Biological Assessment of

Alpha Owens Corning/Upper Hillsborough Basin, including Blackwater Creek, Itchepackesassa Creek, and East Canal

Polk and Hillsborough Counties

NPDES #FL0029653

Sampled October 1996

April 1997

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspection/ Basin Study

Discharger: Alpha Owens Corning/Upper Hillsborough Basin
County: Polk and Hillsborough
NPDES Number: FL0029653
State Permit Expiration Date: 30 June, 1999

Toxics Sampling Inspection (XSI)

Date Sampled: 21 October, 1996

Results: No pesticides or organic compounds were detected in the Alpha Owens effluent. All metals detected in the effluent complied with Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 21 October, 1996

Results: The Alpha Owens effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 21 October, 1996

Results: The macroinvertebrate results suggested healthy conditions prevailed throughout the basin. Six sites within the basin (stations 1, 2, 3, 4, 6, and 7) had Stream Condition Index scores in the "excellent" category, while two sites (stations 5 and 8) were ranked as "good". Apparently, the instream substrate quality, flow, and light penetration characteristics of the system were sufficient that the observed nutrient enrichment and riparian zone disturbances did not translate into negative influences on the invertebrate community. The relatively minor biological differences between the wetland receiving the Alpha Owens discharge and the reference wetland could be accounted for by the higher water flow at the reference wetland. Phytoplankton communities throughout the basin were typical of flowing streams, characterized by low density and chlorophyll *a*, low taxa richness, and low to moderate diversity. It is possible, however, that areas downstream with longer water retention times, such as the lower Hillsborough River or Hillsborough Bay, may be affected by the nutrient loading from this basin. No negative changes appeared to be associated with the Alpha Owens discharge.

Water Quality Inspection (WQI)

Date Sampled: 21 October, 1996

Results: Nutrient enrichment appeared to be a problem throughout the basin. Phosphorus enrichment was observed at stations 1, 2, 3, 4, and 6, where total phosphorus levels were greater than those found in 70 to 80% of other Florida streams. Station 5 had a total phosphorus concentration (1.2 mg/L) greater than those found in 95% of other Florida streams, as well as elevated ammonia (0.14 mg/L). Stations 1, 2, 3, 7, and 8 all had nitrate-nitrite values higher than those found in 80 to 85% of other Florida streams, while nitrate-nitrite at station 6 (2.2 mg/L) was higher than that encountered in 95% of other Florida streams. With the exception of station 8, all sites had algal growth potential (AGP) values above the 5 mg dry wt/L "problem threshold".

Introduction

Biological, physical, chemical, and habitat information was collected from eight stations within the upper Hillsborough River basin (see maps in Appendix A). The eight receiving water sites were selected to assess the effects of human activities in the watershed (*e.g.*, agriculture, urban stormwater inputs from Plant City and Lakeland, as well as the industrial discharge from Alpha Owens Corning) (see maps and station descriptions in Appendix A). Six sites were established in streams draining to the Hillsborough River, including Blackwater Creek, Itchepackesassa Creek, and East Canal. Two stations were situated in forested flowing wetlands, including a test wetland (to assess the effects of the Alpha Owens discharge) and a reference wetland. During the six week period prior to sampling, the basin received an average of 8.6 inches of rain, based on four rain-

Major characteristics of community structure of study sites.

	AO1	AO2	AO3	AO4	AO5	AO6	AO7	AO8
Macroinvertebrate Qualitative								
Number of Taxa	33	32	37	29	36	46	26	22
Florida Index	10	15	8	11	9	24	20	17
Stream Condition Index (SCI)	31	27	27	27	25	31	27	23
LCI (macroinvertebrate component)	–	–	–	–	–	–	9	8
EPT Index	4	8	2	2	2	6	3	0
ETO Index	–	–	–	–	–	–	7	5
% Contribution of Dominant Taxon	13.6	22.7	11.7	55.8	20.6	21.1	9.5	50.5
% Oligochaeta	3.0	1.0	15.3	1.8	2.9	15.3	0	3.7
% Diptera	22.7	11.0	64.4	6.7	38.2	19.0	52.7	16.8
% Ephemeroptera	10.6	17.2	2.5	5.7	20.6	2.5	0	0
% Trichoptera	2.3	3.8	0	1.8	2.0	1.8	12.6	0
% Amphipoda	13.6	2.9	0	4.6	0	0	9.5	1.9
% Coleoptera	22.7	44.8	1.2	6.0	10.8	10.4	3.2	0
% Odonata	1.5	4.3	4.9	6.0	11.8	5.2	15.8	6.5
% Gastropoda	13.6	5.7	3.1	56.5	10.8	22.9	4.2	59.8
% Pelecypoda	7.6	6.2	8.0	9.5	2.0	21.1	2.1	11.2
% Other	1.5	3.3	0	1.4	1.0	1.8	0	0
% Predators	12.1	11.4	11.6	9.1	20.3	11.9	31.5	16.4
% Above Surface Deposit Feeders	33.7	33.7	35.1	11.4	38.0	14.5	29.6	7.5
% Below Surface Deposit Feeders	2.3	1.0	14.7	1.8	2.9	14.4	0	3.7
% Suspension Feeders	9.1	10.5	23.9	10.4	3.9	21.9	17.9	11.2
% Scrapers	18.5	35.3	4.0	6.0	25.0	13.8	4.2	59.8
% Shredders	11.0	4.4	10.1	4.2	7.8	4.9	16.3	1.4
% Other	1.1	0.7	0.6	0.2	0	2.2	0.5	0
% Unknown	0.8	0	0	1.1	1.0	0	0	0
Phytoplankton Algae								
Number of Taxa	6	5	3	9	7	7	6	5
Shannon-Weaver Diversity	1.87	1.62	1.30	3.04	2.55	2.26	2.32	2.25
Algal Density (#/mL)	157.5	251.4	84.0	147.0	157.5	135.3	105.0	63.0
Chlorophyll a (µg/L)	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
% Blue-green	26.7	24.0	0	21.4	13.3	26.9	20.0	25.0
% Green	60.0	76.0	12.5	28.6	6.7	0	80.0	0
% Diatoms	13.3	0	87.5	14.3	66.7	73.1	0	75.0
% Cryptophytes	0	0	0	35.7	13.3	0	0	0
Algal Growth Potential (mg dry wt/l)	41.0	52.3	52.9	12.3	25.7	126.9	25.6	0.7

fall guaging stations in the vicinity of basin.

Alpha Owens Corning is a manufacturing plant for polyester resin. Non-contact cooling water is treated via a separator (for removal of suspended materials) and then passes to a mixing basin and a holding pond. From the holding pond, an average of 0.532 MGD of effluent is discharged through Outfall 001 into an unnamed wetland (station 8 in this study), which ultimately flows to Hidden Lake. Outfalls 002 and 003, which intermittently discharge stormwater runoff, also flow into this same wetland area. Outfall 002 did not discharge between May, 1995, and June, 1996, and 003 discharged only once during this period (0.015 MGD in September, 1995). Neither Outfall 002 nor 003 were discharging during this sampling event.

Permit limits for Outfall 001 are as follows: dissolved oxygen (5.0 mg/L minimum), temperature (92° F or 5° F above the ambient temperature, whichever is less), pH (6.0 to 8.5 SU), five day CBOD (10.0 mg/L maximum), total residual chlorine (0.01 mg/L maximum), hydrogen sulfide (0.04 mg/L maximum), unionized ammonia (0.02 mg/L maximum), and total suspended solids (10.0 mg/L maximum).

Permit limits for Outfall 002 and 003 are as follows: dissolved oxygen (5.0 mg/L minimum), pH (6.0 to 8.5 SU), five day CBOD (10.0 mg/L maximum), total residual chlorine (0.01 mg/L maximum), total suspended solids (10.0 mg/L maximum), fecal coliforms (200 organisms/100 mL maximum monthly average, 400 organisms/100 mL in 10% of samples, or 800 organisms/100 mL on any one day), oil and grease (5.0 mg/L maximum), and temperature (92° F or 5° F above the ambient temperature, whichever is less).

Outfall 001 has consistently complied with permit limits, based upon monthly operating report data. In February, 1996, however, the discharge was acutely toxic to the fish, *Pimephales promelas*. An oil and grease exceedance was noted for Outfall 003 in September, 1995, during the only recent discharge from that outfall. Currently, there are no enforcement actions against this facility.

Methods

The focus of this investigation was to: determine the potential effects of stormwater inputs from Plant City, Lakeland and agricultural areas on tributaries of the Hillsborough River, and determine the effects of the Alpha Owens Corning discharge on the receiving wetland (see station map in Appendix A). Stations 1, 4, and 5 were located in Blackwater Creek. Station 1, located near Highway 39, is the northern-most site in the system, and was chosen to assess the overall quality of the system prior to the Hillsborough River. Stations 4 and 5 are located farther upstream in Blackwater Creek and are potentially affected by non-point source runoff from Lakeland. Station 3, located in the East Canal, was chosen to determine the effects of non-point source runoff from Plant City. Station 2, in Itchepackesassa Creek below the confluence with East Canal, was chosen to assess inputs from the Itchepackesassa Creek. Station 6, located near the headwaters of Itchepackesassa Creek, was selected to assess the effects of stormwater from Lakeland. Additionally, a point source (Florida Juice) discharges into Itchepackesassa Creek upstream of station 6. A biological assessment was performed on this facility in April, 1996.

Station 7, located in a forested wetland near Lake Gibson, was considered the reference wetland site. Station 8, located in a forested wetland which receives the Alpha Owens effluent, was the test wetland site.

Habitat quality was determined for each station during an *in situ* assessment. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on the effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on the effluent and all receiving water sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at all eight sites. Samples were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using 20 discrete dip net sweeps. Phytoplankton was sampled at all 8 sites via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

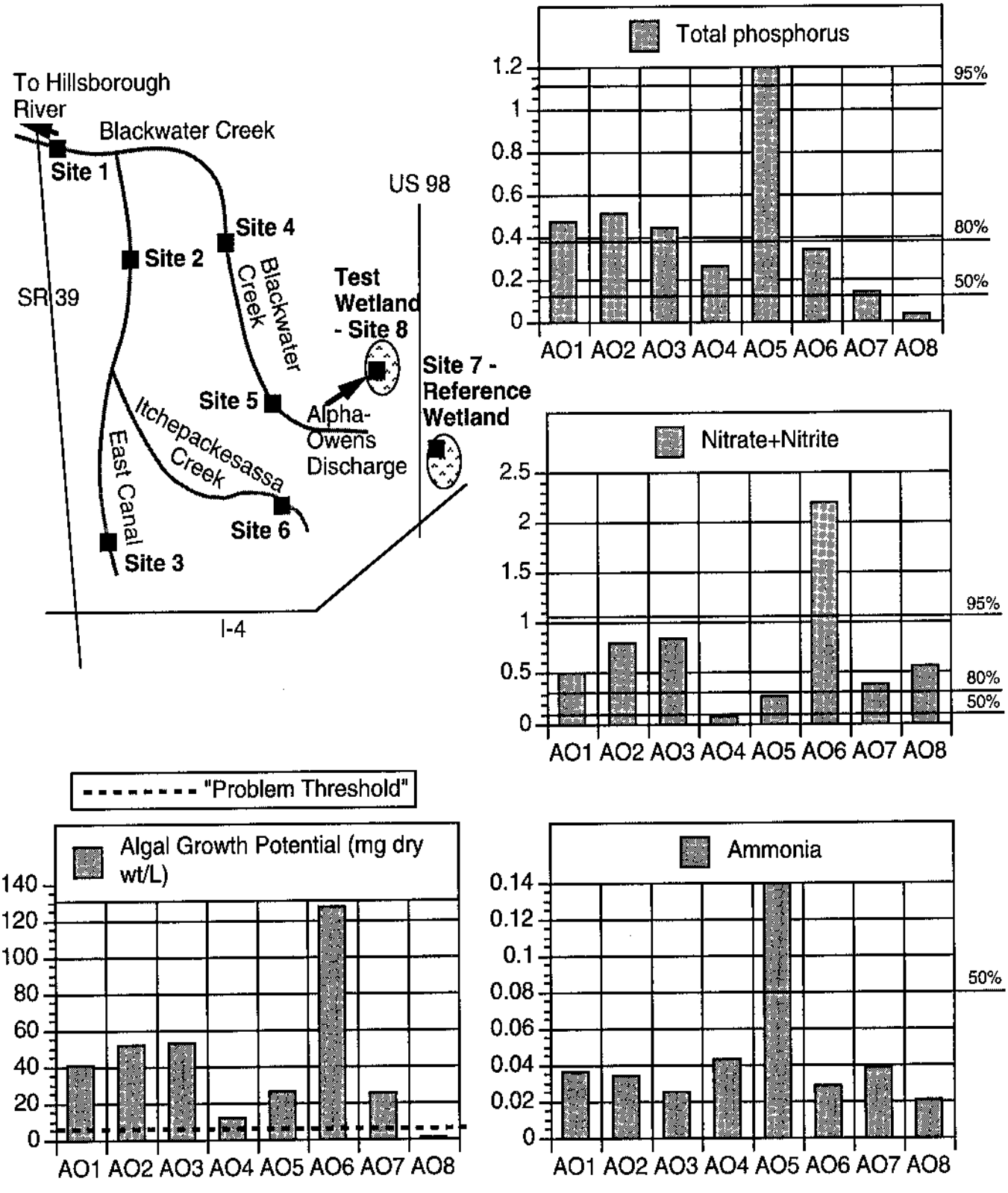

Figure 1. Nutrient and AGP results for the Alpha Owens/ upper Hillsborough Basin Study.

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of a discharge. These are briefly discussed here.

Habitat Assessment: Seven attributes known to have potential effects on the freshwater stream biota were evaluated and scored, with 20 points possible for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points). For marine systems, overall habitat quality is also assigned to one of four categories: Optimal (75-100 points); Suboptimal (50-75 points); Marginal (25-49 points); and Poor (0-24 points) (see habitat assessment field sheets in Appendix B).

Taxa richness: Stress tends to reduce the number of different types of organisms present in a system, although moderate nutrient enrichment may sometimes be correlated with increased algal taxa richness.

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is a related measure which is also associated with disturbance.

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et al.* (1990), Lenat (1993), Farrell (1992), Chang *et al.* (1992), and Whitmore (1989), are used as appropriate.

Ephemeroptera/Plecoptera/Trichoptera Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

Community structure: Substantial shifts in the proportions of major groups of organisms, compared to reference conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions in flowing streams.

Trophic composition/feeding guilds: Disturbance can shift the feeding strategies of invertebrates. In Florida, for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

The Stream condition Index for Florida (SCI) is a composite macroinvertebrate metric (Barbour *et al.* 1996). The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition.

The following personnel were involved in this investigation: Charles Kovach, Andrea Grainger, Peggy Morgan, Brent Johnson, Carrie Clarke, Jemy Hinton, and Lisa Masino (DEP Southwest District) and Lyn Burton, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding, Elizabeth Miller, Urania Quintana, Bart Richard, Landon Ross, Lisa Tamburello, David Whiting, Vicki Whiting, and Greg Wynn (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

Habitat quality was "optimal" at station 1 (lower Blackwater Creek) and station 2 (lower Itchepackesassa Creek), decreasing to "suboptimal" at station 3 (upper East Canal), station 4 (middle Blackwater Creek) and station 6 (upper Itchepackesassa Creek). Habitat quality in the upper Blackwater Creek at station 5 was "marginal". Recognizing that this par-

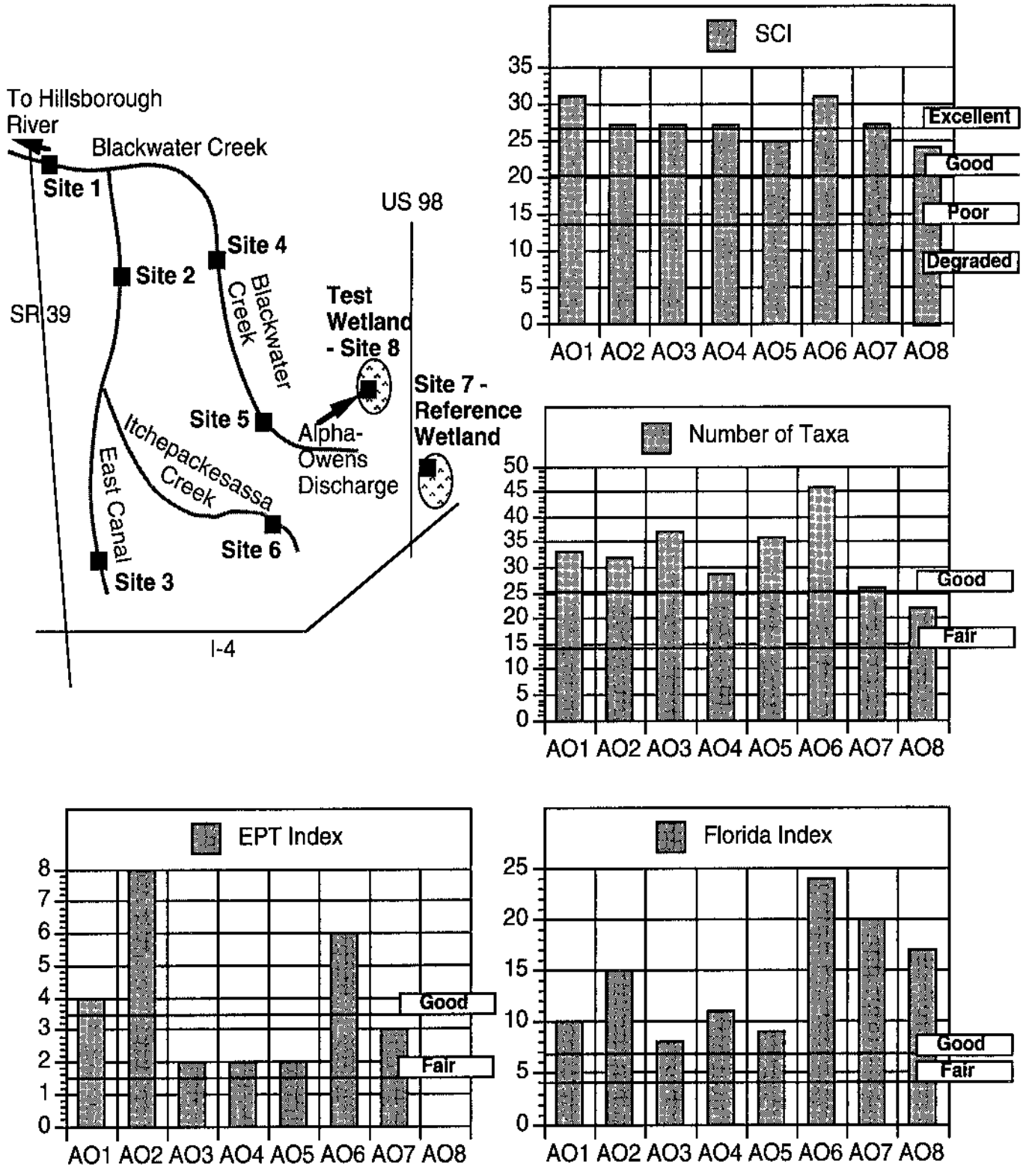

Figure 2. Macroinvertebrate results for the Alpha Owens/ upper Hillsborough Basin Study.

ticular habitat assessment procedure was designed for stream systems, both wetland sites (stations 7 and 8) scored in the "optimal" category for habitat quality. Note that in this instance, both wetland sites were characterized by appreciable water velocity (0.1 m/sec or greater), which is considered good even for stream macroinvertebrates.

Although stations 1 and 2 lost some points for deposition and riparian zone vegetation quality, they both scored in the optimal range for bottom substrate/available cover. Both sites had snags, leaf packs, undercut banks and roots, and rock rubble. Rock rubble was the dominant habitat at station 1 while leaf packs and rock rubble were almost equally represented at station 2. Both sites had good flow (0.2 and 0.25 m/sec at stations 1 and 2, respectively).

The majority of productive habitat at station 3, in upper East Canal, was undercut banks and roots, with aquatic vegetation and a small amount of rock rubble. The stream had been channelized here in the past, and the system had not fully recovered. Water velocity was 0.1 m/sec. The riparian zone buffer width at this site was less than 6 m, showing evidence of human activities close to the stream. This site also lost points for deposition, bank stability, and riparian zone vegetation quality.

Available habitat at station 4, on middle Blackwater Creek, consisted of abundant aquatic vegetation and some undercut banks and roots. Water velocity here was 0.2 m/sec. Although one side of the stream was heavily forested, the other side was cleared and was adjacent to a residential area. Subsequently, the banks were moderately unstable, with little riparian buffer zone. A stormwater drain pipe discharges into the stream at this site.

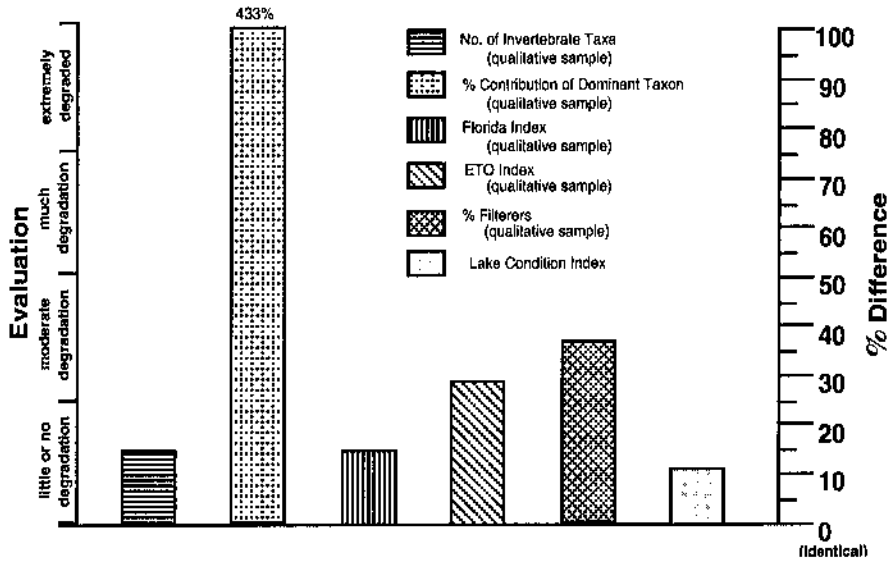

Figure 3. Differences in macroinvertebrate parameters between the reference wetland (near Lake Gibson) and the test wetland (which receives the Alpha Owens discharge).

Station 5, farther upstream on Blackwater Creek, had abundant aquatic vegetation, and a small amount of leaf packs. There was no visible flow at this site and the majority of habitats were affected by silt deposition. This site also had a poor riparian buffer zone, with human activities within 6 m of the stream, and disruption of the riparian zone vegetation.

Station 6, on Itchepackesassa Creek, was characterized by diverse habitat, with leaf packs, vegetation, rock rubble, and undercut banks and roots well represented. Water velocity was moderate here (0.09 to 0.1 m/sec), and the stream appeared to have been recently channelized. This station also suffered from deposition, bank instability, a reduced riparian buffer zone, and disruption of the native riparian vegetation.

The two wetland sites scored in the optimal category on the habitat assessment. Both sites had good representation of available habitats such as snags, leaf packs, aquatic vegetation, and roots, and both sites had water velocities which were as good as, or better than, the stream sites (0.2 and 0.1 m/sec at the reference and test sites, respectively). The reference site scored higher than the test site because it had less deposition, better riparian zone buffer width, and better riparian zone vegetation quality than the test site. Further, the reference site appeared have better flow than the test site.

Dissolved oxygen was sufficient to support aquatic life at all sites, ranging from 5.1 mg/L at station 7 to 9.6 mg/L at station 3 (see Chemistry Summary Table in Appendix). All sites exceeded the minimum Class III dissolved oxygen standard of 5.0 mg/L. The pH ranged from 6.1 SU at station 7 to 7.3 SU at stations 3 and 8. Conductivity ranged from a low of 54 µmhos/cm at station 4 to a high of 335 at station 2. Temperatures were similar at most sites (ranging from 14.3 °C to 17.2

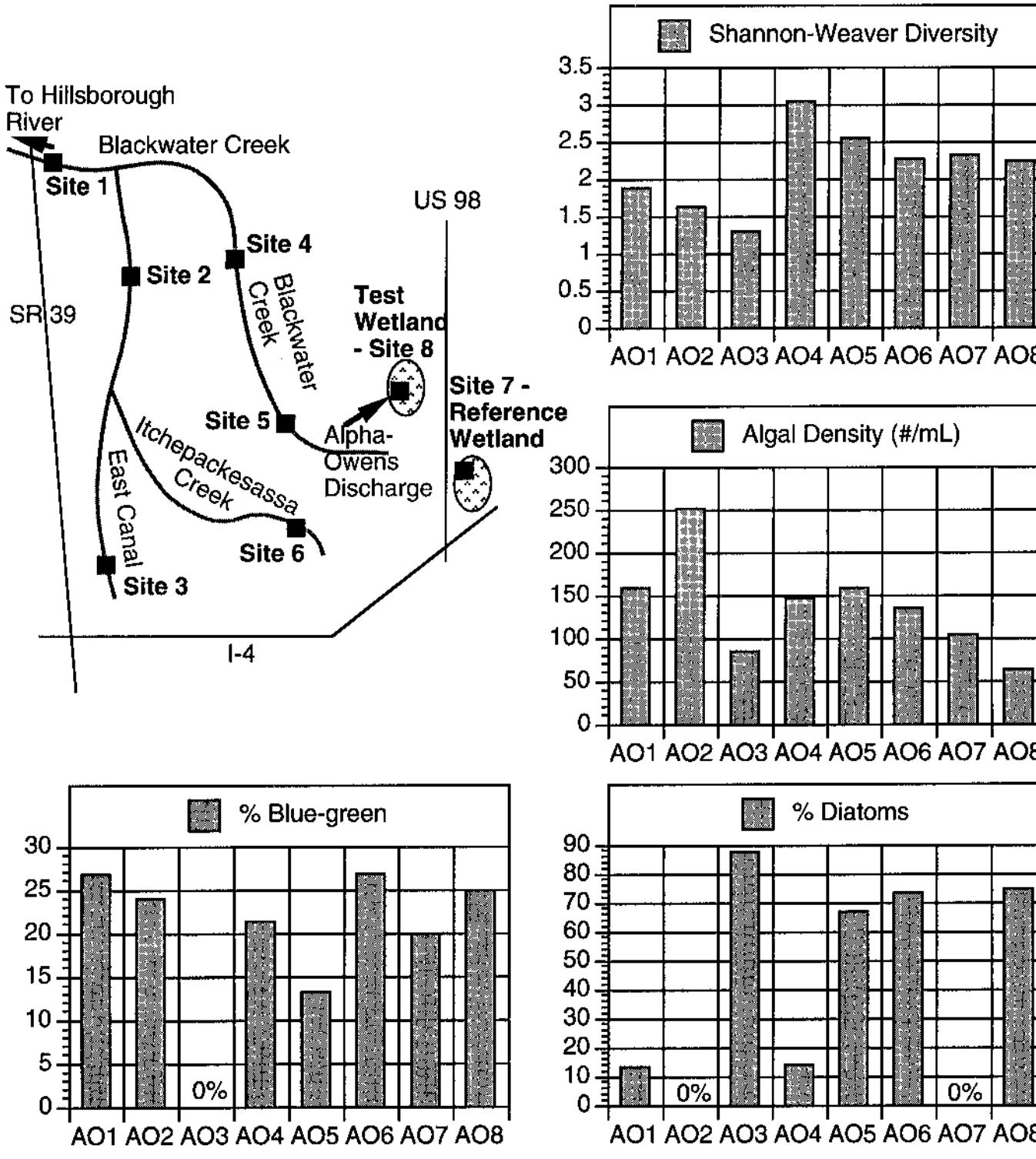

Figure 4. Phytoplankton results for the Alpha Owens/ upper Hillsborough Basin Study.

°C) except for the wetland test site (which was 23.0 °C).

Dissolved oxygen, pH, and temperature of the Alpha Owens effluent complied with permit limits and Class III standards. The effluent total residual chlorine (0.02 mg/L) exceeded the permit limit (maximum of 0.01 mg/L).

The effluent sample from the Alpha Owens Corning plant was not toxic to the invertebrate, *Ceriodaphnia dubia* (Appendix C). Although there was 20% mortality to *Cyprinella leedsi*, the sample was not considered to be acutely toxic to the fish.

No pesticides or organic compounds were detected in the effluent.

The Alpha Owens effluent metals sample was accidentally preserved with sulfuric acid instead of nitric acid. Of the metals analyzed for, only iron (28 µg/L) and copper (7.4 µg/L) were detected in the effluent, both which complied with Class III water quality standards (see Chemistry Summary Table). Note that copper was also detected in the field blank (11.6 µg/L), suggesting copper contamination in the sample bottles or preservative.

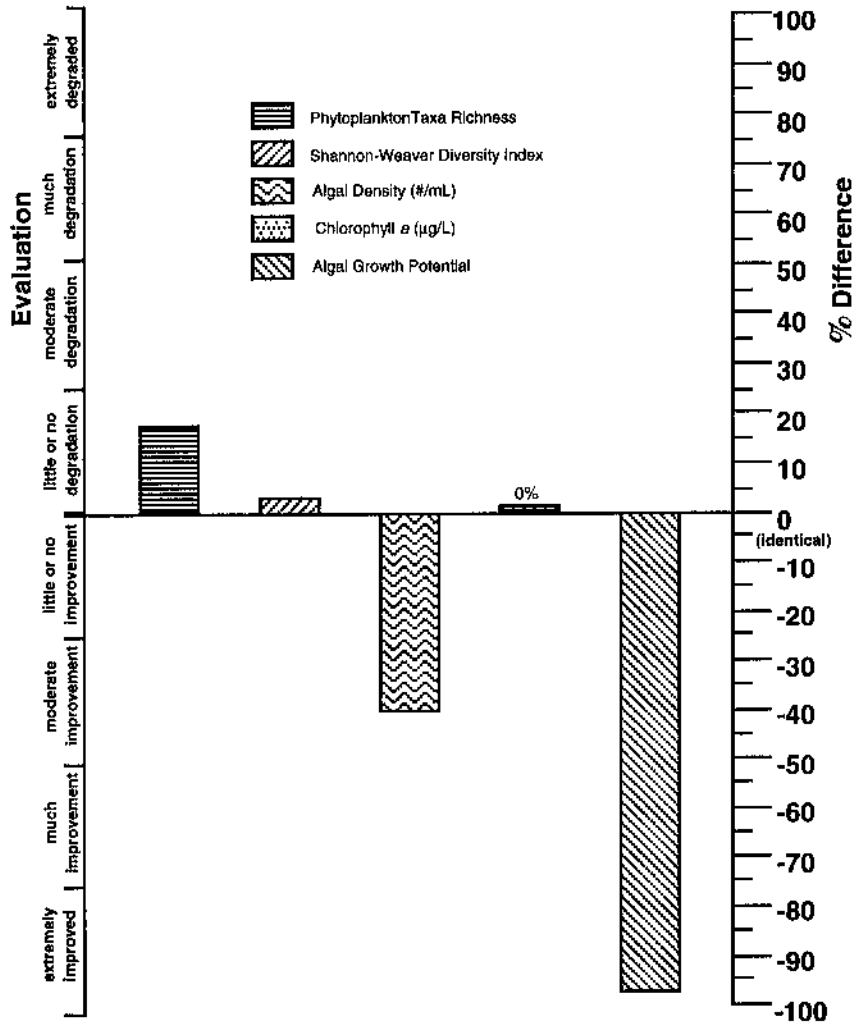

Figure 5. Differences in phytoplankton parameters between the reference wetland (near Lake Gibson) and the test wetland (which receives the Alpha Owens discharge).

Moderate phosphorus enrichment was observed at stations 1, 2, 3, 4, and 6 (Figure 1). Water at these sites had total phosphorus levels greater than those found in 70% to 80% of other Florida streams (see Table of Typical Water Quality Parameters in Appendix). Extreme phosphorus enrichment was observed at Station 5 (upper Blackwater Creek), which had a total phosphorus level of 1.2 mg/L, which is greater than the concentrations found in 95% of other Florida streams. Nitrate-nitrite enrichment was found at stations 1, 2, 3, 7, and 8, where nitrate-nitrite concentrations were higher than those found in 80% to 85% of other Florida streams (Figure 1). Nitrate-nitrite at station 6 (2.2 mg/L) was very elevated, being higher than the values found in 95% of other Florida streams. With the exception of station 5, most stations had low ammonia values. With a concentration of 0.14 mg/L, water at station 5 had ammonia levels higher than 70% of other Florida streams.

Nutrients in the Alpha Owens effluent were low or undetected except for 0.53 mg/L of nitrate-nitrite. The effluent appeared to be the source of the elevated nitrate-nitrite at station 8, the test wetland. All other nutrient levels at station 8 were low.

Algal growth potential (AGP) at seven of the eight sites was above the 5 mg dry wt/L "problem threshold" for freshwater (Raschke and Schultz 1987). AGP values of stations 1 through 7 ranged from a low of 12.3 mg dry wt/L at station 4 to a high of 126.9 mg dry wt/L at station 6. AGP at station 8 (0.7 mg dry wt/L) did not exceed the problem threshold. These

elevated AGP's, along with the obvious nutrient enrichment at the majority of the sites, suggest that human activities in the basin are negatively affecting the water quality. With the exception of moderate nitrate-nitrite enrichment in station 8, the Alpha Owens discharge does not appear to be a nutrient contributor. AGP of the effluent was 0.3 mg dry wt/L.

Qualitative measures of benthic macroinvertebrate community health suggested that all eight sites within the upper Hillsborough River basin were relatively healthy, including the wetland sites. Macroinvertebrate sampling throughout the watershed consisted of the 20 dipnet sweep method for calculation of the Stream Condition Index for Florida (SCI). Note that stations 7 and 8 could appropriately be classified as forested wetlands. However, the presence of flowing water through these systems suggested the SCI measurements could also be applicable in the evaluation of community health.

Macroinvertebrate taxa richness was relatively good at all sites, ranging from a low of 22 taxa at station 8 (the test wetland site) to a high of 46 taxa at station 6 (upper Itchepackesassa Creek) (Figure 2). Based upon the SCI, one expects to find a minimum of 26 taxa at an unimpaired stream site in the Florida Peninsula. Similarly, a minimum Florida Index score of 7 points is expected for an unimpaired peninsular stream. The Florida Index scores throughout the basin surpassed this expectation, ranging from 8 (at station 3, East Canal) to 24 at station 6, upper Itchepackesassa Creek. Note that even the wetland sites, with Florida Index values of 20 at station 7 and 17 at station 8, had exceptionally good scores. The EPT Index was generally low at many stations in this study, fluctuating from 0 EPT taxa at station 8 (the test wetland) to 8 EPT taxa at station 2 (lower Itchepackesassa Creek). An EPT Index of 4 or higher is usually found in a healthy peninsular stream. With the exception of stations 1, 2 and 6, all remaining stations fell below this expected value for EPT richness.

The Stream Condition Index summarizes seven different measures of macroinvertebrate community structure and function, including the parameters mentioned in the preceding paragraph (see SCI worksheets in Appendix D). The SCI ranged from a low of 23 points at station 8 (the test wetland), to a high of 31 at station 1 (lower Blackwater Creek) and station 6 (upper Itchepackesassa Creek) (Figure 2). All stations except station 5 (upper Blackwater Creek) and station 8 (the test wetland) received an "excellent" rating. Stations 5 and 8 were in the "good" category.

These macroinvertebrate results suggest that healthy conditions prevailed throughout the basin, despite the nutrient enrichment and suboptimal habitat observed at some sites. Apparently, the instream substrate quality, flow, and light penetration characteristics of the system were sufficient that the observed nutrient enrichment and riparian zone disturbances did not translate into negative influences on the invertebrate community.

There were biological differences between the wetland receiving the Alpha Owens discharge (station 8) and the reference wetland (station 7) (Figure 3). There was a higher % contribution of the dominant taxon (the gastropod, *Melanoides tuberculata)* at the test wetland, compared to the reference site. There was also a reduction in the number of suspension feeders at the test site. However, the SCI score at station 8 (the test wetland) was 24 points, which clearly places this site in the "good" category. Increased water velocity at the reference wetland (which was double that of the test wetland) could account for the observed differences.

In general, phytoplankton populations were very sparse (less than 300 organisms/mL) throughout the basin, with low taxa richness (between 3 and 9 taxa), and low to moderate diversity (between 1.3 and 3.0) (Figure 4). Chlorophyll *a* was undetected (with a detection limit of 1.0 µg/L) at all stations. No negative changes appeared to be associated with the Alpha Owens discharge (Figure 5). In fact, station 8 actually had a higher percent diatoms than did station 7. Again, flow and light penetration characteristics appeared to neutralize the effects of nutrient enrichment found in the system. It is possible, however, that areas downstream with longer water retention times, such as the lower Hillsborough River or Hillsborough Bay, may be affected by the nutrient loading from this basin.

Conclusions

All eight sites in the study area complied with the minimum Class III dissolved oxygen standard of 5.0 mg/L for fresh water. Dissolved oxygen, pH, and temperature of the effluent complied with permit lim-

its and Class III standards. However, the effluent total residual chlorine was 0.02 mg/L, exceeding Alpha Owen Corning's permit limit.

The Alpha Owens' effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

No pesticides or organic compounds were detected in the Alpha Owens effluent. All metals detected in the effluent complied with Class III water quality standards.

Moderate phosphorus enrichment was observed at stations 1, 2, 3, 4, and 6, where total phosphorus levels were greater than those found in 70 to 80% of other Florida streams. Station 5, in upper Blackwater Creek, had a total phosphorus concentration (1.2 mg/L) greater than those found in 95% of other Florida streams, as well as elevated ammonia (0.14 mg/L). Stations 1, 2, 3, 7, and 8 all had nitrate-nitrite values higher than those found in 80 to 85% of other Florida streams, while nitrate-nitrite at station 6 (2.2 mg/L) was higher than that encountered in 95% of other Florida streams. Nutrient enrichment appeared to be a problem throughout the basin.

Nutrients in the Alpha Owens effluent were low or undetected except for 0.52 mg/L of nitrate-nitrite. The effluent appeared to be the source of the elevated nitrate-nitrite at station 8, the test wetland. All other nutrient levels at station 8 were low or undetected.

With the exception of station 8, all other sites had algal growth potential (AGP) values above the 5 mg dry wt/L "problem threshold", ranging from a 12.3 mg dry wt/L at station 4 to 126.9 mg dry wt/L at station 6. AGP of the Alpha Owens effluent was 0.3 mg dry wt/L.

The macroinvertebrate results suggested healthy conditions prevailed throughout the basin, despite the nutrient enrichment and suboptimal habitat observed at some sites. Six sites within the basin (stations 1, 2, 3, 4, 6, and 7) had Stream Condition Index scores in the "excellent" category, while two sites (stations 5 and 8) were ranked as "good". Apparently, the instream substrate quality, flow, and light penetration characteristics of the system were sufficient such that the observed nutrient enrichment and riparian zone disturbances did not translate into negative influences on the invertebrate community. The relatively minor biological differences between the wetland receiving the Alpha Owens discharge (station 8) and the reference wetland (station 7) could be accounted for by the higher water flow at the reference wetland.

In general, phytoplankton communities throughout the basin were typical of flowing streams, characterized by low density, low taxa richness, and low to moderate diversity. Chlorophyll *a* was undetected at all stations. No negative changes appeared to be associated with the Alpha Owens discharge. Again, flow and light penetration characteristics appeared to neutralize the near-field effects of nutrient enrichment found in the system. It is possible, however, that areas downstream with longer water retention times, such as the lower Hillsborough River or Hillsborough Bay, may be affected by the nutrient loading from this basin.

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Chemistry summary table for Alpha Owens Corning

	Effluent	AO1	AO2	AO3	AO4	AO5	AO6	AO7	AO8
Organic Constituents (ug/L)									
None Detected									
Metals (ug/L)**									
Aluminum	38 I								
Arsenic	20 U								
Cadmium	0.05 U								
Copper	7.4*								
Chromium	6 I								
Iron	28								
Lead	10 U								
Mercury	0.10 U								
Nickel	4 U								
Selenium	30 U								
Silver	0.04 U								
Zinc	10 I								
Nutrients (mg/L)									
Ortho-phosphate	0.024 I	0.47	0.41	0.39	0.21	1.2	0.32	0.15	0.034
Total phosphorus	0.018 I	0.47	0.51	0.44	0.26	1.2	0.34	0.14	0.034
Ammonia	0.020 U	0.036	0.034	0.025	0.043	0.14	0.029	0.039	0.021
Nitrate+Nitrite	0.53 A	0.50	0.80	0.85	0.071	0.27	2.2	0.38	0.56
TKN	0.060 U	0.55	0.61	0.38	0.91	0.63	0.41	0.35	0.061
General Phys-Chem Parameters									
Habitat Assessment		112	116	78	86	66	72	117	107
D. O. (mg/L)	9.9	6.9	7.5	9.6	6.8	6.8	7.8	5.1	5.5
pH (SU)	7.1	7.1	7.1	7.3	6.5	7.0	6.7	6.1	7.3
Specific Conductance (µmhos/cm)	209	330	335	231	54	182	205	171	211
Temperature (°C)	23.6	17.2	16.9	16.8	17.1	14.3	15.3	16.9	23.0
Hardness (mg/L)	140								
Total Residual Chlorine (mg/L)	0.02								
Algal Growth Potential (mg dry wt/L)	0.3	41.0	52.3	52.9	12.3	25.7	126.9	25.6	0.7
Toxicity									
Bioassay Fish	20 % Mortality								
Bioassay Invertebrate	No Mortality								

* - Copper was detected in the field blank at 11.6 µg/L

** - Metals samples were preserved with H2SO4 instead of HNO3

A - Value reported is the mean of two or more determinations

I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit

U - Material analyzed for but not detected; value reported is the minimum detection limit

Typical Values for Selected Parameters in Florida Waters

Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

Percentile Distribution

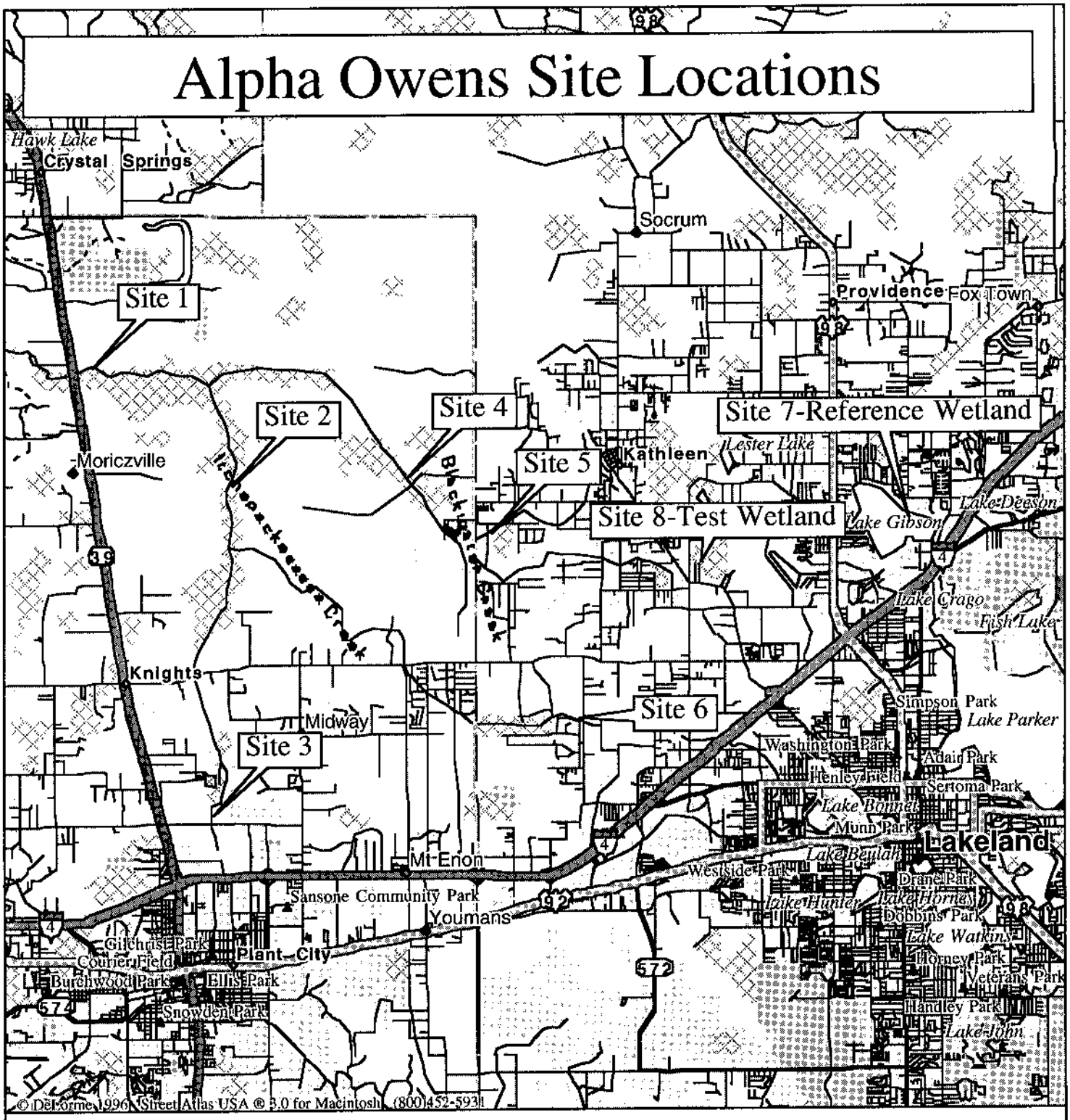
Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphate	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

Units:

Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates

Appendix A

Alpha Owens Site Locations



Mag 12.00
Tue Apr 08 07:33 1997
Scale 1:125,000 (at center)
2 Miles
2 KM

- Secondary SR, Road, Hwy Ramp
- Major Connector
- State Route
- Interstate/Limited Access
- US Highway
- Primary State Route
- Town, Small City
- Large City
- Airfield
- Park or Reservation
- Locale
- County Boundary
- Population Center
- Lake, Ocean

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Alpha Owens Corning		Date Summary Prepared: 7/30/96
Location (attach detailed map): see attachments	County: Polk	District: SW DEP
Federal Permit # and expiration date: FL 0029653 6/30/97	State GMS # and State expiration date: IO53-244619A 6/30/91	Facility Type: (Industrial) Municipal Federal Agricultural Other (list):

Function of facility: Manufactors polyester resin

Description of treatment process: One-Through non-contact cooling water flows through a separator for removal of light or heavy suspended materials prior to passing through a mixing basin and to a holding pond where it is discharged through Outfall 001. At the discharge pipe it is combined with cooling water blowdown. Outfalls 002 and 003 are for stormwater run-off. The corrosion inhibitor Ancool 3180 is added to the cool Tower

Receiving waters: Wetlands to Hidden Lake	Classification: I II (III)	
Design Flow: 1.0 MGD	Mean Flow: 001 = 0.532 mgd, 5/95 to 6/96 002: none 003: 0.015 mgd	Flow during survey:

Discharge is: Continuous Intermittent Seasonal Rainfall dependent
Other (describe) 001 is continuous. 002 and 003 are intermittent

therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.):

None

List effluent limits (if necessary, attach relevant paperwork):

Parameter	Limit (units)
See attachments	

Describe special permit conditions and permit modifications:

There are 2 effluent limitations in the permit. One is for outfall 001, and the other is for outfalls 002 and 003.

Alpha Owens Corning
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s): Outfall 001 to a Parshall Flume.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year:

(1) The February 1996 chronic toxicity results indicated acute toxicity to P. promelas.

(2) DMRs from 11/95 to 2/96 could not be located for review, but no exceedances were noted on the state MORs.

(3) No exceedances have been noted except for oil/grease in Sept 1995 during the one-time discharge from 003.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:

In 1993 there was EPA enforcement at Outfall 002 due to exceedances of the NPDES permit for TSS, fecal coliform, Oil and grease, and BOD. Currently there are no enforcement actions.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:

Additional information:

Staff contributing to this review (signature):

Candace Stanger (Biologist)

(Inspector)

(Engineer)

( )

( )

( )

23. From the issuance date of this permit through its expiration, the effluent from Outfall 001 shall not exceed the effluent limitations and shall be monitored by the permittee as specified below. If there is no discharge, the sample shall be collected on the day of next discharge. The sample shall be taken at the point nearest the discharge prior to mixing with the receiving water body.

EFFLUENT LIMITATIONS/
WATER QUALITY STANDARDS

EFFLUENT CHARACTERISTIC	MIN	30-DAY AVG	MAX	SAMPLING TYPE	SAMPLING FREQUENCY
Flow (MGD)	N/A	Report	Report	Recorder	Continuous
Dissolved Oxygen (mg/l)	5.0	Report	N/A	Grab	Weekly
Temperature (°F)	N/A	Report	*	In Situ	Weekly
pH (std. units)**	6.0	Report	8.5	Grab	Weekly
$CBOD_5$ (mg/l)	N/A	N/A	10.0	Grab	Monthly
Total Residual Chlorine (mg/l)	N/A	Report	0.01	Grab	Weekly
Sulfate (mg/l)	N/A	N/A	Report	Grab	Monthly
Hydrogen Sulfide (mg/l)	N/A	N/A	0.04	Grab	Monthly
Un-ionized ammonia (mg/l)	N/A	N/A	0.02	Calculation	Monthly
Total Suspended Solids (mg/l)	N/A	N/A	10.0	Grab	Monthly

* 92°F or ambient temperature + 5°F, whichever is less [Section 17-302.520(4)(a), F.A.C.].

** Shall not vary more than one unit above or below natural background provided the resulting standard is within this range. If natural background is less than six (6) units, the pH shall not vary below natural background or vary more than one unit above natural background. If natural background is greater than eight and one-half (8.5) units, the pH shall not vary above natural background or vary more than one unit below natural background [Rule 17-302.530(52)(c), F.A.C.].

25. From the issuance date of this permit through its expiration, the effluent from Outfalls 002 and 003 (contact stormwater runoff) shall not exceed the effluent limitations and shall be monitored by the permittee as specified below. If there is no discharge, the sample shall be collected on the day of next discharge. The sample shall be taken at the point nearest the discharge prior to mixing with the receiving water body.

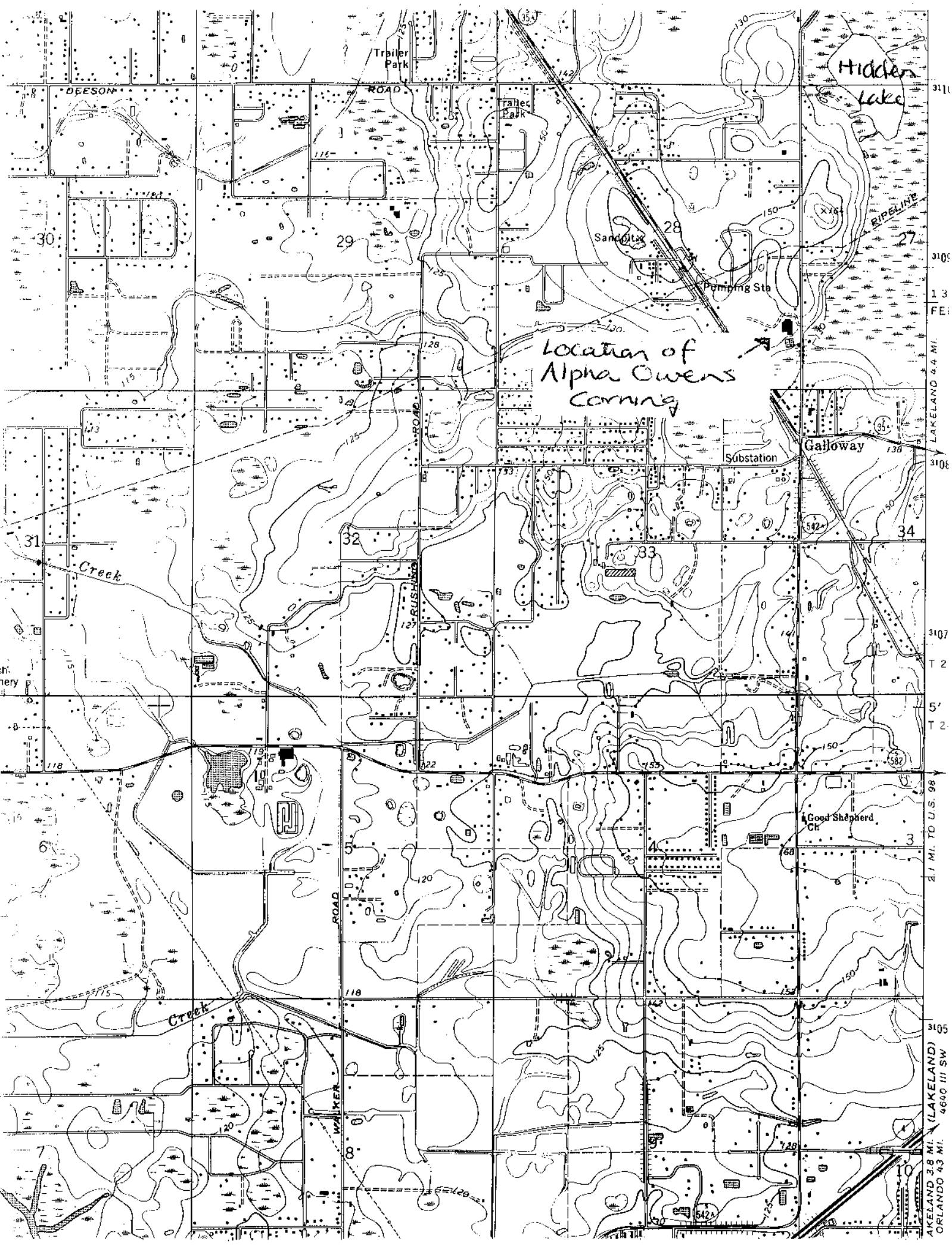
EFFLUENT LIMITATIONS/
WATER QUALITY STANDARDS

EFFLUENT CHARACTERISTIC	MIN	30-DAY AVG	MAX	SAMPLING TYPE	SAMPLING FREQUENCY
Flow (MGD)	N/A	Report	Report	Recorder	Continuous
Dissolved Oxygen (mg/l)	5.0	Report	N/A	Grab	Weekly
pH (std. units)*	6.0	Report	8.5	Grab	Weekly
$CBOD_5$ (mg/l)	N/A	Report	10.0	Grab	Weekly
Total Residual Chlorine (mg/l)	N/A	Report	0.01	Grab	Weekly
Total Suspended Solids (mg/l)	N/A	Report	10.0	Grab	Weekly
Fecal Coliform (#/100ml)	N/A	**	**	Grab	Weekly
Oil and Grease (mg/l)	N/A	Report	5.0	Grab	Weekly
Temperature (°F)	N/A	***	***	Grab	Weekly

* Shall not vary more than one unit above or below natural background provided the resulting standard is within this range. If natural background is less than six (6) units, the pH shall not vary below natural background or vary more than one unit above natural background. If natural background is greater than eight and one-half (8.5) units, the pH shall not vary above natural background or vary more than one unit below natural background [Rule 17-302.530(52)(c), F.A.C.].

** The fecal coliform bacteria count shall not exceed a monthly average of 200 per 100 milliliters of sample, nor exceed 400 per 100 milliliters of sample in 10 per cent of the samples, nor exceed 800 per 100 milliliters on any one day [Rule 17-302.530(6), F.A.C.].

*** 92°F or ambient temperature + 5°F, whichever is less [Section 17-302.520(4)(a), F.A.C.].


Hidden Lake
Trailer Park
DEESON ROAD
Trailer Park
Sandpit
Pumping Sta
PIPELINE
Location of Alpha Owens Corning
Galloway
Substation
LAKELAND 4.4 MI.
RUSHTON ROAD
Creek
Creek
WALKER ROAD
Good Shepherd Ch
2.1 MI. TO U.S. 98
LAKELAND 3.8 MI.
ORLANDO 43 MI.
4640 III SW
30
29
28
27
31
32
33
34
1
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10

Land Use for Alpha Owens/upper Hillsborough River Basin Study

This study was conducted predominantly in the upper Hillsborough River Basin. It involves five subbasins located within the Ichapacksassa and Blackwater Creeks, and one subbasin located within the Peace River (wetland reference site).

Blackwater Creek: Sites 1, 4, and 5

Total acreage of the Blackwater Creek subbasin = 19,719 acres

	Acres	Percent
Urban and Build-up	1774	9%
Agriculture	8584	44%
Rangeland	1450	7%
Upland Forest	2363	12%
Water	54	0.2%
Wetlands	5335	27%
Barren Land	5	0.0%
Transportation, Communication, and Utilities	154	0.8%

Itchepackassa Creek: Site 2

Total acreage of the Itchepackassa Creek subbasin = 10,028 acres

	Acres	Percent
Urban and Build-up	1961	20%
Agriculture	4837	48%
Rangeland	500	5%
Upland Forest	437	4%
Water	120	1%
Wetlands	2071	21%
Barren Land	9	0.1%
Transportation, Communication, and Utilities	93	0.9%

East Canal: Site 3

Total acreage of the East Canal subbasin = 6693 acres

	Acres	Percent
Urban and Build-up	1931	29%
Agriculture	3100	46%
Rangeland	31	0.5%
Upland Forest	500	7.5%
Water	106	2%
Wetlands	963	14%
Barren Land	0	0%
Transportation, Communication, and Utilities	62	1%

Wiggin Prairie Drain into Itchepackassa Creek: Site 6

Total acreage of the Wiggin Prairie Drain subbasin = 3946 acres

	Acres	Percent
Urban and Build-up	633	16%
Agriculture	2318	59%
Rangeland	141	4%
Upland Forest	249	6%
Water	68	2%
Wetlands	432	11%
Barren Land	7	0.2%
Transportation, Communication, and Utilities	98	2%

Saddle Creek (Peace River Basin): Site 7 Reference Wetland

Total acreage of the Saddle Creek subbasin = 62454 acres

	Acres	Percent
Urban and Build-up	26394	42%
Agriculture	11805	19%
Rangeland	676	1%
Upland Forest	3497	6%
Water	10188	16%
Wetlands	8426	14%
Barren Land	179	0.3%
Transportation, Communication, and Utilities	1289	2%

Channelized Creek: Site 8 Test Wetland

Total acreage of the Channelized Creek subbasin = 3295 acres

	Acres	Percent
Urban and Build-up	1044	32%
Agriculture	1330	40%
Rangeland	73	2%
Upland Forest	243	7%
Water	67	2%
Wetlands	533	17%
Barren Land	0	0%
Transportation, Communication, and Utilities	5	0.1%

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/96	1000	Blackwater Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Alpha Owens Corning/ Basin Study	Hills	Blackwater Creek near Hwy 39	Test Site 1 A01

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)

Local Watershed Erosion (check box): None ☐ Slight ☒ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☐

Width of riparian vegetation (m) on least buffered side: 100

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect

9 m wide

0.2 m/s | 0.2 m/s | 0.125 m/s

0.5 m deep | 0.5 m deep | 0.5 m deep

Artificially Channelized ☐ no ☐ recent, severe ☑ some recovery ☐ mostly recovered, more sinuous

Artificially Impounded ☐ yes

High Water Mark: 0.5 (m above present water level) + 0.5 (present depth in m) = 1.0 (m above bed)

Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☒ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE · roots covered by silt

Sediment Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐ very slightly anaerobic odor

Sediment Oils: Absent: ☐ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: none / slight / moderate / severe Silt smothering: none / slight / moderate / severe Other: on roots and snags

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	7	5		Sand	55	3	
Leaf Packs or Mats	3	2		Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble	25	5		Other:			
Undercut banks/Roots	10	5		*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		17.16	7.06	6.93	0.330			VOB
Mid-depth								
Bottom								

System Type : Stream: ☑ (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☐ Slightly turbid: ☑ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:
clear and cool, getting warmer
Subbasin - Blackwater Creek

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☑	☐	☐
Fish	☐	☐	☑	☐
Aquatic Macrophytes	☑	☐	☐	☐
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
Morgan, Hinton, Masino	Peggy Morgan	10/21/96

Appendix B

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/21/96	Blackwater Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
Alpha Owens Corning / Basin Study	Blackwater Creek near Hwy 89	Test Site 1

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover 20	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. (20) 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity 14	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 (14) 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization 15	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern (15) 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition 13	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 (13) 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability 17	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 (17) 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width 20	Width of native vegetation (least buffered side) greater than 18 m (20) 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality 13	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in exotic community evident. Sp. Ruella 15 14 (13) 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[ ] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

Comments

112 **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/21/96	Morgan	Peggy Morgan

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/96	1145	Itchepackasassa

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Alpha Canning / Queens Basin Study	Hills	Cone Ranch in Itchepackasassa Creek	Test Site 2 A02

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)

Local Watershed Erosion (check box): None ☑ Slight ☐ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☐

Width of riparian vegetation (m) on least buffered side: 25

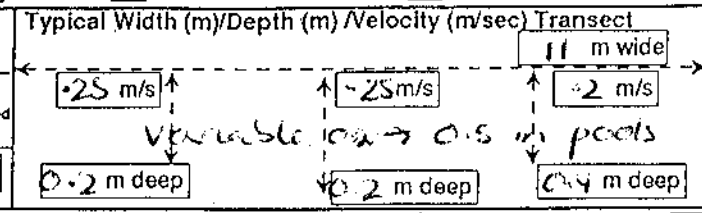
List & map dominant vegetation on back

Artificially Channelized ☐ no ☐ recent, severe ☑ some recovery ☐ mostly recovered, more sinuous

Artificially Impounded ☐ yes

High Water Mark: 0.2 (m above present water level) + 1.5 (present depth in m) = 1.7 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☑ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☑ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: none / slight / moderate / severe — Silt smothering: none / slight / moderate / severe — Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	3	4		Sand	67	4	
Leaf Packs or Mats	10	4		Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble	12	4		Other:			
Undercut banks/Roots	8	4		*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		16.88	7.07	7.53	0.335			VOB
Mid-depth								
Bottom								

System Type : Stream: ☐ (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐ slightly tannic

Weather Conditions/Notes:

No clouds, warming 75°F

Subbasin – Itchepackasassa Ck

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☑	☐	☐
Fish	☐	☐	☑	☐
Aquatic Macrophytes	☑	☐	☐	☐
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
Morgan, Hinton, Masino	Margaret A Morgan	10/21/96

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/21/96	Ichepacheesassa Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
Alpha Owens Community Brain Study	Ichepacheesassa Creek at Cane Ranch	Test Site 2

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **20**	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. (20) 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity **15**	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec (15) 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization **15**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern (15) 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition **15**	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation (15) 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **16**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 (16)	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **20**	Width of native vegetation (least buffered side) greater than 18 m (20) 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality **15**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[ ] Add 5 **points** if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

Comments

116 TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/21/96	Peggy Morgan	Peggy Morgan

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/96	1130	East Canal

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Alpha Creek Corning Basin Study	Hills	East Canal near Sam Allen Rd.	Test Site 3 A03

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)

Local Watershed Erosion (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☑

Width of riparian vegetation (m) on least buffered side: 6

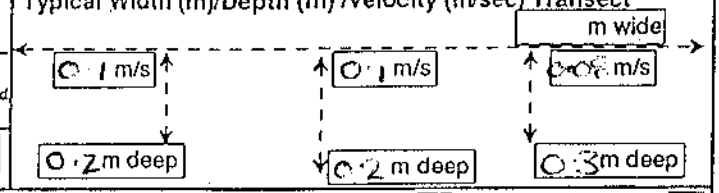
List & map dominant vegetation on back

Artificially Channelized ☐ no ☐ recent, severe ☑ some recovery ☐ mostly recovered, more sinuous

Artificially Impounded ☐ yes

High Water Mark: 1 (m above present water level) + 0.2 (present depth in m) = 1.2 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Canopy Cover % : Open : ☑ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☑ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: (none) slight moderate severe Silt smothering: none (slight) moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	60	2	
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	10	7		Other:			
Rock or Shell Rubble	2	1		Other:			
Undercut banks/Roots	28	10		*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		16.76	7.25	9.55	0.231			0.85
Mid-depth								
Bottom								

System Type : Stream: ☐ (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☐ Green (algae): ☐ Clear: ☑ Other: ☐

Weather Conditions/Notes:
Sunbrain – East Canal

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☑	☐
Fish	☐	☐	☑	☐
Aquatic Macrophytes	☐	☐	☑	☐
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
Johnson, Clarke	Brent Johnson	10/21/96

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/21/96	East Canal

REMARKS:	LOCATION:	FIELD ID/NAME:
Alpha Owens Canning / Basin Study	East Canal near Sam Allen Road	Test Site 3

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **15**	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). **15** 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity **10**	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec **10** 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization **5**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 **8** 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition **15**	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation **15** 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **13**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 **13** 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **5**	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities **5** 4 3 2 1
Riparian Zone Vegetation Quality **12**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 **12** 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[ ] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

78 **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/21/96	Brent Johnson	Brent Johnson

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/96	1235	Blackwater Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Sunny, clear	Mills	Blackwater Creek near Light + Life Methodist Camp Ground - Beeson Rd	Test Site 4 AD4

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)

Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☒ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☑ Moderate potential ☐ Obvious sources ☐

Width of riparian vegetation (m) on least buffered side: 4

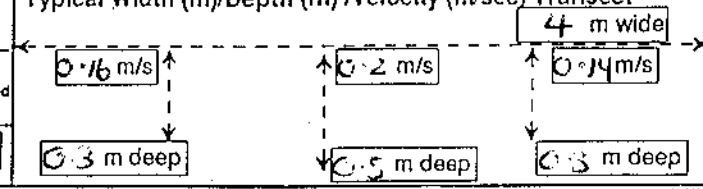
List & map dominant vegetation on back

Artificially Channelized ☐ no ☐ recent, severe ☒ some recovery ☐ mostly recovered, more sinuous

Artificially Impounded ☐ yes

High Water Mark: 0.5 (m above present water level) + 0.5 (present depth in m) = 1 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): 80 Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☑ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: ~~none~~ moderate severe Silt smothering: ~~none~~ moderate slight severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	40	3	
Leaf Packs or Mats				Mud/Muck/Silt	5	1	
Aquatic Vegetation	40	10		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	15	6		*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		17.09	6.50	6.75	0.054			VOB
Mid-depth								
Bottom								

System Type : Stream: ☒ (~~1st - 2nd order~~ 3rd - 4th order ~~5th - 6th order~~ ~~7th order or greater~~) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☒ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☒ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:

Sunny, clear 72°F

Substrate - Itchepackasassa Creek

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☒	☐
Fish	☐	☑	☐	☐
Aquatic Macrophytes	☐	☐	☒	☐
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
STRAINGER, HENNESSY	Candrea Granger	10/21/96

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/2/96	Blackwater Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
Alpha Owens Corning / Basin Study	Blackwater Creek near Mgmt + Life Methodist Camp Ground	Test Site 4

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **16**	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 **(16)**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity **14**	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 **(14)** 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization **15**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern **(15)** 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition **16**	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 **(16)**	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **10**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **(10)** 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **5**	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities **(5)** 4 3 2 1
Riparian Zone Vegetation Quality **10**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. **(10)** 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

Comments

86 TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/21/96	Andrea Grainger	Andrea Grainger

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/96	1000	Blackwater Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Alpha Owen Corning / Basin Study	Polk	Blackwater Creek near # 3805 Shady Oak Drive	Test Site 5 A05

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)

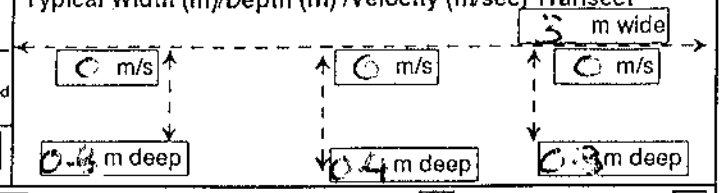
Local Watershed Erosion (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☑

Width of riparian vegetation (m) on least buffered side: 5

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Artificially Channelized ☑ no ☐ recent, severe ☐ some recovery ☐ mostly recovered, more sinuous

Artificially Impounded ☐ yes

High Water Mark: [ ] (m above present water level) + [0.25] (present depth in m) = [1.25] (m above bed)

Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☑ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☑ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: none slight moderate severe Silt smothering: none slight (moderate) severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats	5	2		Mud/Muck/Silt	15	3	
Aquatic Vegetation	80	15		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		14.25	6.95	6.75	0.152			VOB
Mid-depth								
Bottom								

System Type : Stream: ☑ (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☐ Sheen: ☑ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☐ Green (algae): ☐ Clear: ☑ Other: ☐

Weather Conditions/Notes:

Site dommated by water hyacinth. No flow subbasin - Blackwater Creek

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☑	☑	☐
Fish	☐	☑	☐	☐
Aquatic Macrophytes	☐	☐	☐	☑
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
Johnson, Clarke	Brent Johnson	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/21/96	Blackwater Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
Alpha Owens Corning 1/ Basin Study	Black water Creek near- Shady Oak Dr	Test Site 5

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover 12	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 **12** 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity 1	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 **1**
Artificial Channelization 19	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 **18** 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition 9	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 **9** 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability 12	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 **12** 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width 5	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities **5** 4 3 2 1
Riparian Zone Vegetation Quality 9	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 **9** 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

	Add **5 points** if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.	**Comments**
66	**TOTAL SCORE**	

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/21/96	Johnson	Brent Johnson

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/96	0900	Ichepackasassa CR.

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Alpha Queens Corning / Basin Study	Polk	Ichepackasassa Creek near Lecia Ave	Test Site 6 Ab

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
				100			

Local Watershed Erosion (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☑

Width of riparian vegetation (m) on least buffered side: 10

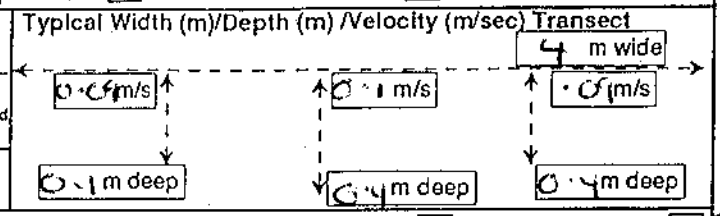
List & map dominant vegetation on back

Artificially Channelized ☐ no ☐ recent, severe ☑ some recovery ☐ mostly recovered, more sinuous

Artificially Impounded ☐ yes

High Water Mark: 2 (m above present water level) + 0.4 (present depth in m) = 2.4 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☑

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☑ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: (none) slight moderate severe Silt smothering: none slight moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	40	1	
Leaf Packs or Mats	5	4		Mud/Muck/Silt	30	1	
Aquatic Vegetation	5	3		Other:			
Rock or Shell Rubble	10	1		Other:			
Undercut banks/Roots	10	10		*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		15.27	6.65	7.8	0.205			VOB
Mid-depth								
Bottom								

System Type : Stream: ☒ (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:

cool, sunny, clear

Sub basin — Wiggins Prairie Drain

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☑	☐
Fish	☐	☐	☑	☐
Aquatic Macrophytes	☐	☐	☑	☐
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
Johnson, Clarke	Brent Johnson	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/21/96	Itchepackassassa

REMARKS:	LOCATION:	FIELD ID/NAME:
Alpha Owen Corning / Basin Shady	Itchepackassassa Ck near Lesley Ave	Test Site 6

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **12**	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 **12** 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity **9**	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 **9** 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization **9**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 **9** 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition **14**	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 **14** 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **12**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 **12** 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **7**	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 **7** 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality **9**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 **9** 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1
	Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.			Comments
72	**TOTAL SCORE**			

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/21/96	Johnson	Brent Johnson

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/96	0832	Lake Gibson

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Alpha Owens Corning / Basin Study	Polk	Unnamed tributary near W. daughtery and Odum Ave.	Reference Site A07

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
A							

Local Watershed Erosion (check box): None ☐ Slight ☒ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☒ Obvious sources ☐

Width of riparian vegetation (m) on least buffered side: 100

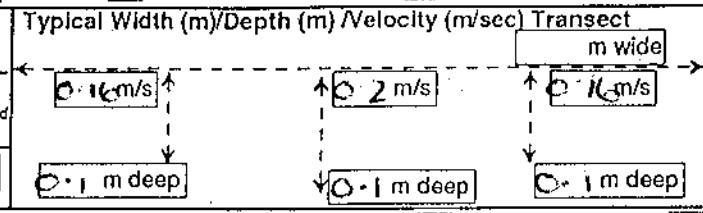
List & map dominant vegetation on back

Artificially Channelized ☒ no ☐ recent, severe ☐ some recovery ☐ mostly recovered

Artificially Impounded ☐ yes more sinuous

High Water Mark: 0.5 (m above present water level) + 0.1 (present depth in m) = 0.6 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☒

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☒ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: none slight moderate severe (Silt smothering: none slight moderate severe) Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	15			Sand	60		
Leaf Packs or Mats	5			Mud/Muck/Silt			
Aquatic Vegetation	5			Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	15			*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		16.92	6.13	5.12	0.171			
Mid-depth								N/OB.
Bottom								

System Type : Stream: ☒ (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:

Sunny, clear

Subbasin - Saddle Creek (Peace R)

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☑	☐	☐
Fish	☐	☐	☑	☐
Aquatic Macrophytes	☐	☑	☐	☐
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
Grainger, Hennessy	Andrea Grainger	10/21/96

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/21/96	Unnamed trib to Lake Carlson

REMARKS:	LOCATION:	FIELD ID/NAME:
Alpha Owens Corning / Basin Study.	Near intersection of Daughtery Rd with Callum Ave	Reference Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **13**	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 **13** 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity **14**	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 **14** 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization **18**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 **18** 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition **18**	Less than 20% of habitats affected by sand or silt accumulation 20 19 **18** 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **16**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 **16**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **20**	Width of native vegetation (least buffered side) greater than 18 m **20** 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality **18**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 **18** 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[ ] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

117 **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/21/96	Andrea Grainger	Andrea Grainger

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/96	0936	Hidden Lake

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Alpha Owen Corning / Basin study	Polk	Wetlands east of Alpha Owens Corning facility	Down stream A08

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)

Local Watershed Erosion (check box): None [ ] Slight [ ] Moderate [X] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [ ] Slight [ ] Moderate potential [ ] Obvious sources [X] Cows road.

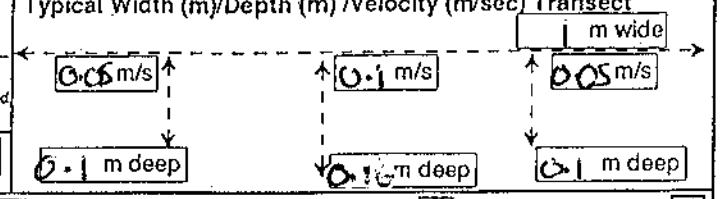
Width of riparian vegetation (m) on least buffered side: | *List & map dominant vegetation on back*

Artificially Channelized [X] no [ ] recent, severe [ ] some recovery [ ] mostly recovered, more sinuous

Artificially Impounded [ ] yes

High Water Mark: 0.16 (m above present water level) + 0. (present depth, in m) = 0.6 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Canopy Cover % : Open : [ ] Lightly Shaded (11-45%): [ ] Moderately Shaded (46-80%): [ ] Heavily Shaded: [X]

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [ ] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [X] sweet smell

Sediment Oils: Absent: [X] Slight: [ ] Moderate: [ ] Profuse: [ ]

Sediment Deposition: Sludge: [ ] Sand smothering: none slight moderate severe (Silt smothering: none slight moderate severe) Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10	3		Sand	30	3	
Leaf Packs or Mats	20	5		Mud/Muck/Silt	10	1	
Aquatic Vegetation	10	3		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	20	5		*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		22.95	7.30	5.48	0.211			VOB
Mid-depth								
Bottom								

System Type : Stream: [X] (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: [ ] Wetland: [ ] Estuary: [ ] Other: [ ]

Water Odors (check box): Normal: [ ] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [X] sweet smell.

Water Surface Oils (check box): None: [X] Sheen: [ ] Globs: [ ] Slick: [ ]

Clarity (check box): Clear: [X] Slightly turbid: [ ] Turbid: [ ] Opaque: [ ]

Color (check box): Tannic: [ ] Green (algae): [ ] Clear: [X] Other: [ ]

Weather Conditions/Notes:
cool, sunny, clear

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[X]	[ ]	[ ]	[ ]
Fish	[ ]	[ ]	[X]	[ ]
Aquatic Macrophytes	[X]	[ ]	[ ]	[ ]
Iron/sulfur Bacteria	[X]	[ ]	[ ]	[ ]

SAMPLING TEAM:	SIGNATURE:	DATE:
Grainger, Hennessy	Chanea Grainger	10/21/96

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/2/96	Hidden Lake

REMARKS:	LOCATION:	FIELD ID/NAME:
Alpha Owens Corning / Basin Study	Wetlands east of Alpha Owen Corning Fac.	Downstream

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **16**	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 **16**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity **11**	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 **11**	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization **18**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 **18** 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition **13**	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 **13** 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **18**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 **18** 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **13**	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 **13** 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality **18**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 **18** 17 **16**	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[ ] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

Comments

107 TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/21/96	Andrea Grainger	Andrea Grainger

Appendix C

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: alpha/Owens Corning
County: Polk
Contact / District: Andrea Grainger / SouthwesT
NPDES Permit #: FL00 29653
LIMS Sample #: 157310 **LIMS Job #:** 96-OCT-22-21
sample log 10-23-96
Test Type: (Screening) Definitive
(Static) Static Renewal | Flow-through
Test Number: 2 of 2
Remarks:

Sample Collection: Date 10-21-96 Time 1035
Test Beginning: Date 10-22-96 Time 1550
Test Ending: Date 10-24-96 Time 1600
Organism Batch #: 79 **Diluent Batch #:** well H2O
Organism Age: 11 days
Test Organism: Cyprinella leedsi

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.5	8.6 @ 22.6 °C	110.6 @ 1054 963 @ 1079 @ 23.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.4 @ 23.4	8.3 @ 24.7 °C	111.1 @ 1054 976 @ 1079 @ 24.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.0 @ 22.0	8.6 @ 22.9 °C	110.7 @ 1054 968 @ 1079 @ 23.7 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control A	A1	5	5	5	7.9	8.2	8.4	23.8	24.0	23.9	7.6	8.1	7.7	245	250	250
Control B	A2	5	5	5	7.9	8.2	8.5	23.8	24.0	23.9	7.7	8.1	7.9	245	250	250
Control C	A3	5	5	5	7.9	8.2	8.5	23.8	24.0	23.9	7.8	8.1	7.9	245	250	250
Control D	A4	5	4 (1D)	4	7.9	8.2	8.5	23.9	24.1	23.9	7.8	8.1	7.9	250	250	250
100% A	A5	5	~~5~~ 4	4 (1D)	8.0	8.2	8.5	23.9	24.0	23.9	8.5	8.2	7.9	235	240	240
100% B	A6	5	5	5	8.0	8.2	8.5	23.9	23.9	23.8	8.5	8.2	8.0	235	235	240
100% C	A7	5	5	4 (1D)	8.0	8.2	8.5	23.8	23.9	23.8	8.5	8.2	8.0	235	235	240
100% D	A8	5	~~B4~~ 3 (1D)	3 (1D)	8.0	8.2	8.5	23.9	24.0	23.8	8.5	8.2	8.0	235	240	240
			A strike through error mf 10-23-96 B - eating error mf 10-23-96													
Measured/Loaded by:		ND	MP	JS	ND	NC	JS	ND	NC	JS	ND	ND	JS	ND	NC	JS
Recorded by:		MF	ME	JS	DW	DW	DN	DW	DW	DN	DW	DW	DN	DW	DW	DN

Investigators' Signatures
Marshall Fairbolt
Julie Sharpe
Dennis Nicholson
A.H. Wolfe
reviewer

form updated 4/01/96

Water Quality Parameters

	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.02	—	Andrea Grainger
Lab Total Residual Cl2 (mg/L):	<.03	<.03	<.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	120	80	120	HACH	DN by MF
Hardness (mg/L as $CaCO_3$):	125	90	115	HACH	DN by MF
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -59.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Alpha/Owens Corning
County: POLK
Contact / District: Andrea Grainger / Southwest
NPDES Permit #: FL00 29653
LIMS Sample #: 157310 **LIMS Job #:** 96-OCT-22-21
sample log 10-28-96
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 1 of 2
Remarks:

Sample Collection: Date 10-21-96 Time 1035
Test Beginning: Date 10-22-96 Time 1500
Test Ending: Date 10-24-96 Time 1500
Organism Batch #: 47 **Diluent Batch #:** 44
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia ~~Studies~~

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.5	8.6 @ 22.6 °C	110.6 @ 105.4 963 @ 1079 @ 23.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.4 @ 23.4	8.3 @ 24.1 °C	111.1 @ 105.4 976 @ 1079 @ 24.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.0 @ 22.0	8.6 @ 22.9 °C	110.7 @ 105.4 968 @ 1079 @ 23.7 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH ~~24 hr~~ 24 hr	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~ 0 hr	UNCORRECTED Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~ 24 h	UNCORRECTED Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~ 48 h
Control A	A	5	5	5	7.9	8.3	8.1	23.2		24.1	7.8		7.6	185		205
Control B	B	5	5	5	7.9		8.4			24.2			7.7			205
Control C	C	~~5~~ 5	~~5~~ 5	5	7.9		8.4			24.2			7.7			205
Control D	D	5	5	4 M	7.9		8.4			24.1			7.7			205
100%	A	5	5	5	8.0	8.2	8.5	23.4		24.1	8.0		7.7	230		250
100%	B	5	5	5	8.0		8.6			24.1			7.7			250
100%	C	5	5	5	8.0		8.6			24.1			7.7			245
100%	D	5	5	5	8.0		8.6			24.1			7.7			245
		* MF 10-22-96 counting/loading error entered on incorrect test			wrote C. dubia pH's in C. dubia Column DW 10/22											
Measured/Loaded by:		MF	MF	DN	ND		JS	ND		JS	ND		JS	ND		JS
Recorded by:		MF	MF	DN	DW		DN	DW		DN	DW		DN	DW		DN

Investigators' Signatures
Marshall Faircloth
Julie Sharpe
Dessa Nicholson
A.H. Wolfe
reviewer
form updated 4/01/96

Water Quality Parameters	Salt Water Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.02	—	Andrea Grainger
Lab Total Residual Cl2 (mg/L):	< .03	< .03	< .03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	120	80	120	Hach	DN by MF
Hardness (mg/L as $CaCO_3$):	125	90	115	Hach	DN by MF
Total ammonia (mg/L as N):	< 0.017	< 0.017	< 0.017	orion	MF

Ammonia Meter #98136 Meter Slope: -59.5 Ammonia Blank: < 0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Appendix D

A01 LOWER BLACKWATER CREEK

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Panhandle Score	Peninsula 5	Peninsula 3	Peninsula 1	Peninsula Score	Northeast 5	Northeast 3	Northeast 1	Northeast Score
Total Number of Taxa	33	≥ 31	30-16	<16		≥ 26	25-14	<14	5	≥ 22	21-12	<12	
EPT Index	4	≥ 7	6-4	<4		≥ 4	3-2	<2	5	-	≥2	<2	
# Chironomid Taxa	12	≥9	8-5	<5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	14	≤22	23-61	>61		≤29	30-64	>64	5	≤31	32-66	>66	
% Diptera	23	-	≤50	>50		-	≤37	>37	3	-	≤47	> 47	
Florida Index	10	≥ 16	15-8	<8		≥7	6-4	<4	5	≥ 8	7-4	<5	
% Suspension feeders/Filterers	9.1	≥ 12	11-6	<6		-	≥7	<7	3	-	≥7	<7	
Total Score		Panhandle				Peninsula			31	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

A02 LOWER ITCHEPACKESASSA CREEK

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Panhandle Score	Peninsula 5	Peninsula 3	Peninsula 1	Peninsula Score	Northeast 5	Northeast 3	Northeast 1	Northeast Score
Total Number of Taxa	32	≥ 31	30-16	<16		≥ 26	25-14	<14	5	≥ 22	21-12	<12	
EPT Index	8	≥ 7	6-4	<4		≥ 4	3-2	<2	5	-	≥2	<2	
# Chironomid Taxa	3	≥9	8-5	<5		≥7	6-4	<4	1	≥7	6-4	<4	
% Contribution of Dominant Taxon	23	≤22	23-61	>61		≤29	30-64	>64	5	≤31	32-66	>66	
% Diptera	11	-	≤50	>50		-	≤37	>37	3	-	≤47	> 47	
Florida Index	15	≥ 16	15-8	<8		≥7	6-4	<4	5	≥ 8	7-4	<5	
% Suspension feeders/Filterers	10.5	≥ 12	11-6	<6		-	≥7	<7	3	-	≥7	<7	
Total Score		Panhandle				Peninsula			27	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

AD 3 EAST CANAL

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Score	Peninsula 5	Peninsula 3	Peninsula 1	Score	Northeast 5	Northeast 3	Northeast 1	Score
Total Number of Taxa	37	≥ 31	30-16	<16		≥ 26	25-14	<14	5	≥ 22	21-12	<12	
EPT Index	2	≥ 7	6-4	<4		≥ 4	3-2	<2	3	-	≥2	<2	
# Chironomid Taxa	19	≥9	8-5	<5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	12	≤22	23-61	>61		≤29	30-64	>64	5	≤31	32-66	>66	
% Diptera	64	-	≤50	>50		-	≤37	>37	1	-	≤47	> 47	
Florida Index	8	≥ 16	15-8	<8		≥7	6-4	<4	5	≥ 8	7-4	<5	
% Suspension feeders/Filterers	23.9	≥ 12	11-6	<6		-	≥7	<7	3	-	≥7	<7	
Total Score		Panhandle				Peninsula			27	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

AD 4 MIDDLE BLACKWATER CREEK

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Score	Peninsula 5	Peninsula 3	Peninsula 1	Score	Northeast 5	Northeast 3	Northeast 1	Score
Total Number of Taxa	29	≥ 31	30-16	<16		≥ 26	25-14	<14	5	≥ 22	21-12	<12	
EPT Index	2	≥ 7	6-4	<4		≥ 4	3-2	<2	3	-	≥2	<2	
# Chironomid Taxa	7	≥9	8-5	<5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	56	≤22	23-61	>61		≤29	30-64	>64	3	≤31	32-66	>66	
% Diptera	6.7	-	≤50	>50		-	≤37	>37	3	-	≤47	> 47	
Florida Index	11	≥ 16	15-8	<8		≥7	6-4	<4	5	≥ 8	7-4	<5	
% Suspension feeders/Filterers	10.4	≥ 12	11-6	<6		-	≥7	<7	3	-	≥7	<7	
Total Score		Panhandle				Peninsula			27	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

A05 , UPPER BLACKWATER CREEK

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Score	Peninsula 5	Peninsula 3	Peninsula 1	Score	Northeast 5	Northeast 3	Northeast 1	Score
Total Number of Taxa	36	≥ 31	30-16	<16		≥ 26	25-14	<14	5	≥ 22	21-12	<12	
EPT Index	2	≥ 7	6-4	<4		≥ 4	3-2	<2	3	-	≥2	<2	
# Chironomid Taxa	13	≥9	8-5	<5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	21	≤22	23-61	>61		≤29	30-64	>64	5	≤31	32-66	>66	
% Diptera	38	-	≤50	>50		-	≤37	>37	1	-	≤47	> 47	
Florida Index	9	≥ 16	15-8	<8		≥7	6-4	<4	5	≥ 8	7-4	<5	
% Suspension feeders/Filterers	3.9	≥ 12	11-6	<6		-	≥7	<7	1	-	≥7	<7	
Total Score		Panhandle				Peninsula			25	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

A06 UPPER ITCHEPACKESASSA CREEK

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Score	Peninsula 5	Peninsula 3	Peninsula 1	Score	Northeast 5	Northeast 3	Northeast 1	Score
Total Number of Taxa	46	≥ 31	30-16	<16		≥ 26	25-14	<14	5	≥ 22	21-12	<12	
EPT Index	6	≥ 7	6-4	<4		≥ 4	3-2	<2	5	-	≥2	<2	
# Chironomid Taxa	17	≥9	8-5	<5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	21	≤22	23-61	>61		≤29	30-64	>64	5	≤31	32-66	>66	
% Diptera	19	-	≤50	>50		-	≤37	>37	3	-	≤47	> 47	
Florida Index	24	≥ 16	15-8	<8		≥7	6-4	<4	5	≥ 8	7-4	<5	
% Suspension feeders/Filterers	21.9	≥ 12	11-6	<6		-	≥7	<7	3	-	≥7	<7	
Total Score		Panhandle				Peninsula			31	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

A07 REFERENCE WETLAND

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Panhandle Score	Peninsula 5	Peninsula 3	Peninsula 1	Peninsula Score	Northeast 5	Northeast 3	Northeast 1	Northeast Score
Total Number of Taxa	26	≥ 31	30-16	<16		≥ 26	25-14	<14	5	≥ 22	21-12	<12	
EPT Index	3	≥ 7	6-4	<4		≥ 4	3-2	<2	3	-	≥2	<2	
# Chironomid Taxa	12	≥9	8-5	<5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	9.5	≤22	23-61	>61		≤29	30-64	>64	5	≤31	32-66	>66	
% Diptera	52.7	-	≤50	>50		-	≤37	>37	1	-	≤47	>47	
Florida Index	20	≥ 16	15-8	<8		≥7	6-4	<4	5	≥ 8	7-4	<5	
% Suspension feeders/Filterers	17.9	≥ 12	11-6	<6		-	≥7	<7	3	-	≥7	<7	
Total Score		Panhandle				Peninsula			27	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

A08 TEST WETLAND RECEIVING ALPHA OWENS DISCHARGE

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Panhandle Score	Peninsula 5	Peninsula 3	Peninsula 1	Peninsula Score	Northeast 5	Northeast 3	Northeast 1	Northeast Score
Total Number of Taxa	22	≥ 31	30-16	<16		≥ 26	25-14	<14	3	≥ 22	21-12	<12	
EPT Index	0	≥ 7	6-4	<4		≥ 4	3-2	<2	1	-	≥2	<2	
# Chironomid Taxa	8	≥9	8-5	<5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	50.5	≤22	23-61	>61		≤29	30-64	>64	3	≤31	32-66	>66	
% Diptera	16.8	-	≤50	>50		-	≤37	>37	3	-	≤47	>47	
Florida Index	17	≥ 16	15-8	<8		≥7	6-4	<4	5	≥ 8	7-4	<5	
% Suspension feeders/Filterers	11.2	≥ 12	11-6	<6		-	≥7	<7	3	-	≥7	<7	
Total Score		Panhandle				Peninsula			23	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

Benthic macroinvertebrate taxa list for the Alpha Owens/ upper Hillsborough River Basin Study, collected via 20 discrete dip net sweeps on 21 October, 1996.

	AO1	AO2	AO3	AO4	AO5	AO6	AO7	AO8
Nemertina								
Prostoma rubrum	–	–	12	–	–	–	–	–
Oligochaeta								
Aulodrilus pigueti	–	–	192	23	–	456	–	–
Branchiura sowerbyi	96	–	–	–	–	–	–	–
Limnodrilus hoffmeisteri	–	–	60	95	8	60	–	20
Dero pectinata	96	–	–	–	–	–	–	–
Dero trifida	–	35	12	–	–	36	–	–
Dero vaga	–	–	–	–	8	–	–	–
Pristinella longisoma	–	–	–	–	8	–	–	–
Psammoryctides convolutus	–	35	–	–	–	–	–	–
Slavina appendiculata	–	–	24	–	–	–	–	–
Enchytraeidae	96	–	–	–	–	12	–	20
Hirudinea								
Batracobdella phalera	96	–	–	–	–	–	–	–
Helobdella sp.	–	–	–	–	–	24	–	–
Helobdella fusca	–	–	–	–	–	12	–	–
Helobdella triserialis	–	–	12	–	–	–	–	–
Gastropoda								
Amnicola dalli johnsoni	1442	143	–	3788	–	552	–	–
Ferrissia sp.	–	–	–	–	8	–	–	–
Ferrissia hendersoni	–	107	–	–	–	12	–	–
Hebetancylus excentricus	–	–	–	–	–	144	–	–
Melanoides tuberculata	–	–	–	–	–	–	–	540
Micromenetus dilatatus	288	–	–	47	48	12	–	–
Micromenetus dilatatus avus	–	–	–	–	–	84	–	–
Physella sp.	–	35	–	–	16	24	–	10
Planorbella duryi	–	–	–	–	–	–	14	–
Pseudosuccinea sp.	–	–	–	–	16	–	–	–
Ancylidae	–	107	24	–	–	72	14	90
Gastropoda	–	35	36	–	–	–	–	–
Pelecypoda								
Corbicula fluminea	–	179	36	–	–	–	–	–
Eupera cubensis	–	71	–	–	–	–	–	–
Pisidiidae	961	215	120	647	16	828	14	120
Amphipoda								
Crangonyx sp.	–	–	–	–	–	–	–	10
Hyalella azteca	1730	215	–	311	–	–	64	–
Amphipoda	–	–	–	–	–	–	–	10
Decapoda								
Palaemonetes sp.	–	35	–	–	–	–	–	–
Palaemonetes paludosus	96	–	–	–	–	–	–	–
Procambarus sp.	96	–	–	–	–	72	–	–
Cambaridae	–	–	–	23	–	–	–	–
Collembola								
Collembola	–	–	–	–	8	–	–	–
Ephemeroptera								

	AO1	AO2	AO3	AO4	AO5	AO6	AO7	AO8
Acerpenna pygmaeus	–	35	–	–	–	48	–	–
Baetis sp.	–	71	–	–	–	–	–	–
Baetis alachua	–	35	–	–	–	–	–	–
Baetis intercalaris	–	71	–	–	–	–	–	–
Caenis sp.	673	683	24	383	168	48	–	–
Callibaetis floridanus	–	–	24	–	–	–	–	–
Labiobaetis sp.	–	71	–	–	–	–	–	–
Stenacron sp.	480	–	–	–	–	–	–	–
Stenonema exiguum	–	323	–	–	–	–	–	–
Tricorythodes albilineatus	96	–	–	–	–	–	–	–
Ephemeroptera	96	–	–	–	–	–	–	–
Odonata								
Argia sp.	–	143	24	–	–	12	43	10
Argia fumipennis	–	–	–	–	–	36	–	–
Boyeria vinosa	–	–	–	23	–	–	–	–
Calopteryx sp.	–	–	–	–	–	12	50	10
Dromogomphus sp.	–	–	–	–	8	–	–	–
Dromogomphus spinosus	–	–	–	–	–	12	–	–
Enallagma sp.	–	–	24	23	–	36	–	–
Enallagma cardenium	–	71	24	–	–	–	–	10
Gomphus sp.	–	–	–	119	–	–	7	10
Hagenius brevistylus	–	35	12	–	–	–	–	–
Ischnura sp.	96	–	–	119	–	12	–	–
Macromia sp.	–	35	–	119	32	–	–	–
Macromia taeniolata	–	–	–	–	–	48	–	–
Progomphus sp.	–	–	–	–	–	–	7	–
Tetragoneuria cynosura	96	–	–	–	–	–	–	–
Coenagrionidae	–	35	–	–	8	36	–	10
Corduliidae	–	–	12	–	–	–	–	–
Libellulidae	–	–	–	–	–	–	–	20
Odonata	–	–	–	–	40	–	–	–
Zygoptera	–	–	–	–	8	–	–	–
Hemiptera								
Mesovelia sp.	–	–	–	47	–	–	–	–
Rhagovelia obesa	–	179	–	–	–	–	–	–
Coleoptera								
Dineutus sp.	–	35	–	–	–	–	7	–
Dubiraphia sp.	–	899	–	–	40	192	–	–
Dubiraphia vittata	865	215	–	263	–	–	–	–
Hydraena sp.	–	–	12	–	–	–	–	–
Hydroporus sp.	–	–	–	–	8	–	–	–
Microcylloepus sp.	–	–	–	–	16	–	–	–
Microcylloepus pusillus	480	1582	–	23	–	156	–	–
Scirtes sp.	–	–	–	–	–	–	14	–
Stenelmis sp.	1538	395	12	23	8	36	–	–
Dryopidae	–	–	–	23	–	24	–	–
Elmidae	–	251	–	–	–	–	–	–
Noteridae	–	–	–	–	8	–	–	–
Scirtidae	–	–	–	71	8	–	–	–
Megaloptera								
Corydalus cornutus	–	35	–	–	–	–	–	–
Trichoptera								
Cernotina sp.	288	–	–	–	–	–	–	–
Cheumatopsyche sp.	–	–	–	–	–	–	57	–

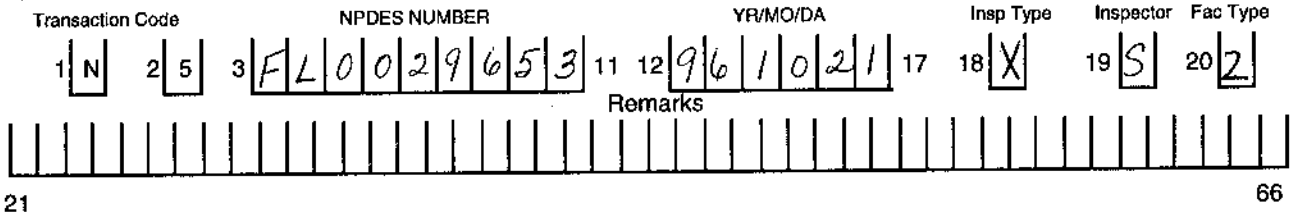
	AO1	AO2	AO3	AO4	AO5	AO6	AO7	AO8
Chimarra sp.	–	–	–	–	–	–	21	–
Hydroptila sp.	–	–	–	–	–	12	–	–
Nectopsyche sp.	–	71	–	–	–	12	–	–
Neotrichia sp.	–	107	–	–	–	36	–	–
Oecetis sp.	–	–	–	–	16	–	7	–
Oxyethira sp.	–	–	–	119	–	12	–	–
Triaenodes sp.	–	71	–	–	–	–	–	–
Leptoceridae	–	35	–	–	–	–	–	–
Noctuidae								
Noctuidae	–	–	–	23	–	–	–	–
Lepidoptera								
Pyralidae	96	–	–	–	–	–	–	–
Diptera								
Ablabesmyia sp.	96	–	–	23	–	–	–	–
Ablabesmyia mallochi	96	–	24	23	8	84	–	40
Ablabesmyia rhamphe grp.	96	–	–	–	8	48	7	10
Chironomus sp.	–	–	12	–	–	–	–	–
Chrysops sp.	–	–	–	–	–	–	–	10
Cladotanytarsus sp.	96	–	36	95	–	–	–	–
Clinotanypus sp.	96	–	–	23	8	36	36	10
Corynoneura sp.	–	–	–	–	–	–	7	–
Cryptochironomus sp.	–	–	–	23	–	24	–	20
Cryptotendipes sp.	–	–	12	–	72	–	–	–
Dicrotendipes modestus	–	–	228	–	–	24	–	–
Endotribelos hesperium	–	–	24	–	–	12	–	–
Goeldichironomus sp.	–	–	12	–	–	–	–	–
Goeldichironomus fluctuans	–	–	–	–	8	–	–	–
Labrundinia sp.	96	–	–	–	8	12	–	–
Labrundinia pilosella	–	–	–	–	–	12	–	–
Nanocladius sp.	96	–	–	–	–	–	–	–
Pagastiella sp.	–	–	–	–	8	–	–	–
Palpomyia/bezzia grp.	288	35	48	–	24	12	7	20
Paracladopelma nereis	–	–	24	–	–	12	7	–
Paralauterborniella nigrohalterale	–	–	–	–	8	–	–	–
Parametriocnemus sp.	–	–	–	–	–	–	7	–
Paratanytarsus sp.	–	–	–	–	–	–	7	–
Paratanytarsus sp. c epler	–	–	12	–	–	–	–	–
Pentaneura inconspicua	96	107	12	–	–	48	36	30
Polypedilum sp.	–	–	–	–	–	36	14	–
Polypedilum convictum grp.	96	143	12	–	–	–	–	–
Polypedilum halterale grp.	–	–	168	–	32	84	–	10
Polypedilum illinoense	–	–	96	–	64	36	28	–
Polypedilum illinoense grp.	–	–	–	167	–	60	–	–
Polypedilum scalaenum	–	–	–	–	–	–	50	–
Polypedilum scalaenum grp.	288	–	96	23	–	120	–	–
Polypedilum sp. a epler	–	–	12	–	–	–	–	–
Simulium sp.	–	323	–	–	–	–	–	–
Stempellinella sp.	–	–	–	–	–	–	50	–
Stenochironomus sp.	480	35	–	–	–	12	28	20
Tanytarsus sp.	192	–	24	–	8	–	–	–
Tanytarsus sp. a epler	96	–	48	–	8	12	–	–
Tanytarsus sp. e epler	–	–	156	–	–	–	–	–
Tanytarsus sp. g epler	–	–	24	23	–	24	–	–
Tanytarsus sp. l epler	–	–	–	–	8	–	–	–

	AO1	AO2	AO3	AO4	AO5	AO6	AO7	AO8
Tanytarsus sp. p epler	–	–	–	–	8	–	–	–
Tanytarsus sp. t epler	–	–	84	–	–	–	–	–
Thienemanniella sp.	–	–	–	–	–	–	–	10
Tipula sp.	–	–	–	–	16	–	–	–
Tribelos sp.	96	–	–	–	–	12	14	–
Tribelos jucundus	–	–	–	–	–	–	36	–
Chironomidae	576	179	96	23	8	24	21	–
Psychodidae	–	–	–	23	–	–	–	–
Tabanidae	–	–	–	–	8	–	–	–

Phytoplankton taxa list and densities (#/mL) for selected sites for the Alpha Owens Basin Study, collected via subsurface grabs on 21 October, 1996.

	AO1	AO2	AO3	AO4	AO5	AO6	AO7	AO8
Cyanophytes								
Aphanocapsa sp.	–	–	–	–	11	–	–	–
Chroococcus sp.	11	10	–	–	–	–	–	–
Dactylococcopsis sp.	–	–	–	11	–	10	11	–
Lyngbya contorta	11	–	–	–	–	–	–	–
Microcystis sp.	–	20	–	–	–	–	–	–
Oscillatoria sp.	21	30	–	21	11	26	11	16
Diatoms								
Achnanthes sp.	11	–	–	11	21	15	–	–
Cyclotella sp.	–	–	–	–	–	–	–	8
Fragilaria sp.	–	–	–	–	–	–	–	16
Gomphonema sp.	–	–	–	–	–	5	–	–
Gyrosigma sp.	–	–	–	–	–	5	–	–
Navicula sp.	–	–	53	–	53	63	–	8
Nitzschia sp.	11	–	21	11	32	10	–	16
Chlorophytes								
Chlamydomonas sp.	–	–	–	21	–	–	42	–
Cosmarium sp.	–	–	–	11	–	–	–	–
Crucigenia sp.	–	–	–	–	–	–	11	–
Dictyosphaerium sp.	–	–	–	–	–	–	11	–
Gloeocystis sp.	–	–	–	11	–	–	–	–
Pediastrum sp.	–	30	–	–	–	–	–	–
Scenedesmus sp.	95	161	11	–	–	–	21	–
Tetraedron sp.	–	–	–	–	11	–	–	–
Cryptophytes								
Chroomonas sp.	–	–	–	21	21	–	–	–
Cryptomonas sp.	–	–	–	32	–	–	–	–

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)



Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)