3 12 07

FINAL REPORT

ECOLOGICAL ASSESSMENT
ECOLOGICAL RISK EVALUATION OF THE SALT MARSH AND ADJACENT AREAS AT THE

LCP SUPERFUND SITE
BRUNSWICK, GA

April 1997

PREPARED BY:

Mark D. Sprenger, Ph.D.
Environmental Response Team
Environmental Protection Agency

Nancy J. Finley
Environmental Response Team
U.S. Fish and Wildlife Service

and

Mark Huston
Environmental Response Team/
Response Engineering & Analytical Contract

Environmental Response Team Center
Office of Emergency and Remedial Response

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (Cont'd.)

LIST OF TABLES (Cont'd.)

LIST OF TABLES (Cont'd.)

LIST OF FIGURES

1.0 INTRODUCTION

1.1 Site Background

The Linden Chemicals and Plastics (LCP) site is located Brunswick, GA (Figure 1; Figure 2). Before LCP began operation, the property had hosted several industrial operations. Beginning in 1919, Atlantic Refining Company (now ARCO) operated an oil refinery at the site. On-site treatment, storage, and disposal of waste generated from ARCO's refinery operations began around 1920 and continued until 1937. From 1937 to 1950, the Georgia Power Company purchased portions of the site and operated an oil-fired power generating facility. Georgia Power Company still retains ownership of 2.9 acres of the north disposal area.

In 1941, Dixie Paints and Varnish Company owned and operated a paint manufacturing facility on a 10.5 acre portion of the site. In 1955, Allied Chemical Inc. (now Allied Signal Inc.) purchased the site property except the 2.9 acres owned by the Georgia Power Company. Between 1955 and 1979, Allied Signal Inc. produced chlorine, caustic soda, hydrochloric acid, and hydrogen gas. The chlor-alkali process used at this facility (solvay process) involved passing a concentrated brine solution between a stationary graphite or metal anode and a flowing mercury (Hg) cathode. The graphite electrodes were impregnated with polychlorinated biphenyls [PCBs (specifically Aroclor 1268)] for part of the period in which the chlor-alkali facility was in operation. In 1979, the Hanlin Group, through its wholly owned subsidiary, LCP Chemicals-Georgia, Inc., purchased the site and the associated chlor-alkali manufacturing plant from Allied (except the Georgia Power Company parcel) and maintained operations until 1994. In 1991, the Hanlin Group filed for protection from creditors under Chapter 11 of the Bankruptcy Code.

In 1994, after a period of severe decline in the plant's maintenance and operation, the State of Georgia revoked the facility's National Permit Discharge Elimination System (NPDES) permit and air quality permit. Subsequently, the State of Georgia referred the site to the United States Environmental Protection Agency (U.S. EPA). As a result, the Emergency Response and Removal Branch issued a Unilateral Administrative Order (UAO) to Allied Signal, Mark White and LCP on 4 April 1994. The UAO was amended on 27 March 1995 to include ARCO, Dixie Paints, and the Georgia Power Company.

1.2 Site Description (Marsh Area)

Purvis Creek is a salt water, tidal water body that flows adjacent to the site and into the Turtle River. Purvis Creek has a maximum width of 500 feet, a maximum depth of 11 feet, and is approximately 2 miles long. Large areas of salt marsh associated with Purvis Creek and tributaries to Purvis Creek are present in the western portion of the site as well as throughout the immediate area. The tidal range of the marsh is approximately seven feet. Tributaries of Purvis Creek wind throughout these marshes and form a complex and extensive hydrologic system. The salt marsh west of the site is bisected by a narrow earthen causeway that extends from the site to Purvis Creek. The causeway separates the northern marsh from the southern marsh and surface hydrologic communication occurs only indirectly through the tidal cycling of Purvis Creek

A drainage ditch carried effluent from the LCP outfall to a tributary of Purvis Creek. The ditch is situated along the southern margin of the causeway and ranges from 10 to 20 feet wide. Purvis Creek discharges to the Turtle River, which is located approximately 1 mile downstream of the site. The Turtle River is tidally influenced and is considered salt water in the vicinity of the site. It is a relatively large water body, approximately 2,000 feet wide at the Purvis Creek confluence with an average depth of approximately 10 feet. A 30-foot deep channel has been dredged in the Turtle River up to a pulp and paper facility.

The habitat present appears to follow a fairly abrupt topographic contour along the western portion of the facility area of the site. Although the elevational difference between "higher" and "lower" ground is only

1.5 to 2 feet, it is perceptible in the hydrology and plant species composition. The salt marsh present in the western portion of the site is vegetated primarily with marsh grass (*Spartina alterniflora*) with occasional patches of black bull rush and is entirely flooded during high tide. The upland present in the eastern portion of the site is subject to infrequent inundation and has a higher proportion of plant species that are adapted for less saturated conditions than those which dominate the wetland. In addition to the commercial and recreational fisheries resources, there are several threatened and endangered species that are, and may be, present in the vicinity of the site.

During the present study, an earthen berm was constructed around the periphery of a former lagoon area and the former facility disposal area. This berm was approximately three feet above the marsh surface; it was covered with geotextile to prevent erosion during high tide and storm events. The berm extended from the outfall south to approximately 50 feet north of monitoring wells 1 and 2 and west approximately 75 feet into the marsh. During the time period that this investigation was conducted, the outfall lagoon was isolated from the tidal marsh, the contaminated material was removed and the lagoon was backfilled.

At the time this study was initiated little information was available on the extent of contamination within the salt marsh. Previous sampling at the site suggested that the highest concentrations of contaminants existed near the lagoon outfall.

Previous studies conducted near the site indicated that elevated levels of Hg and PCBs were detected in fish tissue samples. Black drum (*Pogonias cromis*), red drum (*Sciaenops ocellatus)*, Atlantic croaker (*Micropogon undulatus*), blue crab (*Callinectes sapidus*), shrimp (*Penaeus* spp.), and sheephead (*Archosargus probatocephalus*) have been collected from the Turtle River, Gibson Creek, and Purvis Creek by the Georgia Department of Natural Resources (GADNR 1995). Analyses were conducted on composites of several individuals of the same species. To evaluate human health risks, the fish samples were composed of filets, the blue crab samples were body meat, and the shrimp samples were de-headed and peeled. An initial review of the state's data indicated that Hg was present in all taxa mentioned above, with values ranging from 900 - 8,500 micrograms per kilogram (μg/kg) wet weight. The highest concentration of mercury (8,500 μg/kg, wet weight) was detected in one of three composite samples of blue crab collected from the Turtle River; a specific sampling location was not specified. In Purvis Creek, the Hg level in a composite shrimp sample was 2,400 μg/kg, wet weight (GADNR 1995).

Aroclor 1268 concentrations were reported in 5 out of the 13 composite samples at values above the PCB detection limit of 100 μg/kg, wet weight. The highest value was 410 μg/kg (wet weight) for a composite sample of sheephead, collected from the Turtle River between the Rt. 303 bridge and Buoy Marker 9. The average in all composites was 120 μg/kg (wet weight).

1.3 Objectives

The four major objectives of this investigation were: 1) to conduct an ecological risk assessment with the focus on Removal Program objectives, 2) to generate supplemental fish tissue data for the evaluation of fishery advisories and/or evaluation of human health issues; 3) to generate information to allow the evaluation of potential risk to endangered and threatened species; and 4) to evaluate the distribution of site contaminants in the adjacent salt marsh. This document addresses objectives 1, 3 and 4. Objective 2 was addressed in the *Supplemental Report, LCP Site, Brunswick, GA* (U.S. EPA 1996) and will not be addressed in this report.

1.3.1 Ecological Risk Assessment (Objective 1)

Bulk chemistry, toxicity tests, population and community evaluations, and contaminant

accumulation data were used in exposure models to evaluate ecological risks. The outline of this approach is presented in the Work Plan, Supplement 2 (U.S. EPA 1996). The overall approach was to establish exposure response relationships between media contaminant levels and measurement endpoint responses. Sampling locations were based on the ability to collect target organisms as well as to collect the organisms at targeted contaminant exposure levels.

1.3.2 Supplemental Fish Tissue Data (Objective 2)

This objective was addressed in *Supplemental Report, LCP Site, Brunswick, GA* (U.S. EPA 1996 and will not be addressed in the ecological risk assessment.

1.3.3 Generate Information to Evaluate Risk to Threatened and Endangered Species (Objective 3)

The U.S. Fish and Wildlife Service and the National Marine Fisheries Service, under the Endangered Species Act, are responsible for the protection of federally listed threatened and endangered species. For the purposes of this risk assessment, threatened and endangered species represent valued endpoints and therefore, threatened and endangered species could not be eliminated from the risk assessment process. Since it is not feasible to directly sample threatened and endangered species, surrogate receptors were utilized for evaluation purposes, and the assessment endpoints were designed so that threats to threatened and endangered species would be included in the evaluation.

1.3.4 Evaluate the Distribution of Site Contaminants in the Adjacent Salt Marsh (Objective 4)

Sediment Samples

Initial sediment contaminant screening was conducted during the first field investigation in May 1995. Sediment samples were analyzed on site using field-portable X-ray fluorescence (XRF) analysis and PCB immunoassay kits. Based on the limited field screening results, selected samples were submitted for contaminant analysis. The results generated from the first sampling effort indicated that additional systematic sediment sampling was necessary. As a result, sediment samples were collected in July 1995 and October 1995 for further refinement of the extent of contamination, in the marsh area.

Samples were collected along major drainage pathways in the channels and on the marsh surface. Samples were also collected along the border of the marsh and the site. A grid was established with 100-foot nodes in the marsh adjacent to the site. Sediment samples were collected at each node from a depth of 0 to 6 inches. In addition to the surface samples, several samples were collected from a range of depths (e.g., at depths up to 54 inches) at the grid nodes. Sediment depositional areas were specifically sampled within the marsh system, Purvis Creek, and Turtle River. Details on the sampling design and rationale may be found in the Work Plan and in its supplements.

All sediment samples were analyzed for total mercury and PCBs. All sediments utilized in toxicity tests were analyzed for Target Analyte List (TAL) metals, base-, neutral-, and acid-extractable (BNAs) compounds, and PCBs, as well as for other parameters. Targeted sediment samples (based upon proximity to discharge/facility release points and depositional characteristics, were also analyzed for TAL metals and BNAs.

Water Samples

During May 1995, water samples were collected at mid out-going tide at five sampling locations at which toxicity testing and benthic community sampling were done. Samples were analyzed

for Hg and PCBs. Both total and dissolved Hg were determined.

1.4 Ecological Risk Assessment

Ecological risk assessments are composed of three phases: problem formulation; analysis; and risk characterization. An eight-step process (Figure 3) was used for this risk evaluation, as described in U.S. EPA (1994), however, much of the communication within this process was verbal due to the short time frames available during the investigation.

2.0 PROBLEM FORMULATION

Previous information collected at the site indicated that PCBs, BNAs, and metals [particularly Hg and lead (Pb)] were the contaminants of concern. Therefore, in addition to PCBs, a select number of sediment samples collected in May 1995 were analyzed for BNAs and TAL metals. The concentrations of these compounds were compared to benchmark criteria to determine if further investigation was necessary (Table 1). This procedure is defined as a preliminary risk assessment. The concentrations were compared to benchmark criteria. Any contaminant in which the resultant quotient is less than one was discontinued from review. If the quotient is greater than one (which indicates a potential for risk), the contaminant is retained for further review and evaluated furthers.

Sediment BNA and TAL metals concentrations were screened against known toxic effects levels. Three BNA compounds were detected in the marsh sediments, two of which [bis(2-ethylhexyl)phthalate and di-n-butylphthalate] exceeded the sediment benchmark values (Table 1). Arsenic, chromium, copper, lead, mercury, nickel, and zinc concentrations also exceeded the benchmark values. To evaluate the potential co-distribution of contaminants, the concentrations of BNAs and TAL metals were compared to the concentrations of Hg and PCBs. It was determined that the contaminants retained by the preliminary risk process are collocated with high PCB and mercury concentrations at the site.

To determine the effects of contaminants on biota, it is necessary to understand the mechanisms of toxicity of the chemicals and the systems that they affect. Next is a summary of each contaminant of concern for the LCP site

2.1 Base, Neutral, and Acid Extractable Compounds

Polynuclear aromatic hydrocarbons (PAHs, a component of the BNA analysis) are carcinogenic, mutagenic, and cytotoxic to mammals (Eisler 1987b). Direct application of PAH compounds has been shown to produce tumors in skin and epithelial tissues of mice and rats (U.S. EPA 1980). Many PAHs are transferred across skin, lungs, and intestine; they may be transferred to fetuses if the mother is exposed (U.S. EPA 1980). Dietary ingestion of PAH compounds has been shown to cause mammary cancer, leukemia, lung and stomach tumors in laboratory mice and rats (Dipple 1985). Acute and chronic exposure to carcinogenic PAH compounds is known to result in the destruction of bone marrow and lymphoid tissues, have negative gametogenic effects, cause kidney damage, and change the intestinal and respiratory epithelia (Lee and Grant 1981, U.S. EPA 1980). Application of some PAHs to the skin of mammals causes the destruction of sebaceous glands, hyperplasia, hyperkeratosis, and ulceration (U.S. EPA 1980). Newborn mice exposed to PAHs may die from acute or chronic wasting disease, develop thymomas, and suffer from serious damage to the thymus (U.S. EPA 1980). PAH compounds have also been associated with oocyte and follicle destruction in mouse ovaries (Ward et al. 1985).

PAH carcinogens generally transform cells by genetic injury. The parent PAH compound is metabolized by the mixed-function oxidase pathway to a reactive intermediate, which can in turn bind with cellular macro-molecules (Dipple 1985, Ward et al. 1985). This binding of metabolic intermediate reactive compounds to deoxyribonucleic acid (DNA),ribonucleic acid (RNA), and other cellular proteins is believed to result in cell transformation, and induction of tumors (Eisler 1987b). Difference in species sensitivity to PAH carcinogens is a function of the activity of the mixed-function oxidase pathway. These differences have a direct effect on the rate at which potential cancer causing reactive intermediates are

converted into their unreactive forms (Neff 1979; U.S. EPA 1980; Miranda and Chlabra 1980; Campbell et al. 1983).

The tumorigenic activity of these compounds tends to increase with increasing molecular size (Neff 1979; U.S. EPA 1980; Dipple 1985). This activity has also been observed to increase with increasing alkyl substitution on the carbon rings of the molecules (Eisler 1987b). However, if alkyl additions are longer than two carbon chains, the tumorigenic activity decreases (Eisler 1987b). This decrease is presumably due to size-limited PAH compound transport across cell membranes (Eisler 1987b). It appears that unsubstituted PAH compounds do not accumulate in mammal adipose tissue even though they are highly lipid soluble. This is probably due to their rapid metabolism (U.S. EPA 1980).

In addition to the cytotoxic, mutagenic, and carcinogenic effects of PAH exposure to mammals, many carcinogenic PAH compounds also have negative effects on the immune system (Ward et al. 1985). Non-carcinogenic PAH compounds do not have immuno-suppressive effects on mammals. In general, the more carcinogenic a PAH compound is, the more immuno-suppressive it is.

Another consideration in PAH toxicity to mammals is that many chemicals (including other PAHs) are known to modulate the action of carcinogenic PAHs (Eisler 1987b). This alteration occurs in one of three main pathways. The first major pathway occurs when the addition of a second chemical decreases the activation (increases detoxification) of the carcinogenic PAH. A second pathways occurs when the chemical binds to the carcinogenic PAH, preventing it from reaching key targets in the cell such as DNA. The third pathway is competitive antagonism between the two chemicals (DiGiovanni and Slaga 1981). In most situations where environmental PAH pollution is observed, the PAHs are present in complex mixtures that vary from one sampling site to the next. Understanding the toxicity of PAHs is extremely difficult under normal field conditions.

2.2 Lead

Lead does not biomagnify to a great extent in food chains, although accumulation by plants and animals has been extensively documented (Wixson and Davis 1993, Eisler 1988b). Older organisms typically contain the highest tissue Pb concentrations, with the majority of the accumulation in the bony tissue of vertebrates (Eisler 1988b).

Predicting the accumulation and toxicity of Pb is difficult since its effects are influenced to a very large degree, relative to other metals, by interactions among physical, chemical, and biological variables. In general, organolead compounds are more toxic than inorganic Pb compounds, and young, immature organisms are most susceptible to its effects (Eisler 1988b). In plants, Pb inhibits growth by reducing photosynthetic activity, mitosis, and water absorption. The mechanism by which photosynthetic activity is reduced is attributed to the blocking of sulfhydryl groups, inhibiting the conversion of coproporphyrinogen to proporphyrinogen (Holl and Hampp 1975).

The toxic effects of Pb on aquatic and terrestrial organisms are extremely varied and include mortality, reduced growth and reproductive output, blood chemistry alterations, lesions, and behavioral changes. Generally, Pb inhibits the formation of heme, adversely affects blood chemistry, and accumulates at hematopoietic organs (Eisler 1988b). At high concentrations near levels causing mortality, marked changes to the central nervous system occur prior to death (Eisler 1988b).

Plants can uptake Pb through surface deposition in rain, dust, and soil, or by uptake through the roots. The ability of a plant to uptake Pb from soils is inversely related to soil pH and organic matter content. Lead can inhibit photosynthesis, plant growth, water absorption.

2.3 Mercury

Mercury may be present in the environment in a number of forms. The most toxic and bioavailable form of Hg is methylmercury (MeHg), which is highly stable and lipophilic, accumulating in food chains. Mercury can become methylated biologically or chemically. Microbial methylation of Hg occurs most rapidly under anaerobic conditions, common in wetlands and aquatic sediments. The majority of Hg detected in biological tissues is present in the form of MeHg (Huckabee et al. 1979).

Mercury has no known biological function, and its presence in biological systems appears to result in undesirable effects. A number of toxic responses have been reported for Hg exposure. Eisler (1987a) reports that juvenile life stages are most susceptible to acute effects of Hg exposure. In fish, acute exposure results in impaired respiration, sluggishness, and loss of equilibrium (Armstrong 1979).

Mercury is a potent neurotoxin, resulting in impaired muscular coordination, weight loss, and apathy in birds, mammals, and fish (Eisler 1987a). Other reported effects include histopathological changes, changes in enzyme activity levels, mutagenicity, teratogenicity, and reproductive impairment. Mercury, especially MeHg, is known to concentrate in biological tissues and magnify through the food chain.

Mercury can exist in three oxidation states: elemental Hg (Hg^0), mercurous ion (Hg_2^{2+}), and mercuric ion (Hg^{2+}). The mercuric ion is the most toxic inorganic chemical form (Clarkson and Marsh 1982). Methylmercury is the most hazardous form of Hg due to its high stability, its lipid solubility, and the ability to penetrate membranes in living organisms (Beijer and Jernalov 1979).

Mercury is also a mutagen, teratogen, and carcinogen, and it causes embryocidal, cytochemical, and histopathological effects. Forms of Hg with relatively low toxicity can be transformed into forms of very high toxicity, such as MeHg, through biological processes. In addition, Hg can be bioconcentrated in organisms and biomagnified through food chains.

Mercury in soils is generally not available for uptake by plants, due to the high binding capacity to clays and other charged particles (Beauford et al. 1977). Mercury levels in plant tissues increase as soil levels increase, however 95 percent of the accumulation and retention of Hg is in the root system (Beauford et al. 1977, Cocking et al. 1991).

All Hg compounds interfere with thiol metabolism in organisms, causing inhibition or inactivation of proteins containing thiol ligands and ultimately leading to mitotic disturbances (Das et al. 1982, Elhassani 1983). Mercury also binds strongly with sulfhydryl groups. Phenyl- and MeHg compounds are among the strongest known inhibitors of cell division (Birge et al. 1979). In mammals, MeHg irreversibly destroys the neurons of the central nervous system.

For all organisms tested, early developmental stages were most sensitive to toxic effects of Hg. Organomercury compounds, especially MeHg, were more toxic than inorganic forms. In aquatic organisms, Hg adversely affects reproduction, growth, behavior, osmoregulation and oxygen exchange. At comparatively low concentrations in birds and mammals, Hg adversely affects growth and development, behavior, motor coordination, vision, hearing, histology, and metabolism. In mammals, the fetus is the most sensitive life stage (Eisler 1987).

2.4 PCBs

A variety of PCB induced toxic effects have been observed in mammals. Mink are particularly sensitive to dietary PCB levels (Aulerich et al. 1985). Anorexia, weight loss, lethargy, enlarged livers, and intestinal discharge of blood have been noted in exposed mink (Eisler 1986b). Placental and mammary transfer of PCB has been shown to be a direct route of PCBs between mother and young. PCB exposure can lead to behavioral disorders, specifically in sleep/wake cycles, and in animals that hibernate or aestivate (Sanders and Kirkpatrick 1977, Montz et al. 1982). Negative effects of PCBs on metabolism, thyroid control, ATPase activity, oxidative phosphorylation, steroid hormone activity, immunity, and

vitamin A pathways have been noted in the literature (U.S.EPA 1980, Safe 1984).

PCB toxicity in mammals is highly variable. While some PCBs are extremely toxic, and can produce death and cause reproductive failure in very low levels, others appear to produce few, if any, toxic responses (Eisler 1986b). Toxic responses to PCBs are highly species-specific. Mink are highly susceptible to PCB toxicity, while closely related mammals, such as the European ferret, are more resistant (Eisler 1986b). Younger mammals appear to be more susceptible to PCB poisoning than adults (Eisler 1986b) Mutagenic, carcinogenic, and teratogenic effects of PCB exposure have been observed, with mutagenic activity appearing to increase with increasing chlorination of the PCB molecule (Eisler 1986b).

As with mammals, there is also a great degree of variability among different bird species in response to PCBs. In sensitive species, normal patterns of growth, behavior, reproduction, and metabolism may be altered. Liver concentrations of PCBs are generally highest in piscivorous birds, followed by birds that feed on other smalls bird and mammals, birds that feed on worms and insects, and herbivorous or seed eating birds, respectively (NAS 1979).

2.5 Hazard Characterization

The objective of the exposure assessment is to determine the pathways and media through which receptors may be exposed to site contaminants. Exposure pathways depend on the habitats and receptors present on site, the extent and magnitude of contamination, and the environmental fate and transport of the contaminants of concern (COC).

Exposure to COCs present in forage and prey species via ingestion could cause toxicity in higher trophic level organisms. In addition to exposure via consumption of contaminated forage, ecological receptors may be exposed through incidental water and soil/sediment ingestion or through direct contact. The exposure pathways that were evaluated in this risk assessment were the ingestion of prey, the incidental ingestion of soil/sediment, water, and direct contact.

3.0 ASSESSMENT ENDPOINTS

Assessment endpoints are defined as an explicit expression of the environmental value that is to be protected. This ecological risk assessment focused on the aquatic portions of the site including the adjacent salt marsh, Purvis Creek, and Turtle River. This risk assessment does not address the contaminants associated with the industrial portion (e.g., the buildings) of the site.

The following assessment endpoints were selected for evaluation in this risk assessment:

Endpoint No. 1 Maintenance of ecological health of the salt marsh community, specifically in terms of the structure and function.

Note: This assessment endpoint is intended to be primarily directed at the infaunal marsh community but is inclusive of the entire functioning of the salt marsh ecosystem.

Endpoint No. 2 Protection of the long-term health and reproductive capacity of aquatic reptiles utilizing the marsh and Purvis Creek.

Note: Protection of long-term health and reproductive capacity of aquatic reptiles utilizing the marsh and Purvis Creek. The assessment endpoint for the protection of aquatic reptiles (using the diamondback terrapin as a surrogate) conservatively represents the exposure of the loggerhead, green, and Kemp's Ridley sea turtles to site contaminants. Although the green turtle does not exhibit a similar feeding strategy as the other sea turtles (i.e., herbivorous versus

omnivorous), it is assumed that a herbivorous feeding strategy would result in less accumulation of site contaminants as compared to an omnivorous strategy. Mercury and PCBs do not accumulate to high levels in plants as compared to other tissue.

Endpoint No. 3 Protection of long-term health and reproductive capacity of omnivorous mammal species utilizing the marsh.

Endpoint No. 4 Protection of long-term health and reproductive capacity of piscivorous mammal species utilizing the system (both marine and terrestrial).

Endpoint No. 5 Protection of long-term health and reproductive capacity of avian species that utilize the marsh and Purvis Creek.

Endpoint No. 6 Protection of health and reproductive capacity of fishery resources that utilize the system.

Endpoint No. 7 Protection of the fish nursery function of the marsh system.

Note: The assessment endpoint for the protection of the health and reproductive capacity of the fishery resources is assumed to be inclusive of the impacts to sturgeon. In addition, the fish tissue data collected for the evaluation of fish advisories and/or evaluation of human health issues (through the Fundulus and spot tissue evaluation) are also inclusive of the protection of the short-nose sturgeon assessment endpoint.

Endpoint No. 8 Protection of individual Ridley turtle that feed in the marsh and/or adjacent areas.

Endpoint No. 9 Protection of individual green turtle which feed in the marsh and/or adjacent areas.

Endpoint No. 10 Protection of individual wood stork that feed in the marsh and/or adjacent areas.

Endpoint No. 11 Protection of individual manatee that feed in the marsh and/or adjacent areas.

Endpoint No. 12 Protection of individual shortnose sturgeon that feed in the marsh and/or adjacent areas.

4.0 TESTABLE HYPOTHESES

The testable hypotheses are specific risk questions based on the assessment endpoints. Such factors as the mechanism of contaminant toxicity or the number of exposure pathways determine how many testable hypotheses there are for each assessment endpoint

For assessment endpoint 1, the testable hypothesis is:

Are levels of site contaminants in water, sediment, and biota sufficient to cause adverse alterations to the structure and/or function of the salt marsh community, at either the population or community level?

For assessment endpoint 2, the testable hypothesis is

Are levels of site contaminants in water, sediment, and biota sufficient to result in a dose that could cause adverse effects on the long-term health and/or recruitment of aquatic reptiles utilizing the marsh system?

For assessment endpoint 3, the testable hypothesis is:

Are levels of site contaminants in water, sediment and biota sufficient to result in a dose that could cause adverse effects on the long-term health and/or recruitment of omnivorous mammal species utilizing the marsh?

For assessment endpoint 4, the testable hypothesis is:

Are levels of site contaminants in water, sediment, and biota sufficient to result in a dose that could cause adverse effects on the long-term health and/or recruitment of marine or terrestrial piscivorous mammal species utilizing the marsh/river system?

For assessment endpoint 5, the testable hypotheses are:

1) Are levels of site contaminants in water, sediment, and biota sufficient to result in a dose that could cause adverse effects on the long-term health and/or recruitment of passerine birds that utilize the marsh?

2) Are levels of site contaminants in water, sediment, and biota sufficient to result in a dose that could cause adverse effects on the long-term health and/or recruitment of piscivorous/benthic organism feeding birds that utilize the marsh system?

For assessment endpoint 6, the testable hypothesis is:

Are levels of site contaminants in water, sediment, and biota sufficient to result in an exposure that could cause adverse long-term adverse health effects or recruitment impairment in the fishery resources that utilize the marsh/river system?

For assessment endpoint 7, the testable hypothesis is:

Are levels of site contaminants in water, sediment, and biota sufficient to result in an exposure that could cause adverse effects on the fish egg development, and/or fry (young of the year) survival and development within the marsh area?

For assessment endpoint 8, the testable hypothesis is:

Are the levels of site contaminants in water, sediment, and biota sufficient to result in a dose that could cause reduced life span or reproductive impairment of individual Ridley turtle that feed in the marsh and/or adjacent areas?

For assessment endpoint 9, the testable hypothesis is:

Are the levels of site contaminants in water, sediment and biota sufficient to result in a dose that could cause reduced life span or reproductive impairment of individual green turtle that feed in the marsh and/or adjacent areas.

For assessment endpoint 10, the testable hypothesis is:

Are the levels of site contaminants in water, sediment, and biota sufficient to cause reduced life span or reproductive impairment of individual wood stork that feed in the marsh and/or adjacent areas,

For assessment endpoint 11, the testable hypothesis is:

Are the levels of site contaminants in water, sediment and biota sufficient to cause reduced life span or reproductive impairment of individual manatee that feed in the marsh and/or adjacent areas,

For assessment endpoint 12, the testable hypothesis is:

Are the levels of site contaminants in water, sediment, and biota sufficient to cause reduced life span or reproductive impairment of individual shortnose sturgeon that feed in the marsh and/or adjacent areas.

5.0 CONCEPTUAL MODEL

The conceptual model uses contaminant and habitat characteristics to identify exposure pathways that should be evaluated by the selected measurement endpoints. The site contaminants which were used to select the sampling locations were Hg and PCBs. Benthic invertebrates may be exposed to contaminated sediment through direct contact. For the purposes of this risk assessment, the concentrations of contaminants found in the sediment were evaluated using toxicity tests (using amphipod and brown shrimp), a benthic invertebrate evaluation, and embryo toxicity tests. In addition, a direct comparison of tissue concentrations found in tissue was compared to literature levels to determine impacts from site contaminants. Terrestrial and aquatic receptor species may be exposed by feeding on organisms that have accumulated contaminants in their tissues. Higher trophic level receptors may also be exposed via incidental ingestion of sediment. The following pathways using food ingestion models were evaluated in this risk assessment:

SALT MARSH COMMUNITY

Aquatic reptiles utilizing the marsh and Purvis Creek

Diamondback terrapin (*Malaclemys terrapin*)
- Ingestion of aquatic biota
- Ingestion of sediment
- Ingestion of water

Kemp's Ridley Turtle (*Lepidochelys kempii*)
Green Turtle (*Chelonia mydas*)
Loggerhead Turtle (*Caretta caretta*)

Mammal species using Purvis Creek and Turtle River

Manatee (*Trichechus manatus*)
- Ingestion of aquatic plants
- Ingestion of sediment
- Ingestion of water

Mammal species utilizing the marsh

Otter (*Lutra canadensis*)
- Ingestion of aquatic biota
- Ingestion of sediment
- Ingestion of water

Raccoon (*Procyon lotor*)
- Ingestion of aquatic biota
- Ingestion of sediment
- Ingestion of water

Avian species that utilize the marsh and Purvis Creek

Marsh wren (*Cistothorus palustris*)
- Ingestion of aquatic biota
- Ingestion of sediment
- Ingestion of water

Clapper rail (*Rallus longirostris*)
Ingestion of aquatic biota
Ingestion of sediment
Ingestion of water

Wood Stork (*Mycteria americana*)
Ingestion of aquatic biota
Ingestion of sediment
Ingestion of water

Fishery resources

Killifish (*Fundulus heteroclitus*)
Ingestion of forage
Direct exposure of sediment
Direct exposure to water

Brown shrimp (*Penaeus aztecus*)
Ingestion of forage
Direct exposure of sediment
Direct exposure to water

6.0 MEASUREMENT ENDPOINTS

Measurement endpoints are measurable ecological characteristics that are related to the valued characteristics selected as assessment endpoints. Measurement endpoints should be linked to the assessment endpoints by the mechanism of toxicity and the route of exposure. Measurement endpoints are used to derive a quantitative estimate of potential effects, and to form a basis for extrapolation to the assessment endpoints.

Measurement endpoints were selected on the basis of the presence of receptors on the site, the presence of a complete exposure pathway, and the sensitivity of the receptor to the contaminants. The availability of toxicity information on which risk calculations could be based was also an important consideration. The following measurement endpoints were selected to represent exposure pathways and assessment endpoints identified for the site.

Measurement endpoints for assessment endpoint 1

Maintenance of the ecological health of the salt marsh community, specifically in terms of the structure and function

To evaluate the structure and function of the salt marsh community, solid-phase toxicity tests and a benthic invertebrate survey were conducted. Toxicity tests provide information on the direct toxicity of sediment to invertebrate species and the benthos survey indicates the number of individuals and diversity of the benthic community and identifies functional groups which are present.

Measurement endpoints for assessment endpoints 2, 8, and 9

Protection of long-term health and reproductive capacity of aquatic reptiles using the marsh and Purvis Creek

Protection of individual Ridley turtle that feed in the marsh and/or adjacent areas

Protection of individual green turtle that feed in the marsh and/or adjacent areas

Food chain accumulation studies were selected to evaluate risk to aquatic reptiles. For the threatened and endangered sea turtles, the food chain accumulation model for the diamondback terrapin serves as a surrogate, as it does for other reptiles using the area.

For the terrapin, body burden data and the body burden concentration of food items were used to evaluate the exposure to contaminants. In addition, histopathology evaluation and aspects of reproduction of these species were reviewed to determine risk to these species.

Measurement endpoints for assessment endpoints 3, 4, and 11

Protection of long-term health and reproductive capacity of omnivorous mammal species utilizing the marsh

Protection of long-term health and reproductive capacity of piscivorous mammal species utilizing the marsh

Protection of individual manatee that feed in the marsh and/or adjacent areas

Food chain accumulation studies were selected to evaluate risk to mammalian species that utilize the marsh and adjacent areas.

For the manatee, the assessment and measurement endpoints will be the same. For other mammalian species the otter will be used as a model for piscivorous species and the raccoon for omnivorous mammalian species.

Appropriate forage species were identified for the above receptors, collected, and analyzed. Dietary exposure of receptors to contaminants was quantified and compared to existing toxicity data for these species. Since two of the main contaminants of concern at this site are PCBs and Hg, reproductive toxicity and behavioral or physiological changes that affect reproductive fitness are included in the measurement endpoints.

Measurement endpoints for assessment endpoints 5 and 10

Protection of long term health and reproductive capacity of avian species that utilize the marsh and Purvis Creek

Protection of individual wood stork that feed in the marsh and/or adjacent areas

Food chain accumulation studies were selected to evaluate risk to avian species that utilize the marsh as a feeding area. Selected measurement endpoint receptors species are the marsh wren, clapper rail, and wood stork. Appropriate forage species were identified for the above receptors, collected, and analyzed for both the clapper rail and the wood stork. Dietary exposure of receptors to contaminants were quantified, and compared to existing toxicity data for these species. Since two of the main contaminants of concern at this site are PCBs and Hg, reproductive toxicity and behavioral or physiological changes that affect reproductive fitness were selected as measurement endpoints.

Measurement endpoints for assessment endpoint 6

Protection of the health and reproductive capacity of fishery resources that utilize the system

A comparison of body burden concentration in spot, killifish, and brown shrimp will be compared to literature based values to determine affects. In addition, the direct exposure to spot, killifish, and brown shrimp to contaminated sediment will be evaluated.

Measurement endpoints for assessment endpoint 7

Protection of fishery resources that utilize the marsh as a nursery area

Fishery resources that utilize the marsh as a nursery area can be directly impacted by contaminants in two ways: 1) short-term toxicity to larvae and juveniles utilizing the marsh; and 2) long-term reproductive effects on organisms exposed to contaminants as larvae or juveniles. Levels of contaminants measured in abiotic media in the marsh will be compared to levels documented to cause adverse impacts to aquatic organisms.

Toxicity testing using the pennaid shrimp and the embryo toxicity assay were also used to evaluate threats to the nursery functioning of the marsh.

Measurement endpoints for assessment endpoint 12

Protection of individual short-nose sturgeon that feed in the marsh and/or adjacent areas

Conclusions regarding this assessment endpoint are inferred through the measurement endpoints utilized for the nursery functioning of the marsh.

7.0 FOOD CHAIN ASSUMPTIONS

7.1 Food Chain Exposure Model Assumptions

This portion of the ecological risk assessment concentrates on exposure to Hg and PCBs through food ingestion. The body burden concentration of Hg and PCBs in prey items collected at the site were used to evaluate exposures to receptor species. The wet weight of the food items and a wet weight food ingestion rate are used to calculate an administered dose to the organisms. A dry weight sediment concentration and a dry weight sediment ingestion rate are also used in the dose calculation.

7.2 Risk Characterization: Data/Weight of Evidence Evaluations

The risk characterization was implemented by evaluating each of the measurement endpoints. For assessment endpoints that have multiple measurement endpoints, an overall risk conclusion was determined by reviewing the multiple lines of evidence (referred to as a weight-of-evidence approach). relative to the mechanism of toxicity.

7.3 Toxicity Benchmarks

For this ecological risk evaluation, two ecotoxicological benchmarks were used for the dose models. The first benchmark is the low observed adverse effect level (LOAEL) or low effect benchmark (the value at which an adverse effect was observed). The second is the acute benchmark that was used to evaluate imminent ecological threats (the exposure at which there may be substantive impacts to the assessment endpoints)

To determine an acute or immediate impact from the exposure to PCBs and Hg is difficult for several reasons. PCBs are reproductive, behavioral, and developmental toxins; except under unique conditions they do not cause direct mortality. In addition, the PCBs in the marsh are dominated by Aroclor 1268, for which very limited ecotoxicological information is available. Therefore, an option for evaluating the toxicity of Aroclor 1268 is to use congener specific analyses and then compare the results to existing congener ecotoxicity data. An alternate approach is to assume that Aroclor 1268 has similar toxicity to the most potent Aroclor for which information exists. While this alternate approach has uncertainty associated with it (Aroclor 1268 may have less, equal, or more toxicity than other Aroclors), it is believed that this approach adequately evaluates risks, for the U.S. EPA (Agency) to meet its requirements

Mercury is also a reproductive, behavioral, and developmental toxin; however, depending on the form of Hg and the degree of exposure, mortality can occur. In addition, there is differential toxicity based on the Hg species and compounds found at the site. The rate of Hg speciation and chemical conversion is likely to influence any adverse effects. Conservative assumptions were made on the proportion of organomercury versus inorganic Hg in this risk assessment. Effectively, it was assumed that all of the administered Hg, in the exposure models, was in the form of organomercury.

An acute or imminent threat suggests that a short-term dose is sufficient to cause direct mortality or reproductive failure (loss of recruitment). Acute information is usually reported as a lethal dose (LD) or effect concentration (EC) that is sufficient to have a direct impact on a group of individuals. For this risk assessment a LD, or an EC that may result in mortality or loss of recruitment, will be used in the risk calculations. An example of an EC resulting in mortality is a dose that causes a substantial alteration in feeding response. The alteration of the feeding response does not cause mortality but the lack of feeding, for even a short period of time, could result in mortality.

As stated above, assessment endpoints may have more than one measurement endpoint. For those assessment endpoints having multiple measurement endpoints, a weight-of-evidence approach allows the results of the measurement endpoints to be integrated into a single conclusion. A weight-of-evidence evaluation implies that there are multiple lines-of-evidence, but not all lines-of-evidence have equal strength (e.g. because of toxicological sensitivity of the measurement endpoint or different mechanisms of toxicity between assessment endpoints). For this risk assessment, the following lines-of-evidence (in order of increasing relative strength) were identified:

For assessment endpoint 1, maintenance to ecological health of the salt marsh community, specifically in terms of the structure and function, there are 6 lines-of-evidence.

1) comparison of the sediment concentration to literature-based effects levels
2) food chain exposure models
3) comparison of the body burden concentration of benthic organisms to literature-based effect levels
4) comparison of the body burden concentration with indicators of organism health
5) toxicity test results
6) evaluation of the benthic macroinvertebrate population/community structure

For assessment endpoint 2, protection of long term health and reproductive capacity of aquatic reptiles utilizing the marsh and Purvis Creek, there are four lines-of-evidence.

1) food chain exposure models
2) comparison of the body burden concentrations to literature-based effect levels
3) comparison of the body burden concentration with indicators of organism health
4) histopathology evaluation

For assessment endpoint 3, protection of long term health and reproductive capacity of omnivorous mammal species that utilizing the marsh, there is one line-of-evidence.

1) food chain exposure model

For assessment endpoint 4, protection of long term health and reproductive capacity of piscivorous mammal species that utilize the system (both marine mammals and terrestrial mammals), there is one line-of-evidence.

1) food chain exposure model

For assessment endpoint 5, protection of long term health and reproductive capacity of avian species that utilize the marsh and Purvis Creek, there are four lines-of-evidence.

1) food chain exposure model
2) comparison of the body burden concentration to literature-based effect levels
3) comparison of the body burden concentration with indicators of organism health
4) histopathology evaluation

For assessment endpoint 6, protection of health and reproductive capacity of fishery resources that utilize the system, there are three lines-of-evidence.

1) comparison of sediment concentration to literature-based effects levels
2) comparison of the body burden concentration to literature-based effect levels
3) toxicity tests

For assessment endpoint 7, protection of the fishery nursery function of the marsh system, there are three lines-of-evidence.

1) comparison of sediment concentration to literature-based effects levels
2) comparison of the body burden concentration with indicators of organism health
3) toxicity tests

For assessment endpoints 8 and 9, protection of individual threatened and/or endangered sea turtles, the risk characterization will be inferred from the risk to reptiles.

For assessment endpoint 10, protection of individual wood stork that feed in the marsh and/or adjacent areas, there are four lines-of-evidence.

1) food chain exposure model
2) comparison of the body burden concentration to literature-based effect levels
3) comparison of the body burden concentration with indicators of organism health
4) histopathology evaluation

For the assessment endpoint 11, protection of individual manatee that feed in the marsh and/or adjacent areas, there is one line-of-evidence.

1) food chain model.

For assessment endpoint 12, protection of individual shortnose sturgeon that feed in the marsh and/or adjacent areas, the risk characterization will be inferred from the evaluation of risk to fish.

8.0 SOURCES OF UNCERTAINTY

There is inherent uncertainty within the risk assessment process, however, a knowledge of the cause and the nature of these uncertainties permits the risk assessor and risk manager to interpret and use the risk assessment in the site management process. Sources of uncertainty include natural variability, error, and insufficient knowledge or data. Each of these sources of uncertainty can be addressed differently, therefore, understanding how each of these sources of uncertainty are handled, within the risk assessment, is integral to the interpretation of the risk assessment.

Within this ecological risk assessment, the uncertainties are addressed qualitatively; there has been no attempt to quantify the magnitude of specific sources of uncertainty. However, a systematic and conservative approach was utilized in selecting assumptions; because of this the uncertainties are believed to be systematically one directional (conservative). This approach is consistent with Agency mandates and objectives, allowing the Agency to confidently conclude where substantive ecological risk does not exist. This is important to the Agency as the Agency must be confident in concluding that the risks are not substantive.

Natural variability is an inherent characteristic of ecological systems and stressors. The present study was designed with sufficient "power" and/or rigor to allow for data interpretations anticipating the natural variability. For data comparisons this involved the collection of sufficient replicates to provide for statistical differentiation of measurement endpoint responses for different exposure levels. Additionally, Superfund is required to conduct a risk assessment such that the agency can make informed risk management decisions, not necessarily quantify all risks.

The benchmarks (LOAEL and acute values) used to determine hazard quotients were the lowest, technically defendable values found in the literature. However, there is uncertainty associated with each benchmark. Often, toxicity studies were not available on the same species or same chemical form as evaluated in this risk assessment. When these studies were not available, a consistent process for selection was used to locate studies on similar species or those with comparable chemical form. Details of the specific studies evaluated can be found in the toxicity profiles (Appendices C and D).

For mercury, most of the LOAELs, utilized in this ecological risk assessment, are for methylmercury or other organomercury compound. The mercury concentration in sediment and tissue are reported as total mercury. For the purposes of the food accumulation models and dose calculations, it was assumed that the total mercury calculated from sediment and food is equivalent to an organomercury compound for comparison to the LOAEL. Effectively this translates to the assumption that, for the exposure scenarios, all administered Hg is organomercury. It is acknowledged that this comparison will provide a worst case exposure scenario.

For PCBs, it is assumed that the toxicity of Aroclor 1258 is equivalent to the toxicity of the most toxicologically potent Aroclor for which information was available. This assumption is believed to be conservative since there is no information available to suggest that Aroclor 1268 is more toxic than the other Aroclors. There are a limited number of studies which suggest that Aroclor 1268 is not the most potent Aroclor, at least to some organisms.

Details on the exposure assumptions utilized in the food chain models can be found in the exposure profiles (Appendix B). The risk calculations were based on conservative life history values (e.g. the lowest bodyweight and the highest ingestion rates). In order to provide for a conservative estimate of dose for the hazard quotient calculations, the wet weight concentration of contaminants and the dry weight of the sediment concentrations were used in the dose calculations.

An important contributor to uncertainty is incomplete data sets or information on which the risk assessment is based. The literature values of life history information (e.g., body weight or ingestion rate) may not be the same as a natural population found in Georgia. Also, organisms use their environment unevenly; therefore, an area use factor (AUF) of one is used in this risk assessment. One source of uncertainty is the small database available for calculating parameters (e.g., the shrimp and blue crab Hg and PCB levels) in the exposure model. Additionally, there is a limit to our understanding of the population dynamics of most species, and the community interactions which exist between species. We recognize that this limitation of knowledge (population ecology) is fundamental in the interpretation of measurement endpoints as they relate to the assessment endpoints.

Although the reported LOAELs used in the hazard quotient calculations are for closely related species, response to Hg and PCBs may be different in species for which data were available. In addition, if an appropriate LOAEL was not located, a factor of 10 was used to convert a lethal dose to a LOAEL. Doses reported in toxicological studies were often in units of milligram (mg) contaminant/kg diet. Doses were converted to units of mg/kg bodyweight/day using reported body weights and ingestion rates.

There is uncertainty associated with hazard quotient calculations which indicate a potential risk. The hazard quotients calculated are based upon a literature benchmark. Data is not generally available on the slope of the toxicity curve for most contaminants and little is known about the interaction of the contaminant on the slope of a toxicity curve. For this reason, as well as other discussed in this section, the numerical value of hazard quotient has little absolute meaning. Hazard quotients above 1 indicate a potential risk relative to the benchmark (NOAEL, LOAEL, or acute value), but an HQ of 10 (for the same benchmark) does not mean that the risk is 10 times greater

than the HQ of 1.

Benchmarks obtained from the literature may over- or underestimate actual values for the species modeled in this risk assessment. Another source of uncertainty arises because toxicity values reported in the literature are often derived in single species, single contaminant laboratory studies. Prediction of ecosystem effects from laboratory studies is difficult, as environmental factors and interactions among contaminants in field conditions can influence a toxicants' effects, either by enhancing or augmenting the effects.

Another source of uncertainty is the potential influence of individual contaminant source areas (waste lagoons, facility runoff, or areas of maximum contamination in the marsh) on contaminant accumulation at a particular sampling location. While there is good correlations between sediment contaminant levels and measured body burdens, it is not possible to conclude that ongoing releases from source areas will influence the body burden levels. If the source areas do influence the body burden results, the hazard quotient calculations using this data may overestimate the actual risk associated with a particular sediment concentration.

9.0 SEDIMENT CONTAMINATION

Sediment was collected using disposable plastic, decontaminated stainless steel trowels, or a four-inch hand bucket auger from the upper six inches of sediment. The bucket auger was used only when sediment was collected under water. The amount of organic material included in the samples was minimized by pushing aside the current annual growth of vegetation. In May 1995, due to the size of the area impacted by contaminants, sediment screening was conducted to establish a concentration gradient upon which to base the benthic sampling regime. Screening, was performed by collecting a small volume of sediment that was transferred directly to resealable plastic bags for XRF and immunoassay analyses.

The Spectrace units were operated and calibrated as per the operating manual supplied by the manufacturer, ERTC/REAC SOP #1713, *Spectrace 9000 Field Portable X-Ray Fluorescence Operating Procedures*. Preparation of sediment for XRF analysis initially involved drying one-half ounce of homogenized soil in an aluminum weight boat. The sediment was dried under ambient conditions or under heat lamps. The dried soil was disaggregated, passed through a decontaminated 1-millimeter (mm) stainless steel sieve, and placed in a 31-mm polyethylene X-ray sample cup. The cup was sealed with a piece of 0.2-mm thick polypropylene X-ray film and placed on the XRF detector window for analysis. Several problems were encountered due to the consistency and nature of the sediment. For example, the sediment became extremely hard when dry and was difficult to disaggregate and pass through the sieve. Additionally, the fine texture resulted in undesirable long drying times. Due to the potential volatility of mercury, it was not feasible to use an oven to accelerate the drying. Further, the use of an oven would likely acerbate the aforementioned hardening of the sediment. It was decided to analyze the sediment "as collected" by placing a aliquot directly into the X-ray sample cup and sealing it with a piece of X-ray film. Since the samples were fine textured and collected at low tide, they were relatively dry and were a "peanut butter" consistency. The cup, film side down, was gently tapped to concentrate the sediment on the film, and the cup was placed on the XRF detector window for analysis as described previously. Results of the XRF screening process are presented in Table 2.

A 10-gram aliquot of sediment was prepared for immunoassay screening of PCBs as per instructions provided by Ohmicron, Inc. No problems were encountered during the preparation and extraction of the sediment; however, the high ambient temperatures experienced during the field activities (approximately 85 to 95° F) may have slightly affected the analytical procedure. A pairwise comparison of the immunoassay and laboratory data sets will be performed to develop a measure of how accurately the field screening values predicted the actual results.

In May 1995, a total of 50 locations were sampled for field screening on the basis of previous analytical results, proximity to potential source areas (such as the outfall), local topography and drainage patterns, and habitat. These locations were situated in several general areas of the site including the marsh south of the causeway; the marsh north of the causeway; numerous areas in Purvis Creek and Purvis Creek tributaries up- and downstream of the site; and a reference area located in Troup Creek. Samples were collected from the surface of the marsh and from

tributaries within the marsh at low tide. Areas on the marsh surface were selected on the basis of proximity to a particular source area on the site and were sampled to characterize areas likely to accumulate contaminants but not previously sampled. The latter included depressional areas likely to contain pooled water during ebb tide.

Sediment for laboratory analyses was accumulated in a 5-gallon plastic bucket until a volume sufficient to fulfill analytical requirements was collected. The sample was homogenized and aliquots were transferred into the appropriate sample containers. Approximately 3 gallons of sediment were required for toxicity testing and analysis for metals, PCBs, PAHs, total petroleum hydrocarbons (TPHs), total organic carbon (TOC), and grain size.

9.1 Polychlorinated Biphenyls

Sediment samples were collected in May, July, and October 1995 and analyzed for PCBs. Initially, sediment samples were collected from suspected drainage pathways within the south and north marsh areas, as well as from a reference area. The sediment samples collected in July and October were collected from suspected drainage pathways, from a grid established within the south marsh, and from various depths.

An Aroclor 1268 hot-spot area (concentration > 200 mg/kg, dry weight) originates at the outfall location, and extends approximately 700 feet due west into the south marsh and for approximately 1,000 feet to the south. The concentration of Aroclor 1268 drops sharply at the margin of the hot area, with representative measurements outside the hot area ranging from 3 to 150 mg/kg (Figures 4a and 4b) A summary of the analytical results for sediment PCB analysis are presented in Tables 3-5 and complete analytical reports for each sampling period are located in Appendices E, F, and G.

9.2 Mercury

Sediment samples were collected in May, July, and October 1995. The sampling followed a similar strategy as those samples collected for PCB analysis. Mercury contamination was measured throughout the marsh, but an obvious hot-spot area (concentration > 100 mg/kg, dry weight) originates at the outfall location (Figures 5a and 5b). The hot area extends west of the outfall for approximately 300 feet along the earthen berm, and south of the outfall for approximately 1200 feet. The area extends into the marsh as far as 800 feet. The mercury contamination begins to drop steadily at the boundary of the hot area, but it was consistently measured at concentrations ranging from approximately 5 to 75 mg/kg throughout the remaining area of the south marsh. Summary analytical results for sediment mercury analysis are presented in Tables 6 and 7 (with additional mercury results presented in Tables 9 to 11). Complete analytical reports for each sampling period are located in Appendices E, F, and G.

9.3 Organomercury

A limited number of sediment samples were collected for organomercury analyses. These samples were collected to assist with the design of a sediment methylation rate study. This methylation rate study was not conducted

Six sediment sample locations (F-2, C-3, 19-20, 17-18, M-1, and 36) were selected from the south marsh for the analysis of organomercury compounds (Table 8). At each sample location, a decontaminated stainless steel trowel was used to collect the sediment sample. The sediment sample was placed into a 32-ounce glass jar, placed into a large plastic bag, and stored upright in a cooler on wet ice. The samples being analyzed for organomercury compounds were shipped to a subcontracted laboratory, Aqua Survey, Inc., Flemington, New Jersey

Determination of effects of Hg in aquatic systems strongly depends on the species of Hg present. The primary Hg species include elemental Hg (Hg^0), inorganic Hg (Hg^{2+}), and Me Hg (CH_3Hg^+). Elemental Hg can be oxidized to mercuric ion , which is readily absorbed to both inorganic and organic particles

(Fitzgerald et al. 1991). Methylmercury has been found to be the most bioaccumulated and toxic of the species (Brosset 1987; Gill and Bruland 1990). The process of methylation of Hg is not well understood. Methylation can occur as a result of both biotic and/or abiotic processes. The relative contributions to the MeHg pool from each system strongly depends on the type of wetland or watershed characteristics. Sulfate reduction has been heavily linked as one of the primary processes in the methylation process and may actually be the limiting factor in the process (Compeau and Bartha 1985). The alternative process is demethylation, that occurs in estuarine sediments aerobically. The net methylation, the balance between methylation and demethylation, results in the Hg available for bioaccumulation (Zillioux et al 1991).

The concentration of organomercury compounds (mostly methyl mercury at 0.11 ug/g, dry weight) was greatest at Location 17-18. Location C-3 was the only location that diethylmercury was detected with a concentration of 0.0009 ug/g, dry weight. Dimethyl Hg was not detected in any of these samples.

The data collected during this investigation represents only six sample locations within the marsh area, yet MeHg was detected at all locations analyzed. The ranges of MeHg detected in the marsh vary depending on location. Locations with the highest concentration of total Hg in the sediment did not display the highest concentrations of organomercury. In fact, the location (Location 17-18) with the highest MeHg was the location found to have one of the lowest total Hg levels of the samples submitted. The MeHg and total Hg sediment samples were not found to correlate (r= 0.098). This information suggests that the rate of methylation does not depend solely on the concentration of Hg in sediments.

9.4 Target Analyte List Metals

In May 1995, a total of 15 sediment samples were collected and analyzed for TAL metals. In July 1995, 37 sediment samples were collected and analyzed for TAL metals and an additional 37 sediment samples were collected in October 1995 and analyzed for TAL metals (a total of 89 sediment samples were analyzed for TAL metals over the course of this investigation). The results of these analyses are presented in Tables 9-11 and Appendices E, F, and G contain the analytical summaries.

For the samples collected in May 1995, antimony, selenium, silver, and thallium were not detected in any of the samples. Cadmium was detected in only one sample at a concentration of 0.55 mg/kg, dry weight. Other metals were detected in relatively low concentrations. For example, arsenic was detected at concentrations less than 10 mg/kg, dry weight, chromium at less than 120 mg/kg, dry weight, copper at concentrations less than 56 mg/kg, dry weight, and zinc concentrations less than 160 mg/kg, dry weight.

Similar results were noted for the sediment samples collected in July 1995. Antimony, cadmium, selenium, and silver were not detected in any sample. Similar concentrations of arsenic (concentration less than 10 mg/kg, dry weight), chromium (concentrations less than , copper, and zinc were also detected in these samples.

In an effort to further define the extent of contamination, additional sediment samples were collected from the grid established on the south marsh, and from several locations of Purvis Creek, Gibson Creek, and the Turtle River. In addition, sediment samples were collected from various depths to determine the vertical extent of contamination. These results are presented in Table 11 (depth samples are identified with a 0-6, 12-18, 24-30, or other similar depth range associated with the sample label). The results parallel the results for the samples collected in May and July 1995.

Sediment samples 19-20, 17-18, 36, and the reference location were collected in May 1995. Sediment samples M-1, C-3, and F-2 were collected in July 1995. Target analyte list metals analysis was not conducted on sediment samples F-2 or C-3. However, these 2 samples were analyzed for Hg (Table 4). The highest concentrations of Hg were detected at Location F-2, with concentrations of 580 mg/kg, dry weight. Of these 7 samples, Location 36 was located closest to the LCP outfall, yet it did not display the

highest concentration (230 mg/kg) recorded at the site. Mercury was detected at concentrations above the detection limit in all samples, including the reference location, ranging from 0.13 mg/kg at the reference locations to 580 mg/kg at Location F-2.

As previously discussed, an Hg plume was found in the wetland area from the outfall south to an area west of the former storage lagoons (Figure 6). This Hg contamination has been associated with site processing and discharge of site related process material into the adjacent wetland. Correlation analyses were used to evaluate which of the other metals were collocated with Hg and may have also been released by the LCP into the adjacent wetlands. Mercury concentrations were correlated with each metal concentration using SAS. Any correlation coefficient (r) with a p-value of 0.10 or less was considered to indicate a significant correlation between the Hg concentration and the other metal concentrations. For the metal samples collected in May 1995, there were significant correlations between Hg concentration and seven other metal concentrations [barium, beryllium, calcium, copper (Cu), lead (Pb), nickel (Ni), and zinc (Zn)]. All of these metals, except for beryllium, were found in greater than 90 percent of the sediment samples. Barium was detected at concentrations up to 50 mg/kg, beryllium up to 1.6 mg/kg, calcium up to 9,200 mg/kg, Cu up to 71 mg/kg, Pb up to 220 mg/kg, Ni up to 22 mg/kg, and Zn up to 160 mg/kg. As with Hg, many of these metals were found at the greatest concentrations near the outfall and along eastern edge of the wetland adjacent to LCP.

9.5 Base, Neutral, and Acid-Extractable Compounds

As summarized in Tables 12 and 13, sediment samples were collected in May and October 1995 and analyzed for target compound list (TCL) BNA compounds.

For the samples collected in May 1995, low levels of BNAs were detected in several samples, however, with the exception of di-n-butylphthalate, no BNAs were detected above the detection limit. Phthalates are typically associated with laboratory contamination (plasticizers) and were detected in both the laboratory blanks and the reference sample. The remaining 12 BNA compounds were found at concentrations that were below their respective detection limits. No BNA compounds, with the exception of the previously discussed phthalate, were detected in the sample collected from the reference area. Fluoranthene and pyrene were the most frequently detected PAH compounds and they were both detected in 79 percent of the samples. All the remaining PAH compounds were detected less frequently (<36 percent of the sample locations).

There were no overall trends in BNA distribution at the LCP site. The highest total BNA concentration was found in a sample location collected near the LCP outfall (Location SED 19-20, total BNAs 3,000 μg/kg) but other locations near the outfall contained much lower total BNA concentrations (SED 35, total BNAs 400 μg/kg; SED 36, total BNAs 480 μg/kg; and SED 17-18, no BNAs were detected). The second highest total BNA concentration (1500 μg/kg) was observed in sample LCP50, that was located on the north side of the boardwalk causeway. Samples near this location also contained lower total BNA concentrations (LCP 49, total BNAs 180 μg/kg; LCP 48, total BNAs 190 μg/kg; and LCP 47, total BNAs 280 μg/kg). Complete analytical reports for BNA analysis are presented in Appendices E and G.

Similar results were noted for the samples collected in October 1995 (Table 13). Low levels of BNAs were detected in several samples, but no specific patterns were noted.

9.6 Petroleum Hydrocarbons/Oil and Grease

In May 1995, fifteen sediment samples were collected for TPHs and oil and grease analysis. The samples were collected from the south marsh, the north marsh, and the reference area. Oil and grease were detected in the samples collected from the south marsh ranging from 1,400 μg/g (dry weight) at sample SED 36 (near the outfall) to 81 μg/g in a sample collected at LCP 51 (near grid node J2). Samples collected from the north marsh contained oil and grease ranging from 870 μg/g at LCP50 to non-detect

at LCP 43, LCP 44, LCP 45, and LCP 46. The reference area contained 200 μg/g oil and grease. Samples were also analyzed for TPH. The highest concentration of TPHs was also detected at SED 36 at a concentration of 1,300 μg/g. The next highest concentration of TPHs was detected at LCP 19-20 at a concentration of 560μg/g. Eight of the samples collected in May 1995, including the reference sample, did not contain TPHs above the detection limits. The highest concentrations of TPHs and oil and grease were detected in two sediment samples collected adjacent to the site. Overall, the concentrations decreased with distance from the site. The results of these analyses are presented in Table 14 and Appendix E.

In October 1995, an additional 20 samples were analyzed for TPH. These samples were collected from the south marsh, Purvis Creek (both upstream and downstream of the outfall) and from Gibson Creek. TPHs were detected in 17 of the samples, with the highest concentrations at F2. The concentration at the surface (0-6 inches) was 180 mg/kg, dry weight and the concentration at depth (24-30 inches) was 290 mg/kg, dry weight. The results are listed in Table 15 and Appendix E.

9 7 Dioxin

Six sediment samples that were collected in July 1995 were selected for dioxin analysis. These samples were collected from the following locations in the south marsh: E3, H1, 17-18, 36, 61, and 68. The analysis of these samples confirmed the presence of dioxin in sediment samples collected adjacent to the site (Table 16).

Based on these results, additional sediment samples were collected and analyzed for dioxin analysis, on 16 April 1996 (Table 17). The purpose of this trip was to collect sediment samples for dioxin and dibenzofuran analysis. To determine if a gradient of contamination exists from the site to the Turtle River, 12 locations were selected for sediment collection (Figure 6).

To compare the results between locations, toxicity equivalents (TEQs) were calculated following the U.S. EPA (1987) and U.S. EPA (1989) procedures (Tables 16 and 17). These calculations compare the relative toxicity of each congener to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD).

With the exception of samples collected from Location F2, all results were below 1 part per billion (ppb) TEQs based on both the 1987 and 1989 calculations. Location F2 contained 1.854 ppb TEQs (0-6 inches) and 1.122 ppb TEQs (6-12 inches) based on the U.S. EPA (1989) calculations and contained 0.636 ppb TEQs (0-6 inches) and 0.425 ppb TEQs (6-12 inches) based on the U.S. EPA (1987) calculations. Samples collected in Purvis Creek and Turtle River ranged from 0.001 ppb to 0.006 ppb TEQs based on U.S. EPA (1987) calculations and from 0.003 to 0.022 ppb TEQs based on the U.S. EPA (1989) calculations. Sediment samples collected from the south marsh and outfall canal contained higher dioxin levels (TEQs) than the samples collected from Purvis Creek and Turtle River.

The results of the dioxin analysis of samples collected in July 1995 were higher than the results for the samples collected in April 1996. This may be due in part because the samples collected in July 1995 were collected on the marsh adjacent to the site. At that time, samples were not collected from Purvis Creek or Turtle River and analyzed for dioxin. The highest TEQs were from samples collected from the grid established in the marsh adjacent to the site. Location E-3 contained 4.4 ppb TEQs and Location H-1 contained 11.2 ppb TEQs. These levels were the highest of the six samples collected in July 1995.

There is a distinct trend with regard to the dioxin results. The highest TEQs were for samples collected from the grid established adjacent to the site, with the levels decreasing with distance from the site. There is a clear trend of decreasing dioxin levels (TEQs) from the site out toward the marsh area. When the July 1995 and the May 1996 data are combined, the highest dioxin concentration was found at Location H1 (11.2 ppb TEQs). The next highest dioxin concentrations were found at Location E3 (4.4 ppb TEQs), Location 61 (2.5 ppb TEQs), and Location F2 (1.9 ppb TEQs). It should be noted that Location 61 is

located adjacent to Location L5 (within the sample grid), in a tidal creek channel that drains most of the marsh area adjacent to the site. From there, the dioxin levels steadily decrease with distance from the site. The next highest concentrations are located in the drainage channel and in the outfall canal. These concentrations range as follows: 0.7 ppb TEQs at Location 68, 0.2 ppb TEQs at Location 17-18, and 0.129 ppb TEQs at Location 111.

The next highest concentrations were found at Location 100 (0.022 ppb TEQs). This location is downstream of the outfall ditch. Although there were low levels of dioxin found in sediment collected from Location 117 (across Purvis Creek from the outfall ditch), the strong tidal currents probably carry sediment from the outfall ditch downstream in Purvis Creek without the sediment being deposited on the opposite bank. Location 100 is the first major depositional area in Purvis Creek downstream from the site. This location contained the next highest concentration (0.02 ppb TEQs) in Purvis Creek. The remainder of the locations had dioxin concentrations that ranged from 0.003 - 0.009 ppb (based on 1989 TEQs) and 0.001 - 0.004 ppb (based on 1987 TEQs) in Purvis Creek and Turtle River. Based on these results, the highest dioxin concentrations are located in sediment adjacent to the LCP site, and the concentrations decrease with distance from the site.

In addition, the levels of tetrachlorodibenzo-p-dioxin (TCDD) were compared at all sample locations. These data follow a similar trend to the total TEQs. The highest levels of TCDD [part per trillion (pptr)] were found in the marsh adjacent to the site. The highest values of TCDD were also located in the south marsh, with the levels generally dropping with distance from the site. The highest level of TCDD was found at Location 61 (29.3 pptr). All samples collected from Purvis Creek contained levels of TCDD below 1 pptr. Only those samples collected in the south marsh, and 1 sample collected from the east bank of the Turtle River, contained TCDD at concentrations above 1.0 pptr.

9.8 Acid Volatile Sulfide/Simultaneously Extracted Metals

A limited number of sediment samples were collected for acid volatile sulfide/simultaneously extracted metals (AVS/SEM) analyses. These samples were collected to provide information to assist with the design of a sediment methylation rate study. This methylation rate study was not conducted.

In July 1995, six sediment sample locations (F-2; C-3; 19-20; 17-18; M-1; and 36) from the marsh adjacent to Purvis Creek and one sediment sample location from a reference location were selected for acid volatile sulfide/simultaneously extracted metals (AVS/SEM) analysis. At each sample location, a decontaminated stainless steel trowel was used to collect the sediment sample. The sample was placed in a 32-ounce glass jar, and the jar placed in a large plastic bag and stored upright in a cooler on wet ice. The samples were analyzed for AVS/SEM at Manhattan College, Brooklyn, NY.

Acid volatile sulfide is an operationally defined term used to estimate the amount of reactive sulfide and amorphous iron monosulfide (FeS) in a sample. Acid volatile sulfide is extracted from samples using an unheated mild acid (more severe heated acid treatments release sulfide from pyrite (H_2S) or other non-reactive sulfur compounds; that is other sulfur sources that do not readily exchange trace metals). Acid volatile sulfide is an important partitioning phase for divalent transitional metals, including Ni, Zn, Cd, Cu, Hg, and Pb in marine and freshwater sediments under reducing anoxic conditions (Di Toro et al. 1990; Ankley et al. 1993). After reacting with AVS, these divalent metals form insoluble metal sulfides (Allen et al. 1993). Simultaneously extracted metals (SEM), extracted during the procedure stated previously, are used to quantify the reactive metals in the sediment sample.

Acid volatile sulfide concentrations have been used to explain the results of acute toxicity tests for metals in marine and freshwater sediments for a number of different test species (Allen et al. 1993; Casas and Crecelius 1994; Di Toro et al. 1990; Di Toro et al. 1992). When the molar SEM to AVS ratio for these metals is below 1, the metals are not expected to be present in the pore water and acute toxicity is not expected as a result of these elements. If the molar ratio exceeds 1, free metal ions could be present in

the pore water which can result in toxicity to benthic organisms.

Acid volatile sulfide alone does not accurately predict bioavailability of the divalent metals; it is known that oxides of iron and manganese, humic acids, ion exchange sites on clay minerals, and organic compounds may also be relevant in determining the toxicity of metals in sediments (U.S. EPA 1989). For example, Ankley et al. (1993) observed that in freshwater sediments, normalization of sediment Cu concentrations to AVS accurately predicted sediments that were nontoxic when molar concentrations of Cu to AVS were less than 1; however, toxicity was frequently not observed in samples with molar Cu to AVS ratios significantly greater than 1. Ankley et al. (1993) concluded that pore water concentrations provided an accurate prediction of Cu toxicity and AVS alone did not explain the Cu partitioning.

When multiple divalent transitional metals occur in the sediments, molar concentrations of total SEM metals to AVS is necessary (Di Toro et al. 1990). Any divalent metal that has a lower sulfide solubility parameter than FeS would be expected to form an insoluble metal sulfide, as long as AVS was still available. The model predicts that the more soluble sulfides will release their metals to the pore water precipitating the metal sulfides of the more insoluble sulfides. Of the metal sulfides that form, Hg forms the most insoluble sulfide. However, the reducing conditions necessary for the insoluble sulfides also can facilitate the generation of organomercury compounds.

The TAL metal concentrations represent the total extractable metals in a sample, while the SEM metals represent the potentially "reactive" metals. To qualitatively compare the TAL metal concentrations with the SEM concentrations, the TAL metal concentrations were converted from mg/kg to micromole per gram (μMol/g). To convert mg/kg to μMol/g, the sample concentrations were divided by their respective atomic masses. Table 18 contains the TAL metal concentrations after being converted to μMol/g, dry weight.

Table 19 contains the AVS and SEM concentrations for each sediment sample collected at the LCP site. Acid volatile sulfide was detected in four of the six sample locations and ranged from 1.6 μMol/g at Location 19-20 to 33 μMol/g at Location F-2. Acid volatile sulfides were not detected at Location M-1 or Location 36.

The SEM to TAL ratios relate to the expected availability of an analyte; as the ratio increases so does the expected availability of the analyte (Table 20). The mean SEM to TAL metal ratios were calculated without adjusting a non-detected value. However, if either the TAL concentration or the SEM concentration was below the detection limit, the "U" qualifier was noted in Tables 9,10, and 11. The mean SEM to TAL metal ratio was the lowest for Hg ($\bar{x}$ = 0.019) followed by Ni ($\bar{x}$ = 0.56) and Zn ($\bar{x}$ = 0.56). The highest average ratio was for Cu ($\bar{x}$=1.58). The ratios for Cd, Ni, and Pb may be artificially inflated due to the number of values below the detection limit. It should also be noted that these ratios may be suspect because the sediment samples were collected on different dates. Ideally, the sediment samples should have been collected at the same time and aliquots of the same sample removed and analyzed for TAL, AVS, and SEM.

Table 20 summarizes the SEM to AVS ratios. No single analyte had SEM to AVS ratios greater than one. The ratio of SEM to AVS was calculated for Location M-1 and Location 36. However, because the AVS concentration was below the detection limit, the ratios calculated for these locations are esumates. The highest ratio (excluding Location M-1 and Location 36) for individual analytes were for Zn ($\bar{x}$=0.24), Pb ($\bar{x}$=0.11), and Cu ($\bar{x}$=0.09). The lowest ratios were for Ni ($\bar{x}$=0.04), Hg ($\bar{x}$=0.006), and Cd ($\bar{x}$=0.002).

The ratios for total SEM[1] to AVS exceeded one at Location 19-20. The ratios for the remaining four locations (F-2, C-3, 17-18, and M-1) were below 0.3.

The sediments samples collected in July 1995 had individual SEM to AVS below 1, and except for Location 19-20, had total SEM to AVS ratios less than 1. The total SEM to AVS ratio at Location 19-20 was 1.5. Based on the AVS partitioning models in the literature, none of the sediments are expected to generate divalent metal induced toxicity, with the possible exception of Location 19-20.

The data collected during this investigation at LCP indicate that AVS is present in the sediments at concentrations in the range of those that have been reported in marine sediment (Di Toro et al., 1990). However, based on the molar SEM to AVS ratios, it does not appear that the metals (Zn, Ni, Cu, Cd, Pb, and Hg) in the sediment from marsh adjacent to LCP would be responsible for toxicity to benthic species.

9.9 Grain Size Analysis/Total Organic Carbon

Tables 21 and 22 contain a summary of the grain size and total organic carbon (TOC) at each sample location. Grain size and TOC samples were collected during the May 1995 sampling trip. Grain size and TOC were not analyzed for samples collected from Locations F-2, C-3, and M-1. Total organic carbon concentrations in the marsh sediments ranged from 0.36 to 34 percent. Gravel was not observed in any sample, and sand ranged from 3.1 percent (Location 19-20) to 61.8 percent (Location 48). With the exception of location 48, silt and clay were found in the greatest percentage at all sample locations; these locations consisted of between 75.7 percent (Location 17-18) and 87.1 percent (Reference) of silt and clay combined. Colloids were found at the next greatest percentage, but they did not exceed 21.0 percent at any location.

10.0 EVALUATION OF THE EXTENT OF MARSH CONTAMINATION

10.1 Contour Plots

Contour plots were provided by Geosyntec Consultants (Atlanta, GA) using the sediment analytical results from this project. These plots indicate the distribution of Aroclor 1268 (Figures 4a and 4b) and the distribution of Hg (Figures 5a and 5b) within the sampling area.

The plots indicate that the common source area for Hg and Aroclor 1268 contamination in sediment is from the outfall lagoon area of the chlor-alkali plant. Differences in their physical transport and dispersion into the marsh would account for the differences in the two plots. Little accuracy of the contours is likely in the north marsh.

10.2 Core Samples

To determine the concentration of contaminants at different depths, core samples were collected from the following grid nodes: B1, B2, E3, F2, H1, H2, H3, H4, J1, and L1. Cores were also collected from the following locations outside of the marsh: Gibson Creek (109), Purvis Creek (110), Turtle Creek, upstream of the confluence with Purvis Creek (108), and the Drainage Channel (114). The sampling locations were selected based on the proximity to known or suspected contaminant release points or depositional areas, maximum surface concentrations observed prior to the October 1995 sampling, or to provide a transect across a portion of the marsh. A 60 centimeter (cm) by 5 cm acetate core was inserted into a stainless steel core device. A plastic nose piece was screwed onto the bottom of the coring device. An eggshell stop device was not used so that the sediment was not disturbed while pushing the core into

---

[1] Total SEM = $SEM_{Zn} + SEM_{Ni} + SEM_{Cu} + SEM_{Cd} + SEM_{Pb} + SEM_{Hg}$

the sediment

The core was manually pushed into the sediment and then extracted. The acetate core was removed from the stainless steel sleeve, and the core was sectioned using a razor knife. A section of sediment was removed from the following sections: 0-6 cm; 12-18 cm; 24-30 cm; and (if possible) 54-60 cm. The sediment was placed into the appropriate glass jar. The remaining sections (6-12 cm; 18-24 cm; and 30+ cm) were placed into glass jars and archived. Due to some compression of the sediment while pushing the core into the sediment, not all sections were available for analysis. Each section was analyzed for PCBs, BNAs, and Hg.

PCBs

With the exception of Location E3, the samples collected from the grid contain higher PCB concentrations at the surface (0-6 cm) than at depth (Table 5). The same trend is also apparent for the samples collected from the Turtle River (108) and Gibson Creek (109).

The core sample collected from Purvis Creek (110) indicates that the concentration of PCBs increases with depth. The location of these samples is on the upstream side of a depositional island at the mouth of Purvis Creek and Turtle River. The concentration of PCBs at the surface was 0.25 mg/kg, but the concentration increased to 5.4 mg/kg at depth.

Mercury

With the exception of Location E-3, the samples collected from the grid contain higher Hg concentrations at the surface (0-6 cm) than at the depth (Tables 7). The same trend is also apparent for the samples collected from the Turtle River (108) and Gibson Creek (109).

The core sample collected from Purvis Creek (110) indicates that the concentration of Hg increases with depth. Again, this sample was collected from a depositional area downstream of the site. It should be noted, however, that the concentration of Hg in this sample was very low, compared with the samples collected from the marsh.

The results of the core samples indicate that generally, the concentration of Hg and PCBs decrease with depth. The exception is at Location E-3, where the concentrations remain relatively consistent with depth and the samples collected from the depositional island in the mouth of Purvis Creek. These samples indicate that the concentration of Hg and PCBs increases with depth.

BNAs

Sampling locations for sediment analyses for BNAs were selected based upon known or suspected contaminant release points and depositional areas. No obvious trends are apparent in the distribution of BNAs with soil depth. Some locations had consistent BNA concentrations from the surface to a depth of approximately 30 inches, while others tended to increase or decrease with depth. Depth-related BNA data is located in Table 13.

11.0 WATER CONTAMINATION

Surface water samples were collected in July 1995. The sample container was immersed in the water column, oriented in an upstream direction, and allowed to fill to volume. Disturbed sediment and floating debris were excluded from the sample.

Additional water samples from process area seeps and french drains were collected following a rain storm. Water were collected from the following locations: the wastewater treatment plant (WWTP) effluent, the south seep french

drain, the north seep french drain, and the storm drain. All samples was submitted for chemical analysis of PCBs and total and dissolved TAL metals. Samples for analysis of PCBs were collected in 1-liter wide mouth amber glass bottles and held at 4 degrees Centigrade (°C). One sample for PCB analysis was collected into clear glass 1-liter bottles wrapped with aluminum foil to exclude light. Samples for analysis of total and dissolved metals were collected into 1-liter polyethylene bottles. The total fraction was defined as the concentration detected in an unfiltered sample after vigorous digestion, whereas the dissolved fraction was defined as those constituents that pass through a filter of a specified pore size. The water samples for analysis of total metals were acidified with nitric acid to a pH of less than 2, and held on ice at 4°C. Prior to preservation, the samples for analysis of dissolved metals were filtered through a membrane prefilter and a 0.45 μm glass fiber filter. The filtrate was collected into a 1-liter polyethylene bottle and preserved as described previously. A stainless steel barrel filter under nitrogen pressure was used to filter all samples. The filter apparatus was decontaminated prior to use and between samples.

11.1 In-Situ Water Quality

Water quality parameters were measured to obtain general information on major water quality parameters at the site. No attempt was made to collect definitive information of spatial or temporal fluctuations in water quality parameters.

In-situ water quality was determined at the outfall adjacent to Purvis Creek on 11 and 12 July 1995 (Table 23). A Hydrolab™ Surveyor III was deployed at sample Location 18. Data were collected over a 24-hour period to determine the range of water quality associated with incoming and outgoing tides. Data collected by the Hydrolab™ Surveyor III included temperature (℃), conductivity [millisiemens per centimeter (mS/cm)], salinity [parts per thousand (ppth)], dissolved oxygen [percent saturation (% saturation) and milligrams per liter (mg/L)], reduction/oxidation potential [millivolts (mV)], and depth [meters (m)] (Table 22). The data were automatically logged to the instrument at 15-minutes intervals and downloaded to a personal computer at the end of the 24-hour data collection period. The Hydrolab™ Surveyor III was calibrated prior to use as per the methodology detailed in the Hydrolab Corporation Owners Manual (1985) and ERTC/REAC SOP #2041, *Operation of the Hydrolab Surveyor II Water Quality Management System*.

During the 24-hour period of data collection, there were two periods (2000 to 0230 and 0630 to 0915) when the unit did not function due to flooding of the instrument. It also appears that during low tides the probe of the Hydrolab™ Surveyor III may not have been completely submerged. During low tides, depths of 0 meters were recorded for up to 2.5 to 3 hours prior to and after the slack low tide. During these periods of low tide, the salinity values were 0 ppt, the conductivity values were 0 mS/cm, and oxygen was near 100 percent saturation. These values indicate that the probe may not have been fully submerged.

The data discussed below are limited to the times the instrument was collecting and logging data. Temperature ranged from 23.9 to 34.3°C. Temperature appeared to depend on tidal cycle and time of day. The early morning low tide temperatures were lower than the late afternoon low tide temperatures, and temperature peaked during the slack low tide and gradually decreased with the incoming tide. The pH ranged from 7.2 to 8.0 units. The pH also appeared to depend on tidal cycle; pH ranged from 7.2 to 7.4 units during low tides and from 7.8 to 8.0 units during high tides. The pH and temperature values were recorded during low tide cycles, although based on other parameters it appears that the probe may not have been submerged during these periods and the data may not be meaningful.

Conductivity and salinity values were only obtained for high tides. During low tides the instrument reported conductivity and salinity values of 0 mS/cm and 0 ppt, respectively. During the incoming through the outgoing high tide, conductivity ranged from 3.3 to 3.9 mS/cm, and salinity ranged from 1.8 to 2.1 ppt. Both of these values peaked at high slack tide. Dissolved oxygen ranged from 41.9 to 105.3 percent saturation or 3.1 to 7.5 mg/L. Dissolved oxygen levels appeared to decrease during the incoming tide, fall to the lowest values at slack high tide and increase with the outgoing tide. During outgoing tide, the dissolved oxygen gradually increased from 41.9 to 59.4 percent saturation between 1045 and 1300.

Between 1300 and 1315 the dissolved oxygen jumped to 100 percent saturation. It appears that between these times the probe may not have been submerged. Redox potential, like dissolved oxygen, conductivity and salinity, also appears to have peaked (308 mV) at high slack tide, gradually increasing and decreasing with the incoming and outgoing tides, respectively.

11.2 Polychlorinated Biphenyls

Surface water samples collected from eight locations on the site were analyzed for Aroclor 1268. The results ranged from below the detection limit to 66 ug/L at LCP 19-20 (Table 24).

11.3 Mercury

Surface water mercury concentrations were measured in both filtered and unfiltered samples that were taken in several tributary streams in and upstream of the marsh. Mercury was not detected in any of the filtered samples, but concentrations in the unfiltered samples ranged from 0.20 mg/L at Location 44 to 10 mg/L at Location 35-36. Mercury concentrations in surface water were highest at the point of outfall, and decreased with increasing distance from that location (Tables 25 and 26).

11.4 Other Target Analyte List Metals

Surface water samples were collected from eight locations on the site (Tables 25 and 26). Filtered and unfiltered samples from each location were submitted for TAL metals analysis. Aluminum was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 43 (2,700 μg/L) and was below the detection limit in all eight of the filtered samples. Barium was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 35-36 (140 μg/L) and in all eight of the filtered samples with the highest concentration in sample LCP 35-36 (170 μg/L). Calcium was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 35-36 (350 mg/L) and in all eight of the filtered samples with the highest concentration in sample LCP 35-36 (310 mg/L). Copper was detected in one of the unfiltered samples (LCP 35-36 at 5.1μg/L) and in one of the filtered samples (LCP 45 (17 ug/L). Iron was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 43 (1,800 ug/L) and in all eight of the filtered samples with the highest concentration in sample LCP 17-18 (100 ug/L). Lead was detected in six of the unfiltered samples with the highest concentration in sample LCP 43 (34 ug/L) and in two of the filtered samples with the highest concentration in sample LCP 43 (20 ug/L). Magnesium was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 10-11 (930 mg/L) and in all eight of the filtered samples with the highest concentration in samples LCP 10-11 and LCP 44 (860 mg/L). Manganese was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 17-18 (310 ug/L) and in all eight of the filtered samples with the highest concentration in sample LCP 17-18 (230 ug/L). Potassium was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 10-11 (300 mg/L) and in all eight of the filtered samples with the highest concentration in sample LCP 10-11 (280 mg/L). Sodium was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 10-11 (7,200 mg/L) and in all eight of the filtered samples with the highest concentration in samples LCP 10-11, LCP 17-18, and LCP 46 (6,800 mg/L). Vanadium was detected in all eight of the unfiltered samples with the highest concentration in sample LCP 17-18 (14 ug/L) and in all eight of the filtered samples with the highest concentration in sample LCP 10-11 (13 ug/L). Zinc was not detected in the unfiltered samples but was detected in six of the filtered samples with the highest concentration in sample LCP 45 (32 ug/L)

11.5 Organomercury Compounds

Several water samples were collected from the facility area of the site for mercury speciation analyses. These samples were collected to assist with the evaluation of the water treatment and facility release processes on site

Water samples were collected from known drain systems on site. Effluent from the wastewater treatment facility, and storm water from the south seep french drain, north seep french drain and storm drain were collected. Water samples were collected in 32-ounce clear polyurethane bottles. Bottles were submerged just below the surface and filled. The samples being analyzed for organomercury compounds were shipped to Aqua Survey, Inc., Flemington, New Jersey.

Water collected from the effluent and drain systems at the LCP site displayed MeHg as the only organomercury compound (Table 27). Neither dimethylmercury nor diethylmercury were detected in the water samples collected. The South Seep French Drain displayed the highest total Hg levels (88,000 ng/L) and also the highest concentration of MeHg (180 ng/L). Elemental Hg was found to be at 0.47 ng/L at the South Seep French Drain. The North Seep French Drain had a concentration of MeHg of 27 ng/L, while the elemental and total Hg concentrations were 0.2 ng/L and 2,700 ng/L, respectively. The Storm Drain displayed the highest elemental Hg levels at a concentration of 8.6 ng/L.

The water effluent and seep sample total Hg levels were found to weakly correlate with the MeHg levels in the water samples (r=0.61). This loose correlation may be a factor of the solubility (K_{ow}) of Hg versus the actual concentration/rate of methylation dependency. Elemental and MeHg in water samples did not correlate (r=0.32).

12.0 BENTHIC MACROINVERTEBRATE EVALUATION

Benthic invertebrates display attributes which make them suitable organisms for study to evaluate environmental impacts. These attributes are as follows: a sedentary lifestyle; relatively short life spans; they inhabit the sediment water interface; and different species display different levels of tolerance to contaminants (Dauer et al. 1993). Therefore, benthic invertebrates can be used to evaluate and monitor contaminated areas, establish spacial and temporal distributions of contaminant impacts, and determine the magnitude of the impacts (Bilyard 1987). In addition, benthic invertebrates are strong indicators of impacts to higher trophic levels because of their place in the food web.

Modifications in benthic invertebrates assemblages in response to environmental contamination have been studied in marine systems. Little information is available on the ecology of the benthic invertebrate communities in the Brunswick estuary; however, several studies have investigated the benthic invertebrate communities in southern marsh systems (Sacco 1994). Therefore, benthic invertebrates were sampled to determine impacts to the community structure from site-related contaminants. In this investigation, benthic invertebrates are defined as those organisms that will pass through a 2-mm sieve and impinge on a 0.5 mm (500 μm) sieve. These organisms traditionally account for approximately 90 percent of the biomass and 70 percent of the numbers in an estuarine salt marsh.

12.1 Benthic Community Methods

Sediment samples were collected as described in Section 9.0. The results of the field screening and existing data were evaluated and used to select four on-site locations and one reference location for benthic invertebrate sampling. The locations selected were situated in the marsh west of the site and south of the causeway. The locations were adjacent to the outfall (Location 35-36), in a tributary draining the lagoon area (Location 19-20), in a tributary draining the marsh approximately 150 feet west of the lagoon area (Location 17-18), and in a tributary draining the marsh approximately 1000 feet west of the lagoon area (Location 10-11). A reference location in Troup Creek was also selected.

A total of 10 replicates from each location were collected from a 1-square meter portion of the intertidal marsh using a 3-cm diameter acetate core. Samples were collected by pushing the core approximately 5 cm into the sediment, gently rotating the core to shear off the sediment, and then slowly withdrawing the core from the sediment. If the sediment did not remain in the acetate sleeve, a plastic cap or gloved hand was placed on the top of the sleeve. The sleeve was pulled out of the sediment while the suction,

maintained by the plastic cap or hand, held the core in place. The sediment was carefully removed from the acetate sleeve and placed into the sample container. Since chemical analyses were not performed on the samples collected in this manner, the acetate sleeve was reused between replicates.

The samples were held in coolers on wet ice prior to field sorting. To separate the invertebrates from the sediment, a portion of the core was placed on a 2-mm sieve and rinsed with water. To minimize the volume of water used and expedite the separation of the invertebrates from the sediment and debris, a fine stream of water from a sprayer was used. All invertebrates, sediment tubes, and debris retained by the sieve were preserved in the field with a 10 percent formalin solution.

Benthic invertebrates were sorted, counted, and classified to the lowest possible taxa. Each identified taxa was also assigned to a feeding guild. The feeding guilds were described as sub-surface feeder, surface feeder, and carnivore (Table 28).

12.2 Benthic Community Results and Discussion

The total mean density was 97,723 organisms per square meter (organisms/m^2) and mean infaunal density was 95,926 organisms/m^2. A total of 29 taxa were found in the 49 total samples examined and location 17-18 displayed the highest mean density of 175,813 organisms/m^2. A summary of results are presented in Table 26 and in Appendix H.

Oligochaetes (subsurface feeder) and *Manayunkia aesturina* (surface feeder) were the dominant organisms at all sample locations. All locations contained similar proportions of these species, but the ratio of oligochaetes to *M. aesturina* at Location 35 [outfall (OF) ditch] was nearly equal.

Species abundance and diversity were similar at all locations and no significant differences ($p<0.05$) were noted between the numbers of organisms observed and the concentration of contaminants. The reference location also exhibited a comparable distribution of the dominant organisms. However, there were large differences in the number of organisms found in the individual core samples. This confounded the analysis of any relationship between contaminant concentration and invertebrate density.

The benthic community was dominated by surface feeders which comprised 53 percent of the organisms. Sub-surface feeders (28.6 percent) and nematodes (18.4 percent) comprised the remaining portion of the community. The most abundant species was the surface feeding *Manayunkia aestuarina*, that was found to comprise 46.6 percent of the samples. Omnivorous species were comprised mostly of juvenile shrimp and crabs, which represented less than 1 percent of the total benthic invertebrates. Carnivorous species were found at all locations; however, Tabinidae were only found at the reference location (Table 26).

In general, the LCP marsh had a low diversity of feeding guilds. The samples were dominated by surface-deposit feeders and shallow-burrowing subsurface deposit feeders. This conclusion is similar to that found in Gaston and Nasci (1988). Surface feeders may be less susceptible to sediment contaminants than subsurface feeders (Gaston and Young 1992). *Streblospio benedicti* was only found at the contaminated locations and at high densities. *S. benedicti* is a surface deposit feeder, classified as an early colonizer in the succession of benthic communities. The imbalance of the feeding guilds in favor of early successional species may indicate that the communities were not in equilibrium (Gaston and Young 1988). Equilibrium species are long-lived species that dominate in undisturbed or unstressed habitats, whereas opportunistic species are short-lived that dominate disturbed or stressed habitats (Dauer 1993).

Acute pollutant stresses result in mortalities and sensitive species disappear from communities (Bilyard 1987). Chronic pollutants, although less dramatic in their effects can result in decreased recruitment, growth, fecundity, or induce another physiological changes and ultimately result in changes in the community (Bilyard 1987). Differential survival among species is the primary mechanism leading to

shifts in community dominance and diversity (Scott 1989).

The results of a Commencement Bay, WA study indicated that increasing the concentration of contaminants resulted in a continuous decline in abundance and biomass of all species (Becker et al. 1990). Abundance did not appear to be affected by site contaminants during this study at the LCP site. The interpretation of chemical specific effects on abundances and structure are based on correlations among parameters; therefore, no causal relationship can be established . This problem is compounded by the lack of chronic test methods that can be used to predict contaminant effects on abundances and interpret significant community changes (Scott 1989).

Low faunal densities of pollution tolerant species (*C. capitata* and *Nereis glandicincta*) were found in areas with organic matter concentrations that approached 3.5 percent (Raman and Ganapati 1983). Two locations from the site exhibited total organic carbon levels above 3.5 percent (Location 10-11 and Reference Area), yet did not display alteration in faunal densities compared with the remaining locations with lower total organic carbon values. Therefore organic enrichment does not appear to play a role in the densities of pollution tolerant species at the site.

C. capitata are considered relatively tolerant of pollution in a study of Commencement Bay (Becker et al. 1990). However, pollution tolerant and sensitive taxa vary depending on location. The variation may also be due to differences in life history of the organisms (Seitz and Schafner 1995). Trends in opportunistic species and equilibrium species composition may be the best indicators when analyzing community structure trends in disturbed environments (Dauer and Alden 1995).

In sediments composed of silt-clay, responses to disturbances during the colonizing phase include a shift from subsurface deposit feeders to those inhabiting and feeding on surface sediments and suspensions (Scott 1989). This response is not always observed in other grain-size distributions. Sediments collected in the benthic analysis were primarily composed of a silt-clay distribution; therefore the grain size distribution alone may account for the species present at the site. Macrofauna depend on spacial partitioning to maintain diversity; therefore, their diversity can be affected by sediment instability (Warwick et al. 1990)

13.0 SEDIMENT TOXICITY TESTING

13.1 *Leptocheirus plumulosus* Toxicity Testing Procedures

Sediment toxicity was evaluated using a standard 10-day, acute test using an amphipod, *Leptocheirus plumulosus*. *Leptocheirus* is a representative estuarine benthic macroinvertebrate for the area. Test endpoints included survival and sediment avoidance (Table 29, Appendix I).

13.2 *Leptocheirus plumulosus* Results and Discussion

The 10-day acute solid phase *Leptocheirus plumulosus* toxicity assay indicated no observed behavioral differences between animals exposed to the control and reference sediments and the contaminated test sediments. In addition, the same assay indicated no statistical difference ($p<0.05$) in the survival between all treatments (Table 29, Appendix I). Control survival was 90 percent while survival in organisms exposed to site samples ranged from 63 to 92 percent survival.

13.3 Shrimp Toxicity Testing Procedures

Sediment toxicity was evaluated using a standard 10-day, acute test using a shrimp, *Penaeus vannamei*. *Penaeus* is a representative estuarine macroinvertebrate for the area. Test endpoints included survival and sediment avoidance (Table 29, Appendix I).

13.4 Shrimp Toxicity Results and Discussion

The 10-day acute solid phase *Penaeus vannamei* toxicity assay indicated no observed behavioral differences between animals exposed to the control and reference sediments and the contaminated test sediments. In addition, the same assay indicated no statistical difference ($p<0.05$) in the survival between all treatments (Table 29, Appendix I). Control survival was 97 percent while survival of organisms exposed to site samples ranged from 94 to 100 percent survival.

14.0 EMBRYO TOXICITY TESTING

Sediment samples were collected in May 1995 and submitted for an embryo toxicity test, which were conducted in August 1995. These tests were conducted as a "range finding/exploratory" effort, anticipating a potential need to conduct more detailed work at a later date.

Although there is evidence that some PCBs are relatively nontoxic, some PCB congeners have been found to be highly toxic (Tanabe et al. 1987). Correlations of poor survival in fish eggs with elevated concentrations of PCB have been noted in several aquatic systems, indicating that embryo toxicity may represent a sensitive endpoint for assessing PCB related effects (Harris et al. 1994).

Teratogenic effects of mercury in fish have also been reported. Exposure of fish embryos to mercury contaminated waters is somewhat inhibited by chorion of the egg (Weis and Weis 1991). However, adverse effects have been noted as a result of exposure to waterborne mercury at a concentration range of 0.2 to 100 ug/L (Wiener and Spry 1994) (Table 30; Appendix J).

14.1 Methods

The methods are described in detail by Cooper et al. (1991). Briefly, Japanese medaka (*Oryzias latipes*) stock were obtained from Carolina Biological Supply (Burlington, NC) and maintained in a flow through activated carbon water filtering system. Eggs were collected from females on 17 August 1995, and each egg was separated and examined for fertilization and stage of development. Each egg was then placed in a Teflon-capped glass vial containing 1 mL of rearing solution (NaCl, 10 percent (w/v), 1 mL: KCl, 0.3 percent, 1 mL:$CaCl\,2H_2O$, 0.4 percent, 1 mL, $MgSO\ 7H_2O$, 1.63 percent, 1 mL; H_2O, 95 mL) and test solution (LCP site and reference sediment) at a concentration of 10 mg sediment/mL. Each embryo was stored at 20°C and examined daily for occurrence of lesions. Stages of development were scored for each embryo and survival was determined at three days post hatch. A total of 36 endpoints were scored in addition to survival

14.2 Results

No lesions, mortality or delay in development were observed in the control (rearing solution). One minor reversible lesion (head hemorrhage/congestion) was noted in the reference sample. No mortality was observed in the reference sediment, however delayed hatching was shown although all embryos hatched. Location 17-18 displayed the most severe effects, with 10 percent mortality and a total of seven lesions. The major lesions consisted of heart edema, low blood flow, tail abnormalities, and yolk sphere hemorrhage. A total of six lesions were observed in embryos exposed to sediments from Location 19-20 and one embryo displayed a total of five lesions, that ultimately resulted in death. Location 10-11 displayed similar results with a total of six lesions observed, resulting in the death of one embryo. Location 36 was the only sample from the LCP site that did not display mortality, although it did display lesions (Table 30)

14.3 Discussion

The lesions observed are consistent with lesions known to be associated with dioxins, furans, and PCBs

These lesions could also be associated with mercury exposure since common types of lesions include craniofacial (cyclopia, fusion of eyes), cardiovascular, and skeletal flexures in fish exposed to mercury in the aquatic environment (Weis and Weis 1991). Harris et al. (1994) found slowing of the blood flow in caudal vein, tube heart formation, and various hemorrhage lead to necrosis and death; these lesions were identical to those seen in embryos exposed to various concentrations of TCDD and PCB congener 126. PCB congeners 81, 77 and 126 have also been shown to be embryotoxic in medaka (Harris et al. 1994). The pattern of the lesions and similarity with other reported lesion types strongly indicate a toxic response to planar halogenated aromatic hydrocarbons (Harris et al. 1994; Wisk and Cooper 1990; Cooper et al. 1991).

Cumulative mortalities have been shown to increase around the time of hatching and continue through the absorption of the yolk, indicating that these mortalities are associated with the uptake of the lipophilic compounds in the embryo during yolk absorption (Harris et al. 1994). The present study did not indicate this type of effect but sample sizes were small and mortality remained fairly low. However, the effect described by Harris et al. (1994) may be more pronounced in extracts compared with the solid phase method employed here.

15.0 FIDDLER CRAB BODY BURDEN EVALUATION

15.1 Fiddler Crab Body Burden Materials and Methods

Fiddler crabs (*Uca sp.*) were collected from several of the same locations as those utilized for the benthic macroinvertebrate and toxicity assay sampling. Samples from each location were placed in 32- ounce glass jars and placed on ice. Organisms were pooled from each location to provide sufficient mass for analysis (Tables 31-36; Appendices E, F, and G).

15.2 Fiddler Crab Body Burden Results and Discussion

Mercury concentrations for fiddler crab collected in May 1995 were elevated at the outfall with a mean concentration of 2.6 mg/kg (range 1.5 - 4.1 mg/kg dry weight). A gradient of Hg away from the site was observed in fiddler crabs utilizing the areas selected. Fiddler crabs from Location 19-20 contained a mean concentration of 2.8 mg/kg (dry wt.). Location 17-18 displayed a mean Hg concentration of 2.0 mg/kg, whereas the next location down gradient (Location 10-11) had a mean Hg concentration of 0.7 mg/kg. Mean Hg in fiddler crabs was found to be 0.05 mg/kg at the reference location. Fiddler crab tissue burdens positively correlated with sediment Hg concentration from each location (r=0.78).

Fiddler crabs were also collected in October 1995 from Locations 19-20 and 17-18, and a location on the Little Satilla. A statistical comparison of the whole body concentrations of fiddler crabs collected at Location 17-18 in May 1995 and October 1995 demonstrated that there was no seasonal difference in the body concentrations of PCBs.

In the May 1995 samples, PCB 1268 concentrations were found to positively correlate with tissue burdens in *Uca* sp (r=1.0). Concentrations of PCB were highest at the outfall (mean 43 mg/kg) and became successively lower with distance from the outfall (Location 19-20 mean PCB concentration 68 mg/kg; Location 17-18 mean PCB concentration 40 mg/kg; Location 10-11 mean PCB tissue concentration 4.9 mg/kg). The reference location displayed a mean PCB tissue concentration of 0.08 mg/kg. Lipid normalized PCB concentrations are also presented in Tables 31 and 34.

15.2.1 Lipids

As can be seen in Tables 31-33, the fiddler crab percent whole body lipid content decreased dramatically in May 1995 at Locations 35 (outfall), 19-20, and 17-18. Based on the lipid values there is a 36 to 45 percent reduction in the whole body lipid content of the fiddler crabs at the

most highly contaminated areas.

Evaluations were made for other species analyzed. However, the fiddler crabs were the only organisms to demonstrate a reduction in body lipid content.

Lipids are important sources of energy and structural components in many vertebrate and invertebrate species. Studies examining changes in lipid concentrations in response to environmental pollutants found that lipid content and synthesis was negatively impacted by varying levels of contaminants (Cunningham and Williams, 1972; Kawai et al., 1988; Tulasi et al., 1992). Lipid content is known to change during maturation of the fiddler crab (Mourente et al., 1994), All collected crabs were males and of similar size, so as to minimize natural variations between individuals.

As noted above, it was found that fiddler crabs collected in highly contaminated areas had reduced percent whole body lipid content compared to areas of lesser contamination. A similar study found a significant reduction in lipid content in relation to the application of the mosquito pesticide, fenthion (McKenney et al., 1996).

It is possible that these reductions in lipid content may have sub-lethal effects on crab populations such as reduced fecundity, behavioral disadvantages, reduced growth and maintenance problems. Most studies examining lipid composition have concentrated on reductions of lipids within specific organs but few have addressed potential energetic costs associated with these reductions. Lead accumulation in a freshwater fish was found to significantly decrease lipid metabolism (Tulasi et al., 1992) and it was hypothesized that lead accumulation may therefore decrease fish fecundity as lipids are known to play an important role in teleost reproduction. Studies on the effects of trichlorobenzene, a lipophilic organochlorine, on the lipid composition of diatoms found that cell counts and chlorophyll a concentration were greatly reduced after several days of exposure thereby potentially decreasing photosynthetic rates (Sicko-Goad and Andresen, 1993). While variables, such as age, sex and weight (Larsson et al., 1993; Mourente et al., 1994), must be considered when assessing the effects of decreased lipid content on the overall health of an organism such as fish or fiddler crabs, it appears that decreased lipid composition may cause sub-lethal effects on various physiological functions of a given organism

16.0 BLUE CRAB BODY BURDEN EVALUATION

16.1 Blue Crab Body Burden Materials and Methods

Blue crab *(Calinectes sapidus)* were collected from the site (Purvis Creek up- and downstream of the site and the Turtle River) and reference area using 10- and 13-foot otter trawls. Crabs were collected by deploying and towing the trawls from the vessel stern at slow speed. Typical trawls were approximately 10 minutes in duration and from several hundred to several thousand feet in length. The collected blue crabs were retained in 5-gallon plastic buckets filled with site water. The blue crabs were transferred to 48-quart coolers and depurated for 24 hours prior to processing. The depuration coolers were lined with galvanized 0.25-inch mesh and elevated approximately 1 inch above the bottom to prevent the specimens from coming in contact with fecal material. The chambers were filled with approximately 6 inches of water collected from the reference area and were secured in the air-conditioned trailer on-site.

Following depuration, the blue crabs were sacrificed, weighed, dissected, and separated into edible and inedible samples. The edible sample consisted of muscle tissue removed from the lateral portions of the crab, and the inedible sample consisted of the remaining carcass. The edible portion of the crab was separated from the carcass by hand and by using a disposable scalpel and forceps. Each individual sample was weighed to the nearest 0.01 gram and transferred into appropriate sample containers. The

edible portion was wrapped in aluminum foil and labeled with the sample location, date, and requested analyses using a permanent marker. The foil package was then placed in a resealable plastic bag. The inedible portion was either wrapped in aluminum foil and resealable plastic bags as described previously, or placed into a wide-mouth glass jar labeled with the sample location, date, and requested analyses using a permanent marker. The samples were placed on wet ice, and shipped by overnight carrier directly to the REAC Biology Laboratory in Edison, New Jersey. Prior to analysis, the samples were homogenized and aliquots of the homogenate were withdrawn for subsequent analytical determinations.

16.2 Blue Crab Body Burden Results and Discussion

Blue crab were collected from four locations in May 1995 and analyzed for Hg, PCBs (specifically Aroclor 1268), percent lipids, and percent moisture (Tables 37 - 40)). Seven blue crabs were collected from Purvis Creek upstream of the outfall canal, Purvis Creek downstream of the outfall canal, and from the Turtle River downstream of Purvis Creek. Nine blue crabs were collected from the reference area.

The mean Hg concentration (in mg/kg, dry weight) in edible tissue for crabs collected from the reference area was 0.4 mg/kg; from Purvis Creek upstream of the site was 7.1 mg/kg; from Purvis Creek downstream of the site was 10.1 mg/kg; and from the Turtle River was 1.2 mg/kg. This indicates that the Hg contamination in the edible tissue of blue crab was highest downstream of the site. The same trend was noted with the concentration of Hg found in inedible tissue (the remaining carcass). The lowest concentration was detected at the reference area (0.1 mg/kg) and the highest concentration was detected in Purvis Creek, downstream of the outfall canal (2.4 mg/kg). Whole body concentrations were calculated for each crab. The mean whole body concentration of Hg was lowest at the reference area and highest in the Purvis Creek, downstream of the outfall canal.

The mean PCB concentration (in mg/kg, dry weight) in edible tissue for crabs collected from the reference area was 0.2 mg/kg; from Purvis Creek upstream of the outfall canal was 2.0 mg/kg; from Purvis Creek downstream of the outfall canal was 1.6 mg/kg; and from the Turtle River was below the detection limit. This indicates that the PCB contamination in the blue crab edible tissue was highest directly downstream of the site. The same trend was noted with the concentration of PCBs found in inedible tissue. The lowest concentration of PCBs was detected at the reference area (0.2 mg/kg) and the highest concentration was detected in Purvis Creek, downstream of the outfall canal (2.4 mg/kg). A whole body PCB concentration was calculated for each crab. The highest whole body PCB concentration was noted in Purvis Creek, upstream of the site (4.9 mg/kg). This indicates that blue crab may move with the tides, resulting in crabs with a higher concentration of PCBs located upstream of the site.

The same general trends in concentrations were noted when the results were normalized for percent lipids (PCB results) or converted to wet weight. The highest body burden results were detected in the tissue samples collected in Purvis Creek downstream of the outfall canal, and the lowest concentrations were detected in the blue crab collected from the reference area. Blue crab results are presented in Tables 37-40 and Appendices E and G.

In addition, blue crab were collected in October 1995 and analyzed for whole-body mercury and PCBs (Table 41). For this collection, the reference samples were collected from the Little Satilla River. The concentration of mercury from the reference area (Little Satilla River, 0.14 mg/kg) is similar to the estimated whole-body concentration for blue crab collected from Troup Creek in May 1995 (0.1 mg/kg). The average Hg concentration in blue crab from Purvis Creek, downstream from the outfall was 4.1 mg/kg, which is slightly higher than the blue crabs collected in May 1995 (2.9 mg/kg).

17.0 KILLIFISH BODY BURDEN EVALUATION

17.1 Killifish Body Burden Materials and Methods

Killifish (*Fundulus heteroclitus*) were collected using minnow traps. The minnow traps, baited with bread or pieces of blue crab, were deployed throughout numerous tidal cycles at various locations on-site and in the reference area. The traps were checked routinely, and any killifish collected were removed and transferred to a 5-gallon plastic bucket. The killifish were transported to the staging area, and the fish from the same location were placed into a 48-quart cooler with approximately 6 inches of site water. An aeration system was set up and the fish were allowed to depurate overnight. The following day, the fish were measured (total length) and weighed to the nearest 0.01 gram. Medium-sized males were selected for analysis. Because approximately 30 g of tissue were required for analysis, fish were composited. Usually five to seven fish were required to create a 30 g composite. The fish were wrapped in aluminum foil, placed into a ziplock bag, and frozen. The fish were shipped to the REAC Biological Laboratory, Edison, NJ for homogenization. An aliquot of the homogenate was removed for Hg, PCB, percent moisture, and percent lipid analysis.

17.2 Killifish Body Burden Results and Discussion

In July 1995, killifish were collected from four locations as follows: reference area, the outfall (35), the confluence of the outfall canal and the drainage ditch (71), and Location 43. The whole body concentration of Hg was the highest at the outfall (mean of 3.4 mg/kg, dry weight [0.71 mg/kg, wet weight]), followed by Location 71 (2.4 mg/kg dry weight [0.61 mg/kg, wet weight]), Location 43 (1.0 mg/kg [0.24 mg/kg, wet weight) and the reference area (0.1 mg/kg dry weight [0.023 mg/kg, wet weight]) (Table 42).

Several studies were located which compared Hg body burden concentrations to an effect. Mortality, decreased appetite and decreased activity were observed in rainbow trout (*Salmo gairdneri*) displaying whole body Hg concentrations of 4 to 27 mg/kg, wet weight (Matida et al. 1971). No adverse effect was seen in brook trout (*Salvelinus fontinalis*) with whole body Hg concentrations of 3 mg/kg wet weight. However, the same species displayed increased mortality, deformities and decreased growth at 5 to 7 mg/kg wet weight, and at 24 mg/kg mortality, loss of appetite, and muscle spasms were observed (McKim et al. 1976). The concentration of Hg in killifish collected at the LCP site are lower than the results eliciting a response in the above studies.

The concentrations of PCBs followed the same trend. The whole body concentration of PCBs in killifish was highest at the outfall (mean of 96.02 mg/kg, dry weight [20.1 mg/kg, wet weight]), followed by Location 71 (60.5 mg/kg [15.4 mg/kg, wet weight]), Location 43 (3.8 mg/kg 0.89 mg/kg, wet weight]) and the reference area (0.09 mg/kg [0.02 mg/kg, wet weight]).

Studies were not located which determined the effects of Aroclor 1268 to killifish. However, several studies were located which determined the effects of various whole body concentrations of PCBs to fish. Hansen et al. (1971) found that 46 mg/kg of Aroclor 1254 in whole body spot caused mortality. In another study, Hansen et al. (1975) found that 200 mg/kg whole body concentration of Aroclor 1016 caused mortality in the fry of sheepshead minnows. In a study conducted by Bengtsson (1980) cyprinid minnow with 170 mg/kg Clophen A50 had an inhibition of reproductive development. The concentration of PCBs in killifish at Locations 35 (outfall) and 71 were higher than those eliciting a response in the study conducted by Hansen et al. (1971), assuming that the results presented are in a dry weight basis. However, studies by Mac and Seelye (1981) indicate that a whole body concentration of 4.5 mg/kg Aroclor 1254 in lake trout caused larval mortality.

These results indicate that the highest concentrations of site contaminants were found in fish collected adjacent to the plant outfall, with the concentrations decreasing with distance from the site. Results are presented in Table 42 and Appendix F. In addition, although the mercury concentrations may not present a problem, it appears that the concentration of PCBs in tissue may cause an effect.

18.0 MARSH PERIWINKLE BODY BURDEN EVALUATION

18.1 Marsh Periwinkle Body Burden Materials and Methods

Periwinkle were collected from several of the same locations as those utilized for the benthic macroinvertebrate and toxicity testing. Samples from each location were placed in 32 ounce glass jars and placed on ice. Organisms were pooled from each location to provide sufficient mass for analysis.

18.2 Marsh Periwinkle Body Burden Results and Discussion

Mercury in periwinkle was elevated in the more highly contaminated areas. The distribution of periwinkle was found to be uneven within the marsh. Sufficient numbers for sampling these organisms were only found in a few locations. The outfall area did not support periwinkle; therefore, Location 5, an area within the marsh adjacent to highly contaminated berm was sampled. At Location 5, the mean Hg concentrations (mean tissue concentration 26.3 mg/kg dry weight) in periwinkle were found to be slightly less than in those animals collected from Location 17-18 (mean tissue concentration 33.1 mg/kg). These areas had elevated Hg values in periwinkle when compared to the reference area (mean Hg tissue value 0.6 mg/kg). Mercury tissue concentrations in periwinkle significantly correlated with sediment concentrations at all locations (r=1.0). Mercury levels in periwinkle were similar in animals collected from both Location 5 and Location 17-18. However, the PCB 1268 levels in the same organisms were substantially different, indicating that PCBs are not as mobile in the system as Hg.

PCB 1268 concentrations in periwinkle were elevated at Location 5 (mean concentration of 52 mg/kg dry weight) and Location 17-18 (mean concentration of 4.1 mg/kg). The reference location had a mean concentration of 0.05 mg/kg. All sediment values correlated with the tissue burdens observed in the snail (r= 0.99). Results are presented in Table 43 and Appendices E.

19.0 MARSH GRASS TISSUE EVALUATION

19.1 Marsh Grass Tissue Materials and Methods

Marsh grass was collected from two on-site sampling locations (Locations 35 and 17-18) and the Troup Creek reference location. Plants were collected from the intertidal area during low tide. The aboveground portion of the plant (from the immediate vicinity of the sediment sampling location) was collected by cutting the stems at the sediment surface with a decontaminated knife. The stems were gently rinsed in water from the sampling location to remove loosely adhering sediment particles and to simulate an emersion at high tide. The plants were placed in a plastic bucket and transported to the staging area where they were cut into 6-inch lengths using disposable scalpels and packaged in resealable plastic bags. The samples were placed on wet ice, and shipped by overnight carrier directly to the REAC Biology Laboratory in Edison, New Jersey. Prior to analysis, the entire sample was homogenized; aliquots of the homogenate were withdrawn for subsequent analytical determinations.

19.2 Marsh Grass Tissue Results and Discussion

In May 1995, the aboveground portions of the plants were analyzed for Hg, PCBs (Aroclor 1268), percent moisture, and percent lipids (Table 44). The highest concentration of Hg was detected in marsh grass collected at Location 35 (near the outfall) at 9.5 mg/kg, dry weight. The plants collected at Location 17-18 contained 1.8 mg/kg Hg. Mercury was not detected above the detection limit in the plants collected from the reference area.

PCBs were also detected in marsh grass samples collected from the marsh. The highest concentrations of PCBs were detected at Location 35 at 19 mg/kg, dry weight. The plants collected at Location 17-18 contained 3.3 mg/kg PCBs. The plants collected from the reference area contained 0.021J mg/kg PCBs.

Additional marsh grass samples were collected in July 1995 (Table 45). These samples were analyzed

for Hg, Aroclor 1268, percent moisture, and percent lipids. The average biomass was also determined for the masrsh grass (Table 46). Mercury (4.23 mg/kg, dry weight) and Aroclor 1268 (4.53 mg/kg, dry weight) were highest at Location Well M1. Mercury in the reference samples was below the method detection limit in the 3 replicates, and Aroclor 1268 was below the method detection limit in 2 out of the 3 replicates. Marsh grass was also collected in October 1995 from a different reference area (Little Satilla River)(Table 46). Mercury was below the detection limit in all replicates; Aroclor 1268 was detected in all replicates at low levels.

Mercury and PCBs were detected in marsh grass samples collected from the marsh adjacent to the outfall Because the plants were gently rinsed, most of the contaminants are probably adhered to the outside of the stem (rather than accumulated into the stem tissue). Mercury was not detected on marsh grass samples collected from reference area, and PCBs were detected slightly above the detection limit at the reference area.

20.0 DIAMONDBACK TERRAPIN TISSUE EVALUATION

Diamondback terrapins were collected throughout the marsh system as part of the ecological assessment at the LCP Site. Their use was two-fold; 1) as an indicator for the bioaccumulation model, and 2) as a potential surrogate for the endangered and threatened sea turtles that utilize the site. These reptiles reproduce in the spring and summer with females producing 6-15 eggs per clutch. It is known females may oviposit several clutches/year but they may not reproduce each year.

Transgenerational adverse effects are known in reptiles from organochlorine exposures (Heinz et al. 1991, Bergeron et al. 1994; Guillette et al. 1994; Gross et al. 1995). Reproductive anomalies associated with exposure to organochlorine compounds during embryogenesis have produced young with ovotestis (ovarian and testicular tissue combined) or incomplete Mullerian duct regression or incomplete Wolffian ducts (Austin 1991; Guillette et al. 1994). The incidence of these abnormalities is not easily determined without histopathological and endocrinological data. The results are manifest when population effects are present without recruitment of reproductively viable offspring. Many adult female animals will not exhibit adverse effects as the female "purges" her body of contaminants when the eggs are oviposited.

20.1 Diamondback Terrapin Tissue Materials and Methods

Terrapins were collected throughout the marsh utilizing multiple methods. These methods include capture by hand, trawling, and fyke net. Animals captured by hand were in the process of nesting. Measurements recorded included weight, carapace length, carapace width, plastron length, and plastron width for each animal as well as sex and approximate age (annuli). Each animal was photographed prior to dissection.

Terrapins were sacrificed and processed within 24 hours of capture. Animals were sacrificed using cervical decapitation. The plastron was removed and tissues excised by surgical dissection. Blood was collected from the turtles at the time of sacrifice and placed in vacutainers with lithium heparin, and centrifuged at 2,000 g for five minutes. Plasma was drawn off and frozen (-10 °C) for later analysis. The plasma was analyzed for total protein, albumin, alkaline phosphatase, serum glutamine plasma transferase using a Kodak DT60, and DTSC analyzer using dry chemical analysis techniques. All tests were done using colorimetric test methodology. Total protein was measured using the biuret method and albumin measured using the bromo-cresol green reaction method. Two of the plasma samples appeared to have a high icterus index and another sample was hemolyzed. Hemolysis is known to interfere with some colorimetric tests, and the sample exhibiting hemolysis was not included in any results. Icterus is an indicator of liver stress.

Liver, brain, and gonadal tissues were excised from each animal and submitted for chemical analysis. The reproductive status of each female was evaluated and eggs if present were retained for separate Hg and

PCB analysis.

Small sections of liver, brain, and gonadal tissue were removed for histopathological examination and immediately placed in Bouin's fixative for approximately 24 hours. After fixation, tissues were rinsed with several washes of 10 percent neutral buffered formalin (NBF) to remove excess fixative, and then stored in 10 percent NBF until processed.

Tissues were embedded in paraffin and serially sectioned at 3 to 5 microns. Liver and gonadal tissues were stained with eosin and counter stained with hematoxylin. Brain tissues were stained using the Luxol Fast Blue process. Slides were then scanned for pathological abnormalities.

In utero eggs from two females were collected (during processing) for artificial incubation. The eggs from these females appeared to be fully shelled and it was estimated oviposition would have occurred less than 24 hours from time of capture. In fact, one female was collected just prior to nest excavation and the other was traversing an upland area, en route to a suitable nesting location. Eggs obtained from the females were maintained within their clutch and placed in a clean artificial incubation medium. They were incubated at 30 °C, the temperature known to produce optimum hatchability (Seigel 1984). After 57 days one clutch hatched and the subsequent hatchlings were submitted for chemical analysis.

20.2 Diamondback Terrapin Tissue Results and Discussion

20.2.1 Gross Observations and Morphometrics

Five turtles were collected in May 1995 (Table 47) and three turtles were collected in July 1995 (Tables 48 and 49). Females were actively nesting during this period. Adult terrapins displayed well-worn plastrons and carapaces; an exact age could not be determined for some turtles. Sex was initially determined externally and confirmed during internal examination.

Females appeared reproductively active with hypertrophied oviducts and ovaries containing vitellogenic follicles (1°, 2° and 3°). *Corpora lutea* and *corpora hemorrhagica* also were observed in the ovaries. The livers were mottled and showed indications of vitellogenesis.

Fiddler crabs and marsh periwinkle were found in the gut of the terrapins examined. Accurate weights of gut contents could be obtained for three animals and were 3.5 g, 7.7 g and 11.8 g. The relative percentages of each species could not be quantified. One female (DD-1) displayed evidence of wasting. Little to no body fat was observed in this animal and the gut was empty upon examination.

Adult terrapins exhibit sexual dimorphism, mature females displaying carapace lengths of 15 to 23 centimeters (cm) while mature males have carapace lengths of 10 to 14 cm (Palmer and Cordes 1988). Terrapins collected from the LCP site displayed carapace lengths ranging from 12.2 to 18.8 cm in females and from 11.4 to 12.2 cm in males. Seigel (1984) reported females reached sexual maturity at plastron lengths of 13.5 to 14.0 cm while males reach maturity at plastron lengths of 9.0 to 9.5 cm. All animals collected displayed plastron lengths above those reported for mature males and females except female DD-4 (13.1 cm). However, female DD-4 was sexually mature and produced five eggs that were submitted for chemical analysis. An average body weight of 143 g was reported for individuals with an average plastron length of 89.6 mm (Allen and Littleford 1955). The mean weight for mature females was 712.6 g $\pm$ 135 g (n=9) with a range of 533 to 903 g while the mean weight of mature males was 229.1 g $\pm$ 40.1 g (n=8) with a range of 138 to 264 g.

Growth rates were determined for the animals that could be successfully aged. In those animals aged in a range, the younger age was selected for the calculation to allow for a consistent growth

approximation. All animals collected were within the range considered sexually mature so variations in growth typically observed in immature animals were not an issue (Albers et al 1986). Differences in growth rates between males and females is common given the size sexual dimorphism. Albers et al. (1986) found statistically significant difference between mean growth rates of diamondback terrapin females (2.36 cm/yr) and males (2.22 cm/yr). Mean growth rate observed in female terrapins collected from the site was 2.1 cm/year (n=7), while mean growth rate for males was 1.5 cm/year (n=5).

Mean egg weight was 10.0 g (n=12). One (DD-2) of the two nests incubated hatched in 57 days. Mean hatchling weight was 8.6 g (n=5). These hatchlings were submitted for analyses the day of hatching. The other incubated nest failed to produce hatchlings. The eggs appeared to have died at mid to late embryonic development; however, they were not specifically aged by Zehr stage. These eggs were submitted for residue analysis.

Specific plasma clinical chemistry tests were conducted on the 8 diamondback terrapins from the vicinity of the LCP site. The values for the turtles are indicative of stressors affecting liver enzyme activity and immunological functions. Turtles from the outfall pond and drainage ditch show moderate increases in liver activity with a range of alanine aminotransferase (SGPT) of 11 to 255 g/dl. The elevated alkaline phosphatase (ALKP) values suggest that metabolism has increased in response to stressors (Turtle River samples). High globulin values are indicative of immune response to stressors, including exposure to adverse conditions such as dietary, infectious and reproductive constraints. These responses to environmental stressors can be exacerbated by physiological impairment from xenobiotic agents. The total protein, albumin, globulin data are not remarkable except for two of the twelve samples. One sample could not be validated due to hemolysis.

The analyses, if evaluated with body burdens, show strong circumstantial evidence that the terrapins have been impacted by environmental stressors.

20.2.2 Terrapin Tissue Burdens

Carcass, liver, eggs, and hatchlings were analyzed for PCBs and Hg. All values are reported in dry weight except brain analysis that was reported in wet weight. Aroclor 1268 was detected in carcasses at concentrations ranging from 1.7 mg/kg to 620 mg/kg, while liver concentrations ranged from 12.0 mg/kg to 3500 mg/kg. Mercury was detected in carcasses at concentrations ranging from 1.8 mg/kg to 15 mg/kg, and in liver at concentrations ranging from 11 mg/kg to 330 mg/kg.

Eggs taken from female BD-1 with elevated PCB-1268 (liver 59 mg/kg, carcass 15 mg/kg) and Hg (liver 330 mg/kg, carcass 8 mg/kg) resulted in mean egg PCB and Hg concentrations of 29.7 mg/kg and 0.87 mg/kg, respectively. Eggs taken from female DD-4 with elevated PCB (liver 64 mg/kg, carcass 16 mg/kg) and Hg (liver 98 mg/kg, carcass 7.6 mg/kg) values, with mean egg PCB and Hg concentrations of 28.6 mg/kg dry weight and 2.2 mg/kg dry weight, respectively. The last female, DD-5 also displayed elevated PCB (liver 3500 mg/kg, carcass 620 mg/kg) and Hg (liver 180 mg/kg, carcass 15 mg/kg) and mean egg PCB and Hg concentrations of 477 mg/kg and 4.5 mg/kg, respectively. Eggs from DD-4 did not hatch. These eggs had the highest levels of PCBs and Hg (PCB $\bar{x}$ = 28.6 ug/kg Hg $\bar{x}$ = 2220.0 ug/kg) of the clutches and hatchlings examined.

Hatchlings had a mean concentration of 12.6 mg/kg dry weight Aroclor 1268 and 2.1 mg/kg dry weight Hg and the associated female had an Aroclor 1268 concentration of 12.0 mg/kg in the liver (1.7 mg/kg carcass) and Hg values of 1.8 mg/kg in the carcass and 14.0 mg/kg in the liver. A positive relationship was noted between the PCB concentration in reproductively active

female and the corresponding eggs and hatchlings (r = 0.999, N = 4, df = 2). This positive relationship indicates that there is a transfer of PCBs from the female to the developing embryos during reproductive activities. The low Hg and PCB content of the eggshell indicates the contaminants were transferred through folliculogenesis when yolk proteins and lipids were incorporated into the 1° follicles.

The relationship for Hg between the female and the corresponding eggs and hatchlings was not as dramatic (r = 0.688, N = 4, df = 2) but showed the positive relationship for contaminant uptake and the transfer of Hg to the developing embryo.

Reproductively active females showed a strong positive correlation between the total body burden of Hg and PCBs (r = 0.863, N = 4, df = 2). This correlation was also noted within the eggs and hatchlings (r = 0.914, N = 4, df = 2). These results indicate transgenerational transport of contaminants, specifically Hg and PCBs, is occurring at this site. Since these are a long-lived species, the females may remain reproductively active for several decades. The female can mobilize lipid reserves, incorporate these lipids into follicles and thereby transferring contaminants from the female to the offspring. During this study, the eggs that contained the highest levels of contaminants did not hatch. In addition, offspring from eggs that did hatch died relatively early during their development. This suggests that a mortality threshold had been surpassed by some of the offspring. Populational data will be necessary to determine if there are differences in survival, reproduction and use of this area due to the contaminants.

Given the small sample mass, brain Hg levels were determined in a subset of the animals collected. Concentrations were determined on a wet weight basis due to mass requirements. Concentrations of Hg in the brain of the terrapins collected ranged from 0.36 mg/kg to 3.0 mg/kg wet weight.

Terrapins DD-5 (liver and carcass), DD-6 carcass (which included the liver), and BD-1 (liver and carcass) were analyzed for organomercury compounds (Tables 72 and 73). The carcass of DD-5 displayed 0.005 mg/kg dry weight MeHg and 15 mg/kg dry weight total Hg. The DD-5 liver was found to have 0.02 mg/kg dry weight MeHg and 180 mg/kg dry weight total mercury. Terrapin DD-6 had 0.006 mg/kg dry weight of MeHg and 12 mg/kg dry weight total mercury. The carcass of terrapin BD-1 contained 4.4 mg/kg dry weight MeHg and a total Hg concentration of 8 mg/kg dry weight. The liver contained 9.6 mg/kg dry weight MeHg and 330 mg/kg dry weight total mercury. No dimethylmercury or ethylmercury was detected in these samples.

Although sample sizes were small, contaminant levels of PCBs in terrapin eggs from three females were correlated with their body burden (r= 0.999). PCB concentrations in eggs are indicative of maternal transfer of these lipophilic compounds. Egg Hg levels also were positively correlated with the female body burden (r=0.673).

Bryan et al. (1987) analyzed eggs of common snapping turtles (*Chelydra serpentina serpentina*) for PCBs from a contaminated site. Yolks and albumen were analyzed separately for two eggs. Yolk concentrations were 1.8 mg/kg and 2.9 mg/kg. Albumen and shells were analyzed together and concentrations of 0.12 mg/kg and 0.62 mg/kg, respectively, were detected.

Snapping turtles from Hudson Bay, NY (with high levels of PCB contamination) were found to have levels ranging from 306 to 7,990 mg/kg PCB (mean = 3,047 mg/kg, n=12, 2 pooled) in their fat (Stone et al. 1980). In other areas of New York, snapping turtles had concentrations in fat ranging from 0.4 to 2281 mg/kg (mean = 481 mg/kg, n=10) (Olafson et al. 1983). Albers et al. (1986) reported a mean PCB level in snapping turtles of 39 mg/kg in Maryland and 138

mg/kg in urban New Jersey. Bryan et al. (1987) compared the residues in snapping turtles from both a highly contaminated area and an area of low pollution. Mean PCB levels observed in the liver of these animals were 72 mg/kg in the contaminated area and 1.0 mg/kg in the low pollution area (Bryan et al. 1987).

Duguy et al. (1980) identified PCB and DDE in the tissues of the leatherback sea turtle (*Deirochelys coreacia*) in increasing amounts in the muscle, kidney, liver, and fat, which also corresponded to the lipid levels in those tissues. This was further demonstrated by Bryan et al. (1987) in snapping turtles, where lipoprotein solubility of the PCBs in specific tissues greatly affected tissue burdens. Bryan et al. (1987) hypothesized that disposition of PCBs into fat tissues reduced the toxic effects for the turtle. However, the sublethal effects of PCBs would not be reduced with metabolism of lipid reserves during periods of high activity or low food availability. Moreover, the transgenerational effects of endocrine disrupting effects would be amplified by mobilization of lipids during folliculogenesis, when vitellogenin and other yolk proteins are being incorporated into the follicles. The storage of the contaminants within the fat reservoirs would promote the incorporation of those lipophilic products into the yolk and facultatively enhance endocrine disruption impacts during embryogenesis.

Many reptiles exhibit environmental sex determination (ESD) where incubation temperatures within a given range will define the gender of the hatchling (Bull and Ferguson 1979; Ferguson 1981). Therefore, estrogenic or androgenic effects can be determined experimentally with relative ease. Bergeron et al. (1994) linked two PCB compounds with significant estrogenic effects in red-eared sliders (*Trachemys scripta*). Eggs were "spotted" (placement of a solution on the egg shell) with low (0.88 mg/kg) or high (8.8 mg/kg) doses of PCB compounds, which resulted in a significant increase in sex reversal at the high dose (Bergeron et al. 1994). It was found that 2',4',6'-trichloro-4-biphenylol produced hatchlings with female gonads and oviducts in 100 percent of the treated eggs, while 2',3'-4',5'-tetrachloro-4-biphenylol produced hatchlings with female gonads (50 percent of hatchlings) and oviducts (71 percent of hatchlings)(Bergeron et al. 1994) when incubated at male producing temperatures. Other PCB compounds produced non-significant changes in sex of hatchlings.

Bishop et al. (1991) found a cause-effect relationship between concentrations of organochlorine contaminants and deformities in eggs of the common snapping turtle (*Chelydra s. serpentina*) in the Great Lakes region. Eggs from a contaminated site contained a mean PCB concentration of 2.7 mg/kg, wet weight as compared with a reference location with mean PCB levels of 0.076 mg/kg (Bishop et al. 1991). During the five years of study, 30.5 percent of eggs at a contaminated site produced hatchlings or embryos with deformities as compared with 2.2 percent at the reference location (Bishop et al. 1991). Regression analyses show that 2,3,3',4,4'-pentachlorobiphenyl was most strongly correlated with deformities (Bishop et al. 1991).

Male Caspian terrapins (*Mauremys caspica rivulata*) collected from a polluted area were administered six treatments of 125 ppm of Aroclor 1254 in soybean oil for a period of three weeks (Yawetz et al. 1983). This dose resulted in a 30-fold increase of liver PCB levels, but no changes in the content or activity of cytochrome P-450. Yawetz et al. (1983) speculated that despite the high dose, the specimens may have developed a tolerance to contaminants from living in a polluted environment.

Although sample sizes were small, contaminant levels of Hg in terrapin eggs from three females were not found to be correlated. Mercury concentrations in eggs from the LCP site ranged from 0.70 mg/kg to 5.5 mg/kg, dry weight. Loggerhead turtle yolks from Georgia and South Carolina displayed Hg levels ranging from 0.02 to 0.09 mg/kg while the albumen ranged from 0.1 to 0.3 mg/kg (Hillestad et al. 1974).

Methylmercury is known to concentrate intensely in the albumen of bird eggs, while other mercurials accumulate in the yolk (Cheville 1983).

The liver was found to contain the highest Hg concentrations in the leatherback turtle compared with the other tissues analyzed (Davenport and Wrench 1990).

Although the data on Hg levels in turtles is sparse, the concentrations found in the LCP site terrapins are elevated. Two diamondback terrapins collected by Galluzzi (1981) near a highly contaminated Hg site at the Meadowlands in New Jersey contained Hg levels of 3.6 mg/kg and 7.6 mg/kg Hg in liver and 1.1 mg/kg and 2.4 mg/kg in the kidneys. Terrapin DD-5 collected from the drainage ditch adjacent to the LCP site contained the maximum liver Hg value of 180 mg/kg dry weight.

Juvenile alligators were exposed to a single dose of 5 mg/kg bodyweight methylmercuric chloride by gavage (Peters 1983) to evaluate Hg accumulation in alligator tissue. Animals were sacrificed after 13 weeks, and significant accumulation of Hg was noted. The highest Hg concentration was noted in gonadal tissue. No clinical or gross pathological effects were observed, however histopathological analysis was not conducted. In addition, Schwarz and Flamenbaum (1976) found altered ion transport in the urinary bladder in *Pseudemys scripta* exposed to mercuric chloride. Results from the terrapin analysis are presented in Tables 59-63.

20.2.3 Terrapin Histopathology

Specific toxicity or a specific uniform degeneration in the tissue was not identified. Evidence of a slight freezing artifact was noted. Tissue was found to be appropriately preserved. Mild autolysis was noted in many of the samples. Several of the liver sections demonstrated a mild hepatocellular vacuolization. No liver necrosis, liver fibrosis, fatty change, or ovarian atresia, characteristic of PCB toxicity were observed. Likewise, no hepatic hydropic degeneration or myelin sheath and axonal degeneration, characteristic of Hg toxicity were observed. Normal myelin layering was demonstrated in brain sections analyzed.

The histopathology did not display any degeneration or abnormality known to be associated with the contaminants of concern. Sample sizes were small and no conclusive judgement regarding the status of the population can be inferred from the information. Several terrapin liver samples did indicate vacuolization; however, the staining procedure utilized did not allow for a conclusive determination of the hepatic fatty change. In comparison, hepatic fatty change was found in the fish, spot (*Leiostomus xanthurus*) exposed to 5.0 ppb of Aroclor 1254 for two weeks (Nimmo et al. 1975). Subsequent samples were to be submitted for analysis using a specialized staining process (Oil-Red-O) to further confirm this histopathologically. Histology assessments are located in Appendix K.

21.0 CLAPPER RAIL TISSUE EVALUATION

21.1 Clapper Rail Tissue Materials and Methods

In July 1995, seven clapper rail were collected from the south marsh; in August 1995, seven clapper rail were collected from the reference area. The birds were placed into ziplock bags and held on wet ice until processing. The birds were returned to the staging area for processing and physical measurements were made on each bird. Total length, extent, wing length, tail length, bill length, tarsi length, and total length were recorded for each bird. The birds collected in July 1995 were processed at the site, and the birds collected in August 1995 were sent to the REAC Biological Laboratory, Edison, NJ for processing. Following these measurements, the brain was removed whole and placed into a vial containing Bouin's solution.

Feathers were removed from the body until an approximately 15 g (wet weight) sample was established. The feathers were wrapped in aluminum foil and placed in a ziplock bag. The animal was then dissected and a section of breast muscle removed, weighed to the nearest 0.01 g, wrapped in aluminum foil, and placed in a ziplock bag. Then the liver was removed, weighed, and a small section was dissected and placed in Bouin's solution for histopathological analysis. The remaining carcass was weighed, wrapped in aluminum foil, and placed in a ziplock bag.

Small sections of liver and brain were removed and immediately placed in Bouin's solution for histopathological examination. After fixation, tissues were rinsed with several washes of 10 percent NBF until excess fixative was removed. They were then stored in 10 percent NBF until processing.

Tissue was embedded in paraffin and sectioned at 3-5 microns. Liver and brain were stained with hematoxylin and eosin while most brain tissue was also stained using the Luxol Fast Blue process. Slides were then scanned for pathological abnormalities. It should be noted that the examination of tissue for histopathological evaluation is not correlated to a specific exposure level, but rather indicates an overall exposure to contaminants within the marsh.

21.2 Clapper Rail Tissue Results and Discussion

The clapper rail collected from the site and from the reference area were similar sized. The rail collected from the site averaged 276.6 g wet weight (±24.9 g) , while the rail collected from the reference area averaged 244.3 g (±35.3 g). The average total length of the rails collected on site was 369.7 mm (±7.3 mm) while the average total length of the rails collected from reference area was 362.6 mm (±21.6 mm). The breast muscle, carcass, feathers, and the liver were analyzed for Hg and the breast muscle, carcass, and liver were analyzed for PCBs. The breast muscle, carcass, and liver were also analyzed for percent moisture and percent lipids.

Mercury was detected in every tissue sample from the birds collected from the site as well as those collected from the reference area. The mean Hg concentration in the breast muscle from the birds collected from the site was 5.1 mg/kg, dry weight (1.25 mg/kg wet weight). The mean Hg concentration in the remainder of the carcass was 5.08 mg/kg dry weight (1.25 mg/kg wet weight); the mean Hg concentration in the liver was 15.6 mg/kg dry weight (3.84 mg/kg wet weight); and the Hg in the feathers was 11.25 mg/kg, dry weight. The results for the Hg concentration found in the feathers is reported on an "as received basis" since the limited sample size did not allow for the determination of percent moisture. These Hg concentrations detected in the clapper rail collected from the site were higher than the levels found in the birds collected from the reference area. The mean concentration of Hg in the breast muscle for rail collected from the reference area is 1.60 mg/kg, dry weight (0.39 mg/kg wet weight). The remainder of the carcass contained 1.08 mg/kg Hg (0.27 mg/kg wet weight); the liver contained 3.47 mg/kg Hg (0.85 mg/kg wet weight), and the feathers contained 3.6 mg/kg Hg, dry weight. Again, the results for the Hg concentration in feathers are reported on an "as received basis."

Based on these results, it appears that Hg is accumulating in the tissue and feathers of clapper rail collected from the site in higher levels than the birds collected from the reference area.

The breast muscle, carcass, and the liver for clapper rail collected from the marsh were analyzed for PCBs (specifically Aroclor 1268). The mean concentration of PCBs in the breast muscle was 98.2 mg/kg dry weight, the carcass was 27.82 mg/kg dry weight, and the liver was 25.2 mg/kg, dry weight. The breast muscle, carcass, and liver for clapper rail collected from the reference area were also analyzed for PCBs. The mean concentration of PCBs in the breast muscle was 0.84 mg/kg dry weight; the carcass was 1.85 mg/kg dry weight; and the liver was 0.85 mg/kg dry weight. Clapper rail collected from the reference area contained less than 1 mg/kg dry weight PCBs in any tissue except for clapper rail No. 11. This bird contained 4 mg/kg in the breast muscle, 8.8 mg/kg in the carcass, and 3.2 mg/kg in the liver. This rail may have moved between the marshes to feed, and thereby been exposed to sediment or food with

elevated levels of PCBs.

Mortality was found to be associated with liver Hg concentrations ranging from 4.6 mg/kg to 91 mg/kg, wet weight in white-tailed eagles (*Haliaetus albicilla*)(Henriksson et al. 1966; Koeman et al. 1972; Oehme 1981; Falandysz 1984; Falandysz 1986; and Falandysz et al. 1988). Captive-raised grackles (*Quiscalus quiscula*) displayed mortality at 54.5 mg/kg, wet weight in liver, whereas red-winged blackbirds displayed mortality at Hg concentrations in liver of 126.5 mg/kg, wet weight (Finley 1979). Analytical results are presented in Tables 50-55, and in Appendix G.

21.2.1 Clapper Rail Histopathology

Specific toxicity or a specific uniform degeneration in the tissue was not identified. Multifocal granulomata were present in the livers of the rails, suggesting a parasitic infiltration through the liver or a past bacterial infection. Collections of lymphocytes were present in the portal triad areas. No liver necrosis, or fatty change characteristic of PCB toxicity was observed. Likewise, no hepatic hydropic degeneration characteristic of Hg toxicity was observed. Liver fibrosis was indicated in two of the reference birds.

Tissue was found to be appropriately preserved. Mild autolysis was noted in some brain samples suggesting a mild freezing artifact. Myelin sheath and axonal degeneration, characteristic of Hg toxicity, were not observed with the exception of one bird that displayed focal areas of separation of the myelin fibers, which may be a result of degeneration or handling. Luxol fast blue stained slightly irregular in some of the birds and displayed a few enlarged structures but they could not be identified as an abnormality. Myelin staining in the brain tissue was consistent in all birds examined and it could not be determined whether the staining variation was a function of freezing artifact or the type of staining observed in these type of birds. Vascuolozation of myelin was more severe in one sample. Focal areas of status spongiosis were suggested in the cerebellum of one bird. The source of the spongiosis was not identified. Histology assessments are located in Appendix K.

22.0 BROWN SHRIMP TISSUE EVALUATION

22.1 Brown Shrimp Body Burden Materials and Methods

Brown shrimp were collected during the May sampling period in Purvis creek (upstream and downstream of the site), in the Turtle River, and at a reference area (Tables 56 - 62). In October, shrimp were again sampled at the downstream location and at another reference area (Little Satilla River)(Table 63). The shrimp were kept alive and depurated for 24 hours prior to processing. Edible and inedible portions were segregated and analyzed for mercury and PCBs separately. Samples from each location were placed in a 32-ounce jar and then placed on ice. Organisms from each location were pooled to provide adequate mass for analysis.

22.2 Brown Shrimp Body Burden Results and Discussion

Mean mercury and PCB concentrations in edible tissue ranged from 0.0 to 0.5 mg/kg and from 0.0 to 1.0 mg/kg respectively, in samples collected in May 1995. Similarly, the mean range in inedible tissue was from 0.0 to 0.4 mg/kg dry weight for mercury and from 0.1 to 4.2 mg/kg dry weight for PCBs. Estimated mean total body concentration ranged from 0.0 to 0.1 mg/kg wet weight for mercury, and from 0.0 to 0.6 mg/kg wet weight for PCBs. Concentrations were lowest in shrimp captured in the reference area and were highest in shrimp captured at the upstream Purvis Creek location for both contaminants. Similar levels of both mercury and PCBs were found in shrimp tissue during the October sampling period. Mean mercury concentrations ranged from 0.1 to 0.81 mg/kg, while mean PCB concentrations ranged from 0.1 to 1.2 mg/kg. Brown shrimp data is presented in Tables 56-62 and Appendices E and G.

23.0 GRASSHOPPER TISSUE EVALUATION

Grasshoppers were collected at three Locations: M-1, M-2, and at a reference area (Table 64). Mercury concentrations ranged from below the detection limit to 1.1 mg/kg dry weight, while PCB concentrations ranged from 0.52 to 0.76 mg/kg dry weight. Organisms were pooled together to provide adequate mass for analysis. Mercury levels were lowest in the reference area, however no reference area PCB data were available. Grasshopper data can be found in Table 64 and Appendix G.

24.0 SPOT TISSUE EVALUATION

Spot were collected from an upstream location in Purvis Creek, a downstream location, and in the Turtle River (Table 65 - 68). The fish were filleted, and the resulting tissue was submitted for chemical analysis. Mean mercury and PCB concentrations ranged from 1.0 to 1.5 mg/kg dry weight, and 1.2 to 2.8 mg/kg dry weight, respectively. Levels were highest for both contaminants in fish captured at the upstream location.

The same studies noted in the killifish evaluation were used for the comparison of tissue concentrations in spot. Several studies were located which compared Hg body burden concentrations to an effect. Mortality, decreased appetite and decreased activity were observed in rainbow trout (*Salmo gairdneri*) displaying whole body Hg concentrations of 4 to 27 mg/kg, wet weight (Matida et al. 1971). No adverse effect was seen in brook trout (*Salvelinus fontinalis*) with whole body Hg concentrations of 3 mg/kg wet weight. However, the same species displayed increased mortality, deformities and decreased growth at 5 to 7 mg/kg wet weight, and at 24 mg/kg mortality, loss of appetite, and muscle spasms were observed (McKim et al. 1976). The concentration of Hg in spot collected at the LCP site are lower than the results eliciting a response in the above studies.

Studies were not located which determined the effects of Aroclor 1268 to fish. However, several studies were located which determined the effects of various whole body concentrations of PCBs to fish. Hansen et al. (1971) found that 46 mg/kg of Aroclor 1254 in whole body spot caused mortality. In another study, Hansen et al. (1975) found that 200 mg/kg whole body concentration of Aroclor 1016 caused mortality in the fry of sheepshead minnows. In a study conducted by Bengtsson (1980) cyprinid minnow with 170 mg/kg Clophen A50 had an inhibition of reproductive development. The concentration of PCBs in killifish at Locations 35 (outfall) and 71 were higher than those eliciting a response in the study conducted by Hansen et al. (1971), assuming that the results presented are in a dry weight basis. However, studies by Mac and Seelye (1981) indicate that a whole body concentration of 4.5 mg/kg Aroclor 1254 in lake trout caused larval mortality.

It should be noted that the spot data is for filet analysis only and the above studies report effects for whole body analysis. Therefore, direct comparisons should be used with caution. However, the concentration of mercury and PCBs in spot filet were much lower than the concentrations reported in the literature which cause an adverse effect.

25.0 RAT TISSUE EVALUATION

Terrestrial trap lines were set up along the marsh/facility interface. This small mammal trapping was conducted in an attempt to directly evaluate contaminant body burdens for omnivorous mammals. Unfortunately, the trapping had very limited success. Two rats were captured and analyzed for tissue levels of mercury and PCBs. Mercury concentrations were as high as 0.1 mg/kg and PCB concentrations were as high as 0.32 mg/kg. Results of the rat analysis are further presented in Tables 69 and 70 and in Appendix G.

26.0 OVERALL ORGANOMERCURY TISSUE CONCENTRATIONS

Selected individual organisms which had been analyses for total Hg were analyzed for organomercury tissue concentrations (Tables 71 and 72). These analyses were conducted as preliminary information of the proportion of mercury chemical species in organism tissues.

Methyl, dimethyl, and diethylmercury concentrations were measured in rail, killifish, spot, diamondback

terrapinturtle, blue crab, shrimp, cord grass, fiddler crab and snail. There were no concentrations of dimethyl or diethylmercury found above the method detection limit. Methylmercury was detected at levels as high as 7.8, 2.3, 8.9, and 9.6 mg/kg dry weight in rail, killifish, spot, and turtle tissue, respectively (Tables71and72).

27.0 HAZARD QUOTIENT RESULTS

The hazard quotient (HQ) calculations incorporate life history information on the modeled species (Appendix A and B) and the toxicological information contained in the hazard profiles (Appendix C and D). The species utilized for the HQ calculations were selected to be conservative representatives of a trophic level/food chain exposure pathway related to the assessment endpoints. Hazard quotient calculations are presented in Appendix M and are calculated using dry weight sediment concentrations and dry weight sediment ingestion rates, and wet weight tissue concentrations and wet weight food ingestion rates.

27.1 Diamondback Terrapin

Mercury

The food chain accumulation model predicts that there are no acute, short-term exposure threats based on the exposure of turtles to marsh sediment (at Hg concentrations up to 170.0 mg/kg, dry weight). When the dose calculated in the food chain accumulation model is compared to a LOAEL, the resultant HQ does not predict an adverse response (HQ less than one) from the exposure to contaminated prey or sediment (at Hg concentrations up to 170 mg/kg, dry weight).

PCBs

The food chain accumulation model predicts that there are no acute, short-term exposure threats based on the exposure of turtles to marsh sediment (at PCB concentrations up to 150.0 mg/kg, dry weight). When the dose calculated in the food chain accumulation model is compared to a LOAEL, the resultant HQ does not predict (HQ less than one) from the exposure to contaminated prey or sediment (at PCB concentrations up to 150.0 mg/kg, dry weight).

27.2 Raccoon

Mercury

The food chain accumulation model predicts that there are no short-term exposure threats based on the exposure of raccoon to marsh sediment (at Hg concentrations up to 150.0 mg/kg, dry weight). When the dose calculated in the food chain accumulation model is compared to a LOAEL, the resultant HQ predicts an adverse threat (HQ = 1.22) from the exposure to contaminated prey or sediment (at Hg concentrations of 34.0 mg/kg, dry weight)

PCBs

The food chain accumulation model predicts that there are short-term exposure threats based on the exposure of raccoon to marsh sediment (at PCB concentrations up to 56.0 mg/kg, dry weight). When the dose calculated in the food chain model is compared to a LOAEL, the resultant HQ (HQ = 2.94) predicts an adverse threat from the exposure to contaminated prey or sediment (at PCB concentrations up to 2.29 mg/kg, dry weight).

27.3 Otter

Mercury

The food chain accumulation model predicts that there are no short-term exposure threats based on the exposure of otter to marsh sediment (at Hg concentrations up to 90.0 mg/kg dry weight). When the dose calculated in the food chain model is compared to a LOAEL, the resultant HQ (HQ=1.16) predicts an adverse threat for the exposure of contaminated prey or sediment (at Hg concentrations of 90.0 mg/kg, dry weight).

PCBs

The food chain accumulation model predicts that there are short-term exposure threats based on the exposure of otter to marsh sediment (at PCB concentrations of 66.0 mg/kg, dry weight). When the dose calculated in the food chain accumulation model is compared to a LOAEL, the resultant HQ (HQ= 1.79) predicts an adverse threat for the exposure of contaminated prey or sediment (at PCB concentrations of 5.2 mg/kg dry weight).

27.4 Clapper Rail

Mercury

The food chain accumulation model predicts that there are acute, short-term threats based on the exposure of clapper rail to marsh sediment (at Hg concentrations of 34.0 mg/kg dry weight). When the dose calculated from the food chain accumulation model is compared to a LOAEL, the resultant HQ (HQ=5.79) predicts an adverse threat from the exposure to contaminated prey and sediment (at Hg concentrations of 15.0 mg/kg dry weight).

PCBs

The food chain accumulation model predicts that there are acute, short-term threats based on the exposure of clapper rail to marsh sediment (at PCB concentrations of 56.0 mg/kg dry weight). When the dose calculated from the food chain accumulation model is compared to a LOAEL, the resultant HQ also predicts that there is potential threat from the exposure to contaminated prey and sediment (at PCB concentrations of 2.29 mg/kg dry weight).

27.5 Marsh Wren

Mercury

The grasshoppers analyzed for Hg and PCBs were collected from several areas of the marsh. These areas were designated M-1 and M-2. To determine an exposure point concentration, a mean sediment concentration was calculated based on the sediment samples located within the boundaries of the areas designated M-1 and M-2. The exposure point calculation for M-1 was based on an average surface sediment concentration from Locations H1 and H2 (720 mg/kg Hg and 2420 mg/kg PCBs). The exposure point calculation for M-2 was based on an average surface sediment concentration from Locations H2 through L2 (215 mg/kg Hg and 309 mg/kg PCBs).

The food chain accumulation model predicts that there are acute, short-term threats based on the exposure of marsh wren to sediment (at Hg concentrations of 215 mg/kg dry weight). When the dose calculated from the food chain accumulation model is compared to a LOAEL, the resultant HQ (HQ=11.2) predicts that there is the potential threat from the exposure to contaminated prey and sediment (at Hg concentrations of 215 mg/kg dry weight).

PCBs

The food chain accumulation model predicts that there is are acute, short-term threats based on the

exposure of marsh wren to sediment (at PCB concentrations of 2420.0 mg/kg dry weight). When the dose calculated from the food chain accumulation model is compared to a LOAEL, the resultant HQ also predicts that there is no potential threat from the exposure to contaminated prey and sediment (at PCB concentrations of 309 mg/kg dry weight).

27.6 Wood Stork

Mercury

The food chain accumulation model predicts that there are no acute threats from the exposure to contaminated prey and sediment (at Hg concentrations up to 90.0 mg/kg dry weight). When the dose calculated in the food chain accumulation model is compared to a LOAEL, the resultant HQ (HQ=1.99) predicts an adverse threat from the exposure to contaminated prey or sediment (at Hg concentrations of 30.0 mg/kg dry weight).

PCBs

The food chain accumulation model predicts that there are no acute threats based on the exposure of wood stork to marsh sediment (at PCB concentrations of 70.0 mg/kg). When the dose calculated in the food chain accumulation model is compared to a LOAEL, the resultant HQ (HQ= 2.0) predicts adverse threat form the exposure to contaminated prey or sediment (at PCB concentrations of 66.0 mg/kg).

27.7 Manatee

Mercury

The food chain accumulation model predicts that there are no acute, short-term threats based on the exposure of manatee to marsh sediment (at Hg concentrations of 90.0 mg/kg dry weight). When the dose calculated from the food chain accumulation model is compared to a LOAEL, the resultant HQ also predicts that there is no potential threat from the exposure to contaminated prey and sediment (at Hg concentrations of 90.0 mg/kg dry weight).

PCBs

The food chain accumulation model predicts that there are no acute, short-term threats based on the exposure of manatee to marsh sediment (at PCB concentrations of 70.0 mg/kg dry weight). When the dose calculated from the food chain accumulation model is compared to a LOAEL, the resultant HQ predicts that there is potential threat from the exposure to contaminated prey and sediment (at PCB concentrations of 70.0 mg/kg dry weight)

28.0 RISK ASSESSMENT CONCLUSIONS

28.1 Maintenance to ecological health of the salt marsh community, specifically in terms of the function and structure

The concentrations of Hg, PCBs and localized areas of Zn in sediment exceed ecological benchmarks.

Comparison of whole body PCB concentrations in fiddler crab to whole body concentrations noted in the literature indicate that a potential risk exists to benthic organisms. A similar prediction was not found when Hg concentrations were compared to the literature values.

A significant and substantial reduction in the whole body lipid in fiddler crabs was found at Locations 17-18, 19-20, and the outfall. These locations had elevated PCB and Hg concentrations compared to the

other locations where fiddler crabs were collected (reference and location 10-11). Sediment collected from Location 17-18 contained 15 mg/kg Hg and 56 mg/kg PCBs, Location 19-20 contained 170 mg/kg Hg and 150 mg/kg PCBs, and the Outfall (Location 35) contained 90 mg/kg Hg and 70 mg/kg PCBs. The reduction in body lipid content is typically an indicator of reduced fitness. This suggests that there is a risk (and in fact an impact) to at least one major component of the marsh community. The reduction in lipid content is associated with elevated body burdens of PCBs and Hg. The decrease in body lipid of 36 - 47 percent, while not an effect in and of itself, is likely to translate into reduced reproductive capability and reduced survivorship during periods of starvation (senescence).

The benthic macroinvertebrate study did not reveal alterations in the community structure associated with site contamination. However, this measurement endpoint was to evaluate the threat of direct toxins, such as BNAs and metals.

The results of toxicity tests utilizing *Leptocheirus plumulosus* and *Penaeus vannamei* did not indicate that there was site-related acute mortality threats to benthic and epibenthic species. However, these measurement endpoints were intended to evaluate the threats of direct toxins (BNAs and metals).

In addition, an embryo test was performed in which the results indicate that the more highly contaminated sediment can cause impaired development of fish embryos. However, this test was not conducted as a "definitive test".

It is concluded that at sediment concentrations of Hg greater than 15 mg/kg and Aroclor 1268 greater than 56 mg/kg, there is potential imminent threat to the assessment endpoint.

28.2 Protection of long-term health and reproductive capacity of aquatic reptiles

The food chain exposure models do not suggest imminent threat from Hg or PCBs to reptiles (diamondback terrapin) using the marsh. Hazard quotients calculated using an acute dose or a LOAEL benchmark were all below one. There is no available information to relate body burden concentration to literature levels.

Currently, there is no information on the biological health (biomarkers) suggesting a substantial risk. While there is some suggestion of histopathological effects, no conclusions can be drawn from this information.

Based on the lines of evidence, we cannot conclude that there is an imminent and substantial threat to the assessment endpoint nor are there risks predicted despite substantial body burden concentrations in the species included in the assessment endpoints.

28.3 Protection of long-term health and reproductive capacity of omnivorous mammal species

There is one line of evidence that is based on the food chain exposure model to the raccoon. The hazard quotients calculated from the food chain accumulation models indicate that there is no acute threat at a sediment exposure level of 170.0 mg/kg dry weight Hg. However, the food chain models do predict an acute threat at a sediment exposure level of 56.0 mg/kg dry weight PCBs.

Based on the LOAEL benchmarks, it can not be concluded that a potential risk does not exist at sediment exposure levels in excess of 2.29 mg/kg dry weight PCBs and 15.0 mg/kg dry weight Hg.

It is concluded that, there is an imminent threat at sediment exposure levels of greater than 56.0 mg/kg dry weight PCBs. There is no acute threat at sediment exposure levels up to 170.0 mg/kg dry weight mercury.

Based upon LOAEL benchmarks, it can not be concluded that a risk does not exist at sediment exposure levels as low as 2.29 mg/kg dry weight PCBs and 15.0 mg/kg dry weight Hg.

28.4 Protection of long-term health and reproductive capacity of piscivorous mammal species

Based on the hazard quotients calculated based on the food chain accumulation models for otter, there are no acute threats at sediment exposure levels of less than 90.0 mg/kg dry weight Hg. However, an acute threat is noted at sediment exposure levels of greater than 66.0 mg/kg dry weight PCBs.

Based on the LOAEL benchmarks, it can not be conclude that there is not a risk at sediment exposure levels greater than 5.2 mg/kg dry weight PCBs and 90.00 dry weight Hg.

In conclusion, there is no imminent threat at sediment exposure levels less than 90.0 mg/kg dry weight Hg, however, there is a threat at 66.0 mg/kg dry weight PCBs. In addition, it can not be concluded that a potential risk does not exist at a sediment exposure level of at least as low as 5.2 mg/kg dry weight PCBs and 90.00 dry weight Hg.

28.5 Protection of long-term health and reproductive capacity of avian species

Food chain exposure models using clapper rail indicate that there is an imminent threats due to sediment Hg concentrations of 34.0 mg/kg dry weight and PCB sediment concentrations 56.0 mg/kg dry weight.

Based on the LOAEL benchmarks, it can not be concluded that there is not a potential risk at 15.0 mg/kg dry weight Hg and 2.29 mg/kg dry weight PCBs.

A comparison of body burden levels in clapper rails to literature values indicates that there is no risk due to Hg; however, there is substantial risk due to PCBs.

Currently, there is no information on the biological health (biomarkers) suggesting a substantial risk. An examination of the histopathology of tissue samples collected from the clapper rail indicated that specific toxicity or a specific uniform degeneration in the tissue was not identified. However, it should be noted that the rail were not specifically in the hot zone, but rather from the entire marsh. Therefore, the histopathological evaluation is not related to a specific exposure level.

Food chain exposure models were also calculated for marsh wren. Imminent and substantial threat due to exposure of PCBs and Hg were noted at 2420.0 mg/kg, dry weight and 215.0 mg/kg dry weight respectively. As stated previously, the exposure point concentration for M-1 was calculated as an average of Locations H1 and H2 and the exposure point concentration for M-2 was calculated as an average of Locations H2 through L2

In conclusion, based on the food chain accumulation models for clapper rail and marsh wren, it appears that there is an imminent and substantial threat to these receptors at exposure point concentrations of 56.0 mg/kg dry weight PCBs and 34.0 mg/kg dry weight Hg (based on the food chain accumulation models calculated for clapper rail). In addition, the exposure to LOAEL benchmarks indicates that potential risk exists at 15.0 mg/kg dry weight Hg and 2.29 mg/kg dry weight PCBs.

28.6 Protection of health and reproductive capacity of fishery resources

The concentration of Hg and PCBs in spot and killifish were compared to literature based effect levels. Based on these comparisons, there were no effects based on Hg, and no effects to the spot based on PCB concentrations. There was a potential risk of PCB tissue concentrations to killifish collected at Locations 71 and 35. These locations had sediment PCB concentrations of 66 mg/kg, dry weight and 70 mg/kg, dry weight, respectively

Embryo toxicity testing was conducted in which killifish embryo were exposed to site sediments. Although there were only a few embryos that responded with lesions, the lesions observed were consistent with the lesions observed from PCB exposure. All site sediments tested caused lesions in at least one embryo. These lesions were noted at sediment PCB concentrations as low as 2 mg/kg.

In conclusion, based on embryo toxicity tests, there appears to be potential risk at lower levels of PCBs.

28.7 Protection of the fishery nursery functioning the marsh system

The conclusions for the assessment endpoint are based on the same lines of evidence used in the above assessment endpoint. The concentrations of Hg and PCBs in spot and killifish were compared to literature based effect levels. Based on these comparisons, there were no effects based on Hg, and no effects to the spot based on PCB concentrations. There was a potential risk of PCB tissue concentrations to killifish. There was a potential risk of PCB tissue concentrations to killifish collected at Locations 71 and 35. These locations had sediment PCB concentrations of 66 mg/kg, dry weight and 70 mg/kg, dry weight, respectively

Embryo toxicity testing was conducted in which killifish embryo were exposed to site sediments. Although there were only a few embryos that responded with lesions, the lesions observed were consistent with the lesions observed from PCB exposure. All site sediments tested caused lesions in at least one embryo. These lesions were noted at sediment PCB concentrations as low as 2 mg/kg.

In conclusion, based on embryo toxicity tests, there appears to be potential risk at lower levels of PCBs.

28.8 Protection of individual threatened and/or endangered Ridley sea turtles

For the assessment endpoints related to threatened and/or endangered sea turtles the risk characterization will be inferred from the characterization of risk to reptiles.

28.9 Protection of individual threatened and/or endangered green turtle

For the assessment endpoints related to threatened and/or endangered sea turtles the risk characterization will be inferred from the characterization of risk to reptiles.

28.10 Protection of individual wood stork which feed in the marsh and/or adjacent areas

Based on the hazard quotients calculated based on the food chain accumulation models, there are no acute threats based at 70.0 mg/kg dry weight PCBs and 90.0 mg/kg dry weight Hg. Based on the LOAEL benchmarks, there is a potential risk predicted at 66.0 mg/kg dry weight PCBs and 30.0 mg/kg dry weight Hg.

In conclusion, there are no imminent and substantial threat at exposure point concentrations of 70.0 mg/kg dry weight PCBs and 90 mg/kg dry weight Hg. However, potential risk exists at least as low as 66.0 mg/kg dry weight PCBs and 30.00 mg/kg dry weight Hg.

28.11 Protection of individual manatee (*Trichechus manatus*)

Based on the hazard quotients calculated based on the food chain accumulation models, there is no acute threat based on 70.0 mg/kg dry weight PCBs and 90.0 mg/kg dry weight Hg. Based on the LOAEL benchmarks, there is no potential risk predicted at 70 mg/kg dry weight PCBs and 90.00 mg/kg dry weight Hg.

In conclusion, there is no imminent and substantial threat at exposure point concentrations of 70.0 mg/kg

dry weight PCBs and/or 90.0 mg/kg dry weight Hg. In addition, using LOAEL benchmarks indicates that potential risk does not exist at 70.0 mg/kg dry weight PCBs and 90.0 mg/kg dry weight Hg.

28.12 Protection of individual shortnose sturgeon (*Acipenser brevirostrum*)

There was no information available specifically based on sturgeon. Therefore, the risk to sturgeon will be based on the assessment endpoint of killifish and/or spot. The concentration of Hg and PCBs in spot and killifish were compared to literature based effect levels. Based on these comparisons, there were no effects based on Hg, and no effects to the spot based on PCB concentrations. There was a potential risk of PCB tissue concentrations to killifish. There was a potential risk of PCB tissue concentrations to killifish collected at Locations 71 and 35. These locations had sediment PCB concentrations of 66 mg/kg, dry weight and 70 mg/kg, dry weight, respectively.

In conclusion, based on the exposure of killifish to sediment, there appears to be a potential risk at greater than 66 mg/kg PCBs.

29.0 CONCLUSIONS

The risks of the exposure to sediment were determined in the marsh adjacent to the LCP Superfund site. A variety of biota were collected and analyzed for Hg and PCBs. Based on the information presented above, and the lines-of-eveidence, there is the potential for imminent threat at exposure concentrations in sediment of greater than 30 mg/kg, dry weight of Hg and greater than 50 mg/kg, dry weight of PCBs.

REFERENCES

Albers, P.H., L. Sileo, and B.M. Mulhern. 1986. "Effects of environmental contaminants on snapping turtles of a tidal wetland." *Archives of Environmental Contamination and Toxicology,* 15: 39-49.

Allen, J.F. and R.A. Littleford. 1955. "Observations on the feeding habits and growth of immature diamondback terrapins." *Herpetologica,* 11:77-80.

Allen, H.E., G. Fu and B. Deng. 1993. "Analysis of Acid-Volatile Sulfide (AVS) and Simultaneously Extracted Metals (SEM) for the Estimation of Potential Toxicity in Aquatic Sediments." *Environmental Toxicology and Chemistry,* 12:1441-1453.

Ankley, G.T., V.R. Mattson, E.N. Leonard, C.W. West and J.L. Bennett. 1993. Predicting the Acute Toxicity of Copper in Freshwater Sediments: Evaluation of the Role of Acid-Volatile Sulfide." *Environmental Toxicology and Chemistry,* 11:315-320.

Armstrong, F.A.J. 1979. "Effects of Mercury Compounds on Fish." In: *The Biogeochemistry of Mercury in the Environment.* Ed. J.O. Nriagu. New York, NY: Elsevier/North-Holland Biomedical Press. p. 657-670.

Aulerich, R.J., S.J. Bursian, W.J. Breslin, B.A. Olson, and R.K. Ringer. 1985. "Toxicological manifestations of 2,4,5,2',4',5,-, 2,3,6,2',3',6'-, abd 3,4,5,3',4',5'- hexachlorobiphenyl and Arochlor 1254 in mink." *Journal of Toxicology and Environmental Health,* 15:63-79.

Austin, H. 1990. "The effects of estradiol and testosterone on Mullerian duct regression in theAmerican alligator (*Alligator mississippiensis*)." *General Comparative Endocrinology,* 76:461-472.

Beauford, W., J. Barber and A.R. Barringer. 1977. "Uptake and Distribution of Mercury within Higher Plants." *Physiology of Plants,* 39:261-265.

Becker, D.S., G.R. Bilyard, and T.C. Ginn. 1990. "Comparisons between sediment bioassays and alterations of benthic macroinvertebrate assemblages at a marine superfund site: Commencement Bay, Washington." *Environmental Toxicology and Chemistry,* 9:669-685.

Bergeron, J.M., D. Crews, and J.A. McLachlan. 1994. "PCBs as Environmental Estrogens: Turtle Sex Determination as a Biomarker of Environmental Contamination." *Environmental Health Perspectives,* 102(9): 780-781.

Beijer, K. and A. Jernelov. 1979. "Methylation of mercury in natural waters." In: *The Biogeochemistry of Mercury in the Environment.* Ed. J.O. Nriagu. New York, NY: Elsevier/North-Holland Biomedical Press. p. 201-210.

Bilyard, G.R. 1987. "The value of benthic infauna in marine pollution monitoring studies." *Marine Pollution Bulletin,* 18: 581-585.

Birge, W.J., J.A. Black, A.G. Westerman and J.E. Hudson. 1979. "The effect of mercury on reproduction of fish and amphibians." In: *The Biogeochemistry of Mercury in the Environment.* Ed. J.O. Nriagu. New York, NY: Elsevier/North Holland Biomedical Press. New York, N.Y. p. 629-655.

Bishop, C.A., R.J. Brooks, J.H. Carey, P. Ng, R.J. Norstrom, and D.R.S. Lean. 1991. "The Case for a Cause-Effect Linkage Between Environmental Contamination and Development in Eggs of the Common Snapping Turtle (*Chelydra s. serpentina*) from Ontario, Canada." *Journal of Toxicology and Environmental Health,* 33: 521-547.

Brosset, C. 1987. "The behavior of mercury in the physical environment." *Water, Air,and Soil Pollution,* 34: 145-166.

Bryan, A, W. Stone, P. Olafsson. 1987. "Disposition of toxic PCB congeners in snapping turtle eggs: expressed as toxic equivalents of TCDD." *Bulletin of Environmental Contaminants and Toxicology*, 39:791-796.

Campbell, M.A., S. Bandiera, L. Robertson, A. Parkinson, and S. Safe. 1983. "Hepta-, Hexa-, Tetra- and Dichloronapthalene Congeners as Inducers of Hepatic Microsomal Drug-Metabolizing Enzymes." *Toxicology*, 26:193-205.

Casas, A.M. and E.A. Crecelius. 1994. "Relationship Between Acid Volatile Sulfide and the Toxicity of Zinc, Lead and Copper in Marine Sediments." Environmental Toxicology and Chemistry, 13:529-536.

Cheville, N. 1983. *Cell Pathology*. Ames, IA: Iowa University Press. p. 946.

Clarkson, T.W. and D.O. Marsh. 1982. "Mercury toxicity in man." In: *Clinical, Biochemical and Nutritional Aspects of Trace Elements, Vol. 6.* Ed. A.S. Prasad. New York, NY: Alan R. Liss, Inc. p. 549-568.

Cocking, D. R. Hayes, M.L. King, M.J. Rohrer, R. Thomas and D. Ward. 1991. "Compartmentalization of Mercury in Biotic Components of Terrestrial Floodplain Ecosystems Adjacent to the South River at Waynesboro, VA." *Water, Air and Soil Pollution*, 57-58:159-170.

Compeau, G.C., and R. Bartha. 1985. "Sulfate-reducing bacteria: Principal methylators of mercury in anoxic estuarine sediment." *Applied Environmental Microbiology*, 50: 498-502.

Cunningham, H. M. and D.T. Williams. 1972. Effect of Tetrachlorodibenzo-p-dioxin on growth rate and the synthesis of lipids and protein in rats. Bull. Environ. Contam. Toxicol. 7(1):45-51.

Das, S.K., A. Sharma and G. Talukder. 1982. "Effects of Mercury on Cellular Systems in Mammals - A Review." *Nucleus (Calcutta)*, 25:193-230.

Dauer, D.M., and Alden, R.W., III. 1995. "Long-term trends in the macrobenthos and water quality of the lower Chesapeake Bay (1985-1991)." *Marine Pollution Bulletin*, 30: 840-848.

Dauer, D.M., Luckenbach, M.W., and Rodi, A.J., Jr. 1993. "Abundance biomass comparison (ABC method): effects of an estaurine gradient, anoxic/hypoxic events and contaminated sediments." *Marine Biology*, 116: 507-518.

Dipple, A. 1985. "Polycyclic Aromatic Hydrocarbon Carcinogensis: An Introduction". In: *Polycyclic Hydrocarbons and Carcinogensis*. Ed. R.D. Harvey. Washington, D.C.: American Chemical Society Symposium. p. 1-17.

DiGiovanni, J., and T.J. Slaga. 1981. "Effects of Benzo(e)pyrene [B(e)P] and Dibenz(a,c)anthracene [DB(a,c)A] on the Skin Tumor-Initiating Activity of Polycyclic Aromatic Hydrocarbons." In *Chemical Analysis and Biological Fate: Polynuclear Aromatic Hydrocarbons*. Eds. M. Cooke and A.J. Dennis. Columbus, OH: Fifth International Symposium. Battelle Press. p. 17-31.

Di Toro, D.M., J.D. Mahony, D.J. Hansen, K.J. Scott, M.B. Hicks and S.M. Mayr. 1990. "Toxicity of cadmium in sediments: The role of acid volatile sulfide." *Environmental Toxicology and Chemistry*, 9:1487-1502.

DiToro, D.M., Mahony, J.L., Hansen, D.J., Scott, K.J., Hicks, M.B., Mayr, S.M., amd Redmond, M.S. 1990. "Toxicity of cadmium in sediments: the role of acid volatile sulfide." *Environmental Toxicology and Chemistry*, 9: 429-453.

Di Toro, D.M., J.D. Mahony, D.J. Hansen, K.J. Scott, A.R. Carlson and G.T. Ankley. 1992. "Acid Volatile Sulfide Predicts the Acute Toxicity of Cadmium and Nickel in Sediments." *Environmental Science and Technology*, 26:96-

101.

Eisler, R. 1986. "Polychlorinated Biphenyl Hazards to Fish, Wildlife and Invertebrates: A Synoptic Review." *U.S. Fish and Wildlife Service Biological Report,* 85(1.7).

Eisler, R. 1987a. "Mercury Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review." *U.S. Fish and Wildlife Service Biological Report,* 85(1.10).

Eisler, R. 1987b. "Polycyclic Aromatic Hydrocarbon Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review." *U.S. Fish and Wildlife Service Biological Report,* 85(1.11).

Eisler, R. 1988. "Lead Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review." *U. S. Fish and Wildlife Service Biological Report,* 85(1.14).

Elhassani, S.B. 1983. "The Many Faces of Mercury Poisoning." *Journal of Toxicology,* 19:875-906.

Falandysz, J. 1984. "Metals and organochlorines in a female white-tailed eagle from Uznam Island, Southwestern Baltic Sea." *Environmental Conservation,* 11:262-263.

Falandysz, J. 1986. "Metals and organochlorines in adult and immature males of white-tailed eagle." *Environmental Conservation,* 13:69-70.

Falandysz, J., B. Jakuczun, and T. Mizera. 1988. "Metals and organochlorines in four female white-tailed eagles." *Marine Pollution Bulletin,* 19:521-526.

Ferguson, M. 1982. "Extrinsic microbial degradation of the alligator eggshell." *Science,* 241(4):1135-1137.

Finley, M. T., W. H. Stickel, and R. E. Christensen. 1979. "Mercury residues in tissues of dead and surviving birds fed methylmercury." *Bulletin of Environmental Contamination and Toxicology,* 21:105-110.

Fitzgerald, W.F., R.P. Mason, and G.M. Vandal. 1991. "Atmospheric cycling and air-water exchange of mercury over mid-continental lacustrine regions." *Water, Air, and Soil Pollution,* 56:745-767.

Gaston, G.R. and J.C. Nasci. 1988. "Trophic structure of macrobenthic communities in the Calcasieu estuary, Louisiana." *Estuaries,* 11:201-211.

Gaston, G.R. and Young, J.C. 1992. Effects of contaminants of macrobenthic communities in the upper Calcasieu Estuary, Louisiana. Bull. Environ. Contam. Toxicol. 49: 922-928.

Georgia Department of Natural Resources (GADNR). 1992. *Results of Analyses of Seafood from Turtle River and Purvis Creek.* Atlanta, GA.

Gill, G.A. and K.W. Bruland. 1990. "Mercury speciation in surface freshwater systems in California and other areas." *Environmental Science and Technology,* 24:1392-1400.

Gross, T.S., L. Guillette, H. Percival, G. Masson, J. Matter, and A. Woodward. 1994. "Contaminant-Induced Reproductive Anomalies in Florida." *Comparative Pathology Bulletin,* 26(4).

Guillette, L., T. Gross, G. Masson, J. Matter, H. Percival, and A. Woodward. 1994. "Developmental abnormalities and abnormal sex hormone concentrations in juvenile alligators from contaminated and control lakes in Florida." *Environmental Health Perspectives,* 102(8).

Harris, G.E., Y. Kiparissis, and C.D. Metcalfe. 1994. "Assessment of the toxic potential of PCB congener 81 (3,4,4'5'-tetrachlorobiphenyl) to fish in relation to other non-ortho-substituted PCB congeners." *Environmental Toxicology and Chemistry,* 13:1405-1413.

Heinz, G., Percival, H. and Jennings, M. 1990. "Contaminants in American alligator eggs from Lake Apopka, Lake Griffin, and Lake Okeechobee, Florida." *Environmental Monitor and Access,* 16(3): 277-285.

Henriksson, K., E. Karppanen, and M. Helminen. 1966. "High residue of mercury in Finnish white-tailed eagles." *Omis Fenn.*, 43:38-45.

Holl, W. and R. Hampp. 1975. "Lead and Plants." *Residue Reviews*, 54:79-111.

Huckabee, J.W., J.W. Elwood, and S.G. Hildebrand. 1979. "Accumulation of mercury in freshwater biota." In: *The Biogeochemistry of Mercury in the Environment.* Ed. J.O. Nriagu. New York, NY: Elsevier/North-Holland Biomedical Press. p. 277-302.

Kawai, S., M. Fukushima, N. Miyazaki and R. Tatsukawa. 1988. Relationship between lipid composition and organochlorine levels in the tissues of striped dolphin. Mar. Poll. Bull. 19 (3): 129-133.

Koeman, J. H., R. H. Hadderingh, and M. F. I. J. Bijiveld. 1972. "Persistent pollutants in the white-tailed eagle *(Haliaeetus albicilla)* in the Federal Republic of Germany." *Biology and Conservation,* 4:373-377.

Larsson, P., L. Okla and L.Collvin. 1993. Reproductive status and lipid content as factors in PCB, DDT and HCH contamination of a population of pike (Esox lucius L.) Environ. Toxicol. and Chem. 12:855-861.

Lee, S.D. and L. Grant (eds.). 1981. *Health and Ecological Assessment of Polynuclear Aromatic Hydrocarbons.* Park Forest South, IL: Pathotex Publishers. p. 364.

Matida, Y., H. Kumada, S. Kumura, Y. Saiga, T. Nose, M. Yokote, and H. Kawatsu. 1971. "Toxicity of mercury compounds to aquatic organisms and accumulation of the compounds by the organisms." *Bulletin of the Freshwater Fisheries Research Laboratory (Tokyo),* 21:197-227.

McKim, J. M., G. F. Olson, G. W. Holcombe, and E. P. Hunt. 1976. "Long-term effects of methylmercuric chloride on three generations of brook trout *(Salvelinus fontinalis)*: toxicity, accumulation, distribution, and elimination." *Journal of the Fisheries Research Board of Canada,* 33:2726-2739.

McKenney, C.L., P.S. Harris, M.A. Shirley and R.H. Pierce. 1996. Altered lipid composition in the hepatopancreas of fiddler crabs in relation to mosquito-control pesticide residues. Amer. Zool. 36(5):109(A).

Miranda, C.L., and R.S. Chlabra. 1980. "Species Differences in Stimulation of Intestinal and Hepatic Microsomal Mixed-Function Oxidase Enzymes." *Biochemistry and Pharmacology,* 29: 1161-1165.

Montz, W.E., W.C. Card, and R.L. Kirkpatrick. 1982. "Effects of Polychlorinated Biphenyls and Nutritional Restriction on Barbiturate-Induced Sleeping Times and Selected Blood Characteristics in Raccoons (*Procyon lotor*)." *Bulletin of Environmental Contamination and Toxicology,* 28:578-583.

Mourente, G., A. Medina, S. Gonzalez and A. Rodriguez. 1994. Changes in lipid class and fatty acid contents in the ovary and midgut gland of female fiddler crab *Uca tangeri* (Decapoda, Ocypodidae) during maturation. Mar. Bio. 121(1): 187-197.

National Academy of Science (NAS). 1979. "Polychlorinated biphenyls." Report to the Commission Assessing PCBs in the Environment. Environmental Studies Board. Commission on Natural Resources, National Research Council.

Washington, D.C.: National Academy of Science. p. 46.

Neff, J.M. 1979. *Polycyclic aromatic hydrocarbons in the aquatic environment.* London, England: Applied Science Publications, Ltd. p. 262.

Nimmo, D.R., D.J. Hansen, J.A. Cough, N.R. Cooley, P.R. Parrish, and J.I. Lowe. 1975. "Toxicity of Aroclor 1254 and its physiological activity in several estuarine organisms." *Archives of Environmental Contamination and Toxicology,* 3: 22-39.

Oehme, G. 1981. "Zur Quecksilbeffijckstandsbelastung tot aufgefundener Seeadier, *Haliaeetus albicilla,* in den Jahren 1967-1978." (In German with English summary.) *Hercynia,* 18:353-364.

Raman, A.V., and Ganapati, P.N. 1983. "Pollution effects on ecobiology of benthic polychaetes in Visakhapatnam Harbour (Bay of Bengal)." *Marine Pollution Bulletin,* 14: 46-52.

Sacco, J.N., E.D. Seneca, and T. R. Wentworth. 1994. "Infaunal Community Development of Artificially Established Salt Marshes in North Carolina." *Estuaries,* 17(2):489-500.

Safe, S. 1984. "Polychlorinated biphenyls (PCBs) and polybrominated biphenyls (PBBs): biochemistry, toxicology, and mechanism of action." *CRC Critical Reviews in Toxicology,* 13:319-393.

Sanders, O.T. and R.L. Kirkpatrick. 1977. "Reproductive characteristics and corticoid levels of female white-footed mice fed *ad libitum* and restricted diets containing a polychlorinated biphenyl." *Environmental Research,* 13:358-363.

Scott, K.J. 1989. "Effects of contaminated sediments on marine benthic biota and communities." In: *Committee on Contaminated Marine Sediments.* Ed. A. Corell. Washington, D.C.: National Academy Press. p. 132-154.

Seigel, R.A. 1984. "Parameters of two populations of diamondback terrapins (Malaclemys terrapin) on the Atlantic coast of Florida." In *Vertebrate Ecology and Systematics. A Tribute to Henry S. Fitch.* Eds. R.A. Seigel, L.E. Hunt, J.L. Knight, L. Malaret, and N.L. Zuschlag. Kansas City, KS: Museum of Natural History, University of Kansas Special Publication 10. p. 77-87.

Seitz, R.D., and Schaffner, L.C. 1995. "Population ecology and secondary production of the polychaete *Loimia medusa* (Terebellidae)." *Marine Biology,* 121:701-711.

Sieko-Goad, L. and N.A. Andresen. 1993. "Effect of diatom lipid composition on the toxicity of trichlorobenzene. II. Long-term effects of 1,2,3-trichlorobenzene." *Archives of Environmental Contamination and Toxicology,* 24:243-248.

Stone, W.B., E. Kiviat, S.A. Butkas. 1980. "Toxicants in snapping turtles." *Journal of the New York Fish and Game Commission,* 27:39-50.

Tanabe, S.N., N. Kannan, A. Subramanian, S. Watanabe, and R. Tatsukawa. 1987. "Highly toxic coplanar PCBs: Occurrence, source, persistency, and toxic implications to wildlife and humans." *Environmental Pollution,* 47:147-163.

Tufast, S.J., P.U.M. Reddy and J.V. Ramana Rao. 1992. "Accumulation of lead and effects on total lipids and lipid derivatives in the freshwater fish *Anabas testudineus* (Bloch)." *Ecotoxicology and Environmental Safety,* 23:33-38.

U.S. Environmental Protection Agency. 1996. Supplemental Report, LCP Chemical Site, Brunswick, GA. Report prepared by the U.S. Environmental Protection Agency/Environmental Response Team Center. Edison, NJ.

U.S. Environmental Protection Agency. 1987. *Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans (CDDs and CDFs).* U.S. Environmental Protection Agency, Washington, D.C.EPA/625/3-87/012.

U.S. Environmental Protection Agency. 1989. *Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans (CDDs and CDFs), 1989 Update.* U.S. Environmental Protection Agency, Washington, D.C. EPA/625/3-89/016.

U.S. Environmental Protection Agency. 1989. *Briefing Report to the EPA Science Advisory Board on the Equilibrium Partitioning Approach to Generating Sediment Quality Criteria.* Office of Water Regulations and Standards. Criteria and Standards Division, Washington, DC. EPA 440/5-89-002.

U.S. Environmental Protection Agency. 1980a. *Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons.* U.S. Environmental Protection Agency. Rep. 440/5-80-069.

U.S. Environmental Protection Agency. 1980b. *Ambient Water Quality Criteria for Polychlorinated Biphenyls.* U.S. Environmental Protection Agency. Rep. 440/5-80-068.

Ward, E.C., M.J. Murray, and J.H. Dean. 1985. "Immunotoxicity of nonhalogenated polycyclic aromatic hydrocarbons In: *Immunotoxicity and Immunopharamacology.* Eds. J.H. Dean, M.I. Luster, A.E. Munson, and H. Amos. New York, NY: Raven Press. p. 291-313.

Warwick, R.M., Platt, H.M., Clarke, K.R., Agard, J., and Gobin, J. 1990. "Analysis of macrobenthic and meiobenthic community structure in relation to pollution and disturbance in Hamilton Harbour, Bermuda." *Journal of Experimental Marine Biology and Ecology,* 138:119-142.

Washington, H.G. 1984. "Diversity, biotic and similarity indices: A review with special relevance to aquatic ecosystems." *Water Research,* 6: 653-694.

Wiener, J.G., and D.J. Spry. 1994. "Toxicological significance of mercury in freshwater fish." In: *Environmental contaminants in wildlife: Interpreting tissue concentrations.* Eds. W.N. Beyer, G.H. Heinz, and A.W. Redmon-Norwood. Boca Raton, FL: Lewis Publishers. p. 297-339.

Wisk, J.D., and K.R. Cooper. 1990. "The stage specific toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin in embryos of the Japanese medaka (Oryzias latipes)." *Environmental Toxicology and Chemistry,* 9:1159-1169.

Weis, P., and J.S. Weis. 1991. "The developmental toxicity of metals and metalloids in fish." In. *Metal Ecotoxicology - Concepts and Applications.* Eds. M.C. Newman and A.W. McIntosh. Boca Raton, FL: Lewis Publishers. p. 145-169.

Wixson, B.G. and B.E. Davis. 1993. "Lead in Soil." *Lead in Soil Task Force, Science Reviews,* Northwood. p. 132.

Yawetz, A., I. Sidis, and A. Gasith. 1983. "Metabolism of Parathion and Brain Cholinesterase Inhibition in Aroclor 1254-Treated and Untreated Caspian Terrapin (*Mauremys caspica rivulata*, Emydidae, Chelonia) in Comparison with Two Species of Wild Birds." *Comparative Biochemistry and Physiology,* 75C:377-382.

Zillioux, E.J., D.B. Porcella, and J.M. Benoit. 1991. "Mercury cycling and effects in freshwater wetland ecosystems." *Environmental Toxicology and Chemistry,* 12:2245-2264.

Tables

TABLE 1. Maximum Contaminant Concentration Screen
LCP Site
Brunswick, GA
April 1997

Results in ug/kg

Contaminant	Maximum Concentrations of Contaminants in Sediment			
	Maximum Sediment Concentration	Benchmark	Reference Source	Hazard Quotient
BNA's				
2,4,6 trichlorophenol	610	NB	NB	
bis(2-Ethylhexyl)phthalate	33000	1300	x - fauna	25.38
Di-n-butylphthalate	15000	1400	x - fauna	10.71
Metals				
Aluminum	48000	NB	NB	
Antimony		150	x - fauna	
Arsenic (total)	13	8.2	x - fauna	1.59
Barium	65	NB	NB	
Beryllium	1.7	NB	NB	
Cadmium		1.2	x - fauna	
Calcium	48000	NB	NB	
Chromium (total)	100	5.0	x - flora	20.00
Cobalt		NB	NB	
Copper	49	34	x - fauna	1.44
Iron	39000	NB	NB	
Lead	260	46.7	x - fauna	5.57
Magnesium	15000	NB	NB	
Manganese	400	460	c	0.87
Mercury	420	0.15	x - fauna	2800.00
Nickel	32	20.9	x - fauna	1.53
Potassium	4600	NB	NB	
Selenium		NB	NB	
Silver		1.0	x - fauna	
Sodium	22000	NB	NB	
Thallium		NB	NB	
Vanadium	87	NB	NB	
Zinc	190	150	x - fauna	1.27

NB = No benchmark
NA = Not Applicable

a = Long et al. 1995 (ER-L)
b = Long and Morgan 1990 (ER-L)
c = Persuad et al. 1992 (LEL)
d = USEPA AWQC 1992 (Chronic Criteria)
e = Suter and Mabrey 1994 (SCV)
e* = Suter and Mabrey 1994 (LCV)
x - fauna = Region III BTAG Screening Level for fauna (lowest of flora and fauna chosen)
x - flora = Region III BTAG Screening Level for flora (lowest of flora and fauna chosen)

TABLE 2. Metals Detected in Sediment (XRF Verification)
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Mercury	MDL	Lead	MDL
Location 3	SD3 DUP	7.8	0.39	130	3.9
Location 4	SD4	190	4.0	150	4.0
Location 5	SD5	340	40	200	4.0
Location 5*	WET 5	78	4.1	42	3.7
Location 19*	WET 19	100	2.9	28	3.8
Location 24*	SED 24	65	4.2	23	3.3
Location 25*	SED 25	75	4.2	18	3.5
Location 33*	SED 33	45	4.3	25	3.7
Location 44*	SED 44	1.7	0.06	11	3.7
Lagoon Outfall*	OUTFALL	39	3.5	18	4

MDL denotes Method Detection Limit
* - reported results are on wet weight basis (as received)
Note: Samples taken May 1995

TABLE 3. Aroclor 1268 and 1260 Detected in Sediment Samples
Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample Location	Sample Number	Aroclor 1260	MDL	Aroclor 1268	MDL
Reference	J01508	U	190	81J	190
SED 35	A,B01510	U	130	70000	130
SED 19-20	K01546	U	120	150000	120
SED 36	K01540	U	140	55000	140
SED 17-18	J01545	U	120	56000	120
SED 10-11	K24160	NA	NA	2289J	28
LCP 46	J,K24164	U	460	5900	460
LCP 43	D24161	U	490	5200	490
LCP 44	F24162	U	480	8800	480
LCP 45	G24163	U	470	6200	470
LCP 47	1050A	570	130	18000	130
LCP 48	1051A	730	150	10000	150
LCP 49	1052A	700	190	6600	190
LCP 50	1053A	320	160	1100	160
LCP 51	1055A	32000	400	910000	400

MDL denotes Method Detection Limit
U denotes Not Detected
J denotes value below MDL
Sample location 10-11 analyzed 6 February 1996. The sample exceeded the holding time and the results are estimated
NA denotes Not Analyzed
Note: Samples taken May 1995

TABLE 4. Aroclor 1268 and 1260 Detected in Sediment Samples
Collected in July 1995
LCP Chemical Site
Brunswick, GA
April 1997

(ug/kg, dry weight)

Sample Location	Sample Number	Aroclor 1260	MDL	Aroclor 1268	MDL
41A	B4438	990	130	3600	130
45A	B04339	U	140	22000	140
A-1	A4469	U	66	72000	66
A-2	A4462	U	130	27000	130
A-3	A4455	U	130	53000	130
B-1	A4466	U	140	180000	140
B-2	A4461	U	180	76000	180
B-3	A4472	U	160	80000	160
C-2	A4468	U	250	150000	250
C-3	A4457	U	190	3200	190
D-3	A4458	U	220	150000	220
E-2	A4463	U	150	230000	150
E-3	A4471	U	220	3800000	220
F-2	A4470	U	140	3000000	140
F-3	A4465	U	220	620000	220
G-2	A4464	U	200	430000	200
G-3	A4467	U	210	160000	210
H-1	A4456	U	210	4000000	210
H-2	A4460	U	260	840000	260
H-3	A4459	U	260	250000	260
I-1	04478	U	390	110000	390
I-2	04479	U	290	510000	290
I-3	04480	U	340	230000	340
J-1	04481	U	260	300000	260
J-2	04482	U	230	100000	230
J-3	04483	U	240	110000	240
K-1	04484	U	240	79000	230
K-2	04485	U	230	76000	300
K-3	04486	U	300	22000	240
L-1	04487	U	240	49000	150
L-2	04488	U	230	19000	230
L-3	04489	U	2800	11000	2800
M-1	04490	U	1700	6600	1700
M-3	04491	U	4000	28000	4000
N-3	04492	U	170	5700	170

MDL denotes Method Detection Limit
U denotes Not Detected
Note: Samples taken July 1995

\113\del\fr\9704\table4.wb2

TABLE 4 (cont'd.). Aroclor 1268 and 1260 Detected in Sediment Samples
Collected in July 1995.
LCP Site
Brunswick, GA
April 1997

(ug/kg, dry weight)

Sample Location	Sample Number	Aroclor 1260	MDL	Aroclor 1268	MDL
O-1	04493	U	280	7500	280
O-2	04494	U	190	10000	190
O-3	04495	U	240	7700	240
P-1	04496	U	4700	19000	4700
P-2	04997	U	4100	20000	4100
SED-33-34A	B04338	U	200	1500	200
SED-44A	B04340	U	2800	3600	2800
52	B4439	2300	150	160000	150
53	B4440	390	72	20000	72
54	B4441	680	110	76000	110
55	B4442	830	92	1400	92
60	B4450	8600	150	310000	150
61	B4446	11000	140	1300000	140
62	B4448	4200	140	230000	140
63	B4449	5600	140	170000	140
64	B4445	5100	130	530000	130
65	B4454	5200	150	240000	150
66	B4443	3600	140	190000	140
67	B4444	1700	130	11000	130
68	B4452	5100	130	330000	130
69	B4453	980	150	65000	150
70	B4447	1700	130	120000	130
71	B4451	940	130	66000	130
72	B04357	U	2700	13000	2700
73	B04356	U	140	20000	140
74	B04355	U	3800	5300	3800
75	B04354	U	150	5200	150
76	B04353	U	160	7500	160
77	B04352	U	140	27000	140
78	B04351	U	2500	11100	2500
79	B04350	U	3500	4700	3500
80	B04349	U	3300	5900	3300
81	B04348	U	3200	4400	3200
82	B04347	U	250	5900	250
83	B04346	U	460	2200	460

MDL denotes Method Detection Limit
U denotes Not Detected
Note: Samples taken in July 1995

Table 5. Results of the Analysis for Aroclor 1268 in Sediment
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample Location	Sample ID	% Solids	Aroclor 1268	MDL
Sand Blank	Blank 229	100	U	50
A5	A 113008	25	1800	200
A7	A 113009	30	710	160
B4	A 113010	24	1600	200
B6	A 113011	25	1600	190
B7	A 113012	28	4600	180
C5	A 113013	23	470	220
E5	A 113014	18	U	260
G5	A 113015	16	2200	300
I5	A 113016	18	3200	270
K5	A 113017	18	990	260
M5	A 113018	28	2200	180
E7	A 113019	21	U	230
G7	A 113020	29	1800	160
Purvis Creek	A 100-SED	32	1100	150
Purvis Creek	A 101-SED	28	U	170
Purvis Creek	A 102-SED	30	130J	160
Purvis Creek	A 103-SED	27	U	180
Sand Blank	Blank 230	100	U	50
D4	A 113001	23	42000	200
E4	A 113002	12	56000	390
F4	A 113003	17	47000	280
G4	A 113004	18	71000	270
H4	A 113005	19	66000	250
I4	A 113006	16	17000	310
J4	A 113007	17	16000	290
Sand Blank	Blank 231	100	U	210
Little satilla	A1-SEDREF	23	U	2100
Purvis Creek	A104-SED	32	2700	160
Purvis Creek	A105-SED	28	990J	190

MDL denotes method detection limit
J denotes value below MDL
U denotes undetected
Note: Samples collected in October 1995

Table 5 (cont'd.). Results of the Analysis for Aroclor 1268 in Sediment
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample Location	Sample ID	% Solids	Aroclor 1268	MDL
Purvis Creek	A106-SED	20	160	160
Purvis Creek	A107-SED	29	580	2600
Grid Marsh	B 113035	25	6100	630
Process south	B 113036	85	450000	840
Cell Bldg.	B 113037	89	53000	150
Turtle River US 0-6 108	A 113039	26	600J	110
Turtle River 24-30 108	A 113040	34	88	120
Turtle River 48-54 108	A 113042	40	U	160
Gibson Creek 0-6 109	A 113043	25	200	120
Gibson Creek 18-24 109	A 113044	38	U	130
Gibson Creek 48-54 109	A 113047	36	U	220
H3 0-12	A 113048	17	39000	120
H3 30+	B 113051	30	240	4100
J1 0-6	A 113073	15	5400	63
L1 0-6	A 113074	78	850	59
L1 12-18	A 113076	74	160	2100
F2 0-6	A 113077	28	1100000	2100
Sand Blank	Blank 232	100	U	50
F2 12-18	A 113079	24	88000	2600
F2 24-30	A 113081	27	110000	2700
H4 0-6	A 113093	20	26000	210
H4 12-18	A 113095	19	32000	240
H4 24-30	A 113097	28	99	130
B1 0-6	A 113098	26	15000	170
B1 12-18	A 113100	25	1200	190
B1 24-30	A 113102	37	140	110
E3 0-6	A 113082	18	420000	3800
E3 12-18	A 113084	25	230000	2700
E3 24-30	A 113086	31	430000	1900
B2 0-6	A 113089	25	8900	140

MDL denotes method detection limit
J denotes value below MDL
U denotes undetected
Note: Samples collected in October 1995

Table 5 (cont'd.). Results of the Analysis for Aroclor 1268 in Sediment
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample Location	Sample ID	% Solids	Aroclor 1268	MDL
B2 12-18	A 113091	28	5400	2600
H1 0-6	A 113104	24	490000	2200
H1 12-18	A 113106	25	150000	2400
H2 0-6	A 113108	22	190000	2800
H2 12-18	A 113110	23	5900	200
Sand Blank	Blank 233	100	U	50
Drainage Channel	A111-SED	29	6100	2300
Purvis Creek	A112-SED	34	4800	2200
Main Tributary	A113-SED	29	29000	2300
Purvis Creek 0-6 110	A113113	74	250	68
Purvis Creek 12-18 110	A113115	57	1400	1200
Purvis Creek 24-30 110	A 113117	62	5400	1000
Drainage Channel 0-6 114	A 113119	25	20000	2600
Drainage Channel 12-18 11	A 113121	31	22000	2300
Main tributary	A115-SED	29	2400	140
Main tributary	A116-SED	29	5000	150
Outfall Purvis Creek 117	A117-SED	33	11000	1900
South Marsh 118	A118-SED	32	10000	2300
South Marsh 119	A119-SED	27	3800	190
North Marsh 120	A120-SED	24	17000	2600
North Marsh 121	A121-SED	24	1800	170
Turtle river 122	A122-SED	56	U	66

MDL denotes method detection limit
J denotes value below MDL
U denotes undetected
Note: Samples collected in October 1995

TABLE 6. Mercury Detected in Sediment
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Mercury	MDL
A-1	A4469	18	1.8
A-2	A4462	81	3.2
A-3	A4455	76	2.9
B-1	A4466	88	4.4
B-2	A4461	140	5.3
B-3	A4472	32	1.8
C-2	A4468	200	5.9
C-3	A4457	65	5.3
D-3	A4458	170	5.4
E-2	A4463	200	4.4
E-3	A4471	280	9.6
F-2	A4470	580	17
F-3	A4465	300	11
G-2	A4464	430	12
G-3	A4467	230	5.4
H-1	A4456	960	35
H-2	A4460	480	12
H-3	A4459	210	5.4
SED-33-34A	B04338	0.70	0.08
SED-44A	B04340	20	0.63
SED-45A	B04339	5.1	0.08
72	B04357	8.8	0.12
73	B04356	4.6	0.08
74	B04355	23	0.68
75	B04354	29	0.62
76	B04353	17	0.63
77	B04352	55	0.65
78	B04351	4.0	0.12
79	B04350	7.7	0.14
80	B04349	20	0.68
81	B04348	7.6	0.09
82	B04347	39	1.2
83	B04346	12	0.18

MDL denotes Method Detection Limit
Note: Samples taken in July 1995

TABLE 7. Results of the Analysis for Mercury in Sediment
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Location	Sample ID	% Solids	Mercury
	Blank	100	U
Little Satilla	B 1-SEDREF	24	0.13
Purvis Creek	B 104-SED	27	1.34
Purvis Creek	B 105-SED	27	0.82
Purvis Creek	B 106-SED	22	0.90
Purvis Creek	B 107-SED	32	0.99
Turtle River US 0-6 108	B 113039	25	0.63
Turtle River 24-30 108	B 113040	29	0.31
Turtle River 48-54 108	B 113042	39	0.06
Gibson Creek 0-6 109	B 113043	25	0.70
Gibson Creek 18-24 109	B 113044	38	0.20
Gibson Creek 48-54 109	B 113047	37	0.05
H3 0-12	B 113048	23	220
H3 30+	A 113051	32	0.40
	Blank	100	U
J1 0-6	B 113073	20	280
L1 0-6	B 113074	68	7.0
L1 12-18	B 113076	71	1.1
F2 0-6	B 113077	22	410
F2 12-18	B 113079	32	84
F2 24-30	B 113081	34	73
E3 0-6	B 113082	19	170
E3 12-18	B 113084	25	200
E3 24-30	B 113086	26	450
B2 0-6	B 113089	29	47
B2 12-18	B 113091	32	0.73
H4 0-6	B 113093	21	91
H4 12-18	B 113095	25	100
H4 24-30	B 113097	26	1.4
B1 0-6	B 113098	29	15
B1 12-18	B 113100	26	33
B1 24-30	B 113102	37	0.42
	Blank	100	U
H1 0-6	B 113104	35	330
H1 12-18	B 113106	33	190
H2 0-6	B 113108	23	330
H2 12-18	B 113110	32	8.7

Note: Samples taken October 1995

TABLE 7 (cont'd.). Results of the Analysis for Mercury in Sediment
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Location	Sample ID	% Solids	Mercury
	Blank	100	U
D4	113001	23	85
E4	113002	10	24
F4	113003	8	41
G4	113004	12	43.00
H4	113005	16	120
I4	113006	12	78
J4	113007	11	36
A5	113008	36	14
A7	113009	53	3.00
B4	113010	32	24.00
B6	113011	40	4.7
B7	113012	51	7.2
C5	113013	33	13.00
E5	113014	30	14
G5	113015	37	13
I5	113016	35	25.0
K5	113017	29	22.0
M5	113018	58	11
E7	113019	45	6
G7	113020	52	6
Purvis Creek	101-SED	33	0.91
Purvis Creek	102-SED	42	1.2
Purvis Creek	103-SED	36	1.4
	Blank	100	U
Purvis Creek 0-6 110	B 113113	73	0.09
Purvis Creek 12-18 110	B 113115	61	0.59
Purvis Creek 24-30 110	B 113117	53	0.69
Drainage Channel 0-6 114	B 113119	30	12
Drainage Channel 12-18 11	B 113121	32	39
Outfall Purvis Creek 117	B 117-SED	33	3.6
South Marsh 118	B 118-SED	31	3.3
South Marsh 119	B 119-SED	29	2.5
North Marsh 120	B 120-SED	25	13
North Marsh 121	B 121-SED	24	6.4
Turtle River 122	B 122-SED	41	0.08

Note: Samples taken October 1995

TABLE 8. Methyl, Dimethyl and Diethyl Mercury Detected in Sediment
LCP Site
Brunswick, GA
April 1997

(Results in ug/g, dry weight)

Sample Location	Sample Number	Methyl Mercury	Dimethyl Mercury	Diethyl Mercury
C-3	B03873	0.048	0.00027 J	0.0009
F-2	B03872	0.046	0.00020 J	0.00020 J
M-1	B03876	0.014	0.00080 J	0.00080 J
17-18	B03875	0.11	0.00018 J	0.00018 J
19-20	B03874	0.10	0.00014 J	0.00014 J
19-20	B03874 Duplicate	0.12	0.00014 J	0.00014 J
36	B03877	0.073	0.00016 J	0.00016 J
36	B03877 Duplicate	0.075	NP	NP

J denotes value at or below detection limit
NP denotes analysis Not Performed
Note: Samples taken in July 1995

TABLE 9 Metals Detected in Sediment (May 1995)
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	J01508		A01510		K01546		K01540		J01540	
Sample Location:	Reference		SED 35		SED 19-20		SED 36		SED 17-18	
Metal	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL
Aluminum	22000	28	19000	14	23000	21	20000	21	18000	15
Antimony	U	17	U	8.4	U	13	U	13	U	9.2
Arsenic	9.3	1.5	10	1.3	8.8	0.88	7.4	1.1	6.5	0.69
Barium	39	11	36	5.6	35	8.6	50	8.6	23	6.2
Beryllium	1.6	0.60	1.5	0.30	1.5	0.40	1.3	0.40	1.4	0.30
Cadmium	U	0.80	U	0.40	U	0.60	U	0.60	U	0.50
Calcium	2700	140	3900	70	7600	110	9200	110	2500	77
Chromium	36	2.3	78	1.1	40	1.7	85	1.7	75	1.2
Cobalt	8.6	5.6	10	2.8	9.7	4.3	12	4.3	6.5	3.1
Copper	13	1.7	33	0.80	25	1.3	71	1.3	14	0.90
Iron	31000	25	27000	13	31000	19	26000	19	22000	14
Lead	24	11	50	5.6	71	8.6	75	8.6	33	6.2
Magnesium	6400	140	8100	70	6500	110	9400	110	6100	77
Manganese	580	3.9	740	2	290	3.0	360	3.0	420	2.2
Mercury	0.13	0.12	90	3.8	170	4.1	230	4.9	15	0.69
Nickel	9.8	5.6	15	2.8	15	4.3	22	4.3	9.7	3.1
Potassium	3000	560	3400	280	3300	430	3200	430	2900	310
Selenium	U	1.5	U	1.3	U	0.88	U	1.1	U	0.69
Silver	U	1.4	U	0.70	U	1.1	U	1.1	U	0.8
Sodium	17000	140	19000	70	14000	110	19000	110	16000	77
Thallium	U	1.5	U	1.3	U	0.88	U	1.1	U	0.69
Vanadium	58	5.6	67	2.8	55	4.3	68	4.3	56	3.1
Zinc	68	5.6	99	2.8	84	4.3	150	4.3	59	3.1

MDL denotes Method Detection Limit
U denotes Not Detected
Note: Samples taken May 1995
Conc. - concentration

\113\del\fr\9704\table9.wb2

TABLE 9 (cont'd.) Metals Detected in Sediment (May 1995)
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	J24164		D24161		F24162		G24163		1050A	
Sample Location:	LCP 46		LCP 43		LCP 44		LCP 45		LCP 47	
Metal	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL
Aluminum	22000	15	15000	15	20000	12	25000	16	16000	16
Antimony	U	8.8	U	9.0	12	6.9	U	9.8	U	9.0
Arsenic	9.3	1.2	7.6	0.85	7.9	0.90	5.6	0.70	6.9	1.30
Barium	29	6	21	6	26	4.6	30	6.5	35	6.0
Beryllium	1.5	0.3	1.2	0.30	1.4	0.20	1.6	0.30	1.1	0.30
Cadmium	U	0.4	U	0.50	U	0.30	U	0.50	0.55	0.40
Calcium	5100	73	5400	75	2700	58	3100	81	2700	75
Chromium	84	1.2	66	1.2	120	0.90	89	1.3	82	1.2
Cobalt	7.8	2.9	5.6	3	6.6	2.30	7.5	3.3	6.5	3.0
Copper	12	0.9	9.6	0.90	14	0.70	13	1.0	24	0.90
Iron	26000	13	24000	14	21000	10	26000	15	16000	13
Lead	30	5.9	26	6.0	35	4.6	31	6.5	130	6.0
Magnesium	7600	73	6700	75	6700	58	7500	81	5300	75
Manganese	620	2.1	590	2.1	450	1.6	440	2.3	280	2.1
Mercury	2.7	0.08	2	0.07	8.2	0.33	3.6	0.22	8.4	0.29
Nickel	12	2.9	8.9	3.0	11	2.3	13	3.3	11	3.0
Potassium	3600	290	3100	300	3400	230	3700	330	2600	300
Selenium	U	1.2	U	1.7	U	1.8	U	1.4	U	1.3
Silver	U	0.7	U	0.80	U	0.60	U	0.80	U	0.70
Sodium	21000	73	23000	75	21000	58	21000	81	14000	75
Thallium	U	0.62	U	0.85	U	0.90	U	0.70	U	0.64
Vanadium	62	2.9	50	3.0	64	2.3	69	3.3	51	3.0
Zinc	67	2.9	50	3.0	61	2.3	71	3.3	110	3.0

MDL denotes Method Detection Limit
ND denotes Not Detected
Note: Samples taken May 1995
Conc. - concentration

\113\del\fr\9704\table9.wb2

TABLE 9 (cont'd.). Metals Detected in Sediment (May 1995)
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	1051A		1052A		1053A		1055A		K24160	
Sample Location:	LCP 48		LCP 49		LCP 50		LCP 51		LCP 10-11	
Metal	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL
Aluminum	17000	16	19000	14	18000	14	14000	24	20000	8.5
Antimony	U	9.7	U	8.5	U	8.7	U	14	U	5.1
Arsenic	5.5	0.74	4.9	0.66	5.1	0.57	8.4	1.2	5.4	0.61
Barium	30	6.4	22	5.7	21	5.8	31	9.6	27	3.4
Beryllium	1.1	0.30	1.2	0.30	1.2	0.30	0.71	0.50	1.3	0.20
Cadmium	U	0.50	U	0.40	U	0.40	U	0.70	U	0.30
Calcium	3100	80	3200	71	2400	72	5600	120	3400	42
Chromium	91	1.3	94	1.1	40	1.2	66	1.9	65	0.70
Cobalt	7.8	3.2	5.7	2.8	5.5	2.9	6	4.8	6.1	1.7
Copper	21	1.0	20	0.80	14	0.90	56	1.4	16	0.50
Iron	15000	14	19000	13	20000	13	14000	22	22000	7.6
Lead	110	6.4	81	5.7	140	5.8	220	9.6	35	3.4
Magnesium	6000	80	6200	71	5800	72	6700	120	6100	42.0
Manganese	470	2.3	160	2.0	270	2.0	77	3.4	290	1.2
Mercury	9.3	0.26	6.3	0.22	11	0.80	330	8.9	34	2.20
Nickel	13	3.2	13	2.80	9.4	2.9	17	4.8	12	1.70
Potassium	2900	320	3200	280.0	3200	290.0	2500	480	3100	170
Selenium	U	1.5	U	1.3	U	1.1	U	2.4	U	1.2
Silver	U	0.80	U	0.70	U	0.7	U	1.2	U	0.40
Sodium	17000	80	17000	71	18000	72	23000	120	16000	42
Thallium	U	0.74	U	0.66	U	0.57	U	1.2	U	0.61
Vanadium	58	3.2	54	2.8	46	2.9	45	4.8	54	1.7
Zinc	120	3.2	86	2.8	56	2.9	160	4.9	63	1.7

MDL denotes Method Detection Limit
ND denotes Not Detected
Note: Samples taken May 1995
Conc. - concentration

\113\del\fr\9704\table9.wb2

TABLE 10 Metals Detected in Sediment Samples Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	B4438		B4439		B4440		B4441		B4442	
Sample Location:	41A		52		53		54		55	
Metal	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)
Aluminum	37000	20	36000	21	22000	5.9	31000	15	17000	8.9
Antimony	U	12	U	12	U	3.6	U	9.1	U	5.3
Arsenic	8.6	1.5	11	2.0	4.6	0.77	8.4	1.5	5.6	1.1
Barium	37	8.0	40	8.2	21	2.4	32	6.0	39	3.5
Beryllium	1.8	0.40	1.7	0.40	0.64	0.10	1.5	0.30	0.82	0.20
Cadmium	U	0.60	U	0.60	U	0.20	U	0.50	U	0.30
Calcium	4400	100	3500	100	1900	30	3300	76	36000	44
Chromium	79	1.6	130	1.6	49	0.50	62	1.2	24	0.70
Cobalt	9.4	4.0	9.8	4.1	3.7	1.2	8.1	3.0	4.4	1.8
Copper	14	1.2	19	1.2	6.4	0.40	15	0.9	9.5	0.50
Iron	33000	18	32000	19	20000	5.3	27000	14	15000	8.0
Lead	52	8.0	39	8.2	26	2.4	30	6.0	20	3.5
Magnesium	8000	100	8100	100	4000	30	6600	76	3700	44
Manganese	350	2.8	330	2.9	160	0.80	330	2.1	280	1.2
Mercury	1.9	0.08	49	1.8	5.3	0.22	5.9	0.30	0.13	0.04
Nickel	16	4.0	20	4.1	6.0	1.2	15	3.0	10	1.8
Potassium	4200	400	4000	410	2300	120	3600	300	1800	180
Selenium	U	1.5	U	2.0	U	0.77	U	1.5	U	1.1
Silver	U	1.0	U	1.0	U	0.30	U	0.80	U	0.40
Sodium	17000	100	19000	100	10000	30	15000	76	9700	44
Thallium	U	0.74	U	0.98	U	0.39	U	0.75	U	1.1
Vanadium	78	4.0	78	4.1	45	1.2	71	3.0	33	1.8
Zinc	71	4.0	92	4.1	36	1.2	68	3.0	110	1.8

MDL denotes Method Detection Limit
U denotes Not Detected above MDL
Note: Samples taken in July 1995

\\113\del\fr\9704\table10 wb2

TABLE 10 (cont'd) Metals Detected in Sediment Samples Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	B4443		B4444		B4445		B4446		B4447	
Sample Location:	66		67		64		61		70	
Metal	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)
Aluminum	30000	17	25000	14	36000	17	33000	19	33000	18
Antimony	U	10	U	8.1	U	10	U	12	U	11
Arsenic	9.1	1.5	11	1.4	8.8	1.2	7.5	1.3	7.4	1.3
Barium	33	6.7	25	5.4	69	6.9	36	7.7	40	7.0
Beryllium	1.5	0.30	1.7	0.30	1.8	0.30	1.7	0.40	2.0	0.40
Cadmium	U	0.50	U	0.40	U	0.50	U	0.60	U	0.50
Calcium	3500	84	2100	68	2900	87	3500	96	6600	88
Chromium	110	1.3	45	1.1	64	1.4	61	1.5	160	1.4
Cobalt	10	3.3	9.4	2.7	9.3	3.5	8.2	3.8	11	3.5
Copper	22	1.0	6.8	0.80	22	1.0	29	1.2	24	1.1
Iron	28000	15	31000	12	32000	16	30000	17	36000	16
Lead	46	6.7	20	5.4	60	6.9	87	7.7	53	7.0
Magnesium	7300	84	6800	68	7400	87	6400	96	9800	88
Manganese	320	2.3	220	1.9	300	2.4	310	2.7	500	2.5
Mercury	55	1.5	1.3	0.07	81	1.5	98	3.7	25	1.7
Nickel	15	3.3	13	2.7	19	3.5	19	3.8	19	3.5
Potassium	3700	330	3900	270	4000	350	3700	380	4800	350
Selenium	U	1.5	U	1.4	U	1.2	U	1.3	U	1.3
Silver	U	0.80	U	0.70	U	0.90	U	1.0	U	0.90
Sodium	18000	84	16000	68	16000	87	20000	96	21000	88
Thallium	U	0.73	U	0.71	U	0.59	U	0.65	U	0.66
Vanadium	65	3.3	60	2.7	85	3.5	78	3.8	79	3.5
Zinc	79	3.3	39	2.7	85	3.5	91	3.8	110	3.5

MDL denotes Method Detection Limit
U denotes Not Detected above MDL
Note: Samples taken July 1995

TABLE 10 (cont'd.) Metals Detected in Sediment Samples Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	B4448		B4449		B4450		B4451		B4452	
Sample Location:	62		63		60		71		68	
Metal	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)
Aluminum	28000	16	27000	19	23000	13	36000	14	39000	19
Antimony	U	9.8	U	12	U	8.1	U	8.3	U	12
Arsenic	9.1	1.6	8.7	2.0	7.1	1.3	9.1	1.3	10	2.0
Barium	34	6.5	34	7.7	53	5.4	36	5.6	45	7.8
Beryllium	1.5	0.30	1.4	0.40	1.4	0.30	1.8	0.30	1.8	0.40
Cadmium	U	0.50	U	0.60	U	0.40	U	0.40	U	0.60
Calcium	10000	82	2800	97	2700	67	3600	69	3300	97
Chromium	61	1.3	130	1.5	65	1.1	52	1.1	77	1.6
Cobalt	9.0	3.3	14	3.9	7	2.7	8.9	2.8	9.5	3.9
Copper	21	1.0	23	1.2	20	0.80	15	0.80	19	1.2
Iron	31000	15	24000	17	26000	12	32000	12	31000	18
Lead	51	6.5	44	7.7	130	5.4	28	5.6	48	7.8
Magnesium	7400	82	7100	97	6500	67	7200	69	7700	97
Manganese	460	2.3	250	2.7	310	1.9	340	1.9	440	2.7
Mercury	150	3.6	65	3.8	65	3.8	30	1.1	27	1.5
Nickel	17	3.3	16	3.9	14	2.7	15	2.8	19	3.9
Potassium	3700	330	3500	390	3300	270	3700	280	4200	390
Selenium	U	1.6	U	2.0	U	1.3	U	1.3	U	2.0
Silver	U	0.80	U	1.0	U	0.70	U	0.70	U	1.0
Sodium	17000	82	19000	97	18000	67	16000	69	15000	97
Thallium	U	1.6	U	0.99	U	0.66	U	0.65	U	1.0
Vanadium	67	3.3	65	3.9	65	2.7	68	2.8	85	3.9
Zinc	77	3.3	86	3.9	77	2.7	62	2.8	87	3.9

MDL denotes Method Detection Limit
U denotes Not Detected above MDL
Note: Samples taken July 1995

TABLE 10 (cont'd) Metals Detected in Sediment Samples Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	B4453		B4454		C04478		D04479		C04480	
Sample Location:	69		65		I-1		I-2		I-3	
Metal	Conc (mg/kg)	MDL (mg/kg)	Conc (mg/kg)	MDL (mg/kg)	Conc (mg/kg)	MDL (mg/kg)	Conc (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)
Aluminum	21000	16	35000	16	23000	70	22000	50	18000	64
Antimony	U	9.7	U	9.7	U	42	U	30	U	38
Arsenic	10	2.0	8.2	1.7	5.0	3.1	4.3	2.7	4.5	3.2
Barium	28	6.5	39	6.4	31	28	28	20	U	26
Beryllium	1.5	0.30	1.7	0.30	U	1.4	1.2	1.0	U	1.3
Cadmium	U	0.50	U	0.50	U	2.1	U	1.5	U	1.9
Calcium	4900	81	3100	80	5200	350	6900	250	3700	320
Chromium	160	1.3	110	1.3	84	5.6	80	4.0	96	5.1
Cobalt	7.8	3.2	11	3.2	U	14	U	10	U	13
Copper	17	1.0	29	1.0	57	4.2	45	3.0	32	3.8
Iron	26000	15	31000	14	19000	63	20000	45	17000	58
Lead	39	6.5	57	6.4	250	28	150	20	110	26
Magnesium	7200	81	8000	80	9700	350	9100	250	9300	320
Manganese	360	2.3	330	2.3	170	9.9	160	7.0	130	9.0
Mercury	22	0.68	82	3.3	370	13	290	3.8	130	6.3
Nickel	13	3.2	18	3.2	31	14	26	10	17	13
Potassium	3500	320	4000	320	3600	1400	3700	1000	3600	1300
Selenium	U	2.0	U	1.7	U	3.1	U	2.7	U	3.2
Silver	U	0.80	U	0.80	U	3.5	U	2.5	U	3.2
Sodium	14000	81	20000	80	43000	350	39000	250	46000	320
Thallium	U	1.0	U	0.85	U	3.1	U	2.7	U	3.2
Vanadium	61	3.2	73	3.2	120	14	90	10	80	13
Zinc	87	3.2	91	3.2	200	14	140	10	120	13

MDL denotes Method Detection Limit
U denotes Not Detected above MDL
Note: Samples taken July 1995

TABLE 10 (cont'd). Metals Detected in Sediment Samples Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	C04881		C04482		C04483		C04484		C04485	
Sample Location:	J-1		J-2		J-3		K-1		K-2	
Metal	Conc (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)
Aluminum	17000	48	22000	32	18000	35	13000	31	13000	41
Antimony	U	29	U	19	U	21	U	19	U	25
Arsenic	5.1	2.3	5.9	2.0	6.2	2.2	2.9	1.8	5.5	2.3
Barium	23	19	25	13	21	14	100	12	19	17
Beryllium	U	1.0	1.1	0.6	1.1	0.70	0.8	0.60	0.87	0.80
Cadmium	U	1.4	U	1.0	U	1.0	U	0.90	U	1.2
Calcium	7800	240	3600	160	3400	170	26000	160	3700	210
Chromium	94	3.8	110	2.6	130	2.8	58	2.5	110	3.3
Cobalt	9.6	9.5	U	6.5	7.4	6.9	6.6	6.2	U	8.3
Copper	73	2.9	39	1.9	27	2.1	44	1.9	29	2.5
Iron	15000	43	17000	29	16000	31	12000	28	12000	37
Lead	230	19	84	13	58	14	310	12	68	17
Magnesium	9300	240	8600	160	8400	170	13000	160	8600	210
Manganese	120	6.7	84	4.5	110	4.8	220	4.3	74	5.8
Mercury	310	2.7	150	3.5	120	5.3	110	4.4	93	5.6
Nickel	21	9.5	17	6.5	14	6.9	17	6.2	14	8.3
Potassium	3400	950	3800	650	3800	690	1900	620	3600	830
Selenium	U	2.3	U	2.0	U	2.2	U	1.8	U	2.3
Silver	U	2.4	U	1.6	U	1.7	U	1.6	U	2.1
Sodium	46000	240	36000	160	35000	170	49000	160	44000	210
Thallium	U	2.3	U	2.0	U	2.2	U	1.8	U	2.3
Vanadium	67	9.5	75	6.5	67	6.9	70	6.2	66	8.3
Zinc	180	9.5	100	6.5	84	6.9	93	6.2	88	8.3

MDL denotes Method Detection Limit
U denotes Not Detected above MDL
Note: Sample taken July 1995

\113\del\r\9704\table10 wb2

TABLE 10 (cont'd) Metals Detected in Sediment Samples Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	C04486		C04487		C04488		C04489		C04490		C04491	
Sample Location:	K-3		L-1		L-2		L-3		M-1		M-3	
Metal	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)
Aluminum	18000	43	11000	26	17000	43	7700	25	800	9.4	20000	26
Antimony	U	26	U	16	U	26	U	15	U	5.6	U	16
Arsenic	5.4	1.9	3.8	1.3	6.5	2.0	3.9	1.2	1.4	0.80	6.4	1.7
Barium	23	17	36	10	27	17	12	9.9	U	3.8	26	11
Beryllium	1.1	0.90	0.77	0.50	0.99	0.90	0.53	0.50	U	0.20	1.3	0.50
Cadmium	U	1.3	U	0.80	U	1.3	U	0.70	U	0.30	U	0.80
Calcium	3400	210	3600	130	4200	210	2000	120	540	47	3000	130
Chromium	130	3.4	77	2.1	100	3.4	55	2.0	4.4	0.80	120	2.1
Cobalt	U	8.5	U	5.2	U	8.5	U	5.0	U	1.9	7.1	5.3
Copper	24	2.6	26	1.6	27	2.6	9	1.5	1.6	0.60	22	1.6
Iron	15000	38	8900	23	13000	38	6300	22	640	8.4	21000	24
Lead	52	17	120	10	53	17	75	9.9	19	3.8	36	11
Magnesium	8200	210	6200	130	8100	210	4300	120	800	47	7700	130
Manganese	130	6.0	190	3.6	92	6.0	170	3.5	7.5	1.3	200	3.7
Mercury	58	3.3	86	1.9	64	0.91	19	0.56	5.9	0.08	38	0.84
Nickel	14	8.5	11	5.2	14	8.5	5.6	5.0	U	1.9	12	5.3
Potassium	3800	850	2600	520	3500	850	1800	500	310	190	3800	530
Selenium	U	1.9	U	1.3	U	2.0	U	1.2	U	0.80	U	1.7
Silver	U	2.1	U	1.3	U	2.1	U	1.2	U	0.50	U	1.3
Sodium	35000	210	22000	130	35000	210	18000	120	6900	47	28000	130
Thallium	U	1.9	U	1.3	U	2.0	U	1.2	U	0.80	U	1.7
Vanadium	66	8.5	43	5.2	65	8.5	36	5.0	6.3	1.9	66	5.3
Zinc	74	8.5	64	5.2	79	8.5	31	5.0	6.7	1.9	74	5.3

MDL denotes Method Detection Limit
U denotes Not Detected above MDL
Note: Samples taken July 1995

TABLE 10 (cont'd) Metals Detected in Sediment Samples Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Number:	C04492		C04493		C04494		C04495		C04496		C04497	
Sample Location:	N-3		O-1		O-2		O-3		P-1		P-2	
Metal	Conc. (mg/kg)	MDL (mg/kg)	Conc (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)	Conc. (mg/kg)	MDL (mg/kg)
Aluminum	21000	30	12000	45	19000	25	18000	40	15000	33	20000	27
Antimony	U	18	U	27	U	15	U	24	U	20	U	16
Arsenic	6.3	1.7	5.3	2.2	6.0	1.9	6.1	2.0	3.4	1.1	6.1	2.0
Barium	28	12	21	18	35	10	22	16	930	13	27	11
Beryllium	1.3	0.60	U	0.90	1.3	0.50	1.1	0.80	0.82	0.70	1.3	0.50
Cadmium	U	0.90	U	1.3	U	0.80	U	1.2	U	1.0	U	0.80
Calcium	3100	150	5200	220	3500	130	3400	200	5000	170	3400	130
Chromium	130	2.4	70	3.6	110	2.0	130	3.2	63	2.7	120	2.1
Cobalt	6.1	6.0	U	8.9	6.1	5.1	U	8.0	U	6.6	7.6	5.3
Copper	20	1.8	14	2.7	23	1.5	19	2.4	17	2.0	24	1.6
Iron	19000	27	5800	40	15000	23	17000	36	9300	30	19000	24
Lead	33	12	56	18	37	10	28	16	43	13	35	11
Magnesium	7600	150	9300	220	7800	130	8400	200	7500	170	8000	130
Manganese	210	4.2	50	6.3	190	3.6	120	5.6	75	4.7	210	3.7
Mercury	36	0.61	48	1.1	56	0.68	33	0.95	43	0.85	50	0.75
Nickel	12	6.0	11	8.9	12	5.1	13	8.0	15	6.6	13	5.3
Potassium	3600	600	3200	890	3500	510	3900	800	2900	660	3800	530
Selenium	U	1.7	U	2.2	U	1.9	U	2.0	1.8	1.1	U	2.0
Silver	U	1.5	U	2.2	U	1.3	U	2.0	U	1.7	U	1.3
Sodium	25000	150	46000	220	28000	130	36000	200	30000	170	29000	130
Thallium	U	1.7	U	2.2	U	1.9	U	2.0	U	1.1	U	2.0
Vanadium	70	6.0	57	8.9	64	5.1	68	8.0	82	6.6	63	5.3
Zinc	71	6.0	44	8.9	61	5.1	67	8.0	57	6.6	71	5.3

MDL denotes Method Detection Limit
U denotes Not Detected above MDL
Note: Samples taken July 1995

TABLE 11. Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		A 113035 Grid Marsh		A 113037 Cell Bldg		C 113043 Gibson Creek 0-6 109		C 113044 Gibson Creek 18-24 109		C 113047 Gibson Creek 48-54 109	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	5.0	18000	17	1400	5.6	48000	17	42000	14	46000	13
Antimony	U	0.20	U	17	U	5.6	U	17	U	14	U	13
Arsenic	U	0.01	5.3	1.7	0.41	0.28	13	1.7	12	1.4	15	1.3
Barium	U	0.50	70	1.7	18	0.56	44	1.7	36	1.4	40	1.3
Beryllium	U	0.10	U	0.33	U	0.11	1.7	0.35	1.8	0.27	1.9	0.26
Cadmium	U	0.25	U	0.82	U	0.28	U	0.87	U	0.68	U	0.64
Calcium	U	20	2300	66	410	22	3300	69	2400	55	2600	52
Chromium	U	0.50	66	1.7	5.4	0.56	88	1.7	64	1.4	67	1.3
Cobalt	U	1.0	U	3.3	U	1.1	U	3.5	U	2.7	U	2.6
Copper	U	1.0	17	3.3	20	1.1	15	3.5	10	2.7	10	2.6
Iron	U	7.5	13000	25	3000	8.3	39000	26	31000	21	39000	19
Lead	U	5.0	34	17	15	5.6	29	17	27	14	28	13
Magnesium	U	5.0	4200	17	210	5.6	7500	17	7300	14	7400	13
Manganese	U	0.25	92	0.82	20	0.28	260	0.87	210	0.68	310	0.64
Mercury	U	0.013	26	2.1	15	0.70	0.51	0.043	0.07	0.034	0.04	0.032
Nickel	U	1.5	11	4.9	6.3	1.7	32	5.2	19	4.1	20	3.9
Potassium	U	5.0	2300	17	83	5.6	4600	17	4700	14	5200	13
Selenium	U	0.20	U	17	U	5.6	U	17	U	14	U	13
Silver	U	0.50	U	1.7	U	0.56	U	1.7	U	1.3	U	1.3
Sodium	U	5.0	14000	17	230	5.6	15000	17	12000	14	14000	13
Thallium	U	0.20	U	0.66	U	0.22	U	0.69	U	0.55	U	0.52
Vanadium	U	0.75	43	2.5	3.1	0.83	83	2.6	70	2.1	72	1.9
Zinc	U	0.50	52	1.7	35	0.56	69	1.7	53	1.4	54	1.3

Note: Samples taken October 1995

TABLE 11 (cont'd). Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		C113098 B1 0-6		C113100 B1 12-18		C113102 B1 24-30		A113036 Process South	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	5.0	42000	16	56000	15	55000	13	2500	5.8
Antimony	U	0.20	U	16	U	15	U	13	U	5.8
Arsenic	U	0.01	10.4	1.6	17	1.5	24	1.3	0.8	0.58
Barium	U	0.50	50	1.6	57	1.5	54	1.3	23	0.58
Beryllium	U	0.10	1.5	0.32	1.9	0.31	1.7	0.25	U	0.12
Cadmium	U	0.25	U	0.80	U	0.77	U	0.63	U	0.29
Calcium	U	20	3100	64	2900	62	2500	51	730	23
Chromium	U	0.50	100	1.6	77	1.5	65	1.3	8.9	0.58
Cobalt	U	1.0	U	3.2	U	3.1	3.4	2.5	U	1.2
Copper	U	1.0	43	3.2	31	3.1	37	2.5	21	1.2
Iron	U	7.5	29000	24	44000	23	50000	19	4600	8.7
Lead	U	5.0	95	16	160	15	210	13	65	5.8
Magnesium	U	5.0	7100	16	7700	15	6600	13	400	5.8
Manganese	U	0.25	240	0.80	260	0.77	490	0.63	26	0.29
Mercury	U	0.013	95	0.039	1.5	1.9	7.2	0.32	450	36
Nickel	U	1.5	24	4.8	25	4.6	30	3.8	36	1.7
Potassium	U	5.0	4000	16	4900	15	4800	13	140	5.8
Selenium	U	0.20	U	16	U	15	U	13	U	5.8
Silver	U	0.50	U	1.6	U	1.5	U	1.3	U	0.59
Sodium	U	5.0	14000	16	14000	15	12000	13	240	5.8
Thallium	U	0.20	U	0.64	U	0.62	U	0.51	U	0.23
Vanadium	U	0.75	84	2.4	88	2.3	78	1.9	8.3	0.87
Zinc	U	0.50	120	1.6	150	1.5	180	1.3	30	0.58

Note: Samples taken October 1995

TABLE 11 (cont'd). Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		C113048 H3 0-12		C113051 H3 30+		C113093 H4 0-6		C113095 H4 12-18		C113097 H4 24-30	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	5.0	31000	24	52000	18	28000	15	46000	23	49000	24
Antimony	U	0.20	U	24	U	18	U	15	U	23	U	24
Arsenic	U	0.01	5.6	1.2	7.7	1.8	5.2	1.5	5.8	2.3	6.2	1.2
Barium	U	0.50	31	2.4	48	1.8	29	1.5	45	2.3	46	2.4
Beryllium	U	0.10	0.99	0.48	1.5	0.36	0.87	0.31	1.3	0.47	1.6	0.49
Cadmium	U	0.25	U	1.2	U	0.90	U	0.77	U	1.2	U	1.2
Calcium	U	20	3400	96	2500	72	2400	62	4400	93	3800	98
Chromium	U	0.50	97	2.4	57	1.8	97	1.5	99	2.3	150	2.4
Cobalt	U	1.0	U	4.8	U	3.6	U	3.1	U	4.7	U	4.9
Copper	U	1.0	45	4.8	20	3.6	29	3.1	27	4.7	39	4.9
Iron	U	7.5	24000	36	34000	27	18000	23	29000	35	32000	37
Lead	U	5.0	99	24	180	18	56	15	79	23	130	24
Magnesium	U	5.0	6900	24	6600	18	4900	15	7500	23	8600	24
Manganese	U	0.25	130	1.2	240	0.90	90	0.77	180	1.2	180	1.2
Mercury	U	0.013	240	5.9	1.01	0.045	74	1.9	57	2.9	39	3.0
Nickel	U	1.5	29	7.2	26	5.4	18	4.6	27	7.0	33	7.3
Potassium	U	5.0	3600	24	4500	18	2800	15	4600	23	5100	24
Selenium	U	0.20	U	24	U	18	U	15	U	23	U	24
Silver	U	0.50	U	2.4	U	1.8	U	1.5	U	2.3	U	2.4
Sodium	U	5.0	22000	24	27000	18	11000	15	20000	23	22000	24
Thallium	U	0.20	U	0.96	U	0.72	U	0.62	U	0.93	U	0.98
Vanadium	U	0.75	68	3.6	74	2.7	62	2.3	97	3.5	110	3.7
Zinc	U	0.50	130	2.4	75	1.8	86	1.5	110	2.3	150	2.4

Note: Samples taken October 1995

TABLE 11 (cont'd). Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		B111-SED Drainage Channel		B112-SED Purvis Creek		B113-SED Main Tributary	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	4.0	57000	12	32000	9.2	53000	12
Antimony	U	4.0	U	12	U	9.2	U	12
Arsenic	U	0.008	11	1.2	8.5	0.92	12	1.2
Barium	U	0.40	53	1.2	30	0.92	48	1.2
Beryllium	U	0.08	1.7	0.25	1.0	0.18	1.5	0.25
Cadmium	U	0.20	U	0.62	U	0.46	U	0.62
Calcium	U	16	3700	50	2200	37	4100	49
Chromium	U	0.40	110	1.2	6.7	0.92	110	1.2
Cobalt	U	0.8	U	2.5	U	1.8	U	2.5
Copper	U	0.8	18	2.5	11	1.8	27	2.5
Iron	U	6.0	33000	19	21000	14	33000	18
Lead	U	4.0	36	12	27	9.2	48	12
Magnesium	U	4.0	7400	12	4900	9.2	7600	12
Manganese	U	0.20	420	0.62	200	0.46	360	0.62
Mercury	U	0.013	3.6	0.038	1.0	0.029	9.7	0.039
Nickel	U	1.2	24	3.7	15	2.8	24	3.7
Potassium	U	4.0	3900	12	2500	9.2	4000	12
Selenium	U	4.0	U	12	U	9.2	U	12
Silver	U	0.50	U	1.6	U	1.1	U	1.5
Sodium	U	4.0	13000	12	8900	9.2	14000	12
Thallium	U	0.16	U	0.50	U	0.37	U	0.49
Vanadium	U	0.60	84	1.9	51	1.4	79	1.8
Zinc	U	0.40	82	1.2	53	0.92	84	1.2

Note: Samples taken October 1995

TABLE 11 (cont'd) Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		B115-SED Main Tributary		B116-SED Main Tributary		B106-SED Purvis Creek		B113077 F2 0-6		B113081 F2 24-30	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	4.0	59000	14	46000	13	42000	18	36000	18	41000	12
Antimony	U	4.0	U	14	U	13	U	18	U	18	U	12
Arsenic	U	0.008	12	1.4	11	1.3	12	1.8	6.3	1.8	7.6	1.2
Barium	U	0.40	55	1.4	44	1.3	44	1.8	65	1.8	82	1.2
Beryllium	U	0.08	1.7	0.28	1.5	0.25	1.3	0.36	0.90	0.37	1.0	0.24
Cadmium	U	0.20	U	0.68	U	0.63	U	0.91	U	0.91	U	0.60
Calcium	U	16	3800	55	3200	51	5200	73	48000	73	73000	48
Chromium	U	0.40	130	1.4	110	1.3	99	1.8	81	1.8	46	1.2
Cobalt	U	0.8	U	2.7	U	2.5	U	3.6	U	3.7	U	2.4
Copper	U	0.8	21	2.7	17	2.5	16	3.6	49	3.7	33	2.4
Iron	U	6.0	35000	21	30000	19	32000	27	24000	27	26000	18
Lead	U	4.0	46	14	42	13	30	18	190	18	570	12
Magnesium	U	4.0	8400	14	7400	13	8100	18	15000	18	8300	12
Manganese	U	0.20	^320	0.68	350	0.63	650	0.91	230	0.91	210	0.60
Mercury	U	0.013	9.2	0.042	10	0.39	NA	NA	NR	NA	NR	NA
Nickel	U	1.2	29	4.1	25	3.8	25	5.4	30	5.5	29	3.6
Potassium	U	4.0	4500	14	3700	13	3900	18	3100	18	3100	12
Selenium	U	4.0	U	14	U	13	U	18	U	18	U	12
Silver	U	0.50	U	1.7	U	1.6	U	2.3	U	4.6	U	2.9
Sodium	U	4.0	15000	14	14000	13	21000	18	20000	18	19000	12
Thallium	U	0.16	U	0.55	U	0.51	U	0.73	U	0.73	U	0.48
Vanadium	U	0.60	94	2.1	79	1.9	72	2.7	86	2.7	62	1.8
Zinc	U	0.40	94	1.4	83	1.3	74	1.8	190	1.8	91	1.2

Note: Samples taken October 1995

TABLE 11 (cont'd). Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		C113113 Purvis Creek 0-6 110		C113115 Purvis Creek 12-18 110		C113117 Purvis Creek 24-30 110		C113119 Drainage Channel 0-6 114		C113121 Drainage Channel 12-18 11	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	5.0	6200	7.3	15000	6.9	5800	6.2	30000	16	38000	15
Antimony	U	0.20	U	7.3	U	6.9	U	6.2	U	16	U	15
Arsenic	U	0.01	2.6	0.73	2.4	0.69	1.9	0.62	7.1	1.6	14	1.5
Barium	U	0.50	9.1	0.73	17	0.69	7.6	0.62	37	1.6	43	1.5
Beryllium	U	0.10	0.25	0.15	0.53	0.14	0.22	0.12	1.4	0.33	1.4	0.30
Cadmium	U	0.25	U	0.37	U	0.34	U	0.31	U	0.82	U	0.76
Calcium	U	20	1300	29	1600	28	1300	25	4200	65	3100	61
Chromium	U	0.50	17	0.73	39	0.69	17	0.62	99	1.6	100	1.5
Cobalt	U	1.0	U	1.5	U	1.4	U	1.2	U	3.3	U	3.0
Copper	U	1.0	2.8	1.5	5.0	1.4	2.8	1.2	17	3.3	25	3.0
Iron	U	7.5	6000	11	11000	10	4500	9.3	30000	25	32000	23
Lead	U	5.0	U	7.3	12	6.9	U	6.2	55	16	21	15
Magnesium	U	5.0	1300	7.3	2300	6.9	970	6.2	6900	16	7100	15
Manganese	U	0.25	120	0.37	180	0.34	140	0.31	400	0.82	380	0.76
Mercury	U	0.013	0.25	0.018	0.54	0.017	0.38	0.015	8.1	0.414	32	1.9
Nickel	U	1.5	4.2	2.2	6.6	2.1	2.5	1.9	18	4.9	21	4.6
Potassium	U	5.0	710	7.3	1500	6.9	580	6.2	3900	16	4300	15
Selenium	U	0.20	U	7.3	U	6.9	U	6.2	U	16	U	15
Silver	U	0.50	U	0.74	U	0.69	U	0.61	U	1.6	U	1.5
Sodium	U	5.0	3400	7.3	4700	6.9	2500	6.2	16000	16	15000	15
Thallium	U	0.20	U	0.29	U	0.28	U	0.25	U	0.65	U	0.61
Vanadium	U	0.75	14	1.1	29	1.0	11	0.93	66	2.5	82	2.3
Zinc	U	0.50	14	0.73	28	0.69	14	0.62	72	1.6	88	1.5

Note: Samples taken October 1995

TABLE 11 (cont'd). Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		B 119-SED South Marsh		B 120-SED North Marsh		B 121-SED North Marsh	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	4.0	24000	14	31000	16	32000	16
Antimony	U	4.0	U	14	U	16	U	16
Arsenic	U	0.008	12	1.4	9.6	1.6	13	1.6
Barium	U	0.40	31	1.4	67	1.6	36	1.6
Beryllium	U	0.08	1.1	0.27	1.1	0.32	1.2	0.32
Cadmium	U	0.20	U	0.68	U	0.79	U	0.81
Calcium	U	16	3500	55	4500	63	3200	65
Chromium	U	0.40	97	1.4	61	1.6	160	1.6
Cobalt	U	0.8	U	2.7	U	3.2	U	3.3
Copper	U	0.8	14	2.7	39	3.2	21	3.3
Iron	U	6.0	25000	21	32000	24	31000	24
Lead	U	4.0	34	14	89	16	50	16
Magnesium	U	4.0	6400	14	7000	16	6900	16
Manganese	U	0.20	400	0.68	200	0.79	230	0.81
Mercury	U	0.013	NR	NA	NR	NA	NR	NA
Nickel	U	1.2	18	4.1	24	4.7	24	4.9
Potassium	U	4.0	3200	14	3500	16	3500	16
Selenium	U	4.0	U	14	U	16	U	16
Silver	U	0.50	U	1.7	U	1.9	U	2.0
Sodium	U	4.0	14000	14	11000	16	14000	16
Thallium	U	0.16	U	0.55	U	0.63	U	0.65
Vanadium	U	0.60	58	2.1	73	2.4	66	2.4
Zinc	U	0.40	71	1.4	210	1.6	94	1.6

Note: Samples taken October 1995

TABLE 11 (cont'd). Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		B 117-SED Outfall Purvis Creek		B 118-SED South Marsh		100-SED Purvis Creek	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	4.0	43000	12	44000	13	22000	11
Antimony	U	4.0	U	12	U	13	U	11
Arsenic	U	0.008	14	1.2	14	1.3	5.3	1.1
Barium	U	0.40	44	1.2	40	1.3	23	1.1
Beryllium	U	0.08	1.5	0.24	1.3	0.26	0.6	0.22
Cadmium	U	0.20	U	0.61	U	0.65	U	0.54
Calcium	U	16	6200	48	3800	52	2400	44
Chromium	U	0.40	70	1.2	72	1.3	53	1.1
Cobalt	U	0.8	U	2.4	U	2.6	U	2.2
Copper	U	0.8	18	2.4	19	2.6	9.9	2.2
Iron	U	6.0	36000	18	31000	19	15000	16
Lead	U	4.0	39	12	34	13	25	11
Magnesium	U	4.0	7500	12	6700	13	3900	11
Manganese	U	0.20	500	0.61	310	0.65	170	0.54
Mercury	U	0.013	NR	NA	NR	NA	2.5	0.34
Nickel	U	1.2	25	3.6	25	3.9	13	3.3
Potassium	U	4.0	4000	12	3600	13	1900	11
Selenium	U	4.0	U	12	U	13	U	11
Silver	U	0.50	U	1.5	U	1.6	U	2.7
Sodium	U	4.0	13000	12	12000	13	9700	11
Thallium	U	0.16	U	0.48	U	0.52	U	0.44
Vanadium	U	0.60	83	1.8	82	1.9	35	1.6
Zinc	U	0.40	83	1.2	78	1.3	46	1.1

Note: Samples taken October 1995

TABLE 11 (cont'd) Metals Detected in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID Location	Blank		C113104 H1 0-6		C 113106 H1 12-18		C 113108 H2 0-6		C 113110 H2 12-18	
Analyte	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	U	4.0	24000	20	36000	14	34000	17	36000	19
Antimony	U	0.16	U	20	U	14	U	17	U	19
Arsenic	U	0.008	4.7	2.0	4.0	1.4	5.5	1.7	6.3	1.9
Barium	U	0.40	51	2.0	35	1.4	47	1.7	36	1.9
Beryllium	U	0.08	0.88	0.41	1.4	0.29	1.2	0.34	1.4	0.38
Cadmium	U	0.20	U	1.0	U	0.71	U	0.85	U	0.95
Calcium	U	16	19000	81	3100	57	26000	68	5600	76
Chromium	U	0.40	56	2.0	46	1.4	71	1.7	47	1.9
Cobalt	U	0.8	U	4.1	U	2.9	U	3.4	U	3.8
Copper	U	0.8	46	4.1	34	2.9	44	3.4	27	3.8
Iron	U	6.0	15000	31	22000	21	21000	26	25000	29
Lead	U	4.0	260	20	650	14	220	17	280	19
Magnesium	U	4.0	6900	20	6000	14	8600	17	6400	19
Manganese	U	0.20	110	1.0	110	0.71	180	0.85	150	0.95
Mercury	U	0.013	420	63	0.79	0.045	370	27	30	0.60
Nickel	U	1.2	27	6.1	16	4.3	29	5.1	18	5.7
Potassium	U	4.0	2300	20	2900	14	2500	17	2900	19
Selenium	U	0.16	U	20	U	14	U	17	U	19
Silver	U	0.50	U	2.6	U	1.8	U	2.2	U	2.4
Sodium	U	4.0	22000	20	14000	14	21000	17	34000	19
Thallium	U	0.16	U	0.81	U	0.57	U	0.68	U	0.76
Vanadium	U	0.60	87	3.1	61	2.1	79	2.6	63	2.9
Zinc	U	0.40	190	2.0	110	1.4	160	1.7	88	1.9

Note: Samples taken October 1995

TABLE 12. Creosote and BNA Compounds Detected in Sediment Samples
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample Number:	JK24164		D24161		F24162		G24163		1050A	
Sampling Location:	LCP46		LCP43		LCP44		LCP45		LCP47	
Compound Name	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg
Acenaphthylene	U	3000	U	3900	U	3800	U	3700	U	1000
Phenanthrene	U	3000	U	3900	U	3800	U	3700	U	1000
Anthracene	U	3000	U	3900	U	3800	U	3700	U	1000
2-Methylanthracene	U	3000	U	3900	U	3800	U	3700	U	1000
Carbazole	U	3000	U	3900	U	3800	U	3700	U	1000
Fluoranthene	240J	3000	240J	3900	270J	3800	170J	3700	75J	1000
Pyrene	240J	6000	210J	7800	220J	7600	U	7400	110J	2100
Benzo(a)anthracene	U	3000	U	3900	U	3800	U	3700	U	1000
Chrysene	99J	3000	U	3900	U	3800	U	3700	U	1000
Benzo(b)fluoranthene	U	3000	U	3900	U	3800	U	3700	98J	1000
Benzo(e)pyrene	U	3000	U	3900	U	3800	U	3700	U	1000
Di-n-butylphthalate	6900	2900	1900J	3800	730J	3800	3800	3800	920J	1000
1,3-Dichlorobenzene	U	2900	U	3800	U	3800	U	3800	U	1000
1,4-Dichlorobenzene	U	2900	U	3800	U	3800	U	3800	U	1000
Dimethylphthalate	U	2900	U	3800	U	3800	U	3800	U	1000
Butylbenzlphthalate	340J	2900	330J	3800	U	3800	U	3800	52J	1000
Bis(2-Ethylhexyl)phthalate	190J	2900	U	3800	210J	3800	2300J	3800	U	1000
Di-n-actylphthalate	U	2900	U	3800	38J	3800	U	3800	U	1000
Benzo(k)Fluoranthene	U	3000	U	3900	U	3800	U	3700	U	1000
Benzo(a)pyrene	U	3000	U	3900	U	3800	U	3700	U	1000

MDL denotes Method Detection Limit
U denotes Not Detected
J denotes value below MDL
Note: Samples taken May 1995

TABLE 12 (cont'd.) Creosote and BNA Compounds Detected in Sediment Samples
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample Number:	1051A		1052A		AB01510		J01508		K10546	
Sampling Location:	LCP48		LCP49		SED 35		REFERENCE		SED 19-20	
Compound Name	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg
Acenaphthylene	U	1200	U	1500	U	1000	U	1500	U	1000
Phenanthrene	U	1200	U	1500	U	1000	U	1500	U	1000
Anthracene	U	1200	U	1500	U	1000	U	1500	140J	1000
2-Methylanthracene	U	1200	U	1500	U	1000	U	1500	120J	1000
Carbazole	U	1200	U	1500	U	1000	U	1500	95J	1000
Fluoranthene	84J	1200	80J	1500	77J	1000	U	1500	110J	1000
Pyrene	110J	2300	97J	3000	110J	2100	U	3000	380J	2000
Benzo(a)anthracene	U	1200	U	1500	59J	1000	U	1500	110J	1000
Chrysene	U	1200	U	1500	81J	1000	U	1500	120J	1000
Benzo(b)fluoranthene	U	1200	U	1500	68J	1000	U	1500	190J	1000
Benzo(e)pyrene	U	1200	U	1500	U	1000	U	1500	400J	1000
Di-n-butylphthalate	710J	1100	430J	1500	190J	1000	7300	1500	1800	1000
1,3-Dichlorobenzene	U	1100	U	1500	U	1000	U	1500	900J	1000
1,4-Dichlorobenzene	U	1100	U	1500	U	1000	U	1500	200J	1000
Dimethylphthalate	U	1100	U	1500	U	1000	U	1500	200J	1000
Butylbenzlphthalate	U	1100	U	1500	U	1000	250J	1500	U	1000
Bis(2-Ethylhexyl)phthalate	U	1100	U	1500	330J	1000	U	1500	410J	1000
Di-n-actylphthalate	U	1100	53J	1500	45J	1000	U	1500	29J	1000
Benzo(k)Fluoranthene	U	1200	U	1500	U	1000	U	1500	U	1000
Benzo(a)pyrene	U	1200	U	1500	U	1000	U	1500	U	1000

MDL denotes Method Detection Limit
U denotes Not Detected
J denotes value below MDL
Note: Samples taken May 1995

TABLE 12 (cont'd.). Creosote and BNA Compounds Detected in Sediment Samples
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample Number:	K01540		J01545		1053A		1055A		K24160	
Sampling Location:	SED 36		SED 17-18		LCP50		LCP51		SED 10-11	
Compound Name	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg	Conc. ug/kg	MDL ug/kg
Acenaphthylene	U	1100	U	1000	180J	1300	U	2500	U	1100
Phenanthrene	160J	1100	U	1000	U	1300	U	2500	U	1100
Anthracene	64J	1100	U	1000	U	1300	U	2500	U	1100
2-Methylanthracene	U	1100	U	1000	140J	1300	U	2500	U	1100
Carbazole	U	1100	U	1000	U	1300	U	2500	U	1100
Fluoranthene	96J	1100	U	1000	190J	1300	U	2500	U	1100
Pyrene	160J	2200	U	2000	480J	2500	U	5100	87J	2300
Benzo(a)anthracene	U	1100	U	1000	200J	1300	U	2500	U	1100
Chrysene	U	1100	U	1000	270J	1300	U	2500	U	1100
Benzo(b)fluoranthene		1100	U	1000	U	1300	U	2500	U	1100
Benzo(e)pyrene		1100	U	1000	U	1300	U	2500	U	1100
Di-n-butylphthalate	1000J	1100	840J	1000	2900	1300	2200	2100	890J	1100
1,3-Dichlorobenzene	U	1100	U	1000	U	1300	U	2100	U	1100
1,4-Dichlorobenzene	U	1100	U	1000	U	1300	U	2100	U	1100
Dimethylphthalate	U	1100	U	1000	180J	1300	U	2100	U	1100
Butylbenzlphthalate	U	1100	U	1000	U	1300	U	2100	U	1100
Bis(2-Ethylhexyl)phthalate	U	1100	470J	1000	130J	1300	U	2100	U	1100
Di-n-actylphthalate	180J	1100	U	1000	78J	1300	U	2100	U	1100
Benzo(k)Fluoranthene	U	1100	U	1000	U	1300	U	2500	U	1100
Benzo(a)pyrene	U	1100	U	1000	U	1300	U	2500	U	1100

MDL denotes Method Detection Limit
U denotes Not Detected
J denotes value below MDL
Note: Samples taken May 1995

TABLE 13. BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID	Method-Blk		113104		113108		113110		113035	
Location			H1 0-6		H2 0-6		H2 12-18		Grid Marsh	
Compound	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	5100	U	4300	U	4600	U	3200
Phenol	U	330	U	5100	U	4300	U	4600	U	3200
Aniline	U	330	U	5100	U	4300	U	4600	U	3200
Bis(2-chloroethyl) ether	U	330	U	5100	U	4300	U	4600	U	3200
2-Chlorophenol	U	330	U	5100	U	4300	U	4600	U	3200
1,3-Dichlorobenzene	U	330	U	5100	U	4300	U	4600	U	3200
1,4-Dichlorobenzene	U	330	U	5100	U	4300	U	4600	U	3200
Benzyl alcohol	U	330	U	5100	U	4300	U	4600	U	3200
1,2-Dichlorobenzene	U	330	U	5100	U	4300	U	4600	U	3200
2-Methylphenol	U	330	U	5100	U	4300	U	4600	U	3200
Bis(2-chloroisopropyl) ether	U	330	U	5100	U	4300	U	4600	U	3200
4-Methylphenol	U	330	U	5100	U	4300	U	4600	U	3200
N-Nitrosodi-n-propylamine	U	330	U	5100	U	4300	U	4600	U	3200
Hexachloroethane	U	330	U	5100	U	4300	U	4600	U	3200
Nitrobenzene	U	330	U	5100	U	4300	U	4600	U	3200
Isophorone	U	330	U	5100	U	4300	U	4600	U	3200
2-Nitrophenol	U	330	U	5100	U	4300	U	4600	U	3200
2,4-Dimethylphenol	U	330	U	5100	U	4300	U	4600	U	3200
Bis(2-chloroethoxy) methane	U	330	U	5100	U	4300	U	4600	U	3200
Benzoic Acid	U	1700	U	25000	U	22000	U	23000	U	16000
2,4-Dichlorophenol	U	330	U	5100	U	4300	U	4600	U	3200
1,2,4-Trichlorobenzene	U	330	U	5100	U	4300	U	4600	U	3200
Naphthalene	U	330	U	5100	U	4300	U	4600	U	3200
4-Chloroaniline	U	330	U	5100	U	4300	U	4600	U	3200
Hexachlorobutadiene	U	330	U	5100	U	4300	U	4600	U	3200
4-Chloro-3-methylphenol	U	330	U	5100	U	4300	U	4600	U	3200
2-Methylnaphthalene	U	330	U	5100	U	4300	U	4600	U	3200
Hexachlorocyclopentadiene	U	330	U	5100	U	4300	U	4600	U	3200
2,4,6-Trichlorophenol	U	330	U	5100	U	4300	U	4600	U	3200
2,4,5-Trichlorophenol	U	330	U	5100	U	4300	U	4600	U	3200
2-Chloronaphthalene	U	330	U	5100	U	4300	U	4600	U	3200
2-Nitroaniline	U	330	U	5100	U	4300	U	4600	U	3200
Dimethyl phthalate	U	330	U	5100	U	4300	U	4600	U	3200
2,6-Dinitrotoluene	U	330	U	5100	U	4300	U	4600	U	3200
Acenaphthylene	U	330	U	5100	U	4300	U	4600	U	3200
3-Nitroaniline	U	330	U	5100	U	4300	U	4600	U	3200
Acenaphthene	U	330	U	5100	U	4300	U	4600	U	3200
2,4-Dinitrophenol	U	330	U	5100	U	4300	U	4600	U	3200
4-Nitrophenol	U	330	U	5100	U	4300	U	4600	U	3200
2,4-Dinitrotoluene	U	330	U	5100	U	4300	U	4600	U	3200
Dibenzofuran	U	330	U	5100	U	4300	U	4600	U	3200
Diethylphthalate	U	330	U	5100	U	4300	U	4600	U	3200
Fluorene	U	330	U	5100	U	4300	U	4600	U	3200
4-Chlorophenyl phenyl ether	U	330	U	5100	U	4300	U	4600	U	3200
4-Nitroaniline	U	330	U	5100	U	4300	U	4600	U	3200
4,6-Dinitro-2-methylphenol	U	330	U	5100	U	4300	U	4600	U	3200
N-Nitrosodiphenylamine	U	330	U	5100	U	4300	U	4600	U	3200
1,2-Diphenylhydrazine/Azobenzene	U	330	U	5100	U	4300	U	4600	U	3200
4-Bromophenyl phenyl ether	U	330	U	5100	U	4300	U	4600	U	3200
Hexachlorobenzene	U	330	U	5100	U	4300	U	4600	U	3200
Pentachlorophenol	U	330	U	5100	U	4300	U	4600	U	3200
Phenanthrene	U	330	U	5100	U	4300	U	4600	U	3200
Anthracene	U	330	U	5100	U	4300	U	4600	U	3200
Carbazole	U	330	U	5100	U	4300	U	4600	U	3200
Di-n-butyl phthalate	U	330	U	5100	U	4300	U	4600	260J	3200
Fluoranthene	U	330	U	5100	U	4300	U	4600	U	3200
Benzidine	U	330	U	5100	U	4300	U	4600	U	3200
Pyrene	U	330	U	5100	U	4300	U	4600	U	3200
3,3'-Dimethylbenzidine	U	330	U	5100	U	4300	U	4600	U	3200
Butyl benzyl phthalate	U	330	U	5100	U	4300	U	4600	U	3200
3,3'-Dichlorobenzidine	U	330	U	5100	U	4300	U	4600	U	3200
Benzo(a)anthracene	U	330	U	5100	U	4300	U	4600	U	3200
Chrysene	U	330	U	5100	U	4300	U	4600	U	3200
Bis(2-ethylhexyl) phthalate	U	330	U	5100	U	4300	U	4600	6100	3200
Di-n-octyl phthalate	U	330	U	5100	U	4300	U	4600	U	3200
Benzo(b)fluoranthene	U	330	U	5100	U	4300	U	4600	U	3200
Benzo(k)fluoranthene	U	330	U	5100	U	4300	U	4600	U	3200
Benzo(a)pyrene	U	330	U	5100	U	4300	U	4600	U	3200
Indeno(1,2,3-c,d)pyrene	U	330	U	5100	U	4300	U	4600	U	3200
Dibenzo(a,h)anthracene	U	330	U	5100	U	4300	U	4600	U	3200
Benzo(ghi)perylene	U	330	U	5100	U	4300	U	4600	U	3200

TABLE 13 (cont'd.). BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID Location	Method-Blk		113043 Gibson Creek 0-6 109		113044 Gibson Creek 18-24 109		113047 Gibson Creek 48-54 109		113036 Process South	
Compound	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	3400	U	2600	U	5100	U	1100
Phenol	U	330	U	3400	U	2600	U	5100	U	1100
Aniline	U	330	U	3400	U	2600	U	5100	U	1100
Bis(2-chloroethyl) ether	U	330	U	3400	U	2600	U	5100	U	1100
2-Chlorophenol	U	330	U	3400	U	2600	U	5100	U	1100
1,3-Dichlorobenzene	U	330	U	3400	U	2600	U	5100	U	1100
1,4-Dichlorobenzene	U	330	U	3400	U	2600	U	5100	U	1100
Benzyl alcohol	U	330	U	3400	U	2600	U	5100	U	1100
1,2-Dichlorobenzene	U	330	U	3400	U	2600	U	5100	U	1100
2-Methylphenol	U	330	U	3400	U	2600	U	5100	U	1100
Bis(2-chloroisopropyl) ether	U	330	U	3400	U	2600	U	5100	U	1100
4-Methylphenol	U	330	U	3400	U	2600	U	5100	U	1100
N-Nitrosodi-n-propylamine	U	330	U	3400	U	2600	U	5100	U	1100
Hexachloroethane	U	330	U	3400	U	2600	U	5100	U	1100
Nitrobenzene	U	330	U	3400	U	2600	U	5100	U	1100
Isophorone	U	330	U	3400	U	2600	U	5100	U	1100
2-Nitrophenol	U	330	U	3400	U	2600	U	5100	U	1100
2,4-Dimethylphenol	U	330	U	3400	U	2600	U	5100	U	1100
Bis(2-chloroethoxy) methane	U	330	U	3400	U	2600	U	5100	U	1100
Benzoic Acid	U	1700	U	17000	U	13000	U	^25000	U	5300
2,4-Dichlorophenol	U	330	U	3400	U	2600	U	5100	U	1100
1,2,4-Trichlorobenzene	U	330	U	3400	U	2600	U	5100	U	1100
Naphthalene	U	330	U	3400	U	2600	U	5100	U	1100
4-Chloroaniline	U	330	U	3400	U	2600	U	5100	U	1100
Hexachlorobutadiene	U	330	U	3400	U	2600	U	5100	U	1100
4-Chloro-3-methylphenol	U	330	U	3400	U	2600	U	5100	U	1100
2-Methylnaphthalene	U	330	U	3400	U	2600	U	5100	120	1100
Hexachlorocyclopentadiene	U	330	U	3400	U	2600	U	5100	U	1100
2,4,6-Trichlorophenol	U	330	U	3400	U	2600	U	5100	U	1100
2,4,5-Trichlorophenol	U	330	U	3400	U	2600	U	5100	U	1100
2-Chloronaphthalene	U	330	U	3400	U	2600	U	5100	U	1100
2-Nitroaniline	U	330	U	3400	U	2600	U	5100	U	1100
Dimethyl phthalate	U	330	U	3400	U	2600	U	5100	U	1100
2,6-Dinitrotoluene	U	330	U	3400	U	2600	U	5100	U	1100
Acenaphthylene	U	330	U	3400	U	2600	U	5100	U	1100
3-Nitroaniline	U	330	U	3400	U	2600	U	5100	U	1100
Acenaphthene	U	330	U	3400	U	2600	U	5100	U	1100
2,4-Dinitrophenol	U	330	U	3400	U	2600	U	5100	U	1100
4-Nitrophenol	U	330	U	3400	U	2600	U	5100	U	1100
2,4-Dinitrotoluene	U	330	U	3400	U	2600	U	5100	U	1100
Dibenzofuran	U	330	U	3400	U	2600	U	5100	U	1100
Diethylphthalate	U	330	U	3400	U	2600	U	5100	U	1100
Fluorene	U	330	U	3400	U	2600	U	5100	U	1100
4-Chlorophenyl phenyl ether	U	330	U	3400	U	2600	U	5100	U	1100
4-Nitroaniline	U	330	U	3400	U	2600	U	5100	U	1100
4,6-Dinitro-2-methylphenol	U	330	U	3400	U	2600	U	5100	U	1100
N-Nitrosodiphenylamine	U	330	U	3400	U	2600	U	5100	U	1100
1,2-Diphenylhydrazine/Azobenzene	U	330	U	3400	U	2600	U	5100	U	1100
4-Bromophenyl phenyl ether	U	330	U	3400	U	2600	U	5100	U	1100
Hexachlorobenzene	U	330	U	3400	U	2600	U	5100	U	1100
Pentachlorophenol	U	330	U	3400	U	2600	U	5100	U	1100
Phenanthrene	U	330	U	3400	U	2600	U	5100	390	1100
Anthracene	U	330	U	3400	U	2600	U	5100	73	1100
Carbazole	U	330	U	3400	U	2600	U	5100	U	1100
Di-n-butyl phthalate	U	330	U	3400	U	2600	U	5100	81	1100
Fluoranthene	U	330	U	3400	U	2600	U	5100	180	1100
Benzidine	U	330	U	3400	U	2600	U	5100	U	1100
Pyrene	U	330	U	3400	U	2600	U	5100	830	1100
3,3'-Dimethylbenzidine	U	330	U	3400	U	2600	U	5100	U	1100
Butyl benzyl phthalate	U	330	U	3400	U	2600	U	5100	U	1100
3,3'-Dichlorobenzidine	U	330	U	3400	U	2600	U	5100	U	1100
Benzo(a)anthracene	U	330	U	3400	U	2600	U	5100	500	1100
Chrysene	U	330	U	3400	U	2600	U	5100	620	1100
Bis(2-ethylhexyl) phthalate	U	330	270	3400	U	2600	U	5100	120	1100
Di-n-octyl phthalate	U	330	U	3400	U	2600	U	5100	U	1100
Benzo(b)fluoranthene	U	330	U	3400	U	2600	U	5100	1100	1100
Benzo(k)fluoranthene	U	330	U	3400	U	2600	U	5100	680	1100
Benzo(a)pyrene	U	330	U	3400	U	2600	U	5100	660	1100
Indeno(1,2,3-c,d)pyrene	U	330	U	3400	U	2600	U	5100	200	1100
Dibenzo(a,h)anthracene	U	330	U	3400	U	2600	U	5100	110	1100
Benzo(ghi)perylene	U	330	U	3400	U	2600	U	5100	400	1100

TABLE 13 (cont'd.). BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID	Method-Blk		113106		113037	
Location			H1 12-18		Cell Bldg	
Compound	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	3300	U	2100
Phenol	U	330	U	3300	U	2100
Aniline	U	330	U	3300	U	2100
Bis(2-chloroethyl) ether	U	330	U	3300	U	2100
2-Chlorophenol	U	330	U	3300	U	2100
1,3-Dichlorobenzene	U	330	U	3300	U	2100
1,4-Dichlorobenzene	U	330	U	3300	U	2100
Benzyl alcohol	U	330	U	3300	U	2100
1,2-Dichlorobenzene	U	330	U	3300	U	2100
2-Methylphenol	U	330	U	3300	U	2100
Bis(2-chloroisopropyl) ether	U	330	U	3300	U	2100
4-Methylphenol	U	330	U	3300	U	2100
N-Nitrosodi-n-propylamine	U	330	U	3300	U	2100
Hexachloroethane	U	330	U	3300	U	2100
Nitrobenzene	U	330	U	3300	U	2100
Isophorone	U	330	U	3300	U	2100
2-Nitrophenol	U	330	U	3300	U	2100
2,4-Dimethylphenol	U	330	U	3300	U	2100
Bis(2-chloroethoxy) methane	U	330	U	3300	U	2100
Benzoic Acid	U	1700	360	17000	U	11000
2,4-Dichlorophenol	U	330	U	3300	U	2100
1,2,4-Trichlorobenzene	U	330	U	3300	U	2100
Naphthalene	U	330	U	3300	U	2100
4-Chloroaniline	U	330	U	3300	U	2100
Hexachlorobutadiene	U	330	U	3300	U	2100
4-Chloro-3-methylphenol	U	330	U	3300	U	2100
2-Methylnaphthalene	U	330	U	3300	U	2100
Hexachlorocyclopentadiene	U	330	U	3300	U	2100
2,4,6-Trichlorophenol	U	330	U	3300	U	2100
2,4,5-Trichlorophenol	U	330	U	3300	U	2100
2-Chloronaphthalene	U	330	U	3300	U	2100
2-Nitroaniline	U	330	U	3300	U	2100
Dimethyl phthalate	U	330	U	3300	U	2100
2,6-Dinitrotoluene	U	330	U	3300	U	2100
Acenaphthylene	U	330	U	3300	U	2100
3-Nitroaniline	U	330	U	3300	U	2100
Acenaphthene	U	330	U	3300	U	2100
2,4-Dinitrophenol	U	330	U	3300	U	2100
4-Nitrophenol	U	330	U	3300	U	2100
2,4-Dinitrotoluene	U	330	U	3300	U	2100
Dibenzofuran	U	330	U	3300	U	2100
Diethylphthalate	U	330	U	3300	U	2100
Fluorene	U	330	U	3300	U	2100
4-Chlorophenyl phenyl ether	U	330	U	3300	U	2100
4-Nitroaniline	U	330	U	3300	U	2100
4,6-Dinitro-2-methylphenol	U	330	U	3300	U	2100
N-Nitrosodiphenylamine	U	330	U	3300	U	2100
1,2-Diphenylhydrazine/Azobenzene	U	330	U	3300	U	2100
4-Bromophenyl phenyl ether	U	330	U	3300	U	2100
Hexachlorobenzene	U	330	U	3300	440	2100
Pentachlorophenol	U	330	U	3300	U	2100
Phenanthrene	U	330	U	3300	290	2100
Anthracene	U	330	U	3300	U	2100
Carbazole	U	330	U	3300	U	2100
Di-n-butyl phthalate	U	330	U	3300	270	2100
Fluoranthene	U	330	U	3300	570	2100
Benzidine	U	330	U	3300	U	2100
Pyrene	U	330	U	3300	390	2100
3,3'-Dimethylbenzidine	U	330	U	3300	U	2100
Butyl benzyl phthalate	U	330	U	3300	U	2100
3,3'-Dichlorobenzidine	U	330	U	3300	U	2100
Benzo(a)anthracene	U	330	U	3300	240	2100
Chrysene	U	330	U	3300	360	2100
Bis(2-ethylhexyl) phthalate	U	330	U	3300	220	2100
Di-n-octyl phthalate	U	330	U	3300	U	2100
Benzo(b)fluoranthene	U	330	U	3300	1100	2100
Benzo(k)fluoranthene	U	330	U	3300	260	2100
Benzo(a)pyrene	U	330	220	3300	280	2100
Indeno(1,2,3-c,d)pyrene	U	330	U	3300	320	2100
Dibenzo(a,h)anthracene	U	330	U	3300	150	2100
Benzo(ghi)perylene	U	330	U	3300	420	2100

TABLE 13 (cont'd.). BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID	Method-Blk		113048		113051		113093		113095	
Location			H3 0-12		H3 30+		H4 0-6		H4 12-18	
Compound	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	8900	U	6500	U	5300	U	9100
Phenol	U	330	U	8900	U	6500	U	5300	U	9100
Aniline	U	330	U	8900	U	6500	U	5300	U	9100
Bis(2-chloroethyl) ether	U	330	U	8900	U	6500	U	5300	U	9100
2-Chlorophenol	U	330	U	8900	U	6500	U	5300	U	9100
1,3-Dichlorobenzene	U	330	U	8900	U	6500	U	5300	U	9100
1,4-Dichlorobenzene	U	330	U	8900	U	6500	U	5300	U	9100
Benzyl alcohol	U	330	U	8900	U	6500	U	5300	U	9100
1,2-Dichlorobenzene	U	330	U	8900	U	6500	U	5300	U	9100
2-Methylphenol	U	330	U	8900	U	6500	U	5300	U	9100
Bis(2-chloroisopropyl) ether	U	330	U	8900	U	6500	U	5300	U	9100
4-Methylphenol	U	330	U	8900	U	6500	U	5300	U	9100
N-Nitrosodi-n-propylamine	U	330	U	8900	U	6500	U	5300	U	9100
Hexachloroethane	U	330	U	8900	U	6500	U	5300	U	9100
Nitrobenzene	U	330	U	8900	U	6500	U	5300	U	9100
Isophorone	U	330	U	8900	U	6500	U	5300	U	9100
2-Nitrophenol	U	330	U	8900	U	6500	U	5300	U	9100
2,4-Dimethylphenol	U	330	U	8900	U	6500	U	5300	U	9100
Bis(2-chloroethoxy) methane	U	330	U	8900	U	6500	U	5300	U	9100
Benzoic Acid	U	1700	910	45000	U	32000	U	26000	910	45000
2,4-Dichlorophenol	U	330	U	8900	U	6500	U	5300	U	9100
1,2,4-Trichlorobenzene	U	330	U	8900	U	6500	U	5300	U	9100
Naphthalene	U	330	U	8900	U	6500	U	5300	U	9100
4-Chloroaniline	U	330	U	8900	U	6500	U	5300	U	9100
Hexachlorobutadiene	U	330	U	8900	U	6500	U	5300	U	9100
4-Chloro-3-methylphenol	U	330	U	8900	U	6500	U	5300	U	9100
2-Methylnaphthalene	U	330	U	8900	U	6500	U	5300	U	9100
Hexachlorocyclopentadiene	U	330	U	8900	U	6500	U	5300	U	9100
2,4,6-Trichlorophenol	U	330	U	8900	1800	6500	1100	5300	750	9100
2,4,5-Trichlorophenol	U	330	U	8900	U	6500	U	5300	U	9100
2-Chloronaphthalene	U	330	U	8900	U	6500	U	5300	U	9100
2-Nitroaniline	U	330	U	8900	U	6500	U	5300	U	9100
Dimethyl phthalate	U	330	U	8900	U	6500	U	5300	U	9100
2,6-Dinitrotoluene	U	330	U	8900	U	6500	U	5300	U	9100
Acenaphthylene	U	330	U	8900	U	6500	U	5300	U	9100
3-Nitroaniline	U	330	U	8900	U	6500	U	5300	U	9100
Acenaphthene	U	330	U	8900	U	6500	U	5300	U	9100
2,4-Dinitrophenol	U	330	U	8900	U	6500	U	5300	U	9100
4-Nitrophenol	U	330	U	8900	U	6500	U	5300	U	9100
2,4-Dinitrotoluene	U	330	U	8900	U	6500	U	5300	U	9100
Dibenzofuran	U	330	U	8900	U	6500	U	5300	U	9100
Diethylphthalate	U	330	U	8900	U	6500	U	5300	U	9100
Fluorene	U	330	U	8900	U	6500	U	5300	U	9100
4-Chlorophenyl phenyl ether	U	330	U	8900	U	6500	U	5300	U	9100
4-Nitroaniline	U	330	U	8900	U	6500	U	5300	U	9100
4,6-Dinitro-2-methylphenol	U	330	U	8900	U	6500	U	5300	U	9100
N-Nitrosodiphenylamine	U	330	U	8900	U	6500	U	5300	U	9100
1,2-Diphenylhydrazine/Azobenzene	U	330	U	8900	U	6500	U	5300	U	9100
4-Bromophenyl phenyl ether	U	330	U	8900	U	6500	U	5300	U	9100
Hexachlorobenzene	U	330	U	8900	U	6500	U	5300	U	9100
Pentachlorophenol	U	330	U	8900	U	6500	U	5300	U	9100
Phenanthrene	U	330	U	8900	U	6500	U	5300	U	9100
Anthracene	U	330	U	8900	U	6500	U	5300	U	9100
Carbazole	U	330	U	8900	U	6500	U	5300	U	9100
Di-n-butyl phthalate	U	330	7100	8900	16000	6500	6100	5300	13000	9100
Fluoranthene	U	330	U	8900	U	6500	U	5300	U	9100
Benzidine	U	330	U	8900	U	6500	U	5300	U	9100
Pyrene	U	330	U	8900	U	6500	U	5300	U	9100
3,3'-Dimethylbenzidine	U	330	U	8900	U	6500	U	5300	U	9100
Butyl benzyl phthalate	U	330	U	8900	U	6500	U	5300	U	9100
3,3'-Dichlorobenzidine	U	330	U	8900	U	6500	U	5300	U	9100
Benzo(a)anthracene	U	330	U	8900	U	6500	U	5300	U	9100
Chrysene	U	330	U	8900	U	6500	U	5300	U	9100
Bis(2-ethylhexyl) phthalate	U	330	42000	8900	30000	6500	27000	5300	41000	9100
Di-n-octyl phthalate	U	330	U	8900	U	6500	U	5300	U	9100
Benzo(b)fluoranthene	U	330	U	8900	U	6500	U	5300	U	9100
Benzo(k)fluoranthene	U	330	U	8900	U	6500	U	5300	U	9100
Benzo(a)pyrene	U	330	U	8900	U	6500	U	5300	U	9100
Indeno(1,2,3-c,d)pyrene	U	330	U	8900	U	6500	U	5300	U	9100
Dibenzo(a,h)anthracene	U	330	U	8900	U	6500	U	5300	U	9100
Benzo(ghi)perylene	U	330	U	8900	U	6500	U	5300	U	9100

TABLE 13 (cont'd.). BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID Location	Method-Blk		113097 H4 24-30		113098 B1 0-6		113100 B1 12-18		113113 Purvis Creek 110	
Compound	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	8100	U	5900	U	5900	U	2600
Phenol	U	330	U	8100	U	5900	U	5900	U	2600
Aniline	U	330	U	8100	U	5900	U	5900	U	2600
Bis(2-chloroethyl) ether	U	330	U	8100	U	5900	U	5900	U	2600
2-Chlorophenol	U	330	U	8100	U	5900	U	5900	U	2600
1,3-Dichlorobenzene	U	330	U	8100	U	5900	U	5900	U	2600
1,4-Dichlorobenzene	U	330	U	8100	U	5900	U	5900	U	2600
Benzyl alcohol	U	330	U	8100	U	5900	U	5900	U	2600
1,2-Dichlorobenzene	U	330	U	8100	U	5900	U	5900	U	2600
2-Methylphenol	U	330	U	8100	U	5900	U	5900	U	2600
Bis(2-chloroisopropyl) ether	U	330	U	8100	U	5900	U	5900	U	2600
4-Methylphenol	U	330	U	8100	U	5900	U	5900	U	2600
N-Nitrosodi-n-propylamine	U	330	U	8100	U	5900	U	5900	U	2600
Hexachloroethane	U	330	U	8100	U	5900	U	5900	U	2600
Nitrobenzene	U	330	U	8100	U	5900	U	5900	U	2600
Isophorone	U	330	U	8100	U	5900	U	5900	U	2600
2-Nitrophenol	U	330	U	8100	U	5900	U	5900	U	2600
2,4-Dimethylphenol	U	330	U	8100	U	5900	U	5900	U	2600
Bis(2-chloroethoxy) methane	U	330	U	8100	U	5900	U	5900	U	2600
Benzoic Acid	U	1700	U	42000	U	30000	990	29000	U	13000
2,4-Dichlorophenol	U	330	U	8100	U	5900	U	5900	U	2600
1,2,4-Trichlorobenzene	U	330	U	8100	U	5900	U	5900	U	2600
Naphthalene	U	330	U	8100	U	5900	U	5900	U	2600
4-Chloroaniline	U	330	U	8100	U	5900	U	5900	U	2600
Hexachlorobutadiene	U	330	U	8100	U	5900	U	5900	U	2600
4-Chloro-3-methylphenol	U	330	U	8100	U	5900	U	5900	U	2600
2-Methylnaphthalene	U	330	U	8100	U	5900	U	5900	U	2600
Hexachlorocyclopentadiene	U	330	U	8100	U	5900	U	5900	U	2600
2,4,6-Trichlorophenol	U	330	1600	8100	500	5900	1100	5900	370	2600
2,4,5-Trichlorophenol	U	330	U	8100	U	5900	U	5900	U	2600
2-Chloronaphthalene	U	330	U	8100	U	5900	U	5900	U	2600
2-Nitroaniline	U	330	U	8100	U	5900	U	5900	U	2600
Dimethyl phthalate	U	330	U	8100	U	5900	U	5900	U	2600
2,6-Dinitrotoluene	U	330	U	8100	U	5900	U	5900	U	2600
Acenaphthylene	U	330	U	8100	U	5900	U	5900	U	2600
3-Nitroaniline	U	330	U	8100	U	5900	U	5900	U	2600
Acenaphthene	U	330	U	8100	U	5900	U	5900	U	2600
2,4-Dinitrophenol	U	330	U	8100	U	5900	U	5900	U	2600
4-Nitrophenol	U	330	U	8100	U	5900	U	5900	U	2600
2,4-Dinitrotoluene	U	330	U	8100	U	5900	U	5900	U	2600
Dibenzofuran	U	330	U	8100	U	5900	U	5900	U	2600
Diethylphthalate	U	330	U	8100	U	5900	U	5900	U	2600
Fluorene	U	330	U	8100	U	5900	U	5900	U	2600
4-Chlorophenyl phenyl ether	U	330	U	8100	U	5900	U	5900	U	2600
4-Nitroaniline	U	330	U	8100	U	5900	U	5900	U	2600
4,6-Dinitro-2-methylphenol	U	330	U	8100	U	5900	U	5900	U	2600
N-Nitrosodiphenylamine	U	330	U	8100	U	5900	U	5900	U	2600
1,2-Diphenylhydrazine/Azobenzene	U	330	U	8100	U	5900	U	5900	U	2600
4-Bromophenyl phenyl ether	U	330	U	8100	U	5900	U	5900	U	2600
Hexachlorobenzene	U	330	U	8100	U	5900	U	5900	U	2600
Pentachlorophenol	U	330	U	8100	U	5900	U	5900	U	2600
Phenanthrene	U	330	U	8100	U	5900	U	5900	U	2600
Anthracene	U	330	U	8100	U	5900	U	5900	U	2600
Carbazole	U	330	U	8100	U	5900	U	5900	U	2600
Di-n-butyl phthalate	U	330	7200	8100	15000	5900	27000	5900	2700	2600
Fluoranthene	U	330	U	8100	U	5900	U	5900	U	2600
Benzidine	U	330	U	8100	U	5900	U	5900	U	2600
Pyrene	U	330	U	8100	U	5900	U	5900	U	2600
3,3'-Dimethylbenzidine	U	330	U	8100	U	5900	U	5900	U	2600
Butyl benzyl phthalate	U	330	U	8100	U	5900	U	5900	U	2600
3,3'-Dichlorobenzidine	U	330	U	8100	U	5900	U	5900	U	2600
Benzo(a)anthracene	U	330	U	8100	U	5900	U	5900	U	2600
Chrysene	U	330	U	8100	U	5900	U	5900	U	2600
Bis(2-ethylhexyl) phthalate	U	330	39000	8100	32000	5900	31000	5900	12000	2600
Di-n-octyl phthalate	U	330	U	8100	U	5900	U	5900	U	2600
Benzo(b)fluoranthene	U	330	U	8100	U	5900	U	5900	U	2600
Benzo(k)fluoranthene	U	330	U	8100	U	5900	U	5900	U	2600
Benzo(a)pyrene	U	330	U	8100	U	5900	U	5900	U	2600
Indeno(1,2,3-c,d)pyrene	U	330	U	8100	U	5900	U	5900	U	2600
Dibenzo(a,h)anthracene	U	330	U	8100	U	5900	U	5900	U	2600
Benzo(ghi)perylene	U	330	U	8100	U	5900	U	5900	U	2600

TABLE 13 (cont'd.): BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID Location	Method-Blk		113115 Purvis Creek 12-18 110		113117 Purvis Creek 24-30 110		113119 Drainage Channel 0-6 114		113121 Drainage Channel 12-18 11		113102 B1 24-30	
Compound	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Phenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Aniline	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Bis(2-chloroethyl) ether	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2-Chlorophenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
1,3-Dichlorobenzene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
1,4-Dichlorobenzene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Benzyl alcohol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
1,2-Dichlorobenzene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2-Methylphenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Bis(2-chloroisopropyl) ether	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
4-Methylphenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
N-Nitrosodi-n-propylamine	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Hexachloroethane	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Nitrobenzene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Isophorone	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2-Nitrophenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2,4-Dimethylphenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Bis(2-chloroethoxy) methane	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Benzoic Acid	U	1700	U	13000	U	12000	U	33000	U	27000	1100J	47000
2,4-Dichlorophenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
1,2,4-Trichlorobenzene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Naphthalene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
4-Chloroaniline	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Hexachlorobutadiene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
4-Chloro-3-methylphenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2-Methylnaphthalene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Hexachlorocyclopentadiene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2,4,6-Trichlorophenol	U	330	530	2600	U	2400	610	6500	860	5600	850J	9800
2,4,5-Trichlorophenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2-Chloronaphthalene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2-Nitroaniline	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Dimethyl phthalate	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2,6-Dinitrotoluene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Acenaphthylene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
3-Nitroaniline	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Acenaphthene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2,4-Dinitrophenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
4-Nitrophenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
2,4-Dinitrotoluene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Dibenzofuran	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Diethylphthalate	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Fluorene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
4-Chlorophenyl phenyl ether	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
4-Nitroaniline	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
4,6-Dinitro-2-methylphenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
N-Nitrosodiphenylamine	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
1,2-Diphenylhydrazine/Azobenzene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
4-Bromophenyl phenyl ether	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Hexachlorobenzene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Pentachlorophenol	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Phenanthrene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Anthracene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Carbazole	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Di-n-butyl phthalate	U	330	6600	2600	2700	2400	6300	6500	4300	5600	82000	9800
Fluoranthene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Benzidine	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Pyrene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
3,3'-Dimethylbenzidine	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Butyl benzyl phthalate	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
3,3'-Dichlorobenzidine	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Benzo(a)anthracene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Chrysene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Bis(2-ethylhexyl) phthalate	U	330	18000	2600	17000	2400	33000	6500	26000	5600	31000	9800
Di-n-octyl phthalate	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Benzo(b)fluoranthene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Benzo(k)fluoranthene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Benzo(a)pyrene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Indeno(1,2,3-c,d)pyrene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Dibenzo(a,h)anthracene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800
Benzo(ghi)perylene	U	330	U	2600	U	2400	U	6500	U	5600	U	9800

TABLE 13 (cont'd.) BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID Location	Method-Blk		100-SED Purvis Creek		117-SED Outfall Purvis Creek 117		118-SED South Marsh 118		119-SED South Marsh 119		120-SED North Marsh 120	
Compound	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Phenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Aniline	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Bis(2-chloroethyl) ether	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2-Chlorophenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
1,3-Dichlorobenzene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
1,4-Dichlorobenzene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Benzyl alcohol	U	330	U	2600	200	2900	U	3000	U	3200	U	3800
1,2-Dichlorobenzene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2-Methylphenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Bis(2-chloroisopropyl) ether	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
4-Methylphenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
N-Nitrosodi-n-propylamine	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Hexachloroethane	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Nitrobenzene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Isophorone	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2-Nitrophenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2,4-Dimethylphenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Bis(2-chloroethoxy) methane	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Benzoic Acid	U	1700	U	13000	U	15000	U	15000	U	16000	U	19000
2,4-Dichlorophenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
1,2,4-Trichlorobenzene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Naphthalene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
4-Chloroaniline	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Hexachlorobutadiene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
4-Chloro-3-methylphenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2-Methylnaphthalene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Hexachlorocyclopentadiene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2,4,6-Trichlorophenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2,4,5-Trichlorophenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2-Chloronaphthalene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2-Nitroaniline	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Dimethyl phthalate	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2,6-Dinitrotoluene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Acenaphthylene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
3-Nitroaniline	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Acenaphthene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2,4-Dinitrophenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
4-Nitrophenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
2,4-Dinitrotoluene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Dibenzofuran	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Diethylphthalate	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Fluorene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
4-Chlorophenyl phenyl ether	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
4-Nitroaniline	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
4,6-Dinitro-2-methylphenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
N-Nitrosodiphenylamine	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
1,2-Diphenylhydrazine/Azobenzene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
4-Bromophenyl phenyl ether	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Hexachlorobenzene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Pentachlorophenol	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Phenanthrene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Anthracene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Carbazole	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Di-n-butyl phthalate	U	330	35000	2600	8600	2900	7700	3000	3200	3200	4000	3800
Fluoranthene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Benzidine	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Pyrene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
3,3'-Dimethylbenzidine	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Butyl benzyl phthalate	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
3,3'-Dichlorobenzidine	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Benzo(a)anthracene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Chrysene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Bis(2-ethylhexyl) phthalate	U	330	740	2600	7600	2900	800	3000	840	3200	1000	3800
Di-n-octyl phthalate	U	330	U	2600	1000	2900	U	3000	U	3200	U	3800
Benzo(b)fluoranthene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Benzo(k)fluoranthene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Benzo(a)pyrene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Indeno(1,2,3-c,d)pyrene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Dibenzo(a,h)anthracene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800
Benzo(ghi)perylene	U	330	U	2600	U	2900	U	3000	U	3200	U	3800

TABLE 13 (cont'd.): BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID Location	Method-Blk		121-SED North Marsh 121		113077 F2 0-6		113081 F2 24-30		111-SED Drainage Channel		112-SED Purvis Creek	
Compound	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Phenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Aniline	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Bis(2-chloroethyl) ether	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2-Chlorophenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
1,3-Dichlorobenzene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
1,4-Dichlorobenzene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Benzyl alcohol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
1,2-Dichlorobenzene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2-Methylphenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Bis(2-chloroisopropyl) ether	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
4-Methylphenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
N-Nitrosodi-n-propylamine	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Hexachloroethane	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Nitrobenzene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Isophorone	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2-Nitrophenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2,4-Dimethylphenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Bis(2-chloroethoxy) methane	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Benzoic Acid	U	1700	U	19000	U	21000	U	14000	U	15000	U	11000
2,4-Dichlorophenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
1,2,4-Trichlorobenzene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Naphthalene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
4-Chloroaniline	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Hexachlorobutadiene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
4-Chloro-3-methylphenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2-Methylnaphthalene	U	330	U	3800	U	4300	220	2800	220	3000	U	2200
Hexachlorocyclopentadiene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2,4,6-Trichlorophenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2,4,5-Trichlorophenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2-Chloronaphthalene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2-Nitroaniline	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Dimethyl phthalate	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2,6-Dinitrotoluene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Acenaphthylene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
3-Nitroaniline	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Acenaphthene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2,4-Dinitrophenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
4-Nitrophenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
2,4-Dinitrotoluene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Dibenzofuran	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Diethylphthalate	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Fluorene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
4-Chlorophenyl phenyl ether	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
4-Nitroaniline	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
4,6-Dinitro-2-methylphenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
N-Nitrosodiphenylamine	U	330	U	3800	U	4300	1700	2800	U	3000	U	2200
1,2-Diphenylhydrazine/Azobenzene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
4-Bromophenyl phenyl ether	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Hexachlorobenzene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Pentachlorophenol	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Phenanthrene	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Anthracene	U	330	U	3800	U	4300	330	2800	U	3000	U	2200
Carbazole	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Di-n-butyl phthalate	U	330	11000	3800	4000	4300	8100	2800	2800	3000	2300	2200
Fluoranthene	U	330	U	3800	U	4300	600	2800	U	3000	U	2200
Benzidine	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Pyrene	U	330	U	3800	U	4300	6000	2800	U	3000	U	2200
3,3'-Dimethylbenzidine	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Butyl benzyl phthalate	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
3,3'-Dichlorobenzidine	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Benzo(a)anthracene	U	330	U	3800	U	4300	1500	2800	U	3000	U	2200
Chrysene	U	330	U	3800	U	4300	1800	2800	U	3000	U	2200
Bis(2-ethylhexyl) phthalate	U	330	1200	3800	940	4300	810	2800	800	3000	1500J	2200
Di-n-octyl phthalate	U	330	U	3800	U	4300	U	2800	U	3000	U	2200
Benzo(b)fluoranthene	U	330	U	3800	U	4300	2000	2800	U	3000	U	2200
Benzo(k)fluoranthene	U	330	U	3800	U	4300	470	2800	U	3000	U	2200
Benzo(a)pyrene	U	330	U	3800	U	4300	1600	2800	U	3000	U	2200
Indeno(1,2,3-c,d)pyrene	U	330	U	3800	U	4300	260	2800	U	3000	U	2200
Dibenzo(a,h)anthracene	U	330	U	3800	U	4300	300	2800	U	3000	U	2200
Benzo(ghi)perylene	U	330	U	3800	U	4300	460	2800	U	3000	U	2200

TABLE 13 (cont'd.). BNA Compounds in Sediment Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Client ID	Method-Blk		113-SED		115-SED		116-SED		106-SED	
Location			Main Tributary		Main Tributary		Main Tributary		Purvis Creek	
Compound	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
N-nitrosodimethylamine	U	330	U	2900	U	3100	U	3000	U	1200
Phenol	U	330	U	2900	U	3100	U	3000	U	1200
Aniline	U	330	U	2900	U	3100	U	3000	U	1200
Bis(2-chloroethyl) ether	U	330	U	2900	U	3100	U	3000	U	1200
2-Chlorophenol	U	330	U	2900	U	3100	U	3000	U	1200
1,3-Dichlorobenzene	U	330	U	2900	U	3100	U	3000	U	1200
1,4-Dichlorobenzene	U	330	U	2900	U	3100	U	3000	U	1200
Benzyl alcohol	U	330	U	2900	U	3100	U	3000	U	1200
1,2-Dichlorobenzene	U	330	U	2900	U	3100	U	3000	U	1200
2-Methylphenol	U	330	U	2900	U	3100	U	3000	U	1200
Bis(2-chloroisopropyl) ether	U	330	U	2900	U	3100	U	3000	U	1200
4-Methylphenol	U	330	U	2900	U	3100	U	3000	U	1200
N-Nitrosodi-n-propylamine	U	330	U	2900	U	3100	U	3000	U	1200
Hexachloroethane	U	330	U	2900	U	3100	U	3000	U	1200
Nitrobenzene	U	330	U	2900	U	3100	U	3000	U	1200
Isophorone	U	330	U	2900	U	3100	U	3000	U	1200
2-Nitrophenol	U	330	U	2900	U	3100	U	3000	U	1200
2,4-Dimethylphenol	U	330	U	2900	U	3100	U	3000	U	1200
Bis(2-chloroethoxy) methane	U	330	U	2900	U	3100	U	3000	U	1200
Benzoic Acid	U	1700	U	15000	U	16000	U	15000	U	6000
2,4-Dichlorophenol	U	330	U	2900	U	3100	U	3000	U	1200
1,2,4-Trichlorobenzene	U	330	U	2900	U	3100	U	3000	U	1200
Naphthalene	U	330	U	2900	U	3100	U	3000	U	1200
4-Chloroaniline	U	330	U	2900	U	3100	U	3000	U	1200
Hexachlorobutadiene	U	330	U	2900	U	3100	U	3000	U	1200
4-Chloro-3-methylphenol	U	330	U	2900	U	3100	U	3000	U	1200
2-Methylnaphthalene	U	330	U	2900	U	3100	U	3000	U	1200
Hexachlorocyclopentadiene	U	330	U	2900	U	3100	U	3000	U	1200
2,4,6-Trichlorophenol	U	330	U	2900	U	3100	U	3000	U	1200
2,4,5-Trichlorophenol	U	330	U	2900	U	3100	U	3000	U	1200
2-Chloronaphthalene	U	330	U	2900	U	3100	U	3000	U	1200
2-Nitroaniline	U	330	U	2900	U	3100	U	3000	U	1200
Dimethyl phthalate	U	330	U	2900	U	3100	U	3000	U	1200
2,6-Dinitrotoluene	U	330	U	2900	U	3100	U	3000	U	1200
Acenaphthylene	U	330	U	2900	U	3100	U	3000	U	1200
3-Nitroaniline	U	330	U	2900	U	3100	U	3000	U	1200
Acenaphthene	U	330	U	2900	U	3100	U	3000	U	1200
2,4-Dinitrophenol	U	330	U	2900	U	3100	U	3000	U	1200
4-Nitrophenol	U	330	U	2900	U	3100	U	3000	U	1200
2,4-Dinitrotoluene	U	330	U	2900	U	3100	U	3000	U	1200
Dibenzofuran	U	330	U	2900	U	3100	U	3000	U	1200
Diethylphthalate	U	330	U	2900	U	3100	U	3000	U	1200
Fluorene	U	330	U	2900	U	3100	U	3000	U	1200
4-Chlorophenyl phenyl ether	U	330	U	2900	U	3100	U	3000	U	1200
4-Nitroaniline	U	330	U	2900	U	3100	U	3000	U	1200
4,6-Dinitro-2-methylphenol	U	330	U	2900	U	3100	U	3000	U	1200
N-Nitrosodiphenylamine	U	330	U	2900	U	3100	U	3000	U	1200
1,2-Diphenylhydrazine/Azobenzene	U	330	U	2900	U	3100	U	3000	U	1200
4-Bromophenyl phenyl ether	U	330	U	2900	U	3100	U	3000	U	1200
Hexachlorobenzene	U	330	U	2900	U	3100	U	3000	U	1200
Pentachlorophenol	U	330	U	2900	U	3100	U	3000	U	1200
Phenanthrene	U	330	U	2900	U	3100	U	3000	U	1200
Anthracene	U	330	U	2900	U	3100	U	3000	U	1200
Carbazole	U	330	U	2900	U	3100	U	3000	U	1200
Di-n-butyl phthalate	U	330	3300	2900	19000	3100	3400	3000	3300	1200
Fluoranthene	U	330	U	2900	U	3100	U	3000	U	1200
Benzidine	U	330	U	2900	U	3100	U	3000	U	1200
Pyrene	U	330	U	2900	U	3100	U	3000	U	1200
3,3'-Dimethylbenzidine	U	330	U	2900	U	3100	U	3000	U	1200
Butyl benzyl phthalate	U	330	U	2900	U	3100	U	3000	U	1200
3,3'-Dichlorobenzidine	U	330	U	2900	U	3100	U	3000	U	1200
Benzo(a)anthracene	U	330	U	2900	U	3100	U	3000	U	1200
Chrysene	U	330	U	2900	U	3100	U	3000	U	1200
Bis(2-ethylhexyl) phthalate	U	330	910	2900	1100	3100	1000	3000	240	1200
Di-n-octyl phthalate	U	330	U	2900	U	3100	U	3000	U	1200
Benzo(b)fluoranthene	U	330	U	2900	U	3100	U	3000	U	1200
Benzo(k)fluoranthene	U	330	U	2900	U	3100	U	3000	U	1200
Benzo(a)pyrene	U	330	U	2900	U	3100	U	3000	U	1200
Indeno(1,2,3-c,d)pyrene	U	330	U	2900	U	3100	U	3000	U	1200
Dibenzo(a,h)anthracene	U	330	U	2900	U	3100	U	3000	U	1200
Benzo(ghi)perylene	U	330	U	2900	U	3100	U	3000	U	1200

TABLE 14. Petroleum Hydrocarbons and Oil and Grease Detected in Sediment Samples Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/g, dry weight)

Sample Location	Sample Number	Oil & Grease	Petroleum Hydrocarbons	MDL
LCP 47	1050A	200	110	62
LCP 48	1051A	33J	24J	71
LCP 49	1052A	68J	51J	91
LCP 50	1053A	870	470	76
LCP 51	1055A	81J	U	550
LCP 10-11	K24160	120	58J	68
LCP 46	J,K24164	U	U	180
LCP 43	D24161	U	U	240
LCP 44	F24162	U	U	230
LCP 45	G24163	U	U	230
Reference	J01508	200	U	91
SED 35	A,B01510	230	U	63
SED 19-20	K01540	560	560	60
SED 36	K01540	1400	1300	66
SED 17-18	J01545	170	U	60

MDL denotes Method Detection Limit
U denotes Not Detected
J denoted estimated below MDL

TABLE 15. Total Petroleum Hydrocarbons in Sediment
Samples Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample ID	Location	% Solids	Total Petroleum Hydrocarbons	MDL
Blank (1107S)	-	100	U	3
100-SED	Purvis Creek	37	U	
111-SED	Drainage Channel	32	U	9.2
112-SED	Purvis Creek	44	U	6.8
113-SED	Main Tributary	32	42	9.2
115-SED	Main Tributary	29	20	10
116-SED	Main Tributary	32	37	9.3
106-SED	Purvis Creek	22	51	26
113077	F2 0-6	22	180	27
113081	F2 24-30	34	290	18
Blank (1107)	-	100	U	3
113113	Purvis Creek 0-6 110	68.3	44	8.4
113119	Drainage Channel 0-6 114	30.2	88	19
117-SED	Outfall Purvis Creek 117	33.2	41	8.9
118-SED	South Marsh 118	31	150	9.6
119-SED	South Marsh 119	29.1	61	10
120-SED	North Marsh 120	24	62	12
Blank (1020S2)	-	100	U	3
113035	Grid Marsh	29.9	180	19
113036	Process south	86.6	100	3.5
113037	Cell bldg.	90.1	100	3.3
113047	Gibson Creek 48-54 109	38.8	50	7.7
Blank (1107)	-	100	U	3
121-SED	North Marsh 121	24.3	56	12

TABLE 16. Dioxin Equivalents (1987 and 1989 TEF's)
LCP Site
Brunswick, GA
April 1997

Species	South Marsh H-1			South Marsh 36			South Marsh 17-18		
	Concentration A04456 pg/g	Equivalents(1) A04456 ppt	Equivalents(2) A04456 ppt	Concentration C03877 pg/g	Equivalents(1) C03877 ppt	Equivalents(2) C03877 ppt	Concentration C03875 pg/g	Equivalents(1) C03875 ppt	Equivalents(2) C03875 ppt
TCDD	7.32	7.32	7.32	15.9	15.9	15.9	7.57	7.57	7.57
Other TCDD	78.48	0.7848	0	63.2	0.632	0	40.63	0.4063	0
PeCDD	7.5	3.75	3.75	2.4	1.2	1.2	1.9	0.95	0.95
Other PeCDD	50.9	0.2545	0	133.6	0.668	0	76.8	0.384	0
HxCDD	207.1	8.284	20.71	155.3	6.212	15.53	75.5	3.02	7.55
Other HxCDD	1062.9	0.42516	0	819.7	0.32788	0	492.5	0.197	0
HpCDD	3480	3.48	34.8	1130	1.13	11.3	771	0.771	7.71
Other HpCDD	3710	0.0371	0	4880	0.0488	0	2289	0.02289	0
OCDD	22000	0	22	6850	0	6.85	5570	0	5.57
Total Dioxin (ppt)		24	89		26	51		13	29
TCDF	9660	966	966	359	35.9	35.9	242	24.2	24.2
Other TCDF	45540	45.54	0	1261	1.261	0	1038	1.038	0
PeCDF	32200	3220	1610	885	88.5	44.25	385	38.5	19.25
Other PeCDF	52300	52.3	0	2245	2.245	0	945	0.945	0
HxCDF	73451	734.51	7345.1	2001	20.01	200.1	993.4	9.934	99.34
Other HxCDF	63549	6.3549	0	3639	0.3639	0	1096.6	0.10966	0
HpCDF	107900	107.9	1079	2372	2.372	23.72	1351	1.351	13.51
Other HpCDF	47100	0.471	0	3988	0.03988	0	899	0.00899	0
OCDF	75900	0	75.9	2870	0	2.87	1500	0	1.5
Total Furan (ppt)		5133.0759	11076		150.69178	306.84		76.08665	157.8
Total Equivalents (ppb)		5.2	11.2		0.2	0.4		0.1	0.2

(1) Equivalents based on 1987 Toxicity Equivalency Factors (TEFs)
(2) Equivalents based on 1989 Toxicity Equivalency Factors (TEFs)
pg/g picograms per gram
ppt parts per trillion
ppb parts per billion
Note: Samples taken July 1995

TABLE 16 (cont'd) Dioxin Equivalents (1987and 1989 TEF's)
LCP Site
Brunswick, GA
April 1997

Species	South Marsh 61			South Marsh 68			South Marsh E-3		
	Concentration B04446 pg/g	Equivalents(1) B04446 ppt	Equivalents(2) B04446 ppt	Concentration B04452 pg/g	Equivalents(1) B04452 ppt	Equivalents(2) B04452 ppt	Concentration A04471 pg/g	Equivalents(1) A04471 ppt	Equivalents(2) A04471 ppt
TCDD	29.3	29.3	29.3	20	20	20	14.6	14.6	14.6
Other TCDD	131.7	1.317	0	86	0.86	0	79.6	0.796	0
PeCDD	4.3	2.15	2.15	3.8	1.9	1.9	6.1	3.05	3.05
Other PeCDD	162.7	0.8135	0	172.2	0.861	0	147.9	0.7395	0
HxCDD	138.8	5.552	13.88	117.5	4.7	11.75	151.9	6.076	15.19
Other HxCDD	829.2	0.33168	0	892.5	0.357	0	838.1	0.33524	0
HpCDD	2140	2.14	21.4	2080	2.08	20.8	2410	2.41	24.1
Other HpCDD	2970	0.0297	0	4910	0.0491	0	3480	0.0348	0
OCDD	13100	0	13.1	13700	0	13.7	14000	0	14
Total Dioxin (ppt)		42	80		31	68		28	71
TCDF	2300	230	230	660	66	66	3510	351	351
Other TCDF	8700	8.7	0	4410	4.41	0	19790	19.79	0
PeCDF	6720	672	336	1589	158.9	79.45	9870	987	493.5
Other PeCDF	10580	10.58	0	5081	5.081	0	20330	20.33	0
HxCDF	15540	155.4	1554	4018	40.18	401.8	29809	298.09	2980.9
Other HxCDF	15660	1.566	0	7182	0.7182	0	24591	2.4591	0
HpCDF	24800	24.8	248	4949	4.949	49.49	49550	49.55	495.5
Other HpCDF	15900	0.159	0	7451	0.07451	0	22650	0.2265	0
OCDF	22200	0	22.2	3840	0	3.84	39100	0	39.1
Total Furan (ppt)		1103.205	2390.2		280.31271	600.58		1728.4456	4360
Total Equivalents (ppb)		1.1	2.5		0.3	0.7		1.8	4.4

(1) Equivalents based on 1987 Toxicity Equivalency Factors (TEFs)
(2) Equivalents based on 1989 Toxicity Equivalency Factors (TEFs)
pg/g picograms per gram
ppt parts per trillion
ppb parts per billion
Note: Samples taken July 1995

TABLE 17. Dioxin Equivalents (1987 and 1989 TEFs) for Sediment Samples Collected in April 1996
LCP Chemical Site
Brunswick, GA
April 1997

	Purvis Creek Station 110			Turtle River Station 105			Turtle River Station 108		
Species	Concentration A6425 pg/g	Equivalents(1) A6425 ppt	Equivalents(2) A6425 ppt	Concentration A6424 pg/g	Equivalents(1) A6424 ppt	Equivalents(2) A6424 ppt	Concentration A6423 pg/g	Equivalents(1) A6423 ppt	Equivalents(2) A6423 ppt
TCDD	0.163	0.163	0.163	1.975	1.975	1.975	0.177	0.177	0.177
Other TCDD	3.013	0.030	0.000	12.093	0.121	0.000	12.706	0.127	0.000
PeCDD	0.440	0.220	0.220	0.605	0.303	0.303	0.432	0.216	0.216
Other PeCDD	0.000	0.000	0.000	8.722	0.044	0.000	16.105	0.081	0.000
HxCDD	1.052	0.042	0.105	16.271	0.651	1.627	11.945	0.478	1.195
Other HxCDD	15.795	0.006	0.000	42.052	0.017	0.000	37.045	0.015	0.000
HpCDD	65.556	0.066	0.656	169.799	0.170	1.698	76.380	0.076	0.764
Other HpCDD	9.054	0.000	0.000	27.166	0.000	0.000	0.000	0.000	0.000
OCDD	691.575	0.000	0.692	1687.720	0.000	1.688	709.415	0.000	0.709
Total Dioxin (ppt)		0.527	1.835		3.280	7.290		1.170	3.061
TCDF	0.368	0.037	0.037	3.925	0.393	0.393	0.136	0.014	0.014
Other TCDF	4.609	0.005	0.000	22.818	0.023	0.000	0.000	0.000	0.000
PeCDF	0.705	0.071	0.035	1.048	0.105	0.052	0.494	0.049	0.025
Other PeCDF	5.749	0.006	0.000	10.958	0.011	0.000	0.000	0.000	0.000
HxCDF	8.819	0.088	0.882	12.453	0.125	1.245	2.070	0.021	0.207
Other HxCDF	15.536	0.002	0.000	34.403	0.003	0.000	4.771	0.000	0.000
HpCDF	21.171	0.021	0.212	34.116	0.034	0.341	4.020	0.004	0.040
Other HpCDF	3.174	0.000	0.000	5.288	0.000	0.000	0.000	0.000	0.000
OCDF	10.890	0.000	0.011	19.918	0.000	0.020	3.036	0.000	0.003
Total Furan (ppt)		0.229	1.177		0.693	2.051		0.088	0.289
Total Equivalents (ppb)		0.001	0.003		0.004	0.009		0.001	0.003

(1) Equivalents based on 1987 Toxicity Equivalency Factors (TEFs)
(2) Equivalents based on 1989 Toxicity Equivalency Factors (TEFs)
pg/g picograms per gram
ppt parts per trillion
ppb parts per billion

TABLE 17 (cont) Dioxin Equivalents (1987 and 1989 TEFs) for Sediment Samples Collecetd in April 1996
LCP Chemical Site
Brunswick, GA
April 1997

Species	South Marsh Station F2-Surface Concentration A6428 ng/kg	Equivalents(1) A6428 ppt	Equivalents(2) A6428 ppt	Turtle River Station 106 Concentration A6427 ng/kg	Equivalents(1) A6427 ppt	Equivalents(2) A6427 ppt	Turtle River Station 107 Concentration A6426 ng/kg	Equivalents(1) A6426 ppt	Equivalents(2) A6426 ppt
TCDD	0.585	0.585	0.585	0.130	0.130	0.130	0.738	0.738	0.738
Other TCDD	7.112	0.071	0.000	8.786	0.088	0.000	9.058	0.091	0.000
PeCDD	6.709	3.355	3.355	0.442	0.221	0.221	1.914	0.957	0.957
Other PeCDD	0.000	0.000	0.000	8.426	0.042	0.000	7.938	0.040	0.000
HxCDD	572.629	22.905	57.263	13.209	0.528	1.321	3.477	0.139	0.348
Other HxCDD	0.000	0.000	0.000	46.792	0.019	0.000	146.450	0.059	0.000
HpCDD	1694.145	1.694	16.941	153.418	0.153	1.534	44.303	0.044	0.443
Other HpCDD	0.000	0.000	0.000	0.000	0.000	0.000	122.078	0.001	0.000
OCDD	11214.246	0.000	11.214	1715.094	0.000	1.715	449.794	0.000	0.450
Total Dioxin (ppt)		28.610	89.358		1.181	4.921		2.068	2.936
TCDF	701.523	70.152	70.152	1.853	0.185	0.185	0.571	0.057	0.057
Other TCDF	5014.003	5.014	0.000	6.662	0.007	0.000	0.000	0.000	0.000
PeCDF	3745.842	374.584	187.292	0.600	0.060	0.030	2.496	0.250	0.125
Other PeCDF	6371.258	6.371	0.000	6.122	0.006	0.000	0.000	0.000	0.000
HxCDF	13294.244	132.942	1329.424	7.114	0.071	0.711	2.372	0.024	0.237
Other HxCDF	9448.077	0.945	0.000	10.927	0.001	0.000	0.000	0.000	0.000
HpCDF	17012.044	17.012	170.120	21.465	0.021	0.215	1.354	0.001	0.014
Other HpCDF	0.001	0.000	0.000	3.146	0.000	0.000	0.000	0.000	0.000
OCDF	7248.858	0.000	7.249	18.251	0.000	0.018	0.875	0.000	0.001
Total Furan (ppt)		607.021	1764.238		0.352	1.160		0.332	0.434
Total Equivalents (ppb)		0.636	1.854		0.002	0.006		0.002	0.003

(1) Equivalents based on 1987 Toxicity Equivalency Factors (TEFs)
(2) Equivalents based on 1989 Toxicity Equivalency Factors (TEFs)
pg/g picograms per gram
ppt parts per trillion
ppb parts per billion

TABLE 17 (cont) Dioxin Equivalents (1987 and 1989 TEFs) for Sediment Samples Collected in April 1996
LCP Chemical Site
Brunswick, GA
April 1997

	Purvis Creek Station 117			Purvis Creek Station 102			Purvis Creek Station 100		
Species	Concentration A6431 ng/kg	Equivalents(1) A6431 ppt	Equivalents(2) A6431 ppt	Concentration A6430 ng/kg	Equivalents(1) A6430 ppt	Equivalents(2) A6430 ppt	Concentration A6429 ng/kg	Equivalents(1) A6429 ppt	Equivalents(2) A6429 ppt
TCDD	0.781	0.781	0.781	0.214	0.214	0.214	0.373	0.373	0.373
Other TCDD	0.000	0.000	0.000	7.239	0.072	0.000	5.190	0.052	0.000
PeCDD	1.472	0.736	0.736	0.497	0.249	0.249	0.561	0.281	0.281
Other PeCDD	5.774	0.029	0.000	8.285	0.041	0.000	0.000	0.000	0.000
HxCDD	6.194	0.248	0.619	16.419	0.657	1.642	2.828	0.113	0.283
Other HxCDD	1.649	0.001	0.000	69.956	0.028	0.000	42.660	0.017	0.000
HpCDD	137.753	0.138	1.378	175.898	0.176	1.759	171.616	0.172	1.716
Other HpCDD	357.055	0.004	0.000	472.949	0.005	0.000	497.989	0.005	0.000
OCDD	1481.322	0.000	1.481	1795.379	0.000	1.795	1654.591	0.000	1.655
Total Dioxin (ppt)		1.936	4.995		1.442	5.659		1.012	4.307
TCDF	0.846	0.085	0.085	2.816	0.282	0.282	6.502	0.650	0.650
Other TCDF	13.427	0.013	0.000	3.366	0.003	0.000	17.318	0.017	0.000
PeCDF	1.507	0.151	0.075	0.838	0.084	0.042	30.756	3.076	1.538
Other PeCDF	20.091	0.020	0.000	24.193	0.024	0.000	35.207	0.035	0.000
HxCDF	16.090	0.161	1.609	19.055	0.191	1.906	135.077	1.351	13.508
Other HxCDF	52.250	0.005	0.000	44.589	0.004	0.000	47.179	0.005	0.000
HpCDF	28.843	0.029	0.288	43.449	0.043	0.434	160.436	0.160	1.604
Other HpCDF	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OCDF	34.864	0.000	0.035	28.627	0.000	0.029	202.999	0.000	0.203
Total Furan (ppt)		0.464	2.092		0.631	2.692		5.294	17.503
Total Equivalents (ppb)		0.002	0.007		0.002	0.008		0.006	0.022

(1) Equivalents based on 1987 Toxicity Equivalency Factors (TEFs)
(2) Equivalents based on 1989 Toxicity Equivalency Factors (TEFs)
pg/g picograms per gram
ppt parts per trillion
ppb parts per billion

TABLE 17 (cont) Dioxin Equivalents (1987 and 1989 TEFs) for Sediment Samples Collected in April 1996
LCP Chemical Site
Brunswick, GA
April 1997

Species	South Marsh Station 118 Concentration A6434 pg/g	South Marsh Station 118 Equivalents(1) A6434 ppt	South Marsh Station 118 Equivalents(2) A6434 ppt	Outfall Canal Station 111 Concentration A6433 pg/g	Outfall Canal Station 111 Equivalents(1) A6433 ppt	Outfall Canal Station 111 Equivalents(2) A6433 ppt	Purvis Creek Station 101 Concentration A6432 pg/g	Purvis Creek Station 101 Equivalents(1) A6432 ppt	Purvis Creek Station 101 Equivalents(2) A6432 ppt
TCDD	1.467	1.467	1.467	1.449	1.449	1.449	0.774	0.774	0.774
Other TCDD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PeCDD	2.262	1.131	1.131	3.569	1.785	1.785	0.974	0.487	0.487
Other PeCDD	0.000	0.000	0.000	0.000	0.000	0.000	8.363	0.042	0.000
HxCDD	6.672	0.267	0.667	27.639	1.106	2.764	5.372	0.215	0.537
Other HxCDD	33.908	0.014	0.000	7.091	0.003	0.000	0.324	0.000	0.000
HpCDD	184.220	0.184	1.842	356.583	0.357	3.566	125.164	0.125	1.252
Other HpCDD	545.311	0.005	0.000	705.772	0.007	0.000	373.127	0.004	0.000
OCDD	1803.190	0.000	1.803	3285.556	0.000	3.286	1386.664	0.000	1.387
Total Dioxin (ppt)		3.068	6.911		4.706	12.849		1.647	4.437
TCDF	1.842	0.184	0.184	153.512	15.351	15.351	0.859	0.086	0.086
Other TCDF	0.000	0.000	0.000	792.989	0.793	0.000	18.102	0.018	0.000
PeCDF	1.684	0.168	0.084	223.329	22.333	11.166	1.385	0.139	0.069
Other PeCDF	34.434	0.034	0.000	882.564	0.883	0.000	3.992	0.004	0.000
HxCDF	17.439	0.174	1.744	765.135	7.651	76.514	19.762	0.198	1.976
Other HxCDF	20.093	0.002	0.000	946.520	0.095	0.000	39.983	0.004	0.000
HpCDF	41.290	0.041	0.413	1197.895	1.198	11.979	31.150	0.031	0.312
Other HpCDF	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OCDF	46.445	0.000	0.046	1062.260	0.000	1.062	38.506	0.000	0.039
Total Furan (ppt)		0.605	2.472		48.304	116.072		0.479	2.481
Total Equivalents (ppb)		0.004	0.009		0.053	0.129		0.002	0.007

(1) Equivalents based on 1987 Toxicity Equivalency Factors (TEFs)
(2) Equivalents based on 1989 Toxicity Equivalency Factors (TEFs)
pg/g picograms per gram
ppt parts per trillion
ppb parts per billion

TABLE 18. Converted Target Analyte List Metals in Sediment
LCP Site
Brunswick, GA
April 1997

(Results in uMol/g, dry weight)

Metal	Location						
	F-2	C-3	19-20	17-18	M-1	36	Reference
Mercury	2.9	0.32	0.85	0.07	0.03	1.15	0.0006
Cadmium	NA	NA	0.005U	0.004U	0.003U	0.005U	0.007U
Copper	NA	NA	0.39	0.22	0.025	1.12	0.21
Nickel	NA	NA	0.26	0.17	0.03U	0.37	0.17
Lead	NA	NA	0.34	0.16	0.09	0.36	0.12
Zinc	NA	NA	1.29	0.9	0.1	2.3	1.04

U - Indicates compound not detected

TABLE 19. Results of Acid Volatile Sulfide and Simultaneously Extracted Metals Analysis of Sediment
LCP Site
Brunswick, GA
April 1997

(Results in uMol/g, dry weight)

	Location						
Metal	F-2	C-3	19-20	17-18	M-1	36	Reference
Mercury	0.0047	0.0005	0.0353	0.0042	0.0002U	0.0088	NA
Cadmium	0.04	0.009	0.008	0.005	0.0009	0.007	NA
Copper	0.5	0.27	0.47	0.02	0.12	0.27	NA
Nickel	0.37	0.083	0.2	0.16	0.0079	0.1	NA
Lead	1.9U	0.44U	0.38	1.2U	0.12U	0.18	NA
Zinc	1.9	0.61	1.3	0.41	0.05	0.67	NA
Total SEM	4.7	1.4	2.4	1.8	0.3	1.24	NA
AVS	33	7	1.6	15	1.02U	0.78U	NA

U - Indicates compound not detected
U values used in the total SEM calculation wihtout modification

TABLE 20. Ratio of Simultaneously Extracted Metals to TAL Metals
LCP Site
Brunswick, GA
April 1997

Metal	Location						
	F-2	C-3	19-20	17-18	M-1	36	Reference
Mercury	0.0016	0.0016	0.04	0.06	0.007	0.007	NA
Cadmium	NA	NA	1.6U	1.25U	0.3U	1.4U	NA
Copper	NA	NA	1.2	0.09	4.8	0.24	NA
Nickel	NA	NA	0.77	0.94	0.26U	0.27	NA
Lead	NA	NA	1.12	7.5U	1.3U	0.5	NA
Zinc	NA	NA	1	0.46	0.5	0.29	NA

Ratio of Simultaneously Extracted Metals to Acid Volatile Sulfide Concentrations

Metal	Location						
	F-2	C-3	19-20	17-18	M-1	36	Reference
Mercury	0.0001	7E-05	0.022	0.0003	0.0002U	0.012U	NA
Cadmium	0.001	0.001	0.005	0.0003	0.0009U	0.009U	NA
Copper	0.015	0.038	0.29	0.001	0.12U	0.35U	NA
Nickel	0.011	0.012	0.125	0.01	0.008U	0.13U	NA
Lead	0.057	0.063	0.24	0.08	0.12U	0.23U	NA
Zinc	0.057	0.09	0.8	0.03	0.05U	0.86U	NA
Total SEM	0.14	0.2	1.5	0.12	0.29U	1.6U	NA

U - Indicates compound not detected

TABLE 21 Grain Size Distribution in Sediment Samples Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results reported as percentage by mass)

Classification	Particle Diameter (millimeters)	SED 19-20 J01546	LCP 10-11 J24160	LCP 43 F24161	LCP 44 G24162	LCP 45 F24163	LCP 46 L24164	SED 17-1 K01545	SED 36 J01540	Reference K01508	LCP 35 D01510	LCP 47 C1050	LCP 48 C1051	LCP 49 C1052	LCP 50 C1053	LCP 51 C1055
Gravel	4.75-76.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coarse Sand	2.00-4.74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium Sand	0.425-1.99	0.2	1.0	0.7	0.4	0.9	0.5	0.4	0.4	0.4	0.1	0.6	9.0	1.4	0.5	4.4
Fine Sand	0.075-0.424	2.9	6.8	11.6	5.6	5.8	5.1	3.8	8.3	5.4	2.6	14.3	52.8	9.1	10.1	20.2
Silt	0.005-0.074	34.4	24.7	47.8	49.1	30.1	35.2	21.7	48.7	52.6	39.4	42.8	38.1	33.4	39.9	11.3
Clay	0.001-0.004	49.4	58.6	27.3	37.9	56.1	48.0	55.8	30.6	34.5	48.5	32.3	0.0	46.3	36.8	53.6
Colloids	<0.001	13.0	8.8	12.7	6.9	7.0	11.3	18.3	12.0	7.2	9.4	10.1	0.0	9.9	12.6	10.5

TABLE 22. Total Organic Carbon Detected in Sediment
LCP Site
Brunswick, GA
April 1997

(Results reported as percent)

Sample Location	Sample Number	Percent Organic Matter
Reference	A-H01508	3.6
LCP 10-11	I24160	4.2
LCP 43	E24161	3.0
LCP 44	E24162	4.5
LCP 45	E24163	3.1
LCP 46	I24164	4.4
SED 17-18	I01545	1.3
SED 19-20	A01546	0.78
SED 35	C01510	1.7
SED 36	A01540	0.36
LCP 47	1050B	27
LCP 48	1051B	33
LCP 49	1052B	21
LCP 50	1053B	25
LCP 51	1055B	34

Note: Samples taken May 1995

TABLE 23. Water Quality Results for 11-12 July 1995
LCP Site
Brunswick, GA
April 1997

Time	Temp deg C	pH units	Cond. mS/cm	Salin ppt	DO % Sat	DO mg/l	Redox mV	Depth meterts	Turb NTU	Batt volts
1800	31.74	7.22	3.34	1.8	58.5	4.24	297	0.2	N/A	12.1
1815	31.43	7.26	3.33	1.8	58.1	4.24	299	0.4	N/A	12.1
1830	31.16	7.26	3.33	1.8	54.8	4.01	301	0.6	N/A	12.1
1845	30.97	7.28	3.34	1.8	52.2	3.83	302	0.7	N/A	12.1
1900	30.87	7.3	3.39	1.8	51.7	3.8	303	0.8	N/A	12.1
1915	30.83	7.32	3.45	1.9	52.2	3.84	304	0.8	N/A	12.1
1930	30.67	7.33	3.54	1.9	51	3.76	306	0.9	N/A	12.1
1945	30.51	7.36	3.66	2	51.6	3.81	308	1	N/A	11.8
2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2030	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2115	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2145	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2215	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2245	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2345	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0030	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0115	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0145	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0215	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0245	26.17	7.98	0.0045	0	99.1	8.02	168	0	N/A	14.5&
0300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0315	25.33	8	0.0042	0	99.2	8.15	171	0	N/A	14.5&
0330	24.67	8	0.0041	0	99.2	8.25	186	0	N/A	14.5&
0345	24.46	8.03	0.004	0	99	8.26	186	0	N/A	14.5&
0400	24.79	8.04	0.0038	0	98.3	8.15	171	0	N/A	14.5&
0415	24.81	8.03	0.0037	0	98.9	8.2	164	0	N/A	14.5&
0430	24.54	8.03	0.0036	0	98.8	8.23	173	0	N/A	14.5&
0445	24.24	8.03	0.0034	0	99.3	8.32	179	0	N/A	14.5&
0500	24.1	8.03	0.0033	0	99.1	8.32	186	0	N/A	14.5&
0515	23.92	8.03	0.0033	0	99.4	8.38	181	0	N/A	14.5&
0530	23.97	8.02	0.0032	0	99.1	8.35	182	0	N/A	14.5&
0545	24.12	8.01	0.0031	0	99.1	8.32	176	0	N/A	14.5&

TABLE 23 (cont'd.). Water Quality for 11-12 July 1995
LCP Site
Brunswick, GA
April 1997

Time	Temp deg C	pH units	Cond. mS/cm	Salin ppt	DO % Sat	DO mg/l	Redox mV	Depth meterts	Turb NTU	Batt volts
0600	23.9	7.99	0.0029	0	99.1	8.36	180	0	N/A	14.5&
0615	24.1	7.99	0.0028	0	99	8.31	178	0	N/A	14.5&
0630	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0645	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0715	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0730	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0745	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0815	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0830	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0845	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0915	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0930	30.14	7.39	3.83	2.1	47.7	3.54	293	1.1	N/A	14.5&
0945	30.16	7.4	3.88	2.1	47.4	3.52	297	1.1	N/A	14.5&
1000	30.18	7.4	3.89	2.1	47.3	3.51	301	1.2	N/A	14.6&
1015	30.18	7.39	3.9	2.1	46.4	3.44	305	1.2	N/A	14.6&
1030	30.2	7.4	3.89	2.1	44.8	3.33	308	1.1	N/A	14.6&
1045	30.26	7.37	3.88	2.1	41.9	3.11	307	1.1	N/A	14.6&
1100	30.53	7.37	3.86	2.1	48.7	3.59	306	1	N/A	14.5&
1115	30.69	7.33	3.82	2.1	49.2	3.62	298	1	N/A	14.6&
1130	30.59	7.3	3.75	2	50.5	3.73	280	0.9	N/A	14.6&
1145	30.63	7.29	3.67	2	52.5	3.87	262	0.8	N/A	14.6&
1200	30.75	7.3	3.59	2	54.6	4.02	246	0.6	N/A	14.6&
1215	30.99	7.31	3.55	1.9	57.1	4.19	231	0.5	N/A	14.6&
1230	31.28	7.34	3.51	1.9	59.3	4.33	216	0.3	N/A	14.6&
1245	31.36	7.33	3.46	1.9	58.7	4.28	183	0.1	N/A	14.6&
1300	31.74	7.33	1.123	0.6	59.4	4.34	144	0	N/A	14.6&
1315	31.63	7.86	0.0064	0	101.3	7.45	207	0	N/A	14.5&
1330	32.24	7.73	0.0063	0	99.5	7.24	216	0	N/A	14.6&
1345	33.79	7.92	0.0061	0	98.5	6.98	207	0	N/A	14.6&
1400	33.77	7.9	0.005	0	99	7.02	229	0	N/A	14.6&
1415	34.09	7.9	0.0035	0	99.2	7	224	0	N/A	14.6&
1430	34.32	7.89	0.0029	0	101.2	7.11	230	0	N/A	14.5&
1445	33.34	7.91	0.0016	0	100.2	7.15	241	0	N/A	14.6&
1500	33.44	7.83	0.0013	0	101.8	7.26	255	0	N/A	14.6&
1515	33.77	7.89	0.001	0	102.5	7.27	255	0	N/A	14.6&
1530	33.53	7.9	0.0009	0	101.5	7.23	264	0	N/A	14.6&
1545	34.31	7.99	0.001	0	105.3	7.4	252	0	N/A	14.6&
1600	33.25	7.8	0.0009	0	104.8	7.5	273	0	N/A	14.6&
1615	33.55	7.86	0.0008	0	103.9	7.4	267	0	N/A	14.6&
1630	33.54	7.89	0.0008	0	101.1	7.19	267	0	N/A	14.6&
1645	33.08	7.87	0.0008	0	99.4	7.13	271	0	N/A	14.6&
1700	32.19	7.85	0.0009	0	99.2	7.22	274	0	N/A	14.6&
1715	31.22	7.86	0.0008	0	97.2	7.19	278	0	N/A	14.6&
1730	31.34	7.89	0.0008	0	97.6	7.21	279	0	N/A	14.6&
1745	31.04	7.9	0.0009	0	97.5	7.24	282	0	N/A	14.6&
1800	30.59	7.89	0.0009	0	98.2	7.35	283	0	N/A	14.6&

TABLE 24. Aroclor 1268 Detected in Surface Water
Samples Collected in May 1995
LCP Site
Brunswick, GA
April 1997

Sample Location	Sample Number	Aroclor 1268 (ug/L)	MDL (ug/L)
LCP 10-11	A,B 24165	0.67	0.30
LCP 19-20	A-D 24168	66	0.28
LCP 35-36	A,B 24168	24	0.29
LCP 17-18	A,B 24166	2.6	0.28
LCP 45	A,B 24163	0.14J	0.28
LCP 46	A-D 24164	0.36	0.28
LCP 44	A-B 24162	0.09J	0.28
LCP 43	A,B 24161	0.17J	0.28
Reference	A,B 1037	0.22J	0.38

MDL denotes Method Detection Limit
J denotes concentration below MDL

TABLE 25. Metals Detected in Surface Water Samples Collected in May 1995 (Unfiltered)
LCP Site
Brunswick, GA
April 1997

Sample Number:	D24163		G24161		C24162		G,H24164	
Sample Location:	LCP 45		LCP 43		LCP 44		LCP 46	
Metal	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)
Aluminum	1100	50	2700	50	460	50	1700	50
Barium	31	5.0	34	5.0	33	5.0	41	5.0
Calcium**	270	2.0	280	2.0	270	2.0	300	2.0
Copper	U	5.0	U	5.0	U	5.0	U	5.0
Iron	710	25	1800	25	440	25	1600	25
Lead	U	11	34	11	16	11	U	11
Magnesium**	820	10	830	10	810	10	870	10
Manganese	100	2	160	2	110	2	130	2
Mercury	0.40	0.20	0.50	0.20	0.20	0.20	0.40	0.20
Potassium**	280	2	270	2	270	2	290	2
Sodium**	6600	10	6700	10	6500	10	6900	10
Vanadium	9.2	5	13	5	8.8	5	12	5
Zinc	U	5	U	5	U	5	U	5

** denotes concentrations in mg/L
MDL denotes Method Detection Limit
U denotes Not Detected

TABLE 25 (cont'd.). Metals Detected in Surface Water Samples Collected in May 1995 (Unfiltered)
LCP Site
Brunswick, GA
April 1997

Sample Number:	D24166		C24168		D24165		E,F24167	
Sample Location:	LCP 17-18		LCP 35-36		LCP 10-11		LCP 19-20	
Metal	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)
Aluminum	1700	50	1100	50	820	50	1600	50
Barium	41	5.0	140	5.0	29	5.0	43	5.0
Calcium**	290	2.0	350	2.0	310	2.0	280	2.0
Copper	U	5.0	5.1	5.0	U	5.0	U	5.0
Iron	1600	25	1000	25	580	25	1600	25
Lead	20	11	14	11	13	11	12	11
Magnesium**	830	10	790	10	930	10	800	10
Manganese	310	2	65	2	47	2	180	2
Mercury	3.0	0.20	10	0.40	0.40	0.20	9.2	0.20
Potassium**	270	2	260	2	300	2	260	2
Sodium**	6500	10	6400	10	7200	10	6300	10
Vanadium	14	5	12	5	9.4	5	12	5
Zinc	U	5	U	5	U	5	U	5

** denotes concentrations in mg/L
MDL denotes Method Detection Limit
U denotes Not Detected

TABLE 26. Metals Detected in Surface Water Samples Collected in May 1995 (Filtered)
LCP Site
Brunswick, GA
April 1997

Sample Number:	C24161		D24162		C24163		E24164		C24165	
Sample Location:	LCP 43		LCP 44		LCP 45		LCP 46		LCP 10-11	
Metal	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)
Aluminum	U	50	U	50	U	50	U	50	U	50
Barium	78	5.0	78	5.0	77	5.0	39	5.0	28	5.0
Calcium**	270	2.0	290	2.0	280	2.0	270	2.0	290	2.0
Copper	U	5.0	U	5.0	17	5.0	U	5.0	U	5.0
Iron	58	25	81	25	60	25	48	25	35	25
Lead	20	11	15	11	U	11	U	11	U	11
Magnesium**	790	10	860	10	820	10	830	10	860	10
Manganese	100	2	96	2	80	2	80	2	19	2
Mercury	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Potassium**	270	2	270	2	270	2	270	2	280	2
Sodium**	6200	10	6600	10	6300	10	6800	10	6800	10
Vanadium	10	5	10	5	9.3	5	10	5	13	5
Zinc	13	5	17	5	32	5	U	5	U	5

** denotes concentrations in mg/L
MDL denotes Method Detection Limit
U denotes Not Detected

TABLE 26 (cont'd.). Metals Detected in Surface Water Samples Collected in May 1995 (Filtered)
LCP Site
Brunswick, GA
April 1997

Sample Number:	C24166		G24167		D24168		A20613		A20612	
Sample Location:	LCP 17-18		LCP 19-20		LCP 35-36		Reference		Reference	
Metal	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)	Conc. (ug/L)	MDL (ug/L)
Aluminum	U	50	U	50	U	50	U	50	650	50
Barium	82	5.0	79	5.0	170	5.0	96	5.0	40	5.0
Calcium**	290	2.0	260	2.0	310	2.0	190	2.0	210	2.0
Copper	U	5.0	U	5.0	U	5.0	8.8	5.0	U	5.0
Iron	100	25	72	25	30	25	U	25	380	25
Lead	U	11	U	11	U	11	U	11	U	11
Magnesium**	850	10	770	10	750	10	590	10	630	5.0
Manganese	230	2	110	2	22	2	23	2	36	2.0
Mercury	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Potassium**	270	2	250	2	260	2	190	2	190	2.0
Sodium**	6800	10	6300	10	6300	10	4700	10	4900	5.0
Vanadium	9.4	5	6.4	5	12	5	5.8	5	7.6	5.0
Zinc	14	5	7	5	22	5	38	5	U	5.0

** denotes concentrations in mg/L
MDL denotes Method Detection Limit
U denotes Not Detected

TABLE 27. Total, Elemental, Methyl, Dimethyl, and Diethyl Mercury Detected in Water
LCP Site
Brunswick, GA
April 1997

Sample Location	Sample Number	Total Mercury (ng/l)	Elemental Mercury (ng/l)	Methyl Mercury (ng/l)	Dimethyl Mercury (ng/l)	Diethyl Mercury (ng/l)
WWTP Effluent	01674	9700	0.44	2.30	0.070 J	0.070 J
South Seep French Drain	01675	88000	0.47	180	0.070 J	0.070 J
South Seep French Drain	01675 Duplicate	91000	0.48	180	0.070 J	0.070 J
North Seep French Drain	01676	2700	0.20	27	0.070 J	0.070 J
Storm Drain	04719	82000	8.6	15	0.070 J	0.070 J

J denotes value at or below detection limit
Note: Samples taken July 1995

TABLE 28. Mean Number and Feeding Guild of Benthic Macroinvertebrates Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(reported as organisms/m2)

		Reference (Troup Creek)		OF Ditch (Location 35)		Location 10-11		Location 17-18		Location 19-20	
Organism	Feeding Guild	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Oligochaete A	Sub	5777	3523	6048	3126	10292	12772	9125	4671	2653	3978
Oligochaete B	Sub	4834	4314	2122	4063	3926	5247	8700	5359	5199	10059
Oligochaete C	Sub	0	0	3608	8373	0	0	0	0	0	0
Oligochaete (other)	Sub	118	354	424	895	0	0	531	1031	955	2668
Oligochaete (juvenile)	Sub	10139	6302	8913	13140	23131	14828	3077	3725	2240	2016
Manayunkia aestuarina	Surf	14029	11955	6578	8617	19947	18860	1E+05	77959	42547	37271
Streblospio benedicti	Surf	0	0	17931	20547	4562	4003	849	837	424	548
Capitella sp.	Sub	118	354	212	447	0	0	212	671	1273	2335
Capitella A	Sub	236	468	6791	8565	4987	9929	955	1454	531	902
Capitellidae (other)	Sub	707	1186	637	1674	2016	2572	6154	6183	424	1342
Nereidae	Surf	0	0	637	742	424	1025	106	336	318	513
Syllidae	Carn	0	0	0	0	106	336	0	0	0	0
Orbiniidae	Sub	0	0	106	336	0	0	0	0	0	0
Nematoda	??	5659	5884	3501	4034	73424	46146	2759	3848	2016	2317
Uca sp.	Surf	0	0	106	336	0	0	743	716	106	336
Sesarma sp.	Surf	0	0	0	0	0	0	0	0	212	447
Gammaridae	Surf	354	750	106	336	212	447	318	513	0	0
Cyathura polita	Surf	589	559	743	716	0	0	318	716	0	0
Leptochelia sp.	Surf	0	0	0	0	106	336	0	0	0	0
Harpactocoid copepod	??	118	354	0	0	106	336	0	0	0	0
Crab larvae	Surf	118	354	0	0	0	0	106	336	0	0
Collembola	Surf	1297	2107	0	0	106	336	106	336	0	0
Dolichopodidae	Carn	236	468	0	0	318	513	212	447	106	336
Tabanidae	Carn	118	354	0	0	0	0	0	0	0	0
Ceratopogonidae	Surf	118	354	0	0	0	0	0	0	0	0
Diptera (other)	??	589	771	0	0	106	336	106	336	0	0
Gastropoda	Surf	707	1061	106	336	0	0	0	0	0	0
Rhynchocoela	Carn	0	0	106	336	106	336	0	0	0	0
Acarina	??	118	354	0	0	212	447	0	0	106	336

Surf - Surface Feeder
Sub - Subsurface Feeder
Carn - Carnivore

TABLE 29. Results of the Amphipod and Shrimp Sediment Toxicity Test
LCP Site
Brunswick, GA
April 1997

(Results reported as percent survival)

Sample Location	Sample Number	Marine Amphipod *Leptocheirus plumulosus*		Brown Shrimp *Penaeus vannamei*	
		Mean (% survival)	Std. Dev.	Mean (% survival)	Std. Dev.
Lab Control	NA	90	9	97	5
Reference	A-H 01508	78	8	94	5
LCP 10-11	A-H 24160	92	3	NP	NP
SED 17-18	A-H -1545	83	12	100	0
SED 19-20	B-I 01546	63	21	NP	NP
SED 36	B-I 01540	68	14	97	5

NP denotes analysis Not Performed
NA denotes Not Applicable
Note: Samples taken May 1995

TABLE 30. Medaka (Oryzias latipes) Embryo Toxicity Assay Results
LCP Site
Brunswick, GA
April 1997

Treatment	Percent Mortality	Delayed Hatch	Lesion Number	Types of Lesions
Control	0	No	0	N/A
Reference	0	Yes	1	Minor head hemorrhage/ congestion
Location 36	0	Yes	2	Minor head hemorrhage/congestion and heart edema
Location 10-11	9.1	Yes	6	Heart edema, caudal area hemorrhage, low blood flow
Location 17-18	10	Yes	7	Heart edema and yolk sphere hemorrhage, low blood flow, tail abnormality
Location 19-20	9.1	Yes	6	Heart edema and low blood flow, eye hemorrhage, head hemorrhage, small hypo eye

NA=not applicable
Note: Samples taken July 1995

TABLE 31. Mercury and Aroclor 1268 Detected in Fiddler Crab Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results reported in mg/kg, dry weight)

Sample Location	Mercury	Aroclor 1268	Lipid Normalized	Percent Lipid Whole Body	Percent Solid
LCP 10-11	0.60	4.80	102.1	4.7	34.0
LCP 10-11	0.63	5.30	110.4	4.8	32.0
LCP 10-11	0.57	5.10	113.3	4.5	38.0
LCP 10-11	0.73	5.40	105.9	5.1	31.0
LCP 10-11	0.79	3.60	76.6	4.7	33.0
LCP 10-11	0.64	5.00	84.7	5.9	31.0
Mean	0.66	4.87	98.9	5.0	33.2
Median	0.64	5.05	104.0	4.8	32.5
St. Dev.	0.08	0.60	13.5	0.5	2.4
LCP 17-18	0.96	27.00	1038.5	2.6	39.0
LCP 17-18	1.80	33.00	1222.2	2.7	35.0
LCP 17-18	1.90	59.00	1903.2	3.1	32.0
LCP 17-18	2.10	23.00	920.0	2.5	33.0
LCP 17-18	2.00	61.00	2033.3	3.0	32.0
LCP 17-18	3.50	36.00	1333.3	2.7	33.0
LCP 17-18	1.50	42.00	1500.0	2.8	36.0
Mean	1.97	40.14	1421.5	2.8	34.3
Median	1.95	39.00	1416.7	2.8	33.0
St. Dev.	0.64	13.71	384.5	0.2	1.5
LCP 19-20	2.80	68.00	2615.4	2.6	27.0
Outfall	2.70	47.00	1566.7	3.0	30.0
Outfall	4.10	57.00	1357.1	4.2	32.0
Outfall	1.80	32.00	969.7	3.3	30.0
Outfall	3.40	47.00	1468.8	3.2	28.0
Outfall	1.50	48.00	1655.2	2.9	29.0
Outfall	2.10	19.00	950.0	2.0	32.0
Outfall	2.80	51.00	1961.5	2.6	32.0
Mean	2.63	43.00	1418.4	3.0	30.4
Median	2.45	47.50	1412.9	3.1	31.0
St. Dev.	0.92	12.88	359.3	0.7	1.6
Reference	0.06	0.07	1.4	4.7	36.0
Reference	0.07	0.12	2.0	6.0	33.0
Reference	U	0.10	1.7	5.7	32.0
Reference	0.08	0.09	2.0	4.3	33.0
Reference	0.07	0.07	1.6	4.6	31.0
Reference	U	0.06	1.8	3.2	34.0
Reference	0.05	0.06	1.4	4.2	35.0
Mean	0.05	0.08	1.7	4.7	33.4
Median	0.07	0.08	1.7	4.5	33.0
St. Dev.	0.03	0.02	0.2	0.9	1.3

U denotes undetected

TABLE 32. Aroclor 1268 in Fiddler Crab Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Aroclor 1268 (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid
LCP 10-11	1016-01	4.8	0.059	4.7	34
LCP 10-11	1016-02	5.3	0.058	4.8	32
LCP 10-11	1016-03	5.1	0.063	4.5	38
LCP 10-11	1016-04	5.4	0.061	5.1	31
LCP 10-11	1016-05	3.6	0.059	4.7	33
LCP 10-11	1016-06	5.0	0.063	5.9	31
LCP 17-18	A20611-01	27	0.051	2.6	39
LCP 17-18	A20611-02	33	0.054	2.7	35
LCP 17-18	A20611-03	59	0.064	3.1	32
LCP 17-18	A20611-04	23	0.060	2.5	33
LCP 17-18	A20611-05	61	0.062	3.0	32
LCP 17-18	A20611-06	36	0.058	2.7	33
LCP 17-18	A20611-07	42	0.050	2.8	36
LCP 19-20	A01543	68	0.070	2.6	27
Outfall	A25574-01	47	0.20	3.0	30
Outfall	A25574-02	57	0.15	4.2	32
Outfall	A25574-03	32	0.14	3.3	30
Outfall	A25574-04	47	0.14	3.2	28
Outfall	A25574-05	48	0.11	2.9	29
Outfall	A25574-06	19	0.12	2.0	32
Outfall	A25574-07	51	0.090	2.6	32
Reference	A20610-01	0.068	0.055	4.7	36
Reference	A20610-02	0.12	0.059	6.0	33
Reference	A20610-03	0.095	0.063	5.7	32
Reference	A20610-04	0.087	0.058	4.3	33
Reference	A20610-05	0.074	0.064	4.6	31
Reference	A20610-06	0.056J	0.058	3.2	34
Reference	A20610-07	0.057	0.056	4.2	35

MDL denotes Method Detection Limit
J denotes value below MDL

TABLE 33. Mercury in Fiddler Crab Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg,dry weight)

Sample Location	Sample Number	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
LCP 10-11	1016-01	600	93	4.7	34
LCP 10-11	1016-02	630	150	4.8	32
LCP 10-11	1016-03	570	55	4.5	38
LCP 10-11	1016-04	730	96	5.1	31
LCP 10-11	1016-05	790	75	4.7	33
LCP 10-11	1016-06	640	59	5.9	31
LCP 10-11	1016-07	650	55	NP	NP
LCP 17-18	A20611-01	960	67	2.6	39.2
LCP 17-18	A20611-02	1800	49	2.7	35.1
LCP 17-18	A20611-03	1900	60	3.1	32
LCP 17-18	A20611-04	2100	39	2.5	32.7
LCP 17-18	A20611-05	2000	56	3	32.4
LCP 17-18	A20611-06	3500	78	2.7	32.6
LCP 17-18	A20611-07	1500	65	2.8	36
LCP 19-20	A01543	2800	94	2.6	27
Outfall	A25574-01	2700	73	3	30
Outfall	A25574-02	4100	100	4.2	31.5
Outfall	A25574-03	1800	95	3.3	29.9
Outfall	A25574-04	3400	71	3.2	28.3
Outfall	A25574-05	1500	86	2.9	29.2
Outfall	A25574-06	2100	67	2	32.4
Outfall	A25574-07	2800	78	2.6	32.4
Reference	A20610-01	63	57	4.7	36.3
Reference	A20610-02	65	50	6	33.3
Reference	A20610-03	U	91	5.7	31.5
Reference	A20610-04	76	41	4.3	33
Reference	A20610-05	71	51	4.6	30.9
Reference	A20610-06	U	110	3.2	33.7
Reference	A20610-07	49	34	4.2	35

MDL denotes Method Detection Limit
U denotes Not Detected
NP denotes analysis Not Performed

TABLE 34. Mercury and Aroclor 1268 Detected in Fiddler Crab Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Mercury (mg/kg) whole body	Aroclor 1268 (mg/kg) whole body	PCB Lipid Normalized	Percent Lipid	Percent Solid
19-20	2.9	26	1276.00	2.0	25
19-20	2	13	760.00	1.7	28
19-20	1.9	21	896.52	2.3	25
19-20	1.8	23	1221.58	1.9	27
19-20	2.1	22	1485.33	1.5	26
19-20	3	19	1210.00	1.6	25
19-20	1.9	26	1373.16	1.9	26
Mean	2.23	21.43	1174.66	1.84	26.00
Median	2.00	22.28	1221.58	1.90	26.00
St. Dev.	0.47	4.14	238.73	0.25	1.07
17-18	1.7	24	2378.00	1.0	24
17-18	2.1	78	3876.50	2.0	20
17-18	1.9	49	2057.08	2.4	24
17-18	1.5	47	2338.50	2.0	24
17-18	1.6	10	469.09	2.2	26
Mean	1.76	41.55	2223.83	1.92	23.60
Median	1.70	46.77	2338.50	2.00	24.00
St. Dev.	0.22	23.13	1083.99	0.48	1.96
Little Satilla (Ref.)	U	0.06	4.62	1.3	27
Little Satilla (Ref.)	0.078	0.03	1.00	3.0	30
Mean	0.04	0.05	2.81	2.15	28.50
Median	0.08	0.05	2.81	2.15	28.50
St. Dev.	0.04	0.02	1.81	0.85	1.50

TABLE 35. Aroclor 1268 Detected in Fiddler Crab Collected in October 19
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Aroclor 1268 (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid
19 - 20	A113137	26	0.08	2.0	25
19 - 20	A113138	13	0.07	1.7	28
19 - 20	A113139	21	0.08	2.3	25
19 - 20	A113140	23	0.07	1.9	27
19 - 20	A113141	22	0.07	1.5	26
19 - 20	A113142	19	0.08	1.6	25
19 - 20	A113143	26	0.08	1.9	26
17 - 18	A113144	24	0.08	1.0	24
17 - 18	A113145	78	0.10	2.0	20
17 - 18	A113146	49	0.08	2.4	24
17 - 18	A113147	47	0.08	2.0	24
17 - 18	A113148	10	0.08	2.2	26
REFERENCE	A113151	0.06J	0.07	1.3	27
REFERENCE	A113152	0.03J	0.06	3.0	30

TABLE 36. Mercury Detected in Fiddler Crab Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Parameter: Client ID	Tissue Type	Sample Location	Mercury	
			Conc (ug/kg)	MDL (ug/kg)
Method Blank	-----	Lab	U	40
A113137	Fiddler Crab	NA	2900	150
A113138	Fiddler Crab	NA	2000	100
A113139	Fiddler Crab	NA	1900	80
A113140	Fiddler Crab	NA	1800	110
A113141	Fiddler Crab	NA	2100	70
A113142	Fiddler Crab	NA	3000	120
A113143	Fiddler Crab	NA	1900	77
A113144	Fiddler Crab	NA	1700	76
A113145	Fiddler Crab	NA	2100	91
A113146	Fiddler Crab	NA	1900	93
A113147	Fiddler Crab	NA	1500	83
A113148	Fiddler Crab	NA	1600	100
A113149	Fiddler Crab	NA	1600	95
A113150	Fiddler Crab	NA	U	85
A113151	Fiddler Crab	NA	U	82
A113152	Fiddler Crab	NA	78	74

TABLE 37 Mercury and Aroclor 1268 Detected in Blue Crab Collected in May 1995
LCP Site
Brunswick, GA
April 1997

Sample Location	Weights						Edible Tissue					Inedible Tissue					Estimated Total Body Concentration				Estimated Body Burden (mg)	
	Edible Wet Weight (gm)	Inedible Wet Weight (gm)	Total Wet Weight (gm)	Edible Dry Weight (gm)	Inedible Dry Weight (gm)	Total Dry Weight (gm)	Mercury (mg/kg) (dry weight)	roclor 1268 (mg/kg) (dry weight)	Aroclor Lipid Normalized	Percent Lipid	Percent Solid	Mercury (mg/kg) (dry weight)	Aroclor 1268 (mg/kg) (dry weight)	Aroclor Lipid Normalized	Percent Lipid	Percent Solid	Mercury (mg/kg) (dry weight)	Mercury (mg/kg) (wet weight)	Aroclor 1268 (mg/kg) (dry weight)	Aroclor (mg/kg) (wet weight)	Mercury	Aroclor 1268
Purvis Creek - DS	8.7	52.8	61.5	2.1	21.1	23.2	2.1	0.6	14.9	4.3	23.6	0.7	1.6	66.7	2.4	40.0	0.8	0.3	1.5	0.6	0.0	0.0
Purvis Creek - DS	23.6	216.0	239.6	3.1	57.9	61.0	8.9	1.8	38.3	4.7	13.2	2.0	1.0	76.9	1.3	26.8	2.4	0.6	1.0	0.3	0.1	0.1
Purvis Creek - DS	14.1	73.4	87.5	3.5	27.9	31.4	7.0	2.7	77.1	3.5	25.0	2.4	8.9	222.5	4.0	38.0	2.9	1.0	8.2	2.9	0.1	0.3
Purvis Creek - DS	26.1	144.0	170.1	4.8	47.7	52.5	6.6	1.0	20.9	4.7	18.5	1.8	2.3	92.0	2.5	33.1	2.2	0.7	2.2	0.7	0.1	0.1
Purvis Creek - DS	21.7	176.4	198.1	3.6	40.9	44.6	6.0	1.3	39.4	3.3	16.8	1.3	0.6	23.3	2.4	23.2	1.7	0.4	0.6	0.1	0.1	0.0
Purvis Creek - DS	19.8	150.8	170.5	3.6	52.0	55.6	26.0	3.1	106.9	2.9	18.2	5.4	2.1	161.5	1.3	34.5	6.7	2.2	2.2	0.7	0.4	0.1
Purvis Creek - DS	21.2	160.1	181.3	3.5	57.5	61.0	14.0	0.9	38.7	2.3	16.7	3.0	0.4	43.0	1.0	35.9	3.6	1.2	0.5	0.2	0.2	0.0
Mean	19.3	139.1	158.3	3.5	43.6	47.0	10.1	1.6	48.0	3.7	18.9	2.4	2.4	98.0	2.1	33.1	2.9	0.9	2.3	0.8	0.1	0.1
Median	21.2	150.8	170.5	3.5	47.7	52.5	7.0	1.3	38.7	3.5	18.2	2.0	1.6	76.9	2.4	34.5	2.4	0.7	1.5	0.6	0.1	0.1
St. Dev.	5.5	53.0	57.8	0.8	13.3	13.7	7.3	0.9	30.3	0.9	3.8	1.4	2.7	65.0	1.0	5.6	1.8	0.6	2.5	0.9	0.1	0.1
Purvis Creek - US	12.4	41.6	54.0	1.5	10.2	11.7	0.5	0.5	12.3	4.0	12.2	0.2	0.6	16.4	3.6	24.6	0.3	0.1	0.6	0.1	0.0	0.0
Purvis Creek - US	33.0	160.7	193.6	6.3	54.8	61.0	18.0	5.3	74.6	7.1	19.0	5.2	3.6	102.9	3.5	34.1	6.5	2.1	3.8	1.2	0.4	0.2
Purvis Creek - US	40.7	125.7	166.4	8.5	51.2	59.6	12.0	2.5	54.3	4.6	20.8	2.7	1.7	89.5	1.9	40.7	4.0	1.4	1.8	0.6	0.2	0.1
Purvis Creek - US	37.8	210.2	247.9	8.6	46.7	55.3	5.8	0.8	27.7	3.0	22.8	3.1	4.0	114.3	3.5	22.2	3.5	0.8	3.5	0.8	0.2	0.2
Purvis Creek - US	35.3	162.1	197.4	6.4	60.0	66.4	7.2	2.5	52.1	4.8	18.1	1.7	2.1	67.7	3.1	37.0	2.2	0.7	2.1	0.7	0.1	0.1
Purvis Creek - US	30.4	143.5	173.9	5.8	51.1	56.9	2.6	1.1	34.4	3.2	19.0	0.8	1.5	83.3	1.8	35.6	1.0	0.3	8.9	2.9	0.1	0.5
Purvis Creek - US	45.3	250.7	296.0	9.5	85.7	95.2	3.9	1.5	39.5	3.8	21.0	1.3	1.7	81.0	2.1	34.2	1.6	0.5	13.6	4.4	0.1	1.3
Mean	33.5	156.3	189.9	6.6	51.4	58.0	7.1	2.0	42.1	4.4	19.0	2.2	2.2	79.3	2.8	32.6	2.7	0.8	4.9	1.6	0.2	0.4
Median	35.3	160.7	193.6	6.4	51.2	59.6	5.8	1.5	39.5	4.0	19.0	1.7	1.7	83.3	3.1	34.2	2.2	0.7	3.5	0.8	0.1	0.2
St. Dev.	9.8	61.1	69.7	2.5	20.6	22.7	5.6	1.5	18.8	1.3	3.1	1.6	1.1	29.3	0.8	6.2	2.0	0.8	4.3	1.4	0.1	0.4
Turtle River	15.8	114.0	129.7	2.6	35.9	38.5	1.7	0.0	0.9	3.1	16.3	0.3	0.0	1.4	1.7	31.5	0.4	0.1	6.2	1.8	0.0	0.2
Turtle River	19.3	83.5	102.8	4.1	27.1	31.2	2.3	0.0	0.5	3.2	21.3	0.5	0.0	1.1	3.4	32.5	0.7	0.2	6.8	2.7	0.0	0.3
Turtle River	12.6	51.6	64.2	2.6	17.0	19.6	0.7	0.0	1.4	3.6	20.5	0.3	0.8	23.0	3.3	33.0	0.3	0.1	2.8	0.9	0.0	0.1
Turtle River	22.4	96.1	118.4	3.6	28.9	32.5	0.6	0.0	0.7	2.9	16.1	0.2	0.0	3.7	1.2	30.1	0.3	0.1	2.6	0.7	0.0	0.1
Turtle River	13.6	59.6	73.2	2.5	19.5	22.0	1.0	0.0	0.5	3.5	18.3	0.3	0.0	1.3	2.9	32.7	0.3	0.1	3.7	1.1	0.0	0.1
Turtle River	15.9	63.0	78.8	3.2	21.3	24.5	1.0	0.1	1.8	2.8	20.1	0.3	0.1	2.9	3.8	33.9	0.4	0.1	3.6	1.1	0.0	0.1
Turtle River	19.0	104.4	123.4	2.9	31.0	33.9	1.3	0.1	2.4	2.7	15.2	0.3	0.0	3.0	1.6	29.7	0.4	0.1	5.2	1.4	0.0	0.2
Mean	16.9	81.7	98.6	3.1	25.8	28.9	1.2	0.0	1.2	3.1	18.3	0.3	0.2	5.2	2.8	31.9	0.4	0.1	4.7	1.4	0.0	0.1
Median	15.9	83.5	102.8	2.9	27.1	31.2	1.0	0.0	0.9	3.1	18.3	0.3	0.0	2.9	2.9	32.5	0.4	0.1	3.7	1.1	0.0	0.1
St. Dev.	3.2	22.4	24.5	0.6	6.3	6.4	0.5	0.0	0.7	0.3	2.3	0.1	0.2	7.3	1.0	1.4	0.1	0.0	2.0	0.6	0.0	0.1
Reference	6.4	40.1	46.5	1.1	10.1	11.2	0.2	0.0	0.9	2.9	17.7	U	0.0	0.5	3.0	25.1	0.0	0.0	1.1	0.3	0.0	0.0
Reference	13.0	74.5	87.4	1.8	24.9	26.7	U	0.0	0.8	3.1	13.9	U	0.1	3.7	1.8	33.4	0.0	0.0	0.0	0.0	0.0	0.0
Reference	13.1	56.6	69.7	1.2	9.7	10.9	0.5	0.3	8.0	4.0	8.9	U	0.2	4.2	4.8	17.2	0.1	0.0	3.4	0.5	0.0	0.0
Reference	11.7	94.6	106.3	1.8	27.4	29.2	0.6	0.2	5.8	2.6	15.4	0.1	0.5	31.2	1.7	29.0	0.1	0.0	2.1	0.6	0.0	0.1
Reference	10.3	60.9	71.2	1.6	12.2	13.7	0.4	0.2	5.1	4.3	15.2	U	0.3	6.3	4.9	20.0	0.0	0.0	2.4	0.5	0.0	0.0
Reference	17.4	92.8	110.2	3.2	32.8	36.1	0.8	0.2	2.8	5.3	18.6	0.2	0.1	2.5	4.4	35.4	0.3	0.1	2.7	0.9	0.0	0.1
Reference	21.9	163.9	185.8	2.8	37.5	40.3	0.5	0.2	5.6	4.1	12.7	0.1	0.3	9.1	3.3	22.9	0.2	0.0	2.6	0.6	0.0	0.1
Reference	16.9	103.6	120.4	3.4	54.8	58.2	0.3	0.2	5.3	3.0	20.4	U	0.4	11.2	3.3	52.9	0.0	0.0	0.7	0.4	0.0	0.0
Reference	17.7	105.3	123.0	3.3	9.1	12.3	0.4	0.2	4.5	3.8	18.5	U	0.1	1.6	6.8	8.6	0.1	0.0	4.8	0.5	0.0	0.1
Mean	14.3	88.0	102.3	2.5	26.2	26.5	0.4	0.2	4.3	3.7	15.7	0.1	0.2	7.8	3.8	27.2	0.1	0.0	2.7	0.6	0.0	0.0
Median	13.1	92.8	106.3	1.8	24.9	26.7	0.4	0.2	5.1	3.8	15.4	0.1	0.2	4.2	3.3	25.1	0.1	0.0	2.6	0.5	0.0	0.0
St. Dev.	4.4	34.3	38.3	0.9	14.8	15.4	0.2	0.1	2.3	0.8	3.4	0.1	0.2	8.9	1.5	12.0	0.1	0.0	1.1	0.2	0.0	0.0

TABLE 38. Wet Weights for Blue Crab Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in g, wet weight)

Date Sampled	Sample Location	Sample Number	Edible Weight	Total Weight
17-May-95	Purvis Creek - DS	B01517	8.7	61.5
17-May-95	Purvis Creek - DS	A01514	23.6	239.6
17-May-95	Purvis Creek - DS	B01519	14.1	87.5
18-May-95	Purvis Creek - DS	A03123	26.1	170.1
18-May-95	Purvis Creek - DS	A03121	21.7	198.1
23-May-95	Purvis Creek - DS	1227	19.8	170.5
23-May-95	Purvis Creek - DS	1229	21.2	181.3
23-May-95	Purvis Creek - US	1231	12.4	54.0
23-May-95	Purvis Creek - US	1233	33.0	193.6
23-May-95	Purvis Creek - US	1235	40.7	166.4
23-May-95	Purvis Creek - US	1237	37.8	247.9
23-May-95	Purvis Creek - US	1305	35.3	197.4
23-May-95	Purvis Creek - US	1303	30.4	173.9
23-May-95	Purvis Creek - US	1301	45.3	296.0
20-May-95	Reference	A03125	6.4	46.5
20-May-95	Reference	A01996	13.0	87.4
20-May-95	Reference	A01998	13.1	69.7
20-May-95	Reference	A01994	11.7	106.3
20-May-95	Reference	A01551	10.3	71.2
20-May-95	Reference	A01552	17.4	110.2
20-May-95	Reference	A01993	21.9	185.8
20-May-95	Reference	1006	16.9	120.4
20-May-95	Reference	1004	17.7	123.0
23-May-95	Turtle River	1296	15.8	129.7
23-May-95	Turtle River	1292	19.3	102.8
23-May-95	Turtle River	1286	12.6	64.2
23-May-95	Turtle River	1298	22.4	118.4
23-May-95	Turtle River	1284	13.6	73.2
23-May-95	Turtle River	1288	15.9	78.8
23-May-95	Turtle River	1294	19.0	123.4

TABLE 39 Aroclor 1268 Detected in Blue Crab Collected in May 1995
LCP Site
Brunswick, GA
April 1997

Sample Location	Sample Number	Edible Tissue (mg/kg dry weight)				Edible Tissue (ug/kg wet weight)				Inedible Tissue (mg/kg,dry weight)					Average Estimated Total Body Aroclor 1268 Conc. (mg/kg, dry weight)
		Aroclor 1268	MDL	Percent Lipid	Percent Solid	Aroclor 1268	MDL	Percent Lipid	Percent Solid	Sample Number	Aroclor 1268	MDL (mg/kg)	Percent Lipid	Percent Solid	
Purvis Creek - DS	B01517	0.64	0.13	4.3	24	150	31	4.3	24	A01516	1.6	0.050	2.4	40	0.57
Purvis Creek - DS	A01514	1.8	0.14	4.7	13	240	18	4.7	13	A01515	1	0.070	1.3	27	0.26
Purvis Creek - DS	B01519	2.7	0.08	3.5	25	670	20	3.5	25	B01518	8.9	0.050	4.0	38	2.95
Purvis Creek - DS	A03123	0.98	0.20	4.7	19	190	38	4.7	19	B03124	2.3	0.060	2.5	33	0.67
Purvis Creek - DS	A03121	1.3	0.12	3.3	17	220	20	3.3	17	A03122	0.56	0.050	2.4	23	0.14
Purvis Creek - DS	1227	3.1	0.11	2.9	18	550	20	2.9	18	1228	2.1	0.057	1.3	35	0.71
Purvis Creek - DS	1229	0.89	0.11	2.3	17	150	19	2.3	17	1230	0.43	0.053	1.0	36	0.15
Purvis Creek - US	1231	0.49	0.28	4.0	12	59	34	4.0	12	1232	0.59	0.076	3.6	25	0.13
Purvis Creek - US	1233	5.3	0.10	7.1	19	1000	19	7.1	19	1234	3.6	0.057	3.5	34	1.19
Purvis Creek - US	1235	2.5	0.092	4.6	21	530	19	4.6	21	1236	1.7	0.046	1.9	41	0.65
Purvis Creek - US	1237	0.83	0.085	3.0	23	190	20	3.0	23	1238	4	0.087	3.5	22	0.78
Purvis Creek - US	1305	2.5	0.11	4.8	18	460	20	4.8	18	1306	2.1	0.052	3.1	37	0.72
Purvis Creek - US	1303	1.1	0.1	3.2	19	220	19	3.2	19	1304	1.5	0.054	1.8	36	0.48
Purvis Creek - US	1301	1.5	0.092	3.8	21	320	19	3.8	21	1302	1.7	0.057	2.1	34	0.54
Reference	A03125	0.028J	0.22	2.9	16	5.0J	40	2.9	18	A02000	0.023J	0.079	3.0	25	0.00
Reference	A01996	0.017J	0.14	3.1	14	2.4J	20	3.1	14	A01997	0.039J	0.060	1.8	33	0.00
Reference	A01998	0.049J	0.22	4.0	9.0	4.4J	20	4.0	9.0	A01999	0.76	0.120	4.8	17	0.11
Reference	A01994	0.019J	0.15	2.6	15	2.9J	23	2.6	15	A01995	0.044J	0.067	1.7	29	0.00
Reference	A01551	0.016J	0.17	4.3	15	2.4J	26	4.3	15	A03126	0.038J	0.095	4.9	20	0.00
Reference	A01552	0.051J	0.10	5.3	19	9.7J	19	5.3	19	A01553	0.11	0.056	4.4	35	0.03
Reference	A01993	0.066J	0.14	4.1	13	8.6J	18	4.1	13	A01992	0.048J	0.086	3.3	23	0.00
Reference	1006	0.025J	0.097	3.0	20	5.0J	19	3.0	20	1007	0.016J	0.037	3.3	53	0.00
Reference	1004	0.024J	0.11	3.8	19	4.6J	21	3.8	19	1005	0.067J	0.22	6.8	8.6	0.00
Turtle River	1296	0.32	0.18	3.1	16	51	29	3.1	16	1297	0.2	0.061	1.7	32	0.06
Turtle River	1292	0.15	0.093	3.2	21	32	20	3.2	21	1293	0.53	0.060	3.4	33	0.15
Turtle River	1286	0.22	0.10	3.6	21	46	21	3.6	21	1287	0.31	0.060	3.3	33	0.09
Turtle River	1298	0.15	0.12	2.9	16	24	19	2.9	16	1299	0.11	0.066	1.2	30	0.03
Turtle River	1284	0.23	0.12	3.5	18	41	22	3.5	18	1285	0.3	0.059	2.9	33	0.09
Turtle River	1288	0.16	0.093	2.8	20	32	19	2.8	20	1289	0.37	0.057	3.8	34	0.11
Turtle River	1294	0.17	0.13	2.7	15	26	20	2.7	15	1295	0.11	0.066	1.6	30	0.03

MDL denotes Method Detection Limit

J denotes value below MDL
\113\del\fr\9704\table39.wb2

TABLE 40. Mercury Detected in Blue Crab Collected in May 1995
LCP Site
Brunswick, GA
April 1997

Sample Location	Sample Number	Edible Tissue, dry weight				Edible Tissue, Wet Weight				Inedible Tissue, Dry Weight					Average Estimated Total Body Mercury Conc. (ug/kg, dry weight)
		Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid	Sample Number	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid	
Purvis Creek - DS	B01517	2100	110	4.3	24	500	26	4.3	24	A01516	660	57	2.4	40	300
Purvis Creek - DS	A01514	8900	320	4.7	13	1200	42	4.7	13	A01515	2000	110	1.3	27	600
Purvis Creek - DS	B01519	7000	240	3.5	25	1800	60	3.5	25	B01518	2400	69	4.0	38	1000
Purvis Creek - DS	A03123	6600	230	4.7	19	1300	44	4.7	19	B03124	1800	84	2.5	33	690
Purvis Creek - DS	A03121	6000	130	3.3	17	1000	22	3.3	17	A03122	1300	69	2.4	23	380
Purvis Creek - DS	1227	26000	720	2.9	18	4700	130	2.9	18	1228	5400	130	1.3	35	2200
Purvis Creek - DS	1229	14000	310	2.3	17	2400	53	2.3	17	1230	3000	63	1.0	36	1200
Purvis Creek - US	1231	540	280	4.0	12	65	34	4.0	12	1232	220	140	3.6	25	0
Purvis Creek - US	1233	18000	920	7.1	19	3400	180	7.1	19	1234	5200	150	3.5	34	2100
Purvis Creek - US	1235	12000	290	4.6	21	2500	61	4.6	21	1236	2700	65	1.9	41	1400
Purvis Creek - US	1237	5800	210	3.0	23	1300	48	3.0	23	1238	3100	110	3.5	22	790
Purvis Creek - US	1305	7200	140	4.8	18	1300	25	4.8	18	1306	1700	66	3.1	37	0
Purvis Creek - US	1303	2600	120	3.2	19	490	23	3.2	19	1304	840	81	1.8	36	330
Purvis Creek - US	1301	3900	110	3.8	21	820	23	3.8	21	1302	1300	100	2.1	34	500
Reference	A03125	230	200	2.9	18	41	36	2.9	18	A02000	U	73	3.0	25	0.0
Reference	A01996	U	390	3.1	14	U	55	3.1	14	A01997	U	63	1.8	33	0
Reference	A01998	470	300	4.0	9	42	27	4.0	9	A01999	U	140	4.8	17	0.0
Reference	A01994	550	180	2.6	15	83	27	2.6	15	A01995	120	110	1.7	29	0
Reference	A01551	410	190	4.3	15	62	29	4.3	15	A03126	U	140	4.9	20	0.0
Reference	A01552	800	190	5.3	19	150	36	5.3	19	A01553	210	58	4.4	35	0
Reference	A01993	520	160	4.1	13	68	21	4.1	13	A01992	140	90	3.3	23	0
Reference	1006	330	110	3.0	20	66	22	3.0	20	1007	U	61	3.3	53	0.0
Reference	1004	350	110	3.8	19	67	21	3.8	19	1005	U	390	6.8	8.6	0.0
Turtle River	1296	1700	240	3.1	16	270	38	3.1	16	1297	280	88	1.7	32	110
Turtle River	1292	2300	130	3.2	21	480	27	3.2	21	1293	510	84	3.4	33	230
Turtle River	1286	740	190	3.6	21	160	40	3.6	21	1287	260	83	3.3	33	0
Turtle River	1298	640	120	2.9	16	100	19	2.9	16	1299	230	66	1.2	30	0
Turtle River	1284	970	170	3.5	18	175	31	3.5	18	1285	260	61	2.9	33	100
Turtle River	1288	950	180	2.8	20	190	36	2.8	20	1289	310	61	3.8	34	120
Turtle River	1294	1300	170	2.7	15	200	26	2.7	15	1295	340	89	1.6	30	120

MDL denotes Method Detection Limit
U denotes Not Detected

TABLE 41. Mercury and Aroclor 1268 Detected in Blue Crab Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Mercury (mg/kg) whole body	Aroclor 1268 (mg/kg) whole body	Aroclor Lipid Normalized	Percent Lipid	Percent Solid
Little Satilla	0.15	0.04	1.38	2.9	29
Little Satilla	0.22	0.06	1.76	3.4	31
Little Satilla	0.12	0.06	1.05	5.7	32
Little Satilla	U	0.04	3.64	1.1	23
Little Satilla	0.2	0.03	1.88	1.6	24
Little Satilla	0.17	0.03	2.50	1.2	26
Little Satilla	0.14	0.04	3.33	1.2	25
Mean	0.14	0.04	2.22	2.44	27.00
Median	0.16	0.04	1.88	1.60	26.00
St. Dev.	0.07	0.01	0.90	1.57	3.41
Purvis Creek - DS	2.1	0.6	30.00	2.0	24
Purvis Creek - DS	6.3	5.1	244.29	2.1	24
Purvis Creek - DS	7.9	4.7	204.78	2.3	18
Purvis Creek - DS	2.8	1.4	87.50	1.6	25
Purvis Creek - DS	4	3.0	142.86	2.1	25
Purvis Creek - DS	3.3	2.2	74.14	2.9	14
Purvis Creek - DS	2.6	2.4	104.35	2.3	21
Mean	4.14	2.77	126.84	2.19	21.57
Median	3.30	2.40	104.35	2.10	24.00
St. Dev.	1.99	1.53	70.03	0.36	3.89

TABLE 42. Mercury and Aroclor 1268 Detected in Killifish Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location		Mercury (mg/kg) dry weight	Aroclor 1268 (mg/kg) dry weight	Aroclor Lipid Normalized	Percent Lipid (whole body)	Percent Solid
Confluence (LCP 71)	A04343	2.2	38	844.4	4.5	24
Confluence (LCP 71)	A04344	3.0	320	3809.5	8.4	27
Confluence (LCP 71)	A04473	2.2	8.0	121.2	6.6	25
Confluence (LCP 71)	A04474	2.5	25	274.7	9.1	26
Confluence (LCP 71)	A04475	2.0	14	194.4	7.2	26
Confluence (LCP 71)	A04476	1.5	6.5	166.7	3.9	25
Confluence (LCP 71)	A04477	3.1	12.4	177.1	7.0	25
Mean		2.4	60.56	798.31	6.67	25.43
Median		2.2	14.00	194.44	7.00	25.00
St. Dev.		0.5	106.41	1250.81	1.76	0.90
LCP 43	A04341	0.8	3.8	37.3	10	26
LCP 43	A04342	1.1	4.2	45.2	9.3	26
LCP 43	A2363	1.3	2.8	50.0	5.6	24
LCP 43	A2364	1.1	5.0	73.5	6.8	25
LCP 43	A2365	0.9	4.1	53.9	7.6	21
LCP 43	A2366	1.0	3.4	41.5	8.2	24
LCP 43	A2367	0.9	3.5	42.7	8.2	23
LCP 43	A2368	0.9	4	63.5	6.3	23
LCP 43	A2369	1.0	3.4	33.3	10	25
Mean		1.0	3.74	51.21	7.56	23.57
Median		1.0	3.50	50.00	7.60	24.00
St. Dev.		0.1	0.65	12.79	1.40	1.29
Outfall (35)	A04363	2.5	20	217.4	9.2	26
Outfall (35)	A04364	5.5	220	3333.3	6.6	25
Outfall (35)	A04365	5.1	200	3571.4	5.6	24
Outfall (35)	A04366	4.6	88	1313.4	6.7	21
Outfall (35)	A04367	5.1	140	2187.5	6.4	25
Mean		3.4	96.02	1772.65	6.21	20.90
Median		4.6	88.00	1750.47	6.60	24.00
St. Dev.		2.0	85.87	1388.66	2.23	8.14
Reference	A2359	0.2	0.14	1.7	8.3	23
Reference	A2360	0.1	0.086	0.0	5.9	24
Reference	A2361	0.2	0.063	0.0	5.8	23
Reference	A2362	0.1	0.15	1.8	8.3	23
Reference	A3878	0.2	0.20	2.2	9.3	23
Reference	A3879	U	0.087	0.0	5.7	22
Reference	A3880	0.2	0.12	1.7	7.2	23
Mean		0.1	0.09	1.04	7.21	23.00
Median		0.2	0.15	1.67	7.20	23.00
St. Dev.		0.1	0.08	0.92	1.35	0.53

U denotes undetected

TABLE 43. Mercury and Aroclor 1268 Detected in Snails Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	Aroclor Lipid Normalized	Percent Lipid (soft tissue)	Percent Solid
Reference	0.27	0.06	1.6	3.5	57.2
Reference	0.45	0.04	0.8	5.1	34.6
Reference	0.70	0.05	0.5	8.5	24.6
Reference	0.59	0.04	0.6	7.0	30.2
Reference	0.71	0.04	0.4	9.8	24.3
Reference	0.87	0.06	0.5	12.0	15.8
Mean	0.60	0.05	0.7	7.7	31.1
Median	0.65	0.04	0.6	7.8	27.4
St. Dev.	0.19	0.01	0.4	2.8	13.0
LCP 17-18	39.00	4.80	46.6	10.3	23.8
LCP 17-18	38.00	3.90	49.4	7.9	29.2
LCP 17-18	33.00	3.80	41.8	9.1	27.8
LCP 17-18	33.00	4.30	42.2	10.2	23.5
LCP 17-18	32.00	4.30	48.9	8.8	24.4
LCP 17-18	40.00	5.60	43.8	12.8	16.9
LCP 17-18	17.00	2.40	48.0	5.0	40.2
Mean	33.14	4.16	45.8	9.2	26.5
Median	33.00	4.30	46.6	9.1	24.4
St. Dev.	7.24	0.91	3.0	2.2	6.6
LCP5	27.00	59.00	433.8	13.6	26.6
LCP5	27.00	55.00	429.7	12.8	30.5
LCP5	25.00	41.00	369.4	11.1	28.3
Mean	26.33	51.67	411.0	12.5	28.5
Median	27.00	55.00	429.7	12.8	28.3
St. Dev.	0.94	7.72	29.5	1.0	1.6

TABLE 44. Mercury and Aroclor 1268 Detected in Marsh Grass Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Aroclor 1268 (mg/kg)	MDL (mg/kg)	Mercury (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid
LCP 35	A01541	19	1.5	9.5	0.29	1.9	27
Reference	A01542	0.021J	0.069	U	0.14	1.7	28
LCP 17-18	A01544	3.3	0.33	1.8	0.13	2.2	31

MDL denotes Method Detection Limit
J denotes value below MDL

(Results in mg/kg, wet weight)

Sample Location	Sample Number	Aroclor 1268 (mg/kg)	MDL (mg/kg)	Mercury (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid
LCP 35	A01541	5.13	0.405	2.6	0.08	1.9	27
Reference	A01542	0.006J	0.019	U	0.039	1.7	28
LCP 17-18	A01544	1.023	0.1023	0.56	0.04	2.2	31

MDL denotes Method Detection Limit
J denotes value below MDL

TABLE 45. Mercury and Aroclor 1268 Detected in Marsh Grass Collected in July 1995
LCP Site
Brunswick, Ga
April 1997

(Results in mg/kg, dry weight)

Sample Location	Wet Weight (grams)	Dry Weight (grams)	Percent Lipid	Percent Solid	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	PCB Lipid normalized
Well M1- Rep. 1	310.20	124.20	3.00	41.00	5.90	3.30	110.00
Well M1- Rep. 2	350.40	110.90	3.00	38.00	3.40	2.60	86.67
Well M1- Rep. 3	254.10	85.50	2.80	43.00	3.40	7.70	275.00
Mean	304.90	106.87	2.93	40.67	4.23	4.53	157.22
Median	282.40	120.60	8.62	2.80	2.73	0.39	0.28
St. Dev.	39.49	16.05	0.09	2.05	1.18	2.26	83.82
17-18-Rep. 1	507.30	116.90	2.60	34.00	0.35	0.25	9.62
17-18-Rep. 2	500.10	154.40	2.60	34.00	0.39	0.28	10.77
17-18-Rep. 3	337.40	117.10	2.70	34.00	0.47	0.55	20.37
Mean	448.27	129.47	2.63	34.00	0.40	0.36	13.58
Median	282.40	120.60	8.62	2.73	0.47	0.13	0.00
St. Dev.	78.45	17.63	0.05	0.00	0.05	0.13	4.82
Reference - Rep. 1	257.80	100.00	2.60	42.00	U	0.0060	0.00
Reference - Rep. 2	291.30	114.30	3.10	42.00	U	U	0.00
Reference - Rep. 3	298.10	120.60	2.50	41.00	U	U	0.00
Mean	282.40	111.63	2.73	41.67	0.00	0.00	0.00
Median	282.40	120.60	8.62	2.73	0.47	0.00	0.00
St. Dev.	17.61	8.62	0.26	0.47	0.00	0.00	0.00

U denotes undetected
Note: Samples taken July 1995
Rep. denotes replicate

\113\del\fr\9704\table45.wb2

TABLE 46. Mercury and Aroclor 1268 Detected in Marsh Grass Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Mercury (mg/kg)	MDL (mg/kg)	Aroclor 1268 (mg/kg)	MDL (mg/kg)	PCB Lipid Normalized	Percent Lipid	Percent Solid
Little Satilla	113052	U	0.11	0.01	0.08	0.71	1.4	25
Little Satilla	113053	U	0.14	0.02	0.09	1.25	1.6	23
Little Satilla	113054	U	0.12	0.01	0.07	0.91	1.1	29
Little Satilla	113055	U	0.098	0.01	0.06	0.53	1.9	31
Little Satilla	113056	U	0.11	0.01	0.07	0.56	1.8	29
Little Satilla	113057	U	0.095	0.02	0.07	1.18	1.7	27
Little Satilla	113058	U	0.11	0.02	0.08	1.43	1.4	24
Mean		0.00		0.01		0.94	1.56	26.86
Median		0.00		0.01		0.91	1.60	27.00
St. Dev.		0.00		0.00		0.33	0.26	2.75

Table 47. Mercury and Aroclor 1268 Detected in Diamondback Terrapin Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight except where noted)

Sample Location	Matrix	Sample Number	Mercury (mg/kg)	MDL (mg/kg)	Aroclor 1268 (mg/kg)	MDL (mg/kg)	Arolocr Lipid Normalized	Percent Lipid	Percent Solid
DD-1	Brain	C01515	0.36**	0.1	NP	NP	NP	NP	NP
DD-1	Carcass	A01512	1.80	0.10	1.70	0.70	14	12.0	28.0
DD-1	Liver	B01512	14.00	0.44	12.00	0.10	34	35.0	23.8
DD-2	Brain	C01513	1.60**	0.22	NP	NP	NP	NP	NP
DD-2	Carcass	A01513	7.30	0.20	12.00	0.07	109	11.0	28.3
DD-2	Liver	B01513	100.00	3.40	20.00	0.10	100	20.0	27.5
DD-4	Brain	1002.0	1.30**	0.50	NP	NP	NP	NP	NP
DD-4	Carcass	1001	7.60	0.18	16.00	0.08	276	5.8	23.7
DD-4	Liver	1003	98	3.1	64.00	0.10	291	22.0	20.4
DD-5	Brain	A00571	3.00**	0.20	NP	NP	NP	NP	NP
DD-5	Carcass	A00572	15.00	0.42	620.00	0.15	5167	12.0	13.2
DD-5	Liver	A00570	180.00	4.20	3500.00	0.15	5932	59.0	13.3
DD-5	Egg	A00575	4.00	0.09	430.00	0.09	1720	25.0	40.9
DD-5	Egg	A00576	4.60	0.10	450.00	0.08	1800	25.0	41.2
DD-5	Egg	A00606	5.50	0.12	610.00	0.10	1794	34.0	31.6
DD-5	Egg	A00612	4.70	0.09	440.00	0.08	1630	27.0	38.7
DD-5	Egg	A00615	3.80	0.08	490.00	0.09	1750	28.0	38.2
DD-5	Egg	A00616	4	0.081	390.00	0.06	1696	23.0	45.2
DD-5	Egg	A00617	5.40	0.11	530.00	0.11	1893	28.0	34.3
Mean			4.57		477.14		1755	27.1	38.6
Median			4.60		450.00		1750	27.0	38.7
St. Dev.			0.63		68.18		78	3.3	4.2
DD-6	Brain	A00573	1.30**	0.25	NP	NP	NP	NP	NP
DD-6	Carcass w/liver	A00574	12.00	0.52	500.00	0.09	5495	9.1	21.7

**value based on wet weight (ug/kg)
NP denotes analysis Not Performed

TABLE 48. Aroclor 1268 Detected in Diamondback Terrapin Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Matrix	Aroclor 1268 (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid
DD-4	A00553	Egg from DD-4 (unhatched)	31	0.10	29	83
DD-4	A00554	Egg from DD-4 (unhatched)	26	0.08	31	75
DD-4	A00555	Egg from DD-4 (unhatched)	32	0.08	29	74
DD-4	A00556	Egg from DD-4 (unhatched)	19	0.08	30	67
DD-4	A00557	Egg from DD-4 (unhatched)	35	0.11	29	74
HD-1	04714	Hatchling from turtle DD-1	12	0.14	25	30
HD-2	04715	Hatchling from turtle DD-1	13	0.11	27	33
HD-3	04716	Hatchling from turtle DD-1	14	0.11	29	35
HD-4	04717	Hatchling from turtle DD-1	9.9	0.10	27	30
HD-5	04718	Hatchling from turtle DD-1	14	0.10	26	28
BD-1	04701	Carcass	15	0.08	5.2	23
BD-1	04702	Liver	59	0.06	21	29
BE-1	04703	Egg from turtle BD-1	27	0.13	23	36
BE-2	04704	Egg from turtle BD-1	38	0.06	28	38
BE-3	04705	Egg from turtle BD-1	27	0.06	25	38
BE-4	04706	Egg from turtle BD-1	31	0.06	26	41
BE-5	04707	Egg from turtle BD-1	28	0.07	27	34
BE-6	04708	Egg from turtle BD-1	29	0.08	24	36
BE-7	04709	Egg from turtle BD-1	28	0.08	27	36
NTD-1	04711	Carcass	8.2	0.09	12	22
NTD-1	04710	Liver	21	0.06	35	33
NTD-2	04713	Carcass	36	0.08	17	24
NTD-2	04712	Liver	45	0.06	27	35
Pit Area	A04362	Broken egg shells	0.51	0.05	0.1	90

MDL denotes Method Detection Limit

TABLE 49. Mercury Detected in Diamondback Terrapin Collected in July 1995
LCP Site
Brunswick,GA
April 1997

(Results in ug/kg, dry weight)

Sample Location	Sample Number	Matrix	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
DD-4	A00553	Egg from DD-4 (unhatched)	2200	42	29	83
DD-4	A00554	Egg from DD-4 (unhatched)	2300	48	31	75
DD-4	A00555	Egg from DD-4 (unhatched)	2100	54	29	74
DD-4	A00556	Egg from DD-4 (unhatched)	2200	54	30	67
DD-4	A00557	Egg from DD-4 (unhatched)	2300	50	29	74
HD-1	04714	Hatchling from turtle DD-1	2100	91	25	30
HD-2	04715	Hatchling from turtle DD-1	2000	65	27	33
HD-3	04716	Hatchling from turtle DD-1	2100	79	29	35
HD-4	04717	Hatchling from turtle DD-1	2100	87	27	30
HD-5	04718	Hatchling from turtle DD-1	2100	95	26	28
Eggshell-1	Eggshell-1	Egg shells from turtle DD-1	57	29	NP	NP
Eggshell-2	Eggshell-2	Egg shells from turtle DD-1	52	31	NP	NP
Eggshell-3	Eggshell-3	Egg shells from turtle DD-1	34	26	NP	NP
Eggshell-4	Eggshell-4	Egg shells from turtle DD-1	78	32	NP	NP
Eggshell-5	Eggshell-5	Egg shells from turtle DD-1	110	39	NP	NP
BD-1	04701	Carcass	8000	170	5.2	23
BD-1	04702	Liver	330000	3900	21	29
BE-1	04703	Egg from BD-1	860	77	23	36
BE-2	04704	Egg from BD-1	1100	64	28	38
BE-3	04705	Egg from BD-1	780	54	25	38
BE-4	04706	Egg from BD-1	820	58	26	41
BE-5	04707	Egg from BD-1	1000	82	27	34
BE-6	04708	Egg from BD-1	690	61	24	36
BE-7	04709	Egg from BD-1	870	67	27	36
NTD-1	04711	Carcass	2000	180	12	22
NTD-1	04710	Liver	11000	140	35	33
NTD-2	04713	Carcass	3400	83	17	24
NTD-2	04712	Liver	19000	340	27	35
Pit Area	A04362	Broken egg shells	1100	48	0.10	90

MDL denotes Method Detection Limit
NP denotes analysis Not Performed

TABLE 50. Mercury and Aroclor 1268 ...lected in Clapper Rail Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Tissue	Weight (grams)	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	Aroclor Lipid Normalized	Percent Lipid	Percent Solid
LCP site	Total	310					
	Total	270					
	Total	250					
	Breast	17.4	4.6	8.0	121.2	6.6	24.0
	Breast	10.5	7.3	12.0	181.8	6.6	24.0
	Breast	12.0	5.7	630.0	6300.0	10.0	26.0
	Breast	11.8	5.5	6.3	196.9	3.2	25.0
	Breast	6.8	4.7	19.0	158.3	12.0	23.0
	Breast	11.0	5.3	6.9	181.6	3.8	25.0
	Breast	12.5	2.6	5.3	91.4	5.8	25.0
	Carcass	NC	5.3	0.5	2.8	17.0	30.0
	Carcass	NC	7.9	51.0	318.8	16.0	29.0
	Carcass	NC	7.5	21.0	80.8	26.0	34.0
	Carcass	194.7	5	18.0	197.8	9.1	28.0
	Carcass	138.1	3.5	24.0	160.0	15.0	30.0
	Carcass	181.4	4.2	45.0	250.0	18.0	30.0
	Carcass	230.1	2.2	14.0	93.3	15.0	29.0
	Liver	13.0	13	31.0	155.0	20.0	29.0
	Liver	10.8	22	36.0	189.5	19.0	27.0
	Liver	NC	23	19.0	100.0	19.0	29.0
	Liver	10.6	21	29.0	181.3	16.0	26.0
	Liver	9.8	7.8	26.0	123.8	21.0	28.0
	Liver	11.0	16	26.0	152.9	17.0	28.0
	Liver	10.5	6.8	9.5	59.4	16.0	27.0
	Feathers	2.4	9.4				
	Feathers	1.4	15				
	Feathers	4.2	29				
	Feathers		9.1				
	Feathers		6.8				
	Feathers		4.6				
	Feathers		4.9				

Descriptive Statistics						
Parameter	Weight (grams)	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	Aroclor Lipid Normalized	Percent Lipid	Percent Solid
Mean	276.7					
Median	270.0					
St. Dev.	24.9					
Mean	11.7	5.1	98.2	1033.0	6.9	24.6
Median	11.8	5.3	8.0	181.6	6.6	25.0
St. Dev.	2.9	1.3	217.1	2150.5	2.9	0.9
Mean	186.1	5.1	24.8	157.6	16.6	30.0
Median	188.1	5.0	21.0	160.0	16.0	30.0
St. Dev.	95.4	1.9	16.3	100.1	4.7	1.8
Mean	9.4	15.7	25.2	137.4	18.3	27.7
Median	10.7	16.0	26.0	152.9	19.0	28.0
St. Dev.	3.9	6.2	8.0	42.9	1.8	1.0
Mean	2.7	11.3				
Median	2.4	9.1				
St. Dev.	1.4	7.9				

Physical Features (mm)			
Length	380	Mean	369.7
Length	364	Median	385.0
Length	365	St. Dev.	7.3
Extent	505	Mean	446.0
Extent	425	Median	425.0
Extent	408	St. Dev.	42.3
Wing	155	Mean	144.0
Wing	137	Median	140.0
Wing	140	St. Dev.	7.9
Tail	77	Mean	66.3
Tail	60	Median	62.0
Tail	62	St. Dev.	7.6
Bill	61	Mean	62.0
Bill	62	Median	62.0
Bill	63	St. Dev.	0.8
Tarsi	61	Mean	57.7
Tarsi	56	Median	58.0
Tarsi	56	St. Dev.	2.4

NC = Not Calculated

TABLE 50 (cont'd) Mercury and Aroclor 1268 Detected in Clapper Rail Collected in August 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Tissue	Weight (grams)	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	Aroclor Lipid Normalized	Percent Lipid	Percent Solid
Reference	Total	181					
	Total	233					
	Total	225					
	Total	261					
	Total	306					
	Total	253					
	Total	251					
	Breast	5.8	0.68	0.3	3.7	9.0	24.0
	Breast	10.9	1.4	0.3	4.9	7.0	25.0
	Breast	10.2	1.0	0.3	6.8	4.0	23.0
	Breast	10.6	1.8	4.0	33.3	12.0	25.0
	Breast	12.9	1.2	0.4	3.9	11.0	27.0
	Breast	3.7	0.85	0.2	6.3	3.0	22.0
	Breast	10.5	4.3	0.3	6.0	5.0	26.0
	Carcass	160.1	0.76	0.5	3.5	15.0	31.0
	Carcass	202.9	1.2	0.8	5.1	15.0	29.0
	Carcass	197.9	1.1	0.6	5.2	12.0	31.0
	Carcass	218.7	1.6	8.8	38.3	23.0	33.0
	Carcass	274.2	1.1	1.0	3.7	26.0	34.0
	Carcass	231.7	0.74	0.4	5.0	8.0	30.0
	Carcass	214.6	1.1	0.9	4.3	20.0	32.0
	Liver	9.9	1.9	0.3	2.2	13.0	28.0
	Liver	10.4	3.8	0.4	3.2	13.0	27.0
	Liver	9.8	2.9	0.4	3.5	12.0	28.0
	Liver	11.2	7.1	3.2	21.3	15.0	25.0
	Liver	10.0	3.4	0.6	4.1	14.0	28.0
	Liver	9.8	1.9	0.4	3.7	12.0	27.0
	Liver	7.7	3.3	0.6	4.5	13.0	23.0
	Feathers	1.9	1.7				
	Feathers	2.7	3.8				
	Feathers	1.5	3.3				
	Feathers	5.1	11				
	Feathers	4.1	1.9				
	Feathers	2.2	2.5				
	Feathers	5.7	1.1				

Descriptive Statistics

Parameter	Weight (grams)	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	Aroclor lipid Normalized	Percent Lipid	Percent Solid
Mean	244.3					
Median	251.0					
St. Dev.	35.3					
Mean	9.2	1.6	0.8	9.3	7.3	24.6
Median	10.5	1.2	0.3	6.0	7.0	25.0
St. Dev.	3.0	1.2	1.3	9.9	3.2	1.6
Mean	214.3	1.1	1.9	9.3	17.0	31.4
Median	214.6	1.1	0.8	5.0	15.0	31.0
St. Dev.	32.2	0.3	2.8	11.8	5.9	1.6
Mean	9.8	3.5	0.8	6.1	13.1	26.8
Median	9.9	3.3	0.4	3.7	13.0	27.0
St. Dev.	1.0	1.6	1.0	6.8	1.1	1.8
Mean	3.3	3.6				
Median	2.7	2.5				
St. Dev.	2.7	2.5				

Physical Features (mm)

Length	342	Mean	382.6
Length	360	Median	360.0
Length	354	St. Dev.	21.6
Length	345		
Length	412		
Length	360		
Length	365		
Extent	420	Mean	429.0
Extent	430	Median	428.0
Extent	410	St. Dev.	26.1
Extent	400		
Extent	485		
Extent	428		
Extent	430		
Wing	124	Mean	136.6
Wing	138	Median	136.0
Wing	147	St. Dev.	10.5
Wing	138		
Wing	152		
Wing	121		
Wing	132		
Tail	59	Mean	62.3
Tail	65	Median	61.0
Tail	65	St. Dev.	8.8
Tail	47		
Tail	79		
Tail	60		
Tail	61		
Bill	54	Mean	59.7
Bill	61	Median	59.0
Bill	59	St. Dev.	4.2
Bill	63		
Bill	67		
Bill	55		
Bill	59		
Tarsi	58	Mean	58.4
Tarsi	53	Median	57.0
Tarsi	57	St. Dev.	4.1
Tarsi	55		
Tarsi	65		
Tarsi	64		
Tarsi	57		

TABLE 51. Measurements of Clapper Rails Collected in July and August 1995
LCP Site
Brunswick, GA
April 1997

(Measurements in wet weight)

Date	Sample	Rail	Weight (grams)					Physical Features (mm)					
Collected	Location	Number	Total	Breast	Carcass	Liver	Feathers	Length	Extent	Wing	Tail	Bill	Tarsl
12-Jul-95	LCP site	Rail #1	310	17.4	NC	13.0	2.4	380	505	155	77	61	61
12-Jul-95	LCP site	Rail #2	270	10.5	NC	10.8	1.4	364	425	137	60	62	56
13-Jul-95	LCP site	Rail #3	250	12.0	NC	NC	4.2	365	408	140	62	63	56
18-Jul-95	LCP site	Rail #4	NA	11.8	194.7	10.6	NA	NA	NA	NA	NA	NA	NA
18-Jul-95	LCP site	Rail #5	NA	6.8	138.1	9.8	NA	NA	NA	NA	NA	NA	NA
18-Jul-95	LCP site	Rail #6	NA	11.0	181.4	11.0	NA	NA	NA	NA	NA	NA	NA
18-Jul-95	LCP site	Rail #7	NA	12.5	230.1	10.5	NA	NA	NA	NA	NA	NA	NA
15-Aug-95	Reference	Rail #8 - LCPTC9503	181	5.8	160.1	9.9	1.9	342	420	124	59	54	58
15-Aug-95	Reference	Rail #9 - LCPTC9506	233	10.9	202.9	10.4	2.7	360	430	138	65	61	53
15-Aug-95	Reference	Rail #10 - LCPTC9504	225	10.2	197.9	9.8	1.5	354	410	147	65	59	57
15-Aug-95	Reference	Rail #11 - LCPTC9505	261	10.6	218.7	11.2	5.1	345	400	138	47	63	55
15-Aug-95	Reference	Rail #12 - LCPTC9501	306	12.9	274.2	10.0	4.1	412	485	152	79	67	65
15-Aug-95	Reference	Rail #13 - LCPTC9502	253	3.7	231.7	9.8	2.2	360	428	121	60	55	64
15-Aug-95	Reference	Rail #14 - LCPTC9507	251	10.5	214.6	7.7	5.7	365	430	132	61	59	57

NC denotes value not measured
Missing data points to be supplied by the United States Fish and Wildlife Service
NA denotes data not available

TABLE 52. Aroclor 1268 Detected in Clapper Rail Collected in July and August 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Matrix	PCB 1268 (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid
Rail #1	A04499	Breast Muscle	8.0	0.079	6.6	24
Rail #1	A04345	Carcass	0.48	0.062	17	30
Rail #1	A04498	Liver	31	0.076	20	29
Rail #2	A04361	Breast Muscle	12	0.11	6.6	24
Rail #2	A04500	Carcass	51	0.064	16	29
Rail #2	A04359	Liver	36	0.16	19	27
Rail #3	A03863	Breast Muscle	630	0.11	10	26
Rail #3	A03862	Carcass	21	0.59	26	34
Rail #3	A03865	Liver	19	1.1	19	29
Rail #4	NB9501F	Breast Muscle	6.3	0.090	3.2	25
Rail #4	NB9501D	Carcass	18	0.070	9.1	28
Rail #4	NB9501B	Liver	29	0.11	16	26
Rail #5	NB9502F	Breast Muscle	19	0.11	12	23
Rail #5	NB9502D	Carcass	24	0.06	15	30
Rail #5	NB9502A	Liver	26	0.10	21	28
Rail #6	SM9501F	Breast Muscle	6.9	0.09	3.8	25
Rail #6	SM9501D	Carcass	45	0.07	18	30
Rail #6	SM9501A	Liver	26	0.17	17	28
Rail #7	SM9502F	Breast Muscle	5.3	0.10	5.8	25
Rail #7	SM9502D	Carcass	14	0.06	15	29
Rail #7	SM9502B	Liver	9.5	0.10	16	27
Rail #8 - LCPTC9503	A04880	Breast Muscle	0.33	0.12	9.0	24
Rail #8 - LCPTC9503	A03994	Carcass	0.53	0.06	15	31
Rail #8 - LCPTC9503	A04882	Liver	0.28	0.14	13	28
Rail #9 - LCPTC9506	A04887	Breast Muscle	0.34	0.090	7.0	25
Rail #9 - LCPTC9506	A03991	Carcass	0.77	0.07	15	29
Rail #9 - LCPTC9506	A04886	Liver	0.42	0.090	13	27
Rail #10 - LCPTC9504	A04885	Breast Muscle	0.27	0.10	4.0	23
Rail #10 - LCPTC9504	A03990	Carcass	0.62	0.06	12	31
Rail #10 - LCPTC9504	A04883	Liver	0.42	0.090	12	28
Rail #11 - LCPTC9505	A03998	Breast Muscle	4.0	0.10	12	25
Rail #11 - LCPTC9505	A03989	Carcass	8.8	0.06	23	33
Rail #11 - LCPTC9505	A03997	Liver	3.2	0.10	15	25
Rail #12 - LCPTC9501	A04897	Breast Muscle	0.43	0.08	11	27
Rail #12 - LCPTC9501	A03996	Carcass	0.97	0.06	26	34
Rail #12 - LCPTC9501	A04896	Liver	0.57	0.090	14	28
Rail #13 - LCPTC9502	A04894	Breast Muscle	0.19	0.14	3.0	22
Rail #13 - LCPTC9502	A03995	Carcass	0.40	0.060	8.0	30
Rail #13 - LCPTC9502	A04893	Liver	0.44	0.090	12	27
Rail #14 - LCPTC9507	A04891	Breast Muscle	0.3	0.080	5	26
Rail #14 - LCPTC9507	A03993	Carcass	0.86	0.06	20	32
Rail #14 - LCPTC9507	A04889	Liver	0.58	0.12	13	23

MDL denotes Method Detection Limit

TABLE 53. Aroclor 1268 Detected in Clapper Rail (Breast Muscle)
Collected in July and August 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, wet weight)

Sample Location	Rail Number	Sample Number	PCB 1268 (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
LCP site	Rail #1	A04499	1900	19	6.6	24
LCP site	Rail #2	A04361	2900	26	6.6	24
LCP site	Rail #3	A03863	1700	29	10	26
LCP site	Rail #4	NB9501F	1600	23	3.2	25
LCP site	Rail #5	NB9502F	4500	25	12	23
LCP site	Rail #6	SM9501F	1700	23	3.8	25
LCP site	Rail #7	SM9502F	1300	25	5.8	25
Reference	Rail #8 - LCPTC9503	A04880	79	29	9.0	24
Reference	Rail #9 - LCPTC9506	A04887	85	23	7.0	25
Reference	Rail #10 - LCPTC9504	A04885	62	23	4.0	23
Reference	Rail #11 - LCPTC9505	A03998	1000	25	12	25
Reference	Rail #12 - LCPTC9501	A04897	120	22	11	27
Reference	Rail #13 - LCPTC9502	A04894	42	31	3	22
Reference	Rail #14 - LCPTC9507	A04891	78	21	5	26

MDL denotes Method Detection Limit

TABLE 54. Mercury Detected in Clapper Rail (Breast Muscle)
Collected in July and August 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, wet weight)

Sample Location	Rail Number	Sample Number	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
LCP site	Rail #1	A04499	1100	26	6.6	24
LCP site	Rail #2	A04361	1800	53	6.6	24
LCP site	Rail #3	A03863	1500	22	10	26
LCP site	Rail #4	NB9501F	1400	25	3.2	25
LCP site	Rail #5	NB9502F	1100	28	12	23
LCP site	Rail #6	SM9501F	1300	28	3.8	25
LCP site	Rail #7	SM9502F	650	33	5.8	25
Reference	Rail #8 - LCPTC9503	A04880	160	38	9.0	24
Reference	Rail #9 - LCPTC9506	A04887	350	40	7.0	25
Reference	Rail #10 - LCPTC9504	A04885	230	37	4.0	23
Reference	Rail #11 - LCPTC9505	A03998	450	38	12	25
Reference	Rail #12 - LCPTC9501	A04897	320	25	11	27
Reference	Rail #13 - LCPTC9502	A04894	190	35	3	22
Reference	Rail #14 - LCPTC9507	A04891	1100	26	5	26

MDL denotes Method Detection Limit

TABLE 55. Mercury Detected in Clapper Rail Collected in July and August 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample Location	Sample Number	Matrix	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
Rail #1	A04499	Breast Muscle	4600	110	6.6	24
Rail #1	A04345	Carcass	5300	140	17	30
Rail #1	A04358	Feathers	9400	290	NP	NP
Rail #1	A04498	Liver	13000	440	20	29
Rail #2	A04361	Breast Muscle	7300	220	6.6	24
Rail #2	A04500	Carcass	7900	280	16	29
Rail #2	A04360	Feathers	15000	630	NP	NP
Rail #2	A04359	Liver	22000	490	19	27
Rail #3	A03863	Breast Muscle	5700	84	10	26
Rail #3	A03862	Carcass	7500	150	26	34
Rail #3	A03864	Feathers	29000	820	NP	NP
Rail #3	A03865	Liver	23000	270	19	29
Rail #4	NB9501F	Breast Muscle	5500	99	3.2	25
Rail #4	NB9501D	Carcass	5000	160	9.1	28
Rail #4	NB9501A	Feathers	9100	1900	NP	NP
Rail #4	NB9501B	Liver	21000	610	16	26
Rail #5	NB9502F	Breast Muscle	4700	120	12	23
Rail #5	NB9502D	Carcass	3500	120	15	30
Rail #5	NB9502B	Feathers	6800	180	NP	NP
Rail #5	NB9502A	Liver	7800	620	21	28
Rail #6	SM9501F	Breast Muscle	5300	110	3.8	25
Rail #6	SM9501D	Carcass	4200	130	18	30
Rail #6	SM9501B	Feathers	4600	250	NP	NP
Rail #6	SM9501A	Liver	16000	640	17	28
Rail #7	SM9502F	Breast Muscle	2600	130	5.8	25
Rail #7	SM9502D	Carcass	2200	110	15	29
Rail #7	SM9502E	Feathers	4900	220	NP	NP
Rail #7	SM9502B	Liver	6800	590	16	27
Rail #8 - LCPTC9503	A04880	Breast Muscle	680	160	9.0	24
Rail #8 - LCPTC9503	A03994	Carcass	760	110	15	31
Rail #8 - LCPTC9503	A04881	Feathers	1700	54	NP	NP
Rail #8 - LCPTC9503	A04882	Liver	1900	120	13	28
Rail #9 - LCPTC9506	A04887	Breast Muscle	1400	160	7	25
Rail #9 - LCPTC9506	A03991	Carcass	1200	96	15	29
Rail #9 - LCPTC9506	A04888	Feathers	3800	100	NP	NP
Rail #9 - LCPTC9506	A04886	Liver	3800	140	13	27
Rail #10 - LCPTC9504	A04885	Breast Muscle	1000	160	4	23
Rail #10 - LCPTC9504	A03990	Carcass	1100	130	12	31
Rail #10 - LCPTC9504	A04884	Feathers	3300	68	NP	NP
Rail #10 - LCPTC9504	A04883	Liver	2900	130	12	28
Rail #11 - LCPTC9505	A03998	Breast Muscle	1800	150	12	25
Rail #11 - LCPTC9505	A03989	Carcass	1600	100	23	33
Rail #11 - LCPTC9505	A03999	Feathers	11000	350	NP	NP
Rail #11 - LCPTC9505	A03997	Liver	7100	150	15	25
Rail #12 - LCPTC9501	A04897	Breast Muscle	1200	94	11	27
Rail #12 - LCPTC9501	A03996	Carcass	1100	120	26	34
Rail #12 - LCPTC9501	A04895	Feathers	1900	60	NP	NP
Rail #12 - LCPTC9501	A04896	Liver	3400	120	14	28
Rail #13 - LCPTC9502	A04894	Breast Muscle	850	160	3	22
Rail #13 - LCPTC9502	A03995	Carcass	740	89	8	30
Rail #13 - LCPTC9502	A04892	Feathers	2500	79	NP	NP
Rail #13 - LCPTC9502	A04893	Liver	1900	110	12	27
Rail #14 - LCPTC9507	A04891	Breast Muscle	4300	100	5	26
Rail #14 - LCPTC9507	A03993	Carcass	1100	99	20	32
Rail #14 - LCPTC9507	A04890	Feathers	1100	150	NP	NP
Rail #14 - LCPTC9507	A04889	Liver	3300	140	13	23

MDL denotes Method Detection Limit
NP denotes analysis Not Performed

TABLE 56 Mercury and Aroclor 1268 Detected in Brown Shrimp Collected in May 1995
LCP Site
Brunswick, GA
April 1997

Sample Location	Weights						Edible Tissue					Inedible Tissue					Estimated Total Body Concentration				Estimated Body Burden (mg)	
	Edible Wet Weight	Inedible Wet Weight	Total Wet Weight	Edible Dry Weight	Inedible Dry Weight	Total Dry Weight	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	PCB Lipid Normalized	Percent Lipid	Percent Solid	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	PCB Lipid Normalized	Percent Lipid	Percent Solid	Mercury (mg/kg) dry weight	Mercury (mg/kg) wet weight	Aroclor 1268 (mg/kg) dry weight	Aroclor 1268 (mg/kg) wet weight	Mercury	Aroclor 1268
Purvis Creek - DS	9.1	11.3	20.4	2.2	3.0	5.2	0.2	0.2	7.6	2.9	24.0	0.2	1.2	12.9	9.3	26.7	0.2	0.0	0.6	0.2	9.1E-04	3.1E-03
Purvis Creek - DS	7.5	8.3	15.7	1.7	2.3	4.0	0.4	0.5	13.2	3.8	23.0	0.3	2.3	28.4	8.1	28.0	0.3	0.1	1.2	0.3	1.2E-03	4.8E-03
Purvis Creek - DS	6.2	5.6	11.7	1.5	1.6	3.2	0.5	0.8	38.5	2.0	25.0	0.4	4.2	49.4	8.5	29.1	0.4	0.1	2.4	0.7	1.4E-03	7.6E-03
Purvis Creek - DS	6.9	6.6	13.5	1.7	2.0	3.6	0.5	0.7	25.4	2.8	24.0	0.3	3.9	42.4	9.2	29.7	0.4	0.1	2.1	0.6	1.5E-03	7.6E-03
Purvis Creek - DS	6.9	6.3	13.3	1.7	1.9	3.5	0.5	0.4	12.5	2.8	24.0	0.3	1.1	17.2	6.4	29.6	0.4	0.1	0.7	0.2	1.4E-03	2.4E-03
Purvis Creek - DS	6.7	6.9	13.5	1.6	2.1	3.7	0.4	0.9	26.1	3.3	24.0	0.3	2.2	34.9	6.3	30.2	0.3	0.1	1.3	0.4	1.2E-03	4.9E-03
Purvis Creek - DS	5.1	4.9	10.1	1.1	1.3	2.5	0.4	1.1	34.4	3.2	22.0	0.4	3.1	51.7	6.0	27.0	0.4	0.1	1.9	0.5	9.2E-04	4.7E-03
Purvis Creek - DS	5.9	8.3	14.2	1.3	2.1	3.4	0.3	0.4	26.9	1.6	22.0	0.2	2.2	23.2	9.5	25.9	0.3	0.1	1.0	0.2	9.2E-04	3.4E-03
Purvis Creek - DS	5.8	7.3	13.0	1.4	2.1	3.5	0.5	0.9	22.2	4.1	24.0	0.4	7.3	56.2	13.0	28.6	0.4	0.1	3.3	0.9	1.5E-03	1.1E-02
Purvis Creek - DS	5.7	6.7	12.4	1.4	1.9	3.3	0.3	0.5	10.4	5.2	24.0	0.2	2.4	27.6	8.7	28.4	0.3	0.1	1.2	0.3	9.2E-04	4.0E-03
Mean	6.6	7.2	13.8	1.6	2.0	3.6	0.4	0.6	21.7	3.2	23.6	0.3	3.0	34.4	8.5	28.3	0.3	0.1	1.6	0.4	1.2E-03	5.4E-03
Median	6.4	6.8	13.4	1.6	2.0	3.5	0.4	0.6	23.8	3.1	24.0	0.3	2.4	31.7	8.6	28.5	0.4	0.1	1.3	0.3	1.2E-03	4.8E-03
St. Dev.	1.1	1.7	2.6	0.3	0.4	0.7	0.1	0.3	9.9	1.0	0.9	0.1	1.7	14.2	2.0	1.3	0.1	0.0	0.8	0.2	2.4E-04	2.6E-03
Purvis Creek - US	6.9	6.5	13.5	1.6	1.9	3.5	0.6	1.1	52.4	2.1	23.0	0.4	4.1	67.2	6.1	29.7	0.5	0.1	2.3	0.6	1.8E-03	8.3E-03
Purvis Creek - US	6.1	8.2	14.4	1.4	2.3	3.7	0.5	1.0	28.6	3.5	23.0	0.4	2.3	46.0	5.0	28.3	0.4	0.1	1.2	0.3	1.6E-03	4.7E-03
Purvis Creek - US	7.5	9.3	16.8	1.6	2.8	4.4	0.5	0.8	29.3	2.7	22.0	0.3	3.7	63.8	5.8	29.7	0.4	0.1	1.7	0.4	1.6E-03	7.4E-03
Purvis Creek - US	7.8	8.1	16.0	1.9	2.5	4.3	0.6	0.9	21.8	4.0	24.0	0.4	5.0	72.5	6.9	30.4	0.5	0.1	2.5	0.7	2.0E-03	1.1E-02
Purvis Creek - US	7.2	7.0	14.1	1.7	2.1	3.7	0.6	1.4	53.8	2.6	23.0	0.4	3.8	61.3	6.2	29.5	0.5	0,1	2.3	0.6	1.9E-03	8.6E-03
Purvis Creek - US	7.1	5.9	13.0	2.4	1.3	3.7	0.3	0.7	32.2	2.3	34.0	0.5	6.6	82.5	8.0	22.1	0.4	0.1	4.7	1.4	1.3E-03	1.8E-02
Purvis Creek - US	9.1	7.1	14.5	2.1	2.2	4.3	0.5	0.9	32.1	2.8	23.0	0.4	4.0	70.2	5.7	31.2	0.5	0.1	2.4	0.7	1.9E-03	1.0E-02
Mean	7.4	7.5	14.6	1.8	2.2	4.0	0.5	1.0	35.7	2.9	24.6	0.4	4.2	66.2	6.2	28.7	0.4	0.1	2.5	0.6	1.5E-03	8.3E-03
Median	7.2	7.1	14.4	1.7	2.2	3.7	0.5	0.9	32.1	2.7	23.0	0.4	4.0	67.2	6.1	29.7	0.5	0.1	2.3	0.6	1.6E-03	8.3E-03
St. Dev.	0.9	1.1	1.2	0.3	0.4	0.3	0.1	0.2	11.5	0.6	3.9	0.1	1.2	10.4	0.9	2.8	0.1	0.0	1.0	0.3	5.2E-04	4.2E-03
Turtle River	8.3	9.2	17.4	2.2	2.8	5.0	0.4	0.5	7.6	5.9	27.0	0.2	0.4	8.3	4.1	30.5	0.3	0.1	0.1	0.0	1.4E-03	5.7E-04
Turtle River	7.8	9.0	16.8	2.0	2.7	4.7	0.4	0.3	8.9	3.5	25.0	0.2	0.7	13.3	5.4	30.2	0.3	0.1	0.1	0.0	1.5E-03	6.4E-04
Turtle River	9.6	10.3	19.8	2.6	2.7	5.3	0.4	0.3	11.5	2.6	27.0	0.3	0.4	9.6	4.5	26.4	0.3	0.1	0.1	0.0	1.6E-03	4.9E-04
Turtle River	3.4	4.3	7.7	0.8	0.6	1.4	0.4	0.6	15.6	4.1	23.0	0.6	3.3	34.4	9.6	14.8	0.5	0.1	0.3	0.1	6.8E-04	4.0E-04
Turtle River	8.7	9.7	18.4	2.1	3.0	5.1	0.3	0.2	7.7	2.6	24.0	0.2	0.8	14.5	5.5	30.6	0.2	0.1	0.1	0.0	1.0E-03	7.1E-04
Turtle River	8.8	9.6	18.3	2.3	2.9	5.2	0.4	0.2	1.6	10.0	26.0	0.3	1.1	11.7	9.4	30.2	0.3	0.1	0.2	0.1	1.6E-03	9.2E-04
Mean	7.8	8.7	16.4	2.0	2.4	4.4	0.4	0.3	8.8	4.8	25.3	0.3	1.1	15.5	6.4	27.1	0.3	0.1	0.2	0.2	1.3E-03	2.7E-03
Median	8.5	9.4	17.9	2.2	2.8	5.0	0.4	0.3	8.3	3.8	25.5	0.3	0.8	12.5	5.5	30.2	0.3	0.1	0.1	0.1	1.5E-03	7.1E-04
St. Dev.	2.0	2.0	4.0	0.6	0.8	1.4	0.0	0.2	4.2	2.6	1.5	0.1	1.0	8.7	2.2	5.7	0.1	0.0	0.1	0.2	4.1E-04	3.2E-03
Reference	8.0	7.0	15.0	1.8	1.9	3.8	0.1	0.0	1.0	2.2	23.0	U	0.1	1.1	6.3	27.6	0.1	0.0	0.0	0.0	2.0E-04	0.0E+00
Reference	4.7	9.6	14.3	1.0	2.6	3.7	U	0.0	0.6	3.4	22.0	U	0.0	0.8	6.4	27.6	0.0	0.0	0.0	0.0	0.0E+00	0.0E+00
Reference	9.9	9.3	19.2	2.3	2.5	4.7	U	0.0	0.9	1.6	23.0	U	0.1	1.2	8.0	26.6	0.0	0.0	0.0	0.0	0.0E+00	6.3E-05
Reference	9.1	7.2	15.3	2.3	2.1	4.3	0.1	0.0	0.9	1.7	25.0	U	0.1	1.0	7.9	28.8	0.0	0.0	0.0	0.0	2.0E-04	5.1E-05
Reference	7.0	7.2	14.2	1.4	1.6	3.0	U	0.0	1.4	2.3	20.0	U	0.0	0.7	6.6	22.9	0.0	0.0	0.0	0.0	0.0E+00	0.0E+00
Reference	6.1	6.6	12.8	1.5	1.9	3.4	0.1	0.0	1.4	1.8	24.0	U	0.1	0.9	7.1	29.0	0.0	0.0	0.0	0.0	1.3E-04	0.0E+00
Reference	8.2	7.7	15.8	2.0	2.1	4.1	0.1	0.0	0.9	1.8	24.0	0.1	0.1	0.9	6.5	27.8	0.1	0.0	0.0	0.0	3.7E-04	0.0E+00
Reference	9.9	9.5	19.4	2.3	2.8	5.0	U	0.0	1.2	3.0	23.0	U	0.1	0.7	8.1	29.1	0.0	0.0	0.0	0.0	0.0E+00	0.0E+00
Reference	7.4	7.4	14.9	1.7	2.1	3.8	U	0.0	1.1	1.6	23.0	U	0.1	1.1	6.9	28.3	0.0	0.0	0.0	0.0	0.0E+00	4.1E-05
Reference	9.8	8.3	18.1	2.4	2.5	4.9	U	0.0	0.8	1.8	24.0	U	0.1	1.0	8.8	30.4	0.0	0.0	0.0	0.0	0.0E+00	6.7E-05
Mean	8.0	8.0	15.9	1.9	2.2	4.1	0.0	0.0	1.0	2.1	23.1	0.0	0.1	0.9	7.3	27.8	0.0	0.0	0.0	0.0	9.0E-05	2.2E-05
Median	8.1	7.6	15.2	1.9	2.1	4.0	0.1	0.0	1.0	1.8	23.0	0.1	0.1	0.9	7.0	28.1	0.0	0.0	0.0	0.0	0.0E+00	0.0E+00
St. Dev.	1.6	1.0	2.1	0.4	0.3	0.6	0.0	0.0	0.2	0.6	1.3	0.0	0.0	0.2	0.8	1.9	0.0	0.0	0.0	0.0	1.2E-04	2.8E-05

TABLE 57 Wet Weights of Brown Shrimp (Inedible Tissue) Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in g, wet weight)

Sample Location	Inedible Tissue		Components of Total Inedible Tissue Samples (each weight represents contribution of one shrimp)													
	Sample Number	Total Inedible Wt. (grams)	Shrimp #1	Wt.	Shrimp #2	Wt.	Shrimp #3	Wt.	Shrimp #4	Wt.	Shrimp #5	Wt.	Shrimp #6	Wt.	Shrimp #7	Wt.
Purvis Creek - DS	B01537	11.3	B01537	11.3												
Purvis Creek - DS	B01521C	24.9	B01521	10.4	B01523	6.9	B01525	7.6								
Purvis Creek - DS	A20643C	11.2	A20643	6.7	A20645	4.5										
Purvis Creek - DS	A20647C	13.2	A20647	6.7	A20649	6.5										
Purvis Creek - DS	A20651C	12.7	A20651	6.0	A20653	6.7										
Purvis Creek - DS	A20655C	20.6	A20655	8.5	A20657	5.0	A20660	7.1								
Purvis Creek - DS	A20637C	14.8	A20637	3.9	A20639	4.0	A20641	7.0								
Purvis Creek - DS	B01535C	16.6	B01535	7.6	B01539	9.0										
Purvis Creek - DS	B01531C	14.5	B01531	6.9	B01533	7.6										
Purvis Creek - DS	B01527C	13.4	B01527	8.1	B01529	5.3										
Purvis Creek - US	1321C	26.2	1321	5.2	1323	5.8	1325	7.8	1327	7.4						
Purvis Creek - US	1099C	41.2	1099	7.3	1202	6.9	1204	8.1	1205	9.6	1078	9.4				
Purvis Creek - US	1208C	46.7	1208	9.8	1210	9.5	1213	9.3	1215	7.1	1217	11.1				
Purvis Creek - US	1313C	32.5	1313	8.3	1315	9.4	1317	7.5	1319	7.4						
Purvis Creek - US	1345C	48.8	1345	7.2	1347	6.5	1349	4.6	1351	8.8	1077	8.7	1354	5.8	1356	7.2
Purvis Creek - US	1337C	23.7	1337	6.9	1339	5.2	1341	6.1	1343	5.5						
Purvis Creek - US	1329C	28.2	1329	7.6	1331	4.5	1333	8.4	1335	7.8						
Reference	A20635C	28.1	A20635	7.5	A01555	6.4	A01557	6.7	A01559	7.6						
Reference	A01507C	19.2	A01507	11.3	A01501	7.9										
Reference	A20629C	37.0	A20629	9.6	A20631	9.2	A20633	9.2	1009	9.1						
Reference	A20621C	28.8	A20621	7.2	A20623	7.1	A20625	7.0	A20627	7.5						
Reference	A19764C	14.4	A19764	6.9	A01503	7.6										
Reference	1028C	26.6	1028	5.7	1030	6.9	1032	6.6	1034	7.4						
Reference	1011C	30.7	1011	6.2	1013	8.0	1015	10.8	1018	5.8						
Reference	A01505	9.5	A01505	9.5												
Reference	1020C	29.8	1020	7.8	1022	6.5	1024	6.9	1026	8.7						
Reference	A01561C	33.0	A01561	7.3	A20615	9.0	A20617	9.4	A20619	7.4						
Turtle River	A00717C	18.4	A00717	10.1	1057	8.3										
Turtle River	A00713C	17.9	A00713	9.2	A00715	8.7										
Turtle River	A00709C	20.5	A00709	9.0	A00711	11.5										
Turtle River	1063C	30.2	1063	5.8	1065	4.8	1067	2.6	1069	2.1	1071	11.5	1073	2.2	1075	1.4
Turtle River	1059C	19.4	1059	11.3	1061	8.2										
Turtle River	A00618C	19.1	A00618	9.3	A00707	9.8										

C denotes composite of multiple shrimp

TABLE 58 Wet Weight of Brown Shrimp (Edible Tissue) Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in g, wet weight)

Date Sampled	Sample Location	Sample Number	Number Of Individuals	Composite Wt. (g)			Components of Total Edible Tissue Samples						
				Edible Wt.	Inedible Wt.	Total Wt.	Shrimp #1	Shrimp #2	Shrimp #3	Shrimp #4	Shrimp #5	Shrimp #6	Shrimp #7
18-May-95	Purvis Creek - DS	B01536	1	9.1	11.3	20.4	9.1						
18-May-95	Purvis Creek - DS	B01520C	3	22.4	24.9	47.2	9.2	6.8	6.4				
17-May-95	Purvis Creek - DS	A20642C	2	12.3	11.2	23.5	6.2	6.1					
17-May-95	Purvis Creek - DS	A20646C	2	13.8	13.2	27.0	6.7	7.1					
17-May-95	Purvis Creek - DS	A20650C	2	13.8	12.7	26.5	6.0	7.8					
17-May-95	Purvis Creek - DS	A20654C	3	20.0	20.6	40.6	7.0	5.9	7.1				
17-May-95	Purvis Creek - DS	A20636C	3	15.4	14.8	30.2	4.9	4.0	6.6				
18-May-95	Purvis Creek - DS	B01534C	2	11.9	16.6	28.4	6.5	5.4					
18-May-95	Purvis Creek - DS	B01530C	2	11.5	14.5	26.0	5.4	6.2					
18-May-95	Purvis Creek - DS	B01526C	2	11.3	13.4	24.7	6.7	4.7					
23-May-95	Purvis Creek - US	1322C	4	27.7	26.2	53.9	5.4	6.3	7.7	8.4			
23-May-95	Purvis Creek - US	1200C	5	30.7	41.2	71.8	6.2	5.5	6.2	6.4	6.5		
23-May-95	Purvis Creek - US	1209C	5	37.3	46.7	84.0	7.8	6.5	7.4	6.2	9.5		
23-May-95	Purvis Creek - US	1314C	4	31.3	32.5	63.8	6.6	9.5	8.8	6.6			
23-May-95	Purvis Creek - US	1346C	7	50.3	48.8	99.0	8.0	7.0	6.3	10.1	8.6	4.6	5.7
23-May-95	Purvis Creek - US	1338C	4	28.2	23.7	51.9	7.0	5.8	8.3	7.2			
23-May-95	Purvis Creek - US	1330C	4	29.9	28.2	58.1	7.1	6.4	8.4	8.2			
19-May-95	Reference	A20634C	4	32.1	28.1	60.1	8.9	7.5	8.1	7.6			
17-May-95	Reference	A01506C	2	9.5	19.2	28.6	9.5	6.5					
19-May-95	Reference	A20628C	4	39.7	37.0	76.7	9.0	11.1	9.3	10.3			
19-May-95	Reference	A20620C	4	32.4	28.8	61.2	8.7	7.1	8.2	8.4			
17-May-95	Reference	A19763C	2	14.0	14.4	28.4	6.8	7.2					
19-May-95	Reference	1027C	4	24.6	26.6	51.1	4.6	6.9	5.9	7.3			
19-May-95	Reference	1010C	4	32.7	30.7	63.3	8.8	8.3	9.6	6.0			
17-May-95	Reference	A01504	1	9.9	9.5	19.4	9.9						
19-May-95	Reference	1019C	4	29.7	29.8	59.5	8.2	6.3	7.0	8.4			
19-May-95	Reference	A01560C	4	39.3	33.0	72.3	10.0	10.2	9.8	9.3			
23-May-95	Turtle River	A00716C	2	16.5	18.4	34.9	10.1	6.4					
23-May-95	Turtle River	A00712C	2	15.7	17.9	33.6	8.3	7.4					
23-May-95	Turtle River	A00708C	2	19.2	20.5	39.7	8.0	11.2					
23-May-95	Turtle River	1062C	7	24.0	30.2	54.1	5.3	4.1	2.2	2.2	7.2	1.8	1.3
23-May-95	Turtle River	1058C	2	17.4	19.4	36.8	10.0	7.5					
23-May-95	Turtle River	A24169C	2	17.5	19.1	36.6	8.3	9.2					

C denotes composite of multiple shrimp

TABLE 59. Aroclor 1268 in Brown Shrimp Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, wet weight)

Sample Location	Edible Tissue				
	Sample Number	Aroclor 1268 (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
Purvis Creek	B01536	53	43	2.9	24
Purvis Creek	B01520C	120	51	3.8	23
Purvis Creek	A20642C	190	30	2.0	25
Purvis Creek	A20646C	170	31	2.8	24
Purvis Creek	A20650C	84	29	2.8	24
Purvis Creek	A20654C	210	19	3.3	24
Purvis Creek	A20636C	240	24	3.2	22
Purvis Creek	B01534C	95	33	1.6	22
Purvis Creek	B01530C	220	38	4.1	24
Purvis Creek	B01526C	130	41	5.2	24
Purvis Creek	1322C	250	23	2.1	23
Purvis Creek	1200C	230	20	3.5	23
Purvis Creek	1209C	170	20	2.7	22
Purvis Creek	1314C	210	20	4.0	24
Purvis Creek	1346C	320	20	2.6	23
Purvis Creek	1338C	250	19	2.3	34
Purvis Creek	1330C	210	19	2.8	23
Reference	A20634C	5.1 J	20	2.2	23
Reference	A01506C	4.6 J	18	3.4	22
Reference	A20628C	3.5 J	20	1.6	23
Reference	A20620C	3.8 J	20	1.7	25
Reference	A19763C	6.4 J	34	2.3	20
Reference	1027C	6.2 J	20	1.8	24
Reference	1010C	3.8 J	19	1.8	24
Reference	A01504	8.3 J	48	3.0	23
Reference	1019C	4.1 J	20	1.6	23
Reference	A01560C	3.4 J	20	1.8	24
Turtle River	A00716C	120	110	5.9	27
Turtle River	A00712C	78	19	3.5	25
Turtle River	A00708C	81	19	2.6	27
Turtle River	1062C	150	19	4.1	23
Turtle River	1058C	48	19	2.6	24
Turtle River	A24169C	42	20	10	26

MDL denotes Method Detection Limit
C denotes sample is a Composite of more than one shrimp

TABLE 60 Aroclor 1268 Detected in Brown Shrimp Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Edible Tissue					Inedible Tissue					Average Estimated Total Body Aroclor 126 Concentration (mg/kg)
	Sample Number	Aroclor 1268 (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid	Sample Number	Aroclor 1 (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid	
Purvis Creek	B01536	0 22	0 18	2 9	24	B01537	1 2	0 15	9 3	27	0 17
Purvis Creek	B01520C	0 50	0 22	3 8	23	B01521C	2 3	0 17	8 1	28	0 36
Purvis Creek	A20642C	0 77	0 12	2 0	25	A20643C	4 2	0 11	8 5	29	0 74
Purvis Creek	A20646C	0 71	0 13	2 8	24	A20647C	3 9	0 08	9 2	30	0 69
Purvis Creek	A20650C	0 35	0 12	2 8	24	A20651C	1 1	0 12	6 4	30	0 22
Purvis Creek	A20654C	0 86	0 080	3 3	24	A20655C	2 2	0 07	6 3	30	0 43
Purvis Creek	A20636C	1 1	0 11	3 2	22	A20637C	3 1	0 09	6 0	27	0 55
Purvis Creek	B01534C	0 43	0 15	1 6	22	B01535C	2 2	0 13	9 5	26	0 28
Purvis Creek	B01530C	0 91	0 16	4 1	24	B01531C	7 3	0 13	13	29	1 0
Purvis Creek	B01526C	0 54	0 17	5 2	24	B01527C	2 4	0 10	8 7	28	0 37
Purvis Creek	1322C	1 1	0 10	2 1	23	1321C	4 1	0 64	6 1	30	0 76
Purvis Creek	1200C	1 0	0 089	3 5	23	1099C	2 3	0 34	5 0	28	0 37
Purvis Creek	1209C	0 79	0 089	2 7	22	1208C	3 7	0 66	5 8	30	0 57
Purvis Creek	1314C	0 87	0 082	4 0	24	1313C	5 0	0 63	6 9	30	0 84
Purvis Creek	1346C	1 4	0 085	2 6	23	1345C	3 8	0 65	6 2	30	0 74
Purvis Creek	1338C	0 74	0 056	2 3	34	1337C	6 6	0 89	8 0	22	0 93
Purvis Creek	1330C	0 90	0 084	2 8	23	1329C	4 0	0 64	5 7	31	0 74
Reference	A20634C	0 022J	0 086	2 2	23	A20635C	0 067J	0 071	6 3	28	0
Reference	A10506	0 021J	0 080	3 4	22	A01507C	0 048J	0 10	6 4	28	0
Reference	A20628C	0 015J	0 085	1 6	23	A20629C	0 095	0 072	8 0	27	0 013
Reference	A20620C	0 015J	0 078	1 7	25	A20621C	0 077	0 069	7 9	29	0 012
Reference	A19763C	0 032J	0 17	2 3	20	A19764C	0 049J	0 22	6 6	23	0
Reference	1027C	0 026J	0 083	1 8	24	1028C	0 065J	0 068	7 1	29	0
Reference	1010C	0 016J	0 079	1 8	24	1011C	0 056J	0 071	6 5	28	0
Reference	A01504	0 036J	0 21	3 0	23	A01505	0 055J	0 15	8 1	29	0
Reference	1019C	0 018J	0 086	1 6	23	1020C	0 076	0 071	6 9	28	0 011
Reference	A01560C	0 014J	0 083	1 8	24	A01561C	0 084	0 063	8 8	30	0 014
Turtle River	A00716C	0 45	0 41	5 9	27	A00717C	0 38	0 063	4 1	31	0 11
Turtle River	A00712C	0 31	0 076	3 5	25	A00713C	0 72	0 080	5 4	30	0 14
Turtle River	A00708C	0 30	0 071	2 6	27	A00709C	0 43	0 077	4 5	26	0 093
Turtle River	1062C	0 64	0 083	4 1	23	1063C	3 3	0 66	9 6	15	0 28
Turtle River	1058C	0 20	0 080	2 6	24	1059C	0 80	0 073	5 5	31	0 14
Turtle River	A24169C	0 16	0 075	10	26	A00618C	1 1	0 40	9 4	30	0 18

MDL denotes Method Detection Limit
J denotes value below MDL

TABLE 61. Mercury Detected in Brown Shrimp Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, wet weight)

Sample Location	Edible Tissue				
	Sample Number	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
Purvis Creek - DS	B01536	50	26	2.9	24
Purvis Creek - DS	B01520C	81	39	3.8	23
Purvis Creek - DS	A20642C	130	30	2.0	25
Purvis Creek - DS	A20646C	130	29	2.8	24
Purvis Creek - DS	A20650C	120	31	2.8	24
Purvis Creek - DS	A20654C	100	31	3.3	24
Purvis Creek - DS	A20636C	88	42	3.2	22
Purvis Creek - DS	B01534C	73	37	1.6	22
Purvis Creek - DS	B01530C	110	29	4.1	24
Purvis Creek - DS	B01526C	82	36	5.2	24
Purvis Creek - US	1322C	140	25	2.1	23
Purvis Creek - US	1200C	120	32	3.5	23
Purvis Creek - US	1209C	110	26	2.7	22
Purvis Creek - US	1314C	130	29	4.0	24
Purvis Creek - US	1346C	150	39	2.6	23
Purvis Creek - US	1338C	88	23	2.3	34
Purvis Creek - US	1330C	120	23	2.8	23
Reference	A20634C	25	25	2.2	23
Reference	A01506C	U	31	3.4	22
Reference	A20628C	U	41	1.6	23
Reference	A20620C	22	22	1.7	25
Reference	A19763C	U	38	2.3	20
Reference	1027C	20	19	1.8	24
Reference	1010C	26	24	1.8	24
Reference	A01504	U	35	3.0	23
Reference	1019C	U	30	1.6	23
Reference	A01560C	U	29	1.8	24
Turtle River	A00716C	110	30	5.9	27
Turtle River	A00712C	100	38	3.5	25
Turtle River	A00708C	95	27	2.6	27
Turtle River	1062C	92	25	4.1	23
Turtle River	1058C	67	31	2.6	24
Turtle River	A24169C	94	26	10	26

MDL denotes Method Detection Limit
C denotes sample is a Composite of more than one shrimp

TABLE 62. Mercury Detected in Brown Shrimp Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(ug/kg, dry weight)

Sample Location	Edible Tissue					Inedible Tissue					Average Estimated Total Body Mercury Concentration (ug/kg)
	Sample Number	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid	Sample Number	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid	
Purvis Creek	B01536	210	110	2.9	24	B01537	150	110	9.3	27	45
Purvis Creek	B01520C	350	170	3.8	23	B01521	270	150	8.1	28	78
Purvis Creek	A20642C	500	120	2.0	25	A20643	380	130	8.5	29	120
Purvis Creek	A20646C	530	120	2.8	24	A20647	320	120	9.2	30	110
Purvis Creek	A20650C	480	130	2.8	24	A20651	310	120	6.4	30	100
Purvis Creek	A20654C	420	130	3.3	24	A20655	270	100	6.3	30	91
Purvis Creek	A20636C	400	190	3.2	22	A20637	350	190	6.0	27	92
Purvis Creek	B01534C	330	170	1.6	22	B01535	230	100	9.5	26	65
Purvis Creek	B01530C	470	120	4.1	24	B01531	420	130	13	29	120
Purvis Creek	B01526C	340	150	5.2	24	B01527	240	120	8.7	28	75
Purvis Creek	1322C	620	110	2.1	23	1321C	400	80	6.1	30	130
Purvis Creek	1200C	510	140	3.5	23	1099C	360	93	5.0	28	110
Purvis Creek	1209C	490	120	2.7	22	1208C	300	100	5.8	30	98
Purvis Creek	1314C	560	120	4.0	24	1313C	390	100	6.9	30	130
Purvis Creek	1346C	640	170	2.6	23	1345C	400	87	6.2	30	130
Purvis Creek	1338C	260	68	2.3	34	1337C	530	140	8.0	22	100
Purvis Creek	1330C	540	100	2.8	23	1329C	370	95	5.7	31	120
Reference	A20634C	110	110	2.2	23	A20635	U	130	6.3	28	8.4
Reference	A10506	U	140	3.4	22	A01507	U	110	6.4	28	0
Reference	A20628C	U	180	1.6	23	A20629	U	83	8.0	27	0
Reference	A20620C	88	88	1.7	25	A20621	U	92	7.9	29	11
Reference	A19763C	U	190	2.3	20	A19764	U	200	6.6	23	0
Reference	1027C	85	81	1.8	24	1028C	U	200	7.1	29	11
Reference	1010C	110	100	1.8	24	1011C	72	69	6.5	28	23
Reference	A01504	U	150	3.0	23	A01505	U	110	8.1	29	0
Reference	1019C	U	130	1.6	23	1020C	U	100	6.9	28	0
Reference	A01560C	U	120	1.8	24	A01561	U	91	8.8	30	0
Turtle River	A00716C	420	110	5.9	27	A00717	180	110	4.1	31	82
Turtle River	A00712C	420	150	3.5	25	A00713	240	110	5.4	30	88
Turtle River	A00708C	350	100	2.6	27	A00709	270	110	4.5	26	82
Turtle River	1062C	400	110	4.1	23	1063C	570	240	9.6	15	88
Turtle River	1058C	280	130	2.6	24	1059C	150	120	5.5	31	56
Turtle River	A24169C	360	100	10	26	A00618	280	95	9.4	30	0

MDL denotes Method Detection Limit
U denotes Not Detected
C denotes sample is a Composite of more than one shrimp

TABLE 63. Mercury and Aroclor 1268 Detected in Brown Shrimp Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Mercury (mg/kg) whole body	MDL (mg/kg)	Aroclor 1268 (mg/kg) whole body	MDL (mg/kg)	roclor Lipi Normalized	Percent Lipid	Percent Solid
Little Satilla	A113059	0.13	0.13	0.10	0.10	1.96	5.1	20
Little Satilla	A113060	0.13	0.13	0.07	0.09	1.30	5.4	22
Little Satilla	A113061	U	0.19	0.09	0.10	2.05	4.4	20
Little Satilla	A113062	U	0.16	0.08	0.09	1.78	4.5	21
Little Satilla	A113063	U	0.15	0.09	0.10	2.25	4.0	20
Little Satilla	A113064	U	0.17	0.08	0.09	2.00	4.0	21
Little Satilla	A113065	0.16	0.15	0.08	0.09	1.82	4.4	20
Mean		0.06		0.08		1.88	4.54	20.57
Median		0.13		0.08		1.96	4.40	20.00
St. Dev.		0.07		0.01		0.28	0.49	0.73
Purvis Creek - DS	A113130	0.69	0.14	1.3	0.1	27.61	4.6	23
Purvis Creek - DS	A113131	0.72	0.11	1.0	0.1	51.00	2.0	21
Purvis Creek - DS	A113132	0.73	0.14	1.3	0.1	26.67	4.8	22
Purvis Creek - DS	A113133	0.96	0.13	1.3	0.1	28.51	4.7	20
Purvis Creek - DS	A113134	0.98	0.15	1.4	0.1	27.84	5.1	20
Purvis Creek - DS	A113135	0.83	0.15	1.4	0.1	26.54	5.2	21
Purvis Creek - DS	A113136	0.74	0.14	0.92	0.10	21.40	4.3	20
Mean		0.81		1.23		29.94	4.39	20.93
Median		0.74		1.28		27.61	4.70	21.00
St. Dev.		0.11		0.18		8.87	1.01	1.15

TABLE 64. Mercury and Aroclor 1268 Detected in Grasshopper
Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Mercury (mg/kg)	Aroclor 1268 (mg/kg)	Aroclor Lipid Normalized	Percent Lipid	Percent Solid
Reference	U	NA	NA	NA	NA
M-1	1.1	0.76	5.8	13	31
M-2	0.45	0.52	4.3	12	32

NA denotes Not Analyzed
U denotes undetected

TABLE 65 Mercury and Aroclor 1268 Detected in Spot Collected in July 1995
LCP Site
Brunswick, GA
April 1997

Sample Location	Total Wet Wt. (grams)	Edible filet Wet Wt. (grams)	Total Dry Wt. (grams)	Dry edible filet weight (grams)	Mercury (mg/kg) dry filet weight	Aroclor 1268 (mg/kg) dry filet weight	PCB Lipid Normalized	Percent Lipid	Percent Solid
Purvis Creek - DS	8.0	3.0	1.8	0.09	1.0	0.85	36.96	2.3	22
Purvis Creek - DS	8.5	3.8	1.9	0.15	1.2	1.1	34.38	3.2	22
Purvis Creek - DS	12.0	3.2	2.6	0.10	1.1	0.85	30.36	2.8	22
Purvis Creek - DS	6.1	3.0	1.3	0.09	1.2	3.2	103.23	3.1	22
Purvis Creek - DS	7.5	2.6	1.6	0.07	1.1	1.3	40.63	3.2	21
Purvis Creek - DS	5.9	2.3	1.2	0.05	1.3	1.4	53.85	2.6	21
Purvis Creek - DS	10.4	4.0	2.3	0.16	1.0	0.70	28.00	2.5	22
Mean	8.3	3.1	1.8	0.10	1.1	1.3	46.8	2.8	21.7
Median	8.0	3.0	1.8	0.09	1.1	1.1	37.0	2.8	22.0
St. Dev.	2.1	0.6	0.5	0.04	0.1	0.8	24.3	0.3	0.5
Purvis Creek - US	5.0	1.7	1.1	0.03	1.8	3.0	93.75	3.2	22
Purvis Creek - US	2.5	0.8	0.5	0.01	1.4	2.8	107.69	2.6	20
Purvis Creek - US	2.2	0.7	0.4	0.00	1.5	2.8	116.67	2.4	20
Purvis Creek - US	2.1	0.7	0.4	0.01	1.6	4.2	140.00	3.0	20
Purvis Creek - US	3.7	1.3	0.8	0.02	1.4	1.8	58.06	3.1	21
Purvis Creek - US	2.8	0.9	0.6	0.01	1.4	2	86.96	2.3	21
Purvis Creek - US	4.0	1.2	0.8	0.01	1.4	2.8	121.74	2.3	21
Mean	3.2	1.0	0.7	0.01	1.5	2.8	103.6	2.7	20.7
Median	2.8	0.9	0.6	0.01	1.4	2.8	107.7	2.6	21.0
St. Dev.	1.0	0.4	0.2	0.01	0.1	0.7	24.8	0.4	0.7
Turtle River	2.6	0.8	0.5	0.01	0.7	1.2	52.17	2.3	19
Turtle River	2.9	1.2	0.6	0.02	0.9	1.2	38.71	3.1	20
Turtle River	2.9	1.2	0.6	0.02	1.1	1.2	52.17	2.3	20
Turtle River	3.3	1.1	0.7	0.01	1.4	1.1	44.00	2.5	20
Mean	2.9	1.1	0.5	0.01	1.0	1.2	46.8	2.8	19.8
Median	2.9	1.2	0.6	0.01	1.0	1.2	48.1	2.4	20.0
St. Dev.	0.3	0.2	0.1	0.00	0.3	0.0	5.7	0.3	0.4

Note: Samples taken July 1995

\113\del\fr\9704\table65.wb2

TABLE 66. Wet Weight of Spot Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in g, wet weight)

Date Collected	Sample Location	Sample Number	Number of Individuals	Total Wt.	Edible Filet Wt.
08-Jul-95	Purvis Creek - DS	4403	5	40.1	14.9
08-Jul-95	Purvis Creek - DS	4405	4	34.1	15.3
08-Jul-95	Purvis Creek - DS	4406	5	60.1	15.9
08-Jul-95	Purvis Creek - DS	4408	5	30.5	15.2
08-Jul-95	Purvis Creek - DS	4410	6	44.8	15.4
08-Jul-95	Purvis Creek - DS	4412	7	41.3	16.2
08-Jul-95	Purvis Creek - DS	4414	4	41.5	15.9
08-Jul-95	Purvis Creek - US	4417	7	34.7	12.2
08-Jul-95	Purvis Creek - US	4419	15	37.0	12.1
08-Jul-95	Purvis Creek - US	4421	18	40.0	12.0
08-Jul-95	Purvis Creek - US	4423	17	36.5	12.6
08-Jul-95	Purvis Creek - US	4425	9	33.6	12.0
08-Jul-95	Purvis Creek - US	4427	14	38.5	12.1
08-Jul-95	Purvis Creek - US	4429	11	44.4	12.7
08-Jul-95	Turtle River	4431	14	36.0	11.2
08-Jul-95	Turtle River	4433	9	25.7	11.2
08-Jul-95	Turtle River	4435	9	26.2	11.2
08-Jul-95	Turtle River	4437	8	26.7	9.1

TABLE 67. Aroclor 1268 Detected in Spot (Edible Fillet)
Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Aroclor 1268 (mg/kg)	MDL (mg/kg)	Percent Lipid	Percent Solid
Purvis Creek - DS	4403	0.85	0.089	2.3	22
Purvis Creek - DS	4405	1.1	0.091	3.2	22
Purvis Creek - DS	4406	0.85	0.090	2.8	22
Purvis Creek - DS	4408	3.2	0.086	3.1	22
Purvis Creek - DS	4410	1.3	0.094	3.2	21
Purvis Creek - DS	4412	1.4	0.24	2.6	21
Purvis Creek - DS	4414	0.70	0.089	2.5	22
Purvis Creek - US	4417	3.0	0.11	3.2	22
Purvis Creek - US	4419	2.8	0.11	2.6	20
Purvis Creek - US	4421	2.8	0.12	2.4	20
Purvis Creek - US	4423	4.2	0.12	3.0	20
Purvis Creek - US	4425	1.8	0.11	3.1	21
Purvis Creek - US	4427	2	0.12	2.3	21
Purvis Creek - US	4429	2.8	0.10	2.3	21
Turtle River	4431	1.2	0.13	2.3	19
Turtle River	4433	1.2	0.13	3.1	20
Turtle River	4435	1.2	0.13	2.3	20
Turtle River	4437	1.1	0.13	2.5	20

MDL denotes Method Detection Limit

TABLE 68. Mercury Detected in Spot (Edible Fillet)
Collected in July 1995
LCP Site
April 1997

(Results in ug/kg, wet weight)

Sample Location	Sample Number	Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
Purvis Creek - DS	4403	220	29	2.3	22
Purvis Creek - DS	4405	260	22	3.2	22
Purvis Creek - DS	4406	240	24	2.8	22
Purvis Creek - DS	4408	260	26	3.1	22
Purvis Creek - DS	4410	230	25	3.2	21
Purvis Creek - DS	4412	270	27	2.6	21
Purvis Creek - DS	4414	220	24	2.5	22
Purvis Creek - US	4417	400	26	3.2	22
Purvis Creek - US	4419	280	26	2.6	20
Purvis Creek - US	4421	300	26	2.4	20
Purvis Creek - US	4423	320	26	3.0	20
Purvis Creek - US	4425	290	27	3.1	21
Purvis Creek - US	4427	290	25	2.3	21
Purvis Creek - US	4429	290	27	2.3	21
Turtle River	4431	130	25	2.3	19
Turtle River	4433	170	26	3.1	20
Turtle River	4435	220	28	2.3	20
Turtle River	4437	280	28	2.5	20

MDL denotes Method Detection Limit

TABLE 69. PCBs Detected in Cotton Rat (Whole Body)
Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Sample ID Location	BLK pg23		113200 Whole body		113201 Whole body	
Analyte	Conc	MDL	Conc	MDL	Conc	MDL
Aroclor 1016	U	20	U	63	U	64
Aroclor 1221	U	20	U	63	U	64
Aroclor 1242	U	20	U	63	U	64
Aroclor 1248	U	20	U	63	U	64
Aroclor 1254	U	20	117	63	U	64
Aroclor 1260	U	20	U	63	U	64
Aroclor 1268*	U	20	260	67	320	67

* Samples originally analyzed by a subcontract lab did not include Aroclor 1268. The remaining extract was analyzed at REAC for Aroclor 1268.

TABLE 70. Mercury, Percent Moisture, and Percent Lipids in Cotton Rats Collected in October 1995
LCP Site
Brunswick, GA
April 1997

(Results in ug/kg, dry weight)

Parameter: Client ID	Tissue Type	Sample Location	% Moisture	% Lipids	Mercury	
					Conc (ug/kg)	MDL (ug/kg)
Blank					U	10
113200	Whole Body	North Marsh 6	70	2.5	300	10
113201	Whole Body	North Marsh 14	70	3.0	140	9.5

TABLE 71. Methylmercury Detected in Tissue Samples Collected in May 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg dry weight)

Sample Location	Sample Number	Matrix	Methylmercury (mg/kg)	MDL (mg/kg)	Dimethyl/EthylMercury (mg/kg)	Total Mercury (ug/kg)	MDL (ug/kg)	Percent Lipid	Percent Solid
Purvis Creek	A03121	blue claw crab - edible	4.9	0.017	U	6000	130	3.3	17
Reference	A01560C	shrimp - edible	0.068	0.012	U	U	120	3.4	22
DD-5	A00570	turtle liver	20	0.320	U	180000	4200	59	13
DD-5	A00572	turtle carcass	5.9	0.013	U	15000	420	12	13
Reference	A01553 rep1	blue claw crab - inedible	0.22	0.013	U	210	58	NP	NP
Reference	A01553 rep2	blue claw crab - inedible	0.25	0.015	U	NP	NP	NP	NP
Purvis Creek	A03123	blue claw crab - edible	6.7	0.012	U	6600	230	4.7	19
ST. # 35	A01541	spartina	0.32	0.0013	U	9500	290	1.9	27
Purvis Creek	B01534C	shrimp - edible	0.29	0.019	U	330	170	1.6	22
ST. # 17	1036-01	snail	0.052	0.017	U	39000	1300	10	24
outfall	A25574-06	fiddler crab	0.48	0.010	U	2100	67	2.0	32
ST. # 17	A20611-02 rep1	fiddler crab	0.33	0.017	U	1800	49	2.7	35
ST. # 17	A20611-02 rep2	fiddler crab	0.27	0.014	U	NP	NP	2.7	35
DD-6	A00574	turtle carcass (with liver)	6.2	0.014	U	12000	520	9.1	22
ST. # 10	1016-06	fiddler crab	0.25	0.012	U	640	59	5.9	31

MDL denotes Method Detection Limit
U denotes Not Detected
NP denotes analysis Not Performed

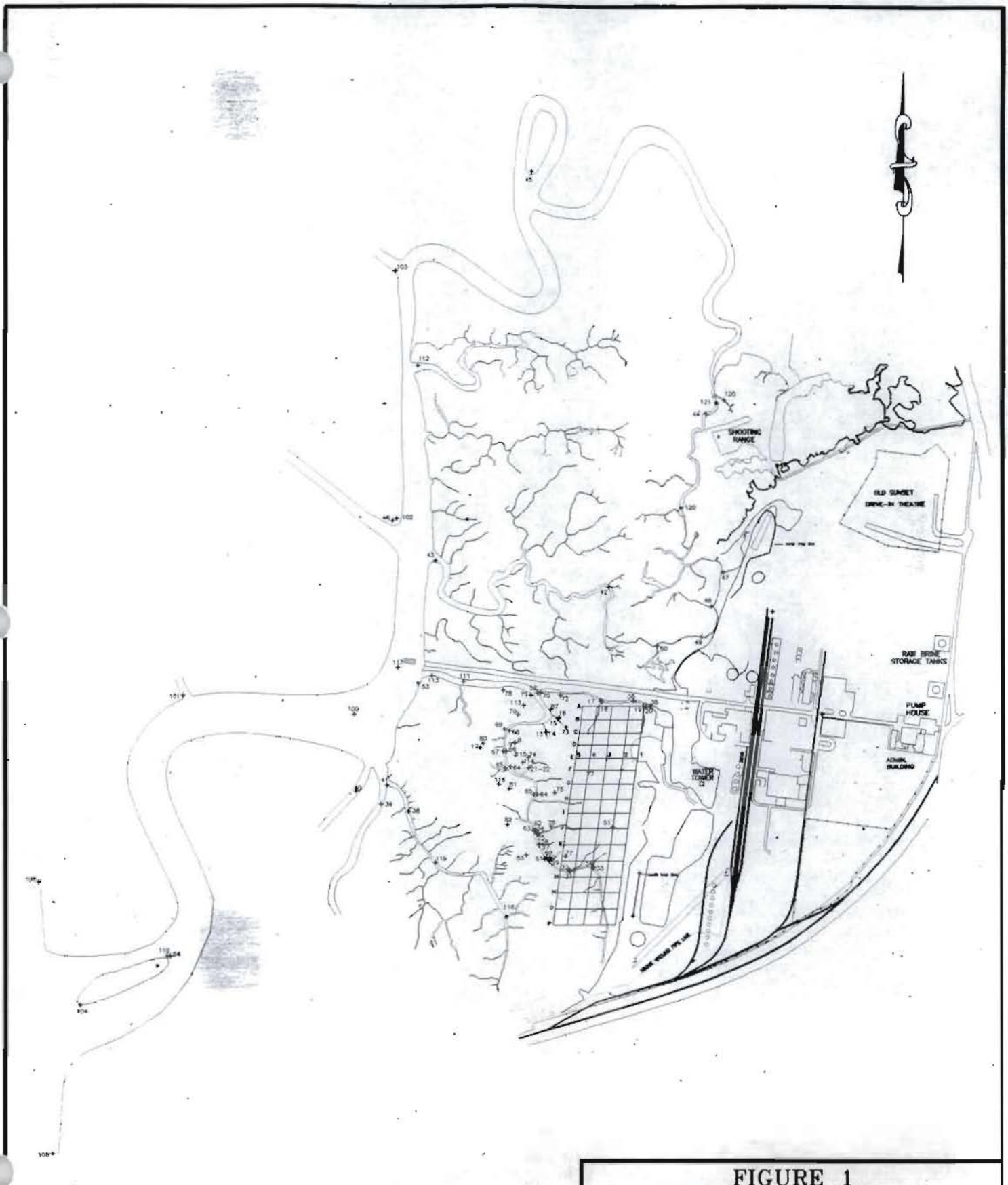
TABLE 72. Methyl, Dimethyl and Diethyl Mercury Detected in Tissue Collected in July 1995
LCP Site
Brunswick, GA
April 1997

(Results in mg/kg, dry weight)

Sample Location	Sample Number	Matrix	Methyl Mercury (mg/kg)	Dimethyl Mercury (mg/kg)	Diethyl Mercury (mg/kg)
Rail #2	A04500	Rail - carcass	7.8	0.00070 J	0.00070 J
Rail #1	A04345	Rail - carcass	4.6	0.00070 J	0.00070 J
Cofluence	A04477	Killifish - whole body	2.3	0.00070 J	0.00070 J
Purvis Creek - DS	4410	Spot - edible fillet	0.870	0.00062 J	0.00062 J
Purvis Creek - DS	4410 - Duplicate	Spot - edible fillet	8.9	0.00070 J	0.00070 J
LCP 43	A2366	Killifish - whole body	0.81	0.00070 J	0.00070 J
BD-1	04701	Turtle - carcass	4.4	0.00060 J	0.00060 J
BD-1	04702	Turtle - liver	9.6	0.00070 J	0.00070 J

J denotes value at or below detection limit
NP denotes analysis Not Performed

Figures



U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-041-001-1113-01

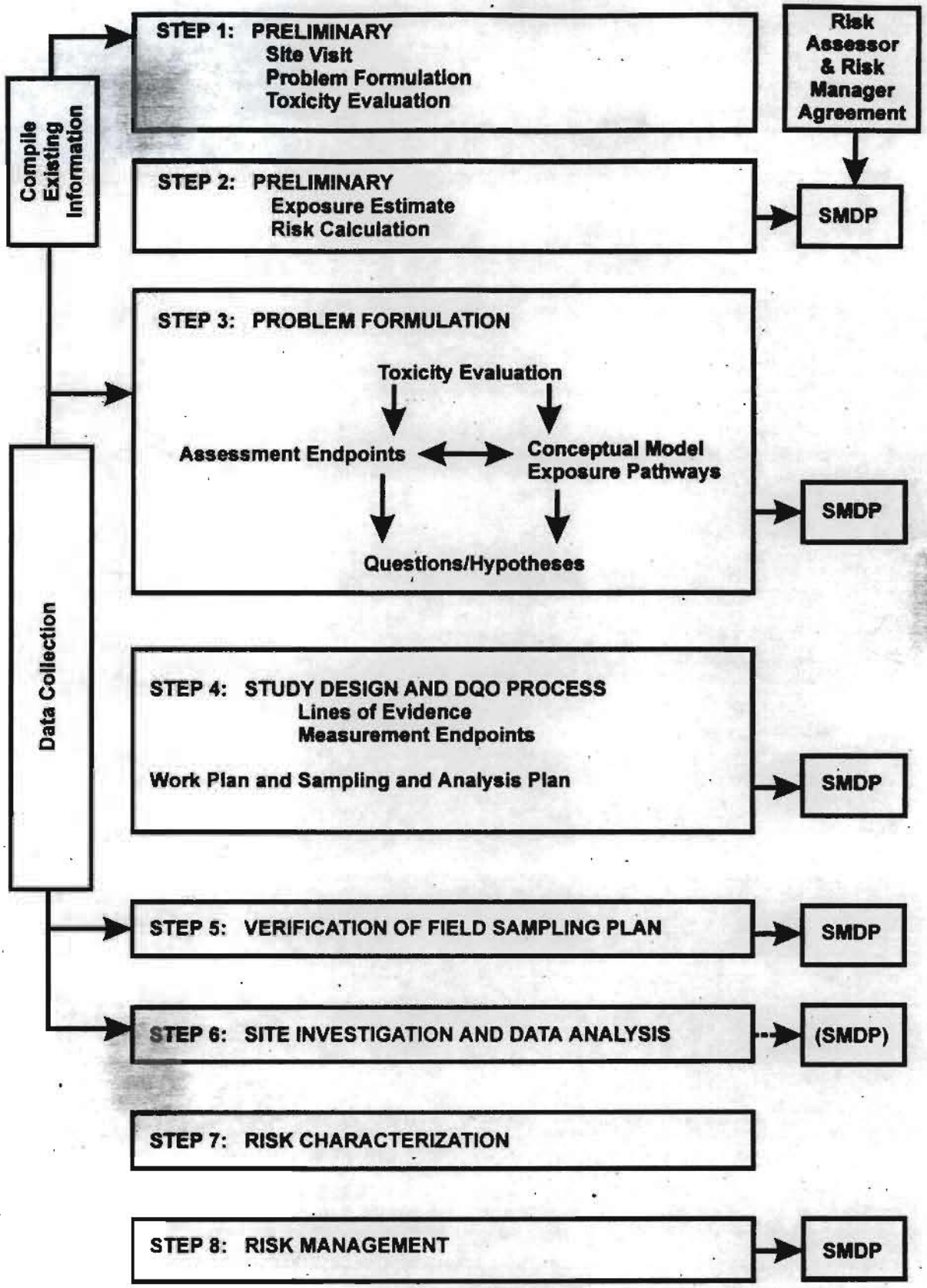
FIGURE 1
SAMPLING LOCATIONS
LCP CHEMICAL SITE
GLYNN COUNTY, GA
APRIL 1997

1113_D.DWG 05/02/1997

U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-041-001-1113-01

FIGURE 2
SAMPLING LOCATIONS
LCP CHEMICAL SITE
GLYNN COUNTY, GA
APRIL 1997

1113_D2.DWG 05/02/1997



U.S. EPA Environmental Response Team Center
Response Engineering and Analytical Contract
68-C4-0022
W.O. # 03347-041-001-1113-01

FIGURE 3
8 Step Risk Assessment Process
LCP Chemical Site
Glynn County, Georgia
April 1997

PCB-1268 IN MARSH SEDIMENT

N

PCB-1268 in Surficial Marsh Sediment (mg/kg)
- 0 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

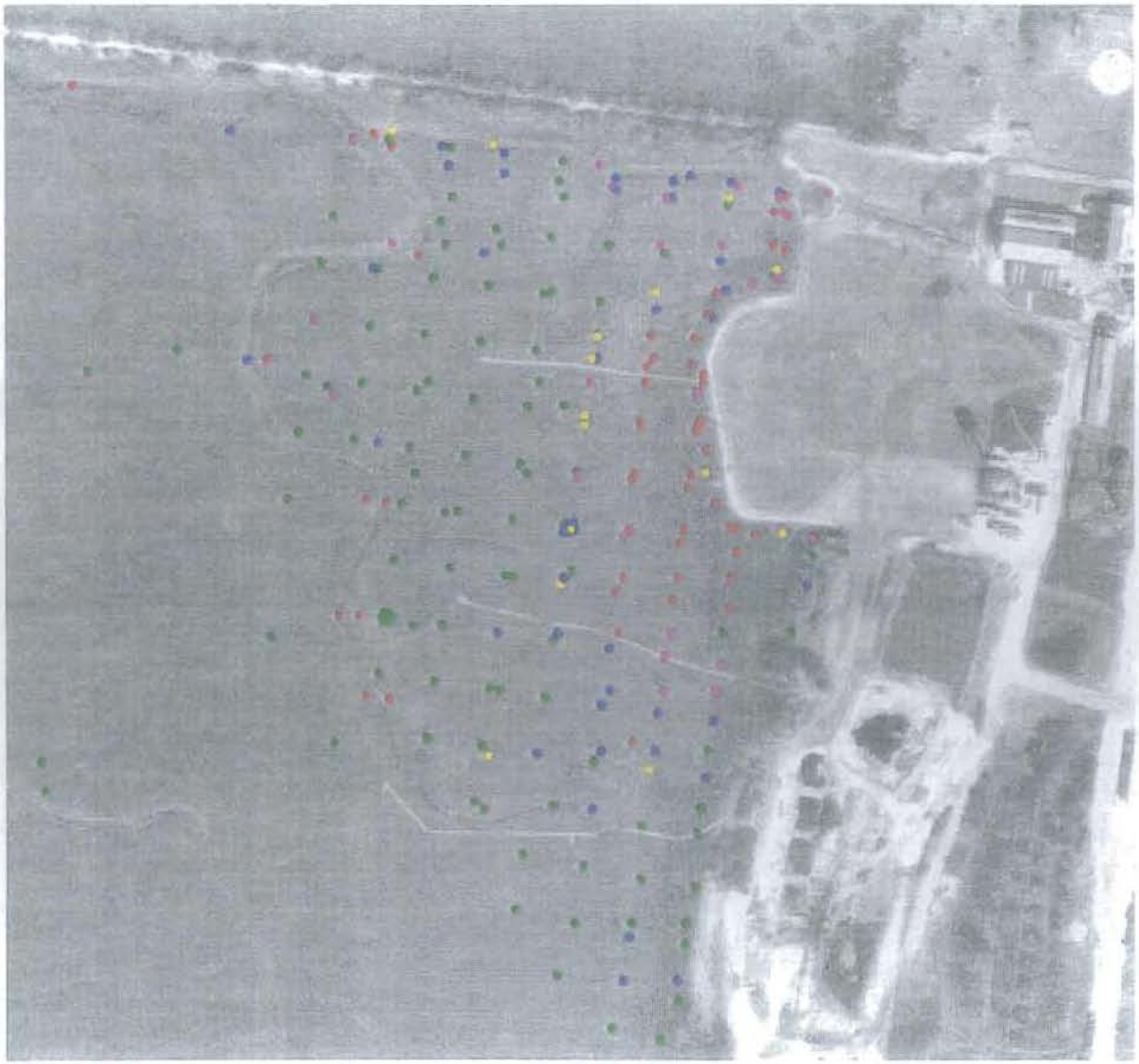
400 0 400 800 Feet

GeoSyntec Consultants
ATLANTA, GEORGIA

DATE: 8 MAY 1997	SCALE: 1"=800'
PROJECT NO. GL0186	FIGURE NO. 4A
DOCUMENT NO.	FILE NO. MARSH\SPRNG.APF

3 12 0767

PCB-1268 IN MARSH SEDIMENT



N

PCB-1268 in Surficial Marsh Sediment (mg/kg)
- 0 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

100 0 100 200 Feet

GeoSyntec Consultants
ATLANTA, GEORGIA

DATE 5 MAY 1997	SCALE 1"=200'
PROJECT NO. GL0186	FIGURE NO. 4B
DOCUMENT NO.	FILE NO. MARSHASPRNG.APR

3 12 0793

MERCURY IN MARSH SEDIMENT

N

Mercury in Surficial Marsh Sediment (mg/kg)
- 0 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

400 0 400 800 Feet

3 12 0799

GeoSyntec Consultants
ATLANTA, GEORGIA

DATE: 8 MAY 1997	SCALE: 1"=800'
PROJECT NO. GL0186	FIGURE NO. 5A
DOCUMENT NO.	FILE NO. MARSH\SPRNG.APR

MERCURY IN MARSH SEDIMENT

N

Mercury in Surficial Marsh Sediment (mg/kg)
- 0 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

100 0 100 200 Feet

GeoSyntec Consultants
ATLANTA, GEORGIA

DATE: 6 MAY 1997	SCALE: 1"=200'
PROJECT NO. GL0186	FIGURE NO. 5B
DOCUMENT NO.	FILE NO. MARSHSPRNG.APR

3 12 0300

SAMPLE LOCATION	COORDINATES
17	31° 11.2258' N 81° 30.6956' W
18	31° 11.2245' N 81° 30.6938' W
36	31° 11.2256' N 81° 30.6695' W
61	31° 11.0564' N 81° 30.7549' W
68	31° 11.1935' N 81° 30.7921' W
100	31° 11.2115' N 81° 30.9574' W
101	31° 11.2320' N 81° 31.1385' W
102	31° 11.4206' N 81° 30.9121' W
105	31° 10.9798' N 81° 32.0504' W
106	31° 10.7399' N 81° 31.2777' W
107	31° 09.9402' N 81° 31.2794' W
108	31° 11.0314' N 81° 31.2926' W
110	31° 10.9514' N 81° 31.1555' W
111	31° 11.2468' N 81° 30.8410' W
117	31° 11.2618' N 81° 30.9106' W
118	31° 10.9934' N 81° 30.7962' W
E3	31° 11.1642' N 81° 30.6889' W
F2	31° 11.1514' N 81° 30.6737' W
H1	31° 11.1202' N 81° 30.6621' W

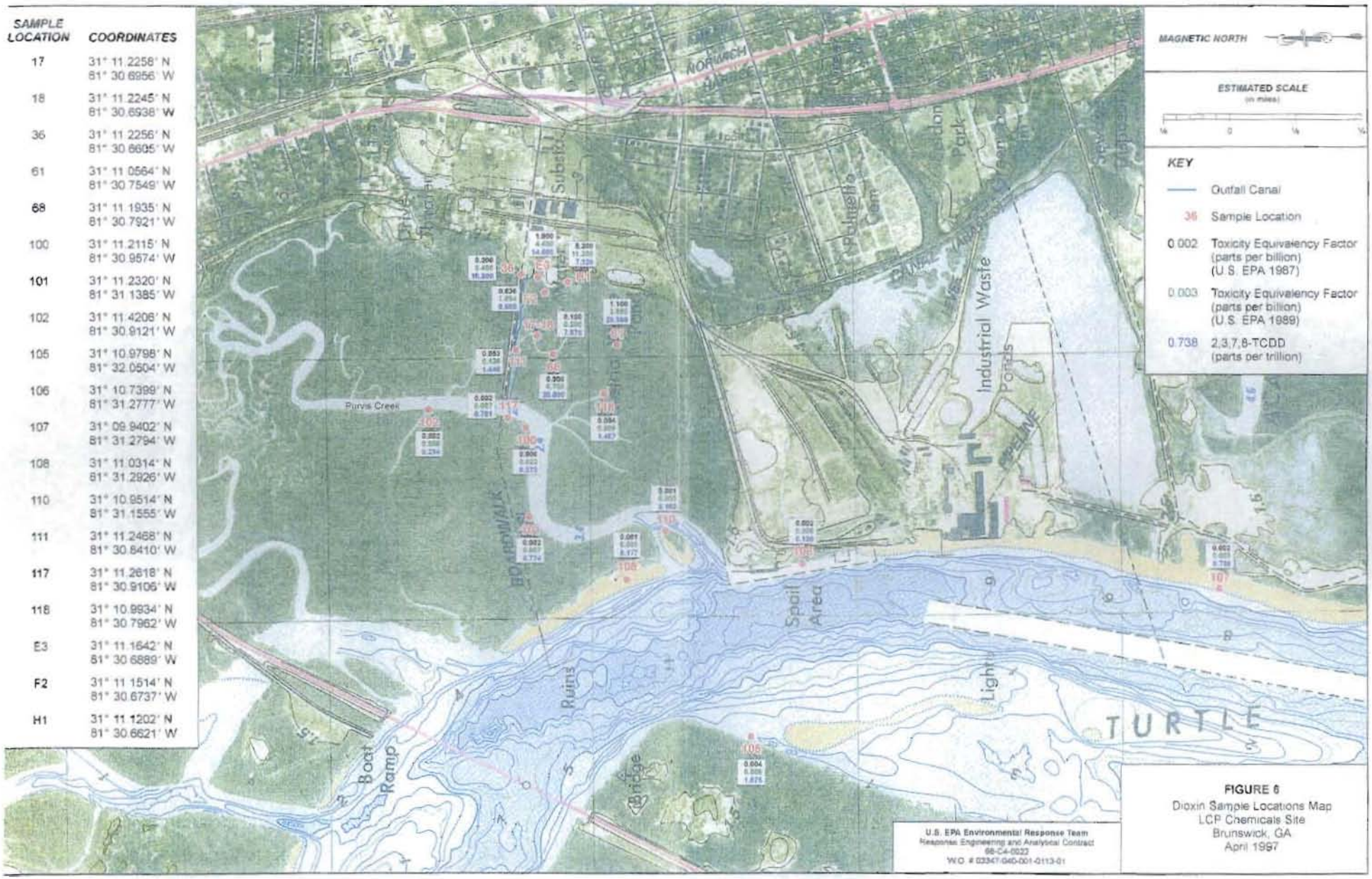


FIGURE 6
Dioxin Sample Locations Map
LCP Chemicals Site
Brunswick, GA
April 1997

3 12 0801