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EPA East – Room 6428 Attn: Section 8(e)
Office of Pollution Prevention and Toxics, U.S. EPA
1200 Pennsylvania Avenue NW
Washington, DC 20460-0001

Re: TSCA 8(e) Substantial Risk Notice on Sulfonate-based and Carboxylic-based Fluorochemicals, Docket 8EHQ-0598-373 - Results from Analysis of Sediments and Surface Water in the Decatur, Alabama Area

Dear Sir or Madam:

3M is submitting this notice to supplement its previous submissions on sulfonate and carboxylic-based fluorochemicals. On behalf of 3M, in June 2012, Exponent, Inc. collected surface water and sediment samples from a thirty-three mile stretch of the Tennessee River (River) in the vicinity of Decatur, AL. This work also included sampling of certain tributaries to the River for the same matrices and an evaluation of historical and current information on industrial and other sources of perfluorinated chemicals to the River in this area aside from the 3M Decatur facility. The results from this study have been compiled and summarized in the enclosed report.

Surface water data for this portion of the Tennessee River has been previously generated and submitted to the subject docket. For certain analytes and locations, the enclosed report includes data that "overlaps" with previous study results. In such instances, the current data is consistently lower than the historical results. It should be noted that the enclosed report also includes data for certain analytes and locations that have not been included in previous 3M sampling campaigns.

While 3M does not believe that any of these data taken alone or cumulatively meet the "substantial risk" reporting threshold, we nevertheless recognize the ongoing work by U.S. EPA to assess fluorochemical exposure pathways. Therefore, we are placing these results in the 8(e) docket as a supplement to previous submissions.

If you have any questions, please contact Deanna Luebker at 651-737-1374 or djluebker@mmm.com.

Sincerely,

Jean B. Sweeney (HDL)

Jean B. Sweeney
Staff Vice President, 3M Environmental, Health and Safety Operations

cc: Glenda Dean, ADEM (enclosure already provided via separate correspondence)

Enclosure

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PFCs in the Tennessee River
Results of Evalution of Potential PFC Sources
and the June 2012 Surface Water
and Sediment Sampling

8EHQ-0598-373

November 2012
Appendix B, Attachment 2,
AXYS Laboratory Reports

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PFCs in the Tennessee River
Results of Evalution of Potential PFC Sources
and the June 2012 Surface Water
and Sediment Sampling

8EHQ-0598-373

November 2012
Appendix B, Attachment 3,
CAS Laboratory Reports

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Deanna Luebker, PhD
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St. Paul, MN 55144-1000

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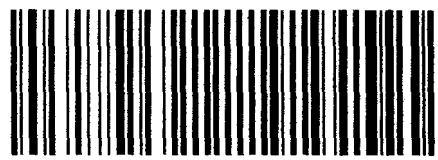

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Perfluorinated Chemicals in the Tennessee River – Results of the Evaluation of Potential PFC Sources and the June 2012 Surface Water and Sediment Sampling

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Perfluorinated Chemicals in the Tennessee River – Results of the Evaluation of Potential PFC Sources and the June 2012 Surface Water and Sediment Sampling

Prepared for

3M Company
St. Paul, MN 55144-1000

Prepared by

Exponent
15375 SE 30th Place, Suite 250
Bellevue, WA 98007

November 2012

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Acronyms and Abbreviations

ADEM	Alabama Department of Environmental Management
AFFF	aqueous film-forming foam
APM	Ascend Performance Materials
AXYS	AXYS Analytical Services
BPA	Biological Processors of Alabama
EPA	U.S. Environmental Protection Agency
Industrial Park	Mallard-Fox Creek Industrial Park
ng/g	nanograms per gram
ng/L	nanograms per liter
NPDES	National Pollutant Discharge Elimination System
PFBA	perfluorobutanoic acid
PFBS	perfluorobutane sulfonate
PFC	perfluorinated chemical
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexane sulfonate
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PFOSA	perfluorooctane sulfonamide
PFPeA	perfluoropentanoic acid
PFUnA	perfluoroundecanoic acid
PTFE	polytetrafluoroethylene
PVDF	polyvinylidene fluoride
QA/QC	quality assurance and quality control
WWTP	wastewater treatment plant

Executive Summary

The purpose of this report is to present the results of research conducted in 2012 by Exponent on behalf of 3M. The research included the evaluation of historical and current information on industrial and other sources of perfluorinated chemicals (PFCs) to the Tennessee River (river) in the Decatur area aside from the 3M Decatur facility. Historical PFC data from previous sampling of surface water and sediment were also evaluated. In addition, surface water and sediments from the Tennessee River and its tributaries were collected and analyzed to provide a current view of the PFC concentrations that could have been affected by nearby sources, other than the 3M Decatur facility. Approximately 30 potential sources were identified including the following:

- **Publically-owned wastewater treatment plant effluent.** Decatur Utilities wastewater treatment plant (WWTP) and City of Moulton WWTP discharges. Effluent from the Decatur Utilities WWTP sampled in 2005 contained a perfluorooctane sulfonate (PFOS) concentration of 2,850 nanograms per liter (ng/L) (parts per trillion) and a perfluorooctanoic acid (PFOA) concentration of 17,400 ng/L. One year later in 2006, effluent from the Decatur Utilities WWTP contained a PFOS concentration of 571 ng/L and a PFOA concentration of 7,080 ng/L. In 2011, PFOA and PFOS in wastewater discharged from the Moulton WWTP ranged from 1,240 to 9,860 ng/L and 619 to 5,440 ng/L, respectively.

- **Releases from agricultural areas where Decatur Utilities sludge had been land-applied.** PFOS and PFOA were detected in soil and surface water sampled at some of these agricultural areas by the U.S. Environmental Protection Agency (EPA) in 2008 and 2009. PFOS was detected in soil from 715 to 1,409 nanograms per gram (ng/g) (parts per billion), and PFOA was detected in soil from 818 to 2,531 ng/g. In surface water, PFOS ranged from undetectable to 66.3 ng/L and PFOA ranged from undetectable to 750 ng/L.

- **Releases from landfills where Decatur Utilities sludge had been disposed.** Landfills that received sludge for disposal include Morris Farms Landfill and Morgan County Regional Landfill. PFOS and PFOA in leachate generated at these landfills have ranged from 43,200 to greater than 55,000 ng/L and from 48,700 to 91,600 ng/L, respectively.

- **The abandoned hazardous waste site of Biological Processors of Alabama (BPA).** In 2009, PFOS and PFOA were detected in waste liquids stored on the property. The maximum concentrations of PFOS and PFOA detected were 76,000 ng/L and 2,400 ng/L, respectively. PFOS and PFOA were also detected in a drainage pathway from the BPA site. Surface water collected from this drainage, upgradient of BPA, had concentrations of PFOS and PFOA of 15,100 and 29,000 ng/L, respectively. In contrast, a surface water sample collected downgradient of BPA had concentrations of PFOS and PFOA of 279,000 and 128,000 ng/L, respectively. Releases from BPA could have contributed to these elevated concentrations; however, more focused sampling is needed to evaluate the relative contribution of the BPA site compared to the former sludge application fields located on 3M property.

- **Surface water and/or groundwater releases from Daikin America/MDA Manufacturing and Toray Fluorofibers.** Between December 2008 and December 2011, PFOA was detected between 4,540 and 307,000 ng/L in effluent discharged from Daikin America to Bakers Creek. Daikin America's National Pollutant Discharge Elimination System permit was recently modified in May 2012 to include quarterly monitoring of PFOS. In September 2012, PFOS was detected between 27,000 and 60,000 ng/L in effluent discharged from three outfalls to Bakers Creek. In 2006, surface water was sampled from Bakers Creek, directly east of the Daikin America facility and PFOS and PFOA were both detected at this location at a concentration of 27,700 ng/L. In 2004, PFOA was detected in groundwater at the Toray Fluorofibers facility at a concentration of 470 ng/L.

More research is needed to evaluate the significance of current and/or historical discharges from these and other sites and facilities that are discussed in this report.

In June 2012, Exponent sampled surface water and, where available, sediments in the Tennessee River and its tributaries within the sampling areas listed below. These areas were selected to evaluate potential additional sources of PFCs and/or to update/supplement sampling previously conducted by others. The PFOS concentrations ranged from 2.7 to 153 ng/L and PFOA ranged from 1.8 to 101 ng/L in surface water. For each area, the approximate river mile, range of PFOS and PFOA concentrations in surface water in June 2012, and potential sources are described below. The concentrations for PFOS and PFOA are also shown for each area in Figure ES-1. Average concentrations for locations with duplicate samples and locations with shallow and deep samples are shown on Figure ES-1.

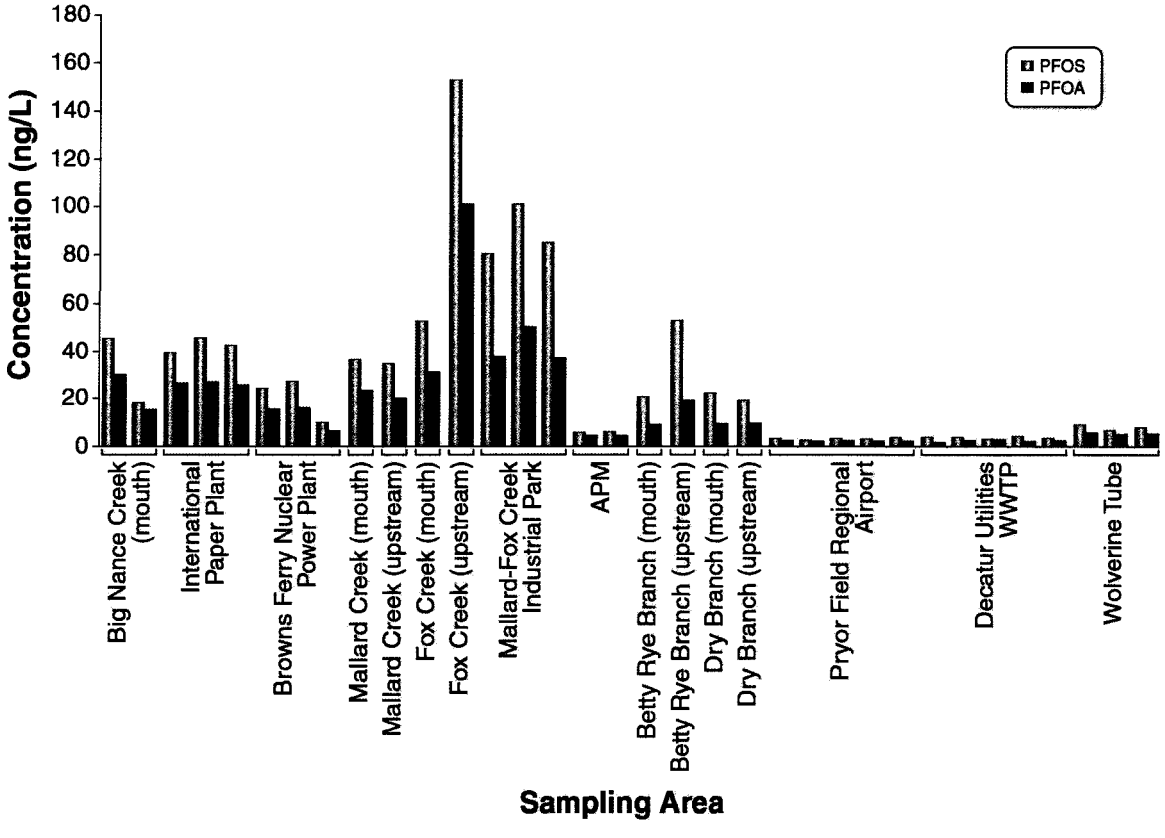

Figure ES-1. Distribution of PFOS and PFOA in surface water collected from the areas within the Wheeler Reservoir and its tributaries

- Big Nance Creek area, River Mile 274, PFOS ranged from 18.3 to 45.7 ng/L and PFOA ranged from 15.3 to 30.2 ng/L. Potential PFC sources are releases from agricultural areas where Decatur Utilities sludge had been applied and the City of Moulton WWTP that received leachate from the BFI Morris Farms Landfill where sludge from Decatur Utilities and others has been disposed.

- International Paper Plant area, River Mile 283, PFOS ranged from 38.4 to 45.9 ng/L and PFOA ranged from 24.9 to 27.1 ng/L. Potential PFC sources are releases from an agricultural area where Decatur Utilities sludge had been applied and discharges from International Paper.

- Browns Ferry Nuclear Power Plant area, River Mile 294, PFOS ranged from 10 to 32.4 ng/L and PFOA ranged from 6.5 to 17 ng/L. Potential PFC sources are erosion of surface soils and/or groundwater migration to the Tennessee River that may have been impacted with PFC-containing aqueous film-forming foam (AFFF).

- Mallard Creek area, River Mile 294, PFOS ranged from 35 to 36.7 ng/L and PFOA ranged from 20.1 to 23.4 ng/L. Potential PFC sources are releases from an agricultural area where Decatur Utilities sludge had been applied, BFI Morris Farms Landfill where sludge from Decatur Utilities and others was disposed, and Bert Jeffries Landfill that may have accepted PFC-containing wastes.

- Fox Creek area, River Mile 296, PFOS ranged from 53.1 to 153 ng/L and PFOA ranged from 31.3 to 101 ng/L. Potential PFC sources are releases from the Morgan County Regional Landfill where sludge from Decatur Utilities and others had been disposed and releases from the nearby Mallard-Fox Creek Industrial Park (Industrial Park).

- The Industrial Park area located along the shoreline of the Tennessee River, River Mile 298, PFOS ranged from 75.9 to 101 ng/L and PFOA ranged from 34.1 to 50.6 ng/L. Potential PFC sources are releases from the Industrial Park and sediments dredged from the river and placed along the shoreline that may have contained PFCs.

- Bakers Creek area, River Mile 301, was not sampled in June 2012. Potential PFC sources, aside from the 3M Decatur facility, are releases from an agricultural area where Decatur Utilities sludge had been applied, Daikin America/MDA Manufacturing, Toray Fluorofibers, Ascend Performance Materials (APM), and BPA.

- APM area, River Mile 302, PFOS ranged from 5.31 to 6.29 ng/L and PFOA ranged from 3.68 to 5.25 ng/L. A potential PFC source is discharges from APM.

- Betty Rye Branch area, River Mile 303, PFOS ranged from 20.8 to 53.4 ng/L and PFOA ranged from 9.14 to 19.2 ng/L. Potential PFC sources are releases from current and historical industrial and commercial facilities including APM and Nichols Aluminum.

- Dry Branch area, River Mile 303, PFOS ranged from 19.3 to 22.3 ng/L and PFOA ranged from 9.58 to 9.8 ng/L. Potential PFC sources are releases from current and historical paper, fabric, box, and furniture manufacturers.

- Pryor Field Regional Airport area[1], River Mile 303, PFOS ranged from 2.71 to 3.75 ng/L and PFOA ranged from 2.25 to 2.47 ng/L. Potential PFC sources are releases from an agricultural area where Decatur Utilities sludge had been applied and the potential use of PFC-containing AFFF at the airport.

- Decatur Utilities WWTP area, River Mile 303.5, PFOS ranged from 2.76 to 4.31 ng/L and PFOA ranged from 1.8 to 3.08 ng/L. The source of PFCs in this area is the discharge of PFC-containing effluent from the WWTP. PFC contributors to the WWTP have included 3M, Daikin America/MDA Manufacturing, Toray Fluorofibers, and the Morgan County Regional Landfill.

[1] Subsequent to sampling, a surface water discharge point was located downriver of the sampling locations. Surface water samples should be collected downriver of these sampling locations in the fall 2012 sampling program.

- Wolverine Tube area, River Mile 307, PFOS ranged from 6.83 to 9.15 ng/L and PFOA ranged from 5.22 to 5.89 ng/L. Potential PFC sources are releases from agricultural areas where Decatur Utilities sludge had been applied and discharges from historical facilities that may have used PFCs (Wolverine Tube and HCI Coatings).

The results of the surface water and sediment sampling demonstrated that there are other sources contributing PFCs to the river besides 3M.

As a result of the potential source research and recent sampling, a comprehensive fish sampling program to determine the levels of PFCs in fish tissue as a result of these multiple potential sources to the river is recommended. Specifically, largemouth bass and channel catfish should be sampled in most of the areas that were sampled for surface water in June 2012, as well as in the Bakers Creek area in the vicinity of the 3M Decatur facility and other PFC sources. Surface water samples would be collected concurrently to provide information on the PFCs that the fish are currently exposed to. The water samples will provide a more robust data set for assessing chemical fingerprinting opportunities. Surface water sampling should also be performed along at least eight cross-river transects to provide current information on PFC levels throughout the Wheeler Reservoir.

1 Site Background

The 3M Decatur facility covers approximately 900 acres and is located at 1101 State Docks Road in Decatur, Alabama, along the south shoreline of the Wheeler Reservoir of the Tennessee River at approximate River Mile 300.5. 3M began operations at the Decatur facility in 1961 with the construction of a chemical manufacturing plant to produce perfluorinated chemicals (PFCs) and other products. In 1962, the facility was expanded to include a film manufacturing plant. Between 1961 and 1962, 3M also constructed an onsite wastewater treatment plant (WWTP) with discharge to the Tennessee River.

Dyneon, located on the southern portion of the 3M Decatur facility, began operations in 1996. Dyneon manufactures vinylidene fluoride and polyvinylidene fluoride (PVDF). Process wastewater generated at Dyneon is managed at 3M's WWTP prior to discharge to the Tennessee River.

Several other manufacturing facilities have been constructed upriver and downriver of the 3M Decatur facility along the approximate 10-mile industrial area located along the south shore of the Tennessee River. Some of these facilities, either currently or in the past, manufactured PFCs, used them as part of their manufacturing process, and/or used PFC-containing aqueous film-forming foam (AFFF) for fighting fires, responding to other emergencies, and/or conducting emergency response training.

In June 2012, Exponent conducted research along with surface water and sediment sampling to identify potential sources of PFCs to the Tennessee River and its tributaries upriver and downriver of the 3M Decatur facility. The results of the research and sampling activities are discussed in the following sections.

2 Methodology

This section describes the methodology used by Exponent to evaluate, generate, and analyze PFC data in the project area. As described below, Exponent researched existing information and completed sampling and analysis in June 2012.

2.1 Research

Exponent researched historical sampling data and the history of potential sources to develop an understanding of conditions in the project area. This research is described in the sections below.

2.1.1 Historical Sampling Data

Surface water and sediment samples have been collected and analyzed in the project area by several researchers. Exponent reviewed these historic sampling data; these data are summarized in Appendix A. Figures showing historical sampling locations are also provided in Appendix A. Pertinent results are discussed in Section 3.

2.1.2 Potential Source Evaluation

Research was conducted concurrently with June 2012 sampling activities to identify potential sources of PFCs to the Tennessee River and its tributaries. This research included identifying facilities where PFCs may have been used or manufactured and where AFFFs may have been used. Surface water drainage from these facilities was also reviewed to evaluate possible pathways to the Tennessee River. The following research activities were conducted:

- Obtained an Environmental Data Resources® report that lists industries in the City of Decatur with environmental records
- Conducted an area reconnaissance near/along the Tennessee River

- Conducted a reconnaissance of upland areas, where groundwater and surface water may ultimately discharge to the Tennessee River
- Reviewed historical maps
- Reviewed historical reverse street directories from 1952 to 2004
- Reviewed the yellow pages of phone books from 1952 to 2004
- Reviewed pertinent newspaper articles from the 1970s to the present
- Reviewed available U.S. Environmental Protection Agency (EPA) Section 308 Clean Water Act information requests regarding the manufacture and use of PFCs at facilities in the Decatur area and whether or not those PFCs were discharged to the Decatur Utilities WWTP
- Contacted the local fire department to obtain information about historic fires where AFFF may have been used.

Potential sources of PFCs to the Tennessee River and its tributaries based on this review are discussed in Section 3.

2.2 June 2012 Sampling Activities

In June 2012, Exponent collected samples of surface water and sediment (where possible) from 12 areas in the Tennessee River and its tributaries upriver and downriver of the 3M Decatur facility (Figure 1). The areas were selected to evaluate potential additional sources of PFCs and/or to update/supplement sampling previously conducted by others. Sampling was not conducted within Bakers Creek in June 2012 because the concentrations of PFCs from several potential sources in this tributary are generally known and 3M's and Daikin's National Pollutant Discharge Elimination System (NPDES) discharges to Bakers Creek are monitored for PFCs on a regular basis. The sampling areas were proximate to:

- Mouth of Big Nance Creek
- Shoreline of International Paper Plant
- Shoreline of Browns Ferry Nuclear Power Plant and near the outfall diffuser
- Mouth of and upstream in Mallard Creek
- Mouth of and upstream in Fox Creek
- Shoreline of the Mallard-Fox Creek Industrial Park (Industrial Park)
- Shoreline of Ascend Performance Materials (APM)
- Mouth of and upstream in Betty Rye Branch
- Mouth of and upstream in Dry Branch
- Shoreline west-southwest of Pryor Field Regional Airport
- Area of the Decatur Utilities WWTP outfall diffuser
- Shoreline of Wolverine Tube.

These sampling areas are shown on Figure 1 and Figures B-2 through B-11 in Appendix B.

The collected surface water and sediment samples were analyzed by AXYS Analytical Services (AXYS). Detailed laboratory reports can be found in Appendix B. The following PFCs were analyzed by AXYS as part of their standard analytical suite:

- Perfluorobutanoic acid (PFBA)
- Perfluoropentanoic acid (PFPeA)
- Perfluorohexanoic acid (PFHxA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorooctanoic acid (PFOA)

- Perfluorononanoic acid (PFNA)
- Perfluorodecanoic acid (PFDA)
- Perfluoroundecanoic acid (PFUnA)
- Perfluorododecanoic acid (PFDoA)
- Perfluorobutane sulfonate (PFBS)
- Perfluorohexane sulfonate (PFHxS)
- Perfluorooctane sulfonate (PFOS)
- Perfluorooctane sulfonamide (PFOSA).

Sampling areas, surface water sampling methodology, sediment sampling methodology, quality assurance and quality control (QA/QC) samples, decontamination procedures, and sampling results are discussed in Appendix B. Pertinent results are discussed in Section 3.

3 Results and Discussion

Results of the June 2012 sampling activities and potential source review are presented in the sections below. Unless otherwise noted, the results discussed below are for individual samples or the average measurements taken at one location during one event (e.g., the sample and a field or laboratory duplicate). These results are presented without distinguishing whether they are "individual" or "average." The discussions in this section also describe averages across multiple sampling locations, which are distinguished as "average."

3.1 June 2012 Sampling Activities

In June 2012, surface water and sediment samples were collected from the Tennessee River and its tributaries to evaluate potential sources of PFCs and/or to update/supplement sampling previously conducted by others. Sampling activities were completed within the 12 sampling areas discussed previously located between River Mile 274 (just downriver of the Wheeler Dam) and River Mile 308 (just downriver of Flint Creek) (Figure 1).

A summary of sampling activities and results is provided in the following sections and in Appendix B.

3.1.1 Surface Water

Surface water samples were collected from each sampling area and analyzed for the 13 PFCs noted in Section 2.2., total dissolved solids, and total suspended solids. Samples were also measured in the field for temperature, conductivity, pH, dissolved oxygen, and turbidity.

PFOA and PFOS were detected in all collected samples. Surface water samples collected from the Big Nance Creek, International Paper Plant, Browns Ferry Nuclear Power Plant, and Mallard Creek sampling areas had an average PFOS concentration of 33.04 nanograms per liter (ng/L) and an average PFOA concentration of 20.81 ng/L.

The highest concentrations of PFOS and PFOA were detected in samples collected in Fox Creek and near the Industrial Park. These areas had an average PFOS concentration of 92.92 ng/L and an average PFOA concentration of 49.28 ng/L.

Sampling areas located upriver of Bakers Creek had an average PFOS concentration of 4.73 ng/L and an average PFOA concentration of 3.37 ng/L, with the exception of Betty Rye Branch and Dry Branch. These areas had an average PFOS concentration of 28.95 ng/L and an average PFOA concentration of 11.93 ng/L, with the highest PFOA and PFOS concentrations detected in the upstream sample collected in Betty Rye Branch.

PFBS, PFHxS, and PFOSA were detected at average concentrations of 24.4 ng/L, 8 ng/L and 3.3 ng/L, respectively, in samples collected downriver of Bakers Creek. The highest concentrations were detected in samples collected in Fox Creek and near the Industrial Park. Samples collected upriver of Bakers Creek had average concentrations of 3.2 ng/L, 4.8 ng/L and 1.4 ng/L of PFBS, PFHxS and PFOSA, respectively.

PFBA and PFHxA were detected in samples collected downriver of Bakers Creek at average concentrations of 25.7 and 29.6 ng/L, respectively, with the highest concentrations detected in a sample collected in Fox Creek. PFBA and PFHxA were detected in samples collected upriver of Bakers Creek at average concentrations of 9.7 ng/L and 3.2 ng/L, respectively.

PFPeA and PFHpA were detected at levels less than 11 ng/L with the exception of Fox Creek and near the Industrial Park. The average PFPeA and PFHpA concentrations in Fox Creek and near the Industrial Park were 14.5 ng/L and 22.7 ng/L, respectively, with the highest concentrations detected in a sample collected in Fox Creek.

PFNA was not detected or was detected close to the reporting limit (maximum detection of 1.04 ng/L near the Industrial Park). PFDA, PFUnA, and PFDoA were not detected in any samples.

A complete summary of surface water sample results and water quality parameters is presented in Appendix B.

3.1.2 Sediment

Sediment samples were collected in all sampling areas with the exception of two areas, International Paper Plant and Browns Ferry Nuclear Power Plant. The river bottom at these areas consisted mainly of shells and gravel. Collected sediment samples were analyzed for the 13 PFCs noted in Section 2.2, total organic carbon, total solids, and particle size.

Sediment samples collected from the Big Nance Creek and Mallard Creek sampling areas had an average PFOS concentration of 3.51 nanograms per gram (ng/g) and an average PFOA concentration of 0.2 ng/g.

The highest concentrations of PFOS were detected in samples collected in Fox Creek and near the Industrial Park. These areas had an average PFOS concentration of 8.21 ng/g and an average PFOA concentration of 0.5 ng/g.

Sampling areas located upriver of Bakers Creek had an average PFOS concentration of 1.1 ng/g, with the exception of the upstream sample collected in Dry Branch. PFOS was detected in this sample at 11.9 ng/g. PFOA was either not detected or was detected at sub-parts per billion levels (highest PFOA concentration of 0.23 ng/g) in these sampling areas.

PFBS and PFHxS were not detected in any samples, with the exception of samples collected from Fox Creek and near the Industrial Park. PFBS was detected near the Industrial Park at 0.228 ng/g and PFHxS was detected in Fox Creek at 0.197 ng/g.

The concentrations of PFOSA in collected samples ranged from non-detect to 1.84 ng/g, with the highest concentration detected in a sample collected near the Industrial Park.

PFBA, PFpeA, and PFNA were not detected in any collected samples.

PFHxA, PFHpA, PFDA, PFUnA, and PFDoA were not detected or detected at low levels. The maximum concentrations of PFHxA, PFHpA, PFDA, PFUnA, and PFDoA were 0.27 ng/g, 0.179 ng/g, 0.124 ng/g, 0.106 ng/g, and 0.234 ng/g, respectively. These maximum

concentrations were detected in samples collected at Big Nance Creek, Fox Creek, Mallard Creek, and Pryor Field Regional Airport.

A complete summary of sediment sample results is presented in Appendix B.

3.2 Potential Source Evaluation

Based on the research conducted, several facilities were identified as potential sources of PFCs to the Tennessee River. These potential sources are discussed below by areas that they may influence within the Tennessee River. These areas were sampled in June 2012 (Appendix B). The selection was based on 1) the general proximity to the areas sampled and 2) the potential surface water drainage pathways to those sections of the river sampled. These areas include, from downriver to upriver (generally):

- Big Nance Creek
- International Paper Plant
- Browns Ferry Nuclear Power Plant
- Mallard Creek
- Fox Creek
- Industrial Park
- APM
- Betty Rye Branch
- Dry Branch
- Pryor Field Regional Airport
- Decatur Utilities WWTP
- Wolverine Tube.

Although Bakers Creek was not sampled in June 2012, potential sources of PFCs to Bakers Creek (other than 3M) identified during research activities are also discussed below. The locations of the potential sources of PFCs are shown on Figures 2 and 3.

3.2.1 Big Nance Creek Area

Big Nance Creek discharges to the Tennessee River at approximate River Mile 274, downriver of the Wheeler Dam. Upstream creeks that flow into Big Nance Creek include Muddy Fork and Crow Branch (Figure 2). Potential sources of PFCs to Big Nance Creek include the land-application of sewage sludge (biosolids) and discharges from the City of Moulton WWTP.

From approximately 1996 to 2008, biosolids from the Decatur Utilities WWTP were land-applied to approximately 5,000 acres of privately-owned agricultural land in Lawrence, Morgan, and Limestone Counties (U.S. EPA 2011). In September 2008 and February 2009, EPA collected surface soil and surface water samples from some of these agricultural lands to determine if the biosolids generated at the Decatur Utilities WWTP were contaminated with PFCs and if the land application of these biosolids resulted in potential releases of PFCs to the environment. Two of the agricultural areas that received sludge applications are located downgradient of the City of Moulton WWTP and potentially drain to Crow Branch and Muddy Fork. EPA collected surface soil and surface water samples from the agricultural area that potentially drains to Crow Branch. PFOS was detected in surface soil at 715 ng/g and PFOA was detected in surface soil at 818 ng/g (U.S. EPA 2009a). PFOA was detected in surface water at 33.7 ng/L and PFOS was not detected (U.S. EPA 2009b). Samples were not collected from the agricultural area whose run-off potentially flows to Muddy Fork. PFC-containing surface water from these agricultural areas may have discharged to Crow Branch and Muddy Fork, which discharge into Big Nance Creek and ultimately to the Tennessee River.

After November 2008, biosolids from the Decatur Utilities WWTP were no longer land-applied and were sent instead to area landfills for disposal, including the BFI Morris Farms Landfill. Leachate generated at this landfill was sent to the City of Moulton WWTP for treatment. Wastewater discharges from the City of Moulton WWTP to Crow Branch, which ultimately

discharges to Big Nance Creek, were found to contain PFOS and PFOA. In 2011, PFOS ranged from 619 to 5,440 ng/L and PFOA ranged from 1,240 to 9,860 ng/L in wastewater discharged to Crow Branch (U.S. EPA 2012b).

PFOS was detected at 92.3 ng/L and PFOA was detected at 295 ng/L (Hansen et al. 2002) in a surface water sample collected in November 2000 at approximate River Mile 273 (near the mouth of Big Nance Creek). These detections were close to the average PFOS and PFOA concentrations detected in samples collected downriver of Fox Creek in November 2000 (average PFOS concentration of 114 ng/L and average PFOA concentration of 389 ng/L).

Surface water samples collected from the mouth of Big Nance Creek in June 2012 (Figure 1) contained 18.3 and 45.7 ng/L of PFOS and 15.3 and 30.2 ng/L of PFOA (Appendix B).

3.2.2 International Paper Plant Area

International Paper Plant is a large paper manufacturing facility located along the south shoreline of the Tennessee River at approximate River Mile 283. Potential sources of PFCs in the vicinity of this paper plant include the land-application of biosolids and discharges from this plant to the Tennessee River.

As stated above, biosolids from the Decatur Utilities WWTP were land-applied to privately-owned agricultural land until November 2008, when the land-applied biosolids were found to contain PFCs. One of the agricultural areas that received sludge applications is located near Spring Creek that discharges just upriver of the International Paper Plant. This agricultural area was not sampled by EPA in September 2008 or February 2009. PFC-containing run-off from this agricultural area may have discharged to Spring Creek which discharges into the Tennessee River, just upriver of the International Paper Plant.

The International Paper Plant may be a source of PFCs due to the potential past and/or current use of PFC-containing coatings during paper manufacturing. Paper coating has been a common use of PFCs to water-proof and grease-proof paper used for a variety of uses such as food

wrapping and pet food bags (EFSA 2012; Trier et al. 2011; Kissa 2001; Walker 2005; Tittlemier et al. 2007). In 2009, this facility reported an average production of 23.7 million pounds of coated paper per month (International Paper 2009). This facility also has a NPDES permit for discharges to the Tennessee River. The main constituents monitored as part of this permit are chlorophenolic compounds. Monitoring for PFCs has not been required in this NPDES permit.

Surface water samples were collected in November 2000 and July 2005 at approximate River Mile 283 and in June 2012 along the shoreline of International Paper Plant. In November 2000, PFOS was detected at 106 ng/L and PFOA was detected at 355 ng/L (Hansen et al. 2002). In July 2005, PFOS was detected at 61.6 ng/L and PFOA was detected at 38.9 ng/L (Weston 2008a,b).

Surface water samples collected in June 2012 (Figure 1) contained 38.4 to 45.9 ng/L of PFOS and 24.9 to 27.1 ng/L of PFOA (Appendix B).

These data and the presence of PFC-generating activities near this location indicate that there are potential local sources.

3.2.3 Browns Ferry Nuclear Power Plant Area

The Browns Ferry Nuclear Power Plant is located along the north shore of the Tennessee River at approximate River Mile 294. Shortly after this plant began operations in January 1975, a fire occurred in the cable spreading room and Unit 1 reactor building. Another fire occurred in 1986 that destroyed a cooling tower. Potential sources of PFCs at this plant include the potential use of PFC-containing AFFFs during these fires that may have contaminated groundwater and surface soils which periodically migrated/eroded into the Tennessee River.

Surface water samples were collected in November 2000 and July 2005 at approximate River Miles 293 and 295 and in June 2012 along the shoreline of this facility. In November 2000, PFOS was detected at 74.8 and 96.4 ng/L and PFOA was detected at 140 and 203 ng/L

(Hansen et al. 2002). In July 2005, PFOS was detected at 74.2 ng/L and PFOA was detected at 67.3 ng/L (Weston 2008a,b).

Surface water samples collected in June 2012 (Figure 1) contained 10 to 32.4 ng/L of PFOS and 6.5 to 17 ng/L of PFOA (Appendix B). These data indicate a potential trend in decreasing PFOS and PFOA concentrations from 2000/2005 to 2012 in this area. It is unclear if there are local or upriver sources influencing these results.

3.2.4 Mallard Creek Area

Mallard Creek is a small tributary that drains into the Tennessee River at approximate River Mile 294. Potential sources of PFCs to Mallard Creek include the land-application of biosolids and discharges from BFI Morris Farms Landfill and Bert Jefferies Landfill.

As stated above, biosolids from the Decatur Utilities WWTP were land-applied to privately-owned agricultural land until November 2008, when the land-applied biosolids were found to contain PFCs. One of the agricultural areas that received sludge applications is located upgradient of Mallard Creek. In September 2008, EPA collected surface soil samples from this agricultural area. PFOS was detected in surface soil at 1,296 and 1,409 ng/g and PFOA was detected in surface soil at 1,895 and 2,531 ng/g (U.S. EPA 2009a). Based on a review of topographic maps, surface water from this agricultural area likely flows toward Mallard Creek and PFC-containing run-off from this agricultural area may discharge to Mallard Creek, which discharges into the Tennessee River.

Beginning in approximately 2009, biosolids from the Decatur Utilities WWTP were disposed of at BFI Morris Farms Landfill. This landfill also accepted sludge from the treatment of process wastewater at 3M, Daikin America, and others. Leachate generated at this landfill was found to contain PFOS and PFOA. PFOA and PFOS were reportedly detected in landfill leachate at 91,600 ng/L and greater than 55,000 ng/L, respectively (Decatur Daily 2009a). In March 2011, groundwater was sampled from wells located upgradient and along the perimeter of the landfill. PFOS and PFOA were detected in shallow groundwater in an upgradient well at 242 ng/L and

325 ng/L, respectively (Weston 2011; 3M 2011). PFOS and PFOA were detected in a shallow downgradient well at 22,500 ng/L and 24,300 ng/L, respectively (Weston 2011; 3M 2011). Based on a review of topographic and hydrogeological maps, surface water and groundwater from this landfill likely flow toward Mallard Creek and potential PFC-containing run-off and groundwater from this landfill may discharge to Mallard Creek, which discharges into the Tennessee River.

The Bert Jefferies Landfill is a former waste disposal site previously operated by Bert Jefferies Construction Company located approximately 0.5 miles south of the mouth of Mallard Creek. This facility recycled drums and received several types of wastes (e.g., scrap rolls of plastic film, pallets, and drums of solidified resins and plastics) from 1977 to 1982. This landfill reportedly had a contract with 3M to dispose of non-chemical wastes (film, paper, cardboard, and drums of solid plastic) during the 1970s (Times Daily 1991); although it may have also accepted PFC-containing wastes from other companies as well. A hydrogeologic investigation at this site identified a volatile organic compound groundwater plume migrating toward Mallard Creek. In 2011, 3M acquired the former Bert Jeffries site. Groundwater, surface water, and sediment were sampled on the site in 2012 and analyzed for PFOA, PFOS, PFHS, and/or PFBS (Weston 2012c; 3M 2012a,b,c). PFOS and PFOA were detected in groundwater at 22,500 ng/L and 8,260 ng/L, respectively, in a well located downgradient of the suspected waste disposal area. PFOA and PFOS ranged from undetectable to 112 ng/L and 30.2 to 303 ng/L, respectively, in surface water collected from a drainage feature located along the east side of the site. PFOA and PFOS in sediment in the same drainage ditch ranged from 0.629 to 2.39 ng/g and 3.95 to 23.8 ng/g, respectively. This east drainage flows in a northerly direction, ultimately discharging into Mallard Creek.

Surface water samples were collected in December 2004, December 2006, and June 2012 from Mallard Creek. In December 2004, PFOS was detected at 275 ng/L and PFOA was detected at 212 ng/L at the mouth of Mallard Creek (Weston 2008a,b). In December 2006, samples were collected again at the mouth of Mallard Creek and PFOS was detected at 48.3 ng/L and PFOA was detected at 51.1 ng/L (Weston 2008a,b).

Surface water samples were collected from Mallard Creek in June 2012 (Figure 1) upstream and at the mouth. PFOS was detected at 35 and 36.7 ng/L and PFOA was detected at 20.1 and 23.4 ng/L, with the higher concentrations in the sample collected at the mouth of Mallard Creek (Appendix B).

3.2.5 Fox Creek and Industrial Park Areas

Fox Creek is a small tributary that drains into the Tennessee River at approximate River Mile 296. Potential sources of PFCs to Fox Creek include operations conducted in the nearby Industrial Park and run-off from the Morgan County Regional Landfill.

The Industrial Park was completed in 1991 and is located along the south bank of the Tennessee River and east of Fox Creek. Prior to completion of the Industrial Park in 1991, approximately 133,000 cubic yards of sediment from the Tennessee River was dredged to open a channel for barge traffic. The dredged material was placed in a 99-acre dredge disposal area on the bank of the river. PFC-containing sediments may have been dredged from the river and placed along the shoreline.

Current companies located within this Industrial Park that may be potential sources of PFCs to the Tennessee River include the following:

- **Neo Industries**—Conducts hard chromium electroplating which may use a PFOS-containing mist suppressor (currently and/or historically) during plating operations. Surface water drainage from this facility appears to flow to the northwest, toward Fox Creek.
- **Hexcel**—Currently produces a precursor material used in carbon fiber and may have historically used PFC-treatment on textiles during textile manufacturing. Hexcel is located on the south shore of the Tennessee River, at approximate River Mile 298, and has a NPDES permit for discharges to the Tennessee River; however, monitoring for PFCs is not required at this time.

- **Nucor Steel (formerly Tricor Steel)**—Produces hot-rolled, pickled, and cold-rolled sheet metal. PFOS can be present in metal sludge from electroplating. Some steel manufacturers are known to recycle electroplating metal sludge and, as a result, PFOS can enter the steel manufacturing waste stream. Trico Steel, which began producing steel in 1997, applied for a NPDES permit for the discharge of approximately 600 gallons per minute of treated wastewater to the Tennessee River and an unnamed tributary of the Tennessee River. This facility may have also used PFC-containing AFFF during a fire in March 1998 of direct-reduced iron, a coke material used in steel processing (Decatur Daily 1998). Surface water drainage from this facility appears to flow to the northwest, toward Fox Creek. This facility has a NPDES permit for discharges to the Tennessee River and a tributary of the Tennessee River; however, monitoring for PFCs is not required at this time.

The Morgan County Regional Landfill is located approximately 3.5 miles south of the mouth of Fox Creek. Biosolids from the Decatur Utilities WWTP were disposed of at this landfill and leachate generated at this landfill was found to contain PFOS and PFOA (Decatur Daily 2009b). This landfill also accepted sludge from the treatment of process wastewater at 3M and possibly other companies. In June 2005, leachate from this landfill was analyzed and contained a PFOS concentration of 43,200 ng/L and a PFOA concentration of 43,100 ng/L (3M 2008). The landfill leachate was tested again in April 2006 and contained a PFOS concentration of 27,400 ng/L and a PFOA concentration of 48,700 ng/L. In approximately April 2011, a treatment system was installed to treat PFCs in the landfill leachate. Following treatment, the concentration of PFCs in leachate was reportedly reduced (Decatur Daily 2011).

In November 2010, groundwater was sampled from wells located upgradient and downgradient of the Morgan County Regional Landfill (Weston 2010; 3M 2010). PFOS and PFOA in the downgradient wells ranged from 30.6 to 14,800 ng/L and undetectable at the reporting limit of 25 ng/L to 7,130 ng/L, respectively. In the upgradient well, PFOS was not detected above the reporting limit of 25 ng/L and PFOA ranged from undetectable at the reporting limit of 25 ng/L to 148 ng/L (depending on the well depth at the one location sampled). The upgradient well

was sampled again in March 2012 and PFOA ranged from undetectable at the reporting limit of 24 ng/L to 85 ng/L (Weston 2012d). Surface water and groundwater from this landfill appear to flow to the northwest, toward Fox Creek. Leachate generated at this circa 1980 landfill may not be completely captured and could result in releases to Fox Creek.

Surface water samples were collected in June 2000, December 2004, and December 2006 from the mouth of Fox Creek and in July 2005 along the shoreline of the Industrial Park. Additional samples were collected from Fox Creek and along the shoreline of the Industrial Park in June 2012. In June 2000, PFOS ranged from 486.5 to 585.5 ng/L and PFOA ranged from 1,985 to 3,460 ng/L (Entrix 2001). In December 2004, PFOS was detected at 192 ng/L and PFOA was detected at 190 ng/L (Weston 2008a,b). In December 2006, PFOS was detected at 63.8 ng/L and PFOA was detected at 76.4 ng/L (Weston 2008a,b). A surface water sample was also collected along the shoreline of the Industrial Park in July 2005. PFOS and PFOA at this location were detected at 123 ng/L and 137 ng/L, respectively (Weston 2008a,b).

Surface water samples collected from Fox Creek, at the mouth and upstream in June 2012 (Figure 1), contained 53.1 and 153 ng/L of PFOS and 31.3 and 101 ng/L of PFOA, with the highest concentrations in the upstream sample. Surface water samples collected in June 2012 along the shoreline of the Industrial Park area contained 75.9 to 101 ng/L of PFOS and 34.1 to 50.6 ng/L of PFOA (Appendix B).

There appears to be a decreasing trend over time in PFOS concentrations in water samples in this area. However, the recent data still show levels above background concentrations.

3.2.6 Bakers Creek Area

Bakers Creek is located to the east of the 3M Decatur facility and potential sources of PFCs to this creek, aside from the 3M Decatur facility, include the land-application of biosolids and discharges from current and historical companies located in the Bakers Creek drainage area.

As stated above, biosolids from the Decatur Utilities WWTP were land-applied to privately-owned agricultural land until November 2008, when the land-applied biosolids were found to contain PFCs. One of the agricultural areas that received sludge applications is located near the Bakers Creek tributary. In February 2009, EPA collected surface water samples from this agricultural area. PFOA concentrations in surface water ranged from non-detect to 30.1 ng/L. PFOS concentrations in surface water ranged from 21.1 to 31.7 ng/L (U.S. EPA 2009b). Surface water drainage in the area of this agricultural area appears to flow to the north, toward/with Bakers Creek, which discharges into the Tennessee River. PFC-containing surface water from this agricultural area may have discharged to Bakers Creek and ultimately to the Tennessee River.

Current companies, other than 3M, that are potential sources of PFCs to Bakers Creek include:

- Daikin America/MDA Manufacturing, located adjacent to the 3M Decatur facility, began operations in approximately 1993. Daikin America stores/ handles perfluorohexane and produces Unidyne™, a fluorinated water and oil repellant. PFC-containing AFFFs may have also been used during fires in May 1999, January 2008, and March 2008. PFOA has been analyzed as part of Daikin America's NPDES permit beginning in approximately December 2008. Between December 2008 and September 2012, PFOA was detected between 4,540 and 307,000 ng/L in effluent discharged from three outfalls to Bakers Creek (U.S. EPA 2012a; ADEM 2012). Daikin America also has an outfall that discharges directly to the Tennessee River. This outfall is located approximately 2,900 feet north-northwest of the mouth of Bakers Creek. PFOA measured in discharge to this outfall ranged from 758 to 27,500 ng/L between December 2008 and September 2012 (U.S. EPA 2012a; ADEM 2012).

  Daikin America's NPDES permit was recently modified in May 2012 to include quarterly monitoring of PFOS and other PFCs. In September 2012, PFOS was detected between 27,000 and 60,000 ng/L in effluent discharged from three outfalls to Bakers Creek (ADEM 2012). PFOS was also detected

at 580 ng/L in effluent discharged directly to the Tennessee River (ADEM 2012).

- Toray Fluorofibers, located east of the 3M Decatur facility, manufactures polytetrafluoroethylene (PTFE) fiber. PTFE was introduced by DuPont and given the name Teflon®. Toray Fluorofibers purchased the business from DuPont and began production of PTFE at the Decatur facility in August 2004. PFOA has been essential for the synthesis and manufacture of PTFE. PFOA functions as a polymerization aid but is not structurally incorporated in the final product. Much of the manufacturing processes conducted at the facility are confidential; however, it is likely that Toray Fluorofibers is a source of PFOA and other PFCs to the Tennessee River. Some wastes from Toray Fluorofibers were also disposed of at Morgan County Regional Landfill, a landfill with known PFC-containing leachate. Sampling conducted at/around Toray Fluorofibers (actual locations not known) in December 2004 (Toray Fluorofibers 2011) detected the following:

  - 470 ng/L of PFOA in a monitoring well
  - 6.5 ng/g of PFOA in subsurface soil
  - 7.7 ng/g of PFOA in surface soil.

  As mentioned in Section 3.2.11, PFOA was detected in wastewater discharged from the Toray Fluorofibers facility to the Decatur Utilities WWTP. Toray Fluorofibers has a current NPDES permit for the discharge of non-contact cooling water, cooling tower blowdown, and boiler blowdown to Bakers Creek; however, monitoring for PFCs is not required.

- As discussed in Section 3.2.7, APM, located to the east of the 3M Decatur facility, may have used PFCs during their manufacturing processes. Discharges from these processes may have drained to the Tennessee River via several NPDES permitted storm water outfalls to Bakers Creek.

- Biological Processors of Alabama (BPA), located to the west of the 3M Decatur facility, was an industrial liquid waste treatment facility for several businesses[2] that may have treated PFC-containing wastes. This facility operated from approximately 2004 to 2008, treated wastes onsite, disposed of certain treated wastes at landfills, and/or discharged the treated wastes to the Decatur Utilities WWTP. During its operation, BPA was cited for more than 100 illegal discharges to the Decatur Utilities WWTP. When BPA ceased operations in 2008, thousands of gallons of waste liquid and sludge were left behind. In 2009, EPA directed the Alabama Department of Environmental Management (ADEM) to assess the site under the Comprehensive Environmental Response, Compensation, and Liability Act. Samples of liquid and sludge wastes were collected in May 2009 and analyzed for PFCs. Several PFCs were detected in the samples analyzed, including PFOA and PFOS. The maximum PFOA and PFOS concentrations detected in sludge samples were 110 ng/g and 360 ng/g, respectively. The maximum PFOA and PFOS concentrations detected in liquid samples were 2,400 ng/L and 76,000 ng/L, respectively.

  During site visits conducted by ADEM in 2009, a drainage ditch located on the BPA site was identified that flows north along the west side of Finley Island Road, then southeast onto the 3M Decatur facility, then east along Highway 20, and finally northeast into Bakers Creek (Figure 3) (ADEM 2009). Based upon the observations made by ADEM, it appears that surface water run-off and/or groundwater seepage could be transported to

[2] In 2001, a number of companies that had allegedly contributed waste to the BPA site signed a settlement agreement for recovery of past response costs for the BPA site. These companies included: Action Resources, Inc.; Armor Environmental Services, Inc.; Ashland Inc., on behalf of itself and its customers (Alcoa, Inc.; Caterpillar Inc.; Fuji Copian Corporation; Hanil E-Hwa Interior Systems; Honda Manufacturing of Alabama, LLC; Hyundai Motor Manufacturing Alabama, LLC; International Flavors & Fragrances; Leading Edge Aviation Mississippi, Inc.; Mercedes-Benz U.S. International, Inc.; Oak Technical, LLC; and Tower Automotive Products Company, Inc.); Cedar Ridge Landfill, Inc.; Cytec Industries, Inc.; Hyundai Motor Manufacturing Alabama, LLC; Maverick Tube LLC; NemakUSA; OmniChem L.L.C.; One Stop Environmental, LLC; Premier Industrial Services, LLC; Printpack Inc.; Quail Hollow Landfill, Inc.; Safety-Kleen Systems, Inc.; Spectrum Industrial Services, Inc.; and TK Aluminum North America Inc. (also referred to as "Teksid").

Bakers Creek from the BPA site via this drainage pathway. However, the ditch crosses the 3M property in the former sludge incorporation area, where sludge was injected into the subsurface in several fields or zones. The drainage appears to cross the northern part of Field 14, a "control" field where sludge was reportedly not injected, and then along the southern boundary of Field 10, a field that reportedly received 4,158 metric tons of sludge (Weston 2008a).

Surface water sampling was conducted in this drainage in April 2006 (Weston 2008a,b). A surface water sample collected upgradient of BPA had a PFOA concentration of 29,000 ng/L and a PFOS concentration of 15,100 ng/L. A surface water sample collected downgradient of BPA had a PFOA concentration of 128,000 ng/L and a PFOS concentration of 279,000 ng/L (Weston 2008a,b). Releases from BPA could have contributed to this elevated concentration; however, more focused sampling is needed to evaluate the relative contribution of the BPA site compared to the former sludge application Field No. 10.

Other companies located upstream along Bakers Creek that may have used PFCs include:

- Whittaker Coatings & Chemicals, a protective coatings manufacturer
- HCI Coatings, an industrial coatings manufacturer.

PFC-containing run-off from these facilities may have discharged to Bakers Creek.

Surface water samples were collected in Bakers Creek in December 2004, April 2006, December 2006, and April 2012. In December 2004, PFOS was detected at 3,420 ng/L and PFOA was detected at 1,707 ng/L (Weston 2008a,b). In April 2006, five samples were collected and PFOS ranged from 62.7 to 27,700 ng/L and PFOA ranged from 106 to 27,700 ng/L. In April 2006, the highest concentration of PFOS and PFOA was detected in the sample collected east of the Daikin America/MDA Manufacturing facility. In December 2006 and April 2012, additional surface water samples were collected at the mouth of Bakers Creek. In December 2006, PFOS

was detected at 53 ng/L and PFOA was undetectable at the reporting limit of 25 ng/L (Weston 2008a,b). In April 2012, PFOS was detected at 691 ng/L (Weston 2012b).

3.2.7 Ascend Performance Materials Area

APM (formerly Chemstrand, Monsanto, and then Solutia) is located along the south shore of the Tennessee River at approximate River Mile 302 between Bakers Creek and Betty Rye Branch. Historically, this facility manufactured chemical fibers, polystyrene plastics, and chemicals for use by textile mills and furniture manufacturers. APM may have used PFCs during these manufacturing processes. Discharges from these processes may have drained to the Tennessee River via several NPDES permitted outfalls to Bakers Creek, Betty Rye Branch, and the Tennessee River.

Surface water samples were collected in November 2000, April 2012, and June 2012 near the shoreline of the APM facility. In November 2000, PFOS was detected at 39.4 ng/L and PFOA was not detected above the reporting limit of 25 ng/L. In April 2012, PFOS was detected at a concentration of 23.7 ng/L (Weston 2012b). In June 2012, PFOS was detected from 5.31 to 6.29 ng/L and PFOA was detected from 3.68 to 5.25 ng/L (Appendix B).

3.2.8 Betty Rye Branch Area

Betty Rye Branch is a small tributary that drains into the Tennessee River at approximate River Mile 303. This area may be potentially impacted by discharges from industrial and commercial sources including:

- APM, as discussed above.
- Nichols Aluminum (formerly Decatur Aluminum Corporation), a producer of painted aluminum sheets used in the construction and automotive markets. Between 1996 and 2005, Nichols Aluminum used a wet chrome pretreatment step as part of the coating operation, a process that may have used PFCs.

PFC-containing AFFFs may have also been used at this facility during fires in 1994 and 1998.

No historical sampling was previously conducted in this area. In June 2012, surface water samples were collected from Betty Rye Branch at the mouth and upstream (Figure 1). These samples contained 20.8 and 53.4 ng/L of PFOS and 9.14 and 19.2 ng/L of PFOA, with the highest concentrations in the upstream sample (Appendix B).

3.2.9 Dry Branch Area

Dry Branch is a small tributary that drains into the Tennessee River at approximate River Mile 303. Several industrial and commercial companies and a major municipal WWTP (Decatur Utilities WWTP) are located along Dry Branch and may be potential historic and/or current sources of PFCs. The Decatur Utilities WWTP receives wastewater from residential and industrial sources, including local facilities that manufacture or use PFCs and may discharge PFC-containing wastewater to the WWTP. A detailed discussion of the Decatur Utilities WWTP is presented in Section 3.2.11. Companies located along Dry Branch may have used PFCs to enhance the water repellency and stain resistance of fabric, paper, fiber, or other materials during their manufacturing processes. Discharges from these processes may have impacted Dry Branch. The historic companies located along Dry Branch include:

- Champion Paper, listed in historical documents as a paper manufacturer, not a paper mill. Actual paper manufacturing processes conducted at this facility are not known.
- Clement Paper, listed in historical documents as a paper manufacturer, not a paper mill. Actual paper manufacturing processes conducted at this facility are not known.
- Browns Brothers, listed in historical documents as a paper manufacturer, not a paper mill. Actual paper manufacturing processes conducted at this facility are not known.

- Cover Stitch, a textile manufacturer.
- Bilt-Rite Box Company, a box manufacturer.
- Lakeside Industries, a waterproof fabric manufacturer.
- Pinecraft, a furniture manufacturer.
- Riddle Furniture Manufacturing, a furniture manufacturer.

Six surface water samples were collected from the mouth of Dry Branch in June 2000. PFOS was detected from 33.05 to 65.5 ng/L and PFOA was detected from 14.45 to 31.35 ng/L (Entrix 2001).

Surface water samples were collected from Dry Branch at the mouth and upstream in June 2012 (Figure 1). These samples contained 19.3 and 22.3 ng/L of PFOS and 9.58 and 9.8 ng/L of PFOA (Appendix B).

3.2.10 Pryor Field Regional Airport Area

Pryor Field is a small regional airport located at approximate River Mile 305. Potential sources of PFCs in this sampling area are the land-application of biosolids and the potential use of PFC-containing AFFFs at Pryor Field Regional Airport.

As stated above, biosolids from the Decatur Utilities WWTP were land-applied to privately-owned agricultural land until November 2008, when the land-applied biosolids were found to contain PFCs. One of the agricultural areas that received sludge applications is located north of Pryor Field Regional Airport near a tributary that discharges to the Tennessee River. In February 2009, EPA collected surface water samples from this agricultural area. PFOS was detected in surface water at 13.2 ng/L and PFOA was not detected (U.S. EPA 2009b). This agricultural area is located near Swan Creek which flows to the southwest eventually discharging into the Tennessee River just downriver of the Pryor Field Regional Airport. PFC-containing run-off from this agricultural area may have discharged to Swan Creek and

ultimately into the Tennessee River. Surface water samples were collected in December 2004 and 2006 near the mouth of Swan Creek and PFOS and PFOA were not detected above the detection limit of 25 ng/L (Weston 2008a,b). This sampling location was located downriver of the June 2012 Pryor Field Regional Airport sampling area.

Surface water samples collected in the Pryor Field Regional Airport area in June 2012 (Figure 1) contained 2.71 to 3.75 ng/L of PFOS and 2.25 to 2.47 ng/L of PFOA (Appendix B). Information uncovered after the June 2012 sampling indicated that run-off from both Pryor Field Regional Airport and the agricultural area that received sludge applications discharge into the Tennessee River downriver of the June 2012 sampling area in the vicinity of Swan Creek (Figure 2). Therefore, samples collected from this area in June 2012 are likely not representative of surface water that may have been impacted by discharges from these potential sources.

3.2.11 Decatur Utilities WWTP Area

The Decatur Utilities WWTP receives wastewater from residential and industrial sources, including local facilities that manufacture or use PFCs and may discharge PFC-containing wastewater to the WWTP. PFC-containing effluent was historically discharged from the Decatur Utilities WWTP to the Tennessee River between River Miles 303 and 304 at the outfall diffuser (Figure 3). Effluent from the WWTP sampled in May 2005 contained a PFOS concentration of 2,850 ng/L and a PFOA concentration of 17,400 ng/L (3M 2008). Effluent from the WWTP was sampled again in April 2006 and contained a PFOS concentration of 571 ng/L and a PFOA concentration of 7,080 ng/L. The 3M Decatur facility has never knowingly discharged any process wastewater to the Decatur Utilities WWTP. From 2001 through 2009, 3M discharged sanitary wastewater to the Decatur Utilities WWTP (3M 2008, 2009). Sanitary wastewater from 3M sampled in April 2006 contained a PFOS concentration of 4,480 ng/L and a PFOA concentration of 4,630 ng/L (3M 2008). Samples collected in April 2009 contained a PFOS and PFOA concentration of 2,560 ng/L and 3,650 ng/L, respectively (3M 2009).

Other facilities that have known discharges of PFC-containing wastewater to the Decatur Utilities WWTP include:

- Daikin America/MDA Manufacturing—Prior to 2009, Daikin America discharged process wastewater to the Decatur Utilities WWTP (Decatur Daily 2009d). PFOS was detected in these discharges; however, Daikin America claims that it has never used PFOS (Decatur Daily 2009c).
- Toray Fluorofibers—Wastewater discharged from Toray Fluorofibers to the Decatur Utilities WWTP was monitored for PFOA between April 2009 and March 2011. PFOA in wastewater ranged from a high of 43,200 ng/L in September 2010 to a low of 47 ng/L in January 2011 (Toray Fluorofibers 2011).

Other facilities that may have discharged PFC-containing wastewater to the Decatur Utilities WWTP include:

- Nichols Aluminum—Used a wet chrome pretreatment step as part of the coating operation that may have used PFCs.
- BPA—This was an industrial liquid waste treatment facility for several businesses that may have treated PFC-containing wastes. The wastes were treated onsite and disposed of at landfills or discharged to the Decatur Utilities WWTP.

As discussed above, from approximately 1996 to 2008, biosolids from the Decatur Utilities WWTP were land-applied to approximately 5,000 acres of privately-owned agricultural land in Lawrence, Morgan, and Limestone Counties. Biosolids from New York City were also land-applied to some agricultural areas in the Decatur area for more than 10 years (U.S. EPA 2009a). In September 2008, EPA collected samples of biosolids from the Decatur Utilities WWTP and New York City, surface soil samples where biosolids were land-applied, and surface soil samples where no biosolids were land-applied (i.e., background samples). PFOS was detected in biosolids collected from both Decatur Utilities (405 and 418 ng/g) and

New York City (32 to 77 ng/g). PFOA was also detected in biosolids collected from both Decatur Utilities (59 and 128 ng/g) and New York City (8 to 20 ng/g). PFOS ranged from 715 to 1,409 ng/g and PFOA ranged from 818 to 2,531 ng/g in surface soil samples collected from fields where biosolids were land-applied. PFOS and PFOA were not detected above the detection limit of 100 ng/g in the background samples. The land application of biosolids ceased in November 2008.

After November 2008, biosolids from the Decatur Utilities WWTP were sent to area landfills for disposal, including the Morgan County Regional Landfill. However, PFC-containing leachate generated at Morgan County Regional Landfill was sent to the Decatur Utilities WWTP for treatment prior to discharge to the Tennessee River. In June 2005, leachate from this landfill was analyzed and contained a PFOS concentration of 43,200 ng/L and a PFOA concentration of 43,100 ng/L (3M 2008). The landfill leachate was tested again in April 2006 and contained a PFOS concentration of 27,400 ng/L and a PFOA concentration of 48,700 ng/L (3M 2008).

In June 2012, surface water samples were collected in the area of the Decatur Utilities WWTP outfall diffuser (Figure 1) and PFOS was detected from 2.76 to 4.31 ng/L and PFOA was detected from 1.8 to 3.08 ng/L (Appendix B). No historical sampling was previously conducted in the area of this outfall diffuser.

Surface water samples were also collected from along the west side of the Decatur Utilities WWTP within Dry Branch in June 2000 and June 2012. In June 2000, six surface water samples were collected from the mouth of Dry Branch and PFOS was detected from 33.05 to 65.5 ng/L and PFOA was detected from 14.45 to 31.35 ng/L (Entrix 2001). Samples collected in June 2012 from the mouth of and upstream in Dry Branch contained 19.3 and 22.3 ng/L of PFOS and 9.58 and 9.8 ng/L of PFOA (Appendix B).

The surface water concentrations at the outfall diffuser were below background but may not reflect the highest concentrations at the mouth of the outfall pipe. Fish may be attracted to this location at certain times of the year.

3.2.12 Wolverine Tube Area

Wolverine Tube is located at approximate River Mile 307. Potential sources of PFCs in the Wolverine Tube sampling area include the land-application of biosolids and discharges from historical facilities that may have used PFCs.

As stated above, biosolids from the Decatur Utilities WWTP were land-applied to privately-owned agricultural land until November 2008, when the land-applied biosolids were found to contain PFCs. Two of these agricultural areas that received sludge applications are located southwest of Wolverine Tube, likely within the drainage basin for Flint Creek. In September 2008 and February 2009, EPA collected surface soil and/or surface water samples, respectively, from these agricultural areas. PFOS was detected in surface soil at 972 ng/g and PFOA was detected in surface soil at 1,598 ng/g (U.S. EPA 2009a). PFOA concentrations in surface water ranged from non-detect to 750 ng/L. PFOS concentrations in surface water ranged from non-detect to 66.3 ng/L (U.S. EPA 2009b). Surface water drainage in the vicinity of these agricultural areas appears to flow to the east, toward Flint Creek which discharges into the Tennessee River just upriver of the Wolverine Tube sampling area. PFC-containing surface water from these agricultural areas may have discharged to Flint Creek and ultimately to the Tennessee River.

Historical companies located in the Wolverine Tube sampling area that may be potential sources of PFCs include:

- The Wolverine Tube facility is located upriver of the 3M Decatur facility at approximate River Mile 307. Wolverine Tube, which began operations in 1948, produced copper and copper-based alloy tubing, aluminum tubing, and extruded aluminum shapes. This facility conducted plating operations and discharged some process wastes to the Tennessee River via three outfalls (Outfalls 1 through 3). This facility may have used PFCs as a mist suppressor during plating operations. Wolverine Tube also disposed of some wastes at BFI Morris Farms Landfill, a landfill with known PFC-containing leachate (Decatur Daily 2009a).

- HCI Coatings, an industrial coatings manufacturer, was historically located along the south bank of the Tennessee River at approximate River Mile 305.5. This company may have used PFCs and PFC-containing run-off from this facility may have discharged to the Tennessee River.

Surface water samples were collected in November 2000, December 2004, July 2005, December 2006, and June 2012 in the vicinity of the Wolverine Tube facility. Between November 2000 and December 2006, PFOS concentrations ranged from undetectable to 52.6 ng/L and PFOA was not detected above the detection limits (Hansen et al. 2002; Weston 2008a,b). PFOS was also detected in November 2000 at 51.9 ng/L at a location approximately 1.5 miles upriver of the Wolverine Tube facility near the mouth of Flint Creek (the creek may have received PFC-containing run-off from agricultural areas where Decatur Utilities WWTP sludge was applied).

Surface water samples collected in June 2012 (Figure 1) contained 6.83 to 9.15 ng/L of PFOS and 5.22 to 5.89 ng/L of PFOA (Appendix B).

Consistently low PFOS and PFOA concentrations at this location indicate that there does not appear to be a substantive source of PFCs in this area.

4 Conclusions and Recommendations

4.1 Conclusions

The recent surface water and sediment sampling together with historic surface water and sediment sampling suggests that there are multiple sources of PFCs to the Wheeler Reservoir and the Tennessee River and its tributaries. This is based on the presence of PFC-generating sites, other than the 3M Decatur facility, and the spatial distribution of PFOS and PFOA in surface water samples collected in June 2012. Additional sampling is needed to evaluate effects on fish tissue concentrations as well as to develop more comprehensive surface water chemistry data for source evaluation.

4.2 Recommendations

Based on the preliminary research and sampling conducted to date, a comprehensive fish and water sampling program is recommended.

The purpose of comprehensive fish sampling program is to provide updated information on PFOS levels in edible fish tissue in the Wheeler Reservoir and the Tennessee River and its tributaries. The sampling methodology will be guided by previous sampling investigations for PFCs in fish tissue and surface water, as well as information evaluated by Exponent on potential sources for PFCs in the Tennessee River besides the 3M Decatur facility.

4.2.1 General Sampling Approach

Sampling locations for fish collection should be similar to those previously identified in the June 2012 water and sediment sampling investigation (Figure 4). Proposed sampling areas include:

1. Tennessee River, River Mile 320—Sampling reach located below Triana at approximate River Mile 320. Previously sampled by ADEM as TENR-320 in 2007, 2008, and 2009.

2. Point Mallard—Sampling reach located on the southern shoreline of the main channel near Point Mallard above the City of Decatur at approximate River Mile 307.5. Previously sampled by 3M in 2004 and 2006.

3. Tennessee River, River Mile 307.5—Sampling reach located in the backwater area to the north of the main channel near Point Mallard above the City of Decatur at approximate River Mile 307.5.

4. Mouth of Betty Rye Branch and Dry Branch—Sampling reach located at the confluence of Betty Rye Branch and Dry Branch with the Tennessee River. Sampling reach is along the southern shoreline of the Tennessee River at approximate River Mile 303.

5. Bakers Creek Mouth—Sampling reach located at the confluence of Bakers Creek with the Tennessee River at approximate River Mile 301. The sampling reach extends along the southern shoreline of the Tennessee River. Previously sampled by 3M in 2004, 2006, and spring 2012. Previously sampled by ADEM as WHEL-11 in 2007, 2008, and 2009.

6. Swan Creek Mouth—Sampling reach along the northern shoreline of the Tennessee River at the mouth of Swan Creek at approximate River Mile 301. Previously sampled by 3M in 2004 and 2006.

7. Tennessee River, River Mile 298—Sampling reach along the southern shoreline of the Tennessee River at approximate River Mile 298. Sampling reach is upstream of the confluence of Fox Creek with the Tennessee River.

8. Round Island Creek Mouth—Sampling reach along the northern shoreline of the Tennessee River at the mouth of Round Island Creek at approximate River Mile 298.

9. Fox Creek Mouth—Sampling reach along the southern shoreline of the Tennessee River at the mouth of Fox Creek at approximate River Mile 296. Previously sampled by 3M in 2004 and 2006.

10. Browns Ferry Nuclear Power Plant—Sampling reach along the northern shoreline of the Tennessee River in the vicinity of Browns Ferry Nuclear Power Plant at approximate River Mile 294.

11. Mallard Creek Mouth—Sampling reach along the southern shoreline of the Tennessee River at the mouth of Mallard Creek at approximate River Mile 293.5. Previously sampled by 3M in 2004 and 2006.

12. Elk River Mouth—Sampling reach along the northern shoreline of the Tennessee River at the mouth of Elk River at approximate River Mile 285.

13. Tennessee River, River Mile 281—Sampling reach along the southern shoreline of the Tennessee River below the mouth of Spring Creek at approximate River Mile 281. Previously sampled by ADEM as TENR-281 in 2007, 2008, and 2009.

At each sampling location, five of each species (largemouth bass and channel catfish) should be collected, consistent with the total number targeted per reach by Weston (2012a). Surface water samples should be collected within each fish sampling area. In addition, to provide current information on PFC concentrations throughout the Wheeler Reservoir, a minimum of 10 evenly spaced water samples should be collected along 8 cross-river transects. This transect sampling should be conducted at the following locations:

1. Transect T1—Below Triana, coincides with the fish sampling reach located below Triana at approximate River Mile 320.

2. Transect T2—Coincides with the fish sampling reaches at approximate River Mile 307.5. This transect will span across the main flow channel as well as the backwater area to the north of the main channel.

3. Transect T3—Immediately downstream from the mouth of Betty Rye Branch and Dry Branch, coincides with the fish sampling reach at approximate River Mile 303.

4. Transect T4—Immediately downstream from the mouth of Bakers Creek, coincides with the fish sampling reach at approximate River Mile 301.

5. Transect T5—Immediately downstream from the mouth of Round Island Creek, coincides with the fish sampling reach at approximate River Mile 298.

6. Transect T6—Immediately downstream from the mouth of Fox Creek, coincides with the fish sampling reach at approximate River Mile 296.

7. Transect T7—Immediately downstream from the mouth of Mallard Creek, coincides with the fish sampling reach at approximate River Mile 293.5.

8. Transect T8—Below Spring Creek and the Elk River, coincides with the fish sampling reach at approximate River Mile 281.

Both fish tissue and water samples should be shipped to the 3M Environmental Laboratory in St. Paul, Minnesota. Split samples (minimum of 10 percent) should also be submitted to AXYS in Sidney, British Columbia, Canada. Fish and surface water samples should be analyzed for the following PFCs monitored as part of 3M's NPDES permit:

- PFBA
- PFHxA
- PFHpA
- PFOA
- Perfluorobutane sulfonamide acid
- 2-(N-ethyl-PFOSA) acetic acid
- 2-(N-methyl-PFOSA) acetic acid

- PFBS
- PFHxS
- PFOS
- PFOSA.

4.2.2 Fish Sampling Methodology

The fish sampling should be conducted using methods that are generally consistent with previous sampling efforts in this area (e.g., Weston 2012a). The sampling plan should include the following elements:

1. **Species:** Largemouth bass and channel catfish should be sampled (both species have been previously sampled).
2. **Sample Types:** Fish tissue should be collected to evaluate exposure to fishermen. Skin-off fish fillets should be collected in the field, as specified in Weston (2012a) based on input from ADEM. Duplicates and other quality control samples will also be collected in a manner that is generally consistent with Weston (2012a).
3. **Fish Size:** The sampling effort should target fish between 13–18 inches in length with a minimum length of 8 inches for largemouth bass and at least 13 inches in length for channel catfish, for consistency with ADEM and Weston (2012a) sampling.
4. **Target Fish Sample Number:** Five of each species per sampling area, consistent with the total number targeted per reach by Weston (2012a).
5. **Collection Method:** Electrofishing using a boat-mounted electrofishing unit and trotlines will be the primary sampling methods. If necessary, electrofishing and trotlines may be augmented by other fish collection techniques such as rod and reel angling.
6. **PFC Analytes:** Fish tissue will be analyzed for the 11 PFCs listed above.

4.2.3 Surface Water Sampling Methodology

Surface water sampling should be conducted using methods that are generally consistent with the June 2012 sampling conducted by Exponent. The sampling plan should include the following elements:

1. **Target Sample Number:** Three locations within each fish sampling area. For the cross-river transects, a minimum of 10 evenly spaced samples will be collected over the length of the transect.

2. **Collection Method:** At each sampling location, grab surface water samples should be collected using a 2.5-L Niskin (polyvinyl chloride) sampler or a peristaltic pump located at approximately 0.6 of the total water depth. At sampling stations where the average water depth is greater than 10 ft, samples should be collected at two depths, 0.2 and 0.8 of the total water depth, consistent with previous sampling events (Weston 2012b). The shallow and deep samples collected at each location will be composited into one sample.

3. **PFC Analytes:** Surface water samples should be analyzed for the 11 PFCs noted above. In addition to the laboratory analyses, surface water samples should be measured in the field for the following parameters:

   - pH
   - Conductivity
   - Temperature
   - Dissolved oxygen
   - Turbidity.

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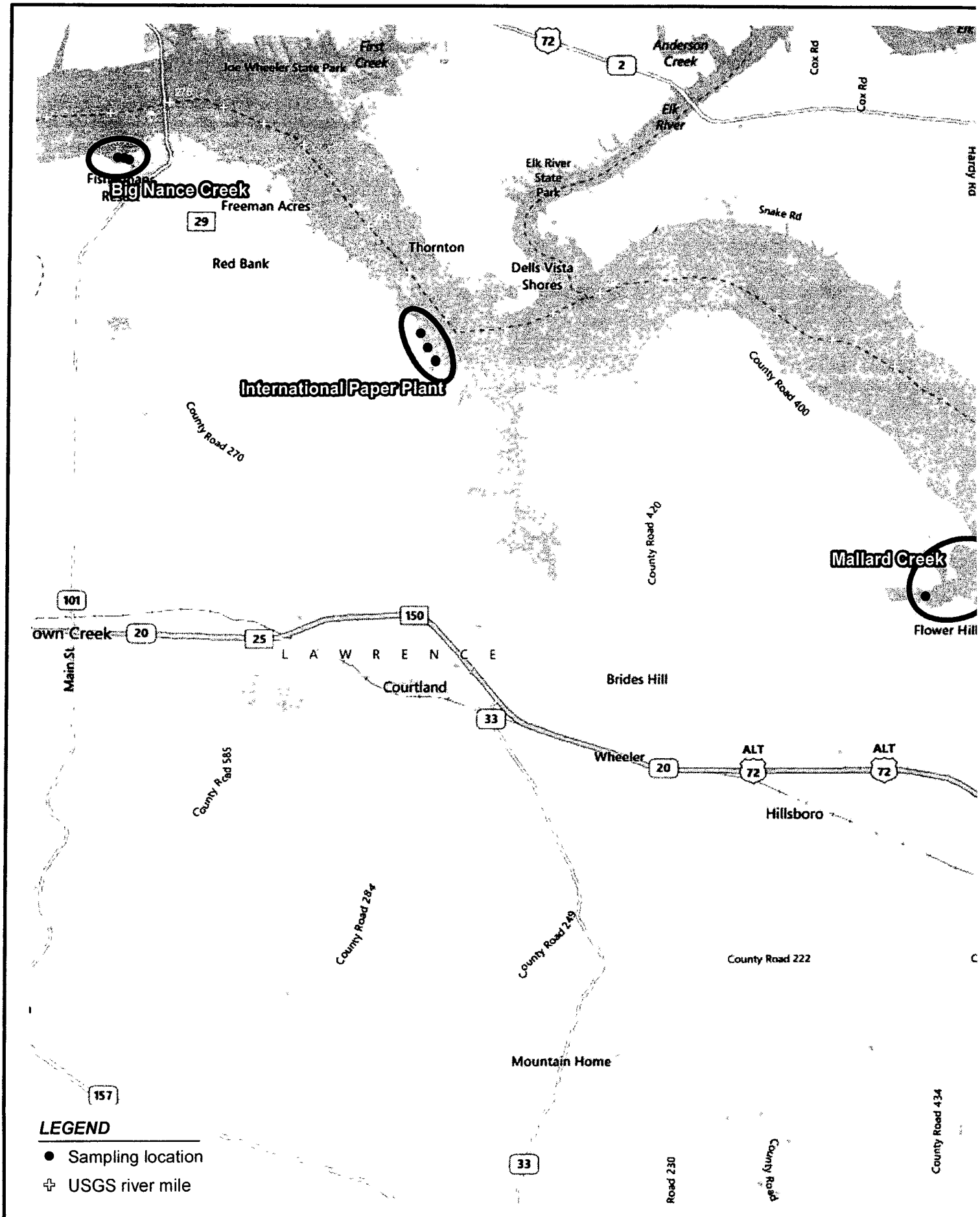
Figures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Mallard Creek
Flower Hill
Ioe Wheeler State Park
First Creek
Anderson Creek
Elk River
Elk River State Park
Cox Rd
Harry Rd
Snake Rd
Freeman Acres
Thornton
Red Bank
Dells Vista Shores
County Road 400
County Road 270
County Road 420
Courtland
Brides Hill
Wheeler
Hillsboro
County Road 585
County Road 284
County Road 249
County Road 222
Mountain Home
County Road 434
Road 230
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150
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ALT
72
157
LEGEND
Sampling location
USGS river mile

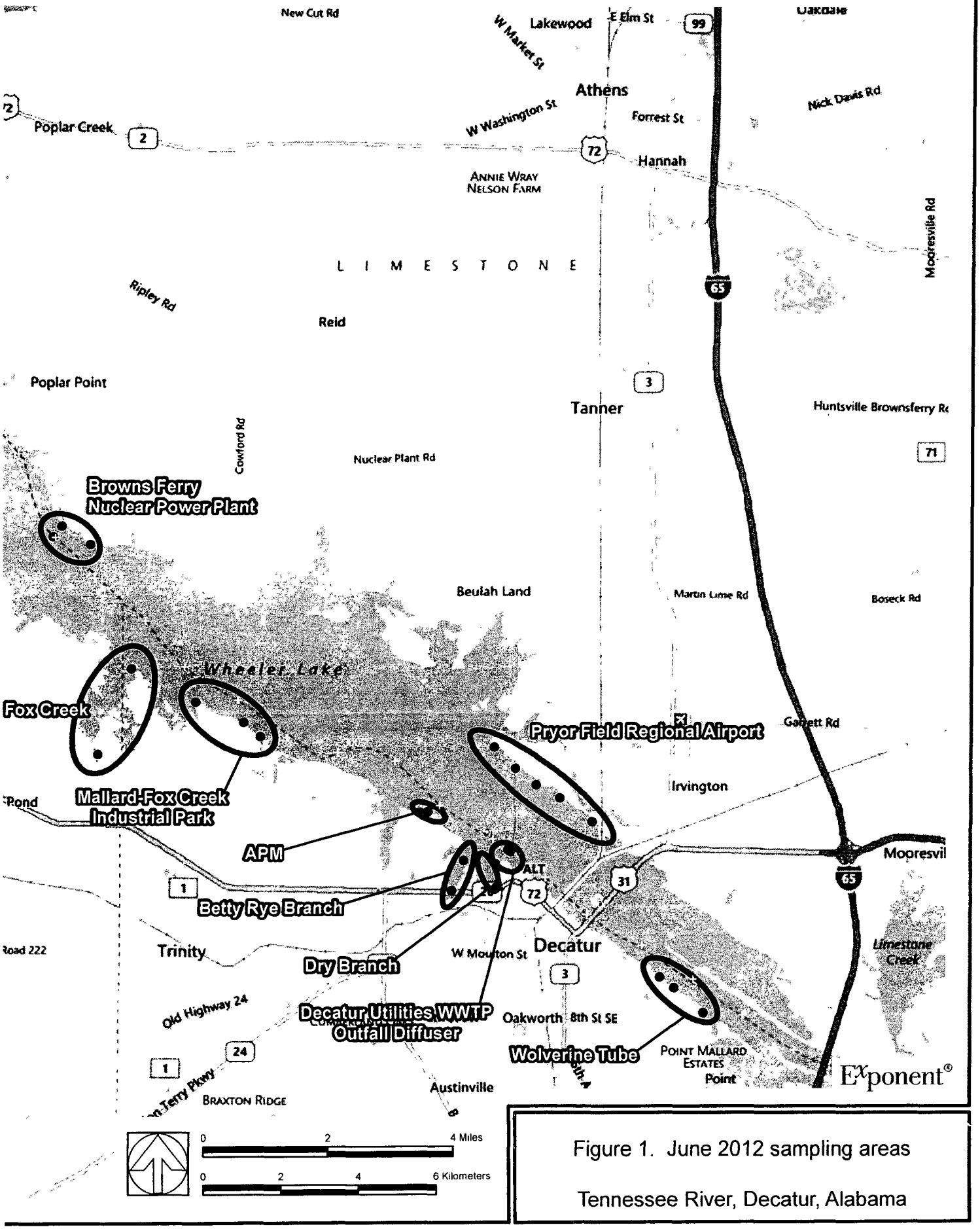

Figure 1. June 2012 sampling areas

Tennessee River, Decatur, Alabama

Joe Wheeler State Park
Wilson Lake
Elk River
Elk River State Park
Freemans Acres
Thornton
Dells View Shores
Big Nance Creek
Spring Creek
Mallard Creek
Courtland
Hillsboro
Mountain Home
Muddy Fork
Mt Moriah
Crow Branch
Hartson
Midway
Town Creek
Decatur Mill
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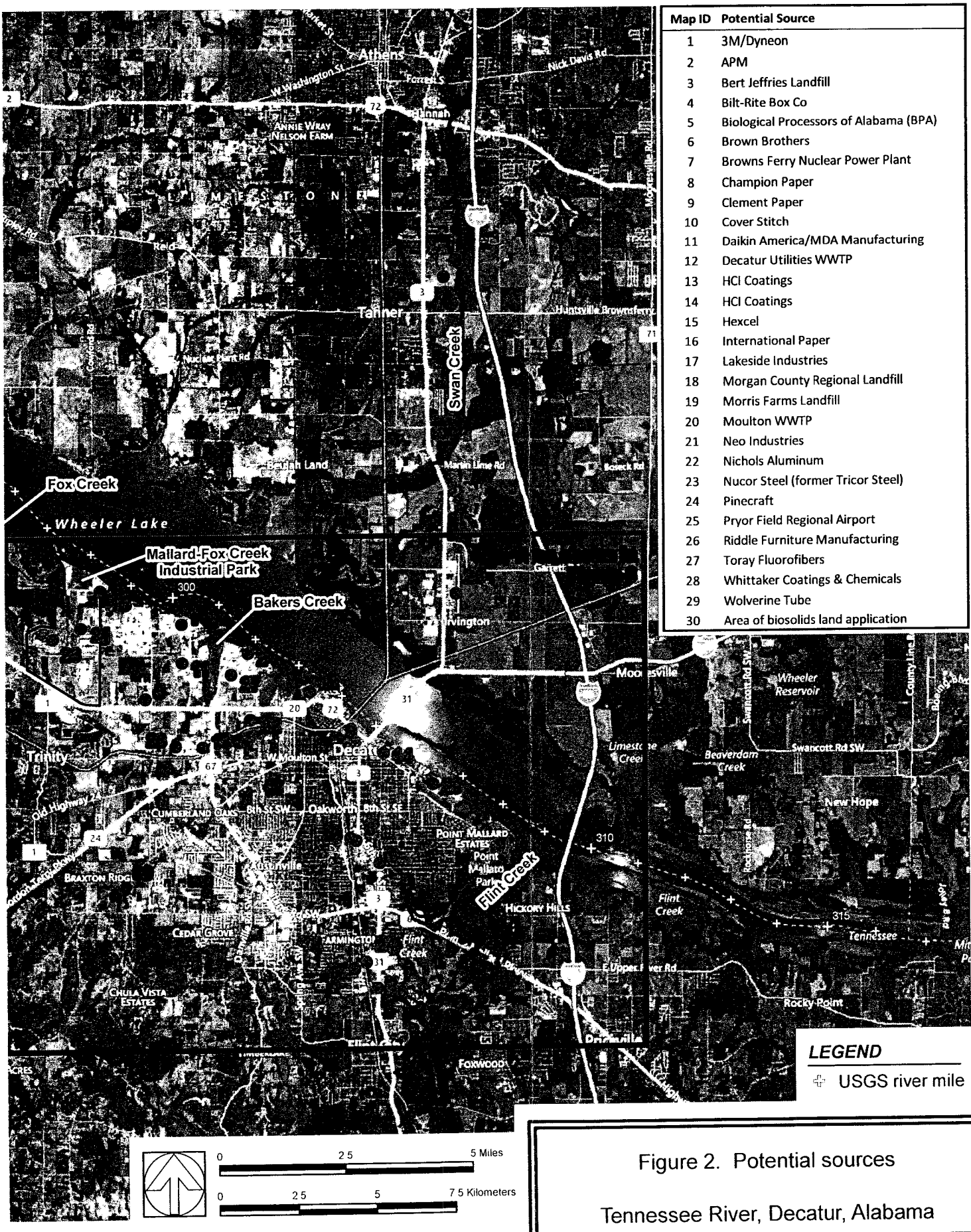
25
33
72

Exponent®



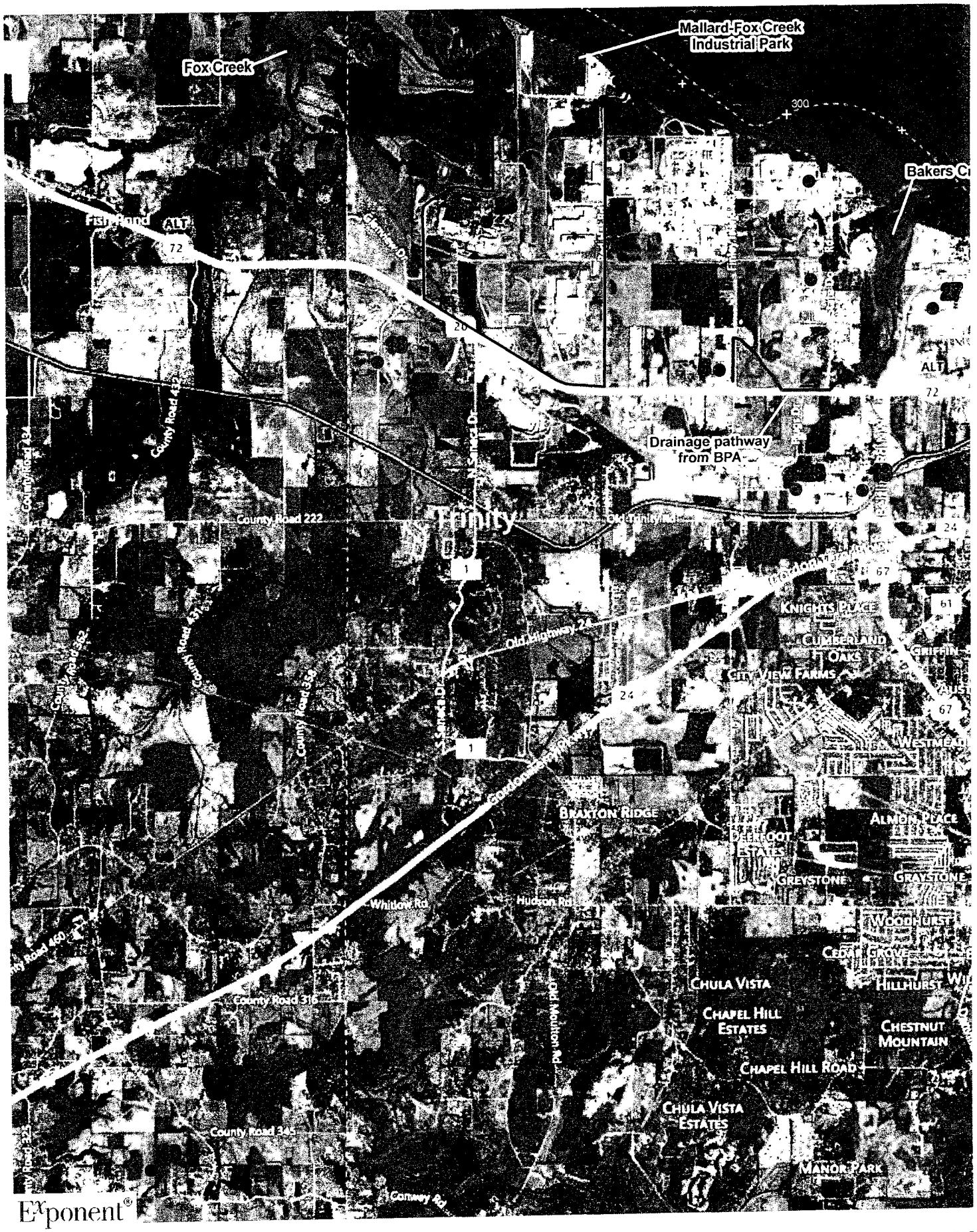
Map ID	Potential Source
1	3M/Dyneon
2	APM
3	Bert Jeffries Landfill
4	Bilt-Rite Box Co
5	Biological Processors of Alabama (BPA)
6	Brown Brothers
7	Browns Ferry Nuclear Power Plant
8	Champion Paper
9	Clement Paper
10	Cover Stitch
11	Daikin America/MDA Manufacturing
12	Decatur Utilities WWTP
13	HCl Coatings
14	HCl Coatings
15	Hexcel
16	International Paper
17	Lakeside Industries
18	Morgan County Regional Landfill
19	Morris Farms Landfill
20	Moulton WWTP
21	Neo Industries
22	Nichols Aluminum
23	Nucor Steel (former Tricor Steel)
24	Pinecraft
25	Pryor Field Regional Airport
26	Riddle Furniture Manufacturing
27	Toray Fluorofibers
28	Whittaker Coatings & Chemicals
29	Wolverine Tube
30	Area of biosolids land application

LEGEND

USGS river mile

Figure 2. Potential sources

Tennessee River, Decatur, Alabama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Bakers Cr
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County Road 434
County Road 222
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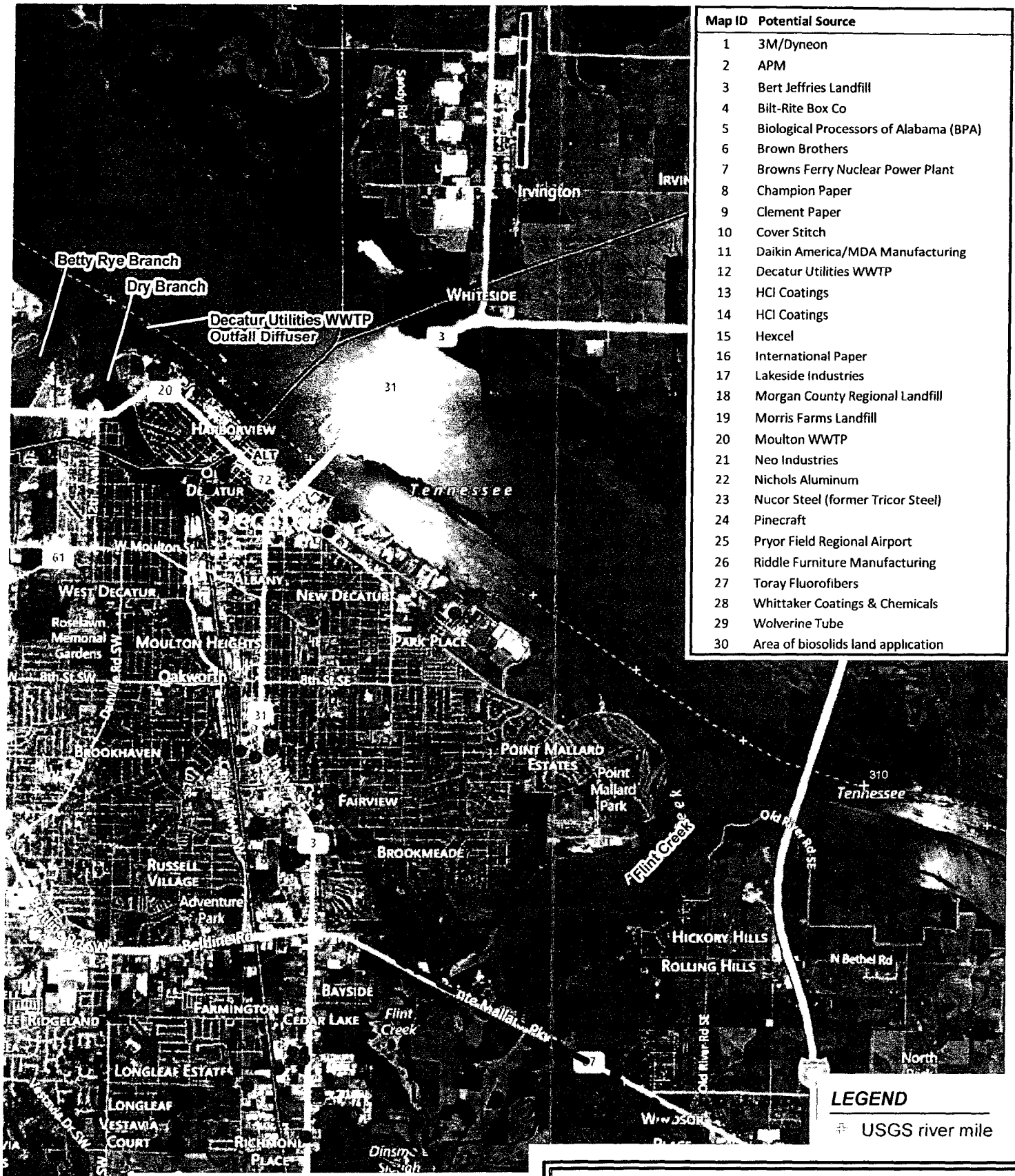
Old Trinity Rd
24
67
61
Knights Pl
Cumberland Oaks
Griffin
Old Highway 24
County Road 432
County Road 352
County Road 350
Sparkman Dr
Glenhaven Dr
Westmeadow Dr
Braxton Ridge
Almon Place
Deerfoot Estates
Greystone
Whitlow Rd
Hudson Rd
Woodhurst
Cedar Grove
Hillhurst
Chula Vista
Chapel Hill Estates
Chestnut Mountain
Chapel Hill Road
Old Moulton Rd
County Road 316
County Road 345
Chula Vista Estates
Manor Park
Conway Rd
Exponent®



Map ID	Potential Source
1	3M/Dyneon
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3	Bert Jeffries Landfill
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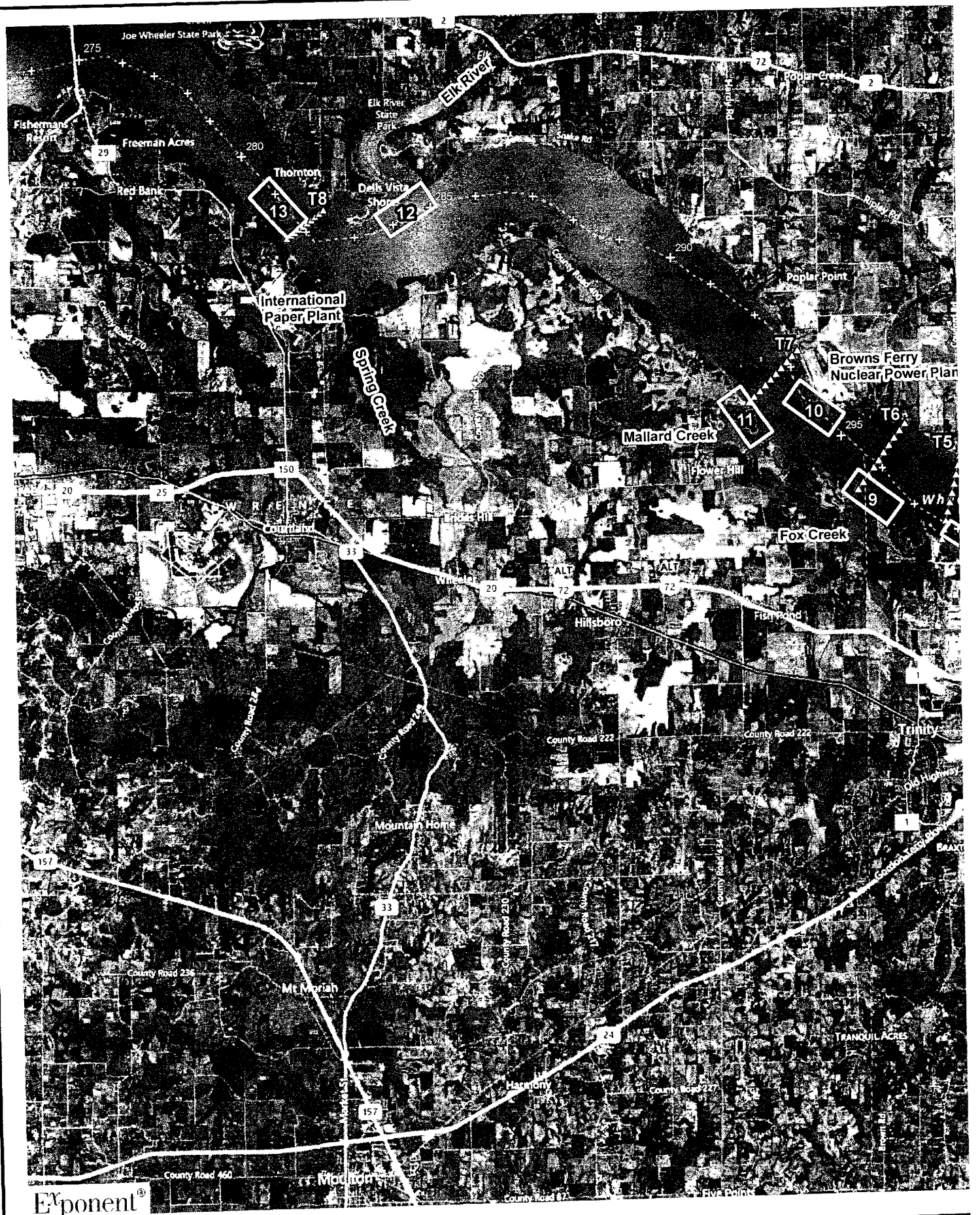
9	Clement Paper
10	Cover Stitch
11	Daikin America/MDA Manufacturing
12	Decatur Utilities WWTP
13	HCl Coatings
14	HCl Coatings
15	Hexcel
16	International Paper
17	Lakeside Industries
18	Morgan County Regional Landfill
19	Morris Farms Landfill
20	Moulton WWTP
21	Neo Industries
22	Nichols Aluminum
23	Nucor Steel (former Tricor Steel)
24	Pinecraft
25	Pryor Field Regional Airport
26	Riddle Furniture Manufacturing
27	Toray Fluorofibers
28	Whittaker Coatings & Chemicals
29	Wolverine Tube
30	Area of biosolids land application

LEGEND

USGS river mile

Figure 3. Potential sources (Decatur detail)

Tennessee River, Decatur, Alabama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Elk River
Elk River State Park
Fisherman's Resort
Freeman Acres
Red Bank
Thornton
Dells Vista Shores
T8
13
12
International Paper Plant
Spring Creek
Poplar Creek
Poplar Point
T7
Browns Ferry Nuclear Power Plan
11
10
T6
T5
Mallard Creek
Flower Hill
9
Fox Creek
Courtland
Wheeler
Hillsboro
Fish Pond
Trinity
Mountain Home
Mt Moriah
Harmony
TRANQUIL ACRES
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County Road 26
County Road 29
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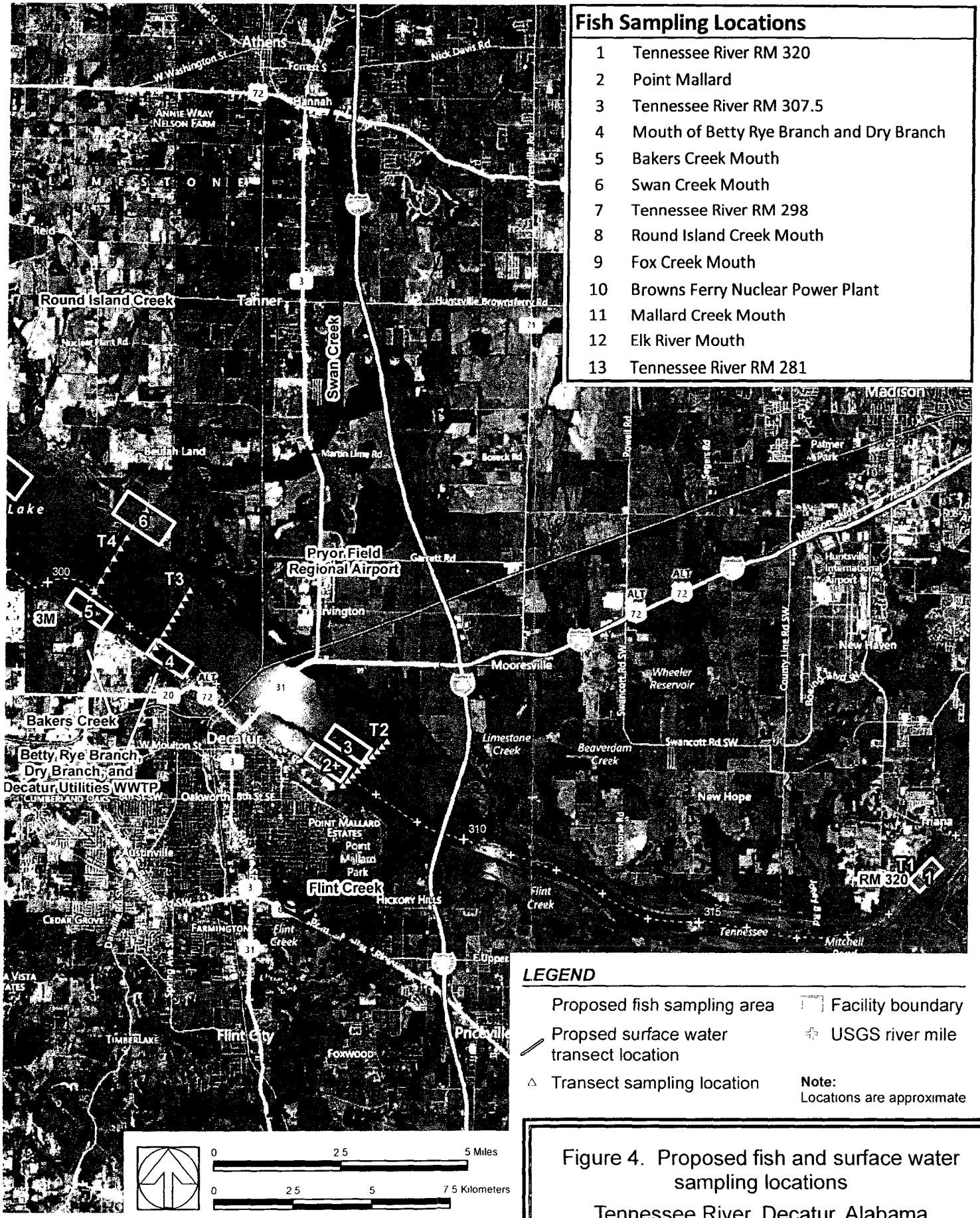
Old Highway 31
Gordon Terrell Rd
Five Points
Exponent®



Fish Sampling Locations

1	Tennessee River RM 320
2	Point Mallard
3	Tennessee River RM 307.5
4	Mouth of Betty Rye Branch and Dry Branch
5	Bakers Creek Mouth
6	Swan Creek Mouth
7	Tennessee River RM 298
8	Round Island Creek Mouth
9	Fox Creek Mouth
10	Browns Ferry Nuclear Power Plant
11	Mallard Creek Mouth
12	Elk River Mouth
13	Tennessee River RM 281

LEGEND

- Proposed fish sampling area
- Facility boundary
- Propsed surface water transect location
- USGS river mile
- △ Transect sampling location

Note:
Locations are approximate

Figure 4. Proposed fish and surface water sampling locations

Tennessee River, Decatur, Alabama

Appendix A

Historical Data on Surface Water and Sediment in the Tennessee River and its Tributaries

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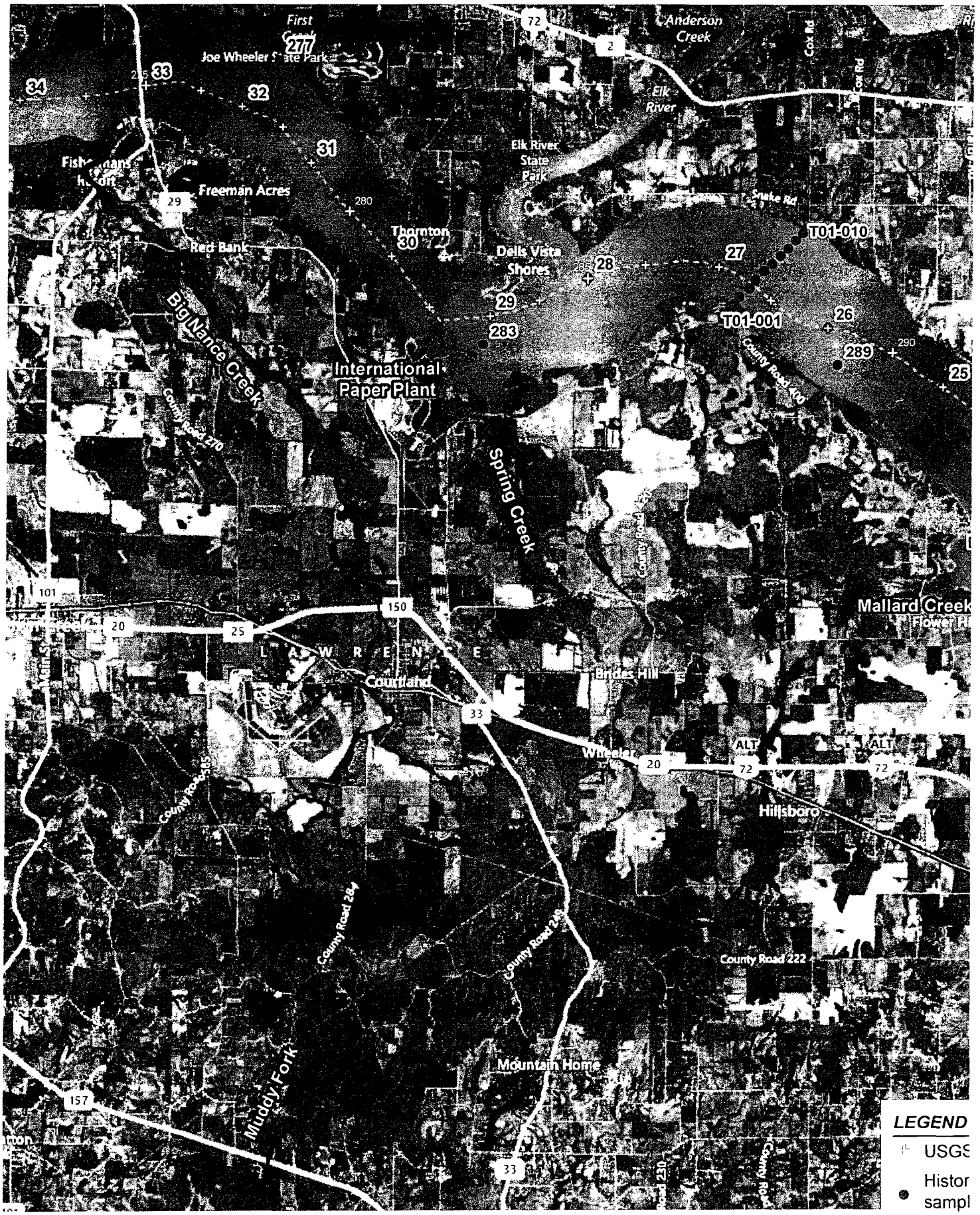
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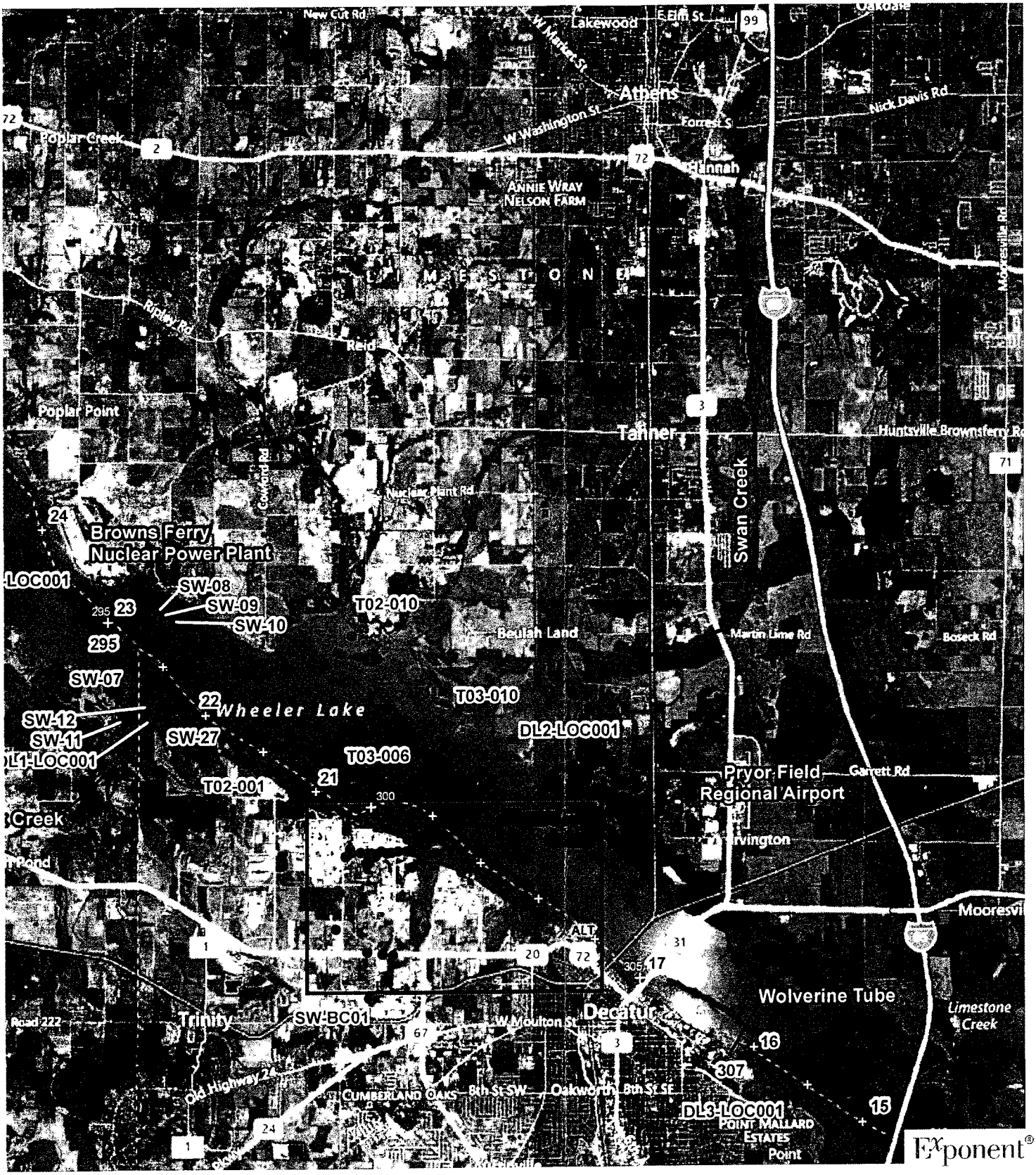
Anderson Creek
Elk River
Elk River State Park
Freeman Acres
Red Bank
Thornton
Dells Vista Shores
Snake Rd
T01-010
T01-001
Big Nance Creek
County Road 270
International Paper Plant
Spring Creek
County Road 100
Mallard Creek
Courtland
Brides Hill
Wheeler
Hillsboro
County Road 565
County Road 284
County Road 222
Mountain Home
Muddy Fork
LEGEND
USGS
Histor
sampl

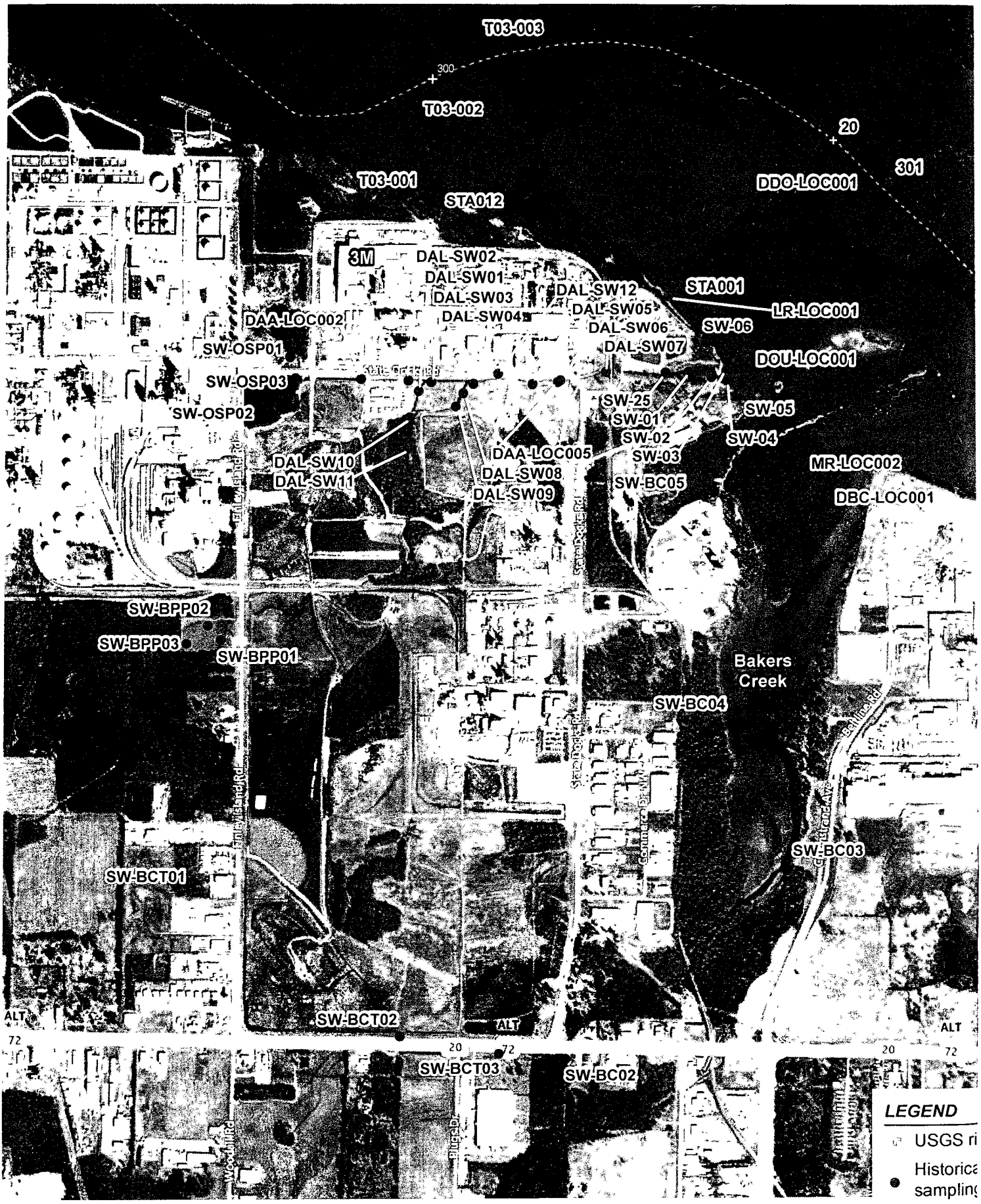


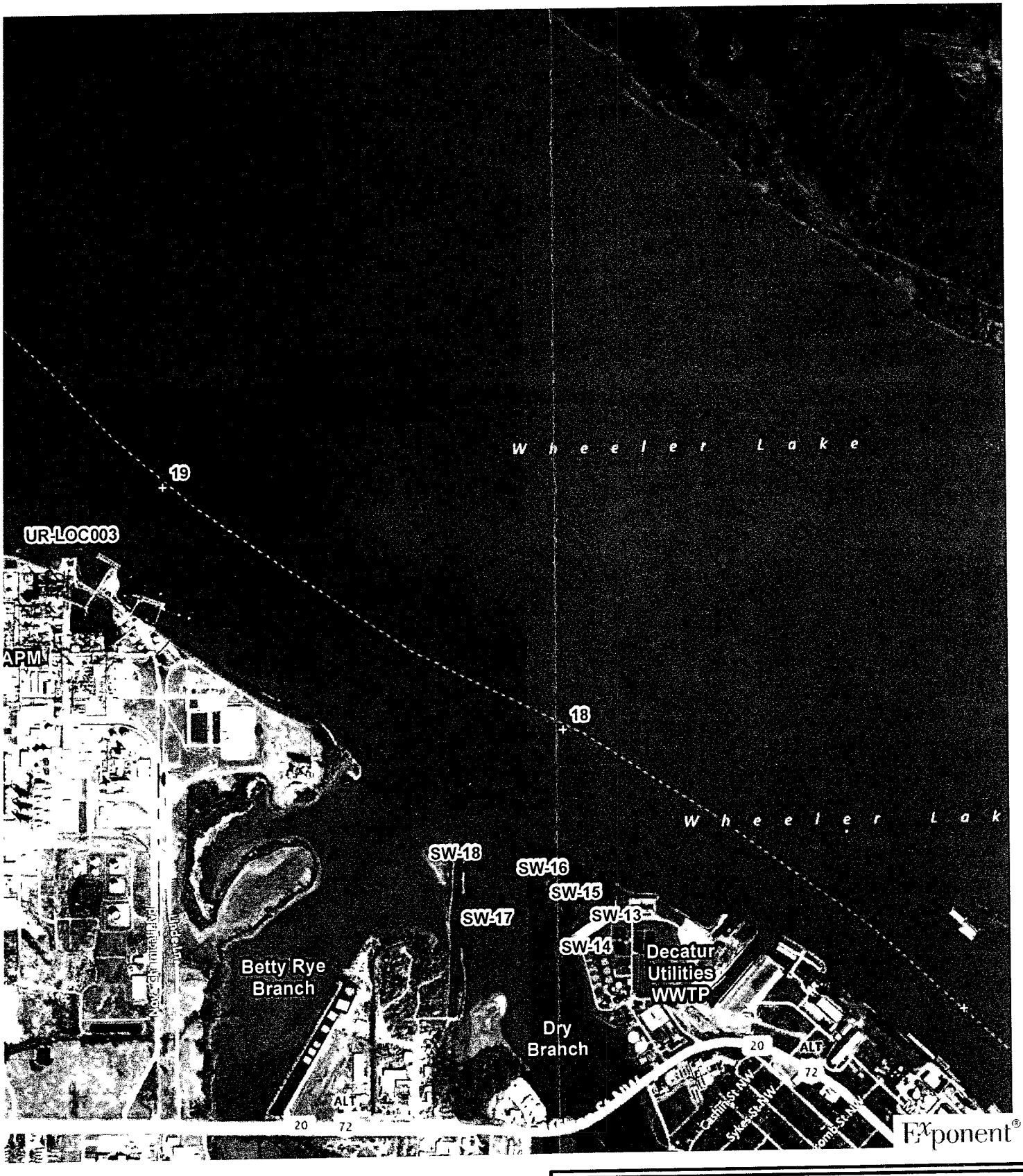
r mile

surface water
ocation

Figure A-1. Historical surface water sampling locations

Tennessee River, Decatur, Alabama


T03-003
300
T03-002
20
301
T03-001
DDO-LOC001
STA012
3M
DAL-SW02
DAL-SW01
DAL-SW03
DAL-SW12
STA001
DAL-SW05
LR-LOC001
DAA-LOC002
DAL-SW04
DAL-SW06
SW-06
SW-OSP01
DAL-SW07
DOU-LOC001
SW-OSP03
SW-25
SW-OSP02
SW-01
SW-05
SW-02
SW-04
DAA-LOC005
SW-03
DAL-SW10
DAL-SW11
DAL-SW08
MR-LOC002
SW-BC05
DAL-SW09
DBC-LOC001
SW-BPP02
SW-BPP03
SW-BPP01
Bakers
Creek
SW-BC04
SW-BC03
SW-BCT01
ALT
SW-BCT02
ALT
ALT
72
20
72
SW-BCT03
SW-BC02
20
72
LEGEND
USGS ri
Historica
samplin



er mile

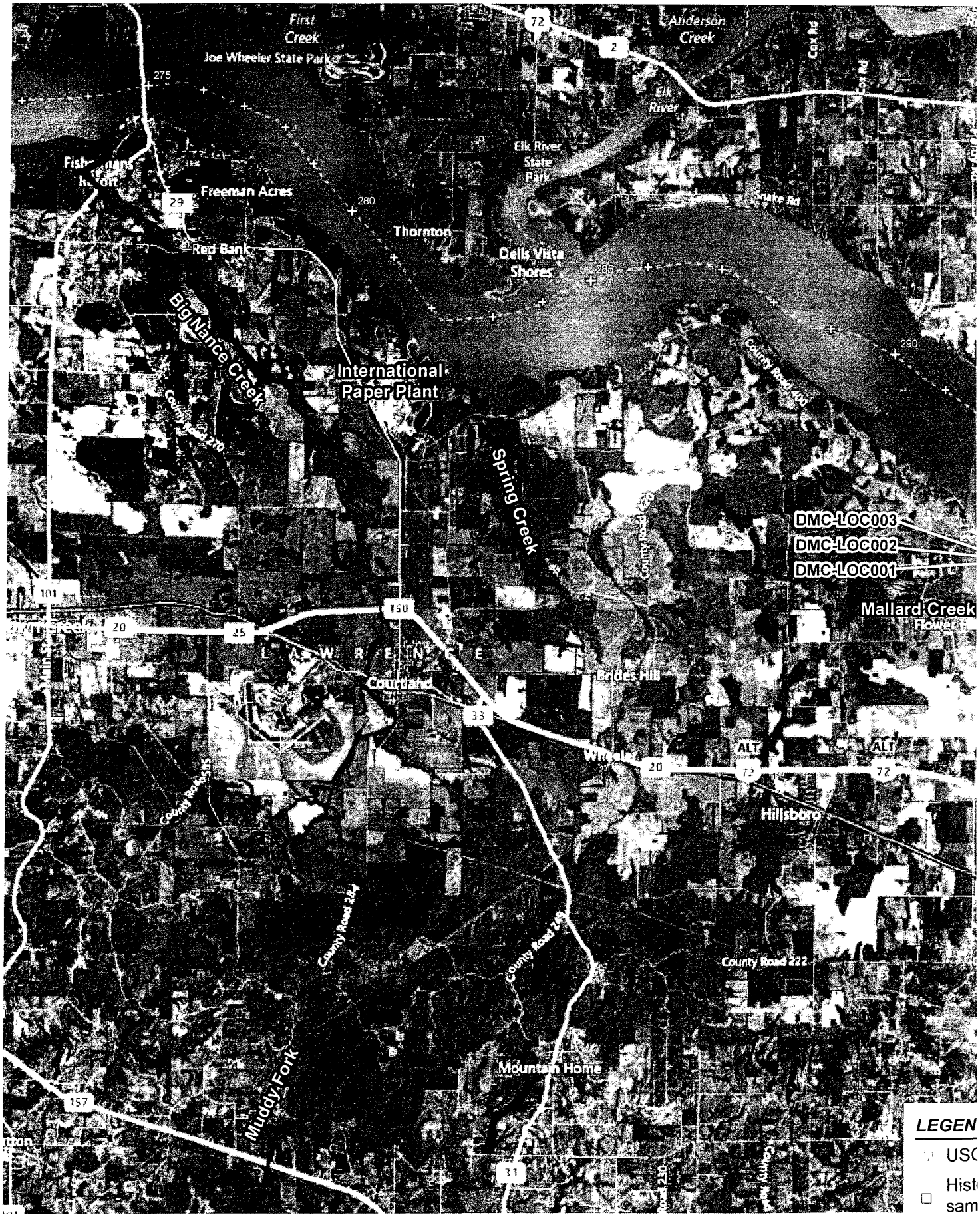
surface water location

0 1,500 3,000 Feet

0 300 600 900 Meters

Figure A-2. Historical surface water sampling locations (3M detail)

Tennessee River, Decatur, Alabama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Joe Wheeler State Park
Anderson Creek
Elk River
Elk River State Park
Freeman Acres
Thornton
Red Bank
Dells Vista Shores
Big Nance Creek
International Paper Plant
Spring Creek
DMC-LOC003
DMC-LOC002
DMC-LOC001
Mallard Creek
Courtland
Bridges Hill
Hillsboro
Mountain Home
Muddy Fork
County Road 222
LEGEN
USC
Hist
sam

er mile

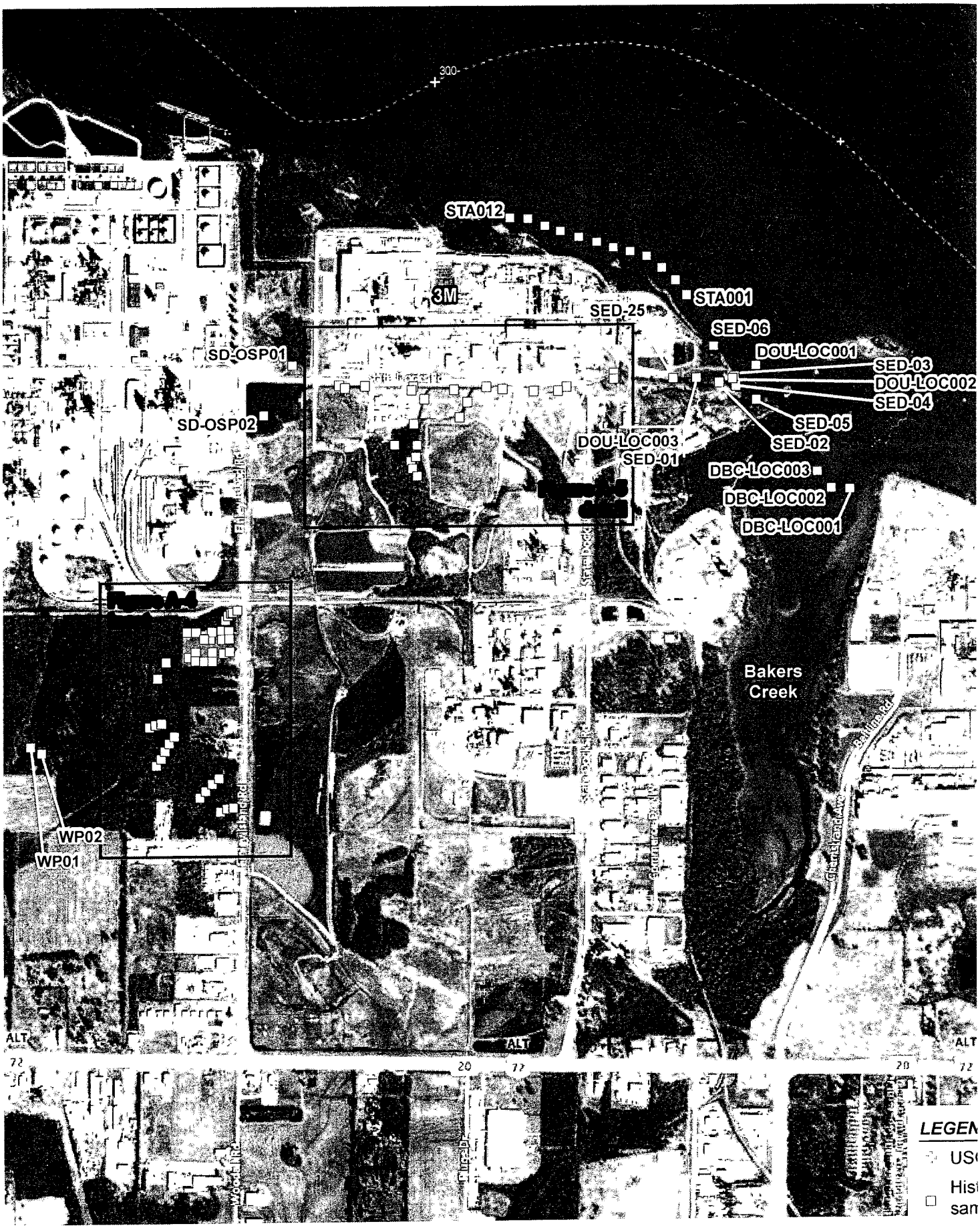
sediment
location

0 2 4 Miles

0 2 4 6 Kilometers

Figure A-3. Historical sediment sampling locations

Tennessee River, Decatur, Alabama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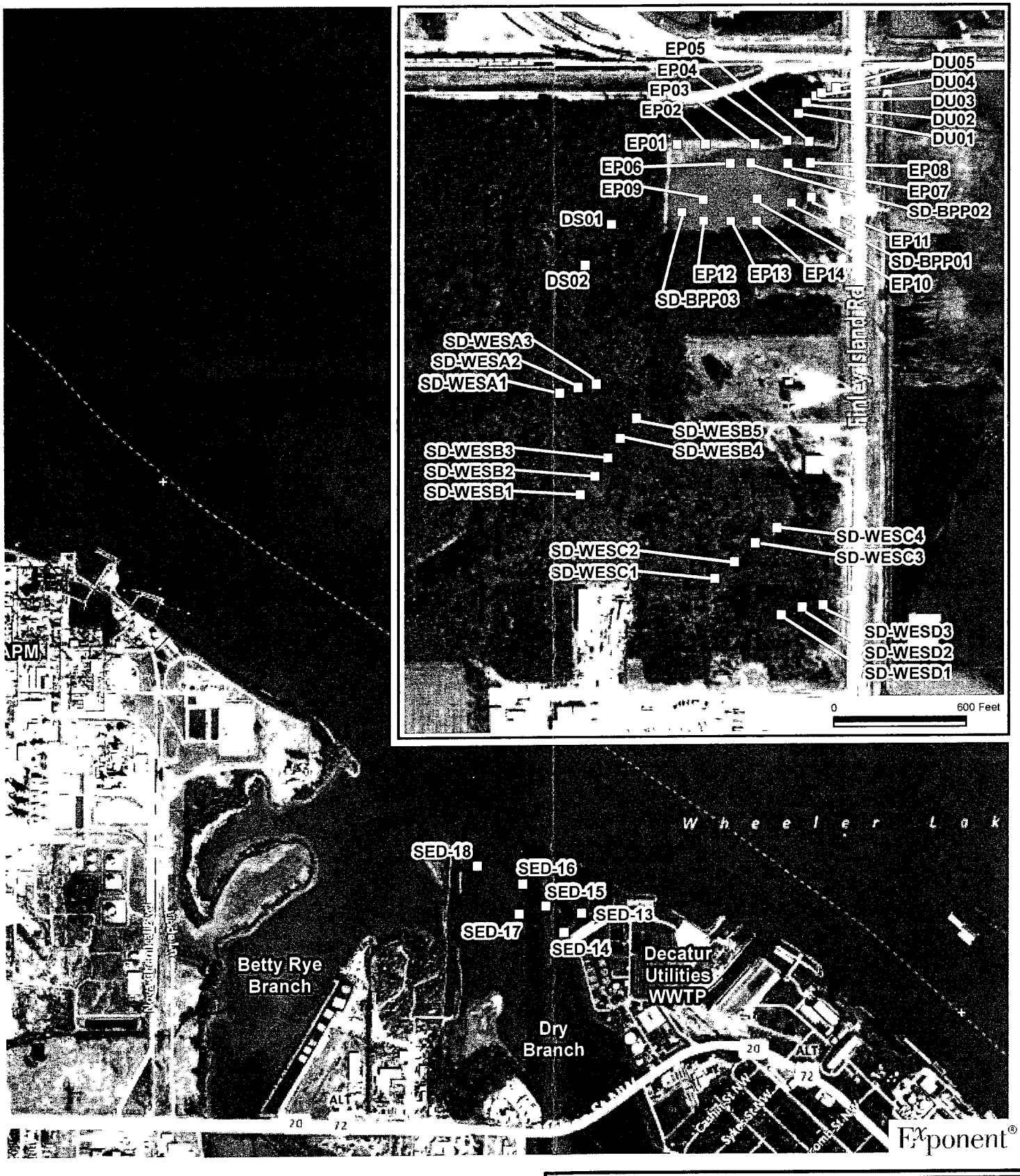
STA001
3M
SED-25
SED-06
DOU-LOC001
SED-03
DOU-LOC002
SED-04
SED-05
SED-02
SD-OSP01
SD-OSP02
DOU-LOC003
SED-01
DBC-LOC003
DBC-LOC002
DBC-LOC001
Bakers
Creek
WP02
WP01
ALT
ALT
ALT



ver mile

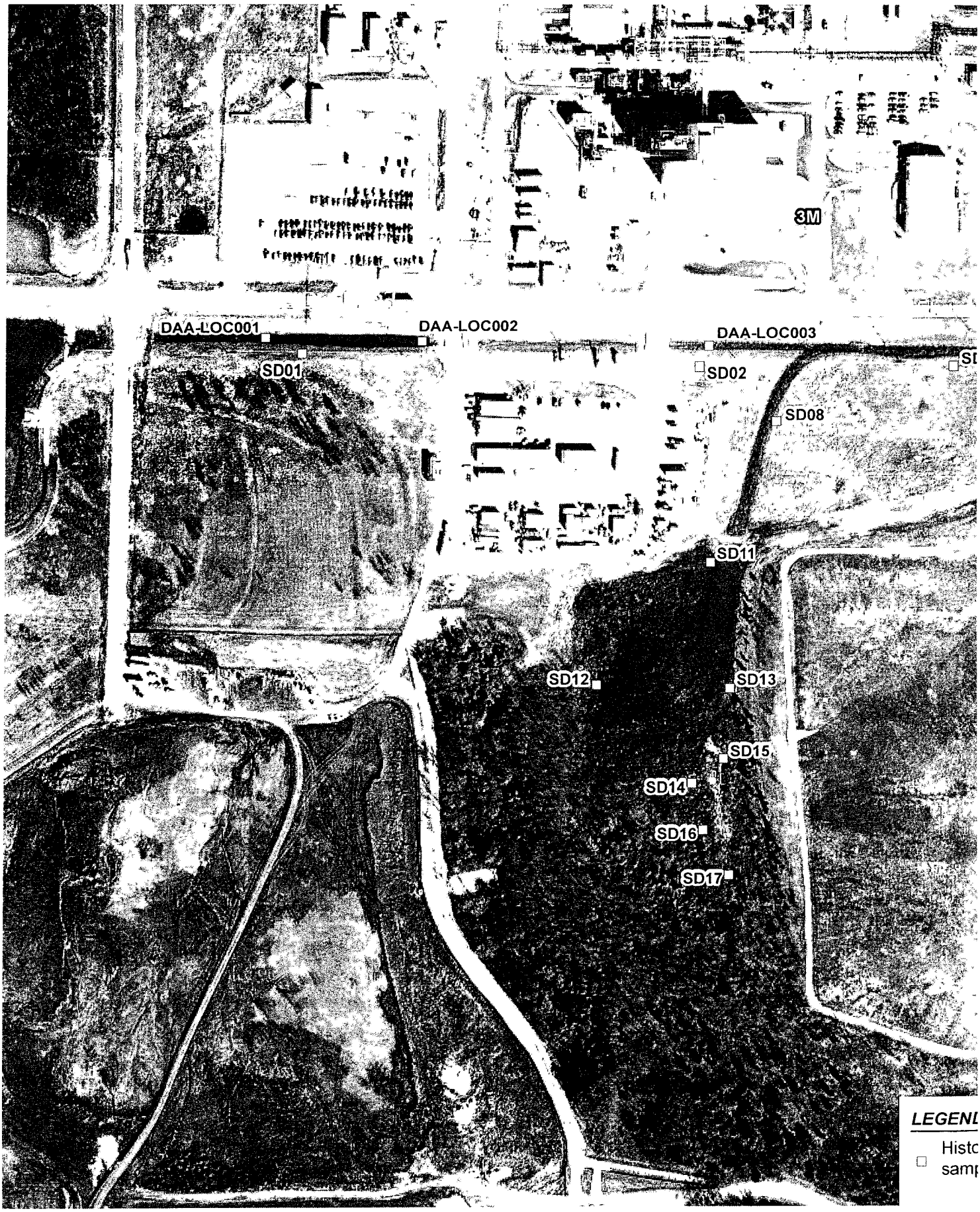
ıl sediment
ʒ location

0 1,500 3,000 Feet

0 300 600 900 Meters

Figure A-4. Historical sediment sampling locations (detail)

Tennessee River, Decatur, Alabama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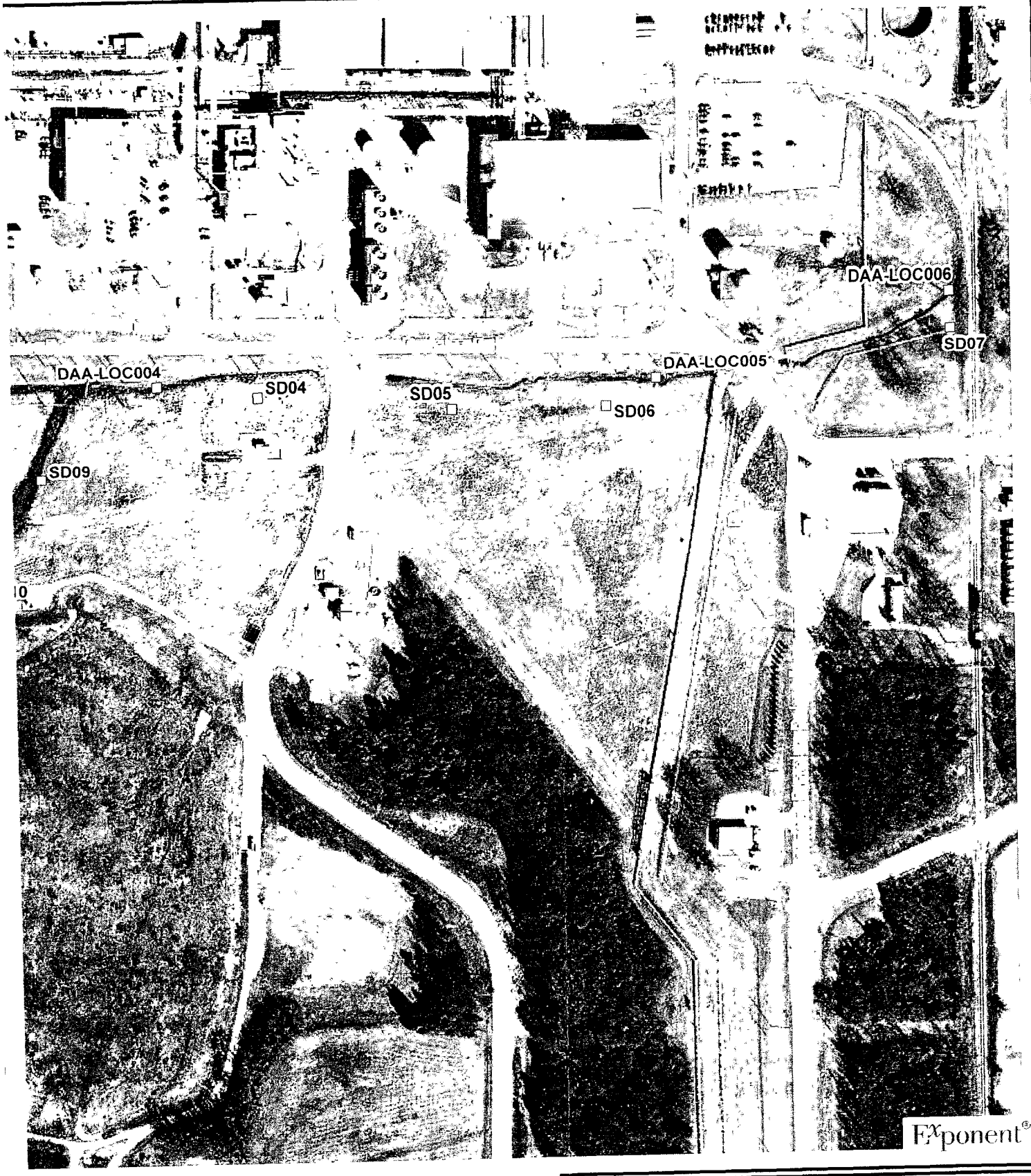
DAA-LOC001
DAA-LOC002
DAA-LOC003
SD01
SD02
SD08
SD11
SD12
SD13
SD15
SD14
SD16
SD17
LEGEND
Histo
samp



l sediment
location

0 250 500 Feet

0 50 100 150 Meters

Figure A-5. Historical sediment sampling locations (3M detail)

Tennessee River, Decatur, Alabama

Tables

Table A-1. Historical surface water sampling data

Sampled By	Sample Date	Locations Sampled	Analytes
Entrix	June 2000	3M Outfall, Fox Creek, Dry Branch, and Upriver (Guntersville)	PFOS, PFHxS, PFOSA, and PFOA
Hansen et al.	Nov 2000	~Every 2 miles between River Miles 261 to 337	PFOS and PFOA
Weston	Dec 2004	3M Outfall, 3M Upland, Bakers Creek, Fox Creek, Mallard Creek, Swan Creek, and Upriver (Point Mallard)	PFOS, PFHxS, PFBS, and PFOA
Weston	July 2005	Longitudinal and Transect River locations	PFOS, PFHxS, PFBS, and PFOA
Weston	Aug 2005	3M Outfall	PFOS, PFHxS, PFBS, and PFOA
Weston	April 2006	3M Upland and Bakers Creek	PFOS, PFHxS, PFBS, and PFOA
Weston	Dec 2006	3M Outfall, 3M Upland, Bakers Creek, Fox Creek, Mallard Creek, Swan Creek, and Upriver (Point Mallard)	PFOS, PFHxS, PFBS, and PFOA
Weston	June 2010	3M Upland	PFOA
Weston	April 2012	3M Outfall, Bakers Creek and APM	PFOS

Table A-2. Historical sediment sampling data

Sampled By	Sample Date	Locations Sampled	Analytes
Entrix	June 2000	3M Outfall, Fox Creek, Dry Branch, and Upriver (Guntersville)	PFOS, PFHxS, PFOSA, and PFOA
Weston	Dec 2004	3M Outfall, 3M Upland, Bakers Creek, Fox Creek, Mallard Creek, Swan Creek, and Upriver (Point Mallard)	PFOS, PFBS, PFHxS, and PFOA
Weston	Aug 2005	3M Outfall and off-site marsh	PFOS, PFBS, PFHxS, and PFOA
Weston	April 2006	3M Upland and off-site marsh	PFOS, PFBS, PFHxS, and PFOA
Weston	Dec 2006	3M Outfall, 3M Upland, Bakers Creek, Fox Creek, Mallard Creek, Swan Creek, and Upriver (Point Mallard)	PFOS, PFBS, PFHxS, and PFOA
Weston	Aug 2007	Off-site marsh	PFOS, PFBS, PFHxS, and PFOA
Weston	June 2010	3M Upland and off-site marsh	PFOA

Note: PFBS - perfluorobutane sulfonate
PFHxS - perfluorohexane sulfonate
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
PFOSA - perfluorooctane sulfonamide

Table A-3. Historical surface water sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Descriptic
6/2000	Fox Creek	SW-08	SW-08	Fox Creek
6/2000	Fox Creek	SW-08 (Lab Dup)	SW-08	Fox Creek
6/2000	Fox Creek	SW-09	SW-09	Fox Creek
6/2000	Fox Creek	SW-09 (Lab Dup)	SW-09	Fox Creek
6/2000	Fox Creek	SW-10	SW-10	Fox Creek
6/2000	Fox Creek	SW-10 (Lab Dup)	SW-10	Fox Creek
6/2000	Fox Creek	SW-07	SW-07	Fox Creek
6/2000	Fox Creek	SW-07 (Lab Dup)	SW-07	Fox Creek
6/2000	Fox Creek	SW-11	SW-11	Fox Creek
6/2000	Fox Creek	SW-11 (Lab Dup)	SW-11	Fox Creek
6/2000	Fox Creek	SW-12	SW-12	Fox Creek
6/2000	Fox Creek	SW-12 (Lab Dup)	SW-12	Fox Creek
6/2000	Fox Creek	SW-12 (Dup)	SW-12	Fox Creek
6/2000	Fox Creek	SW-27	SW-27	Fox Creek
6/2000	Fox Creek	SW-27 (Lab Dup)	SW-27	Fox Creek
6/2000	3M Outfall	SW-01	SW-01	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-01 (Lab Dup)	SW-01	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-02	SW-02	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-02 (Lab Dup)	SW-02	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-03	SW-03	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-03 (Lab Dup)	SW-03	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-04	SW-04	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-04 (Lab Dup)	SW-04	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-05	SW-05	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-05 (Lab Dup)	SW-05	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-06	SW-06	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-06 (Lab Dup)	SW-06	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-06 (Dup)	SW-06	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-25	SW-25	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-25 (Lab Dup)	SW-25	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-26 *	SW-26	3M Outfall Area/Bakers Creek
6/2000	3M Outfall	SW-26 (Lab Dup) *	SW-26	3M Outfall Area/Bakers Creek
6/2000	Dry Branch	SW-13	SW-13	Dry Branch
6/2000	Dry Branch	SW-13 (Lab Dup)	SW-13	Dry Branch
6/2000	Dry Branch	SW-14	SW-14	Dry Branch
6/2000	Dry Branch	SW-14 (Lab Dup)	SW-14	Dry Branch
6/2000	Dry Branch	SW-15	SW-15	Dry Branch
6/2000	Dry Branch	SW-15 (Lab Dup)	SW-15	Dry Branch
6/2000	Dry Branch	SW-16	SW-16	Dry Branch
6/2000	Dry Branch	SW-16 (Lab Dup)	SW-16	Dry Branch
6/2000	Dry Branch	SW-17	SW-17	Dry Branch
6/2000	Dry Branch	SW-17 (Lab Dup)	SW-17	Dry Branch
6/2000	Dry Branch	SW-18	SW-18	Dry Branch
6/2000	Dry Branch	SW-18 (Lab Dup)	SW-18	Dry Branch
6/2000	Dry Branch	SW-18 (Dup)	SW-18	Dry Branch
6/2000	Upriver	SW-19	SW-19	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-19 (Lab Dup)	SW-19	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-20	SW-20	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-20 (Lab Dup)	SW-20	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-21	SW-21	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-21 (Lab Dup)	SW-21	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-22	SW-22	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-22 (Lab Dup)	SW-22	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-23	SW-23	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-23 (Lab Dup)	SW-23	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-24	SW-24	Upstream (Guntersville) Reference Lo
6/2000	Upriver	SW-24 (Lab Dup)	SW-24	Upstream (Guntersville) Reference Lo
11/2000	River Mile 261	40	40	Every ~2 miles between River Miles 2
11/2000	River Mile 263	39	39	Every ~2 miles between River Miles 2
11/2000	River Mile 265	38	38	Every ~2 miles between River Miles 2
11/2000	River Mile 267	37	37	Every ~2 miles between River Miles 2

	Total Depth of River (ft)	Approximate River Mile	Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	PFOS (ng/L)	PFBS (ng/L)	PFHxS (ng/L)	PFOSA (ng/L)	PFOA (ng/L)
	-	294	34.693141	-87.100922	319	-	324	99.4	1,630
	-	294	34.693141	-87.100922	315	-	305	96.3	1,430
	-	294	34.692158	-87.099351	97.6	-	86 3	36.1	582
	-	294	34.692158	-87.099351	98.8	-	83.3	35.4	559
	-	294	34.691328	-87.097158	116	-	110	34.4	925
	-	294	34.691328	-87.097158	109	-	96.9	31.2	882
	-	296	34.677515	-87.109003	509	-	520	149	2,220
	-	296	34.677515	-87.109003	464	-	474	143	2,050
	-	296	34.670708	-87.109214	585	-	446	151	2,050
	-	296	34.670708	-87.109214	497	-	410	141	1,920
	-	296	34.673326	-87.102310	565	-	637	184	2,646
	-	296	34.673326	-87.102310	574	-	654	188	3,030
	-	296	34.673326	-87.102310	588	-	635	190	2,990
	-	296	34.670502	-87 095566	592	-	658	181	3,410
	-	296	34.670502	-87.095566	579	-	658	188	3,510
	-	301	34.641501	-87.034180	131,000	-	35,300	7,930	1,700,000
	-	301	34.641501	-87.034180	154,000	-	38,800	8,830	1,800,000
	-	301	34.641338	-87.033256	66,700	-	17,000	4,400	748,000
	-	301	34.641338	-87.033256	67,700	-	17,700	4,840	753,000
	-	301	34.641537	-87.032682	11,900	-	3,070	1,120	117,000
	-	301	34.641537	-87.032682	13,300	-	3,460	1,160	126,000
	-	301	34.641229	-87 032618	14,500	-	4,250	1,300	107,000
	-	301	34.641229	-87.032618	10,900	-	3,210	878	102,000
	-	301	34.640797	-87.031824	14,800	-	4,130	1,430	162,000
	-	301	34.640797	-87.031824	18,200	-	5,030	1,610	187,000
	-	301	34.642548	-87.033479	11,900	-	3,920	1,020	104,000
	-	301	34.642548	-87.033479	11,900	-	3,800	988	104,000
	-	301	34.642548	-87.033479	15,200	-	4,470	1,140	143,000
	-	301	34 641483	-87.035079	156,000	-	43,900	7,880	1,900,000
	-	301	34.641483	-87.035079	145,000	-	41,500	8,090	1,900,000
	-	301	-	-	77,300	-	12,100	6,960	58,200
	-	301	-	-	78,300	-	11,500	6,700	57,200
	-	303	34.625510	-87 000107	60.2	-	<25	<25	30.7
	-	303	34.625510	-87 000107	65 2	-	<25	<25	32
	-	303	34.624926	-87.000764	67	-	26.4	<25	30.1
	-	303	34.624926	-87.000764	64	-	<25	<25	32.1
	-	303	34.625743	-87.001474	49.7	-	<25	<25	25.6
	-	303	34.625743	-87.001474	59.7	-	<25	<25	30.3
	-	303	34.626434	-87.002350	53.5	-	<25	<25	28.6
	-	303	34.626434	-87 002350	52.9	-	<25	<25	29.2
	-	303	34.625503	-87.002491	41.2	-	<25	<25	<25
	-	303	34.625503	-87.002491	68.4	-	<25	<25	42
	-	303	34.626995	-87.004070	32.9	-	<25	<25	<25
	-	303	34.626995	-87 004070	33.2	-	<25	<25	<25
	-	303	34.626995	-87 004070	40.6	-	<25	<25	<25
	-	-	34.505801	-86.170262	<25	-	<25	<25	<25
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	-	-	34.506788	-86.180104	<25	-	<25	<25	<25
	-	-	34.506788	-86.180104	<25	-	<25	<25	<25
	-	-	34.506467	-86.181005	<25	-	<25	<25	<25
	-	-	34.506467	-86.181005	<25	-	<25	<25	<25
	-	-	34.505623	-86.181942	<25	-	<25	<25	<25
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	-	-	34.504629	-86.182468	<25	-	<25	<25	<25
	-	-	34.504629	-86.182468	<25	-	<25	<25	<25
	-	-	34.504209	-86.181768	<25	-	<25	<25	<25
	-	-	34.504209	-86.181768	<25	-	<25	<25	<25
37	75	261	34.807952	-87.593086	119	-	-	-	521
37	70	263	34.824627	-87.572022	127	-	-	-	580
37	55	265	34.830341	-87 542261	133	-	-	-	598
37	48	267	34.828416	-87.512832	119	-	-	-	531

Table A-3. Historical surface water sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Descriptic
11/2000	River Mile 269	36	36	Every ~2 miles between River Miles 261
11/2000	River Mile 271	35	35	Every ~2 miles between River Miles 261
11/2000	River Mile 273	34	34	Every ~2 miles between River Miles 261
11/2000	River Mile 275	33	33	Every ~2 miles between River Miles 261
11/2000	River Mile 277	32	32	Every ~2 miles between River Miles 261
11/2000	River Mile 279	31	31	Every ~2 miles between River Miles 261
11/2000	River Mile 281	30	30	Every ~2 miles between River Miles 261
11/2000	River Mile 283	29	29	Every ~2 miles between River Miles 261
11/2000	River Mile 285	28	28	Every ~2 miles between River Miles 261
11/2000	River Mile 287	27	27	Every ~2 miles between River Miles 261
11/2000	River Mile 289	26	26	Every ~2 miles between River Miles 261
11/2000	River Mile 291	25	25	Every ~2 miles between River Miles 261
11/2000	River Mile 293	24	24	Every ~2 miles between River Miles 261
11/2000	River Mile 295	23	23	Every ~2 miles between River Miles 261
11/2000	River Mile 297	22	22	Every ~2 miles between River Miles 261
11/2000	River Mile 299	21	21	Every ~2 miles between River Miles 261
11/2000	River Mile 301	20	20	Every ~2 miles between River Miles 261
11/2000	River Mile 302	19	19	Every ~2 miles between River Miles 261
11/2000	River Mile 303	18	18	Every ~2 miles between River Miles 261
11/2000	River Mile 305	17	17	Every ~2 miles between River Miles 261
11/2000	River Mile 307	16	16	Every ~2 miles between River Miles 261
11/2000	River Mile 309	15	15	Every ~2 miles between River Miles 261
11/2000	River Mile 311	14	14	Every ~2 miles between River Miles 261
11/2000	River Mile 313	13	13	Every ~2 miles between River Miles 261
11/2000	River Mile 315	12	12	Every ~2 miles between River Miles 261
11/2000	River Mile 317	11	11	Every ~2 miles between River Miles 261
11/2000	River Mile 319	10	10	Every ~2 miles between River Miles 261
11/2000	River Mile 321	9	9	Every ~2 miles between River Miles 261
11/2000	River Mile 323	8	8	Every ~2 miles between River Miles 261
11/2000	River Mile 325	7	7	Every ~2 miles between River Miles 261
11/2000	River Mile 327	6	6	Every ~2 miles between River Miles 261
11/2000	River Mile 329	5	5	Every ~2 miles between River Miles 261
11/2000	River Mile 331	4	4	Every ~2 miles between River Miles 261
11/2000	River Mile 333	3	3	Every ~2 miles between River Miles 261
11/2000	River Mile 335	2	2	Every ~2 miles between River Miles 261
11/2000	River Mile 337	1	1	Every ~2 miles between River Miles 261
12/2004	Mallard Creek	DMC-SW-LOC001-0-041202	DMC-LOC001	Mallard Creek Mouth
12/2004	Mallard Creek	DMC-SW-LOC001-0-041202 (Dup)	DMC-LOC001	Mallard Creek Mouth
12/2004	Mallard Creek	DMC-SW-LOC001-0-041202 (Lab Dup)	DMC-LOC001	Mallard Creek Mouth
12/2004	Fox Creek	DL1-SW-LOC001-0-041202	DL1-LOC001	Fox Creek Mouth
12/2004	Fox Creek	DL1-SW-LOC001-0-041202 (Dup)	DL1-LOC001	Fox Creek Mouth
12/2004	Fox Creek	DL1-SW-LOC001-0-041202 (Lab Dup)	DL1-LOC001	Fox Creek Mouth
12/2004	3M Outfall	DOU-SW-LOC001-0-041202	DOU-LOC001	3M and Dyneon Facility (Outfall Samplin
12/2004	3M Outfall	DOU-SW-LOC001-0-041202 (Dup)	DOU-LOC001	3M and Dyneon Facility (Outfall Samplin
12/2004	3M Outfall	DOU-SW-LOC001-0-041202 (Lab Dup)	DOU-LOC001	3M and Dyneon Facility (Outfall Samplin
12/2004	Bakers Creek	DBC-SW-LOC001-0-041202	DBC-LOC001	Bakers Creek Mouth
12/2004	Bakers Creek	DBC-SW-LOC001-0-041202 (Dup)	DBC-LOC001	Bakers Creek Mouth
12/2004	Bakers Creek	DBC-SW-LOC001-0-041202 (Lab Dup)	DBC-LOC001	Bakers Creek Mouth
12/2004	Outfall, main channel	DDO-SW-LOC001-0-041202	DDO-LOC001	River Channel Downstream of the Daikin
12/2004	Outfall, main channel	DDO-SW-LOC001-0-041202 (Dup)	DDO-LOC001	River Channel Downstream of the Daikin
12/2004	Outfall, main channel	DDO-SW-LOC001-0-041202 (Lab Dup)	DDO-LOC001	River Channel Downstream of the Daikin
12/2004	Swan Creek	DL2-SW-LOC001-0-041201	DL2-LOC001	Cross River (Swan Creek Mouth)
12/2004	Swan Creek	DL2-SW-LOC001-0-041201 (Dup)	DL2-LOC001	Cross River (Swan Creek Mouth)
12/2004	Swan Creek	DL2-SW-LOC001-0-041201 (Lab Dup)	DL2-LOC001	Cross River (Swan Creek Mouth)
12/2004	Wolverine Tube	DL3-SW-LOC001-0-041201	DL3-LOC001	Upriver (Point Mallard Park)
12/2004	Wolverine Tube	DL3-SW-LOC001-0-041201 (Dup)	DL3-LOC001	Upriver (Point Mallard Park)
12/2004	Wolverine Tube	DL3-SW-LOC001-0-041201 (Lab Dup)	DL3-LOC001	Upriver (Point Mallard Park)
12/2004	3M Upland	DAA-SW-LOC002-0-041202	DAA-LOC002	Avenue A
12/2004	3M Upland	DAA-SW-LOC002-0-041202 (Dup)	DAA-LOC002	Avenue A

	Total Depth of River (ft)	Approximate River Mile	Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	PFOS (ng/L)	PFBS (ng/L)	PFHxS (ng/L)	PFOSA (ng/L)	PFOA (ng/L)
337	38	269	34.813437	-87.482946	105	-	-	-	348
337	24	271	34.808458	-87.450381	110	-	-	-	385
337	19	273	34.800427	-87.415317	92.3	-	-	-	295
337	50	275	34.804120	-87.380059	144	-	-	-	383
337	26	277	34.799378	-87.353407	112	-	-	-	275
337	46	279	34.786485	-87.334034	106	-	-	-	404
337	32	281	34.764978	-87 311526	134	-	-	-	507
337	29	283	34.751917	-87.283932	106	-	-	-	355
337	28	285	34.760122	-87.256969	140	-	-	-	375
337	18	287	34.762672	-87.220824	136	-	-	-	513
337	21	289	34.749264	-87 190543	107	-	-	-	323
337	20	291	34.735624	-87.158534	98	-	-	-	266
337	26	293	34.711377	-87.130680	96.4	-	-	-	203
337	23	295	34.691352	-87.113386	74.8	-	-	-	140
337	25	297	34.671192	-87.087868	30.3	-	-	-	<25
337	23	299	34.654621	-87.058919	37.3	-	-	-	<25
337	24	301	34.649020	-87 028495	54.1	-	-	-	<25
337	26	302	34.638944	-87.015882	39.4	-	-	-	<25
337	33	303	34.631215	-87.000847	39.4	-	-	-	<25
337	22	305	34 613918	-86.974041	37 1	-	-	-	<25
337	24	307	34.599019	-86.944129	52.6	-	-	-	<25
337	19	309	34.582969	-86.915821	51.9	-	-	-	<25
337	20	311	34.573665	-86.883292	31.6	-	-	-	<25
337	21	313	34.562807	-86.851258	18.4	-	-	-	<25
337	22	315	34.554802	-86.817841	21.4	-	-	-	<25
337	26	317	34.550376	-86.783863	21.8	-	-	-	<25
337	37	319	34.557086	-86.751931	22.3	-	-	-	<25
337	20	321	34.579025	-86.728898	26.9	-	-	-	<25
337	40	323	34.588067	-86.698441	31	-	-	-	<25
337	39	325	34.570316	-86 674646	27.4	-	-	-	<25
337	38	327	34.550335	-86 659008	16.8	-	-	-	<25
337	28	329	34.561518	-86.632311	36.9	-	-	-	<25
337	20	331	34.579507	-86.605708	25.8	-	-	-	<25
337	20	333	34.578270	-86.572396	28.8	-	-	-	<25
337	36	335	34.556474	-86.552599	28.9	-	-	-	<25
337	14	337	34.529491	-86 545318	27.8	-	-	-	<25
	-	293.5	34.696604	-87 145800	284	107	53.6	-	214
	-	293 5	34 696604	-87.145800	283	104	54.0	-	221
	-	293 5	34.696604	-87.145800	257	97.6	49.5	-	200
	-	296.3	34.670404	-87.101982	179	76.8	45.7	-	180
	-	296.3	34.670404	-87.101982	213	77.4	49.2	-	200
	-	296.3	34 670404	-87.101982	185	77.4	48.3	-	190
a)	-	301	34.641891	-87.031831	5,710	14,000	1,620	-	3,880
a)	-	301	34.641891	-87.031831	5,640	12,800	1,600	-	3,860
a)	-	301	34.641891	-87.031831	5,820	14,700	1,650	-	3,870
	-	301	34.637921	-87.028135	3,460	93.8	231	-	1,700
	-	301	34.637921	-87.028135	3,920	97.5	252	-	1,810
	-	301	34.637921	-87.028135	2,880	96.2	233	-	1,610
TP Outfall	-	301	34.647094	-87.031182	<25	<25	<25	-	358
TP Outfall	-	301	34 647094	-87.031182	<25	<25	<25	-	394
TP Outfall	-	301	34.647094	-87.031182	<25	<25	<25	-	353
	-	301	34.665652	-87 007560	<25	<25	<25	-	<25
	-	301	34.665652	-87.007560	<25	<25	<25	-	<25
	-	301	34.665652	-87.007560	<25	<25	<25	-	<25
	-	307	34.589398	-86.938715	<25	<25	<25	-	<25
	-	307	34.589398	-86.938715	<25	<25	<25	-	<25
	-	307	34.589398	-86.938715	<25	<25	<25	-	<25
	-	-	34.641316	-87.047175	2,780	379	375	-	1,580
	-	-	34.641316	-87.047175	3,760	432	445	-	1,980

Table A-3. Historical surface water sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Descriptic
12/2004	3M Upland	DAA-SW-LOC002-0-041202 (Lab Dup)	DAA-LOC002	Avenue A
12/2004	3M Upland	DAA-SW-LOC005-0-041202	DAA-LOC005	Avenue A
12/2004	3M Upland	DAA-SW-LOC005-0-041202 (Dup)	DAA-LOC005	Avenue A
12/2004	3M Upland	DAA-SW-LOC005-0-041202 (Lab Dup)	DAA-LOC005	Avenue A
7/2005	River Mile 254	DLS-SW-TRM254-0-050720	TRM254	Tennessee River / Longitudinal Series
7/2005	River Mile 254	DLS-SW-TRM254-0-050720 (Dup)	TRM254	Tennessee River / Longitudinal Series
7/2005	River Mile 254	DLS-SW-TRM254-2-050720	TRM254	Tennessee River / Longitudinal Series
7/2005	River Mile 254	DLS-SW-TRM254-2-050720 (Dup)	TRM254	Tennessee River / Longitudinal Series
7/2005	River Mile 254	DLS-SW-TRM254-F-050720	TRM254	Tennessee River / Longitudinal Series
7/2005	River Mile 254	DLS-SW-TRM254-F-050720 (Dup)	TRM254	Tennessee River / Longitudinal Series
7/2005	River Mile 256	DLS-SW-TRM256-0-050720	TRM256	Tennessee River / Longitudinal Series
7/2005	River Mile 256	DLS-SW-TRM256-0-050720 (Dup)	TRM256	Tennessee River / Longitudinal Series
7/2005	River Mile 261	DLS-SW-TRM261-0-050720	TRM261	Tennessee River / Longitudinal Series
7/2005	River Mile 261	DLS-SW-TRM261-0-050720 (Dup)	TRM261	Tennessee River / Longitudinal Series
7/2005	River Mile 261	DLS-SW-TRM261-2-050720	TRM261	Tennessee River / Longitudinal Series
7/2005	River Mile 261	DLS-SW-TRM261-2-050720 (Dup)	TRM261	Tennessee River / Longitudinal Series
7/2005	River Mile 261	DLS-SW-TRM261-F-050720	TRM261	Tennessee River / Longitudinal Series
7/2005	River Mile 261	DLS-SW-TRM261-F-050720 (Dup)	TRM261	Tennessee River / Longitudinal Series
7/2005	River Mile 265	DLS-SW-TRM265-0-050719	TRM265	Tennessee River / Longitudinal Series
7/2005	River Mile 265	DLS-SW-TRM265-0-050719 (Dup)	TRM265	Tennessee River / Longitudinal Series
7/2005	River Mile 271	DLS-SW-TRM271-0-050719	TRM271	Tennessee River / Longitudinal Series
7/2005	River Mile 271	DLS-SW-TRM271-0-050719 (Dup)	TRM271	Tennessee River / Longitudinal Series
7/2005	River Mile 277	DLS-SW-TRM277-0-050719	TRM277	Tennessee River / Longitudinal Series
7/2005	River Mile 277	DLS-SW-TRM277-0-050719 (Dup)	TRM277	Tennessee River / Longitudinal Series
7/2005	River Mile 277	DLS-SW-TRM277-F-050719	TRM277	Tennessee River / Longitudinal Series
7/2005	River Mile 277	DLS-SW-TRM277-F-050719 (Dup)	TRM277	Tennessee River / Longitudinal Series
7/2005	International Paper Plant	DLS-SW-TRM283-0-050719	TRM283	Tennessee River / Longitudinal Series
7/2005	International Paper Plant	DLS-SW-TRM283-0-050719 (Dup)	TRM283	Tennessee River / Longitudinal Series
7/2005	River Mile 287	DXS-SW-T01001-0-050721	T01-001	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01001-0-050721 (Dup)	T01-001	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01002-0-050721	T01-002	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01002-0-050721 (Dup)	T01-002	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01003-0-050721	T01-003	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01003-0-050721 (Dup)	T01-003	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01004-0-050721	T01-004	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01004-0-050721 (Dup)	T01-004	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01005-0-050721	T01-005	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01005-0-050721 (Dup)	T01-005	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01006-0-050721	T01-006	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01006-0-050721 (Dup)	T01-006	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01007-0-050721	T01-007	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01007-0-050721 (Dup)	T01-007	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01008-0-050721	T01-008	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01008-0-050721 (Dup)	T01-008	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01009-0-050721	T01-009	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01009-0-050721 (Dup)	T01-009	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01010-0-050721	T01-010	Tennessee River Transect
7/2005	River Mile 287	DXS-SW-T01010-0-050721 (Dup)	T01-010	Tennessee River Transect
7/2005	River Mile 289	DLS-SW-TRM289-0-050719	TRM289	Tennessee River / Longitudinal Series
7/2005	River Mile 289	DLS-SW-TRM289-0-050719 (Dup)	TRM289	Tennessee River / Longitudinal Series
7/2005	River Mile 289	DLS-SW-TRM289-F-050719	TRM289	Tennessee River / Longitudinal Series
7/2005	River Mile 289	DLS-SW-TRM289-F-050719 (Dup)	TRM289	Tennessee River / Longitudinal Series
7/2005	Browns Ferry Nuclear Power Plant	DLS-SW-TRM295-0-050719	TRM295	Tennessee River / Longitudinal Series
7/2005	Browns Ferry Nuclear Power Plant	DLS-SW-TRM295-0-050719 (Dup)	TRM295	Tennessee River / Longitudinal Series
7/2005	Mallard-Fox Creek Industrial Park	DXS-SW-T02001-0-050721	T02-001	Tennessee River Transect

Total Depth of River (ft)	Approximate River Mile	Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	PFOS (ng/L)	PFBS (ng/L)	PFHxS (ng/L)	PFOSA (ng/L)	PFOA (ng/L)
-	-	34.641316	-87 047175	2,930	456	433	-	1,820
-	-	34.641250	-87.039257	18,800	2,460	7,980	-	12,200
-	-	34.641250	-87.039257	19,600	3,100	7,880	-	12,400
-	-	34 641250	-87.039257	18,000	3,270	7,350	-	11,800
-	254	34.774039	-87 715123	35.2	12 4	5.50	-	27.9
-	254	34.774039	-87.715123	34.1	12.0	4.81	-	30.7
-	254	34.774039	-87 715123	<9.92	<2.21	<1.04	-	<2.46
-	254	34.774039	-87.715123	<9.92	<2.21	<1.04	-	<2.46
-	254	34.774039	-87 715123	30.0 [b]	12.8 [b]	5.33 [b]	-	28.4 [b]
-	254	34 774039	-87.715123	34 2 [b]	12.1 [b]	5.25 [b]	-	29.0 [b]
-	256	34.784056	-87.682308	32.6	11.1	4.85	-	26.4
-	256	34.784056	-87.682308	34.2	12.5	4.70	-	27.3
-	261	34.809969	-87 605633	32.4	11.8	5.2	-	26.5
-	261	34.809969	-87.605633	33.0	11.0	4.81	-	27.4
-	261	34.809969	-87.605633	<4.96	<2.21	<1.04	-	<4.92
-	261	34.809969	-87 605633	<4 96	<2.21	<1.04	-	<4.92
-	261	34.809969	-87.605633	33.3 [b]	11.6 [b]	5.42 [b]	-	27.9 [b]
-	261	34.809969	-87 605633	23.2 [b]	10.7 [b]	4.86 [b]	-	25.9 [b]
-	265	34.823613	-87.540749	37.7	10.3	5.25	-	30.3
-	265	34.823613	-87 540749	37.5	10.4	5.42	-	28.6
-	271	34.805760	-87 441759	32.0	13.3	5.12	-	25.8
-	271	34.805760	-87.441759	33.2	14.2	5.74	-	26.2
-	277	34.809822	-87.343044	33.6	11 5	5.79	-	28.4
-	277	34.809822	-87.343044	53.0	12.3	7.04	-	29.9
-	277	34.809822	-87.343044	30.4 [b]	11.1 [b]	6.09 [b]	-	28.5 [b]
-	277	34.809822	-87.343044	39.0 [b]	12.5 [b]	6.72 [b]	-	27.8 [b]
-	283	34.745148	-87.285934	52.8	20.3	8.88	-	37.9
-	283	34.745148	-87.285934	70 3	18.1	8.83	-	39 8
-	287	34.754639	-87.216483	73.9	21.5	12.1	-	57.9
-	287	34.754639	-87.216483	68	20.1	11.6	-	57.1
-	287	34.756172	-87.215138	60.7	16.1	10.1	-	49.5
-	287	34 756172	-87.215138	59.4	16.4	9.59	-	47.0
-	287	34.757986	-87.212276	54.2	16.5	8 27	-	47.2
-	287	34.757986	-87.212276	55.5	16 6	9.41	-	46.8
-	287	34.759798	-87.210679	56	15.8	9.7	-	49.0
-	287	34.759798	-87 210679	63 6	16.5	10.1	-	49.5
-	287	34.761680	-87.208324	38.3	9.57	6 33	-	32.8
-	287	34.761680	-87.208324	39	9.85	6.67	-	32.3
-	287	34.763215	-87.206051	20.9	4.32	3.46	-	23.3
-	287	34.763215	-87.206051	21 9	3.66	3.33	-	20.6
-	287	34.765097	-87.203864	27.3	5.66	4.19	-	22.2
-	287	34.765097	-87.203864	26.8	5.64	4.29	-	23.5
-	287	34.766770	-87.201760	21.9	3.69	3.16	-	17.5
-	287	34.766770	-87.201760	21 7	5.02	3.28	-	18.9
-	287	34.768652	-87.199657	20.2	4.91	3.01	-	19.8
-	287	34.768652	-87.199657	20.3	4.44	3.30	-	21.2
-	287	34.770325	-87.197722	21.6	3.95	3.32	-	18 2
-	287	34.770325	-87.197722	21.9	3.85	2.77	-	17.0
-	289	34.740425	-87.187830	76 3	22.5	13.3	-	55.7
-	289	34.740425	-87 187830	72.2	21.3	12.3	-	57.4
-	289	34.740425	-87.187830	58.8 [b]	19.7 [b]	12.9 [b]	-	53.5 [b]
-	289	34 740425	-87 187830	46.2 [b]	20.1 [b]	12.0 [b]	-	54 [b]
-	295	34.687382	-87.108527	73.6	14.3	11.5	-	65.4
-	295	34.687382	-87 108527	74.7	15	11.5	-	69.2
-	298	34.659196	-87.074024	129	41.4	20.5	-	133

Table A-3. Historical surface water sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Descriptio
7/2005	Mallard-Fox Creek Industrial Park	DXS-SW-T02001-0-050721 (Dup)	T02-001	Tennessee River Transect
7/2005	Mallard-Fox Creek Industrial Park	DXS-SW-T02002-0-050721	T02-002	Tennessee River Transect
7/2005	Mallard-Fox Creek Industrial Park	DXS-SW-T02002-0-050721 (Dup)	T02-002	Tennessee River Transect
7/2005	Mallard-Fox Creek Industrial Park	DXS-SW-T02003-0-050721	T02-003	Tennessee River Transect
7/2005	Mallard-Fox Creek Industrial Park	DXS-SW-T02003-0-050721 (Dup)	T02-003	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02004-0-050721	T02-004	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02004-0-050721 (Dup)	T02-004	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02005-0-050721	T02-005	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02005-0-050721 (Dup)	T02-005	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02006-0-050721	T02-006	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02006-0-050721 (Dup)	T02-006	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02007-0-050721	T02-007	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02007-0-050721 (Dup)	T02-007	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02008-0-050721	T02-008	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02008-0-050721 (Dup)	T02-008	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02009-0-050721	T02-009	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02009-0-050721 (Dup)	T02-009	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02010-0-050721	T02-010	Tennessee River Transect
7/2005	River Mile 298	DXS-SW-T02010-0-050721 (Dup)	T02-010	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03001-0-050721	T03-001	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03001-0-050721 (Dup)	T03-001	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03002-0-050721	T03-002	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03002-0-050721 (Dup)	T03-002	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03003-0-050721	T03-003	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03003-0-050721 (Dup)	T03-003	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03004-0-050722	T03-004	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03004-0-050722 (Dup)	T03-004	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03005-0-050722	T03-005	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03005-0-050722 (Dup)	T03-005	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03006-0-050722	T03-006	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03006-0-050722 (Dup)	T03-006	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03007-0-050722	T03-007	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03007-0-050722 (Dup)	T03-007	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03008-0-050722	T03-008	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03008-0-050722 (Dup)	T03-008	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03009-0-050722	T03-009	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03009-0-050722 (Dup)	T03-009	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03010-0-050722	T03-010	Tennessee River Transect
7/2005	River Mile 300	DXS-SW-T03010-0-050722 (Dup)	T03-010	Tennessee River Transect
7/2005	River Mile 301	DLS-SW-TRM301-0-050718	TRM301	Tennessee River / Longitudinal Series
7/2005	River Mile 301	DLS-SW-TRM301-0-050718 (Dup)	TRM301	Tennessee River / Longitudinal Series
7/2005	River Mile 301	DLS-SW-TRM301-F-050718	TRM301	Tennessee River / Longitudinal Series
7/2005	River Mile 301	DLS-SW-TRM301-F-050718 (Dup)	TRM301	Tennessee River / Longitudinal Series
7/2005	Wolverine Tube	DLS-SW-TRM307-0-050718	TRM307	Tennessee River / Longitudinal Series
7/2005	Wolverine Tube	DLS-SW-TRM307-0-050718 (Dup)	TRM307	Tennessee River / Longitudinal Series
8/2005	3M	DNS-SW-STA001-0-050823	STA001	Tennessee River
8/2005	3M	DNS-SW-STA001-0-050823 (Lab Dup)	STA001	Tennessee River
8/2005	3M	DNS-SW-STA001-DB-050823 (Dup)	STA001	Tennessee River
8/2005	3M	DNS-SW-STA002-0-050825	STA002	Tennessee River
8/2005	3M	DNS-SW-STA002-0-050825 (Lab Dup)	STA002	Tennessee River
8/2005	3M	DNS-SW-STA002-DB-050825 (Dup)	STA002	Tennessee River
8/2005	3M	DNS-SW-STA003-0-050824	STA003	Tennessee River
8/2005	3M	DNS-SW-STA003-0-050824 (Lab Dup)	STA003	Tennessee River
8/2005	3M	DNS-SW-STA003-DB-050824 (Dup)	STA003	Tennessee River
8/2005	3M	DNS-SW-STA004-0-050824	STA004	Tennessee River

Total Depth of River (ft)	Approximate River Mile	Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	PFOS (ng/L)	PFBS (ng/L)	PFHxS (ng/L)	PFOSA (ng/L)	PFOA (ng/L)
-	298	34.659196	-87 074024	117	42.3	18.7	-	140
-	298	34.662633	-87.071116	70.7	30.6	12 4	-	75.3
-	298	34.662633	-87.071116	76.2	31.6	12.6	-	85 7
-	298	34.666644	-87.067932	<9.92	<2.21	<1.04	-	2.66
-	298	34.666644	-87 067932	<9.92	<2.21	<1.04	-	<2.46
-	298	34.669966	-87.064885	<9.92	<2.21	<1 04	-	3.17
-	298	34.669966	-87.064885	<9.92	<2.21	<1.04	-	3.63
-	298	34.673862	-87.061838	<7 44	<0.883	<2.60	-	4.30
-	298	34.673862	-87.061838	<49.6	<2.21	<2.60	-	<7.48
-	298	34.677185	-87.058652	<7.44	<0.883	<2.60	-	3.77
-	298	34.677185	-87.058652	7.99	1 01	<2 60	-	3.40
-	298	34.681195	-87.056021	<7.44	<0.883	<2.60	-	2.81
-	298	34.681195	-87.056021	<7.44	<0.883	<2.60	-	3.64
-	298	34.684517	-87.053111	<7.44	1.09	<2.60	-	4.93
-	298	34.684517	-87 053111	<7.44	1.15	<2.60	-	5.26
-	298	34.688069	-87.049509	8.72	2.88	<2 60	-	6.97
-	298	34.688069	-87.049509	8.83	2.44	<2.60	-	7 40
-	298	34.691964	-87.046599	42.6	6.28	3.63	-	8.75
-	298	34.691964	-87 046599	28.5	5.53	3.42	-	9.56
-	300	34 647568	-87 044769	782	818	176	-	440
-	300	34.647568	-87.044769	807	854	185	-	429
-	300	34.649852	-87.042200	23.5	5.19	<2.60	-	165
-	300	34.649852	-87 042200	16.9	4.24	<2.60	-	172
-	300	34.652422	-87.039820	11.1	<0.883	<2.60	-	77.2
-	300	34.652422	-87.039820	11.8	<0.883	<2.60	-	116
-	300	34.655182	-87.037345	22.6	4.3	7 56	-	9.23
-	300	34 655182	-87.037345	16.7	1.06	<2.60	-	3.61
-	300	34.657752	-87.034490	<7.44	<0.883	<2.60	-	2.96
-	300	34.657752	-87 034490	77.3	1.71	3.31	-	<7.48
-	300	34.660703	-87 032206	7.63	<0.883	<2.60	-	2.89
-	300	34.660703	-87.032206	<7 44	<0.883	<2.60	-	<2.46
-	300	34.663082	-87 029446	<7.44	<0.883	<2.60	-	3.15
-	300	34 663082	-87.029446	<49.6	1.07	3.66	-	<7.48
-	300	34.666033	-87 027066	<7.44	<0.883	<2.60	-	2.78
-	300	34.666033	-87 027066	<7 44	<0.883	<2.60	-	2.63
-	300	34.668698	-87.024306	8.09	<0.883	<2.60	-	2.47
-	300	34.668698	-87 024306	<7.44	<0.883	<2.60	-	3.06
-	300	34.671363	-87 021831	7.49	0 908	<2.60	-	4.26
-	300	34 671363	-87.021831	<7.44	<0.883	<2.60	-	3.59
-	301	34.647724	-87.026249	<4.96	<2.21	<1.04	-	<4.92
-	301	34.647724	-87 026249	<4 96	<2.21	1 34	-	<4.92
-	301	34.647724	-87 026249	<4 96 [b]	<2.21 [b]	<1.04 [b]	-	<4.92 [b]
-	301	34.647724	-87.026249	<4 96 [b]	<2 21 [b]	<1.04 [b]	-	<4.92 [b]
-	307	34.597227	-86.946018	6.7	<2.21	<1.04	-	<4.92
-	307	34.597227	-86.946018	<4.96	<2.21	<1.04	-	<4.92
-	301	34.644159	-87.034543	147 [a]	107 [a]	21.7 [a]	-	100
-	301	34.644159	-87 034543	-	-	-	-	112
-	301	34.644159	-87 034543	-	-	-	-	108
-	301	34.644619	-87.034972	369 [a]	135 [a]	52.8 [a]	-	204
-	301	34.644619	-87.034972	-	-	-	-	189
-	301	34.644619	-87.034972	-	-	-	-	192
-	301	34.645009	-87 035508	182 [a]	58.8 [a]	44.4 [a]	-	143
-	301	34.645009	-87 035508	-	-	-	-	139
-	301	34.645009	-87 035508	-	-	-	-	155
-	301	34.645398	-87.036108	529 [a]	133 [a]	175 [a]	-	428

Table A-3. Historical surface water sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Descripti
8/2005	3M	DNS-SW-STA004-0-050824 (Lab Dup)	STA004	Tennessee River
8/2005	3M	DNS-SW-STA004-DB-050824 (Dup)	STA004	Tennessee River
8/2005	3M	DNS-SW-STA005-0-050823	STA005	Tennessee River
8/2005	3M	DNS-SW-STA005-0-050823 (Lab Dup)	STA005	Tennessee River
8/2005	3M	DNS-SW-STA005-DB-050823 (Dup)	STA005	Tennessee River
8/2005	3M	DNS-SW-STA006-0-050824	STA006	Tennessee River
8/2005	3M	DNS-SW-STA006-0-050824 (Lab Dup)	STA006	Tennessee River
8/2005	3M	DNS-SW-STA006-DB-050824 (Dup)	STA006	Tennessee River
8/2005	3M	DNS-SW-STA007-0-050825	STA007	Tennessee River
8/2005	3M	DNS-SW-STA007-0-050825 (Lab Dup)	STA007	Tennessee River
8/2005	3M	DNS-SW-STA007-DB-050825 (Dup)	STA007	Tennessee River
8/2005	3M	DNS-SW-STA008-0-050825	STA008	Tennessee River
8/2005	3M	DNS-SW-STA008-0-050825 (Lab Dup)	STA008	Tennessee River
8/2005	3M	DNS-SW-STA008-DB-050825 (Dup)	STA008	Tennessee River
8/2005	3M	DNS-SW-STA009-0-050826	STA009	Tennessee River
8/2005	3M	DNS-SW-STA009-0-050826 (Lab Dup)	STA009	Tennessee River
8/2005	3M	DNS-SW-STA009-DB-050826 (Dup)	STA009	Tennessee River
8/2005	3M	DNS-SW-STA010-0-050826	STA010	Tennessee River
8/2005	3M	DNS-SW-STA010-0-050826 (Lab Dup)	STA010	Tennessee River
8/2005	3M	DNS-SW-STA010-DB-050826 (Dup)	STA010	Tennessee River
8/2005	3M	DNS-SW-STA011-0-050826	STA011	Tennessee River
8/2005	3M	DNS-SW-STA011-0-050826 (Lab Dup)	STA011	Tennessee River
8/2005	3M	DNS-SW-STA011-DB-050826 (Dup)	STA011	Tennessee River
8/2005	3M	DNS-SW-STA012-0-050826	STA012	Tennessee River
8/2005	3M	DNS-SW-STA012-0-050826 (Lab Dup)	STA012	Tennessee River
8/2005	3M	DNS-SW-STA012-DB-050826 (Dup)	STA012	Tennessee River
4/2006	Bakers Creek	DAL-SW-BC01-0-060412	SW-BC01	Bakers Creek (upstream)
4/2006	Bakers Creek	DAL-SW-BC01-0-060412 (Lab Dup)	SW-BC01	Bakers Creek (upstream)
4/2006	Bakers Creek	DAL-SW-BC01-DB-060412 (Dup)	SW-BC01	Bakers Creek (upstream)
4/2006	Bakers Creek	DAL-SW-BC02-0-060412	SW-BC02	Bakers Creek (upstream)
4/2006	Bakers Creek	DAL-SW-BC02-0-060412 (Lab Dup)	SW-BC02	Bakers Creek (upstream)
4/2006	Bakers Creek	DAL-SW-BC02-DB-060412 (Dup)	SW-BC02	Bakers Creek (upstream)
4/2006	Bakers Creek	DAL-SW-BC03-0-060414	SW-BC03	Bakers Creek
4/2006	Bakers Creek	DAL-SW-BC03-0-060414 (Lab Dup)	SW-BC03	Bakers Creek
4/2006	Bakers Creek	DAL-SW-BC03-DB-060414 (Dup)	SW-BC03	Bakers Creek
4/2006	Bakers Creek	DAL-SW-BC04-0-060414	SW-BC04	Bakers Creek
4/2006	Bakers Creek	DAL-SW-BC04-0-060414 (Lab Dup)	SW-BC04	Bakers Creek
4/2006	Bakers Creek	DAL-SW-BC04-DB-060414 (Dup)	SW-BC04	Bakers Creek
4/2006	Bakers Creek	DAL-SW-BC05-0-060414	SW-BC05	Bakers Creek
4/2006	Bakers Creek	DAL-SW-BC05-0-060414 (Lab Dup)	SW-BC05	Bakers Creek
4/2006	Bakers Creek	DAL-SW-BC05-DB-060414 (Dup)	SW-BC05	Bakers Creek
4/2006	3M Upland	DAL-SW-BCT01-0-060412	SW-BCT01	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BCT01-0-060412 (Lab Dup)	SW-BCT01	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BCT01-DB-060412 (Dup)	SW-BCT01	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BCT02-0-060412	SW-BCT02	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BCT02-0-060412 (Lab Dup)	SW-BCT02	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BCT02-DB-060412 (dup)	SW-BCT02	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BCT03-0-060412	SW-BCT03	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BCT03-0-060412 (Lab Dup)	SW-BCT03	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BCT03-DB-060412 (Dup)	SW-BCT03	Drainage near southwest corner of site
4/2006	3M Upland	DAL-SW-BPP01-0-060413	SW-BPP01	Off-site marsh
4/2006	3M Upland	DAL-SW-BPP01-0-060413 (Lab Dup)	SW-BPP01	Off-site marsh
4/2006	3M Upland	DAL-SW-BPP01-DB-060413 (Dup)	SW-BPP01	Off-site marsh
4/2006	3M Upland	DAL-SW-BPP02-0-060413	SW-BPP02	Off-site marsh
4/2006	3M Upland	DAL-SW-BPP02-0-060413 (Lab Dup)	SW-BPP02	Off-site marsh

Total Depth of River (ft)	Approximate River Mile	Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	PFOS (ng/L)	PFBS (ng/L)	PFHxS (ng/L)	PFOSA (ng/L)	PFOA (ng/L)
-	301	34.645398	-87.036108	-	-	-	-	394
-	301	34.645398	-87.036108	-	-	-	-	439
-	301	34.645557	-87.036752	120 [a]	64.3 [a]	16.2 [a]	-	72.8
-	301	34.645557	-87.036752	-	-	-	-	68.2
-	301	34.645557	-87.036752	-	-	-	-	79.2
-	301	34.645699	-87.037416	NR [a]	NR [a]	39.3 [a]	-	125
-	301	34.645699	-87.037416	-	-	-	-	122
-	301	34.645699	-87.037416	-	-	-	-	140
-	301	34.645888	-87.038074	387 [a]	132 [a]	55.8 [a]	-	207
-	301	34.645888	-87.038074	-	-	-	-	213
-	301	34.645888	-87.038074	-	-	-	-	212
-	301	34.646071	-87.038767	NR [a]	218 [a]	161 [a]	-	370
-	301	34.646071	-87 038767	-	-	-	-	373
-	301	34.646071	-87.038767	-	-	-	-	362
-	301	34.646278	-87.039481	116 [a]	49 2 [a]	37 9 [a]	-	138
-	301	34 646278	-87 039481	-	-	-	-	115
-	301	34.646278	-87.039481	-	-	-	-	114
-	301	34.646455	-87 040108	146 [a]	75.3 [a]	54.4 [a]	-	138
-	301	34.646455	-87.040108	-	-	-	-	141
-	301	34.646455	-87.040108	-	-	-	-	162
-	301	34.646708	-87.040761	112 [a]	NR [a]	42.9 [a]	-	109
-	301	34.646708	-87.040761	-	-	-	-	131
-	301	34.646708	-87.040761	-	-	-	-	134
-	301	34.646725	-87 041468	158 [a]	55 7 [a]	41.2 [a]	-	103
-	301	34.646725	-87.041468	-	-	-	-	112
-	301	34.646725	-87.041468	-	-	-	-	138
-	301	34.610178	-87 045073	62.7 [a]	64.8 [a]	31.6 [a]	-	103
-	301	34.610178	-87.045073	-	-	-	-	104
-	301	34.610178	-87 045073	-	-	-	-	111
-	301	34.619131	-87.038882	91.5 [a]	66.9 [a]	37.7 [a]	-	126
-	301	34.619131	-87.038882	-	-	-	-	133
-	301	34.619131	-87.038882	-	-	-	-	140
-	301	34.625415	-87.030229	3,920 [a]	153 [a]	442 [a]	-	2,370
-	301	34.625415	-87.030229	-	-	-	-	2,530
-	301	34.625415	-87.030229	-	-	-	-	2,660
-	301	34.630224	-87.032448	27,700 [a]	493 [a]	2,180 [a]	-	NR
-	301	34.630224	-87.032448	-	-	-	-	NR
-	301	34.630224	-87.032448	-	-	-	-	27,700
-	301	34.638019	-87.033939	686 [a]	71.9 [a]	61.8 [a]	-	782
-	301	34.638019	-87.033939	-	-	-	-	NR
-	301	34.638019	-87.033939	-	-	-	-	NR
-	-	34.624873	-87.053751	15,100 [a]	479 [a]	2,180 [a]	-	29,000
-	-	34.624873	-87.053751	-	-	-	-	NR
-	-	34.624873	-87 053751	-	-	-	-	NR
-	-	34.619868	-87.045509	279,000 [a]	2,260 [a]	13,600 [a]	-	132,000
-	-	34.619868	-87.045509	-	-	-	-	126,000
-	-	34.619868	-87.045509	-	-	-	-	125,000
-	-	34.619316	-87.041549	44,200 [a]	972 [a]	4,470 [a]	-	24,700
-	-	34.619316	-87.041549	-	-	-	-	24,700
-	-	34.619316	-87.041549	-	-	-	-	28,000
-	-	34.632783	-87.052717	437,000 [a]	7,490 [a]	60,800 [a]	-	NR
-	-	34.632783	-87.052717	-	-	-	-	NR
-	-	34.632783	-87.052717	-	-	-	-	526,000
-	-	34.633260	-87.053225	354,000 [a]	5,770 [a]	39,700 [a]	-	248,000
-	-	34 633260	-87.053225	-	-	-	-	250,000

Table A-3. Historical surface water sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Descriptic
4/2006	3M Upland	DAL-SW-BPP02-DB-060413 (Dup)	SW-BPP02	Off-site marsh
4/2006	3M Upland	DAL-SW-BPP03-0-060413	SW-BPP03	Off-site marsh
4/2006	3M Upland	DAL-SW-BPP03-0-060413 (Lab Dup)	SW-BPP03	Off-site marsh
4/2006	3M Upland	DAL-SW-BPP03-DB-060413 (Dup)	SW-BPP03	Off-site marsh
4/2006	3M Upland	DAL-SW-OSP01-0-060413	SW-OSP01	Goose Pond
4/2006	3M Upland	DAL-SW-OSP01-0-060413 (Lab Dup)	SW-OSP01	Goose Pond
4/2006	3M Upland	DAL-SW-OSP01-DB-060413 (Dup)	SW-OSP01	Goose Pond
4/2006	3M Upland	DAL-SW-OSP02-0-060413	SW-OSP02	Goose Pond
4/2006	3M Upland	DAL-SW-OSP02-0-060413 (Lab Dup)	SW-OSP02	Goose Pond
4/2006	3M Upland	DAL-SW-OSP02-DB-060413 (Dup)	SW-OSP02	Goose Pond
4/2006	3M Upland	DAL-SW-OSP03-0-060413	SW-OSP03	Goose Pond
4/2006	3M Upland	DAL-SW-OSP03-0-060413 (Lab Dup)	SW-OSP03	Goose Pond
4/2006	3M Upland	DAL-SW-OSP03-DB-060413 (Dup)	SW-OSP03	Goose Pond
12/2006	Mallard Creek	DMC-SW-LOC001-0-061213	DMC-LOC001	Mallard Creek Mouth
12/2006	Mallard Creek	DMC-SW-LOC001-DB-061213 (Dup)	DMC-LOC001	Mallard Creek Mouth
12/2006	Fox Creek	DL1-SW-LOC001-0-061213	DL1-LOC001	Fox Creek Mouth
12/2006	Fox Creek	DL1-SW-LOC001-DB-061213 (Dup)	DL1-LOC001	Fox Creek Mouth
12/2006	3M Outfall	DOU-SW-LOC001-0-061213	DOU-LOC001	3M and Dyneon Facility (Outfall Samplin
12/2006	3M Outfall	DOU-SW-LOC001-DB-061213 (Dup)	DOU-LOC001	3M and Dyneon Facility (Outfall Samplin
12/2006	Bakers Creek	DBC-SW-LOC001-0-061214	DBC-LOC001	Bakers Creek Mouth
12/2006	Bakers Creek	DBC-SW-LOC001-DB-061214 (Dup)	DBC-LOC001	Bakers Creek Mouth
12/2006	Swan Creek	DL2-SW-LOC001-0-061214	DL2-LOC001	Cross River (Swan Creek Mouth)
12/2006	Swan Creek	DL2-SW-LOC001-DB-061214 (Dup)	DL2-LOC001	Cross River (Swan Creek Mouth)
12/2006	Wolverine Tube	DL3-SW-LOC001-0-061214	DL3-LOC001	Upriver (Point Mallard Park)
12/2006	Wolverine Tube	DL3-SW-LOC001-DB-061214 (Dup)	DL3-LOC001	Upriver (Point Mallard Park)
12/2006	3M Upland	DAA-SW-LOC002-0-061215	DAA-LOC002	Avenue A
12/2006	3M Upland	DAA-SW-LOC002-DB-061215 (Dup)	DAA-LOC002	Avenue A
12/2006	3M Upland	DAA-SW-LOC005-0-061215	DAA-LOC005	Avenue A
12/2006	3M Upland	DAA-SW-LOC005-DB-061215 (Dup)	DAA-LOC005	Avenue A
6/2010	3M Upland	DAL-SW-SW01-0-100623	DAL-SW01	Avenue A
6/2010	3M Upland	DAL-SW-SW01-DB-100623 (Dup)	DAL-SW01	Avenue A
6/2010	3M Upland	DAL-SW-SW02-0-100622	DAL-SW02	Avenue A
6/2010	3M Upland	DAL-SW-SW02-DB-100622 (Dup)	DAL-SW02	Avenue A
6/2010	3M Upland	DAL-SW-SW03-0-100622	DAL-SW03	Avenue A
6/2010	3M Upland	DAL-SW-SW03-DB-100622 (Dup)	DAL-SW03	Avenue A
6/2010	3M Upland	DAL-SW-SW04-0-100622	DAL-SW04	Avenue A
6/2010	3M Upland	DAL-SW-SW04-DB-100622 (Dup)	DAL-SW04	Avenue A
6/2010	3M Upland	DAL-SW-SW05-0-100622	DAL-SW05	Avenue A
6/2010	3M Upland	DAL-SW-SW05-DB-100622 (Dup)	DAL-SW05	Avenue A
6/2010	3M Upland	DAL-SW-SW06-0-100622	DAL-SW06	Avenue A
6/2010	3M Upland	DAL-SW-SW06-DB-100622 (Dup)	DAL-SW06	Avenue A
6/2010	3M Upland	DAL-SW-SW07-0-100622	DAL-SW07	Avenue A
6/2010	3M Upland	DAL-SW-SW07-DB-100622 (Dup)	DAL-SW07	Avenue A
6/2010	3M Upland	DAL-SW-SW08-0-100623	DAL-SW08	Avenue A
6/2010	3M Upland	DAL-SW-SW08-DB-100623 (Dup)	DAL-SW08	Avenue A
6/2010	3M Upland	DAL-SW-SW09-0-100623	DAL-SW09	Avenue A
6/2010	3M Upland	DAL-SW-SW09-DB-100623 (Dup)	DAL-SW09	Avenue A
6/2010	3M Upland	DAL-SW-SW10-0-100623	DAL-SW10	Avenue A
6/2010	3M Upland	DAL-SW-SW10-DB-100623 (Dup)	DAL-SW10	Avenue A
6/2010	3M Upland	DAL-SW-SW11-0-100623	DAL-SW11	Avenue A
6/2010	3M Upland	DAL-SW-SW11-DB-100623 (Dup)	DAL-SW11	Avenue A
6/2010	3M Upland	DAL-SW-SW12-0-100623	DAL-SW12	Avenue A
6/2010	3M Upland	DAL-SW-SW12-DB-100623 (Dup)	DAL-SW12	Avenue A
4/2012	3M	LOC001	LR-LOC001	Lower
4/2012	3M	LOC001 (Dup)	LR-LOC001	Lower

	Total Depth of River (ft)	Approximate River Mile	Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	PFOS (ng/L)	PFBS (ng/L)	PFHxS (ng/L)	PFOSA (ng/L)	PFOA (ng/L)
	-	-	34.633260	-87.053225	-	-	-	-	249,000
	-	-	34.632668	-87.054079	326,000 [a]	5,210 [a]	38,200 [a]	-	231,000
	-	-	34.632668	-87.054079	-	-	-	-	248,000
	-	-	34 632668	-87.054079	-	-	-	-	352,000
	-	-	34.641997	-87.050014	560 [a]	189 [a]	46.2 [a]	-	335
	-	-	34.641997	-87.050014	-	-	-	-	307
	-	-	34.641997	-87.050014	-	-	-	-	313
	-	-	34.640436	-87 051121	2,820 [a]	342 [a]	562 [a]	-	2,660
	-	-	34.640436	-87.051121	-	-	-	-	NR
	-	-	34.640436	-87.051121	-	-	-	-	NR
	-	-	34.641338	-87.049782	2,380 [a]	316 [a]	495 [a]	-	NR
	-	-	34.641338	-87.049782	-	-	-	-	NR
	-	-	34.641338	-87.049782	-	-	-	-	2,650
	-	293.5	34.696604	-87.145800	49.9	29.2	<25	-	51.1
	-	293.5	34.696604	-87.145800	46.7	29.6	<25	-	<50
	-	296.3	34.670404	-87.101982	61.5	111	<25	-	83.1
	-	296.3	34.670404	-87 101982	66.0	52.6	<25	-	69 7
3)	-	301	34.641891	-87.031831	5,630	NR	1,420	-	3,650
3)	-	301	34.641891	-87 031831	6,080	NR	1,410	-	3,430
	-	301	34.637921	-87 028135	50.6	<25	<25	-	<25
	-	301	34 637921	-87.028135	55.4	<25	<25	-	<25
	-	301	34.665652	-87.007560	<25	<25	<25	-	<25
	-	301	34.665652	-87 007560	<25	<25	<25	-	<25
	-	307	34.589398	-86.938715	<25	<25	<25	-	<25
	-	307	34.589398	-86 938715	<25	<25	<25	-	<25
	-	-	34.641316	-87 047175	1,590	320	284	-	1,310
	-	-	34.641316	-87 047175	1,640	307	293	-	1,320
	-	-	34.641250	-87.039257	105,000	13,900	46,400	-	86,000
	-	-	34.641250	-87.039257	110,000	14,400	46,500	-	86,700
	-	-	34.640914	-87.044886	-	-	-	-	226,000
	-	-	34.640914	-87.044886	-	-	-	-	224,000
	-	-	34.641253	-87.045309	-	-	-	-	161,000
	-	-	34.641253	-87.045309	-	-	-	-	158,000
	-	-	34.641200	-87 044388	-	-	-	-	149,000
	-	-	34.641200	-87.044388	-	-	-	-	151,000
	-	-	34.641152	-87.042712	-	-	-	-	164,000
	-	-	34 641152	-87.042712	-	-	-	-	165,000
	-	-	34.641141	-87.040371	-	-	-	-	193,000
	-	-	34.641141	-87.040371	-	-	-	-	194,000
	-	-	34.641187	-87.039354	-	-	-	-	150,000
	-	-	34.641187	-87.039354	-	-	-	-	145,000
	-	-	34.641506	-87.037459	-	-	-	-	82,900
	-	-	34.641506	-87.037459	-	-	-	-	81,000
	-	-	34.640840	-87.043102	-	-	-	-	242,000
	-	-	34.640840	-87.043102	-	-	-	-	244,000
	-	-	34.640421	-87.043399	-	-	-	-	524,000
	-	-	34.640421	-87 043399	-	-	-	-	505,000
	-	-	34.640063	-87.045219	-	-	-	-	365,000
	-	-	34.640063	-87.045219	-	-	-	-	373,000
	-	-	34.638997	-87.045219	-	-	-	-	930,000
	-	-	34.638997	-87.045219	-	-	-	-	966,000
	-	-	34.641466	-87 041726	-	-	-	-	19,000
	-	-	34.641466	-87.041726	-	-	-	-	19,300
	-	301	34.644000	-87.035000	516	-	-	-	-
	-	301	34.644000	-87.035000	450	-	-	-	-

Table A-3. Historical surface water sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description
4/2012	Bakers Creek	LOC002	MR-LOC002	Middle
4/2012	Bakers Creek	LOC002 (Dup)	MR-LOC002	Middle
4/2012	APM	LOC003	UR-LOC003	Upper
4/2012	APM	LOC003 (Dup)	UR-LOC003	Upper

Note: All historical PFHS results are noted as PFHxS results.
All historical FOSA results are noted as PFOSA results.
< - analyte not detected at reporting limit shown
ng/L - nanogram per liter
NR - not reported due to the endogenous concentration of analyte in sample exceeds the range of applicability of the spike or not reported due to quality control failures

PFBS - perfluorobutane sulfonate
PFHxS - perfluorohexane sulfonate
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
PFOSA - perfluorooctane sulfonamide

[a] Averaged result.

[b] Sample was filtered.

* In the report entitled Selected Fluorochemicals in the Decatur, Alabama Area dated June 2001, Entrix states that sample location SW-26 is located at tl Area/Bakers Creek. Sample SW-26 was collected on June 19, 2001, which is the same day that all other samples were collected from the 3M Outfall Ar Fox Creek samples were collected the next day on June 20, 2001. In addition, the magnitude of results for Sample SW-26 is comparable to other 3M Ou

Total Depth of River (ft)	Approximate River Mile	Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	PFOS (ng/L)	PFBS (ng/L)	PFHxS (ng/L)	PFOSA (ng/L)	PFOA (ng/L)
-	301	34 638000	-87.029000	720	-	-	-	-
-	301	34.638000	-87.029000	661	-	-	-	-
-	302	34.637000	-87.021000	21.0	-	-	-	-
-	302	34.637000	-87.021000	26.3	-	-	-	-

outh of Fox Creek. However, Exponent believes that this sample was collected in the 3M Outfall
akers Creek. It is unlikely that a single sample would have been collected at Fox Creek on this date.
Area/Bakers Creek samples and is not comparable to samples collected in Fox Creek.

Table A-4. Historical sediment sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description	Depth (ft bgs)	Approxim River M
6/2000	Fox Creek	SED-07	SED-07	Fox Creek	-	296
6/2000	Fox Creek	SED-07 (Lab Dup)	SED-07	Fox Creek	-	296
6/2000	Fox Creek	SED-08	SED-08	Fox Creek	-	296
6/2000	Fox Creek	SED-08 (Lab Dup)	SED-08	Fox Creek	-	296
6/2000	Fox Creek	SED-09	SED-09	Fox Creek	-	296
6/2000	Fox Creek	SED-09 (Lab Dup)	SED-09	Fox Creek	-	296
6/2000	Fox Creek	SED-10	SED-10	Fox Creek	-	296
6/2000	Fox Creek	SED-10 (Lab Dup)	SED-10	Fox Creek	-	296
6/2000	Fox Creek	SED-11	SED-11	Fox Creek	-	296
6/2000	Fox Creek	SED-11 (Lab Dup)	SED-11	Fox Creek	-	296
6/2000	Fox Creek	SED-12	SED-12	Fox Creek	-	296
6/2000	Fox Creek	SED-12 (Lab Dup)	SED-12	Fox Creek	-	296
6/2000	Fox Creek	SED-12 (Dup)	SED-12	Fox Creek	-	296
6/2000	Fox Creek	SED-27	SED-27	Fox Creek	-	296
6/2000	Fox Creek	SED-27 (Lab Dup)	SED-27	Fox Creek	-	296
6/2000	3M Outfall	SED-01	SED-01	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-01 (Lab Dup)	SED-01	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-02	SED-02	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-02 (Lab Dup)	SED-02	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-03	SED-03	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-03 (Lab Dup)	SED-03	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-04	SED-04	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-04 (Lab Dup)	SED-04	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-05	SED-05	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-05 (Lab Dup)	SED-05	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-06	SED-06	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-06 (Lab Dup)	SED-06	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-06 (Dup)	SED-06	3M Outfall Area/ Bakers Creek	-	301
6/2000	3M Outfall	SED-25	SED-25	3M Outfall Area	-	301
6/2000	3M Outfall	SED-25 (Lab Dup)	SED-25	3M Outfall Area	-	301
6/2000	Dry Branch	SED-13	SED-13	Dry Branch	-	303
6/2000	Dry Branch	SED-13 (Lab Dup)	SED-13	Dry Branch	-	303
6/2000	Dry Branch	SED-14	SED-14	Dry Branch	-	303
6/2000	Dry Branch	SED-14 (Lab Dup)	SED-14	Dry Branch	-	303
6/2000	Dry Branch	SED-15	SED-15	Dry Branch	-	303
6/2000	Dry Branch	SED-15 (Lab Dup)	SED-15	Dry Branch	-	303
6/2000	Dry Branch	SED-16	SED-16	Dry Branch	-	303
6/2000	Dry Branch	SED-16 (Lab Dup)	SED-16	Dry Branch	-	303
6/2000	Dry Branch	SED-17	SED-17	Dry Branch	-	303
6/2000	Dry Branch	SED-17 (Lab Dup)	SED-17	Dry Branch	-	303
6/2000	Dry Branch	SED-18	SED-18	Dry Branch	-	303
6/2000	Dry Branch	SED-18 (Lab Dup)	SED-18	Dry Branch	-	303
6/2000	Dry Branch	SED-18 (Dup)	SED-18	Dry Branch	-	303
6/2000	Upriver	SED-19	SED-19	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-19 (Lab Dup)	SED-19	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-20	SED-20	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-20 (Lab Dup)	SED-20	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-21	SED-21	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-21 (Lab Dup)	SED-21	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-22	SED-22	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-22 (Lab Dup)	SED-22	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-23	SED-23	Upstream (Guntersville) Reference Location	-	-

Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	Dry Weight (ng/g)					Wet Weight (ng/g)				
		PFOS	PFBS	PFOSA	PFOA	PFHxS	PFOS	PFBS	PFOSA	PFOA	PFHxS
34.677515	-87.109003	1.36	-	0.806	1.19	<0.2	1.01	-	0.598	0.880	<0.2
34.677515	-87.109003	1.18	-	0.745	1.14	<0 2	0.872	-	0.553	0.848	<0.2
34.693141	-87.100922	2.04	-	1.07	1.55	<0.2	0.936	-	0.491	0.71	<0.2
34.693141	-87.100922	2.44	-	1.03	1.61	<0.2	1.12	-	0.471	0.74	<0.2
34.692158	-87.099351	1.96	-	0.998	2.3	<0.2	0.920	-	0.468	1.08	<0.2
34.692158	-87.099351	1.94	-	0.953	2.28	<0.2	0.912	-	0.447	1.07	<0.2
34.691328	-87.097158	1.89	-	0.816	1.27	<0.2	0.864	-	0.373	0.582	<0.2
34.691328	-87.097158	1.82	-	0.860	1.34	<0.2	0.832	-	0.393	0.612	<0.2
34.670708	-87.109214	2.05	-	1.07	1.54	<0.2	1.56	-	0.816	1.17	<0.2
34.670708	-87.109214	2.13	-	1.12	1.55	<0 2	1.62	-	0.848	1.18	<0.2
34.673326	-87.102310	6.46	-	4.62	4.36	0.518	3.47	-	2.48	2.34	0.278
34.673326	-87.102310	5.31	-	3.89	4.30	0.549	2.85	-	2.09	2.31	0.295
34.673326	-87.102310	9.14	-	6.67	4.42	0.590	4.80	-	3.50	2.32	0 310
34.670502	-87.095566	6.54	-	2.79	4.49	0.595	3.63	-	1.55	2.49	0.330
34.670502	-87.095566	6.38	-	5.23	4.97	0.577	3.54	-	2.90	2.76	0.320
34.641501	-87.034180	2,150	-	415	1,550	56.1	1,400	-	270	1,010	36.5
34 641501	-87 034180	2,640	-	487	1,320	60.8	1,720	-	317	862	39 6
34.641338	-87 033256	3,660	-	848	2,500	133	1,860	-	431	1,270	67.4
34.641338	-87.033256	4,070	-	1,010	2,420	137	2,070	-	513	1,230	69.4
34.641537	-87.032682	472	-	113	693	25.8	309	-	73.6	453	16.9
34.641537	-87.032682	662	-	146	806	34.9	433	-	95.2	527	22.8
34.641229	-87 032618	671	-	154	944	35 4	465	-	107	654	24 5
34.641229	-87 032618	690	-	140	927	31.6	478	-	96.9	643	21.9
34.640797	-87.031824	94.6	-	73.9	142	9.77	69.9	-	54.6	105	7.22
34.640797	-87.031824	116	-	77.0	183	10.5	85.5	-	58.9	135	7 79
34.675947	-87.033426	88 9	-	26.5	50.4	8.23	64.7	-	19.3	36.7	5 99
34.675947	-87 033426	115	-	31.7	65.5	9.01	83.6	-	23.1	47.7	6.56
34.675947	-87.033426	133	-	28 3	57.1	8.72	97.3	-	20.8	41.9	6.24
34.641483	-87.035079	12,200	-	2,490	4,110	281	5,750	-	1,170	1,930	132
34.641483	-87 035079	13,000	-	2,620	3,790	294	6,110	-	1,230	1,780	138
34.625510	-87.000107	2.72	-	0.429	<0.2	<0 2	1.62	-	0 255	<0.2	<0.2
34.625510	-87.000107	2.32	-	0.378	<0.2	<0.2	1.38	-	0.225	<0.2	<0.2
34.624926	-87.000764	0.572	-	<0.2	<0.2	<0.2	0.43	-	<0.2	<0.2	<0 2
34.624926	-87 000764	0.673	-	<0.2	<0.2	<0 2	0.506	-	<0.2	<0.2	<0.2
34.625743	-87 001474	2 35	-	0.382	<0.2	<0.2	1 53	-	0.248	<0 2	<0.2
34.625743	-87 001474	2.00	-	0.235	<0.2	<0.2	1 30	-	<0.2	<0.2	<0.2
34.626434	-87.002350	0.657	-	<0.2	<0.2	<0.2	0.452	-	<0.2	<0.2	<0.2
34.626434	-87.002350	0.834	-	<0.2	<0.2	<0.2	0 574	-	<0.2	<0.2	<0.2
34.625503	-87.002491	2.78	-	<0.2	<0.2	<0.2	1.03	-	<0.2	<0 2	<0.2
34.625503	-87 002491	2.42	-	<0.2	<0.2	<0.2	0.896	-	<0 2	<0.2	<0.2
34.626995	-87.004070	1.36	-	<0.2	<0.2	<0.2	0 824	-	<0.2	<0.2	<0.2
34.626995	-87.004070	1.34	-	<0.2	<0.2	<0.2	0.816	-	<0.2	<0.2	<0.2
34.626995	-87.004070	2.28	-	<0.2	<0.2	<0.2	1.38	-	<0 2	<0.2	<0.2
34.505801	-86.170262	<0 2	-	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0 2
34.505801	-86 170262	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0 2
34.506788	-86.180104	0 558	-	<0.2	<0.2	<0.2	0.217	-	<0.2	<0.2	<0.2
34.506788	-86.180104	0.817	-	<0 2	<0.2	<0.2	0 318	-	<0 2	<0.2	<0.2
34.506467	-86.181005	<0 2	-	<0.2	<0.2	<0.2	<0 2	-	<0.2	<0.2	<0.2
34.506467	-86.181005	<0.2	-	<0.2	<0.2	<0.2	<0 2	-	<0.2	<0.2	<0.2
34.505623	-86.181942	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2
34.505623	-86 181942	<0.2	-	<0.2	<0.2	<0 2	<0.2	-	<0.2	<0.2	<0.2
34.504629	-86.182468	<0.2	-	<0.2	<0.2	<0.2	<0 2	-	<0.2	<0.2	<0.2

Table A-4. Historical sediment sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description	Depth (ft bgs)	Approxi River M
6/2000	Upriver	SED-23 (Lab Dup)	SED-23	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-24	SED-24	Upstream (Guntersville) Reference Location	-	-
6/2000	Upriver	SED-24 (Lab Dup)	SED-24	Upstream (Guntersville) Reference Location	-	-
12/2004	Mallard Creek	DMC-SD-LOC003-0-041202	DMC-LOC003	Mallard Creek mouth	-	293.
12/2004	Mallard Creek	DMC-SD-LOC003-0-041202 (Lab Dup)	DMC-LOC003	Mallard Creek mouth	-	293
12/2004	Mallard Creek	DMC-SD-LOC002-0-041202	DMC-LOC002	Mallard Creek mouth	-	293.
12/2004	Mallard Creek	DMC-SD-LOC002-0-041202 (Lab Dup)	DMC-LOC002	Mallard Creek mouth	-	293.
12/2004	Mallard Creek	DMC-SD-LOC001-0-041202	DMC-LOC001	Mallard Creek mouth	-	293.
12/2004	Mallard Creek	DMC-SD-LOC001-0-041202 (Lab Dup)	DMC-LOC001	Mallard Creek mouth	-	293
12/2004	Fox Creek	DL1-SD-LOC003-0-041202	DL1-LOC003	Fox Creek mouth	-	296.
12/2004	Fox Creek	DL1-SD-LOC003-0-041202 (Lab Dup)	DL1-LOC003	Fox Creek mouth	-	296.
12/2004	Fox Creek	DL1-SD-LOC002-0-041202	DL1-LOC002	Fox Creek mouth	-	296.
12/2004	Fox Creek	DL1-SD-LOC002-0-041202 (Lab Dup)	DL1-LOC002	Fox Creek mouth	-	296.
12/2004	Fox Creek	DL1-SD-LOC001-0-041202	DL1-LOC001	Fox Creek mouth	-	296.
12/2004	Fox Creek	DL1-SD-LOC001-0-041202 (Lab Dup)	DL1-LOC001	Fox Creek mouth	-	296.
12/2004	3M Outfall	DOU-SD-LOC001-0-041202	DOU-LOC001	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2004	3M Outfall	DOU-SD-LOC001-0-041202 (Lab Dup)	DOU-LOC001	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2004	3M Outfall	DOU-SD-LOC002-0-041202	DOU-LOC002	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2004	3M Outfall	DOU-SD-LOC002-0-041202 (Lab Dup)	DOU-LOC002	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2004	3M Outfall	DOU-SD-LOC003-0-041202	DOU-LOC003	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2004	3M Outfall	DOU-SD-LOC003-0-041202 (Lab Dup)	DOU-LOC003	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2004	Bakers Creek	DBC-SD-LOC001-0-041202	DBC-LOC001	Bakers Creek mouth	-	301
12/2004	Bakers Creek	DBC-SD-LOC001-0-041202 (Lab Dup)	DBC-LOC001	Bakers Creek mouth	-	301
12/2004	Bakers Creek	DBC-SD-LOC002-0-041202	DBC-LOC002	Bakers Creek mouth	-	301
12/2004	Bakers Creek	DBC-SD-LOC002-0-041202 (Lab Dup)	DBC-LOC002	Bakers Creek mouth	-	301
12/2004	Bakers Creek	DBC-SD-LOC003-0-041202	DBC-LOC003	Bakers Creek mouth	-	301
12/2004	Bakers Creek	DBC-SD-LOC003-0-041202 (Lab Dup)	DBC-LOC003	Bakers Creek mouth	-	301
12/2004	Swan Creek	DL2-SD-LOC001-0-041201	DL2-LOC001	Cross river (Swan Creek mouth)	-	301
12/2004	Swan Creek	DL2-SD-LOC001-0-041201 (Lab Dup)	DL2-LOC001	Cross river (Swan Creek mouth)	-	301
12/2004	Swan Creek	DL2-SD-LOC002-0-041201	DL2-LOC002	Cross river (Swan Creek mouth)	-	301
12/2004	Swan Creek	DL2-SD-LOC002-0-041201 (Lab Dup)	DL2-LOC002	Cross river (Swan Creek mouth)	-	301
12/2004	Swan Creek	DL2-SD-LOC003-0-041201	DL2-LOC003	Cross river (Swan Creek mouth)	-	301
12/2004	Swan Creek	DL2-SD-LOC003-0-041201 (Lab Dup)	DL2-LOC003	Cross river (Swan Creek mouth)	-	301
12/2004	Wolverine Tube	DL3-SD-LOC002-0-041201	DL3-LOC002	Upriver (Point Mallard Park)	-	307.5
12/2004	Wolverine Tube	DL3-SD-LOC002-0-041201 (Lab Dup)	DL3-LOC002	Upriver (Point Mallard Park)	-	307.5
12/2004	Wolverine Tube	DL3-SD-LOC003-0-041201	DL3-LOC003	Upriver (Point Mallard Park)	-	307.5
12/2004	Wolverine Tube	DL3-SD-LOC003-0-041201 (Lab Dup)	DL3-LOC003	Upriver (Point Mallard Park)	-	307.5
12/2004	Wolverine Tube	DL3-SD-LOC001-0-041201	DL3-LOC001	Upriver (Point Mallard Park)	-	307.6
12/2004	Wolverine Tube	DL3-SD-LOC001-0-041201 (Lab Dup)	DL3-LOC001	Upriver (Point Mallard Park)	-	307.6
12/2004	3M Upland	DAA-SD-LOC001-0-041202	DAA-LOC001	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC001-0-041202 (Lab Dup)	DAA-LOC001	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC002-0-041202	DAA-LOC002	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC002-0-041202 (Lab Dup)	DAA-LOC002	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC003-0-041202	DAA-LOC003	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC003-0-041202 (Lab Dup)	DAA-LOC003	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC004-0-041202	DAA-LOC004	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC004-0-041202 (Lab Dup)	DAA-LOC004	Avenue A	-	-

Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	Dry Weight (ng/g)					Wet Weight (ng/g)				
		PFOS	PFBS	PFOSA	PFOA	PFHxS	PFOS	PFBS	PFOSA	PFOA	PFHxS
34.504629	-86.182468	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2
34.504209	-86.181768	0.600	-	<0.2	<0.2	<0.2	0.266	-	<0.2	<0 2	<0.2
34.504209	-86.181768	0.580	-	<0.2	<0.2	<0 2	0.257	-	<0.2	<0.2	<0.2
34.699083	-87.146638	6.94	-	-	2.02	-	-	<0.2	-	-	<0.2
34.699083	-87.146638	7.74	-	-	4.04	-	-	<0.2	-	-	<0.2
34.697843	-87.146469	6.41	-	-	NQ	-	-	<0.2	-	-	<0.2
34.697843	-87.146469	8.13	-	-	-	-	-	<0.2	-	<0.2	<0.2
34.696604	-87.145800	3.51	-	-	0.726	-	-	<0.2	-	-	<0.2
34.696604	-87.145800	3.63	-	-	1 82	-	-	<0.2	-	-	<0.2
34 670885	-87.103317	9.36	-	-	1.93	-	-	<0.2	-	-	<0.2
34.670885	-87.103317	7.93	-	-	1.8	-	-	<0.2	-	-	<0.2
34.670610	-87.102649	7.76	-	-	1.54	-	-	<0.2	-	-	<0 2
34.670610	-87.102649	8.65	-	-	0 935	-	-	<0.2	-	-	<0.2
34 670404	-87.101982	9.59	-	-	NQ	-	-	<0.2	-	-	<0.2
34 670404	-87 101982	6.61	-	-	NQ	-	-	<0.2	-	-	<0.2
34.641891	-87.031831	500	3.77	-	46.9	5 68	-	-	-	-	-
34.641891	-87.031831	460	3.79	-	47.3	5.13	-	-	-	-	-
34.641463	-87.032755	215	6 59	-	22.6	16.1	-	-	-	-	-
34.641463	-87.032755	209	7.37	-	25.8	15.6	-	-	-	-	-
34.641493	-87.034159	390	0 545	-	27	2.89	-	-	-	-	-
34.641493	-87.034159	324	0.591	-	11.9	2.10	-	-	-	-	-
34 637921	-87.028135	73.0	-	-	4.04	0 612	-	<0.2	-	-	-
34.637921	-87.028135	71.6	-	-	4.18	0.657	-	<0.2	-	-	-
34.637952	-87.028874	37.0	-	-	4.24	0 615	-	<0.2	-	-	-
34.637952	-87.028874	37.2	-	-	4.01	0.606	-	<0.2	-	-	-
34 638501	-87.029428	33.8	-	-	3.31	-	-	<0.2	-	-	<0.2
34.638501	-87.029428	32 6	-	-	3.19	-	-	<0.2	-	-	<0.2
34.665652	-87 007560	-	-	-	-	-	<0.2	<0 2	-	<0.2	<0.2
34.665652	-87.007560	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0 2
34.666224	-87.008992	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0.2
34.666224	-87.008992	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0.2
34.666758	-87.010286	-	-	-	1.11	-	<0.2	<0.2	-	-	<0.2
34.666758	-87.010286	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0.2
34.590682	-86 939490	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0 2
34 590682	-86 939490	-	-	-	-	-	<0.2	<0.2	-	<0 2	<0.2
34.591689	-86.938714	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0.2
34.591689	-86.938714	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0.2
34.589398	-86.938715	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0.2
34.589398	-86.938715	-	-	-	-	-	<0.2	<0.2	-	<0.2	<0.2
34.641339	-87.048200	38.5	-	-	1.85	0.336	-	<0.2	-	-	-
34 641339	-87.048200	45.0	-	-	1.43	0.341	-	<0.2	-	-	-
34.641316	-87.047175	37 7	-	-	2.82	0.666	-	<0.2	-	-	-
34.641316	-87.047175	42.3	-	-	4.32	1.15	-	-	-	-	-
34.641287	-87.045290	2,010	-	-	141	54.1	-	<0.2	-	-	-
34.641287	-87.045290	2,230	-	-	149	59.1	-	<0.2	-	-	-
34.641257	-87.042398	4,730	65.9	-	346	709	-	-	-	-	-
34.641257	-87.042398	4,550	102	-	347	665	-	-	-	-	-

Table A-4. Historical sediment sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description	Depth (ft bgs)	Approxima River Mile
12/2004	3M Upland	DAA-SD-LOC005-0-041202	DAA-LOC005	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC005-0-041202 (Lab Dup)	DAA-LOC005	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC006-0-041202	DAA-LOC006	Avenue A	-	-
12/2004	3M Upland	DAA-SD-LOC006-0-041202 (Lab Dup)	DAA-LOC006	Avenue A	-	-
8/2005	3M	DNS-SD-STA001-0-050824	STA001	Tennessee River	-	301
8/2005	3M	DNS-SD-STA001-0-050824 (Lab Dup)	STA001	Tennessee River	-	301
8/2005	3M	DNS-SD-STA002-0-050824	STA002	Tennessee River	-	301
8/2005	3M	DNS-SD-STA002-0-050824 (Lab Dup)	STA002	Tennessee River	-	301
8/2005	3M	DNS-SD-STA003-0-050824	STA003	Tennessee River	-	301
8/2005	3M	DNS-SD-STA003-0-050824 (Lab Dup)	STA003	Tennessee River	-	301
8/2005	3M	DNS-SD-STA004-0-050825	STA004	Tennessee River	-	301
8/2005	3M	DNS-SD-STA004-0-050825 (Lab Dup)	STA004	Tennessee River	-	301
8/2005	3M	DNS-SD-STA005-0-050825	STA005	Tennessee River	-	301
8/2005	3M	DNS-SD-STA005-0-050825 (Lab Dup)	STA005	Tennessee River	-	301
8/2005	3M	DNS-SD-STA006-0-050825	STA006	Tennessee River	-	301
8/2005	3M	DNS-SD-STA006-0-050825 (Lab Dup)	STA006	Tennessee River	-	301
8/2005	3M	DNS-SD-STA007-0-050825	STA007	Tennessee River	-	301
8/2005	3M	DNS-SD-STA007-0-050825 (Lab Dup)	STA007	Tennessee River	-	301
8/2005	3M	DNS-SD-STA008-0-050825	STA008	Tennessee River	-	301
8/2005	3M	DNS-SD-STA008-0-050825 (Lab Dup)	STA008	Tennessee River	-	301
8/2005	3M	DNS-SD-STA009-0-050825	STA009	Tennessee River	-	301
8/2005	3M	DNS-SD-STA009-0-050825 (Lab Dup)	STA009	Tennessee River	-	301
8/2005	3M	DNS-SD-STA010-0-050825	STA010	Tennessee River	-	301
8/2005	3M	DNS-SD-STA010-0-050825 (Lab Dup)	STA010	Tennessee River	-	301
8/2005	3M	DNS-SD-STA011-0-050825	STA011	Tennessee River	-	301
8/2005	3M	DNS-SD-STA011-0-050825 (Lab Dup)	STA011	Tennessee River	-	301
8/2005	3M	DNS-SD-STA012-0-050825	STA012	Tennessee River	-	301
8/2005	3M	DNS-SD-STA012-0-050825 (Lab Dup)	STA012	Tennessee River	-	301
4/2006	3M	DAL-SD-OSP01-0-0000	SD-OSP01	Goose Pond	-	301
4/2006	3M	DAL-SD-OSP01-0-0000 (Lab Dup)	SD-OSP01	Goose Pond	-	301
4/2006	3M	DAL-SD-OSP02-0-0000	SD-OSP02	Goose Pond	-	301
4/2006	3M	DAL-SD-OSP02-0-0000 (Lab Dup)	SD-OSP02	Goose Pond	-	301
4/2006	Off-site marsh	DAL-SD-BPP01-0-0000	SD-BPP01	Off-site marsh	-	-
4/2006	Off-site marsh	DAL-SD-BPP01-0-0000 (Lab Dup)	SD-BPP01	Off-site marsh	-	-
4/2006	Off-site marsh	DAL-SD-BPP02-0-0000	SD-BPP02	Off-site marsh	-	-
4/2006	Off-site marsh	DAL-SD-BPP02-0-0000 (Lab Dup)	SD-BPP02	Off-site marsh	-	-
4/2006	Off-site marsh	DAL-SD-BPP03-0-0000	SD-BPP03	Off-site marsh	-	-
4/2006	Off-site marsh	DAL-SD-BPP03-0-0000 (Lab Dup)	SD-BPP03	Off-site marsh	-	-
12/2006	Mallard Creek	DMC-SD-LOC003-0-061213	DMC-LOC003	Mallard Creek mouth	-	293.3
12/2006	Mallard Creek	DMC-SD-LOC003-0-061213 (Lab Dup)	DMC-LOC003	Mallard Creek mouth	-	293.3
12/2006	Mallard Creek	DMC-SD-LOC002-0-061213	DMC-LOC002	Mallard Creek mouth	-	293.4
12/2006	Mallard Creek	DMC-SD-LOC002-0-061213 (Lab Dup)	DMC-LOC002	Mallard Creek mouth	-	293.4
12/2006	Mallard Creek	DMC-SD-LOC001-0-061213	DMC-LOC001	Mallard Creek mouth	-	293 5
12/2006	Mallard Creek	DMC-SD-LOC001-0-061213 (Lab Dup)	DMC-LOC001	Mallard Creek mouth	-	293.5
12/2006	Fox Creek	DL1-SD-LOC003-0-061213	DL1-LOC003	Fox Creek mouth	-	296.1
12/2006	Fox Creek	DL1-SD-LOC003-0-061213 (Lab Dup)	DL1-LOC003	Fox Creek mouth	-	296.1
12/2006	Fox Creek	DL1-SD-LOC002-0-061213	DL1-LOC002	Fox Creek mouth	-	296.2
12/2006	Fox Creek	DL1-SD-LOC002-0-061213 (Lab Dup)	DL1-LOC002	Fox Creek mouth	-	296.2
12/2006	Fox Creek	DL1-SD-LOC001-0-061213	DL1-LOC001	Fox Creek mouth	-	296.3
12/2006	Fox Creek	DL1-SD-LOC001-0-061213 (Lab Dup)	DL1-LOC001	Fox Creek mouth	-	296.3
12/2006	3M Outfall	DOU-SD-LOC001-0-061213	DOU-LOC001	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2006	3M Outfall	DOU-SD-LOC001-0-061213 (Lab Dup)	DOU-LOC001	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2006	3M Outfall	DOU-SD-LOC002-0-061213	DOU-LOC002	3M and Dyneon Facility (Outfall Sampling Area)	-	301

Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	Dry Weight (ng/g)					Wet Weight (ng/g)				
		PFOS	PFBS	PFOSA	PFOA	PFHxS	PFOS	PFBS	PFOSA	PFOA	PFHxS
34.641250	-87.039257	616	17.8	-	29.6	41.1	-	-	-	-	-
34.641250	-87.039257	649	17.7	-	24	40.4	-	-	-	-	-
34.641671	-87.037410	1,760	8.25	-	82.5	84.1	-	-	-	-	-
34.641671	-87.037410	1,960	6.6	-	65.1	117	-	-	-	-	-
34.644159	-87.034543	21.2 [a]	0.883 [a]	-	5.67	1.36 [a]	-	-	-	-	-
34.644159	-87.034543	-	-	-	4.89	-	-	-	-	-	-
34.644619	-87.034972	NR [a]	0.473 [a]	-	3 08	0.431 [a]	-	-	-	-	-
34.644619	-87 034972	-	-	-	2.95	-	-	-	-	-	-
34.645009	-87.035508	10.9 [a]	0.568 [a]	-	2.31	<0.2 [a]	-	-	-	-	-
34.645009	-87.035508	-	-	-	2.68	-	-	-	-	-	-
34.645398	-87.036108	1.32 [a]	<0.2 [a]	-	0.408	<0 2 [a]	-	-	-	-	-
34.645398	-87.036108	-	-	-	0 377	-	-	-	-	-	-
34.645557	-87.036752	88.0 [a]	<0.2 [a]	-	7.72	2 06 [a]	-	-	-	-	-
34.645557	-87.036752	-	-	-	7.72	-	-	-	-	-	-
34.645699	-87 037416	0.81 [a]	<0.2 [a]	-	0.808	<0.2 [a]	-	-	-	-	-
34.645699	-87.037416	-	-	-	0.703	-	-	-	-	-	-
34 645888	-87.038074	25.9 [a]	0.357 [a]	-	5.18	1.06 [a]	-	-	-	-	-
34.645888	-87.038074	-	-	-	5.68	-	-	-	-	-	-
34 646071	-87.038767	16.3 [a]	<0.2 [a]	-	3.03	0 425 [a]	-	-	-	-	-
34.646071	-87.038767	-	-	-	3 49	-	-	-	-	-	-
34.646278	-87.039481	25.6 [a]	4.43 [a]	-	22.5	6.43 [a]	-	-	-	-	-
34.646278	-87.039481	-	-	-	25.7	-	-	-	-	-	-
34.646455	-87.040108	NR [a]	0.411 [a]	-	7.34	1 26 [a]	-	-	-	-	-
34.646455	-87.040108	-	-	-	7 41	-	-	-	-	-	-
34.646708	-87.040761	4.6 [a]	0.582 [a]	-	1.95	0 393 [a]	-	-	-	-	-
34.646708	-87.040761	-	-	-	2.28	-	-	-	-	-	-
34.646725	-87 041468	15.7 [a]	0 783 [a]	-	4.06	0 729 [a]	-	-	-	-	-
34.646725	-87.041468	-	-	-	3.74	-	-	-	-	-	-
34 641997	-87.050014	10.3 [a]	0.981 [a]	-	-	0.368 [a]	-	-	-	<0.2	-
34.641997	-87 050014	-	-	-	-	-	-	-	-	<0 2	-
34.640436	-87 051121	75.9 [a]	-	-	7.41	0 958 [a]	-	<0 2 [a]	-	-	-
34.640436	-87.051121	-	-	-	6 26	-	-	-	-	-	-
34.632783	-87.052717	3,550	3.14	-	881	84.3	-	-	-	-	-
34.632783	-87.052717	3,520	3.10	-	945	86 1	-	-	-	-	-
34.633260	-87 053225	4,160	4.43	-	927	74.5	-	-	-	-	-
34 633260	-87 053225	3,840	4.84	-	823	64 7	-	-	-	-	-
34.632668	-87.054079	11,900	9.87	-	2390	139	-	-	-	-	-
34.632668	-87.054079	12,000	8.73	-	2380	123	-	-	-	-	-
34.699083	-87.146638	3 05	<0.2	-	0 532	<0 2	-	-	-	-	-
34.699083	-87.146638	4.19	<0.2	-	0 873	<0 2	-	-	-	-	-
34.697843	-87.146469	2.89	<0.2	-	0.602	<0.2	-	-	-	-	-
34.697843	-87.146469	4.50	<0.2	-	0.656	<0.2	-	-	-	-	-
34.696604	-87.145800	1.36	<0.2	-	<0.2	<0.2	-	-	-	-	-
34.696604	-87.145800	2.49	<0.2	-	0 505	<0 2	-	-	-	-	-
34.670885	-87.103317	0.741	<0.2	-	<0.2	<0.2	-	-	-	-	-
34 670885	-87.103317	0.856	<0.2	-	<0.2	<0.2	-	-	-	-	-
34.670610	-87.102649	5.50	0.487	-	1.1	<0.2	-	-	-	-	-
34.670610	-87 102649	3.75	<0.2	-	0.463	<0.2	-	-	-	-	-
34.670404	-87.101982	3.74	<0.2	-	0.586	<0 2	-	-	-	-	-
34.670404	-87 101982	3.05	<0.2	-	0.485	<0.2	-	-	-	-	-
34.641891	-87.031831	488	5.08	-	23.9	6.81	-	-	-	-	-
34.641891	-87.031831	428	5.20	-	54.6	3.62	-	-	-	-	-
34.641463	-87 032755	NR	0.853	-	8.61	3.51	-	-	-	-	-

Table A-4. Historical sediment sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description	Depth (ft bgs)	Approxim River M
12/2006	3M Outfall	DOU-SD-LOC002-0-061213 (Lab Dup)	DOU-LOC002	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2006	3M Outfall	DOU-SD-LOC003-0-061213	DOU-LOC003	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2006	3M Outfall	DOU-SD-LOC003-0-061213 (Lab Dup)	DOU-LOC003	3M and Dyneon Facility (Outfall Sampling Area)	-	301
12/2006	Bakers Creek	DBC-SD-LOC001-0-061214	DBC-LOC001	Bakers Creek mouth	-	301
12/2006	Bakers Creek	DBC-SD-LOC001-0-061214 (Lab Dup)	DBC-LOC001	Bakers Creek mouth	-	301
12/2006	Bakers Creek	DBC-SD-LOC002-0-061214	DBC-LOC002	Bakers Creek mouth	-	301
12/2006	Bakers Creek	DBC-SD-LOC002-0-061214 (Lab Dup)	DBC-LOC002	Bakers Creek mouth	-	301
12/2006	Bakers Creek	DBC-SD-LOC003-0-061214	DBC-LOC003	Bakers Creek mouth	-	301
12/2006	Bakers Creek	DBC-SD-LOC003-0-061214 (Lab Dup)	DBC-LOC003	Bakers Creek mouth	-	301
12/2006	Swan Creek	DL2-SD-LOC001-0-061214	DL2-LOC001	Cross river (Swan Creek mouth)	-	301
12/2006	Swan Creek	DL2-SD-LOC001-0-061214 (Lab Dup)	DL2-LOC001	Cross river (Swan Creek mouth)	-	301
12/2006	Swan Creek	DL2-SD-LOC002-0-061214	DL2-LOC002	Cross river (Swan Creek mouth)	-	301
12/2006	Swan Creek	DL2-SD-LOC002-0-061214 (Lab Dup)	DL2-LOC002	Cross river (Swan Creek mouth)	-	301
12/2006	Swan Creek	DL2-SD-LOC003-0-061214	DL2-LOC003	Cross river (Swan Creek mouth)	-	301
12/2006	Swan Creek	DL2-SD-LOC003-0-061214 (Lab Dup)	DL2-LOC003	Cross river (Swan Creek mouth)	-	301
12/2006	Wolverine Tube	DL3-SD-LOC002-0-061214	DL3-LOC002	Upriver (Point Mallard Park)	-	307.5
12/2006	Wolverine Tube	DL3-SD-LOC002-0-061214 (Lab Dup)	DL3-LOC002	Upriver (Point Mallard Park)	-	307.5
12/2006	Wolverine Tube	DL3-SD-LOC003-0-061214	DL3-LOC003	Upriver (Point Mallard Park)	-	307.5
12/2006	Wolverine Tube	DL3-SD-LOC003-0-061214 (Lab Dup)	DL3-LOC003	Upriver (Point Mallard Park)	-	307.5
12/2006	Wolverine Tube	DL3-SD-LOC001-0-061214	DL3-LOC001	Upriver (Point Mallard Park)	-	307.6
12/2006	Wolverine Tube	DL3-SD-LOC001-0-061214 (Lab Dup)	DL3-LOC001	Upriver (Point Mallard Park)	-	307.6
12/2006	3M Upland	DAA-SD-LOC001-0-061215	DAA-LOC001	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC001-0-061215 (Lab Dup)	DAA-LOC001	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC002-0-061215	DAA-LOC002	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC002-0-061215 (Lab Dup)	DAA-LOC002	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC003-0-061215	DAA-LOC003	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC003-0-061215 (Lab Dup)	DAA-LOC003	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC004-0-061215	DAA-LOC004	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC004-0-061215 (Lab Dup)	DAA-LOC004	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC005-0-061215	DAA-LOC005	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC005-0-061215 (Lab Dup)	DAA-LOC005	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC006-0-061215	DAA-LOC006	Avenue A	-	-
12/2006	3M Upland	DAA-SD-LOC006-0-061215 (Lab Dup)	DAA-LOC006	Avenue A	-	-
8/2007	Off-site marsh	DAL-SD-DS01-0-0010	DS01	Downstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DS01-0-0010 (Lab Dup)	DS01	Downstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DS01-0-0030	DS01	Downstream of off-site marsh	2 5-3	-
8/2007	Off-site marsh	DAL-SD-DS01-0-0030 (Lab Dup)	DS01	Downstream of off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-DS02-0-0010	DS02	Downstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DS02-0-0010 (Lab Dup)	DS02	Downstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DS02-0-0030	DS02	Downstream of off-site marsh	2 5-3	-
8/2007	Off-site marsh	DAL-SD-DS02-0-0030 (Lab Dup)	DS02	Downstream of off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-DU01-0-0010	DU01	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU01-0-0010 (Lab Dup)	DU01	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU02-0-0010	DU02	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU02-0-0010 (Lab Dup)	DU02	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU03-0-0010	DU03	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU03-0-0010 (Lab Dup)	DU03	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU04-0-0010	DU04	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU04-0-0010 (Lab Dup)	DU04	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU05-0-0010	DU05	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DU05-0-0010 (Lab Dup)	DU05	Upstream of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP01-0-0010	EP01	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP01-0-0010 (Lab Dup)	EP01	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP02-0-0010	EP02	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP02-0-0010 (Lab Dup)	EP02	Off-site marsh	0-1	-

Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	Dry Weight (ng/g)					Wet Weight (ng/g)				
		PFOS	PFBS	PFOSA	PFOA	PFHxS	PFOS	PFBS	PFOSA	PFOA	PFHxS
34.641463	-87.032755	NR	0.753	-	8.65	4.15	-	-	-	-	-
34.641493	-87.034159	69.7	0.658	-	8.59	1.17	-	-	-	-	-
34 641493	-87.034159	87.3	0 536	-	9.16	1.07	-	-	-	-	-
34.637921	-87.028135	61.2	<0.2	-	5 60	0 556	-	-	-	-	-
34.637921	-87.028135	55.2	<0.2	-	4.70	0.455	-	-	-	-	-
34.637952	-87.028874	45.6	<0.2	-	4.98	<0.2	-	-	-	-	-
34.637952	-87.028874	43.3	<0.2	-	4.32	0.429	-	-	-	-	-
34.638501	-87.029428	26.9	<0.2	-	3.98	<0.2	-	-	-	-	-
34.638501	-87 029428	27.3	<0.2	-	3.44	<0.2	-	-	-	-	-
34.665652	-87 007560	<0.2	<0.2	-	<0.2	<0.2	-	-	-	-	-
34.665652	-87 007560	<0.2	<0.2	-	<0.2	<0.2	-	-	-	-	-
34.666224	-87.008992	<0.2	<0.2	-	<0.2	<0.2	-	-	-	-	-
34.666224	-87.008992	<0.2	<0.2	-	<0 2	<0.2	-	-	-	-	-
34.666758	-87.010286	<0.2	<0 2	-	<0.2	<0.2	-	-	-	-	-
34.666758	-87.010286	<0 2	<0 2	-	<0.2	<0.2	-	-	-	-	-
34 590682	-86.939490	0.477	<0 2	-	<0.2	<0.2	-	-	-	-	-
34.590682	-86.939490	0 507	<0.2	-	<0.2	<0.2	-	-	-	-	-
34 591689	-86.938714	<0.2	<0.2	-	<0.2	<0.2	-	-	-	-	-
34.591689	-86 938714	<0.2	<0.2	-	<0 2	<0.2	-	-	-	-	-
34 589398	-86.938715	<0.2	<0.2	-	<0.2	<0.2	-	-	-	-	-
34.589398	-86.938715	<0.2	<0.2	-	<0 2	<0 2	-	-	-	-	-
34.641339	-87 048200	106	0.496	-	4 33	0.779	-	-	-	-	-
34.641339	-87.048200	91.8	0.423	-	3.53	0.655	-	-	-	-	-
34.641316	-87.047175	31.7	0.372	-	3.78	0.540	-	-	-	-	-
34.641316	-87.047175	33.3	0.388	-	2.22	0.511	-	-	-	-	-
34.641287	-87.045290	1,290	3.95	-	116	22.7	-	-	-	-	-
34.641287	-87.045290	1,340	4.77	-	110	26.1	-	-	-	-	-
34.641257	-87.042398	2,130	85.6	-	537	674	-	-	-	-	-
34.641257	-87.042398	1,910	87.4	-	574	724	-	-	-	-	-
34.641250	-87.039257	560	3.69	-	45.3	17.8	-	-	-	-	-
34.641250	-87 039257	651	4.09	-	51 2	20.6	-	-	-	-	-
34.641671	-87.037410	554	6.10	-	43.3	NR	-	-	-	-	-
34.641671	-87.037410	794	6.28	-	46.1	NR	-	-	-	-	-
34.632510	-87.054959	627 [a]	ND [a]	-	33 2	2.74 [a]	-	-	-	-	-
34.632510	-87.054959	-	-	-	31.3	-	-	-	-	-	-
34.632510	-87.054959	273 [a]	0 301 [a]	-	28 1	3 06 [a]	-	-	-	-	-
34.632510	-87.054959	-	-	-	30 8	-	-	-	-	-	-
34.631987	-87.055282	616 [a]	ND [a]	-	13.2	1.55 [a]	-	-	-	-	-
34.631987	-87.055282	-	-	-	14.3	-	-	-	-	-	-
34.631987	-87 055282	555 [a]	0.387 [a]	-	47 8	4.75 [a]	-	-	-	-	-
34 631987	-87.055282	-	-	-	51	-	-	-	-	-	-
34.633858	-87.052629	769 [a]	2.25 [a]	-	119	15.3 [a]	-	-	-	-	-
34 633858	-87.052629	-	-	-	154	-	-	-	-	-	-
34.633991	-87.052534	441 [a]	0.27 [a]	-	41.7	2.99 [a]	-	-	-	-	-
34.633991	-87.052534	-	-	-	42 3	-	-	-	-	-	-
34.634075	-87.052416	267 [a]	ND [a]	-	19.5	1.28 [a]	-	-	-	-	-
34.634075	-87 052416	-	-	-	20	-	-	-	-	-	-
34.634113	-87 052347	702 [a]	3 75 [a]	-	121	16.2 [a]	-	-	-	-	-
34 634113	-87.052347	-	-	-	117	-	-	-	-	-	-
34 634178	-87.052164	759 [a]	1.05 [a]	-	79.5	10.0 [a]	-	-	-	-	-
34.634178	-87.052164	-	-	-	81.7	-	-	-	-	-	-
34.633481	-87.054140	215 [a]	0.617 [a]	-	7.84	0.353 [a]	-	-	-	-	-
34.633481	-87.054140	-	-	-	9.10	-	-	-	-	-	-
34.633481	-87.053790	537 [a]	0.663 [a]	-	71.1	6.90 [a]	-	-	-	-	-
34.633481	-87.053790	-	-	-	65 2	-	-	-	-	-	-

Table A-4. Historical sediment sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description	Depth (ft bgs)	Approxim River Mi
8/2007	Off-site marsh	DAL-SD-EP02-0-0030	EP02	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP02-0-0030 (Lab Dup)	EP02	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP02-0-0045	EP02	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP02-0-0045 (Lab Dup)	EP02	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP03-0-0010	EP03	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP03-0-0010 (Lab Dup)	EP03	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP03-0-0030	EP03	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP03-0-0030 (Lab Dup)	EP03	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP03-0-0045	EP03	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP03-0-0045 (Lab Dup)	EP03	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP04-0-0010	EP04	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP04-0-0010 (Lab Dup)	EP04	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP04-0-0030	EP04	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP04-0-0030 (Lab Dup)	EP04	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP05-0-0010	EP05	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP05-0-0010 (Lab Dup)	EP05	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP05-0-0030	EP05	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP05-0-0030 (Lab Dup)	EP05	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP05-DB-0010	EP05	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP05-DB-0010 (Lab Dup)	EP05	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP06-0-0010	EP06	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP06-0-0010 (Lab Dup)	EP06	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-DB07-0-0045	EP07	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-DB07-0-0045 (Lab Dup)	EP07	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP07-0-0010	EP07	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP07-0-0010 (Lab Dup)	EP07	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP07-0-0030	EP07	Off-site marsh	2 5-3	-
8/2007	Off-site marsh	DAL-SD-EP07-0-0030 (Lab Dup)	EP07	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP07-0-0045	EP07	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP07-0-0045 (Lab Dup)	EP07	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP08-0-0010	EP08	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP08-0-0010 (Lab Dup)	EP08	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP09-0-0010	EP09	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP09-0-0010 (Lab Dup)	EP09	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP09-0-0030	EP09	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP09-0-0030 (Lab Dup)	EP09	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP09-0-0045	EP09	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP09-0-0045 (Lab Dup)	EP09	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP10-0-0010	EP10	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP10-0-0010 (Lab Dup)	EP10	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP10-0-0030	EP10	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP10-0-0030 (Lab Dup)	EP10	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP10-0-0045	EP10	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP10-0-0045 (Lab Dup)	EP10	Off-site marsh	4.5-5	-
8/2007	Off-site marsh	DAL-SD-EP11-0-0010	EP11	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP11-0-0010 (Lab Dup)	EP11	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP11-0-0030	EP11	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP11-0-0030 (Lab Dup)	EP11	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP11-DB-0030	EP11	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP11-DB-0030 (Lab Dup)	EP11	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP12-0-0010	EP12	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP12-0-0010 (Lab Dup)	EP12	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP13-0-0010	EP13	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP13-0-0010 (Lab Dup)	EP13	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP13-0-0030	EP13	Off-site marsh	2.5-3	-
8/2007	Off-site marsh	DAL-SD-EP13-0-0030 (Lab Dup)	EP13	Off-site marsh	2.5-3	-

Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	Dry Weight (ng/g)					Wet Weight (ng/g)				
		PFOS	PFBS	PFOSA	PFOA	PFHxS	PFOS	PFBS	PFOSA	PFOA	PFHxS
34.633481	-87.053790	185 [a]	3.00 [a]	-	116	18.2 [a]	-	-	-	-	-
34.633481	-87.053790	-	-	-	116	-	-	-	-	-	-
34.633481	-87.053790	160 [a]	3.45 [a]	-	124	22.0 [a]	-	-	-	-	-
34.633481	-87.053790	-	-	-	129	-	-	-	-	-	-
34.633485	-87.053166	384 [a]	0.739 [a]	-	89.7	9.88 [a]	-	-	-	-	-
34.633485	-87.053166	-	-	-	94.3	-	-	-	-	-	-
34 633485	-87.053166	125 [a]	0.683 [a]	-	30 8	3.80 [a]	-	-	-	-	-
34.633485	-87.053166	-	-	-	31.8	-	-	-	-	-	-
34.633485	-87.053166	75.3 [a]	0.439 [a]	-	25.5	2.96 [a]	-	-	-	-	-
34.633485	-87.053166	-	-	-	28.1	-	-	-	-	-	-
34.633519	-87.052773	1,480 [a]	2.99 [a]	-	265	32.8 [a]	-	-	-	-	-
34.633519	-87.052773	-	-	-	236	-	-	-	-	-	-
34.633519	-87.052773	454 [a]	2.14 [a]	-	148	12.7 [a]	-	-	-	-	-
34.633519	-87.052773	-	-	-	145	-	-	-	-	-	-
34.633504	-87.052499	1,170 [a]	1.63 [a]	-	190	16.1 [a]	-	-	-	-	-
34.633504	-87.052499	-	-	-	193	-	-	-	-	-	-
34.633504	-87.052499	252 [a]	1 43 [a]	-	93.2	8.97 [a]	-	-	-	-	-
34.633504	-87.052499	-	-	-	108	-	-	-	-	-	-
34.633504	-87.052499	1,090 [a]	1 48 [a]	-	152	14.8 [a]	-	-	-	-	-
34.633504	-87.052499	-	-	-	179	-	-	-	-	-	-
34.633253	-87.053482	447 [a]	1.22 [a]	-	80 4	9.98 [a]	-	-	-	-	-
34.633253	-87.053482	-	-	-	107	-	-	-	-	-	-
34.633245	-87.052762	-	-	-	97.6	-	-	-	-	-	-
34.633245	-87.052762	-	-	-	92.3	-	-	-	-	-	-
34.633245	-87.052762	1,030 [a]	3.14 [a]	-	254	25.9 [a]	-	-	-	-	-
34.633245	-87.052762	-	-	-	248	-	-	-	-	-	-
34.633245	-87.052762	314 [a]	1.34 [a]	-	148	10.2 [a]	-	-	-	-	-
34.633245	-87.052762	-	-	-	130	-	-	-	-	-	-
34.633245	-87.052762	279 [a]	0.969 [a]	-	107	8.6 [a]	-	-	-	-	-
34.633245	-87.052762	201 [a]	1.02 [a]	-	123	7.45 [a]	-	-	-	-	-
34.633253	-87.052480	868 [a]	1 11 [a]	-	89.4	7.53 [a]	-	-	-	-	-
34.633253	-87.052480	-	-	-	78	-	-	-	-	-	-
34.632826	-87.053813	670 [a]	1.62 [a]	-	123	15.9 [a]	-	-	-	-	-
34.632826	-87 053813	-	-	-	128	-	-	-	-	-	-
34.632826	-87.053813	187 [a]	1 01 [a]	-	64.1	8 46 [a]	-	-	-	-	-
34.632826	-87.053813	-	-	-	70.1	-	-	-	-	-	-
34.632826	-87.053813	93.3 [a]	0.920 [a]	-	38.8	6.81 [a]	-	-	-	-	-
34.632826	-87.053813	-	-	-	58.6	-	-	-	-	-	-
34.632830	-87 053143	968 [a]	1.28 [a]	-	172	16.9 [a]	-	-	-	-	-
34.632830	-87.053143	-	-	-	161	-	-	-	-	-	-
34 632830	-87 053143	162 [a]	1.12 [a]	-	62 3	7.09 [a]	-	-	-	-	-
34.632830	-87.053143	-	-	-	61.9	-	-	-	-	-	-
34.632830	-87.053143	139 [a]	1.24 [a]	-	67.2	7.86 [a]	-	-	-	-	-
34.632830	-87.053143	-	-	-	56.8	-	-	-	-	-	-
34.632845	-87.052469	736 [a]	5.39 [a]	-	194	26.2 [a]	-	-	-	-	-
34.632845	-87.052469	-	-	-	187	-	-	-	-	-	-
34.632845	-87.052469	201 [a]	1 21 [a]	-	76.7	10.4 [a]	-	-	-	-	-
34.632845	-87.052469	-	-	-	110	-	-	-	-	-	-
34.632845	-87 052469	251 [a]	1.17 [a]	-	97.3	11.9 [a]	-	-	-	-	-
34.632845	-87.052469	-	-	-	126	-	-	-	-	-	-
34.632548	-87.053809	332 [a]	0.485 [a]	-	40.7	4.64 [a]	-	-	-	-	-
34.632548	-87.053809	-	-	-	40.6	-	-	-	-	-	-
34.632544	-87.053474	741 [a]	2.91 [a]	-	166	16 [a]	-	-	-	-	-
34.632544	-87.053474	-	-	-	172	-	-	-	-	-	-
34.632544	-87 053474	345 [a]	1.32 [a]	-	90.1	12.8 [a]	-	-	-	-	-
34.632544	-87.053474	-	-	-	92.3	-	-	-	-	-	-

Table A-4. Historical sediment sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description	Depth (ft bgs)	Approxin River M
8/2007	Off-site marsh	DAL-SD-EP14-0-0010	EP14	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP14-0-0010 (Lab Dup)	EP14	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP14-DB-0010	EP14	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-EP14-DB-0010 (Lab Dup)	EP14	Off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-WP01-0-0010	WP-01	Pond southwest of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-WP02-0-0010	WP-02	Pond southwest of off-site marsh	0-1	-
8/2007	Off-site marsh	DAL-SD-WP02-0-0010 (Lab Dup)	WP-02	Pond southwest of off-site marsh	0-1	-
6/2010	3M Upland	DAL-SD-SD01-0-0000	SD01	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD01-0-0000 (Lab Dup)	SD01	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD01-0-0005	SD01	Avenue A	0 5-1	-
6/2010	3M Upland	DAL-SD-SD01-0-0005 (Lab Dup)	SD01	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD02-0-0000	SD02	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD02-0-0000 (Lab Dup)	SD02	Avenue A	0-0 5	-
6/2010	3M Upland	DAL-SD-SD02-0-0005	SD02	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD02-0-0005 (Lab Dup)	SD02	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD03-0-0000	SD03	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD03-0-0000 (Lab Dup)	SD03	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD03-0-0005	SD03	Avenue A	0 5-1	-
6/2010	3M Upland	DAL-SD-SD03-0-0005 (Lab Dup)	SD03	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD04-0-0000	SD04	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD04-0-0000 (Lab Dup)	SD04	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD04-0-0005	SD04	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD04-0-0005 (Lab Dup)	SD04	Avenue A	0 5-1	-
6/2010	3M Upland	DAL-SD-SD05-0-0000	SD05	Avenue A	0-0 5	-
6/2010	3M Upland	DAL-SD-SD05-0-0000 (Lab Dup)	SD05	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD05-0-0005	SD05	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD05-0-0005 (Lab Dup)	SD05	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD06-0-0000	SD06	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD06-0-0000 (Lab Dup)	SD06	Avenue A	0-0 5	-
6/2010	3M Upland	DAL-SD-SD06-0-0005	SD06	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD06-0-0005 (Lab Dup)	SD06	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD07-0-0000	SD07	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD07-0-0000 (Lab Dup)	SD07	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD07-0-0005	SD07	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD07-0-0005 (Lab Dup)	SD07	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD08-0-0000	SD08	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD08-0-0000 (Lab Dup)	SD08	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD08-DB-0000	SD08	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD08-DB-0000 (Lab Dup)	SD08	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD08-0-0005	SD08	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD08-0-0005 (Lab Dup)	SD08	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD09-0-0000	SD09	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD09-0-0000 (Lab Dup)	SD09	Avenue A	0-0 5	-
6/2010	3M Upland	DAL-SD-SD09-0-0005	SD09	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD09-0-0005 (Lab Dup)	SD09	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD10-0-0000	SD10	Avenue A	0-0 5	-
6/2010	3M Upland	DAL-SD-SD10-0-0000 (Lab Dup)	SD10	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD10-0-0005	SD10	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD10-0-0005 (Lab Dup)	SD10	Avenue A	0 5-1	-
6/2010	3M Upland	DAL-SD-SD11-0-0000	SD11	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD11-0-0000 (Lab Dup)	SD11	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD11-0-0005	SD11	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD11-0-0005 (Lab Dup)	SD11	Avenue A	0 5-1	-
6/2010	3M Upland	DAL-SD-SD12-0-0000	SD12	Avenue A	0-0.5	-

Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	Dry Weight (ng/g)					Wet Weight (ng/g)				
		PFOS	PFBS	PFOSA	PFOA	PFHxS	PFOS	PFBS	PFOSA	PFOA	PFHxS
34.632544	-87.053147	957 [a]	2.64 [a]	-	208	33.5 [a]	-	-	-	-	-
34.632544	-87.053147	-	-	-	207	-	-	-	-	-	-
34.632544	-87.053147	900 [a]	2.41 [a]	-	201	31.1 [a]	-	-	-	-	-
34.632544	-87.053147	-	-	-	186	-	-	-	-	-	-
34.629819	-87.060272	ND	ND	-	ND	ND	-	-	-	-	-
34.629605	-87.059846	ND	ND	-	<0.957	ND	-	-	-	-	-
34.629605	-87.059846	-	-	-	<0 898	-	-	-	-	-	-
34.641251	-87.047960	-	-	-	16.5	-	-	-	-	-	-
34.641251	-87.047960	-	-	-	13.9	-	-	-	-	-	-
34.641251	-87 047960	-	-	-	13.3	-	-	-	-	-	-
34.641251	-87.047960	-	-	-	6.63	-	-	-	-	-	-
34.641174	-87.045352	-	-	-	575	-	-	-	-	-	-
34.641174	-87.045352	-	-	-	539	-	-	-	-	-	-
34.641174	-87.045352	-	-	-	112	-	-	-	-	-	-
34.641174	-87.045352	-	-	-	115	-	-	-	-	-	-
34.641174	-87.043677	-	-	-	93.6	-	-	-	-	-	-
34.641174	-87.043677	-	-	-	116	-	-	-	-	-	-
34.641174	-87.043677	-	-	-	70.5	-	-	-	-	-	-
34 641174	-87.043677	-	-	-	43.6	-	-	-	-	-	-
34 641193	-87 041764	-	-	-	145	-	-	-	-	-	-
34 641193	-87.041764	-	-	-	117	-	-	-	-	-	-
34.641193	-87.041764	-	-	-	80.7	-	-	-	-	-	-
34.641193	-87 041764	-	-	-	74.5	-	-	-	-	-	-
34.641117	-87.040545	-	-	-	52	-	-	-	-	-	-
34.641117	-87.040545	-	-	-	74.6	-	-	-	-	-	-
34.641117	-87.040545	-	-	-	50.2	-	-	-	-	-	-
34.641117	-87.040545	-	-	-	40.4	-	-	-	-	-	-
34.641117	-87.039574	-	-	-	66	-	-	-	-	-	-
34.641117	-87.039574	-	-	-	77.1	-	-	-	-	-	-
34.641117	-87.039574	-	-	-	43.6	-	-	-	-	-	-
34.641117	-87.039574	-	-	-	46.7	-	-	-	-	-	-
34 641479	-87 037404	-	-	-	116	-	-	-	-	-	-
34 641479	-87.037404	-	-	-	96.5	-	-	-	-	-	-
34.641479	-87.037404	-	-	-	123	-	-	-	-	-	-
34 641479	-87.037404	-	-	-	123	-	-	-	-	-	-
34.640889	-87.044847	-	-	-	84.9	-	-	-	-	-	-
34.640889	-87.044847	-	-	-	90.7	-	-	-	-	-	-
34.640889	-87.044847	-	-	-	79.2	-	-	-	-	-	-
34.640889	-87 044847	-	-	-	79.1	-	-	-	-	-	-
34.640889	-87.044847	-	-	-	19.6	-	-	-	-	-	-
34.640889	-87.044847	-	-	-	25.7	-	-	-	-	-	-
34.640794	-87.043134	-	-	-	160	-	-	-	-	-	-
34.640794	-87.043134	-	-	-	153	-	-	-	-	-	-
34.640794	-87.043134	-	-	-	105	-	-	-	-	-	-
34.640794	-87.043134	-	-	-	125	-	-	-	-	-	-
34.640318	-87.043454	-	-	-	987	-	-	-	-	-	-
34.640318	-87.043454	-	-	-	1010	-	-	-	-	-	-
34.640318	-87.043454	-	-	-	663	-	-	-	-	-	-
34.640318	-87.043454	-	-	-	506	-	-	-	-	-	-
34.640124	-87.045274	-	-	-	145	-	-	-	-	-	-
34.640124	-87.045274	-	-	-	150	-	-	-	-	-	-
34.640124	-87.045274	-	-	-	72	-	-	-	-	-	-
34.640124	-87.045274	-	-	-	78.5	-	-	-	-	-	-
34.639457	-87.046016	-	-	-	433	-	-	-	-	-	-

Table A-4. Historical sediment sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description	Depth (ft bgs)	Approxim. River Mi
6/2010	3M Upland	DAL-SD-SD12-0-0000 (Lab Dup)	SD12	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD12-DB-0000	SD12	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD12-DB-0000 (Lab Dup)	SD12	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD12-0-0005	SD12	Avenue A	0 5-1	-
6/2010	3M Upland	DAL-SD-SD12-0-0005 (Lab Dup)	SD12	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD13-0-0000	SD13	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD13-0-0000 (Lab Dup)	SD13	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD13-0-0005	SD13	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD13-0-0005 (Lab Dup)	SD13	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD14-0-0000	SD14	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD14-0-0000 (Lab Dup)	SD14	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD14-0-0005	SD14	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD14-0-0005 (Lab Dup)	SD14	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD15-0-0000	SD15	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD15-0-0000 (Lab Dup)	SD15	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD15-0-0005	SD15	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD15-0-0005 (Lab Dup)	SD15	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD16-0-0000	SD16	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD16-0-0000 (Lab Dup)	SD16	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD16-DB-0000	SD16	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD16-DB-0000 (Lab Dup)	SD16	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD16-0-0005	SD16	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD16-0-0005 (Lab Dup)	SD16	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD17-0-0000	SD17	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD17-0-0000 (Lab Dup)	SD17	Avenue A	0-0.5	-
6/2010	3M Upland	DAL-SD-SD17-0-0005	SD17	Avenue A	0.5-1	-
6/2010	3M Upland	DAL-SD-SD17-0-0005 (Lab Dup)	SD17	Avenue A	0.5-1	-
6/2010	Off-site marsh	DAL-SD-WESA1-0-0000	SD-WESA1	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESA1-0-0000 (Lab Dup)	SD-WESA1	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESA2-0-0000	SD-WESA2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESA2-0-0000 (Lab Dup)	SD-WESA2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESA3-0-0000	SD-WESA3	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESA3-0-0000 (Lab Dup)	SD-WESA3	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB1-0-0000	SD-WESB1	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB1-0-0000 (Lab Dup)	SD-WESB1	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB2-0-0000	SD-WESB2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB2-0-0000 (Lab Dup)	SD-WESB2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB3-0-0000	SD-WESB3	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB3-0-0000 (Lab Dup)	SD-WESB3	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB4-0-0000	SD-WESB4	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB4-0-0000 (Lab Dup)	SD-WESB4	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB4-DB-0000	SD-WESB4	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB4-DB-0000 (Lab Dup)	SD-WESB4	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB5-0-0000	SD-WESB5	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESB5-0-0000 (Lab Dup)	SD-WESB5	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESC1-0-0000	SD-WESC1	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESC1-0-0000 (Lab Dup)	SD-WESC1	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESC2-0-0000	SD-WESC2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESC2-0-0000 (Lab Dup)	SD-WESC2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESC3-0-0000	SD-WESC3	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESC3-0-0000 (Lab Dup)	SD-WESC3	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESC4-0-0000	SD-WESC4	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESC4-0-0000 (Lab Dup)	SD-WESC4	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESD1-0-0000	SD-WESD1	Off-site marsh	-	-

Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	Dry Weight (ng/g)					Wet Weight (ng/g)				
		PFOS	PFBS	PFOSA	PFOA	PFHxS	PFOS	PFBS	PFOSA	PFOA	PFHxS
34.639457	-87.046016	-	-	-	426	-	-	-	-	-	-
34.639457	-87.046016	-	-	-	480	-	-	-	-	-	-
34.639457	-87.046016	-	-	-	471	-	-	-	-	-	-
34.639457	-87.046016	-	-	-	117	-	-	-	-	-	-
34.639457	-87.046016	-	-	-	116	-	-	-	-	-	-
34.639438	-87.045140	-	-	-	151	-	-	-	-	-	-
34.639438	-87.045140	-	-	-	176	-	-	-	-	-	-
34.639438	-87.045140	-	-	-	174	-	-	-	-	-	-
34.639438	-87.045140	-	-	-	165	-	-	-	-	-	-
34.638924	-87.045388	-	-	-	1500	-	-	-	-	-	-
34.638924	-87.045388	-	-	-	1390	-	-	-	-	-	-
34.638924	-87.045388	-	-	-	1330	-	-	-	-	-	-
34.638924	-87.045388	-	-	-	1300	-	-	-	-	-	-
34.639058	-87.045179	-	-	-	604	-	-	-	-	-	-
34.639058	-87.045179	-	-	-	470	-	-	-	-	-	-
34 639058	-87.045179	-	-	-	239	-	-	-	-	-	-
34.639058	-87.045179	-	-	-	282	-	-	-	-	-	-
34.638677	-87.045312	-	-	-	998	-	-	-	-	-	-
34 638677	-87.045312	-	-	-	958	-	-	-	-	-	-
34 638677	-87.045312	-	-	-	1200	-	-	-	-	-	-
34.638677	-87.045312	-	-	-	1070	-	-	-	-	-	-
34.638677	-87.045312	-	-	-	557	-	-	-	-	-	-
34.638677	-87.045312	-	-	-	554	-	-	-	-	-	-
34.638429	-87.045140	-	-	-	1050	-	-	-	-	-	-
34.638429	-87 045140	-	-	-	1040	-	-	-	-	-	-
34.638429	-87.045140	-	-	-	913	-	-	-	-	-	-
34 638429	-87.045140	-	-	-	676	-	-	-	-	-	-
34.630438	-87.055598	-	-	-	28 4	-	-	-	-	-	-
34.630438	-87.055598	-	-	-	30.6	-	-	-	-	-	-
34.630505	-87.055370	-	-	-	33.5	-	-	-	-	-	-
34.630505	-87.055370	-	-	-	29.8	-	-	-	-	-	-
34.630543	-87 055141	-	-	-	33	-	-	-	-	-	-
34.630543	-87.055141	-	-	-	35.8	-	-	-	-	-	-
34.629182	-87.055341	-	-	-	14.4	-	-	-	-	-	-
34.629182	-87.055341	-	-	-	16.4	-	-	-	-	-	-
34.629410	-87.055161	-	-	-	21	-	-	-	-	-	-
34.629410	-87.055161	-	-	-	20.7	-	-	-	-	-	-
34.629648	-87.054999	-	-	-	21	-	-	-	-	-	-
34.629648	-87.054999	-	-	-	23.5	-	-	-	-	-	-
34.629896	-87.054846	-	-	-	21.8	-	-	-	-	-	-
34.629896	-87.054846	-	-	-	23.3	-	-	-	-	-	-
34.629896	-87.054846	-	-	-	24.4	-	-	-	-	-	-
34.629896	-87.054846	-	-	-	26.6	-	-	-	-	-	-
34.630134	-87.054647	-	-	-	48.8	-	-	-	-	-	-
34.630134	-87.054647	-	-	-	45.1	-	-	-	-	-	-
34.628144	-87.053666	-	-	-	30.3	-	-	-	-	-	-
34.628144	-87.053666	-	-	-	28.2	-	-	-	-	-	-
34.628354	-87.053428	-	-	-	38.1	-	-	-	-	-	-
34.628354	-87.053428	-	-	-	39.4	-	-	-	-	-	-
34.628582	-87.053162	-	-	-	30.9	-	-	-	-	-	-
34.628582	-87.053162	-	-	-	38.4	-	-	-	-	-	-
34.629896	-87.054846	-	-	-	22.1	-	-	-	-	-	-
34.629896	-87.054846	-	-	-	20.6	-	-	-	-	-	-
34.627688	-87.052838	-	-	-	8.81	-	-	-	-	-	-

Table A-4. Historical sediment sample results, Tennessee River, Decatur, Alabama

Sample Date	Sample Area	Sample ID	Map ID	Sample Area Description	Depth (ft bgs)	Approxin River M
6/2010	Off-site marsh	DAL-SD-WESD1-0-0000 (Lab Dup)	SD-WESD1	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESD2-0-0000	SD-WESD2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESD2-0-0000 (Lab Dup)	SD-WESD2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESD2-DB-0000	SD-WESD2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESD2-DB-0000 (Lab Dup)	SD-WESD2	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESD3-0-0000	SD-WESD3	Off-site marsh	-	-
6/2010	Off-site marsh	DAL-SD-WESD3-0-0000 (Lab Dup)	SD-WESD3	Off-site marsh	-	-

Note: All historical PFHS results are noted as PFHxS results.
All historical FOSA results are noted as PFOSA results.
< - analyte not detected at reporting limit shown
ng/g - nanogram per gram
NQ - not quantifiable, measured concentration between 0.2 ng/g (wet weight) and the limit of quantitation which is 0.4 ng/g (wet weight)
NR - not reported due to quality control failures
PFBS - perfluorobutane sulfonate
PFHxS - perfluorohexane sulfonate
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
PFOSA - perfluorooctane sulfonamide

[a] Averaged results

Approximate Latitude (decimal degrees)	Approximate Longitude (decimal degrees)	Dry Weight (ng/g)					Wet Weight (ng/g)				
		PFOS	PFBS	PFOSA	PFOA	PFHxS	PFOS	PFBS	PFOSA	PFOA	PFHxS
34.627688	-87.052838	-	-	-	8.33	-	-	-	-	-	-
34.627783	-87.052581	-	-	-	15.7	-	-	-	-	-	-
34.627783	-87.052581	-	-	-	15.7	-	-	-	-	-	-
34.627783	-87.052581	-	-	-	14.5	-	-	-	-	-	-
34.627783	-87.052581	-	-	-	15.1	-	-	-	-	-	-
34.627811	-87.052324	-	-	-	33.6	-	-	-	-	-	-
34.627811	-87.052324	-	-	-	31.7	-	-	-	-	-	-

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Appendix B

Surface Water and Sediment Data Report Including AXYS and CAS Laboratory Reports – Tennessee River in the Vicinity of the 3M Decatur Facility

Exponent®

Appendix B

Surface Water and Sediment Data Report Including AXYS and CAS Laboratory Reports– Tennessee River in the Vicinity of the 3M Decatur Facility

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Acronyms and Abbreviations

AFFF	aqueous film-forming foam
ALS	Analytical Laboratory Services
APM	Ascend Performance Materials
ASTM	American Society for Testing and Materials
AXYS	AXYS Analytical Services
CAS	Columbia Analytical Services
EPA	U.S. Environmental Protection Agency
GPS	global positioning system
Industrial Park	Mallard-Fox Creek Industrial Park
MOU	memorandum of understanding
MS/MSD	matrix spike/matrix spike duplicates
ng/g	nanograms per gram
ng/L	nanograms per liter
NPDES	National Pollutant Discharge Elimination System
PFCs	perfluorinated chemicals
PFCAs	perfluorinated carboxylic acids
PFBA	perfluorobutanoic acid
PFBS	perfluorobutane sulfonate
PFPeA	perfluoropentanoic acid
PFHxS	perfluorohexane sulfonate
PFHxA	perfluorohexanoic acid
PFOS	perfluorooctane sulfonate
PFHpA	perfluoroheptanoic acid
PFOSA	perfluorooctane sulfonamide
PFOA	perfluorooctanoic acid
PFNA	perfluorononanoic acid
PFDA	perfluorodecanoic acid
PFUnA	perfluoroundecanoic acid
PFDoA	perfluorododecanoic acid
PVDF	polyvinylidene fluoride
QA/QC	quality assurance/quality control
SM	standard method
TDS	total dissolved solids
TSS	total suspended solids
TOC	total organic carbon
VDF	vinylidene fluoride
WWTP	wastewater treatment plant

1 Introduction and Purpose

In 2004, 3M and Dyneon entered into a memorandum of understanding (MOU) with the U.S. Environmental Protection Agency (EPA) to develop an environmental assessment program for perfluorooctanoic acid (PFOA) at the 3M Decatur facility located in Decatur, Alabama. The goal of the program was to identify sources and the presence of PFOA in environmental media, including surface water and sediment, on- and offsite.

Between June 2000 and April 2012, several surface water and sediment samples were collected in the Tennessee River and its tributaries, upriver and downriver of the 3M Decatur facility and at the 3M Decatur facility. Some of these sampling events were in response to the MOU. Collected samples were analyzed for various perfluorinated chemicals (PFCs).

In June 2012, Exponent conducted additional surface water and sediment sampling in the Tennessee River and its tributaries in areas upriver and downriver of the 3M Decatur facility. The purpose of this investigation was to provide more current data on PFC concentrations at previously sampled locations and additional data in other locations that have not been as well characterized.

2 Site Setting and History

The 3M Decatur facility covers approximately 900 acres and is located at 1101 State Docks Road in Decatur, Alabama, along the south shoreline of Wheeler Reservoir of the Tennessee River at approximate River Mile 300.5 (Figure B-1). Wheeler Reservoir was created by Wheeler Dam, which is located approximately 25 miles downriver of the 3M Decatur facility at approximate River Mile 275. Wheeler Lake and its tailwaters feed into Wilson Lake located on the west side of Wheeler Dam.

3M began operations at the Decatur facility in 1961 with the construction of a chemical manufacturing plant to produce PFC-related products. In 1962, the facility was expanded to include a film manufacturing plant. Between 1961 and 1962, 3M also constructed an onsite wastewater treatment plant (WWTP) with discharge to the Tennessee River.

Dyneon, located on the southern portion of the 3M Decatur facility, began operations in 1996. Dyneon manufactures vinylidene fluoride (VDF) and polyvinylidene fluoride (PVDF). Process wastewater generated at Dyneon is managed at 3M's treatment plant prior to discharge to the Tennessee River.

During the investigation described in this report, samples were collected in Wheeler Reservoir between River Miles 282 and 308 and in Wilson Lake at approximate River Mile 274.

3 Summary of Field Activities

In June 2012, Exponent collected samples of surface water and sediment (where possible) from 12 areas in the Tennessee River and its tributaries upriver and downriver of the 3M Decatur facility (Figure B-2). These areas were selected to evaluate potential sources of PFCs and/or to update/supplement sampling previously conducted by others.

Sampling areas, surface water sampling methodology, sediment sampling methodology, quality assurance/quality control (QA/QC) samples, and decontamination procedures are discussed in the following sections.

3.1 Sampling Areas

Areas within the Tennessee River sampled in June 2012 by Exponent are shown on Figure B-2 and are listed below. Sampling was not conducted in June 2012 within Bakers Creek because the concentrations of PFCs from several potential sources in this tributary are generally known and 3M's and Daikin's National Pollutant Discharge Elimination System (NPDES) discharges to Bakers Creek are monitored for PFCs on a regular basis. These sampling areas were proximate to:

- Mouth of Big Nance Creek
- Shoreline of International Paper Plant
- Shoreline of Browns Ferry Nuclear Power Plant and near the outfall diffuser
- Mouth of and upstream in Mallard Creek
- Mouth of and upstream in Fox Creek
- Shoreline of Mallard-Fox Creek Industrial Park (Industrial Park)
- Shoreline of Ascend Performance Materials (APM)
- Mouth of and upstream in Betty Rye Branch
- Mouth of and upstream in Dry Branch
- Shoreline west-southwest of Pryor Field Regional Airport
- Decatur Utilities WWTP outfall diffuser area
- Shoreline of Wolverine Tube.

Within each sampling area, sample locations were assigned numerical global positioning system (GPS) waypoints from the boat's GPS system (GPS waypoints 115 through 152). These sample location designations are shown on Figures B-3 through B-11.

3.2 Surface Water Sampling Methodology

Grab surface water samples were collected using a 2.5-L Niskin (polyvinyl chloride) sampler approximately 2 ft from the bottom of the river (sediment surface) at all locations. At locations where the river depth did not allow for use of the Niskin sampler, surface water samples were collected directly with the sample container. In addition, at sampling areas where the average water depth was greater than 10 ft, a second water column sample was collected at approximately 0.2 of the total water depth. Only one shallow surface water sample was collected per sampling area. Samples were poured from the Niskin sampler directly into laboratory-supplied 1-L and 500-mL plastic bottles. The 1-L bottle was submitted to AXYS Analytical Services (AXYS) and the 500-mL bottle was submitted to Columbia Analytical Services (CAS) (Analytical Laboratory Services [ALS] Group). Prior to sample collection at each location, the total estimated depth was recorded and field parameters were measured by lowering a multi-meter probe to the desired sampling depth. Measured water quality parameters included the following:

- pH
- Specific conductivity
- Conductivity
- Temperature
- Dissolved oxygen
- Turbidity.

Samples submitted to AXYS in Sidney, British Columbia, Canada, were analyzed for PFCs by Method MLA-060 (Revision 10). This analysis included the following 13 PFCs:

- Perfluorobutanoic acid (PFBA)
- Perfluoropentanoic acid (PFPeA)
- Perfluorohexanoic acid (PFHxA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorooctanoic acid (PFOA)
- Perfluorononanoic acid (PFNA)
- Perfluorodecanoic acid (PFDA)
- Perfluoroundecanoic acid (PFUnA)
- Perfluorododecanoic acid (PFDoA)
- Perfluorobutane sulfonate (PFBS)

- Perfluorohexane sulfonate (PFHxS)
- Perfluorooctane sulfonate (PFOS)
- Perfluorooctane sulfonamide (PFOSA).

Samples submitted to CAS in Jacksonville, Florida, were analyzed for total suspended solids (TSS) by Standard Method (SM) 2540 D and total dissolved solids (TDS) by SM 2540 C.

Field parameters are shown in Table 1-1 in Attachment 1. Sampling results are shown in Tables 1-2 and 1-3 in Attachment 1. The complete analytical laboratory reports for AXYS and CAS are provided in Attachments 2 and 3, respectively.

3.3 Sediment Sampling Methodology

Sediment samples were collected using a petite Ponar grab sampler (stainless-steel sampler with zinc-plated arms and a neoprene flap to prevent fine material from escaping). Sediment samples were collected from the top 0–6 in. of sediment. Following sample collection, the sediment sample was placed in a clean container and non-sediment materials (e.g., sticks, stones, garbage, etc.) were described and removed. The samples were then placed in laboratory-supplied 250-mL and 500-mL plastic containers. The 250-mL containers were submitted to AXYS and the 500-mL containers were submitted to CAS.

During sediment sampling, observations were also made and recorded regarding fish habitat features at each location. Features noted included the following:

- Extent to which an area is shaded (e.g., shaded by overhanging vegetation or shaded by another structure)
- Presence or absence of aquatic vegetation
- Presence or absence of aquatic structures (e.g., dead trees, rocks, piers/floats, and beaver dams)
- Depth and depth changes over an area (e.g., is there a hole or sharp drop-off in an area)
- Backwater or area sheltered from strong currents
- Sediment type (e.g., sand, soft organic material, etc.).

Samples submitted to AXYS in Sidney, British Columbia, Canada, were analyzed for PFCs by Method MLA-041 (Revision 09). This analysis included the 13 PFCs noted above in Section 3.2.

Samples submitted to CAS in Jacksonville, Florida, were analyzed for particle size by American Society for Testing and Materials (ASTM) Method D422, total organic carbon (TOC) by EPA Method 9060M, and total solids by EPA Method 160.3 Modified.

Sampling results are shown in Tables 1-4 and 1-5 in Attachment 1. The complete analytical laboratory reports for AXYS and CAS are provided in Attachments 2 and 3, respectively.

3.4 Quality Assurance and Quality Control Samples

QA/QC samples were collected during the investigation and included field duplicate, project-specific matrix spike/matrix spike duplicate (MS/MSD), and blank samples.

3.4.1 Field Duplicates

Surface water and sediment field duplicate samples were collected daily for the analysis of PFCs. Field duplicate samples include the following:

- **Surface Water**
  - EX0002, duplicate of EX0001
  - EX0027, duplicate of EX0026
  - EX0071, duplicate of EX0070
  - EX0130, duplicate of EX0129
- **Sediment**
  - EX0017, duplicate of EX0016
  - EX0035, duplicate of EX0024
  - EX0077, duplicate of EX0076
  - EX0142, duplicate of EX0141.

Results of field duplicate samples are summarized in Tables 1-2 and 1-4 in Attachment 1. The complete AXYS analytical laboratory reports are provided in Attachment 2.

3.4.2 Matrix Spike/Matrix Spike Duplicates

Project-specific MS/MSD samples were collected daily for the surface water sampling program and include the following:

- EX0006 (MS) and EX0007 (MSD)
- EX0042 (MS) and EX0043 (MSD)
- EX0064 (MS) and EX0065 (MSD)
- EX0127 (MS) and EX0128 (MSD).

Results of project-specific MS/MSD analyses are included in the AXYS analytical laboratory reports provided in Attachment 2.

3.4.3 Equipment Blanks

Equipment blanks were collected daily for the surface water sampling program. These samples were collected by pouring PFC-free, laboratory-grade distilled water over/through the decontaminated Niskin sampler. Equipment blanks were analyzed for PFCs and include the following samples:

- EX0019
- EX0050
- EX0114
- EX0143.

Results of equipment blanks are presented in Table 1-2 in Attachment 1. The complete AXYS analytical laboratory reports are provided in Attachment 2.

3.4.4 Field Blanks

Field blanks were collected for the surface water sampling program. These samples were collected by pouring PFC-free, laboratory-grade distilled water directly into clean/unused 1-L plastic containers provided by the laboratory. Field blanks were analyzed for PFCs and include the following samples:

- EX0051
- EX0115
- EX0144.

Results of field blanks are presented in Table 1-2 in Attachment 1. The complete AXYS analytical laboratory reports are provided in Attachment 2.

3.5 Decontamination Procedures

All reusable sampling equipment was decontaminated prior to use and between sampling areas. Decontamination was performed by rinsing the equipment with site (i.e., river) water and scrubbing with non-phosphate soap (e.g., Alconox Tergajet) to remove any visible residual material. The scrub brush used was a non-Teflon®/non-coated brush. Scrubbing was followed by a second rinse using site water. The equipment was then rinsed with methanol followed by a final rinse with deionized/distilled water. If equipment was not immediately used after decontamination, it was placed in a clean/decontaminated container.

4 Summary of Sampling Areas

4.1.1 Big Nance Creek

Big Nance Creek discharges to the Tennessee River at approximate River Mile 274, downriver of the Wheeler Dam. Upstream creeks that flow into Big Nance Creek include Muddy Fork and Crow Branch (Figure B-1). Potential sources of PFCs to Big Nance Creek include the land-application of sewage sludge (biosolids) and discharges from the City of Moulton WWTP.

Surface water and sediment samples were collected from the confluence of this creek with the Tennessee River. Sediment could not be collected at Sample Location 119 as this location contained a thick bed of leafy material and small sticks. Because sediment could not be collected at Sample Location 119, the field crew attempted to collect sediment at an alternate location, Sample Location 120. This location was closer to the Tennessee River channel and did contain enough sediment for sample collection. A summary of collected samples is listed in Table B-1 and shown on Figure B-3. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-1. Sampling details, Big Nance Creek

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
118	Mouth of Big Nance Creek to Tennessee River	7	Surface water	June 5, 2012	5	EX0010 and EX0011
			Sediment	June 5, 2012	7	EX0012 and EX0013
119	Mouth of Big Nance Creek to Tennessee River	10	Surface water	June 5, 2012	8	EX0014 and EX0015
120	Mouth of Big Nance Creek to Tennessee River	15	Sediment	June 5, 2012	15	EX0016, EX0017 and EX0018

4.1.2 International Paper Plant

International Paper Plant is a large paper manufacturing facility located along the south shoreline of the Tennessee River at approximate River Mile 283. Potential sources of PFCs in the vicinity of this paper plant include the land-application of biosolids and discharges from this plant to the Tennessee River.

Surface water samples were collected at three locations along the shoreline of this facility. Sediment could not be collected because Sample Locations 116 and 117 contained mainly shells and gravel and Sample Location 115 contained bark, gravel, and a minor amount of sandy red clay. A summary of collected samples is listed in Table B-2 and shown on Figure B-4. Water quality parameters and sample results are presented in Tables 1-1 through 1-3 in Attachment 1.

Table B-2. Sampling details, International Paper Plant

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
115	Along shoreline	34.3	Surface water	June 5, 2012	32	EX0001, EX0002 and EX0003
116	Along shoreline	24.1	Surface water	June 5, 2012	22	EX0004 and EX0005
117	Along shoreline	20.3	Surface water	June 5, 2012	18	EX0008 and EX0009
			Surface water	June 5, 2012	7	EX0020 and EX0021

4.1.3 Browns Ferry Nuclear Power Plant

The Browns Ferry Nuclear Power Plant is located along the north shoreline of the Tennessee River at approximate River Mile 294. Shortly after this plant began operations in January 1975, a fire occurred in the cable spreading room and Unit 1 reactor building. Another fire occurred in 1986 that destroyed a cooling tower. Potential sources of PFCs at this plant include the potential use of PFC-containing aqueous film-forming foams (AFFFs) during these fires that may have contaminated groundwater and surface soils which periodically migrated/eroded into the Tennessee River.

Three surface water samples were collected along the shoreline of the facility and near the outfall diffuser located within the navigation channel of the Tennessee River. Sediment could not be collected because all locations contained mainly shells and gravel. A summary of collected samples is listed in Table B-3 and shown on Figure B-5. Water quality parameters and sample results are presented in Tables 1-1 through 1-3 in Attachment 1.

Table B-3. Sampling details, Browns Ferry Nuclear Power Plant

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
124	Along shoreline	16.4	Surface water	June 6, 2012	14	EX0022 and EX0023
125	Near outfall diffuser	33.4	Surface water	June 6, 2012	31	EX0026, EX0027 and EX0028
			Surface water	June 6, 2012	7	EX0029 and EX0030
126	Along shoreline	9.1	Surface water	June 6, 2012	7	EX0031 and EX0032

4.1.4 Mallard Creek

Mallard Creek is a small tributary that drains into the Tennessee River at approximate River Mile 294. Potential sources of PFCs to Mallard Creek include the land-application of biosolids and discharges from Morris Farms Landfill and Bert Jefferies Landfill (Figure B-1).

Surface water and sediment samples were collected at two locations from Mallard Creek at the mouth and upstream. A summary of collected samples is listed in Table B-4 and shown on Figure B-6. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-4. Sampling details, Mallard Creek

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
127	Mouth of Mallard Creek to Tennessee River	11	Surface water	June 6, 2012	9	EX0033 and EX0034
			Sediment	June 6, 2012	11	EX0024, EX0025 and EX0035
128	Upstream	7	Surface water	June 6, 2012	5	EX0036 and EX0037
			Sediment	June 6, 2012	7	EX0038 and EX0039

4.1.5 Fox Creek

Fox Creek is a small tributary that drains into the Tennessee River at approximate River Mile 296. Potential sources of PFCs to Fox Creek include operations conducted in the nearby Industrial Park and run-off from the Morgan County Regional Landfill (Figure B-1).

Surface water and sediment samples were collected at two locations from Fox Creek at the mouth and upstream. A summary of collected samples is listed in Table B-5 and shown on Figure B-7. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-5. Sampling details, Fox Creek

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
129	Mouth of Fox Creek to Tennessee River	8	Surface water	June 6, 2012	6	EX0040 and EX0041
			Sediment	June 6, 2012	8	EX0044 and EX0045
130	Upstream	2	Surface water	June 6, 2012	0.5	EX0046 and EX0047
			Sediment	June 6, 2012	2	EX0048 and EX0049

4.1.6 Industrial Park

The Industrial Park was completed in 1991 and is located along the south shoreline of the Tennessee River and east of Fox Creek. Potential PFC sources to the river from this area are releases from the Industrial Park and the placement of PFC-containing sediments that may have been dredged from the river and placed along the shoreline.

Surface water and sediment samples were collected at three locations along the shoreline north of this industrial park. A summary of collected samples is listed in Table B-6 and shown on Figure B-7. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-6. Sampling details, Industrial Park

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
131	Along shoreline, north of Industrial Park	7	Surface water	June 7, 2012	5	EX0052 and EX0053
			Sediment	June 7, 2012	7	EX0054 and EX0055

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
132	Along shoreline, north of Industrial Park	15	Surface water	June 7, 2012	13	EX0056 and EX0057
			Sediment	June 7, 2012	15	EX0058 and EX0059
133	Along shoreline, north of Industrial Park	19	Surface water	June 7, 2012	17	EX0060 and EX0061
			Surface water	June 7, 2012	4	EX0062 and EX0063
			Sediment	June 7, 2012	19	EX0066 and EX0067

4.1.7 APM

APM (formerly Chemstrand, Monsanto, and then Solutia) is located along the south shoreline of the Tennessee River at approximate River Mile 302 between Bakers Creek and Betty Rye Branch. Historically, this facility manufactured chemical fibers, polystyrene plastics, and chemicals for use by textile mills and furniture manufacturers. APM may have used PFCs during these manufacturing processes. Discharges from these processes may have drained to the Tennessee River via several NPDES permitted outfalls to Bakers Creek, Betty Rye Branch, and the Tennessee River.

Surface water samples were collected at two locations along the shoreline of this facility. Sediment was only collected at Sample Location 135. Sample Location 134 contained only gravel and no sediment was collected. A summary of collected samples is listed in Table B-7 and shown on Figure B-8. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-7. Sampling details, APM

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
134	Along shoreline of facility	19	Surface water	June 7, 2012	17	EX0068 and EX0069
			Surface water	June 7, 2012	4	EX0070, EX0071 and EX0072
135	Along shoreline of facility	7	Surface water	June 7, 2012	5	EX0073 and EX0074
			Sediment	June 7, 2012	7	EX0075, EX0076 and EX0077

4.1.8 Betty Rye Branch

Betty Rye Branch is a small tributary that drains into the Tennessee River at approximate River Mile 303. This area may be potentially impacted by discharges from industrial and commercial sources (APM and Nichols Aluminum).

Surface water and sediment samples were collected at two locations in Betty Rye Branch at the mouth and upstream. A summary of collected samples is listed in Table B-8 and shown on Figure B-9. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-8. Sampling details, Betty Rye Branch

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
136	Mouth of Betty Rye Branch to Tennessee River	8	Surface water	June 7, 2012	6	EX0078 and EX0079
			Sediment	June 7, 2012	8	EX0080 and EX0081
137	Upstream, adjacent to crossing for Highway 20	5	Surface water	June 7, 2012	3	EX0082 and EX0083
			Sediment	June 7, 2012	5	EX0084 and EX0085

4.1.9 Dry Branch

Dry Branch is a small tributary that drains into the Tennessee River at approximate River Mile 303. Several industrial and commercial companies and a major municipal wastewater treatment plant (Decatur Utilities WWTP) are located along Dry Branch and may be potential historic and/or current sources of PFCs.

Samples were collected at the mouth of and upstream within Dry Branch. A summary of collected samples is listed in Table B-9 and shown on Figure B-9. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-9. Sampling details, Dry Branch

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
138	Mouth of Dry Branch to Tennessee River, west side of WWTP	2	Surface water	June 7, 2012	0.5	EX0086 and EX0087
			Sediment	June 7, 2012	2	EX0088 and EX0089
139	Upstream, adjacent to crossing for Highway 20	8.5	Surface water	June 7, 2012	6.5	EX0090 and EX0091
			Sediment	June 7, 2012	8.5	EX0092 and EX0093

4.1.10 Pryor Field Regional Airport

Pryor Field is a small regional airport located at approximate River Mile 305. Potential sources of PFCs in this sampling area are the land-application of biosolids and the potential use of PFC-containing AFFFs at Pryor Field Regional Airport.

Samples were collected at five locations along the shoreline, downriver of the airport. Sediment could not be collected at Sample Location 144 as this location contained mainly shells with minor gravel and reddish-orange clay. A summary of collected samples is listed in Table B-10 and shown on Figure B-10. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-10. Sampling details, Pryor Field Regional Airport

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
140	Along shoreline, downriver of airport	4.5	Surface water	June 7, 2012	2	EX0094 and EX0095
			Sediment	June 7, 2012	4.5	EX0096 and EX0097
141	Along shoreline, downriver of airport	3	Surface water	June 7, 2012	0.5	EX0098 and EX0099
			Sediment	June 7, 2012	3	EX0100 and EX0101
142	Along shoreline, downriver of airport	9.5-10.9	Surface water	June 7, 2012	8.9	EX0102 and EX0103
			Sediment	June 7, 2012	9.5	EX0104 and EX0105

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
143	Along shoreline, downriver of airport	4.3	Surface water	June 7, 2012	2.3	EX0106 and EX0107
			Sediment	June 7, 2012	4.3	EX0108 and EX0109
144	Along shoreline, downriver of airport	4.5	Surface water	June 7, 2012	2.5	EX0110 and EX0111

4.1.11 Decatur Utilities WWTP

The Decatur Utilities WWTP is located upriver of the 3M Decatur facility at approximate River Mile 303.5. The Decatur Utilities WWTP receives wastewater from residential and industrial sources, including local facilities that manufacture or use PFCs and may discharge PFC-containing wastewater to the WWTP.

Surface water samples were collected in the vicinity of the outfall diffuser for the WWTP located within the navigation channel of the Tennessee River. Sediment could not be collected in this area because these locations contained mainly shells and gravel. A summary of collected samples is listed in Table B-11 and shown on Figure B-9. Water quality parameters and sample results are presented in Tables 1-1 through 1-3 in Attachment 1.

Table B-11. Sampling details, Decatur Utilities WWTP

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
145	Area of outfall diffuser	34	Surface water	June 8, 2012	32	EX0116 and EX0117
146	Area of outfall diffuser	31	Surface water	June 8, 2012	29	EX0119 and EX0120
147	Area of outfall diffuser	29–30	Surface water	June 8, 2012	6	EX0121 and EX0122
			Surface water	June 8, 2012	28	EX0123 and EX0124
148	Area of outfall diffuser	34	Surface water	June 8, 2012	32	EX0125 and EX0126
149	Area of outfall diffuser	35	Surface water	June 8, 2012	33	EX0129, EX0130, and EX0131

4.1.12 Wolverine Tube

The Wolverine Tube facility is located upriver of the 3M Decatur facility at approximate River Mile 307. Potential sources of PFCs in the Wolverine Tube sampling area include the land-application of biosolids and discharges from historical facilities that may have used PFCs (Wolverine Tube and HCI Coatings).

Surface water samples were collected along the shoreline of Wolverine Tube near three outfalls for the facility. Sediments samples were collected in the vicinity of Outfalls 1 and 3. Sediment could not be collected in the vicinity of Outfall 2 as this location contained mainly shells and gravel. A summary of collected samples is listed in Table B-12 and shown on Figure B-11. Water quality parameters and sample results are presented in Tables 1-1 through 1-5 in Attachment 1.

Table B-12. Sampling details, Wolverine Tube

Sample Location	Sample Location Description	Total Depth of River at Sample Location (ft)	Media Sampled	Sample Date	Sample Depth (ft)	Sample ID
150	Area of Outfall 1 (downriver outfall)	3	Surface water	June 8, 2012	0.5	EX0132 and EX0133
			Sediment	June 8, 2012	3	EX0134 and EX0135
151	Area of Outfall 2 (middle outfall)	3.5	Surface water	June 8, 2012	2	EX0136 and EX0137
152	Area of Outfall 3 (upriver outfall)	4	Surface water	June 8, 2012	2	EX0138 and EX0139
			Sediment	June 8, 2012	4	EX0140, EX0141, and EX0142

5 Summary of Sampling Results

5.1 Big Nance Creek and International Paper Plant

PFOS concentrations in surface water samples collected in the vicinity of Big Nance Creek and the International Paper Plant ranged from 18.3 (Big Nance Creek) to 45.9 nanograms per liter (ng/L) (International Paper Plant). Notably, PFHxA concentrations in the vicinity of Big Nance Creek and the International Paper Plant were comparable to PFOS concentrations in surface water samples from the same sample locations.

PFOA concentrations in surface water samples collected in the vicinity of Big Nance Creek and the International Paper Plant ranged from 15.3 (Big Nance Creek) to 30.2 ng/L (Big Nance Creek).

PFBS and PFHxS were also detected in surface water samples collected in the vicinity of Big Nance Creek and the International Paper Plant. PFBS concentrations ranged from 15 (Big Nance Creek) to 28 ng/L (International Paper Plant) and the PFHxS concentration ranged from 4.64 (Big Nance Creek) to 6.3 ng/L (International Paper Plant).

The remaining PFCs evaluated in surface water were measured in concentrations ranging from non-detect to 21.4 ng/L (PFBA at International Paper Plant).

PFOS, PFOSA, PFOA and PFDA were detected in sediment samples collected from Big Nance Creek up to 3.08, 0.195, 0.107, and 0.124 nanograms per gram (ng/g), respectively.

5.2 Browns Ferry Nuclear Power Plant, Mallard Creek, Fox Creek, Industrial Park, APM, Betty Rye Branch, and Dry Branch

Concentrations of PFOS in surface water samples collected in these areas ranged from 5.31 (APM) to 153 ng/L (Fox Creek). Also notable are the PFOS concentrations that ranged from 75.9 to 101 ng/L in the surface water samples collected in the Industrial Park area. PFOSA concentrations in surface water samples ranged from non-detect (APM and Browns Ferry Nuclear Power Plant) to 8.44 ng/L (Industrial Park).

Concentrations of PFOA in surface water samples collected in these areas ranged from 3.68 (APM) to 101 ng/L (Fox Creek).

PFBS and PFHxS were detected in surface water samples with concentrations up to 59.8 and 40.1 ng/L, respectively. PFBA was also detected with concentrations up to 91.8 ng/L. These maximum concentrations were measured in the sample collected upstream in Fox Creek.

A wide range of PFHpA and PFHxA concentrations was also observed. PFHpA concentrations ranged from 2.53 (APM) to 56.3 ng/L (Fox Creek). PFHxA concentrations ranged from 3.76 (Browns Ferry Nuclear Power Plant) to 162 ng/L (Fox Creek). The maximum PFHxA concentration of 162 ng/L was the highest result for any of the PFCs.

The remaining PFCs evaluated in surface water were measured in concentrations ranging from non-detect to 40.8 ng/L (PFPeA at Fox Creek).

PFOS and PFOSA were detected in all sediment samples collected in these areas. The concentrations of PFOS ranged from 0.871 (APM) to 14.6 ng/g (Industrial Park). PFOSA concentrations ranged from 0.102 (APM) to 1.84 ng/g (Industrial Park).

PFOA concentrations in sediment samples ranged from non-detect to 0.811 ng/g (Industrial Park). Other PFCs detected in sediment included PFBS, PFHxS, PFHxA, PFHpA, PFDA, and PFDoA with a maximum concentration of 0.27 ng/g (PFHxA at Fox Creek).

5.3 Pryor Field Regional Airport, Decatur Utilities WWTP, Wolverine Tube

Concentrations of PFOS in surface water samples ranged from 2.71 (Pryor Field Regional Airport) to 9.15 ng/L (Wolverine Tube). Concentrations of PFOA in surface water samples ranged from 1.8 (Decatur Utilities WWTP outfall diffuser) to 5.89 ng/L (Wolverine Tube).

Concentrations of PFBA in surface water samples ranged from 8.75 (Decatur Utilities WWTP outfall diffuser) to 10.5 ng/L (Wolverine Tube).

Concentrations of the remaining perfluorinated carboxylic acids (PFCAs) evaluated in surface water ranged from non-detect to 4.87 ng/L (PFHpA at Wolverine Tube). Concentrations of the remaining perfluorinated sulfonates in surface water samples ranged from non-detect to 2.39 ng/L (PFBS at Wolverine Tube). The highest concentrations of the carboxylates and sulfonates were measured in samples collected in the vicinity of Wolverine Tube.

PFOS concentrations in sediment collected ranged from non-detect to 0.511 ng/g (Pryor Field Regional Airport). The only other PFC detected in sediment was PFUnA at 0.106 ng/g (Pryor Field Regional Airport).

Figures

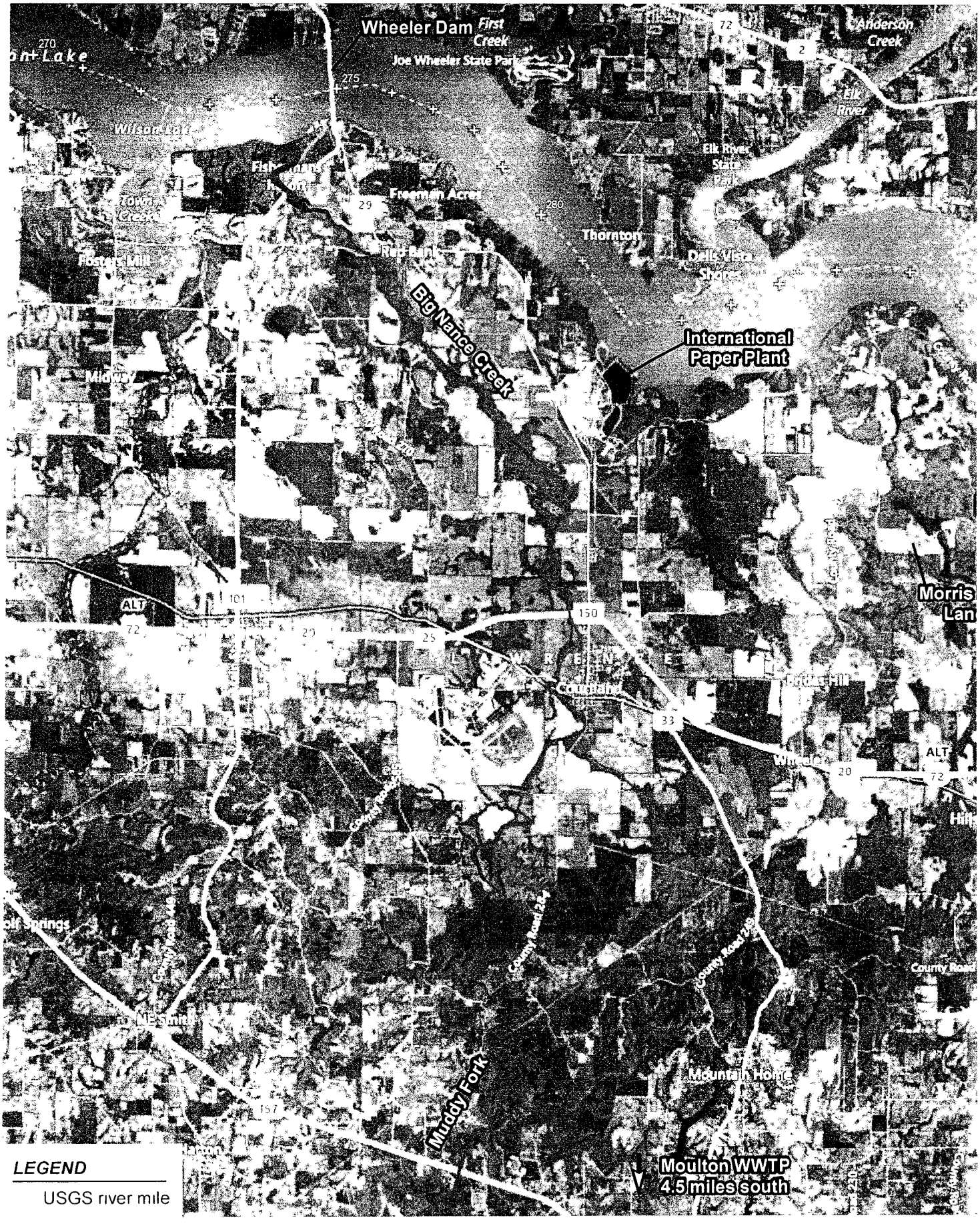
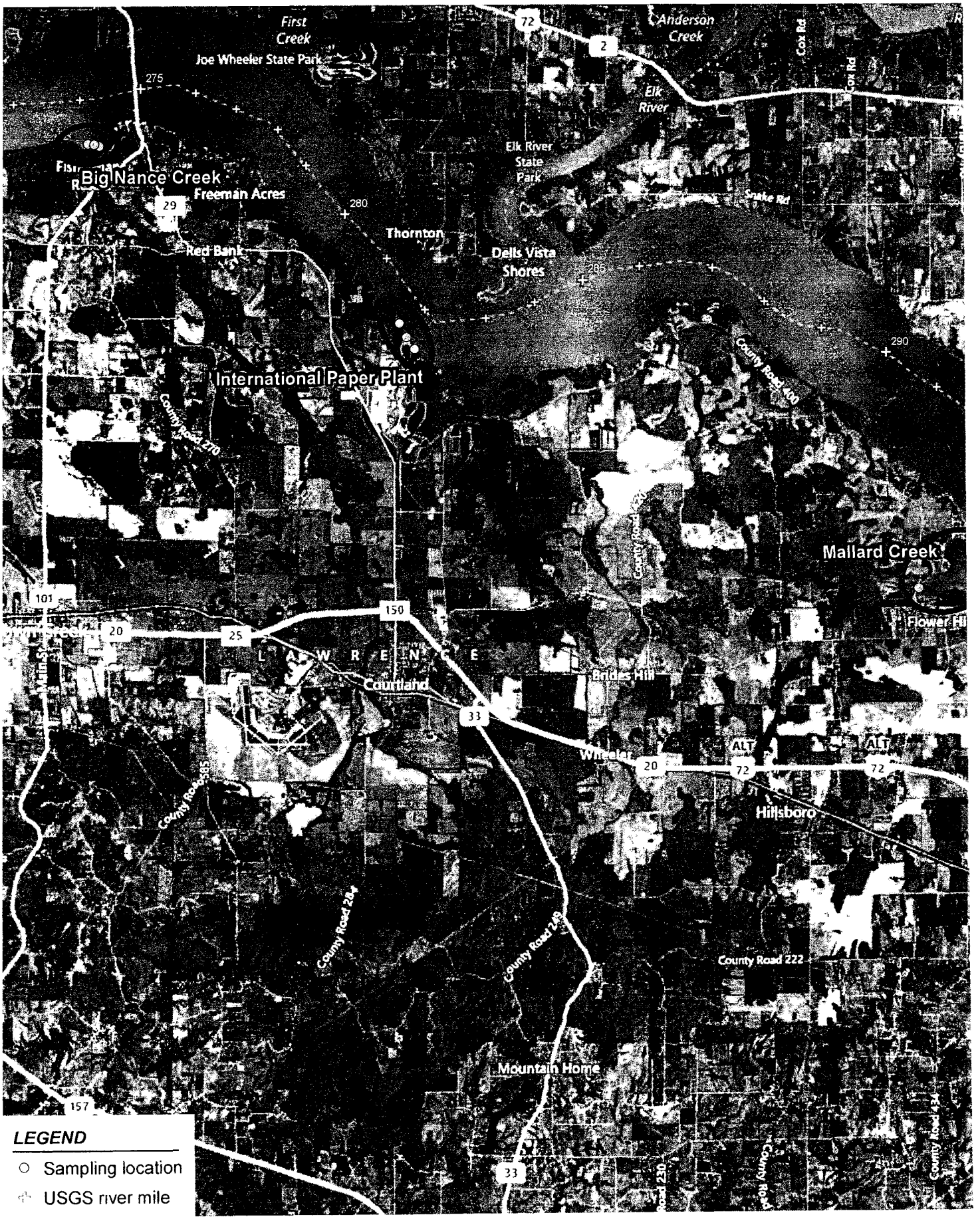

Wheeler Dam
First Creek
Joe Wheeler State Park
Anderson Creek
Elk River
Elk River State Park
Wilson Lake
Freeman Acres
Thornton
Big Nance Creek
International Paper Plant
Morris Lan
Muddy Fork
Moulton WWTP
4.5 miles south
LEGEND
USGS river mile

Figure B-1. Vicinity map

Tennessee River, Decatur, Alabama


First Creek
Joe Wheeler State Park
275
Big Nance Creek
Freeman Acres
29
280
Thornton
Red Bank
72
2
Anderson Creek
Cox Rd
Elk River
Elk River State Park
Snake Rd
Dells Vista Shores
285
290
County Road 450
International Paper Plant
County Road 270
Mallard Creek
101
150
20
25
L A W R E N C E
Courtland
Main St
Bridles Hill
Flower Hi
33
ALT
Wheeler
20
72
Hillsboro
County Road 585
County Road 284
County Road 249
County Road 222
Mountain Home
157
33
County Road 230
LEGEND
Sampling location
USGS river mile

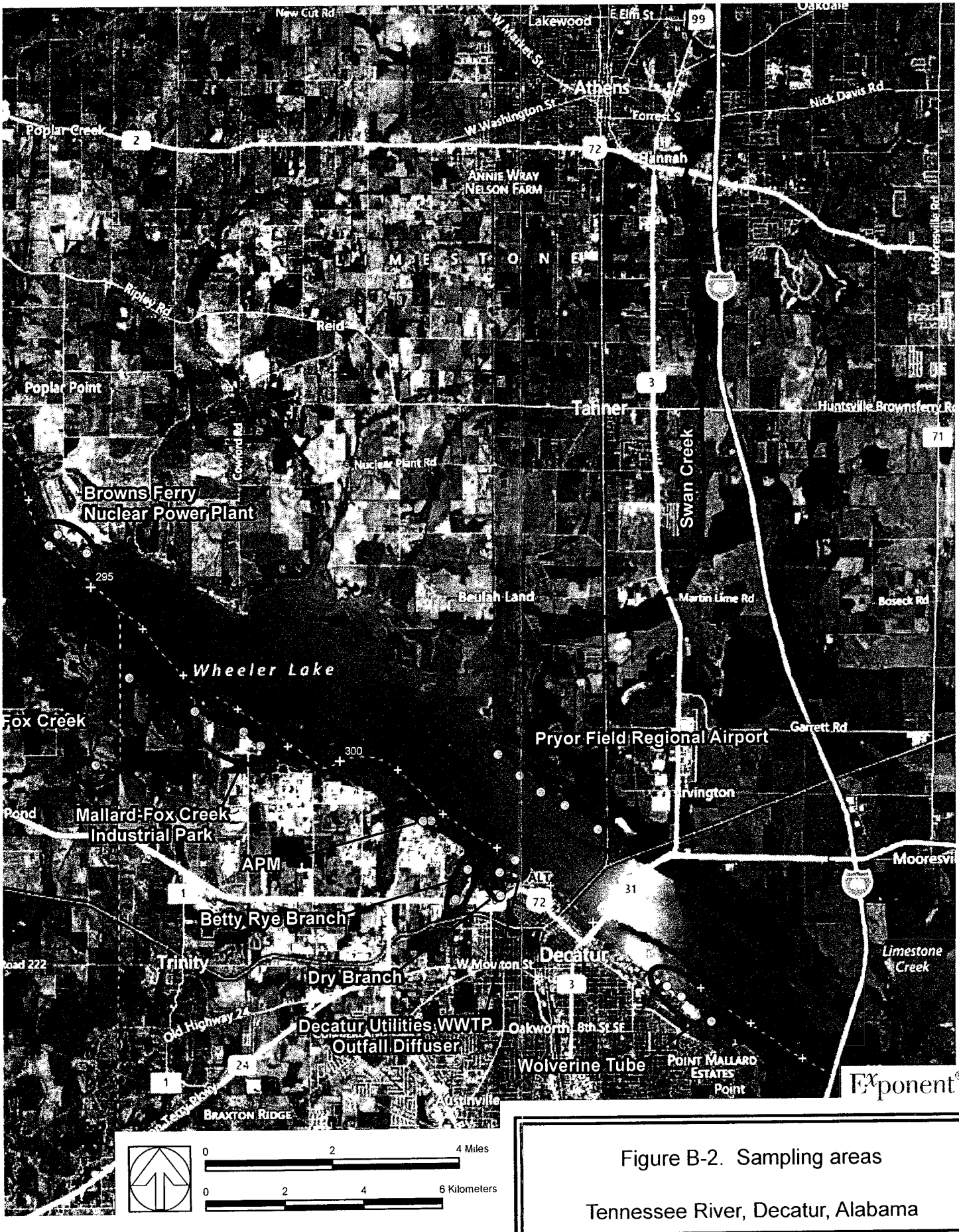
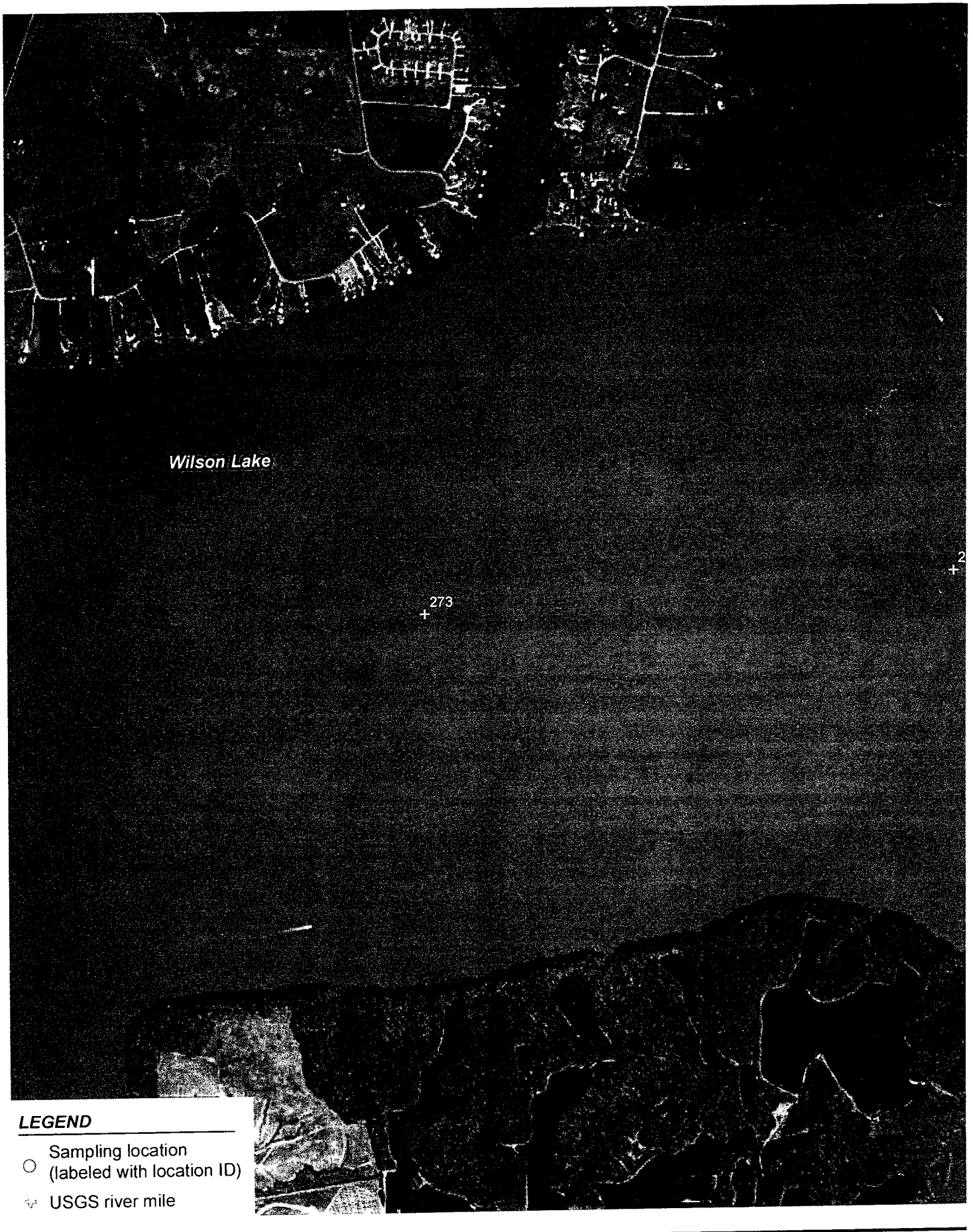


Figure B-2. Sampling areas

Tennessee River, Decatur, Alabama


Wilson Lake
273
2
LEGEND
Sampling location
(labeled with location ID)
USGS river mile

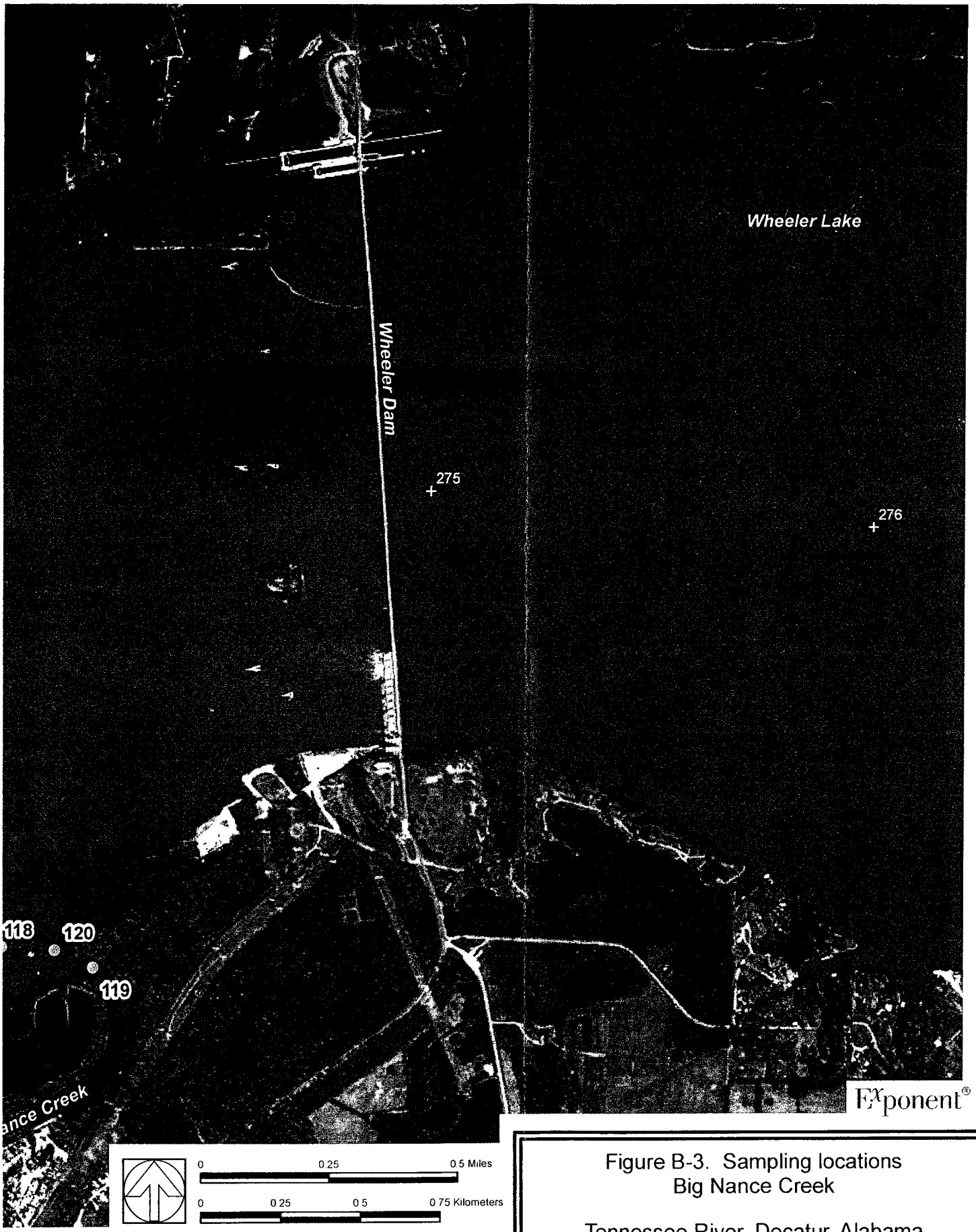
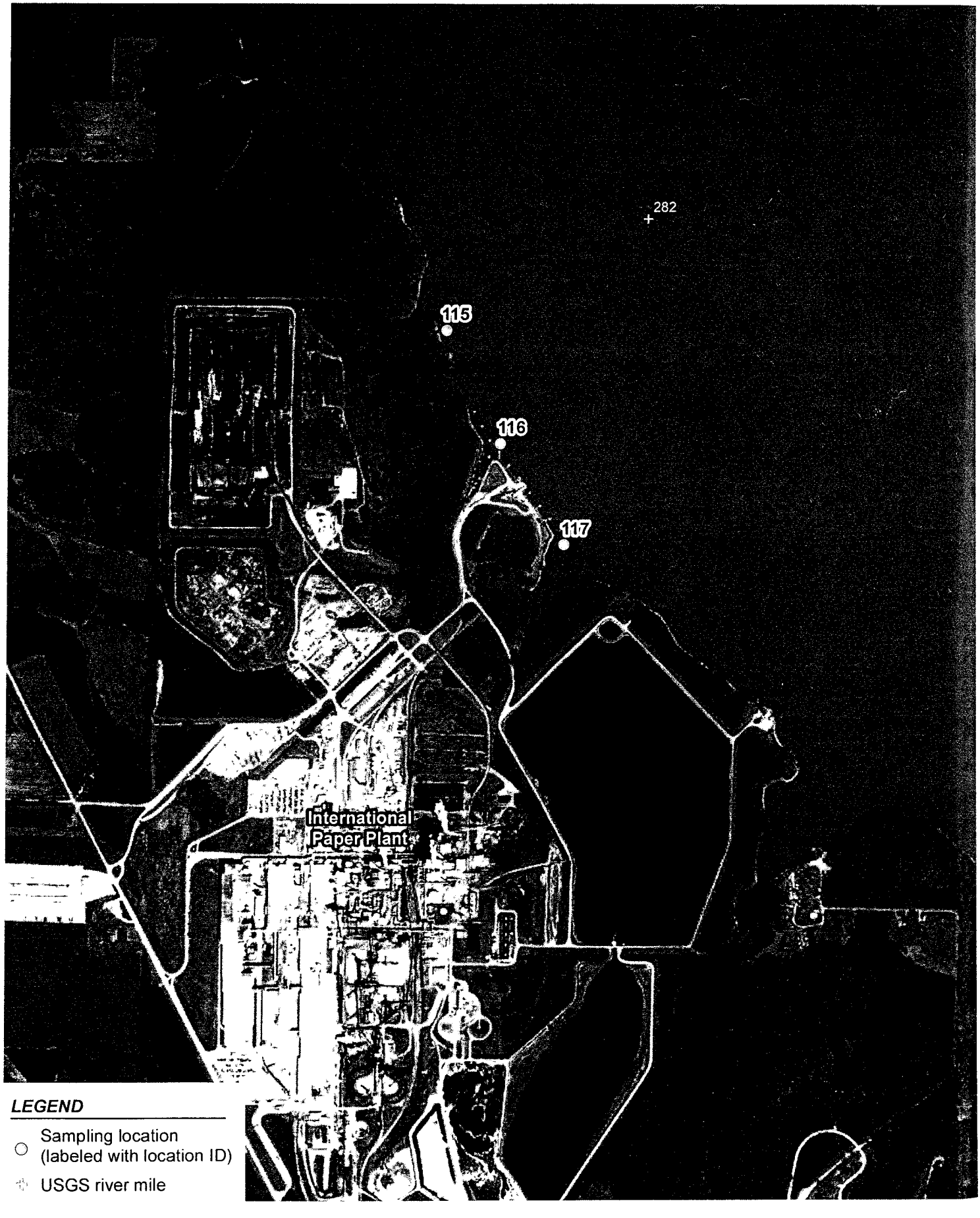


Figure B-3. Sampling locations
Big Nance Creek

Tennessee River, Decatur, Alabama


282
115
116
117
International Paper Plant
LEGEND
Sampling location (labeled with location ID)
USGS river mile

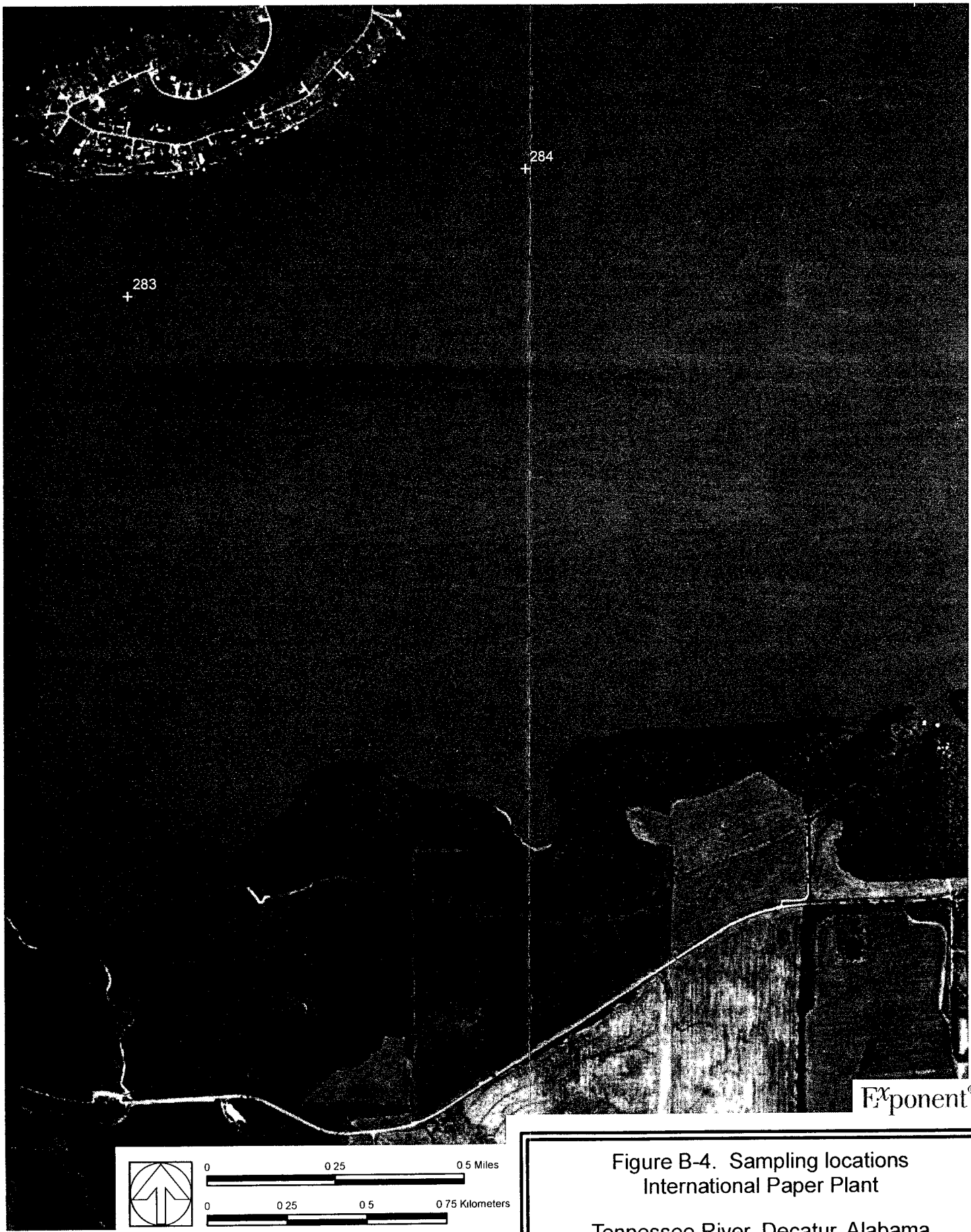


Figure B-4. Sampling locations
International Paper Plant

Tennessee River, Decatur, Alabama

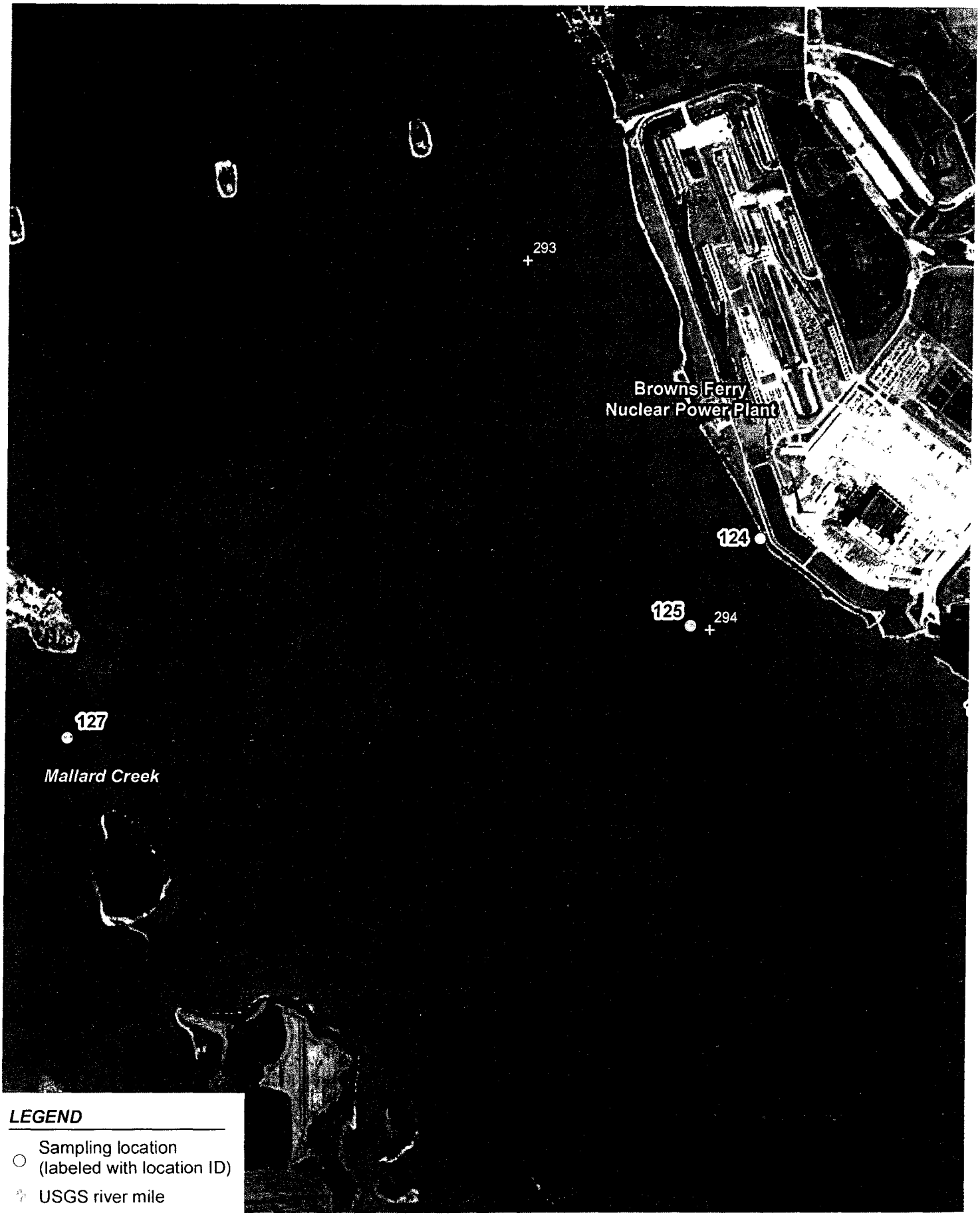
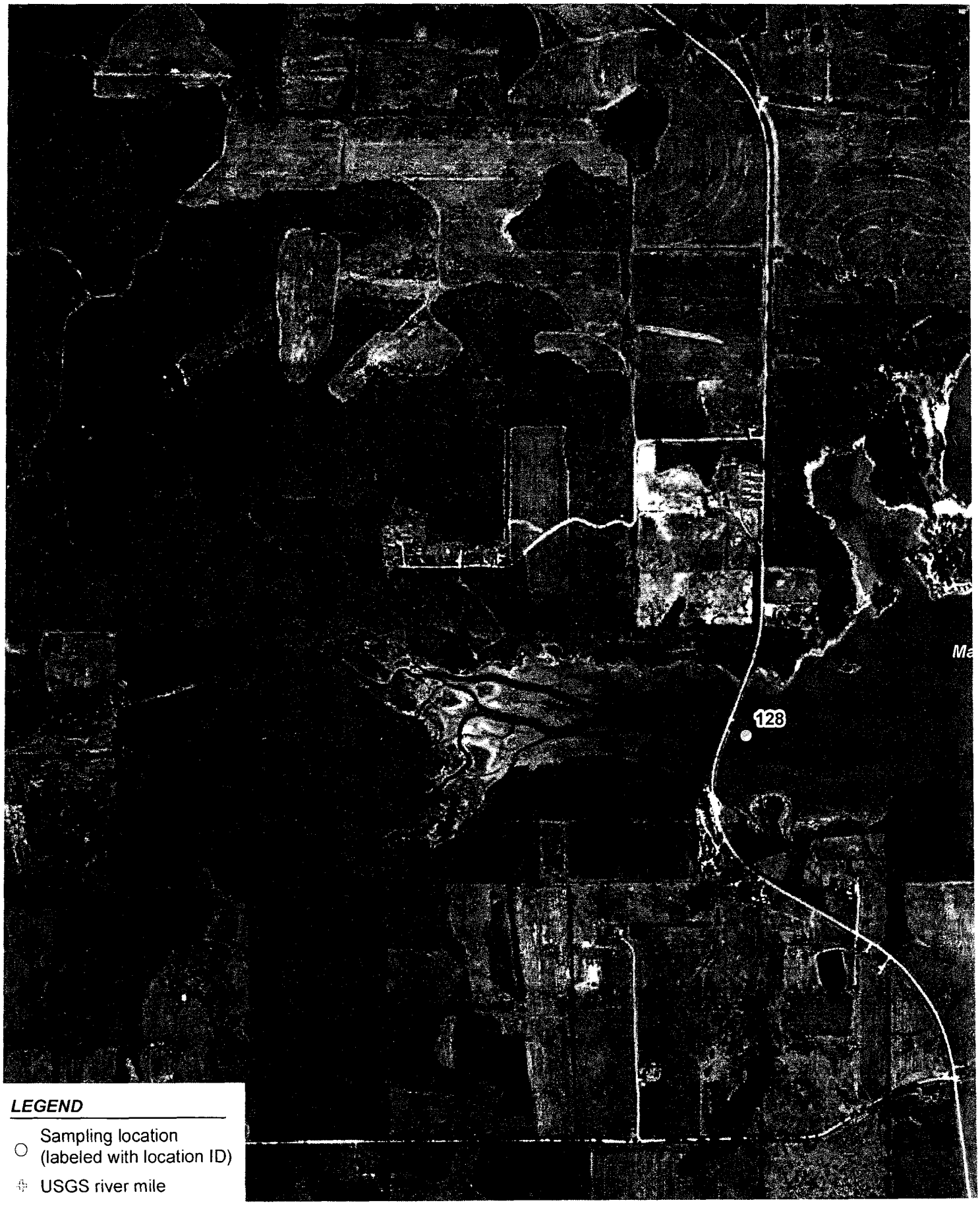

293
Browns Ferry
Nuclear Power Plant
124
125
294
127
Mallard Creek
LEGEND
Sampling location
(labeled with location ID)
USGS river mile

Figure B-5. Sampling locations
Browns Ferry Nuclear Power Plant

Tennessee River, Decatur, Alabama


128
LEGEND
Sampling location
(labeled with location ID)
USGS river mile

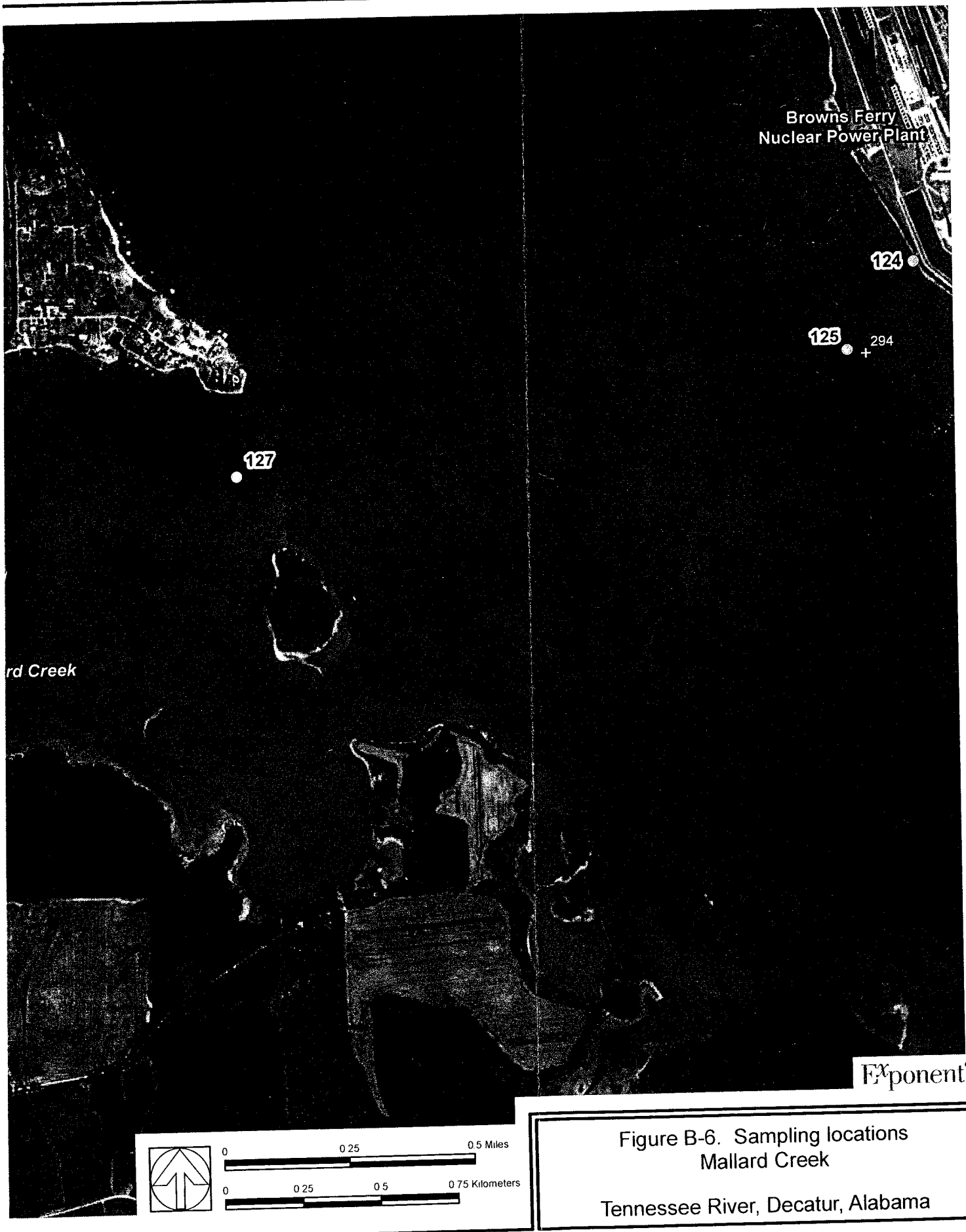
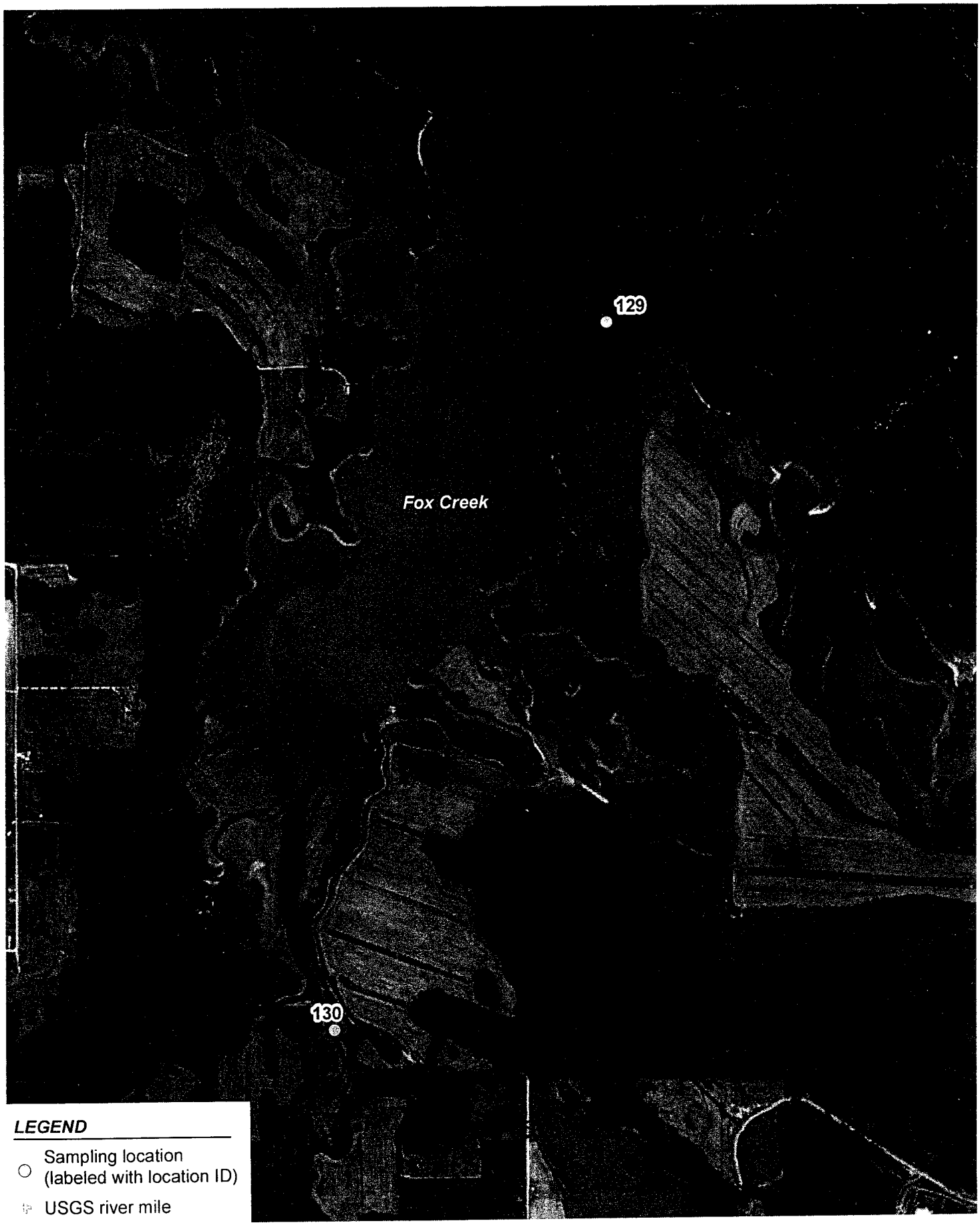


Figure B-6. Sampling locations
Mallard Creek

Tennessee River, Decatur, Alabama


129
Fox Creek
130
LEGEND
Sampling location (labeled with location ID)
USGS river mile

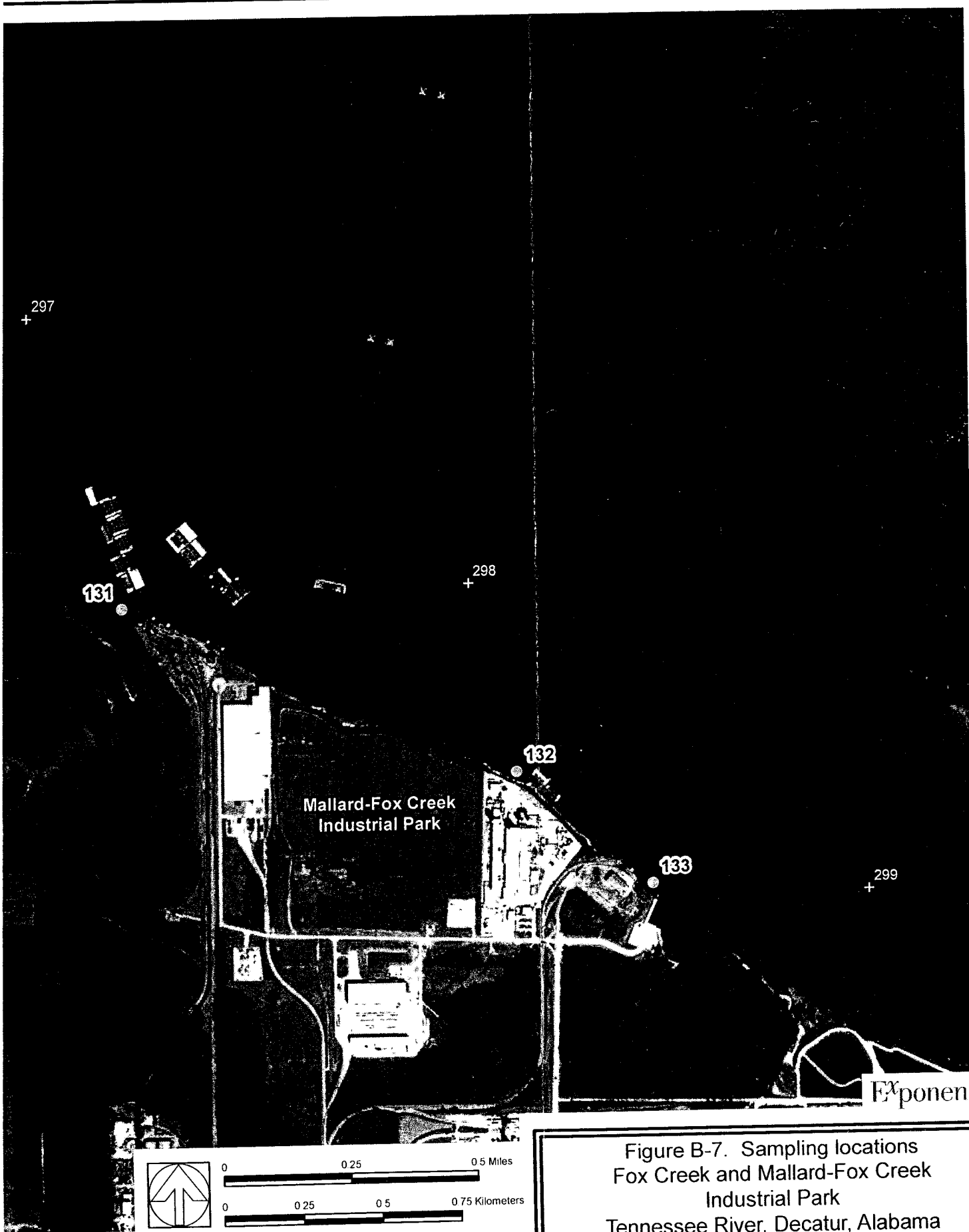


Figure B-7. Sampling locations
Fox Creek and Mallard-Fox Creek
Industrial Park
Tennessee River, Decatur, Alabama

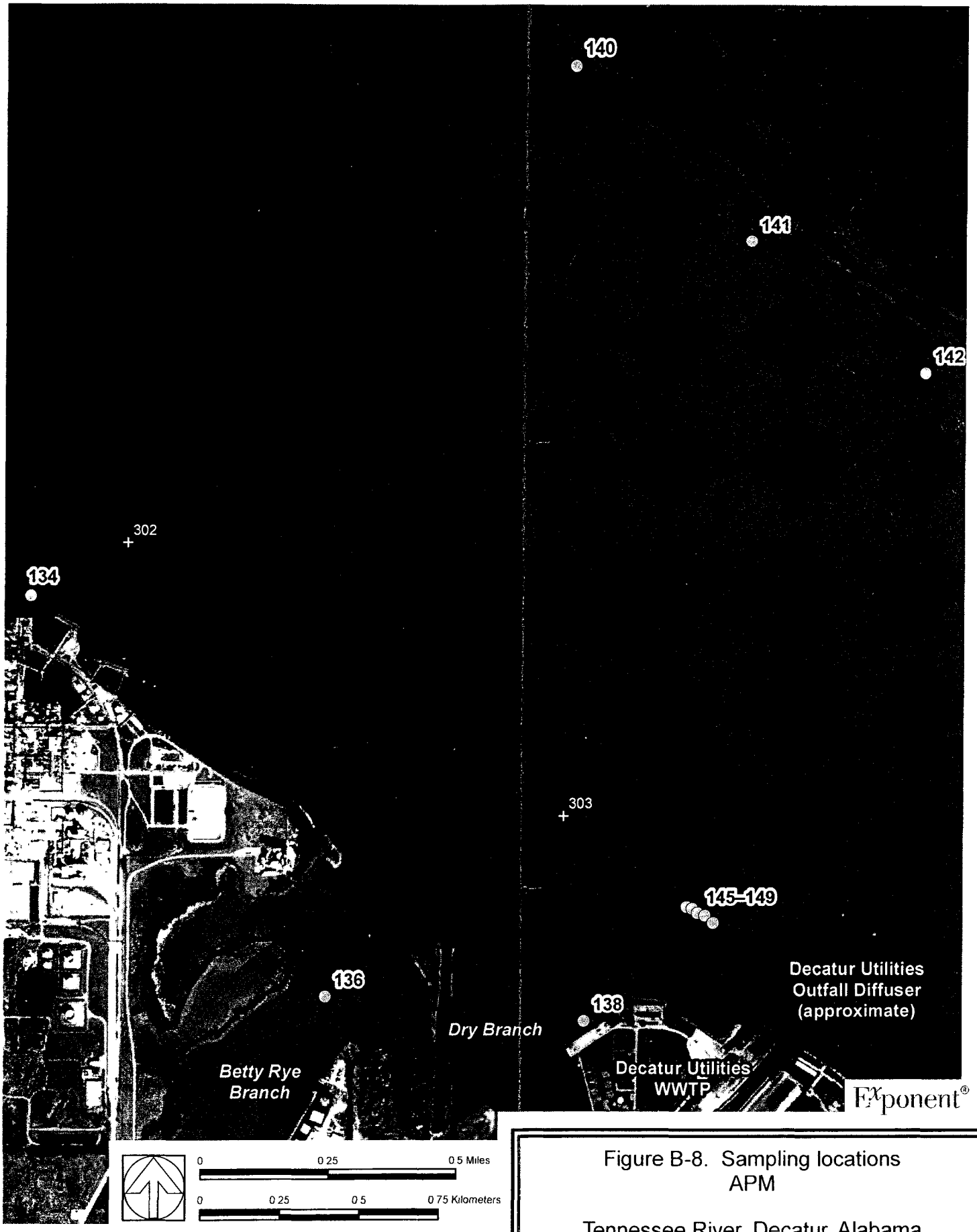
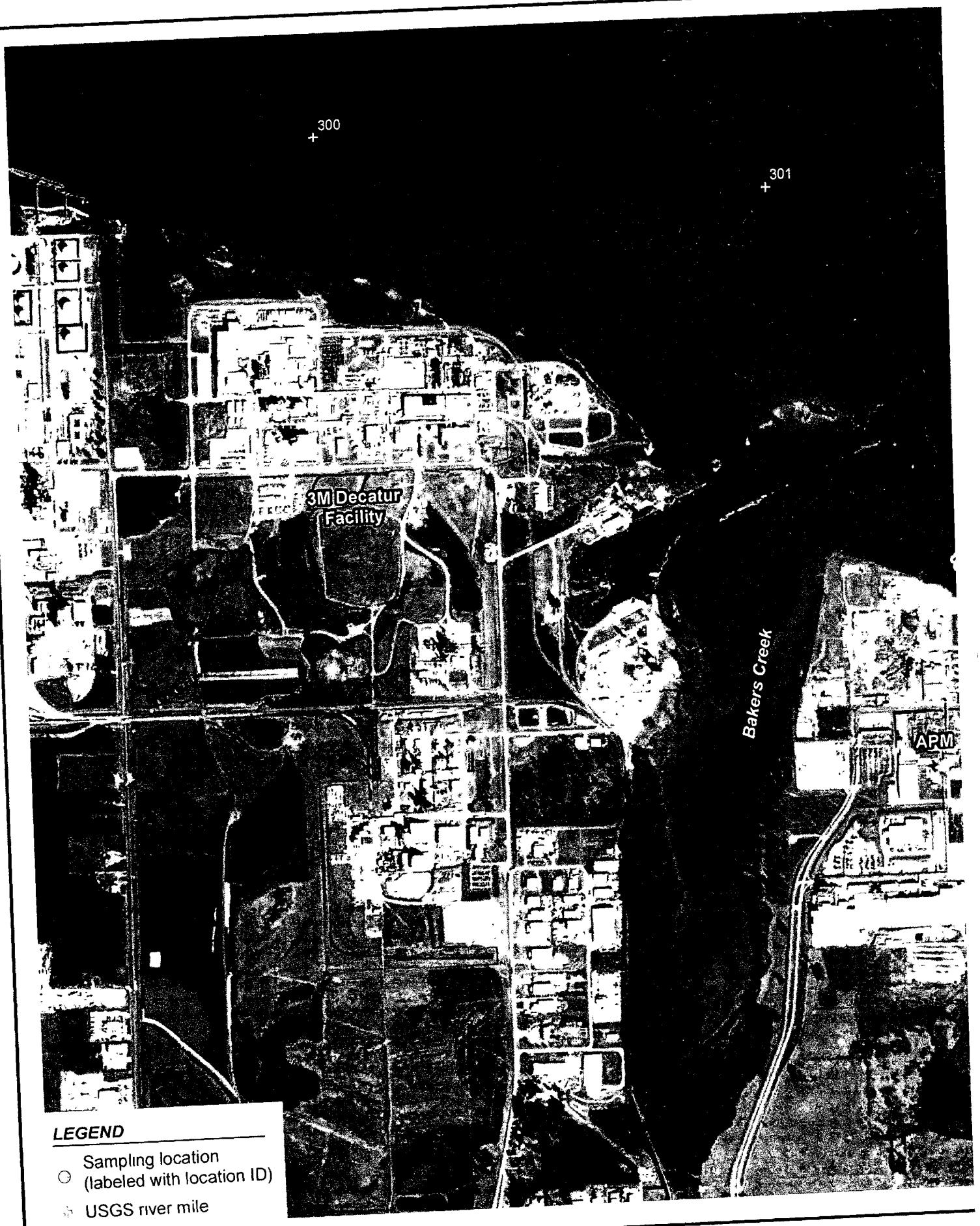
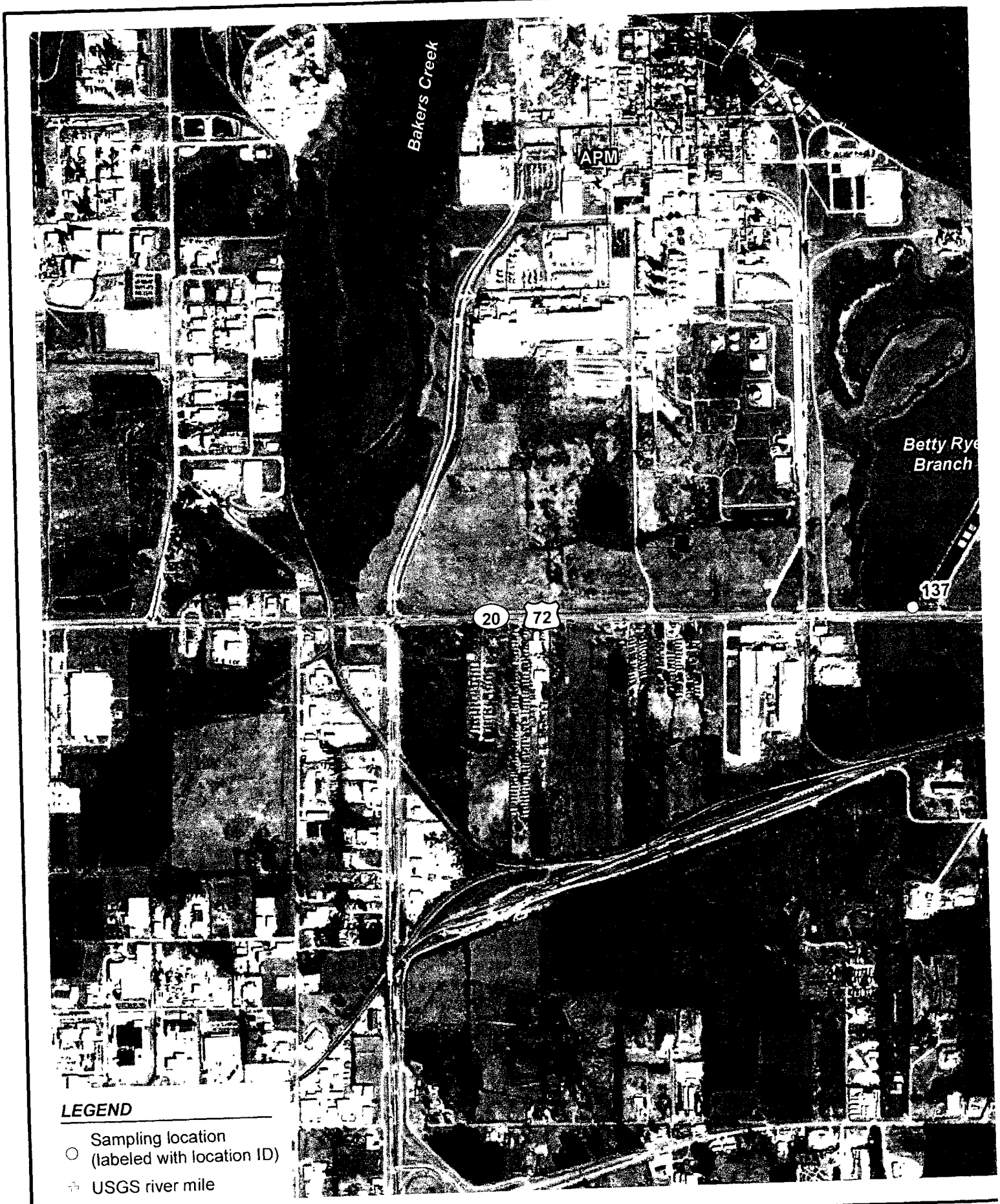


Figure B-8. Sampling locations
APM

Tennessee River, Decatur, Alabama


300
301
3M Decatur Facility
Bakers Creek
APM
LEGEND
Sampling location (labeled with location ID)
USGS river mile


Bakers Creek
APM
Betty Rye
Branch
137
20
72
LEGEND
Sampling location
(labeled with location ID)
USGS river mile

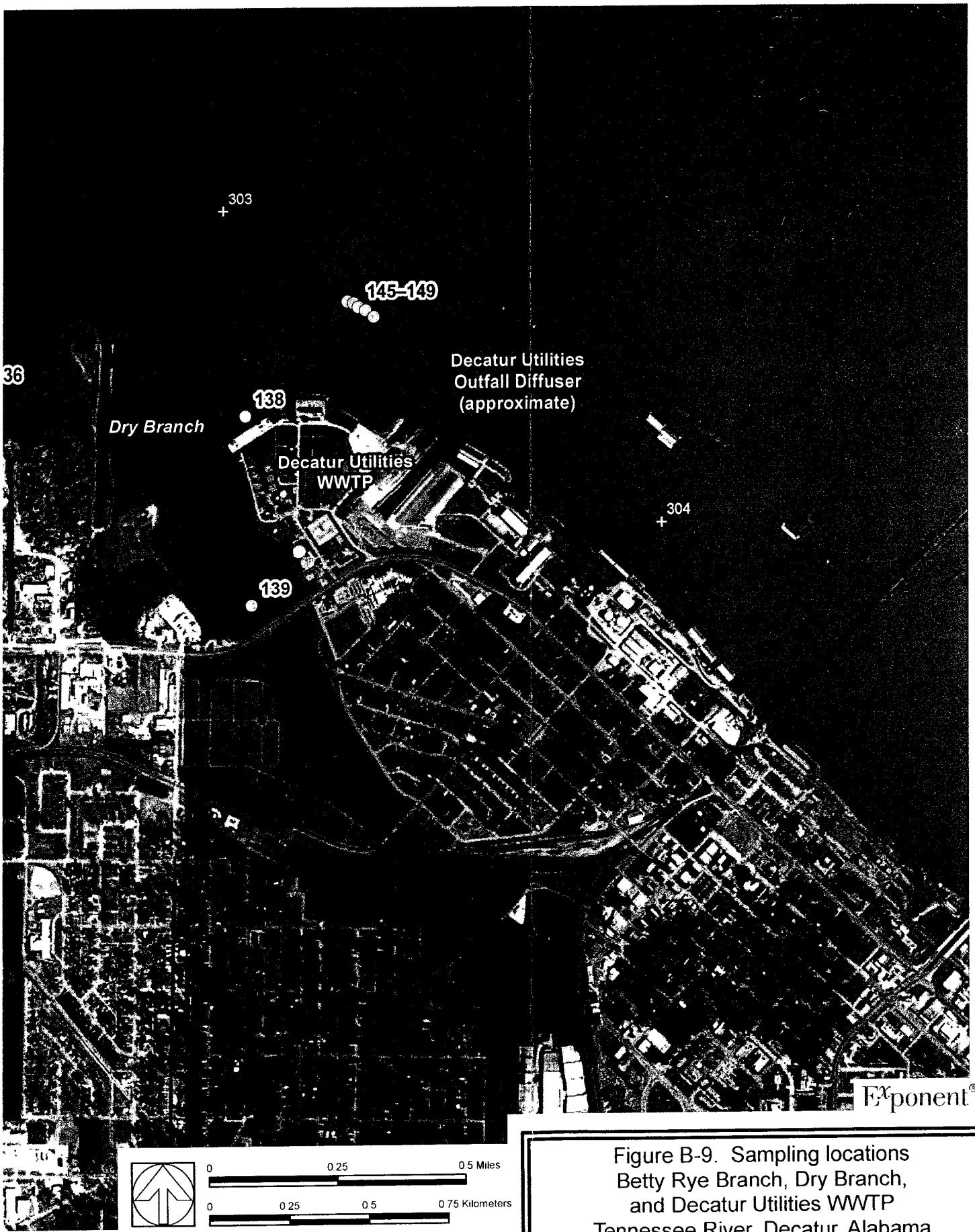


Figure B-9. Sampling locations
Betty Rye Branch, Dry Branch,
and Decatur Utilities WWTP
Tennessee River, Decatur, Alabama

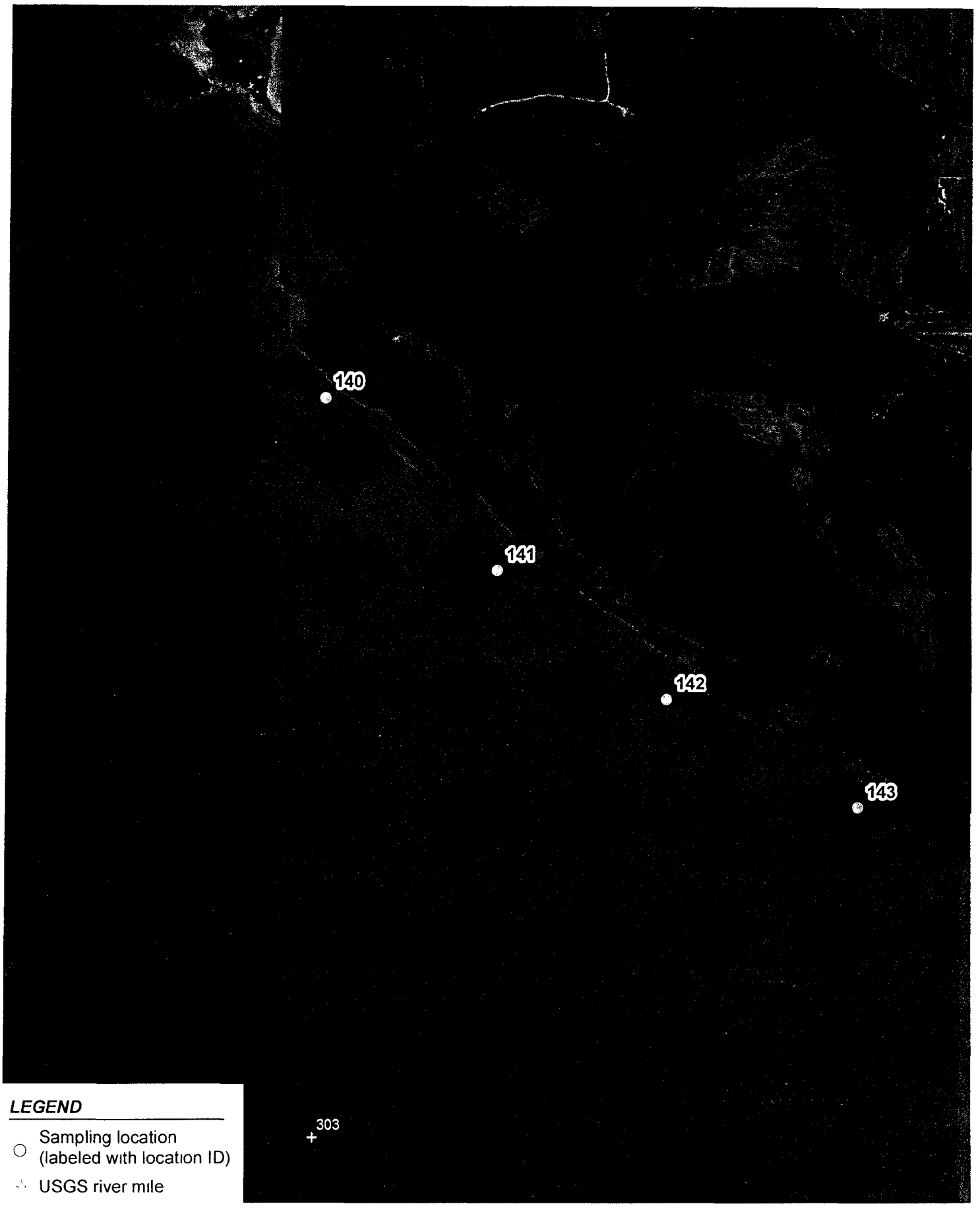

140
141
142
143
303
LEGEND
Sampling location
(labeled with location ID)
USGS river mile

Figure B-10. Sampling locations
Pryor Field Regional Airport

Tennessee River, Decatur, Alabama

305
306
150
Wolveri
LEGEND
Sampling location
(labeled with location ID)
USGS river mile

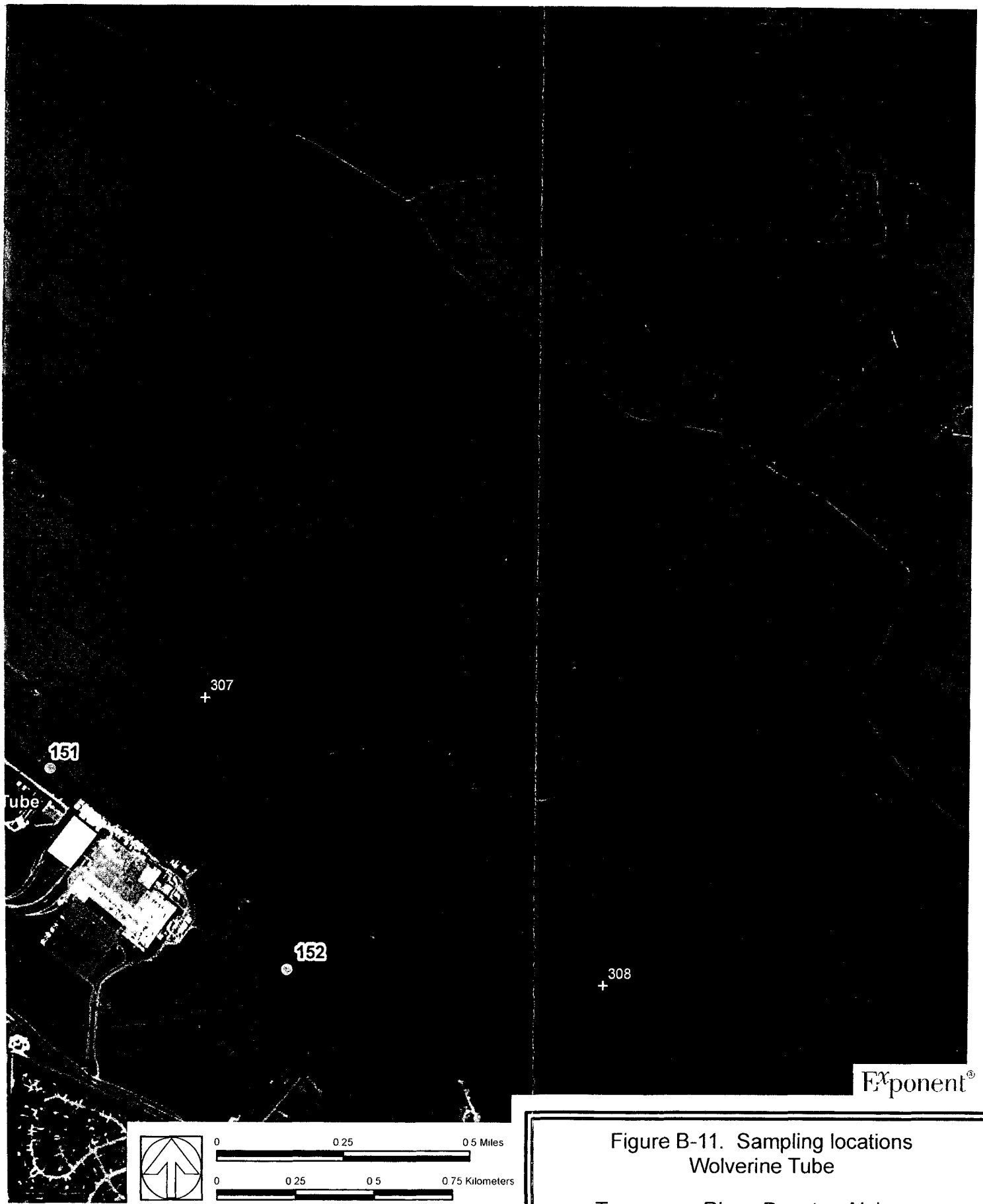


Figure B-11. Sampling locations
Wolverine Tube

Tennessee River, Decatur, Alabama

Attachment 1

Surface Water and Sediment Sampling Results

Table 1-1. Water quality parameters—Tennessee River, Decatur, Alabama

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Total Depth of River (ft)	Latitude (decimal degrees)	Longitude (decimal degrees)	Turbidity (NTU)	pH (s.u.)	Specific Conductivity (µS/cm)	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)
Big Nance Creek												
118	EX0010 and EX0011	6/5/2012	5.0	7.0	34.791278	-87.394639	4.37	8.35	198	0.206	26.87	4.96
119	EX0014 and EX0015	6/5/2012	8.0	10 0	34 790722	-87 391528	5.23	8.64	1	0.001	26.55	8.56
120[a]	EX0016	6/5/2012	15.0	15.0	34.791194	-87.392833	5.29	8.57	243	0.245	25 43	9.61
International Paper Plant												
115	EX0001, EX0002 and EX0003	6/5/2012	32.0	34.3	34.750639	-87.307889	3.79	7 76	196	0.203	26.97	6.80
116	EX0004 and EX0005	6/5/2012	22.0	24.1	34.747417	-87.305972	3.79	8.27	188	0 196	27.13	5.56
117	EX0008 and EX0009	6/5/2012	18 0	20.3	34.744528	-87.303722	3.65	8.64	188	0.197	27.34	9.56
117	EX0020 and EX0021	6/5/2012	7.0	20.3	34.744528	-87.303722	4.32	8.77	1	0.001	27.16	7.05
Browns Ferry Nuclear Power Plant												
124	EX0022 and EX0023	6/6/2012	14.0	16 4	34.703556	-87.122556	6.55	8.40	198	0.211	28.67	6.86
125	EX0026, EX0027 and EX0028	6/6/2012	31.0	33.4	34.701083	-87.124944	10.37	8.08	196	0.202	26.76	6.44
125	EX0029 and EX0030	6/6/2012	7 0	33.4	34 701083	-87.124944	7.52	7.89	198	0.204	26.45	6.48
126	EX0031 and EX0032	6/6/2012	7.0	9.1	34.699278	-87.114528	8.24	7.87	192	0.197	26.32	6.96
Mallard Creek												
127	EX0033 and EX0034	6/6/2012	9.0	11.0	34.697833	-87.146472	7.38	8.47	195	0.202	26 79	7.66
128	EX0036 and EX0037	6/6/2012	5.0	7 0	34 689944	-87.163389	9 05	8.73	194	0.203	27.56	8.44
Fox Creek												
129	EX0040 and EX0041	6/6/2012	6.0	8.0	34.670611	-87.102639	8.74	8.88	200	0.207	26.93	9.70
130	EX0046 and EX0047	6/6/2012	0.5	2.0	34.650694	-87.112028	7.16	8.30	235	0.247	27.52	10.85
Mallard-Fox Creek Industrial Park												
131	EX0052 and EX0053	6/7/2012	5.0	7.0	34.662944	-87.084694	6.59	8.41	199	0.199	25.06	6.14
132	EX0056 and EX0057	6/7/2012	13.0	15.0	34.658111	-87.071111	12.80	8.27	227	0.228	25.23	7.35
133	EX0060 and EX0061	6/7/2012	17.0	19.0	34.654889	-87.066389	8.81	8.23	207	0.208	25.36	8.78
133	EX0062 and EX0063	6/7/2012	4.0	19.0	34.654889	-87.066389	6.95	8.40	208	0.210	25.46	7.00
APM												
134	EX0068 and EX0069	6/7/2012	17.0	19.0	34.637444	-87 019222	3 85	8.00	194	0.197	25.78	4.53
134	EX0070, EX0071 and EX0072	6/7/2012	4.0	19.0	34.637444	-87.019222	2.86	7.75	192	0.197	26.38	5.75
135	EX0073 and EX0074	6/7/2012	5.0	7.0	34.637361	-87.021389	3 16	7.72	193	0.199	26.59	4.40
Betty Rye Branch												
136	EX0078 and EX0079	6/7/2012	6.0	8.0	34.626194	-87.009028	9.40	8.32	192	0 196	26.23	6.00
137	EX0082 and EX0083	6/7/2012	3.0	5.0	34.619361	-87.012417	7.96	8.61	196	0.203	26.71	5.81
Dry Branch												
138	EX0086 and EX0087	6/7/2012	0.5	2.0	34.625500	-87.000111	4.97	7.64	194	0.204	27.5	3.99
139	EX0090 and EX0091	6/7/2012	6.5	8.5	34.620139	-86.999917	6.22	8.69	192	0.198	26.58	7.18
Pryor Field Regional Airport												
140	EX0094 and EX0095	6/7/2012	2.0	4.5	34.652361	-87.000583	5.16	8.79	189	0.203	28.88	7.37
141	EX0098 and EX0099	6/7/2012	0.5	3.0	34.647389	-86.994528	3.87	8.66	191	0.204	28.63	7.26
142	EX0102 and EX0103	6/7/2012	8.9	10.9	34.643694	-86.988556	11.40	8.66	189	0.199	27.75	7.60
143	EX0106 and EX0107	6/7/2012	2.3	4.3	34.640611	-86.981861	5.21	8.74	192	0.206	28.77	8.34
144	EX0110 and EX0111	6/7/2012	2.5	4.5	34.635139	-86.972750	6.63	8.91	190	0.204	28.87	9 30

Table 1-1. (cont.)

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Total Depth of River (ft)	Latitude (decimal degrees)	Longitude (decimal degrees)	Turbidity (NTU)	pH (s u.)	Specific Conductivity (µS/cm)	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)
Decatur Utilities WWTP												
145	EX0116 and EX0117	6/8/2012	32.0	34.0	34.628667	-86.996611	3.10	7.72	203	0.206	25.72	3.97
146	EX0119 and EX0120	6/8/2012	29.0	31.0	34.628611	-86.996417	3 32	7.37	200	0.202	25.7	4.20
147	EX0121 and EX0122	6/8/2012	6.0	29.0	34.628500	-86.996250	2.54	7.52	199	0.203	26.02	7.47
147	EX0123 and EX0124	6/8/2012	28.0	30.0	34.628500	-86.996250	2.93	7.44	199	0.203	25.87	4.52
148	EX0125 and EX0126	6/8/2012	32.0	34.0	34.628417	-86.996000	2.71	7.32	199	0.203	25.87	3.78
149	EX0129, EX0130 and EX0131	6/8/2012	33.0	35.0	34.628222	-86.995722	3.33	7.33	200	0.205	26.38	6.03
Wolverine Tube												
150	EX0132 and EX0133	6/8/2012	0.5	3.0	34.599500	-86.953556	5.20	7.81	205	0.217	28.01	10.10
151	EX0136 and EX0137	6/8/2012	2.0	3.5	34.597000	-86.949528	5.04	8.22	201	0.220	29.67	9.64
152	EX0138 and EX0139	6/8/2012	2.0	4.0	34.591306	-86.941222	7.61	8.38	200	0.225	31.54	8.48

Notes: At some sampling locations, water quality parameters were measured several times during sampling. Only the initial readings are presented in this table.

APM - Ascend Performance Materials
°C - degrees Celsius
µS/cm - microsiemens per centimeter
ft - feet
mg/L - milligrams per liter
mS/cm - millisiemens per centimeter
NTU - nephelometric turbidity units
s.u. - standard units
WWTP - wastewater treatment plant

[a] Water quality parameters were collected at this sampling location; however, no surface water sample was collected.

Table 1-2. Surface water analytical results, AXYS Laboratory—Tennessee River, Decatur, Alabama

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Total Depth of River (ft)	Latitude (decimal degrees)	Longitude (decimal degrees)	Perfluorinated Sulfonates by AXYS Method MLA-060 Rev 10 (ng/L)				Perfluorinated Carboxylates by AXYS Method MLA-060 Rev 10 (ng/L)								
							PFBS	PFHxS	PFOS	PFOSA	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA
Big Nance Creek																			
118	EX0010	6/5/2012	5	7	34.791278	-87.394639	25 4	6 26	45.7	1 82	18 4	5 05	48 1	10 9	30 2	<1.25	<1 25	<1.25	<1 25
119	EX0014	6/5/2012	8	10	34 790722	-87.391528	15	4 64	18.3	<1 09	13.8	2 92	23 5	5 75	15 3	<1 09	<1 09	<1.09	<1 09
International Paper Plant																			
115	EX0001	6/5/2012	32	34.3	34.750639	-87 307889	28	6.3	38.4	2.15	20.3	5 54	41	9 69	26.1	<1.35	<1.35	<1.35	<1 35
115	EX0002 (duplicate of EX0001)	6/5/2012	32	34.3	34 750639	-87.307889	26.2	5 21	40.7	1 78	21 3	5 12	39 9	8.5	27	<1 57	<1 57	<1.57	<1 57
116	EX0004	6/5/2012	22	24.1	34.747417	-87 305972	25.6	5.7	45.9	2.09	20 4	4 79	39.1	8.94	27 1	<1 04	<1 04	<1.04	<1.04
117	EX0008	6/5/2012	18	20.3	34.744528	-87 303722	25.5	5 85	43.5	2.07	21 4	5 99	36 6	8 84	26 6	<1.09	<1.09	<1.09	<1.09
117	EX0020	6/5/2012	7	20.3	34.744528	-87 303722	21.8	5 68	42.1	2 25	20.8	4 68	36 6	9 84	24 9	<1.03	<1 03	<1.03	<1.03
Browns Ferry Nuclear Power Plant																			
124	EX0022	6/6/2012	14	16 4	34 703556	-87 122556	13 9	3.97	24 3	1 69	18.5	3 87	8 48	6 79	15.6	<1.1	<1 1	<1.1	<1 1
125	EX0026	6/6/2012	31	33 4	34 701083	-87 124944	14 2	4.01	24.5	2.42	18.2	4 11	8 26	5 66	14.9	<1.21	<1.21	<1.21	<1.21
125	EX0027 (duplicate of EX0026)	6/6/2012	31	33 4	34 701083	-87.124944	14.9	3 94	25	1 88	21 2	4 01	9 32	7 23	16 6	<1.03	<1 03	<1 03	<1 03
125	EX0029	6/6/2012	7	33.4	34 701083	-87 124944	15.3	4.33	32.4	2.75	19.2	3 45	9 73	7.17	17	<1.12	<1.12	<1.12	<1 12
126	EX0031	6/6/2012	7	9 1	34 699278	-87 114528	5.66	<2.39	10	<1.19	11.2	2.44	3.76	3.05	6.5	<1.19	<1.19	<1.19	<1 19
Mallard Creek																			
127	EX0033	6/6/2012	9	11	34.697833	-87 146472	15	3 8	36.7	2 54	16	4 65	13 7	7 55	23 4	<1 47	<1 47	<1 47	<1.47
128	EX0036	6/6/2012	5	7	34.689944	-87.163389	16 7	3 91	35	2 33	16 3	3 99	13 1	8 15	20 1	<1 05	<1 05	<1 05	<1.05
Fox Creek																			
129	EX0040	6/6/2012	6	8	34.670611	-87 102639	28.5	7	53.1	3 62	25.6	6.61	18 9	12.1	31.3	<1 12	<1.12	<1.12	<1.12
130	EX0046	6/6/2012	0 5	2	34.650694	-87 112028	59.8	40.1	153	3 45	91.8	40 8	162	56 3	101	<0 953	<0.953	<0 953	<0.953
Mallard-Fox Creek Industrial Park																			
131	EX0052	6/7/2012	5	7	34.662944	-87.084694	25.3	10.5	80 6	5.13	25.1	6 93	17 4	14 7	38	<0 885	<0.885	<0 885	<0.885
132	EX0056	6/7/2012	13	15	34 658111	-87.071111	42 7	12.1	101	8 44	40.2	12 2	23 8	19 6	50 6	1	<0 958	<0 958	<0 958
133	EX0060	6/7/2012	17	19	34 654889	-87.066389	24 2	7.82	75 9	4 95	31 7	8.65	16 3	15 9	34 1	<0.929	<0.929	<0.929	<0 929
133	EX0062	6/7/2012	4	19	34 654889	-87 066389	44 1	10.8	93 9	7.51	43.4	12.1	21.8	17.7	40.7	1.04	<0.966	<0.966	<0 966
APM																			
134	EX0068	6/7/2012	17	19	34 637444	-87.019222	2 49	<1.78	5.9	<0 889	10.4	1.83	4.38	3.22	3.68	<0.889	<0.889	<0.889	<0 889
134	EX0070	6/7/2012	4	19	34.637444	-87.019222	2.74	<2 02	6 29	<1.01	9.47	2 24	6 17	4 5	5 25	<1.01	<1.01	<1 01	<1.01
134	EX0071 (duplicate of EX0070)	6/7/2012	4	19	34 637444	-87.019222	2 59	<1.69	5 31	<0 844	9.99	2.25	6.32	4.15	4.65	0.977	<0 844	<0.844	<0 844
135	EX0073	6/7/2012	5	7	34 637361	-87.021389	2 81	<1 8	6.14	<0 898	8 88	1 8	4 23	2 53	4 49	<0.898	<0 898	<0.898	<0.898
Betty Rye Branch																			
136	EX0078	6/7/2012	6	8	34.626194	-87.009028	3 19	<1 93	20 8	1 09	10 2	2.08	5.27	3.75	9 14	<0.965	<0 965	<0 965	<0 965
137	EX0082	6/7/2012	3	5	34.619361	-87 012417	5 58	4.8	53.4	1 88	13 3	3.02	8.36	7.14	19 2	0.908	<0 897	<0 897	<0 897
Dry Branch																			
138	EX0086	6/7/2012	0.5	2	34.625500	-87 000111	3 11	<1.83	22.3	1 17	9 91	2.45	6.99	4.99	9 58	0.97	<0 915	<0.915	<0 915
139	EX0090	6/7/2012	6.5	8 5	34.620139	-86 999917	5.8	<2 07	19.3	1 51	11 1	2 13	7 27	4.21	9 8	<1 03	<1.03	<1 03	<1.03
Pryor Field Regional Airport																			
140	EX0094	6/7/2012	2	4 5	34.652361	-87.000583	1.84	<1.81	3.43	<0.907	9 57	0 98	1 43	1.8	2 47	<0 907	<0.907	<0.907	<0.907
141	EX0098	6/7/2012	0 5	3	34 647389	-86.994528	<1.67	<1.67	2.71	<0.835	9 06	1.17	1 45	1.48	2 25	<0 835	<0 835	<0.835	<0.835
142	EX0102	6/7/2012	8 9	10 9	34 643694	-86.988556	<1 82	<1.82	3 42	<0 91	8 85	<0 91	1 02	2.25	2 45	<0 91	<0.91	<0.91	<0.91
143	EX0106	6/7/2012	2 3	4.3	34 640611	-86.981861	<1 98	<1.98	3.19	<0 989	8 84	1.04	1 19	2.06	2 26	<0 989	<0 989	<0 989	<0.989
144	EX0110	6/7/2012	2.5	4.5	34 635139	-86.972750	<2 15	<2.15	3.75	<1.08	8 88	1.28	1 1	1 9	2 4	<1 08	<1 08	<1.08	<1.08
Decatur Utilities WWTP																			
145	EX0116	6/8/2012	32	34	34 628667	-86.996611	<2.1	<2 1	3.98	<1.05	9 53	1 55	1 25	1 58	1 8	<1.05	<1 05	<1 05	<1.05
146	EX0119	6/8/2012	29	31	34 628611	-86.996417	<2 35	<2 35	3.87	<1 17	9.46	<1.17	2 09	1 71	2.57	<1.17	<1 17	<1 17	<1.17
147	EX0121	6/8/2012	6	29/30	34 628500	-86.996250	<2 08	<2 08	3.61	<1 04	9.58	1 7	1 61	1 42	3 08	<1.04	<1 04	<1 04	<1 04
147	EX0123	6/8/2012	28	29/30	34.628500	-86.996250	<2.31	<2 31	2.76	<1 15	8 98	1 56	1 36	1 4	2 84	<1 15	<1 15	<1.15	<1 15
148	EX0125	6/8/2012	32	34	34.628417	-86.996000	<1.94	<1 94	4.31	<0.968	9 23	<0.968	1 61	1 79	2.23	<0 968	<0.968	<0.968	<0 968

Table 1-2. (cont.)

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Total Depth of River (ft)	Latitude (decimal degrees)	Longitude (decimal degrees)	Perfluorinated Sulfonates by AXYS Method MLA-060 Rev 10 (ng/L)				Perfluorinated Carboxylates by AXYS Method MLA-060 Rev 10 (ng/L)								
							PFBS	PFHxS	PFOS	PFOSA	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA
149	EX0129	6/8/2012	33	35	34.628222	-86.995722	<2.15	<2 15	3.73	<1.08	8 75	1.22	1 35	1 27	2.53	<1.08	<1 08	<1 08	<1.08
149	EX0130 (duplicate of EX0129)	6/8/2012	33	35	34 628222	-86 995722	<2 11	<2.11	3.49	<1 05	9 44	1 6	1.62	1 51	2 51	<1 05	<1 05	<1.05	<1 05
Wolverine Tube																			
150	EX0132	6/8/2012	0 5	3	34 599500	-86 953556	2 39	<1.98	9.15	<0 989	10.5	1 76	2 88	3.34	5 89	<0 989	<0 989	<0.989	<0.989
151	EX0136	6/8/2012	2	3 5	34 597000	-86 949528	2 12	<2 07	6.83	<1 04	9 46	1 6	2.48	3.26	5 22	<1 04	<1 04	<1.04	<1 04
152	EX0138	6/8/2012	2	4	34 591306	-86 941222	<2 14	<2.14	8.02	<1 07	9.97	1 37	2 81	4.87	5 41	<1 07	<1 07	<1.07	<1 07
Equipment Blanks																			
	EX0019	6/5/2012	-	-	-	-	<2.14	<2.14	<2 14	<1 07	<1.07	<1 07	<1 07	<1.07	<1 07	<1 07	<1.07	<1 07	<1.07
	EX0050	6/6/2012	-	-	-	-	<2	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EX0114	6/7/2012	-	-	-	-	<1 89	<1.89	<1 89	<0 945	<0.945	<0 945	<0 945	<0 945	<0 945	<0 945	<0.945	<0.945	<0 945
	EX0143	6/8/2012	-	-	-	-	<2.02	<2 02	<2 02	<1.01	<1.01	<1 01	<1 01	<1 01	<1 01	<1 01	<1 01	<1.01	<1 01
Field Blanks																			
	EX0051	6/6/2012	-	-	-	-	<1 92	<1 92	<1 92	<0 961	<0.961	<0 961	<0 961	<0.961	<0 961	<0 961	<0 961	<0.961	<0 961
	EX0115	6/7/2012	-	-	-	-	<2.28	<2.28	<2 28	<1 14	<1 14	<1 14	<1 14	<1.14	<1.14	<1 14	<1 14	<1.14	<1 14
	EX0144	6/8/2012	-	-	-	-	<2 22	<2 22	<2 22	<1 11	<1 11	<1.11	<1 11	<1 11	<1.11	<1.11	<1 11	<1.11	<1.11

Notes:
APM - Ascend Performance Materials
AXYS - AXYS Analytical Services
ft - feet
ng/L - nanograms per liter
PFBA - perfluorobutanoic acid
PFBS - perfluorobutane sulfonate
PFDA - perfluorodecanoic acid
PFDoA - perfluorododecanoic acid
PFHpA - perfluoroheptanoic acid
PFHxA - perfluorohexanoic acid
PFHxS - perfluorohexane sulfonate
PFNA - perfluorononanoic acid
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
PFOSA - perfluorooctane sulfonamide
PFPeA - perfluoropentanoic acid
PFUnA - perfluoroundecanoic acid
WWTP - wastewater treatment plant
< - analyte not detected at the reporting limit shown

Table 1-3. Surface water analytical results, CAS Laboratory—Tennessee River, Decatur, Alabama

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Total Depth of River (ft)	Latitude (decimal degrees)	Longitude (decimal degrees)	TDS by SM 2540 C (mg/L)	TSS by SM 2540 D (mg/L)
Big Nance Creek								
118	EX0011	6/5/2012	5	7	34 791278	-87.394639	108	<5
119	EX0015	6/5/2012	8	10	34.790722	-87.391528	128	11.5
International Paper Plant								
115	EX0003	6/5/2012	32	34.3	34.750639	-87.307889	93	<5
116	EX0005	6/5/2012	22	24.1	34.747417	-87 305972	98	<5
117	EX0009	6/5/2012	18	20.3	34.744528	-87.303722	91	<5
117	EX0021	6/5/2012	7	20.3	34.744528	-87.303722	93	<5
Browns Ferry Nuclear Power Plant								
124	EX0023	6/6/2012	14	16.4	34.703556	-87.122556	107	7.5
125	EX0028	6/6/2012	31	33.4	34.701083	-87.124944	98	15
125	EX0030	6/6/2012	7	33 4	34 701083	-87.124944	100	9.5
126	EX0032	6/6/2012	7	9.1	34.699278	-87.114528	96	6
Mallard Creek								
127	EX0034	6/6/2012	9	11	34.697833	-87.146472	102	10
128	EX0037	6/6/2012	5	7	34.689944	-87.163389	97	13.5
Fox Creek								
129	EX0041	6/6/2012	6	8	34.670611	-87.102639	117	13
130	EX0047	6/6/2012	0.5	2	34.650694	-87.112028	122	10.5
Mallard-Fox Creek Industrial Park								
131	EX0053	6/7/2012	5	7	34.662944	-87.084694	112	9
132	EX0057	6/7/2012	13	15	34.658111	-87.071111	117	24
133	EX0061	6/7/2012	17	19	34.654889	-87.066389	104	11.5
133	EX0063	6/7/2012	4	19	34.654889	-87.066389	113	9
APM								
134	EX0069	6/7/2012	17	19	34.637444	-87.019222	99	6.5
134	EX0072	6/7/2012	4	19	34.637444	-87.019222	104	<5
135	EX0074	6/7/2012	5	7	34.637361	-87.021389	104	<5
Betty Rye Branch								
136	EX0079	6/7/2012	6	8	34.626194	-87.009028	93	12
137	EX0083	6/7/2012	3	5	34.619361	-87.012417	98	11.5
Dry Branch								
138	EX0087	6/7/2012	0.5	2	34.625500	-87.000111	87	13 5
139	EX0091	6/7/2012	6.5	8.5	34.620139	-86.999917	91	11
Pryor Field Regional Airport								
140	EX0095	6/7/2012	2	4.5	34.652361	-87.000583	100	<5
141	EX0099	6/7/2012	0.5	3	34.647389	-86.994528	94	<5
142	EX0103	6/7/2012	8.9	10.9	34.643694	-86.988556	128	14
143	EX0107	6/7/2012	2.3	4.3	34.640611	-86.981861	98	5.5
144	EX0111	6/7/2012	2.5	4.5	34.635139	-86.972750	91	7
Decatur Utilities WWTP								
145	EX0117	6/8/2012	32	34	34 628667	-86.996611	88	<5
146	EX0120	6/8/2012	29	31	34.628611	-86.996417	100	<5
147	EX0122	6/8/2012	6	29–30	34.628500	-86 996250	101	<5
147	EX0124	6/8/2012	28	29–30	34.628500	-86.996250	99	<5
148	EX0126	6/8/2012	32	34	34.628417	-86.996000	113	<5
149	EX0131	6/8/2012	33	35	34.628222	-86.995722	95	<5
Wolverine Tube								
150	EX0133	6/8/2012	0.5	3	34.599500	-86.953556	101	6
151	EX0137	6/8/2012	2	3.5	34.597000	-86.949528	105	8.5
152	EX0139	6/8/2012	2	4	34.591306	-86.941222	96	11

Notes: APM - Ascend Performance Materials
CAS - Columbia Analytical Services
ft - feet
mg/L - milligrams per liter
SM - standard method
TDS - total dissolved solids
TSS - total suspended solids
< - analyte not detected at the reporting limit shown

Table 1-4. Sediment analytical results, AXYS Laboratory—Tennessee River, Decatur, Alabama

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Total Depth of River (ft)	Latitude (decimal degrees)	Longitude (decimal degrees)	% Moisture by AXYS Method MLA-041 Rev 09	Perfluorinated Sulfonates (dry weight basis) by AXYS Method MLA-041 Rev 09 (ng/g)				Perfluorinated Carboxylates (dry weight basis) by AXYS Method MLA-041 Rev 09 (ng/g)								
								PFBS	PFHxS	PFOS	PFOSA	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA
Big Nance Creek																				
118	EX0012	6/5/2012	7	7	34 791278	-87.394639	26.5	<0 175	<0 175	0.28	<0 0873	<0 0873	<0 0873	<0.0873	<0 0873	<0 0873	<0 0873	<0 0873	<0.0873	<0.0873
120	EX0016	6/5/2012	15	15	34 791194	-87.392833	58 3	<0 161	<0.161	3	0 171	<0 0803	<0 0803	<0 0803	<0 0803	0.107	<0 0803	0.093	<0.0803	<0.0803
120	EX0017 (duplicate of EX0016)	6/5/2012	15	15	34 791194	-87.392833	57.7	<0 188	<0 188	3.08	0 195	<0 094	<0 094	<0.094	<0.094	0.1	<0 094	0.124	<0.094	<0.094
Mallard Creek																				
127	EX0024	6/6/2012	11	11	34 697833	-87.146472	64 8	<0 202	<0.202	6 12	1 54	<0.101	<0 101	<0 101	<0 101	0.348	<0 101	<0.101	<0.101	0 204
127	EX0035 (duplicate of EX0024)	6/6/2012	11	11	34 697833	-87.146472	66	<0.233	<0 233	6 3	1.62	<0 117	<0 117	<0.117	<0.117	0 383	<0.117	<0.117	<0.117	0.234
128	EX0039	6/6/2012	7	7	34.689944	-87.163389	33 8	<0 187	<0.187	2 25	0 212	<0.0934	<0.0934	<0 0934	<0 0934	<0 0934	<0.0934	<0 0934	<0.0934	<0 0934
Fox Creek																				
129	EX0045	6/6/2012	8	8	34.670611	-87.102639	55 6	<0 189	<0 189	5 42	1 6	<0.0943	<0 0943	0 171	<0.0943	0.371	<0 0943	<0 0943	<0 0943	0.179
130	EX0049	6/6/2012	2	2	34.650694	-87.112028	45 5	<0 191	0 197	12.6	0 779	<0.0954	<0 0954	0 27	0.179	0.469	<0 0954	<0.0954	<0.0954	<0 0954
Mallard-Fox Creek Industrial Park																				
131	EX0055	6/7/2012	7	7	34 662944	-87.084694	34.7	<0 197	<0 197	1.42	0 197	<0 0985	<0 0985	<0.0985	<0.0985	<0 0985	<0 0985	<0.0985	<0 0985	<0 0985
132	EX0059	6/7/2012	15	15	34 658111	-87.071111	52.8	<0 197	<0 197	6 99	1 54	<0 0985	<0 0985	<0.0985	<0.0985	0 288	<0 0985	<0.0985	<0 0985	0 131
133	EX0067	6/7/2012	19	19	34 654889	-87.066389	65 7	0 228	<0.202	14 6	1 84	<0.101	<0 101	<0.101	0 123	0.811	<0.101	0 116	<0 101	0.11
APM																				
135	EX0076	6/7/2012	7	7	34.637361	-87.021389	42 2	<0.2	<0.2	0.887	0.114	<0 1	<0.1	<0 1	<0 1	<0.1	<0 1	<0 1	<0.1	<0.1
135	EX0077 (duplicate of EX0076)	6/7/2012	7	7	34 637361	-87.021389	44	<0.194	<0 194	0 871	0.102	<0 0968	<0 0968	<0.0968	<0.0968	<0 0968	<0 0968	<0.0968	<0 0968	<0 0968
Betty Rye Branch																				
136	EX0081	6/7/2012	8	8	34.626194	-87.009028	63.9	<0 199	<0.199	2.87	0 544	<0.0995	<0 0995	<0 0995	<0.0995	0 113	<0 0995	<0 0995	<0.0995	0.117
137	EX0085	6/7/2012	5	5	34 619361	-87 012417	28.8	<0.189	<0 189	1.43	0.157	<0 0946	<0.0946	<0.0946	<0 0946	<0 0946	<0 0946	<0 0946	<0 0946	<0 0946
Dry Branch																				
138	EX0089	6/7/2012	2	2	34.625500	-87 000111	40.5	<0.197	<0 197	1.33	0.138	<0 0987	<0.0987	<0.0987	<0 0987	<0 0987	<0.0987	<0 0987	<0.0987	0 136
139	EX0093	6/7/2012	8.5	8.5	34 620139	-86 999917	66.1	<0.2	<0 2	11 9	1.22	<0 1	<0 1	<0.1	<0.1	0 23	<0 1	<0.1	<0 1	0.18
Pryor Field Regional Airport																				
140	EX0097	6/7/2012	4.5	4 5	34 652361	-87 000583	26.7	<0.195	<0 195	<0 195	<0.0975	<0 0975	<0 0975	<0.0975	<0.0975	<0 0975	<0.0975	<0 0975	<0.0975	<0 0975
141	EX0101	6/7/2012	3	3	34 647389	-86 994528	27.2	<0.189	<0 189	<0 189	<0.0943	<0 0943	<0 0943	<0.0943	<0.0943	<0 0943	<0.0943	<0 0943	<0.0943	<0 0943
142	EX0105	6/7/2012	9.5	9.5	34.643694	-86.988556	44	<0 186	<0.186	0 511	<0 093	<0.093	<0.093	<0 093	<0 093	<0.093	<0 093	<0.093	0 106	<0.093
143	EX0109	6/7/2012	4.3	4.3	34.640611	-86.981861	27.4	<0 196	<0.196	<0 196	<0 0978	<0 0978	<0.0978	<0.0978	<0.0978	<0.0978	<0.0978	<0 0978	<0 0978	<0 0978
Wolverine Tube																				
150	EX0135	6/8/2012	3	3	34 599500	-86 953556	28.5	<0.181	<0 181	<0 181	<0.0907	<0 0907	<0.0907	<0 0907	<0 0907	<0 0907	<0.0907	<0 0907	<0 0907	<0.0907
152	EX0141	6/8/2012	4	4	34 591306	-86 941222	42 6	<0 203	<0.203	0.227	<0 102	<0 102	<0.102	<0 102	<0 102	<0 102	<0.102	<0 102	<0 102	<0 102
152	EX0142 (duplicate of EX0141)	6/8/2012	4	4	34 591306	-86 941222	39.6	<0 194	<0 194	0.313	<0 097	<0 097	<0 097	<0 097	<0.097	<0 097	<0.097	<0.097	<0 097	<0 097

Notes: APM - Ascend Performance Materials
AXYS - AXYS Analytical Services
ft - feet
ng/g - nanograms per gram
PFBA - perfluorobutanoic acid
PFBS - perfluorobutane sulfonate
PFDA - perfluorodecanoic acid
PFDoA - perfluorododecanoic acid
PFHpA - perfluoroheptanoic acid
PFHxA - perfluorohexanoic acid
PFHxS - perfluorohexane sulfonate
PFNA - perfluorononanoic acid
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
PFOSA - perfluorooctane sulfonamide
PFPeA - perfluoropentanoic acid
PFUnA - perfluoroundecanoic acid
< - analyte not detected at the reporting limit shown

Table 1-5. Sediment analytical results, CAS Laboratory—Tennessee River, Decatur, Alabama

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Total Depth of River (ft)	Latitude (decimal degrees)	Longitude (decimal degrees)	TOC (dry) by 9060M (mg/kg)	Particle Size by ASTM D422 (%)							Total Solids by 160.3 Modified (%)
								Clay	Coarse Gravel	Fine Gravel	Coarse Sand	Fine Sand	Medium Sand	Silt	
Big Nance Creek															
118	EX0013	6/5/2012	7	7	34.791278	-87 394639	1,950	3.8	0	0 3	0.1	88.5	0.4	6.9	74
120	EX0018	6/5/2012	15	15	34.791194	-87.392833	19,900	18 2	0	21.1	15.6	20.5	5.1	19.5	52
Mallard Creek															
127	EX0025	6/6/2012	11	11	34.697833	-87.146472	20,400	45.7	0	0	0.2	1.4	0.4	52.3	34
128	EX0038	6/6/2012	7	7	34.689944	-87.163389	7,790	6.7	0	0.2	1.2	73.7	7	11.2	65
Fox Creek															
129	EX0044	6/6/2012	8	8	34.670611	-87.102639	17,400	39	3	2.5	0.1	4.1	0.3	51	41
130	EX0048	6/6/2012	2	2	34.650694	-87.112028	16,700	60 1	0	0	0	11.7	0.6	27.6	55
Mallard-Fox Creek Industrial Park															
131	EX0054	6/7/2012	7	7	34.662944	-87.084694	3,600	11 5	0	0.7	0.2	73.9	1	12.7	69
132	EX0058	6/7/2012	15	15	34.658111	-87.071111	17,700	34	0	1.4	0.8	21.6	1.1	41.1	48
133	EX0066	6/7/2012	19	19	34.654889	-87.066389	65,100	25.9	3 5	13.8	17	9.8	7.9	22.1	38
APM															
135	EX0075	6/7/2012	7	7	34.637361	-87.021389	96,300	9.9	0	8.2	4.8	51.4	6.6	19 1	57
Betty Rye Branch															
136	EX0080	6/7/2012	8	8	34.626194	-87.009028	23,000	39.1	0	0	0	1.7	0.2	59	35
137	EX0084	6/7/2012	5	5	34.619361	-87.012417	8,780	2.8	0	20.5	21.6	28 5	25.1	1.5	72
Dry Branch															
138	EX0088	6/7/2012	2	2	34.625500	-87.000111	12,800	6.8	0	0.7	2.3	45 1	3	42.1	60
139	EX0092	6/7/2012	8.5	8.5	34.620139	-86.999917	36,600	26.5	0	1.9	1.4	10.6	1.8	57 8	32
Pryor Field Regional Airport															
140	EX0096	6/7/2012	4.5	4.5	34.652361	-87.000583	4,490	5.2	0	2.3	0.5	79.7	0.9	11.4	70
141	EX0100	6/7/2012	3	3	34.647389	-86.994528	3,630	5.9	2.6	5.6	2.3	67.9	0.8	14.9	69
142	EX0104	6/7/2012	9.5	9.5	34.643694	-86.988556	12,100	24.5	0	0.7	0	7	0.1	67.7	53
143	EX0108	6/7/2012	4.3	4.3	34.640611	-86.981861	2,170	3.3	0	1.5	0.1	82.6	0.2	12.3	72
Wolverine Tube															
150	EX0134	6/8/2012	3	3	34.599500	-86.953556	5,820	8.1	1 5	4.6	2.5	72.9	6.1	4.3	70
152	EX0140	6/8/2012	4	4	34.591306	-86.941222	12,300	7	0	0.6	1.1	65.3	1.7	24.3	63

Notes: APM - Ascend Performance Materials
ASTM - American Society for Testing and Materials
CAS - Columbia Analytical Services
ft - feet
mg/kg - milligrams per kilogram
TOC - total organic carbon
WWTP - wastewater treatment plant