South Venice Waterways

Pre-Restoration Biological Assessment Monitoring Report

Prepared for:

Sarasota County

1001 Sarasota Center Boulevard

Sarasota, FL 34240

Prepared by:

HSW Engineering, Inc.

2810 Northdale Boulevard, Suite 210B

Tampa, FL 333624

(813) 968-7722

March 4, 2014
(Revised)

Table of Contents

Figures

Tables

Appendixes

Introduction

Background

HSW Engineering, Inc. (HSW) assisted Sarasota County with a biological assessment of the pre-restoration status of four South Venice Waterways. This work consisted primarily of fieldwork, performing a limited characterization of the fauna and algal flora that currently exist within sections of the waterways. The contents of this report were determined in the field during a bio-reconnaissance assessment process performed during an 8-day period spanning November 18 through November 25, 2013.

In October 2011, the Sarasota County Commission awarded $313,000 in funding under CIP#83132309 to the South Venice Community Association (SVCA) for water quality improvement projects in coordination with County staff. The goal of the projects is to improve water quality, habitat, and biodiversity within several open stormwater drainage systems and ponds in the South Venice area, which constitute a large portion of the upper Lemon Bay watershed. Restoration activities conducted in the waterways are anticipated to increase dissolved oxygen and fauna that are indicative of a healthy waterway within the selected aquatic systems. The projects involve water quality and biological monitoring to document conditions before and after restoration activities.

This report summarizes pre-restoration biological assessments of the freshwater portions of four South Venice Waterways in the SVCA project area and documents the occurrence of macro invertebrate and vertebrate populations before restoration activities have been completed. The waterways assessed are Briarwood Ditch, Siesta Ditch, Woodmere Creek North, and Woodmere Creek South (Figure 1).

The pre-restoration biological assessment data together with the water quality monitoring data collected and analyzed by the County provide a baseline characterization of the ecological health of the waterways prior to their restoration or in the case of Siesta Ditch, a transitional restoration assessment. Future post-restoration biological assessments and water quality monitoring will provide data for assessing the effects of restoration efforts on the ecological health of the project waterways.

The scope of work authorized by the County for the pre-restoration biological assessment monitoring comprises the following eight tasks:

- Task 1.1 Pre-Assessment Reconnaissance
- Task 1.2 Transect Delineation
- Task 1.3 Stream Habitat Sketch and Habitat Characterization
- Task 1.4 Photographs
- Task 1.5 Bio-Recon
- Task 1.6 Rapid Periphyton Survey
- Task 1.7 Benthic Survey
- Task 1.8 Monitoring Report

Figure 1. Pre-restoration biological assessment monitoring locations

Purpose and Organization of Report

The purpose of this report is to summarize the monitoring methods and the data collected during the pre-restoration biological monitoring. The report is a deliverable for Work Assignment WA-351 and the associated Purchase Order (PO) No. 141212 issued to HSW. Other work products submitted to the County, many of which are appendices to this report, include aerial maps, field notes and logs, photographs, GIS shapefiles, and Excel workbooks with field observations.

The report is organized into the following primary sections:

Introduction:	Background information
Methods:	Monitoring locations, field procedures, task-by-task work descriptions and work products
Site descriptions:	Summary of physical and biological conditions observed
Hydrometeorological conditions:	Summary of antecedent rainfall and streamflow observed

Methods

Monitoring Locations

Field data were collected along 11 transects, each 100 meters (m) long (Table 1 and Figure 1). Aerial photographs illustrating the location of study transects on each waterway are provided in Appendix A.

Table 1. Pre-restoration biological assessment monitoring locations in Venice, Florida
[Geodetic coordinates of transect 0-meter endpoints]

South Venice Waterway Name	Transect ID	Latitude (degrees north)	Longitude (degrees west)
Briarwood Ditch	1	27.0578	-82.4010
Briarwood Ditch	2	27.0635	-82.4011
Briarwood Ditch	3	27.0675	-82.4009
Siesta Ditch	1	27.0555	-82.4183
Siesta Ditch	2	27.0587	-82.4226
Siesta Ditch	3	27.0647	-82.4262
Woodmere Creek North	1	27.0356	-82.4144
Woodmere Creek North	2	27.0356	-82.4066
Woodmere Creek North	3	27.0354	-82.3992
Woodmere Creek South	1	27.0332	-82.4151
Woodmere Creek South	3	27.0280	-82.4075

Field Procedures

The assessment field procedures are similar to the field methodologies used by the Florida Department of Environmental Protection (FDEP) and other state and federal assessment programs. The assessment employed various elements of rapid survey field methods developed by the FDEP for the following:

- Stream Condition Index (SCI): DEP-SOP-003/11; SCI 1000-Stream Condition Index Methods

- Biological Reconnaissance (BioRecon): DEP-SOP-003/11; BRN 1000-Biological Reconnaissance Methods
- Stream Habitat Assessment (HA): DEP-SOP-001/01; FT 3000-Aquatic Habitat Characterization; FT 3100-Stream and River Habitat Assessment
- Rapid Periphyton Survey (RPS): DEP-SOP-001/01; FS 7230-Rapid Periphyton Survey

Observations were recorded on multiple field logs printed on waterproof paper provided by the County, including the following:

- Stream/River Habitat Sketch Sheet
- Habitat Characterization Field Sheet
- Biological Assessment Field Sheets
- BioRecon Field Sheet
- Rapid Periphyton Survey Form
- Fish Survey Record
- Benthic Core Sample Field Sheet

In order to better characterize biological utilization and ecological health, each waterway was visited repeatedly during the 8-day period of field work. As conditions remained the same throughout the period, observations from these multiple visits have been pooled in the text descriptions and photographic logs contained in this report. Observations recorded for a specific transect on multiple forms were checked for consistency and transcribed into a set of completed forms for each transect. Field data were transferred to Excel workbooks. Compendiums of original and transcribed field sheet sets are provided in Appendix B.

More specific descriptions of activities performed for the Work Assignment Tasks 1.1 – 1.8 and associated work products follow.

Task 1.1 Pre-Assessment Reconnaissance

HSW conducted a pre-survey reconnaissance of the project sites with County staff on September 17, 2013. The purpose of the reconnaissance was to familiarize the monitoring team with site access, staff's past field observations of flora, fauna, and water quality, and the recent restoration activity along Siesta Ditch.

Task 1.2 Transect Delineation

During the week of November 18, 2013, HSW identified and delineated 100-meter long, longitudinal, instream transects at the approximate upstream (head), middle (mid), and downstream (tail) points of Briarwood Ditch, Siesta Ditch, Woodmere Creek North, and Woodmere Creek South. The transects were numbered in upstream order, beginning with #1 for the downstream transect, #2 for the middle transect, and #3 for the upstream transect. A middle transect (#2) was not delineated for Woodmere Creek South due to a lack of access. Transect endpoints were established and labeled as "0" at the downstream end and as "100" at the upstream end, with one exception. Flow in the Woodmere Creek

South downstream transect #1 was not apparent, and the transect was surveyed in reverse order, beginning at the upstream end at a transect endpoint labeled as "0" and ending downstream at an endpoint labeled as "100". The reversal is indicated on the stream/river habitat sketch sheet (Appendix B) and should not have an impact on findings. Transect endpoints were staked and geodetic coordinates of the endpoints were measured using a GPS.

Each transect was divided into ten 10-meter long sections, marking each section along the bank with a flag. Applying FDEP SCI criteria, areas were chosen that would provide an accurate estimate of the site's ecological health. Each transect contained at least 2 square meters (m^2) of one or more of the following habitats: leaf packs, aerobic leaf mats, roots, snags, aquatic vegetation, and rocky outcrops. Minor habitats such as sand, mud/muck, pebbles, and shell hash were sampled if there were fewer than two major habitats.

Deliverables prepared for this task include an aerial map of each waterway delineating the location of each 100-meter transect (Appendix A), an Excel workbook with GPS coordinates (Table 1 is an excerpt), and a GIS shapefile with transect endpoints. The workbook and shapefile were submitted to County on January 14, 2014.

Task 1.3 Stream Habitat Sketch and Habitat Characterization

Stream/River Habitat Sketch sheets were used to record the following:

1. Latitude/longitude at each end of a transect
2. Streambed geometry
3. Bank heights (relative to channel bottom)
4. Major and minor habitats
5. Attached algae and periphyton
6. Bioturbation
7. Stream impacts – natural and anthropogenic
    a. Washouts
    b. Flow restrictions
    c. Trash/debris
    d. Discharge points/outfall pipes
    e. Sediment buildup

Habitat Characterization Field Sheets for each transect were also completed. Stream/River Habitat Sketch sheets and Habitat Characterization Field Sheets are provided in Appendix B.

Task 1.4 Photographs

Digital photographs were taken of each transect using a Nikon D500 SLR camera. Digital images were captioned to indicate key features and catalogued in Word and pdf formats. The photographs depict current conditions, abnormalities, and impacts as noted above. A photographic log of pre-restoration study sites and stream impacts for each 100-meter transect is included as Appendix C. The photographs are labeled according to waterway, transect, and noteworthy features.

Task 1.5 Bio-Recon

Working an upstream direction, the following biological assessments were conducted in each transect:

1. The number of birds, reptiles, amphibians, mollusks, crustaceans, and other wildlife were recorded on the appropriate field log.

2. A BioRecon using DEP SOPs (BRN 1000) as a guideline and further described as follows:

    a. Performed one 0.5m sweep with a D-frame dip net of each of four major habitats identified (total of 4 per transect). When four major habitats were not present, minor habitats were sampled (such as sandy bottom) to complete the sweeps. All organisms were removed and sorted between each sweep.

    b. Organisms were isolated, sorted, and identified to the Order and/or Family and/or lower taxonomic level, photo-documented (post-field, with the exception of all Transects #1, where specimens were preserved as vouchers) and total number recorded on the BioRecon Field Sheet (FD 9000-1).

    c. Select organisms were saved in labeled jars with a sample preservative for later laboratory identification.

3. Numbers and species of fish observed were recorded on the appropriate field log. The most suitable method determined for sampling fish in these waterways was by dip net collection. Other organisms collected were also identified and recorded as "other' on the Fish Survey Form.

Field logs are included in Appendix B and annotated photographs in Appendix C.

Task 1.6 Rapid Periphyton Survey

Rapid Periphyton Surveys using DEP FS 7230 methods as guidelines were conducted at the 0, 25, 50, 75 and 100m sections of each transect. Completed Rapid Periphyton Survey data sheets are included in Appendix B.

Task 1.7 Benthic Survey

In an attempt to capture benthic macro-infauna in both sand and muck habitats, a post-hole digger was used to collect a core sample of sediment from mid-stream, at the 0, 50, and 100m sections of each transect. Sediment samples were sieved through a 2.0 millimeter (mm) sieve into a 0.5mm sieve. Select organisms were saved in labeled jars with a preservative. The macro-organisms were then characterized.

Impending weather conditions and scheduling prompted two deviations from the formal FDEP SOPs. Kitchen sieves with equivalent openings were substituted for box sieves, and 95% isopropanol was substituted for 80% ethanol and ice for sample preservation.

Field logs of representative species are provided in Appendix B and photographs in Appendix C.

Task 1.8 Pre-Restoration Monitoring Report

In addition to the preparation of this report, the raw data listed in Appendix B were assembled into a separate Excel spreadsheet for each transect. The spreadsheets organized by transect were submitted to the County on January 14, 2014. The data were subsequently reassembled into separate Excel spreadsheets organized by biological assemblage and submitted with this report.

Site Descriptions

The four South Venice Waterways evaluated in this biological baseline assessment are similar in their incised and linear nature. Instream aquatic vegetation patterns were similar in each waterway, becoming denser as one proceeded downstream. Woodmere Creek North and Woodmere Creek South had the greatest amount of aquatic vegetation cover of all of the waterways. Muck accumulation was observed in each waterway to varying degrees.

Evidence of bird activity was observed in each waterway (tracks, droppings, feathers), but direct observation was not made in every waterway during the week of fieldwork. The greatest utilization by birds was observed on Briarwood Ditch. Evidence of raccoon utilization was observed in all waterways. Fish assemblages observed were similar among the waterways, being predominantly composed of livebearers (moquitofish and mollies), but some species were observed uniquely in individual waterways as documented elsewhere in this report. Reptile and amphibian observations were few, with the greatest abundance of frogs (leopard frogs) being observed at Transect #3 of Siesta Ditch, and a lone leopard frog and peninsula cooter being observed at Transects #1 and #3, respectively, of Woodmere Creek North. Blue crabs were observed in the downstream transects in all four waterways.

<u>Briarwood Ditch</u>

Briarwood Ditch is the shortest and most deeply incised of the four waterways. Relief from the top of bank to ditch bottom along the length of this straight-line linear waterway ranged from 2-3m in Transect #1, to 3-4m in Transect #2, and 4-5m in Transect #3). Groundwater seepage was most evident in this waterway, primarily along the west bank (particularly in Transect #2) and groundwater boils emerging through the bottom of the ditch were observed as well. Stormwater entry into the waterway was apparent along roads dead-ending at Transects #1 and 2, and from an adjacent pond at the head of Transect #2. Lake water entry was available just above Transect #3, and stormwater input just downstream of this transect.

Briarwood Ditch is the narrowest of the waterways monitored (< 1m to 2m), and is the only waterway with significant exposed rock as habitat (Transect #1). Two relatively large and deep pools (scour from water entry points) exist as unique features at the heads of Transects #2 and #1. These pools supported the greatest amount of bird feeding activity observed in any of the waterways (primarily wading birds). Fin rot and fungus were prevalent among fishes in these pools.

A diverse fish community was observed in Briarwood Ditch, with the highest biomass being present in the scour pools described above. The largest fish observed in any of the waterways were found here, about 10 Florida gar (~1m length) at the heads of Transects #2 and #3. Armored catfish were also

documented in Transect #3, and an assemblage of jewelfish, sunfish and tilapia were abundant at the head of Transect #2, in association with the culvert and scour pool from the connected pond.

A dead pig was observed in Transect #2, and was virtually gone by the following day. It appeared it might have been knocked into the ditch during bank mowing. A recently dead Florida cooter was also observed in Transect #2. The macroinvertebrate community was relatively diverse, likely a result of flow and available instream habitat, which includes rock.

Siesta Ditch

Siesta Ditch is an incised narrow ditch (1-2m width) with incision decreasing in an upstream direction (3-4m relief in Transect #1, 2-3m in Transect #2, and 1-2m in Transect #3). Siesta Ditch had the densest overgrowth canopy obstructing easy access to the ditch, particularly in Transect #1. Some restoration activities have already occurred at the tail of Transect #2, and bank mowing was observed around the upstream extent of this transect just after sampling. Stormwater inputs were observed into Transects #1 and #2, with no direct entry observed in Transect #3, though stormwater enters above the head of this transect. Construction activity associated with increasing the size of drainage pipes entering the head of this waterway was observed during monitoring.

Compared to the other waterways, Siesta Ditch is the second narrowest waterway. It is the only waterway with significant obstructing bank vegetation growing over the ditch bed that impeded access to the transects. The western bank of this waterway in Transect #1 was the least stable encountered in any of the waterways. The head of Transect #2 and the entire length of Transect #3 had significant muck accumulation, up to 1m depth in multiple locations. Mosquito-feeding activity was most apparent in Transect #3 of this waterway. Channel scour was not apparent in Siesta Ditch, and the absence of deeper pools may have limited the abundance of larger fishes and bird feeding activity, neither being observed within this waterway.

The fish community was dominated by moquitofish and mollies. A Congo eel (*amphiuma*) was observed in Transect #1, and a water scorpion (*Ranatra sp.*) in Transect #3. The macroinvertebrate community was depauperate, likely due to poor flow and instream habitat availability.

Woodmere Creek North

Woodmere Creek North has the widest streambed (2-3m) and longest direct linear stretch. It is deeply incised, decreasing in incision in an upstream direction from 4-5m in Transect #1, to 3-4m in Transect #2, and 2-3m in Transect #3. Groundwater seepage was evident in this waterway, primarily along the length of Transect #3 and near the head of Transect #2, along both banks. Bank undercutting was most evident in this waterway, particularly along the head of Transect #2. Instream vegetation was the densest of the four waterways, increasing in abundance in a downstream direction. Egyptian lotus was observed in only this waterway. Wading bird feeding was observed in Transect #3. A peninsula cooter and leopard frog were observed in Transect #1.

No direct stormwater entry into Woodmere Creek North was observed within the transects, with the exception of what appeared to be a roof and/or yard drain piped into the ditch in Transect #1. The fish

community in Woodmere Creek North was primarily composed of moquitofish and mollies. Muck accumulation was significant in patches, particularly in Transects # 1 and 2 were it sometimes exceeded 1m depth. The macroinvertebrate population was diverse, likely a result of the presence of flow and abundant instream habitat.

Woodmere Creek South

Woodmere Creek South has a relatively wide streambed (1-3m) and was the least incised, with incision depths of <2m in both transects.

Water depths within Transect #1 of Woodmere Creek South were the deepest encountered (>1m), and a resident commented that they had not seen water levels that high within this waterway. No flow was apparent in Transect #1, and flow in Transect #3 was minimal at the time of monitoring. Aquatic vegetation was dense within this waterway, particularly in Transect #1.

The fish assemblage in Transect #3 contained the second largest number of larger (>4") fish (after Briarwood Ditch). Though none were captured during sampling, tilapia was observed in this transect. The macroinvertebrate community showed some diversity, likely a result of abundant instream habitat and periodic flow, although flow was minimal at the time of sampling.

Hydrometeorological Conditions Summary

Prior to beginning work on November 18, 2013, rainfall was tracked as an indicator of hydrologic conditions using area rainfall monitoring station data posted on the Sarasota County Water Atlas and County staff were consulted to confirm that conditions were anticipated to be conducive to the planned biological assessment monitoring. A total of 0.17 inches of rainfall was recorded prior to the monitoring at Station ID 750 at the Jacaranda bridge over Alligator Creek from November 1-17, 2013; 0.07 inches on the 2nd and 0.10 inches on the 16th. During the monitoring period, 0.12 inches was recorded on November 22nd.

None of these rainfall events resulted in an appreciable change in streamflow through the period of sampling. The flow conditions observed on each waterway are summarized as follows.

Briarwood Ditch:	Low flow at Transect #1, minimal flow at Transect #2, and stagnant at Transect #3
Siesta Ditch:	Low flow at Transects #1 and #2 and stagnant at Transect #3
Woodmere Creek North:	Low flow was evident at Transects #1 and #2, minimal flow at Transect #3
Woodmere Creek South:	No flow at Transect #1, and minimal flow at Transect #3

Appendix A - Aerial Maps

1. Briarwood Ditch
2. Siesta Ditch
3. Woodmere Creek North
4. Woodmere Creek South

N
W E
S

0 1,125 2,250 4,500 Feet

Source: Aerial Image 02/10/10 from Microsoft World Imagery

South Venice Waterways

Baseline Biological Assessment

Figure 1a
Location of Briarwood Ditch Transects
Venice, FL

HSW Engineering, Inc.

P:\5CC600301 SARCo SV OSDS Bioassessment\10 Computer Modeling\GIS\Briarwood Ditch Transect.mxd

N
W E
S

0 1,125 2,250 4,500 Feet

Source: Aerial Image 02/10/10 from Microsoft World Imagery

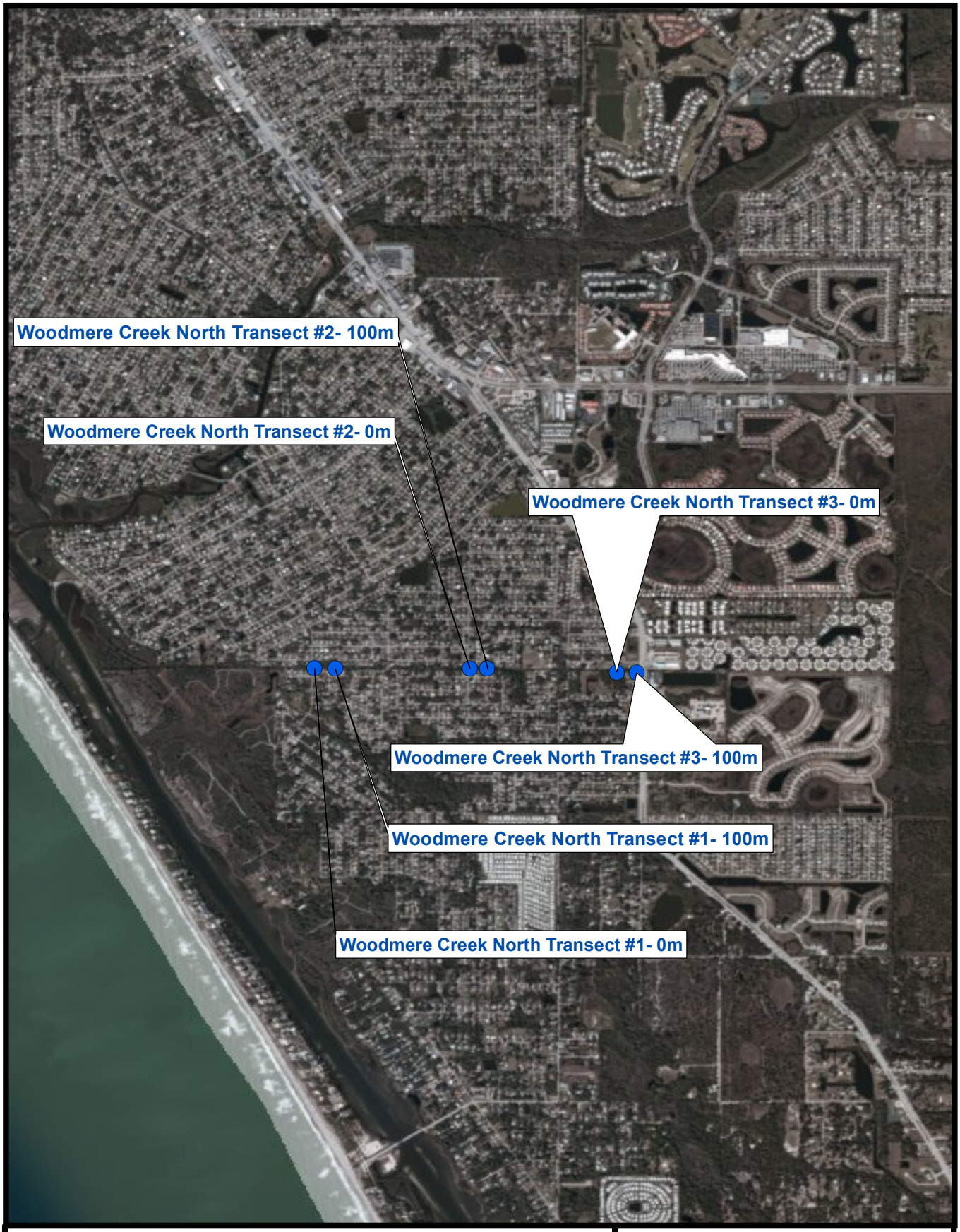
South Venice Waterways

Baseline Biological Assessment

Figure 1b
Location of Siesta Ditch Transects
Venice, FL

HSW Engineering, Inc.

P:\5CC600301 SARCo SV OSDS Bioassessment\10 Computer Modeling\GIS\Siesta Ditch Transect.mxd



N
W E
S

0 1,250 2,500 5,000 Feet

Source: Aerial Image 02/10/10 from Microsoft World Imagery

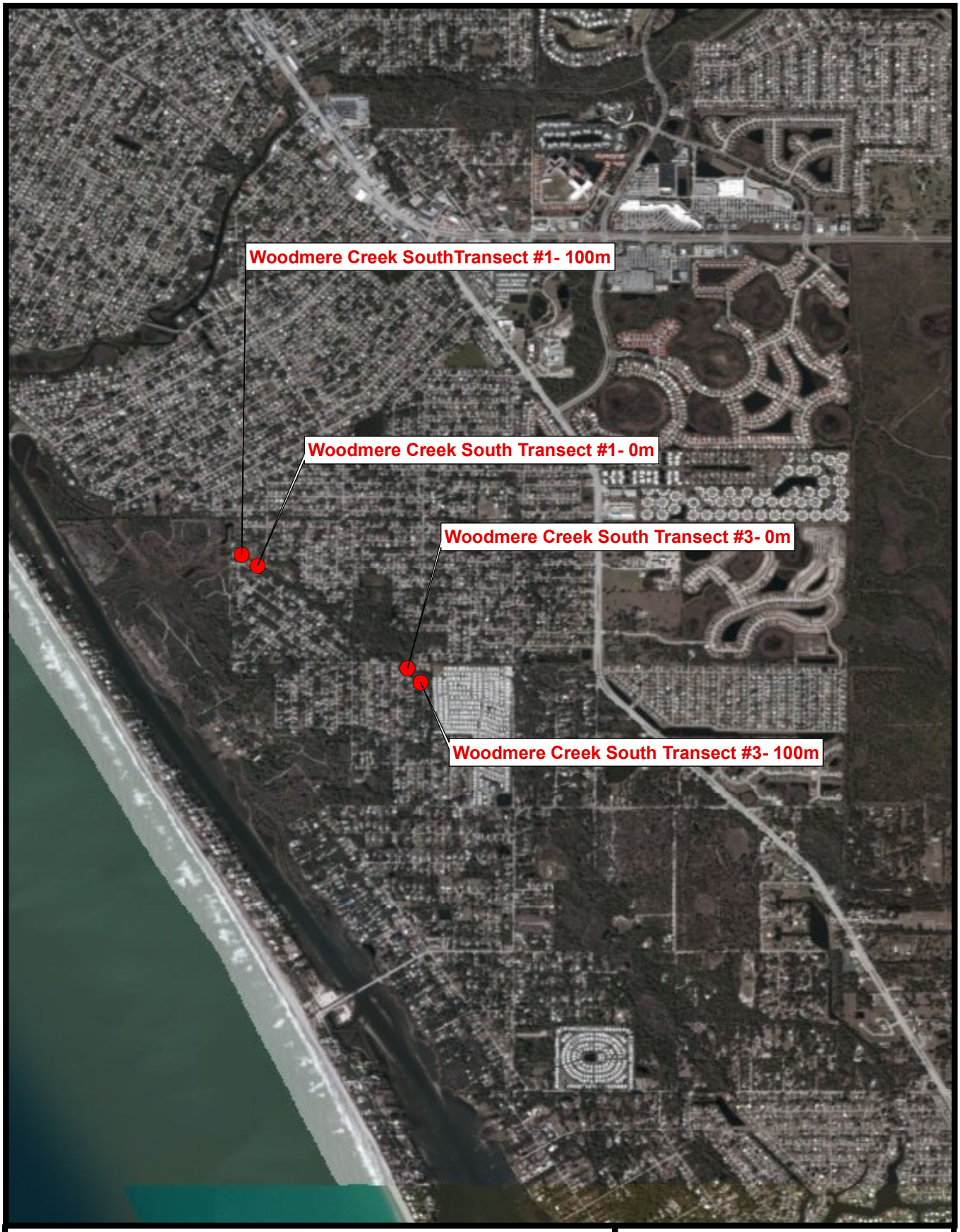
South Venice Waterways

Baseline Biological Assessment

Figure 1c
Location of Woodmere Creek North Transects
Venice, FL

HSW Engineering, Inc.

P:\5CC600301 SARCo SV OSDS Bioassessment\10 Computer Modeling\GIS\Woodmere Creek North Transect.mxd



N
W E
S

0 1,250 2,500 5,000 Feet

Source: Aerial Image 02/10/10 from Microsoft World Imagery

South Venice Waterways

Baseline Biological Assessment

Figure 1d
Location of Woodmere Creek South Transects
Venice, FL

HSW Engineering, Inc.

P:\5CC600301 SARCo SV OSDS Bioassessment\10 Computer Modeling\GIS\Woodmere Creek South.mxd