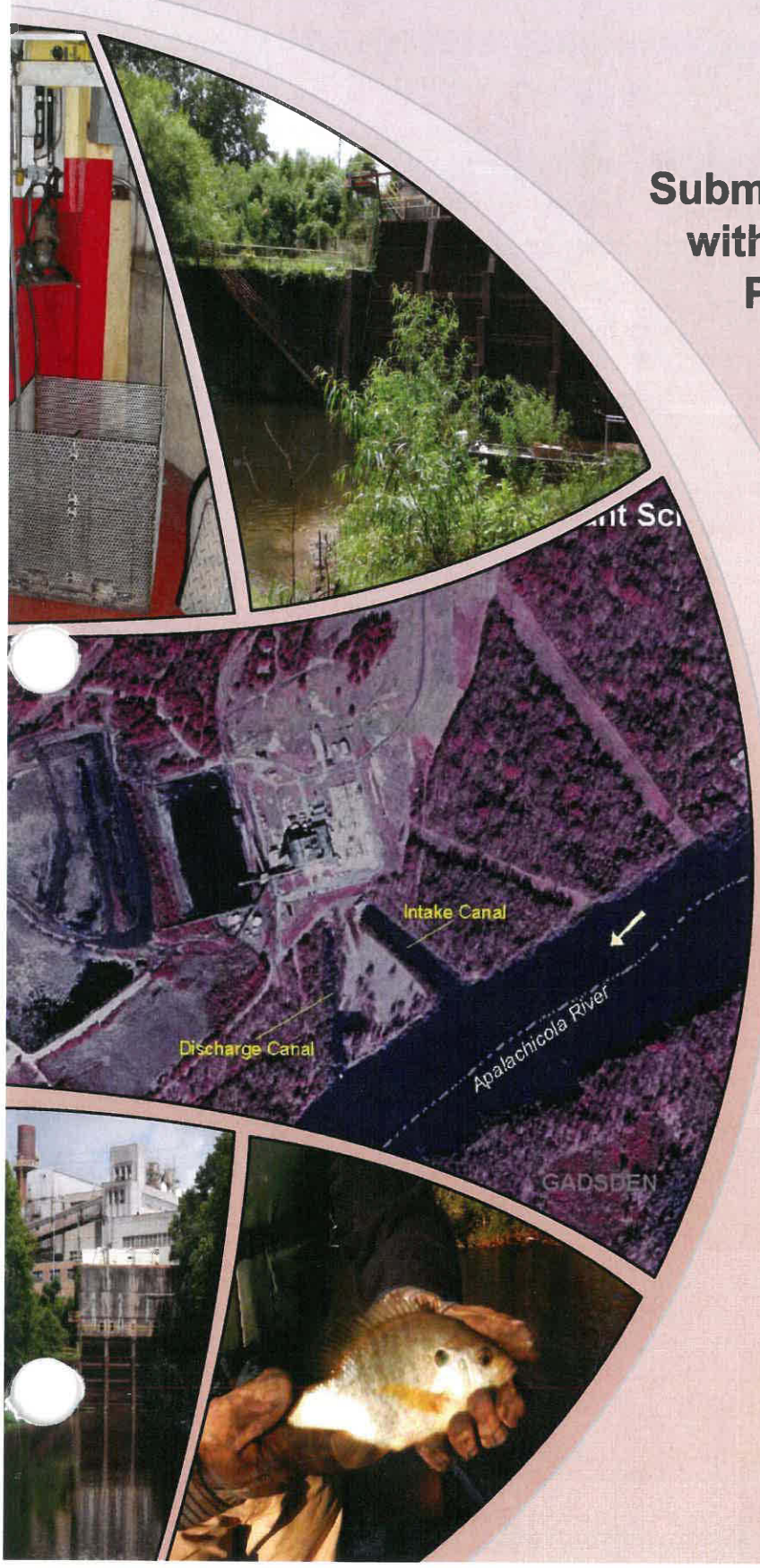
Plant Scholz 316(b)
Impingement Mortality Characterization Study



Submitted in Support of Compliance with Section 316 (b) Phase II Rules Pursuant to 40 CFR 125.95(b)(3)

Prepared For

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November 2009

Plant Scholz 316(b) Impingement Mortality Characterization Study

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Compliance with Section 316 (b) Phase II Rules
Pursuant to 40 CFR 125.95(b)(3)

Submitted to:

GULF POWER
A SOUTHERN COMPANY

Prepared by:

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Table of Contents

Table of Contents (continued)

List of Tables

Table of Contents (continued)

List of Figures

List of Appendices

Table of Contents (continued)

List of Abbreviations and Acronyms

ACF	Apalachicola Chattahoochee Flint
BO	Biological Opinion
BTA	best technology available
°C	Celsius
CDS	Comprehensive Demonstration Study
CFR	Code of Federal Regulations
cfs	cubic feet per second
CPUE	Catch per unit effort
CWA	Clean Water Act
CWIS	cooling water intake structure
DO	dissolved oxygen
EAT	Environmental Assessment and Toxicology (Department and Laboratory, MACTEC)
FDEP	Florida Department of Environmental Protection
fps	feet per second
FWC	Florida Fish and Wildlife Conservation Commission
g	gram(s)
IM&E	Impingement and Entrainment
kg	kilograms
MACTEC	MACTEC Engineering and Consulting, Inc.
mg/L	milligrams per liter
MGD	million gallons per day
mm	millimeter
MW	megawatt
msl	mean sea level
QA/QC	Quality Assurance / Quality Control
RS	representative species
s.u.	pH standard units
TL	total length
US	United States
µS/cm	microhms per centimeter
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Services
USGS	United States Geological Survey

1.0 Introduction

1.1 Regulatory Background and Need

Power plants and other types of industrial facilities that withdraw large volumes of water from rivers, streams, lakes, estuaries, oceans, or other waters of the United States for cooling purposes are regulated by the United States Environmental Protection Agency (USEPA) under the Federal Clean Water Act (CWA). Section 316(b) of the CWA requires USEPA to ensure that the location, design, construction and capacity of cooling water intake structures (CWIS) reflect the Best Technology Available (BTA) for minimizing adverse environmental impacts.

Potential impacts of CWISs on aquatic biota can be characterized by the following mechanisms of impact:

- **Impingement.** Fish and other larger aquatic organisms drawn into facility intake structures become entrapped on the screening system that is designed to keep trash and other floating debris from entering the cooling water system. As a result of being entrapped, these organisms may suffocate because the strength of the intake current may keep their gill covers from opening. Such organisms may also be subjected to other physical stresses and damage that may lead to their mortality. Impingement also includes injury to fish from the screens and related equipment.
- **Entrainment.** Small aquatic organisms such as fish and shellfish eggs and larvae contained in the cooling water enter the facility through the cooling water intake. As these organisms pass through the facility's condenser cooling system, they are subjected to abrupt temperature and pressure increases. In addition, they are exposed to the physical stresses from contact with pumps, impellers and piping, as well as shear forces associated with complex water flows. USEPA generally assumes that entrainment results in complete mortality (i.e., 100 percent) of entrained organisms.

Historically (i.e., 1970s), the electric utilities were required to sample, evaluate, and address all trophic levels of the aquatic community, including phytoplankton, zooplankton, periphyton, benthos, fishes, and other aquatic organisms and all life stages of each group. Among the lessons learned from that work was that the biotic potential (reproductive capability) of the lower trophic levels (e.g., phytoplankton, zooplankton, and periphyton) was high enough to replace entrainment losses within hours. As a result, impingement sampling and evaluation under the new rule is more focused as only applying to the various life stages of fish and shellfish.

Under the terms of an Amended Consent Decree in *Riverkeeper, et al. v. Whitman*, USEPA has developed regulations to this end. On July 9, 2004 the USEPA published its final Phase II rules of this regulatory initiative that establishes national performance standards for the reduction of impingement mortality for existing power plants that withdraw more than 50 million gallons per day (MGD) and that use more than 25 percent of the water for cooling purposes. Plant Scholz uses its water for cooling and withdraws 129.6 MGD at nominal capacity, and is therefore subject to the constraints of the Section 316(b) Phase II rules.

In the July 9, 2004 Phase II rule, USEPA grouped surface waters into five categories:

- Freshwater Rivers and Streams
- Lakes and Reservoirs
- Great Lakes

- Estuaries and Tidal Rivers, and
- Oceans

Different regulatory requirements are established for each body of water, with the stringency of the requirements based on the sensitivity and/or biological productivity of the body of water (Table 1-1).

Table 1-1. Phase II Existing Facilities Performance Standards

Type of Water Body	Condition	Impingement Mortality	Entrainment
Freshwater River or Stream	Facilities with capacity utilization rate <15% or intake flow <5% of annual mean flow of river or stream	Reduce by 80-95%	No Requirement
	Facilities with capacity utilization rate = >15% or intake flow >5% of annual mean flow of river or stream	Reduce by 80-95%	Reduce by 60-90%
Lake or Reservoir	Increase in design intake flow cannot disrupt natural thermal stratification or turnover pattern.	Reduce by 80-95%	No Requirement
Great Lake	Facilities with capacity utilization rate <15%	Reduce by 80-95%	No Requirement
	Facilities with capacity utilization rate = >15%	Reduce by 80-95%	Reduce by 60-90%
Tidal Rivers, Estuaries, and Oceans	Facilities with capacity utilization rate <15%	Reduce by 80-95%	No Requirement
	Facilities with capacity utilization rate = >15%	Reduce by 80-95%	Reduce by 60-90%

Note: Shading indicates applicable performance standards for the Plant Scholz Station.
Source: USEPA, 2004.

Gulf Power's Plant Scholz meets the above criteria and therefore will comply with the applicable requirements of the new Section 316(b) rule, when issued.

As per results of a 1970's 316(b) study, it is believed that during low flow this plant withdraws a maximum of 1.7 percent of the river volume for its cooling water. Because this plant is located on a freshwater river, located above any tidal influence, and does not withdraw greater than 5 percent of the mean annual flow, Gulf Power believes that additional entrainment reduction requirements do not apply.

As required by 40 Code of Federal Regulations (CFR) Part 125.95(b)(3) of the Rule, Plant Scholz has prepared this Impingement Mortality Characterization Study Report. Specific goals and objectives of this study as required by 40 CFR 125.95(b)(3) are to:

i. Provide taxonomic identifications of all life stages of fish, shellfish, and any species protected under Federal, State, or Tribal Law that are in the vicinity of the cooling water intake structures and are susceptible to impingement;
ii. Characterize all life stages of fish, shellfish, and any species protected under Federal, State, or Tribal Law identified by the previous step, including a description of the abundance and temporal and spatial characteristics in the vicinity of the cooling water intake structures, based on sufficient data to characterize annual, seasonal, and diel variations in impingement;
iii. Document the current impingement of all life stages of fish, shellfish, and any species protected under Federal, State or Tribal Law identified by the previous steps and provide an estimate of impingement to be used as the calculation baseline. Any impingement sampling will be collected during periods of representative operational flows for the cooling water intake structures and the flows associated with the samples will be documented.

The above-referenced regulations were challenged by industry and environmental groups and arguments were heard in the Second Circuit Court. The Court's decision *Riverkeeper, Inc. v. USEPA*, 475 F.3d 83, (2d Circuit, 2007) resulted in the remand of several provisions of the Phase II rule:

a. USEPA's determination of the BTA under section 316(b);
b. The rule's performance standard ranges;
c. The cost-cost and cost-benefit compliance alternatives;
d. The Technology Installation and Operation Plan provision;
e. The restoration provision; and
f. The ``independent supplier'' provision.

As a result of this significant decision, the USEPA Assistant Administrator for Water issued a memorandum on March 20, 2007, announcing USEPA's intention to suspend the Phase II rule. Effective July 9, 2007, 40 CFR 122.21(r)(1)(ii) and (5), 125.90(a), (c) and (d) and 125.91 through 125.99 in Subpart J were suspended (FR July 9, 2007 (Volume 72, Number 130), Pages 37107-37109).

While the above-referenced action effectively suspended the Rule, USEPA indicated that permits for existing Phase II facilities should be considered using "Best Professional Judgment" on a case-by-case basis.

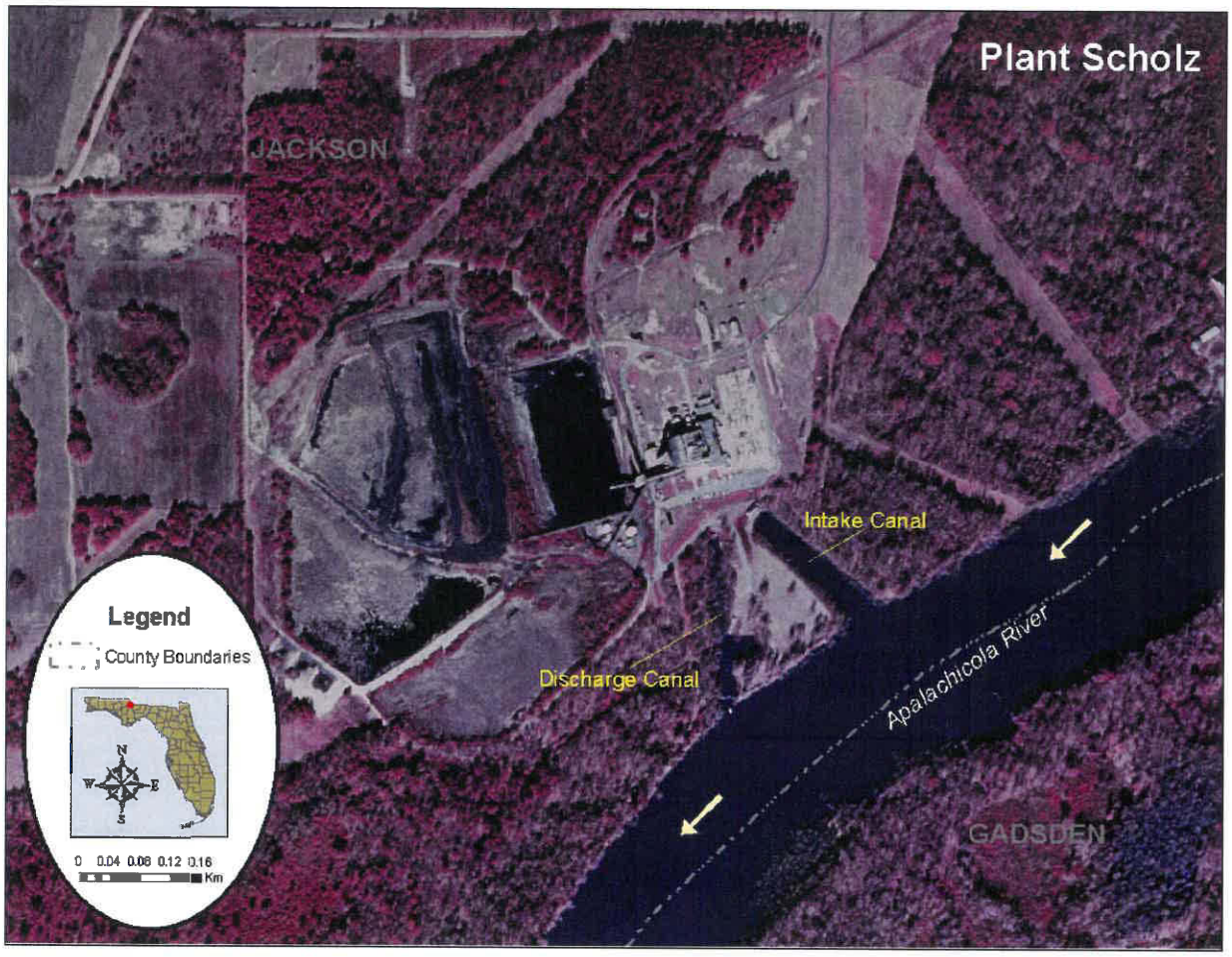
This report is submitted to provide information to support the determination of best professional judgment decisions for Gulf Power pursuant to Section 316(b) of the CWA at Plant Scholz. The report presents aquatic biological information including results of impingement mortality conducted at the Scholz Combined Cycle Plant from 2005 through 2007.

1.2 Description of Plant Scholz

Plant Scholz is located on the Apalachicola River 3.5 miles downstream of the Jim Woodruff Lock and Dam near Chattahoochee, Florida and 2.3 miles south of US Highway 90 (Figure 1-1). The plant is located at approximately latitude 30° 40' 12.45"N, and longitude 84° 53' 14.68"W. The site is located on the west bank of the Apalachicola River in the upper river corridor from Chattahoochee to Blountstown. The river is a freshwater river in the area of the Plant location.

Plant Scholz began operation in 1953. Plant Scholz operates as a peaking plant and has a 98 megawatt (MW) capacity and a once-through cooling system. Water is withdrawn from the Apalachicola River and pumped to the condenser and then back out to the river. The condenser is a horizontal, two pass-divided water box arrangement with a condensing surface area of 32,500 square feet.

Figure 1-1. Aerial Photo Showing Plant Scholz Location

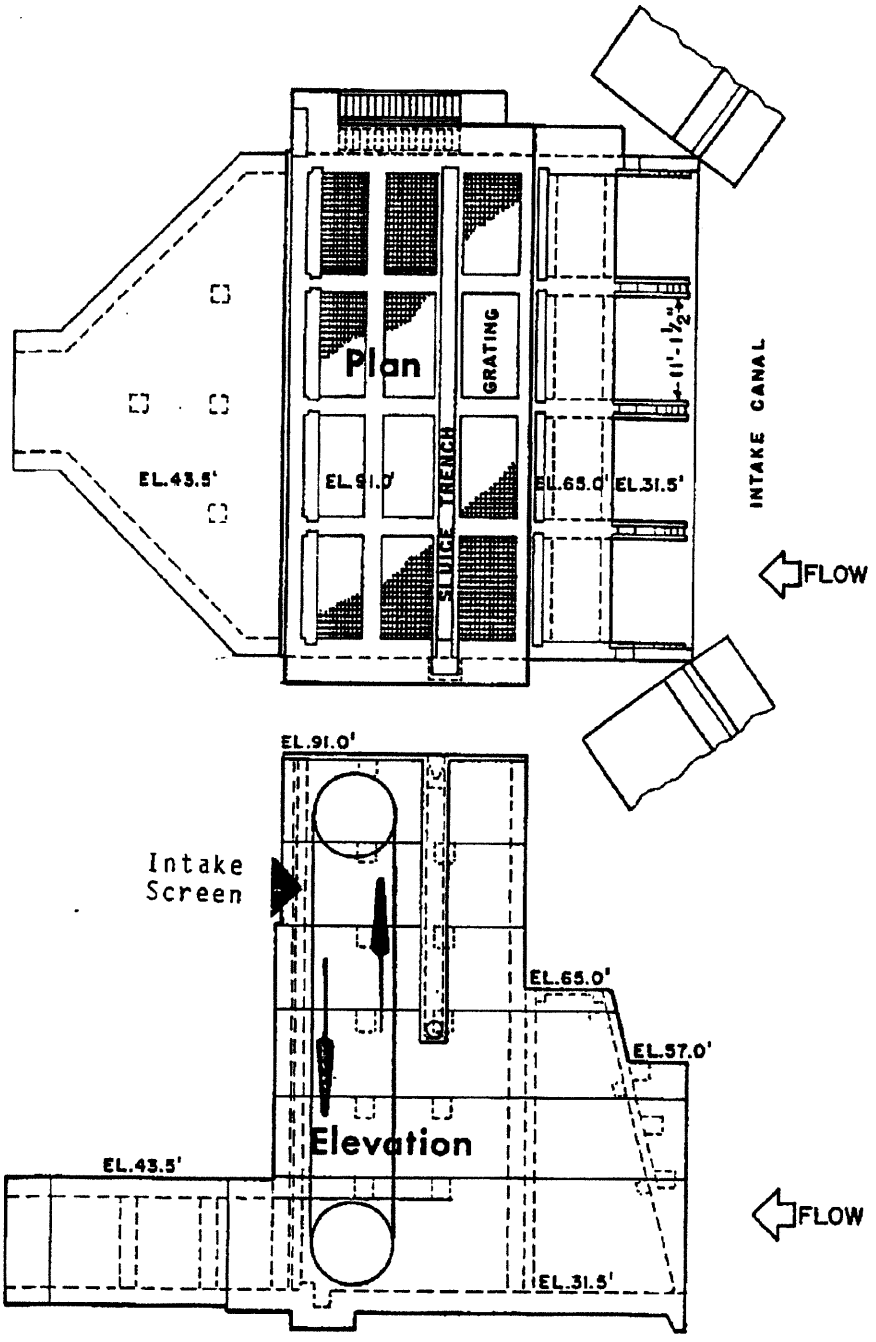


The CWIS is located at the end of the intake canal and is approximately 54 feet wide with a trash rack in each of the four bays. The trash rack has 5/16 inch wide by 3.5 inch thick steel bars with 4 inch spacing and 3-11/16 inch clear openings (Figure 1-2). Each screen is approximately 10 feet wide by 60 feet long and consists of 3/8 inch copper or stainless steel mesh and is equipped with ultrasonic differential arms and a screen wash system. During washing, the water is supplied as a spray and screens are rotated. There are two generating units which are fed by four continuously operating intake pumps which withdraw water at 191 cubic feet per second (cfs).

The Plant's intake is angled slightly upstream and consists of an approximately 600 foot long, narrow canal cut between the Plant and the swiftly moving Apalachicola River. The canal is seven feet deep with 2.5:1 slopes and a bottom width of approximately 30 feet at an elevation of 35 feet mean sea level (MSL).

Scholz Intake Canal

Figure 1-2. Cooling Water Intake Structure Side-View at Plant Scholz



The total design intake capacity for Units 1 and 2 is approximately 130 million gallons per day (MGD) utilizing four water pumps. The Apalachicola River has a mean annual flow of approximately 13,000 MGD at the United States Geologic Survey (USGS) gaging station located upstream at Chattahoochee, Florida.

The Plant Scholz CWIS is designed to withdraw up to 191 cfs which equates to approximately 1 percent of the annual mean flow compared to the Chattahoochee gage. Since the river does not meet the regulatory definition of a tidal river at this location, and the capacity utilization rate is <5 percent of the total annual mean streamflow, under the provisions of the new Section 316(b) rule, entrainment sampling and reduction are not required for Plant Scholz.

2.0 Historic and Recent Studies Near CWIS

2.1 Summary of Physical Characteristics of Source Water Body

The final 316(b) rule defines a freshwater river or stream as, "a lotic (free-flowing) system that does not receive significant inflows of water from oceans or bays due to tidal action." According to Florida Department of Environmental Protection (FDEP), the Apalachicola River in the vicinity of Plant Scholz is classified as an alluvial river. Plant Scholz is located above the zone of tidal influence.

The Apalachicola River within the immediate area of the CWIS is a navigable river that is characterized as a dredged channel with side-channel and backwater habitats. This portion of the Apalachicola River is largely rural. Maximum velocities encountered in the river channel are approximately 3.5 feet per second during periods of high flow (USGS, 2008). This periodic high velocity in the river will affect the numbers and kinds of organisms that may be impacted by the CWIS. Table 2-1 presents a summary of the physical characteristics of the source water body including its configuration in the vicinity of the CWIS.

Table 2-1. Source Water Body Physical Characteristics in the Vicinity of the Scholz CWIS

General Source Water Body Characteristics	
Source Water Body Name	Apalachicola River
Source Water Body Type	freshwater river
Average river discharge during the study (2005-2007)	15,191 cfs (May 2005 through October 2007)
Range of river stage	39 to 65 feet mean sea level
Other notable changes or activities in the source water body that are relevant to Impingement, Mortality and Entrainment (IM&E) studies	The Apalachicola River is a navigable river that is utilized for commercial transport of materials by barge and large craft.
Habitat Characteristics	
Channel Morphology	Dredged navigable channel
Aquatic Habitat Features	Riverine habitats dominate. River is bordered by dense vegetation growth within riparian zone.
Water Depth	River is approximately 9 feet deep in channel.
Shoreline Features	Immediate vicinity of CWIS is undeveloped. Forested riparian zone extends upstream, downstream, and across channel.
Width of Riparian Zone	100 to 500 feet on opposing shoreline 200 to 500 feet upstream and downstream of CWIS

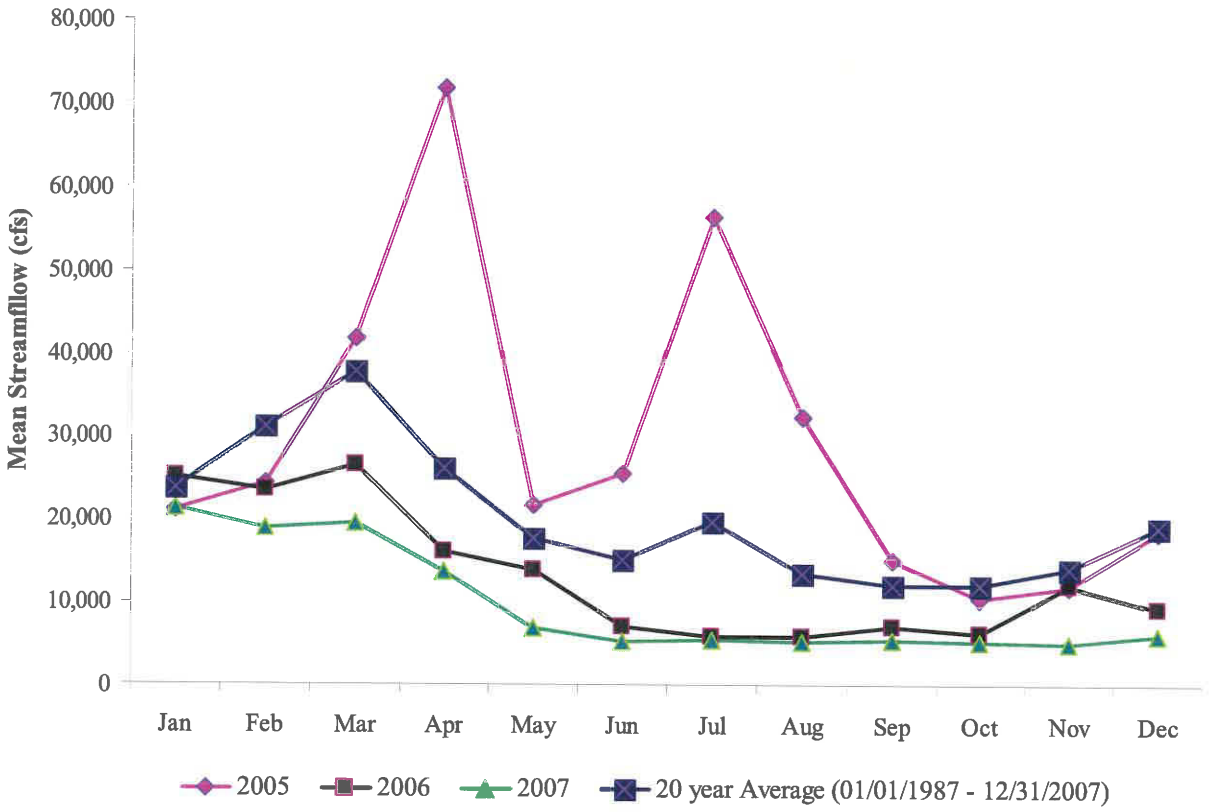
Source: MACTEC, 2007 Created by: KEM Reviewed by: PLM

Annual mean flow for the Apalachicola River at the US Geologic Survey (USGS) stream gage at Chattahoochee, Florida (Gage: 02358000) was determined for the period from 1999 through 2005 to be 17,986 cfs (USGS, 2008). The Apalachicola River water budget is heavily dominated by streamflow (Elder *et al.*, 1988).

Mean annual streamflow in the Apalachicola River from January 1999 to December 2004 was 15,242 cfs. River flows during the period of this study (Figure 2-1) were higher (2005) and lower (2006, 2007) than average (USGS, 2008). This higher average during the 2005 water year was likely due to the active

hurricane season in the summer of 2005. Flows in 2006 and 2007 were probably due to near-drought conditions in the region.

Figure 2-1. Monthly Average Mean Streamflow (cfs) of the Apalachicola River from 1987 to 2007 vs Streamflow during the Impingement Study



Prepared by: SEM Reviewed by: RDD
Source: USGS, 2008.

2.1.1 Channel Dimensions

Tidal influences of the Apalachicola River do not extend beyond 25 miles upstream from the river's mouth. The Apalachicola River falls 40 feet as it flows through the Gulf Coast Lowlands. The width of the river ranges from several hundred feet when confined to its banks to nearly 4.5 miles during high flows. This river is part of the Apalachicola Chattahoochee Flint (ACF) River Basin in the Blue Ridge, Piedmont, and Coastal Plain Physiographic Provinces. The Chattahoochee and Flint Rivers converge at Lake Seminole to form the Apalachicola River, which flows into Apalachicola Bay and the Gulf of Mexico (USGS, 2004). Channel dimensions in the vicinity of Plant Scholz have been maintained through annual dredging for navigational purposes; however, in October 2005 FDEP halted dredging in the Apalachicola River.

Historic channel dimensions and maintenance activities in the vicinity of Plant Scholz were described in detail in Breedlove and Associates (1970's) as follows:

"Navigation functions of the Apalachicola River require a nine foot draft, 100 foot channel from the intersection of the Apalachicola River with the Intracoastal Waterway north to the confluence of the Chattahoochee-Flint Rivers, a distance of 104 miles. Maintenance dredging is performed annually in the area to maintain the channel as near as possible to its authorized depth of nine feet. The average annual quantity of material dredged from the Apalachicola River is approximately one million cubic yards. Dredged material has been disposed of in open water or on the shore. In the vicinity of the Scholz Center, between mile 96 and 107, an average of 143,580 cubic yards are dredged each year...

In an effort to provide the 9 X 100 foot navigation channel year-round, the river has been modified by dredging, contraction dikes, and cutoffs. These modifications have resulted in a changed bottom contour due to removal of ridges and shoal areas, and a change in the width to depth ratio. The navigation channel occupies 20 percent of the river cross-sectional area and the contraction dikes opposite the channel serve as dredge disposal areas..."

In October 2005, FDEP halted dredging in the Apalachicola River, therefore, the channel depth of the river is no longer maintained to a depth of 9 ft.

2.1.2 Hydrology

Eighty percent of the Apalachicola River flow is contributed by the Chattahoochee and Flint Rivers, 11 percent from the Chipola River, and less than 10 percent from groundwater and overland flow (Elder *et al,* 1988). The Chipola River-Apalachicola River's largest tributary drains one-half of the Apalachicola River basin. The Chipola River is classified as a spring-fed river with baseflow derived principally from aquifers (USGS, 2004).

The Jim Woodruff Lock and Dam began operations in 1957, an event which substantially altered the Apalachicola River hydroperiod compared to historic conditions (Breedlove and Associates, no date). Stage and discharge records from 1929-79 for the Apalachicola River indicate that dams have had little effect on the magnitude of high flows or seasonal distribution of discharge over an annual cycle. Dam regulation did reduce the amount of time that flow was at low extremes. Water stages in the river within the first 30 miles downstream of Jim Woodruff Lock and Dam have lowered due to scouring of the river bottom (USGS, 2004). Flow regulation from the Jim Woodruff Dam is now the subject of additional scrutiny as the needs of federally listed species are receiving more attention.

2.2 Water Quality Characteristics

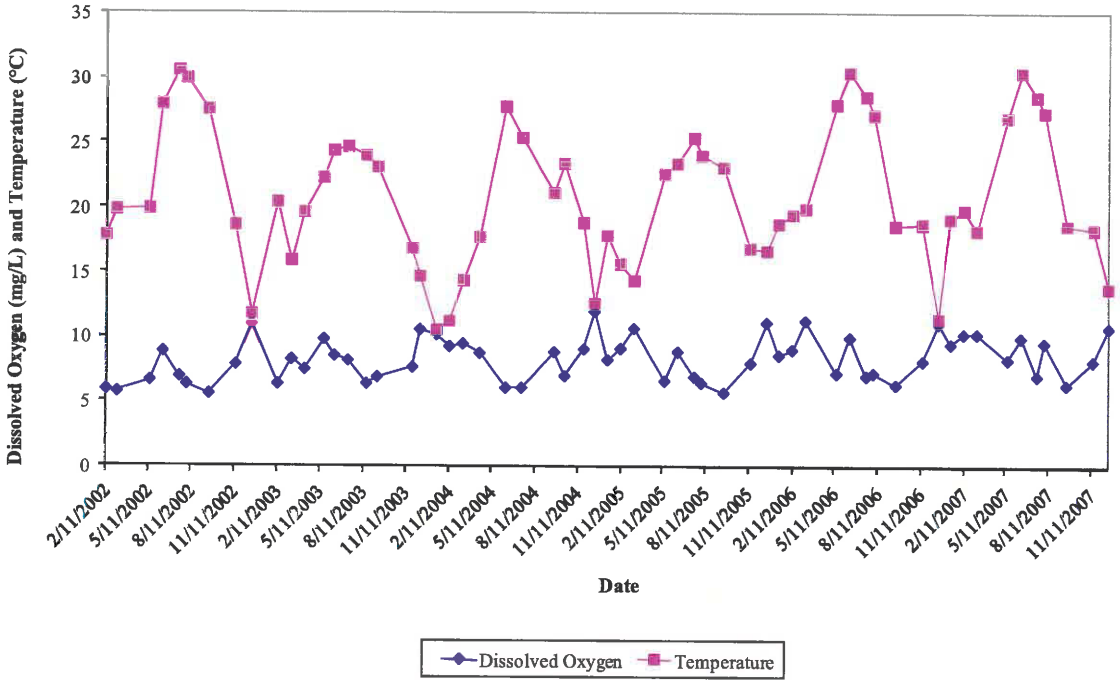
Both the Apalachicola River and Apalachicola Bay are on the state 303(d) list of impaired waters due to excess pathogens (including coliform bacteria), excess nutrients and high turbidity (USEPA, 2006).

Water quality data for the Apalachicola River collected at the USGS gage station #02358000, which is located at the site of the abandoned bridge downstream of US 90 and approximately 4 miles from the project site, were obtained from the USEPA's STORET database (accessed February 2008). Data for the period (February 2002 through November 2007) indicate that dissolved oxygen (DO) and temperature undergo fairly typical seasonal fluctuations expected of a warmwater river in this region (Figure 2-2).

DO values were higher in winter months when water temperatures were cooler. The pH (Figure 2-3) was fairly neutral, although there was some variability within and between seasons.

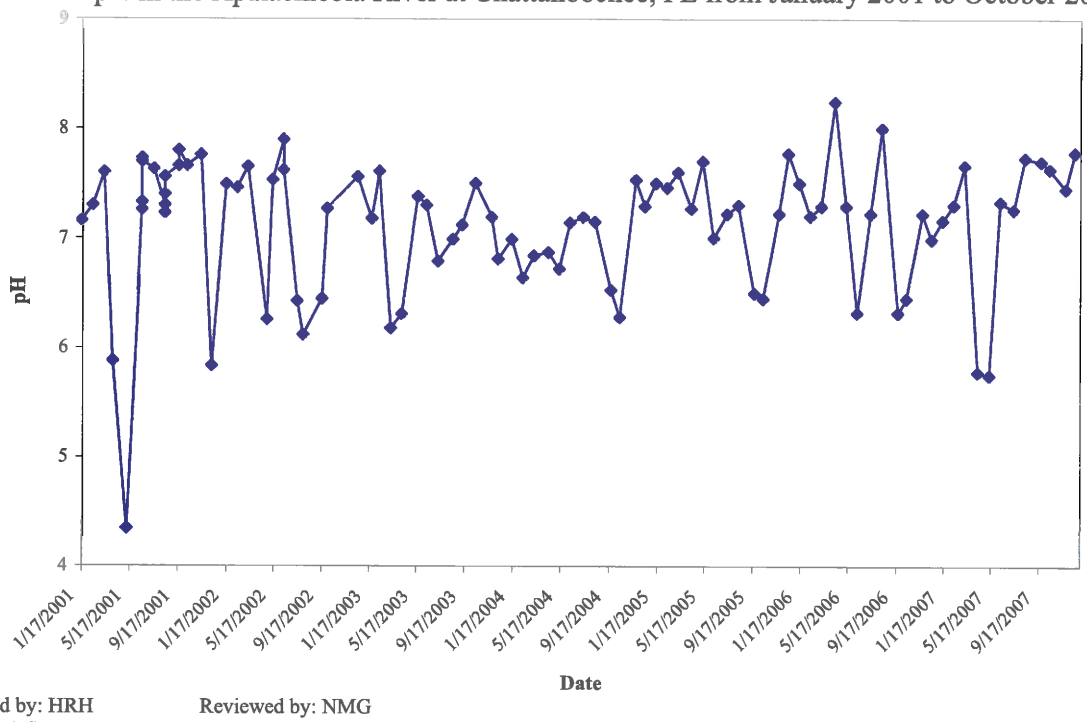
Water quality monitoring was conducted during the current study (see Section 3.2 for methodology associated with water quality monitoring). Water quality measurements (summarized in Figures 2-4 and 2-5) indicate that the river would not support a cold-water fishery; water temperatures are low in winter and high in summer (temperature range 12.5 to 30.6 °C); DO concentrations were adequate to support most warm-water fish (DO range 5.1 to 13.8 mg/L); conductivity is generally low as is indicative of freshwater (conductivity range 42 to 145 µS/cm); and the pH is circumneutral (pH range 6.42 to 8.22 s.u).

Figure 2-2. Dissolved Oxygen Concentrations and Temperature in the Apalachicola River from February 2002 through October 2007



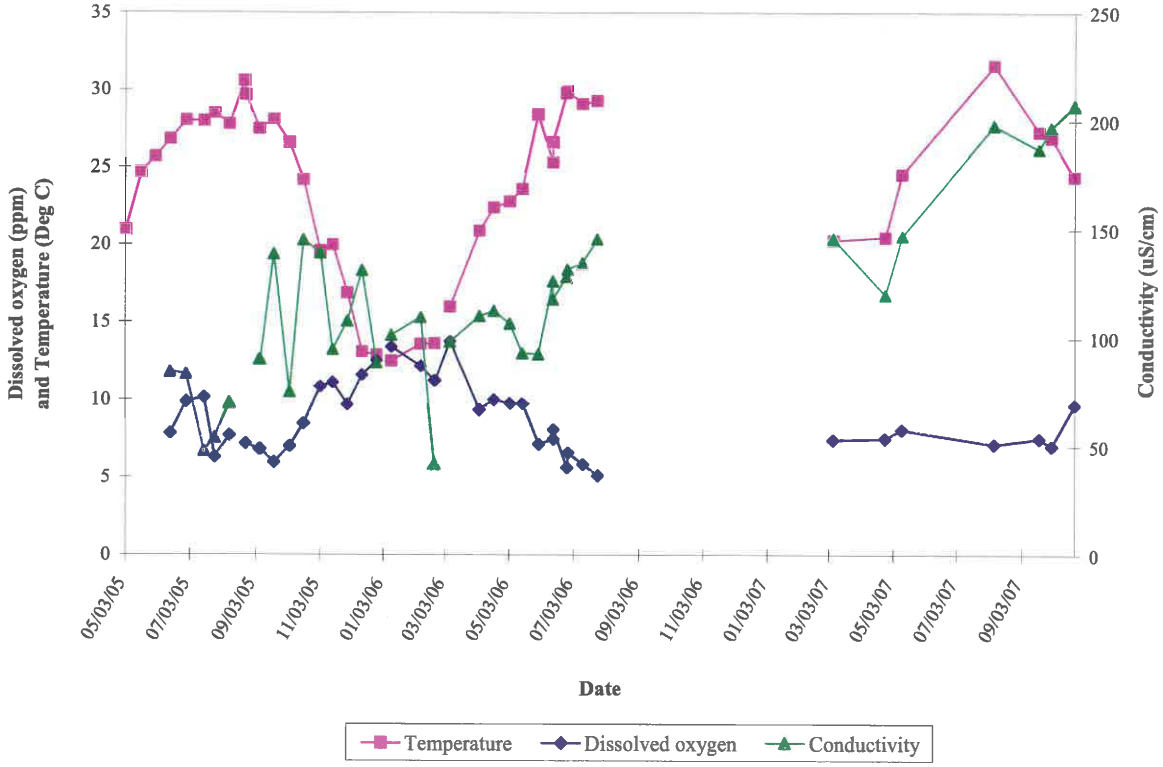
Prepared by: HRH Reviewed by: NMG
Source: USEPA STORET database. Accessed February, 2008. USGS gage 02358000.

Figure 2-3. pH in the Apalachicola River at Chattahoochee, FL from January 2001 to October 2007



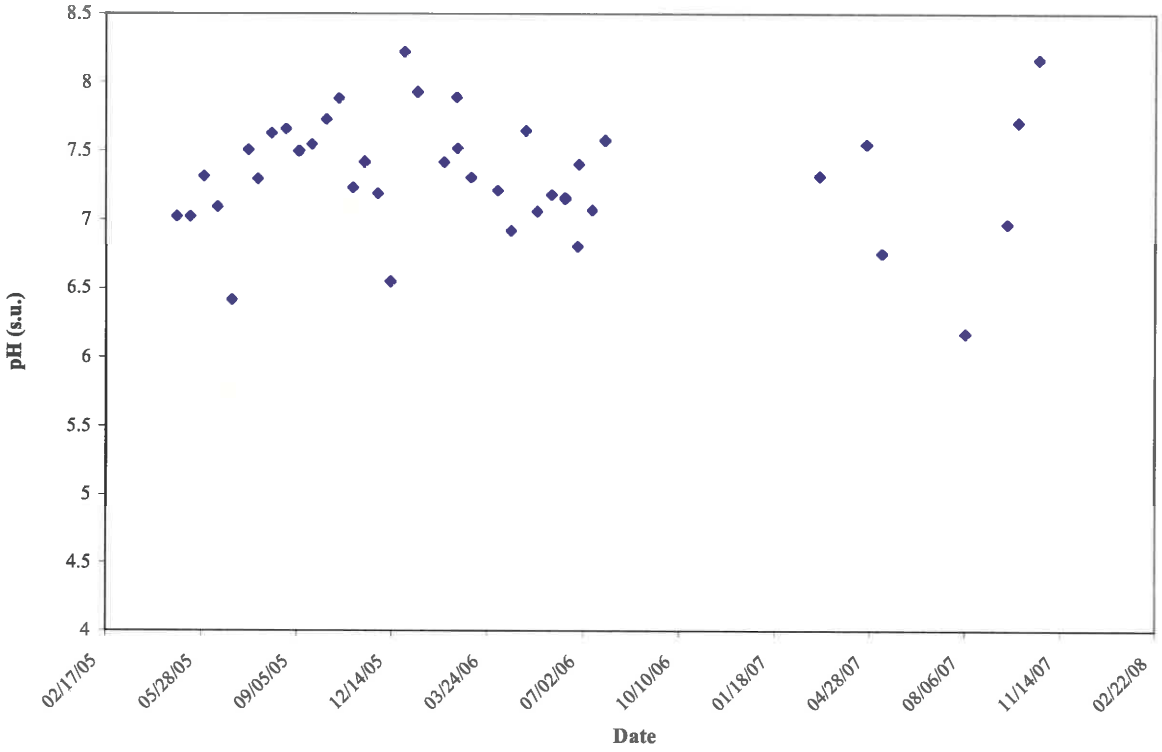
Prepared by: HRH Reviewed by: NMG
Source: USEPA STORET database. Accessed February, 2008.

Figure 2-4. Dissolved Oxygen Concentrations, Temperature, and Conductivity Measured at Plant Scholz Intake from May 2005 through October 2007



Prepared by: JLD Reviewed by: NMG

Figure 2-5. pH Measured at Plant Scholz Intake from May 2005 through October 2007



Prepared by: JLD Reviewed by: JMR

2.3 Taxonomic List of Species in the Vicinity of the CWIS

In accordance with 40 CFR Section 125.95(b)(3)(i), Gulf Power is required to compile a list of fish and shellfish occurring in the vicinity of the CWIS at Plant Scholz. This section presents the taxonomic list, including information available from historic published and unpublished data, findings from the current impingement mortality study, and results of the electrofishing survey conducted during this study.

Fisheries survey data was obtained for the reach of the Apalachicola River in which Plant Scholz is located. One source of data was the Florida Fish and Wildlife Conservation Commission's (FWC) annual electrofishing survey in the Apalachicola River (1984-1993 and 2000-2003). FWC data indicate more species richness in comparison to the MACTEC Engineering and Consulting, Inc. (MACTEC) 2005-2007 impingement study and the 2006/2007 electrofishing survey. It is evident that there is quite an overlap regarding the types of species caught between the studies, however, and these included species such as the basses (*Micropterus* spp.), sunfishes (*Lepomis* spp.), catfishes (Ictaluridae), gars (*Lepisosteus* spp.), and black crappie (*Pomoxis nigromaculatus*). Based on review of existing information, fish species recorded in the Apalachicola River are presented in Table 2-2.

Table 2-2. Taxonomic List of Fish Species in the Vicinity of Plant Scholz (Page 1 of 2)

Common Name	Scientific Name	Present Impingement Study	Historic FWC Electrofishing Surveys	2006/2007 MACTEC Electrofishing Survey
American eel	*Anguilla rostrata*		X	X
Atlantic needlefish	*Strongylura marina*	X	X	X
American shad	*Alosa sapidissima*		X	
Atlantic silverside	*Menidia menidia*	X		X
Black crappie	*Pomoxis nigromaculatus*	X	X	X
Black redhorse	*Moxostoma duquesnii*			X
Blackbanded darter	*Percina nigrofasciata*		X	X
Blacktail shiner	*Cyprinella venusta*	X	X	X
Blue catfish	*Ictalurus furcatus*			X
Blue stripped shiner	*Cyprinella caerulea*		X	
Bluefin killifish	*Lucania goodei*		X	
Bluegill	*Lepomis macrochirus*	X	X	X
Bowfin	*Amia calva*		X	X
Brook silverside	*Labidesthes sicculus*		X	
Catfish	Ictaluridae	X		
Chain pickerel	*Esox niger*		X	X
Channel catfish	*Ictalurus punctatus*	X	X	X
Clear chub	*Hybopsis winchelli*		X	
Coastal shiner	*Notropis petersoni*		X	
Common carp	*Cyprinus carpio*		X	X
Dollar sunfish	*Lepomis marginatus*		X	
Flathead catfish	*Pylodictis olivaris*	X	X	X
Florida gar	*Lepisosteus platyrhincus*			X
Gar	*Lepisosteidae* sp.	X		
Gizzard shad	*Dorosoma cepedianum*	X	X	X
Golden redhorse	*Moxostoma erythrurum*			X
Grass carp	*Ctenopharyngodon idella*			X
Green sunfish	*Lepomis cyanellus*		X	
Hogchoker	*Trinectes maculatus*	X	X	X
Largemouth bass	*Micropterus salmoides*	X	X	X
Longear sunfish	*Lepomis megalotis*			X
Longnose gar	*Lepisosteus platostomus*		X	X
Madtoms	*Noturus* sp.	X	X	
Needlefish	*Strongylura* sp.			X
Pipefish	*Syngnathus* sp.	X		
Pugnose shiner	*Notropis anogenus*		X	
Quillback	*Carpiodes cyprinus*			X
Redbreast sunfish	*Lepomis auritus*	X	X	X
Redear sunfish	*Lepomis microlophus*		X	X
Redfin pickerel	*Esox americanus americanus*			X
Redhorse	*Moxostoma* sp.		X	X
River redhorse	*Moxostoma carinatum*		X	
Shiners	*Notropis* sp.	X	X	X
Shoal bass	*Micropterus cataractae*		X	
Silverside shiner	*Notropis candidus*	X		X
Skipjack herring	*Alosa chrysochloris*	X	X	X
Snail bullhead	*Ameiurus brunneus*		X	
Southern flounder	*Paralichthys lethostigma*		X	
Spotfin mojarra	*Eucinostomus argenteus*		X	
Spotted bass	*Micropterus punctulatus*		X	
Spotted bullhead	*Ameiurus serracanthus*		X	

Table 2-2. Taxonomic List of Fish Species in the Vicinity of Plant Scholz (Page 2 of 2)

Common Name	Scientific Name	Present Impingement Study	Historic FWC Electrofishing Surveys	2006/2007 MACTEC Electrofishing Survey
Spotted gar	*Lepisosteus oculatus*		X	X
Spotted sucker	*Minytrema melanops*		X	
Spotted sunfish	*Lepomis punctatus*		X	
Striped bass	*Morone saxatilis*		X	X
Striped gar	*Lepisosteus* sp.			X
Striped mullet	*Mugil cephalus*		X	X
Sunfishes	*Lepomis* sp.	X	X	
Sunshine bass	*Morone chrysops(hybrid)*		X	
Tadpole madtom	*Noturus gyrinus*		X	
Taillight shiner	*Notropis maculatus*		X	
Threadfin shad	*Dorosoma petenense*	X	X	X
Unkown	Unknown	X	X	
Warmouth sunfish	*Lepomis gulosus*		X	
Weed shiner	*Notropis texanus*		X	
White bass	*Morone chrysops*		X	
White catfish	*Ictalurus catus*	X	X	X
	Total	**22**	**53**	**37**

Prepared by: EMH&JLD Reviewed by: SAR

2.4 Historic Fisheries Studies in the Vicinity of the CWIS

The FWC's annual electrofishing survey in the Apalachicola River (1984-1993 and 2000-2003) indicated that bluegill, redbreast sunfish and blacktail shiner are the most abundant fish in the river with threadfin shad, channel catfish, largemouth bass, and blue striped shiner also being relatively abundant. Table 2-3 summarizes the results of the FWC annual electrofishing survey in the Apalachicola River.

Table 2-3. Historic Fisheries Summary for the Apalachicola River (FWC) (page 1 of 2)

Common Name	Scientific Name	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	2000	2001	2003	Average Count per Year	Percent of Total from All Years
American eel	*Anguilla rostrata*	----	----	----	2	----	1	----	----	----	----	2	----	2	2	0.1
Atlantic needlefish	*Strongylura marina*	8	3	3	3	3	9	5	4	4	2	----	2	5	4	0.5
Atlantic shad	*Alosa sapidissima*	----	----	----	----	----	----	----	----	----	----	3	----	----	3	0.0
Black crappie	*Pomoxis nigromaculatus*	4	8	4	1	5	3	1	3	----	3	----	1	3	3	0.4
Blackbanded darter	*Percina nigrofasciata*	3	----	1	17	6	3	9	18	3	1	1	20	----	7	[illegible]
Blacktail shiner	*Cyprinella venusta*	5	90	176	42	70	55	70	24	28	6	16	3	----	49	6.2
Blue stripped shiner	*Cyprinella caerulea*	10	55	16	29	23	1	94	----	28	37	----	----	----	33	3.1
Bluefin illifish	*Lucania goodei*	----	----	1	----	----	----	----	----	----	----	----	----	----	1	0.0
Bluegill	*Lepomis macrochirus*	303	276	267	207	208	223	293	277	201	139	123	185	378	237	32.5
Bowfin	*Amia calva*	7	8	4	5	3	4	4	3	1	2	9	5	4	5	0.6
Brook silverside	*Labidesthes sicculus*	----	1	2	----	2	2	11	----	1	1	11	----	----	4	0.3
Brown bullhead	*Amieurus nebulosus*	2	----	----	----	----	----	----	----	----	----	----	----	----	2	0.0
Chain pickerel	*Esox niger*	----	----	----	----	----	----	----	1	----	1	----	----	----	1	0.0
Channel catfish	*Ictalurus puntatus*	10	34	7	53	50	69	41	26	15	6	5	10	33	28	3.8
Clear chub	*Hybopsis winchelli*	----	2	5	----	----	----	----	1	----	----	----	----	----	3	0.1
Coastal shiner	*Notropis petersoni*	4	15	----	----	12	68	17	67	50	51	117	----	1	40	4.2
Common carp	*Cyprinus carpio*	2	6	1	4	3	----	1	5	----	----	----	----	1	3	0.2
Dollar sunfish	*Lepomis marginatus*	----	----	----	1	----	----	----	----	----	----	----	----	----	1	0.0
Flathead catfish	*Pylodictis olivaris*	----	2	----	----	----	1	1	----	1	----	1	----	----	1	0.1
Gizzard shad	*Dorosoma petenense*	5	32	30	2	3	5	2	13	12	10	1	1	6	9	1.[illegible]
Grayfin Redhorse	*Moxostoma* sp.	7	7	4	1	3	----	7	8	20	2	3	----	11	7	[illegible]
Green sunfish	*Lepomis cyanellus*	----	----	----	----	----	----	----	----	----	----	3	----	----	3	0.0
Hogchoker	*Trinectes maculatus*	1	4	3	4	25	3	19	1	----	----	116	6	2	17	1.9
Largemouth bass	*Micropterus salmoides*	18	35	49	26	57	32	15	16	21	11	58	9	31	29	4.0
Longnose gar	*Lepisosteus platostomus*	1	1	----	----	----	----	----	5	----	1	----	----	----	2	0.1
Pugnose shiner	*Notropis anogenus*	----	1	1	1	----	----	----	1	1	1	----	----	----	1	0.1
Quillback carpsucker	*Carpiodes cyprinus*	7	36	19	25	28	17	10	7	28	13	17	14	7	18	2.4
Redbreasted sunfish	*Lepomis auritus*	106	67	23	53	125	146	21	14	14	11	31	31	87	56	7.7
Redear sunfish	*Lepomis microlophus*	25	36	36	24	44	74	46	33	13	19	75	12	64	39	5.3
River redhorse	*Moxostoma carinatum*	----	----	----	----	----	----	----	----	----	----	----	2	1	2	0.0

Table 2-3. Historic Fisheries Summary for the Apalachicola River (FWC) (page 2 of 2)

Common Name	Scientific Name	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	2000	2001	2003	Average Count per Year	Percent of Total from All Years
Shoal bass	*Micropterus cataractae*	----	----	----	----	----	1	----	5	----	1	----	----	----	2	0.1
Skipjack herring	*Alosa chrysochloris*	----	----	1	4	----	1	7	3	1	2	----	5	----	3	0.3
Snail bullhead	*Ameiurus brunneus*	1	----	2	----	----	----	2	----	----	----	----	----	----	2	0.1
Southern flounder	*Paralichthys lethostigma*	----	----	3	----	----	----	----	----	----	----	----	----	----	3	0.1
Spotfin mojarra	*Eucinostomus argenteus*	----	----	1	----	----	----	----	----	----	4	40	----	----	15	0.5
Spotted bass	*Micropterus punctulatus*	----	----	----	----	----	3	----	----	4	----	5	9	5	5	0.3
Spotted bullhead	*Ameiurus serracanthus*	----	2	1	1	----	----	3	1	----	----	----	----	----	2	0.1
Spotted gar	*Lepisosteus oculatus*	11	1	1	----	1	3	2	1	----	1	3	----	1	3	0.3
Spotted sucker	*Minytrema melanops*	1	13	10	3	11	14	2	7	32	3	14	12	6	10	1.4
Spotted sunfish	*LepomispPunctatus*	----	----	----	----	1	----	----	----	----	----	7	12	3	6	0.2
Striped bass	*Morone saxatilis*	7	3	2	9	4	55	4	1	12	5	9	9	4	10	1.3
Striped mullet	*Mugil cephalus*	----	2	17	----	30	----	----	1	4	----	16	3	1	9	0.8
Sunshine bass	*Morone chrysops(hybrid)*	7	3	----	21	12	3	----	9	12	3	2	4	16	8	1.0
Tadpole madtom	*Noturus gyrinus*	----	----	2	----	----	----	----	----	----	----	----	----	----	2	0.0
Taillight shiner	*Notropis maculatus*	----	----	----	----	----	----	----	----	----	----	----	12	----	12	0.1
Threadfin shad	*Dorosoma petenense*	8	172	168	24	60	32	9	22	51	62	----	46	----	59	6.9
Warmouth sunfish	*Lepomis gulosus*	----	----	----	1	----	----	----	----	1	1	1	1	2	1	0.1
Weed shiner	*Notropis texanus*	36	2	9	47	21	103	247	29	98	54	143	103	----	74	5.1
White bass	*Morone chrysops*	10	6	2	7	3	----	6	6	7	----	2	1	2	5	0.5
White catfish	*Ictalurus catus*	----	----	----	----	----	----	1	----	----	----	1	----	1	1	0.0
unknown		----	1	----	----	----	----	----	----	----	----	----	----	----	1	0.0
Total		**609**	**924**	**871**	**617**	**813**	**931**	**950**	**612**	**663**	**453**	**835**	**518**	**677**		
Species richness		**27**	**31**	**33**	**28**	**27**	**27**	**29**	**31**	**27**	**29**	**30**	**26**	**26**		

Prepared by: EMH Reviewed by: SAR Source: FWC, 1984-1993 and 2000-2003.

Historical studies allow for the summary of taxonomic identifications and characterizations of all life stages of fish and shellfish known to occur in the vicinity of Plant Scholz CWIS. Couch (1993) describes the fishery (fish and shellfish) in the ACF system as follows:

Fish Diversity. The ACF River basin is inhabited by 148 known species of freshwater fishes in 21 families. Sixteen of these species have been introduced and 6 are endemic. Introduced species include the rainbow and brook trout, white catfish, flathead catfish, goldfish, carp, rough shiner, white bass, green sunfish, smallmouth bass, white crappie, yellow perch, sauger, and walleye. Endemic species include the grayfin redhorse, greater jumprock, bluestripe shiner, highscale shiner, bandfin shiner, and the shoal bass. The gulf sturgeon is the only fish species in the basin listed as threatened by the US Fish and Wildlife Service (USFWS), but an additional 16 species are listed by Alabama, Florida, or Georgia as being threatened, rare, unusual, or of special concern.

Mollusk Diversity. Historic records indicate that the ACF River basin supported a diverse mollusk fauna that includes 49 species of unionid mussels in 17 genera, of which 9 are endemic (Johnson, 1972). Six unionid mussel species currently are listed by the USFWS as candidates for status as threatened or endangered (US Department of the Interior, 1991). The USFWS currently is conducting a survey of the mussel fauna of the basin to determine the status of these species.

According to the FWC, the Upper Apalachicola River/ Lake Seminole is a popular area for white bass fishing (striped bass, sunshine bass, etc.). These species are heavily stocked into the upper Apalachicola River.

2.5 Background Fisheries Survey in the Vicinity of the CWIS

Electrofishing was conducted by MACTEC personnel on a quarterly basis in 2006, and again in the intake canal in the summer of 2007 to characterize the background fishery in the vicinity of the Plant. Electrofishing transects were performed in the intake canal at Plant Scholz and in the Apalachicola River adjacent to Plant Scholz both upstream and downstream of the intake canal. During each electrofishing event, four to six transects were performed in the intake embayment and four to six transects were performed in the Apalachicola River. Electrofishing was conducted at each transect for 10 minutes and the amperage was adjusted based on the temperature, conductivity and type of electrofisher in order to transfer approximately 3000 watts of power to the fish. All fish shocked during each 10 minute transect were collected and kept in a livewell until the end of each transect. After each transect was complete, all fish were identified, measured, weighed and returned to the source waterbody in a place where they would not be shocked again on subsequent transects. A summary of the electrofishing sampling dates is included in Table 2-4.

2.5.1 Summary of Electrofishing Sampling

A total of 37 species of fish (Table 2-5) were collected during the 2006/2007 electrofishing effort conducted in the Intake Canal at Plant Scholz and the Apalachicola River in the vicinity of the plant. The electrofishing survey captured all of the species that were sampled during the impingement study. The species collected represent a variety of warmwater fish that might be expected to occur in the area. The fish captured include herbivorous, omnivorous, and piscivorous species.

Bluegill sunfish was the most commonly collected fish species, and accounted for 14 percent of the total catch in Apalachicola River and 33 percent of the total catch in the Intake Canal. Threadfin shad were the second most commonly captured species in the river (14 percent of total), but were not captured in the Intake Canal.

The minimum length at maturity for bluegills is 75 – 100 mm TL. The length at maturity for hogchoker is 115 snout-vent length (USFWS, 1978). The majority of the bluegills and hogchokers captured in the electrofishing survey were small (<100 mm). They were generally in the size range that would classify them as juveniles and were generally in the same size range as those collected in the impingement samples. The size distribution of fish in the Intake Canal was toward smaller fish (66 percent < 100 mm) (Table 2-6), whereas fish captured in the river tended to be larger (62 percent >10 cm).

Table 2-4. Summary of Electrofishing Sampling Dates at Plant Scholz, January 2006 – August 2007

Sample Date	Intake Canal	Apalachicola River
1/25/2006	SCH-S-1-W-1-IN	SCH-S-1-W-1-RIV
	SCH-S-1-W-2-IN	SCH-S-1-W-2-RIV
	SCH-S-1-W-3-IN	SCH-S-1-W-3-RIV
		SCH-S-1-W-4-RIV
5/18/2006	SCH-S-2-Sp-1-IN	SCH-S-2-SP-1-OUT
	SCH-S-2-Sp-2-IN	SCH-S-2-SP-2-OUT
	SCH-S-2-Sp-3-IN	SCH-S-2-SP-3-OUT
	SCH-S-2-Sp-4-IN	SCH-S-2-SP-4-OUT
		SCH-S-2-SP-5-OUT
		SCH-S-2-SP-6-OUT
8/30/2006	SCH-S-3-S-1-IN	SCH-S-3-S-1-OUT
	SCH-S-3-S-2-IN	SCH-S-3-S-2-OUT
	SCH-S-3-S-3-IN	SCH-S-3-S-3-OUT
	SCH-S-3-S-4-IN	SCH-S-3-S-4-OUT
	SCH-S-3-S-5-IN	SCH-S-3-S-5-OUT
11/7/2006	SCH-S-12-W-30-IN	
	SCH-S-12-W-31-IN	
	SCH-S-12-W-32-IN	
12/7/2006	SCH-S-12-W-34-IN	SCH-S-12-W-33-IN
	SCH-S-12-W-35-IN	SCH-S-12-W-36-IN
	SCH-S-12-W-38-IN	SCH-S-12-W-37-IN
	SCH-S-12-W-39-IN	
8/7/2007	SCH-S-12-W-40-IN	
	SCH-S-12-W-41-IN	
	SCH-S-12-W-42-IN	
8/8/2007	SCH-S-12-W-43-IN	
	SCH-S-12-W-44-IN	

Prepared by: SEM Reviewed by: RDD

Table 2-5. Summary of Fish Captured in 2006/07 Electrofishing Surveys in the Plant Scholz Intake Canal and Apalachicola River near Plant Scholz

Common Name	Scientific Name	Apalachicola River		Scholz Intake Canal	
		Count	Percent of Total	Count	Percent of Total
American eel	*Anguilla rostrata*	3	1.10	0	0.00
Atlantic needlefish	*Strongylura marina*	2	0.73	3	0.61
Atlantic silversides	*Menidia menidia*	1	0.37	34	6.92
Blackbanded darter	*Percina nigrofasciata*	1	0.37	0	0.00
Black crappie	*Pomoxis nigromaculatus*	0	0.00	3	0.61
Black redhorse	*Moxostoma duquesnii*	0	0.00	1	0.20
Blacktail shiner	*Cyprinella venusta*	5	1.83	10	2.04
Blue catfish	*Ictalurus furcatus*	1	0.37	0	0.00
Bluegill	*Lepomis macrochirus*	38	13.92	161	32.79
Bowfin	*Amia calva*	20	7.33	25	5.09
Chain pickerel	*Esox niger*	1	0.37	1	0.20
Channel catfish	*Ictalurus punctatus*	2	0.73	0	0.00
Common carp	*Cyprinus carpio*	2	0.73	0	0.00
Flathead catfish	*Pylodictis olivaris*	1	0.37	0	0.00
Florida gar	*Lepisosteus platyrhincus*	4	1.47	1	0.20
Gizzard shad	*Dorosoma cepedianum*	33	12.09	14	2.85
Golden redhorse	*Moxostoma erythrurum*	1	0.37	3	0.61
Grass carp	*Ctenopharyngodon idella*	0	0.00	1	0.20
Hogchoker	*Trinectes maculatus*	6	2.20	12	2.44
Largemouth bass	*Micropterus salmoides*	15	5.49	28	5.70
Longear sunfish	*Lepomis megalotis*	5	1.83	25	5.09
Longnose gar	*Lepisosteus osseus*	0	0.00	1	0.20
Needlefish	*Strongylura* sp.	0	0.00	2	0.41
Quillback	*Carpoides cyprinus*	17	6.23	4	0.81
Redbreast sunfish	*Lepomis auritus*	5	1.83	2	0.41
Redear sunfish	*Lepomis microlophus*	10	3.66	5	1.02
Redfin pickerel	*Esox americanus americanus*	0	0.00	1	0.20
Redhorses	*Moxostoma* sp.	13	4.76	10	2.04
Shiners	*Notropis* sp.	15	5.49	35	7.13
Silverside shiner	*Notropis candidus*	15	5.49	83	16.90
Skipjack herring	*Alosa chrysochloris*	1	0.37	8	1.63
Spotted gar	*Lepisosteus oculatus*	3	1.10	3	0.61
Striped bass	*Morone saxatilis*	2	0.73	1	0.20
Striped gar	*Lepisosteus* sp.	1	0.37	0	0.00
Striped mullet	*Mugil cephalus*	13	4.76	14	2.85
Threadfin shad	*Dorosoma petenense*	36	13.19	0	0.00
White catfish	*Ictalurus catus*	1	0.37	0	0.00
Total Number		273	100.00	491	100.00
Number of Taxa		31		28	

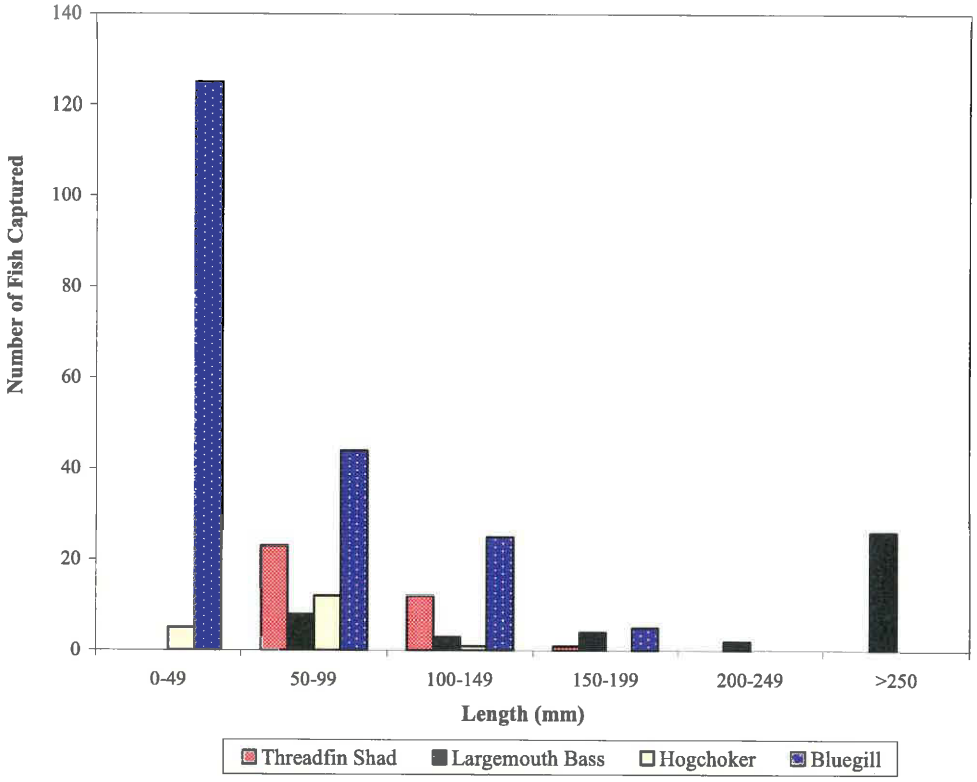
Prepared by: SEM Reviewed by: RDD

Table 2-6. Size Class Distribution of Fish Captured in 2006/07 Electrofishing Surveys near Plant Scholz

Size Class (mm)	Intake Canal # Fish	Intake Canal of Total	River # Fish	River of Total
< 49	152	30.96	30	10.99
50 – 99	172	35.03	74	27.11
100 – 249	79	16.09	39	14.29
250 – 499	64	13.03	101	37.00
500 – 749	23	4.68	27	9.89
≥ 750	1	0.20	2	0.73
Total	491	100.00	273	100.00

Prepared by: SEM Reviewed by: RDD

Figure 2-6. Length-Frequency Distributions of Four Species Commonly Captured in the 2006/07 Electrofishing Survey



Prepared by: SEM Reviewed by: RDD

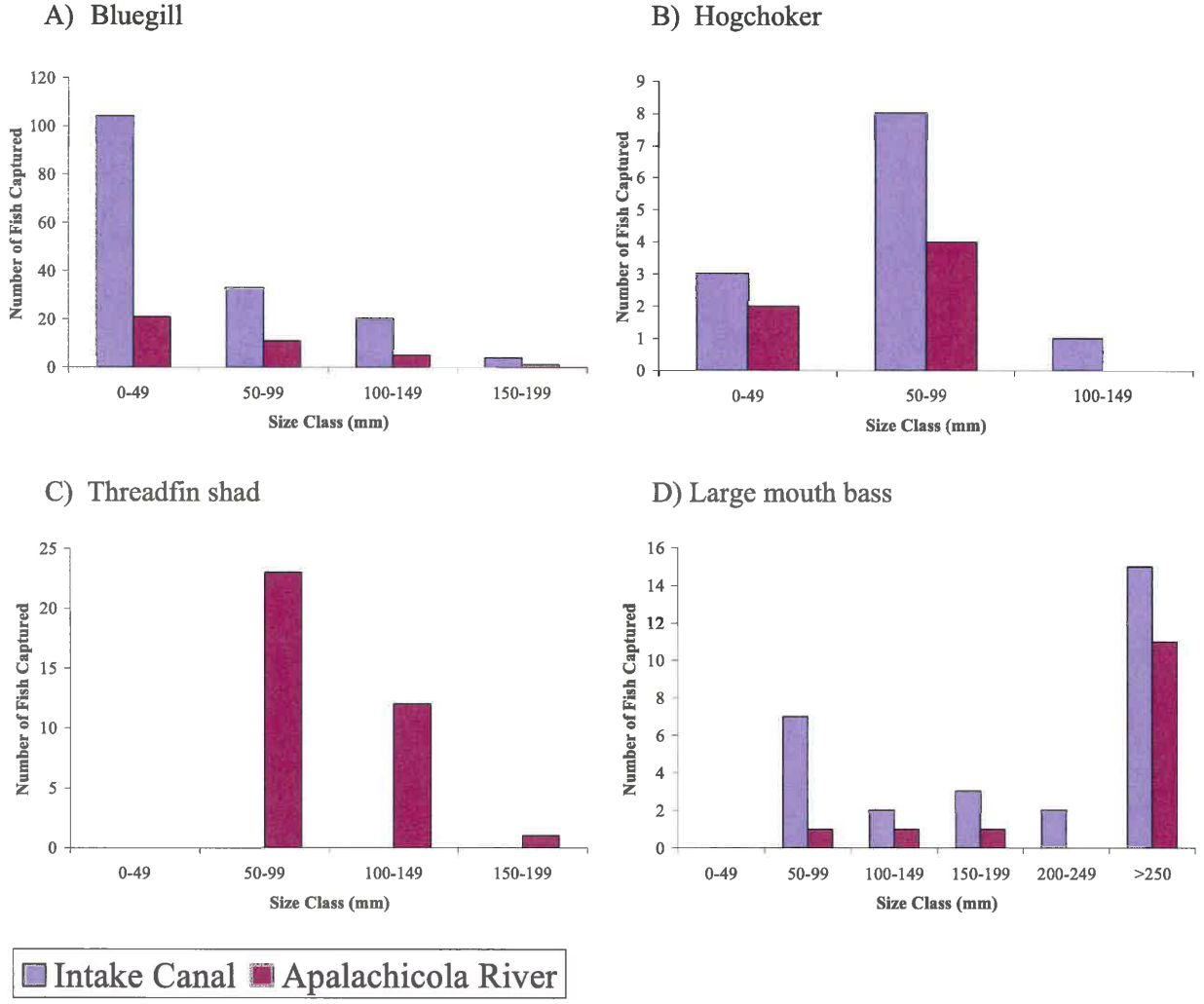
Bluegills and hogchokers were common in both the Intake Canal and the Apalachicola River and the length frequency distributions were similar (Table 2-7; Figure 2-7). Largemouth bass were more commonly captured in the Intake Canal than the river; however, the length frequency distributions were similar (Table 2-7; Figure 2-7). Threadfin shad were only captured in the river. Some larger fish (>30 cm) including blue catfish, channel catfish, flathead catfish, white catfish, common carp, and striped gar were rarely captured during the electrofishing survey; however, they were only captured in the river. Alternately, black crappie, black redhorse, grass carp, needle fish, and redfin pickerel were also rarely captured and only captured in the intake canal. (Table 2-5)

Table 2-7. Size Class Distribution of Four Species Commonly Captured in 2006/07 Electrofishing Survey

Size Class (mm)	Number of Fish Captured							
	Bluegill		Hogchoker		Largemouth Bass		Threadfin Shad	
	Intake Canal	Apalachicola River	Intake Canal	Apalachicola River	Intake Canal	Apalachicola River	Intake Canal	Apalachicola River
0-49	104	21	3	2	0	0	0	0
50-99	33	11	8	4	7	1	0	23
100-149	20	5	1	0	2	1	0	12
150-199	4	1	0	0	3	1	0	1
200-249	0	0	0	0	2	0	0	0
≥250	0	0	0	0	15	11	0	0
Total	161	38	12	6	29	14	0	36

Prepared by: SEM Reviewed by: RDD

Figure 2-7. Size Class Distribution of A) Bluegill; B) Hogchoker; C) Threadfin shad; and D) Large mouth bass Four Species Commonly Captured in 2006/07 Electrofishing Survey



Prepared by: SEM Reviewed by: KEM

Average catch per unit effort (CPUE) for fish in the 2006-2007 electrofishing survey was 90.38 fish per hour in the Apalachicola River compared to 127.79 in the Scholz Intake Canal (Table 2-8). CPUE was generally less than 300 fish per hour except for two events on 11/7/2006 and 12/7/2006 where over 600 fish per hour were captured. There is no seasonal pattern associated with CPUE for electrofishing in the Intake Canal or the Apalachicola River.

Table 2-8. Summary of Catch per Unit Effort of Fish in the Intake Canal and Apalachicola River Near Plant Scholz, 2006-2007

Sample Date	Scholz Intake Canal		Apalachicola River	
	Sample ID	Fish per hour	Sample ID	Fish per hour
1/25/2006	SCH-S-1-W-1-IN	17.96	SCH-S-1-W-1-RIV	60.11
	SCH-S-1-W-2-IN	76.92	SCH-S-1-W-2-RIV	52.33
	SCH-S-1-W-3-IN	65.87	SCH-S-1-W-3-RIV	23.39
			SCH-S-1-W-4-RIV	299.40
5/18/2006	SCH-S-2-Sp-1-IN	107.78	SCH-S-2-SP-1-OUT	185.63
	SCH-S-2-Sp-2-IN	101.80	SCH-S-2-SP-2-OUT	113.77
	SCH-S-2-Sp-3-IN	83.83	SCH-S-2-SP-3-OUT	101.80
	SCH-S-2-Sp-4-IN	83.83	SCH-S-2-Sp-4-OUT	137.72
			SCH-S-2-SP-5-OUT	11.98
			SCH-S-2-Sp-6-OUT	59.88
8/30/2006	SCH-S-3-S-1-IN	149.70	SCH-S-3-S-1-OUT	113.77
	SCH-S-3-S-2-IN	155.69	SCH-S-3-S-2-OUT	0.00
	SCH-S-3-S-3-IN	77.84	SCH-S-3-S-3-OUT	23.95
	SCH-S-3-S-4-IN	119.76	SCH-S-3-S-4-OUT	77.84
	SCH-S-3-S-5-IN	59.88	SCH-S-3-S-5-OUT	35.93
11/7/2006	SCH-S-12-W-30-IN	95.81		
	SCH-S-12-W-31-IN	Short wire		
	SCH-S-12-W-32-IN	760.48		
12/7/2006	SCH-S-12-W-34-IN	0.00	SCH-S-12-W-33-IN	89.82
	SCH-S-12-W-35-IN	89.82	SCH-S-12-W-36-IN	0.00
	SCH-S-12-W-38-IN	670.66	SCH-S-12-W-37-IN	239.52
	SCH-S-12-W-39-IN	77.84		
8/7/2007	SCH-S-12-W-40-IN	17.96		
	SCH-S-12-W-41-IN	23.95		
	SCH-S-12-W-42-IN	17.96		
8/8/2007	SCH-S-12-W-43-IN	17.96		
	SCH-S-12-W-44-IN	65.87		
	Average	**127.79**		**90.38**

Prepared by: SEM Reviewed by: RDD

2.6 Historic Impingement and Entrainment Study at Plant Scholz

Impingement and Entrainment (IM&E) information for Plant Scholz CWIS has been documented previously in:

Breedlove & Associates. Undated. A 316(b) Demonstration for the Scholz Electric Generating Center, Sneads, Florida. Prepared for Gulf Power. 63 pp. + Appendices (Undated, 1970's).

Breedlove and Associates conducted an evaluation of entrainment and impingement potential at Plant Scholz circa 1970's. Based upon a literature review of the life history characteristics of fish in the system, Breedlove and Associates concluded that entrainment and impingement were probably unimportant at Plant Scholz. In addition, the inference was made that the intake canal would provide poor habitat for fish because the low velocity in the intake channel and the sitting of the intake itself would likely discourage fish from entering the canal because the intake canal joins the river at approximately a right angle to the river channel, but angled slightly upstream.

Worst-case entrainment mortality was estimated to be 2.2 percent of fish production based upon mass-balance calculations of river water passing through the plant. In the Breedlove and Associates study, impingement was also considered and assumed to be insignificant since velocities in the intake channel were lower than the USEPA criteria of 0.5 feet per second (fps).

The Breedlove and Associates report is a paper study that did not include collection of fish or shellfish samples. Fish species listed in the Breedlove and Associates report as being species that were probably present in the Apalachicola River near the site include:

- Alabama shad (*Alosa alabamae*) – anadromous, spawn near site January – March
- Skipjack herring– migratory, spawn near site March – April
- Gulf sturgeon (*Acipenser oxyrhynchus desotoi*)
- Striped bass – spawn in Apalachicola River March – May
- Threadfin shad
- Gizzard shad

Anecdotal information from Plant Scholz personnel also suggests that the observed low impingement as reported in the Breedlove and Associates study is typical, as plant personnel have observed very low impingement in subsequent years. The screens require infrequent cleaning, and when they do, it is mostly due to accumulation of deciduous leaves.

2.7 Listed Species and Species of Special Concern

Federal and state databases were consulted to identify fish and shellfish species of concern which might be distributed in this reach of the Apalachicola River. The riverine listed species (Table 2-9) included four species of fish and 11 freshwater bivalves, one snake, and two turtles. None of the fish or shellfish species listed below were impinged at Plant Scholz during sampling between May 2005 and October 2007.

Table 2-9. Fish and Shellfish Species of Special Concern in Jackson County, FL

Common Name	Scientific Name	Status	Observed During IM Study?
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Federally Threatened, State Species of Special Concern	No
Shoal bass	*Micropterus* sp.	State Species of Special Concern	No
Bluenose shiner	*Pteronotropis welaka*	State Species of Special Concern	No
Gulf moccasinshell	*Medionidus penicillatus*	Federally Endangered	No
Oval pigtoe	*Pleurobema pyriforme*	Federally Endangered	No
Tapered pigtoe	*Quincuncina burkei*	Candidate for Federal Listing	No
Fat threeridge	*Amblema neislerii*	Federally Endangered	No
Chipola slabshell	*Elliptio chipolaensis*	Federally Threatened	No
Purple bankclimber	*Elliptoideus sloatianus*	Federally Threatened	No
Southern sandshell	*Lampsilis australis*	Candidate for Federal Listing	No
Shinyrayed pocketbook	*Lampsilis subangulata*	Federally Endangered	No

Source: FNAI, 2006 Database Search for Jackson County, FL.
Prepared by: HRH Reviewed by: JLD

Gulf sturgeon, a subspecies of Atlantic sturgeon, were historically abundant in the Apalachicola River, which supported a commercial fishery until the early 1970's. In 1991, the gulf sturgeon was listed as threatened by USFWS. Recent studies on the gulf sturgeon in the Apalachicola River (summarized in and also conducted by Zehfuss, *et al.*, 1999) indicate that the majority of the sturgeon are found in the downstream vicinity of the Jim Woodruff Dam and that recruitment into the population is low. In September 2006, the USFWS issued a Biological Opinion (BO) on Jim Woodruff Dam operations issues in order to improve downstream conditions for gulf sturgeon and federally listed freshwater mussels.

2.8 Representativeness

Historic information on the Apalachicola River allows for the characterization of fisheries populations from the Apalachicola River in the vicinity of Plant Scholz. The FWC study conducted during the years between 1984 and 2003 indicates the species present (electroshocked) in the river at that time; however, the FWC study does have limitations, which include:

- Collection time of year for each study year is unknown,
- Collection time of day for each study year is unknown,
- Standardization (or lack of) electroshocking gear is unknown.

The electrofishing survey conducted as part of this study provides information relative to fish distribution, habitat and size in the vicinity of Plant Scholz. Data collected from the Impingement Study which comprises this report would seem to be representative of the fishery in the Apalachicola River. All of the species identified in this study have been collected in the vicinity of the plant over the past two decades in the state's fisheries monitoring program (Table 2-3). The state's species list is substantially longer, which is to be expected given that their dataset represents a much more substantial sampling effort and is presumed to have occurred in multiple habitats in the river.

The studies, therefore, are considered to provide representative information with respect to taxonomic presence of fish in the vicinity of the Scholz CWIS; and therefore, are considered to provide

representative information with respect to the requirements of 40 CFR 125.95(3)(i) and provide an adequate taxonomic list of fish present within the Apalachicola River in the vicinity of the CWIS.

2.9 Quality Assurance/Quality Control

The information reported in Table 2-1 was documented by the FWC, with the limitations as listed above. State agencies generally follow internal Quality Assurance/Quality Control (QA/QC) measures. Therefore, it is assumed that the data passed basic QC checks. Consequently these data are somewhat useful in supporting the Comprehensive Demonstration Study at Plant Scholz.

3.0 Impingement Study Methodology

3.1 Impingement Sampling Methods

Impingement study methodology is discussed in the following paragraphs, and was conducted in accordance with *Standard Operating Procedures for Aquatic Ecological Sampling and Analysis Submitted in Support of the Section 316(b) Impingement and Entrainment Characterization Studies in Compliance* with Section 316(b) Phase II Rules (MACTEC, 2005a).

3.1.1 Pre-sampling Activities

Impingement sampling was conducted by either MACTEC Engineering and Consulting, Inc. (MACTEC) or Gulf Power personnel on a bi-weekly basis from May 2005 to June 2006 and by MACTEC personnel monthly from March – May and August – October 2007. Impingement sampling was conducted using a collection basket, which was placed within the screen wash discharge flume located at the CWIS.

Plant Scholz Impingement Sampling Basket

Traveling screens were operated and backwashed in advance of each sampling event to remove any trash or debris that accumulated on the screens or in the screen wash trough. Debris and screen wash water were collected using a basket place under the screen wash discharge located at the CWIS. Subsequent to the backwashing of traveling screens, and at the onset of each 24-hour sampling event, Gulf Power personnel placed the collection basket under the screen wash discharge to collect the sample.

3.1.2 Impingement Sample Collection

Impingement samples were collected using a collection basket consisting of a net with a 3/8" mesh. At the onset of each 24-hour sampling event, Gulf Power personnel placed the clean collection device under the screen wash discharge located at the CWIS. After the 24-hour sampling event, the basket was removed, cleaned of all organisms, cleaned of all debris, and stored at Plant Scholz for the next sampling event.

In addition to the regular biweekly impingement sample, diel variability in impingement was assessed by collecting two discrete 12-hour samples (one daytime, one nighttime) on selected dates during each season.

Sampling date, start time, and stop time were recorded on field data sheets for all samples. Additionally, daily plant operational information, such as the number of operating pumps and traveling screens was also obtained and was used to adjust daily catch information to flow-based catch rates.

3.1.3 Field Processing

When MACTEC personnel performed impingement sampling, competent fisheries biologists processed the impingement samples on site. Samples were processed by counting, measuring weight to the nearest gram using a digital top-loading scale, and measuring length to the nearest millimeter (mm) Total Length

(TL) using a measuring board. Identification of specimens contained in the samples was to the lowest practicable taxonomic level using one or both of the following taxonomic keys:

- Eddy, Samuel. 1969. How to Know the Freshwater Fishes, 2nd Edition. WM.C. Brown Company Publishers.
- Hoese, H.D. and R.H. Moore. 1998. Fishes of the Gulf of Mexico, 2nd Edition. Texas, Louisiana, and Adjacent Waters. Texas A&M University Press.

Fish in the samples were sorted by species. Individual specimens were measured to the nearest millimeter TL, and weight was measured to the nearest gram. If partial fish (head only, tail only) were present in the sample, measurements were accompanied by a description of the fish body part. Fish were recorded as live if the fish was able to maintain equilibrium in an aerated bucket. Fish were recorded as moribund or stunned if they were unable to maintain equilibrium, could not swim down, were lying on the bottom of the aerated bucket or had extruded the swim bladder. Fish were recorded as dead if they had unmoving gill flaps, no body movement and clouded eyes. Fish were recorded as previously dead if they showed any signs of decomposition or extensive fungus growth.

3.1.4 Collection of Non-Fish Organisms

Other organisms found in the impingement sample, such as bivalves, were identified to a practicable taxonomic level and were counted and weighed (in the case of few specimens) or weighed in bulk (in the case of numerous specimens).

3.1.5 Treatment of Live/Dead Fish

When MACTEC personnel performed impingement samples, all live fish were returned to the source body of water in a suitable area where they were not subject to reimpingement, subsequent to processing. Sampled fish were examined for presence of tags. No tags were found during this study.

3.1.6 Laboratory Processing

When Gulf Power personnel performed impingement sampling, all fish were stored frozen by Gulf Power personnel until a MACTEC field technician could retrieve the samples from Plant Scholz. The frozen fish were brought back to the MACTEC Envrionmental Assessment and Toxicoloty (EAT) Laboratory for processing. Fish in the samples were sorted by species. Individual specimens were measured to the nearest mm TL, and weight was measured to the nearest gram. If partial fish (head only, tail only) were present in the sample, measurements were accompanied by a description of the fish body part. Fish were recorded as live (by Gulf Power personnel upon sampling) if the fish was able to maintain equilibrium in an aerated bucket. Fish were recorded as moribund or stunned if they were unable to maintain equilibrium, could not swim down, were lying on the bottom of the aerated bucket or had extruded the swim bladder. Fish were recorded as dead if they had unmoving gill flaps, no body movement and clouded eyes. Fish were recorded as previously dead if they showed any signs of decomposition or extensive fungus growth.

3.2 Water Quality Measurements

Water quality data, including pH, DO, temperature and conductivity were obtained during each impingement sampling event by Gulf Power personnel and during each electrofishing event by MACTEC personnel. Water quality measurements were obtained at the CWIS prior to impingement sampling and at

the transect locations during electrofishing events and results were recorded on field data sheets. Details concerning detections limits, calibration procedures, and meter specifications are given in the *Standard Operating Procedures for Aquatic Ecological Sampling and Analysis* (MACTEC, 2005a) , the *Proposal for Information Collection Plant Scholz* (MACTEC, 2005b), and the *Quality Assurance Project Plan for Impingement Mortality and Entrainment Characterization Studies at Gulf Power* (MACTEC, 2005c). The water quality results are discussed in Section 2.2.

3.3 Quality Assurance/Quality Control

The following paragraphs summarize QA/QC procedures followed during the study, in general accordance with the *Quality Assurance Project Plan for Impingement Mortality and Entrainment Characterization Study at Gulf Power* (MACTEC, 2005c).

3.3.1 Taxonomic Identification of Fish and Shellfish

Proper taxonomic identification of fish and shellfish collected as part of the impingement study and field electroshocking survey was assured by using properly trained personnel who are familiar with freshwater fish and shellfish. Reviews of the accuracy of field and laboratory taxonomy of impingement samples was undertaken as part of the auditing program. Results of the Field and Laboratory QA audits indicated there was 100 percent agreement on taxonomic identification. A second qualified taxonomist confirmed the voucher collections for the impingement study. There was 100 percent agreement between the two taxonomists in the identifications of the vouchers. Additionally, a voucher collection was established for the Plant in which several specimens of each identified taxon were preserved and retained in labeled containers. Voucher collections were reviewed for accuracy by a second qualified fisheries biologist. All original voucher identifications were confirmed.

3.3.2 Fish Measurement and Enumeration

Proper measurement and enumeration of all fish and shellfish collected as part of the impingement study was assured by using properly trained personnel who are familiar with fish and shellfish collection and processing techniques. Additionally, assessments of the accuracy of field measurement and enumeration of collected specimens were undertaken as part of the field auditing program. A series of field audits recorded the following efficiencies in sample sorting (total fish and shellfish): 96 percent, 90 percent, and 88 percent. Similarly, collections returned to the laboratory for processing were subject to laboratory auditing procedures in which fish and shellfish measurement and enumeration accuracy was evaluated. Project audits of batch count repeated measures (N=2) resulted in a relative percent differences of 0-0 percent. Project audits of length repeated measures (N=6) resulted in a relative percent difference of 0-5 percent. One sample had a difference of 10 mm between measures on a large fish; all other control checks had differences of 0 mm on fish of varying sizes. Project audits of weight repeated measures (N=11) resulted in a relative percent difference of 0-14 percent. One fish had a measurement difference of 0.3 grams between measurements of 2.2 and 1.9 grams, for a relative percent difference of 14 percent. Fish weights for the repeated measures checks ranged from < 1 gram to 193.8 grams. Laboratory audits and QA verification of fish measurement and enumeration was based on a frequency of 10 percent of all sample collections returned to the laboratory for processing.

3.3.3 Water Quality Instrument Calibration and Frequency

During electrofishing events, water quality instruments were calibrated immediately prior to use in the field. The calibration procedures followed standard manufacturers' instructions to ensure equipment functioned within tolerances established by the manufacturers. A record of the instrument calibration was maintained in an instrument calibration log book by the field technician calibrating the equipment. For impingement sampling, water quality parameters were measured and recorded by Gulf Power personnel.

Water quality parameters (temperature, DO, conductivity, and pH) were generally recorded during each impingement sampling event; however, water quality parameters were not recorded on the following dates due to equipment failure or malfunction:

- Temperature was not recorded on January 9 and February 21, 2006.
- DO was not recorded on May 3, May 17, May 31, August 23, 2005, and January 9, 2006.
- Conductivity was not recorded on May 3, May 17, May 31, August 23, August 24, 2005, January 9, 2006, and February 21, 2006.
- pH was not recorded on August 23, 2005 and January 9, 2006.

3.3.4 Sample Handling and Custody

Water quality measurements and sample descriptions were recorded on field data sheets. Entries were made in ink, signed or initialed by the sampler, and dated. If an incorrect entry was made, the information was crossed out with a single strike mark that was initialed and dated by the sampler.

Sample identification numbers were assigned prior to sample collection. For example, a sample identified as "SCH-a-b-c", where SCH equals Plant Scholz; a equals sampling method; b equals event number; and c equals sampling period (00 is a 24 hour sampling event; 12 is the first 12 hours of a sampling event; and 24 is the second 12 hours of a sampling event). For samples collected for laboratory processing, the following sample and or specimen packaging and shipment procedures were used to ensure that the samples/specimens arrived at the laboratory in good condition.

Gulf Power and MACTEC personnel were personally responsible for the care and custody of the samples/specimens until they were transferred to MACTEC staff or properly dispatched to a courier with tracking capability. Sample containers were identified by use of sample labels with sample numbers, sampling locations, the date/time of collection, name of samplers, and if appropriate specimen identification. Sample labels were completed using waterproof ink. Sample/specimen containers were placed in a box or cooler to minimize disturbance and breakage of sample containers.

3.3.5 Data Management

Data was recorded onto specific project forms immediately after measurements were taken. The field data were entered into a project developed *Access*™ database (MACTEC's Biological Database Management System) and were reviewed for accuracy and completeness. Reports were generated from the database and/or from database information exported into *Excel*™ and *SYSTAT*™ for reporting or calculation/statistical purposes. All electronic files (data, database, reports, etc.) were stored on the office local area network under the project number in an appropriately named subdirectory. Original field logbooks and any additional raw data are maintained in the project files located in the MACTEC office central files under the project number.

3.4 Health and Safety Precautions

Proper health and safety procedures were followed during all sampling events. MACTEC policy requires a "tailgate safety briefing" occur prior to the start of any field sampling effort. MACTEC staff participating in the field studies were trained in company health and safety policies and procedures prior to field activity. During electrofishing events, all MACTEC field team members followed the MACTEC Electrical Safety, Environmental Safety and Health Procedure (MACTEC, 2006). Field team members wore life vests, and field team members responsible for dipnetting fish from the bow of the boat also wore heavy rubber gloves and polarized sunglasses. Thicker cloth gloves were worn for fish handling to reduce the possibility of puncture wounds and cuts from fish spines, scutes and teeth.

Formalin was used to preserve voucher specimens collected during the impingement study. Formalin was stored in a tightly sealed container and was kept away from ignition sources. Formalin was handled in well-ventilated areas to avoid inhalation. Protective gear (i.e. latex gloves and protective eyewear) were worn when handling formalin according to MACTEC Standard Operating Procedures (SOPs).

4.0 Results and Discussion

Impingement sampling was conducted at Plant Scholz from May 2005 to October 2007 (Table 4-1). Thirty-eight sampling events were conducted, including six diurnal samples. Raw data for all impingement samples and electroshocking data was recorded in MACTEC's Biological Database Management System adapted for use in the Scholz impingement and electrofishing studies. Output from this database can be found in Appendix A for impingement fisheries reports, Appendix B for water quality reports and Appendix C for plant operational reports.

Although the collection of impingement samples was originally scheduled for a 12-month period (May 2005 to May 2006), Gulf Power personnel continued to collect samples and record water quality values through July 25, 2006 and again for several months in 2007. Diurnal samples were not collected after May 2006.

Table 4-1. Identification of Impingement Samples Collected (page 1 of 2)

Sample ID	Sample Date
SCH-I-01-00	5/3/2005
SCH-I-02-00	5/17/2005
SCH-I-03-00	5/31/2005
SCH-I-04-00	6/14/2005
SCH-I-05-00	6/29/2005
SCH-I-06-00	7/13/2005
SCH-I-07-00	7/26/2005
SCH-I-08-00	8/9/2005
SCH-I-09-12	8/23/2005
SCH-I-09-24	8/24/2005
SCH-I-10-12	9/6/2005
SCH-I-10-24	9/7/2005
SCH-I-11-00	9/20/2005
SCH-I-12-00	10/5/2005
SCH-I-13-00	10/18/2005
SCH-I-14-00	11/3/2005
SCH-I-15-00	11/15/2005
SCI-I-16-00	11/29/2005
SCH-I-17-00	12/13/2005
SCH-I-18-00	12/27/2005
SCH-I-19-12	1/9/2006
SCH-I-19-24	1/10/2006
SCH-I-20-00	2/7/2006
SCH-I-21-12	2/20/2006
SCH-I-21-24	2/21/2006
SCH-I-22-00	3/7/2006
SCH-I-23-00	4/4/2006
SCH-I-24-00	4/18/2006
SCH-I-25-00	5/3/2006
SCH-I-26-00	5/15/2006
SCH-I-27-00	5/30/2006
SCH-I-28-12	6/13/2006
SCH-I-28-24	6/13/2006

Table 4-1. Identification of Impingement Samples Collected (page 2 of 2)

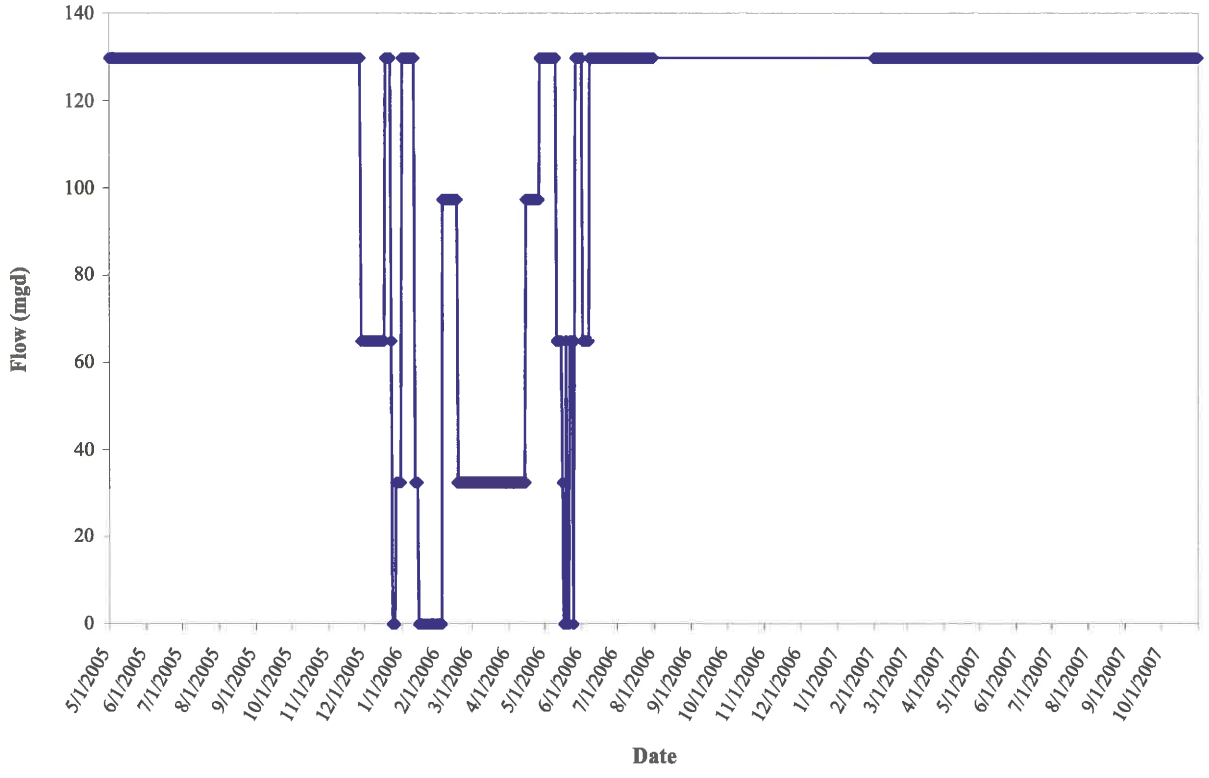
Sample Date	Impingement
SCH-I-29-12	6/26/2006
SCH-I-29-24	6/27/2006
SCH-I-30-00	7/11/2006
SCH-I-31-00	7/25/2006
SCH-I-31-24	3/7/2007
SCH-I-32-24	4/25/2007
SCH-I-33-24	5/11/2007
SCH-I-34-24	8/7/2007
SCH-I-35-24	9/19/2007
SCH-I-36-24	10/1/2007
SCH-I-37-24	10/23/2007

Prepared by: SEM Reviewed by: JLD

4.1 Summary of Plant Operations

Plant operations are often a primary determinant of impingement rates at a given facility. During the study year, plant water use varied from day to day but on average Scholz withdrew approximately 130 MGD (Figure 4-1).

Figure 4-1. Water Usage in Million Gallons per Day for Plant Scholz for the 2005-2007 Study Period



Prepared by: JLD Reviewed by: NMG

4.2 Summary of Impingement Rates and Temporal Variability

4.2.1 Impingement Overview

Twenty-two species of fish (Table 4-2) and three species of shellfish (Table 4-3) were collected during the 19-month impingement sampling effort conducted at Plant Scholz. Hogchoker and bluegill sunfish were the most commonly captured species (quantity 130 and 72, respectively), and together accounted for 68 percent of the total fish catch (Table 4-2). Asiatic clam (*Corbicula* sp.), an invasive species, was the most commonly collected shellfish during the 19-month study conducted at Plant Scholz (Table 4-3). Total biomass of fish and shellfish collected over the 19-month study was 3.2 kilograms (kg).

Table 4-2. Taxonomic Composition of Fish Impinged at Plant Scholz, May 2005–October 2007

Common Name	Scientific Name	Number	Percent of Total
Atlantic needlefish	*Strongylura marina*	1	0.34
Atlantic silverside	*Menidia menidia*	1	0.34
Black crappie	*Pomoxis nigromaculatus*	15	5.07
Blacktail shiner	*Cyprinella venusta*	3	1.01
Blue catfish	*Ictalurus furcatus*	1	0.34
Bluegill	*Lepomis macrochirus*	72	24.32
Catfishes	Ictaluridae	3	1.01
Channel catfish	*Ictalurus punctatus*	4	1.35
Flathead catfish	*Pylodictis olivaris*	1	0.34
Gars	Lepisosteidae	1	0.34
Gizzard shad	*Dorosoma cepedianum*	2	0.68
Hogchoker	*Trinectes maculatus*	130	43.92
Largemouth bass	*Micropterus salmoides*	5	1.69
Madtoms	*Noturus* sp.	1	0.34
Pipefish	*Syngnathus* sp.	1	0.34
Redbreast sunfish	*Lepomis auritus*	2	0.68
Shiners	*Notropis* sp.	4	1.35
Silverside shiner	*Notropis candidus*	3	1.01
Skipjack herring	*Alosa chrysochloris*	1	0.34
Sunfishes	Centrarchidae	1	0.34
Threadfin shad	*Dorosoma petenense*	27	8.78
Unidentified larva	*Unidentified larva*	1	0.34
White catfish	*Ictalurus catus*	17	5.74
	Total Number	**297**	**100.00**
	Number of Taxa	**22**	

Prepared by: JLD Reviewed by: SEM

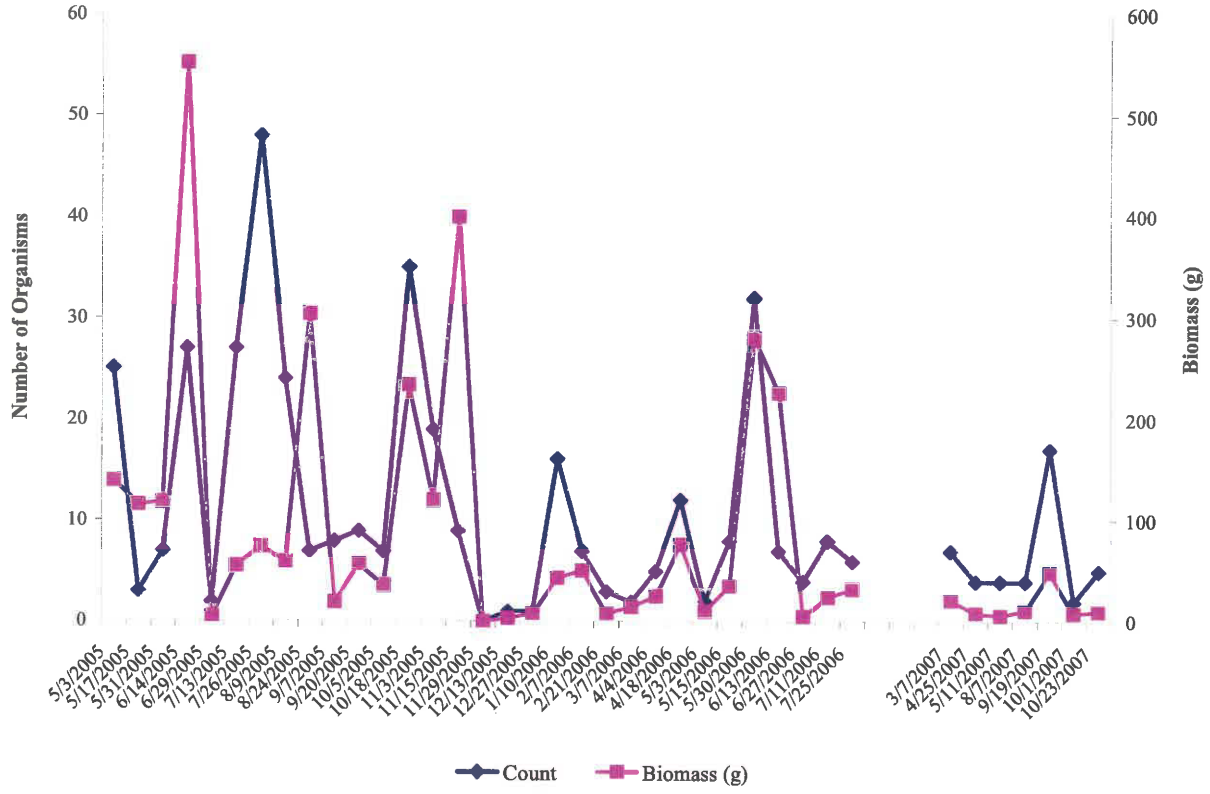
Table 4-3. Taxonomic Composition of Shellfish Impinged at Plant Scholz, May 2005–October 2007

Common Name	Scientific Name	Number	Percent of Total
Asiatic clam	*Corbicula* sp.	72	61.54
Crayfish	*Procambarus* sp.	43	36.75
Grass shrimp	*Palaemonetes* sp.	2	1.71
	Total Number	**117**	**100.00**
	Number of Taxa	**3**	

Prepared by: JLD Reviewed by: SEM

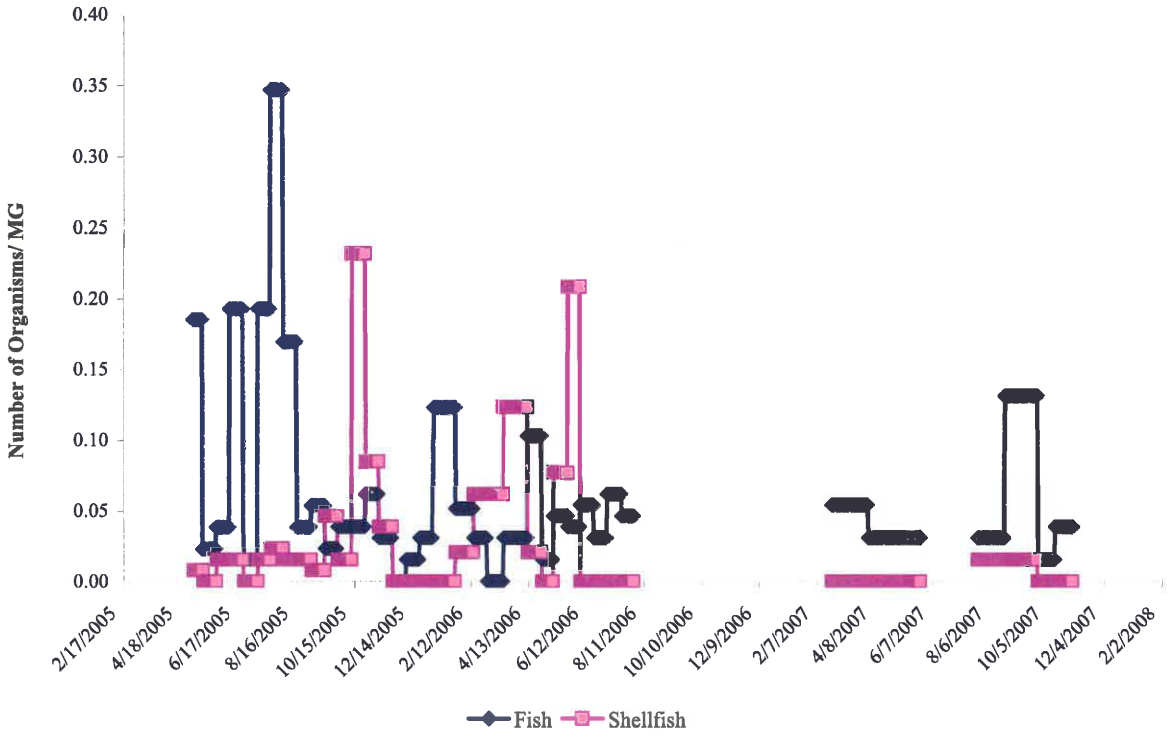
Fish and shellfish impingement were low at Plant Scholz (Figure 4-2) staying below 50 organisms on any given date throughout the study. Impingement results expressed on a flow-weighted basis (Figures 4-3 and 4-4) indicate that in general fish were impinged in higher numbers and biomass than shellfish across most months. Fish and shellfish impingement was substantially less than one individual organism per million gallons of intake water (0.37 organisms per million gallons) (Figure 4-3) and less than 4.26 grams of total biomass per million gallons of intake water (Figure 4-4).

Figure 4-2. Raw Impingement for Fish and Shellfish Counts and Biomass at Plant Scholz



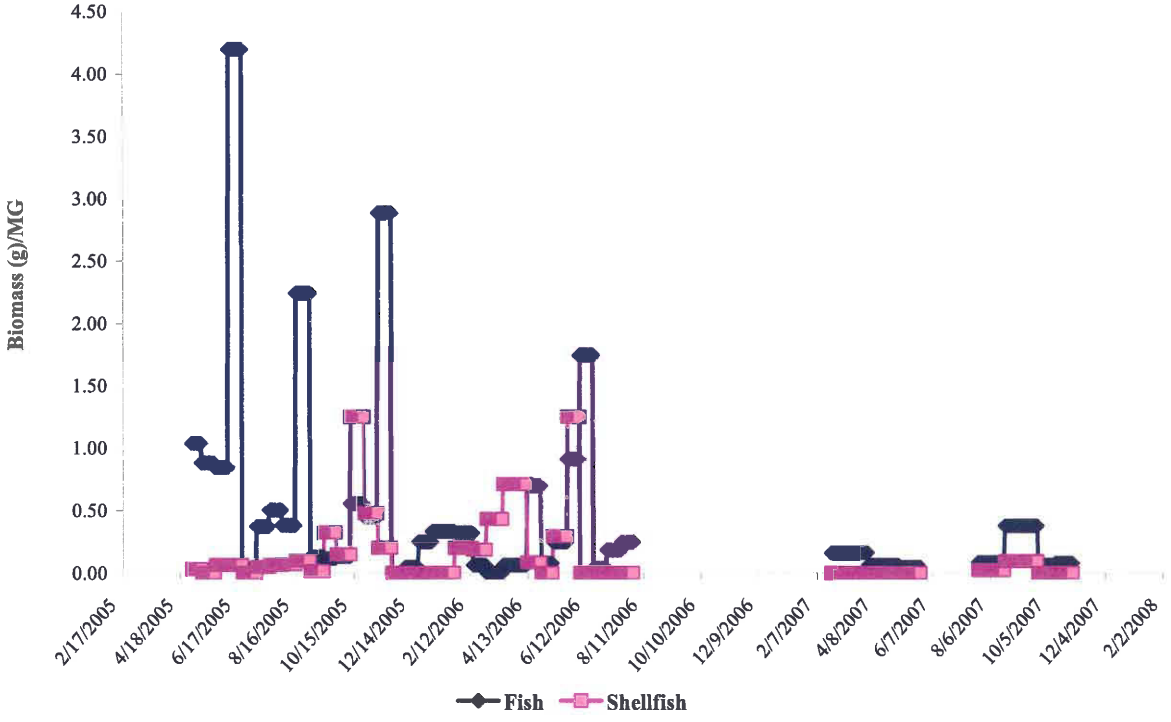
Prepared by: SEM Reviewed by: JLD

Figure 4-3. Flow Weighted Impingement of Fish and Shellfish by Count for Plant Scholz, May 2005 – October 2007



Prepared by: SEM Reviewed by:JLD

Figure 4-4. Flow Weighted Impingement of Fish and Shellfish Biomass for Plant Scholz, May 2005 – October 2007



Prepared by: SEM Reviewed by: JLD

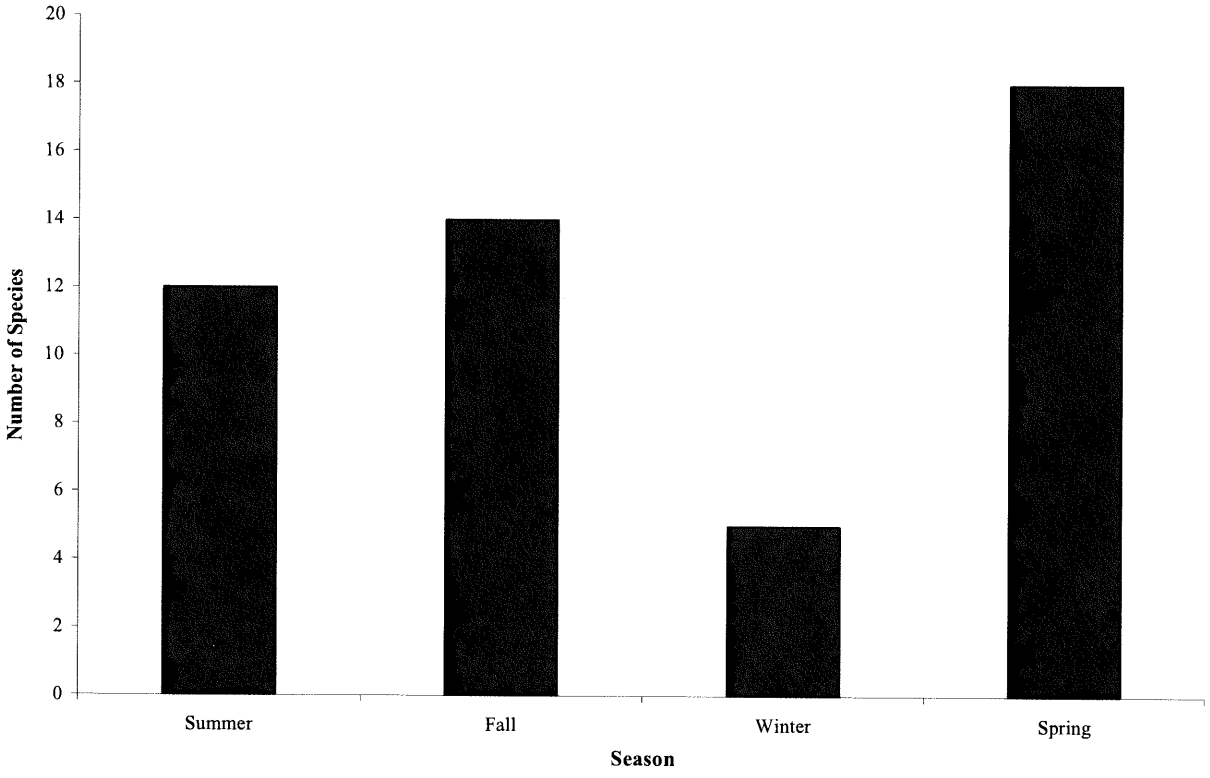
4.2.2 Seasonal Impingement

Impingement expressed on a count basis (Figure 4-3) indicated low impingement rates, with no discernable seasonal trends. For example, the highest impingement rates over the study, on a count basis, occurred in July and October of 2005 with some of the lowest impingement rates bracketing those higher events.

Impingement expressed on a biomass basis (Figure 4-4) indicated low impingement rates, with no discernable seasonal trends. For example, the highest biomass of impinged organisms over the study occurred in May, August and November of 2005 with some of the lowest impingement rates bracketing those high events.

Species richness across seasons was variable in the impingement study (Figure 4-5) with the lowest richness observed during the winter months. The highest species richness was observed during the spring, a time when fish are migrating to spawn, including anadromous species like gizzard shad(Table 4-4).

Figure 4-5. Fish and Shellfish Species Richness by Season from May 2005 through October 2007 Impingement Study at Plant Scholz



Prepared by: SAR&JLD Reviewed by: SEM

Of the 25 species of fish and shellfish which were identified in the 2005-2007 impingement study at Plant Scholz, only 4 were collected across all four seasons (Tables 4-4 and 4-5). Those species were: crayfish, bluegill, threadfin shad, and hogchoker. All other species collected were missing from one or more sampling seasons.

Table 4-4. Life Stages of Fish Species and Season(s) of Impingement for Plant Scholz

Common Name	Scientific Name	Winter	Spring	Summer	Fall
Atlantic needlefish	*Strongylura marina*				A
Black crappie	*Pomoxis nigromaculatus*		J,A	J,A	A
Blacktail chiner	*Cyprinella venusta*		J,A		
Blue catfish	*Ictalurus furcatus*		J		
Bluegill	*Lepomis macrochirus*	J	J,A	J, A	J,A
Catfishes	*Ictalurus* sp.		A	A	
Channel catfish	*Ictalurus punctatus*		A	J	J
Flathead catfish	*Pylodictis olivaris*		J		
Gars	*Lepiosteus* sp.			unk	
Gizzard shad	*Dorosoma cepedianum*		J,A		
Hogchoker	*Trinectes maculatus*	J, A	J,A	J, A	J,A
Largemouth bass	*Micropterus salmoides*		J	J	
Redbreast sunfish	*Lepomis auritus*		J		
Shiners	*Notropis* sp.		J	J	
Skipjack herring	*Alosa chrysochloris*				J
Sunfishes	*Lepomis I*			unk	
Threadfin shad	*Dorosoma petenense*	A	J	J,A	J
Unidentified larva	Unidentified Larva				L
White catfish	*Ictalurus catus*		J	J, A	J
Madtoms	*Noturus I*				A
AtlanticsSilverside	*Menidia menidia*				J
Pipefish	*Syngnathus sp.*				J
Silverside shiner	*Notropis candidus*	J	J		

J=Juvenile, A=Adult, unk=unknown, L = Larva
Prepared by: EMH&JLD Reviewed by: SEM

Table 4-5. Life Stages of Shellfish Species and Season(s) of Impingement for Plant Scholz

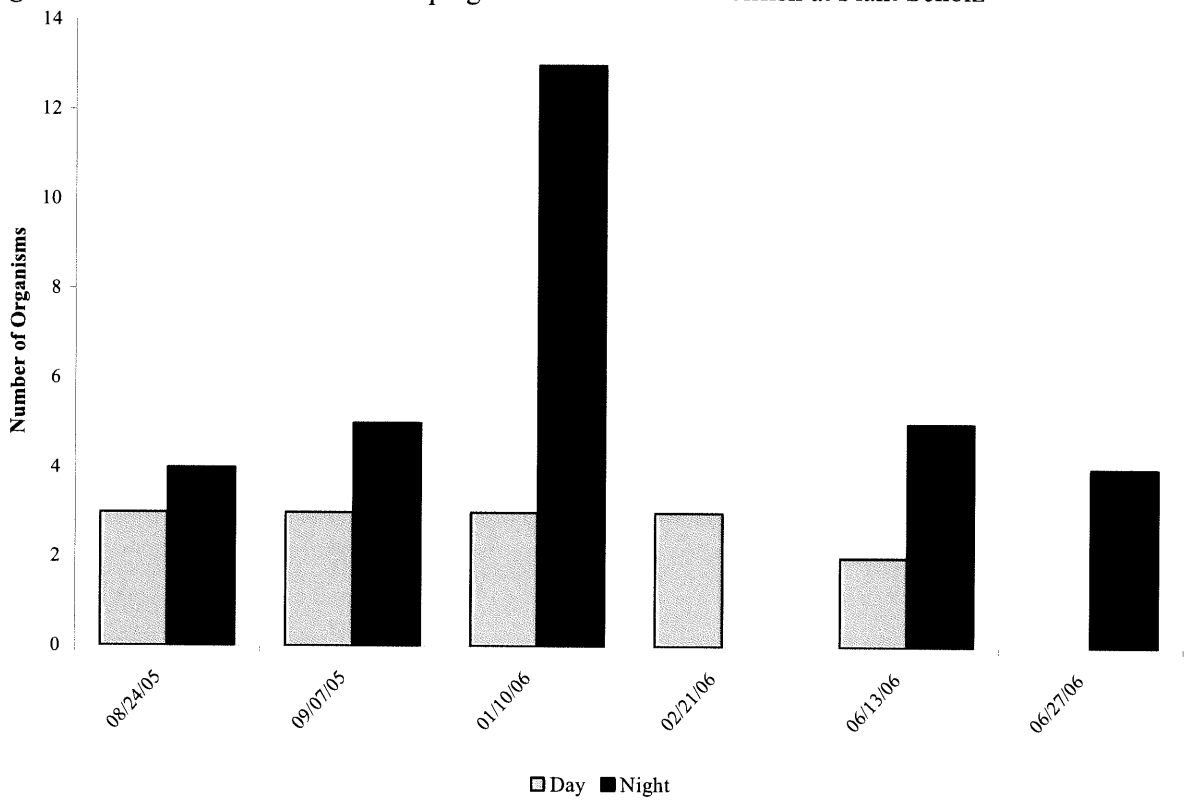
Common Name	Scientific Name	Winter	Spring	Summer	Fall
Asiatic clam	*Corbicula* sp.		A	A	A
Crayfish	*Procambarus* sp.	A	A	A	A
Grass shrimp	*Palaemontes* sp.		A		

J=Juvenile, A=Adult
Prepared by: EMH&JLD Reviewed by: SEM

4.2.3 Diel Patterns

Day versus night sampling was conducted on 5 separate sampling dates (Figure 4-6). Night-time impingement rates exceeded day-time impingement on all of the sampling dates; however, catch rates were very low (0-13 organisms) in all samples.

Figure 4-6. Diurnal Variation in Impingement of Fish and Shellfish at Plant Scholz



Prepared by JMD Reviewed by: SEM
Source: MACTEC, 2009

4.2.4 Impingement Patterns of Representative Species (RS)

Bluegill, hogchoker, and Asiatic clam accounted for the majority of the total abundance of fish and shellfish collected during the impingement study at Plant Scholz from 2005-2007 (Table 4-2). Ten of the 25 species of fish and shellfish impinged during this study were present only once.

On a total count basis, hogchokers and bluegill were the most commonly impinged fish species in the study. In terms of biomass, bluegill comprised the majority of the total biomass, followed by gizzard shad and the Asiatic clam.

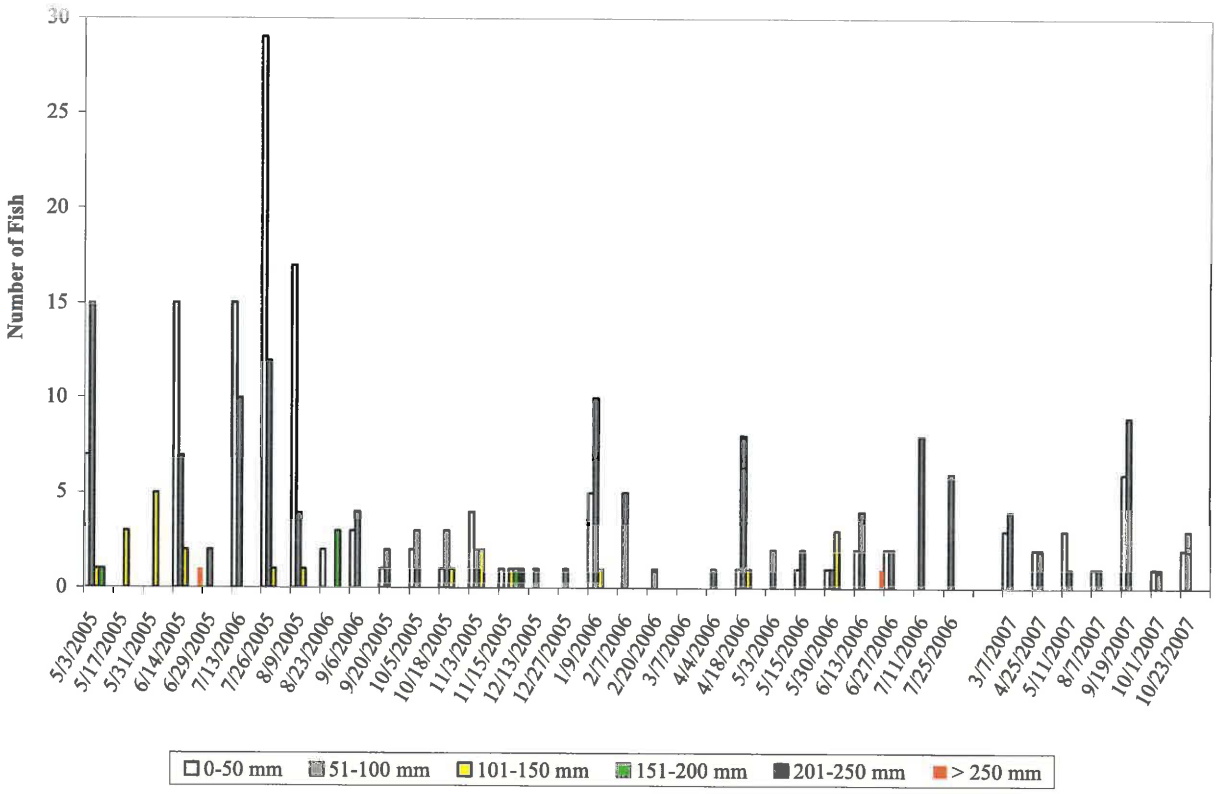
Most of the fish impinged at Plant Scholz were in the smaller size classes (Figure 4-7). This is to be expected because: these fish are not strong enough swimmers to escape the intake if they get within the pump's influence; smaller fish are usually more abundant than larger fish in aquatic systems; and the diel data discussed above indicate that most fish are impinged at night which is when smaller fish are more active. Only three fish greater than 200 mm were captured during the study (Figure 4-7), a gizzard shad, a bluegill, and a channel catfish.

Bluegill (*Lepomis macrochirus),* a benthopelagic subtropical species, was commonly collected in the intake canal near the power plant. Most bluegill impinged at Plant Scholz were juveniles (<100 mm TL; Figure 4-8). On many dates bluegill were not represented in the samples; their relative importance in the overall impingement calculation can be explained by relatively high counts during a few sampling events.

Hogchoker (*Trinectes maculates*), a demersal subtropical species, was commonly collected in the intake canal near the powerplant. Hogchoker impingement was greatest during periods of high flow. Sixty-three percent of the hogchokers collected during the 2005/2007 impingement sampling were collected during five sampling events between May and August 2005. Average stream flow during this period was above average conditions (see Figure 2-1). Most hogchoker impinged at Plant Scholz were found to be in the <50 mm length category (Figure 4-9)

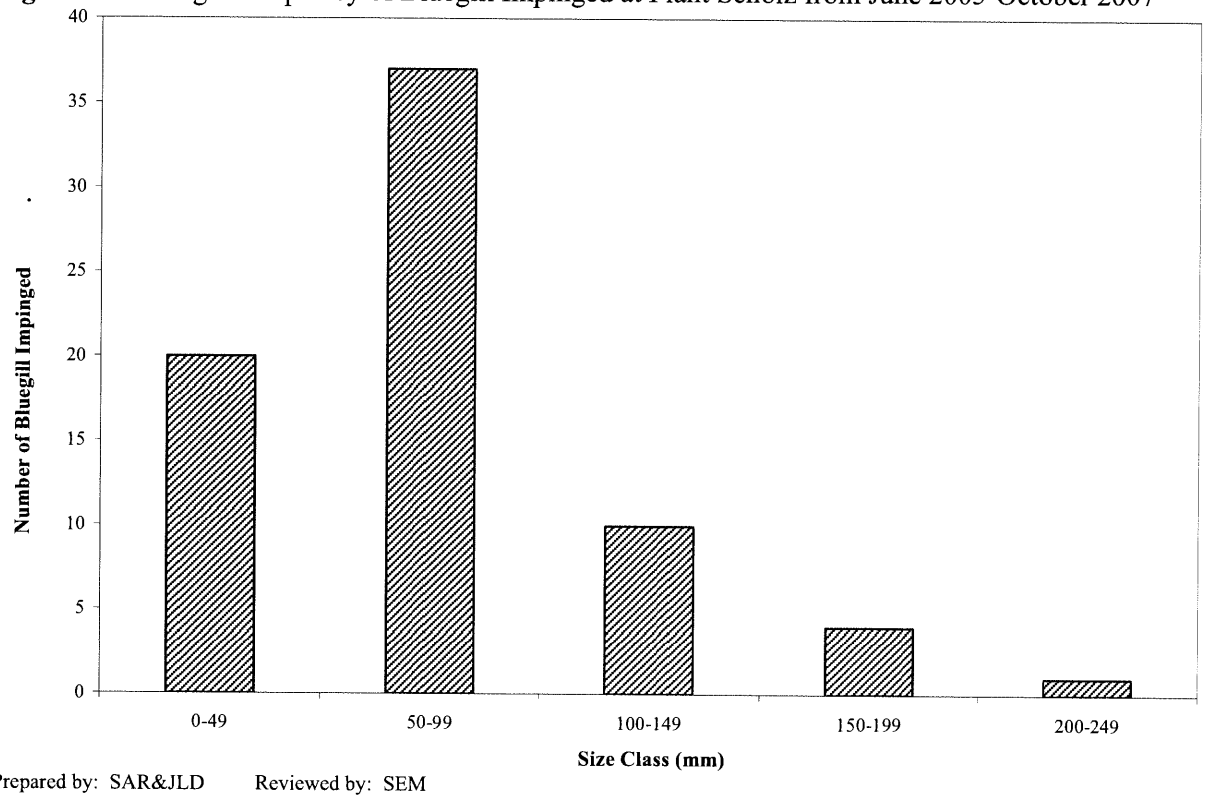
The Asiatic clams, an invasive exotic mollusk, represent 17 percent of the total organisms and 63 percent of the shellfish collected during the 2005/07 impingement sampling. Sixty-three percent of the Asiatic clams collected during the 2005/07 impingement sampling were collected during three sampling events between October and November 2005.

Figure 4-7. Size Classes of Fish Impinged at the Scholz Plant from May 2005 through October 2007



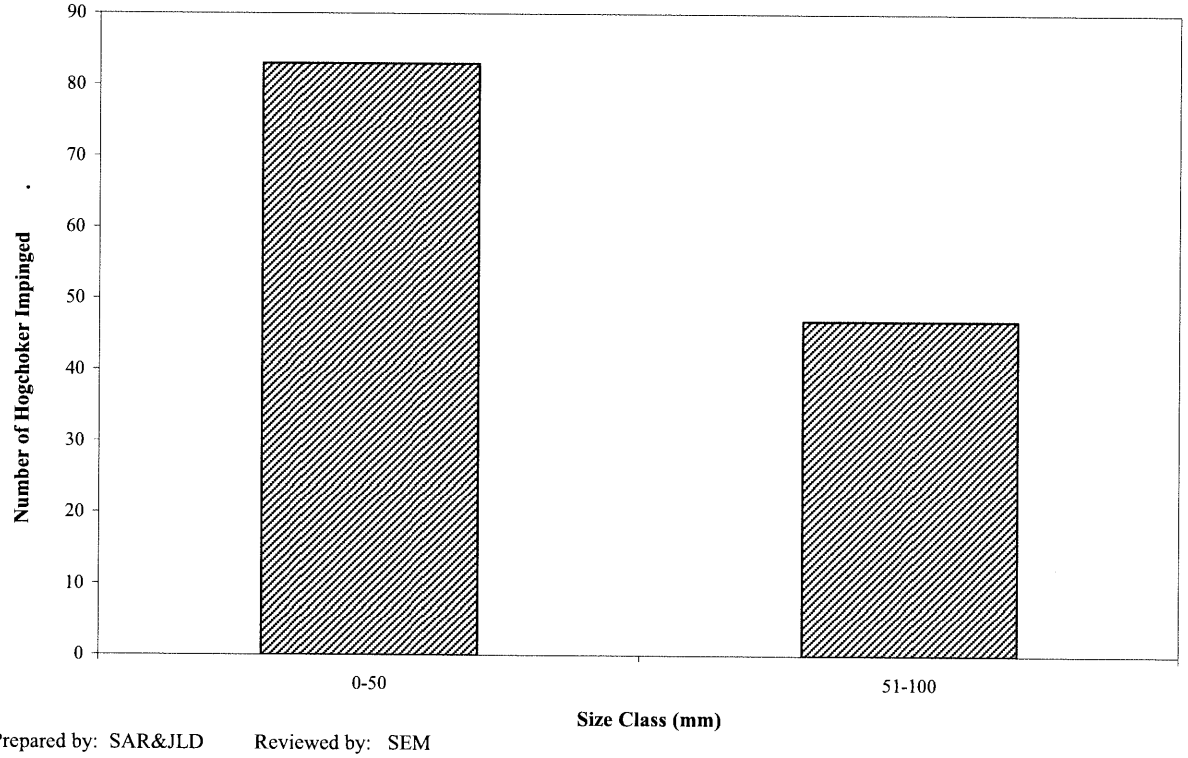
Prepared by: EMH&JLD Reviewed by: SEM

Figure 4-8. Length Frequency of Bluegill Impinged at Plant Scholz from June 2005-October 2007



Prepared by: SAR&JLD Reviewed by: SEM

Figure 4-9. Length Frequency of Hogchoker Impinged at Plant Scholz from June 2005-October 2007



Prepared by: SAR&JLD Reviewed by: SEM

4.2.5 Overview of Fish Mortality from Impingement

For the purposes of this report, it has been assumed that all of the fish and shellfish impinged die during impingement. Observations during the field study indicated that 25 percent of fish and 83 percent of shellfish were alive at the time of collection (Table 4-6). Hogchoker was the most commonly impinged species and 44 percent of the hogchokers were found to be alive after impingement. Bluegill was the second most commonly impinged species and 22 percent of the bluegill were found to be alive after impingement. A survival study was beyond the scope of this project, so the long-term survival of fish and shellfish during impingement sampling is not known; however, other studies (McLaren and Tuttle, 2000; McLean, 2003) demonstrated 19-99 percent survival rates of impinged fish in which survival was dependent on species, fish size, life stage, season, and fish condition.

Table 4-6. Condition of Impinged Fish at Plant Scholz May 2005-October 2007

Common Name	Live	Dead	Moribund
Atlantic needlefish	0	1	0
Atlantic silverside	0	1	0
Black crappie	1	14	0
Blacktail shiner	0	3	0
Blue catfish	0	1	0
Bluegill	16	54	2
Catfishes	0	3	0
Channel catfish	0	4	0
Flathead catfish	1	0	0
Gars	0	1	0
Gizzard shad	0	2	0
Hogchoker	57	73	0
Largemouth bass	0	5	0
Madtoms	0	1	0
Pipe fish	0	1	0
Redbreast sunfish	0	2	0
Shiners	0	4	0
Silverside shiners	0	3	0
Skipjack herring	0	1	0
Sunfishes	0	1	0
Threadfin shad	0	27	0
Unidentified larva	0	1	0
White catfish	0	17	0
Total	**75**	**220**	**2**

Prepared by: SEM Reviewed by: JLD

Table 4-7. Condition of Impinged Shellfish at Plant Scholz May 2005-October 2007

Common Name	Live	Dead	Moribund
Asiatic clam	68	4	0
Crayfish	29	14	0
Grass Shrimp	0	2	0
Total	**97**	**20**	**0**

Prepared by: SEM Reviewed by: JLD

5.0 Annual Impingement Mortality Estimates

5.1 Observed Annual Impingement Estimate

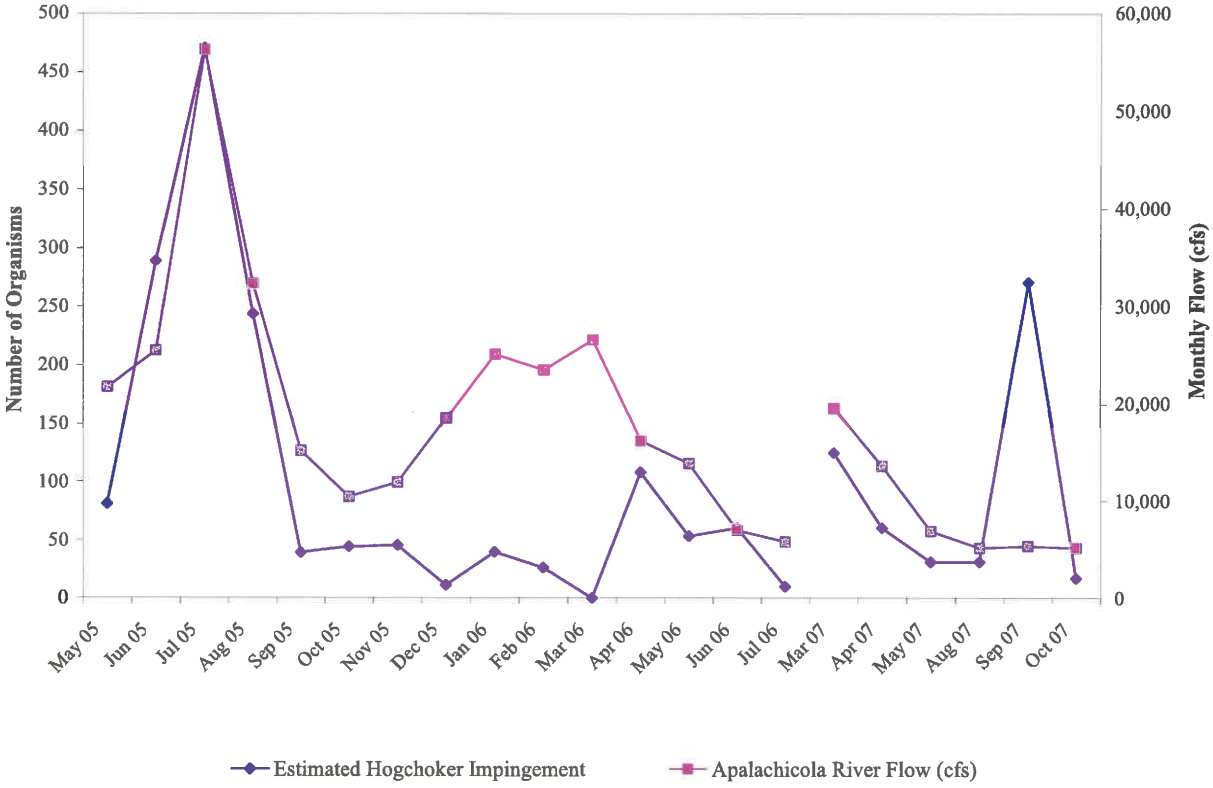
Sampled impingement rates were used to estimate annual impingement at Plant Scholz from May 2005-May 2006. Actual impingement density on sampling dates was used in conjunction with actual flow data to estimate impingement on non-sample dates; and counts and biomass were summed by month (Table 5-1, 5-2, 5-3, and 5-4). Monthly impingement rates range from 10 fish per month in March 2005 to 877 fish per month in July 2005. These results suggest that there is variability in fish populations in the vicinity of the plant over time.

A total of 4,355 fish and shellfish specimens (3,157 fish and 1,198 shellfish) are estimated to have been impinged between May 1, 2005 and April 31, 2006 at Plant Scholz. Hogchoker comprised the majority of the impingement estimate (1,397 organisms), approximately 32 percent of the total. Bluegill accounted for approximately 20 percent of the total with 873 organisms. The invasive Asiatic clams comprised approximately 15 percent of the total with 651 organisms. During the 2007 sampling period (March – May and August – October) a total of 1,208 fish and shellfish are estimated to have been impinged at Plant Scholz (1,086 fish and 122 shellfish). Bluegill and hogchoker comprised the majority of the impingement estimate (279 and 533, respectively).

In terms of biomass, a total of approximately 36 kg (79.4 pounds) of fish and shellfish (29 kg fish and 7 kg shellfish) were estimated to have been impinged between May 1, 2005 and April 31, 2006. The bluegill comprised the majority of the annual estimated impingement (15kg), accounting for approximately 41 percent of the total. Although the gizzard shad accounted for less than 1 percent of the annual impingement estimate by number, it accounted for 18 percent of the annual impingement estimate by weight. This is due to a single large gizzard shad collected during impingement sampling in June 2005. The invasive Asiatic clam (3.5 kg) comprised 10 percent of the impingement estimate. Hogchoker, which was the dominant fish species numerically, had an annual biomass estimate of 3.3 kg which is approximately 9 percent of the total biomass impinged. During the 2007 sampling (March-May and Aug-October) a total of 3 kg (6.6 pounds) of fish and shellfish (2.7kg fish and 0.5kg shellfish) were estimated to have been impinged. Hogchoker comprised the majority of the 2007 biomass, accounting for 44 percent (1.4 kg) of the total estimate.

Hogchocker impingement was greatest during periods of high flow. Annual mean flow for the Apalachicola River at the US Geologic Survey (USGS) stream gage at Chattahoochee, Florida (Gage: 02358000) was plotted against the estimated monthly impingement of hogchokers at plant Scholz (Figure 5-1). Monthly estimated impingement of hogchokers and river flow are linearly correlated at a significance level of 0.01 ($R^2 = 0.44$).

Figure 5-1. Estimated Monthly Impingement of Hogchoker and Monthly Average Mean Streamflow (cfs) of the Apalachicola River during the study period 2005-2007



Prepared by: SEM Reviewed by: RDD/WAT

Table 5-1. Estimated Monthly Impingement of Fish and Shellfish by Species Count

Taxon		2005								2006							2007					
Common Name	Scientific Name	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-06	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Mar-07	Apr-07	May-07	Aug-07	Sep-07	Oct-07
Atlantic needlefish	*Strongylura marina*	0	0	0	0	0	6	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic silverside	*Menidia menidia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0
Black crappie	*Pomoxis nigromaculatus*	16	14	12	3	14	14	0	0	0	0	0	0	8	15	99	0	0	0	31	0	0
Blacktail shiner	*Cyprinella venusta*	9	14	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0
Blue catfish	*Ictalurus furcatus*	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluegill	*Lepomis macrochirus*	175	23	79	115	27	6	61	14	317	56	0	0	16	25	0	62	0	62	0	90	65
Catfishes	*Ictalurus* sp.	0	0	0	0	26	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0
Channel catfish	*Ictalurus punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	15	14	0	0	31	0	30	0
Flathead catfish	*Pylodictis olivaris*	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0
White catfish	*Ictalurus catus*	0	0	60	51	39	64	9	0	0	0	10	11	0	0	0	0	0	0	0	0	0
Largemouth bass	*Micropterus salmoides*	0	0	13	0	0	0	0	0	0	0	0	0	0	40	21	0	0	0	0	0	0
Gars	*Lepisosteus* sp.	0	0	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gizzard shad	*Dorosoma cepedianum*	9	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogchoker	*Trinectes maculatus*	81	289	471	244	39	44	45	11	39	26	0	108	53	60	10	124	60	31	31	270	17
Madtoms	*Noturus* sp	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipefish	*Syngnathus* sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0
Redbreast sunfish	*Lepomis auretus*	8	7	0	0	0	0	0	0	0	0	0	0	8	5	0	0	0	0	0	0	0
Shiners	*Notropis* sp.	0	14	12	3	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	17
Silverside shiner	*Notropis candidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	60	0	0	0	0
Skipjack herring	*Alosa chrysochloris*	0	0	0	0	3	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sunfishes	*Lepomis* sp.	0	0	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Threadfin shad	*Dorosoma petenense*	0	14	206	57	0	0	0	0	21	0	0	0	0	10	74	0	0	0	0	0	14
Unidentified Larvae		0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Number of Impinged Fish		**298**	**403**	**877**	**479**	**148**	**173**	**124**	**25**	**377**	**82**	**10**	**161**	**99**	**170**	**218**	**217**	**120**	**124**	**62**	**450**	**113**
Asiatic clam	*Corbicula* sp.	8	7	0	0	0	472	164	0	0	0	0	0	204	110	0	0	0	0	0	60	0
Crayfish	*Procambarus* sp.	9	14	62	65	103	36	0	0	15	60	82	72	82	25	0	0	0	0	62	0	0
Grass shrimp	*Palaemonetes* sp.	8	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Number of Impinged Shellfish		**25**	**42**	**62**	**65**	**103**	**508**	**164**	**0**	**15**	**60**	**82**	**72**	**286**	**135**	**0**	**0**	**0**	**0**	**62**	**60**	**0**

Prepared by: SEM Reviewed by: RDD

Table 5-2. Estimated Monthly Impingement of Fish and Shellfish by Weight (grams)

Taxon		2005								2006							2007					
Common Name	Scientific Name	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-06	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Mar-07	Apr-07	May-07	Aug-07	Sep-07	Oct-07
Atlantic needlefish	*Strongylura marina*	0	0	0	0	0	18	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic silverside	*Menidia menidia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0
Black crappie	*Pomoxis nigromaculatus*	224	196	12	3	182	826	0	0	0	0	0	0	160	120	569	0	0	0	248	0	0
Blacktail shiner	*Cyprinella venusta*	72	350	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0
Blue catfish	*Ictalurus furcatus*	0	588	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bluegill	*Lepomis macrochirus*	2521	454	178	5067	14	192	5150	42	820	320	0	0	424	280	0	186	0	93	0	210	14
Catfishes	*Ictalurus* sp.	0	0	0	0	130	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0
Channel catfish	*Ictalurus punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	3210	28	0	0	62	0	0	0
Flathead catfish	*Pylodictis olivaris*	0	0	0	0	0	0	0	0	0	0	0	168	0	0	0	0	0	0	0	0	0
White catfish	*Ictalurus catus*	0	0	264	162	91	215	0	0	0	0	20	22	0	0	0	0	0	0	0	0	0
Largemouth bass	*Micropterus salmoides*	0	0	26	0	0	0	0	0	0	0	0	0	0	40	32	0	0	0	0	0	0
Gars	*Lepisosteus* sp.	0	0	48	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gizzard shad	*Dorosoma cepedianum*	531	5936	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogchoker	*Trinectes maculatus*	189	690	760	165	65	152	207	88	135	117	0	748	325	155	10	403	90	31	0	840	17
Madtoms	*Noturus* sp.	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipefish	*Syngnathus* sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redbreast sunfish	*Lepomis auretus*	168	147	0	0	0	0	0	0	0	0	0	0	344	215	0	0	0	0	0	0	0
Shiners	*Notropis* sp.	0	0	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51
Silverside shiner	*Notropis candidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	150	0	0	0	0
Skipjack herring	*Alosa chrysochloris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sunfishes	*Lepomis* sp.	0	0	36	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Threadfin shad	*Dorosoma petenense*	0	70	123	33	0	0	0	0	210	0	0	0	0	10	99	0	0	0	0	0	70
		0	0	0	0	0	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Weight of Impinged Fish		**3705**	**8431**	**1459**	**5454**	**482**	**1543**	**5384**	**130**	**1165**	**437**	**20**	**1022**	**1253**	**4030**	**738**	**651**	**240**	**186**	**248**	**1110**	
Asiatic clam	*Corbicula* sp.	64	56	0	0	0	2542	896	0	0	0	0	0	1150	640	0	0	0	0	0	0	0
Crayfish	*Procambarus* sp.	36	98	174	340	671	307	0	0	146	349	524	365	412	170	0	0	0	0	93	0	0
Grass shrimp	*Palaemonetes* sp.	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Weight of Shellfish		**100**	**168**	**174**	**340**	**671**	**2849**	**896**	**0**	**146**	**349**	**524**	**365**	**1562**	**810**	**0**	**0**	**0**	**0**	**93**	**360**	**0**

Prepared by: SEM Reviewed by: RDD

5.2 Annual Impingement Mortality at Nominal Capacity

This section presents estimates of impingement mortality that would occur under the existing system configuration if the facility operated continuously at nominal capacity.

5.2.1 Impingement Mortality

Actual loss due to impingement was estimated from monitoring data. Sample intervals were typically two events per month from May, 2005 through July, 2006 (15 months), followed by a seven month gap in sampling until March 2007 after which samples were collected generally once per month through October 2007 (eight months). Thus the sampling period spans 29 months, with a seven month gap. The results were examined graphically and statistically to identify significant seasonal patterns. Seasonality could confound this analysis given the variable sampling effort. All fish and shellfish impinged were assumed to be lost even though there is evidence that a percentage of organisms survive impingement. The numbers of fish and shellfish, as well as their mass were normalized to the intake flow during the sampling event to define number and biomass densities.

Upon completion of this examination of seasonal patterns, as described further in Section 5.1.1, it was determined that seasonal variability was not significant. Therefore, average rates (per intake volume) were multiplied by the plant's intake flow at nominal capacity to estimate actual annual impingement losses at nominal capacity. The plant has operated at nominal capacity for large portions of the 29 month sampling duration, but was occasionally operating at reduced capacity for some sampling events. Whereas it is customary to use monthly averages (USEPA, 2002) to estimate annual impingement, monthly averages were also determined from the monitoring data and multiplied by flow per month at nominal capacity. These alternative estimates were very similar to the estimate based on the simple average of all monitoring results, consistent with the finding that seasonal variations are not significant.

A Monte Carlo simulation was used to characterize the uncertainty in the estimate of annual impingement.

5.2.1.1 Statistical Evaluation of Seasonal Variability

To investigate potential seasonal variability and develop a valid extrapolation method, fish and shellfish count per intake volume and biomass per intake volume were examined by month, regardless of year. If a seasonal pattern exists, uncertainty in the estimate may be reduced by estimating averages separately by seasons. An average will be highly uncertain in two circumstances:

a) If values exhibit large variances (certainly the case in impingement data), and
b) When the number of samples used to estimate the average is small.

If seasonal patterns exist, with one season having much greater impingement mortality than other seasons, segmenting the data by season may reduce uncertainty by reducing the variance in each subset, resulting in a more reliable average. On the other hand, segmenting the data by season reduces the number of samples available to estimate the average, which can increase the uncertainty in the average, even though the variances of each subset are smaller. Thus, there is a "balancing act" between the benefits of

segmenting the data by season (reduced variance) and the disadvantages (smaller sample size for each season).

First, impingement density values were sorted by month regardless of year. There were 41 sampling events over the study period. Densities were calculated by taking the raw numbers of individuals impinged as well as their respective raw biomass values, and dividing those values by the flow (MGD) for that given sampling period. As a result, organism density was defined by two separate parameters- number of individuals and the organisms' biomass. Organism density and biomass density were used for subsequent statistics. Monthly average densities are illustrated in Figures 5-2 and 5-3. Fish density was highest in January and July, and lowest in December. Fish biomass peaked in June, August and November and was relatively low and constant the rest of the year. Fish density and biomass did not overlap in any particular season; however, a peak in fish density in June followed by peak biomass in July may be attributed to growth (Figure 5-2). Shellfish density and biomass follow the same pattern throughout the year peaking in the months of April and October (Figure 5-3).

Figure 5-2. Monthly Averages for Flow-Weighted Fish Density and Biomass

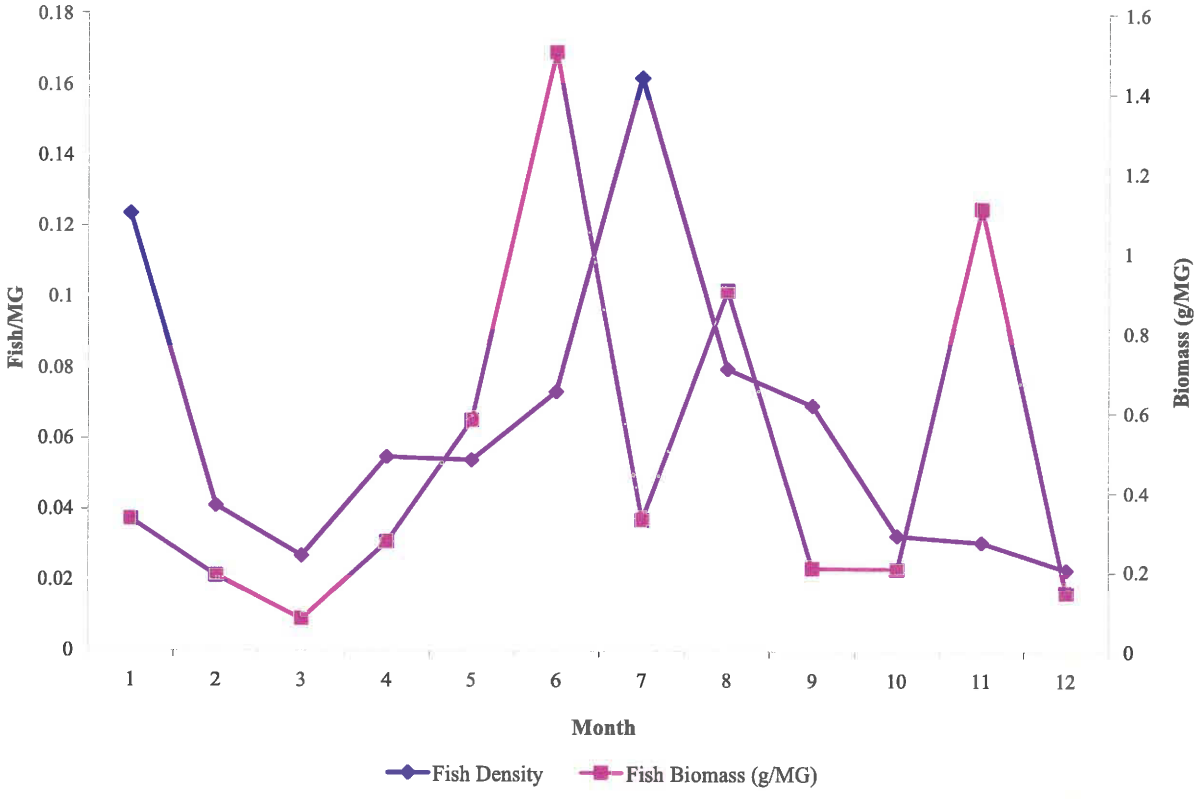


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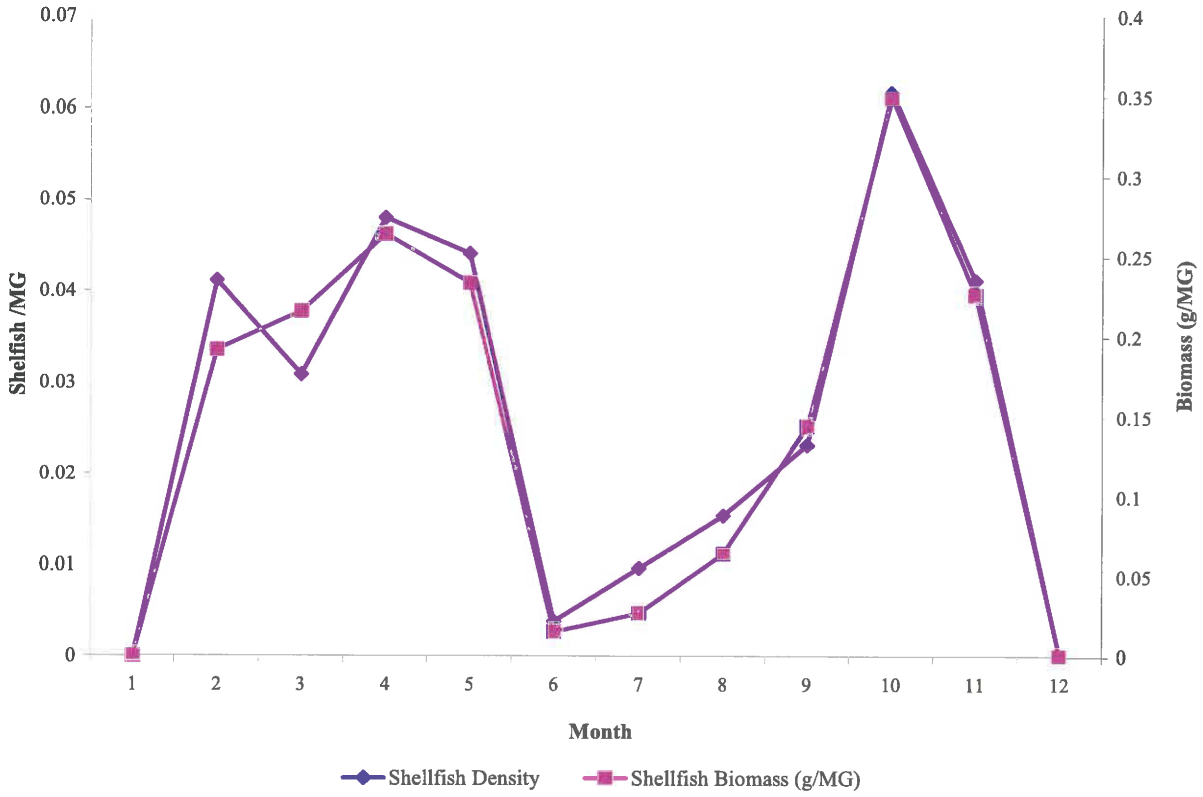
Figure 5-3. Monthly Averages for Flow-Weighted Shellfish Density and Biomass



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Moving averages over 6 month intervals were calculated for organism density and biomass to identify "high" and "low" seasons (where a high season reflected a higher organism density and a low season reflected a lower organism density) and were used to determine and define periods. This strategy can be used to prevent selection of measured impingement rates from times of the year when rates were seasonally "high" to simulate impingement rates at times when rates were seasonally "low", and vice versa. Data within these "high" and "low" seasons were examined for normality. The seasonal data were not normal, therefore, a nonparametric Kruskal Wallis test was implemented using SYSTAT 11 (SYSTAT Software, Inc., 2004). The Kruskal Wallis test revealed that fish density and biomass as well as shellfish density and biomass in the low and high seasons were not significantly different from each other.

The "high" and "low" seasons used to determine and define periods, are summarized as follows:

The high and low seasons for SHELLBIO:
High = Feb-Jul
Low = Aug-Jan

The high and low seasons for SHELLDEN:
High = Feb-Jul
Low = Aug-Jan

The high and low seasons for FISHBIO:
High = Jun-Nov
Low = Dec-May

The high and low seasons for FISHDEN:
High = Apr-Sept
Low = Oct-Mar

5.2.1.2 Estimate of Annual Impingement Mortality

Since the data do not indicate significant seasonal variations, monitoring results were averaged to estimate fish and shellfish density (number per million gallons), fish and shellfish biomass density (kg per million gallons), and multiplied by the annual intake volume at nominal capacity. Actual annual impingement was estimated by this procedure as:

- Fish – 3,064 per year, and
- Fish biomass – 26 kg per year.
- Shellfish – 1,415 per year, and
- Shellfish biomass – 7.6 kg per year.

Since it is customary to use monthly averages in such estimates (USEPA, 2002) an alternative estimate was developed using densities averaged by month, regardless of year, and multiplied by the average daily flow at nominal capacity and the number of days in each month to produce an alternate estimate of actual annual impingement losses. The results are:

- Fish – 3,055 per year, and
- Fish biomass – 23 kg per year.
- Shellfish – 1,251 per year, and
- Shellish biomass – 6.8 kg per year.

These results are very similar to those obtained using annual average densities. Additional evaluation of the uncertainty in the actual impingement estimates was performed using Monte Carlo simulation.

5.2.2 Monte Carlo Simulation

Uncertainty in the estimated annual impingement rates were characterized using Monte Carlo simulation. Impingement on any particular day is, for the most part, a random event. Thus, assigning a measured fixed value (i.e., impingement rate) to simulate values for pumping rates on days when no samples were

taken does not adequately account for this randomness. Consequently, a more robust simulation method, the Monte Carlo technique, was applied to the Plant Scholz impingement data.

Monte Carlo simulation is a proven and widely accepted statistical technique by which a quantity is calculated repeatedly (e.g., estimate of annual impingement), thousands of times, using randomly selected parameter values (e.g., measured impingement rates) for each calculation. The results approximate the full range of possible outcomes, and the likelihood of each. The random occurrence in games of chance is similar to how Monte Carlo simulation selects variable values at random to simulate a particular modeling scenario. In rolling a die, it is intuitive that one of six numbers will come up, but it is not known *a priori* which value it will be for any particular roll. It is the same with variables that have a known range of values, such as for impingement data, but an uncertain value for any particular time or event.

Due to there being no discernable seasonal trends, all of the flow-weighted data was used at once for the Monte Carlo simulation (e.g. it was not partitioned by season "low" and "high").

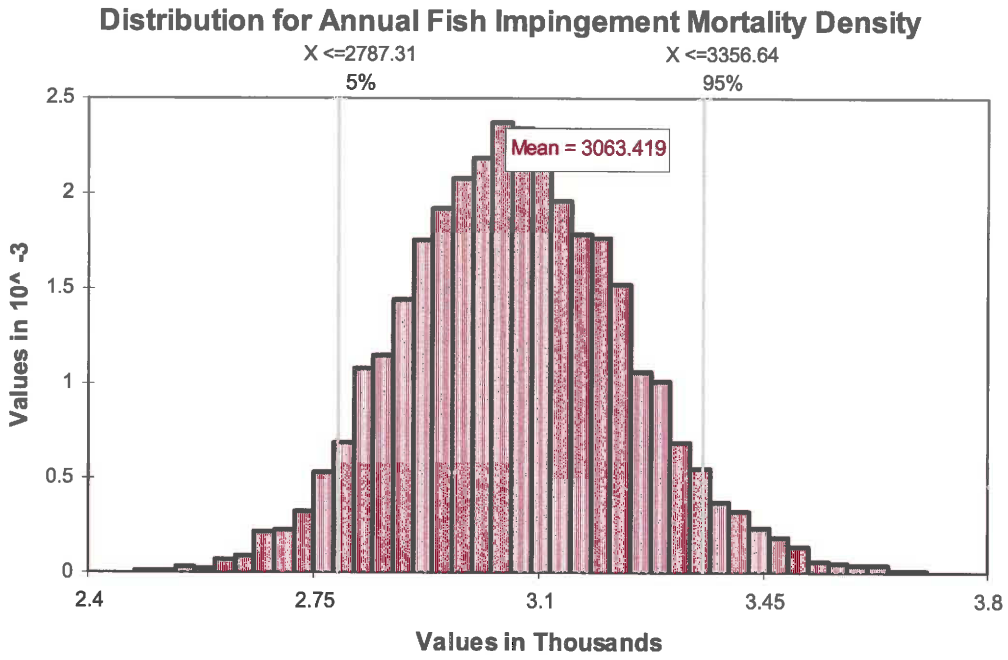
A robust simulation method, the Monte Carlo technique, was applied to the Plant Scholz impingement data. Monte Carlo was implemented using @RISK (Palisade Corporation, 1999). The simulation procedure for estimating annual impingement during the study period followed this sequence:

1. For each day of the year-long study period a measured impingement rate (number or biomass per MG) was randomly drawn by the computer from the existing pool of data from all observed densities.
2. The measured impingement density (drawn randomly) was multiplied by the intake volume at nominal capacity, thereby generating a daily estimate of impingement at nominal capacity. This process was repeated until a daily estimate of impingement was calculated for each day of a simulation year.
3. Daily impingement estimates were then summed to derive an annual estimate of impingement. Next, annual estimates were summed to yield the total annual impingement mortality estimate.
4. The above process was repeated 10,000 times, resulting in 10,000 possible outcomes for the estimate of annual impingement based on the seasonally partitioned data.
5. Descriptive statistics (i.e., mean and 95th percentile of mean density) were performed on the resulting output data distribution.

The Monte Carlo simulation estimated an annual impingement of 3,064 fish with a 95 percentile upper confidence limit equal approximately to 3,350 fish (Figure 5-4). Annual fish biomass impinged was estimated to be approximately 26.1 kg, with a 95 percentile upper confidence limit of approximately 29.7 kg (Figure 5-5).

The Monte Carlo simulation estimated an annual impingement of 1,457 shellfish with a 95 percentile upper confidence limit of 1,674 shellfish (Figure 5-6). In evaluating annual impingement biomass density of shellfish, a mean of approximately 7.6 kg was estimated with a 95 percentile upper confidence limit equal approximately to 8.8 kg (Figure 5-7).

Figure 5-4. The Distribution for Impingement as a Measure of Fish Density



Created by: SEM Checked by: WAT

Figure 5-5. The Distribution for Impingement as a Measure of Fish Biomass Density

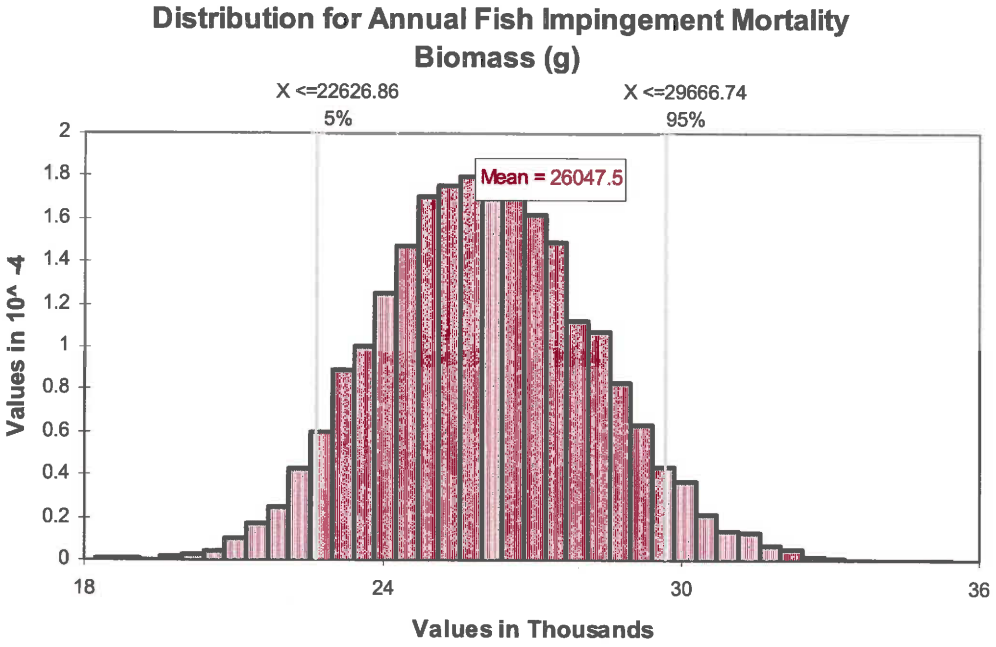


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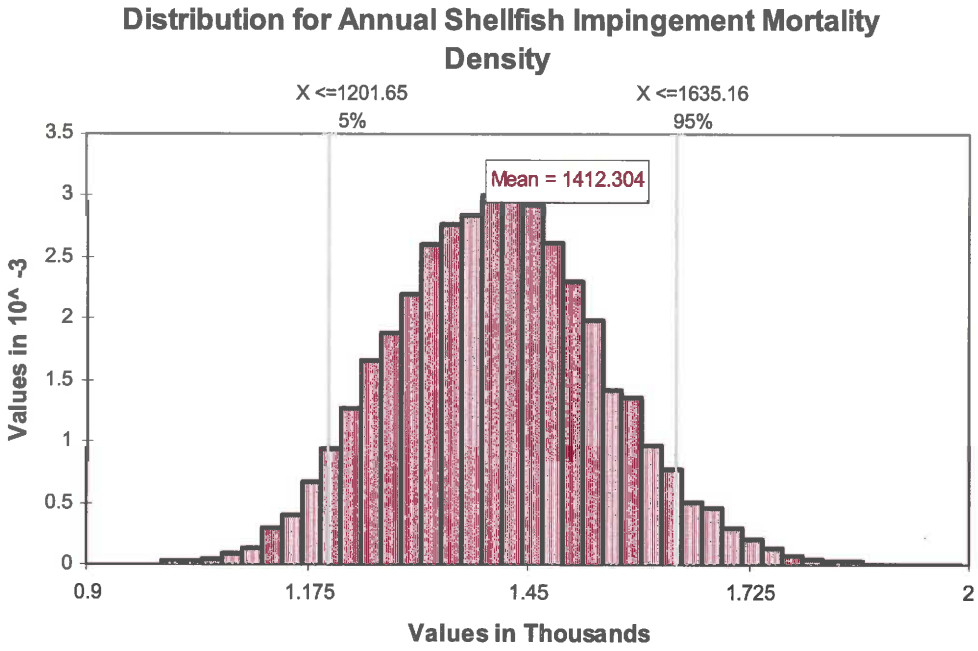
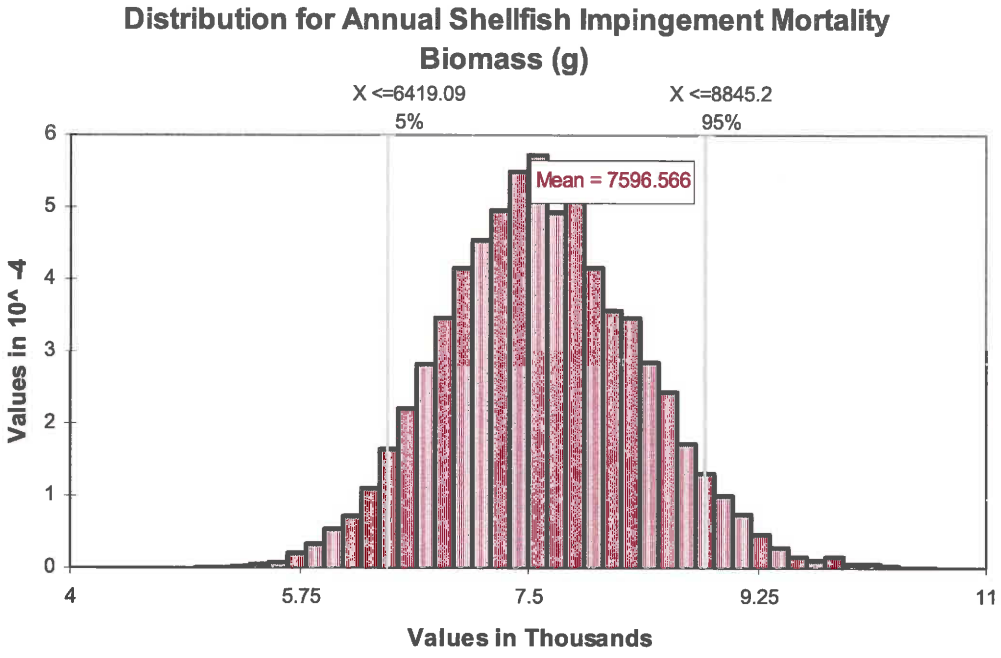
Figure 5-6. The Distribution for Impingement as a Measure of Shellfish Density



Created by: SEM Checked by: WAT

Figure 5-7. The Distribution for Impingement as a Measure of Shellfish Biomass Density



Created by: SEM Checked by: WAT

Results of the Monte Carlo simulation, the linear interpolation methodologies, and 2005-2006 annual estimates are summarized in Table 5-7. The Monte Carlo procedure's best estimate for fish impingement mortality at Plant Scholz for one year is 3,063 fish which may be compared with the simple spreadsheet estimate of 3,064 fish. The 5th and 95th confidence limits, as determined by the Monte Carlo procedure are 2,787 and 3,356, respectively. Note the simple spreadsheet estimate and the Monte Carlo procedure relatively close in their estimation of annual impingement.

Table 5-3. Comparison of the Monte Carlo Average and Confidence Limits with the Estimates of Annual Average Impingement

Parameter	Monte Carlo 95 Lower Confidence Limit	Monte Carlo Average	Annual Average Impingement 2005-2006	Monte Carlo 95 Upper Confidence Limit
Fish	2,787	3,063	3,157	3,356
Fish biomass (kg)	22.6	26.0	29.2	29.7
Shellfish	1,202	1,412	1,198	1,635
Shellfish biomass (kg)	6.4	7.6	6.6	8.8

Created by: SEM Checked by: WAT/RDD

Results are similar for other metrics. The Monte Carlo method indicates best estimates that are within 2.8 percent of the simple spreadsheet method. Monte Carlo annual totals (with 5th and 95th percentile estimates) are:

- Fish impinged – 3,063 (2,787 – 3,356);
- Shellfish impinged – 1,412 (1,202 – 1,635);
- Fish biomass – 26.0 (22.6 - 29.7) kg; and
- Shellfish biomass – 7.6 (6.4 – 8.8) kg.

As specified in the PIC, these results are also expressed per MG of intake volume:

- Fish impinged – 0.07
- Shellfish impinged – 0.03
- Fish biomass – 0.55 grams; and
- Shellfish biomass –0.16 grams

The Monte Carlo derived values provide the best estimate of impingement for Plant Scholz because:

- The uncertainty associated with impingement being a random event is better integrated into the estimate of annual impingement.
- Impingement rates for sampled days are randomly drawn from actual measurements and assigned to un-sampled days rather than assigned arbitrarily.
- The resulting annual estimate of impingement is based on a conservative estimate of the mean drawn from thousands of possible outcomes, not on a single estimate.
- The high number of simulation trials captures a wide array of potential impingement outcomes based on actual sampling data and provides a robust and unbiased estimate of the mean impingement.

6.0 Conclusions

Evaluation of the potential impact of fish losses due to impingement mortality can be evaluated in terms of the potential relative effect of these losses on overall ecosystem health and the condition of the standing stocks of fish and shellfish populations in the source water body in the vicinity of the CWIS.

As was discussed in Section 5, the total annual impingement at Plant Scholz is estimated to be low (approximately 3,100 fish, 26 kg per year; 1,200 shellfish, 7 kg per year). Impingement density was estimated to be very low (0.07 fish, 0.55 grams per million gallons; 0.03 shellfish, 0.16 grams per million gallons). Hogchoker and bluegill were the most commonly captured species and together accounted for 68 percent of the total fish catch.

The potential effects of the losses of fish and shellfish due to impingement on ecosystem health can be viewed in terms of overall population size of the species and their natural mortality and fecundity. Fish have a high fecundity, as noted here by a few species as examples. Hogchoker and bluegill were the most commonly captured species; bluegills spawn between 2,540 and 64,000 eggs (USFWS, 1978), hogchockers spawn between 11,075 and 54,000 eggs producing increasingly more eggs as the females age (USFWS, 1978). These numbers provide sufficient evidence that fish found in the Apalachicola River have substantially higher annual reproductive output than the number impinged at Plant Scholz. The observed overall impingement rates should not result in a significant adverse effect on the resident aquatic communities in the Apalachicola River by virtue of both the low number of fish and shellfish impinged and the natural mortality and high fecundity that occurs within the fish and shellfish populations.

Asiatic clam, an invasive species, was the most commonly collected shellfish during impingement sampling at Plant Scholz, accounting for 62 percent of the total shellfish catch. The Asiatic clam has caused millions of dollars worth of damage to intake pipes used by power, water, and other industries. In addition, the Asiatic clam can out compete many native clam species for food and space (Global Invasive Species Database, 2005). Excluding the Asiatic clam, the annual impingement estimate for shellfish would be reduced to approximately 550 shellfish and 3 kg per year.

Annual estimated are based on worst case scenario, assuming all impinged organisms die during impingement. Twenty-five percent of all fish and 83 percent of all shellfish captured during this study were alive when washed off the screens after impingement. Excluding Asiatic clams 64 percent of shellfish were alive post impingement. Hogchoker and bluegill were the most commonly impinged fish and 44 percent of hogchoker and 22 percent of bluegill were alive post impingement. Long term survivability of fish and shellfish after impingement was not studied; however, other studies have document 19-99 percent survival of impinged fish (McLaren and Tuttle, 2000; McClean, 2003). Assuming 25 percent of fish and 64 percent of shellfish survive impingement; annual impingement mortality estimates (excluding Asiatic clams) would be reduced to approximately 2,325 fish and 198 shellfish per year.

Table 6-1 illustrates the catch per unit effort for impingement compared to that for the Intake Canal and the Apalachicola River. Catch per unit effort was calculated as the total number of organisms collected during the study divided by the total number of hours of sampling. The catch per unit effort for impingement is two to three orders of magnitude less than catch per unit effort for electroshocking in both the river and the Intake Canal. In other words, the number of fish impinged at the plant in an hour is less than 1 percent of the number of fish that were captured in an hour of intensive electrofishing in both the Intake Canal and the river.

Table 6-1. Catch per Unit Effort for Scholz Intake Canal, Apalachicola River, and Impingement

Taxon	Scholz Intake Canal	Apalachicola River	Impingement 2005-2007
Fish per hour	127.79	90.38	0.33
Shellfish per hour	na	na	0.13

Created by: SEM Reviewed by: RDD
na = not applicable (Electrofishing does not target shellfish)

Catch per unit effort for electrofishing was greater in the Intake Canal than in the Apalachicola River. The increased catch was due to the high number of bluegill nesting in the intake canal. The intake canal joins the river at approximately a right angle to the river channel, but angled slightly upstream. This vegetated backwater provides ideal nesting habitat for the bluegill.

Prior impingement characterization performed in 1970 was qualitative because during the initial studies both the regulatory reviewers and Gulf Power agreed that impingement at Plant Scholz was *de minimus*. Conditions have not changed, and based on the result of this study, impacts due to impingement remain *de minimus*.

Based on the low numbers of fish and shellfish impinged, and the high reproductive rate of the primary species captured, it is concluded that the fish and shellfish impingement mortality incurred at the CWIS of Plant Scholz is *de minimus* and does not occur at a rate that would affect resident fish populations within the Apalachicola River system. Additional reductions in impingement mortality rates are not warranted. As a result, it is recommended to continue to operate Plant Scholz as it is currently run.

7.0 References

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Plant Scholz
NPDES Permit #FL0002283
Issuance Date: July 1, 2005
Expiration Date: June 30, 2010
Renewal Application

Thermal Effects Evaluation Plan and Monitoring Reports

Condition I.E.16 required Gulf Power to "develop and evaluation plan in accordance with Rule 62-302.520(1), F.A.C...designed to determine any effects on the biological communities from the heated water discharge to the Apalachicola River.

Gulf Power submitted the plan required by Condition I.E.16, (a copy is attached to this permit application) and submits the results of the study with the permit application. Gulf Power is submitting two reports: "Hester-Dendy Identification and Enumeration Report," and Scholz Stream Condition Index Report."

Conclusions:

Based on collected data, no adversities have been indicated as a result of the cooling water discharge from the Scholz plant. The attached reports show that results of the biological integrity tests using Hester/Dendy substrates deployed in the Apalachicola River above and below the confluence of the Plant Scholz cooling water discharge have shown that the sum Shannon-Weaver diversity index of macroscopic invertebrate populations were not reduced to less than 75 percent of background levels.

Joseph H. Neese
Senior Environmental Specialist
Gulf Power Company

12/8/09
Date

Biological Monitoring Plan
Scholz Electric Generating Plant
Per Condition I.E.16

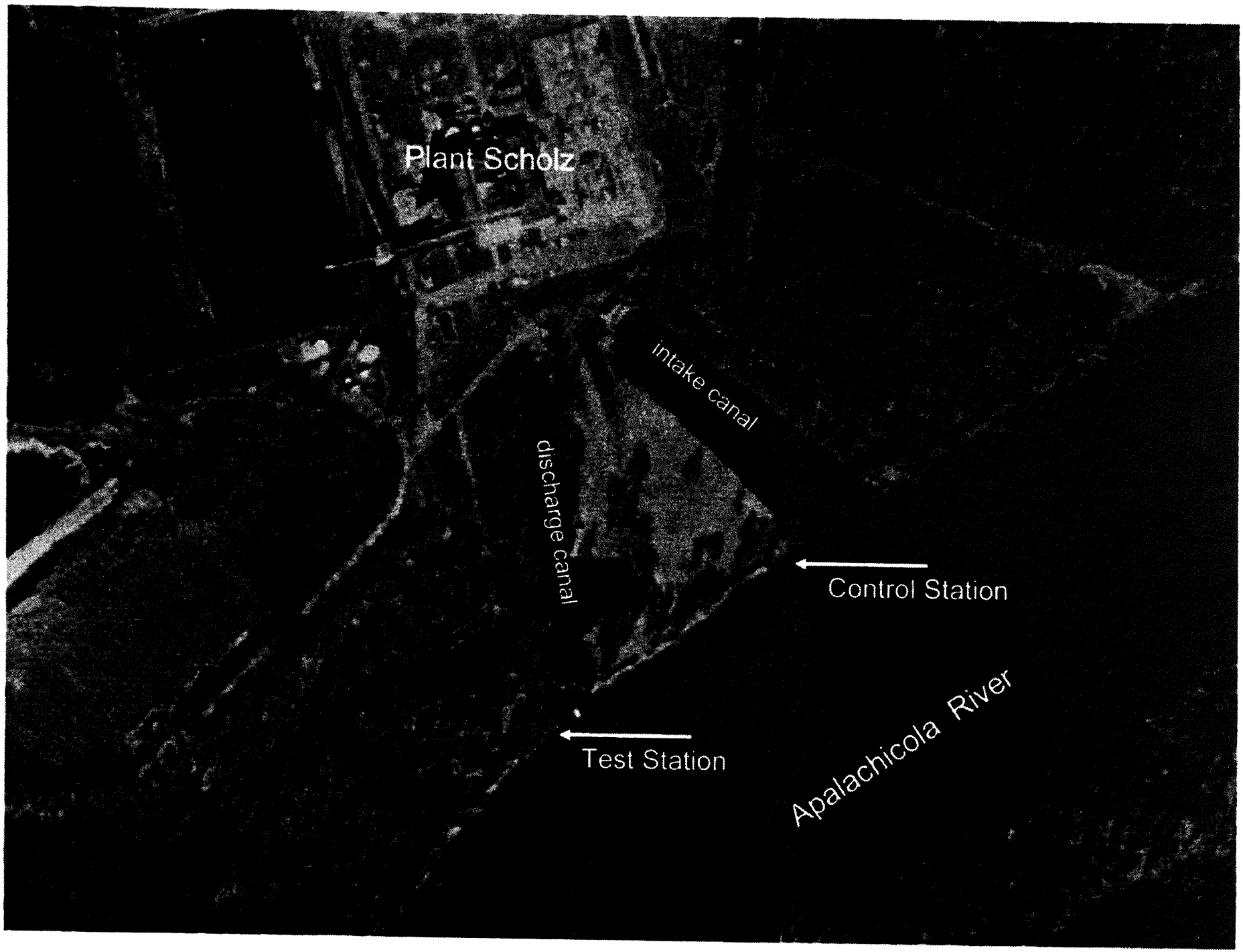
Proposed Biological monitoring Plan for Gulf Power Company's Scholz Electric Generating Plant

The purpose of this investigation is to assure that the thermal discharge from the Scholz Plant is not causing substantial damage or harm to the aquatic life or vegetation or interfering with the beneficial uses of the receiving water. The proposed monitoring plan will allow for a comparison of biological community health between a control station and a test station. The use of artificial substrates was selected because there is little available natural habitat for macroinvertebrates in this area. The locations of the test and control sample stations are shown on the attached aerial photograph. The control station is located downstream of the plant intake canal because the area of the river just above the intake canal is too shallow due to limestone outcrops, and because the overall habitat more closely matches the test station.

The biological monitoring will take place in the year prior to permit renewal during the months of June, July or August. Three Hester-Dendy artificial substrates will be suspended from galvanized electrical conduit pipe driven into the Apalachicola River streambed for a 28-day period. The substrates will be placed approximately 30.4 cm (1 ft) above the streambed at a water depth of approximately 1.5 m (5 ft). The location of the artificial substrate samplers in the vertical water column, instead of using surface floating platforms, is primarily to reduce the problem of vandalism. Following the 28-day submersion period, samplers will be retrieved in wide mouth containers and sealed before bringing to the surface. All containers will be preserved in a 10 percent formalin solution and transported to a taxonomy lab for processing.

The samples will be examined for total number of species, total number of animals per unit area, total number of each species of animal per unit area, (species composition), and total wet weight of organism per unit area. The data will be calculated into species diversity numbers (Shannon-Weaver Index). Values will be considered acceptable if the Shannon Weaver Index at the discharge canal is not reduced to less than 75% of the control location.

The physical parameters, dissolved oxygen, pH, temperature and specific conductance will be measured on the day the substrates are deployed and on the date they are retrieved.


Plant Scholz
intake canal
discharge canal
Control Station
Test Station
Apalachicola River

MACTEC

engineering and constructing a better tomorrow

November 13, 2009

Mr. James Douglas
Southern Company Services
42 Inverness Center Parkway, Bin B426
Birmingham, AL 25242

Subject: **Hester-Dendy Identification and Enumeration Report**
Gulf Power Plant Scholz
Jackson County, Sneads, Florida
MACTEC Project No.: 6063090152

Dear Mr. Douglas:

MACTEC Engineering and Consulting, Inc. (MACTEC) has completed benthic macroinvertebrate identification, enumeration, wet weight determination, and index calculations for benthic invertebrate samples collected on Hester-Dendy artificial substrates deployed along the Apalachicola River in the vicinity of the Plant Scholz effluent discharge canal in the summer of 2009. The results are presented in this report.

In the summer of 2009, fourteen Hester-Dendy artificial substrate samplers were deployed at four locations (between 3 and 4 samplers per location) along the Apalachicola River (AR3R, AR4R, AR5R and AR5RA) for a 28-day period. AR3R and AR4R are upstream of the Discharge Canal, AR5R is at the confluence of the discharge canal and the Apalachicola River, and AR5RA is nearfield downstream of the Discharge Canal. Samplers were deployed and retrieved by Southern Company Services staff. All samples were preserved in a 10 percent formalin solution. On July 24, 2009, samples were relinquished to MACTEC scientists for transport to MACTEC's Gainesville, FL taxonomy laboratory where they were logged in, processed (i.e. invertebrates sorted from debris), and examined by a qualified taxonomist. Replicates were sub-sampled and analyzed until a minimum of 100 organisms per replicate had been enumerated, a minimum of 300 organisms per sampling station was achieved, or the entire sample was processed. The results were corrected for total sample area, tabulated, and summarized as: total number of species, total number of animals per unit area, total number of each species of animal per unit area, and wet weight of organisms per unit area (Table 1; see also Attachment A). Diversity was quantified using the Shannon-Weiner Index (Table 1). Quality assurance and quality control checks were conducted according to the FDEP SOP on Laboratory Quality Control (SOP LQ1000). QA/QC requirements for sampling processing and taxonomic identification were met (results shown on bench sheets in Attachment B).

Table 1. Hester-Dendy Summary Statistics by Sampling Station

Parameter	Sampling Station			
	AR3R	**AR4R**	**AR5R**	**AR5RA**
Count/m2	733	375	339	3071
# species/m2	27	33	36	46
Wet Weight (g/m^2)	0.894	1.964	1.375	8.429
Shannon-Weiner	1.15	2.25	2.34	2.33

Prepared by: SEM Checked by: KEM

Thank you for the opportunity to provide ecological services to you and Southern Company Services. If you have questions, or require additional information, please do not hesitate to contact me at (352) 333-3634, or via email semcmorrow@mactec.com.

Sincerely,

MACTEC Engineering and Consulting, Inc.

Shannon McMorrow
Environmental Scientist

for Judith L. Dudley Ph.D. with permission
Principal Scientist

Attachments: 2

Attachment A

Macroinvertebrate Identification and Enumeration

Plant Scholz
Apalachicola River (AR)
Hester-Dendy Artificial Sampler Macroinvertebrate Identification and Enumeration
Samples Received July 24, 2009
Project #: 6063090152

Summary Statistics

Parameter	Sampling Station			
	AR3R	AR4R	AR5R	AR5RA
Total Individuals	352	240	217	1474
Average # individuals	117	60	54	491
Standard Deviation- Individuals	68	25	50	346
% Coefficient of Variance - Individuals	57.59	41.39	92.62	70.46
Total # species	13	21	23	22
Average # of species per sample	8	13	9	15
Standard Deviation - species	1.73	3.30	5.91	1.53
% Coefficient of Variance - Species	21.65	24.94	63.88	10.41
Total Wet Weight (g)	0.43	1.26	0.88	4.05
Average Wet Weight (in g) of 3 Reps	0.14	0.31	0.22	1.35
Standard Deviation - Wet Weight	0.09	0.42	0.26	0.86
% Coefficient of Variance - Wet Weight	66.37	133.48	117.45	64.00
Count/m2	733	375	339	3071
# species/m2	27	33	36	46
Wet Weight (g/m^2)	0.894	1.964	1.375	8.429
Shannon-Weiner	1.15	2.25	2.34	2.33

Created by: SEM
Checked by: KEM

Plant Scholz
Apalachicola River (AR)
Hester-Dendy Artificial Sampler Macroinvertebrate Identification and Enumeration
Samples Received July 24, 2009
Project #: 6063090152

Species List

PHYLUM	CLASS	ORDER	FAMILY	TRIBE	GENUS	SPECIES
Annelida	Clitellata	(Hirudinea)				
Annelida	Clitellata	(Oligochaeta)				
Arthropoda	Insecta	Coleoptera	Elmidae		*Stenelmis*	
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogoninae (subfamily)		
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae (subfamily)		
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Asheum*	
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Chironomus*	
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Cryptochironomus*	
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Dicrotendipes*	
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*halterale* grp
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*illinoense* grp
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*scalaenum* grp
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Tribelos*	
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini		
Arthropoda	Insecta	Diptera	Chironomidae	Pentaneurini	*Ablabesmyia*	*rhamphe* grp
Arthropoda	Insecta	Diptera	Chironomidae	Pentaneurini	*Ablabesmyia*	
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae (subfamily)		
Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*	
Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsini	*Tanytarsus*	
Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsini		
Arthropoda	Insecta	Diptera	Chironomidae		*Nanocladius*	
Arthropoda	Insecta	Diptera	Chironomidae			
Arthropoda	Insecta	Diptera	Tipulidae			
Arthropoda	Insecta	Diptera				
Arthropoda	Insecta	Ephemeroptera	Caenidae		*Caenis*	
Arthropoda	Insecta	Ephemeroptera	Heptageniidae		*Maccaffertium*	*exiguum*
Arthropoda	Insecta	Ephemeroptera	Isonychiidae		*Isonychia*	*sayi*
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae		*Tricorythodes*	*albilineatus*
Arthropoda	Insecta	Ephemeroptera				
Arthropoda	Insecta	Megaloptera	Corydalidae		*Corydalus*	*cornutus*
Arthropoda	Insecta	Megaloptera	Sialidae		*Sialis*	
Arthropoda	Insecta	Odondata	Coenagrionidae		*Argia*	
Arthropoda	Insecta	Odondata	Corduliidae		*Epitheca*	
Arthropoda	Insecta	Odondata	Corduliidae		*Macromia*	
Arthropoda	Insecta	Trichoptera	Hydropsychidae		*Hydropsyche*	
Arthropoda	Insecta	Trichoptera	Hydropsychidae		*Macrostemum*	*carolina*
Arthropoda	Insecta	Trichoptera	Hydropsychidae			
Arthropoda	Insecta	Trichoptera	Leptoceridae			
Arthropoda	Insecta	Trichoptera	Polycentropodidae		*Neureclipsis*	
Arthropoda	Insecta	Trichoptera				
Arthropoda	Malacostraca	Amphipoda	Hyalellidae		*Hyalella*	*azteca*
Arthropoda	Malacostraca	Amphipoda				
Arthropoda	Malacostraca	Decapoda	Cambaridae			
Mollusca	Bivalvia	Veneroida	Tellinidae		*Tellina*	
Mollusca	Gastropoda					
Platyhelminthes	Turbellaria	Tricladida	Planariidae		*Planaria*	

Plant Scholz
Apalachicola River (AR)
Hester-Dendy Artificial Sampler Macroinvertebrate Identification and Enumeration
Samples Received July 24, 2009
Project #: 6063090152

AR3R

Adjusted for Split Factor

PHYLUM	CLASS	ORDER	FAMILY	TRIBE	GENUS	SPECIES	AR3R Rep 1	AR3R Rep 2	AR3R Rep 3	AR3R Total per sq m
							AR3R-1	AR3R-2	AR3R-3	
Annelida	Clitellata	(Oligochaeta)					1	1	0	4
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Dicrotendipes*		0	0	1	2
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*halterale* grp.	6	5	7	38
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*illinoense* grp.	2	0	0	4
Arthropoda	Insecta	Diptera	Chironomidae	Pentaneurini	*Ablabesmyia*	*rhamphe* grp.	10	0	0	21
Arthropoda	Insecta	Diptera	Chironomidae	Pentaneurini	*Ablabesmyia*		5	0	5	21
Arthropoda	Insecta	Diptera	Chironomidae		*Nanocladius*		1	0	0	2
Arthropoda	Insecta	Diptera					8	0	2	21
Arthropoda	Insecta	Ephemeroptera	Caenidae		*Caenis*		6	3	10	40
Arthropoda	Insecta	Ephemeroptera					49	47	158	529
Arthropoda	Insecta	Trichoptera	Polycentropodidae		*Neureclipsis*		0	1	0	2
Arthropoda	Malacostraca	Amphipoda	Hyalellidae		*Hyalella*	*azteca*	8	5	10	48
Platyhelminthes	Turbellaria	Tricladida	Planariidae		*Planaria*		0	1	0	2
					Total Individuals		96	63	193	352
					Average # individuals					117
					Standard Deviation- Individuals					68
					% Coefficient of Variance - Individuals					57.59
					Total # species		10	7	7	13
					Average # of species per sample					8
					Standard Deviation - species					1.73
					% Coefficient of Variance - Species					21.65
					Total Wet Weight (g)		0.110	0.069	0.250	0.43
					Average Wet Weight (in g) of 3 Reps					0.14
					Standard Deviation - Wet Weight					0.09
					% Coefficient of Variance - Wet Weight					66.37
					Count/m2					733
					# species/m2					27
					Wet Weight (g/m^2)					0.894
					Shannon-Weiner					1.15

Prepared by: RT
Checked by: SEM

Plant Scholz
Apalachicola River (AR)
Hester-Dendy Artificial Sampler Macroinvertebrate Identification and Enumeration
Samples Received July 24, 2009
Project #: 6063090152

AR4R

Adjusted for Split Factor

PHYLUM	CLASS	ORDER	FAMILY	TRIBE	GENUS	SPECIES	AR4R Rep 1	AR4R Rep 2	AR4R Rep 3	AR4R Rep 4	AR4R Total per sq m
							AR4R-1	AR4R-2	AR4R-3	AR4R-4	
Arthropoda	Insecta	Coleoptera	Elmidae		*Stenelmis*		0	0	0	2	3
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogoninae (subfamily)			1	0	0	1	3
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Asheum*		0	0	1	1	3
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Cryptochironomus*		1	3	0	0	6
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Dicrotendipes*		2	1	1	3	11
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*halterale* grp.	4	6	3	2	23
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*illinoense* grp.	7	0	0	0	11
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*scalaenum* grp.	1	0	0	0	2
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Tribelos*		20	4	13	10	73
Arthropoda	Insecta	Diptera	Chironomidae	Pentaneurini	*Ablabesmyia*		21	4	3	17	70
Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsini	*Tanytarsus*		1	2	0	0	5
Arthropoda	Insecta	Diptera	Chironomidae				1	1	0	2	6
Arthropoda	Insecta	Diptera					3	5	2	1	17
Arthropoda	Insecta	Ephemeroptera	Heptageniidae		*Maccaffertium*	*exiguum*	4	3	2	4	20
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae		*Tricorythodes*	*albilineatus*	1	2	0	1	6
Arthropoda	Insecta	Trichoptera	Hydropsychidae		*Hydropsyche*		0		0	1	2
Arthropoda	Insecta	Trichoptera	Polycentropodidae		*Neureclipsis*		24	12	17	10	98
Arthropoda	Insecta	Trichoptera					1	1	0	0	3
Arthropoda	Malacostraca	Amphipoda	Hyalellidae		*Hyalella*	*azteca*	3	0	0	2	8
Arthropoda	Malacostraca	Decapoda	Cambaridae				1	0	0	0	2
Platyhelminthes	Turbellaria	Tricladida	Planariidae		*Planaria*		0	0	1	0	2
					Total Individuals		96	44	43	57	240
					Average # Individuals						60
					Standard Deviation- Individuals						25
					% Coefficient of Variance - Individuals						41.39
					Total # species		17	13	9	14	21
					Average # of species per sample						13
					Standard Deviation - species						3.30
					% Coefficient of Variance - Species						24.94
					Wet Weight (g)		0.943	0.090	0.126	0.098	1.26
					Average Wet Weight (in g) of 3 Reps						0.31
					Standard Deviation - Wet Weight						0.42
					% Coefficient of Variance - Wet Weight						133.48
					Count/m2						375
					# species/m2						33
					Wet Weight (g/m^2)						1.964
					Shannon-Weiner						2.25

Prepared by: RT
Checked by: SEM

Plant Scholz
Apalachicola River (AR)
Hester-Dendy Artificial Sampler Macroinvertebrate Identification and Enumeration
Samples Received July 24, 2009
Project #: 6063090152

AR5R

Adjusted for Split Factor

PHYLUM	CLASS	ORDER	FAMILY	TRIBE	GENUS	SPECIES	AR5R Rep 1	AR5R Rep 2	AR5R Rep 3	AR5R Rep 4	AR5R Total per sq m
							AR5R-1	AR5R-2	AR5R-3	AR5R-4	
Arthropoda	Insecta	Coleoptera	Elmidae		*Stenelmis*		0	0	0	1	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogoninae (Subfamily)			0	7	0	0	11
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Dicrotendipes*		0	1	0	0	2
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*halterale* grp	20	7	0	4	48
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*scalaenum* grp	2	13	0	0	23
Arthropoda	Insecta	Diptera	Chironomidae	Pentaneurini	*Ablabesmyia*		9	32	0	1	66
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Tribelos*		11	13	0	6	47
Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsini	*Tanytarsus*		3	0	0	0	5
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae (Subfamily)			0	1	0	0	2
Arthropoda	Insecta	Diptera	Chironomidae				1	0	0	1	3
Arthropoda	Insecta	Diptera					3	9	0	2	22
Arthropoda	Insecta	Ephemeroptera	Heptageniidae		*Maccaffertium*	*exiguum*	3	0	0	0	5
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae		*Tricorythodes*	*albilineatus*	1	0	0	0	2
Arthropoda	Insecta	Ephemeroptera					2	0	0	0	3
Arthropoda	Insecta	Odondata	Corduliidae		*Epitheca*		1	0	0	0	2
Arthropoda	Insecta	Odondata	Corduliidae		*Macromia*		1	0	0	0	2
Arthropoda	Insecta	Trichoptera	Hydropsychidae				0	1	0	0	2
Arthropoda	Insecta	Trichoptera	Hydropsychidae		*Hydropsyche*		0	0	0	1	2
Arthropoda	Insecta	Trichoptera	Polycentropodidae		*Neureclipsis*		0	0	0	15	23
Arthropoda	Insecta	Trichoptera					0	1	0	1	3
Arthropoda	Malacostraca	Amphipoda	Hyalellidae		*Hyalella*	*azteca*	2	35	1	3	64
Mollusca	Bivalvia	Veneroida	Tellinidae		*Tellina*		1	0	0	0	2
Mollusca	Gastropoda						1	0	0	0	2
					Total Individuals		61	120	1	35	217
					Average # individuals						54
					Standard Deviation- Individuals						50
					% Coefficient of Variance - Individuals						92.62
					Total # species		15	11	1	10	23
					Average # of species per sample						9
					Standard Deviation - species						5.91
					% Coefficient of Variance - Species						63.88
					Wet Weight (g)		0.596	0.162	0.012	0.110	0.88
					Average Wet Weight (in g) of 3 Reps						0.22
					Standard Deviation - Wet Weight						0.26
					% Coefficient of Variance - Wet Weight						117.45
					Count/m2						339
					# species/m2						36
					Wet Weight (g/m^2)						1.375
					Shannon-Weiner						2.34

Prepared by: RT
Checked by: SEM

Plant Scholz
Apalachicola River (AR)
Hester-Dendy Artificial Sampler Macroinvertebrate Identification and Enumeration
Samples Received July 24, 2009
Project #: 6063090152

AR5RA

Adjusted for Split Factor

PHYLUM	CLASS	ORDER	FAMILY	TRIBE	GENUS	SPECIES	AR5RA Rep 1	AR5RA Rep 2	AR5RA Rep 3	AR5RA Total per sq m
							AR5RA-1	AR5RA-2	AR5RA-3	
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Asheum*		0	0	6	13
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Dicrotendipes*		0	0	2	4
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*halterale* grp	0	0	16	33
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Polypedilum*	*illinoense* grp	56	176	30	546
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini	*Tribelos*		2	8	18	58
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini			0	0	8	17
Arthropoda	Insecta	Diptera	Chironomidae	Pentaneurini	*Ablabesmyia*		4	16	28	100
Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*		6	24	0	63
Arthropoda	Insecta	Diptera	Tipulidae				4	0	0	8
Arthropoda	Insecta	Diptera					12	24	10	96
Arthropoda	Insecta	Ephemeroptera	Caenidae		*Caenis*		0	0	4	8
Arthropoda	Insecta	Ephemeroptera	Heptageniidae		*Maccaffertium*	*exiguum*	0	24	28	108
Arthropoda	Insecta	Ephemeroptera	Isonychiidae		*Isonychia*	*sayi*	0	16	0	33
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae		*Tricorythodes*	*albilineatus*	2	32	24	121
Arthropoda	Insecta	Megaloptera	Corydalidae		*Corydalus*	*cornutus*	2	8	6	33
Arthropoda	Insecta	Trichoptera	Hydropsychidae		*Hydropsyche*		152	256	0	850
Arthropoda	Insecta	Trichoptera	Hydropsychidae		*Macrostemum*	*carolina*	40	184	0	467
Arthropoda	Insecta	Trichoptera	Hydropsychidae				0	0	40	83
Arthropoda	Insecta	Trichoptera	Leptoceridae				6	32	0	79
Arthropoda	Insecta	Trichoptera	Polycentropodidae		*Neureclipsis*		46	56	24	263
Arthropoda	Insecta	Trichoptera					4	24	4	67
Platyhelminthes	Turbellaria	Tricladida	Planariidae		*Planaria*		0	8	2	21
					Total Individuals		336	888	250	1474
					Average # individuals					491
					Standard Deviation- Individuals					346
					% Coefficient of Variance - Individuals					70.46
					Total # species		13	15	16	22
					Average # of species per sample					15
					Standard Deviation - species					1.53
					% Coefficient of Variance - Species					10.41
					Wet Weight (g)		0.806	2.344	0.896	4.05
					Average Wet Weight (in g) of 3 Reps					1.35
					Standard Deviation - Wet Weight					0.86
					% Coefficient of Variance - Wet Weight					64.00
					Count/m2					3071
					# species/m2					46
					Wet Weight (g/m^2)					8.429
					Shannon-Weiner					2.33

Prepared by: RT
Checked by: SEM

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Attachment B
Laboratory Bench sheets

MACTEC Engineering and Consulting Inc. Gainesville, FL

Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project #: 6063090152 Task #: 02.02 Scholz Hester Dendys **Client: SCS**

Sample ID	Receipt Date at MACTEC	Matrix	Picked Date	Technician Initials (picker)	# Grids or Squares Picked	Total number of organisms observed	QA/QC Pass or Fail	QA/QC By & Date	Sample ID by	Sample ID date
AR3R HD-1	7/24/2009	Composite	9-14-09	SEM	All picked out of All	99			SEM	9-14-09
AR3R HD-2	7/24/2009	Composite	9-14-09	SEM	All picked out of All	63			SEM	9-14-09
AR3R HD-3	7/24/2009	Composite	9-14-09	SEM	All picked out of All	193			SEM	9-14-09
AR4R HD-1	7/24/2009	Composite	9-15-09	SEM	All picked out of All	96			SEM	9-14-09
AR4R HD-2	7/24/2009	Composite	9-16-09	SEM	All picked out of All	44			SEM	9-16-09
AR4R HD-3	7/24/2009	Composite	9-16-09	SEM	All picked out of All	43			SEM	9-16-09
AR5R HD-1	7/24/2009	Composite	9-17-09	SEM	All picked out of All	75			SEM	9-17-09
AR5R HD-2	7/24/2009	Composite	9-17-09	SEM	All picked out of All	133			SEM	9-17-09
AR5R HD-3	7/24/2009	Composite	9-16-09	SEM	~~All~~ SEM picked All out of ~~All~~ SEM 100	2			SEM	9-16-09
AR5RA HD-1	7/24/2009	Composite	9-18-09	SEM	~~All~~ SEM picked out of ~~All~~ 100	168			SEM	9-18-09
AR5RA HD-2	7/24/2009	Composite	9-18-09	SEM	~~All~~ SEM picked out of ~~All~~ 48	111			SEM	9-18-09
AR5RA HD-3	7/24/2009	Composite	9-17-09	SEM	50 picked out of 100	125			SEM	9-17-09

MACTEC Engineering and Consulting Inc. Gainesville, FL

Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project #: 6063090152 Task 02.02 Scholz Hester-Dendys **Client: SCS**

Sample ID	Receipt Date at MACTEC	Matrix	Picked Date	Technician Initials (picker)	# Grids or Squares Picked	Total number of organisms observed	QA/QC Pass or Fail	QA/QC By & Date	Sample ID by	Sample ID date
AR4R HD-4	7/24/2009	Composite	9-28-09	SEM	All picked out of All	57	Pass	JJ	9-28-09	SEM
AR5R HD-4	7/24/2009	Composite	9-29-09	SEM	All picked out of All	35	Pass	JJ	9-28-09	SEM

MACTEC Engineering and Consulting, Inc.
Newberry, Florida

Invertebrate Sampling Analysis

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ATR3R HD-1 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): Hester-Dendy	**Sample Collection Date:** Collected by Client
Number of Grids/Squares Picked: All picked out of All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-14-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-14-09	**Technician Initials (sorter)** SEM	**Total number of organisms** ~~99~~ SEM 96
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
8	Hyalella azteca	species	1	Nanocladius ~~Cricotopus~~ SEM	Genus
49	Ephemeroptera (pupa)	Order	2	Polypedilum illinoense (group)	species
8	Diptera (pupa)	Order			
6	Caenis	Genus			
1	Oligochaeta				
6	Polypedilum halterale (group)	species			
10	Abablesmyia rhamphe (group)	species			
5	Ablabesmyia (~~Thienemannimyia~~ SEM) sp.	Genus			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 24 chironomidae - weight = 0.022

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: AR3R HD-2 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): Hester-Dendy	**Sample Collection Date:** Samples Collected by Client
Number of Grids/Squares Picked: All picked out of All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-14-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-14-09	**Technician Initials (sorter)** SEM	**Total number of organisms** ~~62~~ SEM 63
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
5	Hyallela azteca	Species			
47 ~~8~~ SEM	Ephemeroptera	Order			
3	Caenis	Genus			
1	Oligochaeta	Sub-Class			
1	Planaria				
1	Neureclipsis	Genus			
5	Polypedilum halterale Group	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered PK date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 5 Chironomidae, wet weight = 0.007

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: AR3R HD-3 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): Hester-Dendy	**Sample Collection Date:** Samples collected by client
Number of Grids/Squares Picked: All picked out of All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-14-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-14-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 193
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
10	Hyallela azteca	Species			
158	Ephemeroptera	Order			
2	Diptera (pupa)	Order			
10	Caenis	Genus			
5	Ablabesmyia ~~sample (group)~~ ~~Species~~ Genus sem				
7	Polypedilum halterale (group)	Species			
1	Dicrotendipes	Genus			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/29/09 Data QAed SEM date 9/22/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 13 chironomidae - wet weight = 0.011

MACTEC Engineering and Consulting, Inc.
Newberry, Florida

Invertebrate Sampling Analysis

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ARYR HD-1 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): Hester Dendy	**Sample Collection Date:** ~~Sample Collected by Client~~
Number of Grids/Squares Picked: All picked out of All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-15-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-15-09	**Technician Initials (sorter)** 9-15-09 SEM	**Total number of organisms** SEM ~~100~~ 96
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	Cambaridae	family	1	Chironomidae	family
~~1~~	~~Heptageniidae~~	~~family~~	20	Tribelos	Genus
4	Maccaffertium exiguum	Species	4	Polypedilum halterale (group)	~~Genus~~ Species
1	Tricorythodes albilineatus	Species	21	Stylodesmyia sp.	Genus
1	Trichoptera (pupa)	Order	2	Dicrotendipes	Genus
~~2~~ 3	Diptera (pupa)	Order	7	Polypedilum illinoense (group)	~~Genus~~ Species
3	Hyalella azteca	Species	1	Polypedilum scalaenum (group)	Species
24 ~~23~~ 58	Neureclipsis	Genus	1	Tanytarsus	Genus

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 64 chironomidae, wet weight = 0.095

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ARYR HD-1 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): Hester-Dendy	**Sample Collection Date:** Sample Collected by Client
Number of Grids/Squares Picked: All picked out of All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-15-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-15-09	**Technician Initials (sorter)** 9-15-09 SEM	**Total number of organisms** 96
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	SEM ~~Coplodadius~~ Ceratopogoninae	sub family			
1	Cryptochironomus	Genus			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

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SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ARYR HD-2 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** Sample Collected by Client
Number of Grids/Squares Picked: All **picked out of** All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-16-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-16-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 444~~6~~43 SEM
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
3 III	Maccaffertium exiguum	Species	3 III	Cryptochironomus	Genus
2 II	SEM Tricorythodes ~~sp.~~ albilineatus	~~Species~~ Species	2 II	Tanytarsus	Genus
1	Trichoptera (pupa)	Order	4 IIII	Ablabesmyia sp.	Genus
5 IIIII SEM	Diptera (pupa)	Order	1 I	Dicrotendipes	Genus
12	Neureclipsis	Genus			
4 IIII	Tribelos	Genus			
1 I	Chironomidae	family			
6 IIIII I	Polypedilum halterale (group)	Genus			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered PT date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp) SEM 21 Chironomidae wet weight = 0.027

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Newberry, Florida

Invertebrate Sampling Analysis

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ARYR HD-3 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** Sample Collected by Client
Number of Grids/Squares Picked: All **picked out of** All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-16-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-16-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 43
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
2	Maccaffertium exiguum	Species	1	Dicrotendipes	Genus
17	Neureclipsis	Genus	1	Asheum	Genus
2	Diptera (pupa)	Order			
1	Planaria	Genus			
13	Tribelos	Genus			
~~*~~	~~Chironomidae~~	~~Family~~ SEM			
3	Atherix sp.	Genus			
3	Polypedilum halterale (group)	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 21 chironomidae; wet weight = 0.052

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: AKYR HD-4 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** Sample Collected by Client
Number of Grids/Squares Picked: 100 **picked out of** 100	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-28-09	**Technician Initials (picker)** JSM
Sample Sort Date: 9-28-09	**Technician Initials (sorter)** JSM	**Total number of organisms** 57
QA/QC Pass/Fail Pass	**QA/QC Completed By:** DD	**QA/QC Date:** 10-9-09

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	Ceratopogoninae	sub-family	10	Tribelos	Genus
4	Maccaffertium exiguum	Species	3	Dicrotendipes	Genus
1	Tricorythodes albilineatus	Species	17	Ablabesmyia	Genus
1	Diptera (pupa)	Order	1	Asheum	Genus
1	Hydropsyche	Genus	2	Polypedilum halterale (group)	Species
2	Stenelmis (1 adult, 1 larva)	Genus	2	Chironomidae	~~Family~~ Family
10	Neureclipsis	Genus			
2	Hyalella azteca	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/29/09 Data QAed JSM date 9/29/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 35 chironomidae - wet weight = 0.039

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152 **Client:** SCS

Sample Identification Number: ARSR HD-1 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** ~~Sample Collected by Client~~
Number of Grids/Squares Picked: All picked out of All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** ~~9-16-09~~ 9-17-09	**Technician Initials (picker)** SEM
Sample Sort Date: ~~9-16-09~~ 9-17-09	**Technician Initials (sorter)** SEM	**Total number of organisms** ~~SEM 72 SEM~~ 75
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
3	Maccaffertium exiguum	Species	2	Hyalella azteca	Species
2	Ephemeroptera (head) mashed	Order	14+3 SEM	Neureclipsis	Genus
1	Gastropoda		11	Tribelos	Genus
1	Macromia sp.	Genus	1	Chironomidae	Family
1	Epitheca sp. (LPIL)	Genus	20	Polypedilum halterale (group)	Species
1	Tricorythodes albilineatus	Species	9	Abiskesmyia sp.	Genus
1	Hy SEM Tellina	Genus	3	Tanytarsus	Genus
3	Diptera (pupa)	Order	2	Polypedilum ~~scalaenum~~ Scalaenum (group)	Species

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered RT date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): ~~46~~ chironomidae; wetweight = 0.039

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: AR5R HD-2 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** Sample Collected by Client
Number of Grids/Squares Picked: All picked out of All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-17-09	**Technician Initials (picker)** JEM
Sample Sort Date: 9-17-09	**Technician Initials (sorter)** 9 SEM	**Total number of organisms** 133
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
7 SEM	Ceratopogoninae	sub-family	1	Tanypodinae	
1	Hydropsychidae	family	1	Dicrotendipes	Genus
1	Trichoptera (pupa)	Order	32	Alotaeniya sp.	Genus
9	Diptera (pupa)	Order	~~7~~	~~Polypedilum halterale (group)~~ SEM	~~Species~~ SEM
35	Hyallela azteca	Species	7	Polypedilum halterale (Group)	Species
13 ~~12~~ SEM	Neureclipsis	Genus			
13	Tribelos	Genus			
13	Polypedilum ~~halterale~~ scalaenum (group)	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/29/09 Data QAed SEM date 9-27-09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): ~~7~~ 6 diptera SEM wet weight = 0.024

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Invertebrate Sampling Analysis

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ARSR HD-3 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** Sample Collected by Client
Number of Grids/Squares Picked: All picked out of All	

Sample Receipt Date:	**Sample Picked Date:** 9-16-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-16-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 2
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	Hyalella azteca	Species			
1	Neureclipsis	Genus			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

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Invertebrate Sampling Analysis

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: AR5R HD-4 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** Sample collected by Client
Number of Grids/Squares Picked: All **picked out of** All	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-29-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-29-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 35
QA/QC Pass/Fail Pass	**QA/QC Completed By:** DD	**QA/QC Date:** 10-9-09

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	Stenelmis	Genus	6	Tribelos	Genus
3	Hyalella azteca	Species	1	Ablabesmyia	Genus
15	Neureclipsis	Genus			
1	Trichoptera (pupa)	Order			
2	Diptera (pupa)	Order			
1	Hydropsyche	Genus			
4	Polypedilum halterale (group)	Species			
1	Chironomidae	~~Tribe~~ Family			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date ~~9/28~~ 9/29/09 Data QAed SEM date 9/29/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 12 chironomidae

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ARSRA HD-1 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): Hester-Dendy	**Sample Collection Date:** ~~Sample Collected by Client~~
Number of Grids/Squares Picked: 50 picked out of ~~96~~ SEM 100	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-18-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-18-09	**Technician Initials (sorter)** SEM	**Total number of organisms** ~~178~~ SEM 168
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	Corydalus cornutus ~~cordsen~~	& Species	3	Leptoceridae	family
	~~Hydropsychidae~~	~~family~~	6	Diptera (pupa)	Order
23	Neureclipsis	Genus	SEM 20	Macrostemum carolina	Species
	~~Macrostemum carolina~~	~~Species~~	28	Polypedilum illinoense (group)	Species
7690 SEM	Hydropsyche	Genus	1	Tribelos ~~fallaciosum~~ SEM	Genus
1	Tricorythodes albilineatus	Species	2	Ablabesmyia ~~monilis~~ SEM (Group)	~~Species~~ Genus SEM
2	Trichoptera (pupa)	Order		~~Polypedilum scalaenum (group)~~	~~Species~~
2	Tipulidae	family	3	Rheotanytarsus	Genus

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/24/09 Data QAed SEM date 9-27-09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 44 chironomidae = 0.006

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ARSRA HD-2 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): Hester-Dendy	**Sample Collection Date:** Sample Collected by Client
Number of Grids/Squares Picked: 1 picked out of 8	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-18-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-18-09	**Technician Initials (sorter)** SEM	**Total number of organisms** SEM ~~117~~ 111
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
2 II	Isonychia * sayi	~~Genus~~ Species SEM	3	Diptera (pupa)	Order
3 III	Maccaffertium exiguum	Species	32	Hydropsyche	Genus
4 IIII	Leptoceridae	family	23	Macrostemum carolina	Species
1 I	Corydalus cornutus	Species	1 I	~~Tanytarsini~~ Tribelos ~~fluviatilis~~ SEM	Genus
4 IIII	Tricorythodes albilineatus	Species	22 IIII IIII II	Polypedilum illinoense (Group)	Species
1 I	Planaria		2 II	Ablabesmyia ~~monilis (Group)~~ sp. SEM	~~Species~~ Genus SEM
7 VII	Neureclipsis	Genus	3 III	Rheotanytarsus	Genus
3 III	Trichoptera (pupa)	Order			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/24/09 Data QAed SEM date 9-27-09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 28 chironomidae - wet weight = 0.005

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Invertebrate Sampling Analysis

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: ARSRA H03 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** Sample collected by Client
Number of Grids/Squares Picked: 50 **picked out of** 100	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-17-09	**Technician Initials (picker)** SEM
Sample Sort Date: 9-17-09	**Technician Initials (sorter)** SEM	**Total number of organisms** SEM ~~133~~ 125
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
20	Hydropsychidae	family	12	Hyd SEM Nyctiophylax	Genus
2	Caenis	Genus	4	Chironomini	Tribe
14	Maccaffertium exiguum	Species	3	Asheum	Genus
12	Tricorythodes albilineatus	Species	9	Tribelos	Genus
3	Corydalus cornutus *	Species	8	Polypedilum halterale (group)	Species
1	Planaria		15	Polypedilum illinoense (group)	Species
2	Trichoptera (pupa)	Order	14	Abdalesmyia sp.	Genus
5	Diptera (pupa)	Order	1	Dicrotendipes	Genus

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): Chironomidae weight = 0.021

MACTEC Engineering and Consulting, Inc.
Newberry, Florida

Invertebrate Sampling Analysis

Macroinvertebrate Sample Wet Weight Data Form

Project number: 6063090152

Client: SCS

Plant Name: Scholz

Sample Type (Hester-Dendy, SCI, Ponar): Hester-Dendy **Sample Collection date:** Samples Collected by Client

Weighted by: GN Date: 9-23-09

QAed by: SEM Pass/Fail Pass Date: 9-28-09

Sample Identificaiton Number	Wet Weight (g)	Sample Identificaiton	Wet Weight (g)
AR3R HD-1	0.088	AR3R HD-1 (diptera)	0.022
AR3R HD-2	0.062	AR3R HD-2 (diptera)	0.007
AR3R HD-3	0.239	AR3R HD-3 (diptera)	0.011
AR4R HD-1	0.848	AR4R HD-1 (diptera)	0.095
AR4R HD-2	0.063	AR4R HD-2 (diptera)	0.027
AR4R HD-3	0.074	AR4R HD-3 (diptera)	0.052
AR4R HD-4	0.059	AR4R HD-4 (diptera)	0.039
AR5R HD-1	0.557	AR5R HD-1 (diptera)	0.039
AR5R HD-2	0.138	AR5R HD-2 (diptera)	0.024
AR5R HD-3	0.012	AR5R HD-3 (diptera)	(no diptera)
AR5R HD-4	0.0953	AR5R HD-4 (diptera)	0.0144

Entered in database SEM date 9-29-09

Database QAed RJ date 9/29/09

MACTEC Engineering and Consulting, Inc.
Newberry, Florida

Invertebrate Sampling Analysis

Macroinvertebrate Sample Wet Weight Data Form

Project number: 6063090152

Client: SCS

Plant Name: Scholz

Sample Type (Hester-Dendy, SCI, Ponar): Hester-Dendy **Sample Collection date:** Samples Collected by Client

Weighted by: GN Date: 9-23-09

QAed by: SEM Pass/Fail Pass Date: 9-28-09

Sample Identificaiton Number	Wet Weight (g)	Sample Identificaiton	Wet Weight (g)
ARSRA HD-1	0.397	ARSRA HD-1 (diplea)	0.006
ARSRA HD-2	0.288	ARSRA HD-2 (diplea)	0.005
ARSRA HD-3	0.427	ARSRA HD-3 (diplea)	0.021
~~ARSRA~~ SEM			

Entered in database SEM date 9-29-09

Database QAed [illegible] date 9/29/09

MACTEC

engineering and constructing a better tomorrow

November 13, 2009

Mr. James Douglas
Southern Company Services
42 Inverness Center Parkway, Bin B426
Birmingham, AL 25242

Subject: **Scholz Stream Condition Index Report**
Part of Scholz Annual Environmental Monitoring
Gulf Power Plant Scholz
Sneads, Jackson County, Florida
MACTEC Project No.: 6063090152

Dear Mr. Douglas:

MACTEC Engineering and Consulting, Inc. (MACTEC) completed stream condition index determinations on July 23, 2009 at five pre-selected locations along the Apalachicola River at Plant Scholz. The results of that environmental monitoring are described in this report.

Plant Scholz, a Southern Company facility, is located in Sneads, Jackson County, Florida. The Plant is located on the Apalachicola River 3.5 miles downstream of the Jim Woodruff Lock and Dam near Chattahoochee, Florida and 2.3 miles south of US Highway 90. The River is considered a freshwater river in the area of the Plant location. The Plant is located at approximately latitude 30' 40' 12.45 N, and longitude 84' 53' 14.68 W (decimal degrees). The sampling effort conducted on July 23, 2009 was part of the routine monitoring conducted by the plant as part of their environmental compliance program. Samples were collected in the plant's discharge canal, as well as in the river in the vicinity of the plant (Table 1).

Table 1. Approximate Coordinates of Stream Condition Index Sample Locations

Sample ID	Latitude (Degree Minute Seconds)	Longitude (Degree Minute Seconds)	Site Description
SCI # 1	30° 39' 57.9" N	84° 53' 14.2" W	Apalachicola River Downstream of Discharge
SCI # 2	30° 40' 1.7" N	84° 53' 4.3" W	Apalachicola River Between Intake and Discharge Canal
SCI # 3	30° 40' 47.9" N	84° 52' 16.5" W	Apalachicola River Upstream of Intake Canal, Reference
SCI Intake	30° 40' 10.7" N	84° 53' 7.9" W	Intake Canal, Scholz Plant
SCI Discharge	30° 40' 4.7" N	84° 53' 11.9" W	Discharge Canal, Scholz Plant

Source: MACTEC, 2009 Prepared by: SEM Checked by: KEM

Stream Condition Index Determination

Methods and Procedure

A records review was conducted prior to the July, 2009 site visit, and included a review of the hydrologic conditions of the Apalachicola River to ensure that water levels and flows were appropriate and safe for the field effort associated with a Stream Condition Index Determination (Attachment 1). In addition, land-use in the vicinity of the sample locations was evaluated.

SCI Sample Collection (Woody Debris)

MACTEC environmental scientist Shannon McMorrow has been trained in stream condition index determination methods by the Florida Department of Environmental Protection (FDEP) and has passed an audit to evaluate her competence of the protocols. Shannon McMorrow, accompanied by other MACTEC environmental scientists, conducted the SCI determination at sites near the Scholz Plant on the Apalachicola River according to FDEP Standard Operating Procedures (SOPs) for Aquatic Habitat Characterization and SCI D-Frame Dipnet Sampling (FDEP SOPs FT 3000 and FS7420) on July 23, 2009.

Prior to sampling the sample positions were checked with a hand-held GPS unit and the 100 meter reach to be sampled was measured and flagged every 10 meters. The study area was visually scanned from a boat to determine physical parameters, to verify that the shoreline was wadable, and to evaluate habitat quality. The 100 meter reach was sketched and the number, type, and proportions of productive substrates were quantified. Water quality measurements (temperature, DO, pH, conductivity, and salinity) were taken with a calibrated multiprobe YSI 650 MDS (serial number 05K1409). Secchi depth was measured using a Secchi disc attached to a ruled line. Velocity of the river was measured using the ruled dipnet handle, a stopwatch, and a floating leaf. Depth was measure using a digital depth finder. The average width of the river was estimated during the visual scan and verified using aerial photographs. Measurements and observations were recorded on the FDEP Physical/ Chemical characterization field sheets, and Stream/River habitat assessment field sheets. The results of those field assessments are tabulated in Attachment 2 and copies of the field data sheets for the Physical and Chemical Characterization, Habitat Assessment are included in Attachment 3 of this report.

SCI Sample Collection (Roots)

The project area was accessed by boat and samples were collected via pedestrian transect. Due to the water depth at the sites, sample collection was limited to the shoreline, where general water depths were 0.1 to 0.5 meters. Care was taken to make sure that samples were collected at approximately the same depths across all

sampling stations. Twenty 0.5 meter sweeps were performed with a D-Frame Dipnet (mesh size 500μm) to collect invertebrates. Productive habitats were targeted for sampling according to FDEP SOP for Stream Condition Index (D-Frame Dipnet) Sampling (FS7420). All of the net's contents were carefully transferred to labeled sample jars and the nets were examined carefully to ensure that all organisms had been transferred. Samples were preserved in the field with 10 % buffered formalin.

All samples were taken to MACTEC's Gainesville, FL taxonomy laboratory where they were logged in, processed (i.e. invertebrates sorted from debris), and examined by a qualified taxonomist. Two aliquots from the SCI sample with a minimum 140 and a maximum of 160 organisms were sorted from the debris. Macroinvertebrates were identified using taxonomic guides listed in the bibliography of this report. MACTEC's reference collection of Florida invertebrates was consulted as necessary to aid in identifications.SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). The average SCI scores from the two aliquots were reported as the final SCI score. Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the guidance in SOP LT7100 and LT 7200 and filterer and clinger taxa were identified according to life history information from Merritt and Cummins (2008) "An Introduction to the Aquatic Insects of North America." Quality assurance and quality control checks were conducted according to the FDEP SOP on Laboratory Quality Control (SOP LQ1000). QA/QC requirements for sampling picking and taxonomic identification were met (results shown on bench sheets in Attachment 4).

SCI Results

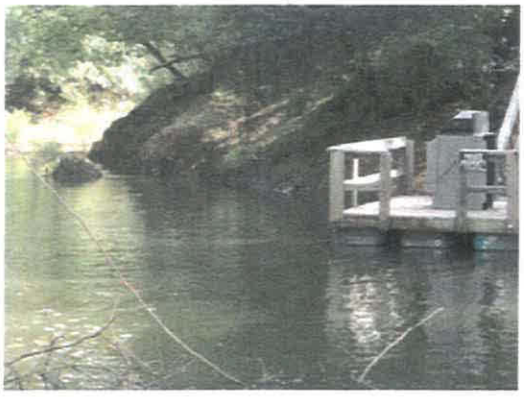
All SCI reaches in this study were located in a watershed that has predominately forested/natural land uses surrounding the power plant (industrial land use). The riparian zones of all reaches were greater than 18 meters wide except at the discharge canal where the riparian zone averaged 15 meters.

The site pictured to the left, SCI #1, is down stream of the discharge canal on the Apalachicola River. This area was artificially channelized and had a width of 100 meters and an average depth of 4 meters. Substrates included woody debris, undercut banks with exposed roots, and sand. Sand smothering was moderate and sediment odors were normal. Periphyton and fish were common, macrophytes were absent, and iron/sulfur bacteria were absent. SCI #1 received a habitat assessment score of 114 out of a possible 160 points.

Pictured to the right is SCI #2, located between the intake and discharge canal on the Apalachicola River. This reach was artificially channelized and approximately 100 meters wide and 6.5 meters deep. Substrates included woody debris, rock or shell rubble, and sand. Silt smothering was slight, and sand smothering was moderate. Sediment odors were normal. Periphyton was common, fish were rare, aquatic macrophytes and iron/sulfur bacteria were absent. SCI # 2 received a habitat assessment score of 116 out of a possible 160 points.

Pictured to the left is the reference site, SCI #3, which was located upstream of the intake canal. This reach was artificially channelized or dredged and is approximately 100 meters wide with an average depth of 3 meters. Substrates included woody debris, undercut banks with exposed roots, sand, mud, muck, and silt. Silt smothering was slight and sand smothering was moderate. Sediment odors were normal. Periphyton and fish were common, aquatic macrophytes and iron/sulfur bacteria were absent. SCI #3 received a habitat assessment score of 116 out of a possible 160 points.

The picture on the right is of SCI Intake, in the intake canal at Plant Scholz on the Apalachicola River. At this sampling location, the river was approximately 25 meters wide, 3 meters deep, and artificially channelized. Substrates included woody debris, leaf packs/mats, aquatic vegetation, rock or shell rubble, sand, mud, muck, and silt. Silt smothering was slight and sand smothering was moderate. Sediment odors were normal. Periphyton was rare, fish were common, aquatic macrophytes were rare, and iron/sulfur bacteria were absent. SCI Intake received a habitat assessment score of 101 out of a possible 160 points.



Pictured to the left is the discharge canal where sample SCI Discharge was collected. This reach was artificially channelized and was approximately 10 meters wide with an average depth of 1.5 meters. Substrates included woody debris, rock, or shell rubble, undercut banks with exposed roots, leaf mats, mud, muck, and silt. Silt smothering was severe and the sediment odors were normal. Periphyton was common, fish were rare, aquatic macrophytes were absent and iron/sulfur bacteria were absent. SCI Discharge received a habitat assessment score of 112 out of a possible 160 points.

Copies of the field data sheets for the Physical and Chemical Characterization and Habitat Assessment are included in Attachment 3 of this report. The results of those field assessments are tabulated in Attachment 2 of this report. The general results are summarized below in Table 2.

Table 2. Summary of Results of Habitat Assessment and Stream Condition Index Determination

Location ID	Location Description	Habitat Assessment Score	Final SCI score (A)	SCI 2007 Category Name
SCI #1	Apalachicola Downstream of Discharge	114	30	Impaired
SCI #2	Apalachicola River Between Intake and Discharge Canal	116	35	Healthy
SCI #3	Apalachicola River Upstream of Intake, Reference	116	31	Impaired
SCI Intake	Intake Canal	101	9	Impaired
SCI Discharge	Discharge Canal	112	26	Impaired

Source: MACTEC, 2009
A = Averaged Score
Prepared by: SEM Checked by: JMR

With the FDEP method, the benthic invertebrate community data are used to generate a "Stream Condition" score which are expressed on a scale from 0-100 with a score in the range of 0- 35 considered to be "Impaired"; 35-67 equal to "Healthy"; and 68-100 equal to "Exceptional." All SCI determinations conducted on the Apalachicola River near Plant Scholz, including the reference site, received scores in the SCI Category "Impaired" with the exception of SCI #2 which received a score of "Healthy." According to FDEP SOP LT7200, a stream receiving a score of "Impaired" has:

> *"Notable loss of taxonomic diversity; Ephemeroptera, Trichoptera, long-lived, clinger, and sensitive taxa uncommon or rare; half the number of filterers than expected; assemblage dominated by a tolerant taxon; very tolerant individuals represent a large proportion of the individuals collected; has stream conditions that are very different from natural conditions."*

A stream receiving a score of "Healthy" has:

> *"Diverse assemblage with 30 different species found on average; several different taxa each of Ephemeroptera, Trichoptera, and long-lived and, on average, 5 unique clinger and 6 sensitive taxa routinely found; small increase in dominance by a single taxon relative to Category 1; very tolerant taxa represent a small percentage of individuals, but noticeably increased from Category 1."*

The "impaired" ratings derived from this survey are not surprising given that all of the sites in this survey have been artificially channelized, a state that is obviously very different from natural conditions. Sections of the Apalachicola River are listed on Florida's list of impaired water bodies (FDEP, 2002). Even the reference sample received an SCI score of "impaired". This section of the Apalachicola is also downstream of the Jim Woodruff Lock and Dam which has created unnatural conditions. Furthermore, most of the samples were

dominated by the invasive Asiatic clam, *Corbicula manilensis*. The dominance of this species reduces the diversity within the samples by out competing other native bivalves. Final SCI scores associated with SCI samples collected in the Apalachicola River are within 5 points of one another. SCI scores for the samples collected upstream of Plant Scholz (SCI #3) and downstream of Plant Scholz (SCI #1) are within one point of each other. These results indicate that the benthic invertebrate community is not being adversely impacted by the discharge water. Taxonomic enumeration and SCI metric calculations are included in Attachment 2.

Tasks Completed for the Plant Scholz Annual Environmental Monitoring Program

As per the Quote for Annual Environmental Monitoring Program dated April 7, 2009 to Mr. James Douglas, MACTEC has completed the following tasks associated with Annual Environmental Monitoring for Plant Scholz:

- Provided one (1) qualified scientist to assist Southern Company with SCI determination
- Conducted macroinvertebrate sampling using the 20 sweep, D-frame dipnet method
- Provided taxonomic laboratory identification, wet weight determination, data reduction, and index calculations including the metrics for long-lived and sensitive taxa, percent very tolerant, taxa richness, Ephemeroptera taxa, Trichoptera taxa, percent Dominance, percent Tanytarsini, number of clinger taxa and percent filter feeders.
- Provided excel spreadsheets for each station which includes taxonomic ID and enumeration. Those files are included as separate attachments.
- Performed QA/QC of the field and laboratory analyses

Thank you for the opportunity to provide ecological services to you and Southern Company Services. If you have questions, or require additional information, please do not hesitate to contact me at (352) 333-3634, or via email semcmorrow@mactec.com.

Sincerely,

MACTEC Engineering and Consulting, Inc.

Shannon McMorrow
Environmental Scientist

for Judith L. Dudley Ph.D. with permission
Principal Scientist

Attachments: 4

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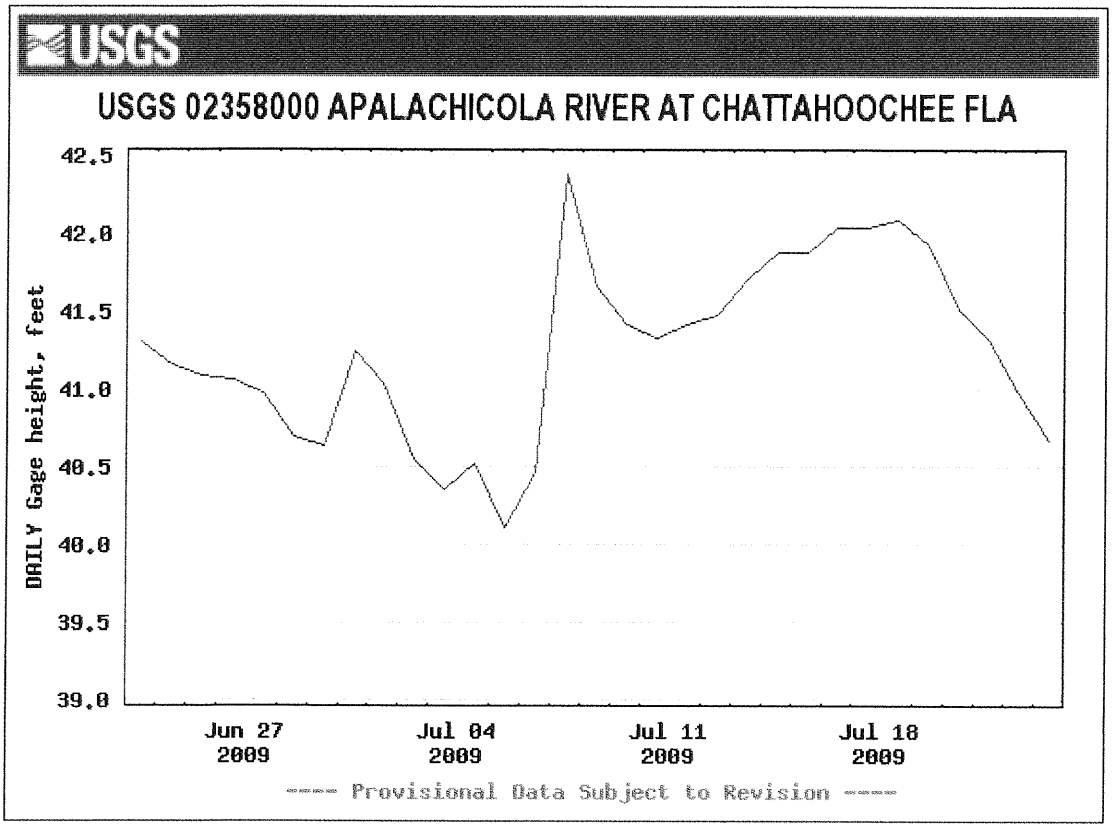
ATTACHMENT 1

HYDROGRAPH FOR APALACHICOLA RIVER JUNE 23 – JULY 23, 2009



Source USGS, 2009

Description

LOCATION.--Lat 30°42'03", long 84°51'33", in NW1/4 sec.32, T.4 N., R.6 W., Jackson County, Hydrologic Unit 03130011, on downstream side of abandoned bridge downstream of U.S. Highway 90, 0.6 mi downstream from Jim Woodruff Dam, 0.6 mi upstream from Mosquito Creek, 1.0 mi west of Chattahoochee, and 106 mi upstream from mouth.
DRAINAGE AREA.--17,200 mi^2, approximately.
Datum of gage is National Geodetic Vertical Datum of 1929 (National Weather Service bench mark).

ATTACHMENT 2

RESULTS

PHYSICAL/CHEMICAL CHARACTERIZATION AND HABITAT ASSESSMENT
STREAM CONDITION INDEX DETERMINATION

Plant Scholz
Apalachicola River (AR)
Stream Condition Index (SCI)
Samples Collected July 23, 2009
Project #: 6063090152

Summary Statistics

Parameter	Sampling Station				
	SCI #1	SCI #2	SCI #3	Intake	Discharge
Habitat Assessment Score	114	116	116	101	112
Average SCI Score	30	35	31	9	26
SCI Category	Impaired	Healthy	Impaired	Impaired	Impaired
Average Wet-Weight (g)	30.003	25.161	33.727	26.689	110.981

Prepared by: SEM
Checked by: JMR

Riparian Zone / Stream Features	Southern Company Plant Scholz, Apalachicola River				
	SCI # 1 Downstream of Discharge	SCI # 2 Between Intake and Discharge Canal	SCI # 3 Upstream of Intake Canal	Discharge Canal	Intake Canal
Watershed Land Use	Forest/Natural, Industrial	Forest/Natural, Industrial	Forest Natural	Forest/Natural, Industrial	Forest/Natural, Industrial
Local Watershed Erosion	Slight	Slight	Moderate	Slight	Slight
Local Watershed NPS Pollution	Slight	Slight	Slight	No Evidence	Slight
Riparian Zone Width (m)	>20	>20	>20	15	>18
Artificially Channelized	Yes, some recovery	Yes, some recovery	Yes, mostly recovered	Yes, some recovery	Severe
Artificially Impounded	Yes	Yes	Yes	Yes	Yes
High Water Mark (m)	13.5	2	3.5	4.5	2.5
Stream Width (m)	100	100	100	10	25
Typical Depth (m)	4	6.5	7	1.5	3
Typical Velocity (m/s)	0.25	0.17	0.2	0.14	0.09
Canopy cover	Open	Open	Open	Lightly Shaded	Open

Sediment/Substrate					
Sediment Odors	Normal	Normal	Normal	Normal	Normal
Sediment Oils	Absent	Absent	Absent	Absent	Absent
Sediment Deposition	moderate	Moderate sand smothering/ slight silt smothering	Slight sand and silt smothering	Severe silt smothering	Moderate sand smothering/ slight silt smothering
Woody Debris (%)	10	10	10	5	5
Leaf Packs or Mats (%)	0	0	0	5	2
Aquatic Vegitation (%)	0	0	0	0	5
Rock or Shell Rubble (%)	0	10	0	30	5
Undercut Banks/Exposed Roots (%)	5	0	5	10	0
Sand (%)	85	75	85	0	8
Mud/Muck/Silt (%)	0	5	0	50	75

Water Quality	Southern Company Plant Scholz, Apalachicola River				
	SCI # 1 Downstream of Discharge	SCI # 2 Between Intake and Discharge Canal	SCI # 3 Upstream of Intake Canal	Discharge Canal	Intake Canal
Date	7/23/2009	7/23/2009	7/23/2009	7/23/2009	7/23/2009
Time	1000	1245	1542	0930	1400
Sample Depth (meters)	0.1	0.1	0.1	0.1	0.1
Temperature (°C)	28.82	29.01	28.75	28.42	29.31
pH (su)	7.39	7.29	7.37	7.75	7.34
D.O. (mg/L)	7.02	7.64	6.7	6.09	7.14
Conductivity (us/cm = umhos)	169	170	172	175	170
Sample Depth (meters)	6	10	4	2	2.5
Temperature (°C)	28.88	29.01	28.73	28.32	29.3
pH (su)	7.33	7.32	7.36	7.53	7.34
D.O. (mg/L)	6.75	7.53	6.53	6.97	6.52
Conductivity (us/cm = umhos)	169	170	171	171	170
Sample Depth (meters)	12	20	9.1	4.5	5.6
Temperature (°C)	28.89	29.01	28.73	28.32	29.29
pH (su)	7.33	7.38	7.35	7.53	7.37
D.O. (mg/L)	6.64	7.18	6.77	7.01	6.54
Conductivity (us/cm = umhos)	169	170	171	172	170
Secchi (m)	0.75	1	1	0.75	1
System Type	7th Order or greater	7th Order or greater	7th Order or greater	1st Order (Discharge)	1st Order (Intake)
Water Odors	Normal	Normal	Normal	Normal	Normal
Water Surface Oils	None	None	None	None	None
Clarity	Clear	slightly turbid	slightly turbid	slightly turbid	slightly turbid
Color	Clear	Clear	Clear	Clear	Clear

Other Information					
Weather Conditions	Clear	Clear	Clear	Partly Cloudy	Clear
Periphyton Abundance	Common	Common	Common	Common	Rare
Fish Abundance	Common	Rare	Common	rare	Common
Aquatic Macrophytes	Absent	Absent	Absent	Absent	Rare
Iron / Sulfur Bacteria	Absent	Absent	Absent	Absent	Absent
Sampling Team	Shannon McMorrow, Dave Dickens, Joe Neese	Shannon McMorrow, Dave Dickens, Joe Neese	Shannon McMorrow, Dave Dickens, Joe Neese	Shannon McMorrow, Dave Dickens, Joe Neese	Shannon McMorrow, Dave Dickens, Joe Neese

Habitat Assessment	Southern Company Plant Scholz, Apalachicola River				
	SCI # 1 Downstream of Discharge	SCI # 2 Between Intake and Discharge Canal	SCI # 3 Upstream of Intake Canal	Discharge Canal	Intake Canal
Primary Habitat Components					
Substrate Diversity	9	10	9	18	11
Substrate Availability	10	9	10	16	10
Water Velocity	14	18	14	14	8
Habitat Smothering	15	12	14	12	11
Primary Score	48	49	47	60	40
Secondary Habitat Components					
Artificial Channelization	11	11	14	9	9
Bank Stability - Right Bank	9	8	9	5	6
Bank Stability - Left Bank	6	8	6	5	6
Riparian Buffer Zone Width - Right Bank	10	10	10	5	10
Riparian Buffer Zone Width - Left Bank	10	10	10	10	10
Riparian Zone Vegetation Quality - Right Bank	10	10	10	8	10
Riparian Zone Vegetation Quality - Left Bank	10	10	10	10	10
Secondary Score	66	67	69	52	61

Total Score	114	116	116	112	101

Prepared by: JM
Reviewed by: SEM

PROJECT PLANT SCHOLZ
STATION SCI #1
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI #1

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphonidae		1	1									1
Annelida	Hirudinea				3	1									
Annelida	Oligochaeta				4	1									
Arthropoda	Insecta	Diptera			6										
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	8	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Cricotopus* sp.	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus* sp.	3	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum halterale* grp.	2	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* grp.	3	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus* sp.	1	1									1
Arthropoda	Insecta	Ephemeroptera	Caenidae	*Caenis* sp.	6	1	1		1				1		
Arthropoda	Insecta	Ephemeroptera	Neoephemeridae	*Neoephemera youngi*	1	1	1								
Arthropoda	Insecta	Odonata	Gomphidae	*Dromogomphus* sp.	2	1									
Arthropoda	Insecta	Trichoptera	Brachycentridae	*Brachycentrus* sp.	2	1		1	2		1				
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Hydropsyche* sp.	3	1		1	3	1				1	
Arthropoda	Insecta	Trichoptera	Polycentropodidae	*Neureclipsis sp.*	1	1		1	1	1					
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	50	1						50			
Arthropoda	Malacostraca	Decapoda	Cambaridae		4	1					1				
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes* sp.	1	1					1				
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	14	1			14		1				
Mollusca	Gastropoda	Ancylidae			2	1									
Mollusca	Gastropoda	Architaenioglossa	Viviparidae	*Viviparus* sp.	4	1									
Mollusca	Gastropoda	Mesogastropoda	Pleuroceridae	*Elimia albanyensis*	20	1									
Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Planaria*	1	1									
					Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Very Tolerant Taxa
					143	23	2	3	14.68531469	2	4	34.96503497	4.347826087	1	17.39130435

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	23.00	2.12	2.12
Total Ephemeroptera	2.00	3.33	3.33
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	14.69	3.11	3.11
Total Clingers	2.00	1.29	1.29
Total Long-lived Taxa	4.00	8.00	8.00
% Dominance	34.97	2.43	2.43
% Tanytarsini	4.35	5.08	5.08
Total Sensitive Taxa	1.00	0.53	0.53
Total Very Tolerant Taxa	17.39	1.91	1.91

Sum SCI	32.09
Final SCI score	36
SCI Category	Healthy
Total Wet Weight (g)	16.23

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

PROJECT PLANT SCHOLZ
STATION SCI #1 Duplicate
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI #1 Duplicate

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae		3	1									1
Arthropoda	Insecta	Diptera			4										
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	10	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Cricotopus* sp.	1	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus* sp.	5	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum halterale* grp.	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* grp.	3	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Stenochironomus* sp.	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Tribelos* sp.	1	1									
Arthropoda	Insecta	Ephemeroptera	Baetidae		2	1	1								
Arthropoda	Insecta	Ephemeroptera	Caenidae	*Caenis* sp.	2	1	1								
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	*Tricorythodes albilineatus*	1	1	1							1	
Arthropoda	Insecta	Hemiptera			1	1									
Arthropoda	Insecta	Odonata	Gomphidae	*Dromogomphus spinosus*	1	1									
Arthropoda	Malacostraca	Amphipoda	Gammaridae	*Gammarus* sp.	3	1									
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	69	1						69			
Arthropoda	Malacostraca	Decapoda	Cambaridae		1	1					1				
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes* sp.	5	1					1				
Mollusca	Bivalvia	Unionoida	Unionidae	*Elliptoideus sloatianus*	1	1			1		1				
Mollusca	Bivalvia	Unionoida	Unionidae	*Utterbackia imbecillis*	1	1			1		1				
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	23	1			23		1				
Mollusca	Gastropoda	Basommatophora	Physidae	*Physella cubensis*	3	1									1
Mollusca	Gastropoda	Mesogastropoda	Pleuroceridae	*Elimia albanyensis*	1	1									
Platybelminthes	Turbellaria	Tricladida	Planariidae	*Planaria*	1	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Very Tolerant Taxa
144	23	3	0	17.36111111	0	5	47.91666667	0	1	21.73913043

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	23.00	2.12	2.12
Total Ephemeroptera	3.00	5.00	5.00
Total Trichoptera	0.00	0.00	0.00
% Filter Feeders	17.36	3.72	3.72
Total Clingers	0.00	0.00	0.00
Total Long-lived Taxa	5.00	10.00	10.00
% Dominance	47.92	-1.49	0.00
% Tanytarsini	0.00	0.00	0.00
Total Sensitive Taxa	1.00	0.53	0.53
Total Very Tolerant Taxa	21.74	1.32	1.32

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

Sum SCI	22.69
Final SCI score	25
SCI Category	Impaired
Total Wet Weight (g)	43.78

PROJECT PLANT SCHOLZ
STATION SCI #2
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI #2

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea				2	1									
Annelida	Oligochaeta				6	1									
Arthropoda	Insecta	Coleoptera	Elmidae	*Stenelmis* sp.	1	1				1					
Arthropoda	Insecta	Diptera			21										
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogoninae (sub-family)	2	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	10	1									
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini (tribe)	5										
Arthropoda	Insecta	Diptera	Chironomidae	*Cricotopus* sp.	6	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus* sp.	3	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* grp.	26	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Pseudochironomus* sp.	2	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus* sp.	24	1			24				24		
Arthropoda	Insecta	Diptera	Chironomidae	*Tribelos* sp.	1	1									
Arthropoda	Insecta	Ephemeroptera	Caenidae	*Caenis* sp.	1	1	1								
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Hydropsyche* sp.	1	1		1	1	1				1	
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Mayatrichia ayama*	2	1		1							
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	31	1						31			
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	1	1			1		1				
Mollusca	Gastropoda	Architaenioglossa	Viviparidae	*Viviparus* sp.	7	1									
Mollusca	Gastropoda	Mesogastropoda	Pleuroceridae	*Elimia albanyensis*	8	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Very Tolerant Taxa
160	18	1	2	16.25	2	1	19.375	15	1	16.66666667

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	18.00	0.61	0.61
Total Ephemeroptera	1.00	1.67	1.67
Total Trichoptera	2.00	2.86	2.86
% Filter Feeders	16.25	3.47	3.47
Total Clingers	2.00	1.29	1.29
Total Long-lived Taxa	1.00	2.00	2.00
% Dominance	19.38	7.16	7.16
% Tanytarsini	15.00	8.40	8.40
Total Sensitive Taxa	1.00	0.53	0.53
Total Very Tolerant Taxa	16.67	2.02	2.02

Sum SCI	30.00
Final SCI score	33
SCI Category	Impaired
Total Wet Weight (g)	10.78

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

PROJECT PLANT SCHOLZ
STATION SCI #2 Duplicate
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI #2 Duplicate

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae		1	1									1
Annelida	Oligochaeta				3	1									
Arthropoda	Insecta	Coleoptera	Gyrinidae	*Dineutus* sp.	1	1									
Arthropoda	Insecta	Diptera			9										
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogoninae (sub-family)	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	7	1									
Arthropoda	Insecta	Diptera	Chironomidae	Chironomini (tribe)	4										
Arthropoda	Insecta	Diptera	Chironomidae	*Cricotopus* sp.	7	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus* sp.	4	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Dicrotendipes* sp.	5	1			5						
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum halterale* grp.	16	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* grp.	5	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Pseudochironomus* sp.	3	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus* sp.	25	1			25			25	25		
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia bipunctulatus*	1	1									
Arthropoda	Insecta	Trichoptera	Polycentropodidae	*Neureclipsis sp.*	1	1		1	1	1					
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	20	1									
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes* sp.	1	1					1				
Mollusca	Bivalvia	Unionoida	Unionidae	*Elliptoideus sloatianus*	1	1			1		1				
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	2	1			2		1				
Mollusca	Gastropoda	Architaenioglossa	Viviparidae	*Viviparus* sp.	7	1									
Mollusca	Gastropoda	Basommatophora	Physidae	*Physella cubensis*	3	1									
Mollusca	Gastropoda	Mesogastropoda	Pleuroceridae	*Elimia albanyensis*	13	1									1
Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Planaria*	1	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Tolerant Taxa
141	22	0	1	24.11347518	1	3	17.73049645	17.73049645	0	22.72727273

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	22.00	1.82	1.82
Total Ephemeroptera	0.00	0.00	0.00
Total Trichoptera	1.00	1.43	1.43
% Filter Feeders	24.11	5.25	5.25
Total Clingers	1.00	0.65	0.65
Total Long-lived Taxa	3.00	6.00	6.00
% Dominance	17.73	7.66	7.66
% Tanytarsini	17.73	8.88	8.88
Total Sensitive Taxa	0.00	0.00	0.00
Total Very Tolerant Taxa	22.73	1.20	1.20

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

Sum SCI	32.89
Final SCI score	37
SCI Category	Healthy
Total Wet Weight (g)	39.55

PROJECT PLANT SCHOLZ
STATION SCI #3
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI #3

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae		3	1									1
Annelida	Oligochaeta				2	1									
Arthropoda	Insecta	Coleoptera	Gyrinidae	*Dineutus* sp.	1	1									
Arthropoda	Insecta	Diptera			13										
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogoninae (sub-family)	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	5	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus* sp.	3	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* grp.	6	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus* sp.	6	1			6				6		
Arthropoda	Insecta	Diptera	Chironomidae	*Tribelos* sp.	1	1									
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Hydroptyche* sp.	5	1		1		1				1	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Macrostemum carolina*	1	1		1	1	1	1				
Arthropoda	Insecta	Trichoptera	Polycentropodidae	*Neureclipsis sp.*	1	1		1	1	1					
Arthropoda	Malacostraca	Amphipoda	Corophiidae	*Apocorophium* sp.	1	1									
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	64	1						64			
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes* sp.	2	1					1				
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	24	1			24		1				
Mollusca	Gastropoda	Architaenioglossa	Viviparidae	*Viviparus* sp.	1	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Tolerant Taxa
140	17	0	3	22.85714286	3	3	45.71428571	4.285714286	1	17.64705882

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	17.00	0.30	0.30
Total Ephemeroptera	0.00	0.00	0.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	22.86	4.97	4.97
Total Clingers	3.00	1.94	1.94
Total Long-lived Taxa	3.00	6.00	6.00
% Dominance	45.71	-0.82	0.00
% Tanytarsini	4.29	5.05	5.05
Total Sensitive Taxa	1.00	0.53	0.53
Total Very Tolerant Taxa	17.65	1.87	1.87

Sum SCI	24.94
Final SCI score	28
SCI Category	Impaired
Total Wet Weight (g)	12.73

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

PROJECT PLANT SCHOLZ
STATION SCI #3 Duplicate
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI #3 Duplicate

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae		1	1									1
Annelida	Oligochaeta				2	1									
Arthropoda	Insecta	Coleoptera	Haliplidae	*Peltodytes* sp.	1	1									1
Arthropoda	Insecta	Diptera			7										
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Axarus* sp.	2	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Cricotopus* sp.	1	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* grp.	4	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus* sp.	3	1			3				3		
Arthropoda	Insecta	Diptera	Chironomidae	*Tribelos* sp.	1	1									
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Maccaffertium exiguum*	1	1	1			1				1	
Arthropoda	Insecta	Odonata	Coenagrionidae	*Enallagma* sp.	1	1									
Arthropoda	Insecta	Odonata	Gomphidae	*Dromogomphus spinosus*	2	1									
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Hydropsyche* sp.	1	1		1	1	1				1	
Arthropoda	Insecta	Trichoptera	Polycentropodidae	*Neureclipsis* sp.	3	1		1	3	1					
Arthropoda	Malacostraca	Amphipoda	Gammaridae	*Gammarus* sp.	1	1									
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	31	1									
Arthropoda	Malacostraca	Decapoda	Cambaridae		2	1					1				
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes* sp.	2	1					1				
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	45	1			45		1	45			
Mollusca	Gastropoda	Architaenioglossa	Viviparidae	*Viviparus* sp.	37	1									
Mollusca	Gastropoda	Basommatophora	Physidae	*Physella cubensis*	1	1									1
Mollusca	Gastropoda	Mesogastropoda	Pleuroceridae	*Elimia albanyensis*	7	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Tolerant Taxa
157	22	1	2	33.12101911	3	3	28.66242038	1.910828025	2	22.72727273

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	22.00	1.82	1.82
Total Ephemeroptera	1.00	1.67	1.67
Total Trichoptera	2.00	2.86	2.86
% Filter Feeders	33.12	7.30	7.30
Total Clingers	3.00	1.94	1.94
Total Long-lived Taxa	3.00	6.00	6.00
% Dominance	28.66	4.34	4.34
% Tanytarsini	1.91	3.24	3.24
Total Sensitive Taxa	2.00	1.05	1.05
Total Very Tolerant Taxa	22.73	1.20	1.20

Sum SCI	31.42
Final SCI score	35
SCI Category	Healthy
Total Wet Weight (g)	54.73

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

PROJECT PLANT SCHOLZ
STATION Intake Canal
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI Intake

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae		4	1									1
Annelida	Oligochaeta				7	1									
Arthropoda	Insecta	Coleoptera	Gyrinidae		1	1									
Arthropoda	Insecta	Coleoptera	Haliplidae	*Peltodytes* sp.	2	1									1
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogoninae (sub-family)	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	8	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Chironomus* sp.	1	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus* sp.	1	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum halterale* grp.	14	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus* sp.	1	1			1				1		
Arthropoda	Insecta	Ephemeroptera	Ephemeridae	*Hexagenia* sp.	3	1	1								
Arthropoda	Insecta	Megaloptera	Sialidae	*Sialis* sp.	1	1									
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia* sp.	1										
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia bipuntulatus*	1	1									
Arthropoda	Insecta	Odonata	Coenagrionidae	*Enallagma* sp.	2	1									
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	64	1						64			
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	2	1			2		1				
Mollusca	Gastropoda	Architaenioglossa	Viviparidae	*Viviparus* sp.	14	1									
Mollusca	Gastropoda	Basommatophora	Physidae	*Physella cubensis*	5	1									1
Mollusca	Gastropoda	Mesogastropoda	Pleuroceridae	*Elimia albanyensis*	11	1									
Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Planaria*	6	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Tolerant Taxa
150	20	1	0	2	0	1	42.66666667	0.666666667	0	25

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	20.00	1.21	1.21
Total Ephemeroptera	1.00	1.67	1.67
Total Trichoptera	0.00	0.00	0.00
% Filter Feeders	2.00	0.23	0.23
Total Clingers	0.00	0.00	0.00
Total Long-lived Taxa	1.00	2.00	2.00
% Dominance	42.67	0.10	0.10
% Tanytarsini	0.67	1.55	1.55
Total Sensitive Taxa	0.00	0.00	0.00
Total Very Tolerant Taxa	25.00	0.95	0.95

Sum SCI	7.70
Final SCI score	9
SCI Category	Impaired
Total Wet Weight (g)	21.27

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

PROJECT PLANT SCHOLZ
STATION Intake Canal Duplicate
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI Intake Duplicate

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae		5	1									1
Annelida	Oligochaeta				1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus* sp.	1	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum halterale* grp.	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus* sp.	2	1			2				2		
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia* sp.	1	1									
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	69	1						69			
Arthropoda	Malacostraca	Decapoda	Cambaridae		1	1					1				
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	1	1			1		1				
Mollusca	Gastropoda	Architaenioglossa	Ampullariidae	*Pomacea paludosa*	1	1					1				
Mollusca	Gastropoda	Architaenioglossa	Viviparidae	*Viviparus* sp.	36	1									
Mollusca	Gastropoda	Basommatophora	Physidae	*Physella cubensis*	5	1									
Mollusca	Gastropoda	Mesogastropoda	Pleuroceridae	*Elimia albanyensis*	19	1									1
Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Planaria*	1	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Tolerant Taxa
144	14	0	0	2.083333333	0	3	47.91666667	0.013888889	0	21.42857143

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	14.00	-0.61	0.00
Total Ephemeroptera	0.00	0.00	0.00
Total Trichoptera	0.00	0.00	0.00
% Filter Feeders	2.08	0.25	0.25
Total Clingers	0.00	0.00	0.00
Total Long-lived Taxa	3.00	6.00	6.00
% Dominance	47.92	-1.49	0.00
% Tanytarsini	0.01	0.04	0.04
Total Sensitive Taxa	0.00	0.00	0.00
Total Very Tolerant Taxa	21.43	1.36	1.36

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

Sum SCI	7.65
Final SCI score	8
SCI Category	Impaired
Total Wet Weight (g)	32.11

PROJECT PLANT SCHOLZ
STATION Discharge Canal
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI Discharge

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae		7	1									1
Annelida	Oligochaeta				4	1									
Arthropoda	Insecta	Coleoptera	Elmidae	*Stenelmis* sp.	3	1				1					
Arthropoda	Insecta	Coleoptera	Haliplidae	*Peltodytes* sp.	1	1									1
Arthropoda	Insecta	Diptera			2										
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	7	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* grp.	1	1									1
Arthropoda	Insecta	Diptera	Chironomidae	*Stenochironomus* sp.	1	1									
Arthropoda	Insecta	Ephemeroptera	Caenidae	*Caenis* sp.	1	1	1								
Arthropoda	Insecta	Hemiptera			1	1									
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia bipuntulatus*	1	1									
Arthropoda	Insecta	Odonata	Corduliidae	*Macromia* sp.	4	1					1			1	
Arthropoda	Insecta	Odonata	Libellulidae	*Libellula* sp.	1	1									
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	28	1									
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes* sp.	6	1					1				
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	83	1			83		1	83			
Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Planaria*	3	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Tolerant Taxa
154	16	1	0	53.8961039	1	3	53.8961039	0	1	18.75

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	16.00	0.00	0.00
Total Ephemeroptera	1.00	1.67	1.67
Total Trichoptera	0.00	0.00	0.00
% Filter Feeders	53.90	12.02	10.00
Total Clingers	1.00	0.65	0.65
Total Long-lived Taxa	3.00	6.00	6.00
% Dominance	53.90	-3.30	0.00
% Tanytarsini	0.00	0.00	0.00
Total Sensitive Taxa	1.00	0.53	0.53
Total Very Tolerant Taxa	18.75	1.71	1.71

Sum SCI	20.55
Final SCI score	23
SCI Category	Impaired
Total Wet Weight (g)	109.89

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

PROJECT PLANT SCHOLZ
STATION Discharge Canal Duplicate
TYPE SCI
Sample Collection Date: 7/23/2009

Stream Condition Index Results for Plant Scholz SCI Discharge Duplicate

Phylum	Class	Order	Family	Genus Species	Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini Taxa	Sensitive Taxa	Very Tolerant Taxa
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae		7	1									1
Arthropoda	Insecta	Coleoptera	Elmidae	*Stenelmis* sp.	3	1				1					
Arthropoda	Insecta	Coleoptera	Gyrinidae	*Dineutus* sp.	1	1									
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogoninae (sub-family)	1	1									
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesymia rhampe* grp.	1	1									
Arthropoda	Insecta	Ephemeroptera	Caenidae	*Caenis* sp.	3	1	1								
Arthropoda	Insecta	Odonata	Corduliidae	*Macromia* sp.	1	1					1			1	
Arthropoda	Insecta	Trichoptera			1	1		1							
Arthropoda	Malacostraca	Amphipoda	Gammaridae	*Gammarus* sp.	6	1									
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	19	1									
Arthropoda	Malacostraca	Decapoda	Cambaridae		1	1					1				
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes* sp.	1	1					1				
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula manilensis*	92	1			92		1	92			
Mollusca	Gastropoda	Ancylidae			1	1									
Mollusca	Gastropoda	Architaenioglossa	Viviparidae	*Viviparus* sp.	1	1									
Platyhelminthes	Turbellaria	Tricladida	Planariidae	*Planaria*	1	1									

Total Abundance	Total Taxa	Total Ephemeroptera	Total Trichoptera	% Filter Feeders	Total Clingers	Total Long-lived Taxa	% Dominance	% Tanytarsini	Total Sensitive Taxa	% Tolerant Taxa
140	16	1	1	65.71428571	1	4	65.71428571	0	1	6.25

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	16.00	0.00	0.00
Total Ephemeroptera	1.00	1.67	1.67
Total Trichoptera	1.00	1.43	1.43
% Filter Feeders	65.71	14.71	10.00
Total Clingers	1.00	0.65	0.65
Total Long-lived Taxa	4.00	8.00	8.00
% Dominance	65.71	-6.88	0.00
% Tanytarsini	0.00	0.00	0.00
Total Sensitive Taxa	1.00	0.53	0.53
Total Very Tolerant Taxa	6.25	4.50	4.50

Sum SCI	26.76
Final SCI score	30
SCI Category	Impaired
Total Wet Weight (g)	112.07

Prepared by: RT
Reviewd by: SEM

SCI metrics were calculated according to the FDEP SOPs for Stream Condition Index Determination (SOPs LT7100 and LT7200). Long lived taxa, sensitive taxa, and very tolerant taxa were determined using the SOP LT7100 and LT 7200 and filterer and clinger taxa were identified in Merritt and Cummins 2008 "An Introduction to the Aquatic Insects of North America".

ATTACHMENT 3

FIELD DATA SHEETS

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

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		7-23-09	9:30	Apalachicola River

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Jackson	Scholz Discharge Canal	Discharge Scholz

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
80%						20%	

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☑ Slight ☐ Moderate potential ☐ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: 15m

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☐ recent, severe ☒ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☒ yes ~~☐~~ more sinuous

HIGH WATER MARK: 0.5 (m above present water level) + ~~0.5~~ 4 SEM (present depth in m) = 4.5 (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY

10 m wide		
0.1 m/s	0.1 m/s	0.1 m/s
1 m deep	1.5 m deep	2 m deep

TYPICAL VELOCITIES
7 secs = 0.14 m/s
6 secs = 0.17 m/s
5 secs = 0.20 m/s
4 secs = 0.25 m/s
3 secs = 0.33 m/s
2 secs = 0.50 m/s
1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☒ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: (NONE) MODERATE SEVERE SILT SMOTHERING: NONE MODERATE (SEVERE) OTHER:

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	~~10~~ 5	4	D.pret	SAND	~~5~~ SOM	~~+~~SEM	
LEAF PACKS OF MATS	5	4	D.pret	MUD/MUCK/SILT	~~60~~ 50	3	D.pret
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE	30	4	D.pret	OTHER:			
ROOTS	10	4	D.pret				

DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP	~~0.1~~ ~~0.2~~ 0.2	29.42	7.75	6.09	175	Salinity		0.75
MID-DEPTH	2	28.32	7.53	6.97	171	0.07		
BOTTOM	4.5	28.32	7.53	7.01	172	0.07		

SYSTEM TYPE: STREAM: (1ST-2ND ORDER) 3RD-4TH ORDER 5TH – 6TH ORDER 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☒ SLIGHTLY TURBID: ☒ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☒ OTHER: ☐

WEATHER CONDITIONS/NOTES:

Partly cloudy, warm, calm

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☐
FISH	☐	☒	☐	☐
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: SEM, DD, JN, SB, KK

SIGNATURE: [signature]

DATE: 7-23-09

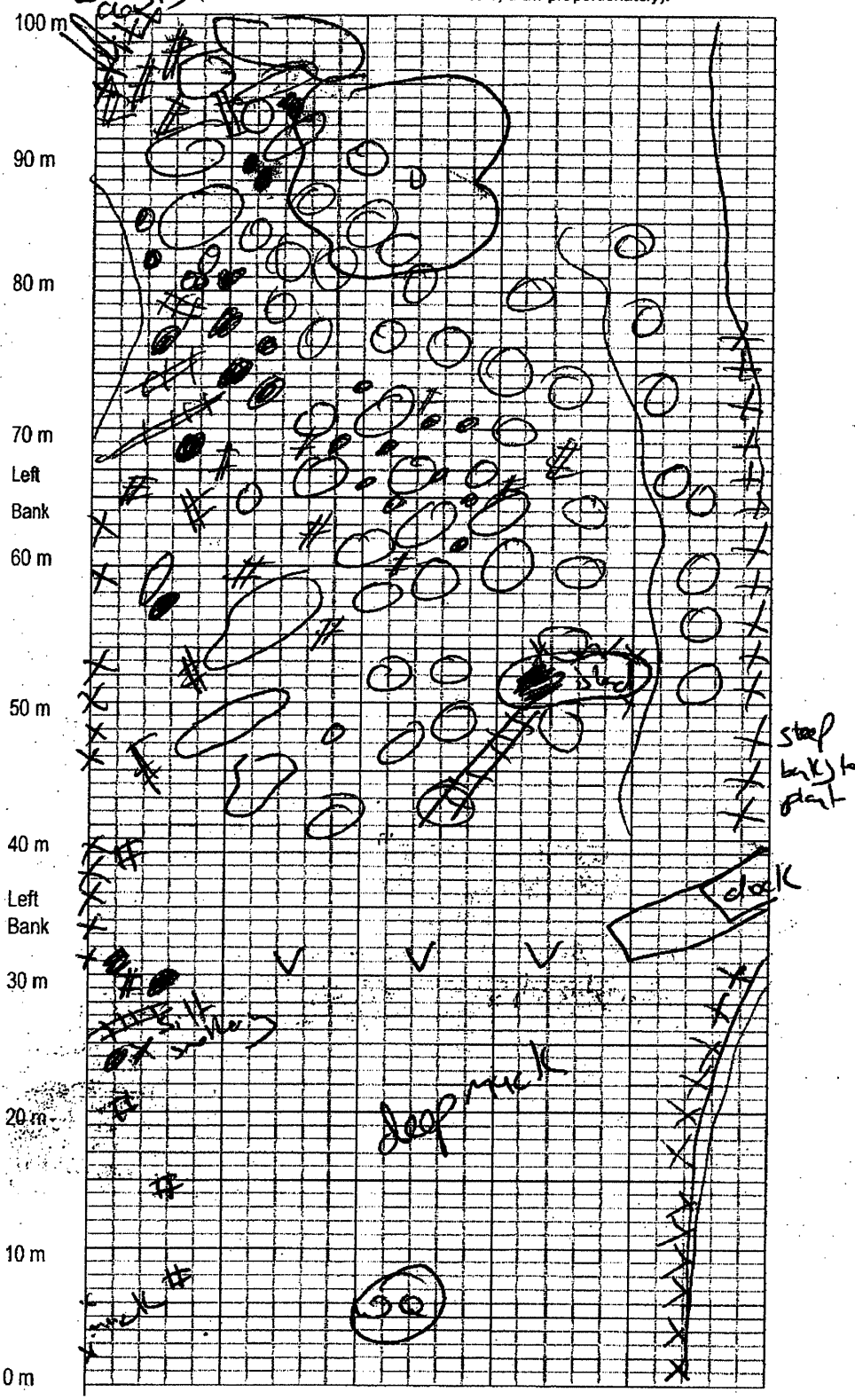
Sampling turtle

~~Set #~~ SC1 Discharge
SEM

DEP-SOP-001/01: Form FD 9000-4

Stream/River Habitat Sketch Sheet

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



Substrates: Code key, draw proportionate habitat abundance.

- # Snags
- X Roots
- ● Leaf Packs (or mats)
- ≈ Macrophytes
- rocks
- _____
- _____

Velocity: V

Note where velocity measures were taken.

Habitat Smothering:

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

Bank Stability:

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

Riparian Buffer Width: 20m of R
10m of AR

Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed/other notes:

Hickory
Oak
Sycamore

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: Apalachicola River
REMARKS:	COUNTY: Jackson	LOCATION: Apalachicola River, Scholz	FIELD ID/NAME: Scholz Discharge

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 18	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 16	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 14	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 12 Primary Score 60	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** 9	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. Some diversity of depth, but no pools (>2 times prevailing depth) present. 10 **(9)** 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth with no pools. 5 4 3 2 1
Bank Stability Right Bank 5 Left Bank 5	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 5 Left Bank 10	Width of vegetation greater than 18 m 10 9	Width of vegetation 12 to 18 m 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 8 Left Bank 10 Secondary Score 52	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 is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

112 TOTAL SCORE

Date: 2-23-09	Analyst: S. McMorrow	Signature: SMcM

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

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		7-23-09	10:00	Apalachicola Bay

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Jackson	Apalachicola River, Downstream at Discharge	SC1 #1

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
90%						10%	

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☑ Moderate potential ☐ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: >20m

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☐ recent, severe ☒ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☒ yes more sinuous

HIGH WATER MARK: 0.5 (m above present water level) + 13 (present depth in m) = 13.5 (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY: 100 m wide

0.25 m/s	0.33 m/s	0.25 m/s
3 m deep	4 m deep	3 m deep

TYPICAL VELOCITIES
- 7 secs = 0.14 m/s
- 6 secs = 0.17 m/s
- 5 secs = 0.20 m/s
- 4 secs = 0.25 m/s
- 3 secs = 0.33 m/s
- 2 secs = 0.50 m/s
- 1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☒ LIGHTLY SHADED (11-45%): ☐ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE SLIGHT (MODERATE) SEVERE SILT SMOTHERING: NONE SLIGHT MODERATE SEVERE OTHER: ☐

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	5	7	D.pred	SAND	60	3	D.pred
LEAF PACKS OF MATS				MUD/MUCK/SILT	25	3	D.pred
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
ROOTS	10	7	D.pred	DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP	0.1	28.82	7.39	7.02	169	0.07		0.75m
MID-DEPTH	6	28.88	7.33	6.75	169	0.07		
BOTTOM	12	28.89	7.33	6.64	169	0.07		

SYSTEM TYPE: STREAM: 1ST-2ND ORDER ☐ 3RD-4TH ORDER ☐ 5TH – 6TH ORDER ☐ 7TH ORDER OR GREATER ☐ LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☒ SLIGHTLY TURBID: ☐ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☒ OTHER: ☐

WEATHER CONDITIONS/NOTES: Clear, hot, calm

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☐
FISH	☐	☐	☒	☐
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: SEM, DD, JN, JD, SD, KK

SIGNATURE:

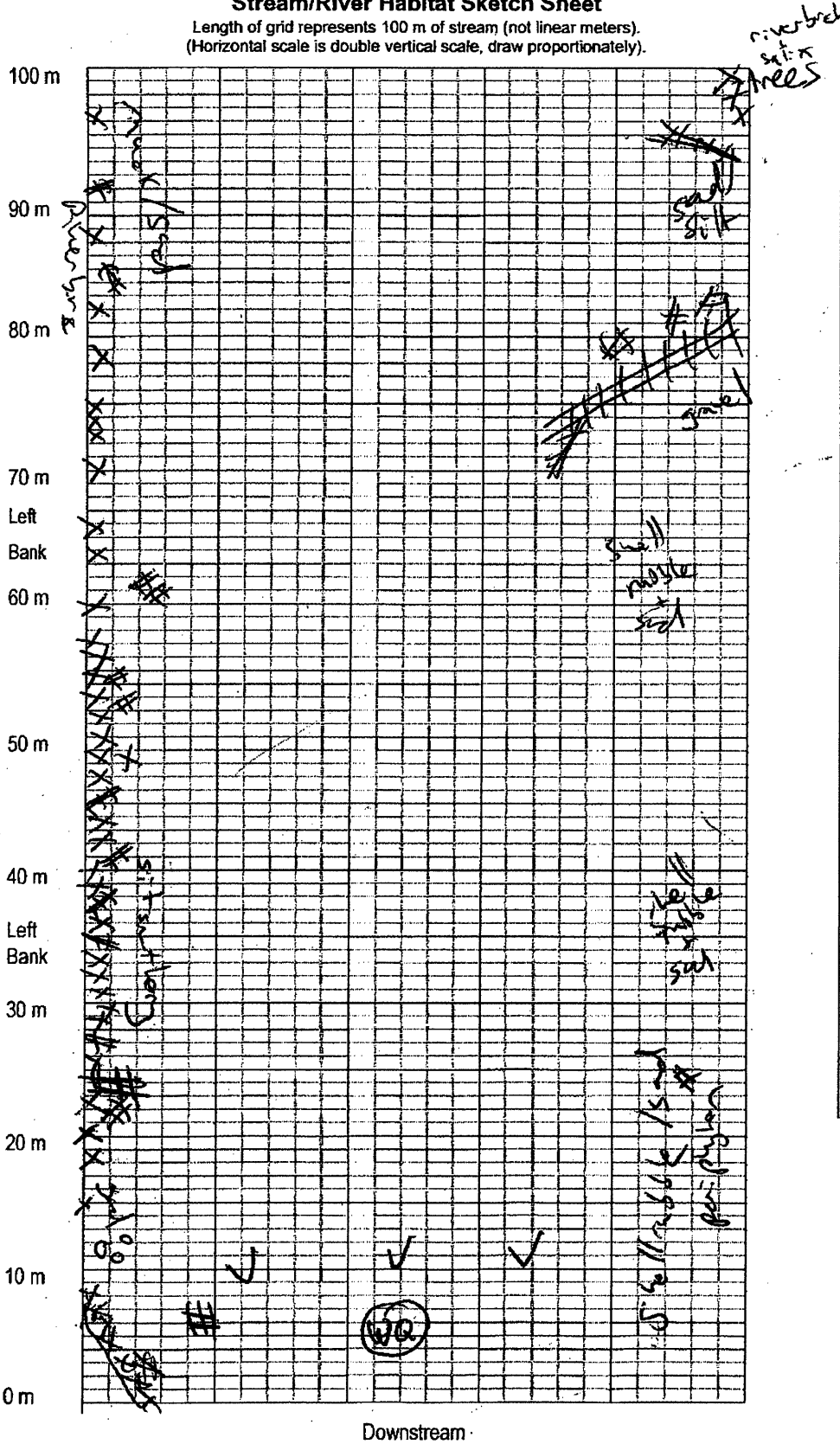
DATE: 7-23-09

Scholz SC1 #1

DEP-SOP-001/01: Form FD 9000-4

Stream/River Habitat Sketch Sheet

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



Substrates: Code key, draw proportionate habitat abundance.

- Snags
- Roots
- Leaf Packs (or mats)
- Macrophytes
- _____
- _____
- _____

Velocity:

Note where velocity measures were taken.

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:

River birch
Elm
Salix
Sweetgum

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): 7-23-09	RECEIVING BODY OF WATER: Apalachicola Bay ~~Pensacola Bay~~ system
REMARKS:	COUNTY:	LOCATION: Downstream of Discharge	FIELD ID/NAME: SC1 #1 - scholz

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 9	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 10	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 14	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 15 Primary Score 48	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** 11	Good sinuosity. No evidence of dredging or artificial straight-ening. No spoil banks. Diversity of depths. 20 19 18 17 16	Good sinuosity within old chan-nelized 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. Some diversity of depth, but no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth with no pools. 5 4 3 2 1
Bank Stability Right Bank 9 Left Bank 6	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 18 m 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 66	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 is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

114 TOTAL SCORE

Date: 7-23-09	Analyst: S. McMorrow	Signature:

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

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: ___ SUBMITTING AGENCY NAME: ___		STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
REMARKS:	COUNTY: Jackson	LOCATION: Apalachicola River btwn Intake Discharge		FIELD ID/NAME: SC1 #2	

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
80						20	

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☑ Moderate potential ☐ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: >20m

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☐ recent, severe ☒ some recovery ☐ mostly recovered more sinuous

ARTIFICIALLY IMPOUNDED ☒ yes

HIGH WATER MARK 0.5 (m above present water level) + 6 ~~22~~ = ~~Gauge ft~~ SEM (present depth in m) ~~2m~~ ~~10.5~~ SEM 65 (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY: ___ m wide

0.17 m/s	0.2 m/s	0.17 m/s
10 ft m deep	22 ft m deep	20 ft m deep

~~8/10 mi~~ 1/ft SEM

TYPICAL VELOCITIES: 7 secs = 0.14 m/s; 6 secs = 0.17 m/s; 5 secs = 0.20 m/s; 4 secs = 0.25 m/s; 3 secs = 0.33 m/s; 2 secs = 0.50 m/s; 1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☐ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐ ___

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE (MODERATE) SLIGHT SEVERE SILT SMOTHERING: NONE MODERATE (SLIGHT) SEVERE OTHER: ___

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	~~20~~ 10	7	D.pret	SAND	~~80~~ 75	1	D.pret
LEAF PACKS OR MATS				MUD/MUCK/SILT	5	5	D.pret
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE	10	7	D.pret	OTHER:			
ROOTS				*DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION*			

WATER QUALITY	DEPTH ~~(m)~~ ft	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):	Sal		SECCHI (M):
TOP	0.1	29.01	7.29	7.64	170	0.07		1.0 m
MID-DEPTH	10	29.01	7.32	7.73	170	0.07		
BOTTOM	20	29.01	7.38	7.78	170	0.07		

SYSTEM TYPE: STREAM: 1ST-2ND ORDER 3RD-4TH ORDER 5TH – 6TH ORDER 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐ ___

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐ ___

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☐ SLIGHTLY TURBID: ☒ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☒ OTHER: ☐ ___

WEATHER CONDITIONS/NOTES: Warm, calm, clear

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☐
FISH	☐	☒	☐	☐
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: SEM, DD, JN, SB, KK

SIGNATURE: [signature]

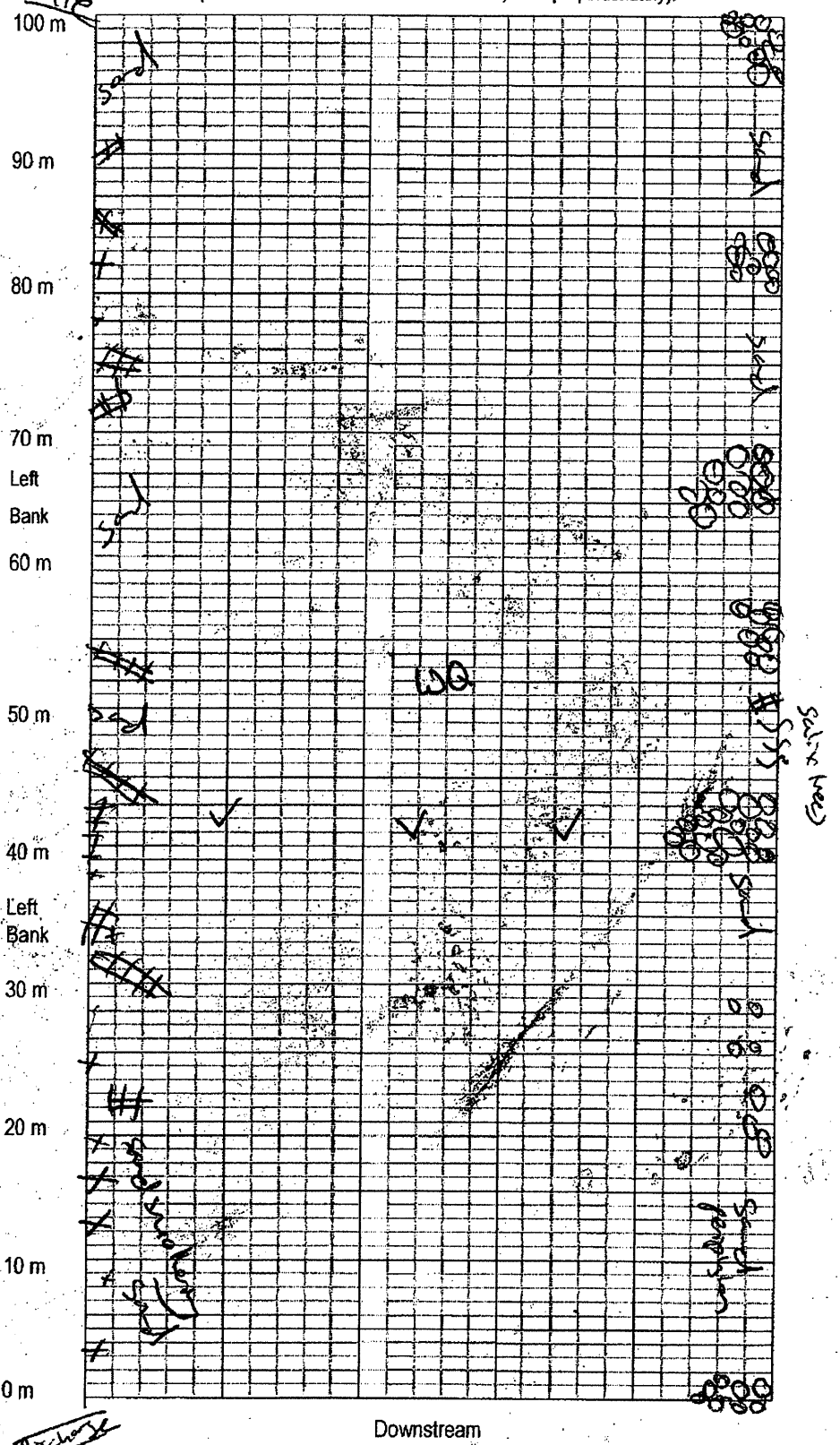
DATE: 7-23-09

SC1#2

DEP-SOP-001/01: Form FD 9000-4

Stream/River Habitat Sketch Sheet

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



Substrates: Code key, draw proportionate habitat abundance.

- Snags
- Roots
- Leaf Packs (or mats)
- Macrophytes
- O rock
- _____
- _____

Velocity:

Note where velocity measures were taken. V

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:

River birch
Salix
Sycamore

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:
		7-23-09	Apalachicola Bay

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Jackson	between Intake + Dixie Lodge @ Apalachicola River	SC1 FF2

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 10	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 9	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	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 12 Primary Score 49	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 11	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. Some diversity of depth, but no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth with no pools. 5 4 3 2 1
Bank Stability Right Bank 9 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 18 m 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 67	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 is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

116 + 15 = 131 **TOTAL SCORE**

Date:	Analyst:	Signature:
7-23-09	S. McMorrow	

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

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		7-23-09		Apalachicola River

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Jackson	Scholz Intake	Intake Scholz

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
70%						30%	

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☑ Moderate potential ☐ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: >18m

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☒ recent, severe ☐ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☒ yes ☐ more sinuous

HIGH WATER MARK: 0.5m + 6ft = 2.5m
(m above present water level) (present depth in m) (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY: 25 m wide

0.09 m/s	0.09 m/s	0.09 m/s
2ft	6ft	3ft
m deep	m deep	m deep

TYPICAL VELOCITIES
7 secs = 0.14 m/s
6 secs = 0.17 m/s
5 secs = 0.20 m/s
4 secs = 0.25 m/s
3 secs = 0.33 m/s
2 secs = 0.50 m/s
1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☒ LIGHTLY SHADED (11-45%): ☐ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE MODERATE SLIGHT SEVERE

SILT SMOTHERING: NONE MODERATE SLIGHT SEVERE OTHER:

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS) ✓	5%	5	D.pret	SAND	80%	1	D.pret
LEAF PACKS OF MATS	2%	1	D.pret	MUD/MUCK/SILT	75	3	D.pret
AQUATIC VEGETATION ✓	5%	5	D.pret	OTHER:			
ROCK OR SHELL RUBBLE ✓	5%	5	D.pret	OTHER:			
ROOTS							

DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION

WATER QUALITY	DEPTH (m/ft)	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):	Sal		SECCHI (M):
TOP	0.1	29.31	7.34	7.14	170	0.07		1.0m
MID-DEPTH	2.5	29.30	7.34	6.52	170	0.07		
BOTTOM	5.6	29.29	7.37	6.54	170	0.07		

SYSTEM TYPE: STREAM: 1ST-2ND ORDER 3RD-4TH ORDER 5TH – 6TH ORDER 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☒ Intake canal

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☐ SLIGHTLY TURBID: ☒ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☒ OTHER: ☐

WEATHER CONDITIONS/NOTES:
smoked w/s: Hs

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☒	☐	☐
FISH	☐	☐	☒	☐
AQUATIC MACROPHYTES	☒	☒	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: SEM, DD, JN, SB, KK

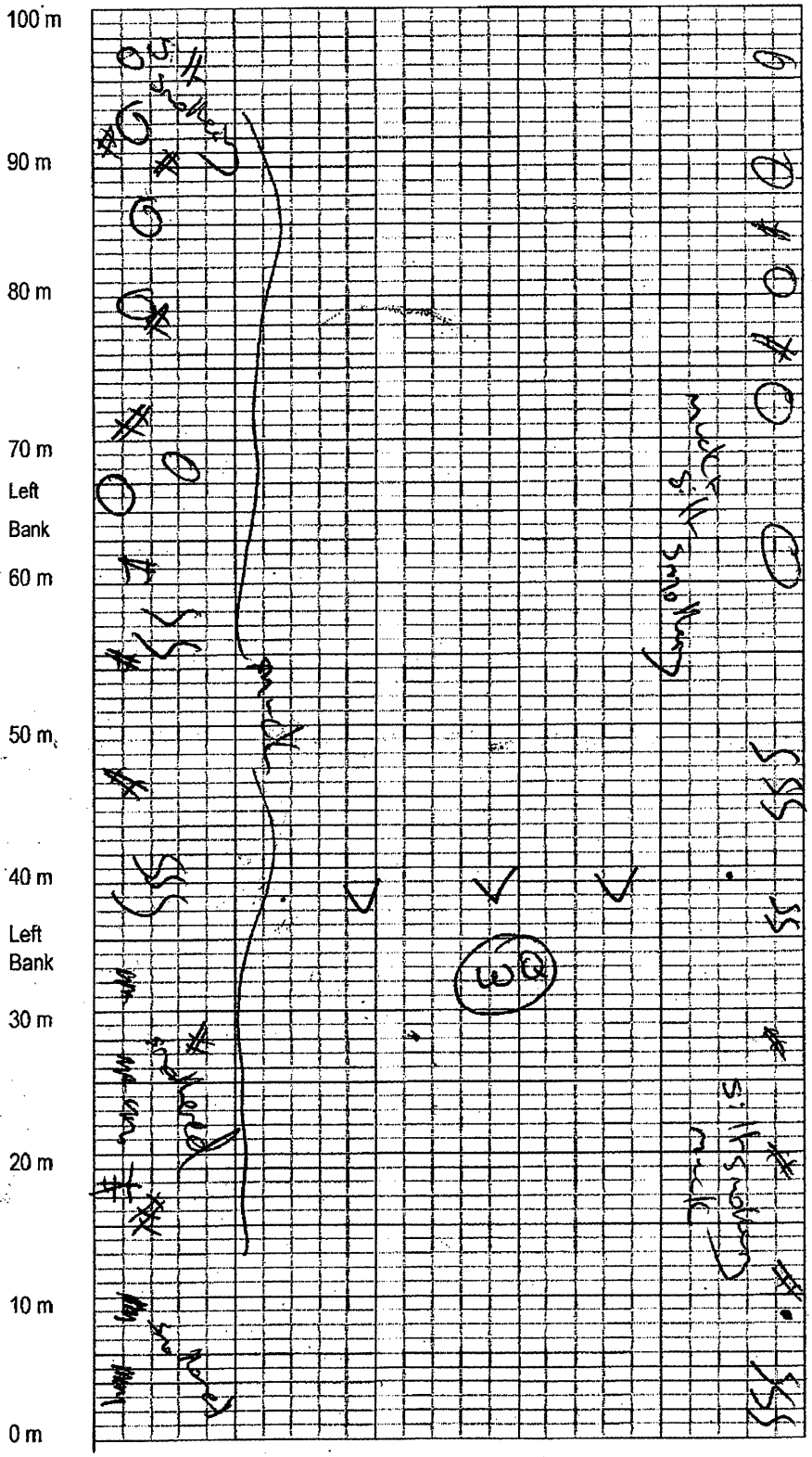
SIGNATURE: [signature] DATE: 7-23-09

Intake Canal
Scholz

DEP-SOP-001/01: Form FD 9000-4

Stream/River Habitat Sketch Sheet

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



Substrates: Code key, draw proportionate habitat abundance.

- # Snags
- X Roots
- Leaf Packs (or mats)
- SS Macrophytes
- ☐ _____
- ☐ _____
- ☐ _____

Velocity:

Note where velocity measures were taken. V

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:

Salix
River birch
Sycamore
Alligator weed

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): 7-23-09	RECEIVING BODY OF WATER: Apalachicola River
REMARKS:	COUNTY: Jackson	LOCATION: Scholz Intake	FIELD ID/NAME: Intake Scholz

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 11	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 10	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 9	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 Primary Score 40	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** 9	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. Some diversity of depth, but no pools (>2 times prevailing depth) present. 10 (9) 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth with no pools. 5 4 3 2 1
Bank Stability Right Bank 6 Left Bank 6	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 18 m 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 61	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 is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

101 TOTAL SCORE

Date: 7-23-09	Analyst: S. McMorrow	Signature:

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

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		7-23-09	15:42	Apalachicola Bay

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Jackson	Scholz SC1#3 upstream of intake	SC1 #3

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
100%							

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☐ Moderate ☑ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☑ Moderate potential ☐ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: >20 m

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☐ recent, ☐ severe ☐ some recovery ☒ mostly recovered

ARTIFICIALLY IMPOUNDED ☒ yes more sinuous

HIGH WATER MARK: 0.5m (m above present water level) + 9ft (present depth in m) = 3.5m (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY: 100 m wide

0.25 m/s	0.2 m/s	0.2 m/s
6 m deep	9.1 ft m deep	7 m deep

TYPICAL VELOCITIES
7 secs = 0.14 m/s
6 secs = 0.17 m/s
5 secs = 0.20 m/s
4 secs = 0.25 m/s
3 secs = 0.33 m/s
2 secs = 0.50 m/s
1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☒ LIGHTLY SHADED (11-45%): ☐ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE MODERATE (SLIGHT) SEVERE SILT SMOTHERING: NONE MODERATE (SLIGHT) SEVERE OTHER:

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	10%	7	D.pret	SAND	85%	6	D.pret
LEAF PACKS OF MATS				MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
ROOTS	5%	7	D.pret	DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP	0.4 ft	28.75	7.37	6.70	172	0.07		~~0.75~~ 1.00
MID-DEPTH	4.6 ft	28.73	7.36	6.53	171	0.07		
BOTTOM	9.1 ft	28.73	7.35	6.77	171	0.07		

SYSTEM TYPE: STREAM: 1ST-2ND ORDER ☐ 3RD-4TH ORDER ☐ 5TH – 6TH ORDER ☐ 7TH ORDER OR GREATER ☐ LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐

WATER COLORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☒ SLIGHTLY TURBID: ☒ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☒ OTHER: ☐

WEATHER CONDITIONS/NOTES:

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☐
FISH	☐	☐	☒	☐
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: SEM, AO, JN, SD, KK

SIGNATURE: [signature]

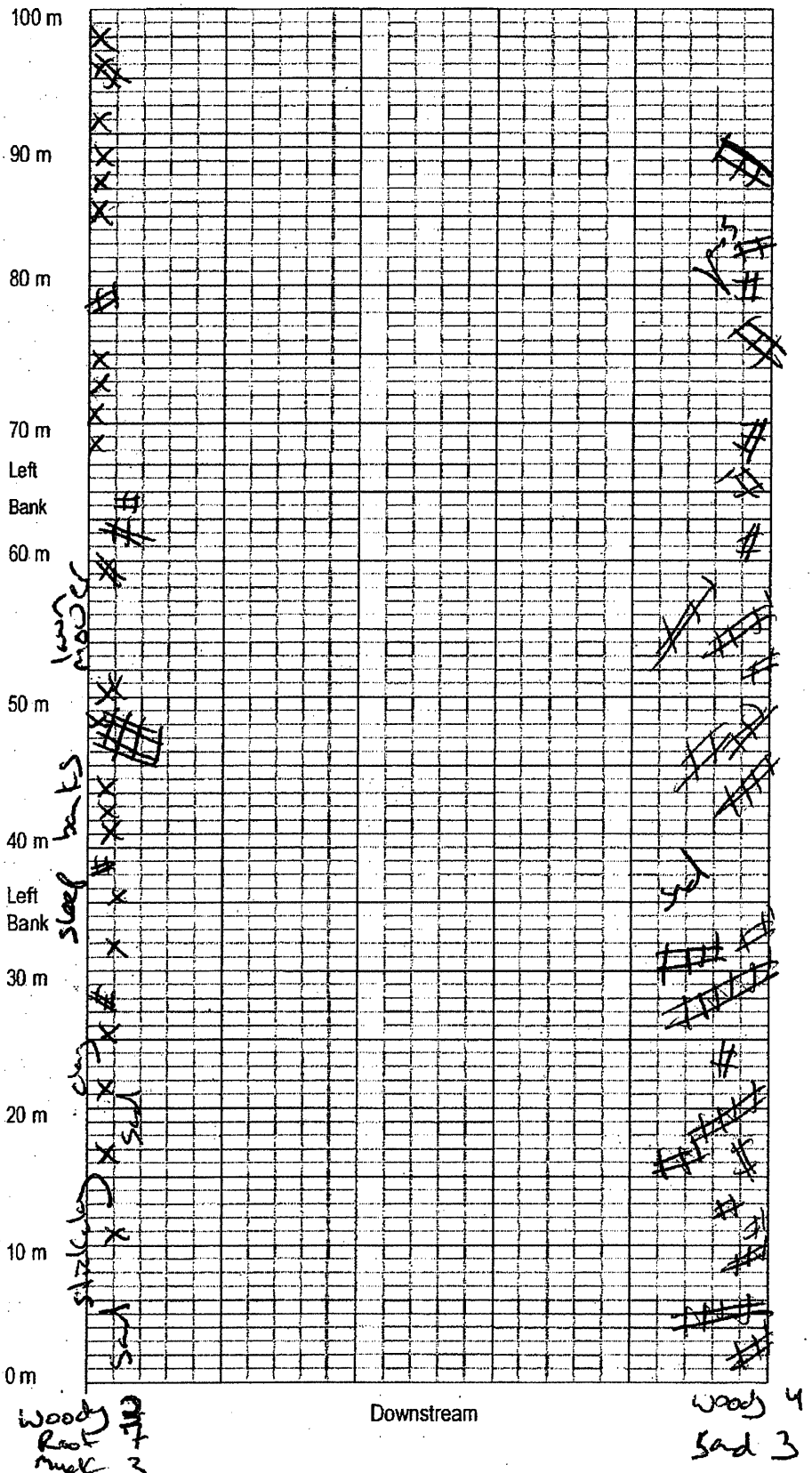
DATE: 7-23-09

SC1#3

DEP-SOP-001/01: Form FD 9000-4

Stream/River Habitat Sketch Sheet

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



Substrates: Code key, draw proportionate habitat abundance.

- Snags
- Roots
- Leaf Packs (or mats)
- Macrophytes
- _____
- _____
- _____

Velocity:

Note where velocity measures were taken.

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:

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): 7-23-09	RECEIVING BODY OF WATER: Apalachicola Bay
REMARKS:	COUNTY: Jackson	LOCATION: Apalachicola River Upstream of Intake SC1 #3	FIELD ID/NAME:

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 9	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 10	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 14	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 14 Primary Score 47	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** 14	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. Some diversity of depth, but no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth with no pools. 5 4 3 2 1
Bank Stability Right Bank 9 Left Bank 6	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 18 m 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 69	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 is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

116 TOTAL SCORE

Date: 7-23-09	Analyst: S McMorrow	Signature:

Form FD 9000-8: FIELD INSTRUMENT CALIBRATION RECORDS

INSTRUMENT (MAKE/MODEL#) 556 YSI **INSTRUMENT #** 06D1748AE

PARAMETER: *[check only one]*

☐ TEMPERATURE ☑ CONDUCTIVITY ☐ SALINITY ☐ pH ☐ ORP
☐ TURBIDITY ☐ RESIDUAL Cl ☐ DO ☐ OTHER _____

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A 718 mmhos/cm MACTEC DD 07/14/09 expire 8/14/09
Standard B 147 mmho/cm MACTEC DD 07/14/09 expire 8/14/09
Standard C _____

DATE (y/mm/dd)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE OF UNIT (COND)	SAMPLER INITIALS
7-20-09	11:54	A	718	~~718~~ 770	9 SEM	~~YES~~ NO SEM	SEM	SEM
7-20-09	11:55	B	~~147~~ 144	144	0	NO		SEM
7-20-09	12:00	A	718	696 SEM		NO		SEM
7-20-09	19:08	B	~~147~~ 144	163		NO		SEM
7-20-09	19:10	A	718	970		NO		SEM
7/21/09	7:38	B	144	147		NO		SEM
7/21/09	7:40	A	718	662		NO		SEM
7/21/09	17:47	A	~~720~~ 718	728		NO		SD
7/21/09	17:50	B	147	152		NO		SD
7/22/09	8:48	A	718	658		YES		SEM
7/22/09	8:50	B	147	149		NO		SEM
7/22/09	8:55	A	718	714		NO		SEM
7/22/09	15:00	B	147	190		NO		SEM
7/22/09	15:02	A	718	799		NO		SEM
7/23/09	8:48	B	147	177		Yes		SEM
7/23/09	8:50	A	718	718		NO		SEM
7/23/09	8:55	B	147	147		NO		SEM
7/23/09	17:07	B	147	216		NO		SEM
7/22/09	17:08	A	~~720~~ 718	721		NO		SEM

Form FD 9000-8: FIELD INSTRUMENT CALIBRATION RECORDS

INSTRUMENT (MAKE/MODEL#) YSI 556 **INSTRUMENT #** 06017481AE

PARAMETER: *[check only one]*

☐ TEMPERATURE ☐ CONDUCTIVITY ☐ SALINITY ☑ pH ☐ ORP
☐ TURBIDITY ☐ RESIDUAL Cl ☐ DO ☐ OTHER _____

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A 7 RICCA 2801275 12/2009
Standard B 10 RICCA 2803403 09/2009
Standard C _____

DATE (m/dd/yy)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES/NO)	TYPE (INIT. CONT)	SAMPLER INITIALS
7-20-09	11:54	A	7	6.87		NO		SEM
7-20-09	11:54	B	10	9.97		NO		SEM
7-20-09	19:10	A	7	7.22		NO		SEM
720-09	19:12	B	10	10.23		NO		SEM
721-09	7:40	A	7	7.38		No		SEM
7/21/09	7:50	B	10	10.25		NO		SEM
7/21/09	17:47	B	10	9.97		NO		DD
7/21/09	17:47	A	7	7.10		NO		DD
7/22/09	8:56	A	7	7.07		No		SEM
7/22/09	8:56	B	10	10.06		No		SEM
7-22-09	14:54	A	7	6.94		No		SEM
7-22-09	14:56	B	10	~~9~~ 10.04		No		SEM
7-23-09	8:58	A	7	6.95		NO		SEM
7-23-09	8:59	B	10	9.93		NO		SEM
7-23-09	17:02	B	10	10.14		NO		SEM
7-23-09	17:03	A	7	7.16		NO		SEM
7-23-09								

Form FD 9000-8: FIELD INSTRUMENT CALIBRATION RECORDS

INSTRUMENT (MAKE/MODEL#) YSI 556 **INSTRUMENT #** 06017498AE

PARAMETER: *[check only one]*

☐ TEMPERATURE ☐ CONDUCTIVITY ☐ SALINITY ☐ pH ☐ ORP
☐ TURBIDITY ☐ RESIDUAL Cl ☑ DO ☐ OTHER _____

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A DI water 29°C
Standard B DI water 25°C
Standard C DI Water 38 °C

DATE (yy/mm/dd)	TIME (military)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV.	CALIBRATED (YES/NO)	TYPE (INIT. COND)	SAMPLER INITIALS
7-2009	12:00	A	7.69	7.70		NO		SEM
7-20-09	19:15	A	7.69	7.18		NO		SEM
7-21-09	7:53	B	8.26	7.20		YES		SEM
7-21-09	7:58	B	8.26	8.30		NO		SEM
7-21-09	17:55	C	8.03	7.31		NO		SEM
7-22-09	8:58	A	7.69	7.62		NO		SEM
7-22-09	14:51	31°C	7.43	7.86		NO		SEM
7-23-09	9:09	31°C	7.43	~~7.62~~ 7.50		NO		SEM
7-23-09	17:10	26°C	8.11	7.72		NO		SEM

ATTACHMENT 4

LABORATORY DATASHEETS

MACTEC Engineering and Consulting Inc. Gainesville, FL

Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project #: 6063090152 Task #: 02.01 **Scholz SCI** **Client: SCS**

Sample ID	Receipt Date at MACTEC	Matrix	Picked Date	Technician Initials (picker)	# Grids or Squares Picked	Total number of organisms observed	QA/QC Pass or Fail	QA/QC By & Date	Sample ID by	Sample ID date
Scholz SCI # 1	7/24/2009	Composite	~~8/19/09~~ GD ~~8/17/09~~	GD	~~12~~ 5 picked out of 104	~~276~~ 213 GD			SEM	~~9-4-09~~ ~~9-8-09~~/SEM ~~9-21-09~~
Scholz SCI # 2	7/24/2009	Composite	8/18/09	GD	~~26~~ 13 SEM picked out of 104	~~401~~ 200 SEM	Pass	8/18/09	~~Pass~~ SEM	9-8-09, 9-21-09
Scholz SCI # 3	7/24/2009	Composite	8/17/09	SS	52 picked out of 104	212			SEM	9-8-09
Scholz Intake	7/24/2009	Composite	8/18/09	GD	26 picked out of 104	228			SEM	9-9-09
Scholz Discharge	7/24/2009	Composite	8/18/09	SS	~~52~~ 25 picked out of 104	214			SEM	9-14-09

Duplicates

Scholz SCI #1D 7/24/09 Comp.	9-16-09	~~JEH~~ JEH	23/104	144	SEM	9-18-09
Scholz SCI #2D 7/24/09 Comp.	9/17/09	JEH	11/104	141	SEM	9-21-09
Scholz SCI #3D 7/24/09 Comp.	9/17/09	JM	52/104	157	SEM	9-17-09
Scholz SCI Intake D 7/24/09 Comp.	9/17/09	JM	26/104	144	SEM	9-21-09
Scholz SCI Discharge 7/24/09 Comp	9/18/09	JEH	9/104	140	SEM	9-21-09

MACTEC Engineering and Consulting, Inc.
Newberry, Florida

Invertebrate Sampling Analysis

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: #1 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 12 **picked out of** 100	

Sample Receipt Date: 7/24/09	**Sample Picked Date:** 8/19/09	**Technician Initials (picker)** GD
Sample Sort Date: 9-4-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 142
QA/QC Pass/Fail Pass	**QA/QC Completed By:** DD	**QA/QC Date:** 10/9/09

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
14 +1 SEM	Corbicula manilensis	Species	1	Neoephemera youngi *	Species
20 +3 SEM +1 SEM	Elimia albanyensis	Species	1	Palaemonetes	Genus
4 SEM	Viviparus	genus	6 SEM	Caenis	Genus
4	Cambaridae	family	2 +2 SEM	Hyallela azteca	Species
2	Dromogomphus	Genus	3	Hirudinea	Class
3	~~Hydropsychidae~~ Hydropsyche	~~family~~ Genus	2	Ancylidae	family
2	Brachycentrus *	Genus	4	Oligochaeta	Sub-Class
1	~~Polycentrop~~ Neureclipsis * +1 SEM	Genus	6	Diptera (Pupa)	Order

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/24/09 Data QAed SEM date 9-27-09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 82 chironomids (wet weight = 0.016) +7 SEM

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SC1#1 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SC1	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 12 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 8/19/09	**Technician Initials (picker)** GD
Sample Sort Date: 9-4-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 142
QA/QC Pass/Fail Pass	**QA/QC Completed By:** DD	**QA/QC Date:** 10-9-09

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
3	~~Erythr~~ Cryptochironomus	Genus			
2	Polypedilum halterale (group)	Species			
3	Polypedilum illinoense (group)	Species			
8 *sem	Stictochironomus rhamphe (group)	species			
1	Tanytarsus	genus			
1	Cricotopus	genus			
1	Planaria	Genus			
1	Glossiphoniidae	family			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered KT date 9/29/09 Data QAed SEM date 9-27-09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SCI #1 D (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): Hester-Dendy	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 23 **picked out of** 104	

Sample Receipt Date: 7.24-09	**Sample Picked Date:** 9-18-09	**Technician Initials (picker)** ~~SEM~~ SEM JEH
Sample Sort Date: SEM	**Technician Initials (sorter)** 9-18-09	**Total number of organisms** 144
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	Elliptoideus sloatianus *	Species	1	Cambaridae	family
1	Utterbackia imbecillis *	Species	1	Hemiptera	Order
23	Corbicula manilensis	Species	1	Dromogomphus spinosus	Species
1	Elimia albanyensis	Species	2	Baetidae	Family
5	Palaemonetes	Genus	2	Caenis	Genus
3	Physella cubensis	Species	1	Tricorythodes albilineatus	Species
3	Gammarus	Genus	69	Hyalella azteca	Species
1	Planaria		3	Glossiphoniidae	family

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered PK date 9/25/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): ~~SEM~~ chironomidae wet weight = 0.010

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SCI #1D (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): HD	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 23 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-16-09	**Technician Initials (picker)** JEH
Sample Sort Date: 9-18-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 144
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
4	Diptera (pupa)	Order			
1	Tribelos (SEM)	Genus			
5	Cryptochironomus	Genus			
10	Ablabesmyia rhamphe (group)	Species			
3	Polypedilum illinoense (group)	Species			
1	Cricotopus	Genus			
1	Polypedilum halterale (group)	Species			
1	Stenochironomus	Genus			

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered RF date 9/29/09 Data QAed SEM date 9-27-09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

MACTEC Engineering and Consulting, Inc.
Newberry, Florida

Invertebrate Sampling Analysis

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SC1 #2 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 26 **picked out of** 104	

Sample Receipt Date: 7/24/09	**Sample Picked Date:** 8/18/09	**Technician Initials (picker)** GD
Sample Sort Date: 9-8-09 / 9-28-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 160
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
7	Viviparus	Genus	~~2~~ 21 SEM	Diptera (pupa)	Order
~~8~~ 9 SEM	Elimia albanyensis	Species	6	Oligochaeta	Sub Class
1 ~~2~~ SEM	Corbicula manilensis	Species	2	Ceratopogoninae	sub-family
2 "	Mayatrichia ayama	Species	2	Hirudinea	Class
1 '	Stenelmis	Genus	6	Cricotopus	
1 '	~~Hydropsychidae~~ Hydropsyche	~~family~~ Genus SEM	26	Polypedilum illinoense (group)	
1 '	Caenis	Genus	10	~~Tanytarsini~~ SEM Ablabesmyia rhamphe (group)	species
~~1~~ 32	Hyallela azteca	Species	5	Chironomini	Tribe

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered PT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): Fish larvae + eggs; chironomids wet weight = ~~0.123~~ 0.072

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SC1 #2 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 26 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 8/18/09	**Technician Initials (picker)** GJ
Sample Sort Date: 7-8-09 / 9-21-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 160
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
3	Cryptochironomus	Genus			
24	Tanytarsus	Genus			
2	Pseudochironomus	Genus			
1	Tribelos	Genus			

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered RK date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SC1#2 Duplicate (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): ~~Hester-Dendy~~ SCI SEM	**Sample Collection Date:** ~~9-21-09~~ SEM 7-23-09
Number of Grids/Squares Picked: 11 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** ~~9-21-09~~ SEM 9-17-09	**Technician Initials (picker)** ~~SEM~~ SEM JEH
Sample Sort Date: 9-21-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 141
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	Planaria		7	Viviparus	Genus
3 III	Physella cubensis	Species	2	Corbicula manilensis	Species
1 I	Ceratopogoninae	Sub family	13+2 SEM	Elimia albanyensis	Species
3 +SEM III	Oligochaeta	sub-Class	1 I	Palaemonetes	Genus
1 I	Neureclipsis	Genus	20	Hyallela azteca	Species
1 I	Argia bipunctulata	Species	1	Glossiphoniidae	family
1 I	~~Longdactidae~~ Dineutus SEM	~~family~~ Genus	9	Diptera (pupa)	Order
1 I	Elliptoideus sloatianus	Species	5 IIII	Dicrotendipes	Genus

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): ~~SEM~~ SEM Chironomidae = 0.018

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SCI #2 Duplicate (one sample per form)	**Plant Location Name:** Schlz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 11 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-17-09	**Technician Initials (picker)** JEH
Sample Sort Date: 9-21-09	**Technician Initials (sorter)** SEM	**Total number of organisms** ~~JEH~~SEM 141
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
3	Pseudochironomus	Genus	7	Alabamyia thayhe (group)	
1	~~Chironomus~~ SEM	Genus			
4	Cryptochironomus	Genus			
16	Polypedilum halterale (group)	Species			
5	Polypedilum illinoense (group)	Species			
25	Tanytarsus	Genus			
4	Chironomini	Tribe			
7	Cricotopus	Genus			

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered RT date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: #3 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 52 **picked out of** 104	

Sample Receipt Date: 7/24/09	**Sample Picked Date:** 8/17/09	**Technician Initials (picker)** SS
Sample Sort Date: 9-8-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 140
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
2	Palaemonetes	Genus	~~63~~ SEM 64	Hyallela azteca	Species
1	~~Corydalidae~~ Dineutus	~~family~~ Genus SEM	SEM #13	Diptera (Pupa)	Order
1	Apocorophium sp.	Genus	~~3~~ ~~6~~ SEM		
3	Glossiphoniidae	family	1	~~Ceratopogonidae~~ Ceratopogoninae SEM	~~family~~ sub-family
5 SEM ~~5~~ 6 SEM	~~Hydropsychidae~~ Hydropsyche	~~family~~ Genus SEM	1	Neureclipsis	Genus
2	Oligochaeta	Sub-Class	6	Polypedilum illinoense (grp)	Species
24	Corbicula manilensis	Species	6	Tanytarsus	Genus
1	Viviparus		5	Ablabesmyia rhamphe (group)	Species

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered PT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): SEM ~~24~~ 13 chironomids (wet weight = 0.0088) SEM

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SCI #3 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 52 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 8/17/09	**Technician Initials (picker)** SS
Sample Sort Date: 9-8-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 140
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
3	Cryptochironomus	Genus			
1	Tribelos / ~~Thienemanniella~~ SEM	Genus			
1	Macrostemum carolina	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered RT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SCI #3 D (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 52 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9/17/09	**Technician Initials (picker)** JM
Sample Sort Date: 9-17-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 3 som ~~153~~ 157
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1 I	Gammarus	Genus	1 I	Pelbodytes	Genus
1 I	Maccaffertium exiguum	Species	45	Corbicula manilensis	Species
3 III	Neureclipsis	Genus	37	Viviparus	Genus
2 II	Palaemonetes	Genus	2 II	Cambaridae	family
2 II	Oligochaeta	Sub-Class	7 2som II	Elimia albangensis	Species
1 I	Glossiphoniidae	family	1 I	Physella cubensis	Species
2 II	Dromogomphus spinosus	Species	1 I	~~Hydropsychidae~~ Hydropsyche	~~Family~~ Genus
1 I	Enallagma sp.	Genus	7	Diptera (pupa)	Order

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RF date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 12 chironomidae - wet weight = 0.009

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SC1 #3 D (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 52 **picked out of** 109	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9/12/09	**Technician Initials (picker)** SEM
Sample Sort Date: 9/17/09	**Technician Initials (sorter)** SEM	**Total number of organisms** 157
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
31	Hyallela azteca	Species			
4	Polypedilum illinoense (Group)	Species			
3	Tanytarsus	Genus			
2	Axarus	Genus			
1	Tribelos ~~+ Pheropsectra~~ SEM	Genus			
1	Cricotopus	Genus			
1	Ablabesmyia rhamphe (group)	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered RT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152 **Client:** SCS

Sample Identification Number: SCI Intake (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 26 **picked out of** 104	

Sample Receipt Date: 7/24/09	**Sample Picked Date:** 8/18/09	**Technician Initials (picker)** GD
Sample Sort Date: 9-9-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 150
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
3 +SEM	~~Heptagenia~~ SEM Hexagenia	Genus	14 +7SEM	Viviparus	Genus
2	Enallagma	Genus	2	Corbicula manilensis	Species
1	Argia ~~bimaculipunctulata~~ SEM bipunctulata	Species	5	Physella cubensis	species
1	Argia (no gills)	Genus	11	Elimia albanyensis	Species
1	Sialis	Genus	64 +4SEM	Hyalella azteca	Species
7	Oligochaeta	Sub Class	1	Ceratopogoninae	Sub-family
2	Peltodytes	Genus	6	Planaria	Order
1	Gyrinidae	family	4	Glossiphoniidae	family

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered PT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 25 chironomidae - no weight = 0.018

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: SC1 Intake (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SC1	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 26 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 8-18-09	**Technician Initials (picker)** GD
Sample Sort Date: 9-9-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 150
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
8	Ablabesmyia rhamphe (group)	Species			
1	Tanytarsus	Genus			
1	Chironomus	Genus			
1	Cryptochironomus	Genus			
14	Polypedilum halterale (group)	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered PT date 9/29/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152 **Client:** SCS

Sample Identification Number: SCI Intake Duplicate (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 26 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-17-09	**Technician Initials (picker)** JM
Sample Sort Date: 9-21-09	**Technician Initials (sorter)** SCM	**Total number of organisms** ~~140~~ 144
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
5	Physella cubensis	Species	5	Glossiphoniidae	family
1	Corbicula manilensis	Species	36	Viviparus	Genus
1	Pomacea paludosa	Species	19	Elimia albungensis	Species
1	Planaria		1	Polypedilum halterale (Group)	Species
1	Oligochaeta	Sub-Class	1	Cryptochironomus	Genus
1	Cambaridae	family	2	Tanytarsus	Genus
1	Argia	Genus			
69	Hyalella azteca	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered RT date 9/24/09 Data QAed SCM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 4 chironomidae. wet weight = 0.000 6g SCM

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: Discharge SCI (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 26 **picked out of** 52	

Sample Receipt Date: 7/24/09	**Sample Picked Date:** 8/18/09	**Technician Initials (picker)** SS
Sample Sort Date: 9-14-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 154
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
H8 83 SEM	Corbicula manilensis	Species	1	Argia bipunctulata	Species
SEM 3 4	Macromia sp.	Genus	2	Diptera (pupa)	Order
6	Paberoretes sp.	Genus	1	Caenis	Genus
1	Libellula sp	Genus	3 2 SEM	Stenelmis	Genus
1	Peltodytes sp.	Genus	1	Heniptera	Order
4	Oligochaeta	Sub-Class	35 28 SEM	Hyallela azteca	Species
7	Glossiphoniidae	family	7	Ablabesmyia rhamphe (group)	Species
3	Planaria		1	Stenochironomus	Genus

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered PT date 9/24/09 Data QAed SEM date 9-27-09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 10 Chironomids weighs 4 = 0.0059

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152

Client: SCS

Sample Identification Number: Discharge SC1 (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SC1	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 26 **picked out of** 52	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 8/18/09	**Technician Initials (picker)** SJ
Sample Sort Date: 9-14-09	**Technician Initials (sorter)** SBM	**Total number of organisms** 154
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
1	Polypedilum illinoense (group)	Species			

(a) 100 organisms per Sample (Sample Identification Number) is goal

Data Entered RK date 9/24/09 Data QAed SCM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp):

SCS Gulf Power Macroinvertebrate Sample Picking and Sorting Data Form

Project number: 6063090152 **Client:** SCS

Sample Identification Number: Discharge Duplicate (one sample per form)	**Plant Location Name:** Scholz
Sample Type (SCI, Petite Ponar, Hester-Dendy): SCI	**Sample Collection Date:** 7-23-09
Number of Grids/Squares Picked: 9 **picked out of** 104	

Sample Receipt Date: 7-24-09	**Sample Picked Date:** 9-18-09	**Technician Initials (picker)** JEH
Sample Sort Date: 9-24-09	**Technician Initials (sorter)** SEM	**Total number of organisms** 140
QA/QC Pass/Fail	**QA/QC Completed By:**	**QA/QC Date:**

Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)	Number of Organisms by Sort (a)	Taxonomic Identification, if known	Taxonomic Level (ex. Family, genus, division, etc.)
92 92 SEM	Corbicula manilensis	Species	1	Ceratopogoninae	sub-family
1	Cambaridae	family	1	Trichoptera (mangled)	Order
6	Gammarus	Genus	3 RSEM	Caenis	Genus
1	Palaemonetes	Genus	3	Stenelmis	Genus
1	Ancylidae	family	19	Hyalella azteca	Species
1	Planaria		7	Glossiphoniidae	family
1	Macromia	Genus	1	Viviparus	Genus
1	~~Corydalidae~~ Dineutus	~~family~~ Genus	1	Alabesmyia alumphe (group)	Species

(a) 100 organisms per Sample (Sample Identification Number) is goal
Data Entered PT date 9/24/09 Data QAed SEM date 9/27/09

COMMENTS (other organisms not identified; for example, 10 fish, 2 shrimp): 1 chironomidae - wet weight = 0.0005