

Biological Assessment of

Packaging Corporation of America

Hamilton County

NPDES # FL0000281

Sampled September 24, 2012

January 2013

Biology Section

Bureau of Laboratories

Division of Environmental Assessment and Restoration

Quality Manual No. 870346G

NELAC Certification No. E31780

CONTENTS

Facility Overview

Methods

Results

Conclusion

Literature Cited

Tables and Figures

Table 1	Effluent Limits, Class III Freshwater Criteria and Chemical Data.
Table 2	Effluent Limits, Class III Freshwater Criteria and Metals Data.
Table 3	Measured and Predicted Algal Growth Potential (AGP)
Table 4	Periphyton Composition - Qualitative
Table 5	Macroinvertebrate Hester-Dendy Samples – Quantitative
Table 6	Macroinvertebrate Dipnet Samples - Qualitative
Figure 1	USGS Gage Height Graph for the Withlacoochee River Near Pinetta, FL

Appendices

Appendix A	Map of facility
Appendix B	Facility summary
Appendix C	Explanation of measurements
Appendix D	Chain of Custody
Appendix E	Physical/Chemical and Habitat Assessment field sheets
Appendix F	Acoustic Doppler Current Profiler (ADCP) Flow Measurements
Appendix G	Chemical analyses of effluent and receiving water
Appendix H-1	Qualitative periphyton – wet algal taxa list and number of algal units counted
Appendix H-2	Qualitative periphyton – diatom taxa list and number of diatom valves counted
Appendix I-1	Hester-Dendy macroinvertebrate samples: taxa list and average number of individuals per m^2
Appendix I-2	Hester-Dendy macroinvertebrate samples: taxa list and total number of individuals counted
Appendix J-1	Dipnet sweep macroinvertebrate samples: collapsed taxa list and number of individuals counted by replicate
Appendix J-2	Dipnet sweep macroinvertebrate samples: taxa list and number of individuals counted

EPA End Sheet

Facility Overview

The Packaging Corporation of America (PCA) is an Industrial Wastewater Facility. The effluent is discharged into the Withlacoochee River, a Class III Fresh Water at the confluence of Jumping Gulley Creek and the river (see map Appendix A). The design flow of the wastewater system is 55 million gallons per day (MGD). The annual average effluent flow for August 2011 to July 2012 was 8.91 MGD. The plant discharges continuously, and the flow measured during this survey was 13.04 MGD (PCA staff).

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

See the Facility Summary (Appendix B) for a description of the facility, summary of permit limits, and Discharge Monitoring Report (DMR) information.

Methods

The purpose of this investigation was to determine the effects of the discharge on the biota of the receiving waters. Chemical and biological comparisons were made between a Control Site (located in the Withlacoochee River beginning 80m upstream of the confluence of Jumping Gulley Creek and the Withlacoochee River and ending 180 m upstream of the confluence), Test Site 1 (located in the Withlacoochee River beginning near the end of the downstream edge of the mixing zone; the 100 m mark for the Stream Condition Index (SCI) was approximately 400 m downstream of the confluence of Jumping Gulley Creek and the Withlacoochee River) and Test Site 2 (located approximately 3.5 km downstream of the facility; the 0 m mark for the SCI is located approximately 50 m upstream of County Road 152 bridge) (see map Appendix A). Effluent samples were taken as grab samples from monitoring location EFF-1. Total Suspended Solids (TSS; mg/L) and Carbonaceous Biochemical Oxygen Demand (CBOD; mg/L) were collected as 24-hour composite samples from EFF-1. Toxicity samples were not collected during this survey since the permit writers already had enough existing data to forego additional toxicity testing. Flow measurements using an acoustic doppler current profiler (ADCP) were measured upstream and downstream of this facility's discharge point. See Appendix F for the measurements and notes.

All field and laboratory biological methods followed Bureau of Laboratories and Biology Section Standard Operating Procedures (see http://www.dep.state.fl.us/labs/library/lab_sops.htm and http://www.dep.state.fl.us/water/sas/sop/sops.htm for details) and met DEP quality assurance/quality control standards (see http://www.dep.state.fl.us/water/sas/qa/index.htm). Explanations of specific methods and measurements can be found in Appendix C.

The following were involved in this investigation: Eesa Ali, Jeremy Parrish, Jann Gruentzel, Sharon Piltz (NE District) and FDEP Central Laboratory in Tallahassee. The report was reviewed by District representatives and the Point Source Studies Review Committee (Michelle Fish and Mike Tanski).

Results

Organic Constituents (See Table 1 and Appendix G)

- No organic constituents were detected in the effluent.
- No organic constituents were detected in the equipment blank.

Metals (See Table 2 and Appendix G)

- All metals in the effluent grab samples were either undetected or detected at levels that complied with effluent permit limits and Class III Freshwater Quality Criteria (62-302.530, F. A. C.).
- Control Site iron (1,190 µg/L), Test Site 1 iron (1,260 µg/L), and Test Site 2 iron (1,170 µg/L) exceeded Class III Freshwater Quality Criterion (62-302.530(38), F.A.C.).

- All other metals in the Control Site, Test Site 1, and Test Site 2 grab samples were either undetected or detected at levels that complied with Class III Freshwater Quality Criteria (62-302.530, F. A. C.).
- No metals were detected in the equipment blank.

Physical and Chemical Parameters (See Table 1 and Appendices D, E and G)

- The Habitat Assessment score at the Control Site (120) places it in the Optimal category (categories from Appendix C). The Habitat Assessment score at Test Site 1 (106) and Test Site 2 (113) places both sites in the Suboptimal category. Both test sites only had two productive habitats (snags and rocks) while the Control Site had three productive habitats (snag, rock, and roots). All three sites had poor substrate availability, but there was slightly more substrate available at the Control Site. Test Site 2 had a higher water velocity than Test Site 1 and the Control Site. Habitat smothering affected Test Site 1 and Test Site 2 more significantly than at the Control Site. Artificial channelization, bank stability, riparian buffer zone width, and riparian zone vegetation quality were similar at all three sites.
- The dissolved oxygen of the Control Site (4.9 mg/L) and Test Site 1 (4.8 mg/L) were both below the minimum limit for Class III Freshwater Quality Criterion (62-302.530 (30), F.A.C.). On February 14, 1990, site-specific alternative criteria (SSAC) (DEP File No. VE-24-334) were approved to allow the dissolved oxygen outside of the mixing zone to not be lowered to any less than 4.0 mg/L during the months of June through October. Therefore, the low dissolved oxygen at Test Site 1 does not constitute an exceedance of Class III Freshwater Quality Criterion. Dissolved oxygen of the effluent and Test Site 2 both complied with Class III Freshwater Quality Criterion and permit limits.
- The pH (Standard Units) of the effluent, Control Site, Test Site 1 and Test Site 2 complied with Class III Freshwater Quality Criterion and permit limits.
- The specific conductance of the effluent (2,035 µmhos/cm) exceeded Class III Freshwater Quality Criterion (62-302.530 (22), F.A.C.) but met the permitted effluent limit. Specific conductance of the Control Site, Test Site 1 and Test Site 2 complied with Class III Freshwater Quality Criterion.
- Chlorophyll *a* (corrected) was detected in the effluent sample. Chlorophyll *a* was not sampled at the Control Site, Test Site 1 or Test Site 2 for comparisons.
- Turbidity (NTU) in the effluent, Control Site, Test Site 1, and Test Site 2 samples complied with Class III Freshwater Quality Criterion and permit limits.
- Oils and Greases (mg/L) in the effluent sample were undetected and therefore complied with Class III Freshwater Quality Criterion and permit limits.
- Total Suspended Solids (TSS; lbs/day) of the effluent complied with permit limits.
- The permit contains a limit for Biochemical Oxygen Demand (BOD; lbs/day) of the effluent. However, a result for BOD cannot be calculated because a Biochemical Oxygen Demand analysis was not performed.

Nutrients (See Table 1 and Appendix G)

- Effluent unionized ammonia (0.03 mg/L) exceeded Class III Freshwater Quality Criterion (62-302.530(3), F.A.C.).
- Ortho-phosphate and total phosphorus detected in the effluent samples were approximately five times higher than the amount detected in the Control Site sample. Ortho-phosphate and total phosphorus detected in Test Site 1 and Test Site 2 samples were slightly higher than the amounts detected in the Control Site samples but were not elevated to the amount detected in the effluent sample. Total ammonia detected in the effluent sample was an order of magnitude higher than the amount detected in the Control Site, Test Site 1 and Test Site 2 samples. Control Site, Test Site 1 and Test Site 2 nitrate+nitrite samples were similar and over twice the amount found in the effluent sample. However, total Kjeldahl nitrogen, organic nitrogen, and total nitrogen detected in the effluent sample were more than double the amounts found in the Control and Test Sites' samples. Although effluent nutrient measurements were higher than those of the Control Site, there was no detectable nutrient enrichment of the Test Sites due to the effluent.

- No nutrients were detected in the equipment blank.

Algal Growth Potential (See Table 3 and Appendix G)

- Raschke and Shultz (1987) determined that AGP values above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The AGP value in the effluent sample using the freshwater species, *Pseudokirchneriella subcapitata,* was approximately 5 times greater than the problem threshold value. The analytical chemistry suggests that the effluent is nitrogen limited.
- AGP samples for the Control and Test Sites were not collected due to changes in the original sampling plan. During the sampling planning stages, the Control Site and Test Sites were not scheduled to be sampled. Initially, this facility was to be sampled for a third year inspection. The AGP analysis was not revised to reflect the addition of the instream sites.

Bioassessment

Periphyton (See Table 4 and Appendices H-1 and H-2)

- Periphyton communities at the Control and both Test Sites consisted mostly of diatoms. The diatom community at the Control Site and Test Site 2 was dominated by the *Staurosirella pinnata*, and the diatom community at Test Site 1 was dominated by *Achnanthidium exiguum*. There were no adverse affects apparent on the periphyton community in the Withlacoochee River from the effluent.

Macroinvertebrates (See Tables 5 and 6 and Appendices I-1, I-2, J-1 and J-2)

- Quantitative macroinvertebrate data were collected from Hester Dendy samplers at the Control Site and Test Sites. Due to the width of the Withlacoochee River at Test Site 1, two samplers, one on the right bank and one on the left bank, were deployed to ensure that influences of the discharge would be captured. The Control Site, Test Site 1 Right Bank and Test Site 2 samplers contained three condos. The Test Site 1 Left Bank sampler contained four condos, but the data for one condo was not analyzed to make it comparable to the other samplers. The Shannon-Weaver diversity scores were similar at the Control Site, Test Site 1 Left Bank, Test Site 1 Right Bank, and Test Site 2 (4.03, 4.25, 4.26, and 3.84, respectively). The Control Site was dominated by *Corynoneura* sp., a dipteran, whereas all three samplers at the Test Sites were dominated by *Tricorythodes albilineatus*, an ephemeropteran. Ephemeropterans are sensitive to disturbance while dipterans are considered to be pollution tolerant. Test Site 2 had fewer Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa and fewer taxa overall than the Control Site, Test Site 1 Left Bank, and Test Site 1 Right Bank. All three Test Site samplers had a larger percentage of trichopterans than the Control Site. Surface deposit feeders dominated all four sites. This functional feeding group corresponds to the number of dipterans. Test Site 1 Left Bank, Test Site 1 Right Bank and Test Site 2 had higher numbers of suspension feeders and scrapers than the Control Site.
- Qualitative macroinvertebrate data from dipnet samples indicated low diversity in the macroinvertebrate community at all three sites. The Control Site scored 27 A on the Stream Condition Index (SCI) placing it in Category 3. Test Site 1 scored 30 A on the SCI and Test Site 2 scored 23 A, placing both in Category 3 (see Appendix C for an explanation of SCI Categories). All sites were dominated by the pollution tolerant amphipod, *Hyalella azteca* which made up nearly half of the sample from each site. Additionally, all three sites shared similar, low numbers of Ephemeroptera, Trichoptera, clinger, long-lived and sensitive taxa. Test Site 2 had a larger percentage of very tolerant individuals. Despite low number of Ephemeroptera taxa, the communities at all three sites consisted of 15-20% Ephemeroptera due in part by the presence of *Tricorythodes albilineatus* which was also found in the Hester Dendy samplers. Shredders and surface deposit feeders were the dominant functional feeding groups at all three sites. Overall, there were no negative effects on macroinvertebrates at either of the Test Sites that were attributable to the effluent. Any adverse affects on the macroinvertebrate community were more likely attributable to poor substrate availability and possibly perturbation of the communities due to a spike in river flows the weekend prior to sampling (see Figure 1).

Conclusion

Flow measurements collected upstream and downstream of the Packaging Corporation of America are documented in Appendix F. Toxicity samples were not collected during this survey as samples had been collected annually rather than every fifth year.

Iron in Control Site, Test Site 1, and Test Site 2 samples all exceeded Class III Freshwater Quality Criteria (62-302.530(38), F.A.C). The dissolved oxygen measurements at the Control Site and Test Site 1 were below the minimum limit for Class III Freshwater Quality Criterion (62-302.530 (30), F.A.C.). However, the low dissolved oxygen at Test Site 1 does not constitute an exceedance of Class III Freshwater Quality Criteria because the facility has a SSAC for dissolved oxygen that extends beyond the mixing zone. The specific conductance of the effluent exceeded Class III Freshwater Quality Criterion (62-302.530 (22), F.A.C.) but met the permitted effluent limit. Effluent nutrients were generally higher than those found in the Control Site samples or the Test Sites' samples. The nutrient amounts detected in the samples collected at the Test Sites do not reflect nutrient enrichment and demonstrate that the Withlacoochee River is providing sufficient dilution of the effluent. AGP samples were not collected at the instream sites for comparison with the effluent due to a change in the scheduled sampling. The AGP value in the effluent sample was approximately 5 times greater than the problem threshold value.

There were no adverse affects apparent on the periphyton community in the Withlacoochee River from the effluent. The Hester-Dendy samplers collected macroinvertebrate data that reflected a more diverse community at all three instream sites than the data collected using dipnet samples and the SCI. The SCI samples indicated disturbed macroinvertebrate communities at all three instream sites. However, these results may be attributable to poor substrate availability, which is common in large river systems, or to disruption due to the spike in river flow. Follow-up sampling is planned to further examine the macroinvertebrate community at these sites. Overall, there were no negative effects on macroinvertebrates at either of the Test Sites that were attributable to the effluent.

Literature Cited

Fore, L.S., Frydenborg, R., Miller, D., Frick, T., Whiting, D., Espy, J., and Wolfe, L. 2007. Development and Testing of Biomonitoring Tools for Macroinvertebrates in Florida Streams (Stream Condition Index and Biorecon). Florida Department of Environmental Protection. 110pp.

Karr, J.R. & E.W. Chu. 1998. Restoring life in running waters: Better biological monitoring. Island Press. Covelo, California. 200 p.

Magurran, A. E. 1988. Ecological diversity and its measurement. Princeton University Press, Princeton, New Jersey.

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. EPA-600/9-78-018. U. S. EPA, Cincinnati, Ohio. 126 p.

Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross and R. M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: Benthic macroinvertebrates and fish. U. S. EPA, Office of Water Regulations and Standards, Washington D.C., EPA 440-4-89-001

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

Stevenson, R. J. and L. L. Bahls. 1999. Periphyton protocols. Pp. 6.1-6.22 in: Rapid bioassessment protocols for use in wadeable streams and rivers. 2nd edition. By: M. T. Barbour, J. Gerritsen, B. D. Snyder and J. B. Stribling. EPA 841-B-99-002. U. S. Environmental Protection Agency, Office of Water, Washington, D. C.

Stevenson, R. J. and J. P. Smol. 2003. Use of algae in environmental assessments, pp. 775-803, in: Freshwater algae of North America, edited by J. D. Wehr and R. G. Sheath, Academic Press, San Diego. 918 pp.

USEPA. 2000. Nutrient Criteria Technical Guidance Manual – River and Streams. EPA-822-B-00-002.

Table 1. Effluent limits, Class III Freshwater Criteria and chemical data.

Packaging Corporation of America	Class III Criteria	Effluent Limits	Effluent	Control Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)						
None Detected	-	-	None Detected	-	-	-
Nutrients (mg/L)						
Ortho-phosphate	-	-	0.37	0.07	0.078	0.089
Total Phosphorus	-	Report	0.66	0.13	0.14	0.15
Total Ammonia	-	Report	0.61	0.028	0.034	0.038
Un-ionized Ammonia	≤ 0.02 s	0.134 c	0.03 c	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate and Nitrite	-	-	0.12	0.33	0.34	0.32
Total Kjeldahl Nitrogen	-	Report	2.3	0.82	0.83	0.84
Organic Nitrogen	-	-	1.69 c	0.792 c	0.796 c	0.802 c
Total Nitrogen	-	Report	2.42 c	1.15 c	1.17 c	1.16 c
Organic Carbon		-	21	18	18	18
General Physical and Chemical Parameters						
Habitat Assessment	-	-	-	120	106	113
Dissolved Oxygen (mg/L)	≥ 5.0	≥1.5	8.0	4.9	4.8 †	7.2
pH (SU)	6.0 - 8.5	6.0 - 9.0	7.8	6.7	6.8	6.8
Conductivity (µmhos/cm)	≤ 1,275	≤ 3,300	2,035	106	166	163
Temperature (°C)	-	Report	27.6	23.1	23.8	23.2
Sample Depth (m)	-	-	0.3	1.0	1.6	0.2
Chlorophyll a (µg/L) - Corrected	-	-	51	-	-	-
Phaeophytin (µg/L)	-	-	9.4	-	-	-
Total Suspended Solids (mg/L)	-	see below	5 I p	7 I	6 I	4 I
Total Suspended Solids (lbs/day)	-	≤ 16,140	544 c *	-	-	-
Turbidity (NTU)	< 29 t	≤ 80	12	12	10 A	9.1
Color (true, PCU)	-	-	230 A	190	190	200
Alkalinity (mg CaCO3/L)	≥ 20	-	351	32	39	38
CBOD, 5 day (mg/L), N - inhibited	-	see below	4.3 A p	1 I	0.81 I	0.63 I
BOD, 5 day (lbs/day), N -uninhibited	-	≤ 8,291 c *	**	-	-	-
Oils and Greases (mg/L)	≤ 5.0	≤ 5.9	0.79 U	-	-	0.75 U
Chloride (mg/L)	-	-	25	7.7	8.2	8
Fluoride (mg/L)	≤ 10.0	-	0.21	0.1	0.11	0.11
Sulfate (mg/L)	-	-	650	4.7	19	20
Flow (MGD)	-	≤ 55	13.04	-	-	-
Hardness (mg $CaCO_3$)	-	Report	224	44.2	51	48.9

Value exceeds the Class III Water Quality Criteria or permit limits

c - Value is calculated

p - 24 hour time proportioned composite

t - Shall not exceed 29 NTUs above background

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

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

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

"-" Sample/measurement was not collected

† - Site-Specific Alternative Criteria (SSAC) allows the dissolved oxygen outside of the mixing zone to be ≥ 4.0 mg/L during the months of June-October.

* - Limit based on daily upstream river flow calculated from downstream flow reading and 24 hour effluent discharge flow.

**- A result cannot be calculated as a CBOD N-inhibited analysis was performed instead of a BOD N-uninhibited analysis.

J - Estimated value (appears in Appendix G)

Table 2. Effluent limits, Class III Freshwater Criteria and metals data. Class III Criteria based on hardness are presented individually for each site based on hardness at that site.

Packaging Corporation of America	Effluent Class III Criteria	Effluent Limits	Effluent	Control Site Class III Criteria	Control Site	Test Site 1 Class III Criteria	Test Site 1	Test Site 2 Class III Criteria	Test Site 2
Metals (µg/L unless otherwise noted)									
Aluminum	-	-	412	-	666	-	679	-	660
Arsenic	≤ 50	-	0.42 I	≤ 50	1.03	≤ 50	1.03	≤ 50	0.99 I
Cadmium	≤ 0.49 b	-	0.05 U	≤ 0.15 b	0.05 U	≤ 0.16 b	0.05 U	≤ 0.16 b	0.05 U
Calcium (mg/L)	-	-	50.8	-	13.3	-	15	-	14.4
Chromium-III	≤ 167 b	-	0.97 I	≤ 44.2 b	1.2	≤ 49.7 b	1.3	≤ 48.1 b	1.2
Copper	≤ 18.6 b	-	0.5 U	≤ 4.64 b	1.16	≤ 5.25 b	1.13	≤ 5.08 b	1.11
Iron	≤ 1,000	-	110 I	≤ 1,000	1,190	≤ 1,000	1,260	≤ 1,000	1,170
Lead	≤ 8.86 b	≤ 9.6	0.24 I	≤ 1.13 b	0.95	≤ 1.35 b	0.96	≤ 1.28 b	0.92
Magnesium (mg/L)	-	-	23.5	-	2.67	-	3.29	-	3.18
Nickel	≤ 103 b	-	0.54 I	≤ 26.2 b	0.69 I	≤ 29.5 b	0.67 I	≤ 28.6 b	0.71 I
Selenium	≤ 5.0	-	0.2 U	≤ 5.0	0.21 I	≤ 5.0	0.23 I	≤ 5.0	0.21 I
Sodium	-	-	400	-	4.3	-	13.3	-	14
Silver	≤ 0.07	-	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U
Zinc	≤ 237 b	≤ 250	5 U	≤ 60.0 b	10 I	≤ 67.7 b	8.8 I	≤ 65.5 b	5 U

See Table 1 for calculated hardness.

Value exceeds the Class III Water Quality Criteria or permit limits

b - Value is calculated based on hardness

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

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

Table 3. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN) and total nitrogen (TN) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus.

Packaging Corporation of America					
Location	AGP (measured)	Predicted AGP (TSIN) ± 20%		Predicted AGP (TN) ± 20%		Inorganic N:P ratio	Total N:P ratio
Effluent	27.0	27.7	± 5.5	92.0	± 18.4	2.0	3.7

Table 4. Periphyton Composition - Qualitative

Packaging Corporation of America	Control Site	Test Site 1	Test Site 2
Number of Wet Taxa	16	20	10
Number of Wet Algal Units Identified	302	301	302
Percent Dominant Wet Taxon	74.8	81.7	75.8
Dominant Wet Taxon Name	Bacillariophyta (Diatoms)	Bacillariophyta (Diatoms)	Bacillariophyta (Diatoms)
Number of Diatom Taxa	47	40	45
Number of Diatom Algal Units Identified	500	500	500
Percent Dominant Diatom Taxon	26.8	18.4	19.0
Dominant Diatom Taxon Name	*Staurosirella pinnata*	*Achnanthidium exiguum*	*Staurosirella pinnata*
Percentage Composition for Wet Algae			
Blue-green algae	23.5	11.0	24.2
Green algae	1.0	7.0	0.0
Diatoms	74.8	81.7	75.8
Euglenophytes	0.7	0.3	0.0

Table 5. Macroinvertebrate Hester-Dendy Samples - Quantitative.

Packaging Corporation of America	Control Site	Test Site 1 Left Bank	Test Site 1 Right Bank	Test Site 2
Summary Statistics				
Shannon-Weaver Diversity	4.03	4.25	4.26	3.84
Number of Taxa	40	47	43	35
Number of EPT Taxa	14	14	14	11
Percent Dominant Taxon	19.3	20.4	17.0	16.4
Dominant Taxon Name	*Corynoneura* sp. (Diptera)	*Tricorythodes albilineatus* (Ephemeroptera)	*Tricorythodes albilineatus* (Ephemeroptera)	*Tricorythodes albilineatus* (Ephemeroptera)
Total Number of Individuals (counted)	574	780	665	698
Total Number of Individuals (#/m^2)	1,522	1,550	1,761	1,849
Community Composition: Percent of total				
Acariformes	0	0.1	0	0
Amphipoda	1.9	1.8	10.1	1.3
Coleoptera	0.9	0.8	0.8	0.3
Diptera	67.6	37.6	36.7	33.1
Ephemeroptera	23.0	34.4	31.9	45.7
Gastropoda	0.0	0.0	0.2	0.0
Odonata	0.2	0.1	0.3	0.1
Plecoptera	0.0	0.0	0.0	0.0
Trichoptera	5.6	24.5	19.2	18.3
Other	0.9	0.7	0.9	1.2
Functional Feeding Groups: Percent of total				
Piercers	0.4	0.7	1.7	0.6
Predators	3.7	7.0	5.0	4.4
Scrapers	5.5	9.3	11.5	14.8
Shredders	12.9	6.8	9.3	9.1
Surface Deposit Feeders	64.1	41.1	40.1	44.6
Suspension Feeders	13.4	20.0	26.0	23.6
Unknown	0.2	15.1	6.4	2.8

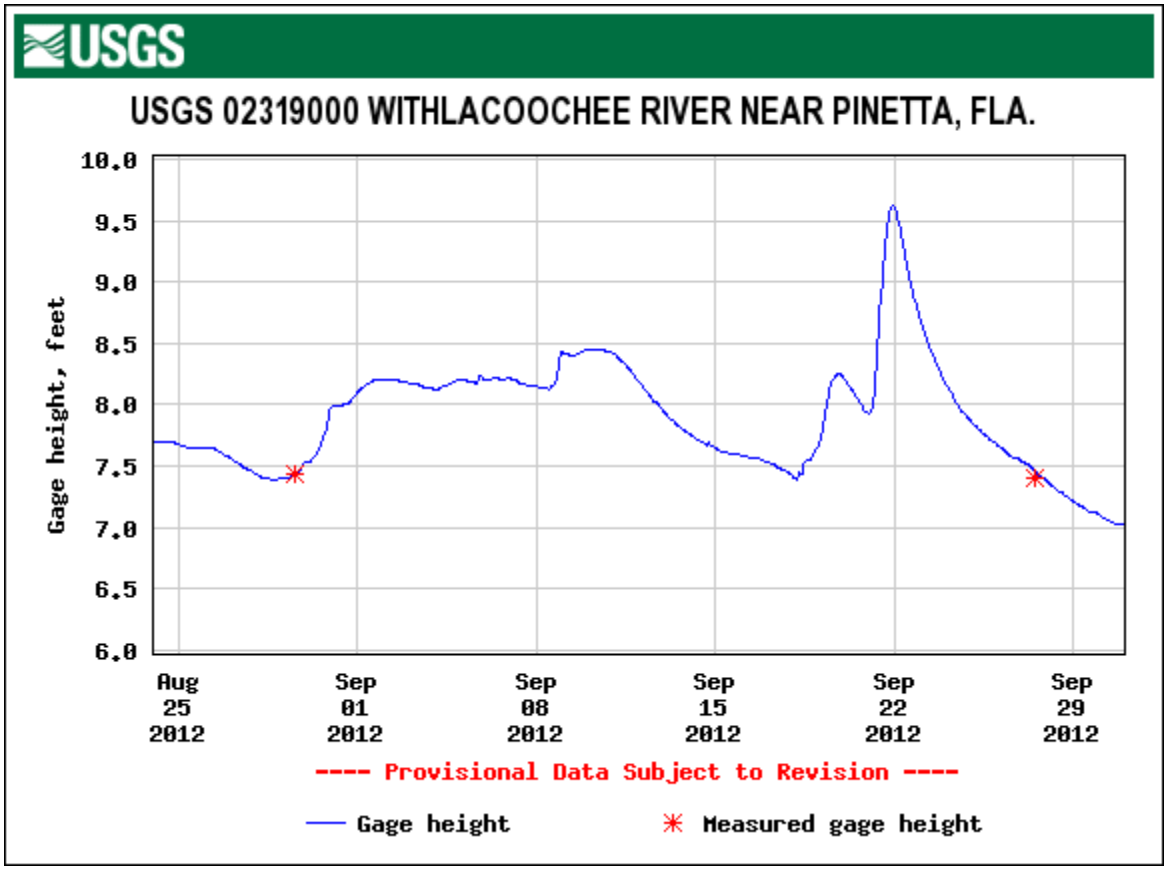
Table 6. Macroinvertebrate Dipnet Samples - Qualitative.

Packaging Corporation of America	Control Site		Test Site 1		Test Site 2	
Summary Statistics						
Stream Condition Index 2007 (value)	27 A		30 A		23 A	
Stream Condition Index 2007 (category) *	Category 3		Category 3		Category 3	
Stream Condition Index Metrics	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
Number of Total Taxa	25	27	25	35	28	25
Number of Ephemeroptera Taxa	2	4	2	4	3	5
Number of Trichoptera Taxa	3	0	3	3	2	1
Number of Clinger Taxa	3	1	3	3	2	2
Number of Long-lived Taxa	1	2	1	1	0	1
Number of Sensitive Taxa	2	4	2	1	1	2
Percent of Dominant Taxon	43.6	52.3	50.0	39.0	45.8	49.4
Percent Suspension Feeders and Filterers	0.6	2.0	3.4	4.2	1.0	1.3
Percent of Tanytarsini Individuals	0.6	0.0	0.6	0.0	0.7	1.3
Percent of Very Tolerant Individuals	0.6	3.3	1.9	3.9	10.5	10.6
Total Number of Individuals	156	153	160	154	153	160
Community Composition: Percent of total						
Dominant Taxon Name	*Hyalella azteca* (Amphipoda)	*Hyalella azteca* (Amphipoda)	*Hyalella azteca* (Amphipoda)	*Hyalella azteca* (Amphipoda)	*Hyalella azteca* (Amphipoda)	*Hyalella azteca* (Amphipoda)
Acariformes	3.2	4.6	8.1	6.5	4.6	2.5
Amphipoda	43.6	52.3	50.0	39.0	45.8	49.4
Bivalvia	0.0	2.0	1.9	2.6	0.0	0.6
Coleoptera	8.3	3.9	0.6	0.7	0.7	1.3
Decapoda	1.3	2.6	0.0	0.7	0.0	0.6
Diptera	5.8	9.2	13.8	17.5	28.8	20.0
Ephemeroptera	25.0	15.7	15.6	14.9	15.0	20.0
Gastropoda	5.1	5.2	3.8	3.9	3.3	3.1
Isopoda	1.3	1.3	0.0	0.0	0.0	0.0
Odonata	2.6	2.6	0.0	0.7	0.0	0.6
Oligochaeta	0.6	0.7	0.0	0.0	0.0	0.0
Plecoptera	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera	1.9	0.0	6.3	9.7	1.3	1.3
Other	1.3	0.0	0.0	3.9	0.7	0.6
Functional Feeding Groups: Percent of total						
Browser-Grazers	0.6	1.3	0.0	0.3	0.0	0.3
Burrowing Deposit Feeders	0.6	0.7	0.0	0.0	0.0	0.0
Piercers	0.6	0.3	1.9	5.8	0.0	1.3
Predators	9.3	11.8	15.3	13.6	12.1	8.4
Scavengers	1.3	2.0	0.0	0.3	0.0	0.3
Scrapers	13.1	8.2	4.4	4.6	5.6	4.7
Shredders	21.8	27.1	25.3	22.1	29.7	31.6
Surface Deposit Feeders	50.6	46.7	49.7	45.8	51.0	51.6
Suspension Feeders	0.6	2.0	3.4	4.2	1.0	1.3
Unknown	1.3	0.0	0.0	3.3	0.7	0.6

A - Value reported is the mean of two determinations

* SCI_2007 categories from Table LT 7200-2 of DEP-SOP-002/01 as referenced in Quality Assurance Rule (62-160 F.A.C.), December 3, 2008: Values 0 ≤ 34 are Category 3; Values 35 < 67 are Category 2; Values 68 ≤ 100 are Category 1

Figure 1. USGS Gage Height Graph for the Withlacoochee River Near Pinetta, FL

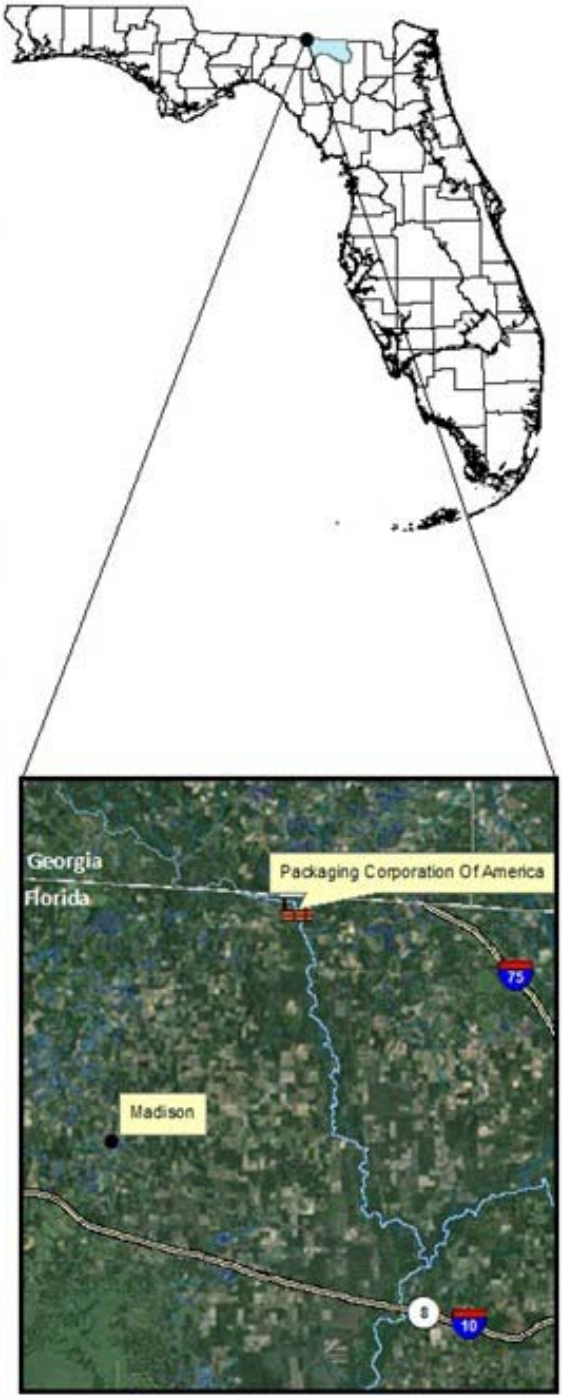


Appendix A

Packaging Corporation of America

Fifth Year Bioassessment Sampling Locations





Appendix B

Facility Summary

PCA – FL0000281 – August-2012

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event	
Prepared By: Samuel Schlesinger, E.I.	**Contact Number:** 904-256-1687
Facility Name (as it appears on permit): Packaging Corporation of America	**Current Name:** same
NPDES Permit Number: FL0000281	**Permit Expiration Date:** 2/17/2013
Physical Address: 5495 Lake Park-Clyattville Road, Clyattville, Georgia	
District: Northeast	**County:** Hamilton
Function of Facility: Facility treats industrial wastewater.	
Facility Type: Industrial Wastewater	**Permitted Capacity (MGD):** 55.0

Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months):

D-001	
Month	Flow MGD
1/31/2011	13.14
2/28/2011	12.4
3/31/2011	10.04
4/30/2011	6.97
5/31/2011	5.19
6/30/2011	7.98
7/31/2011	8.45
8/31/2011	5.89
9/30/2011	7.98
10/31/2011	6.47
11/30/2011	6.5
12/31/2011	11.26
1/31/2012	13.9
2/29/2012	13.81
4/30/2012	7.83

If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months):
N/A
Description of type of Discharge:
☒ Continuous ☐ Intermittent ☐ Seasonal ☐ Rainfall Dependent ☐ Other, please specify

PCA – FL0000281 – August-2012

Description of Sampling Location(s) - actual permit designation of permitted sampling point(s):

Sample Point	Description of Monitoring Location
EFF-1	Effluent control structure following the parshall flume flow meter. No chemical addition, including defoamers, shall occur after the sampling location.
SWD-2	In the Withlacoochee River at the USGS Gaging Station at Pinetta, Florida as reported as the USGS gauging station value at 07:00 am on the USGS website when that data is available online. If the website data is not available, the Permittee may obtain a USGS reading via telephone if available, or the Permittee shall take a manual stage reading at the USGS gauging station before 12:00 noon, and use the corresponding USGS flow rating to report the daily river flow that day.
CAL-1	Calculated Value.
SWU-1	In the Withlacoochee River, located approximately 100 feet up stream (north) of outfall D-001 (located near the confluence of Jumping Gully Creek and the Withlacoochee River). Streamside samples will be taken from the east riverbank, approximately four to five feet out from the water's edge.
SWD-1	In the Withlacoochee River, near Florida Highway 150 Bridge. Streamside samples will be taken approximately four to five feet out from the water's edge or mid-river from the bridge, as appropriate.

Description of Permitted Outfall(s): (excerpted from current permit)

Surface Water Discharge:

An existing 55.0 MGD maximum daily discharge to Withlacoochee River (Class III Fresh waters), D-001. The D-001, discharge to Withlacoochee River outfall line is approximately 150 feet in length, discharges at a depth that varies with river stage, generally ranging between a depth of approximately 10 feet to a depth of approximately 30 feet and the point of discharge is located approximately at latitude 30° 37' 21" N, longitude 83° 16' 11" W

PCA – FL0000281 – August-2012

Description of Treatment Process (if multiple discharge points, include a detailed map or diagram of facility):

Treatment consists of a mechanical bar screen at the influent to the wastewater lift station prior to the primary clarifier, a manual bar screen for the auxiliary wastewater lift station bypass line, and a back-up manual bar screen in the channel downstream from the mechanical bar screen. The wastewater lift station pumps wastewater consisting of process and non-process wastewater from the mill manufacturing operations, and storm water, to a primary clarifier and associated sludge ponds for treatment for settleable solids removal. Secondary treatment is accomplished in a series of seven ponds covering approximately 850 acres, with nutrient addition to the first and fourth ponds, and coagulant/precipitant at the discharge from pond 6 for incremental emergency color reduction. There are four anaerobic facultative ponds, followed by an aerated stabilization basin, a 350 acre facultative impoundment, and a final polishing pond (pond 7), prior to a final effluent pumping station and associated conveyance system which discharges final treated effluent from outfall D-001 to the Withlacoochee River, a class III fresh surface water of the state. The pump station is designed to convey 55 MGD maximum of effluent to outfall D-001. The pump station includes bar screens, a post aeration chamber, parshall flume for effluent flow monitoring, and effluent pumps which convey the effluent to a final concrete control splitter structure identified as station 001B and then to outfall D-001. Approximately 13,000 L.F. of 48 inch HDPE transmission pipe conveys the effluent from EFF-1 to station 001B. The effluent gravity flows into the Withlacoochee River through outfall D-001.Under high river stage the control structure splits the flow to a 5th port in order to prevent overflow of effluent from the control structure and damage from backpressure to the diffuser system and associated effluent conveyance system. A culvert with a minimum 8-square foot opening in the control dam of Jumping Gully Creek is provided to allow normal flow from Jumping Gully Creek to pass unrestricted to the Withlacoochee River. Outfall D-001 discharges into a segment of the Withlacoochee wherein a site-specific alternative water quality criterion (SSAC) for dissolved oxygen (DO) have been established and continued beginning since 1990.

PCA – FL0000281 – August-2012

I. Effluent Limitations and Monitoring Requirements

A. Surface Water Discharges

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge process wastewater, non process wastewater, and stormwater from Outfall D-001. Such discharge shall be limited and monitored by the permittee as specified below and reported in accordance with condition I.E.3.

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	Monthly Average	Daily Maximum	Daily Minimum	Monitoring Frequency	Sample Type	Sample Point
Flow (MGD)	--	Report	--	Continuous	PLC	EFF-1
Upstream River Flow (CFS)	--	See Note 1 and 2	--	Daily	Calculated	CAL-1 See Note 1 and I.A.12
Downstream River Flow (CFS)	--	Report	--	Daily	Grab See Note I.A.11	SWD-2
Flow (RWC)	--	20% RWC See note 3	--	Daily	Calculated	CAL-1 See note 3
pH (SU)	--	9.0	6.0	Daily	Grab	EFF-1
Oxygen, Dissolved (DO) (MG/L)	--	--	1.5	Daily	Grab	EFF-1
Biochemical Oxygen Demand-5 (LBS/D)	--	See Note 1	--	Daily	24-hour time proportioned composite	EFF-1
Solids, Total Suspended (LBS/D)	--	See Note 1	--	3/week	24-hour time proportioned composite	EFF-1
Color (PCU)	--	See Note 4	--	Daily	Grab	EFF-1
Turbidity (NTU)	--	80	--	Weekly	Grab	EFF-1
Specific Conductance (UMHO/CM)	--	3,300	--	Weekly	Grab	EFF-1
Temperature (F), Water (DEG.F)	--	Report	--	Weekly	Grab	EFF-1
Nitrogen, Total (MG/L)	--	Report	--	Quarterly	Grab	EFF-1
Nitrogen, Total (LBS/D)	--	Report	--	Quarterly	Calculated	CAL-1
Nitrogen, Kjeldahl, Total (as N) (MG/L)	--	Report	--	Quarterly	Grab	EFF-1

PCA – FL0000281 – August-2012

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	Monthly Average	Daily Maximum	Daily Minimum	Monitoring Frequency	Sample Type	Sample Point
Nitrogen, Ammonia, Total (as N) (MG/L)	--	Report	--	Quarterly	Grab	EFF-1
Ammonia, Unionized (as NH3) (MG/L)	--	0.134	--	Quarterly	Calculated	CAL-1 See Note 5
Phosphorus, Total (MG/L)		Report		Quarterly	Grab	EFF-1
Phosphorus, Total (LBS/D)		Report		Quarterly	Calculated	CAL-1
Oil and Grease (MG/L)	--	5.9	--	Quarterly	Grab	EFF-1
Lead, Total Recoverable (UG/L)	--	9.6	--	Quarterly	Grab	EFF-1
Zinc, Total Recoverable (UG/L)	--	250	--	Quarterly	Grab	EFF-1
Hardness, as CaCO3 (MG/L)	--	Report	--	Quarterly	Grab	EFF-1
Whole Effluent Toxicity (Chronic)	See Note 6					EFF-1
Oxygen, Dissolved (DO) (MG/L)	--	--	Report	Daily	Grab	SWU-1
pH (SU)	--	Report	Report	Weekly	Grab	SWU-1
Temperature (F), Water (DEG.F)	--	Report	--	Weekly	Grab	SWU-1
Specific Conductance (UMHO/CM)	--	Report	--	Weekly	Grab	SWU-1
Color (PCU)	--	Report	--	Daily	Grab	SWU-1
Turbidity (NTU)	--	Report	--	Weekly	Grab	SWU-1
Nitrogen, Total (MG/L)	--	Report	--	Quarterly	Grab	SWU-1
Nitrogen, Ammonia, Total (as N) (MG/L)	--	Report	--	Quarterly	Grab	SWU-1
Ammonia, Unionized (as NH3) (MG/L)	--	Report	--	Quarterly	Calculated	SWU-1
Phosphorus, Total (MG/L)		Report		Quarterly	Grab	SWU-1
Oil and Grease (MG/L)	--	Report	--	Quarterly	Grab	SWU-1
Lead, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	SWU-1

PCA – FL0000281 – August-2012

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	Monthly Average	Daily Maximum	Daily Minimum	Monitoring Frequency	Sample Type	Sample Point
Zinc, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	SWU-1
Hardness, Total (as CaCO3) (MG/L)	--	Report	--	Quarterly	Grab	SWU-1
Oxygen, Dissolved (DO) (MG/L)	--	Report	--	Daily	Grab	SWD-1
pH (SU)	--	Report	--	Weekly	Grab	SWD-1
Temperature (F), Water (DEG.F)	--	Report	--	Weekly	Grab	SWD-1
Specific Conductance (UMHO/CM)	--	Report	--	Weekly	Grab	SWD-1
Color (PCU)	--	Report	--	Weekly	Grab	SWD-1
Turbidity (NTU)	--	Report	--	Weekly	Grab	SWD-1
Nitrogen, Total (MG/L)	--	Report	--	Quarterly	Grab	SWD-1
Nitrogen, Ammonia, Total (as N) (MG/L)	--	Report	--	Quarterly	Grab	SWD-1
Ammonia, Unionized (as NH3) (MG/L)	--	Report	--	Quarterly	Calculated	SWD-1
Phosphorus, Total (MG/L)		Report		Quarterly	Grab	SWD-1
Oil and Grease (MG/L)	--	Report	--	Quarterly	Grab	SWD-1
Lead, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	SWD-1
Zinc, Total Recoverable (UG/L)	--	Report	--	Quarterly	Grab	SWD-1
Hardness, Total (as CaCO3) (MG/L)	--	Report	--	Quarterly	Grab	SWD-1

NOTES:

Note 1: The following discharge limitations shall apply at EFF-1:

	Discharge Limitation		
Parameter	Monthly Average	Daily Maximum*	Annual Average **
BOD_5*	6,434 lbs/day	12,869 lbs/day	5,550 lbs/day
TSS	10,760 lbs/day	16,140 lbs/day	

* The maximum allowable loading of BOD_5 (lb/day) discharged in any one day at EFF-1 shall not exceed 12.0 lb/day of BOD_5 for each cubic foot/second (cfs) of river flow.

If the upstream dissolved oxygen is less than 4.6 mg/l, then the following loading will apply:

Upstream D.O. (mg/l)	Loading lb/Day/River cfs
4.5	10
4.4	8
4.3	6
4.2	4
<4.1	2

Effluent BOD_5, upstream river flow, BOD_5 lb/day/river cfs and appropriate BOD_5/cfs limits shall be tabulated for each month and submitted with the monthly discharge monitoring report (DMR). The upstream river flow value is used to calculate the pounds per day of BOD5 for each cubic foot/second of stream flow.

** The annual average BOD_5 shall be a 12-month moving average.

2. The daily upstream river flow shall be calculated using the downstream flow reading and subtracting the 24-hour effluent discharge flow. The upstream river flow value is used to calculate the pounds per day of BOD5 for each cubic foot/second (cfs) of river flow, in accordance with Note 1.

3. The Receiving Water Concentration (RWC) shall be calculated daily and reported monthly on the DMR. The RWC shall be calculated as the average daily effluent flow rate at EFF-1 divided by the daily downstream river flow rate as measured in the Withlacoochee River at the U.S.G.S. Gaging Station at Pinetta, Florida per Note I.A.11. The daily RWC shall not exceed 20 percent after mixing.
4. Color limits were established to meet the transparency standard of FAC Rule 62-302.530(68), in the receiving water based upon full mixing. Full mixing was determined to be a length of 1,171 feet from outfall structure D-001 in conjunction with the mixing zones established in Part I.A.4. Therefore, full mixing length is recognized for demonstrating compliance with the transparency standard in the receiving water.

   From the effective date of this permit the permittee shall sample EFF-1 daily and discharge shall comply with the following effluent limitation. The discharge shall not cause a greater than 50 color unit (PCU) increase in true color from natural background conditions: The maximum allowable effluent color limit is to be calculated as follows:

   $$Ce = (50/RWC) + Cu$$

   where:
   Ce = effluent color limitation, PCU
   Cu = upstream color, PCU, monitored per Part I.A.1.
   RWC = receiving water concentration, calculated per Part I.A.5.
   The permittee shall calculate the maximum allowable effluent color for each day based on the RWC and upstream color, and shall prepare a table of the daily calculated RWC, maximum effluent color limit, and the measured effluent color value. This table shall be submitted as an attachment to the DMR

5. Un-ionized ammonia shall be calculated based on a separate single grab sample for total ammonia. The pH and temperature at the time of the grab sample shall be used for the calculation and reported on the DMR. [62-302.530(3)]

6. The permittee shall comply with the following requirements to evaluate chronic whole effluent toxicity of the discharge from outfall D-001.
   a. Effluent Limitation
      (1) Whole effluent chronic toxicity shall not result in a No Observed Effect Concentration (NOEC) of less than 20% effluent in any test. [Rule 62-302.530(61), F.A.C.]

b. Monitoring Frequency
   (1) "Routine" toxicity tests shall be conducted annually, the first starting within one year from last test, and lasting for the duration of this permit unless a reduction in the frequency of monitoring is granted in writing by the Department.

c. Test Requirements
   (1) Routine Tests: All routine tests shall be conducted using a control (0% effluent) and one test concentration of 20% final effluent. The Permittee may opt to run a series of dilutions that include a 20% concentration.
   (2) Additional Follow-up Tests, if required:
      (a) If a routine test does not meet the chronic toxicity limitation in 3.a.(1) above, the permittee shall conduct three additional follow-up tests on each species that failed the test.
      (b) The first additional follow-up test shall be conducted using a control (0% effluent) and a minimum of five dilutions. The dilution series should bracket the target concentration such that at least two dilutions above (not to exceed 100% effluent) and two dilutions below the target concentration (20%) and a control (0% effluent) are run. All test results shall be statistically analyzed according to the Appendices in EPA-821-R-02-013.
      (c) The first test shall be initiated within two weeks of the end of the failed routine test. The remaining additional follow-up tests shall be conducted weekly thereafter until a total of three valid additional follow-up tests are completed.
   (3) The permittee shall conduct a daphnid, Ceriodaphnia dubia, Survival and Reproduction Test and a fathead minnow, Pimephales promelas, Larval Survival and Growth Test, concurrently.
   (4) All test species, procedures and quality assurance criteria used shall be in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th ed., EPA-821-R-02-013. Any deviation of the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use. In the event the above method is revised, the permittee shall conduct chronic toxicity testing in accordance with the revised method.
      (5) The control water and dilution water used shall be moderately hard water as described in EPA-821-R-02-013, Section 7.

d. Sampling Requirements
   (1) For each routine or additional follow-up test required, a total of three 24-hour composite samples of final effluent shall be collected and used per the sampling protocol discussed in EPA-821-R-02-013, Section 8.
   (2) The first composite sample shall be used to initiate the test. The remaining two composite samples shall be collected according to the protocol and used as renewal solutions on Day 3 (48 hours) and Day 5 (96 hours) of the test.

e. Quality Assurance Requirements
   (1) A standard reference toxicant (SRT) quality assurance (QA) chronic toxicity test shall be conducted with each species used in the required toxicity tests either concurrently or started no more than 30 days before the date of each routine or additional follow-up test conducted. The SRT-QA data shall be included in the reports for each companion routine or additional follow-up test required.
   (2) If the mortality in the control (0% effluent) exceeds 20% for either species in any test or does not meet "test acceptability criteria", the test for that species (including the control) shall be invalidated and the test repeated. Test acceptability criteria for each species are defined in EPA-821-R-02-013, Section 13.12 (C. dubia) and Section 11.12 (P. promelas).
   (3) If, during any test, 100% mortality occurs in the 100% effluent concentration prior to the end of the test and control mortality is less than 20% at that time, that test (including the control) shall be terminated with the conclusion that the test fails and constitutes non-compliance.
   (4) Additional follow-up tests shall be evaluated for acceptability based on the observed dose-response relationship and the percent minimum significant difference (PMSD), as required by EPA-821-R-02-013, Sections 10.2.6 and 10.2.8, respectively. Results from these evaluations shall be included with the bioassay reports.
   (5) The laboratory shall be certified by the Department of Health Environmental Laboratory Certification Program (DOH ELCP) for the matrix, test and analyte (organism) being measured to comply with this

permit.

f. Reporting Requirements

(1) Results from all required tests shall be reported on the Discharge Monitoring Report (DMR) in the following manner:

(a) Routine Test Results: If the NOEC of a test species is greater than or equal to 20% effluent, ">20%" should be entered on the DMR for that species. If the NOEC of a test species is less than 20% effluent, "<20%" should be entered. If a dilution series bioassay test is run for the routine test, the % effluent determined to be the NOEC concentration may be entered.

(b) Additional Test Results: Report the % effluent determined to be the NOEC endpoint of the test.

(2) A bioassay laboratory report for each routine test shall be prepared according to EPA-821-R-02-013, Section 10, Report Preparation and Test Review, and mailed to the Department at the address below within 30 days of the completion of the test.

(3) For additional follow-up tests, a single bioassay laboratory report shall be prepared according to EPA-821-R-02-013, Section 10, and mailed within 45 days of completion of the third valid additional follow-up test. If any additional follow-up test or two consecutive routine tests do not meet the effluent limitation specified in 3.a.(1) above, the permittee shall contact the Department within 30 days of the report submittal to discuss the appropriate corrective actions necessary to remedy the observed chronic toxicity.

(4) All bioassay reports shall be sent to:

Florida Department of Environmental Protection
Northeast District Office
7777 Baymeadows Way West Suite 100
Jacksonville, Florida 32256-7590

PCA – FL0000281 – August-2012

PART I: Continued	
Receiving Waters: **Withlacoochee River**	**Classification (indicate whether fresh or marine):** **Class III Fresh water**

Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.):

See Notes on page 7-10.

Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.):

N/A –

Facility Mixing Zone Details (if applicable):
See Notes on page 7-10.

List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:
For January 1, 2011 to April 2012 (from PCS)

Date	Parameter and Units	Limit	Result
1/31/2011	BOD lbs/cfs/d	12.0	12.2

Describe previous FYI and WQBEL study:
Last Biological Assessment sampling was done by FDEP August 22-26, 2011

Conclusion

The effluent samples collected from the EFF-01 NPDES sampling point for this facility on August 22, 24, and 26, 2011, were not chronically toxic to either test species during the 7-day chronic definitive bioassays. The effluent AGP result was greater than the "problem" threshold for fresh receiving waters suggesting that nutrient enrichment may be an issue. Effluent water quality samples collected on August 24, 2011, did not exceed applicable Class III freshwater quality criterion and/or permitted limits. In-stream metals and nutrients results above and below the outfall did not exceed applicable Class III freshwater quality criteria but did indicate inputs from sources other than the PCA effluent. Dissolved oxygen at both in-stream sites exceeded the Class III freshwater criterion (62-302.530(30) F.A.C.).

Describe previous or current Enforcement Actions (including WLs):
N/A

Describe any violations or problems noted in previous inspection:

No comments

Discuss whether DMR trends within previous five years are improving or declining:
No comments

Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse):

No comments

PCA – FL0000281 – August-2012

PART II: Sampling Event Information	
Date(s) sample collected: 9/23-9/24/12 composites, 9/24/2012 grabs.	**Sampler(s):** Eesa Ali & Jeremy Parrish
Temperature (Deg C): 27.60	**pH (SU):** 7.79
Dissolved Oxygen (mg/L): 8.01	**Conductivity (umhos/cm):** 2035
Total Residual Chlorine (mg/L): NA	**Total Residual Chlorine - after Disinfection (mg/L):** NA
Method of Chlorination: none	**Method of De-chlorination:** NA
Flow During Sample Collection for each outfall(MGD): 13.04 (AS REPORTED BY FACILITY)	
Mean Flow for each outfall for previous 12 months based on sampling date (If samples are taken on more than one day, indicate Mean Flow for each day): 8.91 MGD average daily flow from 8/1/2011- 8/1-2012	
Describe Discharge during Sampling Event: ☒ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☐ **Other, please specify**	
Describe any conditions, difficulties or abnormal events that occurred during the sample collection and any other additional comments here:	

Appendix C

Explanation of Measurements

(1) Quality Assurance and Quality Control

FDEP's quality assurance requirements for analytical laboratories and field activities are codified in Chapter 62-160, F.A.C., Quality Assurance (QA Rule) and in internal Standard Operating Procedures (FDEP SOPs). Methods for all analyses are on file at the FDEP Central Laboratory in Tallahassee and may be viewed on the web at http://www.floridadep.org/labs/sop/index.htm and/or http://www.floridadep.org/labs/qa/index.htm .

(2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides following FDEP SOPs. The results from these analyses were compared with Water Quality Criteria (62-302, F.A.C.) and facility permit limits. Exceedances of Water Quality Criteria may constitute violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Habitat Assessment

Habitat assessment is used to evaluate the physical structure and extent of disturbance in a waterbody. Eight aspects are ranked, with 20 possible points for each aspect (QA Rule SOP FT 3100). The Habitat Assessment score includes types and amounts of benthic substrates, water velocity, amount of sand or silt accumulation, extent of artificial channelization, bank stability, and riparian zone width and vegetation type. All scores are summed to yield an overall Habitat Assessment score. Habitat Assessment score ranges from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

(4) Algal Growth Potential (AGP)

The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L. Raschke and Shultz (1987) found that an AGP above 5.0 mg dry weight/L represents a "problem" threshold for fresh receiving waters, implying nutrient enrichment. High AGP values may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C. and/or 62-302.530(47)(b), F.A.C..

The concentration of nutrients in a water sample may be used to calculate the expected yield of AGP under the assumption that other required nutrients (e.g. silicon, micronutrients) are present in excess (Miller *et al*. 1978). The expected amount of production is calculated as 38 times the total soluble inorganic nitrogen (nitrate and nitrite plus ammonia) under nitrogen limitation or 430 times the ortho-phosphate (OP) concentration under phosphorus limitation with an error of $\pm$ 20%. When the ratio of nitrogen to phosphorus (N: P) is less than 10:1, nitrogen limitation of algal production is likely. When the N: P ratio is 20:1 or greater, phosphorus limitation is likely (USEPA 2000). For ratios in-between, co-limitation may occur. Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may constitute an exceedance of 62-302.530(61), F.A.C.

(5) Algal Phytoplankton and Periphyton Assemblages

Qualitative periphyton are sampled by taking subsamples of algae from natural substrates throughout the sample reach. Phytoplankton were sampled from the water column using a 1 L grab sample. Periphyton were subsampled and identified to the lowest practical level, usually species. Wet taxa and diatoms are identified separately. In the wet taxa analysis, soft algae are identified to the lowest practical level, and diatoms are identified only to order level (diatom). In the diatom analysis, diatoms are identified to the lowest practical level.

Chlorophyll *a* Content: Chlorophyll *a* content is an estimate of algal biomass . High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be constitute exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C. and/or 62-302.530(47)(b) F.A.C..

Algal Density: Algal density is estimated as number of natural units/ml for phytoplankton samples. Although algal density of a single site is highly variable and depends on a number of factors, comparison of algal density at a control site to algal density at a related test site gives a partial comparison of algal biomass at the two sites (Stevenson and Smol 2003).

Taxa richness: Taxa richness is the number of distinct algal taxa present in a sample. Extreme nutrient enrichment tends to reduce the number of different types of algae present in a sample because a few tolerant taxa tend to reproduce rapidly and constitute the majority of the cells present. However, moderate nutrient enrichment of nutrient poor waters may sometimes be correlated with increased algal taxa richness (Stevenson and Bahls 1999) as the algal community begins to respond to the increased input of nutrients.

Community Composition: Shifts in relative proportions of major groups of algae downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Stevenson and Bahls 1999) and may constitute exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C.

(6) Benthic Macroinvertebrate Assemblages

Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days. Qualitative collections are made using 20 dipnet sweeps (QA Rule SOP FS7420). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species.

Taxa richness: Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility's effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C..

Percent Contribution of Dominant Taxon: Percent contribution of the dominant taxon is calculated by dividing the number of individuals in the most abundant taxa by the total number of individuals counted. Percent contribution of the dominant taxon tends to increase with increasing perturbation (Plafkin *et al*., 1989). Increases in the percent contribution of the dominant taxon related to a facility's effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C. and/or 62-302.530(47)(b), F.A.C..

Community Composition: Shifts in proportions of major groups of organisms downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Fore et. al. 2007, Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C.

Functional Feeding Groups: Environmental degradation may differentially affect groups of invertebrates based on how the group feeds (e.g. predators, deposit feeders, etc.). In Florida, pollution may be responsible for reducing the numbers of filter feeders and shredders (Fore et. al. 2007). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present in equitable abundance among taxa (Magurran 1988). A difference of 25% in Shannon-Weaver diversity between results from Hester-Dendy multiplate samplers incubated for 28 days at test and control sites constitute exceedances of 62-302.530(10), F.A.C..

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric developed for Florida (Fore et. al. 2007). This Index was revised in 2007 using data from qualitative dipnet samples. The SCI now assigns points to ten parameters; depending on how closely each parameter approaches an expected value (QA Rule SOP LT 7200). Points are assigned according to in which bioregion (Panhandle, Northeast, or Peninsula) the sampling location exists -and summed to yield a final SCI score (range 0-100). Included in the calculation of SCI are taxa richness, number of Ephemeroptera taxa, number of Trichoptera taxa, percent contribution of the dominant taxon, number of sensitive taxa, number of clinger taxa, number of long-lived taxa, percent contribution of Tanytarsini, percent contribution of very tolerant, and the percent contribution of suspension and filter feeders. As human disturbance increases, it is expected that taxa richness, the number of Ephemeroptera taxa, Trichoptera taxa, sensitive taxa, clinger taxa, long-lived taxa, and the percent contribution of Tanytarsini and suspension and filter feeders will decrease while percent contribution of dominant taxon, and percent contribution of very tolerant taxa will increase.

Scores are broken into three categories (1, 2, and 3). Sites in Category 1 are described as having higher diversity than Category 2 sites, particularly for Ephemeroptera and Trichoptera. A Category 1 site may have several more clinger and sensitive taxa, a higher proportion of Tanytarsini, and a lower percent of a dominant taxon than a site in Category 2. The site will also have a very small percentage of very tolerant individuals, if any.

Sites in Category 2 are described as having an average of 30 species with several different taxa of Ephemeroptera and Trichoptera. A Category 2 site also has several different long-lived taxa and, on average, 5 clinger and 6 sensitive taxa. There is a slight increase in dominance by a single taxon relative to sites in Category 1. Very tolerant taxa represent a small percentage of individuals but are noticeably increased as compared to sites in Category 1.

Sites in Category 3 are described as having a notable loss in taxonomic diversity, and Ephemeroptera, Trichoptera, long-lived, clinger and sensitive taxa are uncommon or rare. Filter feeders are reduced by at least 50%. The site is dominated by a tolerant taxon, and very tolerant individuals represent a large proportion of the individuals collected.

SCI 2007 categories are from Table LT 7200-2 of DEP-SOP-002/01 as referenced in Draft Quality Assurance Rule (62-160, F.A.C.), December 3, 2008. A decrease in ordinal SCI score from the Control to the Test site may be evidence of degradation related to a facility's effluent. An SCI score in Category 3, if it is shown to be related to a facility's effluent, may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or a violation of 62-302.530(61).

Appendix D
Chain of Custody

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-09-24-16
FYI5 Packaging Corp of America Sampling Inspection

Requester: Michelle Fish
Field Report Prepared By: S. Piltz
Collected By: E.Al./S.Piltz/J.Parish/JG
Send Final Report To: Tom Rauth
Sampling Agency: NED FDEP

Customer: NE-DIST
Project ID: FYI5
PMAS: 1143

Lab ID *	Location / Field ID: PCA FYI EFF1 24 HTC				☐ Comp ☐ Grab	Collection (comp begin or grab) Eastern Date 9/24/12 Time 1355 Central		Composite end Date Time	Eastern Central	Bottle Group(s)** A
						Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number		
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH		Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)		NPDES Number		
	Latitude ☐ dd ☐ dms	Longitude	☐ dd ☐ dms		Comments: composite 11:23 9/23/12 EDT to 11:23 9/24/12 / 2.3°C in refrigerator					
Lab ID *	Location / Field ID: PCA FYI EFF1 GRAB				☐ Comp ☐ Grab	Collection (comp begin or grab) Eastern Date 9/24/12 Time 1400 Central		Composite end Date Time	Eastern Central	Bottle Group(s)** B
						Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 8.81	Storet Station Number		
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C) 27.6	pH 7.79		Sample Depth 0.3 ☐ m ☐ ft	1.03 ☒ Salinity (PPTh) 2035 ☐ Sp Conductance (umho/cm)		NPDES Number		
	Latitude ☐ dd ☐ dms	Longitude	☐ dd ☐ dms		Comments					
Lab ID *	Location / Field ID: PCA Instream Control				☐ Comp ☑ Grab	Collection (comp begin or grab) Eastern Date 9/24/12 Time 1000 Central		Composite end Date Time	Eastern Central	Bottle Group(s)** C, D
						Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 4.93	Storet Station Number		
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C) 23.08	pH 6.72		Sample Depth 1.0 ☐ m ☐ ft	0.05 ☑ Salinity (PPTh) 106 ☑ Sp Conductance (umho/cm)		NPDES Number		
	Latitude ☐ dd ☐ dms	Longitude	☐ dd ☐ dms		Comments					
Lab ID *	Location / Field ID: PCA Test 1 End of Mixing Zone				☐ Comp ☑ Grab	Collection (comp begin or grab) Eastern Date 9/24/12 Time 1450 Central		Composite end Date Time	Eastern Central	Bottle Group(s)** C, D
						Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 4.84	Storet Station Number		
	Matrix (include type e.g. Salt, Fresh, etc) Fresh	Temp (C) 23.8	pH 6.78		Sample Depth 1.6 ☑ m ☐ ft	0.08 ☑ Salinity (PPTh) 1166 ☑ Sp Conductance (umho/cm)		NPDES Number		
	Latitude ☐ dd ☐ dms	Longitude	☐ dd ☐ dms		Comments					

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
E. Al.	9/24/12		TBJ	9/25/12 09:20				

* Shaded Areas for Lab use only. 1447

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Page 1 of 5

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-09-24-16
FYI5 Packaging Corp of America Sampling Inspection

Requester: Michelle Fish
Field Report Prepared By: S. Piltz

Customer: NE-DIST
Project ID: FYI5
PMAS: 1143

Collected By: E.Al./S.Piltz/JP/JG
Sampling Agency: NED FDEP
Send Final Report To: Tom Rauth

Lab ID *

Location: PCA Test 2 Upstream of CR150
Field ID:
Matrix (include type e.g. Salt, Fresh, etc):
Temp (C):
pH:
Latitude: ☐ dd ☐ dms
Longitude: ☐ dd ☐ dms

☐ Comp ☐ Grab
Collection (comp begin or grab) Eastern Central: Date Time
Composite end Eastern Central: Date Time
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number:
Bottle Group(s)**: C, D
Comments: + 3 H_2O_2 = 1/3 + 2/3 + 3/3

Lab ID *

Location: Blank Equipment
Field ID:
Matrix (include type e.g. Salt, Fresh, etc):
Temp (C):
pH:
Latitude: ☐ dd ☐ dms
Longitude: ☐ dd ☐ dms

☐ Comp ☐ Grab
Collection (comp begin or grab) Eastern Central: Date 9/24/12 Time 1335
Composite end Eastern Central: Date Time
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number:
Bottle Group(s)**: F/E
Comments: Equipment Blank from Beta Sampler

Lab ID *

Location: PCA Instream Control HD1
Field ID:
Matrix (include type e.g. Salt, Fresh, etc):
Temp (C):
pH:
Latitude: ☐ dd ☐ dms
Longitude: ☐ dd ☐ dms

☑ Comp ☐ Grab
Collection (comp begin or grab) Eastern Central: Date 9/24/12 Time 1000
Composite end Eastern Central: Date 9/24/12 Time 1000
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number:
Bottle Group(s)**: C
Comments:

Lab ID *

Location: PCA Instream Control HD2
Field ID:
Matrix (include type e.g. Salt, Fresh, etc):
Temp (C):
pH:
Latitude: ☐ dd ☐ dms
Longitude: ☐ dd ☐ dms

☑ Comp ☐ Grab
Collection (comp begin or grab) Eastern Central: Date 9/24/12 Time 1000
Composite end Eastern Central: Date 9/24/12 Time 1000
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number:
Bottle Group(s)**: C
Comments:

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	9/24/12 1445		[signature]	9/25/12 0900				

* Shaded Areas for Lab use only.
** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Page 2 of 5

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-09-24-16
FYI5 Packaging Corp of America Sampling Inspection

Requester: Michelle Fish

Field Report Prepared By: S. Piltz

Customer: NE-DIST
Project ID: FYI5
PMAS: 1143

Collected By: E. Ali / S. Piltz / JP / JG

Sampling Agency: NFD FDEP

Send Final Report To: Tom Rauth

Lab ID *

Location: PCA Instream Control H03

Field ID:

☑ Comp ☐ Grab | Collection (comp begin or grab) Eastern Central Date 8/27/12 Time 1000 | Composite end Eastern Central Date 9/24/12 Time 1000 | Bottle Group(s)** C

Tot Res Chlorine (mg/L): | Diss Oxygen (mg/L): | Storet Station Number:

Matrix (include type e.g. Salt, Fresh, etc): | Temp (C): | pH:

Sample Depth ☐ m ☐ ft | ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm) | NPDES Number:

Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Comments:

Lab ID *

Location:

☐ Comp ☐ Grab | Collection (comp begin or grab) Eastern Central Date Time | Composite end Eastern Central Date Time | Bottle Group(s)**

Field ID:

Tot Res Chlorine (mg/L): | Diss Oxygen (mg/L): | Storet Station Number:

Matrix (include type e.g. Salt, Fresh, etc): | Temp (C): | pH:

Sample Depth ☐ m ☐ ft | ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm) | NPDES Number:

Latitude ☐ dd | Longitude ☐ dd ☐ dms | Comments:

Lab ID *

Locatic: PCA TEST1L Endof Mtz Zone H01

Field ID:

☑ Comp ☐ Grab | Collection (comp begin or grab) Eastern Central Date 8/27/12 Time | Composite end Eastern Central Date 9/24/12 Time 1450 | Bottle Group(s)** C

Tot Res Chlorine (mg/L): | Diss Oxygen (mg/L): | Storet Station Number:

Matrix (include type e.g. Salt, Fresh, etc): | Temp (C): | pH:

Sample Depth ☐ m ☐ ft | ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm) | NPDES Number:

Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Comments:

Lab ID *

Location: PCA TEST1L Endof Mtz Zone H02

Field ID:

☑ Comp ☐ Grab | Collection (comp begin or grab) Eastern Central Date 8/27/12 Time | Composite end Eastern Central Date 9/24/12 Time 1450 | Bottle Group(s)** C

Tot Res Chlorine (mg/L): | Diss Oxygen (mg/L): | Storet Station Number:

Matrix (include type e.g. Salt, Fresh, etc): | Temp (C): | pH:

Sample Depth ☐ m ☐ ft | ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm) | NPDES Number:

Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Comments:

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
E. M.	9.24.12 1445		ABJ	9/25/12 09:20				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Page 3 of 5

Florida Department of Environmental Protection

Event ID *

Central Laboratory Sample Submittal Form

Request Number: RQ-2012-09-24-16
FYI5 Packaging Corp of America Sampling Inspection

Requester: Michelle Fish
Field Report Prepared By:

Customer: NE-DIST
Project ID: FYI5
PMAS: 1143

Collected By: GA/SP/JP/DG
Send Final Report To: Tom Rauth
Sampling Agency: DEP

Lab ID *	Loc Fiel PCA TEST1L Endof Mix Zone HD1	☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Date 8/27/12 Time Central	Composite end Eastern Date 9/24/12 Time 1450 Central	Bottle Group(s)** C
		Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments			

Lab ID *	Location PCA Test 1L End of Mix Zone HD4	☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Date 8/27/12 Time Central	Composite end Eastern Date 9/24/12 Time 14:50 Central	Bottle Group(s)**
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd	Longitude ☐ dd ☐ dms	Comments			

Lab ID *	Locati Field I PCA TEST1R Endof Mix Zone HD1	☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Date 8/27/12 Time Central	Composite end Eastern Date 9/24/12 Time 1450 Central	Bottle Group(s)** C
		Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd	Longitude ☐ dd ☐ dms	Comments			

Lab ID *	Locati Field I PCA TEST1R Endof Mix Zone HD2	☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Date 8/27/12 Time Central	Composite end Eastern Date 9/24/12 Time 1450 Central	Bottle Group(s)** C
		Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments			

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
C Mi	9-24-12 1445		ABB	9/25/12 0820				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Page 4 of 5

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-09-24-16
FYI5 Packaging Corp of America Sampling Inspection

Requester: Michelle Fish
Field Report Prepared By: S. Piltz

Customer: NE-DIST
Project ID: FYI5
PMAS: 1143

Collected By: EA/SP/JP/JG NED
Send Final Report To: Tom Rauth
Sampling Agency:



Lab ID *	Loc / Fiel			☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Central: Date 9/27/12 Time	Composite end Eastern Central: Date 9/24/12 Time 1350	Bottle Group(s)**: C
				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude ☐ dd ☐ dms	Longitude	☐ dd ☐ dms	Comments			

Lab ID *	Location PCA Test 2 upstream CR350 HD 1/3			☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Central: Date Time	Composite end Eastern Central: Date Time	Bottle Group(s)**
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude ☐ dd ☐ dms	Longitude	☐ dd ☐ dms	Comments			

Lab ID *	Location PCA Test 2 up. CR350 HD 2/3			☐ Comp ☐ Grab	Collection (comp begin or grab) Eastern Central: Date Time	Composite end Eastern Central: Date Time	Bottle Group(s)**
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude ☐ dd ☐ dms	Longitude	☑ dd ☐ dms	Comments			

Lab ID *	Location PCA Test 2 up. CR350 HD 3/3			☐ Comp ☐ Grab	Collection (comp begin or grab) Eastern Central: Date Time	Composite end Eastern Central: Date Time	Bottle Group(s)**
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude ☐ dd ☐ dms	Longitude	☐ dd ☐ dms	Comments			

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
E. M.	1445		ABD	9/25/12 0920				

* Shaded Areas for Lab use only. 9/24/12

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-09-24-16
FYI5 Packaging Corp of America Sampling Inspection

Customer: NE-DIST
Project ID: FYI5
PMAS: 1143

Requester: Michelle Fish
Collected By: J. Weger, T. Risk, J. Savage
Sampling Agency: FDEP Bio Lab

Field Report Prepared By: J. Weger
Send Final Report To: Tom Rauth

Lab ID *	Location	Field ID	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Latitude	Longitude	Comp / Grab	Collection (comp begin or grab) Eastern Central	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	Sample Depth	Salinity (PPTh) / Sp Conductance (umho/cm)	NPDES Number	Composite end Date Time Eastern Central	Comments	Bottle Group(s)**
	Withlacoochie River	PCA Test 2	Fresh	23.21	6.80	30.5974 dd	-83.2606 dd	Grab	Date 09/24/12 Time 1115		7.18		0.2 m	163 Sp Conductance				C, D.
	Withlacoochie River	PCA Test 2 - Rep 1	Fresh			dms	dms	Grab	Date 09/24/12 Time 1100				ft				Hester Dendy	C
	Withlacoochie River	PCA Test 2 - Rep 2	Fresh			dms	dms	Grab	Date 09/24/12 Time 1100				ft				Hester Dendy	C
	Withlacoochie River	PCA Test 2 - Rep 3	Fresh			dms	dms	Grab	Date 09/24/12 Time 1100				ft				Hester Dendy	C

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
			ABB	9/25/12 09:20				

* Shaded Areas for Lab use only.
** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-09-24-16
FYI5 Packaging Corp of America Sampling Inspection

Requester: Michelle Fish

Field Report Prepared By: J. Weger

Customer: NE-DIST
Project ID: FYI5
PMAS: 1143

Collected By: J. Weger, T. Risk, J. Savage

Send Final Report To: Tom Rauth

Sampling Agency: FDEP Bio Lab

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central: Date / Time	Composite end Eastern Central: Date / Time	Bottle Group(s)**
	Withlacoochie River	☒ Comp ☐ Grab	Date 09/24/12 Time 1100		C
	Field ID: PCA Test 2 - Rep 4	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc): Fresh	Temp (C)	pH	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Hester Dendy		

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central: Date / Time	Composite end Eastern Central: Date / Time	Bottle Group(s)**
		☐ Comp ☐ Grab			
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments		

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central: Date / Time	Composite end Eastern Central: Date / Time	Bottle Group(s)**
		☐ Comp ☐ Grab			
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments		

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central: Date / Time	Composite end Eastern Central: Date / Time	Bottle Group(s)**
		☐ Comp ☐ Grab			
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments		

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
			ABS	9/25/12 @ 9:20				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Appendix E

Physical/Chemical and Habitat Assessment field sheets

DEP-SOP-001/01: Form FD 9000-3 — ELFS

PHYSICAL/CHEMICAL CHARACTERIZATION ELECTRONIC FIELD SHEET

SAMPLE ID :
ORG ID :
COUNTY : Hamilton
STORET # : 21010029
DATE : 9/24/2012
TIME : 1000

Latitude :			Longitude :		
30 (degrees)	37 (minutes)	21.79 (seconds)	-83 (degrees)	16 (minutes)	11.21 (seconds)

SITE NAME : Withlacoochee 80m up from PCA outfall
SAMPLE COMPLETE ? yes
FIELD ID/NAME : 2012 PCA 5YI Control site
RECEIVING BODY OF WATER : Suwannee River

RIPARIAN ZONE / STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category) :

Forest/Natural	silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industry	Other (Specify)
55	12	18	10	3	1	1	0

Local Watershed Erosion (select one) : ☐ None ☐ Slight ☑ Moderate ☐ Heavy
Local Watershed NPS Pollution : ☐ No evidence ☑ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side
Left Bank : +18 Right Bank : +18

High Water Mark: 13 (m) + 2 (above present water level) = 15 (present depth) (above bed)

Artificially Impounded ☐ Yes ☑ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect
40 m wide
0.17 m/s 0.33 m/s 0.2 m/s
1 m deep 2 m deep 1.5 m deep

Artificially Channelized : ☑ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe

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

SEDIMENT / SUBSTRATE

Sediment Oils ☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☑ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :

Sediment Deposition ☐ Sludge
Sand Smothering : ○ None ◉ Slight ○ Moderate ○ Severe
Silt Smothering : ○ None ○ Slight ◉ Moderate ○ Severe
☐ Other (Specify) :

SUBSTRATE TYPE
Assessment Tool: ☑ SCI ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)	0.525	5	3
Undercut Banks / Roots	0.3	5	3
Leaf Packs or Mat			
Aquatic Vegetation	0.03	0	0
Rock or Shell Rubble..	3.325	5	4
Sand.....			
Mud / Muck / Silt		5	
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond. (UMHO/CM)	Salinity (PPT)	SECCHI (M)
Top :							0.7
Mid-Depth :	1	23.08	6.72	4.93	106	0.05	☐ VOB
Bottom :							

Water Surface Oils : ☑ None ☐ Sheen ☐ Globs ☐ Slick

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

Water Sample Taken ? ◉ Yes ○ No
Algae Sample Taken ? ◉ Yes ○ No

SYSTEM TYPE ☑ Stream ☐ Lake ☐ Wetland ☐ Estuary ☐ Other (Specify) :

Clarity ○ Clear ◉ Slightly Turbid ○ Turbid ○ Opaque

Color ☑ Tannic ☐ Green (Algae) ☐ Clear ☐ Other (Specify) :

WEATHER CONDITIONS / NOTES :

~80F, sunny, calm.
Minor habitat = silt

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton :	○	○	◉	○
Fish :	○	○	◉	○
Aquatic Macrophytes :	○	◉	○	○
Iron/Sulfur Bacteria :	◉	○	○	○

☑ The antecedent hydrologic conditions have been met to my best knowledge.
Water samples preserved ? ◉ Yes ◉ pH<2 ○ No Algae samples preserved ? ☑ Yes ☐ No

SAMPLING TEAM : NED:SP/JP/JG/EA || Tally: JW/TR/JS
SIGNATURE :
DATE : 9/24/2012

Revision Date: September 5, 2008

DEP-SOP-001/01: Form FD 9000-5
STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY):	RECEIVING BODY OF WATER:
	21010029	09/24/2012	Suwannee River

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Hamilton	Withlacoochee River 80m up from PCA outfall	2012 PCA 5YI Control site

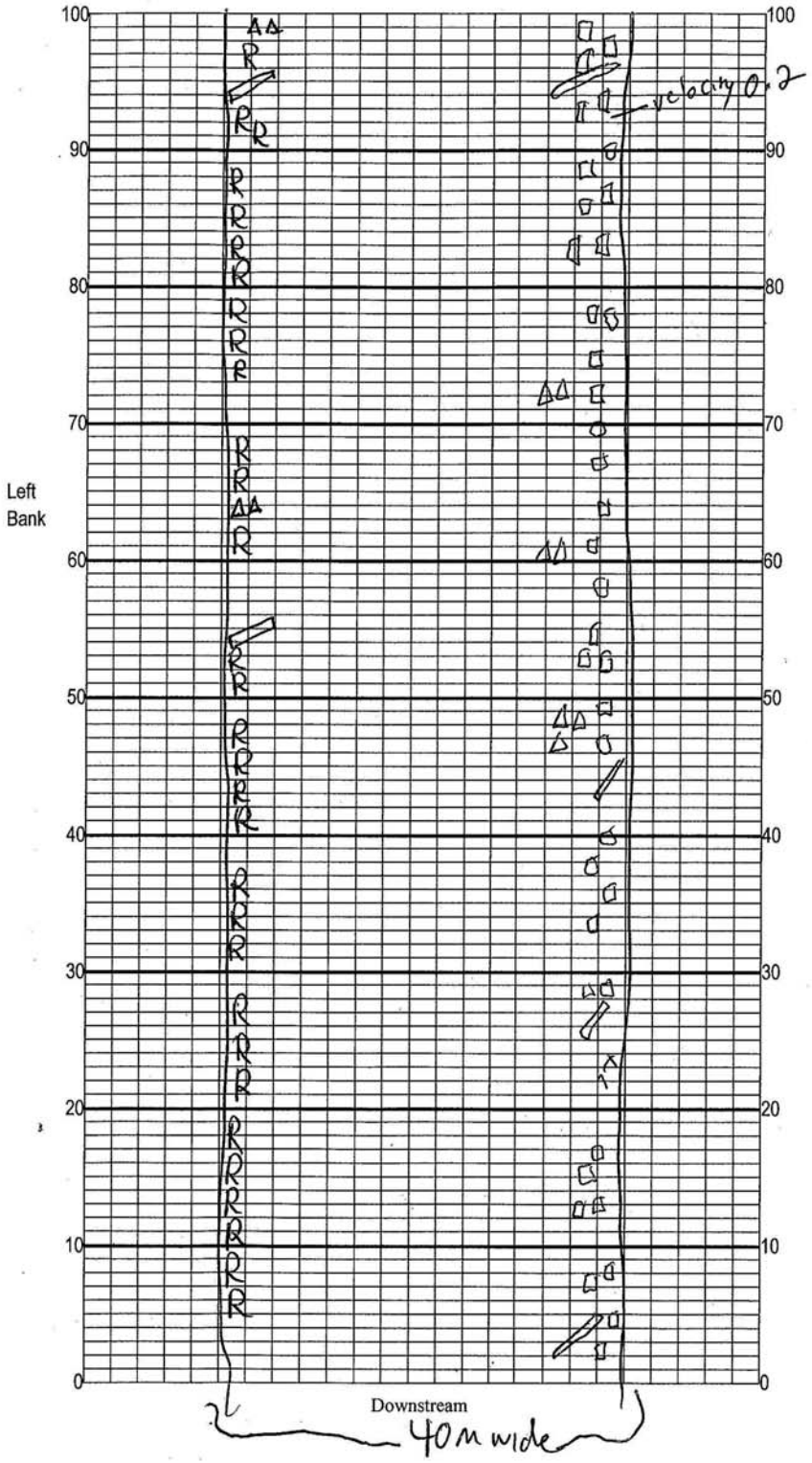
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 11	Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 4	Greater than 30% major productive habitat present at site 20 19 18 17 16	16% to 30% major productive habitat, by aerial extent 15 14 13 12 11	6% to 15% major productive habitat 10 9 8 7 6	Less than 5% major productive habitat 5 4 3 2 1
Water Velocity 13	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec ≥0.33 0.31 0.29 0.27 >0.25 20 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 0.25 0.21 0.17 0.13 >0.1 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 0.1 0.09 0.07 0.06 0.05 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec <0.05 0.04 0.03 0.01 <0.01 5 4 3 2 1
Habitat Smothering 15 Primary Score **43**	Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae. 20 19 18 17 16	Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae. 15 14 13 12 11	Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth). 10 9 8 7 6	Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation. 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 20	Expected sinuosity given the stream width. No evidence of dredging or artificial straightening. No spoil banks. 20 19 18 17 16	Good sinuosity within old channelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered. 15 14 13 12 11	Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area. 10 9 8 7 6	Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks. 5 4 3 2 1
Bank Stability Right Bank 9 Left Bank 9	Bankfull > 60% of bank height. Slope of bank ≤ 60° from bankful to top of bank. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank 9 Left Bank 10	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 77	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants; tree, shrub, and forbs represented, if appropriate). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

120 **TOTAL SCORE**

Date:	Analyst:	Signature:
9/24/2012	SP/JG/JP/EA	

Form FD 9000-5 Revision Date: December 19, 2011

DEP-SOP-001/01 Form FD 9000-4
Stream/River Habitat Sketch Sheet



Location: PC Upstream of Discharge

Date: 9/24/12

Sampler: JP/SP & EA/JG

100 m: Latitude	
Longitude	
0 m: Latitude	
Longitude	
Substrates: Code key, draw proportionate habitat abundance.	%
Snags	0.525
Roots/undercut banks	0.3
Leaf Packs (or mats)	
Aquatic Macrophytes	0.03
ROCK on Right	3.325
R Rock on left	
Pools total # observed =	
# range expected =	
Average width 40 m	
Average depth 2 m	
Velocity measured at 90 meter mark.	
WQ & chemistry taken at 10 meter mark.	
Habitat Smothering: Note areas (on map) where sand or silt is smothering substrates, limiting habitability.	
Bank Stability: Note areas (on map) with unstable, eroding banks.	
Riparian Buffer Width: Note areas (on map) where natural vegetation is altered or eliminated.	

Plants observed / other notes:

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Revision Date: June 2, 2011

DEP-SOP-001/01: Form FD 9000-3

ELFS

PHYSICAL/CHEMICAL CHARACTERIZATION ELECTRONIC FIELD SHEET

SAMPLE ID :
ORG ID :
COUNTY : Hamilton
STORET # : 21010030
DATE : 9/24/2012
TIME : 1450

Latitude :			Longitude :		
30 (degrees)	35 (minutes)	50.10 (seconds)	-83 (degrees)	15 (minutes)	36.7 (seconds)

SITE NAME : Withlacoochee River at end of PCA DO mixing zone
SAMPLE COMPLETE ? yes
FIELD ID/NAME : 2012 PCA 5YI Test site
RECEIVING BODY OF WATER : Suwannee River

RIPARIAN ZONE / STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category) :

Forest/Natural	silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industry	Other (Specify)
55	12	18	10	3	1	1	0

Local Watershed Erosion (select one) : ☐ None ☐ Slight ☑ Moderate ☐ Heavy
Local Watershed NPS Pollution : ☐ No evidence ☑ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side
Left Bank : +18 Right Bank : +18

High Water Mark: 13 (m) + 3.1 (above present water level) = 15.1 (present depth) (above bed)

Artificially Impounded ☐ Yes ☑ No

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

m/s	0.16 m/s	m/s
0.5 m deep	3.1 m deep	1.5 m deep

Artificially Channelized : ☑ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe

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

SEDIMENT / SUBSTRATE

Sediment Oils ☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☑ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :

Sediment Deposition ☐ Sludge ☐ Other (Specify) :
Sand Smothering : ○ None ◉ Slight ○ Moderate ○ Severe
Silt Smothering : ○ None ○ Slight ◉ Moderate ○ Severe

SUBSTRATE TYPE
Assessment Tool: ☑ SCI ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)	0.5	7	4
Undercut Banks / Roots			
Leaf Packs or Mat			
Aquatic Vegetation	0.1	3	3
Rock or Shell Rubble..	0.6	7	3
Sand.....			
Mud / Muck / Silt		3	
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond. (UMHO/CM)	Salinity (PPT)	SECCHI (M)
Top :							0.7
Mid-Depth :	1.6	23.8	6.78	4.84	166	0.08	☐ VOB
Bottom :							

Water Surface Oils : ☑ None ☐ Sheen ☐ Globs ☐ Slick
Water Odors : ☑ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Other (Specify) :

Water Sample Taken ? ◉ Yes ○ No
Algae Sample Taken ? ◉ Yes ○ No

SYSTEM TYPE ☑ Stream ☐ Lake ☐ Wetland ☐ Estuary ☐ Other (Specify) :

Clarity ○ Clear ○ Slightly Turbid ◉ Turbid ○ Opaque

Color ☑ Tannic ☐ Clear ☐ Green (Algae) ☐ Other (Specify) :

WEATHER CONDITIONS / NOTES :
~80F, sunny, calm.
Minor habitat = silt

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton :	○	○	◉	○
Fish :	○	○	◉	○
Aquatic Macrophytes :	○	◉	○	○
Iron/Sulfur Bacteria :	◉	○	○	○

☑ The antecedent hydrologic conditions have been met to my best knowledge.
Water samples preserved ? ○ Yes ◉ pH<2 ○ No Algae samples preserved ? ☑ Yes ☐ No

SAMPLING TEAM : NED:SP/JG || Tally: JW/TR/JS
SIGNATURE :
DATE : 9/24/2012

Revision Date: September 5, 2008

DEP-SOP-001/01: Form FD 9000-5
STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY): 09/24/12	RECEIVING BODY OF WATER:
REMARKS:	COUNTY: Hamilton	LOCATION: Withlacoochee River	FIELD ID/NAME: PCA Test 1

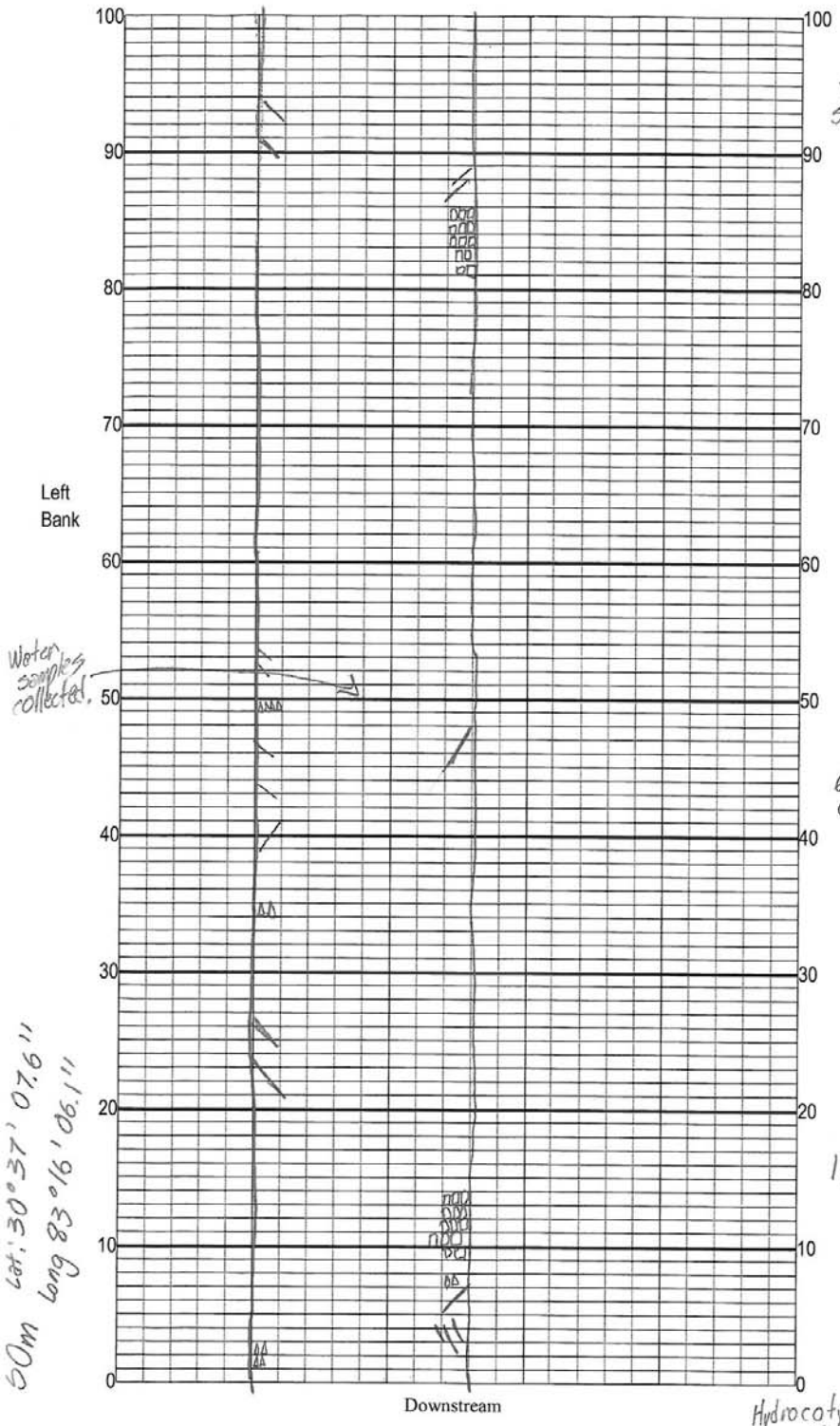
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components: Snag III, Rock III, Veg. III, bottom III Substrate Diversity: 8	Four or more productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 (8) 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability: 1	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 (2) (1)
Water Velocity: 12 0.2 0.16	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 0.25 0.1 15 14 (13) (12) 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering: 11 (no pools but large pool every 480m) Primary Score: 32	Adequate number of pools (1-2 per 12 times width) and <25% of habitats affected by sand or silt accumulation. 20 19 18 17 16	Adequate number of pools (1-2 per 12 times width) and >25% of habitats affected by sand or silt accumulation. 15 14 13 12 (11)	Does not have required number of pools (1-2 per 12 times width) and/or has shallow pools (<2 times prevailing depth). 10 9 8 7 6	Pools are absent. Most habitats affected by sand or silt accumulation. 5 4 3 2 1
Secondary Habitat Components Artificial Channelization: 20	Good sinuosity. No evidence of dredging or artificial straightening. No spoil banks. Diversity of depths. (20) 19 18 17 16	Good sinuosity within old channelized area and a diversity of depths. Evidence of dredging in the past (>10 yrs) but mostly recovered. 15 14 13 12 11	Some sinuosity developed within channelized area or some diversity of depth, but typically no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth. 5 4 3 2 1
Bank Stability: + + − Right Bank: 8 Left Bank: 8	Bankfull > 60% of bank height. Slope of bank ≤ 60°. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank: 10 Left Bank: 10	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank: 9 Left Bank: 9 Secondary Score: 74	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants, trees, understory shrubs, or non-woody macrophytes). Minimal disturbance. 10 (9)	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

106 **TOTAL SCORE**

Date: 09/24/12	Analyst: J. Weger	Signature:

Periphyton

DEP-SOP-001/01 Form FD 9000-4
Stream/River Habitat Sketch Sheet



Location: Test 1 RA Withlacoochee

Date: 09/24/12

Sampler: T. Risk, S. Pilto, J. Weger, J. Gruentzel, J. Sauy

100 m: Lattitude	30.5974
Longitude	-83.2606
0 m: Lattitude	30.6185
Longitude	-83.2684

Substrates: Code key, draw proportionate habitat abundance.	%
Snags	0.5
Roots/undercut banks	
Leaf Packs (or mats)	
Aquatic Macrophytes	0.1
Rock	0.6

none observed Pools — total # observed = 0; # range expected = 21

Average width 40 m

Average depth not measured m >1m

6 seconds 0.166 m/s — Velocity measured at 50 meter mark.

WQ & chemistry taken at 50 meter mark.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed / other notes:

1 block = 5m Total: 4000m²

2.25 m² veg = 0.1%
25 m² rock = 0.6%
20 m² snag = +0.5%
1.2%

Hydrocotyle
Hypericum
Cinnobium
Taxodium
Mikania skandens
Alternanthera philoxeroides

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Revision Date: June 2, 2011

DEP-SOP-001/01: Form FD 9000-3

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SAMPLE ID : _____ ORG ID : _____

COUNTY : Hamilton STORET # : _____

DATE : 09/24/12 TIME : 1115

Latitude : 30.5974 (degrees) (minutes) (seconds) Longitude : -83.3536 (degrees) (minutes) (seconds)

SITE NAME : YSI Test 2 - Withlacoochee River SAMPLE COMPLETE ? Y

FIELD ID/NAME : _____ RECEIVING BODY OF WATER : _____

RIPARIAN ZONE / STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category) :

Forest/Natural	silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industry	Other (Specify)

Local Watershed Erosion (select one) : ☐ None ☐ Slight ☐ Moderate ☐ Heavy

Local Watershed NPS Pollution : ☐ No evidence ☐ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side

Left Bank : >18 Right Bank : >18m

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

Artificially Impounded ☐ Yes ☐ No

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

40 m wide

m/s 0.3 m/s m/s

m deep m deep m deep

Artificially Channelized : ☒ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe

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

SEDIMENT / SUBSTRATE

Sediment Oils ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :

Sediment Deposition ☐ Sludge Sand Smothering : (None) Slight Moderate Severe; Silt Smothering : None Slight (Moderate) Severe ☐ Other (Specify) :

SUBSTRATE TYPE

Assessment Tool : ☒ SCI ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)		7	4
Undercut Banks / Roots			
Leaf Packs or Mat			
Aquatic Vegetation		2	3
Rock or Shell Rubble..		7	3
Sand.....			
Mud / Muck / Silt		4	
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond. (UMHO/CM)	Salinity (PPT)	Secchi (M)
Top :	0.2	23.21	6.90	7.18	163		NA
Mid-Depth :							☐ VOB
Bottom :							

Water Surface Oils : ☒ None ☐ Sheen ☐ Globs ☐ Slick

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

Water Sample Taken ? ☒ Yes ☐ No collected @ 20m

Algae Sample Taken ? ☒ Yes ☐ No

SYSTEM TYPE ☐ Stream ☐ Lake ☐ Wetland ☐ Estuary ☒ Other (Specify) : River

Clarity ☐ Clear ☐ Slightly Turbid ☒ Turbid ☐ Opaque

Color ☒ Tannic ☐ Green (Algae) ☐ Clear ☐ Other (Specify) :

WEATHER CONDITIONS / NOTES :

Warm, sunny

YSI #2 Passed Post-Sampling Verification

☒ The antecedent hydrologic conditions have been met to my best knowledge.

Water samples preserved ? ☒ Yes ☒ pH<2 ☐ No Algae samples preserved ? ☐ Yes ☐ No

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton :	☐	☐	☐	☒
Fish :	☐	☐	☐	☒
Aquatic Macrophytes :	☐	☐	☒	☐
Iron/Sulfur Bacteria :	☒	☐	☐	☐

SAMPLING TEAM : J. Weger, T. Risk, J. Savage SIGNATURE : _____ DATE : 09/24/12

Revision Date: September 5, 2008

DEP-SOP-001/01: Form FD 9000-5
STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY): 09/24/12	RECEIVING BODY OF WATER:
REMARKS:	COUNTY: Hamilton	LOCATION: Withlacoochee River	FIELD ID/NAME: PCA Test 2

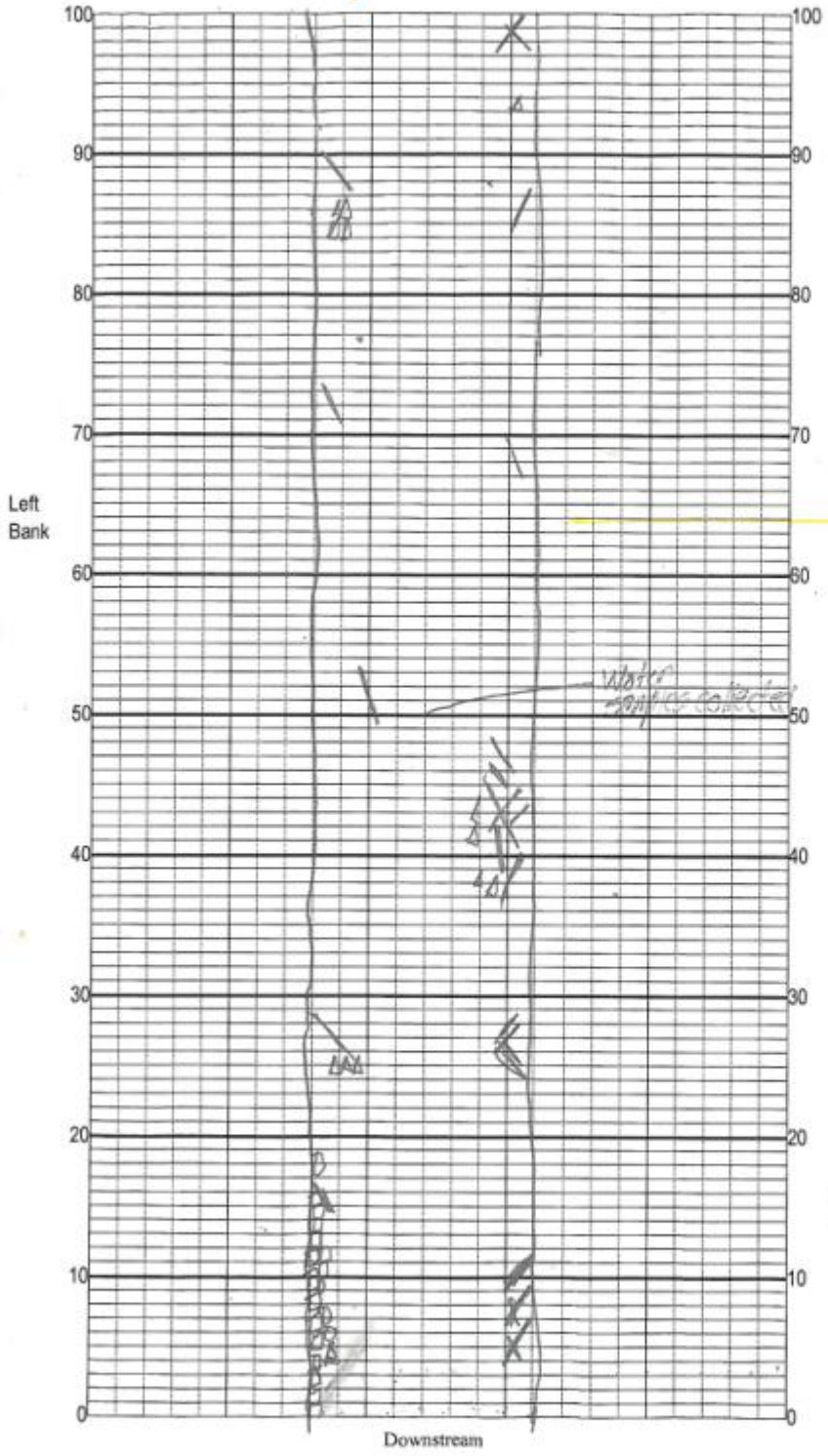
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 8	Four or more productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 (8) 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 1	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 (1)
Water Velocity 18 0.33m/s	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 (18) 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 11 no pools but large riffle velocity 180m Primary Score 38	Adequate number of pools (1-2 per 12 times width) and <25% of habitats affected by sand or silt accumulation. 20 19 18 17 16	Adequate number of pools (1-2 per 12 times width) and >25% of habitats affected by sand or silt accumulation. 15 14 13 12 (11)	Does not have required number of pools (1-2 per 12 times width) and/or has shallow pools (<2 times prevailing depth). 10 9 8 7 6	Pools are absent. Most habitats affected by sand or silt accumulation. 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 20	Good sinuosity. No evidence of dredging or artificial straightening. No spoil banks. Diversity of depths. (20) 19 18 17 16	Good sinuosity within old channelized area and a diversity of depths. Evidence of dredging in the past (>10 yrs) but mostly recovered. 15 14 13 12 11	Some sinuosity developed within channelized area or some diversity of depth, but typically no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth. 5 4 3 2 1
Bank Stability + + − Right Bank 8 Left Bank 8	Bankfull > 60% of bank height. Slope of bank ≤ 60°. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. (8) (7) 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width river access road about 20m from LB Right Bank 10 Left Bank 9	Width of vegetation greater than 18 m (10) 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 75	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants, trees, understory shrubs, or non-woody macrophytes). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

113 **TOTAL SCORE**

Date: 09/24/12	Analyst: J. Weger	Signature: JWeger

Form FD 9000-5 Revision Date: June 6, 2008

DEP-SOP-001/01 Form FD 9000-4
Stream/River Habitat Sketch Sheet



PCA Test 2

Location: W. Withlacoochee River

Date: 09/24/12

Sampler: Risk, Savage, Weger

100 m: Lattitude	30.5978
Longitude	-83.2609
0 m: Lattitude	30.5971
Longitude	-83.2603

Substrates: Code key, draw proportionate habitat abundance.	%
Snags	0.8
Roots/undercut banks	0
Leaf Packs (or mats)	0
Aquatic Macrophytes	0.1
Rock	0.5
Pools — total # observed = 0; # range expected = 4-8	

Average width 40 m
Average depth not measured m >1m

Velocity measured at 50 meter mark.

WQ & chemistry taken at 50 meter mark.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed / other notes:

Total 4000m²

1 square = 5m

2.25m² veg = 0.1%
20m² rock = 0.5%
33m² snag = 0.8%

1.4%

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Revision Date: June 2, 2011

Appendix F.

Acoustic Doppler Current Profiler (ADCP) Flow Measurements

Withlacoochee Area Sampling

Tallahassee staff is assisting the Northeast District staff because of the number of and distance among sampling sites required and the detail of information needed to support permit revision. Water quality and biological sampling is critical to the Department's mission of assessing and protecting Florida's surface waters.

The recent sampling at the Withlacoochee River sites were intended to produce a discharge measurement at a site upstream and one downstream of the PCA Mixing zone. To perform this measurement staff employed the use of an RDI Workhorse, ADCP unit.

Acoustic Doppler Current Profiler (ADCP): An instrument that obtains profiles of water velocity by transmitting sound of known frequency into the water and measuring the Doppler shift of reflections from scatters, which are assumed to be moving passively with water.

The instrument was configured as follows:

Mode 1: General purpose water profiling. This is the most robust profiling mode, designed for the widest variety of measurement applications. Mode 1 can resolve high and can measure over long ranges.

Bottom Mode 7: Similar to bottom mode 5, except that it is optimized for slow moving platforms in very shallow, high backscatter environments.



Upstream Site



Downstream Site

Department of Environmental Protection

ADCP PREDEPLOYMENT TEST

METER#: 115790
MODEL: WORKHORSE ADCP
DATE USED: 09/24/2012
PROJECT: WITHLACOOCHEE / PCA
STATUS: OPERATIONAL
OPERATOR: GEORGE JACKSON
CHECK TYPE (check for post): _____
COMMENTS: _____

```
paq

PRE-DEPLOYMENT TESTS

CPU TESTS:
  RTC.....PASS
  RAM.....PASS
  ROM.....PASS
RECORDER TESTS:
  PC Card #0.....DETECTED
    Card Detect.....PASS
    Communication.....PASS
    DOS Structure.....PASS
    Sector Test (short).....PASS
  PC Card #1.....NOT DETECTED
DSP TESTS:
  Timing RAM.....PASS
  Demod  RAM.....PASS
  Demod  REG.....PASS
  FIFOs.....PASS
SYSTEM TESTS:
  XILINX Interrupts... IRQ3  IRQ3  IRQ3 ...PASS
  Receive Loop-Back.....PASS
  Wide Bandwidth.....PASS
  Narrow Bandwidth.....PASS
  RSSI Filter.....PASS
  Transmit.....PASS
SENSOR TESTS:
  H/W Operation.....PASS
>pt200

  Ambient  Temperature =    23.16 Degrees C
  Attitude Temperature =    23.99 Degrees C
  Internal Moisture    = 8CC9h

Correlation Magnitude: Wide Bandwidth

              Lag  Bm1  Bm2  Bm3  Bm4
                0  255  255  255  255
                1  170  171  174  178
                2   30   33   41   46
                3    6    8    3    4
                4   11   14   17   19
```

ADCP PREDEPLOYMENT TEST

```
                5    9   14   15   20
                6    2    5    4    8
                7    3    4    3    4

  High Gain RSSI:    45   50   54   51
   Low Gain RSSI:    28   32   36   30

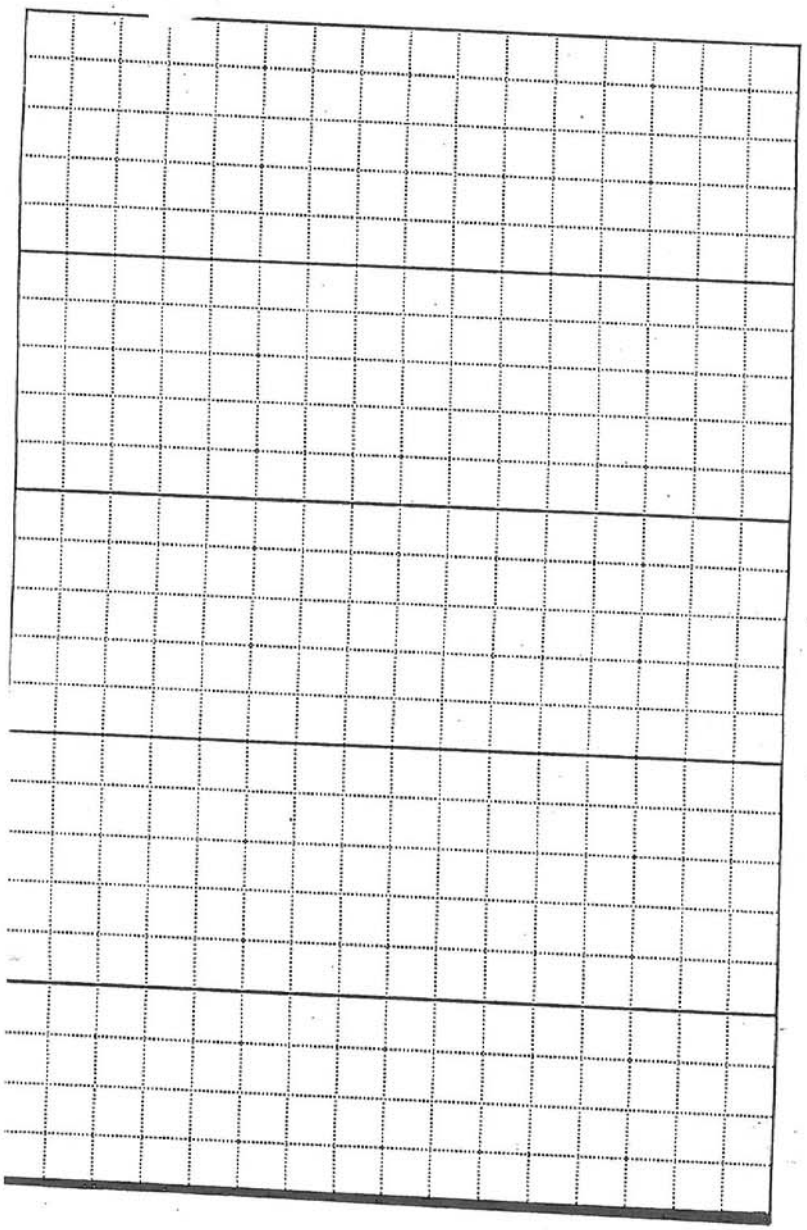
  SIN Duty Cycle:    47   43   42   44
  COS Duty Cycle:    52   51   52   49

Receive Test Results = $00000000 ... PASS

IXMT    =      0.8 Amps rms  [Data=47h]
VXMT    =     46.9 Volts rms [Data=b9h]
   Z    =     57.7 Ohms
Transmit Test Results = $0 ... PASS

    8    8   12    0
   12   12    8    0
   12    8   12    0
   12   19    0    0
  255  255  255  255
    8   12    0    0
   19   19   12    0
  255  255  255  255
   12    8    0    0
    8    8   19    0
    8    8   12    0
  255  255  255  255
Electronics Test Results = $00000000 ... PASS
Receive Bandwidth:
    Sample      bw    bw    bw    bw    bw
      rate  expect   Bm1   Bm2   Bm3   Bm4
      1229     480   428   419   405   389 Khz
   results          PASS  PASS  PASS  PASS
RSSI Time Constant:

RSSI Filter Strobe 1 =   38400 Hz
  time   Bm1   Bm2   Bm3   Bm4
  msec  cnts  cnts  cnts  cnts
     1    14    17    17    16
     2    25    28    29    28
     3    32    36    37    36
     4    37    41    43    42
     5    40    45    46    45
     6    42    47    48    47
     7    44    48    50    49
     8    45    49    51    50
     9    45    50    52    51
    10    46    50    52    51
   nom    47    51    54    52
result    PASS  PASS  PASS  PASS
>
```



U.S. DEPARTMENT OF THE INTERIOR
Geological Survey
WATER RESOURCES DIVISION
ADCP DISCHARGE MEASUREMENT NOTES

Meas. No. _____
Comp. by _____
Ck'd by _____

Sta. No. 1
PCA - UPSTREAM
Date 9/24/12 Party G JACKSON, M KLEIN

G.H. _____ Area _____ Vel. _____ Disch. _____
Firmware Ver. _____ Transect Ver. _____ Water mode _____ Bottom mode 7
ADCP S/N _____ X-ducer Freq. 1200 Boat/motor used 13'/30HP
X-ducer depth .35 Blank Dist. _____ Cell size _____ ADCP set to watch ☐
No. water pings _____ No. bottom pings _____ Index Velocity _____

GAGE READINGS						DATALOGGER DATA
Time		Inside	Outside		Vel.	Downloaded before meas? ☐
						File name?
						DATA OK? ☐
						EDL set for measurement:
						Time _____ Interval _____
						EDL reset:
						Time _____ Interval _____
						EDL set to watch ☐
Weighted Mean						ADCP DATA
Correction						Config. file
Corrected Mean						Diag. Test
						Deployment

Check bar. chain found _____ changed to _____ at _____
Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage.
Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%) based on the following:
Flow _____
Cross section _____
Control _____
Weather _____ Wind spd. _____ Direction _____
Stratification _____
Visual Vel _____ upstr., downstr.
Water Density Conditions:

Time	Temp	Cond	Depth

Gage operating _____ Battery voltage _____ Manometer Pressure Tank _____
HWM _____ outside, in well
Remarks _____

UPSTREAM

Measurement Notes

Left Bank: (Sloping) Vertical Other:_____ Right Bank: (Sloping) Vertical Other:_____

Transect Number	Start Bank	Start Time	Start Distance Ft.	Ending Distance Ft.	Ending Time	Unadjusted Discharge ~~Ft.3/S~~	Remarks
000R	L(R)	1120	10.0	12.0	1123	755.346	TL DEPTH = 8.0'
003R	(L) R	1245	12.0	10.0	1248	709.226	
007R	L (R)	1307	10.0	12.0	1312	733.685	
008R	(L) R	1325	12.0	10.0	1332	719.231	
	L R						
	L R						
	L R						
	L R						
	L R						
	L R						
	L R						
	L R						

Notes:

Computation Notes

Beginning Ensemble number	Beginning Distance added	Ending Ensemble number	Ending Distance added	Discharge Estimated Top	Discharge Measured Middle	Discharge Estimated Bottom	Discharge Estimated Left	Discharge Estimated Right	Discharge Total
				Mean				Mean	

Estimation method: Top _____

Coefficient of variation (%) _____

ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- Upstream
DATE:	09/24/2012
CONFIG. FILE:	**pccaupstr_site.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'24.5 W 083 16'14.5
COLLECTED BY:	George Jackson

FILE NAME	EST. TOP	MEAS. MIDDLE	ESTIMATED			TOTAL
			BOTTOM	LEFT	RIGHT	
PCAAUPSTR_ 000R	238.649	348.561	130.603	15.121	19.388	752.322
PCAAUPSTR_ 003R	176.109	386.631	108.303	15.411	22.772	709.226
PCAAUPSTR_ 007R	215.094	356.710	129.824	11.574	21.687	734.890
PCAAUPSTR_ 008R	187.451	401.387	114.024	-2.638	19.008	719.231
	MEAN	**373.222 [ft3/s]**			**MEAN**	**728.917 [ft3/s]**

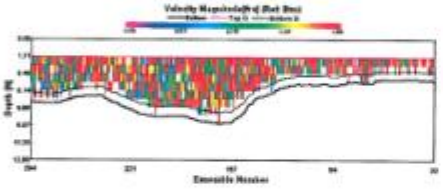
MEAN / RANGE:

ESTIMATION METHOD:

TOP: *POWER*
BOTTOM: *POWER*

ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- Upstream
DATE:	09/24/2012
CONFIG. FILE:	**pccaupstr_site.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'24.5 W 083 16'14.5
COLLECTED BY:	George Jackson

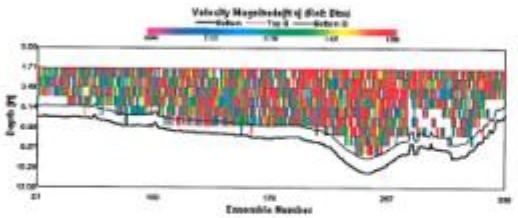


```
File name                          = C:\Program Files\RD
Instruments\ADCP_PCA\Up Stream Site\pccaupstr_site000r.000
Date [yy/mm/dd]                    = 12/09/24
First ensemble time                = 11:19:57
Last ensemble time                 = 11:22:02
First ensemble number              = 30
Last ensemble number               = 284
Number of ensembles                = 255
Distance made good [ft]            = 115.91
Length [ft]                        = 133.76
Transect time [s]                  = 124.40
Max depth [ft]                     = 8.36
Area [ft2]                         = 795.01
River width [ft]                   = 135.91
Average boat speed [ft/s]          = 1.08
Average boat course [deg]          = 54.24
Flow speed [ft/s]                  = 1.00
Flow direction [deg]               = 128.32
Total discharge [ft3/s]            = 752.32
Top discharge [ft3/s]              = 238.65
Measured discharge [ft3/s]         = 348.56
Bottom discharge [ft3/s]           = 130.60
Left shore discharge [ft3/s]       = 15.12
Right shore discharge [ft3/s]      = 19.39
```

```
Begin Shore                    = RIGHT
Left shore distance [ft]       = 10.00
Right shore distance [ft]      = 10.00
Left shore velocity [ft/s]     = 0.68
Right shore velocity [ft/s]    = 1.36
Left shore depth [ft]          = 6.28
Right shore depth [ft]         = 4.03
Left shore area [ft2]          = 31.41
Right shore area [ft2]         = 20.17
WinRiver version               = 10.06.00
Firmware version               = 16.21
Beam angle [deg]               = 20
Bottom mode                    = 7
Water mode                     = 1
Bin size [cm]                  = 25
ADCP transducer depth [ft]     = 0.35
Magnetic variation [deg]       = 0.00
Beam 3 misalignment [deg]      = 0.00
Compass one cycle K            = 0.0000
Compass one cycle offset       = 0.0000
Compass two cycle K            = 0.0000
Compass two cycle offset       = 0.0000
Speed of sound correction type= 0
Projection angle [deg]         = 0.00
Crossectional area type        = 2
Top discharge method           = POWER
Bottom discharge method        = POWER
Power curve coefficient        = 0.1667
Cut top bins                   = 0
Cut bins above sidelobe        = 0
Left area coefficient          = 0.3535
Right area coefficient         = 0.3535
Number of shore pings          = 10
Velocity reference             = BTM
Depth reference                = ADCP
```

ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- Upstream
DATE:	09/24/2012
CONFIG. FILE:	**pccaupstr_site.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'24.5 W 083 16'14.5
COLLECTED BY:	George Jackson

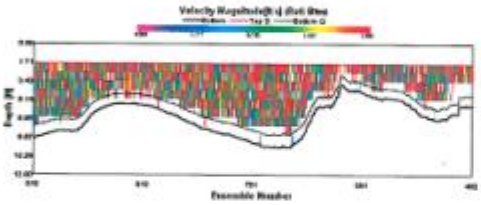


```
File name                          = C:\Program Files\RD
Instruments\ADCP_PCA\Up Stream Site\pccaupstr_site003r.000
Date [yy/mm/dd]                    = 12/09/24
First ensemble time                = 12:45:09
Last ensemble time                 = 12:47:52
First ensemble number              = 21
Last ensemble number               = 336
Number of ensembles                = 316
Distance made good [ft]            = 111.56
Length [ft]                        = 135.01
Transect time [s]                  = 162.59
Max depth [ft]                     = 10.69
Area [ft2]                         = 961.39
River width [ft]                   = 133.56
Average boat speed [ft/s]          = 0.83
Average boat course [deg]          = 229.03
Flow speed [ft/s]                  = 0.74
Flow direction [deg]               = 127.05
Total discharge [ft3/s]            = 709.23
Top discharge [ft3/s]              = 176.11
Measured discharge [ft3/s]         = 386.63
Bottom discharge [ft3/s]           = 108.30
Left shore discharge [ft3/s]       = 15.41
Right shore discharge [ft3/s]      = 22.77
```

```
Begin Shore                     = LEFT
Left shore distance [ft]        = 12.00
Right shore distance [ft]       = 10.00
Left shore velocity [ft/s]      = 0.61
Right shore velocity [ft/s]     = 1.04
Left shore depth [ft]           = 5.95
Right shore depth [ft]          = 6.19
Left shore area [ft2]           = 35.72
Right shore area [ft2]          = 30.95
WinRiver version                = 10.06.00
Firmware version                = 16.21
Beam angle [deg]                = 20
Bottom mode                     = 7
Water mode                      = 1
Bin size [cm]                   = 25
ADCP transducer depth [ft]      = 0.35
Magnetic variation [deg]        = 0.00
Beam 3 misalignment [deg]       = 0.00
Compass one cycle K             = 0.0000
Compass one cycle offset        = 0.0000
Compass two cycle K             = 0.0000
Compass two cycle offset        = 0.0000
Speed of sound correction type= 0
Projection angle [deg]          = 0.00
Crossectional area type         = 2
Top discharge method            = POWER
Bottom discharge method         = POWER
Power curve coefficient         = 0.1667
Cut top bins                    = 0
Cut bins above sidelobe         = 0
Left area coefficient           = 0.3535
Right area coefficient          = 0.3535
Number of shore pings           = 10
Velocity reference              = BTM
Depth reference                 = ADCP
```

ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- Upstream
DATE:	09/24/2012
CONFIG. FILE:	**pccaupstr_site.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'24.5 W 083 16'14.5
COLLECTED BY:	George Jackson

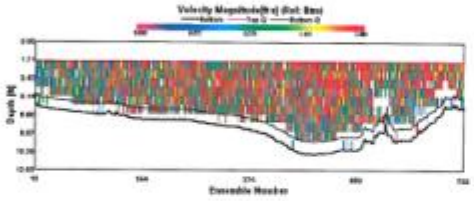


```
File name                          = C:\Program Files\RD
Instruments\ADCP_PCA\Up Stream Site\pccaupstr_site007r.000
Date [yy/mm/dd]                    = 12/09/24
First ensemble time                = 13:07:44
Last ensemble time                 = 13:11:23
First ensemble number              = 482
Last ensemble number               = 919
Number of ensembles                = 438
Distance made good [ft]            = 121.37
Length [ft]                        = 148.42
Transect time [s]                  = 219.28
Max depth [ft]                     = 9.46
Area [ft2]                         = 925.16
River width [ft]                   = 141.12
Average boat speed [ft/s]          = 0.68
Average boat course [deg]          = 60.73
Flow speed [ft/s]                  = 0.89
Flow direction [deg]               = 128.94
Total discharge [ft3/s]            = 734.89
Top discharge [ft3/s]              = 215.09
Measured discharge [ft3/s]         = 356.71
Bottom discharge [ft3/s]           = 129.82
Left shore discharge [ft3/s]       = 11.57
Right shore discharge [ft3/s]      = 21.69
```

```
Begin Shore                    = RIGHT
Left shore distance [ft]       = 10.00
Right shore distance [ft]      = 10.00
Left shore velocity [ft/s]     = 0.39
Right shore velocity [ft/s]    = 1.09
Left shore depth [ft]          = 8.50
Right shore depth [ft]         = 5.62
Left shore area [ft2]          = 42.51
Right shore area [ft2]         = 28.12
WinRiver version               = 10.06.00
Firmware version               = 16.21
Beam angle [deg]               = 20
Bottom mode                    = 7
Water mode                     = 1
Bin size [cm]                  = 25
ADCP transducer depth [ft]     = 0.35
Magnetic variation [deg]       = 0.00
Beam 3 misalignment [deg]      = 0.00
Compass one cycle K            = 0.0000
Compass one cycle offset       = 0.0000
Compass two cycle K            = 0.0000
Compass two cycle offset       = 0.0000
Speed of sound correction type= 0
Projection angle [deg]         = 0.00
Crossectional area type        = 2
Top discharge method           = POWER
Bottom discharge method        = POWER
Power curve coefficient        = 0.1667
Cut top bins                   = 0
Cut bins above sidelobe        = 0
Left area coefficient          = 0.3535
Right area coefficient         = 0.3535
Number of shore pings          = 10
Velocity reference             = BTM
Depth reference                = ADCP
```

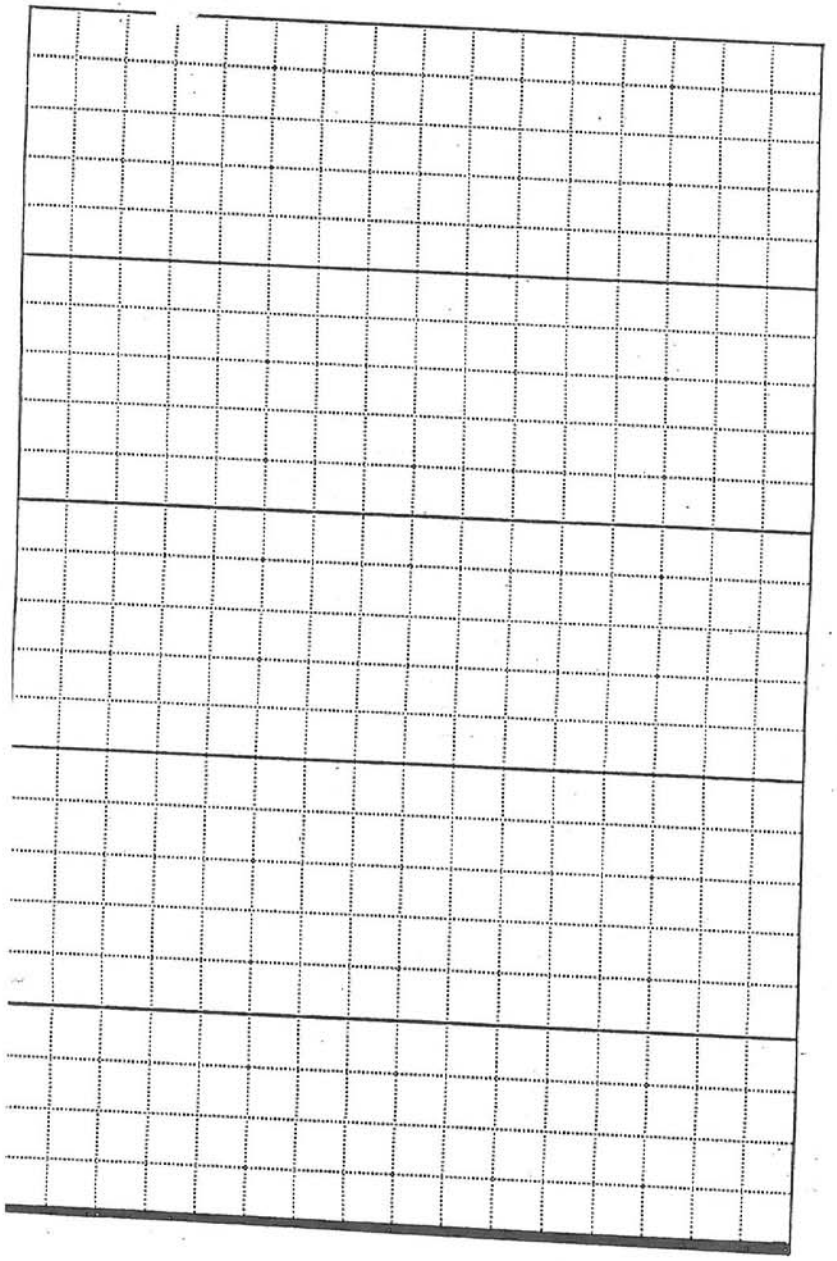
ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- Upstream
DATE:	09/24/2012
CONFIG. FILE:	**pccaupstr_site.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'24.5 W 083 16'14.5
COLLECTED BY:	George Jackson



```
File name                          = C:\Program Files\RD
Instruments\ADCP_PCA\Up Stream Site\pccaupstr_site008r.000
Date [yy/mm/dd]                    = 12/09/24
First ensemble time                = 13:25:38
Last ensemble time                 = 13:31:50
First ensemble number              = 15
Last ensemble number               = 732
Number of ensembles                = 718
Distance made good [ft]            = 112.87
Length [ft]                        = 147.99
Transect time [s]                  = 371.69
Max depth [ft]                     = 10.49
Area [ft2]                         = 960.26
River width [ft]                   = 134.87
Average boat speed [ft/s]          = 0.40
Average boat course [deg]          = 225.80
Flow speed [ft/s]                  = 0.78
Flow direction [deg]               = 129.27
Total discharge [ft3/s]            = 719.23
Top discharge [ft3/s]              = 187.45
Measured discharge [ft3/s]         = 401.39
Bottom discharge [ft3/s]           = 114.02
Left shore discharge [ft3/s]       = -2.64
Right shore discharge [ft3/s]      = 19.01
```

```
Begin Shore                     = LEFT
Left shore distance [ft]        = 12.00
Right shore distance [ft]       = 10.00
Left shore velocity [ft/s]      = -0.11
Right shore velocity [ft/s]     = 0.89
Left shore depth [ft]           = 5.91
Right shore depth [ft]          = 6.07
Left shore area [ft2]           = 35.45
Right shore area [ft2]          = 30.36
WinRiver version                = 10.06.00
Firmware version                = 16.21
Beam angle [deg]                = 20
Bottom mode                     = 7
Water mode                      = 1
Bin size [cm]                   = 25
ADCP transducer depth [ft]      = 0.35
Magnetic variation [deg]        = 0.00
Beam 3 misalignment [deg]       = 0.00
Compass one cycle K             = 0.0000
Compass one cycle offset        = 0.0000
Compass two cycle K             = 0.0000
Compass two cycle offset        = 0.0000
Speed of sound correction type= 0
Projection angle [deg]          = 0.00
Crossectional area type         = 2
Top discharge method            = POWER
Bottom discharge method         = POWER
Power curve coefficient         = 0.1667
Cut top bins                    = 0
Cut bins above sidelobe         = 0
Left area coefficient           = 0.3535
Right area coefficient          = 0.3535
Number of shore pings           = 10
Velocity reference              = BTM
Depth reference                 = ADCP
```



U.S. DEPARTMENT OF THE INTERIOR
Geological Survey
WATER RESOURCES DIVISION
ADCP DISCHARGE MEASUREMENT NOTES

Sta. No. 2 PCA - DS MIXING ZONE
Meas. No. _____
Comp. by _____
Ck'd by _____
Date 01/24/12 Party G JACKSON, M HEIN
G.H. _____ Area _____ Vel. _____ Disch. _____
Firmware Ver. _____ Transect Ver. _____ Water mode 1 Bottom mode 7
ADCP S/N _____ X-ducer Freq. 1200 Boat/motor used 15'/30 HP
X-ducer depth .35 Blank Dist. _____ Cell size _____ ADCP set to watch ☐
No. water pings _____ No. bottom pings _____ Index Velocity _____

GAGE READINGS							DATALOGGER DATA
Time		Inside	Outside			Vel.	Downloaded before meas? ☐
							File name _____
							DATA OK? ☐ _____
							EDL set for measurement:
							Time _____ Interval _____
							EDL reset:
							Time _____ Interval _____
							EDL set to watch ☐
Weighted Mean							ADCP DATA
Correction							Config. file _____
Corrected Mean							Diag. Test _____
							Deployment _____

Check bar. chain found _____ changed to _____ at _____
Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage.
Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%) based on the following:
Flow _____
Cross section _____
Control _____
Weather _____ Wind spd. _____ Direction _____
Stratification _____
Visual Vel _____ upstr., downstr.
Water Density Conditions:

Time	Temp	Cond	Depth

Gage operating _____ Battery voltage _____ Manometer Pressure Tank _____
HWM _____ outside, in well
Remarks _____

DSMX2

MEASUREMENT NOTES

LEFT BANK: (SLOPING) VERTICAL OTHER:_____ RIGHT BANK: (SLOPING) VERTICAL OTHER:_____

Transect Number	Start			Ending		Unadjusted Discharge ~~FT3/S~~	Remarks
	Bank	Time	Distance ~~FT~~	Distance ~~FT~~	Time		
002	L (R)	1514	15.0	3.5	1518	721.840	
004	L (R)	1529	15.0	3.5	1534	715.848	
005	(L) R	1538	3.5	15.0	1543	701.351	
006	L (R)	1548	15.0	3.5	1553	704.622	
	L (R)						
	L R						
	L R						
	L R						
	L R						
	L R						
	L R						
	L R						

Notes:

COMPUTATION NOTES

Beginning		Ending		Discharge					
Ensemble number	Distance added	Ensemble number	Distance added	Estimated Top	Measured Middle	Estimated Bottom	Estimated Left	Estimated Right	Total
				Mean				Mean	

Estimation method: Top _____ Coefficient of variation (%) _____

ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- DS Mxg Zone
DATE:	09/24/2012
CONFIG. FILE:	**dsmxz_pca.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'09.7 W 083 16'06.6
COLLECTED BY:	George Jackson

FILE NAME	EST. TOP	MEAS. MIDDLE	ESTIMATED			TOTAL
			BOTTOM	LEFT	RIGHT	
DSMXZ_PCA_ 002R	171.893	434.683	94.967	7.140	13.156	721.840
DSMXZ_PCA_ 004R	171.245	429.668	98.525	2.281	13.792	715.512
DSMXZ_PCA_ 005R	161.186	421.098	97.653	3.361	19.057	702.356
DSMXZ_PCA_ 006R	164.667	418.258	96.270	7.928	17.498	704.622
	MEAN	**425.927 [ft3/s]**			**MEAN**	**711.082 [ft3/s]**

MEAN / RANGE:

ESTIMATION METHOD:

TOP: *POWER*
BOTTOM: *POWER*

ADCP MEASURMENTS:

LOCATION: Withlacoochee River- DS Mxg Zone

DATE: 09/24/2012

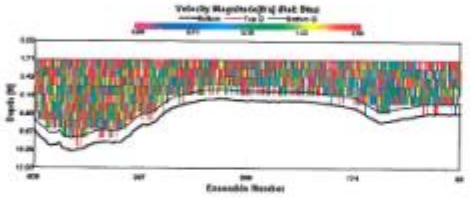
CONFIG. FILE: **dsmxz_pca.wrc**

RIGHT EDGE TYPE: Sloping

LEFT EDGE TYPE: Sloping

NOTES: N 30 37'09.7 W 083 16'06.6

COLLECTED BY: George Jackson

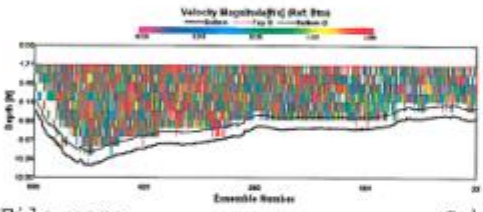


```
File name                          = C:\Program Files\RD
Instruments\ADCP_PCA\DS_mixg zn\dsmxz_pca002r.000
Date [yy/mm/dd]                    = 12/09/24
First ensemble time                = 15:14:14
Last ensemble time                 = 15:17:59
First ensemble number              = 63
Last ensemble number               = 508
Number of ensembles                = 446
Distance made good [ft]            = 116.61
Length [ft]                        = 155.72
Transect time [s]                  = 225.52
Max depth [ft]                     = 10.41
Area [ft2]                         = 1026.88
River width [ft]                   = 135.11
Average boat speed [ft/s]          = 0.69
Average boat course [deg]          = 95.67
Flow speed [ft/s]                  = 0.70
Flow direction [deg]               = 191.22
Total discharge [ft3/s]            = 721.84
Top discharge [ft3/s]              = 171.89
Measured discharge [ft3/s]         = 434.68
Bottom discharge [ft3/s]           = 94.97
Left shore discharge [ft3/s]       = 7.14
Right shore discharge [ft3/s]      = 13.16
Begin Shore                        = RIGHT
Left shore distance [ft]           = 3.50
Right shore distance [ft]          = 15.00
```

```
Left shore velocity [ft/s]     = 0.65
Right shore velocity [ft/s]    = 0.36
Left shore depth [ft]          = 8.85
Right shore depth [ft]         = 6.80
Left shore area [ft2]          = 15.48
Right shore area [ft2]         = 50.98
WinRiver version               = 10.06.00
Firmware version               = 16.21
Beam angle [deg]               = 20
Bottom mode                    = 7
Water mode                     = 1
Bin size [cm]                  = 25
ADCP transducer depth [ft]     = 0.35
Magnetic variation [deg]       = 0.00
Beam 3 misalignment [deg]      = 0.00
Compass one cycle K            = 0.0000
Compass one cycle offset       = 0.0000
Compass two cycle K            = 0.0000
Compass two cycle offset       = 0.0000
Speed of sound correction type= 0
Projection angle [deg]         = 0.00
Crossectional area type        = 2
Top discharge method           = POWER
Bottom discharge method        = POWER
Power curve coefficient        = 0.1667
Cut top bins                   = 0
Cut bins above sidelobe        = 0
Left area coefficient          = 0.3535
Right area coefficient         = 0.3535
Number of shore pings          = 10
Velocity reference             = BTM
Depth reference                = ADCP
```

ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- DS Mxg Zone
DATE:	09/24/2012
CONFIG. FILE:	**dsmxz_pca.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'09.7 W 083 16'06.6
COLLECTED BY:	George Jackson

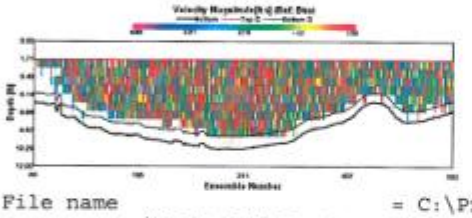


```
File name                          = C:\Program Files\RD
Instruments\ADCP_PCA\DS_mixg zn\dsmxz_pca004r.000
Date [yy/mm/dd]                    = 12/09/24
First ensemble time                = 15:29:27
Last ensemble time                 = 15:34:00
First ensemble number              = 33
Last ensemble number               = 556
Number of ensembles                = 524
Distance made good [ft]            = 121.70
Length [ft]                        = 156.99
Transect time [s]                  = 272.92
Max depth [ft]                     = 10.93
Area [ft2]                         = 1093.30
River width [ft]                   = 140.20
Average boat speed [ft/s]          = 0.58
Average boat course [deg]          = 101.55
Flow speed [ft/s]                  = 0.65
Flow direction [deg]               = 191.47
Total discharge [ft3/s]            = 715.51
Top discharge [ft3/s]              = 171.25
Measured discharge [ft3/s]         = 429.67
Bottom discharge [ft3/s]           = 98.53
Left shore discharge [ft3/s]       = 2.28
Right shore discharge [ft3/s]      = 13.79
Begin Shore                        = RIGHT
Left shore distance [ft]           = 3.50
Right shore distance [ft]          = 15.00
```

```
Left shore velocity [ft/s]     = 0.29
Right shore velocity [ft/s]    = 0.39
Left shore depth [ft]          = 6.34
Right shore depth [ft]         = 6.61
Left shore area [ft2]          = 11.09
Right shore area [ft2]         = 49.54
WinRiver version               = 10.06.00
Firmware version               = 16.21
Beam angle [deg]               = 20
Bottom mode                    = 7
Water mode                     = 1
Bin size [cm]                  = 25
ADCP transducer depth [ft]     = 0.35
Magnetic variation [deg]       = 0.00
Beam 3 misalignment [deg]      = 0.00
Compass one cycle K            = 0.0000
Compass one cycle offset       = 0.0000
Compass two cycle K            = 0.0000
Compass two cycle offset       = 0.0000
Speed of sound correction type= 0
Projection angle [deg]         = 0.00
Crossectional area type        = 2
Top discharge method           = POWER
Bottom discharge method        = POWER
Power curve coefficient        = 0.1667
Cut top bins                   = 0
Cut bins above sidelobe        = 0
Left area coefficient          = 0.3535
Right area coefficient         = 0.3535
Number of shore pings          = 10
Velocity reference             = BTM
Depth reference                = ADCP
```

ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- DS Mxg Zone
DATE:	09/24/2012
CONFIG. FILE:	**dsmxz_pca.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'09.7 W 083 16'06.6
COLLECTED BY:	George Jackson

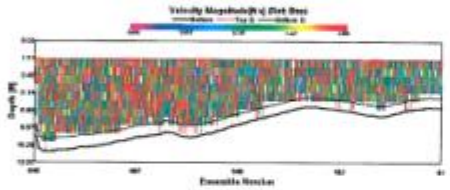


```
File name                          = C:\Program Files\RD
Instruments\ADCP_PCA\DS_mixg zn\dsmxz_pca005r.000
Date [yy/mm/dd]                    = 12/09/24
First ensemble time                = 15:38:20
Last ensemble time                 = 15:42:43
First ensemble number              = 60
Last ensemble number               = 562
Number of ensembles                = 503
Distance made good [ft]            = 121.83
Length [ft]                        = 138.35
Transect time [s]                  = 263.39
Max depth [ft]                     = 10.36
Area [ft2]                         = 1086.96
River width [ft]                   = 140.33
Average boat speed [ft/s]          = 0.53
Average boat course [deg]          = 276.12
Flow speed [ft/s]                  = 0.71
Flow direction [deg]               = 197.35
Total discharge [ft3/s]            = 702.36
Top discharge [ft3/s]              = 161.19
Measured discharge [ft3/s]         = 421.10
Bottom discharge [ft3/s]           = 97.65
Left shore discharge [ft3/s]       = 3.36
Right shore discharge [ft3/s]      = 19.06
Begin Shore                        = LEFT
Left shore distance [ft]           = 3.50
Right shore distance [ft]          = 15.00
```

```
Left shore velocity [ft/s]     = 0.46
Right shore velocity [ft/s]    = 0.53
Left shore depth [ft]          = 5.92
Right shore depth [ft]         = 6.73
Left shore area [ft2]          = 10.36
Right shore area [ft2]         = 50.51
WinRiver version               = 10.06.00
Firmware version               = 16.21
Beam angle [deg]               = 20
Bottom mode                    = 7
Water mode                     = 1
Bin size [cm]                  = 25
ADCP transducer depth [ft]     = 0.35
Magnetic variation [deg]       = 0.00
Beam 3 misalignment [deg]      = 0.00
Compass one cycle K            = 0.0000
Compass one cycle offset       = 0.0000
Compass two cycle K            = 0.0000
Compass two cycle offset       = 0.0000
Speed of sound correction type= 0
Projection angle [deg]         = 0.00
Crossectional area type        = 2
Top discharge method           = POWER
Bottom discharge method        = POWER
Power curve coefficient        = 0.1667
Cut top bins                   = 0
Cut bins above sidelobe        = 0
Left area coefficient          = 0.3535
Right area coefficient         = 0.3535
Number of shore pings          = 10
Velocity reference             = BTM
Depth reference                = ADCP
```

ADCP MEASURMENTS:

LOCATION:	Withlacoochee River- DS Mxg Zone
DATE:	09/24/2012
CONFIG. FILE:	**dsmxz_pca.wrc**
RIGHT EDGE TYPE:	Sloping
LEFT EDGE TYPE:	Sloping
NOTES:	N 30 37'09.7 W 083 16'06.6
COLLECTED BY:	George Jackson



```
File name                          = C:\Program Files\RD
Instruments\ADCP_PCA\DS_mixg zn\dsmxz_pca006r.000
Date [yy/mm/dd]                    = 12/09/24
First ensemble time                = 15:47:52
Last ensemble time                 = 15:53:11
First ensemble number              = 41
Last ensemble number               = 649
Number of ensembles                = 609
Distance made good [ft]            = 121.22
Length [ft]                        = 140.45
Transect time [s]                  = 318.86
Max depth [ft]                     = 10.94
Area [ft2]                         = 1109.16
River width [ft]                   = 139.72
Average boat speed [ft/s]          = 0.44
Average boat course [deg]          = 113.45
Flow speed [ft/s]                  = 0.69
Flow direction [deg]               = 191.80
Total discharge [ft3/s]            = 704.62
Top discharge [ft3/s]              = 164.67
Measured discharge [ft3/s]         = 418.26
Bottom discharge [ft3/s]           = 96.27
Left shore discharge [ft3/s]       = 7.93
Right shore discharge [ft3/s]      = 17.50
```

Begin Shore	= RIGHT
Left shore distance [ft]	= 3.50
Right shore distance [ft]	= 15.00
Left shore velocity [ft/s]	= 0.64
Right shore velocity [ft/s]	= 0.51
Left shore depth [ft]	= 9.96
Right shore depth [ft]	= 6.53
Left shore area [ft2]	= 17.43
Right shore area [ft2]	= 48.98
WinRiver version	= 10.06.00
Firmware version	= 16.21
Beam angle [deg]	= 20
Bottom mode	= 7
Water mode	= 1
Bin size [cm]	= 25
ADCP transducer depth [ft]	= 0.35
Magnetic variation [deg]	= 0.00
Beam 3 misalignment [deg]	= 0.00
Compass one cycle K	= 0.0000
Compass one cycle offset	= 0.0000
Compass two cycle K	= 0.0000
Compass two cycle offset	= 0.0000
Speed of sound correction type	= 0
Projection angle [deg]	= 0.00
Crossectional area type	= 2
Top discharge method	= POWER
Bottom discharge method	= POWER
Power curve coefficient	= 0.1667
Cut top bins	= 0
Cut bins above sidelobe	= 0
Left area coefficient	= 0.3535
Right area coefficient	= 0.3535
Number of shore pings	= 10
Velocity reference	= BTM
Depth reference	= ADCP

Appendix G
Chemical analysis of effluent and receiving water

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 14:00	Effluent	AGP/LN	Algal Growth Potential	27		mg DryWt/L	0.3	0.9
9/24/2012 11:23	Effluent	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	4.3	A	mg/L	0.2	2
9/24/2012 14:00	Effluent	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	51		ug/L	0.65	2
9/24/2012 14:00	Effluent	Chlorophyll/Grain Size/BOD	Phaeophytin-a	9.4		ug/L	0.47	1.4
9/24/2012 14:00	Effluent	Field Parameter	Dissolved Oxygen	8.01		mg/L		
9/24/2012 14:00	Effluent	Field Parameter	pH	7.79				
9/24/2012 14:00	Effluent	Field Parameter	Sample Depth	0.3		m		
9/24/2012 14:00	Effluent	Field Parameter	Specific Conductance	2035		umhos/cm		
9/24/2012 14:00	Effluent	Field Parameter	Temperature	27.6		C		
9/24/2012 14:00	Effluent	Metals	Aluminum	412		ug/L	5	20
9/24/2012 14:00	Effluent	Metals	Arsenic	0.42	I	ug/L	0.25	1
9/24/2012 14:00	Effluent	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Metals	Calcium	50.8		mg/L	0.075	0.3
9/24/2012 14:00	Effluent	Metals	Chromium	0.97	I	ug/L	0.3	1.2
9/24/2012 14:00	Effluent	Metals	Copper	0.5	U	ug/L	0.5	1
9/24/2012 14:00	Effluent	Metals	Hardness	224		mg/L	0.4	1.6
9/24/2012 14:00	Effluent	Metals	Iron	110	I	ug/L	30	120
9/24/2012 14:00	Effluent	Metals	Lead	0.24	I	ug/L	0.2	0.8
9/24/2012 14:00	Effluent	Metals	Magnesium	23.5		mg/L	0.04	0.16
9/24/2012 14:00	Effluent	Metals	Nickel	0.54	I	ug/L	0.25	1
9/24/2012 14:00	Effluent	Metals	Selenium	0.2	U	ug/L	0.2	0.8
9/24/2012 14:00	Effluent	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/24/2012 14:00	Effluent	Metals	Sodium	400		mg/L	2.5	10
9/24/2012 14:00	Effluent	Metals	Zinc	5	U	ug/L	5	20
9/24/2012 14:00	Effluent	Nutrients	Alkalinity	351		mg CaCO3/L	0.65	2.5
9/24/2012 14:00	Effluent	Nutrients	Ammonia-N	0.61		mg N/L	0.01	0.02
9/24/2012 14:00	Effluent	Nutrients	Chloride	25		mg Cl/L	2	5
9/24/2012 14:00	Effluent	Nutrients	Color (true)	230	A	PCU	7.5	18
9/24/2012 14:00	Effluent	Nutrients	Fluoride	0.21		mg F/L	0.035	0.1
9/24/2012 14:00	Effluent	Nutrients	Kjeldahl Nitrogen	2.3		mg N/L	0.08	0.2
9/24/2012 14:00	Effluent	Nutrients	NO2NO3-N	0.12		mg N/L	0.004	0.01
9/24/2012 14:00	Effluent	Nutrients	O-Phosphate-P	0.37		mg P/L	0.02	0.05
9/24/2012 14:00	Effluent	Nutrients	Organic Carbon	21		mg C/L	0.4	0.8
9/24/2012 14:00	Effluent	Nutrients	Sulfate	650		mg SO4/L	2	5

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 14:00	Effluent	Nutrients	Total-P	0.66		mg P/L	0.02	0.05
9/24/2012 11:23	Effluent	Nutrients	TSS	5	I	mg/L	2	10
9/24/2012 14:00	Effluent	Nutrients	Turbidity	12		NTU	0.1	0.1
9/24/2012 14:00	Effluent	Overflow	Oil and Grease	0.79	U	mg/L	0.79	2.8
9/24/2012 14:00	Effluent	Pesticides	Alachlor	0.3	U	ug/L	0.3	1.2
9/24/2012 14:00	Effluent	Pesticides	Ametryn	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Atrazine	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Azinphos Methyl	0.1	U	ug/L	0.1	0.4
9/24/2012 14:00	Effluent	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.8
9/24/2012 14:00	Effluent	Pesticides	Butylate	0.1	U	ug/L	0.1	0.4
9/24/2012 14:00	Effluent	Pesticides	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Chlorpyrifos Methyl	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Diazinon	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Ethion	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Ethoprop	0.025	U	ug/L	0.025	0.1
9/24/2012 14:00	Effluent	Pesticides	Fenamiphos	0.15	U	ug/L	0.15	0.6
9/24/2012 14:00	Effluent	Pesticides	Fonofos	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Hexazinone	0.15	U	ug/L	0.15	0.6
9/24/2012 14:00	Effluent	Pesticides	Malathion	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Metalaxyl	0.2	U	ug/L	0.2	0.8
9/24/2012 14:00	Effluent	Pesticides	Metolachlor	0.3	U	ug/L	0.3	1.2
9/24/2012 14:00	Effluent	Pesticides	Metribuzin	0.1	U	ug/L	0.1	0.4
9/24/2012 14:00	Effluent	Pesticides	Mevinphos	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Naled	0.2	U	ug/L	0.2	0.8
9/24/2012 14:00	Effluent	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.6
9/24/2012 14:00	Effluent	Pesticides	Parathion Ethyl	0.1	U	ug/L	0.1	0.4
9/24/2012 14:00	Effluent	Pesticides	Parathion Methyl	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Pesticides	Phorate	0.025	U	ug/L	0.025	0.1
9/24/2012 14:00	Effluent	Pesticides	Prometryn	0.1	U	ug/L	0.1	0.4
9/24/2012 14:00	Effluent	Pesticides	Simazine	0.05	U	ug/L	0.05	0.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	1,2,4-Trichlorobenzene	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2,4,6-Trichlorophenol	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2,4-Dichlorophenol	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2,4-Dimethylphenol	10	U	ug/L	10	42
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2,4-Dinitrophenol	16	U	ug/L	16	62
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2,4-Dinitrotoluene	1	U	ug/L	1	4.2

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2,6-Dinitrotoluene	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2-Chloronaphthalene	1	UJ	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2-Chlorophenol	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3.1	UJ	ug/L	3.1	12
9/24/2012 14:00	Effluent	Priority Organic Pollutants	2-Nitrophenol	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	3,3'-Dichlorobenzidine	42	U	ug/L	42	170
9/24/2012 14:00	Effluent	Priority Organic Pollutants	4-Bromophenyl phenyl ether	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	4-Chloro-3-methylphenol	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2.1	U	ug/L	2.1	8.3
9/24/2012 14:00	Effluent	Priority Organic Pollutants	4-Nitrophenol	16	U	ug/L	16	62
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Acenaphthene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Acenaphthylene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Anthracene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Benzidine	100	UJ	ug/L	100	420
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Benzo(a)anthracene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Benzo(a)pyrene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Benzo(b)fluoranthene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Benzo(k)fluoranthene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Bis(2-chloroethyl)ether	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3.1	U	ug/L	3.1	12
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	16	U	ug/L	16	62
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Butyl benzyl phthalate	5.2	U	ug/L	5.2	21
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Chrysene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Diethyl phthalate	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Dimethyl phthalate	10	U	ug/L	10	42
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Di-n-butyl phthalate	5.2	U	ug/L	5.2	21
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Di-n-octyl phthalate	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Fluoranthene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Fluorene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Hexachlorobenzene	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Hexachlorobutadiene	3.1	U	ug/L	3.1	12
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Hexachlorocyclopentadiene	3.1	U	ug/L	3.1	12
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Hexachloroethane	3.1	U	ug/L	3.1	12

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Isophorone	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Naphthalene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Nitrobenzene	2.1	U	ug/L	2.1	8.3
9/24/2012 14:00	Effluent	Priority Organic Pollutants	N-Nitrosodimethylamine	2.1	U	ug/L	2.1	8.3
9/24/2012 14:00	Effluent	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2.1	U	ug/L	2.1	8.3
9/24/2012 14:00	Effluent	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3.1	U	ug/L	3.1	12
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Pentachlorophenol	3.1	UJ	ug/L	3.1	12
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Phenanthrene	0.21	U	ug/L	0.21	0.83
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Phenol	1	U	ug/L	1	4.2
9/24/2012 14:00	Effluent	Priority Organic Pollutants	Pyrene	0.21	U	ug/L	0.21	0.83
9/24/2012 10:00	Control Site	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1	I	mg/L	0.2	2
9/24/2012 10:00	Control Site	Field Parameter	Dissolved Oxygen	4.93		mg/L		
9/24/2012 10:00	Control Site	Field Parameter	pH	6.72				
9/24/2012 10:00	Control Site	Field Parameter	Sample Depth	1		m		
9/24/2012 10:00	Control Site	Field Parameter	Specific Conductance	106		umhos/cm		
9/24/2012 10:00	Control Site	Field Parameter	Temperature	23.08		C		
9/24/2012 10:00	Control Site	Metals	Aluminum	666		ug/L	5	20
9/24/2012 10:00	Control Site	Metals	Arsenic	1.03		ug/L	0.25	1
9/24/2012 10:00	Control Site	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
9/24/2012 10:00	Control Site	Metals	Calcium	13.3		mg/L	0.075	0.3
9/24/2012 10:00	Control Site	Metals	Chromium	1.2		ug/L	0.3	1.2
9/24/2012 10:00	Control Site	Metals	Copper	1.16		ug/L	0.5	1
9/24/2012 10:00	Control Site	Metals	Hardness	44.2		mg/L	0.4	1.6
9/24/2012 10:00	Control Site	Metals	Iron	1190		ug/L	30	120
9/24/2012 10:00	Control Site	Metals	Lead	0.95		ug/L	0.2	0.8
9/24/2012 10:00	Control Site	Metals	Magnesium	2.67		mg/L	0.04	0.16
9/24/2012 10:00	Control Site	Metals	Nickel	0.69	I	ug/L	0.25	1
9/24/2012 10:00	Control Site	Metals	Selenium	0.21	I	ug/L	0.2	0.8
9/24/2012 10:00	Control Site	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/24/2012 10:00	Control Site	Metals	Sodium	4.3		mg/L	0.5	2
9/24/2012 10:00	Control Site	Metals	Zinc	10	I	ug/L	5	20
9/24/2012 10:00	Control Site	Nutrients	Alkalinity	32		mg CaCO3/L	0.65	2.5
9/24/2012 10:00	Control Site	Nutrients	Ammonia-N	0.028		mg N/L	0.01	0.02
9/24/2012 10:00	Control Site	Nutrients	Chloride	7.7		mg Cl/L	0.2	0.5
9/24/2012 10:00	Control Site	Nutrients	Color (true)	190		PCU	7.5	18

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 10:00	Control Site	Nutrients	Fluoride	0.1		mg F/L	0.035	0.1
9/24/2012 10:00	Control Site	Nutrients	Kjeldahl Nitrogen	0.82		mg N/L	0.08	0.2
9/24/2012 10:00	Control Site	Nutrients	NO2NO3-N	0.33		mg N/L	0.004	0.01
9/24/2012 10:00	Control Site	Nutrients	O-Phosphate-P	0.07		mg P/L	0.004	0.01
9/24/2012 10:00	Control Site	Nutrients	Organic Carbon	18		mg C/L	0.4	0.8
9/24/2012 10:00	Control Site	Nutrients	Sulfate	4.7		mg SO4/L	0.2	0.5
9/24/2012 10:00	Control Site	Nutrients	Total-P	0.13		mg P/L	0.004	0.01
9/24/2012 10:00	Control Site	Nutrients	TSS	7	I	mg/L	2	10
9/24/2012 10:00	Control Site	Nutrients	Turbidity	12		NTU	0.1	0.1
9/24/2012 14:50	Test Site 1	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.81	I	mg/L	0.2	2
9/24/2012 14:50	Test Site 1	Field Parameter	Dissolved Oxygen	4.84		mg/L		
9/24/2012 14:50	Test Site 1	Field Parameter	pH	6.78				
9/24/2012 14:50	Test Site 1	Field Parameter	Sample Depth	1.6		m		
9/24/2012 14:50	Test Site 1	Field Parameter	Specific Conductance	166		umhos/cm		
9/24/2012 14:50	Test Site 1	Field Parameter	Temperature	23.8		C		
9/24/2012 14:50	Test Site 1	Metals	Aluminum	679		ug/L	5	20
9/24/2012 14:50	Test Site 1	Metals	Arsenic	1.03		ug/L	0.25	1
9/24/2012 14:50	Test Site 1	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
9/24/2012 14:50	Test Site 1	Metals	Calcium	15		mg/L	0.075	0.3
9/24/2012 14:50	Test Site 1	Metals	Chromium	1.3		ug/L	0.3	1.2
9/24/2012 14:50	Test Site 1	Metals	Copper	1.13		ug/L	0.5	1
9/24/2012 14:50	Test Site 1	Metals	Hardness	51		mg/L	0.4	1.6
9/24/2012 14:50	Test Site 1	Metals	Iron	1260		ug/L	30	120
9/24/2012 14:50	Test Site 1	Metals	Lead	0.96		ug/L	0.2	0.8
9/24/2012 14:50	Test Site 1	Metals	Magnesium	3.29		mg/L	0.04	0.16
9/24/2012 14:50	Test Site 1	Metals	Nickel	0.67	I	ug/L	0.25	1
9/24/2012 14:50	Test Site 1	Metals	Selenium	0.23	I	ug/L	0.2	0.8
9/24/2012 14:50	Test Site 1	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/24/2012 14:50	Test Site 1	Metals	Sodium	13.3		mg/L	0.5	2
9/24/2012 14:50	Test Site 1	Metals	Zinc	8.8	I	ug/L	5	20
9/24/2012 14:50	Test Site 1	Nutrients	Alkalinity	39		mg CaCO3/L	0.65	2.5
9/24/2012 14:50	Test Site 1	Nutrients	Ammonia-N	0.034		mg N/L	0.01	0.02
9/24/2012 14:50	Test Site 1	Nutrients	Chloride	8.2		mg Cl/L	0.2	0.5
9/24/2012 14:50	Test Site 1	Nutrients	Color (true)	190		PCU	7.5	18
9/24/2012 14:50	Test Site 1	Nutrients	Fluoride	0.11		mg F/L	0.035	0.1
9/24/2012 14:50	Test Site 1	Nutrients	Kjeldahl Nitrogen	0.83		mg N/L	0.08	0.2

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 14:50	Test Site 1	Nutrients	NO2NO3-N	0.34		mg N/L	0.004	0.01
9/24/2012 14:50	Test Site 1	Nutrients	O-Phosphate-P	0.078		mg P/L	0.004	0.01
9/24/2012 14:50	Test Site 1	Nutrients	Organic Carbon	18		mg C/L	0.4	0.8
9/24/2012 14:50	Test Site 1	Nutrients	Sulfate	19		mg SO4/L	0.2	0.5
9/24/2012 14:50	Test Site 1	Nutrients	Total-P	0.14		mg P/L	0.004	0.01
9/24/2012 14:50	Test Site 1	Nutrients	TSS	6	I	mg/L	2	10
9/24/2012 14:50	Test Site 1	Nutrients	Turbidity	10	A	NTU	0.1	0.1
9/24/2012 11:15	Test Site 2	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.63	I	mg/L	0.2	2
9/24/2012 11:15	Test Site 2	Field Parameter	Dissolved Oxygen	7.18		mg/L		
9/24/2012 11:15	Test Site 2	Field Parameter	pH	6.8				
9/24/2012 11:15	Test Site 2	Field Parameter	Sample Depth	0.2		m		
9/24/2012 11:15	Test Site 2	Field Parameter	Specific Conductance	163		umhos/cm		
9/24/2012 11:15	Test Site 2	Field Parameter	Temperature	23.21		C		
9/24/2012 11:15	Test Site 2	Metals	Aluminum	660		ug/L	5	20
9/24/2012 11:15	Test Site 2	Metals	Arsenic	0.99	I	ug/L	0.25	1
9/24/2012 11:15	Test Site 2	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
9/24/2012 11:15	Test Site 2	Metals	Calcium	14.4		mg/L	0.075	0.3
9/24/2012 11:15	Test Site 2	Metals	Chromium	1.2		ug/L	0.3	1.2
9/24/2012 11:15	Test Site 2	Metals	Copper	1.11		ug/L	0.5	1
9/24/2012 11:15	Test Site 2	Metals	Hardness	48.9		mg/L	0.4	1.6
9/24/2012 11:15	Test Site 2	Metals	Iron	1170		ug/L	30	120
9/24/2012 11:15	Test Site 2	Metals	Lead	0.92		ug/L	0.2	0.8
9/24/2012 11:15	Test Site 2	Metals	Magnesium	3.18		mg/L	0.04	0.16
9/24/2012 11:15	Test Site 2	Metals	Nickel	0.71	I	ug/L	0.25	1
9/24/2012 11:15	Test Site 2	Metals	Selenium	0.21	I	ug/L	0.2	0.8
9/24/2012 11:15	Test Site 2	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/24/2012 11:15	Test Site 2	Metals	Sodium	14		mg/L	0.5	2
9/24/2012 11:15	Test Site 2	Metals	Zinc	5	U	ug/L	5	20
9/24/2012 11:15	Test Site 2	Nutrients	Alkalinity	38		mg CaCO3/L	0.65	2.5
9/24/2012 11:15	Test Site 2	Nutrients	Ammonia-N	0.038		mg N/L	0.01	0.02
9/24/2012 11:15	Test Site 2	Nutrients	Chloride	8		mg Cl/L	0.2	0.5
9/24/2012 11:15	Test Site 2	Nutrients	Color (true)	200		PCU	7.5	18
9/24/2012 11:15	Test Site 2	Nutrients	Fluoride	0.11		mg F/L	0.035	0.1
9/24/2012 11:15	Test Site 2	Nutrients	Kjeldahl Nitrogen	0.84		mg N/L	0.08	0.2
9/24/2012 11:15	Test Site 2	Nutrients	NO2NO3-N	0.32		mg N/L	0.004	0.01
9/24/2012 11:15	Test Site 2	Nutrients	O-Phosphate-P	0.089		mg P/L	0.004	0.01

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 11:15	Test Site 2	Nutrients	Organic Carbon	18		mg C/L	0.4	0.8
9/24/2012 11:15	Test Site 2	Nutrients	Sulfate	20		mg SO4/L	0.2	0.5
9/24/2012 11:15	Test Site 2	Nutrients	Total-P	0.15		mg P/L	0.004	0.01
9/24/2012 11:15	Test Site 2	Nutrients	TSS	4	I	mg/L	2	10
9/24/2012 11:15	Test Site 2	Nutrients	Turbidity	9.1		NTU	0.1	0.1
9/24/2012 11:15	Test Site 2	Overflow	Oil and Grease	0.75	U	mg/L	0.75	2.7
9/24/2012 13:35	Equipment Blank	Metals	Aluminum	5	U	ug/L	5	20
9/24/2012 13:35	Equipment Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
9/24/2012 13:35	Equipment Blank	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
9/24/2012 13:35	Equipment Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
9/24/2012 13:35	Equipment Blank	Metals	Copper	0.5	U	ug/L	0.5	1
9/24/2012 13:35	Equipment Blank	Metals	Hardness	0.4	U	mg/L	0.4	1.6
9/24/2012 13:35	Equipment Blank	Metals	Iron	30	U	ug/L	30	120
9/24/2012 13:35	Equipment Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
9/24/2012 13:35	Equipment Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
9/24/2012 13:35	Equipment Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
9/24/2012 13:35	Equipment Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
9/24/2012 13:35	Equipment Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/24/2012 13:35	Equipment Blank	Metals	Sodium	0.5	U	mg/L	0.5	2
9/24/2012 13:35	Equipment Blank	Metals	Zinc	5	U	ug/L	5	20
9/24/2012 13:35	Equipment Blank	Nutrients	Alkalinity	0.65	U	mg CaCO3/L	0.65	2.5
9/24/2012 13:35	Equipment Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
9/24/2012 13:35	Equipment Blank	Nutrients	Chloride	0.2	U	mg Cl/L	0.2	0.5
9/24/2012 13:35	Equipment Blank	Nutrients	Color (true)	2.5	U	PCU	2.5	6
9/24/2012 13:35	Equipment Blank	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
9/24/2012 13:35	Equipment Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
9/24/2012 13:35	Equipment Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
9/24/2012 13:35	Equipment Blank	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
9/24/2012 13:35	Equipment Blank	Nutrients	Organic Carbon	0.4	U	mg C/L	0.4	0.8
9/24/2012 13:35	Equipment Blank	Nutrients	Sulfate	0.2	U	mg SO4/L	0.2	0.5
9/24/2012 13:35	Equipment Blank	Nutrients	Total-P	0.002	U	mg P/L	0.002	0.005
9/24/2012 13:35	Equipment Blank	Nutrients	TSS	2	U	mg/L	2	10
9/24/2012 13:35	Equipment Blank	Nutrients	TSS	2	U	mg/L	2	10
9/24/2012 13:35	Equipment Blank	Nutrients	Turbidity	0.1	U	NTU	0.1	0.1
9/24/2012 13:35	Equipment Blank	Overflow	Oil and Grease	0.79	U	mg/L	0.79	2.8

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 13:35	Equipment Blank	Pesticides	Alachlor	0.3	U	ug/L	0.3	1.2
9/24/2012 13:35	Equipment Blank	Pesticides	Ametryn	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Atrazine	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Azinphos Methyl	0.099	U	ug/L	0.099	0.4
9/24/2012 13:35	Equipment Blank	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.79
9/24/2012 13:35	Equipment Blank	Pesticides	Butylate	0.099	U	ug/L	0.099	0.4
9/24/2012 13:35	Equipment Blank	Pesticides	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Chlorpyrifos Methyl	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Diazinon	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Ethion	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Ethoprop	0.025	U	ug/L	0.025	0.099
9/24/2012 13:35	Equipment Blank	Pesticides	Fenamiphos	0.15	U	ug/L	0.15	0.59
9/24/2012 13:35	Equipment Blank	Pesticides	Fonofos	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Hexazinone	0.15	U	ug/L	0.15	0.59
9/24/2012 13:35	Equipment Blank	Pesticides	Malathion	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Metalaxyl	0.2	U	ug/L	0.2	0.79
9/24/2012 13:35	Equipment Blank	Pesticides	Metolachlor	0.3	U	ug/L	0.3	1.2
9/24/2012 13:35	Equipment Blank	Pesticides	Metribuzin	0.099	U	ug/L	0.099	0.4
9/24/2012 13:35	Equipment Blank	Pesticides	Mevinphos	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Naled	0.2	U	ug/L	0.2	0.79
9/24/2012 13:35	Equipment Blank	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.59
9/24/2012 13:35	Equipment Blank	Pesticides	Parathion Ethyl	0.099	U	ug/L	0.099	0.4
9/24/2012 13:35	Equipment Blank	Pesticides	Parathion Methyl	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Pesticides	Phorate	0.025	U	ug/L	0.025	0.099
9/24/2012 13:35	Equipment Blank	Pesticides	Prometryn	0.099	U	ug/L	0.099	0.4
9/24/2012 13:35	Equipment Blank	Pesticides	Simazine	0.05	U	ug/L	0.05	0.2
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2,4-Dichlorophenol	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2,4-Dimethylphenol	10	U	ug/L	10	41
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2,4-Dinitrophenol	15	U	ug/L	15	61
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2-Chloronaphthalene	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2-Chlorophenol	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3.1	U	ug/L	3.1	12

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	2-Nitrophenol	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	41	U	ug/L	41	160
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2	U	ug/L	2	8.2
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	61
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Acenaphthene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Acenaphthylene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Anthracene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Benzidine	100	U	ug/L	100	410
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Benzo(a)anthracene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Benzo(a)pyrene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3.1	U	ug/L	3.1	12
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	61
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Butyl benzyl phthalate	5.1	U	ug/L	5.1	20
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Chrysene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Diethyl phthalate	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Dimethyl phthalate	10	U	ug/L	10	41
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Di-n-butyl phthalate	5.1	U	ug/L	5.1	20
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Di-n-octyl phthalate	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Fluoranthene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Fluorene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Hexachlorobenzene	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Hexachlorobutadiene	3.1	U	ug/L	3.1	12
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	3.1	U	ug/L	3.1	12
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Hexachloroethane	3.1	U	ug/L	3.1	12
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Isophorone	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Naphthalene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Nitrobenzene	2	U	ug/L	2	8.2

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	2	U	ug/L	2	8.2
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2	U	ug/L	2	8.2
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3.1	U	ug/L	3.1	12
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Pentachlorophenol	3.1	U	ug/L	3.1	12
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Phenanthrene	0.2	U	ug/L	0.2	0.82
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Phenol	1	U	ug/L	1	4.1
9/24/2012 13:35	Equipment Blank	Priority Organic Pollutants	Pyrene	0.2	U	ug/L	0.2	0.82

Appendix H-1

Wet ID taxa list and number of algal units counted to a target of 300 natural units for qualitative natural periphyton collections made from the Packaging Corporation of America on 09/24/12.

	Control Site	Test Site 1	Test Site 2
Bacillariophyta			
Bacillariophyta	226	246	229
Chlorophycota			
Apatococcus lobatus	-	3	-
Chlorella sp.	-	5	-
Closterium moniliferum moniliferum	1	1	-
Cosmarium granatum granatum	1	-	-
Scenedesmus bijuga	1	3	-
Scenedesmus quadricauda	-	2	-
Spirogyra sp.	-	5	-
Staurastrum leptocladum cornutum	-	1	-
Tetraedron trigonum	-	1	-
Cyanophycota			
Chroococcus minutus	-	4	-
Cyanobium parvum	1	-	-
Geitlerinema acutissimum	-	-	2
Heteroleibleinia kuetzingii	-	-	8
Jaaginema geminatum	-	1	-
Jaaginema gracile	6	1	3
Leibleinia epiphytica	3	-	-
Lyngbya aestuarii	-	3	1
Nostoc sp.	-	1	-
Oscillatoria tenuis	3	-	1
Phormidium aerugineo-caeruleum	1	1	1
Planktolyngbya lacustris	2	5	1
Planktolyngbya limnetica	1	-	-
Plectonema wollei	23	2	19
Pseudanabaena mucicola	2	-	3
Schizothrix calcicola	22	10	34
Scytonema arcangelii	-	1	-
Synechocystis sp.	7	4	-
Euglenophycota			
Lepocinclis sp.	1	-	-
Phacus sp.	-	1	-
Phacus orbicularis	1	-	-

Appendix H-2

Diatom taxa list and number of valves counted to a target of 500 valves for qualitative periphyton collected from the Packaging Corporation of America on 09/24/12.

	Control Site	Test Site 1	Test Site 2
Bacillariophyta			
Bacillariophyceae			
Achnanthes fluviatilis	5	-	12
Achnanthes rupestoides	1	2	-
Achnanthidium exiguum	33	92	49
Achnanthidium microcephalum	-	-	1
Achnanthidium minutissimum	-	1	-
Amphora sp.	-	-	1
Amphora copulata	1	-	1
Bacillaria paxillifer	10	3	6
Caloneis sp.	-	3	-
Capartogramma crucicula	1	-	-
Chamaepinnularia sp.	1	-	-
Cocconeis fluviatilis	28	32	30
Cocconeis placentula	8	22	7
Diadesmis confervacea	6	12	8
Diadesmis contenta	27	3	-
Diploneis parma	-	-	1
Encyonema neomesianum	1	-	-
Eunotia sp.	7	20	1
Eunotia formica	3	1	-
Fallacia tenera	2	-	6
Frustulia sp.	3	4	1
Geissleria acceptata	75	78	94
Geissleria decussis	-	-	1
Gomphonema sp.	9	-	2
Gomphonema parvulum	4	9	6
Gyrosigma sp.	3	-	-
Gyrosigma scalproides	-	1	-
Hippodonta capitata	-	-	1
Hippodonta hungarica	2	-	3
Karayevia clevei	7	-	10
Lemnicola hungarica	-	-	1
Luticola mutica	-	1	-
Navicula sp.	3	3	8
Navicula cryptocephala	-	2	-
Navicula cryptotenella	4	-	-
Navicula germainii	2	-	-

Appendix H-2 (continued)

Navicula kotschyi	-	3	-
Navicula minima	1	-	-
Navicula peregrina	-	-	1
Navicula rostellata	5	-	-
Navicula schroeteri	-	-	3
Navicula viridula	1	-	-
Naviculaceae	1	7	5
Nitzschia sp.	9	1	5
Nitzschia amphibia	17	4	4
Nitzschia frustulum	-	2	3
Nitzschia palea	2	-	-
Nupela vitiosa	1	-	-
Pinnularia sp.	-	1	1
Placoneis sp.	3	-	3
Placoneis elginensis	2	-	1
Planothidium apiculatum	-	2	-
Planothidium delicatulum	5	6	8
Planothidium frequentissimum	-	1	13
Planothidium rostratum	3	70	24
Pleurosigma laveis	1	-	5
Sellaphora pupula	-	-	4
Tryblionella sp.	-	-	1
Coscinodiscophyceae			
Aulacoseira granulata	2	4	-
Aulacoseira herzogii	-	1	-
Hydrosera whampoensis	6	-	6
Melosira sp.	11	4	-
Fragilariophyceae			
Fragilaria capucina	5	2	3
Fragilaria martyi	-	2	-
Fragilariaceae	-	2	7
Opephora sp.	1	-	-
Pseudostaurosira brevistriata	42	12	41
Staurosira elliptica	1	6	12
Staurosirella pinnata	134	76	95
Synedra ulna	-	2	1
Mediophyceae			
Cyclotella meneghiniana	1	3	4

Appendix I-1

Benthic macroinvertebrates collapsed taxa list and density (average number of individuals/m^2 rounded to the nearest individual, n = 3 samples) from Hester-Dendy artificial substrates incubated for 28 days upstream and downstream of the Packaging Corporation of America and collected on 09/24/12. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site1 Left Bank	Test Site 1 Right Bank	Test Site 2
Annelida				
Hirudinea				
Helobdella fusca	-	-	-	3
Arthropoda				
Arachnida				
Koenikea sp.	-	2	-	-
Crustacea				
Hyalella azteca	29	28	177	24
Insecta				
Coleoptera				
Berosus sp.	-	2	-	-
Dubiraphia vittata	-	-	11	-
Stenelmis sp.	13	10	-	5
Stenelmis lignicola	-	-	3	-
Diptera				
Ablabesmyia mallochi	-	4	3	8
Ablabesmyia rhamphe grp.	3	12	8	-
Cecidomyiidae	3	-	-	-
Cladotanytarsus sp.	3	-	-	-
Corynoneura sp.	293		-	-
Corynoneura sp. B Epler	-	123	109	52
Cricotopus or *Orthocladius* sp.	-	4	-	-
Dicrotendipes modestus	-	2	-	-
Dicrotendipes neomodestus	5	4	3	-
Goeldichironomus sp.	-	2	8	-
Hemerodromia sp.	3	-	-	-
Kribiodorum perpulchrum	38	6	3	11
Labrundinia sp.	-	6	3	6
Nanocladius sp.	-	4	-	-
Nilotanypus fimbriatus	-	-	-	6
Palpomyia/Bezzia grp.	11	-	8	-
Pentaneura inconspicua	22	74	47	39
Polypedilum fallax	-	2	3	-

Appendix I-1 (continued)

Polypedilum flavum	133	40	90	242
Polypedilum illinoense grp.	27	6	3	3
Polypedilum scalaenum grp.	22	66	28	39
Pseudochironomus sp.	3	-	-	-
Rheotanytarsus exiguus grp.	96	48	104	68
Rheotanytarsus pellucidus	30	4	96	31
Simulium sp.	-	8	-	5
Stenochironomus sp.	174	65	28	30
Tanytarsus sp. A Epler	-	18	6	8
Tanytarsus sp. C Epler	5	12	6	-
Tanytarsus sp. L Epler	-	2	6	-
Tanytarsus sp. Y Epler	-	4	-	-
Thienemanniella lobapodema	110	-	71	33
Thienemanniella similis	34	-	-	13
Thienemanniella sp. B Epler	-	40	-	13
Thienemannimyia grp.	8	6	8	6
Tribelos fuscicornis	5	16	6	-
Tvetenia tshernovskii	-	2	3	-
Ephemeroptera				
Acerpenna pygmaea	-	-	3	-
Baetis intercalaris	8	6	6	22
Centroptilum triangulifer	-	4	-	-
Choroterpes basalis	-	2	-	-
Isonychia sp.	-	-	5	-
Maccaffertium exiguum	66	50	61	258
Procloeon sp.	-	-	3	-
Procloeon rufostrigatum	-	4	-	-
Pseudocloeon ephippiatum	52	144	182	254
Pseudocloeon propinquum	19	-	-	3
Stenacron sp.	3	7	3	4
Tricorythodes albilineatus	201	316	299	304
Megaloptera				
Corydalus cornutus	11	10	16	16
Nigronia sp.	3	-	-	3
Odonata				
Argia sp.	3	-	-	3
Coenagrionidae	-	2	-	-
Ischnura ramburi	-	-	5	-
Trichoptera				
Cheumatopsyche sp.	12	29	31	48
Chimarra sp.	42	46	66	143

Appendix I-1 (continued)

Cyrnellus fraternus	13	157	90	8
Hydropsyche sp.	4	-	56	129
Hydropsyche rossi	-	107	-	-
Hydroptila sp.	5	10	29	11
Nectopsyche candida	3	-	-	-
Neotrichia sp.	3	32	66	-
Oecetis persimilis	3	-	-	-
Mollusca				
Gastropoda				
Ancylidae	-	-	3	-

Appendix I-2

Benthic macroinvertebrates taxa list and counts (number of individuals counted) collected from Hester-Dendy artificial substrates (n= 3 samples) incubated upstream and downstream of the Packaging Corporation of America for 28 days and collected on 09/24/12.

	Control Site	Test Site 1 Left Bank	Test Site 1 Right Bank	Test Site 2
Annelida				
Hirudinea				
Helobdella fusca	-	-	-	1
Arthropoda				
Arachnida				
Koenikea sp.	-	1	-	-
Crustacea				
Hyalella azteca	11	14	67	9
Insecta				
Coleoptera				
Berosus sp.	-	1	-	-
Dubiraphia vittata	-	-	4	-
Stenelmis sp.	5	5	-	2
Stenelmis lignicola	-	-	1	-
Diptera				
Ablabesmyia mallochi	-	2	1	3
Ablabesmyia rhamphe grp.	1	6	3	-
Cecidomyiidae	1	-	-	-
Chironomidae	10	4	8	7
Cladotanytarsus sp.	1	-	-	-
Corynoneura sp.	108	58	20	18
Corynoneura sp. B Epler	-	3	20	1
Cricotopus or *Orthocladius* sp.	-	2	-	-
Dicrotendipes modestus	-	1	-	-
Dicrotendipes neomodestus	2	2	1	-
Goeldichironomus sp.	-	1	3	-
Hemerodromia sp.	1	-	-	-
Kribiodorum perpulchrum	14	3	1	4
Labrundinia sp.	-	3	1	2
Nanocladius sp.	-	2	-	-
Nilotanypus sp.	-	-	-	1
Nilotanypus fimbriatus	-	-	-	1
Palpomyia/Bezzia grp.	4	-	3	-
Pentaneura inconspicua	8	37	17	14
Polypedilum sp.	-	-	-	2
Polypedilum fallax	-	1	1	-

Appendix I-2 (continued)

Polypedilum flavum	49	20	33	87
Polypedilum illinoense grp.	10	3	1	1
Polypedilum scalaenum grp.	8	33	10	14
Pseudochironomus sp.	1	-	-	-
Rheotanytarsus sp.	-	-	-	1
Rheotanytarsus exiguus grp.	35	24	38	24
Rheotanytarsus pellucidus	11	2	35	11
Simulium sp.	-	4	-	2
Stenochironomus sp.	64	32	10	11
Tanytarsus sp. A Epler	-	9	2	3
Tanytarsus sp. C Epler	2	6	2	-
Tanytarsus sp. L Epler	-	1	2	-
Tanytarsus sp. Y Epler	-	2	-	-
Thienemanniella sp.	36	19	9	13
Thienemanniella lobapodema	13	-	17	5
Thienemanniella similis	4	-	-	2
Thienemanniella sp .B Epler	-	1	-	2
Thienemannimyia grp.	3	3	3	2
Tribelos fuscicornis	2	8	2	-
Tvetenia tshernovskii	-	1	1	-
Ephemeroptera				
Acerpenna pygmaea	-	-	1	-
Baetidae	-	4	3	1
Baetis intercalaris	3	3	2	8
Centroptilum triangulifer	-	2	-	-
Choroterpes basalis	-	1	-	-
Heptageniidae	-	5	-	31
Isonychia sp.	-	-	2	-
Maccaffertium sp.	9	-	2	20
Maccaffertium exiguum	16	21	21	47
Procloeon sp.	-	1	1	-
Procloeon rufostrigatum	-	1	-	-
Pseudocloeon sp.	1	20	18	-
Pseudocloeon ephippiatum	19	49	48	95
Pseudocloeon propinquum	7	-	-	1
Stenacron sp.	1	3	1	1
Tricorythodes albilineatus	76	159	113	115
Megaloptera				
Corydalus cornutus	4	5	6	6
Nigronia sp.	1	-	-	1
Odonata				

Appendix I-2 (continued)

Argia sp.	1	-	-	1
Coenagrionidae	-	1	1	-
Ischnura ramburi	-	-	1	-
Trichoptera				
Cheumatopsyche sp.	3	13	10	12
Chimarra sp.	16	23	25	54
Cyrnellus fraternus	4	79	32	2
Hydropsyche sp.	1	46	18	32
Hydropsyche rossi	-	3	-	-
Hydropsychidae	2	6	5	23
Hydroptila sp.	2	5	11	4
Nectopsyche candida	1	-	-	-
Neotrichia sp.	1	16	25	-
Oecetis persimilis	1	-	-	-
Polycentropodidae	1	-	2	1
Mollusca				
Gastropoda				
Ancylidae	-	-	1	-

Appendix J-1

Qualitative benthic macroinvertebrate collapsed taxa list and number of individuals counted from 20-discrete-dipnet sweeps conducted upstream and downstream of the Packaging Corporation of America on 09/24/12. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site		Test Site 1		Test Site 2	
	Rep 1	**Rep 2**	**Rep 1**	**Rep 2**	**Rep 1**	**Rep 2**
Annelida						
Oligochaeta						
Haplotaxida						
Limnodrilus hoffmeisteri	-	1	-	-	-	-
Tubificidae	1	-	-	-	-	-
Arthropoda						
Arachnida						
Acariformes						
Albia sp.	-	5	-	-	-	-
Arrenurus sp.	2	-	13	6	1	3
Lebertia sp.	-	1	-	-	-	-
Mideopsis sp.	3	1	-	2	4	1
Momonia sp.	-	-	-	-	1	-
Neumania sp.	-	-	-	1	1	-
Unionicola sp.	-	-	-	1	-	-
Crustacea						
Amphipoda						
Hyalella azteca	68	80	80	60	70	79
Decapoda						
Cambaridae	2	2	-	-	-	-
Palaemonetes sp.	-	2	-	1	-	1
Isopoda						
Caecidotea sp.	2	2	-	-	-	-
Insecta						
Coleoptera						
Berosus sp.	-	1	-	-	-	-
Dubiraphia vittata	13	5	1	1	1	1
Microcylloepus pusillus	-	-	-	-	-	1
Diptera						
Ablabesmyia mallochi	-	6	4	2	1	-
Ablabesmyia rhamphe grp.	3	2	4	1	-	-
Asheum beckae	-	-	-	1	-	-
Atrichopogon sp.	-	-	1	1	3	8
Coelotanypus sp.	1	-	-	-	-	-
Cricotopus or Orthocladius sp.	-	-	-	1	1	-
Cryptotendipes sp.	-	-	-	-	1	-

Appendix J-1 (continued)

Dicrotendipes sp.	1	-	-	-	-	-
Dicrotendipes modestus	-	-	-	1	-	-
Forcipomyia sp.	-	-	-	-	4	-
Goeldichironomus sp.	-	-	1	-	-	-
Kribiodorum perpulchrum	-	-	1	1	-	-
Labrundinia sp.	-	1	-	-	-	-
Labrundinia becki	1	-	-	-	-	-
Palpomyia/Bezzia grp.	-	2	1	3	10	1
Parametriocnemus sp.	-	-	1	-	-	-
Pentaneura inconspicua	-	-	-	1	1	-
Polypedilum flavum	-	-	-	-	1	1
Polypedilum halterale grp.	-	-	-	-	1	-
Polypedilum illinoense grp.	-	1	1	3	16	16
Polypedilum scalaenum grp.	-	2	-	-	-	-
Polypedilum trigonus	-	-	-	1	-	-
Procladius sp.	-	-	1	-	1	-
Pseudochironomus sp.	1	-	1	1	-	-
Stenochironomus sp.	-	-	-	3	2	3
Tanytarsus sp. C Epler	-	-	-	-	-	2
Tanytarsus sp. L Epler	1	-	-	-	-	-
Tanytarsus sp. O Epler	-	-	1	-	1	-
Tribelos fuscicornis	1	-	5	7	1	1
Ephemeroptera						
Caenis sp.	22	11	-	1	-	-
Maccaffertium exiguum	-	1	-	-	-	2
Neoephemera sp.	-	-	-	1	-	-
Procloeon sp.	-	-	-	-	-	1
Pseudocentroptiloides usa	-	1	-	-	-	-
Pseudocloeon ephippiatum	-	-	3	2	1	1
Pseudocloeon propinquum	-	-	-	-	1	-
Sparburus sp.	-	-	-	-	-	3
Tricorythodes albilineatus	17	11	22	19	21	25
Heteroptera						
Pelocoris sp.	-	-	-	-	1	-
Pleidae	-	-	-	1	-	-
Lepidoptera						
Undetermined Lepidoptera	-	-	-	-	-	1
Odonata						
Argia sp.	1	3	-	-	-	-
Coenagrionidae	-	-	-	-	-	1
Enallagma sp.	-	1	-	-	-	-

Appendix J-1 (continued)

Neurocordulia sp.	3	-	-	-	-	-
Undetermined Odonata	-	-	-	1	-	-
Trichoptera						
Cernotina sp.	1	-	5	4	1	-
Cyrnellus fraternus	-	-	2	2	1	-
Hydroptila sp.	1	-	3	9	-	2
Neotrichia sp.	1	-	-	-	-	-
Mollusca						
Bivalvia						
Veneroida						
Eupera cubensis	-	-	3	4	-	-
Musculium sp.	-	1	-	-	-	-
Pisidium dubium	-	2	-	-	-	-
Sphaeriidae	-	-	-	-	-	1
Gastropoda						
Basommatophora						
Ancylidae	1	1	3	4	3	1
Lymnaeidae	-	-	-	-	-	3
Micromenetus sp.	1	3	1	1	-	1
Mesogastropoda						
Hydrobiidae	6	4	1	1	2	-
Pomacea sp.	-	-	1	-	-	-
Platyhelminthes						
Undetermined Platyhelminthes	2	-	-	5	-	-

Appendix J-2

Qualitative benthic macroinvertebrate taxa list and number of individuals counted from 20-discrete-dipnet sweeps conducted upstream and downstream of the Packaging Corporation of America on 09/24/12.

	Control Site		Test Site 1		Test Site 2	
	Rep 1	**Rep 2**	**Rep 1**	**Rep 2**	**Rep 1**	**Rep 2**
Annelida						
Oligochaeta						
Limnodrilus hoffmeisteri	-	1	-	-	-	-
Tubificidae	1	-	-	-	-	-
Arthropoda						
Arachnida						
Undetermined Acariformes	1	-	-	-	-	-
Albia sp.	-	5	-	-	-	-
Arrenurus sp.	2	-	13	6	1	3
Lebertia sp.	-	1	-	-	-	-
Mideopsis sp.	2	1	-	2	4	1
Momonia sp.	-	-	-	-	1	-
Neumania sp.	-	-	-	1	1	-
Unionicola sp.	-	-	-	1	-	-
Crustacea						
Undetermined Amphipoda	3	3	-	-	2	5
Hyalella azteca	65	77	80	60	68	74
Cambaridae	2	2	-	-	-	-
Palaemonetes sp.	-	2	-	1	-	1
Caecidotea sp.	2	2	-	-	-	-
Insecta						
Coleoptera						
Berosus sp.	-	1	-	-	-	-
Dubiraphia vittata	13	5	1	1	1	1
Microcylloepus pusillus	-	-	-	-	-	1
Diptera						
Ablabesmyia mallochi	-	4	4	2	1	-
Ablabesmyia rhamphe grp.	3	2	4	1	-	-
Asheum beckae	-	-	-	1	-	-
Atrichopogon sp.	-	-	1	1	3	7
Ceratopogonidae	-	-	-	-	1	1
Chironomidae	-	2	-	3	-	-
Coelotanypus sp.	1	-	-	-	-	-
Cricotopus or Orthocladius sp.	-	-	-	1	1	-
Cryptotendipes sp.	-	-	-	-	1	-
Dicrotendipes sp.	1	-	-	-	-	-
Dicrotendipes modestus	-	-	-	1	-	-

Appendix J-2 (continued)

Forcipomyia sp.	-	-	-	-	4	-
Goeldichironomus sp.	-	-	1	-	-	-
Kribiodorum perpulchrum	-	-	1	1	-	-
Labrundinia sp.	-	1	-	-	-	-
Labrundinia becki	1	-	-	-	-	-
Palpomyia/Bezzia grp.	-	2	1	3	9	1
Parametriocnemus sp.	-	-	1	-	-	-
Pentaneura inconspicua	-	-	-	1	1	-
Polypedilum sp.	-	-	-	-	-	1
Polypedilum flavum	-	-	-	-	1	1
Polypedilum halterale grp.	-	-	-	-	1	-
Polypedilum illinoense grp.	-	1	1	3	16	15
Polypedilum scalaenum grp.	-	2	-	-	-	-
Polypedilum trigonus	-	-	-	1	-	-
Procladius sp.	-	-	1	-	1	-
Pseudochironomus sp.	1	-	1	1	-	-
Stenochironomus sp.	-	-	-	3	2	3
Tanytarsus sp. C Epler	-	-	-	-	-	2
Tanytarsus sp. L Epler	1	-	-	-	-	-
Tanytarsus sp. O Epler	-	-	1	-	1	-
Tribelos fuscicornis	1	-	5	4	1	1
Ephemeroptera						
Baetidae	-	-	1	-	-	-
Caenis sp.	22	11	-	1	-	-
Maccaffertium exiguum	-	1	-	-	-	2
Neoephemera sp.	-	-	-	1	-	-
Procloeon sp.	-	-	-	-	-	1
Pseudocentroptiloides usa	-	1	-	-	-	-
Pseudocloeon ephippiatum	-	-	2	2	1	1
Pseudocloeon propinquum	-	-	-	-	1	-
Sparburus sp.	-	-	-	-	-	3
Tricorythodes albilineatus	17	11	22	19	21	25
Heteroptera						
Pelocoris sp.	-	-	-	-	1	-
Pleidae	-	-	-	1	-	-
Lepidoptera						
Undetermined Lepidoptera	-	-	-	-	-	1
Odonata						
Argia sp.	1	3	-	-	-	-
Coenagrionidae	-	-	-	-	-	1
Enallagma sp.	-	1	-	-	-	-
Libellulidae	2	-	-	-	-	-
Neurocordulia sp.	1	-	-	-	-	-

Appendix J-2 (continued)

Undetermined Odonata	-	-	-	1	-	-
Trichoptera						
Cernotina sp.	1	-	5	4	1	-
Cyrnellus fraternus	-	-	2	2	1	-
Hydroptila sp.	1	-	3	9	-	2
Neotrichia sp.	1	-	-	-	-	-
Mollusca						
Bivalvia						
Eupera cubensis	-	-	1	1	-	-
Musculium sp.	-	1	-	-	-	-
Pisidium dubium	-	2	-	-	-	-
Sphaeriidae	-	-	2	3	-	1
Gastropoda						
Ancylidae	1	1	3	4	3	1
Lymnaeidae	-	-	-	-	-	3
Micromenetus sp.	1	3	1	1	-	1
Hydrobiidae	6	4	1	1	2	-
Pomacea sp.	-	-	1	-	-	-
Platyhelminthes						
Undetermined Platyhelminthes	2	-	-	5	-	-

The Priority Pollutants Analysis of the Packaging Corporation of America effluent sampled on September 24, 2012 NPDES #FL0000281

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 0 0 2 8 1 11	12 1 2 0 9 2 4	# x	# S	# 2

Remarks

#

Biological Analyses of the Packaging Corporation of America effluent sampled on September 24, 2012 NPDES #FL0000281

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 0 0 2 8 1 11	12 1 2 0 9 2 4	# S	# S	# 2

Remarks

#