones) and to calculate the extent of surface vegetation coverage. The primary indices of submerged vegetation cover and biomass for the stream, percent area coverage (PAC) and percent volume inhabited (PVI), are determined by transiting the stream by boat and employing a fathometer to collect "hard and soft return" data. These data are later analyzed for presence and absence of vegetation and to determine the height of vegetation if present. The PAC is determined from the presence and absence analysis of 100 sites in the stream and the PVI is determined by measuring the difference between hard returns (lake bottom) and soft returns (top of vegetation) for sites (within the 100 analyzed sites) where plants are determined present.

The data collected during the site vegetation sampling include vegetation type, exotic vegetation, predominant plant species and submerged vegetation biomass. The total number of species from all sites is used to approximate the total diversity of aquatic plants and the percent of invasive-exotic plants on the stream (Tables 7, 13, 18, 23 and 30). The study area value in Tables 7, 13, 18, 23 and 30 only includes vegetation from the Rocky Creek Study Area assessment conducted in 2011-2012. The study area values for Total Pest Plant Species in **Error! Reference source not found.**7, 13, 18, 23 and 30 indicates species that were present in high occurrence for the entire study area, whereas the Stream Section Total Pest Plant Species indicates the number of species in the stream section that were present in high occurrence. These data are determined from the vegetation assessment regions. The tables are divided into Floating Leaf, Emergent and Submerged plants and contain the plant code, species, common name and presence (indicated by a 1) or absence (indicated by a blank space) of species and the calculated percent occurrence (number sites species is found/number of regions) and type of plant (Native, Non-Native, Invasive, Pest). In the "Type" category, the term invasive indicates the plant is commonly considered invasive in this region of Florida and the term "pest" indicates that the plant has a greater than 55% occurrence in the lake and is also considered a problem plant for this region of Florida, or in a non-native invasive that is or has the potential to be a problem plant in the lake and has at least 40% occurrence. These two terms are somewhat subjective; however, they are provided to give lake property owners some guidance in the management of plants on their property. The code E1 denotes Category I invasive species, as defined by the **Florida Exotic Pest Plant Council** (FLEPPC); these are species "that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives." The code E2 denotes Category II invasive species, as defined by FLEPPC; these species "have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. Please remember that to remove or control plants in a wetland (stream shoreline) in Hillsborough County the property owner must secure an **Application To Perform Miscellaneous Activities In Wetlands** permit from the **Environmental Protection Commission of Hillsborough County** and for management of in-stream vegetation outside the wetland fringe (for streams with an area greater than ten acres), the property owner must secure a **Florida Department of Environmental Protection** **Aquatic Plant Removal Permit**.

[3] **See end note 3.**

Table 7. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Rocky Creek above the Weir

Parameter	Stream Section	Study Area
Number of Vegetation Assessment Regions	15	111
Total Plant Diversity (# of Taxa)	103	156
% Non-Native Plants	26.21%	26.28%
Total Pest Plant Species	6	2

Figure 36. Typical Vegetation Community of Rocky Creek above the Weir

Figure 37. Vegetation Assessment Region Map for Rocky Creek above the Weir

Table 8. Emergent Zone Vegetation Assessment Results for Rocky Creek above the Weir

Plant Species Code	Plant Species	Common Name	Rocky Creek Above Weir Sample Region															(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Percent Occurrence
SPO	*Sabal spp.*	Cabbage Palms, Palmetto	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N
VRA	*Vitis rotundifolia*	Muscadine Grape	1	1	1	1	1	1	1	1		1	1	1	1	1	1	93.33%	N, P
CAL	*Callicarpa americana*	American Beauty Berry	1	1	1	1	1	1	1	1		1	1	1	1	1	1	93.33%	N
ULA	*Urena lobata*	Caesar's Weed	1	1	1	1	1	1	1	1		1	1	1	1	1	1	93.33%	NN, I, E1 , P
FCA	*Fraxinus caroliniana*	Pop Ash	1		1	1	1	1	1	1	1	1	1	1	1	1	1	93.33%	N
QLA	*Quercus laurifolia*	Laurel Oak	1	1	1	1	1		1	1		1	1		1	1		73.33%	N
COS	*Cephalanthus occidentalis*	Common Buttonbush				1	1	1	1	1	1	1	1	1	1		1	73.33%	N
APS	*Alternanthera philoxeroides*	Alligator Weed	1	1	1	1	1	1	1	1				1		1		66.67%	NN, I, E2, P
DBA	*Dioscorea bulbifera*	Air Potato	1	1			1		1	1		1	1	1		1	1	66.67%	NN, I, E1, P
SCA	*Salix caroliniana*	Carolina Willow; Coastalplain Willow		1	1	1	1	1	1	1			1		1		1	66.67%	N
SMI	*Smilax bona-nox*	Saw Greenbrier Cat Briar		1	1	1	1			1		1	1	1		1	1	66.67%	N
LPA	*Ludwigia peruviana*	Peruvian Primrosewillow	1	1	1	1	1	1						1	1	1		60.00%	NN, I, E1, P
OCA	*Osmunda cinnamomea*	Cinnamon Fern	1	1	1	1	1	1	1	1			1					60.00%	N
AAA	*Ampelopsis arborea*	Peppervine	1	1	1	1	1		1	1				1				53.33%	N
BOC	*Boehmeria cylindrica*	Bog Hemp, False Nettle	1	1	1		1	1				1			1	1		53.33%	N
ACM	*Aster carolinianum (symphyotrichum carolinianum)*	Climbing Aster		1	1	1	1		1	1			1				1	53.33%	N
ACE	*Acer rubrum var. trilobum*	Southern Red Maple	1	1	1	1	1	1	1					1				53.33%	N
BHA	*Baccharis halimifolia*	Eastern False Willow, Saltbush	1		1			1	1						1	1	1	46.67%	N
PHS	*Polygonum hydropiperoides*	Swamp Smartweed	1	1		1	1		1				1	1				46.67%	N
PHN	*Panicum hemitomon*	Maidencane					1			1		1	1	1	1		1	46.67%	N
STS	*Schinus terebinthifolius*	Brazilian Pepper	1		1	1		1	1	1								40.00%	NN, I, E1, P
PPP	*Pleopeltis polypodioides*	Resurrection Fern				1		1				1		1	1	1		40.00%	N
PLU	*Pluchea spp.*	Marsh Fleabane,Camphorweed	1	1		1	1	1	1									40.00%	N
WAX	*Myrica cerifera*	Wax Myrtle	1	1	1	1	1											33.33%	N
XAA	*Ximenia americana*	Tallow Wood, Hog Plum				1	1		1				1				1	33.33%	N
TDM	*Taxodium distichum*	Bald Cypress					1	1					1			1	1	33.33%	N
SAM	*Sambucus canadensis*	Elderberry	1	1		1	1											26.67%	N
BPA	*Bidens alba*	White Beggar Ticks	1			1								1		1		26.67%	N
BMA	*Urochloa mutica*	Para Grass	1	1			1										1	26.67%	NN, I, E1
EUP	*Eupatorium capillifolium*	Dog Fennel	1		1									1	1			26.67%	N
CYO	*Cyperus odoratus*	Fragrant Flatsedge	1			1	1	1										26.67%	N
MSS	*Mikania scandens*	Climbing Hempvine		1	1	1	1											26.67%	N
RF	*Osmunda regalis*	Royal Fern				1	1		1				1					26.67%	N
IGA	*Ilex glabra*	Inkberry, Gallberry					1		1	1						1		26.67%	N
BLS	*Blechnum serrulatum*	Swamp Fern	1		1								1					20.00%	N
WTA	*Sphagneticola (Wedelia) trilobata*	Creeping Oxeye						1				1	1					20.00%	NN, I, E2
EWI	*Echinochloa walteri*	Coast Cockspur Grass (hairy)	1	1			1											20.00%	N
ECM	*Enterolobium contortisiliquum*	Earpod Tree		1			1	1										20.00%	NN

Table 9. Emergent Zone Vegetation Assessment Results for Rocky Creek above the Weir Continued

Plant Species Code	Plant Species	Common Name	Rocky Creek Above Weir Sample Region																(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Percent Occurrence	
TRS	*Toxicoendron radicans*	Poison Ivy			1		1									1		20.00%	N
CCA	*Cinnamomum camphora*	Camphor-tree											1	1			1	20.00%	NN, I, E1
COM	*Commelina spp.*	Dayflower	1	1				1										20.00%	N
QNA	*Quercus nigra*	Water Oak		1	1	1												20.00%	N
QVA	*Quercus virginiana*	Live Oak				1	1						1					20.00%	N
HTM	*Hypericum tetrapetalum*	Fourpetal St. John's-Wort	1						1				1					20.00%	N
CEA	*Colocasia esculenta*	Wild Taro, Dasheen, Coco Yam							1	1								13.33%	NN, I, E1
PAR	*Paspalum repens*	Water Paspalum	1	1														13.33%	N
AVS	*Andropogon virginicus var. glaucus*	Broom grass	1	1														13.33%	N
NEA	*Nephrolepsis spp.*	Sword Fern	1		1													13.33%	N
PQA	*Parthenocissus quinquefolia*	Woodbine	1			1												13.33%	N
BRP	*Broussonetia papyrifera*	Paper Mulberry		1								1						13.33%	NN, I, E2
EAA	*Eclipta alba (prostrata)*	False Daisy, Yerba De Tajo	1	1														13.33%	N
PIN	*Pinus spp.*	Pine Tree	1				1											13.33%	N
SVA	*Sesbania virgata*	Wand Riverhemp	1										1					13.33%	NN
DIO	*Diospyros virginiana*	Common Persimmon	1										1					13.33%	N
PFO	*Paederia foetida*	Skunk Vine			1								1					13.33%	NN, I, E1
ERH	*Erechtites hieracifolia*	Fireweed	1		1													13.33%	N
RBA	*Ruellia simplex*	Britton's Wild Petunia				1			1									13.33%	NN, I, E1
SSM	*Sapium sebiferum*	Popcorn Tree, Chinese Tallow Tree	1														1	13.33%	NN, I, E1
CER	*Ceratopteris thalictroides*	Water Sprite		1					1									13.33%	NN
CFL	*Coreopsis floridana*	Florida Tickseed	1														1	13.33%	N
CDS	*Cyperus distinctus*	Swamp Flat Sedge		1		1												13.33%	N
PDM	*Polygonum densiflorum (glabrum)*	Denseflower Knotweed	1			1												13.33%	N
TAS	*Taxodium ascendens*	Pond Cypress				1								1				13.33%	N
CAM	*Crinum americanum*	Swamp lily	1															6.67%	N
AAR	*Ambrosia artemisiifolia*	Common Ragweed	1															6.67%	N
RVS	*Rumex verticillatus*	Swamp Dock	1															6.67%	N
TYP	*Typha spp.*	Cattails	1															6.67%	N
ADM	*Acrostichum danaeifolium*	Leather Fern			1													6.67%	N
MAH	*Melia azedarach*	Chinaberry Tree												1				6.67%	NN, I, E2

Table 10. Emergent Zone Vegetation Assessment Results for Rocky Creek above the Weir Continued

Plant Species Code	Plant Species	Common Name	Rocky Creek Above Weir Sample Region																(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Percent Occurrence	
CFA	*Canna flaccida*	Golden Canna, Bandana-Of-The-Everglades	1															6.67%	N
LOS	*Ludwigia octovalvis*	Mexican Primrosewillow, Long-stalked Ludwigia	1															6.67%	N
BMI	*Bacopa monnieri*	Common Bacopa, Herb-Of-Grace	1															6.67%	N
PCA	*Pontederia cordata*	Pickerel Weed					1											6.67%	N
SLA	*Sagittaria lancifolia*	Bulltongue Arrowhead, Duck Potato	1															6.67%	N
CAS	*Cupaniopsis anacardioides*	Carotwood		1														6.67%	NN, I, E1
LJM	*Lygodium japonicum*	Japanese Climbing Fern						1										6.67%	NN, I, E1
RCS	*Ricinus communis*	Castorbean													1			6.67%	NN, I, E1
RPS	*Rubus pensilvanicus*	Sawtooth Blackberry			1													6.67%	N
AIA	*Aeschynomene indica*	Indian Joint Vetch	1															6.67%	NN
CPT	*Cyperus polystachyos*	Flat Sedge	1															6.67%	N
GLS	*Gordonia lasianthus*	Loblolly Bay			1													6.67%	N
GRA	*Grevillea robusta*	Silkoak										1						6.67%	NN
JMS	*Juncus megacephalus*	Bighead Rush	1															6.67%	N
LRU	*Lycopus rubellus*	Taperleaf Waterhorehound											1					6.67%	N
SPA	*Spartina spp.*	Cordgrass	1															6.67%	N
FSR	*Fuirena scirpoidea*	Southern Umbrellasedge, Rush Fuirena		1														6.67%	N
GTM	*Galium tinctorium*	Marsh Bedstraw	1															6.67%	N
ICE	*Ilex cassine*	Dahoon Holly		1														6.67%	N
ITE	*Itea virginica*	Virginia Willow						1										6.67%	N
JES	*Juncus effusus var solutus*	Soft Rush					1											6.67%	N
JUM	*Juncus marginatus*	Shore Rush, Grassleaf Rush	1															6.67%	N
MVA	*Magnolia virginiana*	Sweetbay Magnolia				1												6.67%	N
SCE	*Saururus crenuus*	Lizard's Tail					1											6.67%	N
SCS	*Scirpus cubensis (Oxycaryum cubense*	Burhead Sedge,Cuban Scirpus	1															6.67%	NN

Plant Species Code	Plant Species	Common Name	Rocky Creek Above Weir Sample Region																(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Percent Occurrence	
HYE	*Hydrocotyl umbellata*	Manyflower Marshpennywort, Water Pennywort	1	1	1	1	1	1									1	46.67%	N
NLM	*Nuphar lutea var. advena*	Spatterdock, Yellow Pondlily	1	1	1	1	1		1									40.00%	N
PSS	*Pistia stratoides*	Water Lettuce	1	1	1	1	1											33.33%	NN, I, E1
SMA	*Salvinia minima*	Water Spangles, Water Fern	1		1	1												20.00%	NN, I, E1
SPI	*Spirodela polyrhiza*	Giant Duckweed	1	1														13.33%	N
LEN	*Lemna spp.*	Common Duckweed	1															6.67%	N
ECS	*Eichhornia crassipes*	Water Hyacinth	1															6.67%	NN, I, E1

Table 11. Floating Leaved Zone Vegetation Assessment Results for Rocky Creek above the Weir

Figure 38. Photograph of the Typical Vegetative Cover of Rocky Creek above the Weir

Table 12. Submerged Zone Vegetation Assessment Results for Rocky Creek above the Weir

Plant Species Code	Plant Species	Common Name	Rocky Creek Above Weir Sample Region																(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Percent Occurrence	
MUM	*Micranthemum umbrosum*	Shade Mudflower, Baby's Tears	1	1		1	1		1									33.33%	N
MAM	*Myriophyllum aquaticum*	Parrot Feather	1															6.67%	NN

Table 13. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Channel A from the Salinity Barrier to the Weir

Parameter	Stream Section	Study Area
Number of Vegetation Assessment Regions	17	111
Total Plant Diversity (# of Taxa)	71	156
% Non-Native Plants	22.54%	26.28%
Total Pest Plant Species	8	2

Figure 39. Typical shoreline vegetation community of Channel A from the salinity barrier to the weir.

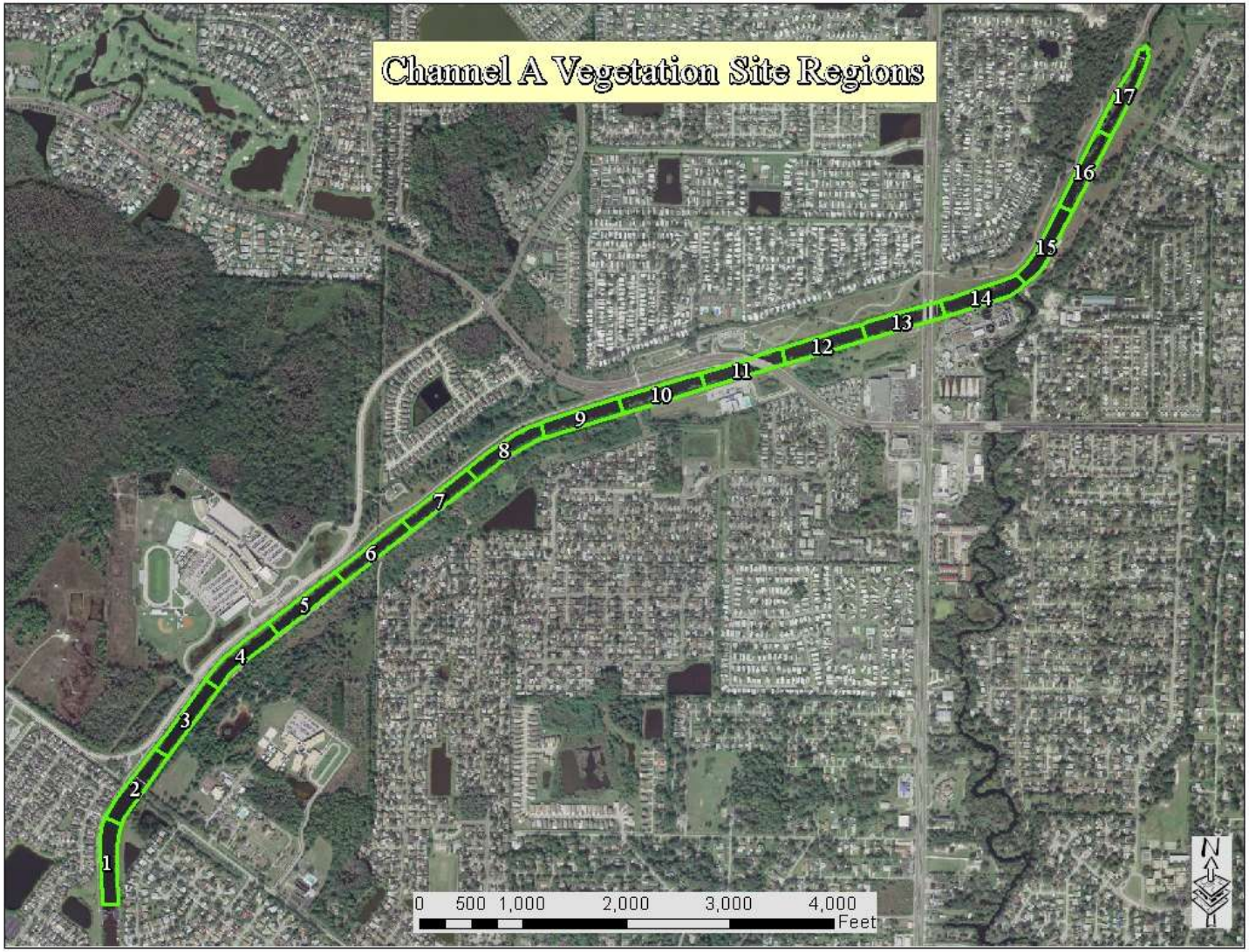


Figure 40. Map of the Vegetation Assessment Regions for Channel A from the Salinity Barrier to the Weir

Table 14. Emergent Zone Vegetation Assessment for Channel A from the Salinity Barrier to the Weir

Plant Species Code	Plant Species	Common Name	Channel A Sample Region																	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Percent Occurrence	
APS	*Alternanthera philoxeroides*	Alligator Weed	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN , I, E2, P
AVS	*Andropogon virginicus var. glaucus*	Broom grass	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N
CEA	*Colocasia esculenta*	Wild Taro, Dasheen, Coco Yam	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E1, P
CAM	*Crinum americanum*	Swamp lily	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N
OCA	*Osmunda cinnamomea*	Cinnamon Fern	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N
SPO	*Sabal spp.*	Cabbage Palms, Palmetto	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	94.12%	N
LEN	*Lemna spp.*	Common Duckweed	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	88.24%	N
SAM	*Sambucus canadensis*	Elderberry	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	88.24%	N
SSS	*Solidago sempervirens*	Seaside Goldenrod	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	88.24%	N
BOC	*Boehmeria cylindrica*	Bog Hemp, False Nettle	1	1	1	1	1	1		1			1	1	1	1	1	1	1	82.35%	N
LOS	*Ludwigia octovalvis*	Mexican Primrosewillow, Long-stalked Ludwigia	1	1	1	1	1	1	1	1	1	1			1		1	1	1	82.35%	N
STS	*Schinus terebinthifolius*	Brazilian Pepper	1	1	1	1	1	1	1	1	1		1	1	1	1			1	82.35%	NN, I, E1, P
BPA	*Bidens alba*	White Beggar Ticks	1	1	1	1	1	1	1	1	1	1			1			1	1	76.47%	N
PRS	*Panicum repens*	Torpedo Grass	1	1	1	1	1	1			1	1			1	1	1	1	1	76.47%	NN, I, E1, P
WAX	*Myrica cerifera*	Wax Myrtle				1	1	1	1	1	1	1	1	1	1	1				64.71%	N
BHA	*Baccharis halimifolia*	Eastern False Willow, Saltbush				1	1	1			1	1	1		1	1		1	1	58.82%	N
NEA	*Nephrolepsis spp.*	Sword Fern					1	1		1	1	1	1	1	1	1	1			58.82%	N
MSS	*Mikania scandens*	Climbing Hempvine	1	1	1	1	1		1			1		1			1			52.94%	N
EUP	*Eupatorium capillifolium*	Dog Fennel		1	1			1				1	1			1	1		1	47.06%	N
LAN	*Lantana spp.*	Lantana	1	1	1		1	1	1	1		1								47.06%	NN
QVA	*Quercus virginiana*	Live Oak		1	1									1	1	1	1	1	1	47.06%	N
TYP	*Typha spp.*	Cattails	1	1	1		1	1				1	1	1						47.06%	N
ACM	*Aster carolinianum (symphyotrichum carolinianum)*	Climbing Aster		1		1			1	1	1	1				1				41.18%	N
BMA	*Urochloa mutica*	Para Grass	1	1	1	1						1	1						1	41.18%	NN, I, E1, P
VRA	*Vitis rotundifolia*	Muscadine Grape				1		1		1		1			1	1			1	41.18%	N
AAA	*Ampelopsis arborea*	Peppervine	1			1			1			1	1	1						35.29%	N
CYO	*Cyperus odoratus*	Fragrant Flatsedge			1			1	1						1			1	1	35.29%	N
LPA	*Ludwigia peruviana*	Peruvian Primrosewillow							1		1	1		1	1	1				35.29%	NN, I, E1
BMI	*Bacopa monnieri*	Common Bacopa, Herb-Of-Grace		1		1	1				1								1	29.41%	N
LLA	*Leucaena leucocephala*	White leadtree		1					1	1		1		1						29.41%	NN, I, E2
RPS	*Rubus pensilvanicus*	Sawtooth Blackberry											1	1	1	1			1	29.41%	N
SCA	*Salix caroliniana*	Carolina Willow; Coastalplain Willow									1	1		1	1				1	29.41%	N
UAA	*Ulmus americana*	American Elm					1	1	1										1	23.53%	N
ACE	*Acer rubrum var. trilobum*	Southern Red Maple												1	1				1	17.65%	N
DBA	*Dioscorea bulbifera*	Air Potato												1	1	1				17.65%	NN, I, E1
PHN	*Panicum hemitomon*	Maidencane	1	1															1	17.65%	N
SLA	*Sagittaria lancifolia*	Bulltongue Arrowhead, Duck Potato											1	1	1					17.65%	N

Table 15. Emergent Zone Vegetation Assessment for Channel A from the Salinity Barrier to the Weir Continued

Plant Species Code	Plant Species	Common Name	Channel A Sample Region																	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Percent Occurrence	
TDM	*Taxodium distichum*	Bald Cypress												1	1				1	17.65%	N
CFA	*Canna flaccida*	Golden Canna, Bandana-Of-The-Everglades			1										1					11.76%	N
EBI	*Eleocharis baldwinii*	Baldwin's Spikerush, Roadgrass			1									1						11.76%	N
GTM	*Galium tinctorium*	Marsh Bedstraw		1		1														11.76%	N
PAR	*Paspalum repens*	Water Paspalum	1												1					11.76%	N
CLG	*Cyperus ligularis*	Swamp Flatsedge					1									1				11.76%	N
PIN	*Pinus spp.*	Pine Tree		1										1						11.76%	N
SCV	*Scirpus validus*	Soft-stem Bulrush												1	1					11.76%	N
SMI	*Smilax bona-nox*	Saw Greenbrier Cat Briar														1			1	11.76%	N
SPB	*Spartina bakeri*	Sand Cordgrass											1	1						11.76%	N
BLS	*Blechnum serrulatum*	Swamp Fern												1						5.88%	N
COS	*Cephalanthus occidentalis*	Common Buttonbush																	1	5.88%	N
ECM	*Enterolobium contortisiliquum*	Earpod Tree			1															5.88%	NN
GLS	*Gordonia lasianthus*	Loblolly Bay				1														5.88%	N
IVA	*Iris virginica*	Southern Blue Flag											1							5.88%	N
LRS	*Ludwigia repens*	Creeping Primrosewillow, Red Ludwigia													1					5.88%	N
MVA	*Magnolia virginiana*	Sweetbay Magnolia													1					5.88%	N
PHS	*Polygonum hydropiperoides*	Swamp Smartweed												1						5.88%	N
RCS	*Ricinus communis*	Castorbean											1							5.88%	NN, I, E2
SVA	*Sesbania virgata*	Wand Riverhemp				1														5.88%	NN
TGA	*Thalia geniculata*	Fireflag, Arrowroot										1								5.88%	N

Table 16. Floating Leaved Zone Vegetation Assessment for Channel A from the Salinity Barrier to the Weir

Plant Species Code	Plant Species	Common Name	Channel A Sample Region																	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Percent Occurrence	
NLM	*Nuphar lutea var. advena*	Spatterdock, Yellow Pondlily		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	94.12%	N
HYE	*Hydrocotyl umbellata*	Manyflower Marshpennywort, Water Pennywort	1	1	1							1		1		1		1	1	47.06%	N
PSS	*Pistia stratoides*	Water Lettuce									1		1	1	1		1	1	1	41.18%	NN, I, E1, P
SMA	*Salvinia minima*	Water Spangles, Water Fern											1	1	1	1	1	1	1	41.18%	NN, I, E1, P
ECS	*Eichhornia crassipes*	Water Hyacinth															1	1	1	17.65%	NN, I, E1
SPI	*Spirodela polyrhiza*	Giant Duckweed											1							5.88%	N

Table 17. Submerged Zone Vegetation Assessment for Channel A from the Salinity Barrier to the Weir

Plant Species Code	Plant Species	Common Name	Channel A Sample Region																	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Percent Occurrence	
CDM	*Ceratophyllum demersum*	Coontail	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N
HVA	*Hydrilla verticillata*	Hydrilla, water thyme	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E1, P
ALG	*Algal Spp.*	Algal Mats, Floating	1	1	1	1	1	1	1	1	1	1	1		1			1	1	82.35%	N
NGS	*Najas guadelupensis*	Southern Waternymph			1		1				1	1		1						29.41%	N
MUM	*Micranthemum umbrosum*	Shade Mudflower, Baby's Tears						1												5.88%	N
MAM	*Myriophyllum aquaticum*	Parrot Feather												1						5.88%	N
NIT	*Nitella spp.*	Nitella															1			5.88%	N

Table 18. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Rocky Creek between Channel A and Channel G

Parameter	Stream Section	Study Area
Number of Vegetation Assessment Regions	12	111
Total Plant Diversity (# of Taxa)	75	156
% Non-Native Plants	29.33%	26.28%
Total Pest Plant Species	12	2

Figure 41. Photograph of the typical vegetation communities along Rocky Creek between Channel A and Channel G

Figure 42. Map of Vegetation Assessment Regions for Rocky Creek between Channel A and Channel G

Table 19. Emergent Zone Vegetation Assessment for Rocky Creek between Channel A and Channel G

Plant Species Code	Plant Species	Common Name	Lower Rocky Creek Sample Region													(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic, (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	Percent Occurrence	
APS	*Alternanthera philoxeroides*	Alligator Weed	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E2, P
AAA	*Ampelopsis arborea*	Peppervine	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N, P
STS	*Schinus terebinthifolius*	Brazilian Pepper	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E1, P
CEA	*Colocasia esculenta*	Wild Taro, Dasheen, Coco Yam	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E1, P
VRA	*Vitis rotundifolia*	Muscadine Grape	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N, P
ACM	*Aster carolinianum (symphyotrichum carolinianum)*	Climbing Aster	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N
LPA	*Ludwigia peruviana*	Peruvian Primrosewillow		1	1	1	1	1	1	1	1	1	1	1	91.67%	NN, I, E1, P
PAR	*Paspalum repens*	Water Paspalum	1	1		1	1	1	1	1	1	1	1	1	91.67%	N
SPO	*Sabal spp.*	Cabbage Palms, Palmetto	1	1		1	1	1	1	1	1	1		1	83.33%	N
WAX	*Myrica cerifera*	Wax Myrtle	1	1	1	1	1		1	1		1	1	1	83.33%	N
NEA	*Nephrolepsis spp.*	Sword Fern	1	1	1	1	1	1		1	1		1	1	83.33%	N
ADM	*Acrostichum danaeifolium*	Leather Fern	1	1	1	1	1		1	1		1	1		75.00%	N
BOC	*Boehmeria cylindrica*	Bog Hemp, False Nettle	1	1	1	1	1	1			1		1		66.67%	N
SAM	*Sambucus canadensis*	Elderberry	1	1	1	1		1					1	1	58.33%	N
CAM	*Crinum americanum*	Swamp lily		1		1	1	1	1		1	1			58.33%	N
PRS	*Panicum repens*	Torpedo Grass	1	1			1	1	1			1		1	58.33%	NN, I, E1, P
CAL	*Callicarpa americana*	American Beauty Berry	1	1		1	1	1	1	1					58.33%	N
CYF	*Carya floridana*	Scrub Hickory		1		1	1	1	1	1	1				58.33%	N
DBA	*Dioscorea bulbifera*	Air Potato	1			1		1	1		1			1	50.00%	NN, I, E1, P
OCA	*Osmunda cinnamomea*	Cinnamon Fern			1		1		1	1			1	1	50.00%	N
QLA	*Quercus laurifolia*	Laurel Oak		1	1			1		1	1	1			50.00%	N
SMI	*Smilax bona-nox*	Saw Greenbrier Cat Briar	1	1		1		1					1	1	50.00%	N
BMA	*Urochloa mutica*	Para Grass			1	1	1			1				1	41.67%	NN, I, E1, P
BLS	*Blechnum serrulatum*	Swamp Fern					1	1			1		1	1	41.67%	N
DLA	*Dryopteris ludoviciana*	Shield Fern	1	1	1		1	1							41.67%	N
CAQ	*Carya aquatica*	Water Hickory			1		1		1		1	1			41.67%	N
XAA	*Ximenia americana*	Tallow Wood, Hog Plum						1	1	1			1		33.33%	N
WTA	*Sphagneticola (Wedelia) trilobata*	Creeping Oxeye	1				1	1			1				33.33%	NN, I, E2
QGA	*Quercus geminata*	Sand Live Oak	1		1	1	1								33.33%	N
SCA	*Salix caroliniana*	Carolina Willow; Coastalplain Willow		1								1		1	25.00%	N
BPA	*Bidens pilosa*	White Beggar Ticks						1			1			1	25.00%	N
PQA	*Parthenocissus quinquefolia*	Woodbine					1						1	1	25.00%	N
LLA	*Leucaena leucocephala*	White leadtree	1		1					1					25.00%	NN, I, E2
ECM	*Enterolobium contortisiliquum*	Earpod Tree		1	1				1						25.00%	NN
MAH	*Melia azedarach*	Chinaberry Tree	1	1				1							25.00%	NN, I, E2
TRS	*Toxicoendron radicans*	Poison Ivy								1		1	1		25.00%	N

Table 20. Emergent Zone Vegetation Assessment for Rocky Creek between Channel A and Channel G Continued

Plant Species Code	Plant Species	Common Name	Lower Rocky Creek Sample Region												(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	Percent Occurrence	
PIN	*Pinus spp.*	Pine Tree					1			1		1			25.00%	N
ICR	*Ipomea cairica*	Mile a Minute Vine	1					1	1						25.00%	N
PFO	*Paederia foetida*	Skunk Vine		1						1				1	25.00%	NN, I, E1
BHA	*Baccharis halimifolia*	Eastern False Willow, Saltbush	1											1	16.67%	N
CYO	*Cyperus odoratus*	Fragrant Flatsedge			1					1					16.67%	N
MSS	*Mikania scandens*	Climbing Hempvine											1	1	16.67%	N
RVS	*Rumex verticillatus*	Swamp Dock	1		1										16.67%	N
EAA	*Eclipta alba (prostrata)*	False Daisy, Yerba De Tajo						1						1	16.67%	N
SVA	*Sesbania virgata*	Wand Riverhemp	1		1										16.67%	N
DIO	*Diospyros virginiana*	Common Persimmon				1								1	16.67%	N
PCA	*Pontederia cordata*	Pickerel Weed			1									1	16.67%	N
ACE	*Acer rubrum var. trilobum*	Southern Red Maple											1		8.33%	N
ULA	*Urena lobata*	Caesar's Weed			1										8.33%	NN, I, E1
AVS	*Andropogon virginicus var. glaucus*	Broom grass												1	8.33%	N
COS	*Cephalanthus occidentalis*	Common Buttonbush								1					8.33%	N
BRP	*Broussonetia papyrifera*	Paper Mulberry			1										8.33%	NN, I, E2
UAA	*Ulmus americana*	American Elm	1												8.33%	N
EWI	*Echinochloa walteri*	Coast Cockspur Grass (hairy)												1	8.33%	N
RF	*Osmunda regalis*	Royal Fern										1			8.33%	N
IGA	*Ilex glabra*	Inkberry, Gallberry							1						8.33%	N
CCA	*Cinnamomum camphora*	Camphor-tree		1											8.33%	NN, I, E1
COM	*Commelina spp.*	Dayflower		1											8.33%	N
AIA	*Aeschynomene indica*	Indian Joint Vetch												1	8.33%	N
GRA	*Grevillea robusta*	Silkoak												1	8.33%	NN
MVS	*Melalauca viminalis*	Bottlebrush		1											8.33%	NN, I, E2
CNM	*Chasmanthium nitidum*	Shiny Woodoats				1									8.33%	N
LLA	*Ludwigia leptocarpa*	Anglestem Primrosewillow									1				8.33%	N
LRS	*Ludwigia repens*	Creeping Primrosewillow, Red Ludwigia								1					8.33%	N
MGA	*Magnolia grandiflora*	Southern Magnolia			1										8.33%	N

Table 21. Floating Leaved Zone Vegetation Assessment for Rocky Creek between Channel A and Channel G

Plant Species Code	Plant Species	Common Name	Lower Rocky Creek Sample Region												(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	Percent Occurrence	
NLM	*Nuphar lutea var. advena*	Spatterdock, Yellow Pondlily	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N
LEN	*Lemna spp.*	Common Duckweed	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N
ECS	*Eichhornia crassipes*	Water Hyacinth	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E1, P
PSS	*Pistia stratoides*	Water Lettuce	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E1, P
SMA	*Salvinia minima*	Water Spangles, Water Fern	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E1, P
SPI	*Spirodela polyrhiza*	Giant Duckweed	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N

Table 22. Submerged Zone Vegetation Assessment for Rocky Creek between Channel A and Channel G

Plant Species Code	Plant Species	Common Name	Lower Rocky Creek Sample Region												(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	Percent Occurrence	
CDM	*Ceratophyllum demersum*	Coontail	1	1	1	1									33.33%	N
HVA	*Hydrilla verticillata*	Hydrilla, water thyme						1			1	1	1		33.33%	NN, I, E1
HPA	*Hygrophila polysperma*	East Indian Hygophila	1	1	1	1									33.33%	NN, I, E1
NGS	*Najas guadelupensis*	Southern Waternymph			1	1					1				25.00%	N

Figure 43. Photograph of the typical vegetation community of Rocky Creek between Channel A and Channel G. Pictured here are *Salvinia minima*, *Nuphar advena*, *Lemna spp*., *Paspalum repens*, *Colocassia esculenta*, *Crinum Americana*, and *Schinus terebinthifolus*.

Table 23. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Channel G from the Salinity Barrier to the Weir

Parameter	Stream Section	Study Area
Number of Vegetation Assessment Regions	14	111
Total Plant Diversity (# of Taxa)	84	156
% Non-Native Plants	36.91 %	26.28%
Total Pest Plant Species	14	2

Figure 44. Photograph of the typical vegetation communities of Channel G

Figure 45. Map of Vegetation Assessment Site Regions for Channel G from the Salinity Barrier to the Weir

Table 24. Emergent Zone Vegetation Assessment for Channel G from the Salinity Barrier to the Weir

Plant Species Code	Plant Species	Common Name	Channel G Sample Region														(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	Percent Occurrence
CEA	*Colocasia esculenta*	Wild Taro, Dasheen, Coco Yam	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	NN, I, E1, P
APS	*Alternanthera philoxeroides*	Alligator Weed	1	1	1	1	1	1		1	1	1	1		1	1	85.71%	NN, I, E2, P
LPA	*Ludwigia peruviana*	Peruvian Primrosewillow	1	1	1			1	1	1	1	1	1	1	1	1	85.71%	NN, I, E1, P
OCA	*Osmunda cinnamomea*	Cinnamon Fern	1	1	1	1	1	1	1	1	1	1		1	1		85.71%	N
PAR	*Paspalum repens*	Water Paspalum	1		1	1	1	1	1	1	1	1	1		1	1	85.71%	N
SAM	*Sambucus canadensis*	Elderberry	1	1	1	1		1	1	1	1	1	1	1		1	85.71%	N
ACE	*Acer rubrum var. trilobum*	Southern Red Maple		1	1	1	1	1	1	1		1		1	1	1	78.57%	N
STS	*Schinus terebinthifolius*	Brazilian Pepper	1	1	1	1	1	1		1	1	1		1		1	78.57%	NN, I, E1, P
BPA	*Bidens alba*	White Beggar Ticks	1	1	1	1	1		1	1				1	1	1	71.43%	N
CAM	*Crinum americanum*	Swamp lily	1	1	1	1	1		1	1	1	1			1		71.43%	N
PRS	*Panicum repens*	Torpedo Grass	1	1	1	1	1	1	1	1				1		1	71.43%	NN, I, E1, P
QLA	*Quercus laurifolia*	Laurel Oak	1	1		1	1			1		1		1	1	1	64.29%	N
BMA	*Urochloa mutica*	Para Grass	1	1	1	1	1	1	1	1						1	64.29%	NN, I, E1, P
AVS	*Andropogon virginicus var. glaucus*	Broom grass	1	1	1	1	1	1	1	1							57.14%	N
BOC	*Boehmeria cylindrica*	Bog Hemp, False Nettle	1		1	1	1	1		1	1				1		57.14%	N
UAA	*Ulmus americana*	American Elm		1	1	1	1	1	1	1				1			57.14%	N
BHA	*Baccharis halimifolia*	Eastern False Willow, Saltbush		1	1	1		1	1	1	1						50.00%	N
BMI	*Bacopa monnieri*	Common Bacopa, Herb-Of-Grace				1	1	1		1		1	1	1			50.00%	N
SVA	*Sesbania virgata*	Wand Riverhemp		1			1		1	1	1		1	1			50.00%	NN, I, P
WAX	*Myrica cerifera*	Wax Myrtle	1	1					1	1	1	1					42.86%	N
SCA	*Salix caroliniana*	Carolina Willow; Coastalplain Willow		1					1	1	1			1	1		42.86%	N
SMI	*Smilax bona-nox*	Saw Greenbrier Cat Briar		1		1	1	1						1		1	42.86%	N
CAS	*Cupaniopsis anacardioides*	Carotwood	1		1	1	1	1									35.71%	NN, I, E1
CYO	*Cyperus odoratus*	Fragrant Flatsedge	1			1	1			1		1					35.71%	N
MSS	*Mikania scandens*	Climbing Hempvine				1	1	1		1					1		35.71%	N
SPO	*Sabal spp.*	Cabbage Palms, Palmetto	1	1		1				1		1					35.71%	N
SSS	*Solidago sempervirens*	Seaside Goldenrod	1	1	1				1	1							35.71%	N
TOS	*Tradescantia ohiensis*	Bluejacket	1	1	1	1	1										35.71%	N
LAN	*Lantana spp.*	Lantana		1			1	1		1							28.57%	NN
LLA	*Leucaena leucocephala*	White leadtree	1							1	1	1					28.57%	NN, I, E2
PPU	*Pennisetum purpureum*	Elephant Grass, Napier Grass									1	1	1	1			28.57%	NN, I, E1

Table 25. Emergent Zone Vegetation Assessment for Channel G from the Salinity Barrier to the Weir Continued

Plant Species Code	Plant Species	Common Name	Channel G Sample Region															(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	Percent Occurrence	
TYP	*Typha spp.*	Cattails		1				1	1	1							28.57%	N
VRA	*Vitis rotundifolia*	Muscadine Grape										1		1	1	1	28.57%	N
DBA	*Dioscorea bulbifera*	Air Potato								1	1					1	21.43%	NN, I, E1
ICR	*Ipomea cairica*	Mile a Minute Vine								1	1					1	21.43%	NN
LOS	*Ludwigia octovalvis*	Mexican Primrosewillow, Long-stalked Ludwigia				1	1	1									21.43%	N
PHN	*Panicum hemitomon*	Maidencane				1	1			1							21.43%	N
AJN	*Albiza julibrissin*	Silk Tree, Mimosa			1									1			14.29%	NN, I, E1
AAR	*Ambrosia artemisiifolia*	Common Ragweed	1					1									14.29%	N
AAA	*Ampelopsis arborea*	Peppervine				1				1							14.29%	N
CER	*Ceratopteris thalictroides*	Water Sprite										1			1		14.29%	NN
COM	*Commelina spp.*	Dayflower												1	1		14.29%	N
ICA	*Imperata cylindrica*	Cogon Grass			1										1		14.29%	NN, I, E1
QGA	*Quercus geminata*	Sand Live Oak			1	1											14.29%	N
RCS	*Ricinus communis*	Castorbean							1				1				14.29%	NN, I, E2
RVS	*Rumex verticillatus*	Swamp Dock	1				1										14.29%	N
SLA	*Sagittaria lancifolia*	Bulltongue Arrowhead, Duck Potato	1	1													14.29%	N
WTA	*Sphagneticola (Wedelia) trilobata*	Creeping Oxeye	1					1									14.29%	NN, I, E2
ULA	*Urena lobata*	Caesar's Weed										1		1			14.29%	NN, I, E1
AAS	*Amaranthus australis*	Southern Amaranth						1									7.14%	N
BLS	*Blechnum serrulatum*	Swamp Fern	1														7.14%	N
BRP	*Broussonetia papyrifera*	Paper Mulberry										1					7.14%	NN, I, E1
CAL	*Callicarpa americana*	American Beauty Berry										1					7.14%	N
CFA	*Canna flaccida*	Golden Canna, Bandana-Of-The-Everglades	1														7.14%	N
ECM	*Enterolobium contortisiliquum*	Earpod Tree											1				7.14%	NN
ERH	*Erechtites hieracifolia*	Fireweed								1							7.14%	N
EUP	*Eupatorium capillifolium*	Dog Fennel				1											7.14%	N
LJM	*Lygodium japonicum*	Japanese Climbing Fern										1					7.14%	NN, I, E1
MVS	*Melalauca viminalis*	Bottlebrush									1						7.14%	NN, I, E2
MAH	*Melia azedarach*	Chinaberry Tree										1					7.14%	NN, I, E2
NEA	*Nephrolepsis spp.*	Sword Fern												1			7.14%	NN
OHA	*Opuntina humifusa*	Pricklypear					1										7.14%	N
PQA	*Parthenocissus quinquefolia*	Woodbine												1			7.14%	N
PIN	*Pinus spp.*	Pine Tree	1														7.14%	N
PCA	*Pontederia cordata*	Pickerel Weed													1		7.14%	N
QNA	*Quercus nigra*	Water Oak			1												7.14%	N
TGA	*Thalia geniculata*	Fireflag, Arrowroot	1														7.14%	N

Table 26. Floating Leaved Zone Vegetation Assessment for Channel G from the Salinity Barrier to the Weir

Plant Species Code	Plant Species	Common Name	Channel G Sample Region														(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	Percent Occurrence
NLM	*Nuphar lutea var. advena*	Spatterdock, Yellow Pondlily	1	1	1	1	1	1	1	1	1		1		1	1	85.71%	N
LEN	*Lemna spp.*	Common Duckweed	1	1	1	1	1	1	1	1	1	1			1	1	85.71%	N, P
SMA	*Salvinia minima*	Water Spangles, Water Fern	1	1	1	1	1			1	1	1	1	1	1	1	85.71%	NN, I, E1, P
ECS	*Eichhornia crassipes*	Water Hyacinth	1	1	1	1	1	1		1	1		1		1	1	78.57%	NN, I, E1, P
ALG	*Algal Spp.*	Algal Mats, Floating	1	1		1		1	1	1			1	1	1	1	71.43%	N
PSS	*Pistia stratoides*	Water Lettuce	1	1	1	1	1	1	1	1	1				1		71.43%	NN, I, E1, P
HYE	*Hydrocotyl umbellata*	Manyflower Marshpennywort, Water Pennywort				1	1	1		1	1	1	1		1	1	64.29%	N
SPI	*Spirodela polyrhiza*	Giant Duckweed													1		7.14%	N

Table 27. Submerged Zone Vegetation Assessment for Channel G from the Salinity Barrier to the Weir

Plant Species Code	Plant Species	Common Name	Channel G Sample Region														(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	Percent Occurrence
SPY	*Spirogyra spp.*	Filamentous algae/ mats	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100.00%	N, P
CDM	*Ceratophyllum demersum*	Coontail	1	1	1	1	1	1	1	1			1	1	1	1	85.71%	N
HPA	*Hygrophila polysperma*	East Indian Hygophila	1	1	1	1	1	1	1	1	1		1	1	1		85.71%	NN, I, E1, P
ALG	*Algal Spp.*	Algal Mats, Floating	1	1		1		1	1	1			1	1	1	1	71.43%	N
HVA	*Hydrilla verticillata*	Hydrilla, water thyme	1	1		1	1	1	1	1	1		1		1		71.43%	NN, I, E1, P
NGS	*Najas guadelupensis*	Southern Waternymph		1	1	1	1	1		1			1				50.00%	N
LSE	*Limnophila sessiliflora*	Asian Marshweed									1					1	14.29%	NN, I, E1
MAM	*Myriophyllum aquaticum*	Parrot Feather				1									1		14.29%	N
CHA	*Chara spp .*	Muskgrass						1									7.14%	N

Figure 46. At the time of the assessment, Channel G was experiencing a period of low flow coming over the weir. The result was a large bloom of floating aquatic vegetation due to nutrient rich stagnant waters.

Table 28. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Lower Channel A Main and Canals

Parameter	Stream Section	Study Area
Number of Vegetation Assessment Regions	19	111
Total Plant Diversity (# of Taxa)	21	156
% Non-Native Plants	19.05%	26.28%
Total Pest Plant Species	2	2

Figure 47. Typical shoreline vegetation community of Lower Channel A

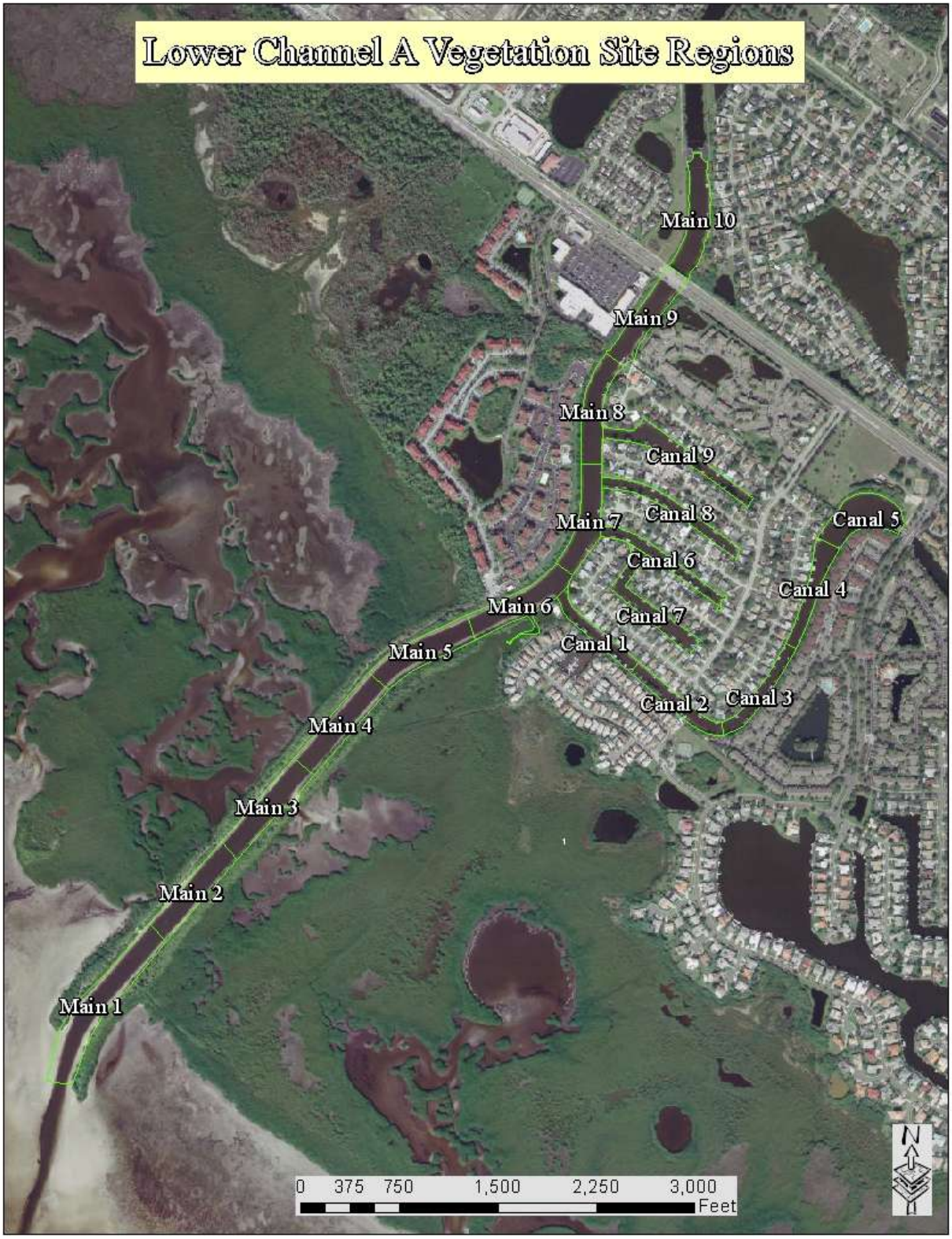


Figure 48. Map of Vegetation Assessment Site Regions for Lower Channel A

Table 29. Emergent Zone Vegetation Assessment for Lower Channel A

Plant Species Code	Plant Species	Common Name	Lower Channel A Main Channel Sample Region										Lower Channel A Canals Sample Region									Percent Occurrence	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9		
RZM	*Rhizophora mangle*	Red Mangrove	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1		1		84.21%	N
STS	*Schinus terebinthifolius*	Brazilian Pepper	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1	1		84.21%	NN, I, E1 P
AVG	*Avicennia germinans*	Black Mangrove	1	1	1	1	1	1	1	1	1	1	1		1	1	1					73.68%	N
SPO	*Sabal spp.*	Cabbage Palms, Palmetto	1	1	1	1	1	1	1	1	1	1	1	1	1		1					73.68%	N
QGA	*Quercus geminata*	Sand Live Oak	1	1	1	1	1	1	1	1	1		1	1	1							63.16%	N
ECM	*Enterolobium contortisiliquum*	Earpod Tree	1	1	1	1	1	1	1	1	1											47.37%	NN, P
SPB	*Spartina bakeri*	Sand Cordgrass	1	1	1	1	1	1				1										36.84%	N
PIN	*Pinus spp.*	Pine Tree	1	1	1	1	1	1					1									36.84%	N
BHA	*Baccharis halimifolia*	Eastern False Willow, Saltbush	1	1	1	1		1														26.32%	N
SHA	*Sesbania herbacea*	Danglepod Sesban	1	1	1	1	1															26.32%	N
BE	*Blutaparon vermiculare*	Silverhead, Saaltweed		1	1							1						1		1		26.32%	N
AVS	*Andropogon virginicus var. glaucus*	Broom grass		1	1	1	1															21.05%	N
LAG	*Laguncularia racemosa*	White Mangrove	1	1		1		1														21.05%	N
JVA	*Juniperus virginiana*	Red Cedar	1	1	1																	15.79%	N
BPA	*Bidens alba*	White Beggar Ticks	1				1															10.53%	N
JRO	*Juncus roemerianus*	Needle Rush, Black Rush										1	1									10.53%	N
TYP	*Typha spp.*	Cattails										1					1					10.53%	N
CIS	*Cyperus involucratus*	Umbrella flat sedge										1										5.26%	NN, I, E2
EUP	*Eupatorium capillifolium*	Dog Fennel					1															5.26%	N
WAX	*Myrica cerifera*	Wax Myrtle						1														5.26%	N
LLA	*Leucaena leucocephala*	White leadtree															1					5.26%	NN, I, E2

Table 30. Total Diversity, Percent Exotics, and Number of Pest Plant Species for Rocky Creek below Channel G Salinity Barrier Main and Canals

Parameter	Stream Section	Study Area
Number of Vegetation Assessment Regions	34	111
Total Plant Diversity (# of Taxa)	61	156
% Non-Native Plants	31.15%	26.28%
Total Pest Plant Species	1	2

Figure 49. Photograph of the typical shoreline vegetation communities of Rocky Creek below the Channel G salinity barrier

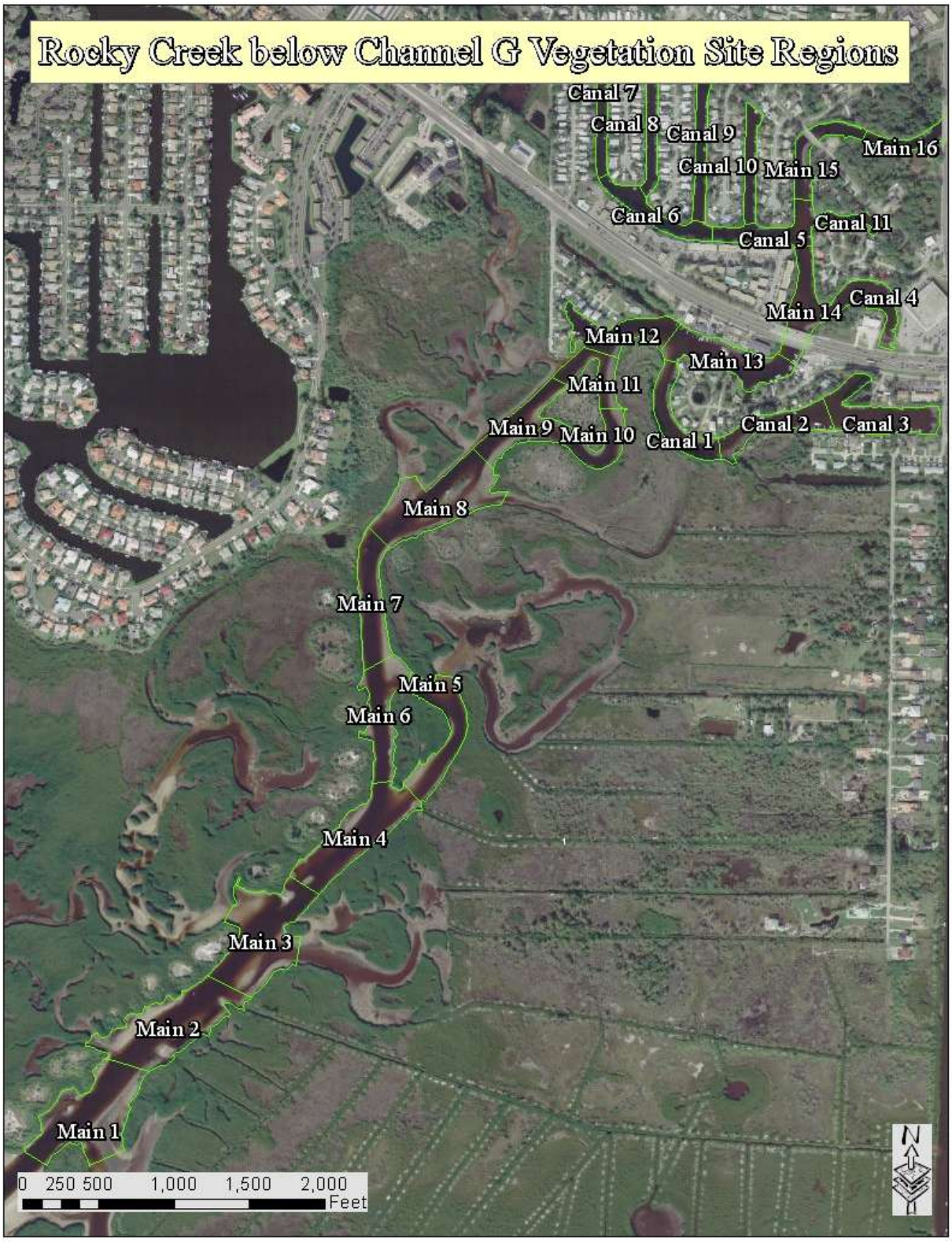


Figure 50. Map of the Vegetation Assessment Site Regions for Rocky Creek below the Channel G Salinity Barrier Part 1

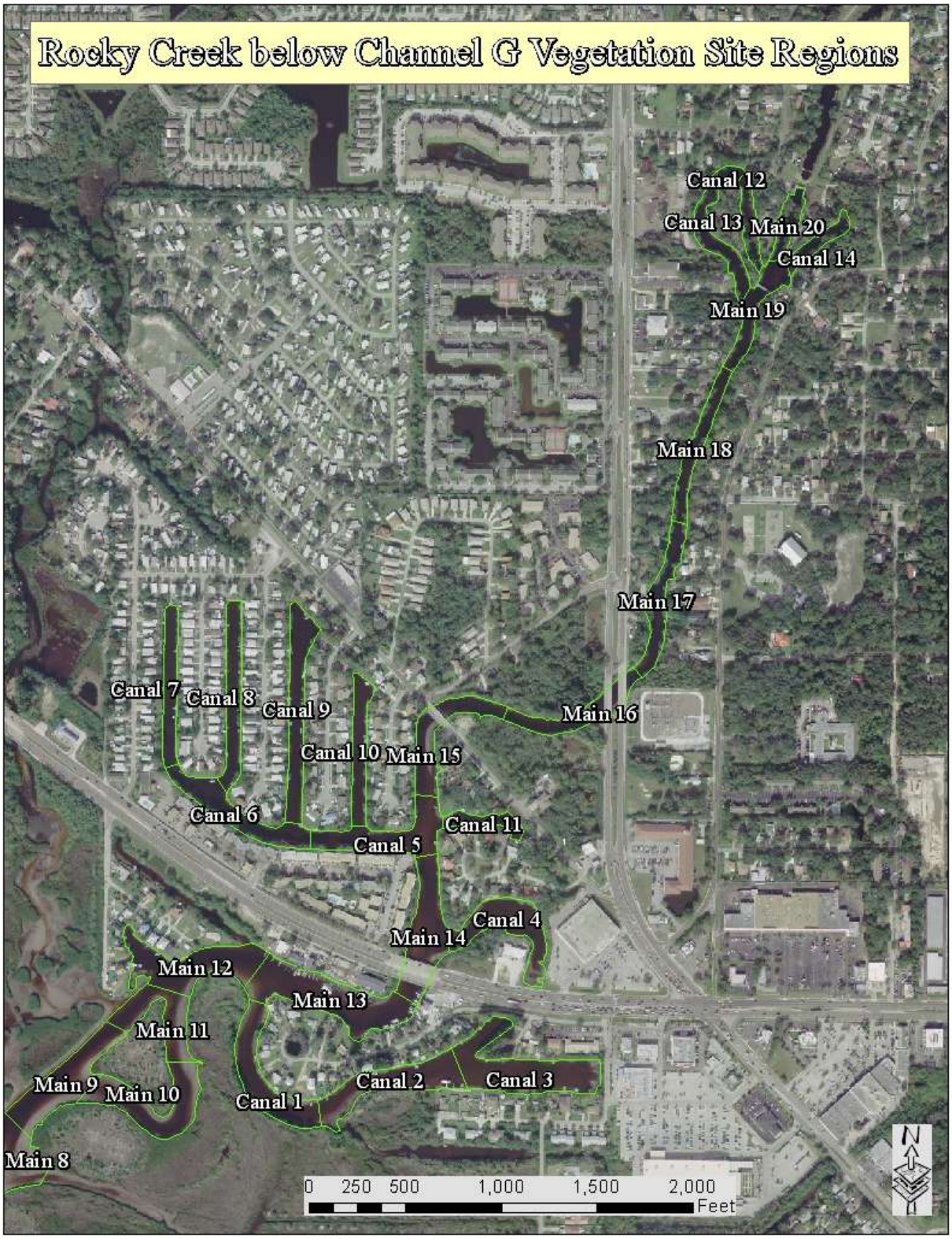


Figure 51. Map of the Vegetation Assessment Site Regions for Rocky Creek below the Channel G Salinity Barrier Part 2

Table 31. Emergent Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Main Channel. Percent Occurrence is for Main Channel and Canals.

Plant Species Code	Plant Species	Common Name	Rocky Creek below Channel G Salinity Barrier Main Channel																				Percent Occurrence	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
STS	*Schinus terebinthifolius*	Brazilian Pepper	1		1				1		1	1	1	1	1	1	1	1	1	1	1	1	76.47%	NN, I, E1, P
ADM	*Acrostichum danaeifolium*	Leather Fern									1	1	1	1		1	1	1	1	1	1	1	61.76%	N
RZM	*Rhizophora mangle*	Red Mangrove	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						61.76%	N
SPO	*Sabal spp.*	Cabbage Palms, Palmetto	1		1			1	1	1	1	1		1		1	1	1	1		1	1	55.88%	N
JRO	*Juncus roemerianus*	Needle Rush, Black Rush			1					1	1	1	1	1		1	1	1					38.24%	N
BHA	*Baccharis halimifolia*	Eastern False Willow, Saltbush			1				1	1	1	1	1			1							35.29%	N
CLA	*Casuarina equisetifolia*	Australian Pine			1									1	1		1	1			1		35.29%	NN, I, E1
PIN	*Pinus spp.*	Pine Tree									1	1	1				1	1	1		1	1	32.35%	N
AVG	*Avicennia germinans*	Black Mangrove	1	1	1			1	1	1		1	1	1									29.41%	N
AJN	*Albiza julibrissin*	Silk Tree, Mimosa												1	1	1	1	1					26.47%	NN, I, E1
QLA	*Quercus laurifolia*	Laurel Oak																		1	1		26.47%	N
CAM	*Crinum americanum*	Swamp lily												1			1		1		1		23.53%	N
LLA	*Leucaena leucocephala*	White leadtree																	1	1	1	1	23.53%	NN, I, E2
QGA	*Quercus geminata*	Sand Live Oak	1			1			1		1	1		1		1						1	23.53%	N
ACM	*Aster carolinianum*	Climbing Aster														1		1	1	1		1	20.59%	N
CIS	*Cyperus involucratus*	Umbrella flat sedge															1			1	1		20.59%	NN, I, E2
BE	*Blutaparon vermiculare*	Silverhead, Saltweed	1						1					1	1	1							17.65%	N
PRS	*Panicum repens*	Torpedo Grass												1	1		1	1			1		17.65%	NN, I, E1
WTA	*Sphagneticola (Wedelia) trilobata*	Creeping Oxeye																1	1			1	17.65%	NN, I, E2
APS	*Alternanthera philoxeroides*	Alligator Weed														1			1	1			14.71%	NN, I, E2
AVS	*Andropogon virginicus var. glaucus*	Broom grass			1				1		1												14.71%	N
BPA	*Bidens alba*	White Beggar Ticks														1		1	1	1		1	14.71%	N
CCA	*Cinnamomum camphora*	Camphor-tree																		1			14.71%	NN, I, E1
JVA	*Juniperus virginiana*	Red Cedar			1											1							14.71%	N
SSS	*Solidago sempervirens*	Seaside Goldenrod	1								1			1									14.71%	N
VRA	*Vitis rotundifolia*	Muscadine Grape																1	1			1	14.71%	N
CAS	*Cupaniopsis anacardioides*	Carotwood																	1	1		1	11.76%	NN, I, E1
MEL	*Melaleuca quinquenervia*	Punk Tree, Melaleuca									1			1			1						11.76%	NN, I, E1
QVA	*Quercus virginiana*	Live Oak															1	1	1	1			11.76%	N
COC	*Coccoloba uvifera*	Seagrape															1						8.82%	N

Table 32. Emergent Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Main Channel Continued. Percent Occurrence is for Main Channel and Canals.

Plant Species Code	Plant Species	Common Name	Rocky Creek below Channel G Salinity Barrier Main Channel																			Percent Occurrence	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
WAX	*Myrica cerifera*	Wax Myrtle											1					1					8.82%	N
RVS	*Rumex verticillatus*	Swamp Dock																1	1	1			8.82%	N
UAA	*Ulmus americana*	American Elm																	1	1			8.82%	N
XAA	*Ximenia americana*	Tallow Wood, Hog Plum															1	1					8.82%	N
AAS	*Amaranthus australis*	Southern Amaranth																			1	1	5.88%	N
BMI	*Bacopa monnieri*	Common Bacopa, Herb-Of-Grace												1		1							5.88%	N
CJE	*Cladium jamaicense*	Jamaica Swamp Saw Grass															1						5.88%	N
CLG	*Cyperus ligularis*	Swamp Flatsedge	1								1												5.88%	N
MAH	*Melia azedarach*	Chinaberry Tree																	1	1			5.88%	NN, I, E2
OHA	*Opuntina humifusa*	Pricklypear									1				1								5.88%	N
RBA	*Ruellia simplex*	Britton's Wild Petunia									1		1										5.88%	NN, I, E1
SAM	*Sambucus canadensis*	Elderberry																	1				5.88%	N
SPB	*Spartina bakeri*	Sand Cordgrass							1														5.88%	N
ACE	*Acer rubrum var. trilobum*	Southern Red Maple																	1				2.94%	N
BRP	*Broussonetia papyrifera*	Paper Mulberry																	1				2.94%	NN, I, E1
CEA	*Colocasia esculenta*	Wild Taro, Dasheen, Coco Yam																		1			2.94%	NN, I, E1
COM	*Commelina spp.*	Dayflower																	1				2.94%	N
CYO	*Cyperus odoratus*	Fragrant Flatsedge																			1		2.94%	N
DBA	*Dioscorea bulbifera*	Air Potato							1														2.94%	NN, I, E1
FCA	*Fraxinus caroliniana*	Pop Ash																				1	2.94%	N
GTM	*Galium tinctorium*	Marsh Bedstraw																	1				2.94%	N
IAA	*Ipomoea aquatica*	Water Spinach													1								2.94%	NN, I, E1
LAG	*Laguncularia racemosa*	White Mangrove																					2.94%	N
LAN	*Lantana spp.*	Lantana																					2.94%	NN
MGA	*Magnolia grandiflora*	Southern Magnolia											1										2.94%	N
NEA	*Nephrolepsis spp.*	Sword Fern																					2.94%	NN
PQA	*Parthenocissus quinquefolia*	Woodbine			1																		2.94%	N
PRC	*Prunus caroliniana*	Carolina Laurelcherry																1					2.94%	N
QNA	*Quercus nigra*	Water Oak															1						2.94%	N
SMI	*Smilax bona-nox*	Saw Greenbrier Cat Briar																					2.94%	N
TYP	*Typha spp.*	Cattails															1						2.94%	N

Table 33. Emergent Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Canals. Percent Occurrence is for Main Channel and Canals.

Plant Species Code	Plant Species	Common Name	Rocky Creek below Channel G Salinity Barrier Canals														Percent Occurrence	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		
STS	*Schinus terebinthifolius*	Brazilian Pepper	1	1	1	1				1	1	1	1	1	1	1	76.47%	NN, I, E1, P
ADM	*Acrostichum danaeifolium*	Leather Fern	1	1		1	1	1				1	1	1	1	1	61.76%	N
RZM	*Rhizophora mangle*	Red Mangrove	1	1	1	1	1	1									61.76%	N
SPO	*Sabal spp.*	Cabbage Palms, Palmetto	1			1					1			1		1	55.88%	N
JRO	*Juncus roemerianus*	Needle Rush, Black Rush	1	1	1								1				38.24%	N
BHA	*Baccharis halimifolia*	Eastern False Willow, Saltbush	1	1			1					1			1		35.29%	N
CLA	*Casuarina equisetifolia*	Australian Pine	1	1	1		1							1	1		35.29%	NN, I, E1
PIN	*Pinus spp.*	Pine Tree												1	1	1	32.35%	N
AVG	*Avicennia germinans*	Black Mangrove		1													29.41%	N
AJN	*Albiza julibrissin*	Silk Tree, Mimosa	1	1	1	1											26.47%	NN, I, E1
QLA	*Quercus laurifolia*	Laurel Oak	1	1	1	1							1	1		1	26.47%	N
CAM	*Crinum americanum*	Swamp lily											1	1	1	1	23.53%	N
LLA	*Leucaena leucocephala*	White leadtree									1			1	1	1	23.53%	NN, I, E2
QGA	*Quercus geminata*	Sand Live Oak															23.53%	N
ACM	*Aster carolinianum*	Climbing Aster					1									1	20.59%	N
CIS	*Cyperus involucratus*	Umbrella flat sedge					1	1						1	1		20.59%	NN, I, E2
BE	*Blutaparon vermiculare*	Silverhead, Saltweed			1												17.65%	N
PRS	*Panicum repens*	Torpedo Grass			1												17.65%	NN, I, E1
WTA	*Sphagneticola (Wedelia) trilobata*	Creeping Oxeye										1	1	1			17.65%	NN, I, E2
APS	*Alternanthera philoxeroides*	Alligator Weed													1	1	14.71%	NN, I, E2
AVS	*Andropogon virginicus var. glaucus*	Broom grass	1												1		14.71%	N
BPA	*Bidens alba*	White Beggar Ticks															14.71%	N
CCA	*Cinnamomum camphora*	Camphor-tree								1	1			1	1		14.71%	NN, I, E1
JVA	*Juniperus virginiana*	Red Cedar		1	1	1											14.71%	N
SSS	*Solidago sempervirens*	Seaside Goldenrod	1	1													14.71%	N
VRA	*Vitis rotundifolia*	Muscadine Grape												1	1		14.71%	N
CAS	*Cupaniopsis anacardioides*	Carotwood					1										11.76%	NN, I, E1
MEL	*Melaleuca quinquenervia*	Punk Tree, Melaleuca	1														11.76%	NN, I, E1
QVA	*Quercus virginiana*	Live Oak															11.76%	N
COC	*Coccoloba uvifera*	Seagrape					1			1							8.82%	N

Table 34. Emergent Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Canals Continued. Percent Occurrence is for Main Channel and Canals.

Plant Species Code	Plant Species	Common Name	Rocky Creek below Channel G Salinity Barrier Canals														Percent Occurrence	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		
WAX	*Myrica cerifera*	Wax Myrtle												1			8.82%	N
RVS	*Rumex verticillatus*	Swamp Dock															8.82%	N
UAA	*Ulmus americana*	American Elm												1			8.82%	N
XAA	*Ximenia americana*	Tallow Wood, Hog Plum													1		8.82%	N
AAS	*Amaranthus australis*	Southern Amaranth															5.88%	N
BMI	*Bacopa monnieri*	Common Bacopa, Herb-Of-Grace															5.88%	N
CJE	*Cladium jamaicense*	Jamaica Swamp Saw Grass											1				5.88%	N
CLG	*Cyperus ligularis*	Swamp Flatsedge															5.88%	N
MAH	*Melia azedarach*	Chinaberry Tree															5.88%	NN, I, E2
OHA	*Opuntina humifusa*	Pricklypear															5.88%	N
RBA	*Ruellia simplex*	Britton's Wild Petunia															5.88%	NN, I, E1
SAM	*Sambucus canadensis*	Elderberry														1	5.88%	N
SPB	*Spartina bakeri*	Sand Cordgrass											1				5.88%	N
ACE	*Acer rubrum var. trilobum*	Southern Red Maple															2.94%	N
BRP	*Broussonetia papyrifera*	Paper Mulberry															2.94%	NN, I, E1
CEA	*Colocasia esculenta*	Wild Taro, Dasheen, Coco Yam															2.94%	NN, I, E1
COM	*Commelina spp.*	Dayflower															2.94%	N
CYO	*Cyperus odoratus*	Fragrant Flatsedge															2.94%	N
DBA	*Dioscorea bulbifera*	Air Potato															2.94%	NN, I, E1
FCA	*Fraxinus caroliniana*	Pop Ash															2.94%	N
GTM	*Galium tinctorium*	Marsh Bedstraw															2.94%	N
IAA	*Ipomoea aquatica*	Water Spinach															2.94%	NN, I, E1
LAG	*Laguncularia racemosa*	White Mangrove		1													2.94%	N
LAN	*Lantana spp.*	Lantana									1						2.94%	NN
MGA	*Magnolia grandiflora*	Southern Magnolia															2.94%	N
NEA	*Nephrolepsis spp.*	Sword Fern														1	2.94%	NN
PQA	*Parthenocissus quinquefolia*	Woodbine															2.94%	N
PRC	*Prunus caroliniana*	Carolina Laurelcherry															2.94%	N
QNA	*Quercus nigra*	Water Oak															2.94%	N
SMI	*Smilax bona-nox*	Saw Greenbrier Cat Briar														1	2.94%	N
TYP	*Typha spp.*	Cattails															2.94%	N

Table 35. Submerged Vegetation Zone Assessment for Rocky Creek below the Channel G Salinity Barrier, Main Channel. Percent Occurrence is for Main Channel and Canals.

Plant Species Code	Plant Species	Common Name	Rocky Creek below Channel G Salinity Barrier Main Channel																			Percent Occurrence	(N) Native, (NN) Non-native, (I) Invasive, (E1,E2) Exotic , (P) Pest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
GRA	*Gracilaria spp.*	Gracilaria algae species	1	1	1																		8.82%	N
HWI	*Halodule wrightii*	Shoal Grass	1	1																			5.88%	N
ULV	*Ulva spp.*	Ulva algae species	1																				2.94%	N

Discussion of Vegetation Assessment Results

The highest diversity of species found in the Rocky creek study area was in the natural region of rocky Creek above the weir on Channel A. In this region 103 species were identified. 26.21% of these species were non-native to Florida and 6 species were considered pest plants for this region. Channel G from the salinity barrier to the weir had the second highest number of species identified (84), but also the highest percentage of non-native species (36.91%) and the highest number of pest plant species (14) present. Rocky Creek below the Channel G salinity barrier was the most varied in terms of habitat of the region. At the mouth at Upper Tampa Bay, Rocky Creek is a predominately tidal salt water habitat dominated by *Rhizophora mangle* with many winding back bays and spoil island estuaries. This lower region also contained seagrasses and macroalgae typical of marine habitats. There is a gradient of marine to freshwater stream habitat that becomes dominated by freshwater stream vegetation near vegetation region 16.

The Rocky Creek study area has moderate submerged vegetation communities primarily in Channel A, Channel G and Rocky Creek in the region of each between the salinity barriers and the weirs. The submerged vegetation zones in these three areas were dominated by the invasive species *hydrilla verticillata* and *hygrophila polysperma* as well as the native species *spirogyra spp* (algal mats) and *ceratophyllum demersum*. Channel G between the salinity barrier and the weir, in particular, had a high biomass of the invasive species.

Section 3: Long-term Ambient Stream Water Chemistry

A critical element in any stream assessment is the long-term water chemistry data set. These data are obtained from several data sources that are available to the Water Atlas and are managed in the Water Atlas Data Download and graphically presented on the water quality page for streams in Hillsborough County.

The Rocky Creek Water Quality Page can be viewed at:
http://www.hillsborough.wateratlas.usf.edu/river/waterquality.asp?wbodyid=66&wbodyatlas=river

The Channel A Water Quality Page can be viewed at:

http://www.hillsborough.wateratlas.usf.edu/river/waterquality.asp?wbodyid=21&wbodyatlas=river

The Channel G Water Quality Page can be viewed at:

http://www.hillsborough.wateratlas.usf.edu/river/waterquality.asp?wbodyid=197&wbodyatlas=river

A primary source of stream water chemistry in Hillsborough County is the Routine Monitoring Sampling by the Hillsborough County Environmental Protection Commission. These data are displayed and analyzed on the Water Atlas as shown in Figure **Error! Reference source not found.**52 through Figure 69 for the Rocky Creek Study Area. The figures are graphs of: (1) the overall water quality index (WQI), which is a method commonly used to characterize the productivity of a stream, and may be thought of as a stream's ability to support plant growth and a healthy food source for aquatic life; (2) the chlorophyll *a* concentration, which indicates the stream's algal concentration, and (3) the stream's Secchi Disk depth which is a measure of water visibility and depth of light penetration. These data are used to evaluate a stream's ecological health and to provide a method of ranking stream's and are indicators used by the US Environmental Protection Agency (USEPA) and the Florida Department of Environmental Protection (FDEP) to determine a stream's level of impairment. The Secchi Disk depth graphs include benchmarks which indicate the median values for a large number of streams in Florida expressed as percentiles.

Based on best available data, Rocky Creek above the Channel A Weir has a color value determined as a platinum cobalt unit (pcu) value of 90.9 and is considered a dark water stream (has a mean color in pcu equal to or below 40). Channel A from the Salinity Barrier to the Weir has a color value determined as a platinum cobalt unit (pcu) value of 90.9 and is considered a dark water stream (has a mean color in pcu equal to or below 40). Rocky Creek between Channel A and Channel G has a color value determined as

a platinum cobalt unit (pcu) value of 88.5 and is considered a dark water stream (has a mean color in pcu equal to or below 40). Channel g from the Salinity Barrier to the Weir has a color value determined as a platinum cobalt unit (pcu) value of 59.3 and is considered a dark water stream (has a mean color in pcu equal to or below 40). The FDEP and USEPA may classify a stream as impaired if the stream is a dark stream (has a mean color in pcu greater than 40) and has a WQI greater than 60, or is a clear stream and has a WQI greater than 40.

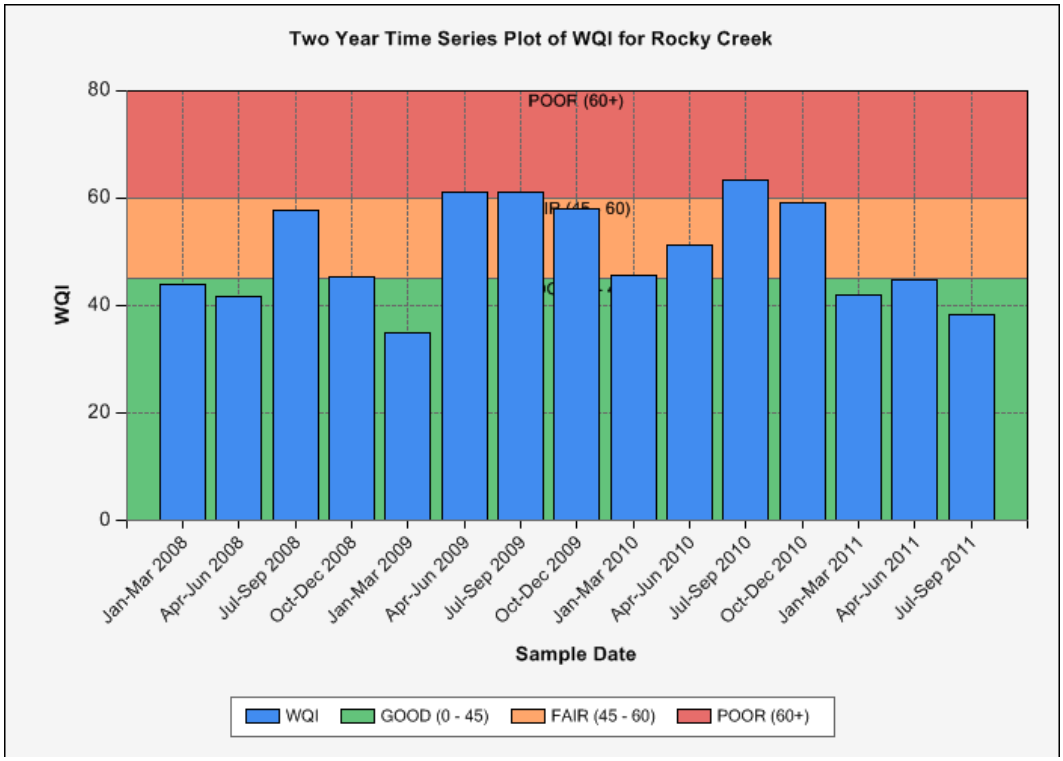


Figure 52. Graph of Water Quality Index for Rocky Creek above the Weir

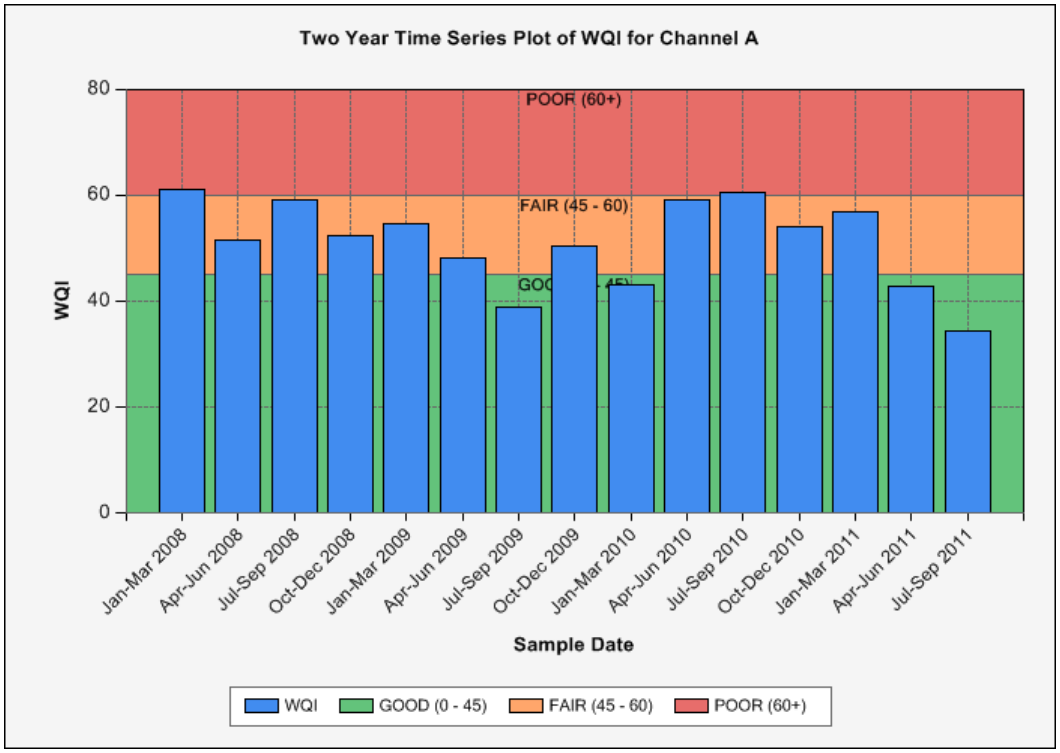


Figure 53. Graph of Water Quality Index for Channel A from the Salinity Barrier to the Weir

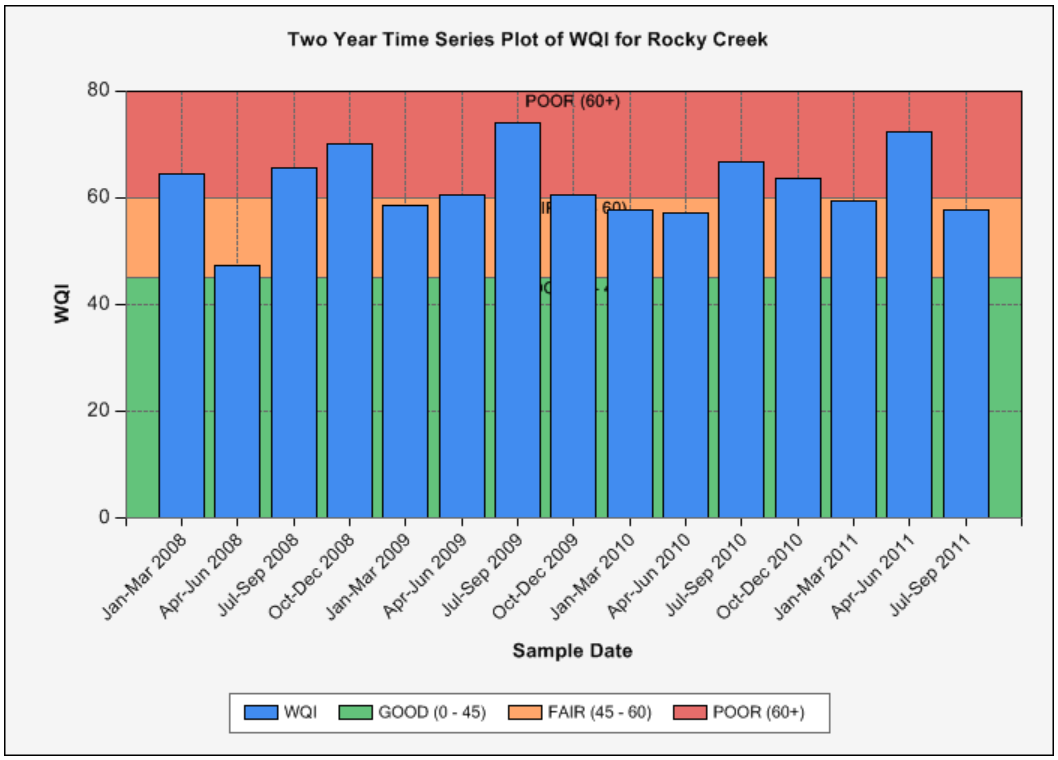


Figure 54. Graph of Water Quality Index for Rocky Creek between Channel A and Channel G

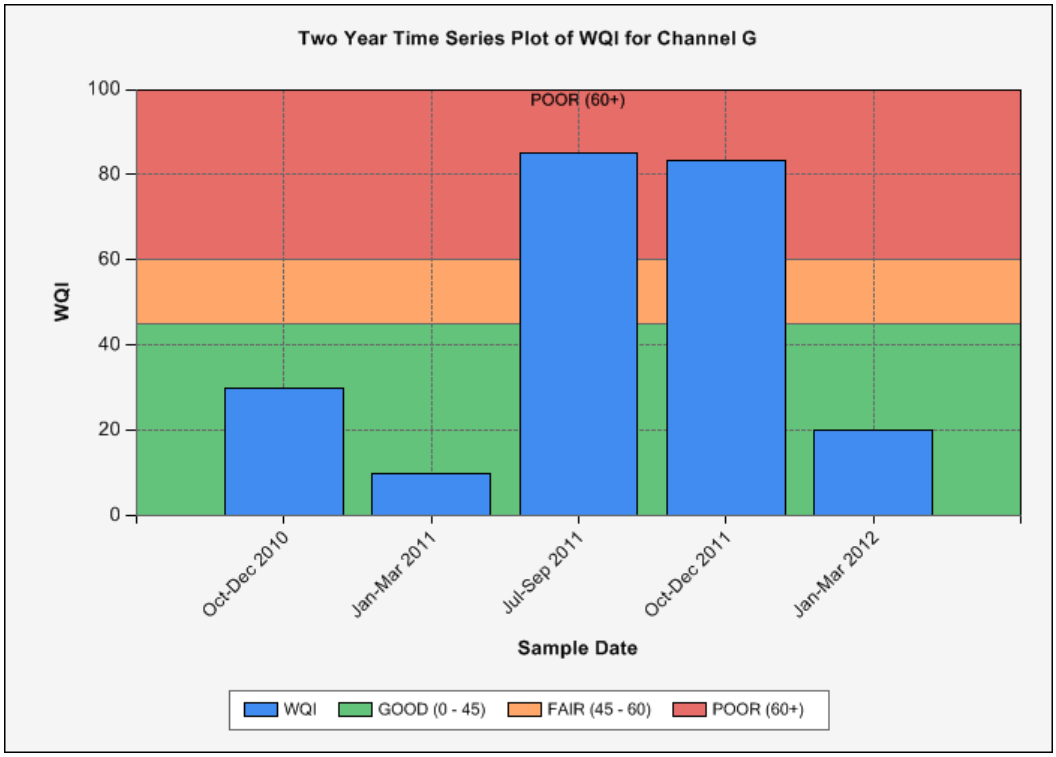


Figure 55. Graph of Water Quality Index for Channel G from the Salinity Barrier to the Weir

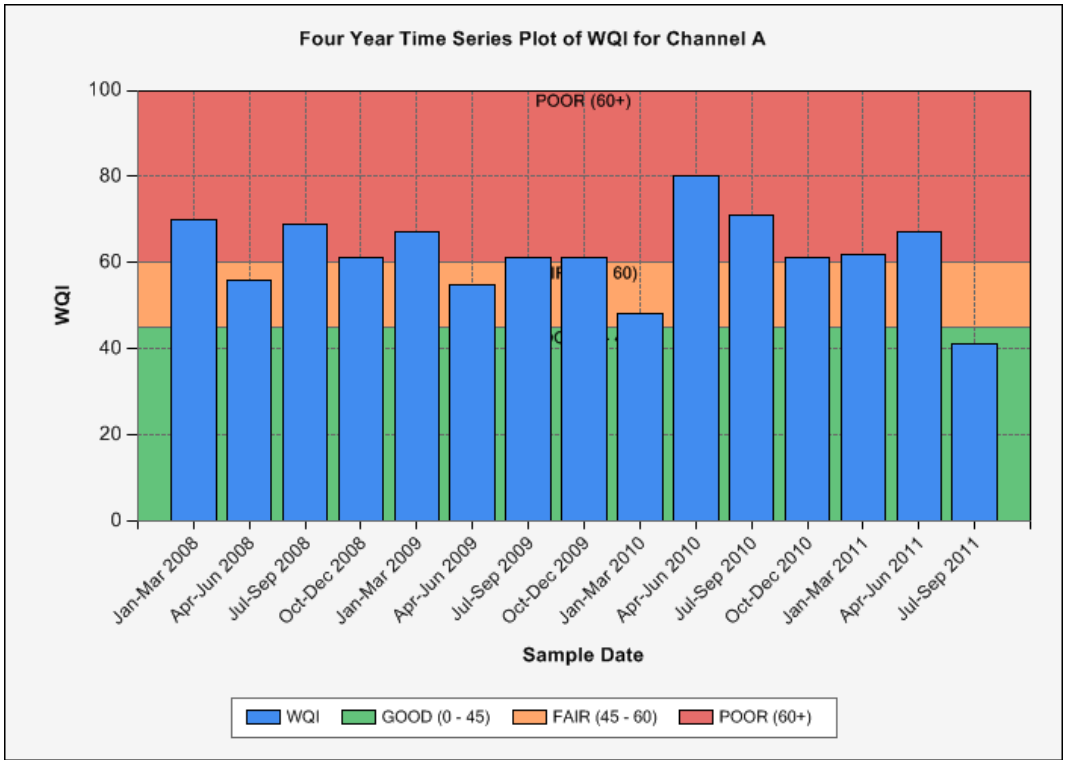


Figure 56. Graph of Water Quality Index for Channel A below the Salinity Barrier

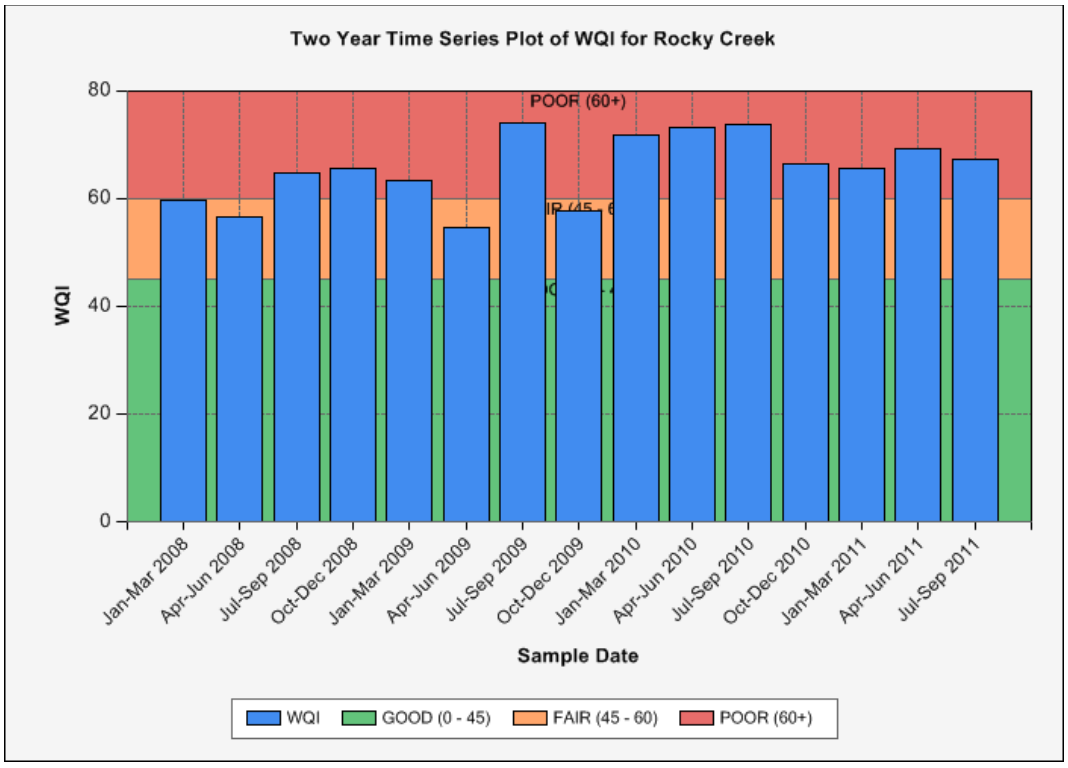


Figure 57. Graph of Water Quality Index for Rocky Creek below the Channel G Salinity Barrier

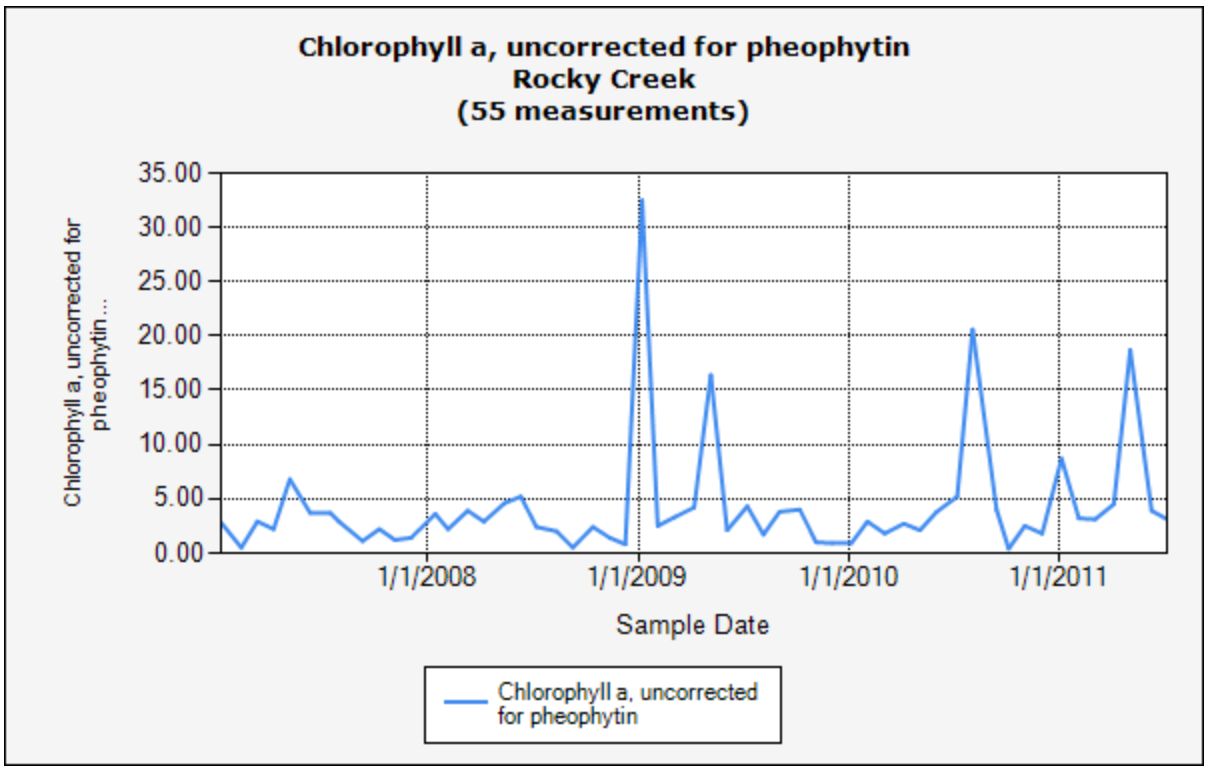


Figure 58. Graph of Chlorophyll-a uncorrected for pheophytin for Rocky Creek above the Weir

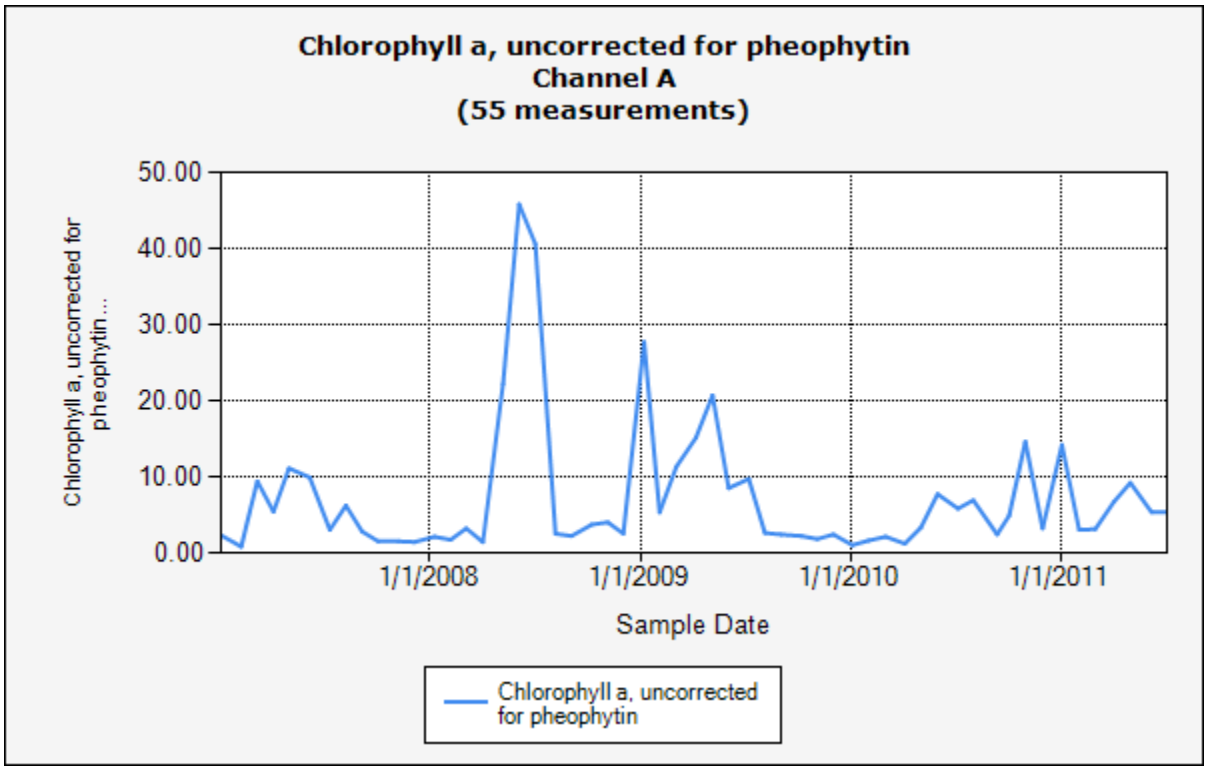


Figure 59. Graph of Chlorophyll-a uncorrected for pheophytin for Channel A from the Salinity Barrier to the Weir

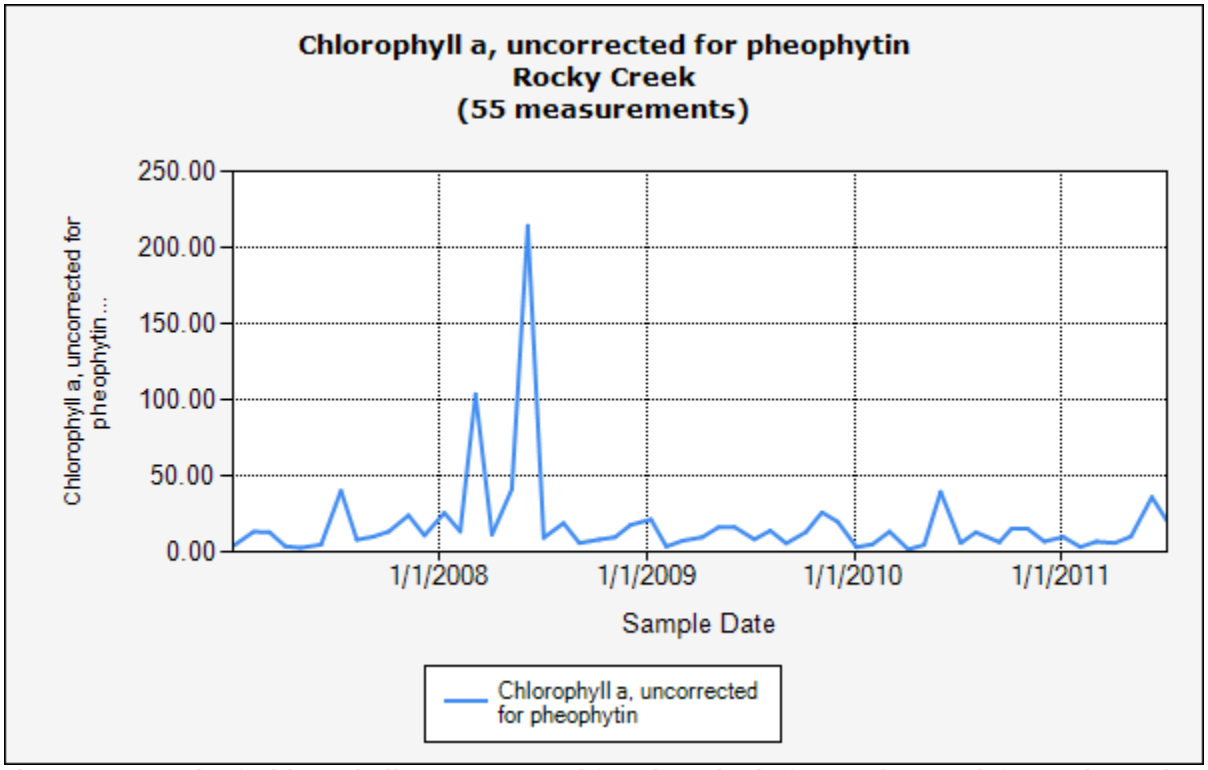


Figure 60. Graph of Chlorophyll-a uncorrected for pheophytin for Rocky Creek from Channel A to Channel G

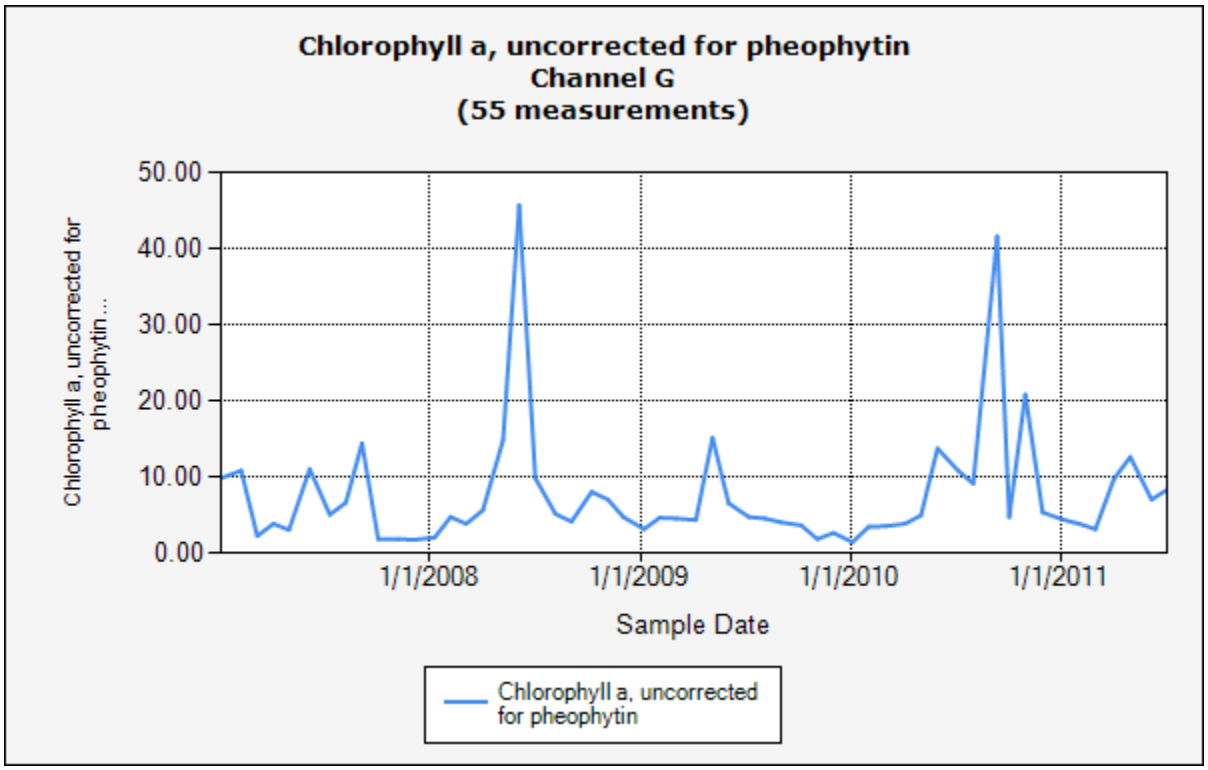


Figure 61. Graph of Chlorophyll-a uncorrected for pheophytin for Channel G from the Salinity Barrier to the Weir

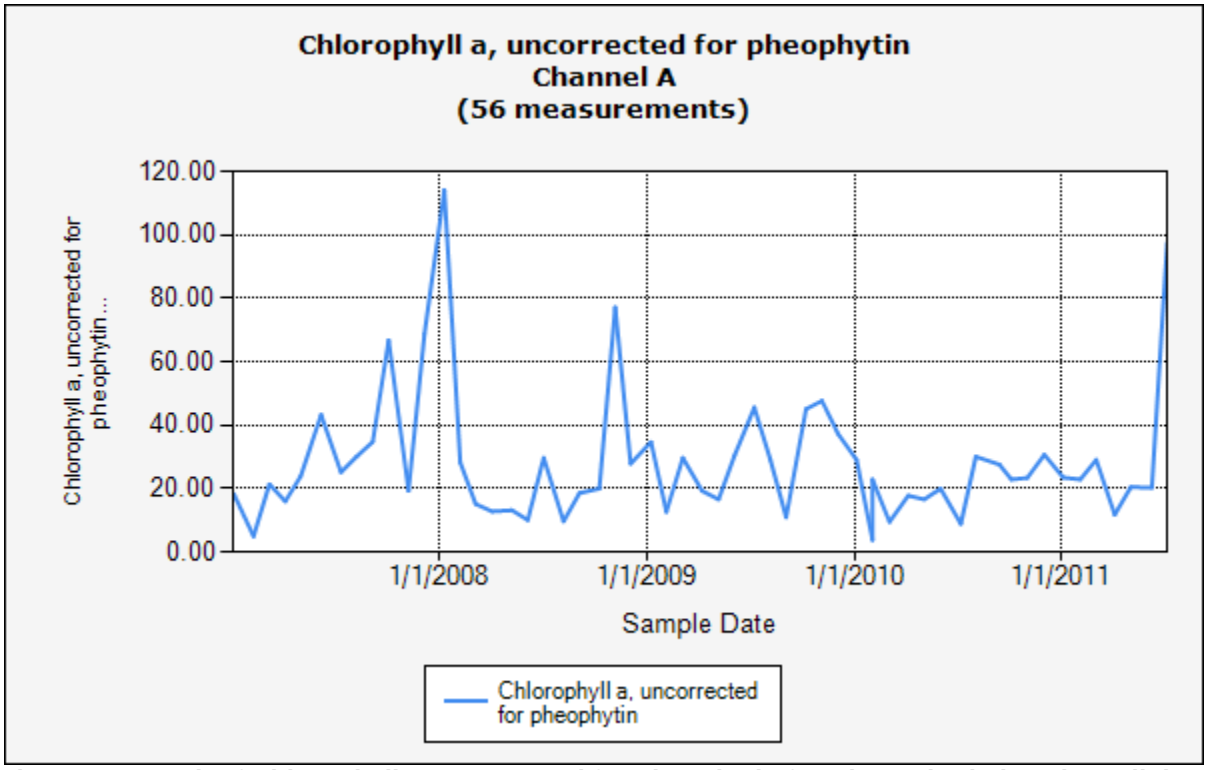


Figure 62. Graph of Chlorophyll-a uncorrected for pheophytin for Channel A below the Salinity Barrier

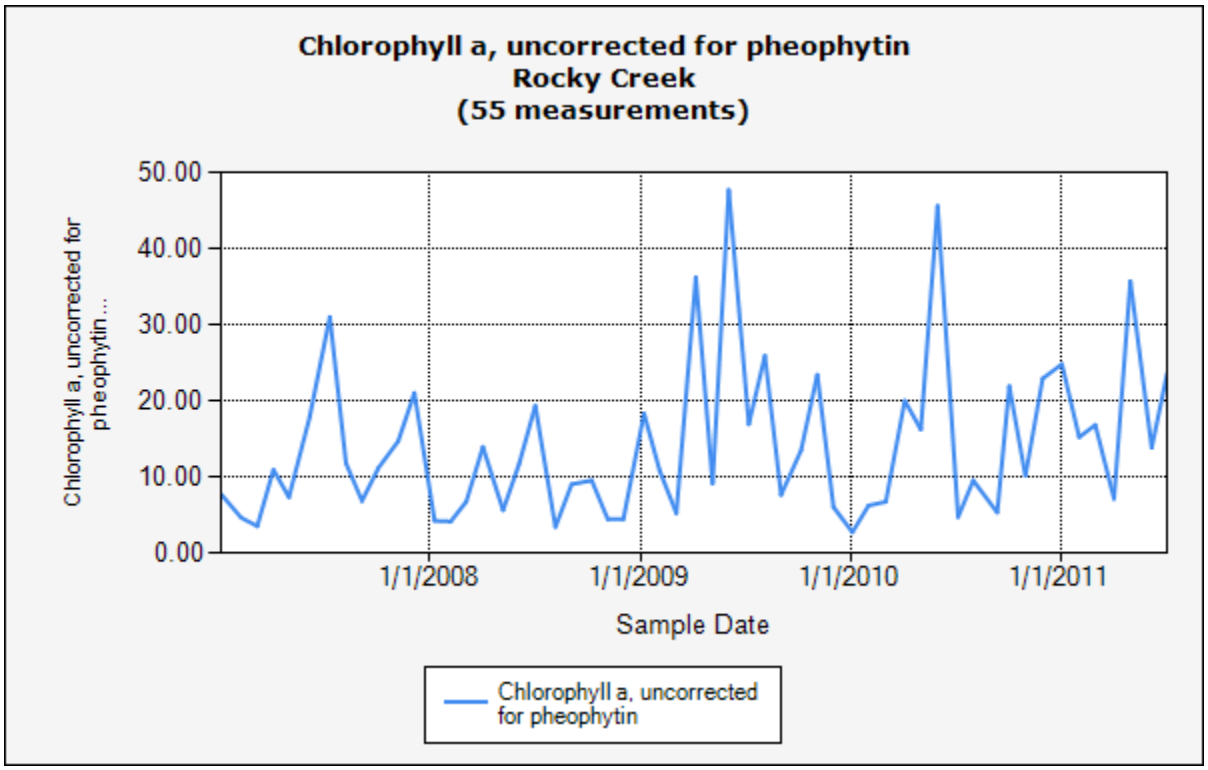


Figure 63. Graph of Chlorophyll-a uncorrected for pheophytin for Rocky Creek below the Channel G Salinity Barrier

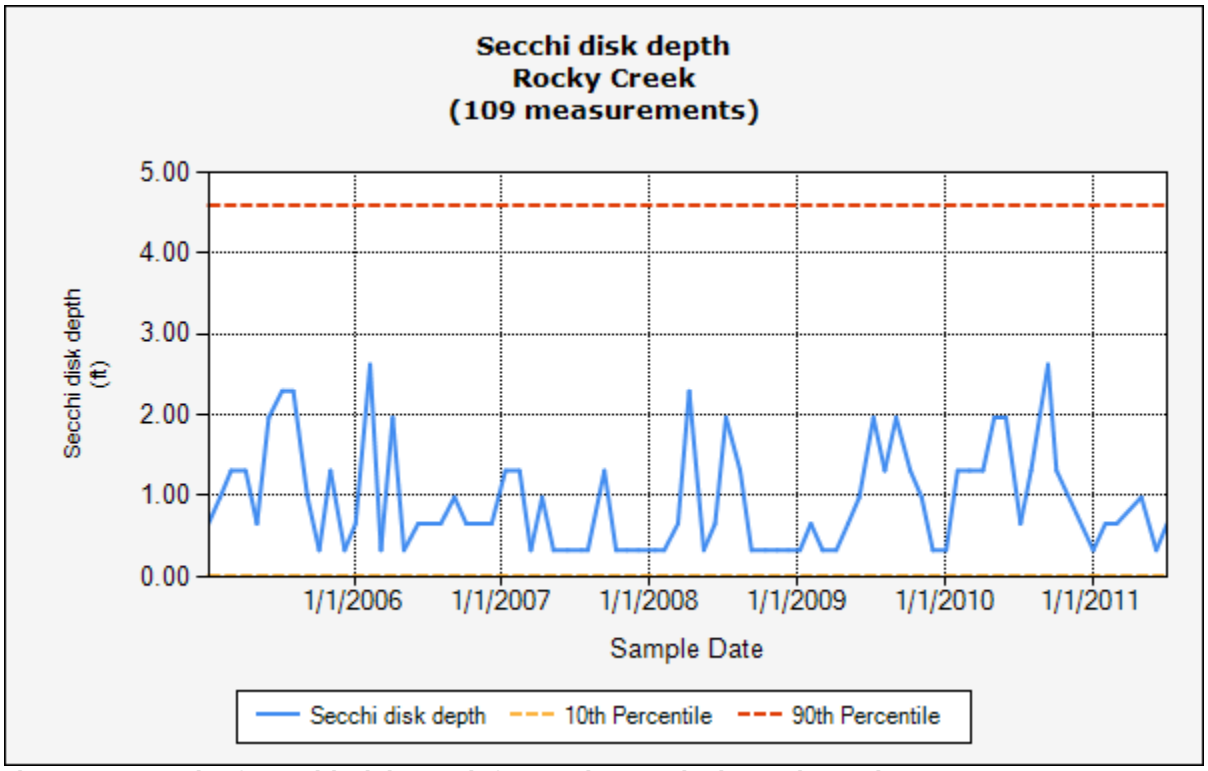


Figure 64. Graph of Secchi Disk Depth for Rocky Creek above the Weir

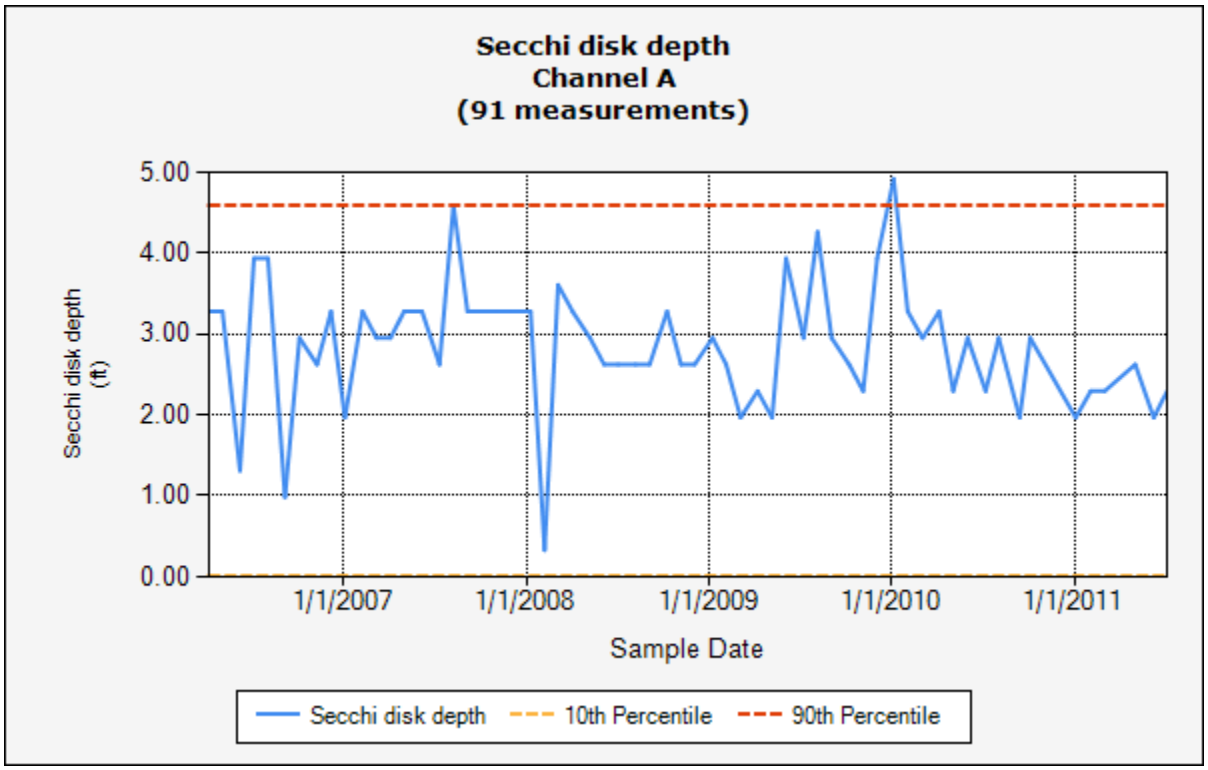


Figure 65. Graph of Secchi Disk Depth for Channel A form the Salinity Barrier to the Weir

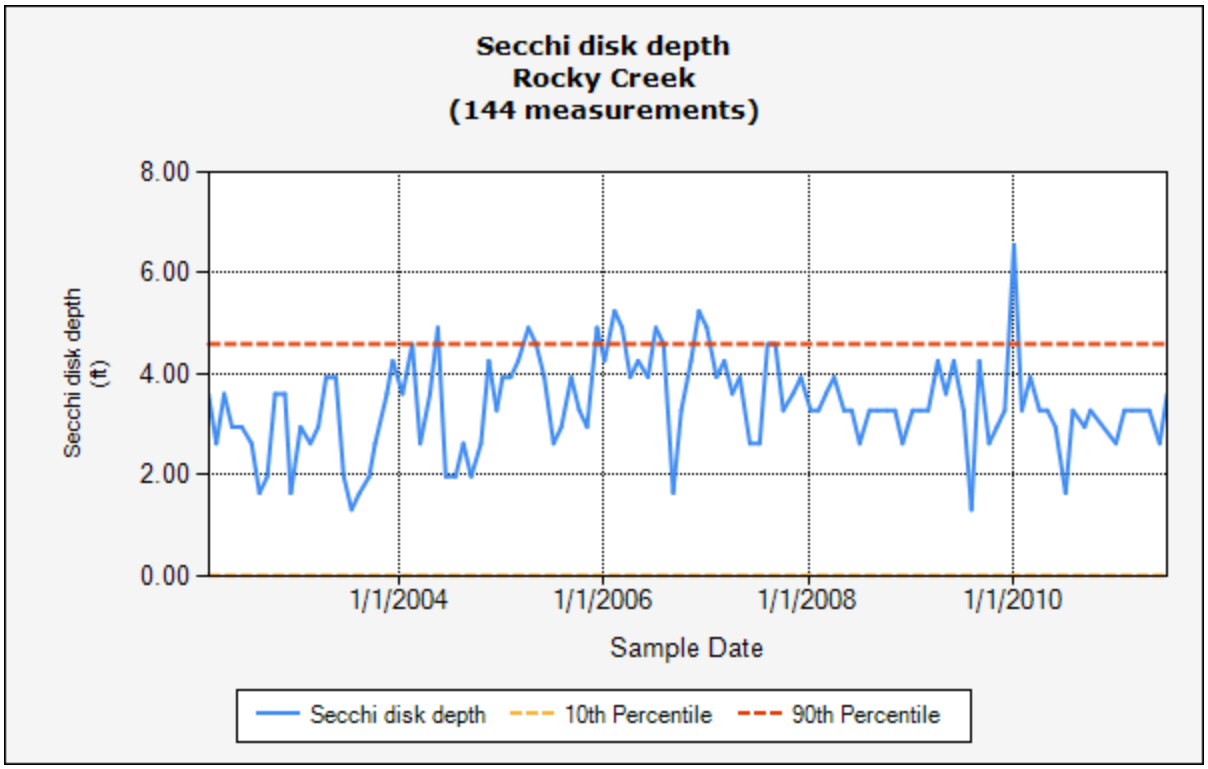


Figure 66. Graph of Secchi Disk Depth for Rocky Creek between Channel A and Channel G

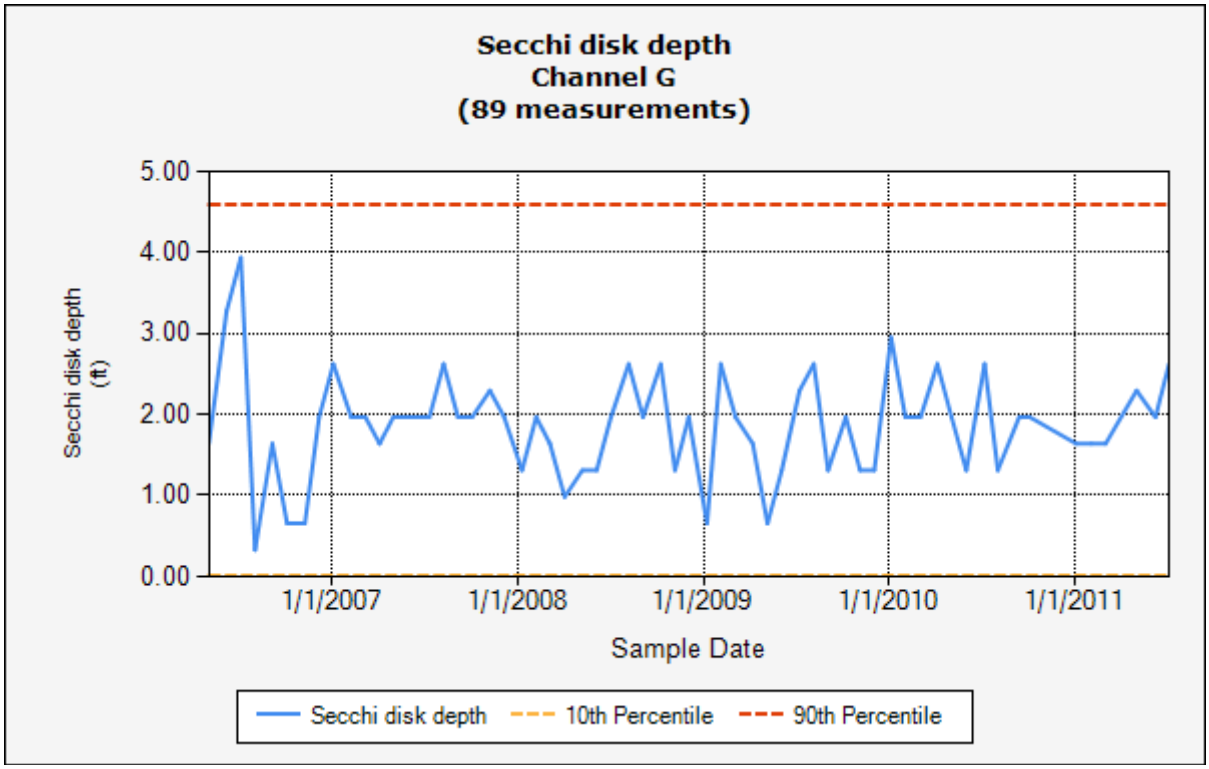


Figure 67. Graph of Secchi Disk Depth for Channel G from the Salinity Barrier to the Weir

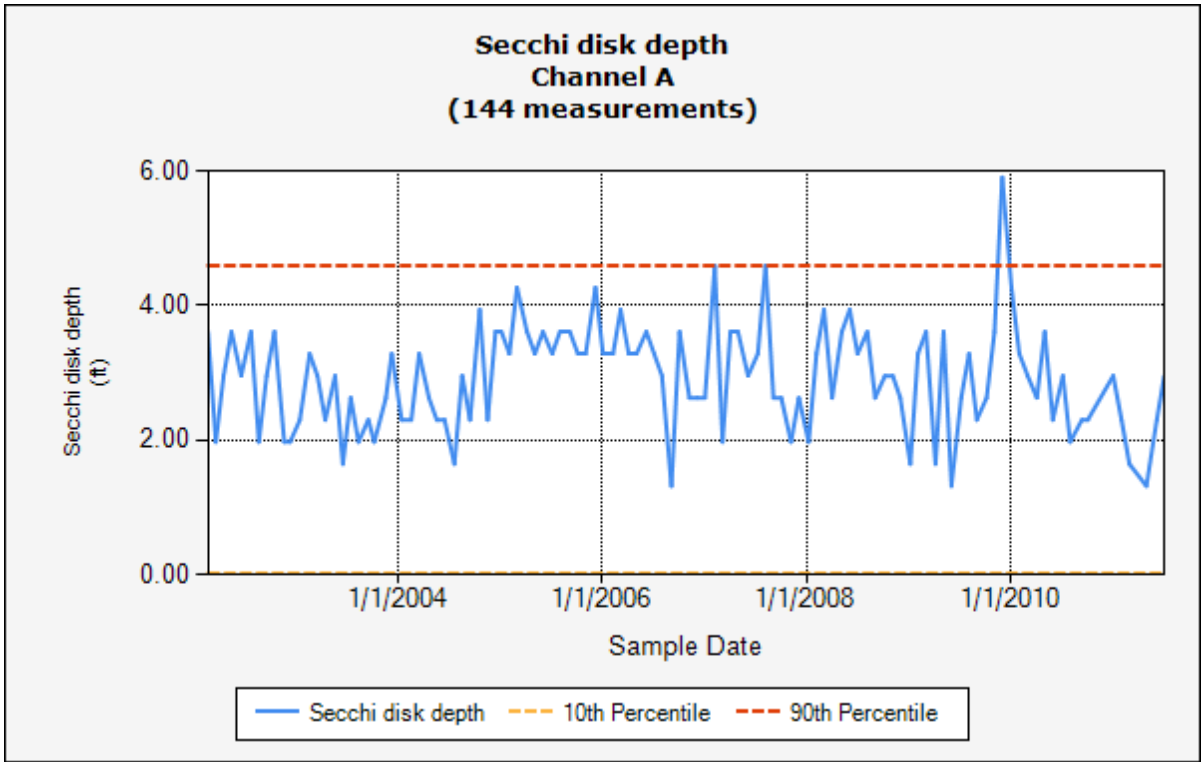


Figure 68. Graph of Secchi Disk Depth for Channel A below the Salinity Barrier

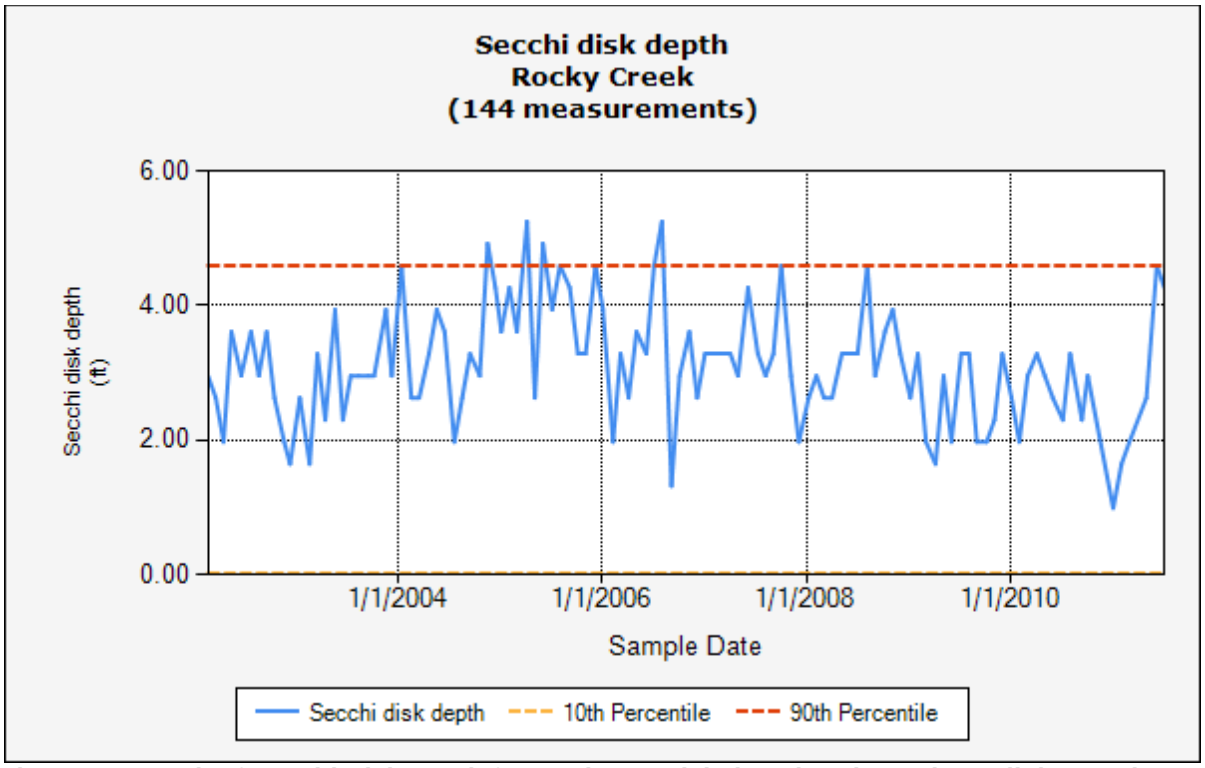


Figure 69. Graph of Secchi Disk Depth for Rocky Creek below the Channel G Salinity Barrier

As part of the stream assessment the physical water quality and chemical water chemistry of a stream are measured. These data only indicate a snapshot of the stream's water quality; however they are useful when compared to the trend data available from Hillsborough County Environmental Protection Commission or other sources. Tables 36, 37, 38, 39, 40 and 41 contain the summary water quality data and index values and adjusted values calculated from these data. The total phosphorus (TP), total nitrogen (TN) and chlorophyll *a* water chemistry sample data are the results of chemical analysis of samples taken during the assessment and analyzed by the Hillsborough County Environmental Protection Commission laboratory.

The growth of plants (planktonic algae, macrophytic algae and rooted plants) is directly dependent on the available nutrients within the water column of a stream and to some extent the nutrients which are held in the sediment and the vegetation biomass of a stream. Additionally, algae and other plant growth are limited by the nutrient in lowest concentration relative to that needed by a plant. Plant biomass contains less phosphorus by weight than nitrogen so phosphorus is many times the limiting nutrient. When both nutrients are present at a concentration in the stream so that either or both may restrict plant growth, the limiting factor is called "balanced". The ratio of total nitrogen to total phosphorous, the "N to P" ratio (N/P), is used to determine the limiting factor. If N/P is greater than or equal to 30, the stream is considered phosphorus limited, when this ratio is less than or equal to 10, the stream is considered nitrogen limited and if between 10 and 30 it is considered balanced.

Table 36. Water Quality Parameters (Laboratory) for Rocky Creek above the Weir

Parameter	Value	Mean Value
Stream Area (Acres)	19.79	
Stream Area (m^2)	46,876.79	
Stream Volume (m^3)	65,648.77	
Number of Vegetation Regions	15	
Average Station SAV Weight	0.03 kg	
Total Phosphorus (ug/L)	132	47.67
Total Nitrogen (ug/L)	1,334	842.83
Chlorophyll a (ug/L)	6.2	4.25
TN/TP	10.11	17.68
Limiting Nutrient	Balanced	Balanced
Fecal Coliform (#/100 ml)	> 4000	806.91
Dissolved Oxygen WQI	24.7	55.2
Phosphorus WQI	56	28.8
Nitrogen WQI	56	26.2
Fecal Coliform WQI	100	86.9
WQI (Confidence)	60.23 (3)	56.53 (3)
Color (PCU)	90.9	71.60
Secchi disk depth (ft)	3.5	0.89
Impaired WQI for Stream	60	60
Stream Status (Water Column)	Poor	Fair

Table 37. Water Quality Parameters (Laboratory) for Channel A from the Salinity Barrier to the Weir

Parameter	Value	Mean Value
Stream Area (Acres)	47.83	
Stream Area (m^2)	193,547.61	
Stream Volume (m^3)	282,643.86	
Number of Vegetation Regions	17	
Average Station SAV Weight	0.308 kg	
Total Phosphorus (ug/L)	132	130.05
Total Nitrogen (ug/L)	1,334	1,664.81
Chlorophyll a (ug/L)	6.2	7.24
TN/TP	10.11	12.80
Limiting Nutrient	Balanced	Balanced
Fecal Coliform (#/ 100 ml)	> 4000	611.6
Dissolved Oxygen WQI	24.7	81.6
Phosphorus WQI	56	55.7
Nitrogen WQI	56	71.6
Fecal Coliform WQI	100	82.9
WQI (Confidence)	60.23 (3)	76.05 (3)
Color (PCU)	90.9	50.88
Secchi disk depth (ft)	3.1	2.88
Impaired WQI for Stream	60	60
Stream Status (Water Column)	Poor	Poor

Table 38. Water Quality Parameters (Laboratory) for Rocky Creek between Channel A and Channel G

Parameter	Value	Mean Value
Stream Area (Acres)	15.46	
Stream Area (m^2)	62,566.69	
Stream Volume (m^3)	57,972.14	
Number of Vegetation Regions	12	
Average Station SAV Weight	0.274 kg	
Total Phosphorus (ug/L)	114	148.67
Total Nitrogen (ug/L)	1,294	1,429.26
Chlorophyll a (ug/L)	4.1	18.25
TN/TP	11.35	9.61
Limiting Nutrient	Balanced	Nitrogen
Fecal coliform (#/ 100ml)	3,520	257.04
Dissolved Oxygen WQI	39.5	57.4
Phosphorus WQI	53.4	58.4
Nitrogen WQI	54.7	61.5
Fecal Coliform WQI	100	77.6
WQI (Confidence)	64.5 (3)	64.98 (3)
Color (PCU)	88.5	43.62
Secchi disk depth (ft)	3.2	3.68
Impaired WQI for Stream	60	60
Stream Status (Water Column)	Poor	Poor

Table 39. Water Quality Parameters (Laboratory) for Channel G from the Salinity Barrier to the Weir

Parameter	Value	Mean Value
Stream Area (Acres)	18.12	
Stream Area (m^2)	73,339.20	
Stream Volume (m^3)	70,844.50	
Number of Vegetation Regions	14	
Average Station SAV Weight	0.499 kg	
Total Phosphorus (ug/L)	102	72.0
Total Nitrogen (ug/L)	1,231	845.7
Chlorophyll a (ug/L)	3.4	7.6
TN/TP	12.07	11.75
Limiting Nutrient	Balanced	Balanced
Fecal Coliform (#/ 100ml)	880	463.5
Dissolved Oxygen WQI	35.6	67.2
Phosphorus WQI	51.7	41
Nitrogen WQI	51.6	26.4
Fecal Coliform WQI	88.4	79.8
WQI (Confidence)	58.55 (3)	60.23 (3)
Color (PCU)	88.5	53.17
Secchi disk depth (ft)	3.4	1.87
Impaired WQI for Stream	60	60
Stream Status (Water Column)	Fair	Poor

Table 40. Water Quality Parameters (Laboratory) for Channel A below the Salinity Barrier

Parameter	Value	Mean Value
Stream Area (Acres)	74.18	
Stream Area (m^2)	300,192.27	
Stream Volume (m^3)	252,200.32	
Number of Vegetation Regions	19	
Average Station SAV Weight	0.000 kg	
Total Phosphorus (ug/L)	127	167.45
Total Nitrogen (ug/L)	489	789.24
Chlorophyll a (ug/L)	5.2	28.44
TN/TP	3.85	4.71
Limiting Nutrient	Nitrogen	Nitrogen
Fecal Coliform (#/ 100ml)	20	101.25
Dissolved Oxygen WQI	66.8	81.9
Phosphorus WQI	55.3	60.9
Nitrogen WQI	8.9	22.6
Fecal Coliform WQI	20	54.4
WQI (Confidence)	39.6 (3)	59.35 (3)
Color (PCU)	11.6	19.28
Secchi disk depth (ft)	5.1	2.99
Impaired WQI for Stream	60	60
Stream Status (Water Column)	Good	Fair

Table 41. Water Quality Parameters (Laboratory) for Rocky Creek below the Channel G Salinity Barrier

Parameter	Value	Mean Value
Stream Area (Acres)	102.16	
Stream Area (m^2)	413,443.71	
Stream Volume (m^3)	367,234.13	
Number of Vegetation Regions	34	
Average Station SAV Weight	0.0334 kg	
Total Phosphorus (ug/L)	146	141.89
Total Nitrogen (ug/L)	505	952.09
Chlorophyll a (ug/L)	5.6	14.07
TN/TP	3.46	6.71
Limiting Nutrient	Nitrogen	Nitrogen
Fecal Coliform (#/ 100ml)	40	285.82
Dissolved Oxygen WQI	76.25	81
Phosphorus WQI	58	57.4
Nitrogen WQI	9.2	35.2
Fecal Coliform WQI	33.3	73.4
WQI (Confidence)	47.7 (3)	66.9 (3)
Color (PCU)	14.2	35.50
Secchi disk depth (ft)	4.1	2.96
Impaired WQI for Stream	60	60
Stream Status (Water Column)	Good	Poor

The color of a stream is also important to the growth of algae. Dark, tannic streams tend to suppress algal growth and can tolerate a higher amount of nutrient in their water column; while clear streams tend to support higher algal growth with the same amount of nutrients. The color of a stream, which is measured in a unit called the "platinum cobalt unit (PCU)" because of the standard used to determine color, is important because it is used by the State of Florida to determine stream impairment as explained earlier. Rivers and streams or other "flow through" systems tend to support lower algal growth for the same amount of nutrient concentration. All these factors are important to the understanding of your stream's overall condition. Tables 36 through 41 include many of the factors that are typically used to determine the actual state of plant growth in your stream. These data should be understood and reviewed when establishing a management plan for a stream; however, as stated above other factors must be considered when developing such a plan. Please contact the Water Atlas Program if you have questions about this part or any other part of this report.

Table contain the field data taken in the center of the lake using a multi-probe (Eureka Manta) which has the ability to directly measure the temperature, pH, dissolved oxygen (DO), percent DO (calculated from DO, temperature and conductivity), conductivity and salinity. These data are listed for three levels in the stream and a mean value measurement.

Table 42. Water Chemistry Data Based on Manta Water Chemistry Probe for Rocky Creek above the Weir

Sample Location	Sample Depth (m)	Time	Temp (deg C)	Conductivity (mS/cm3)	Salinity (PSS)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH
Surface	0.507	12:40 pm	27.53	0.184	0	87.29	7.03	6.965
Middle	0.92	12:45 pm	27.53	0.184	0	87.265	7.03	6.94
Bottom	1.36	12:50 pm	27.53	0.184	0	86.92	7.00	6.97
Mean	0.929	12:45 pm	27.53	0.184	0	87.16	7.02	6.958

Table 43. Water Chemistry Data Based on Manta Water Chemistry Probe for Channel A from the Salinity Barrier to the Weir

Sample Location	Sample Depth (m)	Time	Temp (deg C)	Conductivity (mS/cm3)	Salinity (PSS)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH
Surface	0.507	12:40 pm	27.53	0.184	0	87.29	7.03	6.965
Middle	0.92	12:45 pm	27.53	0.184	0	87.265	7.03	6.94
Bottom	1.36	12:50 pm	27.53	0.184	0	86.92	7.00	6.97
Mean	0.929	12:45 pm	27.53	0.184	0	87.16	7.02	6.958

Table 44. Water Chemistry Data Based on Manta Water Chemistry Probe for Rocky Creek between Channel A and Channel G

Sample Location	Sample Depth (m)	Time	Temp (deg C)	Conductivity (mS/cm3)	Salinity (PSS)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH
Surface	0.778	10:20 am	27.540	0.18	0	78.754	6.344	6.756
Middle	1.763	10:25 am	27.522	0.18	0	78.494	6.324	6.758
Bottom	2.873	10:30 am	27.52	0.18	0	78.172	6.299	6.750
Mean	1.805	10:25 am	27.527	0.18	0	78.473	6.322	6.755

Table 45. Water Chemistry Data Based on Manta Water Chemistry Probe for Channel G from the Salinity Barrier to the Weir

Sample Location	Sample Depth (m)	Time	Temp (deg C)	Conductivity (mS/cm3)	Salinity (PSS)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH
Surface	0.52	10:45 am	28.03	0.216	0.1	76.102	6.077	6.863
Middle	1.29	10:50 am	27.94	0.212	0.1	76.036	6.081	6.863
Bottom	2.13	10:55 am	27.85	0.208	0.1	75.836	6.075	6.876
Mean	1.32	10:45 am	27.94	0.212	0.1	75.991	6.078	6.868

Table 46. Water Chemistry Data Based on Manta Water Chemistry Probe for Channel A below the Salinity Barrier

Sample Location	Sample Depth (m)	Time	Temp (deg C)	Conductivity (mS/cm3)	Salinity (PSS)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH
Surface	0.597	10:35 am	23.65	37.195	23.524	67.53	5.10	7.218
Middle	1.105	10:40 am	23.12	37.171	23.515	65.48	4.96	7.240
Bottom	1.963	10:45 am	23.35	37.190	23.519	63.32	4.81	7.249
Mean	1.222	10:40 am	23.51	37.185	23.519	65.45	4.96	7.236

Table 47. Water Chemistry Data Based on Manta Water Chemistry Probe for Rocky Creek below the Channel G Salinity Barrier

Sample Location	Sample Depth (m)	Time	Temp (deg C)	Conductivity (mS/cm3)	Salinity (PSS)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH
Surface	**0.534**	**12:30 pm**	**24.449**	**29.175**	**18.000**	**56.16**	**4.316**	**7.415**
Middle	**0.797**	**12:35 pm**	**24.154**	**30.260**	**18.740**	**57.359**	**4.413**	**7.386**
Bottom	**1.308**	**12:40 pm**	**23.822**	**31.281**	**19.450**	**57.743**	**4.451**	**7.406**
Mean	**0.870**	**12:35 pm**	**24.142**	**30.239**	**18.730**	**57.087**	**4.393**	**7.402**

To better understand many of the terms used in this report, we recommend that the reader visit the Hillsborough County & City of Tampa Water Atlas and explore the "Learn More" areas which are found on the resource pages. Additional information can also be found using the Digital Library on the Water Atlas website.

Section 4: Conclusion

The Rocky Creek Study Area is a diverse region of natural and manmade streams and canals. Due to the design of Channel A and Channel G between the salinity barriers and the weirs, a natural riparian vegetation zone has not been established due to the steep banks and channelized nature of the water bodies. Instead, pioneer species and non-native invasive species have dominated the riparian zone. The primary pest plant species for the entire region include: *Alternanthera philoxeroides, Colocasia esculenta and Schinus terebinthifolius*. However, many other species are pest plant species of concern in individual regions of the system.

In Rocky Creek above the Channel A weir, *Urena lobata, Alternanthera philoxeroides, Dioscorea bulbifera, Ludwigia peruviana* and *Schinus terebinthifolius* were pest plant species. In Channel A from the salinity barrier to the weir, *Alternanthera philoxeroides, Colocasia esculenta, Hydrilla verticillata, Schinus terebinthifolius, Panicum repens, Pistia stratoides, Urochloa mutica* and *Salvinia minima* were pest plant species. In Rocky Creek between Channel A and Channel G, *Alternanthera philoxeroides, Colocasia esculenta, Schinus terebinthifolius, Panicum repens, Pistia stratoides, Urochloa mutica, Salvinia minima, Ludwigia peruviana, Dioscorea bulbifera* and *Eichhornia crassipes wer pest plant species.* For Channel G from the salinity barrier to the weir, *Alternanthera philoxeroides, Colocasia esculenta, Hydrilla verticillata, Schinus terebinthifolius, Panicum repens, Pistia stratoides, Urochloa mutica, Salvinia minima, Ludwigia peruviana, Hygrophila polysperma,* and *Eichhornia crassipes* were pest plant species. In Channel A below the Salinity Barrier, *Schinus terebinthifolius and Enterolobium contortisiliquum* were pest plant species. In Rocky Creek below the Channel G salinity barrier, only *Schinus terebinthifolius* was a pest plant species.

The noticeable lower amounts of pest plant species found in the system below the salinity barriers can be attributed to the salinity gradient found in these regions and the inability of many species of non-native and native plants to cope with salinity stress.

This assessment was accomplished to assist stream property owners to better understand and manage their streams. Hillsborough County supports this effort as part of their Stream Waterwatch Program (SWW) and has developed guidelines for stream property owner groups to join the SWW and receive specific assistance from the County in the management of their stream. For additional information and recent updates please visit the Hillsborough County & City of Tampa Water Atlas website.

Stream Assessment Notes

1. The Water Quality Index (WQI)[1] is similar to the Trophic State Index (TSI) in that both are used for the statewide assessment of surface waters: the 305(b) Report. WQI is used for streams, black waters (natural tea and coffee-colored waters), and springs, while TSI is used for lakes and estuaries. The WQI is calculated by averaging the values of most or all of the parameters within five water quality parameter categories: 1) water clarity (measured as turbidity and-or Secchi disk depth), 2) dissolved oxygen, 3) oxygen demanding substances (measured as biochemical oxygen, chemical oxygen demand and-or total organic carbon), 4) nutrients (measured as total nitrogen, nitrite plus nitrate, and-or total phosphorus), and 5) bacteria (total coliform and-or fecal coliform).

   Water Atlas presents WQIs over the last four seasons (three month intervals). The WQI "value" for a waterbody is determined by averaging the values (data) of the aforementioned parameters for each "season" (Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec). These seasonal averages are then averaged to provide an overall "rating" or WQI. The term "confidence" expresses the degree of completeness of the index; in other words, "confidence" states how many parameter categories were used to calculate the Overall Water Quality Index.

   Ranges of WQI values have been established to provide a general ranking of the waterbody (Figure 1.) WQI values may also include the 'Confidence' (Figure 2) , which provides you with some relative idea as to how much information was used to calculate the WQI for that waterbody.

WQI	Rating
0-45	Good
45-60	Fair
>60	Poor

   Figure 1. Water Quality Index (WQI) ranges and their designations.

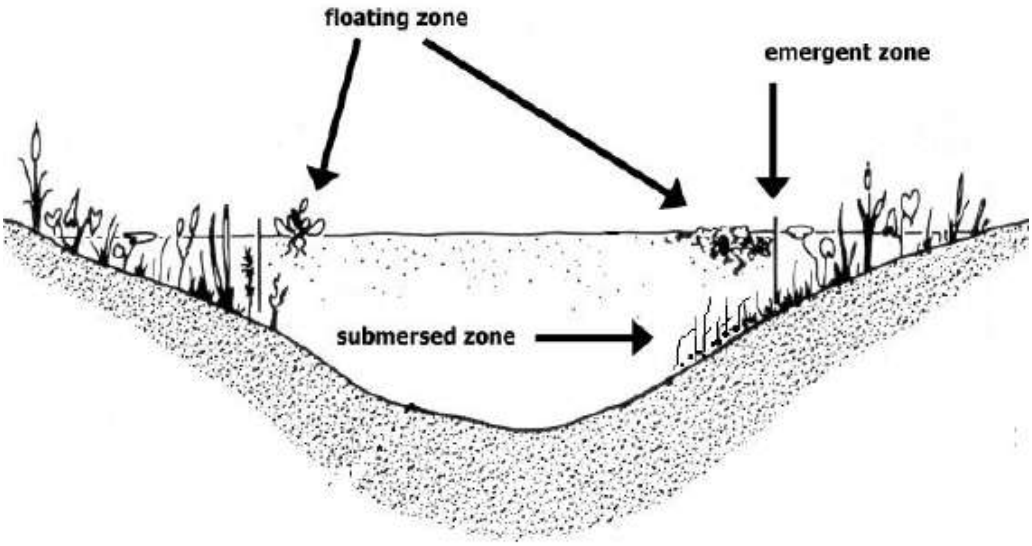
WQI	Rating	Confidence	Season
30	Good	5/5	Winter (2000)
40	Good	3/5	Fall (2000)
30	Good	2/5	Summer (2000)
50	Fair	3/5	Summer (2000)

   Figure 2. WQI rankings are provided with examples of Confidence values.

   [1]The acronym WQI also stands for "Water Quality Inspection" in much of the DEP literature.

2. **Wide Area Augmentation System** (WAAS) is a form of differential GPS (DGPS) where data from 25 ground reference stations located in the United States receive GPS signals form GPS satellites in view and retransmit these data to a master control site and then to geostationary satellites. The geostationary satellites broadcast the information to all WAAS-capable GPS receivers. The receiver decodes the signal to provide real time correction of raw GPS satellite signals also received by the unit. WAAS-enabled GPS is not as accurate as standard DGPS which employs close by ground stations for correction, however; it was shown to be a good substitute when used for this type of mapping application. Data comparisons were conducted with both types of DGPS employed simultaneously and the positional difference was determined to be well within the tolerance established for the project.

3. The three primary aquatic vegetation zones are shown below:



4. A lake is **impaired** if: "For the purposes of evaluating nutrient enrichment in lakes, TSIs shall be calculated based on the procedures outlined on pages 86 and 87 of the State's 1996 305(b) report, which are incorporated by reference. Lakes or lake segments shall be included on the planning list for nutrients if:(1) For lakes with a mean color greater than 40 platinum cobalt units, the annual mean TSI for the lake exceeds 60, unless paleolimnological information indicates the lake was naturally greater than 60, or (2) For lakes with a mean color less than or equal to 40 platinum cobalt units, the annual mean TSI for the lake exceeds 40, unless paleolimnological information indicates the lake was naturally greater than 40, or (3) For any lake, data indicate that annual mean TSIs have increased over the assessment period, as indicated by a positive slope in the means plotted versus time, or the annual mean TSI has increased by more than 10 units over historical values. When evaluating the slope of mean TSIs over time, the Department shall require at least a 5 unit increase in TSI over the assessment period and use a Mann's one-sided, upper-tail test for trend, as described in Nonparametric Statistical Methods by M. Hollander and D. Wolfe (1999 ed.), pages 376 and 724 (which are incorporated by reference), with a 95% confidence level."

References: 62-303.352—Nutrients in Lakes. Specific Authority 403.061, 403.067 FS. Law Implemented 403.062, 403.067 FS. History - New 6- 10-02, Amended 12-11-06. Please see page 12 of the Impaired Waters Rule. Updated activity regarding impaired waters may be tracked at: http://www.dep.state.fl.us/water/tmdl/

5. An **adjusted chlorophyll a value** (µg/L) was calculated by modifying the methods of Canfield et al (1983). The total wet weight of plants in the lake (kg) was calculated by multiplying lake surface area (m^2) by PAC (percent area coverage of macrophytes) and multiplying the product by the biomass of submersed plants (kg wet weight m^2) and then by 0.25, the conversion for the 1/4 meter sample cube. The dry weight (kg) of plant material was calculated by multiplying the wet weight of plant material (kg) by 0.08, a factor that represents the average percent dry weight of submersed plants (Canfield and Hoyer, 1992) and then converting to grams. The potential phosphorus concentration (mg/m^3) was calculated by multiplying dry weight (g) by 1.41 mg TP g-1 dry weight, a number that represents the mean phosphorus (mg) content of dried plant material measured in 750 samples from 60 Florida lakes (University of Florida, unpublished data), and then dividing by lake volume (m^3) and then converting to µg/L (1000/1000). From the potential phosphorus concentration, a predicted chlorophyll a concentration was determined from the total phosphorus and chlorophyll a relationship reported by Brown (1997) for 209 Florida lakes. Adjusted chlorophyll a concentrations were then calculated by adding each lake's measured chlorophyll a concentration to the predicted chlorophyll a concentration.