

# Health Consultation

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FISH IN RICE CREEK AT THE GEORGIA-PACIFIC SITE

PALATKA, PUTNAM COUNTY, FLORIDA

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

## **Health Consultation: A Note of Explanation**

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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## HEALTH CONSULTATION

FISH IN RICE CREEK AT THE GEORGIA-PACIFIC SITE

PALATKA, PUTNAM COUNTY, FLORIDA

Prepared by:

Florida Department of Health  
Bureau of Community Environmental Health  
Under a Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry

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## **Summary and Statement of Issues**

In March 2002, the federal Agency for Toxic Substances and Disease Registry (ATSDR) received a petition including fishing, health and environmental concerns about Rice Creek, St. Johns River, and Etonia Creek, all of which are near the Palatka (Putnam County) Georgia-Pacific paper mill. The Florida Department of Health (DOH) and the Florida Department of Environmental Protection (DEP) worked together to address these concerns.

Because Rice Creek is directly downstream of Georgia Pacific, this is the water body we would expect to find the highest levels of contaminants in fish. Therefore, Florida DOH, ATSDR and Florida DEP agreed only fish from Rice Creek would be collected, evaluated and summarized in this health consultation.

Georgia-Pacific has an industrial wastewater permit with the Florida DEP, which requires fish testing in Rice Creek. In July 2003, Georgia-Pacific contractors, with the oversight of the Florida DEP and the Florida DOH, collected 48 bluegill and white catfish from Rice Creek. Because of the low dioxin levels found in the fish, in December 2003 the Florida DOH determined a fish consumption advisory is not necessary for Rice Creek. Thus the conclusions and recommendations in this health consultation are only applicable to those who eat fish caught from Rice Creek near the Georgia-Pacific paper mill.

## **Purpose**

This health consultation addresses the petitioner's concern about people eating fish from Rice Creek. Because the petitioner was already notified in December 2003 that a fish advisory is not necessary for Rice Creek, this health consultation summarizes and validates Florida DOH's reasoning for not issuing a fish advisory.

## **Site Background and History**

The Georgia-Pacific site is on Highway 216 near US 17, in the vicinity of Palatka, Putnam County, Florida. At this site Georgia-Pacific operates a pulp and paper mill, from which Rice Creek receives effluent (Figures 1, 2, and 3). Rice Creek flows west to east, north of the Georgia-Pacific facility. Etonia Creek is a tributary of Rice Creek. Rice Creek flows into the St. Johns River east of the Georgia-Pacific facility.

In 1999 and 2000, Georgia-Pacific's contractors collected largemouth bass and bluegill from Rice Creek and sent the fish to Alta Analytical Perspectives laboratories for dioxin analysis. The Florida DOH concluded, however, that the contractors collected too few fish of each species. The Florida DOH recommended they collect between seven and 10 fish of each species.

In October 2001, Georgia-Pacific's contractor collected more fish from Rice Creek. However, Florida DOH was unable to make a health determination because the fish samples were contaminated in the laboratory, thus rendering the data invalid.

In addition to the Rice Creek fish data, Georgia-Pacific's contractor also submitted fish data from the St. Johns River. The Florida DOH only considered fish collected from Rice Creek because they best represent the health risk to persons who eat fish from Rice Creek. Fish from Rice Creek represent the 'worst case' because Rice Creek is the most likely to be impacted by the site. In the future, assessment of fish from St. Johns River and Etonia Creek may be warranted if other sources are identified or if fish in Rice Creek represent an exposure concern.

In its March 2002 correspondence, the petitioner requested that ATSDR:

1. advise people not to eat fish from Rice or Etonia Creeks,
2. test fish in the St. John's River,
3. ensure Georgia-Pacific keeps dioxin-containing sludge in their wastewater lagoon, and
4. assess and remediate dioxin-containing sediments in Rice Creek, Etonia Creek, and St. Johns River.

In June 2002, ATSDR notified the petitioner they would research site information and address the petitioner's concerns. In November 2002, ATSDR contacted the Florida DOH for assistance with the petitioner's request. The Florida DOH agreed to coordinate fish collection from Rice Creek, evaluate fish results, and prepare a report (Appendix A). In February 2003, the Florida DOH received a copy of the petitioner's correspondence from ATSDR and began coordination of fish testing from Rice Creek with the Florida DEP.

In October 2003, the Florida DOH received a request from the Natural Resources Defense Council (NRDC) to post fish consumption advisories on the St. Johns River and on Rice Creek. The NRDC, a national environmental organization, claimed fish were contaminated with dioxin and posed a public health risk. The NRDC claimed deficiencies with fish sampling methods and with past results from Georgia-Pacific's contractor.

In November 2003, the Florida DOH stated they would evaluate new fish data received in October 2003 and determine whether any detected contamination levels warranted issuing a fish advisory (Appendix B). Florida DOH reviewed the fish test results and found no apparent public health hazard from persons who consumed fish containing the levels of dioxins/furans found in fish taken from Rice Creek near the Georgia-Pacific site.

In December 2003, the Florida DOH sent a letter to the petitioner stating a fish advisory was not necessary (Appendix C). The Florida DOH also informed the petitioner that a written health consultation would be forthcoming. Also in December 2003, the Florida DOH explained the use of the 7 parts per trillion (ppt) dioxin standard to the petitioner. The Florida DOH also explained that further fish testing in Rice Creek is unnecessary (Appendix D). At this same time, a nearby resident voiced concerns about lesions on fish. The Florida Fish and Wildlife Conservation Commission (FWCC) offered to test collected fish for fungus, bacteria, parasites, brevetoxin and saxitoxin. To date, the resident has not contacted the Florida FWCC, and the FWCC has not performed fish testing.

## **Demographics**

According to the 2000 Census, approximately 15,000 Palatka residents could potentially fish in Rice Creek. Access is, however, only available upstream, given that Rice Creek is fenced downstream of Georgia-Pacific.

## **Discussion**

Georgia-Pacific's contractor and Florida DOH collected one species of water-column-dwelling predator game fish (bluegill, *Lepomis macrochirus*), and one species of bottom feeder (white catfish, *Ameiurus catus*). Both are freshwater species. Bluegill is a middle of the food chain predator and a good indicator of persistent pollutants that could biomagnify through several trophic levels of the food web. Bluegills eat, insects, crustaceans, fish eggs, small fish, mollusks and snails. White catfish are bottom feeders, eating crustaceans, fish eggs and aquatic plants. See Attachment A for photos and detailed descriptions of these fish.

From November 2002 through July 2003, the Florida DOH Bureau of Community Environmental Health reviewed fish plans and sampling plans, participated in numerous teleconferences, and coordinated fish collection with the Florida DEP and Georgia-Pacific's contractor. In June 2003, the Florida DEP finalized their Fish Tissue Collection and Analysis Plan of Study (Appendix E).

On July 11 and 12, 2003, volunteer students working with Florida DEP interviewed 22 persons fishing along Rice Creek. The purpose of these interviews was to determine what type of fish people eat and how they prepared those fish. Twelve of the 22 persons interviewed reported eating fish from Rice Creek. Six reported eating catfish, and six reported eating bluegill. Most filleted their fish and cooked them with the skin on.

## **Fish Evaluation**

### ***Fish Collection and Shipment***

In July 2003, using electro-fishing equipment at locations both upstream and downstream of the Georgia-Pacific discharge, Georgia-Pacific's contractor collected bluegill and white catfish from Rice Creek. Of all the fish observed, the most numerous were bluegill and white catfish. The contractor and DOH also observed speckled catfish, redbreast and red-ear sunfish. The downstream location was west of the railroad bridge. The upstream location was at that point closest to the mill's discharge which was still accessible by boat. Fish collection and sampling time both upstream and downstream was adequate.

Georgia-Pacific's contractor sent the largest and oldest bluegill and white catfish (48 fish) to the laboratory for dioxin analyses. Georgia-Pacific's contractor weighed and measured the fish. They rinsed the fish with deionized water, wrapped them individually in heavy-duty aluminum foil, and secured them with a taped label.

Then, to prevent cross-contamination, the contractor placed each fish in a labeled Ziploc bag and transported them—on ice—to the laboratory. The shipment included the proper transportation labels and forms as well as chain of custody and laboratory forms. Alta Analytical Perspectives Laboratories filleted, composited, homogenized and analyzed four samples (12 upstream catfish, 12 downstream catfish, 12 upstream bluegill, and 12 downstream bluegill).



### ***Fish Laboratory Methods and Analyses***

Alta Analytical resected (i.e., cut) and filleted all 48 fish, leaving skins and scales intact. Using standard operating procedures, the laboratory composited the fish by species. Alta Analytical analyzed four separate composite samples, then analyzed for dioxins/furans using EPA Method 1613B. This analysis included preparation (resection and filleting), homogenizing, compositing, and two quality assurance (QA) samples (one procedure blank and one duplicate).

### ***Interpretation of Fish Results***

In October 2003, the Florida DOH received the Annual Fish Tissue Dioxin Monitoring report and fish data from the Florida DEP and Georgia-Pacific. Figure 3 shows the fish sampling locations. Table I summarizes the fish data from upstream and downstream locations in Rice Creek.

After reviewing these fish data, the Florida DOH determined the calculated dioxin/furan toxicity equivalents (TEQ) levels found in the bluegill and catfish are well below its guideline of 7 parts per trillion (ppt), and are, therefore, not likely to cause illness. Consequently, Florida DOH is not recommending additional fish sampling and is not issuing a fish consumption advisory for Rice Creek.

A TEQ is the mean concentration of the total dioxin/furan toxic equivalents. The Florida DOH assumed that on average, adults eat 30 grams of fish per day and children eat 15 grams per day. These rates may overestimate average fish consumption, but err on the side of protecting human health.

The levels of dioxins/furans in the fish collected from Rice Creek near the Georgia-Pacific site do not appear to be a health risk. Florida DOH does not expect any illness from eating bluegill or white catfish containing the levels of dioxins found in Rice Creek near the Georgia-Pacific site. The calculated doses for dioxins and furans for each fish species were less than the Agency for Toxic Substances and Disease Registry (ATSDR's) Minimum Risk Level (MRL) for 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) the standard for comparing all congeners of dioxins. An MRL is an estimate of daily human exposure to a dose of a chemical that is likely to be without an appreciable risk of adverse noncancerous effect over a specified duration of exposure. The potential toxicity of all the congeners of dioxins and furans were converted to TCDD equivalents to determine the risk of adverse human effects. This number is called the TEQ (Toxicity Equivalency Value). Using the highest TEQ value in the four fish species (0.51 parts per trillion or ppt), our estimate of a child's and an adult's maximum acute (1–14 days) exposure to 2,3,7,8-TCDD from eating the fish from Rice Creek is slightly higher than the ATSDR's MRL. Our estimate of a child's and an adult's maximum intermediate (15–364 days) exposure to 2,3,7,8-TCDD from eating fish from the creek is 17 times less than the ATSDR's MRL. Our estimate of a child's and an adult's maximum long-term ( $\geq 365$  days) exposure to 2,3,7,8-TCDD from eating fish from the creek is 510 times less than the ATSDR's MRL.

The calculated dose for dioxins and furans for each fish species was also less than ATSDR's Cancer Effect Level (CEL) in animals for 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD). A CEL establishes levels of exposure associated with carcinogenic effects. There are CELs for long-term ( $\geq 365$  days) exposure but none for acute (1–14 days) or intermediate (15–364 days) exposure. The Florida DOH used the CELs for 2,3,7,8-TCDD as this congener is the standard for comparison of all congeners of dioxins and furans. Using the highest TEQ value in the four fish species (0.51 parts per trillion or ppt), the Florida DOH estimate of a child's and an adult's maximum long-term ( $\geq 365$  days) exposure to 2,3,7,8-TCDD from eating fish from the creek is two times less than the ATSDR's CEL.

### **Other Health-Based Standards**

Currently, the U.S. Food and Drug Administration (USFDA) does not have action levels for dioxins or furans in human food (DHHS 1998). Because dioxin analysis is costly and time-consuming, available data on background levels in most foods are limited. FDA is expanding its monitoring program to obtain more comprehensive data on background levels. The FDA is also working to identify opportunities to reduce human exposure to dioxins (USFDA 2002).

### **Consideration of Biological Testing**

The Florida DOH also considered biological testing (urine or blood) for people eating the fish from Rice Creek. The dioxin levels found in the fish do not, however, warrant a biological investigation.

### **Child Health Initiative and Other Susceptible Populations (Women)**

Because this health consultation involves children who eat fish from Rice Creek near the Georgia-Pacific site, children are a concern. Dioxins/furans in fish can affect pregnant women, nursing mothers and children. It is important to remember children are not small adults. Children are more sensitive to the effects of dioxins/furans than are adults. Few studies have looked at how dioxins/furans can affect a child's health. However, in one such study where children exposed to higher-than-current background levels of 2,3,7,8-TCDD; the children appeared more sensitive than adults. Florida DOH has no information showing any differences between children and adults in terms of how much dioxin enter one's body, where dioxins can be found in one's body, and how fast dioxins leave one's body (ATSDR 1998). Children drink more fluids, eat more food, and breathe more air per kilogram of body weight than do adults. Children have a larger skin surface in proportion to their body volume. A child's diet—that often differs from that of an adult's—and a child's behavior and lifestyle can also influence exposure. Children, especially small children, are closer to the ground than are adults. They crawl on the floor, put things in their mouths, and might ingest inappropriate items such as dirt or paint chips. Children also spend more time outdoors than do adults. Finally and perhaps most importantly, children do not have the judgment of adults for avoiding hazards (ATSDR 1998).

Thus, DOH reviewed the results of the fish sample analysis aware that sensitive populations such as pregnant women, nursing mothers and children are a particular concern. Still, we conclude that the dioxin/furans found in bluegill and white catfish from Rice Creek near the Georgia-Pacific site are not likely to cause illness in adults or children.

## **Conclusions**

1. There is no apparent public health hazard from eating fish containing the levels of dioxin/furan found in fish taken from Rice Creek near the Georgia-Pacific site.
2. The concentrations of dioxins/furans in fish from Rice Creek near the Georgia-Pacific site do not warrant biological testing of persons who eat these fish.

## **Recommendations**

At this time and for this health consultation only, the Florida DOH does not offer any recommendations for this site.

## **Public Health Action Plan**

In December 2003, Florida DOH sent a letter to the petitioner stating a fish consumption advisory for Rice Creek was not necessary (Appendix C).

DOH is currently re-evaluating the criteria used for evaluating the potential for adverse human health effects for exposure to dioxin-like compounds. This evaluation will be completed no later than June 2005. The risk of human health effects will be re-examined when the new criteria are finalized.

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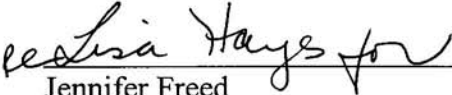
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## Certification

The Florida DOH, Bureau of Community Environmental Health, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) prepared the Fish in Rice Creek at the Georgia-Pacific Site Health Consultation. The health consultation was prepared in accordance with approved methodology and procedures existing at the time.

  
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The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation, and concurs with its findings.

  
\_\_\_\_\_  
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## References

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[DHHS] Department of Health and Human Services. 1998. Action levels for poisonous or deleterious substances in human food and animal feed. Washington, DC: US Food and Drug Administration.

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# MAP OF FLORIDA



FIGURE 1  
COUNTY MAP  
RICE CREEK, PALATKA

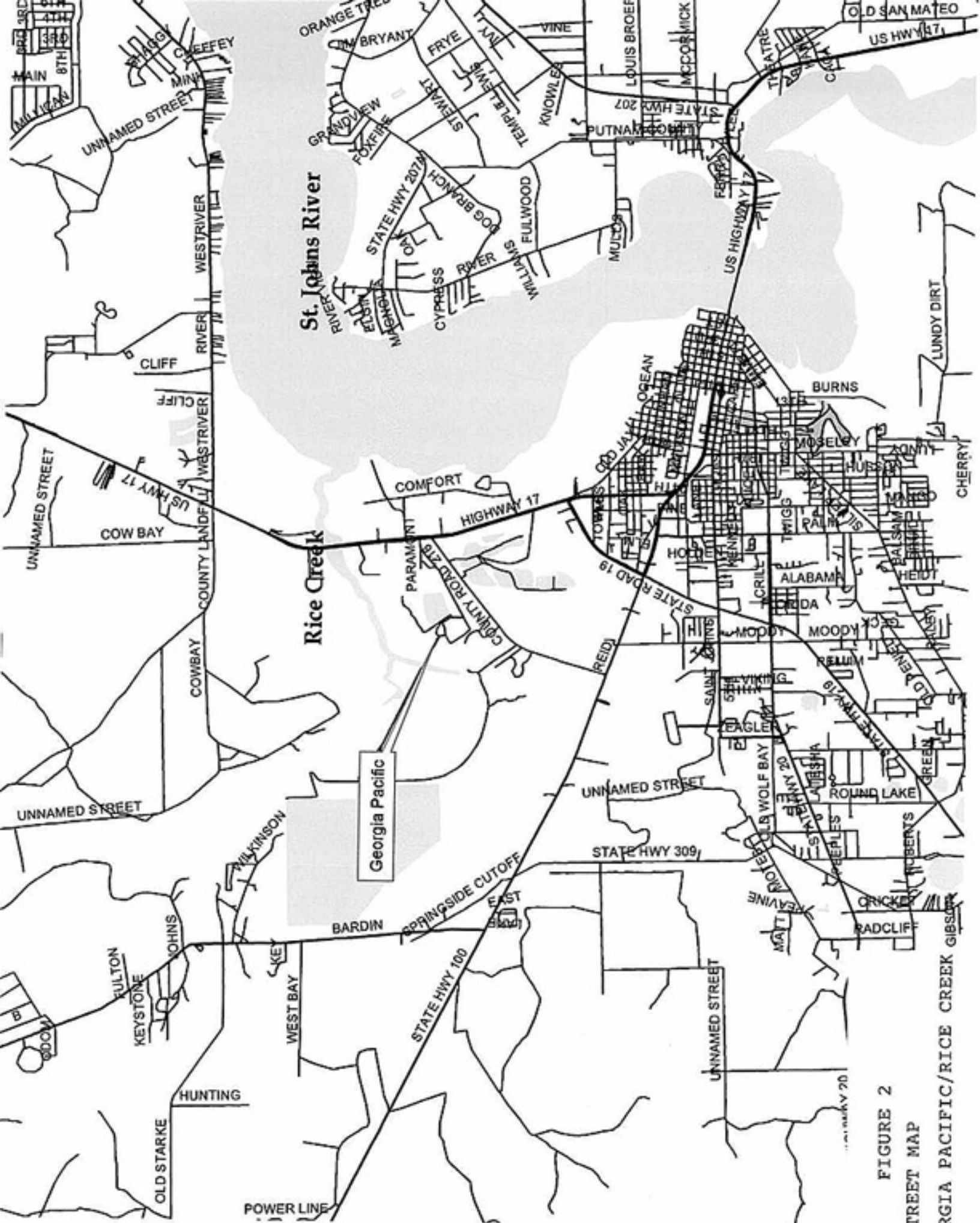
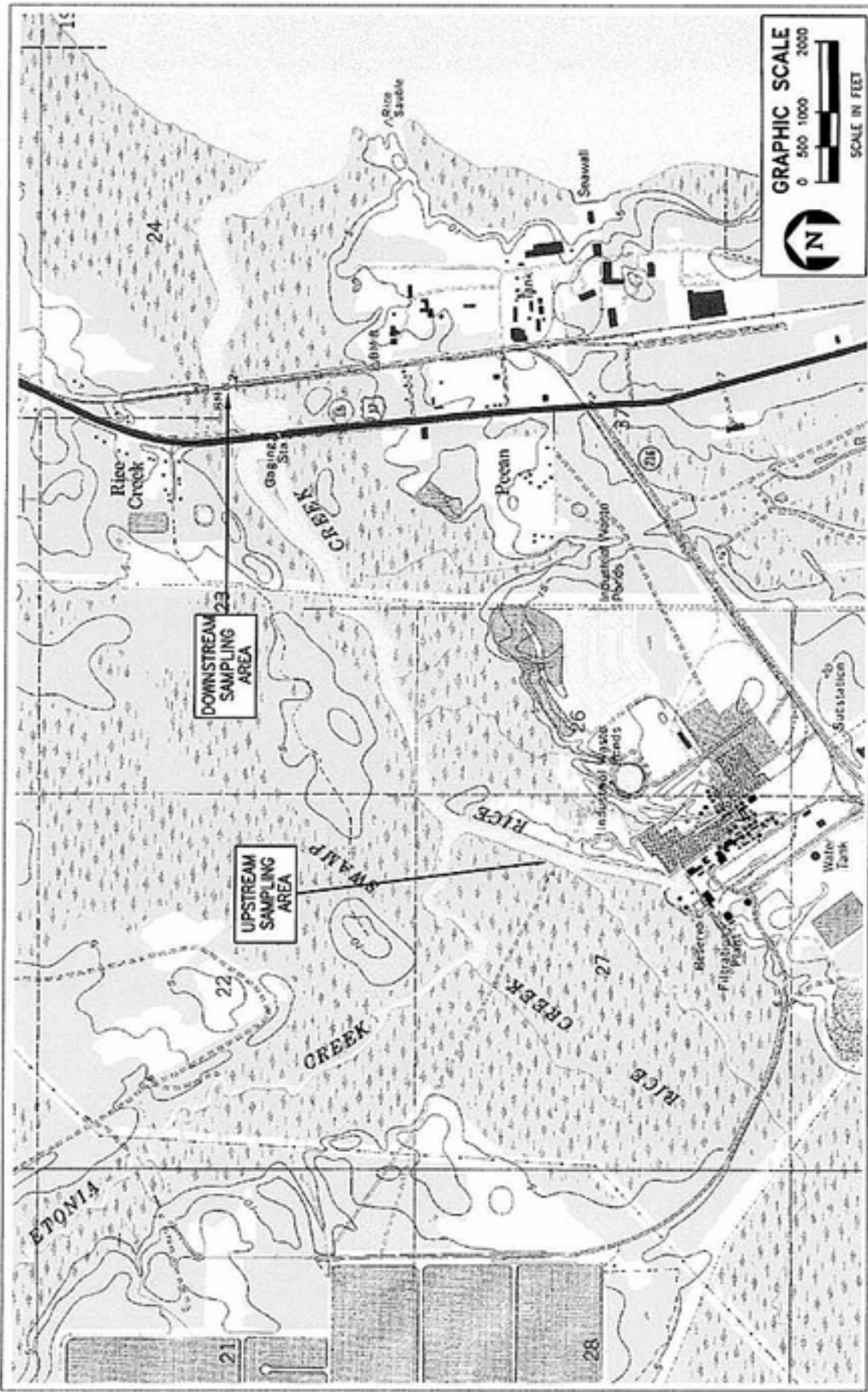


FIGURE 2

STREET MAP

GEORGIA PACIFIC/RICE CREEK





**FIGURE 3**  
**SAMPLING AREAS IN RICE CREEK**  
**ANNUAL FISH TISSUE DIOXIN AND FURAN MONITORING**  
**JULY, 2003**  
**PALATKA, FLORIDA**

**ECT**  
 Environmental Consulting & Technology, Inc.

Fish in Rice Creek at the Georgia-Pacific Site, Palatka, Putnam County, Florida Health Consultation

**Table I - Rice Creek Fish Data**

**TABLE I**  
**RICE CREEK FISH DATA**  
**JULY 2003**  
**Toxicity Equivalents (TEQs)\***

Dioxin Congeners	TEF**	Bluegill upstream	White Catfish upstream	Bluegill downstream	White Catfish downstream
<b>Polychlorinated dibenzodioxins</b>					
2,3,7,8-TCDD	1	0.39	0.16	0.17	<0.15
1,2,3,7,8-PeCDD	1	<0.07	<0.07	<0.09	<0.09
1,2,3,4,7,8-HxCDD	0.1	<0.04	<0.05	<0.04	<0.07
1,2,3,6,7,8-HxCDD	0.1	0.07	0.12	<0.04	0.13
1,2,3,7,8,9-HxCDD	0.1	<0.04	<0.05	<0.04	<0.08
1,2,3,4,6,7,8-HpCDD	0.01	0.07	0.12	<0.06	0.15
OCDD	0.0001	<0.21	<0.20	<0.15	<0.16
<b>Polychlorinated dibenzofurans</b>					
2,3,7,8-TCDF	0.1	0.43	0.18	0.21	0.16
1,2,3,7,8-PeCDF	0.05	<0.11	0.04	<0.11	0.05
2,3,4,7,8-PeCDF	0.5	<0.10	<0.06	<0.10	<0.11
1,2,3,4,7,8-HxCDF	0.1	<0.02	<0.01	<0.02	0.03
1,2,3,6,7,8-HxCDF	0.1	<0.02	<0.01	<0.02	<0.02
2,3,4,6,7,8-HxCDF	0.1	<0.02	<0.01	<0.02	<0.02
1,2,3,7,8,9-HxCDF	0.1	<0.02	<0.02	<0.03	<0.03
1,2,3,4,6,7,8-HpCDF	0.01	<0.02	<0.03	<0.03	<0.04
1,2,3,4,7,8,9-HpCDF	0.01	<0.03	<0.04	<0.04	<0.06
OCDF		<0.11	<0.12	<0.06	<0.09
<b>TOTAL TEQ</b>		<b>0.51</b>	<b>0.25</b>	<b>0.27</b>	<b>0.2</b>
*Wet fish filets with skin and scales analyzed, not dried					
*All levels are in parts per trillion (ppt)					
*For non-detects, 1/2 of the detection limit was used to calculate TEQs					
*Levels are rounded to two significant figures					
**TEF = Toxic Equivalency Factor					
**World Health Organization TEF values were used to calculate the TEQs					