Biological Assessment of
Otter Creek adjacent to
WastePro Panama City Beach C&D Debris Disposal Facility
Bay County
FDEP File No. 0206299-004-SO
WACS ID No. NWD/03/00091074

Conducted January 31, 2013 and March 26, 2013

October 2013

Water Facilities

Watershed Management Program

Northwest District

Executive Summary

As requested by the Department of Environmental Protection (DEP) Waste Management/Air Resources Cleanup Section, staff from the DEP Watershed Section conducted water quality sampling and biological assessments on Otter Creek, which is located adjacent to the WastePro Panama City Beach C&D Debris Disposal Facility, Bay County (WastePro) on January 31, 2013 and March 26, 2013. The objectives of this study were to:

1) Measure the existing water quality (including low level mercury by method EPA 1631E) and biological health of Otter Creek adjacent to and below the active cells of WastePro as compared to an upstream Control Site in Otter Creek; and

2) Determine if debris disposal activities resulted in non-compliance with the biological integrity criterion as referenced in Rule 62-302.530 (10), Florida Administrative Code (F.A.C.).

Six stream sites, including Control and Test stations, were sampled for this project to assess the influence of the WastePro facility on water quality and biological communities in Otter Creek. Overall, the biological community of the Test Site stretch of Otter Creek (downstream of WastePro) was characterized as healthy, achieving a Stream Condition Index (SCI) score similar to that of the Control Site. Therefore, Otter Creek (downstream of WastePro) is currently meeting the expectations for a healthy well-balanced system. However, it should be noted that biological background conditions prior to debris disposal activities are not known for this system which would have provided a better representation of baseline conditions prior to construction of the facility.

While natural background ammonia levels are normally very low in this area [(0.004 mg/L) as measured in Butler Branch, a northern tributary to Otter Creek (Figure 1)], a review of ground water monitoring well data (sampled April 2012 by facility personnel) revealed elevated ammonia levels in groundwater adjacent to Otter Creek. Elevated ammonia levels were also observed in adjacent surface waters, as high as 1.6 mg/L (total ammonia). However, an apparent decreasing downstream gradient was noted, likely due to a dilution effect from clear seepage streams observed along its

banks. Ammonia samples collected in January, 2013, from Otter Creek, below the monitoring wells, were 2.5 times lower than upstream sampling sites. This could possibly indicate that anthropogenic nutrient enrichment is originating upstream from WastePro.

In 2011 residents along lower Otter Creek raised concerns of reduced fish populations and suspected the drop in population was caused by landfill activities in the upper watershed. This led to an investigation by Florida Fish and Wildlife Conservation Commission (FWC) to sample fish tissue from Otter Creek. Fish tissue analysis conducted in 2012 by FWC indicated high levels of mercury. Mercury samples from surface waters collected during this study in March, 2013, downstream from the landfill (Down Gradient), were 1.4 times lower (0.0030 µg/L) than the background location above the landfill (Background 1) at 0.0042 µg/L. Both sites complied with the water quality criterion of 0.012 µg/L.

Introduction

This study was conducted to assess the influence of the WastePro facility on water quality and biological communities of Otter Creek. Although healthy, well-balanced stream and river communities may be maintained with some level of human activity, such activities may result in waterbody degradation. Human stressors may include increased inputs of nutrients, sediments, metals and/or pesticides from watershed runoff, adverse hydrologic alterations, undesirable removal of habitat or riparian buffer vegetation, and introduction of nuisance (generally exotic) plants and animals. DEP has field methods to evaluate if human activities have resulted in the condition where a particular waterbody has exceeded water quality criteria of Chapter 62-302, F.A.C., including whether adverse impacts to biological communities have occurred. DEP water quality standards are designed to protect designated uses of the waters of the state (*e.g.,* recreation, aquatic life support), and exceedances of these standards is associated with interference with the designated use. The SCI assesses how closely the macroinvertebrate community (*e.g.,* aquatic insects, clams, and crayfish) of a stream resembles the macroinvertebrate community of an undisturbed or “reference”

condition. The habitat assessment evaluates the availability and quality of habitat for macroinvertebrates, and can help diagnose the cause of a low SCI score.

Site Information and Sampling Locations

The study site is located approximately 3 miles southwest of Pine Log State Forest, 3.6 miles west of State Road 79, in Bay County, and in the Gulf Coast Flatwoods 75a Ecoregion (Figure 1). Upstream from the study site is Steelfield Landfill, which has been in operation since the late 1990s. A Control Site on upper Otter Creek above both landfills was initially planned, however stream alterations (i.e., reduced flow) caused by a culvert and a dirt road made sampling conditions inappropriate. Biological background conditions prior to landfill activities are not known; therefore an SCI Control Site (Figures 1 and 3) was selected as a comparison to the SCI Test Site (Figures 1 and 2) to investigate potential impacts from the WastePro landfill.

Biological Assessment Locations

Two biological sites were selected for this assessment, a Test and Control Site. The Test Site is located along the northeastern WastePro property line adjacent to two groundwater monitoring wells (MW-4 and MW-6, Figure 1) where elevated levels of iron, ammonia and total dissolved solids were previously measured. The SCI Control Site is located approximately 400 m upstream from the Test Site.

Water Quality Sampling Locations

Six sites were selected for water quality samples including the two biological stations (Test and Control). See Table 1 for a list of water quality sample sites and coordinate locations. A permit compliance station (Down Gradient SW-2) was used as a water quality sampling site located downstream from the landfill. An additional sample for water quality (Western Stream) was collected from an un-named stream flowing along the north western property boundary. Two background sites are located above the WastePro Landfill activities. Background 1 on Otter Creek splits the property boundary between WastePro and Steelfield Landfill. Background 2 sample site is located on Butler

Branch, a small 1st – 2nd order stream which drains silviculture, wetlands and an old logging road from the northeast.

Methods

The SCI was conducted on January 31, 2013 by the DEP Northwest District Office. Surface water samples were collected on January 31 and an additional sample on March 26, 2013 for analysis of nutrients and metals following DEP Standard Operating Procedures (SOPs, see http://www.dep.state.fl.us/water/sas/sop/sops.htm for details). Sampling and analyses met DEP quality assurance/ quality control standards (see http://www.dep.state.fl.us/water/sas/qa/index.htm). The SCI was conducted per DEP SOP FS7420 and calculated per DEP SOP LT7200. The SCI consists of collecting macroinvertebrates via 20 D-frame dip-net sweeps (0.5 m in length) in the most productive habitats in a 100 m reach of stream. The organisms are sub-sampled, and identified to the lowest practical taxonomic level. The SCI is composed of ten metrics, eight of which decrease in response to human disturbance, with two metrics (% very tolerant and % dominant) increasing in response to human disturbance. According to DEP SOP LT 7000, the SCI score ranges and categories are: (68-100) Exceptional; (35-67) Healthy; and (0-34) Impaired. EPA approved biological health assessment criteria state that a site is considered to meet designated uses if the average of the two most recent SCI scores is 40 or higher and neither of those scores is less than 35. The Stream and River Habitat Assessment was conducted per DEP SOP FT 3100. The Habitat Assessment is a rapid field method in which a sampler scores eight in-stream and riparian components to estimate the influence of habitat factors on the resident aquatic organisms. Habitat Assessment scores range from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

The BioRecon is the initial screening tool for streams, intended to rapidly assess a site to prioritize it for more intensive sampling (see http://www.dep.state.fl.us/water/bioassess/methods.htm#BioRecon for more information).

Results and Discussion

Stream Condition Index

The SCI score for the Otter Creek Test Site was in the lower range of the Exceptional Category (68), while the Otter Creek Control Site scored in the upper range of Healthy (67) (Tables 2 and 3; see Appendix A for a brief explanation of these results). The results of the metrics to calculate the SCI were very similar with neither sample exceeding the other by more than 4 points (Table 4). Total EPT for each site was 11. Although a metric not used in the SCI, Ephemeroptera, Plecoptera and Trichoptera (EPT) or mayflies, stoneflies and caddisflies are sensitive aquatic insects that decline in polluted streams. A nearby tributary ("Seminole Hills Branch" see map inset) sampled October 11, 2006 total EPT was doubled at 22 taxa. Lower EPT on Otter Creek is a possible indication of anthropogenic impacts from upstream landfill activities.

Habitat Assessment

The Habitat Assessment scores for the Otter Creek Test and Control Sites were similar, scoring 103 and 117, respectively, placing them in the mid suboptimal range. Three major habitats, snags, roots/undercut banks and leaf packs (mats) were observed in both 100 m stretches, which resulted in a suboptimal score for substrate diversity. A diversity of habitat is the key to a more diverse aquatic macroinvertebrate community. Moderate silt smothering was observed at the Test Site, which resulted in a marginal score for substrate availability (Figure 4). Riparian buffer width and bank stability scored in the optimal range for both sites. A wide riparian buffer (>18m) and stable banks help reduce sedimentation within the stream. Typical water velocities in the Test Site stretch were 2 times faster than the Control Site giving it an almost perfect score for water velocity. Fish and sensitive aquatic insects require sufficient water velocity to maintain high dissolved oxygen.

Water Chemistry

Two separate water quality sampling events were conducted during this study. On January 31, 2013, 4 sites were sampled that included Down Gradient, Test (SCI), Control (SCI) and

Background 1. On March 26, 2013, the previous sites were again sampled for water quality with 2 additional sites included, Background 2 and Western Stream, for a total of 6 sites. A decreasing downstream gradient for water quality parameters was observed in both sampling events. On January 31, 2013, total nitrogen (TN) at Background 1 was 3.90 mg/L and 1.89 mg/L at Down Gradient. On March 26, 2013, concentrations of TN at Background 1 and Down Gradient were 1.82 and 1.19 mg/L, respectively. All TN results exceeded the State Numeric Nutrient Threshold of 0.67 mg/L for TN (Panhandle West), but note that the stream numeric nutrient criterion is achieved if the flora and fauna are healthy. Dissolved oxygen (DO) exhibited an increasing downstream gradient, most likely from an increase in water velocity. A low DO reading (4.24 mg/L) was measured at the Background 1 location possibly due to the iron/sulfur bacteria bloom and low flow observed below the road culvert (Figure 5). On January 31, 2013, the iron concentration was 1,110 µg/L at Background 1, which exceeded the surface water criteria of 1,000 µg/L. However, the iron concentration at the Down Gradient location was 630 µg/L.

Concentrations of mercury were below the detection limit (0.12 µg/L) in the samples at all 4 stations from the first sampling event January 31, 2013, using method EPA 245.1 Rev. 3.0. Therefore on March 26, 2013 a more sensitive method for mercury analysis was used, EPA 1631E with a method detection limit of 0.1 ng/L. Mercury results at all locations were low but lower at Butler Branch and Western Stream, 0.0019 and 0.0023 µg/L, respectively. Although there is no water quality criterion for sulfate, it should be noted this parameter was higher at Down Gradient site (14 mg/L, January 31, 2013) and the highest at Western Stream (26 mg/L, March 26, 2013) when compared to Butler Branch (1.2 mg/L, March 26, 2013). With the exception of iron at the Background 1 site, all metals met the Class III surface water standards.

Conclusions

Elevated iron levels were measured at the Background 1 Site in Otter Creek suggesting possible goundwater leachate from Steelfield Landfill. All other sites complied with Class III water quality standards. Elevated concentrations of iron in surface waters, which may be caused by input of

iron-rich groundwaters, may be associated with growth of iron bacteria and subsequent habitat smothering and lowering of DO. An iron/sulfur bacteria bloom was observed during a Biorecon on October 11, 2006 to assess stream impacts from Steelfield Landfill activities (Figure 6). At that time of the assessment, dissolved oxygen measured 4.06 mg/L (46.2% saturation). An iron/sulfur bacteria bloom was not observed during the January 31, 2013 and March 26, 2013 assessment.

Local citizens complained of a decrease in fish populations in lower Otter Creek which prompted a preliminary site investigation by DEP staff on December 14, 2011. Fish tissue collected from Otter Creek, April 11, 2012, by Florida Fish and Wildlife Conservation Commission, revealed elevated levels of mercury in large mouth bass and bluegill of 1.7 and 0.41 mg/kg, respectively (http://www.doh.state.fl.us/floridafishadvice/2013_Brochure.pdf). The large mouth bass levels in Otter Creek exceeded recommended limits of <1.5 ppm methyl-mercury, by the Florida Department of Health, (see Appendix C). It has been determined that > 95% of the mercury loading to Florida waters is through atmospheric deposition, with > 95% of the mercury loading from sources outside Florida. DEP has adopted a statewide TMDL for mercury reduction: http://www.dep.state.fl.us/water/tmdl/draft_tmdl.htm#mercury

Although total nitrogen samples exceeded the regional nutrient threshold, an imbalance of flora and fauna was not observed, indicating compliance with stream nutrient criteria. Aquatic plants comprised less than 1% (0.02 m^2) of the available habitat in the 100 m reach of the Test and minimal algae growth was observed. The moderate to heavily shaded canopy in the stream inhibits the excessive growth of algae but if given appropriate conditions, e.g., light exposure and retention time, algal growth could increase in the future.

Table 1: Sample Station Coordinates.

Site	Latitude	Longitude
Down Gradient (SW-2)	30˚ 22’ 40.6”	085˚ 55’ 42.8”
SCI Test 0 m	30˚ 22’ 35.0”	085˚ 55’ 36.4”
SCI Control 0 m	30˚ 22’ 24.0”	085˚ 55’ 20.5”
Background 1 (SW-1)	30˚ 22’ 06.4”	085˚ 55’ 06.3”
Background 2 (Butler Branch)	30˚ 22’ 25.2”	085˚ 55’ 14.2”
Western Stream	30˚ 22’ 40.7”	085˚ 55’ 42.8”

Note: SW-1 and SW-2 are established permit compliance locations.

Table 2. Physical/Chemical Water Quality Values for Panama City Beach C&D Debris Disposal Facility study sites collected January 31, 2013. SCI scores reflect the Panhandle West region calculations.

	Down Gradient	SCI Test	SCI Control	Background 1	Applicable Class III Water Quality Criteria
SCI Score	NA	68A Category 1 “Exceptional”	67A Category 2 “Healthy”	NA	
Habitat Score	NA	103 Suboptimal	115 Suboptimal	NA	
Temperature Field (˚C)	16.34	16.69	17.33	18.82	
Specific Conductance Field (µmhos/cm)	190	196	224	349	Shall not be increased more than 50% above background or to 1275, whichever is greater.
Dissolved Oxygen Field (mg/L)	7.87	7.75	7.10	4.24	≥5.0
Dissolved Oxygen Field (%)	80.3	79.5	74	45.6	
pH Field	6.68	7.18	6.93	6.45	
TDS (mg/L)	97	106A	117	173	
Total Phosphorus (mg/L)	0.004	0.003	0.004	0.006	* ≤ 0.06
Nitrate+Nitrite (mg/L)	0.3	0.3	0.36	0.5	
Ammonia (mg/L)	0.69	0.65	0.88	1.6	
Total Kjeldahl Nitrogen (mg/L)	0.9	0.92	1.10	1.80	
Total Nitrogen (mg/L)	1.89	1.87	2.34	3.90	* ≤ 0.67
Sulfate (mg SO4/L)	14	13	5.8	7.8	

Mercury (µg/L) [EPA 245.1 MDL 0.12 µg/L]	0.12 U	0.12 U	0.12 U	0.12 U	0.012
Iron (µg/L)	630	590	590	1110	≤ 1000
Aluminum (µg/L)	123	130	158	267	
Arsenic (µg/L)	0.31	0.25 U	0.281	0.481	≤ 50

* Panhandle West nutrient region. U – Analyzed for but not detected. A – Mean of two or more determinations.
Values do not comply with Class III Fresh water quality standards, 62-302, F.A.C.

Table 3: Chemical Water Quality Values for Panama City Beach C&D Debris Disposal Facility study sites collected March 26, 2013.

	Down Gradient	Western Stream	SCI Test	SCI Control	Background 1	Background 2
Temperature Field (˚C)	14.37	16.64	14.64	14.30	14.56	13.13
Specific Conductance Field (µmhos/cm)	114	119	112	102	143	44
Dissolved Oxygen Field (mg/L)	8.08	7.46	7.95	7.84	7.01	8.24
Dissolved Oxygen Field (%)	79.1	76.5	78.2	76.6	68.9	78.5
pH Field	6.05	5.87	5.95	5.49	6.09	3.44
TDS (mg/L)	70	66	64	68	88	32
Total Phosphorus (mg/L)	0.005	0.003	0.006	0.006	0.006	0.005
Nitrate+Nitrite (mg/L)	0.16	0.029	0.17	0.15	0.21	0.005
Ammonia (mg/L)	0.33	0.15	0.35	0.34	0.61	0.004
Total Kjeldahl Nitrogen (mg/L)	0.70	0.33	0.68	0.75	1.00	0.33
Total Nitrogen* (mg/L)	1.19	0.509	1.20	1.24	1.82	0.339
Sulfate (mg SO4/L)	9.6	26	7.2	2.7	3.3	1.2
Mercury (µg/L), Field Blank	0.00042	0.00043	0.00049	0.00041	0.00044	0.00042
Mercury (µg/L) [EPA 1631E MDL 0.1 ng/L]	0.0030	0.0023	0.0028	0.0029	0.0042	0.0019
Iron (µg/L)	580	330	610	600	870	270
Aluminum (µg/L)	347	191	373	420	524	406
Arsenic (µg/L)	0.25 U	0.25 U	0.27 I	0.27 I	0.32 I	0.25 U

* Panhandle West nutrient region. **U** – Analyzed for but not detected. **I** – Reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. Values do not comply with Class III Fresh water quality standards, 62-302, F.A.C.

Table 4. Stream Condition Index metric score results, Otter Creek at WastePro, January 31, 2013. Note: results are an average of 2 replicates except Ephemeroptera and Trichoptera taxa.

Stream Condition Index Metric	Test Site	Control Site
Total taxa	34	30
Ephemeroptera taxa	3	1
Trichoptera taxa	4	7
% Filterer	53	54
Long-lived taxa	4	3
Clinger taxa	10	9
% Dominance	21	24
% Tanytarsini	3	8
Sensitive taxa	12	10
% Very tolerant	2	1
SCI_2007 score	68	67

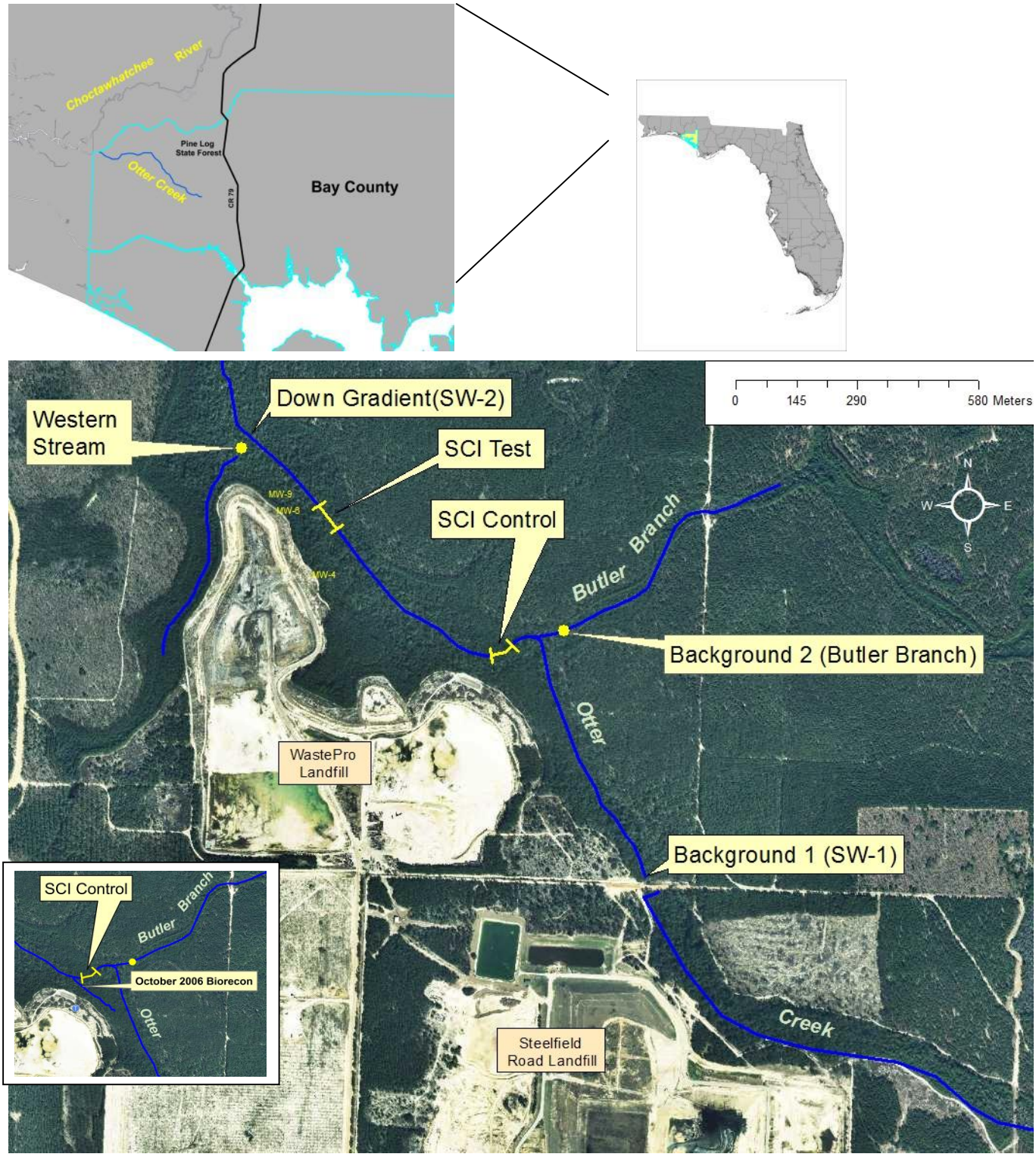


Figure 1. Map of study sight and sampling locations on Otter Creek and WastePro in Bay County. Map inset showing site of control location for a Biorecon conducted October 11, 2006.



Figure 2. SCI location Otter Creek below/adjacent to WastePro (Test) upstream view.



Figure 3. SCI location Otter Cr above (Control) active cell of WastePro downstream view.



Figure 4. Photo of habitat smothering at SCI Test site conducted January 31, 2013, on Otter Creek.



Figure 5. Background 1 station on Otter Creek showing upstream culvert, March 26, 2013.



Figure 6. Iron/sulfur bacteria bloom on Otter Creek during a Biorecon conducted on October 11, 2006.

Contact and resources for more information

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Florida Department of Environmental Protection. Standards and Assessment Section Bureau of Assessment and Restoration Support DEP-SAS-003/1. 2011. Development of Aquatic Life Use Support Attainment Thresholds for Florida's Stream Condition Index and Lake Vegetation Index

http://www.dep.state.fl.us/water/bioassess/docs/attainment-thresholds-sci-and-lvi.pdf

Florida Department of Environmental Protection. 2004. Wastewater Guidelines and Manuals, *Notice of New Method for Mercury Testing.*
http://www.dep.state.fl.us/water/wastewater/docs/Hg_Fact_Sheet_01-04.pdf

Otter Creek at Steelfield landfill SW3 monitoring site October 11. 2006 Ecosummary (for a copy of that and other Ecosummary reports contact Devan Cobb Devan.R.Cobb@dep.state.fl.us).

Appendix A

Table LT 7200-2 Determination of Biological Indices

SCI Score	SCI 2007 Category Name	Example Description
68–100	**Category 1 ("exceptional")**	Higher diversity of taxa than for Category 2, particularly for Ephemeroptera and Trichoptera; several more clinger and sensitive taxa than found in Category 2; high proportion for Tanytarsini; few individuals in the dominant taxon; very tolerant individuals make up a very small percentage of the assemblage.
48–67	**Category 2 ("healthy")**	Diverse assemblage with 30 different species found on average; several different taxa each of Ephemeroptera, Trichoptera, and long-lived and, on average, 5 unique clinger and 6 sensitive taxa routinely found; small increase in dominance by a single taxon relative to Category 1; very tolerant taxa represent a small percentage of individuals, but noticeably increased from Category 1.
35-47	**Category 2 ("healthy")**	Diverse assemblage with 30 different species found on average; several different taxa each of Ephemeroptera, Trichoptera, and long-lived and, on average, 5 unique clinger and 6 sensitive taxa routinely found; small increase in dominance by a single taxon relative to Category 1; very tolerant taxa represent a small percentage of individuals, but noticeably increased from Category 1. **Note:** any score of 35 and above is not impaired using the current interpretation categories.
0–34	**Category 3 ("impaired")**	Notable loss of taxonomic diversity; Ephemeroptera, Trichoptera, long-lived, clinger, and sensitive taxa uncommon or rare; half the number of

filterers than expected; assemblage dominated by a tolerant taxon; very tolerant individuals represent a large proportion of the individuals collected.

Appendix B

Macroinvertebrate Taxa List

Control

STORET station ->	32020127
Sample date ->	1/31/2013
Bench ID ->	42427

Order	Taxon Name	Rep 1NCounted	Rep 2NCounted	Total Count
Amphipoda	Crangonyx	10	6	16
Bivalvia	Bivalvia	1	0	1
Isopoda	Caecidotea	1	0	1
Gastropoda	Ancylidae	1	1	2
Oligochaeta	Eclipidrilus	0	1	1
	Eclipidrilus palustris	1	1	2
	Tubificidae	0	1	1
Coleoptera	Matus leechi	0	1	1
	Dineutus	0	1	1
	Ectopria thoracica	1	0	1
Diptera	Tipulidae	0	1	1
	Limonia	1	0	1
	Hexatoma	0	1	1
	Simulium*	34	37	71
	Chironomidae	0	1	1
	Ablabesmyia mallochi	1	2	3
	Pentaneura inconspicua	1	0	1
	Djalmabatista pulcher	0	2	2
	Phaenopsectra	0	2	2
	Polypedilum fallax	0	1	1
	Stenochironomus	0	1	1
	Cladotanytarsus	0	1	1
	Rheotanytarsus pellucidus	1	0	1
	Hemerodromia	7	4	11
	Palpomyia/bezzia grp.	0	1	1
	Thienemannimyia grp.	8	7	15
	Ablabesmyia rhamphe grp.	0	1	1

	Polypedilum illinoense grp.	1	3	4
Diptera	Rheotanytarsus exiguus grp.	12	8	20
Heteroptera	Rhagovelia	1	0	1
Megaloptera	Nigronia serricornis	1	0	1
Odonata	Gomphidae	0	1	1
	Progomphus	0	1	1
	Libellulidae	1	2	3
	Coenagrionidae	1	0	1
	Enallagma	1	0	1
	Argia	0	2	2
	Epicordulia princeps regina	1	0	1
Ephemeroptera	Leptophlebiidae	4	2	6
	Habrophlebia vibrans	4	1	5
Plecoptera	Perlinella drymo	1	1	2
	Perlesta placida complex	2	0	2
	Acroneuria arenosa/evoluta	1	0	1
Trichoptera	Chimarra	4	1	5
	Lype diversa	1	0	1
	Hydropsyche	20	31	51
	Hydropsyche elissoma	5	2	7
	Triaenodes	0	3	3
	Oecetis	15	8	23
	Oecetis georgia	4	5	9
	Polycentropus	1	1	2
	Oecetis sphyra/morsei	1	0	1

Test

STORET station -> 32020126
Sample date -> 1/31/2013
Bench ID -> 42437

Order	Taxon Name	Rep 1NCounted	Rep 2NCounted	Total Count
Amphipoda	Amphipoda	8	4	12
Bivalvia	Bivalvia	1	0	1
Isopoda	Caecidotea	0	1	1
Decapoda	Cambaridae	0	1	1
Gastropoda	Ancylidae	1	0	1

Oligochaeta	Lumbriculidae	1	0	1
	Eclipidrilus	0	1	1
	Eclipidrilus palustris	6	4	10
	Enchytraeidae	2	1	3
	Tubificidae	2	1	3
	Limnodrilus hoffmeisteri	0	1	1
	Naididae	0	1	1
	Nais(animal)	0	1	1
Coleoptera	Stenelmis	2	1	3
Diptera	Cecidomyiidae	1	0	1
	Simulium	19	16	35
	Ablabesmyia mallochi	1	0	1
	Djalmabatista pulcher	1	3	4
	Rheocricotopus robacki	0	1	1
	Asheum beckae	1	0	1
	Cryptochironomus	0	1	1
	Polypedilum fallax	3	0	3
	Stenochironomus	2	1	3
	Tribelos fuscicornis	0	1	1
Diptera continued.	Tribelos jucundum	0	1	1
	Xenochironomus xenolabis	0	1	1
	Hemerodromia	3	5	8
	Palpomyia/bezzia grp.	1	1	2
	Thienemannimyia grp.	1	3	4
	Phaenopsectra punctipes grp.	1	0	1
	Polypedilum scalaenum grp.	1	0	1
	Polypedilum illinoense grp.	1	1	2
	Rheotanytarsus exiguus grp.	2	5	7
	Neostempellina reissi	2	0	2
	Kribiodorum perpulchrum	0	2	2
Odonata	Gomphidae	2	1	3
	Neurocordulia	0	2	2
	Calopteryx	1	0	1
	Argia	0	1	1
Ephemeroptera	Leptophlebiidae	5	5	10
	Habrophlebia vibrans	7	8	15
	Eurylophella doris	1	0	1
	Maccaffertium smithae	0	1	1

Plecoptera	Acroneuria abnormis	7	2	9
	Perlinella drymo	0	1	1
	Perlesta placida complex	3	1	4
	Acroneuria arenosa/evoluta	1	0	1
Trichoptera	Chimarra*	27	33	60
	Lype diversa	1	2	3
	Hydropsychidae	0	1	1
	Hydropsyche	6	3	9
	Hydropsyche elissoma	17	24	41
	Oecetis sphyra/morsei	1	0	1

*Dominant Taxa

Appendix C

Florida Department of Health

Recommended Fish Consumption Rate vs Methylmercury Concentration in Fish, as used for Florida Fish Consumption Advisories

Meal Frequency	Uncooked Filet Size	Advice Location	Sensitive Population[1] (ppm)	General Population[2] (ppm)
2 meals per week	8 oz	Freshwater	<0.1	<0.3
1 meal per week	8 oz	Freshwater	<0.2	<0.6
1 meal per month	8 oz	Freshwater	<0.85	<1.5
None		Freshwater	≥0.85	≥1.5

1 Sensitive population= women of childbearing age and young children. Based on USEPA's reference dose (RfD) for methyl mercury, 1x10E-4 mg/kg-body weight/day
Assumed body weight of 64 kg.
2 General population = all other individuals Based on ATSDR's MRL for methylmercury , 3x10E-4 mg/kg-bodyweight/day

Assumed body weight of 70 kg.