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DIOXIN MONITORING PROGRAM

STATE OF MAINE

2000

BY

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Acknowledgements

Successful collection of the samples was accomplished directly by DEP staff, the Penobscot Indian Nation assisted by Acheron Inc. on behalf of Lincoln Pulp and Paper Co and Ft James Inc.. The Department of Marine Resources and Department of Inland Fisheries and Wildlife also assisted in collecting samples and providing nets. Heather Shoven, a graduate student at the University of Maine, conducted the SPMD studies. Close cooperation with the Water Research Institute (now the Environmental Chemistry Laboratory) also at the University made the analytical results much better. Assistance of Friends of Merrymeeting Bay and a consultant, Applied Biomonitoring, made the caged mussel study possible.

EXECUTIVE SUMMARY

The goal of Maine's Dioxin Monitoring Program, established in 1988, is "to determine the nature of dioxin contamination in the waters and fisheries of the State". Charged with administration of the program, the Department of Environmental Protection (DEP) is required to sample fish once a year below no more than 12 bleached pulp mills, municipal wastewater treatment plants, or other known or likely sources of dioxin. DEP is required to incorporate the results of all studies into a report to the Joint Standing Committee on Natural Resources by March 31 of the following year. Costs of sample collection and analysis are assessed to the selected facilities. DEP is advised by the Surface Water Ambient Toxic (SWAT) Monitoring Program Technical Advisory Group in implementation of the program.

The primary objective of the Dioxin Monitoring Program is to monitor dioxin in fish for assessment of ecological and human health. A second objective is to measure trends, progress toward reduction in environmental concentrations, and effectiveness and need for further controls. A third objective is to determine if bleached kraft pulp mills are discharging dioxin into Maine rivers, which is prohibited as of December 31, 2002 by the dioxin law of 1997 [38 MRSA section 420(2)(I)] The final test is that fish (or surrogate) downstream have no more dioxin than fish (or surrogate) upstream of a mill's discharge, the 'above/below' test.

In 2000, the Dioxin Monitoring Program continued development of a suitable 'above/below' fish test. Intensive monitoring of bass and suckers on the Kennebec River and the Penobscot River, as in 1999, was repeated to gather similar data for a second year. Changes from 1999 included use of 1. small bass instead of small suckers and 2. composite samples of livers on the Kennebec River. In addition, as part of DEP's SWAT monitoring program, semi-permeable membrane devices (SPMDs) and caged mussel studies were conducted as potential surrogates for the fish test.

Fish Consumption Advisories
Based on data through 1999, the Maine Bureau of Health revised the fish consumption advisories in August 2000 (Appendix 1). There is a 'General Consumption Advisory for All Inland Surface Waters due to Mercury Contamination'. Also there are more restrictive 'Specific Freshwater Fish Consumption Advisories' for the Androscoggin River, Kennebec River below Madison, the Penobscot River below Lincoln, Salmon Falls River below Berwick, and Sebasticook River (including East and West branches) due to PCBs and dioxins. An advisory on lobster tomalley was continued from 1994 along the entire coast of Maine due to dioxins and PCBs.

Findings of the 2000 Program

1. Concentrations of dioxin toxic equivalents (DTEh) were much lower than in past years at many stations, some of which are below pulp and paper mills showing significant reductions in their discharges of dioxin, while other stations are below industrial/municipal facilities that have done less or nothing to reduce their discharges of dioxin. These results are interesting and results of the future years will be necessary to interpret any trends.

2. Concentrations of DTEH exceeded the Bureau of Health's Fish Tissue Action Level for cancer (FTALc=1.5 ppt) only in eels from the Penobscot River below Brewer.

3. The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in higher levels of total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level at other locations as well. Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition.

4. Concentrations of 2378-TCDD (TCDD) and DTEh in all fish samples collected below bleached kraft mill discharges to the Androscoggin River, Kennebec River, and Penobscot River, were significantly greater than those at reference stations unimpacted by point sources, except for TCDD in bass at Riley on the Androscoggin River.

5. Concentrations of TCDD in white perch and DTEh in white perch and suckers from Androscoggin Lake were significantly greater than in any species from all other lakes (n=8) or river reference stations that have been sampled. For the first time, however, concentrations of both TCDD and DTEh in bass were similar to reference stations. Concentrations of both TCDD and DTEh in bass and suckers are lower than those found in those species from the Androscoggin River, the most likely the source, but concentrations in white perch are similar to those in bass from the river.

6. There was no significant difference in TCDD or DTEh in bass from above and below SAPPI Westbrook's paper mill, now that the pulp mill has closed, but traces of furan remain elevated below the mill.

7. Since the development of the Above/Below test began in 1997, over 78 tests have been conducted for different dioxins, species, tissue types, and other surrogates in an attempt to develop a test powerful enough to accurately measure any differences above and below a mill. Bass and semi-permeable membrane devices show the most promise and will be tested again in the 2001 program.

INTRODUCTION

Maine's Dioxin Monitoring Program (DMP), established in 1988, has been amended and reauthorized through 2002 by the Maine legislature. The goal of the program is "to determine the nature of dioxin contamination in the waters and fisheries of the State". Charged with administration of the program, the Department of Environmental Protection (DEP) is required to sample fish once a year below no more than 12 bleached pulp mills, municipal wastewater treatment plants, or other known or likely sources of dioxin. The Department is also required to sample sludge once a quarter from the same facilities.

The primary objective of the DMP is to monitor dioxin in fish for assessment of ecological health and of human health. The data are used by the Maine Bureau of Health (BOH) to determine the need for any Fish Consumption Advisories to protect human consumers of fish from certain Maine rivers. The data are also used by DEP and other state and federal agencies in determining impacts of discharge of dioxin on wildlife species.

A second objective is to continue monitoring at some historical stations to measure trends. Trends are followed to measure progress toward reduction in environmental concentrations and effectiveness and need for further controls.

A third objective, to identify sources and magnitude of dioxin discharges, received new emphasis in 1997 when the Maine legislature enacted LD 1633 "An Act to Make Fish in Maine Rivers Safe to Eat and Reduce Color Pollution". The key requirement is that 'a (bleach kraft pulp) mill may not discharge dioxin into its receiving waters' [38 MRSA section 420(2)(I)]. Interim tests that concentrations of TCDD in effluent from the bleach plant must be below EPA's method 1613 nominal detection limit (10 ppq) by July 31, 1998 and TCDF must be below the same detection limit by December 31, 1999 have been achieved. As the final test, by December 31, 2002 fish below a bleached kraft pulp mill have no more dioxin than fish above the mill, the so-called "above/below (A/B) fish test". Although the DMP has successfully detected differences above and below discharges in past years, as the amount of dioxin discharged is reduced, the DMP needs to be modified to allow an enhanced ability to detect smaller differences with known statistical confidence.

The monitoring program is coordinated with other ongoing programs conducted by the Department, US Environmental Protection Agency (EPA), or dischargers of wastewater. The proposed annual monitoring plan must be submitted to the Surface Water Ambient Toxic (SWAT) monitoring program

Technical Advisory Group (TAG), created under 38 MRSA section 420-B, for review and advice. The selected facilities must be notified of their inclusion in the proposed program at least 30 days prior to submittal to the TAG. The Department must incorporate the results of all studies into a report due the Natural Resources Committee by March 31 of the following year. A draft of the report is reviewed by the TAG before completion of the final report. Costs of sample collection and analysis are assessed as a fee to the selected facilities. Payment of the fees is a condition of the waste discharge license granted by the state for continued operation and discharge of wastewater to waters of the State. However, if the selected facility is a publicly owned treatment works (POTW), then the fees may be assessed to the known or likely industrial generator of dioxin and payment will not be a condition of the waste discharge license of the POTW.

Due to continuing controversy over the effects of dioxin on human and ecological health, the US Environmental Protection Agency (EPA) announced that in 1991 it would begin a thorough scientific reassessment of dioxin. EPA proposed that the process would be open to the public and consequently held several meetings to share information and receive comments. A draft report was issued in 1994 and subsequent review in 1995 by EPA's Science Advisory Board called for revisions of some chapters. Revised drafts published in 2000 indicate that dioxin may exhibit reproductive and developmental effects, immuno-toxic effects, neuro-toxic effects, and cancer. In addition, the reports find that concentrations of dioxin in the environment have decreased since the 1970S. Also 'EPA currently estimates that the amount of dioxin in tissues of the general human population closely approaches within a factor of 10, the levels at which adverse effects might be expected to occur'. In March 2001 EPA's Scientific Advisory Board published its draft review of EPA's new revisions and is divided on whether or not dioxin is a carcinogen, but does believe EPA has underestimated non-cancer effects. The SAB also does not agree that there is enough evidence to support EPA's statement about current body burdens and probable adverse health impacts.

DEP has determined, from fish collected since 1984, that concentrations of dioxins in fish from locations unaffected by certain industrial discharges are less than 0.15 ppt, while concentrations in fish below those sources of dioxin are consistently greater than that. Consequently, as one method of determining known or likely sources of dioxin, a Fish Monitoring Threshold (FMT=0.15 ppt) is used by DEP as a monitoring threshold to determine stations that will be retained in the annual program.

For informing the public about potential risk from consuming fish contaminated with dioxin and dioxin-like compounds, the BOH publishes fish consumption advisories. These advisories are based on a comparison of a Fish Tissue Action Level (FTAL) for dioxin toxic equivalent (DTE) concentrations with the 95th percentile upper confidence limit on the mean DTE in fish tissue. Should a tissue concentration exceed an FTAL, a fish consumption rate (e.g., #meals per month) which is unlikely to result in deleterious effects is determined. Two FTALs have been derived for evaluating potential deleterious effects from exposure to dioxins and dioxin-like compounds. Both FTALs were developed using standard USEPA risk assessment methods (EPA 1997). For potential carcinogenic effects associated with long-term exposure, BOH has developed a FTALc of 1.5 ppt, while for reproductive and developmental effects potentially arising from shorter exposure durations, BOH has developed a FTALr of 1.8 ppt (Frakes, 1990). The FTALr for reproductive and developmental effects is relevant to women of child bearing age, pregnant women, and lactating women. The FTALs are compared to the concentration of DTE in edible portions of the fish, skinless filet data. Where whole fish data are reported, the DTE concentration is divided by a factor of 3.5, determined from previous studies with white suckers, to estimate skinless filet concentration. In this report all comparisons with DTE in fish are made with FTALc, since that is the lower of the two and protective of both effects.

PROGRAM DESIGN

The primary emphasis of the 2000 program was to collect fish samples from the appropriate stations and species from each river such that accurate, complete, and current data are available to assess impact to wildlife and human consumers. The program design included sampling at least one station below each major source to document trends and sampling of historic stations that showed dioxin above the FMT, whether or not any fish consumption advisories were issued. Finally the program was modified to evaluate the ability to detect minimum significant differences of the appropriate magnitude for the above/below fish test.

The 2000 program was initially drafted by DEP according to the objectives listed above and sent to participating facilities for comment in early May and to the SWAT TAG later in the month. The workplan was discussed finalized at the SWAT TAG meeting on June 22, 2000.

In 2000 all stations were monitored for ecological and human health assessment and trends (Table 1). At least 5 game fish (bass or other important species) were collected from each station and analyzed individually as skinless fillets.

In order for DEP to accurately determine whether or not there is a discharge of dioxin from a mill, for the Above/Below Fish Test the minimum significant difference (MSD) that can be determined with acceptable statistical probability needs to be relatively small and relevant to background concentrations. Ideally the MSD should be established before the test at some absolute value or fraction of the background concentration. During debate in the legislature, a MSD of 10 % of the background concentration was proposed as a goal by DEP. This would work for TCDF and DTE, where measurable quantities are determined, but not for TCDD, where background concentrations are generally below detection. For TCDD, the detection level (0.05-0.1 ppt wet weight) itself was proposed to serve as the goal, an MSD of 100%. Although initially thought to be achievable, results from the 1997-1998 program with whole suckers showed MSDs to be much higher. In 1999 MSDs for both bass and sucker filets were lower than in previous years, approaching the target in some samples.

Therefore, in 2000 parts of the DMP was repeated to gather data for a second year to see if MSDs from 1999 could be repeated or improved. At the Kennebec River in Norridgewock and Fairfield, filets from 10 legal sized smallmouth bass and 50 male white suckers were collected to be analyzed as individuals for the bass and as 10 composites of 5 each for the suckers. At Rumford Point and Rumford on the Androscoggin River and at Woodville and South Lincoln on the Penobscot River, filets from 10 smallmouth bass were also collected, and from the two Penobscot stations filets of 10 suckers were also collected. At all other Above/Below stations, ten white suckers were captured and combined into 2 composites of 5 fish each. Trout were analyzed as individuals at all stations, except that brown trout from Gilead on the Androscoggin River were analyzed as a composite of all five fish.

In addition, the DMP was modified in a number of ways. Ten small smallmouth bass, instead of 10 small white suckers that were collected in 1999, were collected at the two Kennebec River stations. To increase the tissue sample size in order to lower detection limits, livers from 50 male white suckers were combined into 10 composites of 5 livers at each of the two Kennebec River stations. As part of DEP's SWAT monitoring program, semi-permeable membrane devices (SPMDs) were deployed in 4 experiments in the Androscoggin River and Kennebec River (described in a later section). Also as part of the SWAT program, caged mussels were deployed at the two Kennebec River stations for the same time as the SPMDs (described in a later section).

All samples were analyzed for all 2378-substituted dioxins and furans. Station locations along with specified fish species are shown in Table 1. Station location maps show exact locations of collections (Appendix 6).

At stations affected by a single discharger, sampling will continue yearly until there are at least two consecutive cycles for each species where dioxin is below the FMT and is not increasing. At stations affected by more than one discharger where fish concentrations are not below the FMT, each discharger will continue to be included in the annual sampling program until enough evidence has been gathered to demonstrate that dioxin is no longer present in the discharge in significant quantities. Such evidence must be at least 8 consecutive sludge analyses, equally distributed over all seasons for a minimum of two years, that show no 2378-TCDD (TCDD) detected at a suitably low detection level, (2) full congener analysis of sludge for all 2378 substituted dioxins and furans, (3) other pertinent information such as process changes, changes in hook-ups that show reductions in the level of dioxins and furans being discharged to insignificant levels.

The preferred sampling time is late in the summer when fish are likely to be most contaminated after being exposed to higher concentrations of dioxin during low river flows and after significant growth has occurred. At some locations there has been a problem collecting enough fish later in the summer. Here sampling began in mid-May to try to insure that a suitable sample was collected. These stations were also visited after the beginning of July. If fish were captured during the later period, those samples were submitted for analyses. Otherwise, the fish collected during the early period were used. Sampling at other stations began in July (Appendix 8).

SAMPLING PROCEDURES

Fish were collected by DEP with assistance of state agencies and the Penobscot Indian Nation. Upon capture, fish were immediately killed, weighed and measured, rinsed in river water, wrapped in aluminum foil with the shiny side out, labeled, and placed in a cooler on ice for transport to the DEP lab. Chain-of-custody forms were used to record all field information and document all transfers. In the lab, all fish samples were frozen and later transported whole to the Senator George J. Mitchell Center for Environmental and Watershed Research (formerly the Water Research Institute) at the University of Maine for analysis. All other procedures generally followed EPA's Sampling Guidance Manual for the National Dioxin Study (July 1984). A laboratory log was kept for an inventory of samples in the lab at any time and final disposition.

Table 1. 2000 Dioxin Monitoring Program- Stations, facilities, and species

STATION	FACILITY	SPECIES
Androscoggin R		
Gilead	Mead	bass, sucker, trout
Rumford	Mead	bass, sucker
Riley	IP	bass
Liv Fls(Otis imp)	IP	bass
Turner (GIP)	Mead & IP	bass
Lisbon Falls	Mead & IP	bass
Androscoggin Lake	Mead & IP	bass, sucker,w perch
Kennebec R		
Norridgewock	SAPPI Somerset	bass, sucker
Fairfield	SAPPI Somerset	bass, sucker
Sidney	KSTD	bass, sucker
Penobscot R		
Woodville	Lincoln P&P	bass, sucker
S Lincoln	Lincoln P&P	bass, sucker
Milford	Fort James Co	bass, sucker
Veazie	Fort James Co	bass, sucker
Orrington	Brewer	eel
Salmon Falls R		
S Berwick	Berwick Sewer Dist.	bass
Sebasticook R		
W Br Palmyra	Town of Hartland	bass

Most of the facilities in the program already sample sludge or effluent as part of their Maine Sludge Spreading Permit or Waste Discharge License or Federal NPDES permit. Data from those programs provide adequate information about sources of dioxin. Therefore, no additional sludge samples were collected as part of this program. Effluent data are also used when available to indicate sources and any trends.

CALCULATIONS

In this report, DTE are shown as a range with non-detects calculated at zero (DTEo) and at the detection limit (DTEd) as a mean for all samples of a given species at each station (Table 2). For comparison with the FMT and FTALc, and comparison between years and stations, DTEh were used as calculated using non-detects at 1/2 the detection limit. The upper 95^{th} percentile confidence limit (UCL) was used for these comparisons, consistent with the policy of the BOH. In some cases (reference stations) DTEo were also discussed since those were below the FMT while DTEh exceeded the FMT, which shows the importance of low detection limits and the treatment of non-detects. For the other stations both DTEo and DTEh were above the FMT, and DTEo were not discussed.

A related issue is that of EMPCs, estimated maximum possible concentrations. Some compounds, particularly hydroxydiphenyl ethers (DPEs), are coextracted with furans. Various steps have successfully been taken to minimize these interferences, but some DPEs remain. In this report, EMPCs were treated as non-detects.

Statistical analyses of differences in TCDD and DTEh between stations were performed using the non-parametric Mann-Whitney test. Trends were determined using Kendall's tau, a rank-order correlation statistic, for the period 1990-1999. In this report only differences that are statistically significant at p=0.05 will be reported as significant.

RESULTS AND DISCUSSION

Most of the samples of fish targeted in the initial workplan were collected (Appendix 2). Mean concentrations of TCDD and DTEh for each species and station for the last 5 years are shown in Table 2 while earlier data are in Appendix 12. A description of fish collected and results for each sample location with respect to the objectives of the program is discussed below. For each station there are (1) a comparison of DTEh to the Fish Tissue Action Level cancer endpoint (FTALc=1.5 ppt in filets, 5.25 in whole suckers), (2) a comparison of TCDD and DTEh with those at reference stations, (3) a discussion of trends in TCDD and DTEh in fish and (4) a discussion of TCDD and TCDF in sludge or wastewater as an indicator of trends in discharges. Following discussion of each station is one of the Above/Below test comparing the efficacy of many different tests.

TCDD in fish have normally been below detection (0.1 ppt) in river reference stations (except the Presumpscot at Windham) and lakes (except Androscoggin Lake) tested. Trace amounts of DTEh (0.2-0.3 ppt, less than 10% of the FTALc) at these reference stations are likely due to the ubiquitous atmospheric depostion. Reference stations in 2000 are discussed below.

Since the initial results indicated that TCDD, TCDF, and DTEo were much lower at many stations, some of which are below facilities that have done more or less than others or nothing to reduce discharges of dioxin, in 1999 than in 2000, some samples were rerun. As an objective criterion for selection of which samples to rerun, those samples with results that were greater than 30% different, DEP's data quality objective for duplicates, from 1999, were rerun. As both the initial 2000 data set and reruns all met their QA data quality objectives, in this report values from both sets were averaged for each sample where there was enough tissue left to duplicate the initial sample weight. One exception was bass at Norridgewock on the Kennebec which will be discussed below.

Androscoggin River

Gilead Five rainbow trout and five brown trout were collected near Peabody Island in Gilead, while ten bass and the ten suckers were caught further downsteam at Rumford Point (Appendix 7). As both stations are downstream of the American Pulp and Paper Co's bleached kraft mill in Berlin, New Hampshire, they are therefore not true reference stations unimpacted by direct discharge of dioxin. Both stations are upstream of all Maine mills on the river and are considered the same station relative to point sources. DTEh in rainbow trout, brown trout, bass and suckers were 90%, 44%, 80% and 43% of the FTALc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in higher levels of total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Every year measured, TCDD and DTEh in fish have been significantly higher at this station than in fish from reference stations in Maine.

Rumford Ten smallmouth bass and ten white suckers were collected from the river reach from just below the discharge from Mead's bleached kraft pulp and paper mill in Rumford downstream about 4 miles to Dixfield (Appendix 7). Concentrations of DTEh in the bass and in the suckers were 63% and 45% of the FTALc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in higher levels of total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in the suckers as well (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. TCDD and DTEh concentrations were significantly greater than reference stations on other Maine rivers. Concentrations of DTEh in bass were lower than those upstream at Rumford Point, but TCDD levels were not different between the two stations for either species. No sludge data have been reported since 1989. Concentrations of both TCDD and TCDF have been reported below variable detection levels in final effluent since 1993 and below a 10 ppq detection limit in bleach plant effluent since 1998 (Appendix 4).

TABLE 2. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1996-2000 (pg/g)

WATER/STATION	SPECIES	TIS	1996 TCDD	1996 DTE	1997 TCDD	1997 DTE	1998 TCDD	1998 DTE	1999 TCDD	1999 DTE	2000 TCDD	2000 DTE
ANDROSCOGGIN LAKE												
Wayne	bn trout	f	0.7	1.1-2.3								
	bass	f	0.6	1.2-2.2			0.2	0.4-1.0	0.1	0.2-0.8	<0.1	0.02-1.3
	w perch						0.5	0.6-1.2	0.2	0.3-0.9	0.2	0.2-0.8
	sucker	w	0.4	1.4-2.5			0.4	0.9-1.1			<0.1	0.1-1.1
ANDROSCOGGIN R												
Gilead	rb trout		0.9	2.0-2.6	0.5	1.6-2.1	0.4	1.5-2.0	0.7	1.7-2.3	0.4	0.9-1.4
	bn trout		0.4	1.0-1.5					0.4	1.0-1.5	0.1	0.4-1.0
	bass								0.4	1.4-1.5	0.2	0.8-1.2
	sucker	w	0.7	4.4-5.3	0.5	3.4-3.8	0.9	3.1-3.5	0.8	2.9-3.3	0.3	1.8-2.2
Rumford	bass	f			0.5	1.2-1.8	0.4	1.1-1.5	0.6	1.5-1.9	0.2	0.6-1.1
	sucker	w	0.8	4.1-5.2	0.5	3.6-4.9	0.4	3.0-3.4	0.4	2.8-3.2	0.3	1.9-2.3
Riley	bass				0.3	1.1-2.2	0.2	0.8-1.0	<0.1	0.6-0.9	<0.1	0.2-0.6
	sucker	w			0.5	3.8-4.8	0.3	2.5-2.8	0.3	2.6-2.8		
Jay	bass	f	0.5	1.3-1.4								
	sucker	w										
Livermore Falls	bass	f			0.3	1.2-1.4	0.2	1.1-1.2	0.2	0.9-1.2	0.2	0.6-1.0
	sucker	w	0.6	3.4-3.9	0.5	2.8-2.9	0.5	2.8-2.9	0.4	2.4		
N Turner	sucker	w										
Auburn-GIP	bass	f	0.6	2.1-2.5	0.4	2.0-2.2	0.4	1.6-1.8	0.4	1.6-1.8	0.1	0.4-0.9
	lm bass	f										
	sucker	w										
	bullhead	w										
Lisbon Falls	bn trout	f										
	bass	f			0.6	1.3-1.8	0.5	1.1-1.5	0.7	1.7-2.1	0.2	0.5-1.0
	sucker	w	0.7	1.6-2.8								
BRAVE BOAT HARBOR												
Kittery	lobster	t	1.7	13.8-15.5								
COREA	lobster	t	0.6	6.6-7.3								
KENNEBEC R												
Madison	bn trout	f										
	bass	f	<0.1	0.1-0.8	<0.2	0.03-1.6						
	sucker	w	<0.1	0.3-1.0	<0.1	0.2-0.8						
Norridgewock	bass						<0.1	0.03-0.6	<0.1	0.03-0.7	<0.1	0.05-0.7
	bn trout										<0.1	0.04-0.7
	sucker						<0.1	0.2-0.7	<0.1	0.03-0.7	<0.1	0.05-0.7
Fairfield	trout	f			1.2	1.3-1.9						
	bass	f			0.6	0.6-1.2	0.3	0.4-1.0	0.4	0.4-1.0	0.4	0.5-1.1
	sucker	w	1.6	2.1-2.7	1.2	1.7-2.1	0.9	1.4-1.8	0.3	0.4-1.0	0.4	0.5-1.0
Sidney	bass	f	0.2	0.4-1.0	0.2	0.3-0.9					0.2	0.2-0.8
	bn trout										0.3	0.3-0.8
	sucker	w										
Augusta	bn trout	f			0.6	1.0-1.3						
	bass	f			0.5	0.8-1.6	0.3	0.6-0.9	0.3	0.6-0.9		
	sucker	w	2.2	2.6-3.3								
Phippsburg	lobster	t	3.6	16.7-18.6								

TABLE 2. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1996-2000 (pg/g)

			1996		1997		1998		1999		2000	
WATER/STATION	SPECIES	TIS	TCDD	DTE	TCDD	DTE	TCDD	DTE	TCDD	DTE	TCDD	DTE
PENOBSCOT R												
E Br Grindstone	bass	f	<0.1	0.1-0.8	<0.1	0.04-0.7	<0.1	0.04-0.7				
	sucker	w	<0.1	0.1-0.8	<0.1	0.07-0.7	<0.1	0.07-0.7				
E Millinocket	bass	f			<0.1	0.04-0.7	<0.1	0.04-0.7				
	sucker	w			<0.1	0.09-0.7	<0.1	0.09-0.7				
Woodville	bass				<0.1	0.07-0.7	<0.1	0.06-0.7	<0.1	0.08-0.7	<0.1	0.1-0.7
	sucker				<0.1	0.09-0.7	<0.1	0.08-0.7	<0.1	0.1-0.7	<0.1	0.1-0.7
Winn	bass								<0.1	0.2-0.8	<0.1	0.1-0.7
	sucker								<0.1	0.2-0.9	<0.1	0.1-0.8
S Lincoln	bass	f	0.3	0.5-1.2	0.2	0.4-1.0	0.2	0.4-0.9	0.4	0.6-1.0	0.2	0.3-0.9
	sucker	w	1.6	2.2-3.2	1.2	1.6-2.2	1.0	1.4-2.0	1.0	1.4-1.6	0.7	1.0-1.5
Milford	bass	f			0.2	0.4-0.9	0.2	0.2-0.8	0.1	0.4-0.7	0.2	0.3-0.9
	sucker	w			1.0	1.6-2.0	1.0	1.5-2.0	1.0	1.5-1.6	0.8	1.1-1.6
Veazie	bass	f	0.3	0.3-1.5	0.3	0.4-0.9	0.2	0.3-0.9	0.3	0.4-0.9	0.4	0.5-1.1
	sucker	w	0.4	0.9-2.0	1.1	1.3-1.9	1.0	1.2-1.8	1.1	1.3-1.7	0.9	1.2-1.7
Bangor	eel	f	0.3	0.4-1.5							1.6	2.0-2.5
Stockton Springs	lobster	t	0.9	12.5-13.2								
PRESUMPSCOT R												
Windham	bass	f	<0.1	0.5-1.5	<0.1	0.5-0.7	<0.1	0.4-0.8			<0.1	0.1-0.7
	sucker	w			0.2	1.2-1.4	0.2	1.2-1.4				
Westbrook	bass	f	0.2	0.4-0.9	0.1	0.4-0.9	<0.1	0.3-0.8			<0.1	0.2-0.8
	sucker	w			0.2	1.6-2.0	0.2	1.6-2.0				
Portland	lobster	t	2.7	18.9-21.6								
ST CROIX R												
Woodland	bass	f			<0.1	0.02-0.7	<0.1	0.06-0.7	<0.1	0.06-0.7		
	sucker				<0.1	0.09-0.7	<0.1	0.08-0.7	<0.1	0.07-0.7		
Baring	bass				<0.1	0.03-0.7	<0.1	0.05-0.7	<0.1	0.05-0.7		
	sucker	w			<0.1	0.07-0.8	<0.1	0.08-0.8	<0.1	0.08-0.7		
Robbinston	lobster	t	1.0	10.2-11.2								
SALMON FALLS R												
Acton	sucker		<0.1	0.1-1.0								
S Berwick	bass	f			0.2	0.3-0.6			0.1	0.3-0.6	0.1	0.2-0.8
	lm bass								0.2	0.5-0.8		
	pickerel	f			0.6	0.8-1.0						
	sucker	w	2.0	3.2-4.5								
SEBASTICOOK R												
E Br Corinna	bass				<0.1	0.1-0.7						
Newport	lm bass	f			0.2	1.2-1.4						
	w perch	f	0.3	1.6-2.3								
Sebastcook L	bass	f									0.1	0.5-0.8
	w perch	f									0.2	0.8-0.9
W Br Harmony	bass				<0.1	0.06-0.7						
	sucker		0.1	0.1-1.2								
W Br Palmyra	bass	f			0.3	0.6-0.9	0.2	0.5-0.8	0.2	0.6-0.8	0.1	0.4-2.7
	sucker	w	1.2	2.2-3.6								

w=whole fish, f=fillet, m=meat, t=tomalley
DTE= dioxin toxic equivalents using WHO 98 toxic equivalency factors (TEF).
Range shown at nd=0 and nd=mdl, ie DTEo-DTEd

Riley Five smallmouth bass were collected from the river above the Riley Dam, about 19 miles downstream of Mead Paper Company and upstream of International Paper Company's discharge (Appendix 7). Concentrations of DTEh in the bass were 31% of the FTALc (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. DTEh were significantly greater than reference stations on other Maine rivers but appear to be slowly declining in recent years (Table 2). TCDD concentrations were all below detection for the first time.

Livermore Falls Five smallmouth bass were captured in the Otis Impoundment, approximately 2 miles downstream of the discharge from International Paper Company's Jay mill (Appendix 7). Concentrations of DTEh in the bass were 62% of the FTALc (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. TCDD and DTEh were significantly greater than reference stations on other Maine rivers. There has been a significant decline of TCDD in both bass and suckers and of DTEh in suckers since 1990. There are no new sludge data since 1996, but concentrations of TCDD and TCDF in bleach plant effluent and final effluent are well below EPA's reporting level (Appendix 4).

Auburn-GIP Five smallmouth bass were collected in Gulf Island Pond (GIP) near the deep hole at Seagull Island, approximately 30 miles downstream of International Paper Company (Appendix 7). Concentrations of DTEh in the bass were 49% of the FTALc (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in higher levels of total toxic equivalents (TTEh) in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. TCDD and DTEh were significantly greater than reference stations on other Maine rivers. There was a significant decline in TCDD in the early 1990s, and in 2000 DTEh were for the first time lower than in recent years.

Lisbon Falls Five smallmouth bass were captured in the Pejepscot Impoundment, approximately 45 miles below International Paper Company (Appendix 7). This station showed the largest decline in TCDD and DTEh from 1999 of all the stations in the initial 2000 dataset, and although the reruns were higher, they were still much lower than those of

1999 (Table 2). Concentrations of DTEh were 66%of the FTALc (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in higher concentrations of total toxic equivalents (TTEh) in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. TCDD and DTEh were significantly greater than reference stations on other Maine rivers.

Androscoggin Lake

Wayne Androscoggin Lake in Wayne and Leeds is a 4000 acre 38 foot deep meso-trophic lake with a unique reverse delta at the outlet formed by centuries of periodic backflow from the Androscoggin River via the Dead River into the lake. There is a dam on the Dead River that reduces but does not prevent the backflow into the lake, which usually occurs once or twice every year. Significant amounts of dioxin were found in fish from the lake in 1996, 1998, and 1999. In 2000, ten smallmouth bass, ten white perch, and ten white suckers were collected from the lake and analyzed as 2 composites of 5 fish each.

DTEh were 64, 37%,% and 13% of the FTALc for bass, white perch, and suckers respectively, (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD in white perch and DTEh in white perch and suckers were significantly greater than in any species from all other lakes (n=8) that have been sampled and significantly higher than in fish from all river reference stations, but, for the first, time concentrations of both in bass were similar to reference stations. Concentrations of both in bass and suckers are lower than those found those species from Livermore Falls on the Androscoggin River, which is most likely the source, but concentrations in white perch are similar to those in bass in the river. Concentrations of TCDD and DTEh in suckers appear lower than in previous years.

Kennebec River

Norridgewock Ten smallmouth bass, and fifty male white suckers were collected from the river at Norridgewock (Appendix 7). Five brown trout were also collected from below the dam in Madison. Although these locations are downstream of the discharge from Madison Paper Industries discharge in Madison, comparison of dioxin in fish from this station in 1998 and 1999 with that from fish caught at the

Kennebec River reference station above Madison previously, showed no significant difference between the two locations. These locations therefore serve both as a reference for the river and the upstream station for the SAPPI Somerset mill.

DTEh in all three species were 26-27% FTALc, but this was an artifact of relatively high detection limits as shown by DTEo at 3% of the FTALc for all three species (Appendix 2). In fact, TCDD and most other congeners that add significantly to the DTE were below detection and therefore the FMT for all samples. TCDF was present in all samples in trace amounts. The differences between DTEh and DTEo are much larger at these stations than at any station downstream of point sources on the river, and document the problem of the impact of high detection limits and treatment of non-detects. The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. TCDD and DTEo were similar to those from previous years for this and the Madison station. DTEh vary among years due to different detection limits. The trace amount of DTE measured in these fish is likely due to long-range transport and atmospheric deposition from remote sources. This station was also used for additional development of the above/below fish test described in a later section of this report.

<u>Fairfield</u> Ten smallmouth bass, five brown trout and fifty male white suckers were collected from the river between the Shawmut Dam and the I-95 bridge, approximately 7-8 miles below SAPPI Somerset's bleached kraft pulp and paper mill in Skowhegan (Appendix 7). Concentrations of DTEh in bass, brown trout, and suckers were 61%, 39% and 57% of the FTALc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2000). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD and DTEh were significantly greater than those at the reference station at Norridgewock for all three species. There was no significant trend in concentrations in bass during the 1990s, but there appears a slight reduction in both TCDD and DTEh since 1994. There was, however, a significant reduction in TCDD and DTEh in suckers during the longer period. Effluent data (Appendix 4) and sludge data (Appendix 3) document decreases in discharges over the years especially since early 1997. Concentrations of TCDD and TCDF are well below the limits of the new law (<10ppq in the bleach plant). This station was also used for additional development of the above/below fish test described in a later section of this report.

Sidney

This station is downstream of Lockwood Dam in Waterville/Winslow which is about 10 miles downstream of the current discharges from SAPPI Somerset in Skowhegan. The Kennebec Sanitary Treatment District discharges about 2 miles downstream of the dam. Five brown trout were captured just below the dam and five smallmouth bass were collected about 10 miles below the dam in Sidney. Both of these fish samples are considered to be from the Sidney station since the fish have free movement within this river reach. Concentrations of DTEh in bass and trout were 41% and 48% of the FTALc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2000). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD and DTEh in bass were significantly greater than those at the reference station at Norridgewock. There has been no trend in bass during the 1990s, which have been more variable over the years, but concentrations since 1997 were slightly lower than all but one previous year. Sludge data from KSTD in recent years show that TCDD is below 1 ppt, but TCDF and DTEh are usually detected at a few ppt documenting the discharge of small amounts of dioxin to the river.

Penobscot River

Woodville Although this station is downstream of Great Northern's pulp and paper mills in Millinocket and East Millinocket, fish collected at this station in 1997 and 1998, had similarly low concentrations of dioxin as the historical reference station at Grindstone on the East Branch, uninfluenced by these mills. Therefore, this station may serve as a reference station for the Penobscot River and the upstream station for Lincoln Pulp and Paper. In 2000 ten smallmouth bass and ten white suckers were collected from this station.

Concentrations of DTEh in bass and suckers were 32% and 8% of the FTALc respectively (Appendix 2), but this was an artifact of detection levels and the impact of treatment of non-detects. Concentrations of all congeners that add significantly to DTE were below detection and therefore the FMT, except for trace amounts of TCDF in suckers and somewhat higher levels than previously in bass. As a result concentrations of DTEo were only 9% and 2% of the FTALc for both species. The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002).

Winn As in 1999, at the request of Lincoln Pulp and Paper Company in Lincoln, bass (8) and suckers (10) were captured from the river at Winn, approximately 4 miles below the confluence with the Mattawamkeag River and about 8 miles upstream of the Company's bleached kraft mill in Lincoln. The Mattawamkeag River is thought by the Company to potentially be a source of dioxin downstream of the Woodville station and the Winn station is believed by the Company to be a more appropriate station for the above/below test. Funding for this work was provided by the Company above and beyond the DMP. TCDD was not detected in any sample for either year. DTEh were 10% and 29% for bass and 11% and 9% for suckers of the FTALc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Concentrations of all congeners that add significantly to DTE were below detection and therefore the FMT, except for TCDF. As a result concentrations of DTEo were an even smaller percentage of the FTALc for both species. TCDF in bass and TCDF and DTEo in suckers were higher than usually found at the Woodville reference station for 1999 but not 2000. Since these results are variable from year to year, they do not support the idea that there is a significant source between the Woodville station and mill. Since the results and other fish and sediment data collected by the Penobscot Indian Nation are not conclusive and there is no barrier to prevent fish from moving up from below the mill, this station may not be a good reference for the Above/Below fish test.

South Lincoln Ten smallmouth bass and ten white suckers (Appendix 7) were collected from the river near the boat ramp in South Lincoln, approximately 4 miles downstream of Lincoln Pulp and Paper Company's bleached kraft mill in Lincoln. Concentrations of DTEh in bass and suckers were 44% and 27% of the FTALc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD and DTEh were significantly greater than those at the Woodville reference station. There has been, however, a significant decrease in TCDD and DTE in both bass and suckers during the 1990s, although less so with bass since 1996. This decline is likely a result of decreased discharges from the mill as documented by decreased concentrations of TCDD and TCDF in sludge (Appendix 3) and in effluent, which shows compliance with the limits of the new law (Appendix 4), since 1997. A change in the mill's bleaching process from chlorine based bleaching to primarily oxygen based bleaching in 1999 may account for the slightly lower TCDD and DTEh concentrations in 2000, but full benefit will likely take longer to discern.

Milford Located at Freese Island near the boat ramp in Costigan, this station is approximately 34 miles downstream of Lincoln Pulp and Paper Company's bleached kraft mill in Lincoln and is the upstream station for the above/below test for the Fort James mill about 5 miles downstream. Five smallmouth bass and ten white suckers were captured from this station. Concentrations of DTEh in bass and suckers were 47% and 29% of the FTAlc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD and DTEh were significantly greater than those at the Woodville reference station. Like the South Lincoln station, at this station there has been a significant decrease in TCDD and DTEh in both suckers and bass during the 1990s, although less so for bass since 1996, likely due to decreased discharges from Lincoln Pulp and Paper Company during that time.

Veazie Five smallmouth bass and ten white suckers (Appendix 7) were collected from the Veazie Impoundment about 7-8 miles below Fort James' bleached kraft mill in Old Town. Concentrations of DTEh in bass and suckers were 60% and 28% of the FTALc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD and DTEh were significantly greater than those at the Woodville reference station both years. At this station there has been a significant decrease in TCDD and DTEh in bass and DTEh in suckers since the early 1990s, although not much since 1996, likely a result of decreased discharges from both upstream mills as documented by effluent (Appendix 4) and sludge (Appendix 3) data. TCDD and TCDF bleach plant effluent concentrations at the Fort James mill have continued to decline since early 1998 and have met the limits of the new law.

Orrington Ten eels were collected from an eel fisherman from the river in Orrington, downstream of the Town of Brewer's sewage treatment plant outfall and combined into 2 composites of 5 fish each. The Brewer treatment plant treats wastewater from the Eastern Fine Paper mill which uses pulp made at Lincoln Pulp and Paper Co in Lincoln. Concentrations of DTEh exceeded the FTALc (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD and DTEh were significantly greater than those for bass, another top predator, at the Woodville reference station or any other station. Concentrations were significantly greater than those in eels from this same location in 1996. The reason for this is unknown, since concentrations in discharges, as documented by lower concentrations in Brewer's sludge and effluent or sludge from Lincoln Pulp and Paper and Fort James, have decreased since that time (Appendix 3, 4).

Presumpscot River

Windham Five smallmouth bass (Appendix 7) were collected from the river below North Gorham Pond in Windham. Concentrations of DTEh in bass and suckers were 30% of the FTALc but DTEo were only 7%, documenting the impact of treatment of non-detects (Appendix 2). Concentrations of all congeners that add significantly to DTE were below detection and therefore the FMT, except for trace amounts of TCDF. The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. This station has been used as a reference station for the Presumpscot River since 1993 since there are no known point sources of dioxin upstream. However, concentrations of TCDD, TCDF, PeCDD, PeCDF and DTEh from this station have been significantly higher than all other reference stations in the program every year through 1998. These results suggest that there are other local sources of dioxin which have not yet been discovered. These concentrations must represent a combination of background from local sources and long range transport and atmospheric deposition from remote sources. The data for 2000, however, look more like those from other reference stations have for all years monitored.

Westbrook Five smallmouth bass (Appendix 7) were collected from the river near the US Route 302 bridge about 1.5 miles downstream of the discharge from SAPPI Westbrook's bleached kraft pulp and paper mill. In 1999 the pulp mill ceased operation and the paper mill now purchases its pulp. This is the first year since then that fish have been monitored.

Concentrations of DTEh in bass were 35% of the FTALc although DTE0 was only 11%, documenting the impact of treatment of non-detects (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD and DTEh were similar but concentrations of TCDF were significantly greater than the Windham reference station, showing both improvement with some residual from past discharges remaining in the river. The latest data, taken within a few months of the cessation of the pulp mill document reduced discharges from the mill (Appendix 3, 4), but there are no new data since.

Salmon Falls River

South Berwick Five smallmouth bass (Appendix 7) were collected from the Rollinsford Impoundment about 2 miles below the discharge from the Berwick Sewer District's municipal wastewater treatment plant in Berwick, whose discharge is 85% effluent from Prime Tanning Company.

DTEh were 39% of the FTALc all bass combined (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD (marginally) and DTEh were significantly greater than in fish from previous years at an upstream reference station at Acton, which had concentrations similar to other reference stations in Maine. There was no significant trend for TCDD or DTEh in bass during the 1990s. There are no new sludge or effluent data from the treatment plant to show any changes in discharges. These results document a local source of dioxin to this reach of the river most likely the Prime Tanning discharge.

Sebasticook River

West Branch at Palmyra Ten smallmouth bass were collected from the river near the US Route 2 bridge about 3-4 miles below the discharge from the Town of Hartland, whose effluent is about 85% effluent from Irving Tanning Company, and combined into two samples of five fish each.

Concentrations of DTEh were 103% of the FTALc, but DTEo were much less, documenting the impact of the treatment of non-detects, especially for this station (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2000). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition. Concentrations of TCDD and DTEh were significantly greater than in fish from the reference site upstream of the discharge in Great Moose Lake in years past. There are no significant trends for TCDD or DTEh during the 1990s. These results document a local source of dioxin to this reach of the river most likely the Irving Tanning discharge. Although the only sample result reported (1996) showed no detectable amount of dioxin in effluent (Appendix 4), low solubility and high bioconcentration of dioxin make effluent data less meaningful than sludge data. Sludge data from 1989 show measurable levels of TCDF (Appendix 3), but there are no newer sludge data to aid interpretation of current levels of discharge.

Sebasticook Lake

Newport Eight smallmouth bass and ten white perch were collected from Sebasticook Lake, about 4 miles downstream of the Corinna Sewer District's discharge. This facility treated the waste from the Eastland Woolen Mill in Corinna until 1996, when the mill ceased operation. Since then groundwater and river sediments have been found to be contaminated with a number of pollutants from the mill. The site was placed on the National Priorities List of Superfund sites in 1999, and cleanup has begun. This work was funded by Maine's SWAT monitoring program.

Concentrations of DTEh in bass and white perch were 50% and 64% of the FTALc respectively (Appendix 2). The addition of dioxin-like (coplanar) PCBs, measured as part of DEP's SWAT program, to DTEh may result in total toxic equivalents (TTEh) that exceed a Fish Tissue Action Level in these fish (DEP, 2002). Sources of PCBs are unknown but likely include long-range transport and atmospheric deposition.

Concentrations of DTEh in bass and both TCDD and DTEh in white perch were significantly greater than in fish from the reference site upstream of the discharge in Corinna in years past (Table 2, Appendix 12). Concentrations of DTEh were significantly lower than when last measured (1996,1997) at the East Branch of the Sebasticook River at the inlet to the lake.

Above/Below Test

The goal in development of a suitably sensitive Above/Below test, is to be able to detect a minimum significant difference (MSD) in dioxin and/or furan concentrations above and below a mill as small as a target value of 10% of that above the mill or as small as possible. MSDs are normalized to mean concentrations above the discharge to provide a relative measure, since units and scales are different for different congeners, test types, species, and tissues. Where the concentrations above the mill are below the detection limit, as is the case for TCDD in muscle tissue, the MSD target is an absolute value (0.05-0.1 ppt) rather than a relative one.

Since the development of the Above/Below test began in 1997, tests of TCDD, TCDF, and DTEo on both a wet and lipid weight basis have been conducted in small bass, single and composite large bass filets, bass livers, large and small whole suckers, single and composite sucker filets, single and composite sucker livers, single and 2 composites of SPMDs, and caged mussels, for a total of 78 tests. Some tests continue to show promise while others do not and have been discarded. The modifications in the 2000 DMP resulted in further progress towards determination of the most sensitive test. Each modification is discussed separately.

<u>Bass</u>

Ten large bass were captured at one pair of stations on each of the Androscoggin (ARP at Rumford Point above and ARF at Dixfield below the Mead mill in Rumford), Kennebec (KNW at Norridgewock above and KFF at Fairfield below the SAPPI Somerset mill), and Penobscot (PBW at Woodville above and PBL at S Lincoln below Lincoln Pulp and Paper in Lincoln) rivers, essentially repeating studies conducted in 1999. All bass were to be within a 25 mm length range within and between paired stations, which was achieved for most of the the Kennebec and Penobscot but less so for the Androscoggin Due to difficulty in collecting fish (Appendix 7). All bass were analyzed as individuals.

Concentrations of TCDF on a wet weight basis and both TCDF and DTEo on a lipid weight basis were significantly lower at Rumford than at Rumford Point, but there was no difference in TCDD between the two stations (Appendix 2). MSDs were normalized to the mean concentrations of Norridgewock and Woodville since Rumford Point is downstream of American Tissue mill in Berlin New Hampshire. MSDs were lower than in 1999, except for TCDF and DTEo which were higher on a lipid weight basis (Table 3). MSDs were lower for lipid weights than for wet weights, but none were close to the target values. Considerable variation in concentrations at Rumford Point were primarily responsible for the relatively high MSDs. Concentrations of TCDD, TCDF, and DTEo were significantly higher at Fairfield than at Norridgewock on both wet and lipid weight basis as in all previous years (Appendix 2). MSDs were generally similar to those in 1999 (Table 3). MSDs were closest to targets for TCDF followed by TCDD and then DTEo, and lipid weight based MSDs were lower than wet weight MSDs. MSDs were lower than those from the Androscoggin. None of the MSDs met target values, however.

Concentrations of TCDD, TCDF, and DTEo were significantly higher at South Lincoln than at Woodville for both wet and lipid weights except for DTEo based on lipid (Appendix 2). MSDs were generally lower than in 1999 except for TCDF on a lipid basis (Table 3). Lipid weight MSDs were slightly lower than wet weight MSDs except for TCDF which was the only one that came close to meeting the target value. MSDs here were the lowest of those from all three rivers.

Small Bass

Since small fish of a given species at a station are younger than much larger fish, they generally have lower body burdens of contaminants such as dioxin. In addition, younger fish generally have higher growth rates and uptake of contaminants that may more reflect current ambient contaminant levels better than older fish which may have residues from years past. And small fish tend to have smaller home ranges, therefore may be more representative of local conditions than larger fish which may move to different areas within the year. All of these may result in less variation in concentrations and decrease MSDs.

To examine this idea, in 1999 we collected small suckers from the Kennebec River at Norridgewock (KNW)and Fairfield (KFF). Interestingly, MSDs were higher for the small suckers than for the larger suckers for TCDD, TCDF, and DTEo both on a wet and lipid weight basis. Since, in studies conducted beginning in 1997, MSDs were often lower for large bass than for large suckers, in 2000, small bass, rather than small suckers, were collected from these same stations (Appendix 7).

Concentrations of TCDD, TCDF, and DTEo were significantly higher at Fairfield than at Norridgewock. On a wet weight basis, small bass MSDs were quite a bit lower than those for large bass for TCDD and DTEo, and similar for TCDF (Table 3). And lipid normalized MSDs were even lower relative to background concentrations than the wet weight MSDs. MSDs were lower for large bass for DTEo, however. Small bass MSDs were also lower than large sucker MSDs on both a wet and lipid weight basis. Nevertheless, MSDs were still much higher than the targets.

Table 3. Minimum Significant Differences for 2000 Above/Below Tests

STATIONS	SPECIES	N	TCDDw ppt	%bg	TCDFw ppt	%bg	DTEow ppt	%bg	TCDDL ppt	%bg	TCDFL ppt	%bg	DTEoL ppt	%bg
FISH														
ARP/ARF	SMB	10	0.14	**280**	2.23	**384**	0.50	**526**	19.6	**131**	189.7	**123**	57	**219**
		20	0.10	**200**	1.58	**272**	0.35	**368**	13.9	**93**	134.1	**87**	40.6	**156**
KNW/KFF	SMB	10	0.17	**340**	0.53	**129**	0.2	**400**	24.4	**176**	63.3	**71**	13.7	**127**
		20	0.12	**240**	0.38	**93**	0.14	**280**	17.2	**124**	44.8	**50**	9.7	**90**
	sSMB	10	0.09	**180**	0.64	**139**	0.16	**267**	1.49	**115**	8.7	**73**	2.3	**163**
		20	0.06	**120**	0.45	**98**	0.11	**183**	1.05	**81**	6.1	**51**	1.63	**116**
	WHS	10	0.16	**320**	0.46	**164**	0.26	**520**	2.57	**139**	8.4	**84**	5.5	**355**
		20	0.11	**220**	0.32	**114**	0.18	**360**	1.82	**98**	6	**60**	3.9	**252**
PBW/PBL	SMB	10	0.09	**180**	0.15	**20**	0.15	**107**	18.7	**117**	208.5	**95**	46	**41**
		20	0.06	**120**	0.11	**15**	0.11	**79**	13.2	**83**	147.5	**67**	32.5	**79**
	WHS	10	0.31	**620**	0.88	**154**	0.39	**390**	1.83	**153**	6.23	**48**	2.13	**107**
		20	0.22	**440**	0.62	**109**	0.27	**270**	1.3	**108**	4.76	**36**	1.5	**75**
LIVERS														
KNW/KFF	WHS	10	1.23	**425**	13.31	**261**	2.87	**191**	4.62	**453**	51.7	**272**	11.4	**193**
		20												
MUSSELS														
KNW/KFF		10	<		0.57	**89**	0.69	**133**	<		86.6	**78**	105	**119**
		20	<		0.41	**64**	0.49	**94**	<		61.2	**55**	74.5	**85**
SPMDs														
KNW/KFF		5							<		3.21	**105**	0.38	**78**
		10							<		2.27	**74**	0.26	**53**
ARP/ARF		10							<		6.5	**77**	1.89	**129**
		20							<		6.17	**73**	1.33	**90**

Suckers

The 10 composites of 5 fish each of sucker filets showed significantly higher concentrations of TCDD, TCDF, and DTEo at Fairfield (KFF) below the SAPPI Somerset mill on the Kennebec River than Norridgewock (KNW) above the mill (Appendix 2). MSDs were lowest for TCDF, followed by TCDD, and then DTEo in order (Table 3). Lipid weight based MSDs were lower than wet weight MSDs. MSDs were higher for TCDD and similar for TCDF and DTEo compared to individual filets in 1999 (Table 3). MSDs for these composites of sucker filets were much greater than the targets. MSDs were higher than those for both large and small bass for TCDF and DTEo, but slightly lower for TCDD, quite similar to that of 1999. It appears that suckers may not be as good a test species as bass.

Ten large suckers were captured from the Penobscot River at Woodville (PBW) above and at S Lincoln (PBL) below Lincoln Pulp and Paper in Lincoln. All suckers were within a 30 mm length range within and between stations (Appendix 7). All were analyzed as whole fish. Concentrations of TCDD, TCDF, and DTEo were significantly higher at South Lincoln than at Woodville. MSDs were higher for some measurements and lower for others than suckers from the Kennebec. Lipid based MSDs were lower than wet weight based MSDs as with most other species and stations. MSDs were higher than those for the bass at this station, also similar to most other stations. MSDs were not close to the target values.

Livers

Previous monitoring of lobsters in Maine has shown higher levels of dioxin and furans in the hepatopancreas or liver than muscle tissues. Other studies elsewhere have similarly shown higher concentrations of these compounds in the livers of fish and shellfish. Because higher levels might make it easier to detect differences between stations, in 1999, livers were collected from bass and suckers from the Norridgewock (KNW) and Fairfield (KFF) stations and analyzed individually. It was uncertain if individual livers would be large enough to analyze and contain enough dioxin and furan to measure.

Initial extractions of the fish livers resulted in a large amount of diphenyl ether interferences for the furans, especially the TCDF. The methods currently used for separation of these compounds from fish tissue are not adequate for the liver samples. The analytical method was modified to minimize this interference.

Due to low tissue sample size and resulting relatively high detection levels, no detectable amounts of any congeners were measured in either bass or suckers from the reference station Norridgewock, except for a few samples where HpCDF was detected (Appendix 10). Therefore, calculation of MSDs was not meaningful. At Fairfield, detectable amounts of TCDD and TCDF were measured in most samples and other congeners were detected in many samples.

In order to increase the tissue sample size and lower minimum detection limits to be able to measure TCDD or TCDF at the reference station, in 2000 we collected 50 male suckers to be combined into 10 samples of 5 livers each at the same stations, Norridgewock and Fairfield. Results showed that detectable levels of TCDD and TCDF were measured in all (but one at each station for TCDD) samples (Appendix 10). Detectable levels of most other congeners were measured in many samples as well. Concentrations of TCDD, TCDF, and DTEo were significantly higher at Fairfield than at Norridgewock. This occurred even though the MSDs were much higher than the 10% target value making the test relatively insensitive (Table 3). There was not much difference in wet weight MSDs and lipid weight MSDs.

Concentrations of TCDD, TCDF, and DTEo in one composite of 10 liver samples from female suckers at Fairfield were well within the ranges of those for the 10 samples of males, although well below the mean. Mature females would be expected to have lower levels due to annual purging of lipiophilic contaminants with eggs.

SPMDs

Semipermeable membrane devices (SPMDs) are integrative sampling devices which combine membrane diffusion and liquid-liquid partitioning to concentrate low to moderate molecular mass hydrophobic compounds from water (Huckins et al, 1996). SPMDs have some features that give them some advantages over monitoring contaminants in fish. SPMDs can be deployed in water to accumulate single, pulsed, or continuous contaminant releases over time. SPMDs are anchored to sample at specific locations, thereby avoiding any question of origin of contaminants caused by fish movement. SPMDs do not change function under stress, unlike gills of fish. There are no biotransformations or elimination like that in fish. There are, however, a number of conditions, such as temperature, DOC, solids which can effect the efficiency of these devices. And accumulation of contaminants does not occur by the same process of uptake in fish, thereby potentially limiting their use to accumulation in a relative sense.

Made of low density polyethylene lay-flat tubing (2.5 cm wide by 91.4 cm long), containing a thin film of neutral triolein and placed inside stainless steel canisters, SPMDs are deployed in the waterbody where they accumulate contaminants until retrieved. Laboratory handling of the SPMDs after field deployment involves the removal of biofouling, which is exterior debris and periphyton, before extraction. After this initial cleanup, the devices are then spiked with a cocktail of surrogates consisting of C-13 labeled analogs of the toxic native dioxin congeners in order to monitor recovery. After surrogate addition, individual SPMDs are dialyzed and the collected dialysates are cleaned by gel permeation chromatography followed by Florisil solid phase extraction. The extracts from the three SPMDs in each deployment site canister are then combined to enhance detection and each resulting sample is concentrated to ten microliters for HR GC/MS analysis.

In order to assess the potential of SPMDs to determine if mills are discharging dioxin, DEP has funded studies at the University of Maine Environmental Chemistry Laboratory (formerly the Water Research Institute) since 1999 through the Surface Water Ambient Toxics (SWAT) program. In 1999, the focus was development and refinement of field and laboratory techniques by deploying the SPMDs in the nearby Penobscot River for 3 one-month trials and then retrieving them for laboratory analysis.

In 2000, four studies or deployments were conducted as described below (Tables 4 and 5)and in more detail by Shoven (2001).

TABLE 4. Objectives of the 2000 Field Season Deployments

Objective	**#**	**# of SPMDs**
➢ Deployment Time Study: To determine SPMD uptake rates and biofouling over the 28-day deployment period. **Location: Androscoggin R. at Dixfield (10A,B)**	1, 2	20 SPMDs per deployment with 5 retrieved each week for 4 weeks
➢ Androscoggin Above/Below Study: To test the ability of SPMDs to detect differences in dioxin in the river Above/Below a mill. **Locations: Rumford Point (13) and Dixfield (10)**	4	20 SPMDs per site with all retrieved after 28 days
➢ Kennebec Above/Below Study: To test the ability of SPMDs to detect differences in the river Above/Below a mill. **Locations: Norridgewock (11) and Fairfield (12)**	3	10 SPMDs per site with all retrieved after the 54 days

TABLE 5. Descriptions of the 2000 Field Season Deployments

Deployment #	Deployed	Retrived	Time (days)	Site	SPMDs per site	#SPMDs / sample	# Reps
1	6/2/00	6/9/00	7	10-A	5	5	1
		6/16/00	14	10-B	5	5	1
		6/23/00	21	10-A	5	5	1
		6/30/00	28	10-B	5	1	5
2	7/7/00	7/14/00	7	10-A	5	5	1
	6/30/00	7/14/00	14	10-B	5	5	1
	7/7/00	7/28/00	21	10-A	5	5	1
	6/30/00	7/28/00	28	10-B	5	1	5
3	8/3/00	9/26/00	54	11	10	2	5
				12	10	2	5
4	9/19/00	10/17/00	28	10	20	2	10
				13	20	2	10

Results were as follows.

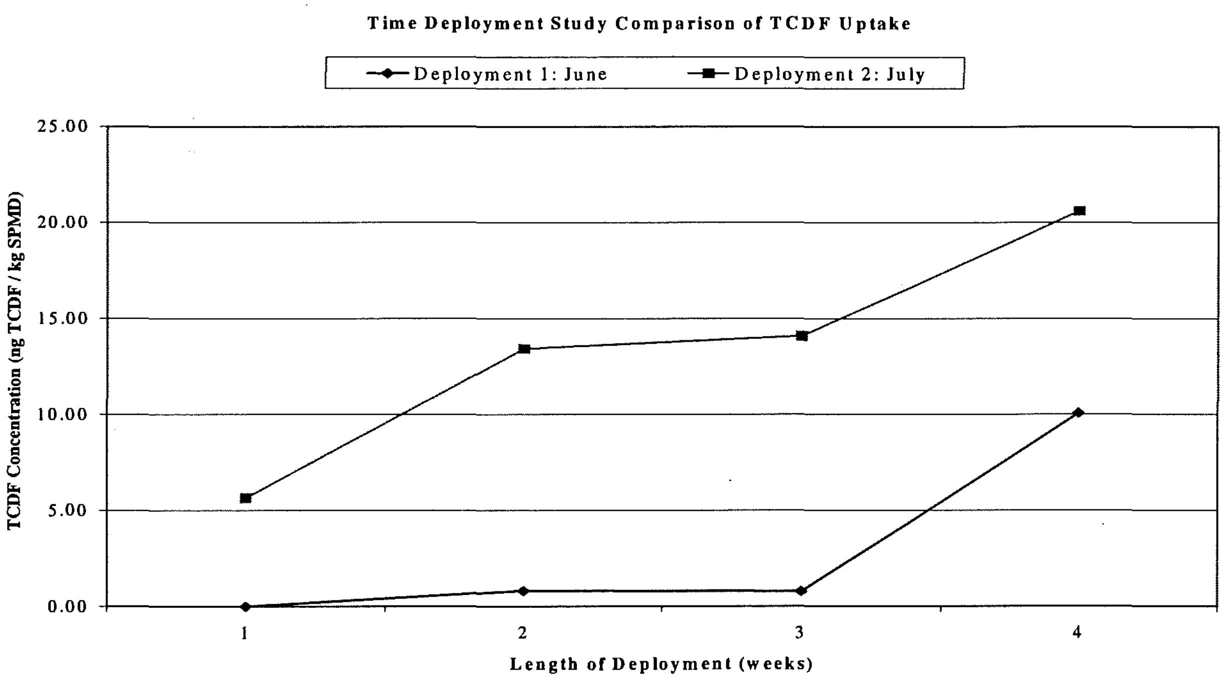
Deployment Time Study, Deployments 1 and 2

One objective was to determine differences in uptake in colder water (June) than in warmer water (July). Another objective was to determine if uptake rates were constant over time or if biofouling with growths of algae and accumulation of other materials would change the uptake rates. This is critical to know to help determine the optimum length of deployment time. Longer deployment times should result in more uptake of dioxin unless biofouling or other processes reduce or eventually stop further uptake. For these and all deployments, SPMDs were suspended from floats so as to be approximately 1 meter below the water surface in all water levels at a location that was at least 4 m deep.

Results showed that uptake of TCDF continued over the 4 weeks in each month (Figure 1), as did uptake of many other furans as well (Table 6). No TCDD or PeCDD and only a few other dioxins were detected. The two curves show that uptake rates were considerably higher in warmer water (July) than in colder water (June)(Figure 1). The different slopes documented different uptake rates for each week for each deployment. In June uptake rates were relatively low for the first three weeks also likely reflecting lower temperatures during that period. Differences for all weeks may also be due to other factors including river velocities, dilution of dioxin levels in the river due to changes in river flow volume, suspended sediment load, dissolved organic carbon, and measurement error, among others.

Qualitatively, the biofouling on the membrane increased in coverage and changed characteristics over the four-week period progressing from tiny tan specs to larger army green, rod-like shapes. Each week the deployment canisters had more growth collected on the surfaces. Since uptake rates during week 4 was not diminished from earlier weeks in either month, biofouling did not seem to be an important factor in these 30 day exposures during June and July.

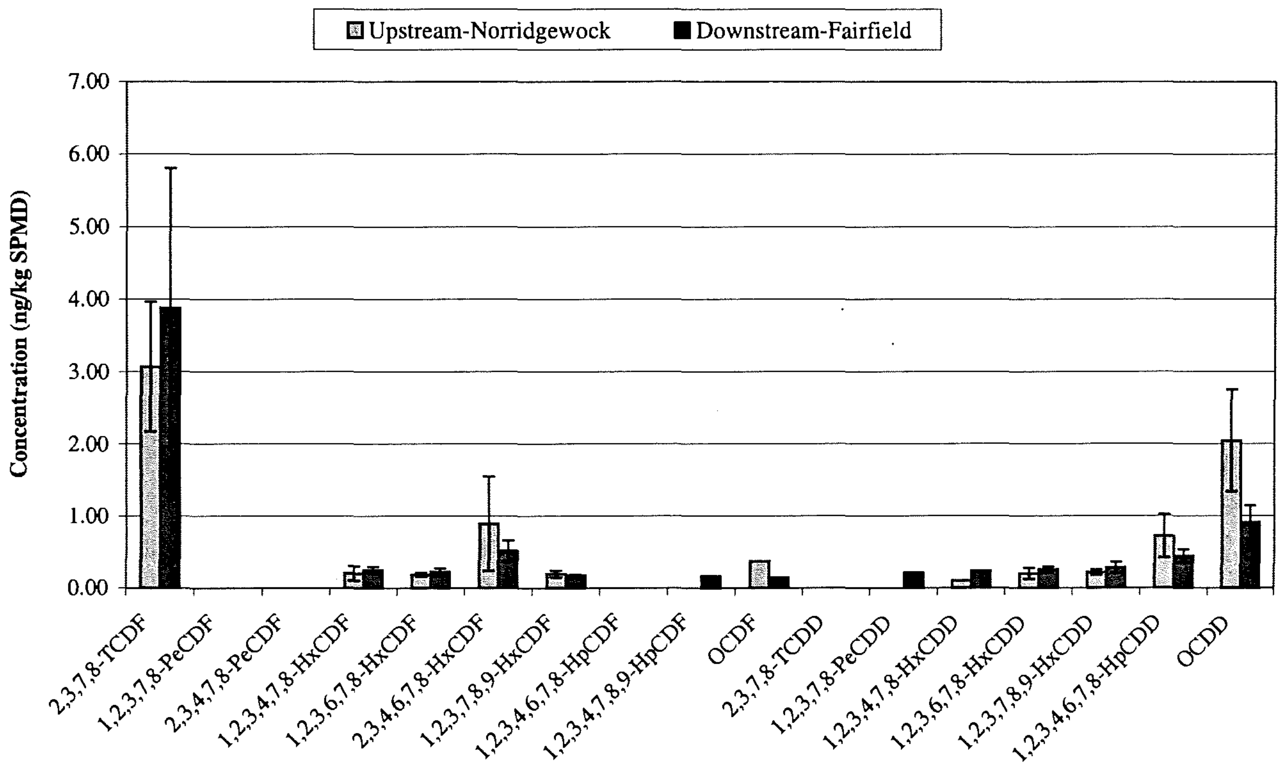
Figure 1.



Kennebec Above/Below Study, Deployment 3

This study was conducted in conjunction with fish collections and caged mussel studies at the same two stations in order to be able to compare performance of all the studies in terms of MSDs for the above/below stations. This was a longer deployment than any of the others (Table 5). Results of deployment 3 show that TCDF was the most abundant congener detected (Figure 2). No TCDD nor any PeCDD or PeCDF were detected, but small amounts of other dioxins and furans were detected. Although TCDF appeared increased at Fairfield, the station below the SAPPI Somerset mill, the difference was not significant (error bars are 95% confidence limits). There were no significant differences in above/below concentrations for any other congener with the exception of OCDD, which was higher at the station above the mill. However, relatively small sample size (n=5) and considerable variation at each site (TCDF CV=24-40%, DTEo CV=26-29%) resulted in MSDs (105% for TCDF and 78% for DTEo) well above the target of 10% (Table ?).

Figure 2. Kennebec River Upstream-Downstream Deployment



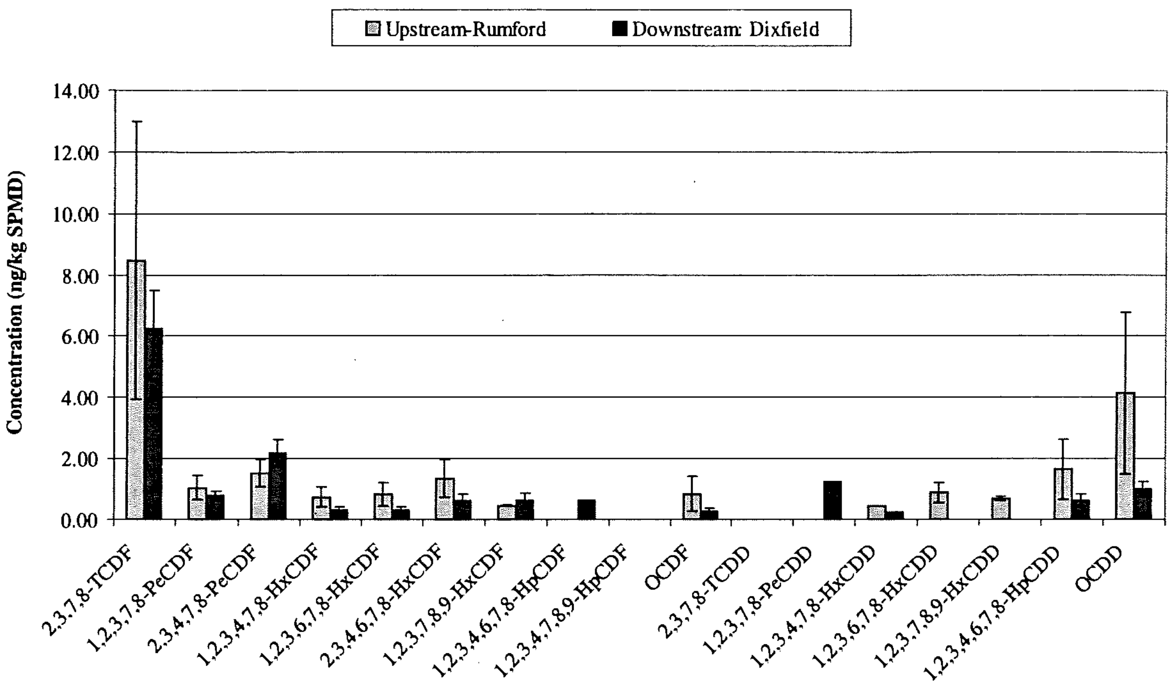
Androscoggin Above/Below Study, Deployment 4

Like the Kennebec study, TCDF was most abundant, but appeared slightly higher upstream of the mill, although the difference was not significant. No TCDD was detected but most other congeners were at one or both stations. There were no significant differences between the two stations for any congener with the exception of OCDD which was significantly higher upstream. Although sample sizes were higher (n=10) than for the Kennebec study (n=5), so was the variance (TCDF CV=28-75%, DTEo CV=45-79%) resulting in MSDs (77% and 129% for TCDF and DTEo respectively) that were similar to those from the Kennebec, also well above the target of 10%.

Conclusions

Comparison of deployments 1,2 and 4 showed uptake of TCDF (mean=8.66+-6.33 ng/kg) in mid September-mid October deployment were lower, similar to those of June (mean=10.08+-0.62 ng/kg), than those of July (mean=20.6+-7.09 ng/kg) likely resulting from temperature differences. Therefore, for maximum uptake, July and August would be better months for use of SPMDs. Uptake rates were not

Figure 3. Androscoggin River Upstream-Downstream Deployment 4



constant probably due to a number of factors, but bio-fouling did not seem to be the problem in 30 day exposures. Deployment 3, a 54 day exposure on the Kennebec River resulted in lower uptake than the other deployments, which is most likely due to lower levels of dioxins and furans in the Kennebec compared to the Androscoggin.

Caged Mussels

This project was a cooperative one with the Maine Department of Inland Fisheries and Wildlife (DIFW) and Friends of Merrymeeting Bay (FOMB) assisted by a consultant, Applied Biomonitoring of Kirkland, Washington. Caged bivalves have been used to monitor pulp and paper mill effluents in Finland for over 20 years. Environment Canada is currently considering caged bivalves as an alternative to the required adult fish survey in their Environmental Effects Monitoring after several successful pilot studies. Caged bivalves are a potentially powerful tool because of their ability to quantify exposure and effects over space and time. Caged bivalves offer an advantage of increased sample size over fish that are often difficult to collect in desired numbers. The initial size range can be also be standardized. This should limit dioxin variability in mussel tissues thereby allowing smaller MSDs to be detected. Caged mussels anchored in place represent exposure at a fixed point in space unlike fish which may move around.

The approach was to measure survival, growth, and bioaccumulation of dioxins and furans in caged freshwater mussels at the same time and locations above and below the SAPPI Somerset bleached kraft pulp and paper mill on the Kennebec River, Norridgewock and FAIRFIELD, as the fish collections and SPMD studies, in order to compare uptake of contaminants and MSDs among all these Above/Below tests. Freshwater mussels, *Elliptio complanata*, were collected by SCUBA divers from DIFW and FOMB from Nequasset Lake, an undeveloped lake in Woolwich serving as Bath's water supply. The mussels were weighed, sorted by length, and then randomly distributed by length to nylon mesh bags that were then attached to PVC frames and enclosed with polypropylene mesh predator guards according to the methods of Salazar and Salazar (2000). An initial sample of 5 composites of 35 mussels was collected and subsequently analyzed for all 2378- substituted dioxins and furans, percent lipid and percent solids. Individual identities were noted by position within each mesh bag and cages enabling calculation of survival and growth for each individual.

Ten cages of 35 mussels each were placed at both Norridgewock and Fairfield on August 3, 2000 and retrieved on September 26, 2000, giving a 54 day exposure. Upon retrieval mussels were measured for length and weight, and then shucked. Shell and soft tissues were then weighed. Tissues of mussels from each cage were composited into one sample for analysis for all 2378- substituted dioxins and furans, percent lipid and percent solids. Individual mussels were also monitored for survival and growth.

Results of the initial 5 composite samples from Nequasset Lake showed no detectable dioxins or furans (Appendix 11). This was interesting because feral fish from a number of other relatively undeveloped and somewhat developed lakes and ponds as well as rivers have always been found to contain measurable levels of TCDF and some other dioxins and furans. Nor at the end of the exposure did the mussels contain any measurable TCDD either. Measurable concentrations of TCDF, however, were found in all samples at both stations, and many other dioxins and furans were found as well in most samples. Concentrations were similar to those in bass at Norridgewock but 2-3 x lower than those in bass at Fairfield on a wet weight basis, and similar to those in large bass but higher than in small bass on a lipid weight basis at both stations. Concentrations were higher than those in suckers, sucker livers, and SPMDs on a lipid weight basis at both stations. MSDs were similar for TCDF and lower for DTEo to those of fish, but lower for TCDF and higher for DTEo than SPMDs (Table 3). There was no significant difference in TCDD, TCDF, or DTEo between the two stations, unlike the results for fish.

Conclusions

Of all the test types (large and small bass, large sucker filets and whole fish, sucker liver composites, freshwater mussels, and SPMDs) tested in 2000, only the fish and livers were able to detect significant differences between stations above and below some bleached kraft pulp and paper mills. Freshwater mussels and SPMDs did not detect any differences. SPMDs were tested again in 2001 with an enhanced sample design that may lead to improved capability to detect differences. Freshwater mussels did not appear to be a useful monitoring device, perhaps because they are at a lower trophic level than fish. MSDs were generally lower for bass than for suckers or livers. Neither liver nor mussel studies were repeated, but studies with fish were repeated in 2001.

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APPENDIX 1

MAINE BUREAU OF HEALTH

FISH CONSUMPTION ADVISORY, AUGUST 2000

LOBSTER TOMALLEY CONSUMPTION ADVISORY, 2 FEBRUARY 1994

The Year 2000 Freshwater Fish Consumption Advisories

(109K) UPDATED

The Year 2000 Marine Fish and Shellfish Consumption Advisory

(104K) UPDATED

Mercury in Fish Brochure **(1,451 K)** UPDATED

Safe Eating Guidelines Chart

(219 K) UPDATED

Know the Mercury Levels in the Fish You Eat

UPDATED

Fish Preparation Methods to Reduce Risk **(264K)**

Interactive Map of the Fish Consumption Advisories UPDATED

Warnings on Eating Fish Caught in Maine Waters

The Bureau of Health is responsible for recommending the warnings on eating fish based on the presence of chemicals (MSRA 22 § 1696 I).

Fish is Good for You and Your Family if you follow the Eating Guidelines

Fish is good for you and your family. It is a low fat source of protein that is rich in nutrients. Studies have shown that eating fish regularly (such as once per week) can reduce the chance of death from a heart attack. The American Heart Association recommends people eat fish regularly. Fish is also one of the few foods that are rich in the 3-omega fatty acids needed for proper development of the brain and nervous system in the unborn fetus and infants. So be sure to include fish in your

But some fish have chemicals in them that may be harmful if you eat too much. T of Health issues eating guidelines for fish (called "Fish Consumption Advisories") Maine waters so you can still get the health benefits of eating fish by choosing safe fish, safer places to catch fish, safer ways to prepare fish, and limiting how much c you eat.

Click HERE to request a copy of the fish consumption advisories.

Our website makes extensive use of Acrobat ( ) files. Click here Get Acrobat Reader anc the directions to download your FREE Adobe Acrobat Reader.

Procedures for Setting Fish Consumption Guidelines SOON TO COME!

Bureau of Health Home Page

Environmental Toxicology Program Home Page

State of Maine Home Page

Last Updated: 08/30/01

WARNING ABOUT EATING FRESHWATER FISH

Warning: **Mercury in Maine freshwater fish may harm the babies of pregnant and nursing mothers, and young children.**

SAFE EATING GUIDELINES

- **Pregnant and nursing women, women who may get pregnant, and children under age 8** SHOULD NOT EAT any freshwater fish from Maine's inland waters. Except, for brook trout and landlocked salmon, 1 meal per month is safe.

- **All other adults and children older than 8** CAN EAT 2 freshwater fish meals per month. For brook trout and landlocked salmon, the limit is 1 meal per week.

It's hard to believe that fish that looks, smells, and tastes fine may not be safe to eat. But the truth is that fish in Maine lakes, ponds, and rivers have mercury in them. Other states have this problem too. Mercury in the air settles into the waters. It then builds up in fish. For this reason, older fish have higher levels of mercury than younger fish. Fish (like pickerel and bass) that eat other fish have the highest mercury levels.

Small amounts of mercury can harm a brain starting to form or grow. That is why unborn and nursing babies, and young children are most at risk. Too much mercury can affect behavior and learning. Mercury can harm older children and adults, but it takes larger amounts. It may cause numbness in hands and feet or changes in vision. The Safe Eating Guidelines identify limits to protect everyone.

Warning: **Some Maine waters are polluted, requiring additional limits to eating fish.**

Fish caught in some Maine waters have high levels of PCBs, Dioxins or DDT in them. These chemicals can cause cancer and other health effects. The Bureau of Health recommends additional fish consumption limits on the waters listed below. Remember to check the mercury guidelines. If the water you are fishing is listed below, check the mercury guideline above and follow the most limiting guidelines.

SAFE EATING GUIDELINES

Androscoggin River Gilead to Merrymeeting Bay: — **6-12** fish meals a year.
Dennys River Meddybemps Lake to Dead Stream: — **1-2** fish meals a month.
Green Pond, Chapman Pit, & Greenlaw Brook
(Limestone): — **Do not eat any fish from these waters.**
Little Madawaska River & tributaries
(Madwaska Dam to Grimes Mill Road): — **Do not eat any fish from these waters.**
Kennebec River Augusta to the Chops: — **Do not eat any fish from these waters.**
Shawmut Dam in Fairfield to Augusta: — **5** trout meals a year, **1-2** bass meals a month.
Madison to Fairfield: — **1-2** fish meals a month.
Meduxnekeag River: — **2** fish meals a month.
North Branch Presque Isle River — **2** fish meals a month.
Penobscot River below Lincoln: — **1-2** fish meals a month
Prestile Stream: — **1** fish meal a month.
Red Brook in Scarborough: — **6** fish meals a year.
Salmon Falls River below Berwick: — **6-12** fish meals a year.
Sebasticook River (East Branch, West Branch & Main Stem)
(Corinna/Hartland to Winslow): — **2** fish meals a month.

For more details, including warnings on striped bass, bluefish and lobster tomalley call (207)-287-6455 or visit our web site at janus.state.me.us/dhs/bohetp/index.html

Revised August 29, 2000
Environmental Toxicology Program
Maine Bureau of Health

APPENDIX 2

DIOXIN AND FURAN CONCENTRATIONS IN FISH

2000

CODES	STATIONS
AGL	ANDROSCOGGIN RIVER AT GILEAD
ARP	ANDROSCOGGIN RIVER BELOW GILEAD AT RUMFORD POINT
ARF	ANDROSCOGGIN RIVER BELOW RUMFORD
ARY	ANDROSCOGGIN RIVER AT RILEY
ALV	ANDROSCOGGIN RIVER AT LIVERMORE FALLS
AGI	ANDROSCOGGIN RIVER AT GULF ISLAND POND, AUBURN
ALS	ANDROSCOGGIN RIVER AT LISBON FALLS
ALW	ANDROSCOGGIN LAKE AT WAYNE
KMD	KENNEBEC RIVER AT MADISON
KNK	KENNEBEC RIVER AT NORRIDGEWOCK
KFF	KENNEBEC RIVER AT SHAWMUT, FAIRFIELD
KSD	KENNEBEC RIVER AT SIDNEY
KAG	KENNEBEC RIVER AT AUGUSTA
PBG	PENOBSCOT RIVER AT GRINDSTONE
PBR	PENOBSCOT RIVER W BR AT EAST MILLINOCKET
PBW	PENOBSCOT RIVER AT WOODVILLE
PBM(PBN)	PENOBSCOT RIVER AT WINN
PBL	PENOBSCOT RIVER AT SOUTH LINCOLN
PBC	PENOBSCOT RIVER AT MILFORD
PBV	PENOBSCOT RIVER AT VEAZIE
PBB	PENOBSCOT RIVER BELOW BANGOR AT ORRINGTON
PWD	PRESUMPSCOT RIVER AT WINDHAM
PWB	PRESUMPSCOT RIVER AT WESTBROOK
SFA	SALMON FALLS RIVER AT ACTON
SFS	SALMON FALLS RIVER AT SOUTH BERWICK
SEC	SEBASTICOOK RIVER E BR AT CORINNA
SEN	SEBASTICOOK RIVER E BR AT NEWPORT
SLN	SEBASTICOOK RIVER AT NEWPORT
SWH	SEBASTICOOK RIVER W BR AT HARTLAND
SWP	SEBASTICOOK RIVER W BR AT PALMYRA
SCW	ST CROIX RIVER AT WOODLAND
SCB	ST CROIX RIVER AT BARING

SPECIES

BNT	BROWN TROUT
CHP	CHAIN PICKEREL
LMB	LARGEMOUTH BASS
SMB	SMALLMOUTH BASS
WHP	WHITE PERCH
WHS	WHITE SUCKER

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-43	00-48	00-49	00-50	00-51	00-52		00-404	00-405
DEP ID		AGL-BNT-C1	AGL-RBT-1	AGL-RBT-2	AGL-RBT-3	AGL-RBT-4	AGL-RBT-5	AGL-RBT	ARP-SMB-1	ARP-SMB-2
		ave						ave		
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	2.17	4.26	5.11	6.38	2.59	4.06	4.5	0.59	3.21
12378-pecdf	0.25	0.88	1.55	1.18	1.64	0.88	0.52	1.2	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	0.48
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	0.52
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
1234678-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	0.41
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	1.17
2378-tcdd	0.10	0.12	0.42	0.38	0.61	0.22	0.17	0.4	0.05	0.11
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
1234678-hpcdd	0.50	0.51	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
ocdd	0.50	2.26	<DL	<DL	0.81	<DL	1.15	1.0	2.64	0.95
DTEo		**0.39**	**0.92**	**0.95**	**1.33**	**0.52**	**0.60**	**0.9**	**0.06**	**0.73**
DTEd		**0.95**	**1.49**	**1.52**	**1.90**	**1.09**	**1.17**	**1.4**	**0.74**	**1.15**
DTEh		**0.67**	**1.21**	**1.23**	**1.61**	**0.81**	**0.88**	**1.1**	**0.40**	**0.94**
DTEh sd								**0.32**		
DTEh Confidence								**0.20**		
DTEh 95 UCL								**1.35**		
	% FTAL	**0.44**						**90**		
% Lipids		0.93	1.62	1.05	2.12	0.93	0.81	1.43	0.26	0.68
Sample weight (g)		50.1	50.0	50.1	50.0	50.0	50.0		50.0	50.0

Values less than the established MDLs are to be considered estimated values.

* = Values are influenced by the presence of diphenyl ethers and are estimated maximum concentrations.

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-406	00-407	00-409	00-409	00-410	00-409	00-409	00-409	
DEP ID		ARP-SMB-3	ARP-SMB-4	ARP-SMB-5	ARP-SMB-6	ARP-SMB-7	ARP-SMB-8	ARP-SMB-9	ARP-SMB-10	ARP-SMB
										ave
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	2.09	4.96	3.35	4.96	1.88	4.09	5	4	3.4
12378-pecdf	0.25	<DL	<DL	#DIV/0!	0.45	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
23478-pecdf	0.25	0.52	0.86	0.27	0.425	0.29	0.51	0.32	0.41	0.5
123478-hxcdf	0.25	<DL	<DL	#DIV/0!	#DIV/0!	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
123678-hxcdf	0.25	0.74	0.47	0.47	0.37	0.18	0.51	0.5	0.39	0.5
234678-hxcdf	0.25	<DL	<DL	#DIV/0!	#DIV/0!	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
123789-hxcdf	0.25	<DL	<DL	#DIV/0!	#DIV/0!	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
1234678-hpcdf	0.50	<DL	0.65	0.35	0.455	0.31	0.21	0.5	0.53	0.4
1234789-hpcdf	0.50	<DL	<DL	#DIV/0!	#DIV/0!	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ocdf	0.50	0.94	1.66	1.41	1.05	<DL	0.845	1.6	1.21	1.2
2378-tcdd	0.10	0.16	0.19	0.29	0.255	0.15	0.27	0.33	0.31	0.2
12378-pecdd	0.25	<DL	<DL	#DIV/0!	#DIV/0!	<DL	0.21	0.15	#DIV/0!	#DIV/0!
123478-hxcdd	0.25	<DL	<DL	#DIV/0!	#DIV/0!	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
123678-hxcdd	0.25	<DL	<DL	#DIV/0!	#DIV/0!	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
123789-hxcdd	0.25	<DL	<DL	#DIV/0!	#DIV/0!	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
1234678-hpcdd	0.50	<DL	<DL	#DIV/0!	#DIV/0!	<DL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ocdd	0.50	1.29	1.78	1.67	2.37	0.69	1.96	2.06	1.98	1.7
DTEo		**0.70**	**1.17**	**0.66**	**1.02**	**0.50**	**1.07**	**1.12**	**0.96**	**0.8**
DTEd		**1.13**	**1.59**	**1.14**	**1.43**	**0.93**	**1.38**	**1.41**	**1.38**	**1.2**
DTEh		**0.92**	**1.38**	**0.90**	**1.22**	**0.72**	**1.22**	**1.26**	**1.17**	**1.0**
DTEh sd										**0.30**
DTEh Confidence										**0.19**
DTEh 95 UCL										**1.20**
% FTAL										**80**
% Lipids		0.60	1.16	0.57	1.23	0.36	0.61	1.49	1.11	0.85
Sample weight (g)		50.0	50.0			50.0				
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID DEP ID		00-415 ARP-WHS-C1	00-414 ARP-WHS-C2	00-415-c1 ARP-WHS	00-414-c2 ARP-WHS	ARP-WHS	00-434 ARF-SMB-1	00-435 ARF-SMB-2	00-436 ARF-SMB-3	00-437 ARF-SMB-4
						ave				
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	7.14	11.5	8.97	12.6	10.1	2.09	2.88	1.84	3.91
12378-pecdf	0.25	0.61	0.84	0.59	0.74	0.7	0.89	0.63	1.14	1.51
23478-pecdf	0.25	0.58	0.92	0.62	0.87	0.7	0.25	0.21	0.36	0.48
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	0.48	0.66	0.52	0.76	0.6	<DL	<DL	<DL	<DL
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.81	1.36	1.02	1.47	1.2	0.35	0.41	0.63	0.29
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
ocdf	0.50	0.25	0.52	0.35	0.47	0.4	<DL	<DL	<DL	<DL
2378-tcdd	0.10	0.21	0.41	0.26	0.48	0.3	0.11	0.14	0.22	0.27
12378-pecdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	0.25	0.69	0.5	<DL	<DL	<DL	<DL
ocdd	0.50	1.93	2.28	2.08	1.47	1.9	1.87	2.25	1.96	0.92
DTEo		**1.30**	**2.14**	**1.561**	**2.195**	**1.8**	**0.49**	**0.57**	**0.65**	**0.98**
DTEd		**1.71**	**2.55**	**1.966**	**2.600**	**2.2**	**0.93**	**1.00**	**1.08**	**1.41**
DTEh		**1.51**	**2.35**	**1.76**	**2.40**	**2.0**	**0.71**	**0.79**	**0.87**	**1.20**
DTEh sd						**0.44**				
DTEh Confidence						**0.27**				
DTEh 95 UCL						**2.28**				
% FTAL						**43**				
% Lipids		6.54	14.33	6.91	6.18	7.16	0.91	1.14	1.09	1.42
Sample weight (g)		50.0	50.0	50.1	50.0		50.0	50.0	50.0	50.0
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-438	00-439	00-440	00-441	00-442	00-443		00-444	00-447
DEP ID		ARF-SMB-5	ARF-SMB-6	ARF-SMB-7	ARF-SMB-8	ARF-SMB-9	ARF-SMB-10	ARF-SMB	ARF-WHS-C1	ARF-WHS-C2
								ave		
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	2.45	2.87	2.06	1.14	1.79	2.22	2.3	11.3	8.41
12378-pecdf	0.25	0.61	0.78	0.49	0.37	0.41	0.63	0.7	0.71	0.39
23478-pecdf	0.25	0.35	0.18	0.21	0.33	0.27	0.46	0.3	0.69	0.54
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.25	0.30
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
1234678-hpcdf	0.50	0.41	0.50	0.63	0.29	0.26	0.37	0.4	<DL	<DL
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.47	0.61
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
2378-tcdd	0.10	0.18	0.25	0.16	0.20	0.19	0.29	0.2	0.39	0.33
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.51	0.49
ocdd	0.50	1.58	0.77	1.28	1.01	1.39	0.87	1.4	3.66	2.87
DTEo		**0.63**	**0.67**	**0.50**	**0.50**	**0.53**	**0.78**	**0.6**	**1.94**	**1.50**
DTEd		**1.07**	**1.11**	**0.94**	**0.94**	**0.96**	**1.21**	**1.1**	**2.34**	**1.91**
DTEh		**0.85**	**0.89**	**0.72**	**0.72**	**0.74**	**0.99**	**0.8**	**2.14**	**1.70**
DTEh sd								**0.15**		
DTEh Confidence								**0.10**		
DTEh 95 UCL								**0.94**		
% FTAL								**63**		
% Lipids		0.70	0.87	0.94	0.59	0.66	0.93	0.75	14.29	14.25
Sample weight (g)		50.0	50.0	50.0	50.0	50.0	50.0		50.0	50.0
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID DEP ID		00-447-c2 ARF-WHS	00-444-c1 ARF-WHS	ARF-WHS	00-424 ARY-SMB-1	00-425 ARY-SMB-2	00-426 ARY-SMB-3	00-427 ARY-SMB-4	00-428 ARY-SMB-5	ARY-SMB
				ave						ave
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	12.6	15.2	11.9	1.04	0.74	0.56	0.69	0.37	0.7
12378-pecdf	0.25	0.69	0.57	0.6	<DL	<DL	<DL	<DL	<DL	#DIV/0!
23478-pecdf	0.25	0.63	0.72	0.6	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123478-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
234678-hxcdf	0.25	0.41	0.38	0.3	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdf	0.50	<DL	<DL	#DIV/0!	0.52	0.41	0.29	0.35	0.21	0.4
1234789-hpcdf	0.50	0.62	0.47	0.5	<DL	<DL	<DL	<DL	<DL	#DIV/0!
ocdf	0.50	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
2378-tcdd	0.10	0.25	0.39	0.3	<DL	<DL	<DL	<DL	<DL	#DIV/0!
12378-pecdd	0.25	<DL	<DL	#DIV/0!	0.17	0.15	0.10	0.20	0.14	0.2
123478-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdd	0.50	1.35	0.56	0.7	<DL	<DL	<DL	<DL	<DL	#DIV/0!
ocdd	0.50	1.22	2.89	2.7	2.10	0.69	1.02	0.89	1.16	1.2
DTEo		**1.920**	**2.347**	**1.9**	**0.28**	**0.23**	**0.16**	**0.27**	**0.18**	**0.2**
DTEd		**2.325**	**2.752**	**2.3**	**0.70**	**0.65**	**0.58**	**0.70**	**0.60**	**0.6**
DTEh		**2.12**	**2.55**	**2.1**	**0.49**	**0.44**	**0.37**	**0.48**	**0.39**	**0.4**
DTEh sd				**0.35**						**0.05**
DTEh Confidence				**0.21**						**0.03**
DTEh 95 UCL				**2.34**						**0.47**
% FTAL				**45**						**31**
% Lipids		14.65	14.97	7.59	0.73	0.85	0.49	0.58	0.51	4.07
Sample weight (g)		50.0	50.1		50.0	50.0	50.0	50.0	50.0	
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-454	00-457	00-409	00-460	00-462		00-120	00-121	00-122
DEP ID		ALV-SMB-1	ALV-SMB-4	ALV-SMB	ALV-SMB-7	ALV-SMB-9	ALV-SMB	AGI-SMB-1	AGI-SMB-2	AGI-SMB-3
				ave			ave			
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	2.26	2.28	3.56	2.78	1.89	2.6	0.94	1.47	0.44
12378-pecdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	0.81	1.35	0.56
23478-pecdf	0.25	<DL	0.27	0.32	0.31	<DL	0.3	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	<DL	<DL	<DL
123678-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	<DL	<DL	<DL
234678-hxcdf	0.25	<DL	<DL	0.26	<DL	<DL	0.3	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	<DL	<DL	<DL
1234678-hpcdf	0.50	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	0.51	<DL	<DL
1234789-hpcdf	0.50	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	<DL	<DL	<DL
ocdf	0.50	1.01	0.88	0.9	2.14	0.78	1.1	<DL	0.81	0.74
2378-tcdd	0.10	0.10	0.15	0.17	0.21	0.13	0.2	0.11	0.05	0.21
12378-pecdd	0.25	<DL	<DL	0.22	0.18	<DL	0.2	<DL	0.18	<DL
123478-hxcdd	0.25	0.20	0.32	0.565	0.44	0.37	0.4	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!	0.51	<DL	<DL
ocdd	0.50	0.55	1.95	2.81	2.25	0.78	1.7	1.83	0.59	2.67
DTEo		**0.35**	**0.55**	**0.98**	**0.87**	**0.36**	**0.6**	**0.25**	**0.39**	**0.28**
DTEd		**0.90**	**0.97**	**1.14**	**1.04**	**0.91**	**1.0**	**0.81**	**0.81**	**0.85**
DTEh		**0.62**	**0.76**	**1.06**	**0.96**	**0.63**	**0.8**	**0.53**	**0.60**	**0.56**
DTEh sd							**0.20**			
DTEh Confidence							**0.12**			
DTEh 95 UCL							**0.93**			
% FTAL							**62**			
% Lipids		0.21	0.94		1.02	0.28	1.70	0.39	0.13	0.35
Sample weight (g)		50.0	50.0		50.0	50.0		50.0	50.1	50.1
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID DEP ID		00-123 AGI-SMB-4	00-124 AGI-SMB-5	AGI-SMB	00-429 ALS-SMB-1	00-430 ALS-SMB-2	00-431 ALS-SMB-3	00-432 ALS-SMB-4	00-433 ALS-SMB-5	00-429 ALS-SMB
				ave						
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	2.05	2.26	1.4	0.41	0.55	0.38	0.30	0.41	1.25
12378-pecdf	0.25	1.74	1.48	1.2	<DL	<DL	<DL	<DL	<DL	0.21
23478-pecdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	<DL	<DL	#DIV/0!	0.26	0.20	0.15	0.35	0.24	0.31
234678-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.39	0.25	0.4	0.33	0.18	<DL	0.25	<DL	0.81
1234789-hpcdf	0.50	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	1.02	<DL	0.9	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	0.14	0.18	0.14	0.05	0.05	0.05	0.05	0.05	0.10
12378-pecdd	0.25	<DL	0.21	0.2	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	0.47	0.62	0.5	<DL	<DL	<DL	<DL	<DL	<DL
ocdd	0.50	2.06	1.49	1.7	1.06	0.52	1.47	0.66	0.54	0.73
DTEo		**0.44**	**0.70**	**0.4**	**0.07**	**0.08**	**0.05**	**0.07**	**0.07**	**0.27**
DTEd		**1.00**	**1.00**	**0.9**	**0.72**	**0.72**	**0.70**	**0.72**	**0.72**	**0.81**
DTEh		**0.72**	**0.85**	**0.7**	**0.39**	**0.40**	**0.38**	**0.39**	**0.39**	**0.54**
DTEh sd				**0.13**						
DTEh Confidence				**0.08**						
DTEh 95 UCL				**0.73**						
% FTAL				**49**						
% Lipids		0.30	0.35	0.29	0.72	0.36	0.27	0.66	0.23	0.156
Sample weight (g)		50.0	50.0		50.0	50.0	50.0	50.0	50.0	20.0
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID DEP ID		00-430 ALS-SMB	00-431 ALS-SMB	00-432 ALS-SMB	00-433 ALS-SMB	 ALS-SMB	00-83 ALW-SMB-C1	00-81 ALW-SMB-C2	00-80-c2 ALW-SMB	00-83-c1 ALW-SMB
						ave				
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	3.35	2.41	1.69	2.87	1.4	<DL	<DL	0.15	0.20
12378-pecdf	0.25	0.41	<DL	0.15	0.31	0.3	<DL	<DL	<DL	<DL
23478-pecdf	0.25	0.36	<DL	0.52	0.36	0.4	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	0.61	<DL	0.54	0.6	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	0.22	<DL	0.47	0.52	0.3	<DL	<DL	<DL	0.25
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	1.04	1.87	1.15	0.57	0.8	<DL	<DL	<DL	0.31
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
2378-tcdd	0.10	0.70	0.41	0.52	0.25	0.2	<DL	<DL	<DL	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	0.35	<DL	0.41	0.4	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	1.14	<DL	0.87	1.0	<DL	<DL	<DL	<DL
ocdd	0.50	1.51	0.47	1.24	0.66	0.9	<DL	0.57	1.86	2.35
DTEo		**1.27**	**0.78**	**1.02**	**0.894**	**0.5**	**0.00**	**0.00**	**0.015**	**0.048**
DTEd		**1.68**	**1.29**	**1.43**	**1.249**	**1.0**	**0.69**	**0.69**	**2.678**	**1.191**
DTEh		**1.47**	**1.04**	**1.22**	**1.07**	**0.7**	**0.34**	**0.34**	**1.35**	**0.62**
DTEh sd						**0.42**				
DTEh Confidence						**0.26**				
DTEh 95 UCL						**0.99**				
% FTAL						**66**				
% Lipids		0.165	0.264	0.561	0.249	0.27	0.19	0.25	0.368	0.306
Sample weight (g)		45.0	50.1	50.1	43.0		50.0	50.1	50.0	50.1
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID DEP ID		ALW-SMB	00-90 ALW-WHP-C1	00-93 ALW-WHP-C2	00-90-c1 ALW-WHP	00-92-c2 ALW-WHP	ALW-WHP	00-100 ALW-WHS-C1	00-101 ALW-WHS-C2	00-100-c1 ALW-WHS
		ave					ave			
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	0.18	0.15	0.35	0.25	0.33	0.3	1.02	0.88	1.51
12378-pecdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
23478-pecdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
123478-hxcdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
123678-hxcdf	0.25	0.25	<DL	<DL	0.35	0.59	0.5	<DL	<DL	<DL
234678-hxcdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
123789-hxcdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
1234678-hpcdf	0.50	0.31	0.37	<DL	0.30	0.41	0.4	0.33	<DL	0.41
1234789-hpcdf	0.50	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
ocdf	0.50	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
2378-tcdd	0.10	#DIV/0!	0.10	<DL	0.19	0.26	0.2	<DL	<DL	<DL
12378-pecdd	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
123478-hxcdd	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
123678-hxcdd	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
123789-hxcdd	0.25	#DIV/0!	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL
1234678-hpcdd	0.50	#DIV/0!	<DL	<DL	0.4	0.35	0.4	<DL	<DL	<DL
ocdd	0.50	1.59	1.71	0.96	2.06	1.47	1.6	3.21	1.47	1.42
DTEo		**0.02**	**0.12**	**0.04**	**0.257**	**0.360**	**0.2**	**0.11**	**0.09**	**0.155**
DTEd		**1.31**	**0.69**	**0.71**	**0.800**	**0.902**	**0.8**	**0.78**	**0.77**	**1.323**
DTEh		**0.66**	**0.41**	**0.37**	**0.53**	**0.63**	**0.5**	**0.44**	**0.43**	**0.74**
DTEh sd		**0.47**					**0.12**			
DTEh Confidence		**0.29**					**0.07**			
DTEh 95 UCL		**0.96**					**0.56**			
% FTAL		**64**					**37**			
% Lipids		2.25	2.00	2.46	1.98	2.76	1.80	10.02	9.06	10.18
Sample weight (g)			50.0	50.1	50.0	50.0		50.2	50.1	50.1
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-101-c2			00-125	00-126	00-237	00-238	00-239
DEP ID		ALW-WHS	ALW-WHS		KNW-SMB-1	KNW-SMB-2	KNW-SMB-3	KNW-SMB-4	KNW-SMB-5
			ave						
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	1.74	1.3		0.19	0.15	0.51	0.49	0.60
12378-pecdf	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	<DL	#DIV/0!		<DL	<DL	0.25	0.21	<DL
234678-hxcdf	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.52	0.4		<DL	<DL	<DL	<DL	<DL
1234789-hpcdf	0.50	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
12378-pecdd	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	#DIV/0!		<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	#DIV/0!		<DL	<DL	0.52	0.47	0.28
ocdd	0.50	2.06	2.0		0.85	0.96	1.81	2.34	3.34
DTEo		**0.179**	**0.1**		**0.019**	**0.015**	**0.081**	**0.075**	**0.063**
DTEd		**1.347**	**1.1**		**0.697**	**0.693**	**0.729**	**0.722**	**0.736**
DTEh		**0.76**	**0.6**		**0.358**	**0.354**	**0.405**	**0.399**	**0.399**
DTEh sd			**0.18**						
DTEh Confidence			**0.11**						
DTEh 95 UCL			**0.71**						
% FTAL			**13**						
% Lipids		8.61	6.76		0.23	0.17	0.91	0.62	0.37
Sample weight (g)		50.1			50.0	50.0	50.0	50.0	50.0
Values less than the establishec									
* = Values are influenced by the									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-240	00-241	00-242	00-243	00-244		00-568	00-569
DEP ID		KNW-SMB-6	KNW-SMB-7	KNW-SMB-8	KNW-SMB-9	KNW-SMB-10	KNW-SMB	<NW-SSMB-'	<NW-SSMB-:
							ave		
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.31	0.44	0.25	0.91	0.22	0.41	0.40	0.45
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123678-hxcdf	0.25	<DL	0.19	<DL	0.29	<DL	0.24	<DL	<DL
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
1234678-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.41	0.47
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
1234678-hpcdd	0.50	<DL	0.42	0.51	0.61	0.33	0.45	0.37	0.42
ocdd	0.50	1.15	1.62	1.55	3.57	2.26	1.95	0.83	1.09
DTEo		**0.031**	**0.067**	**0.030**	**0.126**	**0.026**	**0.05**	**0.05**	**0.05**
DTEd		**0.709**	**0.715**	**0.703**	**0.770**	**0.698**	**0.72**	**0.72**	**0.72**
DTEh		**0.370**	**0.391**	**0.367**	**0.448**	**0.362**	**0.39**	**0.38**	**0.39**
DTEh sd							**0.03**		
DTEh Confidence							**0.02**		
DTEh 95 UCL							**0.40**		
% FTAL							**27**		
% Lipids		0.28	0.66	0.51	0.80	0.27	0.48	3.34	3.89
Sample weight (g)		50.0	50.0	50.0	50.0	50.0		50.1	49.9
Values less than the establishec									
* = Values are influenced by the									

WRI ID		00-570	00-571	00-572	00-573	00-574	00-575	00-576	00-577		00-63
DEP ID		KNW-SSMB-	KNW-SSMB-	KNW-SSMB-	KNW-SSMB-	KNW-SSMB-	KNW-SSMB-	KNW-SSMB-	KNW-SSMB-10	KNW-SSMB	KNW-BNT-1
										ave	
Compound	**DL (ng/Kg)**										
2378-tcdf	0.11	0.31	0.52	0.36	0.47	0.32	0.44	0.62	0.73	0.46	0.26
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
1234678-hpcdf	0.50	0.33	0.75	0.46	0.35	0.47	0.52	0.74	0.63	0.51	<DL
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
1234678-hpcdd	0.50	0.30	0.48	0.39	0.29	0.35	0.41	0.47	0.58	0.41	<DL
ocdd	0.50	0.76	1.36	1.15	0.66	0.87	1.21	2.03	2.26	1.22	0.49
DTEo		**0.04**	**0.06**	**0.04**	**0.05**	**0.04**	**0.05**	**0.07**	**0.09**	**0.06**	**0.03**
DTEd		**0.70**	**0.73**	**0.71**	**0.72**	**0.71**	**0.72**	**0.74**	**0.75**	**0.72**	**0.70**
DTEh		**0.37**	**0.40**	**0.38**	**0.39**	**0.37**	**0.39**	**0.41**	**0.42**	**0.39**	**0.36**
DTEh sd										**0.02**	
DTEh Confidence										**0.01**	
DTEh 95 UCL										**0.40**	
% FTAL										**27**	
% Lipids		3.67	4.42	3.53	3.17	2.42	3.84	5.55	5.88	3.97	0.35
Sample weight (g)		50.1	49.9	50.0	50.1	46.0	50.1	46.0	40.0		50.0
Values less than the establishec											
* = Values are influenced by the											

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-64	00-65	00-66	00-67		00-129-c1	00-146-c2	00-134-c3	00-139-c4
DEP ID		KNW-BNT-2	KNW-BNT-3	KNW-BNT-4	KNW-BNT	KNW-BNT	KNW-WHS	KNW-WHS	KNW-WHS	KNW-WHS
						ave				
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	0.38	0.22	0.35	0.57	0.36	0.29	0.25	0.44	0.32
12378-pecdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	0.31	<DL	0.25	<DL
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	0.31	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	<DL	<DL	<DL	<DL	#DIV/0!	0.45	0.33	0.52	0.25
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	0.42	0.42	<DL	<DL	<DL	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	0.42	<DL	0.53	0.41	0.45	<DL	<DL	<DL	<DL
ocdd	0.50	0.51	0.39	0.47	0.67	0.51	0.45	0.59	0.74	0.63
DTEo		**0.04**	**0.02**	**0.04**	**0.06**	**0.04**	**0.065**	**0.028**	**0.105**	**0.035**
DTEd		**0.71**	**0.70**	**0.71**	**0.73**	**0.71**	**0.712**	**0.701**	**0.728**	**0.707**
DTEh		**0.38**	**0.36**	**0.38**	**0.40**	**0.38**	**0.39**	**0.36**	**0.42**	**0.37**
DTEh sd						**0.01**				
DTEh Confidence						**0.01**				
DTEh 95 UCL						**0.39**				
% FTAL						**26**				
% Lipids		0.74	0.30	0.69	1.39		2.570	2.665	3.425	3.117
Sample weight (g)		50.0	50.0	50.0	50.0		50.1	50.1	50.1	50.1
Values less than the establishec										
* = Values are influenced by the										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID DEP ID		00-127-c5 KNW-WHS	00-130-c6 KNW-WHS	00-131-c7 KNW-WHS	00-135-c8 KNW-WHS	00-133-c9 KNW-WHS	00-151-c10 KNW-WHS	 KNW-WHS	00-247 KFF-SMB-1
								ave	
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.21	0.38	0.15	0.27	0.33	0.17	0.28	1.02
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123678-hxcdf	0.25	<DL	0.35	<DL	<DL	<DL	<DL	0.30	<DL
234678-hxcdf	0.25	<DL	0.25	<DL	<DL	<DL	<DL	0.28	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
1234678-hpcdf	0.50	<DL	0.31	<DL	<DL	0.29	0.30	0.35	0.39
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.41
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.55
ocdd	0.50	0.33	0.82	1.02	0.57	0.84	0.42	0.64	0.97
DTEo		**0.021**	**0.101**	**0.015**	**0.027**	**0.036**	**0.020**	**0.05**	**0.52**
DTEd		**0.699**	**0.724**	**0.693**	**0.705**	**0.709**	**0.693**	**0.71**	**1.09**
DTEh		**0.36**	**0.41**	**0.35**	**0.37**	**0.37**	**0.36**	**0.38**	**0.81**
DTEh sd								**0.02**	
DTEh Confidence								**0.01**	
DTEh 95 UCL								**0.39**	
% FTAL								**26**	
% Lipids		2.410	3.352	2.172	2.231	2.953	2.807		0.63
Sample weight (g)		50.1	50.1	50.0	50.1	50.0	50.1		50.0
Values less than the establishec									
* = Values are influenced by the									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-248	00-249	00-250	00-251	00-252	00-253	00-254	00-255A	00-255B	
DEP ID		KFF-SMB-2	KFF-SMB-3	KFF-SMB-4	KFF-SMB-5	KFF-SMB-6	KFF-SMB-7	KFF-SMB-8	KFF-SMB-9	KFF-SMB-10	KFF-SMB
											ave
Compound	**DL (ng/Kg)**										
2378-tcdf	0.11	1.15	1.63	1.47	0.87	0.93	0.82	0.72	1.23	0.61	1.05
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdf	0.50	0.48	0.67	0.46	0.34	0.37	0.61	0.42	0.59	0.35	0.47
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
2378-tcdd	0.10	0.55	0.62	0.36	0.29	0.48	0.59	0.32	0.39	0.26	0.43
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdd	0.50	0.73	0.97	0.81	0.66	0.78	0.69	0.41	0.76	0.35	0.67
ocdd	0.50	1.64	3.07	1.17	1.23	1.68	2.11	1.35	1.82	0.74	1.58
DTEo		**0.68**	**0.80**	**0.52**	**0.39**	**0.58**	**0.69**	**0.40**	**0.53**	**0.33**	**0.54**
DTEd		**1.24**	**1.37**	**1.09**	**0.95**	**1.15**	**1.25**	**0.97**	**1.09**	**0.90**	**1.11**
DTEh		**0.96**	**1.08**	**0.80**	**0.67**	**0.87**	**0.97**	**0.68**	**0.81**	**0.61**	**0.83**
DTEh sd											**0.15**
DTEh Confidence											**0.09**
DTEh 95 UCL											**0.92**
% FTAL											**61**
% Lipids		0.90	1.39	0.80	0.62	0.99	0.95	0.73	1.00	0.40	0.84
Sample weight (g)		50.0	50.0	50.0	50.1	50.1	50.1	50.0	50.0	50.0	
Values less than the establishec											
* = Values are influenced by the											

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-343	00-344	00-345	00-346	00-347	00-348	00-349	00-350	00-351	00-352
DEP ID		KFF-SSMB-1	KFF-SSMB-2	KFF-SSMB-3	KFF-SSMB-4	KFF-SSMB-5	KFF-SSMB-6	KFF-SSMB-7	KFF-SSMB-8	KFF-SSMB-9	FF-SSMB-1
Compound	**DL (ng/Kg)**										
2378-tcdf	0.11	0.98	1.16	1.36	1.72	0.95	1.47	2.08	1.51	1.84	2.36
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	0.18	0.21	0.31	0.38	0.44	0.53	0.46	0.21	0.33	0.51
234678-hxcdf	0.25	0.24	0.29	0.36	0.47	0.41	0.61	0.56	0.35	0.45	0.48
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	0.15	0.23	0.32	0.26	0.21	0.27	0.25	0.17	0.29	0.36
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	0.40	0.32	0.67	0.59	0.48	0.51	0.44	0.35	0.77	0.59
ocdd	0.50	1.02	0.66	1.15	2.61	1.57	2.09	1.83	1.06	3.91	4.20
DTEo		**0.29**	**0.40**	**0.53**	**0.52**	**0.39**	**0.54**	**0.56**	**0.38**	**0.56**	**0.70**
DTEd		**0.82**	**0.92**	**1.05**	**1.05**	**0.92**	**1.06**	**1.09**	**0.90**	**1.08**	**1.22**
DTEh		**0.56**	**0.66**	**0.79**	**0.78**	**0.66**	**0.80**	**0.83**	**0.64**	**0.82**	**0.96**
DTEh sd											
DTEh Confidence											
DTEh 95 UCL											
% FTAL											
% Lipids		3.43	3.33	4.89	3.92	3.55	4.39	4.58	4.88	5.51	6.70
Sample weight (g)		50.1	50.0	50.1	50.0	50.0	50.1	50.1	50.0	50.0	44.2
Values less than the establishec											
* = Values are influenced by the											

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID			00-58	00-59	00-60	00-61	00-62	
DEP ID		KFF-SSMB	KFF-BNT-01	KFF-BNT-02	KFF-BNT-03	KFF-BNT-04	KFF-BNT-05	KFF-BNT
		ave						ave
Compound	**DL (ng/Kg)**							
2378-tcdf	0.11	1.54	0.35	0.41	0.72	0.55	0.95	0.60
12378-pecdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
23478-pecdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123478-hxcdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdf	0.25	0.36	<DL	<DL	<DL	<DL	<DL	#DIV/0!
234678-hxcdf	0.25	0.42	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdf	0.25	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdf	0.50	#DIV/0!	0.51	0.25	0.48	0.62	0.75	0.52
1234789-hpcdf	0.50	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
ocdf	0.50	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
2378-tcdd	0.10	0.25	0.22	0.10	0.21	0.18	0.29	0.20
12378-pecdd	0.25	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123478-hxcdd	0.25	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdd	0.25	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdd	0.25	#DIV/0!	0.25	<DL	<DL	<DL	<DL	0.25
1234678-hpcdd	0.50	0.51	0.45	0.61	0.45	0.47	0.69	0.53
ocdd	0.50	2.01	1.06	0.89	1.15	0.67	0.89	0.93
DTEo		**0.49**	**0.290**	**0.150**	**0.291**	**0.246**	**0.349**	**0.27**
DTEd		**1.01**	**0.832**	**0.717**	**0.859**	**0.814**	**0.889**	**0.82**
DTEh		**0.75**	**0.561**	**0.433**	**0.575**	**0.530**	**0.619**	**0.54**
DTEh sd		**0.12**						**0.07**
DTEh Confidence		**0.07**						**0.04**
DTEh 95 UCL		**0.82**						**0.59**
% **FTAL**		**55**						**39**
% Lipids		4.52	2.54	2.76	1.84	1.87	1.88	2.18
Sample weight (g)			50.1	50.1	50.1	50.1	50.1	50.10
Values less than the establishec								
* = Values are influenced by the								

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID DEP ID		00-177-c1 KFF-WHS	00-213-c2 KFF-WHS	00-209-c3 KFF-WHS	00-189-c4 KFF-WHS	00-193-c5 KFF-WHS	00-184-c6 KFF-WHS	00-188-c7 KFF-WHS	00-179-c8 KFF-WHS
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.55	1.25	0.98	1.08	0.82	0.41	0.56	0.77
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	<DL	0.51	0.21	0.48	0.42	<DL	0.25	0.18
234678-hxcdf	0.25	<DL	0.39	0.37	0.42	0.36	<DL	0.25	0.33
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	<DL	0.51	<DL	0.36	<DL	<DL	<DL	<DL
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	0.25	0.40	0.42	0.35	0.41	<DL	0.35	0.45
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	0.71	0.47	0.62	0.51	<DL	0.19	0.36
ocdd	0.50	1.15	2.64	2.21	1.74	1.42	0.94	0.85	1.51
DTEo		**0.305**	**0.627**	**0.581**	**0.558**	**0.575**	**0.041**	**0.458**	**0.582**
DTEd		**0.883**	**1.145**	**1.103**	**1.076**	**1.098**	**0.719**	**0.981**	**1.104**
DTEh		**0.59**	**0.89**	**0.84**	**0.82**	**0.84**	**0.38**	**0.72**	**0.84**
DTEh sd									
DTEh Confidence									
DTEh 95 UCL									
% FTAL									
% Lipids		1.944	4.220	3.981	4.131	3.406	1.056	3.008	3.340
Sample weight (g)		50.1	50.1	50.0	50.1	49.9	50.1	49.8	50.0
Values less than the establishec									
* = Values are influenced by the									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES

WRI ID		00-192-c9	00-181-c10		00-650	00-651	00-652	00-653	00-654	
DEP ID		KFF-WHS	KFF-WHS	KFF-WHS	KSD-SMB-1	KSD-SMB-2	KSD-SMB-3	KSD-SMB-4	KSD-SMB-5	KSD-SMB
				ave						ave
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	1.15	1.42	0.90	1.34	0.88	1.15	0.61	0.32	0.86
12378-pecdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
23478-pecdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123478-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdf	0.25	0.39	<DL	0.35	0.25	<DL	0.31	<DL	<DL	0.28
234678-hxcdf	0.25	0.25	<DL	0.34	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdf	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdf	0.50	<DL	<DL	0.44	0.39	<DL	0.25	<DL	<DL	0.32
1234789-hpcdf	0.50	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
ocdf	0.50	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
2378-tcdd	0.10	0.51	0.26	0.38	0.18	0.15	0.20	0.11	0.05	0.14
12378-pecdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123478-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdd	0.25	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdd	0.50	0.42	0.22	0.44	0.61	0.32	0.48	0.47	0.39	0.45
ocdd	0.50	1.87	0.75	1.51	1.15	0.63	0.97	0.54	0.74	
DTEo		**0.693**	**0.404**	**0.48**	**0.35**	**0.24**	**0.35**	**0.18**	**0.04**	**0.23**
DTEd		**1.216**	**0.977**	**1.03**	**0.89**	**0.81**	**0.90**	**0.75**	**0.71**	**0.81**
DTEh		**0.95**	**0.69**	**0.76**	**0.62**	**0.53**	**0.62**	**0.46**	**0.37**	**0.52**
DTEh sd				**0.17**						**0.11**
DTEh Confidence				**0.10**						**0.09**
DTEh 95 UCL				**0.86**						**0.62**
% FTAL				**57**						**41**
% Lipids		3.679	2.768		0.78	0.29	0.89	0.24	0.19	
Sample weight (g)		50.1	50.0		50.1	50.1	50.1	50.0	50.1	
Values less than the establishec										
* = Values are influenced by the										

WRI ID		00-58	00-59	00-60	00-61	00-62	
DEP ID		KSD-BNT-1	KSD-BNT-2	KSD-BNT-3	KSD-BNT-4	KSD-BNT-5	KSD-BNT
							ave
Compound	**DL (ng/Kg)**						
2378-tcdf	0.11	0.49	0.35	0.85	0.51	1.24	0.69
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdf	0.50	0.42	<DL	0.35	0.31	0.59	0.42
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!
2378-tcdd	0.10	0.18	0.05	0.29	0.22	0.35	0.22
12378-pecdd	0.25	<DL	<DL	0.10	<DL	0.16	0.13
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!
1234678-hpcdd	0.50	0.48	0.35	0.41	0.51	0.56	0.46
ocdd	0.50	0.69	0.56	0.77	0.47	1.09	0.72
DTEo		**0.24**	**0.04**	**0.48**	**0.28**	**0.65**	**0.34**
DTEd		**0.81**	**0.71**	**0.80**	**0.85**	**0.96**	**0.83**
DTEh		**0.52**	**0.37**	**0.64**	**0.56**	**0.80**	**0.58**
DTEh sd							**0.16**
DTEh Confidence							**0.14**
DTEh 95 UCL							**0.72**
% FTAL							**48**
% Lipids		0.80	0.14	1.34	0.83	2.43	
Sample weight (g)		50.1	50.0	50.0	50.1	50.1	
Values less than the establishec							
* = Values are influenced by the							

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-509	00-510	00-511	00-512	00-513	00-514	00-515	00-516
DEP ID		PBW-SMB-2	PBW-SMB-3	PBW-SMB-6	PBW-SMB-7	PBW-SMB-9	PBW-SMB-10	PBW-SMB-12	PBW-SMB-13
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.77	1.15	0.31	0.59	0.51	0.83	0.70	0.76
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	0.36	0.52	<DL	0.42	0.18	0.25	<DL	0.39
123678-hxcdf	0.25	0.52	0.41	0.25	0.31	0.35	0.61	0.48	0.43
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.48	0.66	0.39	0.48	0.47	0.35	0.52	0.78
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdd	0.50	2.87	3.65	0.66	1.54	1.06	3.15	1.49	2.20
DTEo		0.17	0.21	0.06	0.14	0.11	0.17	0.12	0.17
DTEd		0.79	0.84	0.71	0.76	0.73	0.80	0.77	0.79
DTEh		0.48	0.53	0.38	0.45	0.42	0.48	0.45	0.48
DTEh sd									
DTEh Confidence									
DTEh 95 UCL									
% FTAL									
% Lipids		0.82	1.03	0.19	0.26	0.69	0.99	0.33	0.53
Sample weight (g)		50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Values less than the established MDLs are to be considered estimated values.

* = Values are influenced by the presence of diphenyl ethers and are estimated maximum concentrations.

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-517	00-518	00-509	00-510	00-511	00-512	00-513	00-514	00-515
DEP ID		PBW-SMB-14	PBW-SMB-16	PBW-SMB	PBW-SMB	PBW-SMB	PBW-SMB	PBW-SMB	PBW-SMB	PBW-SMB
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	0.44	1.07	0.84	1.06	0.44	0.57	0.85	0.72	0.57
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	0.31	0.40	0.62	<DL	0.25	0.52	<DL	<DL
123678-hxcdf	0.25	0.24	0.36	0.63	0.41	<DL	0.26	0.41	0.48	0.15
234678-hxcdf	0.25	<DL	<DL	<DL	0.25	<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.39	0.51	0.51	0.35	0.47	0.29	0.61	0.25	0.19
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdd	0.50	1.15	1.47	1.25	2.06	1.74	1.72	2.36	3.41	1.09
DTEo		0.07	0.18	0.192	0.238	0.049	0.111	0.184	0.123	0.074
DTEd		0.72	0.80	0.815	0.835	0.721	0.734	0.807	0.770	0.722
DTEh		0.40	0.49	0.50	0.54	0.39	0.42	0.50	0.45	0.40
DTEh sd										
DTEh Confidence										
DTEh 95 UCL										
% FTAL										
% Lipids		0.25	0.45	0.905	0.163	0.155	0.134	0.484	1.96	0.173
Sample weight (g)		50.0	50.0	50.1	49.0	50.1	50.1	50.0	50.0	50.1
Values less than the established N										
* = Values are influenced by the pi										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID DEP ID		00-516 PBW-SMB	00-517 PBW-SMB	00-518 PBW-SMB	PBW-SMB	00-367 PBW-WHS-3	00-368 PBW-WHS-4	00-369 PBW-WHS-5	00-372 PBW-WHS-6
					ave				
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.91	0.58	1.31	0.75	0.76	0.49	0.67	0.52
12378-pecdf	0.25	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	0.31	0.51	0.25	0.38	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	0.27	0.36	0.29	0.38	0.51	0.47	0.32	0.39
234678-hxcdf	0.25	<DL	<DL	<DL	0.25	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.51	0.47	0.34	0.45	0.47	0.52	0.45	0.44
1234789-hpcdf	0.50	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	#DIV/0!	2.31	<DL	<DL	1.75
2378-tcdd	0.10	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
12378-pecdd	0.25	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	#DIV/0!	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	#DIV/0!	1.74	0.61	1.02	1.15
ocdd	0.50	1.85	0.94	2.68	1.92	4.21	3.66	1.08	5.61
DTEo		0.154	0.150	0.189	0.14	0.15	0.11	0.11	0.11
DTEd		0.777	0.772	0.811	0.77	0.79	0.75	0.76	0.75
DTEh		0.47	0.46	0.50	0.46	0.47	0.43	0.44	0.43
DTEh sd					0.05				
DTEh Confidence					0.03				
DTEh 95 UCL					**0.49**				
% FTAL					**32**				
% Lipids		0.237	0.321	0.438	0.55	6.56	3.68	4.12	6.22
Sample weight (g)		50.0	50.0	50.1		50.0	49.9	50.1	50.1
Values less than the established M									
* = Values are influenced by the pı									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-375	00-376	00-377	00-378	00-379	00-381		99-369
DEP ID		PBW-WHS-11	PBW-WHS-12	PBW-WHS-13	PBW-WHS-15	PBW-WHS-16	PBW-WHS-19	mean	PBN-SMB-1
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.35	0.28	0.72	0.51	0.83	0.59	0.57	0.68
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
123678-hxcdf	0.25	0.41	0.29	0.31	<DL	0.18	0.33		0.42
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
1234678-hpcdf	0.50	0.29	<DL	0.30	0.49	<DL	0.62		0.39
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL		<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	0.75		<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
1234678-hpcdd	0.50	0.77	0.54	0.96	1.14	0.59	1.06		<DL
ocdd	0.50	2.36	1.41	2.93	3.66	1.74	2.25		1.06
DTEo		0.09	0.06	0.12	0.07	0.11	0.11	0.10	0.114
DTEd		0.73	0.71	0.76	0.74	0.75	0.75	0.75	0.762
DTEh		0.41	0.39	0.44	0.40	0.43	0.43	0.43	0.44
DTEh sd								0.02	
DTEh Confidence								0.01	
DTEh 95 UCL								**0.44**	
% FTAL								**8**	
% Lipids		3.27	2.88	4.63	4.00	4.00	4.93	4.43	0.42
Sample weight (g)		50.1	50.1	49.9	49.9	50.1	50.0		50.0
Values less than the established M									
* = Values are influenced by the pı									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		99-370	99-371	99-372	99-373	99-374		99-397-C1	99-396-C2	
DEP ID		PBN-SMB-2	PBN-SMB-3	PBN-SMB-4	PBN-SMB-5	PBN-SMB-6	ave	PBN-WHS-C1	PBN-WHS-C2	AVE
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	0.83	1.57	1.42	1.15	1.37	1.17	1.56	2.01	1.79
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
123678-hxcdf	0.25	0.37	0.73	0.49	0.50	0.58	0.52	0.61	0.44	0.53
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
1234678-hpcdf	0.50	0.29	0.56	0.61	0.33	0.44	0.44	0.85	0.63	0.74
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL	#DIV/0!
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.87	1.05	0.96
ocdd	0.50	1.59	2.49	2.01	1.48	2.25	1.81	2.37	3.14	2.76
DTEo		0.123	0.236	0.197	0.168	0.200	0.17	0.234	0.262	0.25
DTEd		0.771	0.883	0.842	0.816	0.847	0.82	0.877	0.905	0.89
DTEh		0.45	0.56	0.52	0.49	0.52	0.50	0.56	0.58	0.57
DTEh sd							0.05			0.02
DTEh Confidence							0.03			0.01
DTEh 95 UCL							**0.53**			**0.58**
% FTAL							**10**			**11**
% Lipids		0.59	0.82	0.73	0.66	1.10		8.83	8.20	
Sample weight (g)		50.0	49.9	50.0	50.4	50.0		49.8	49.9	
Values less than the established M										
* = Values are influenced by the pı										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-519	00-520	00-521	00-522	00-523	00-524	00-525	00-526
DEP ID		PBM-SMB-1	PBM-SMB-2	PBM-SMB-3	PBM-SMB-4	PBM-SMB-5	PBM-SMB-6	PBM-SMB-7	PBM-SMB-8
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.59	0.33	0.47	0.39	0.51	0.32	0.48	0.63
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	0.41	<DL	0.77	0.28	0.35	0.25	0.57	0.69
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.56	0.52	0.67	0.38	0.41	0.25	0.41	0.48
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdd	0.50	1.15	0.88	1.37	1.02	0.71	2.27	0.66	1.71
DTEo		0.11	0.04	0.13	0.07	0.09	0.06	0.11	0.14
DTEd		0.75	0.71	0.78	0.72	0.74	0.71	0.76	0.78
DTEh		0.43	0.37	0.45	0.39	0.41	0.38	0.43	0.46
DTEh sd									
DTEh Confidence									
DTEh 95 UCL									
% FTAL									
% Lipids		0.89	0.41	0.87	0.45	0.78	0.44	0.65	0.83
Sample weight (g)		50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Values less than the established M									
* = Values are influenced by the pı									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID			00-527	00-528	00-529	00-530	00-531	00-532	00-533
DEP ID		mean	PBM-WHS-1	PBM-WHS-2	PBM-WHS-3	PBM-WHS-4	PBM-WHS-5	PBM-WHS-6	PBM-WHS-7
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.47	0.91	0.61	1.10	0.48	1.24	0.69	0.63
12378-pecdf	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25		0.46	0.30	0.29	0.18	0.45	0.35	0.37
234678-hxcdf	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50		0.61	0.26	0.32	<DL	0.36	0.49	0.52
1234789-hpcdf	0.50		<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50		<DL	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	#DIV/0!	<DL	<DL	<DL	<DL	<DL	<DL	<DL
12378-pecdd	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25		<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50		1.06	0.75	0.42	0.55	0.48	0.66	0.51
ocdd	0.50		3.07	2.24	1.75	1.06	1.42	1.97	2.34
DTEo		0.09	0.15	0.10	0.15	0.07	0.18	0.12	0.11
DTEd		0.74	0.80	0.74	0.79	0.72	0.82	0.76	0.75
DTEh		0.42	0.48	0.42	0.47	0.39	0.50	0.44	0.43
DTEh sd		0.03							
DTEh Confidence		0.02							
DTEh 95 UCL		**0.44**							
% FTAL		**29**							
% Lipids		0.66	11.09	9.99	12.31	4.88	13.27	9.43	9.60
Sample weight (g)			50.0	50.0	50.0	50.0	49.9	50.0	50.1
Values less than the established M									
* = Values are influenced by the pı									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-534	00-535	00-536		00-499	00-500	00-501	00-502
DEP ID		PBM-WHS-8	PBM-WHS-9	PBM-WHS-10	mean	PBL-SMB-1	PBL-SMB-2	PBL-SMB-3	PBL-SMB-4
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.98	0.79	1.06	0.85	1.14	1.37	0.95	1.52
12378-pecdf	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
123678-hxcdf	0.25	0.51	0.42	0.31		0.41	0.52	<DL	0.38
234678-hxcdf	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.69	0.66	0.52		0.35	0.47	<DL	0.66
1234789-hpcdf	0.50	<DL	<DL	<DL		<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL		<DL	0.81	<DL	<DL
2378-tcdd	0.10	<DL	<DL	<DL	#DIV/0!	0.19	0.21	0.16	0.22
12378-pecdd	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL		<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	0.62	0.71	0.44		<DL	<DL	<DL	<DL
ocdd	0.50	2.09	1.74	1.57		1.66	2.02	1.41	0.36
DTEo		0.16	0.13	0.15	0.13	0.35	0.40	0.26	0.42
DTEd		0.80	0.78	0.79	0.77	0.90	0.95	0.83	0.96
DTEh		0.48	0.46	0.47	0.45	0.62	0.68	0.54	0.69
DTEh sd					0.03				
DTEh Confidence					0.02				
DTEh 95 UCL					**0.47**				
% FTAL					**9**				
% Lipids		14.44	9.62	12.10	10.67	1.05	1.01	0.70	1.46
Sample weight (g)		49.9	50.1	50.1		50.0	50.0	50.0	50.0
Values less than the established M									
* = Values are influenced by the p									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-503	00-504	00-505	00-506	00-507	00-508	00-499	00-500	00-501
DEP ID		PBL-SMB-5	PBL-SMB-6	PBL-SMB-7	PBL-SMB-8	PBL-SMB-10	PBL-SMB-11	PBL-SMB	PBL-SMB	PBL-SMB
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	0.84	0.75	1.21	0.68	0.94	0.55	1.26	1.47	1.14
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	<DL	0.46	0.25	0.36	0.27	0.21	0.45	0.63	0.25
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	<DL	0.35	0.61	0.47	0.52	0.39	0.31	0.35	<DL
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	0.51	0.88	0.45
2378-tcdd	0.10	0.15	0.10	0.28	0.11	0.20	0.17	0.22	0.24	0.14
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.56	<DL
ocdd	0.50	0.75	1.05	0.98	1.32	2.08	1.74	2.25	1.79	1.30
DTEo		0.23	0.22	0.43	0.22	0.33	0.25	0.394	0.459	0.279
DTEd		0.81	0.77	0.98	0.77	0.87	0.80	0.942	1.002	0.832
DTEh		0.52	0.50	0.71	0.49	0.60	0.52	0.67	0.73	0.56
DTEh sd										
DTEh Confidence										
DTEh 95 UCL										
% FTAL										
% Lipids		0.62	0.71	1.10	0.84	1.05	0.84	0.604	0.918	0.575
Sample weight (g)		50.0	50.0	50.0	50.0	50.0	50.0	50.1	50.1	50.0
Values less than the established N										
* = Values are influenced by the pı										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-502	00-503	00-504	00-505	00-506	00-507	00-508		00-353
DEP ID		PBL-SMB	PBL-SMB	PBL-SMB	PBL-SMB	PBL-SMB	PBL-SMB	PBL-SMB	mean	PBL-WHS-2
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	1.83	1.31	0.84	1.10	0.79	1.48	0.61	1.09	2.28
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123678-hxcdf	0.25	0.44	0.61	0.33	<DL	0.41	0.48	<DL	0.40	0.51
234678-hxcdf	0.25	<DL	<DL	0.25	<DL	<DL	<DL	<DL	0.25	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
1234678-hpcdf	0.50	0.82	0.44	0.29	0.35	0.29	0.29	0.35	0.43	0.62
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
ocdf	0.50	0.62	0.65	<DL	<DL	0.51	<DL	<DL	0.63	<DL
2378-tcdd	0.10	0.25	0.18	0.13	0.24	0.14	0.38	0.14	0.19	0.92
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.28
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	0.78	<DL	<DL	<DL	0.67	0.57
ocdd	0.50	0.97	1.65	0.55	0.84	1.85	1.98	1.14	1.38	3.05
DTEo		0.485	0.377	0.275	0.361	0.263	0.579	0.205	0.34	1.24
DTEd		1.033	0.924	0.798	0.929	0.811	1.127	0.777	0.89	1.76
DTEh		0.76	0.65	0.54	0.65	0.54	0.85	0.49	0.62	1.50
DTEh sd									0.08	
DTEh Confidence									0.05	
DTEh 95 UCL									**0.67**	
% FTAL									**44**	
% Lipids		1.23	0.442	0.419	0.579	0.858	0.838	0.581	0.94	12.80
Sample weight (g)		50.1	50.1	50.1	50.0	50.1	50.1	50.1		50.0
Values less than the established N										
* = Values are influenced by the pı										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-354	00-356	00-358	00-360	00-361	00-363	00-364	00-365	00-366
DEP ID		PBL-WHS-3	PBL-WHS-7	PBL-WHS-9	PBL-WHS-13	PBL-WHS-14	PBL-WHS-21	PBL-WHS-22	PBL-WHS-23	PBL-WHS-24
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	1.39	2.67	2.09	1.87	2.15	1.50	1.85	2.47	3.51
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	0.49	0.41	0.35	0.67	0.42	0.25	0.29	0.52	0.66
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.41	0.52	0.50	0.57	0.61	<DL	0.46	0.69	0.81
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	0.45	0.88	0.79	0.82	0.73	0.47	0.51	0.88	0.97
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	0.31	0.25	0.37	0.51	0.38	<DL	0.42	0.31	0.44
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	0.42	0.67	0.38	0.49	0.68	0.51	0.46	0.59	0.63
ocdd	0.50	2.81	2.27	2.26	1.51	1.88	1.24	1.69	3.36	3.07
DTEo		0.68	1.23	1.08	1.14	1.04	0.65	0.78	1.22	1.45
DTEd		1.20	1.74	1.60	1.65	1.56	1.20	1.29	1.74	1.96
DTEh		0.94	1.48	1.34	1.39	1.30	0.92	1.03	1.48	1.70
DTEh sd										
DTEh Confidence										
DTEh 95 UCL										
% FTAL										
% Lipids		8.95	10.90	9.99	11.79	10.34	6.37	9.72	12.66	13.37
Sample weight (g)		50.1	50.1	50.0	50.1	50.1	50.0	50.0	50.1	50.0
Values less than the established M										
* = Values are influenced by the p										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID DEP ID		00-353 PBL-WHS	00-354 PBL-WHS	00-356 PBL-WHS	00-358 PBL-WHS	00-360 PBL-WHS	00-361 PBL-WHS	00-363 PBL-WHS	00-364 PBL-WHS	00-365 PBL-WHS
Compound	**DL (ng/Kg)**									
2378-tcdf	0.11	2.01	1.51	1.90	2.19	1.67	2.58	1.61	2.07	2.65
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	0.72	0.62	0.28	0.41	0.51	0.62	<DL	0.48	0.35
234678-hxcdf	0.25	0.34	<DL	<DL	<DL	<DL	0.31	0.28	<DL	0.25
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.59	0.35	0.58	0.25	0.42	0.66	0.51	0.67	0.48
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	0.35	<DL	0.71	0.42	<DL	<DL	<DL	<DL	0.41
2378-tcdd	0.10	0.55	0.52	0.48	0.35	0.63	0.62	0.39	0.71	0.85
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	0.44	0.47	0.35	<DL	0.62	0.25	<DL	0.35	0.52
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	0.81	0.56	0.77	0.92	0.55	0.74	0.55	0.68	1.35
ocdd	0.50	3.35	3.37	1.96	3.07	1.06	2.67	2.02	2.91	4.22
DTEo		0.915	0.789	0.747	0.622	0.920	1.010	0.590	1.014	1.246
DTEd		1.408	1.307	1.264	1.165	1.437	1.503	1.132	1.531	1.738
DTEh		1.16	1.05	1.01	0.89	1.18	1.26	0.86	1.27	1.49
DTEh sd										
DTEh Confidence										
DTEh 95 UCL										
% FTAL										
% Lipids		13.18	9.36	11.13	10.52	12.67	10.67	8.12	11.01	13.53
Sample weight (g)		50.1	50.1	50.0	50.0	50.0	50.0	49.9	50.1	50.1
Values less than the established M										
* = Values are influenced by the pı										

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-366		00-537	00-538	00-539	00-540	00-541	
DEP ID		PBL-WHS	mean	PBC-SMB-1	PBC-SMB-2	PBC-SMB-3	PBC-SMB-4	PBC-SMB-5	mean
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	3.87	2.19	1.75	0.99	1.98	1.05	1.86	1.53
12378-pecdf	0.25	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	
23478-pecdf	0.25	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	
123478-hxcdf	0.25	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	
123678-hxcdf	0.25	0.55	0.48	0.42	<DL	0.35	<DL	0.51	
234678-hxcdf	0.25	<DL	0.30	<DL	<DL	<DL	<DL	<DL	
123789-hxcdf	0.25	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	
1234678-hpcdf	0.50	0.72	0.55	0.52	0.41	0.71	<DL	0.85	
1234789-hpcdf	0.50	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	
ocdf	0.50	0.56	0.49	<DL	<DL	<DL	<DL	<DL	
2378-tcdd	0.10	1.14	0.68	0.18	0.13	0.19	0.10	0.17	0.15
12378-pecdd	0.25	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	
123478-hxcdd	0.25	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	
123678-hxcdd	0.25	0.61	0.40	<DL	<DL	<DL	<DL	<DL	
123789-hxcdd	0.25	<DL	#DIV/0!	<DL	<DL	<DL	<DL	<DL	
1234678-hpcdd	0.50	0.81	0.66	<DL	<DL	<DL	<DL	<DL	
ocdd	0.50	3.62	2.57	1.15	1.78	2.06	1.26	2.34	
DTEo		1.659	1.00	0.40	0.23	0.43	0.21	0.42	0.34
DTEd		2.176	1.52	0.95	0.81	0.98	0.78	0.96	0.90
DTEh		1.92	1.26	0.68	0.52	0.70	0.49	0.69	0.62
DTEh sd			0.26						0.10
DTEh Confidence			0.16						0.09
DTEh 95 UCL			**1.42**						**0.71**
% FTAL			**27**						**47**
% Lipids		16.37	10.69	0.90	0.35	1.19	0.40	1.46	0.86
Sample weight (g)		50.0		50.0	50.0	50.1	50.1	50.0	
Values less than the established N									
* = Values are influenced by the p									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-542	00-543		00-552	00-553	00-554	00-555	00-556
DEP ID		PBC-WHS-C1	PBC-WHS-C2	mean	PBV-SMB-1	PBV-SMB-2	PBV-SMB-3	PBV-SMB-4	PBV-SMB-5
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	2.47	3.51	2.99	0.61	0.72	0.53	0.47	0.42
12378-pecdf	0.25	<DL	<DL		<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL		<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL		<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	<DL	0.29		0.56	0.71	0.49	<DL	0.51
234678-hxcdf	0.25	<DL	<DL		<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL		<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	0.41	0.57		0.42	0.61	0.38	<DL	0.35
1234789-hpcdf	0.50	<DL	<DL		<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL		<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	0.88	0.63	0.76	0.37	0.53	0.44	0.31	0.29
12378-pecdd	0.25	<DL	<DL		<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL		<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	0.25	0.31		<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL		<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	1.06	0.87		<DL	<DL	<DL	<DL	<DL
ocdd	0.50	2.67	2.91		1.79	2.25	2.09	1.66	1.82
DTEo		1.17	1.06	1.11	0.49	0.68	0.55	0.36	0.39
DTEd		1.71	1.57	1.64	1.04	1.23	1.09	0.93	0.93
DTEh		1.44	1.31	1.38	0.77	0.95	0.82	0.64	0.66
DTEh sd				0.09					
DTEh Confidence				0.12					
DTEh 95 UCL				**1.50**					
% FTAL				**29**					
% Lipids		9.35	8.22	8.79	1.23	1.46	1.27	0.88	0.75
Sample weight (g)		49.9	50.0		50.0	50.0	50.0	50.0	50.1
Values less than the established M									
* = Values are influenced by the pı									

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

WRI ID		00-552	00-553	00-554	00-555	00-556		00-558	00-557
DEP ID		PBV-SMB	PBV-SMB	PBV-SMB	PBV-SMB	PBV-SMB	mean	PBV-WHS-C1	PBV-WHS-C2
Compound	**DL (ng/Kg)**								
2378-tcdf	0.11	0.58	0.75	0.52	0.61	0.48	0.57	1.75	2.38
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123678-hxcdf	0.25	0.67	0.82	0.55	0.25	0.43	0.55	0.42	0.61
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
1234678-hpcdf	0.50	0.58	0.49	0.41	0.26	0.51	0.45	0.41	0.35
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
ocdf	0.50	0.65	<DL	<DL	<DL	<DL	0.65	<DL	<DL
2378-tcdd	0.10	0.41	0.58	0.39	0.34	0.31	0.40	0.96	0.82
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	0.31
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	#DIV/0!	0.51	0.75
ocdd	0.50	2.21	1.98	2.36	1.89	3.02	2.11	2.69	2.07
							#DIV/0!		
							#DIV/0!		
DTEo		0.54	0.74	0.50	0.43	0.41	0.51	1.19	1.16
DTEd		1.09	1.29	1.05	0.98	0.95	1.06	1.73	1.68
DTEh		0.81	1.02	0.78	0.70	0.68	0.78	1.46	1.42
DTEh sd							0.13		
DTEh Confidence							0.11		
DTEh 95 UCL							**0.89**		
% FTAL							**60**		
% Lipids		0.602	1.05	0.658	0.505	0.738	1.12	11.25	9.49
Sample weight (g)		50.1	50.0	50.1	50.1	50.1		49.9	50.1
Values less than the established M									
* = Values are influenced by the pı									

WRI ID			00-475	00-474	
DEP ID		mean	PBB-EEL-C1	PBB-EEL-C2	mean
Compound	**DL (ng/Kg)**				
2378-tcdf	0.11	2.07	3.11	2.57	2.84
12378-pecdf	0.25		<DL	<DL	
23478-pecdf	0.25		<DL	<DL	
123478-hxcdf	0.25		<DL	<DL	
123678-hxcdf	0.25		0.88	0.65	
234678-hxcdf	0.25		0.25	0.31	
123789-hxcdf	0.25		<DL	<DL	
1234678-hpcdf	0.50		1.02	0.56	
1234789-hpcdf	0.50		<DL	<DL	
ocdf	0.50		0.91	1.10	
2378-tcdd	0.10	0.89	1.66	1.47	1.57
12378-pecdd	0.25		<DL	<DL	
123478-hxcdd	0.25		<DL	<DL	
123678-hxcdd	0.25		0.75	0.63	
123789-hxcdd	0.25		<DL	<DL	
1234678-hpcdd	0.50		1.14	0.89	
ocdd	0.50		3.36	4.02	
DTEo		1.17	2.18	1.90	2.04
DTEd		1.70	2.67	2.39	2.53
DTEh		1.44	2.43	2.15	2.29
DTEh sd		0.03			0.20
DTEh Confidence		0.04			0.27
DTEh 95 UCL		**1.48**			**2.56**
% FTAL		**28**			**171**
% Lipids		10.37	19.81	16.50	18.15
Sample weight (g)			50.0	50.0	
Values less than the established M					
* = Values are influenced by the pı					

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

DEP ID		PWD-SMB-01	PWD-SMB-02	PWD-SMB-03	PWD-SMB-04	PWD-SMB-05	mean	PWB-SMB-1
WRI ID		00-115	00-116	00-117	00-118	00-119		00-110
Compound	**DL (ng/Kg)**							
2378-tcdf	0.11	0.84	0.38	0.77	0.47	0.51	0.59	0.82
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL		<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL		<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL		<DL
123678-hxcdf	0.25	0.49	0.35	0.26	0.19	0.23		<DL
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL		<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL		<DL
1234678-hpcdf	0.50	0.26	0.31	0.21	0.44	<DL		<DL
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL		<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL		<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	#DIV/0!	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL		<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL		<DL
123678-hxcdd	0.25	0.32	<DL	0.25	<DL	<DL		<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL		<DL
1234678-hpcdd	0.50	0.35	0.49	0.40	0.52	0.55		0.37
ocdd	0.50	0.67	0.71	0.52	1.03	0.67		1.25
DTEo		**0.17**	**0.08**	**0.13**	**0.08**	**0.08**	**0.11**	**0.09**
DTEd		**0.79**	**0.72**	**0.75**	**0.72**	**0.73**	**0.74**	**0.76**
DTEh		**0.48**	**0.40**	**0.44**	**0.40**	**0.40**	**0.43**	**0.42**
DTEh sd							**0.04**	
DTEh Confidence							**0.03**	
DTEh 95 UCL							**0.46**	
% FTAL							**30**	
% Lipids		0.50	0.37	0.37	0.33	0.27		0.33
Sample weight (g)		50.0	50.0	50.1	50.0	50.0		50.1

Values less than the established MDLs are to be considered estimated values.

* = Values are influenced by the presence of diphenyl ethers and are estimated maximum concentrations.

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

DEP ID		PWB-SMB-2	PWB-SMB-3	PWB-SMB-4	PWB-SMB-5	mean	SFS-SMB-1	SFS-SMB-2
WRI ID		00-111	00-112	00-113	00-114		00-645	00-646
Compound	**DL (ng/Kg)**							
2378-tcdf	0.11	1.66	0.95	1.25	1.86	1.31	0.97	0.53
12378-pecdf	0.25	<DL	<DL	<DL	<DL		<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL		<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL		<DL	<DL
123678-hxcdf	0.25	<DL	0.25	0.38	0.31		<DL	<DL
234678-hxcdf	0.25	<DL	<DL	<DL	<DL		0.88	0.25
123789-hxcdf	0.25	<DL	<DL	<DL	<DL		<DL	<DL
1234678-hpcdf	0.50	<DL	<DL	<DL	0.42		0.69	0.26
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL		<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL		<DL	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	#DIV/0!	0.18	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL		0.10	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL		<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL		0.53	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL		<DL	<DL
1234678-hpcdd	0.50	0.54	0.71	0.56	0.51		<DL	<DL
ocdd	0.50	0.66	2.01	0.97	1.03		1.67	0.88
DTEo		**0.17**	**0.13**	**0.17**	**0.23**	**0.16**	**0.53**	**0.08**
DTEd		**0.84**	**0.77**	**0.82**	**0.87**	**0.81**	**0.80**	**0.69**
DTEh		**0.51**	**0.45**	**0.49**	**0.55**	**0.48**	**0.66**	**0.39**
DTEh sd						**0.05**		
DTEh Confidence						**0.04**		
DTEh 95 UCL						**0.53**		
% FTAL						**35**		
% Lipids		0.32	0.67	0.60	0.80		1.54	0.27
Sample weight (g)		50.0	50.1	50.0	50.1		50.1	50.1
Values less than the established M								
* = Values are influenced by the pı								

APPENDIX 2. DIOXIN AND FURAN CONCENTRATIONS IN 2000 FISH SAMPLES.

DEP ID WRI ID		SFS-SMB-3 00-647	SFS-SMB-4 00-648	SFS-SMB-5 00-649	mean	SWP-SMB-C1 00-625	SWP-SMB-C2 00-626	mean
Compound	DL (ng/Kg)							
2378-tcdf	0.11	0.76	0.47	0.56	0.66	0.29	0.34	0.32
12378-pecdf	0.25	<DL	<DL	<DL		<DL	<DL	
23478-pecdf	0.25	<DL	<DL	<DL		<DL	<DL	
123478-hxcdf	0.25	<DL	<DL	<DL		<DL	<DL	
123678-hxcdf	0.25	<DL	<DL	<DL		0.21	0.18	
234678-hxcdf	0.25	0.55	0.46	0.39		<DL	<DL	
123789-hxcdf	0.25	<DL	<DL	<DL		<DL	<DL	
1234678-hpcdf	0.50	0.49	0.57	0.48		0.57	0.44	
1234789-hpcdf	0.50	<DL	<DL	<DL		<DL	<DL	
ocdf	0.50	<DL	<DL	<DL		0.64	0.79	
2378-tcdd	0.10	0.10	<DL	<DL	0.14	0.14	0.11	0.13
12378-pecdd	0.25	<DL	<DL	<DL		0.18	0.21	
123478-hxcdd	0.25	<DL	<DL	<DL		<DL	<DL	
123678-hxcdd	0.25	0.21	<DL	<DL		0.39	0.31	
123789-hxcdd	0.25	<DL	<DL	<DL		<DL	<DL	
1234678-hpcdd	0.50	<DL	<DL	<DL		0.77	0.49	
ocdd	0.50	1.08	2.04	0.76		1.26	1.03	
DTEo		**0.26**	**0.10**	**0.10**	**0.21**	**0.42**	**0.41**	**0.42**
DTEd		**0.78**	**0.74**	**0.74**	**0.75**	**2.67**	**2.66**	**2.67**
DTEh		**0.52**	**0.42**	**0.42**	**0.48**	**1.55**	**1.54**	**1.54**
DTEh sd					**0.11**			**0.01**
DTEh Confidence					**0.10**			**0.01**
DTEh 95 UCL					**0.58**			**1.55**
% FTAL					**39**			**103**
% Lipids		0.66	0.37	0.25		0.65	0.58	
Sample weight (g)		50.1	50.1	50.1		50.1	50.1	
Values less than the established M								
* = Values are influenced by the pı								

DEP ID WRI ID		SLN-SMB-C1 00-661-C1	SLN-SMB-C2 00-660-C2	mean	SLN-WHP-C1 00-668-C1	SLN-WHP-C2 00-670-C2	mean
Compound	**DL (ng/Kg)**						
2378-tcdf	0.11	0.31	0.25	0.28	0.51	0.42	0.47
12378-pecdf	0.25	<DL	<DL		<DL	<DL	
23478-pecdf	0.25	0.18	<DL		0.245	0.21	
123478-hxcdf	0.25	<DL	<DL		<DL	<DL	
123678-hxcdf	0.25	<DL	<DL		0.21	0.35	
234678-hxcdf	0.25	<DL	<DL		<DL	<DL	
123789-hxcdf	0.25	<DL	<DL		<DL	<DL	
1234678-hpcdf	0.50	0.45	0.56		0.69	0.74	
1234789-hpcdf	0.50	<DL	<DL		<DL	<DL	
ocdf	0.50	<DL	<DL		<DL	0.89	
2378-tcdd	0.10	0.09	0.05	0.07	0.15	0.18	0.17
12378-pecdd	0.25	0.34	0.28		0.39	0.21	
123478-hxcdd	0.25	0.25	0.53		0.62	0.31	
123678-hxcdd	0.25	0.41	0.35		0.21	0.49	
123789-hxcdd	0.25	<DL	<DL		<DL	<DL	
1234678-hpcdd	0.50	0.66	0.41		0.56	0.82	
ocdd	0.50	1.03	0.85		1.26	0.75	
DTEo		0.628	0.403	**0.52**	0.830	0.668	**0.75**
DTEd		0.771	0.770	**0.77**	0.948	0.785	**0.87**
DTEh		**0.70**	**0.59**	**0.64**	**0.89**	**0.73**	**0.81**
DTEh sd				**0.08**			**0.11**
DTEh Confidence				**0.11**			**0.16**
DTEh 95 UCL				**0.75**			**0.97**
% FTAL				**50**			**64**
% Lipids		1.092	0.764		2.685	2.539	
Sample weight (g)		50.1	50.1		50.0	50.0	
Values less than the established M							
* = Values are influenced by the p							

APPENDIX 3

TCDD AND TCDF IN SLUDGE FROM

MAINE WASTEWATER TREATMENT PLANTS

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
AMERICAN TISSUE AUGUSTA	880930	62.6	36.9	414.0
	881223	61.4	37.6	326.0
	890403	61.6	34.6	242.0
	890628	65.5	17.7	414.0
	971125		0.5	4.3
AUBURN VPS	951005		1.3	17.9
AUBURN FIBER	970806		<0.9	9.9
AUGUSTA SANITARY DISTRICT	900409		<1.2	1.3
	900608		<3.9	2.5
	900608		E2.1	10.2
	900914		<20.0	E20.0
	900809		<20	
	910108		<5	5.0
	910220		<1.9	0.8
	910301		<1.9	4.8
	920416		1.9	1.9
	920427		<1.0	1.9
	930223		<1.3	<1.3
	940215		<1.0	<1.0
			<0.02	0.0
			<0.23	1.8
	950227		1.9	<1
	960228		<1	<1
	970408		0.9	<0.9
	980514		<1	<1
ANSON-MADISON SANITARY DISTRICT	910408		<1.3	2.2
	911001		1.7	4.6
BANGOR	950104		20.6	20.7
	950104		20.3	20.2
BERWICK SEWER DISTRICT	861111		<2.5	<4.0
	890301	76.4	14.0	19.9
	890927	75.3	<12.1	<12.1
	891208	87.5	1152.0	872.0
BIDDEFORD	900208		7.2	30.0
	900208		39.0	310.0
	910501		<0.86	3.7
	910703		<0.57	<0.95
	920204		<1.5	2.9
	930121		<2.4	<3.2
	940209		<0.19	<0.48
	940913		<1.0	<2.9
	950815		<.22	1.6
	970218		<0.8	<1.7
BREWER	920520		<2.1	36.0
	920901		<6.0	110.0
	921116		3.8	19.0
	930202		<3.7	11.0
	930511		1.2	9.8
	930810		4.1	24.0
	931118		3.8	26.0
	940201		3.2	24.0
	940517		<0.9	14.0
	940823		4.5	26.0
	941108		5.2	36.0
	950613		<1	18.0
	960611		2.1	17.0
	970212		3.4	22.0
	980622		<1	<1

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
BREWER	990730		<1	1.3
	000718		1.1	1.0
BOWATER				
MILLINOCKET	850618		<0.4	
	880602		<1.9	7.3
	940414		<7.4	<8.9
	940506		<.9	6.7
	950316		<.6	4.0
	960711		<1, <1	<1
	960914		<0.4, <0.3	4.4
	960917		<1	<1
CORINNA SEWER DISTRICT	850506			
	871117		<11.9	<28.8
	880301		<3.0	8.5
	890222		<13.0	
	890510		<5.0	
	900131		2.3	127.0
	900606		<4.0	85.4
	900606		<4.9	82.2
	900919		<10.0	50.0
	901009		<1.5	<.8
	901024		<8.0	
	910313		<5.0	
	910514			
	920304		<3.9	<8.4
	930405		<4.8	19.9
	930811		<9.9	68.6
	940308		<13.1	46.0
	940810		<5.6	7.8
	950321		<2.1	13.3
	960206		<1.8	12.7
American Pulp and Paper	88		104.0	2930.0
BERLIN NH				
FORT JAMES	880801		12.0	34.0
OLD TOWN	881225	78.6	301.0	963.0
	890423	78.7	380.0	1197.0
	890718	68.8	50.6	478.0
	950103		8.8	65.0
FRASER PAPER LTD	880903	68.3	13.9	233.0
MADAWASKA	890106	79.1	E23.4	204.0
	890406	71.3	E3.83	12.9
	890930	80.1	5.0	E26.6
	940426		<.1	0.8
GARDINER WATER DISTRICT	900918		<0.87	4.6
	910401		1.4	4.4
	911002		<0.54	5.1
	920504		<3.5	9.4
	921116		<.93	<6.4
	930407		<0.13	0.9
	931115		<1.6	<18
	931115			
	931115		<0.9	
	940329		<0.2	<1.1
	941018		<1.2	<4.3
	950221		<2.8	5.2
	951003		<1.7	
	960326		4.1	27.0
	961015		0.8	11.0
	970331		<1.1	<5.8

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
GEORGIA PACIFIC CO WOODLAND	890113	75.8	<6.2	<3.55
	890424	74.7	<0.63	<4.74
	890718	66.0	<1.76	12.9
	891217		0.9	3.2
	910630		<1	2.0
	910630		<1	1.0
	910630		<1	<1
	910630		1.0	4.0
	910630		<1	<1
	910630		<1	2.0
	911231		<1	2.0
	911231		2.0	5.0
	911231		<1	3.0
	911231		<1	2.0
	930108		<1	<1
	940530		<5.0	<5.0
	941222		<5.0	11.9
	950331		<5.0	14.3
	950630		<5.0	<5.0
	950930		<5.0	24.5
	951231		<1.0	3.4
HARTLAND WASTEWATER TREATMENT PLANT	881007	65.0	<2.86	<1.71
	881221	65.5	<7.25	E6.09
	890312	64.3	<0.28	5.6
	890627	63.3	<1.36	6.5
	000127		<0.4	E1.4
	000426		<0.5	<0.4
	000922		<2.1 <3.1	<1.9 <2.2
	001205		<0.8	<0.9
HAWK RIDGE COMPOST UNITY (compost)	1989-90	mean n=(	6.6	15.9
	1991	(1.6-13)		mean n=4
	900420		2.9	15.0
	900507		3.4	6.0
	900628		3.4	31.0
	900712		5.0	40.0
	900817		3.4	31.0
	900820		3.0	30.0
	900820		5.0	40.0
	901010		<5	30.0
	910115		0.6	6.4
	910207		4.0	59.5
	910806		1.6	15.0
	920123		2.6	18.0
	920318		<1	
	920715		<2.0	34.0
	920818		<1.0	18.0
	921007		2.2	23.0
	930111		<2.2	12.0
	930406		1.7	16.0
	930629		1.7	22.0
	931213		3.4	28.0
	940101		2.6	27.0
	940422		<1.0	12.0
	940422		<1	9.1
	940725		1.6	13.0
	941024		<2.4	13.0
			4.9	33.0
	950724		<1	12.0
	951012		1.1	12.0
	960131		<1	8.8
	960501		<1	6.6
	960709		<1	7.6
	961007		1.4	10.0

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
HAWK RIDGE COMPOST	970110		<1	1.5
UNITY	970305		<1	3.6
	970725		<1	3.8
	971014		<1	3.8
INTERNATIONAL PAPER CO	850621		51.3W	
JAY	870115		190.0	760.0
	880218		24.0	130.0
	880219		23.0	121.0
	880223		14.0	75.0
	880225		57.0	250.0
	880226		15.0	79.0
	880227		13.0	79.0
	881231		16.6W	143W
	890124		15W	77W
	890126		28.0	112.0
	890323		7.7W	42.6W
	890417		24.0	150.0
	950712		7.2	39.0
	960125		2.6	16.0
	960126		2.8	16.0
	960227		<1.0	14.0
	960228		2.3	14.0
	961015		<1	4.0
	961016		<1	5.4
	961126		4.6	22.0
	961127		2.7	12.0
KENNEBEC SANITARY	870713			
TREATMENT DISTRICT	871105			
WATERVILLE	880118			
	880322			
	880518			
	880921			
	890711			
	891011			
	900410		E7.9	121.0
	900824		3.3	54.0
	901101		3.6	12.0
	901221		3.5	6.7
	901221		3.5	19.0
	910408		<2.3	<3.3
	910606		<2.9	<5.0
	910808		2.3	53.0
	910911		3.1	4.1
	920226		2.6	20.0
	920708		<1.0	11.0
	930914		1.1	6.3
	941021		<1.0	8.2
	951113		<1	1.3
	960924		<1	<1
	971010		<1	12.0
	990120		<1	<1
	990915		<1	<1
	000927		0.4, <4.8, <0.3 .75, <3.1, 2.9,3.	
KIMBERLY-CLARK	871008		36.0	
WINSLOW	871201		13.5	
	880331		25.0	219.0
	880630		19.0	177.0
	880930		22.0	189.0
	881231		17.0	181.0
	890331		18.0	177.0
	890628		14.0	89.0
	890927		11.0	67.0

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
KIMBERLY-CLARK WINSLOW	891231		13.0	115.0
	900201		12.0	86.0
	900628		12.0	94.0
	900928		9.4	76.0
	901231		7.2	63.0
	910214		12.0	86.0
	910411		8.3	100.0
	910630		4.6	62.0
	910930		6.5	69.0
	911101		6.5	63.2
	911203		6.3	68.1
	920225		6.5	72.1
	920623		5.2	55.0
	921006		5.1	60.0
	921228		7.2	59.0
	930317		4.7	47.0
	930629		4.2	37.0
	930917		3.9	42.0
	931231		5.2	44.0
	940101		3.5	31.0
	940401		3.7	27.0
	940909		4.9	33.0
	941231			30.0
	950331		4.4	42.0
	950608		<1	24.0
	950930		2.2	25.0
	951231		3.0	34.0
	960122	RWT	3.0	34.0
	960410		3.1	29.0
	960702		4.4	36.0
	960702D		1.6	17.0
	961030		2.4	18.0
	961030D		<1	17.0
	970318	RWT	2.4	16.0
	970616	RWT	1.4	16.0
	971104	RWT	1.3	23.0
KITTERY WWTP	990319		<0.4	5.2
LEWISTON-AUBURN TREATMENT PLANT	871231		<1.0	ean for year (n=4
	881031		0.0	
	900809		E10	9.0
	910306		<7.3	<7.3
	920610		<0.8	4.5
	930625		<1	4.4
	930922		<2.7	<2.5
	950405		<2.2	0.8
	960625		<1	<1
	961202		<1	21.0
	990730		1.0	6.9
	000201	limed	<0.6	8.5
LINCOLN PULP & PAPER CO LINCOLN	881119		48W	223W
	890123	80.9	44.0	203.0
	890123		44.0	173.0
	890407	85.1	49.0	298.0
	890407		41.0	219.0
	890831	83.5	182.0	640.0
	890831		156.0	625.0
	890831		41.0	220.0
	890831		59.0	294.0
	921231		20.4	91.6
	931014		9.1	187.5
	940331	PRI SL	14.9	154.0
	940331	SEC SL	97.1	734.0

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
LINCOLN PULP & PAPER CO	960302		<0.4	<0.3
LINCOLN	960419		4.2	21.7
	960431		4.2	25.1
	970831		3.7	20.0
	971130		<1.5	3.7
	980930		<0.7	1.2
	990531		0.3	1.5
	990930		0.4	1.0
	000130		1.3	1.5
MEAD PAPER	850621		32.0	
RUMFORD	880602		105.0	674.0
	890108	77.1	114.0	569.0
	890407	73.1	46.5	184.0
	890628	76.8	E9.91	134.0
OAKLAND TREATMENT PLANT	910304		<2.5	10.0
	910329		<5	10.0
	920415		<1.0	<1.0
	920415		<1	<1
	930408		<1.0	<1.0
	930501		<1.0	11.0
	940426		<1.0	<1.0
OLD TOWN	880525		<3.0	<3.0
	900212		<2.2	16.7
	910918		<2.9	6.6
	910918		<2.2	
ORONO TREATMENT PLANT	900316		2.1	
	900412		8.5	
	901001		3.5	9.2
	901021		3.9	
	910324		<2.1	9.5
	910918		<2.9	6.6
	920323		<0.6	7.6
	920328		9.4	
	920915		<0.5	5.4
	921015		1.1	
	930427		1.3	
	930427		<0.5	3.4
	940502		<0.6	2.5
PERC	910417		<2.0	9.9
PORTLAND WATER DISTRICT	861205			
PORTLAND	870402			
	871124			
	880913			
	891206		E1.2	11.3
	891206		1.6	14.5
	901002		<3	10.0
	901002		<3	20.0
	910826		<64	<32
	910828		<66	<140
	920715		<1.1	6.4
	920715		0.9	7.6
	930719		<1	2.3
	930719		<1.1	<3.2
	940718		<1.0	0.8
	950727		0.5	1.0
	960807		<0.7	<0.1
	980811		<0.4	3.4
	980514		<1	<1
	990602		<1	5.6
	000913		<0.1	8.0

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
WESTBROOK WWTF	861205			
	870402			
	871119			
	891205		E1.6	14.5
WESTBROOK WWTF	901001		<3.0	9.0
	910826		<64	<32
	920714		<1.1	7.6
	930719		<1.0	3.2
	980811		<0.2	4.1
	001011		<0.6	3.5
	001121			3.6
	001228		1.2	3.4
REGIONAL WASTE SYSTEMS PORTLAND	890111	ash	5.5	28.0
	890112	ash	6.0	24.0
	890113	ash	10.0	50.0
	890114	ash	10.0	20.0
	890121	ash	6.0	90.0
	900211	ash	E20	210.0
ROBINSON MANUFACTURING OXFORD	870113		10.1	17.5
	880419		<0.4	<0.2
	881004		<7.3	<9.6
	890119		<0.39	<1.2
	890119D		<2.1	<1.1
	910226		<3.0	<3.0
	910305		<3	<0.3
	910308		<3	<3
	910323		<5	<5
	910323		<3	<3
	920610		<1.2	<1.0
	960216		<1	0.1
	960315		<1	4.2
	970220		<1	<1
	980218		<1	<1
SAPPI -SOMERSET	861217		<2	47.0
	870519		13.0	21.0
	870930			
	871215		60.0	
	880325		27.0	88.0
	880630	EPA	67.0	33.0
	881014		40.0	98.0
	881220		54.0	177.0
	890303		54.0	92.0
	890629		23.0	53.0
	890926		<.8	16.0
	891205		18.0	52.0
	900314		<18	23.0
	900620		35.0	73.0
	900916		45.0	86.0
	901215		39.5	115.0
	910324		23.1	51.0
	910626		39.4	146.0
	910910		69.9	260.0
	920624		33.0	856.0
	920923		20.0	39.0
	921218		15.0	45.0
	930107		11.0	31.0
	930616		23.0	73.0
	930916		56.0	170.0
	931229		42.0	110.0
	940108		31.0	95.0
	940627		33.0	89.0
	940926		12.0	36.0
	941212		11.0	20.0
	950313		3.6	15.0
	950510		3.3	11.0

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
SAPPI -SOMERSET	950914		9.6	25.0
	951120	comb	1.2	4.2
	960327		2.0	9.6
	960624		5.1	18.0
	960910		5.2	11.0
	961014		5.2	15.0
	970319		5.5	26.0
	970624		8.5	36.0
			4.9	
	970917		<.71	2.0
	971216		<.28	0.7
	980316		<.79	<6.2
	980527		1.0	2.5
	980928	dredgin	6.6	18.0
	981208		<.4	0.7
	990330		<.26	<4.2
	990607		<.4	0.8
	990921		<.48	<5.4
	991215		<.4	1.2
	000131		<.65	1.8
	000607		<.729	2.9
	000926	dredgin	1.86	6.8
	001213		<.207	1.4
SAPPI - WESTBROOK	850620		17.2	
	870929		31.0	
	871231		21.0	135.0
	880331		5.6	21.0
	880401		8.7	3.9
	880630		13.0	55.0
	881207		19.0	127.0
			19.0	69.0
	890106		<1.8	31.0
	890600		<1.2	13.0
	890600		5.3	35.0
	890600		<.2	0.2
	890600		<.4	8.8
	890600		69.9	60.0
	891031		5.0	30.0
	891130		3.0	30.0
	891231		7.0	50.0
	900131		6.0	20.0
	900228		2.7	24.6
	900331		5.1	33.6
	900430		5.9	34.6
	900531		5.3	25.8
	900630		19.0	26.0
	900730		5.2	20.6
	900831		2.9	12.1
	900930		2.5	10.0
	901231		7.7	35.7
	910917		70.0	275.0
	910331		3.4	21.5
	910630		2.9	19.6
	910930		3.8	14.2
	911231		2.4	25.1
	920331		1.2	19.4
	920505		1.6	10.8
	920821			24.5
	940131		0.9	11.6
	940324			12.3
	940728		2.1	17.3
	941213		5.3	29.2
	950329		1.2	20.0
	950602		1.0	10.1
	950911			18.3
	951120		1.1	23.3

APPENDIX 3. TCDD AND TCDF IN SLUDGE FROM WASTEWATER TREATMENT PLANTS (pg/g)

LOCATION	DATE	%MOIST	TCDD	TCDF
	960327		2.0	9.6
	990113		4.0	61.0
	990407		2.9	36.0
	990728		1.0	14.0
	990830		<0.9	4.0
	990928		<1.0	2.8
S PORTLAND STP	880000		<8.65	<48
	900314		<5.3	<3.5
	900314		<2.7	<5.4
	910508			<10
	910531		<5	
	920401		<1.0	<0.8
	920428		<0.8	1.4
	920714		0.9	6.4
	930324		<2.8	<2.8
	940315		<1.0	3.9
	941005		8.7	48.0
	950405		<1	3.3
	960610		<1	5.3
	970616		<1	15.0
	000912		<	2.6
Van Buren WWTP	000918		0.6	4.0

D=duplicate analysis

APPENDIX 4

TCDD AND TCDF IN EFFLUENT FROM MAINE WASTEWATER TREATMENT PLANTS

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE	TCDD (pg/l)	TCDF (pg/l)
ANSON MADISON	920408	<3	<3
	921001	<3	20
BREWER	920624	<5.9	
	930429	<3.9	
	941129	7.4	
	950503	<3.6	
	960416	<10	
FORT JAMES	880630	39	
	890131	27	120
	890222	210	340
	890223	92	290
	890224	77	340
	890320		34
	890324		24
	890325	36	73
	890405	30	110
	890410	17	52
	890411	32	89
	890824	32	94
	890831	13	150
	890911	<4.1	14
	890915	<3.3	<8.1
	890921	<5.7	13
	890927	<5.3	9.7
	891011	<3	11
	891019	<5.2	14
	891102	<6	18
	891106	6.7	22
	891114	<9.5	<7.1
	891127	<6.4	20
	891206	<8.4	13
	891213	<8.3	20
	891221	<4.7	23
	900105	<6.8	<8.3
	900111	<9	<8.5
	900118	<5.9	6.1
	900125	<6.7	10
	900207	<4.6	17
	900214	<6.6	23
	900222	<7.3	15
	900301	<6	11
	900308	<3	12
	900315	<4	16
	900329	<7.4	14
	900407	<7.2	24
	900502	<7	19
	900729	<9.9	49
	910330	17	70
	910430	19	65
	910530	9.5	41

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
FORT JAMES	910630		6.8		43
	910830		11		66
	911030				7.9
	911130		<7.7		<16
	920330		<5.7		50
	920730		16		69
	920830		<4.9		23
	921030		<3.0		
	921230		4.8		
	930130		<5.0		14
	930330		<4.9		12
	930530		<4.2		11
	930630		<2.8		15
	930830		<1.6		9.2
	930930		<3.5		7.6
	931130		<3.1		32
	931230		<3.2		19
	940230		<4.8		7.7
	940330		<4.6		12
	940530		<1.5		<4.5
	940630		<3.5		9.2
	940830		<2.0		<4.8
	940930		<4.6		<6.8
	941130		<9.5		<10
	941230		<1.1		5.8
	942730		<1.1		5.8
	950130		<2.4		8.2
	950119		<2.4		8.2
	951230		<1.1		5.8
	950430		<1.4		5.6
	950430		8		36
	950421		<1.4		5.6
	950622		<2		6.8
	950928		<3.8		8.1
	951129		<5.4		13
	951228		<1.4		6.2
	980115	BPA	<2.8		<5.8
		BPB	<11		53
	980130		<3		9.4
		BPA	<2.9		18
		BPB	<2.8		8.9
	980219	BPA	<1.7		12
		BPB	<3.9		39
	980230		<2.6		8.7
	980328	BPA	<5.8		11
		BPB	<5.2		13
	980330		<2		9.1
	980730		<3		<4
	980830	BP	<3.5	BP	<4.2
	980930		<3.2		<4.8
		BP	5.9	BP	28
	981030		<3.2		<4.8
		BP	<3.5	BP	<4.2

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
FORT JAMES	981130		<5.5		<5.4
		BP	<3.4	BP	<4.6
	981230		<1.6		8.7
		BP	<3.1	BP	6.5
	990130		<3.4		<2.6
		BP	<3	BP	<3.9
	990230		<10		<10
		BP	<10	BP	<10
	990330	BP	<2.3	BP	<1.8
	990530		<1.9<4.7		<2.9<3.3
		BP	<3.2	BP	<4.8
	990630		<1.3		<1.8
		BP	<2.3	BP	7.3
	990730		<.93		<1.4
		BP	<2.6	BP	<1.8
	990930		<.68		<2.1
		BP	<1.3	BP	<5
	991030		<2.5		<2.1
		BP	<3	BP	<3.6
	000130		<8.4		<4.9
		BP	<9.0	BP	<5.4
	000330		<3.4		<3.1
		BP	<2.9	BP	<2.3
	000430		<7.4		<7.6
		BP	<5.0	BP	<5.5
	000630		<2.2		<1.5
		BP	<4.0	BP	<3.0
	000830		<1.2		<1.1
		BP	<3.0	BP	<3.2
	001030		<2.3		<2.6
		BP	<3.4	BP	<3.4
	001130		<2.7		<1.4
		BP	<2.7	BP	<3.2
GEORGIA PACIFIC Baileyville	880101		6.8		25
	900316		<5		4
	900423		<3		<6
	900531		<8		<5
	900619		<3		<1
	900716		<1		<3
	900807		<2		<5
	910630		<10		<10
	910630		<10		<10
	910630		<11		<11
	910630		<11		<11
	910630		<11		<11
	910630		<11		<11
	910630		<10		<10
	910630		<11		<11
	910630		<11		<11
	911231		<10		<10
	911231		<10		<10
	911231		<11		<11

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
GEORGIA PACIFIC	911231		<11		<11
Baileyville	911231		<10		<10
	911231		<11		<11
	911231		<10		<10
	911231		<11		<11
	911231		<11		<11
	930408		<10		<10
	930506		<10		<10
	930713		<10		<10
	940530		<10		<10
	941222		<10		<10
	950331		<10		<10
	950630		<10		<10
	950930		<10		<10
	951231		<10		<10
	980330				60
	980421		<10		60
	980825		<10		40
		BP	<10	BP	10
	981230		<10		<10
		BP	<10	BP	<10
	990430		<10		<10
		BP	<10	BP	<10
	990930		<4		<3
			<2		<6
		BP	<2ALK<4ACID	BP	<2ALK<7ACID
		BP	<5ALK<3ACID	BP	<4ALK<3ACID
	991030		<5		<3
		BP	<7ALK<5ACID	BP	<8ALK<3ACID
	991130		<1		<6
		BP	<1ALK<2ACID	BP	<5ALK<3ACID
	000130		<4.2		<3.4
		BP	<2.0ALK<2.0ACID	BP	<4.0ALK<3.0ACID
			<5.0		<4.0
		BP	<3.0ALK<3.0ACID	BP	<3.0ALK<2.0ACID
	000930	BP	<7.1ALK<3.4ACID	BP	<5.6ALK<2.4ACID
		BP	<2.3ALK<2.5ACID	BP	<1.6ALK<1.7ACID
	001200	BP	<5.9ALK<3.8ACID	BP	<5.3ALK<2.1ACID
		BP	<5.1ALK<4.0ACID	BP	<4.0ALK<3.0ACID
INTERNATIONAL PAPER	880101		88		420
	880715		30		150
	890307		30		100
			E6		E20
			E20		E20
	890310		16		74
	890616		<8		980

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)	TCDF (pg/l)
INTERNATIONAL PAPER	890621		17	140
	890713		<16	50
	890720	DEP	30	150
	890818		20	110
	900413		<10	90
	910924		<10	60
	910926		<10	60
	911129		50	210
	911219		<20	<80
	920125		20	110
	920126		20	110
	920127		30	100
	920128		30	100
	920129		13.7	49.9
	920312		19.3	65.6
	920320		14.8	73.9
	920423		<13.9	59.1
	920610		<5.7	29.5
	920617		<6.3	30.8
	920723		<8.4	33.6
	920819		6.6	29.7
	920923		<2.6	<2.0
	921111		<6.1	22.4
	921202		<2.6	<14.4
	930125		5.4	19.6
	930222		<5.3	25.5
	930420		<2.0	16.7
	930527		4.3	10.3
	930716		<5.2	28.9
	930826		<5.3, <6.5	21.5, 19.2
	930910		<8.6	9.4
	931022			19.5
	931119		<3.6	19.5
	931224		10.9	31.1
	940125		<4.1	21.6
	940226		7.3	38
	940422		7.7	41.1
	940520		4.1	25.6
	940722		<3.4	16.7
	940829		<7.9	31.8
	941027		<3.4	25.3
	941125		<6.8	24.4
	950126		<5.0	20.9
	950222		<3.6	21.4
	950420		<2.5	25.6
	950527		<1.8	24.1
	950724		<3.2	16.1
	950826		<4.9	7.5
	950929		<6.0	15.4
	951020		<8.5	12.9
	951122		<3.8	10.5
	960228		<10	6.5
	960430		<10	12.8

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
INTERNATIONAL PAPER	960530		<10		15.7
	961030		<10		7.7
	961130		<10		<10
	970130		<10		<10
	970228		<10		11.5
	970330		<10		<10
	970330	BPA	<6.2	BPA	<6.3
		BPB	<5.1	BPB	<3.7
	970430		<10		14.4
	970522	BPA	4.9	BPA	5.6
		BPB	10.9	BPB	9.6
	970406	BPA	<4.9	BPA	10.9
		BPB	<5.6	BPB	9.6
	970630		<10		6.8
	970730		<10		<10
	970728	BPA	<5.2	BPA	11.5
		BPB	<5.4	BPB	6.3
	970830		<10		<10
	971030		<10		
	971013	BPA	<4.3	BPA	<5
		BPB	<7.2	BPB	<8.3
	971130		<10		
	980117		<2.1		7.1
	980126	BPA	<3.5		<3.2
		BPB	<1.2		<1.7
	980221		<3.7		<3.7
	980406	BPA	<0.6		<2.3
		BPB	<1.4		<1.3
	980516		<3		8
	980613		<1.4		<2.2
	980706	BPA	<2.8		19
		BPB	<1.2		4.8
	980711		<2.3		4.9
	980814		<2.2		<1.1
	981012	BPA	<2.0		45
		BPB	<2.9		<1.6
	981016		<2		5.1
	981116	BPA	<6.8		9.9
	981119		<7		<8.6
	981130	BPB	<3.3		<5.2
	990117		<2.8		3.6
	990112	BPA	<.99		54
		BPB	<.97		4
	990312		<3		7.4
	990304	BPA	<2.1		9.7
		BPB	<2.7		<5.9
	990412		<5.9		18
	990408	BPA	<2.6		7.4
		BPB	<5.5		<5
	990618		<5.1		<4.2
	990622	BPA	<8.6		<9
		BPB	<3.3		<4.1
	990723		<2.2		<1.6

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
INTERNATIONAL PAPER	990720	BPA	<2.9		130
		BPB	<2.5		<2.3
	990917		<6.2		<6.5
	990913	BPA	<3.8		<1.6
		BPB	<3.4		<1.4
	991008		<5.6		6.6
	991005	BPA	<2		<1.6
		BPB	<3		<1.3
	991112		<2.7		<6.5
	991110	BPA	<2.7		<4
		BPB	<2.1		<2.1
	000104	BPA	<2.5		<1.8
		BPB	<3.0		<2.8
	000306	BPA	<1.6		<5.0
		BPB	<1.1		<2.6
	000419	BPA	<2.9		<1.6
		BPB	<2.7		<1.8
	000612	BPA	<3.7		<2.6
		BPB	<1.51		<0.59
	000705	BPA	<2.43		<4.57
		BPB	<2.07		<1.8
	000829	BPA	<2.28		<3.57
		BPB	<1.69		<2.20
	001019	BPA	<0.573		<1.91
		BPB	<0.698		<1.61
	001207	BPA	<1.80		<1.89
		BPB	<0.825		<1.19
HARTLAND	960530		<0.06		
KIMBERLY-CLARK	930308		<10		<12
	930623		<4.6		<3.9
LINCOLN PULP AND PAPER	881130		32		130
	920817		11.2		69.8
	920908		<11		27.3
	921117		7.7		39.1
	921216		<1.9		9.5
	931230		<5.5		<17.3
	940417		1.9		7.5
	950824		1.3		8.5
	960409		1.3		8.5
	970116	BP	25.4	BP	103
	970212	BP	11	BP	43.1
	970522	BP	11.4	BP	27.6
	970813	BP	6.4	BP	14.4
	971001	BP	1.6	BP	1.9
	971231	BP	<2.4	BP	<3.83
	980330	BP	<3.4	BP	<3.7
	980430	BP	<10	BP	13.2
	980630	BP	<8.9	BP	<4

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
LINCOLN PULP AND PAPER	980830	BP	<7.1	BP	<7.6
	980930	BP	<2.3<4.1	BP	<2.3<3.2
	981130	BP	<2.6<4.9	BP	<2.7<3.6
	981230	BP	<1.5	BP	<1.3
	990230	BP	<1.1	BP	<2.1
	990330	BP	<2.5	BP	<3.8
	990430	BP	<2.8	BP	<3.2
	990630	BP	<4.4	BP	<4.5
	990830	BP	<4.3	BP	<2.8
	990930	BP	<1.3	BP	<.44
	991030	BP	<2.3	BP	<2.2
	991130	BP	<3	BP	<2.9
	000130	BP	<	BP	<1.4
	000330	BP	<3.0	BP	<1.2
	000430	BP	<1.6	BP	<1.3
	000630	BP	<7.14	BP	<3.63
	000730	BP	<2.07	BP	<1.25
	000830	BP	<2.14	BP	<3.17
	001030	BP	<3.39	BP	<2.17
	001130	BP	<2.08	BP	<
MEADE PAPER	880518		120		570
	890301		25		80
	890807		<6		20
	890810		<13		20
	890814		<5		13
	890817		<5		18
	890821		<8		21
	890824		<5		10
	890829		<5		18
	890831		<11		20
	890905		<11		20
	890907		<9		18
	891023		<3		7
	891026		<5		6
	891222		<5		20
	900216		<2		6
	900216		<1		7
	900515		<10		<8
	900515		<1		5
	900627		<3		8
	900627		<3		9
	920217		<4.6		14
	920221		<4.6		13
	920311		<4.6		9.9
	920316		3.2		8.7
			3.5		12
			4.6		17
	920326		4.5		8.5
	920412		6.3		24
	920613		<4.6		6.8
	920708		<4.6		<5.8
	920831		<4.6		3.5

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
MEADE PAPER	920904		<3.8		
	921104		<3.7		
	921201		<2.4		
	930105		<2.4		
	930201		<2.4		<10
	930401		<2.8		<10
	930501		<2.4		<10
	930701		<3.9		12
	930801		<2.8		<3.4
	931001		<3.2		<10
	931101		<3.9		<3.6
	940130		<2.8		<5.2
	940219		<1.9		<1.3
	940417		<3.3		<2.4
	940509		<3.6		<1.2
	940728		<3.7		<1.7
	940829		<2.7		<2.0
	941024		<2.1		<1.1
	941205		<2.7		<1.8
	950131		<10		<10
	950229		<10		<10
	950430		<10		<10
	950531		<10		<10
	950731		<10		<10
	950831		<10		<10
	951031		<10		<10
	951130		<10		<10
	960130		<10		<10
	960330		<10		<10
	960430		<10		<10
	960530		<10		<10
	960730		<10		<10
	960830		<10		<10
	961030		<10		<10
	961130		<10		<10
	970317		<10		<10
	980130		<10		<10
	980230		<10		<10
	980430		<10		<10
	980530		<10		<10
	980609	BP	<10		<10
	980730		<10		<10
	980830	BP	<10		<10
	981030	BP	<10		<10
	981130	BP	<10		<10
	990130		<10		<10
		BP	<10	BP	<10
	990230		<10		<10
		BP	<10	BP	<10
	990430		<10		<10
		BP	<10	BP	<10
	990530		<10		<10

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
MEADE PAPER		BP	<10	BP	<10
	990730		<10		<10
		BP	<10	BP	<10
	990830		<10		<10
		BP	<10	BP	<10
	991030		<10		<10
		BP	<10	BP	<10
	991130		<10		<10
		BP	<10	BP	<10
	000113	BP	<10	BP	<10
	000224	BP	<10	BP	<10
	000410	BP	<10	BP	<10
	000505	BP	<10	BP	<10
	000718	BP	<10	BP	<10
	001003	BP	<10	BP	<10
	001106	BP	<10	BP	<10
SAPPI - SOMERSET	880630		16,19		63,100
	900710		<7.1		8.4
	900716		<6.1		5.9
	dup		<5.5		<7.3
	900724		<3.6		<3.9
	930105		<3.4		9.2
	930224		<4.7		15
	930311		<4.0		10
	930409		6.8		18
	930616		6.3		14
	930917		7		17
	931203		7.6		19
	940107		<3.8		9.2
	940624		<10		13
	940923		<11		8.7
	941209		<4.6		6.6
	950310		9		11.6
	950505		<10.3		6.6
	950616		<3.9		<9.4
	950807		5.8		14.5
	950911		2.8		15.3
	951124		<4.2		38.7
	951208		<7.4		29
	960112		<1.6		<2.3
	960209		<3.2		<4.8
	960405		<2.7		<2.7
	960610		<3.6		6.5
	960712		<3.0		4.2
	960809		5.8		15
	961108		<4.9		11
	961206		<4.1		9.7
	970103		<4.3		6.2
	970207		<2.0		7.5
	970411		<2.2		5.7
	970509		8.2		12
	970708	BP	<3.0		

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)	TCDF (pg/l)
SAPPI - SOMERSET	970711		<3.2	<2.9
	970805	BP	<2.9	
	970807	BP	<3.5	
	970815		<3	<3.3
	970820	BP	<3.7	
	980825	BP	<2.3	
	970916	BP	<2.6	
	971017		<9.1	<6.3
	971114		<3.8	<0.51
	980109		<3.5	<1.9
	980112	BP	<3.2	
	980206		<4.3	<2
	980410		<1.6	<1.6
	980608		<5.7	<1.7
	980810		<1.6	<2.5
	980911		<1.9	<2
	981009		<1.9	<1.9
	981106		<2.2	<1
	990210		<1.5	<1.2
	990310		<2.6	<2
	990410		<4.6	<3.3
	990510		<3.4	<4.5
	990710		<3.5	<3.9
	990910		<7.3	<6
	991010		<4.1	<6.1
	991110		<2.2	<1.1
	000204		<3.4	<4.7
	000310		<3.1	<3.1
	000407		<3.3	<3.3
	000505		<5.7	<4.5
	000728		<2.24	<1.22
	000908		<4.34	<4.67
	001110		<0.556	<1.13
	001208		<3.61	<3.09
SAPPI - WESTBROOK	880101		6.3	
	1989		1	
	901118		<3	8
	910425		<5	<5
	910716		<8	<5
	911203		<8	<5
	920218		<2.8	7
	920507		<1.2	4.6
	920715		<5.8	<4.9
	921114		<1.8	3.9
	930303		<7.8	16
	930617		<1.5	<6.4
	930915		<2.4	5.7
	931208		<3.4	<7.3
	940130		<6.5	<9.8
	940324			<5.9
	940727		3.6	7.8
	941212		<6.0	<15.8
	950730		<5.4	9.8
	950615		<2.8	<9.9
	950815		<4.3	<21.9

APPENDIX 4. 2378-TCDD AND 2378-TCDF IN EFFLUENT FROM WASTEWATER TREATMENT PLANTS

SOURCE	DATE		TCDD (pg/l)		TCDF (pg/l)
SAPPI - WESTBROOK	970519	BP	<7.9	BP	<10
	970808	BP	5.05	BP	<8.2
	971002	BP	<	BP	13.46
	980324		<1.6		5.9
	980914	BP	13.4	BP	130
	980915		<1.0		11
	980921		<1.9		<1.9
		BP	<10	BP	110
	981118		<10		<10
		BP	<10	BP	130
	981208	BP	<10	BP	140
	981209		<11		<11
	990113		<10		<10
	990131				<11
		BP	10	BP	140
	990209		<10		<10
	990318		<10		<10
	990331				<10
		BP	<11	BP	150
	990407		<10		<10
	990526		<11		15
	990617		<10		<10
	990630				15
		BP	<11	BP	130
	990728		<9.5		<9.5
	990731	BP	<10	BP	54
	990830		<10		<10
	990830		<10		<10

APPENDIX 5

2378-TCDD AND 2378-TCDF IN SEDIMENTS FROM VARIOUS STATIONS ON THE ANDROSCOGGIN RIVER

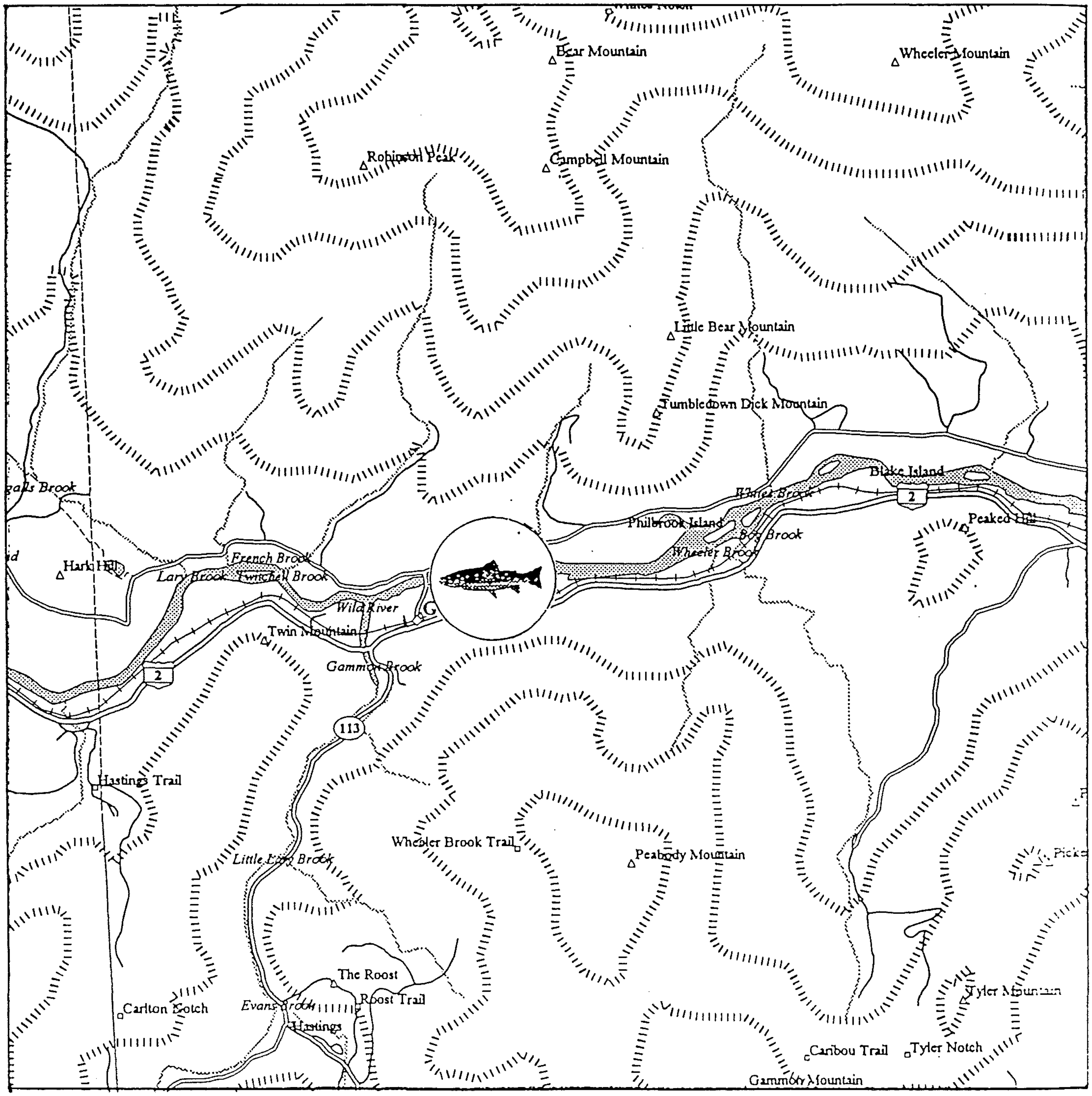
APPENDIX 5. 2378-TCDD AND 2378-TCDF IN SEDIMENTS FROM STATIONS ON THE ANDROSCOGGIN R

LOCATION	DATE	2378-TCDD	2378-TCDF	% MOISTURE	% DOC
Virginia Impoundment Rumford N443147 W703217	910308	4.4	185		2.35
Riley Impoundment Jay N443002 W701458	910306	5.3	168		3.31
Otis Impoundment Livermore Falls N442846 W701213	910327	E6.8	162		2.85
Gulf Island Pond Turner N441520 W701050	850711	23.1			
Gulf Island Pond Turner N441420 W701125	850711	30.3			
Gulf Island Pond Turner N441225 W701210	850711	20.4			
Gulf Island Pond Greene N441040 W701240	850711	39.5 42.6dup			
Gulf Island Pond Greene N440932 W701222	910313	27.4	371		6.79
Worumbo Impound. Lisbon Falls N435950 W700405	910327	4.7	64.2		2.31
Brunswick below dam N435445 W695550	850711	2.5			
Brunswick Cow Island N435520 W695745	850711	1.7			

APPENDIX 6

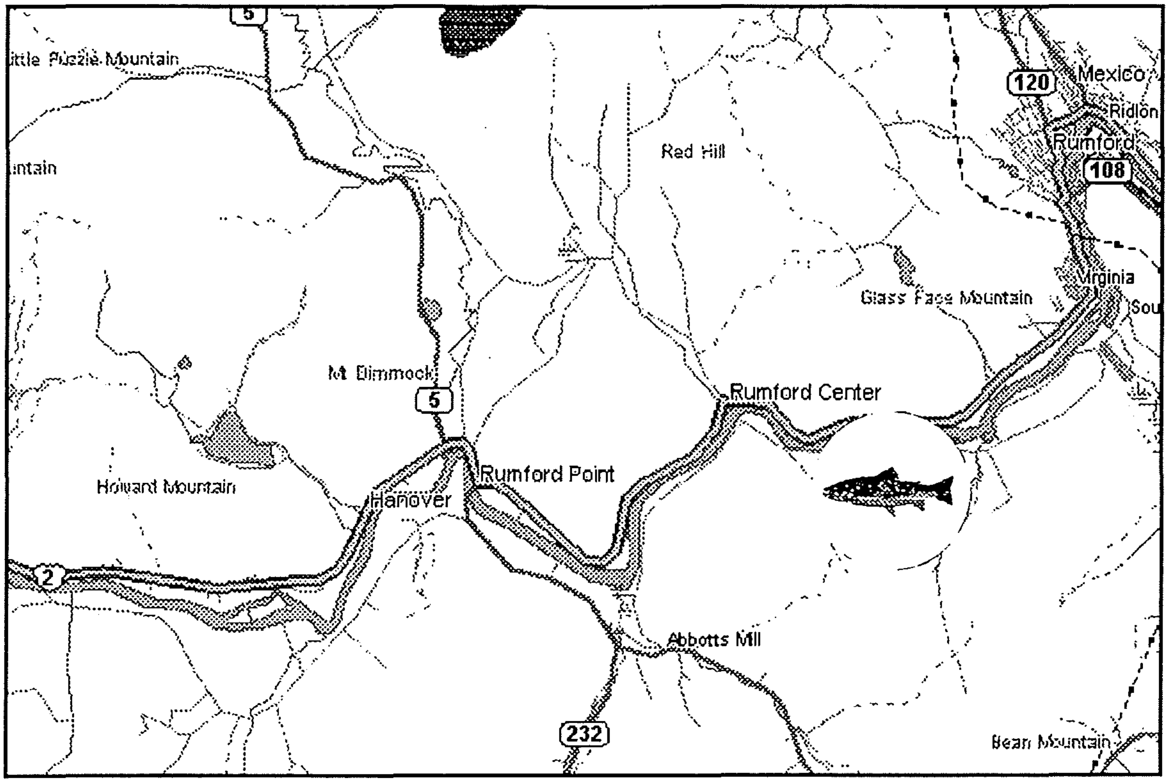
SAMPLE LOCATION MAPS

AGL ANDROSCOGGIN RIVER AT GILEAD

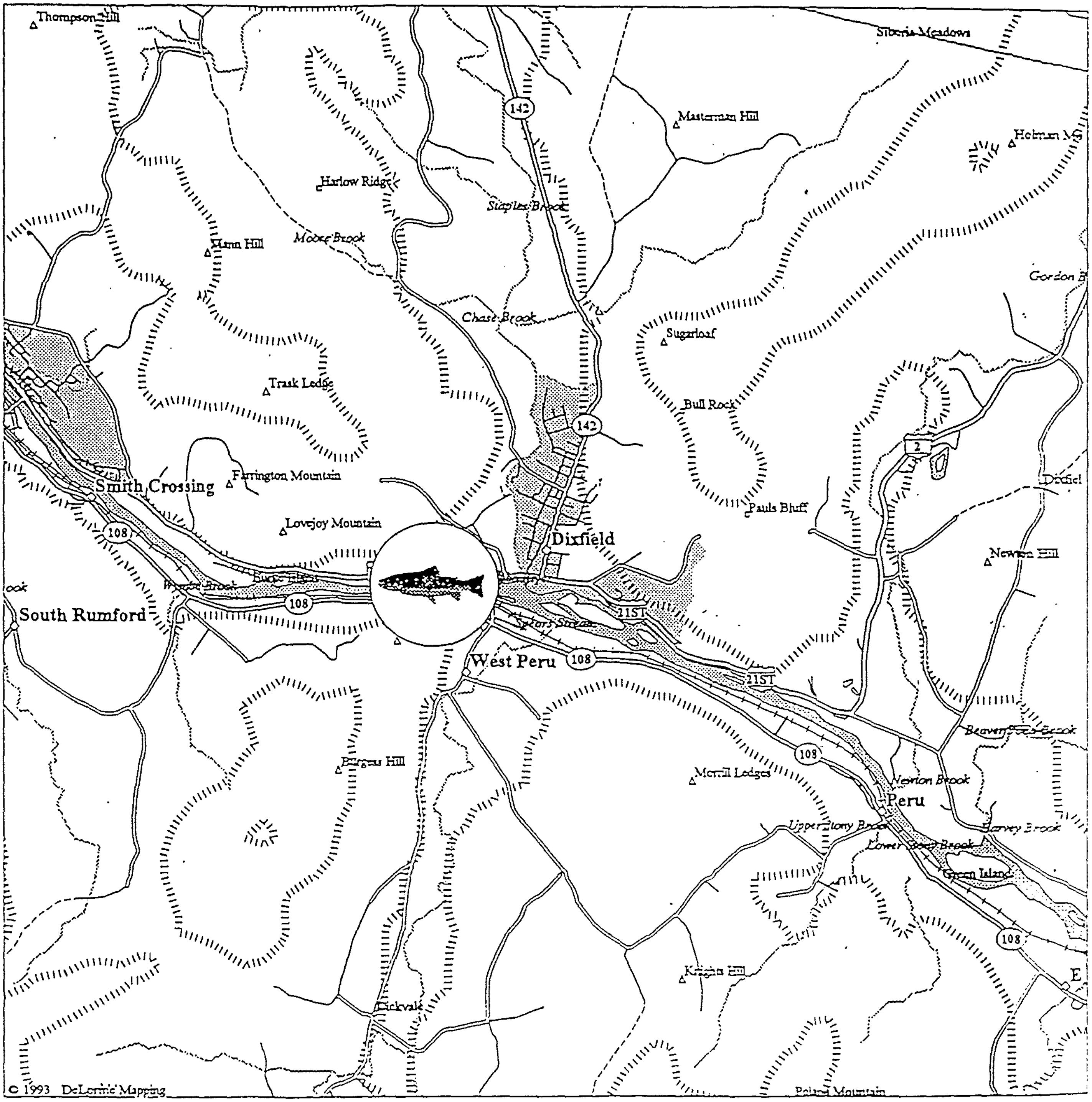


Androscoggin River at Rumford Point

ARP



ARF ANDROSCOGGIN RIVER AT RUMFORD

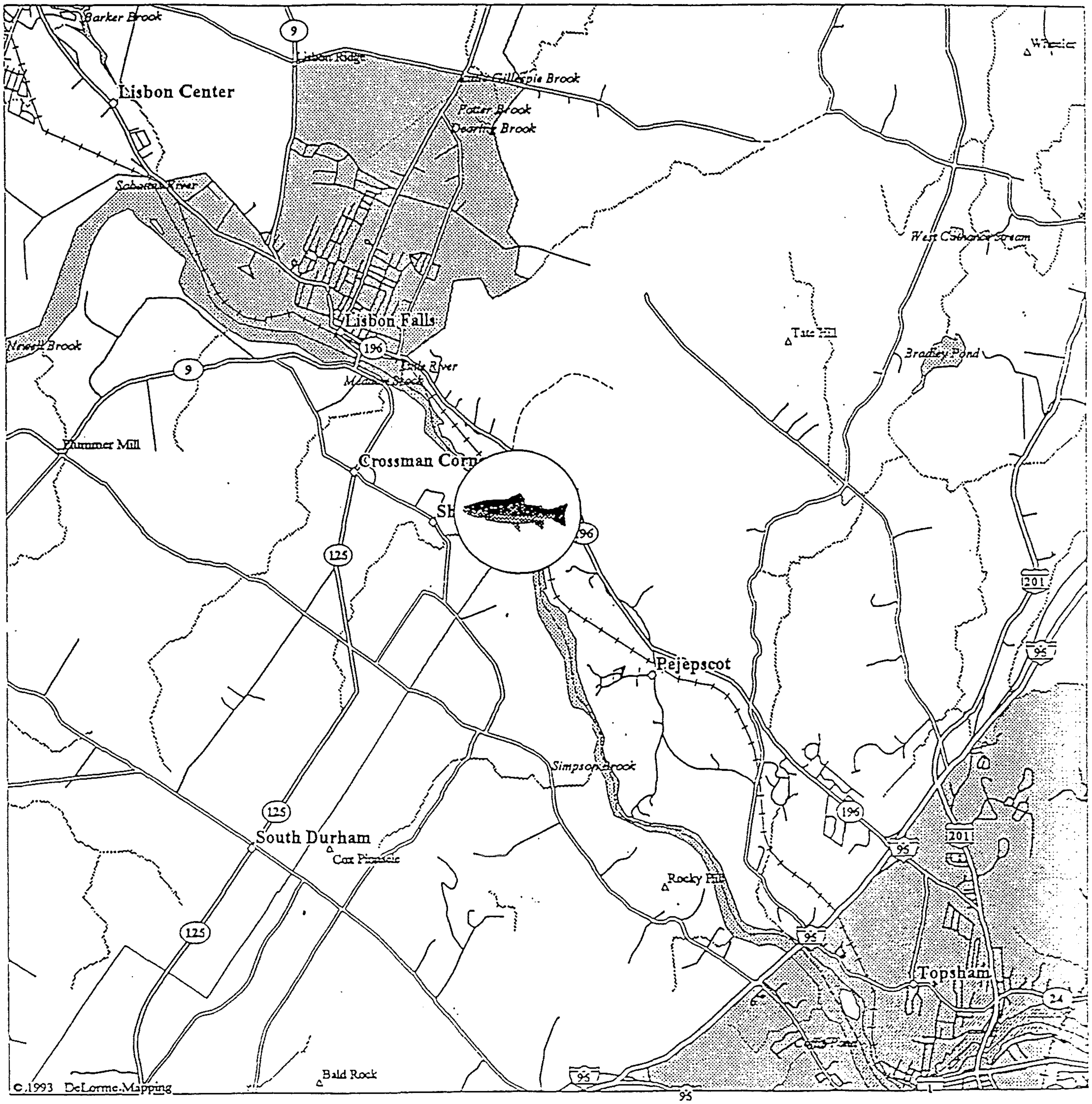


ALV ANDROSCOGGIN RIVER AT LIVERMORE FALLS
ARY ANDROSCOGGIN RIVER AT RILEY

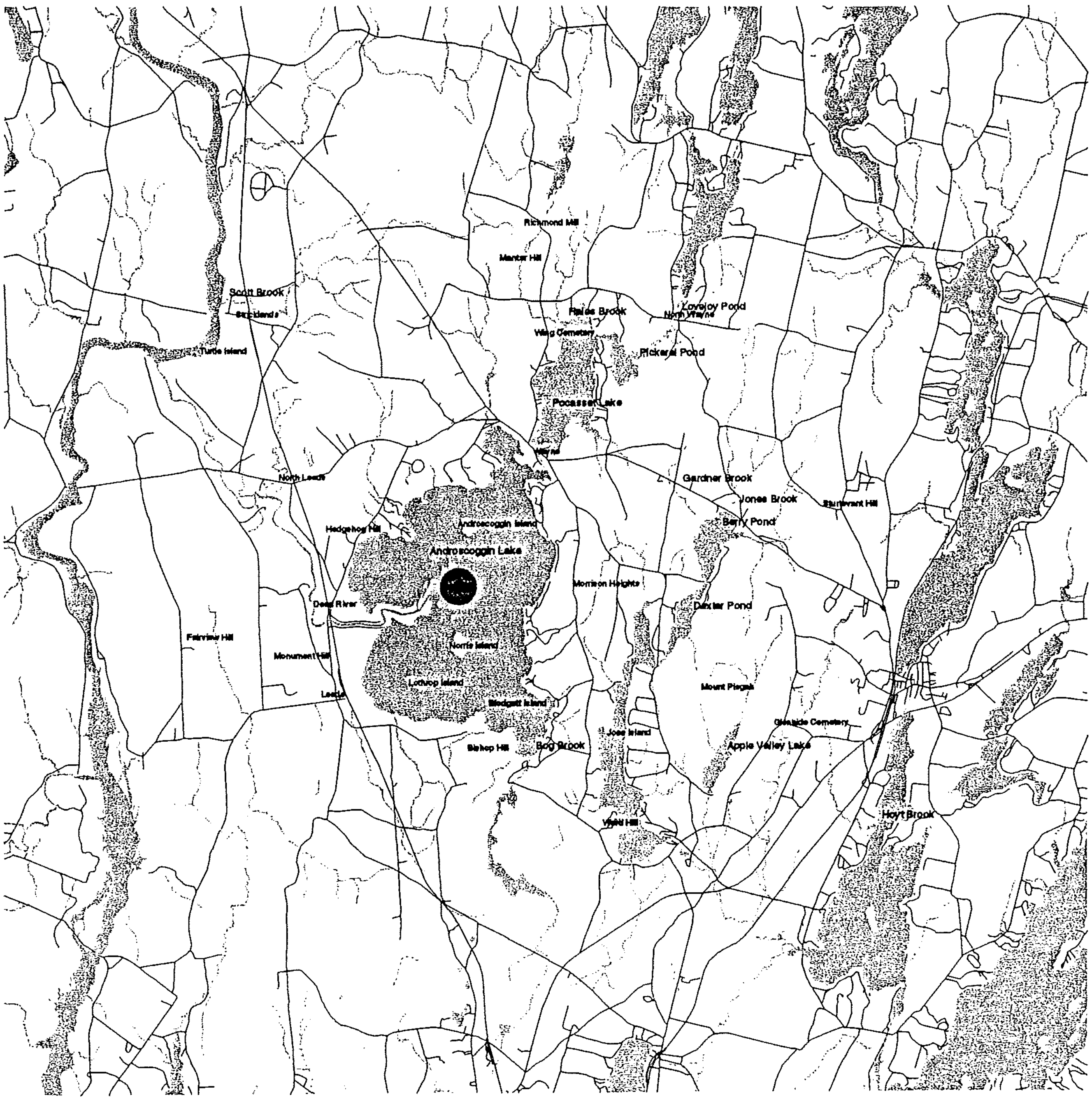
AGI ANDROSCOGGIN RIVER AT GULF ISLAND POND, AUBURN

ALS

ANDROSCOGGIN RIVER AT LISBON FALLS



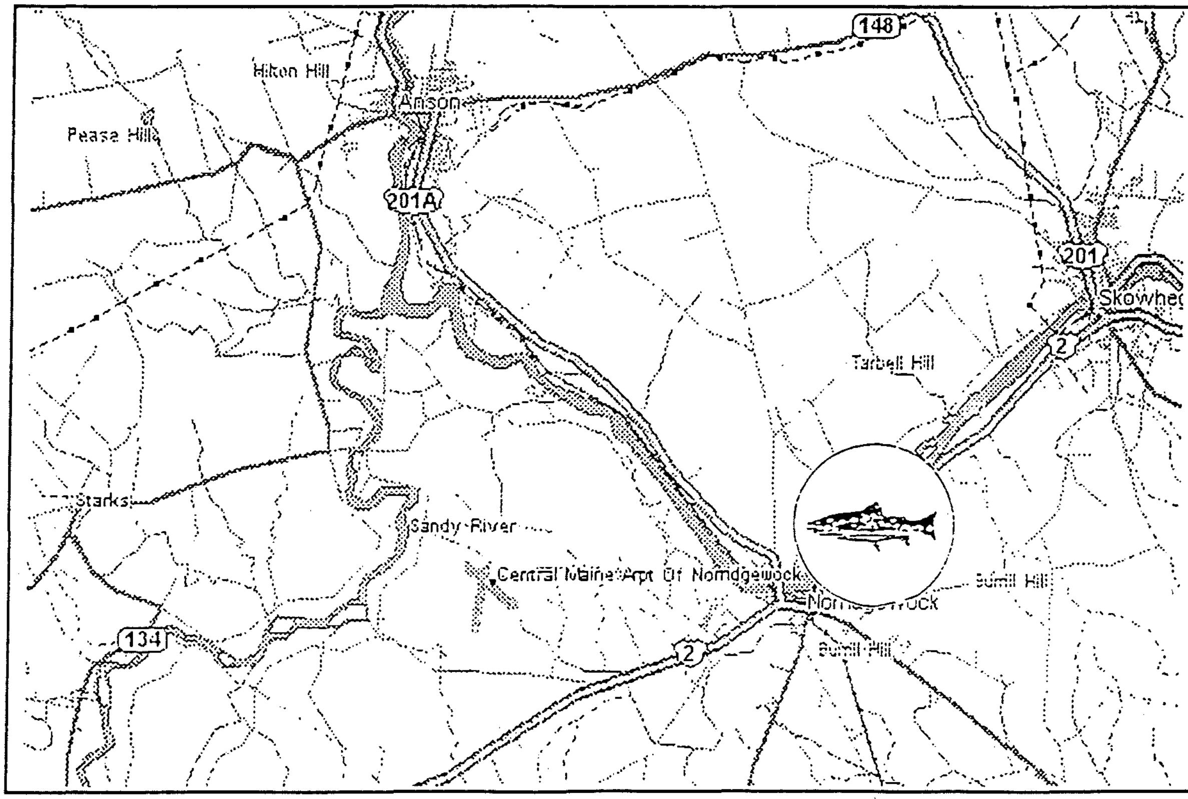
ALW Androscoggin Lake



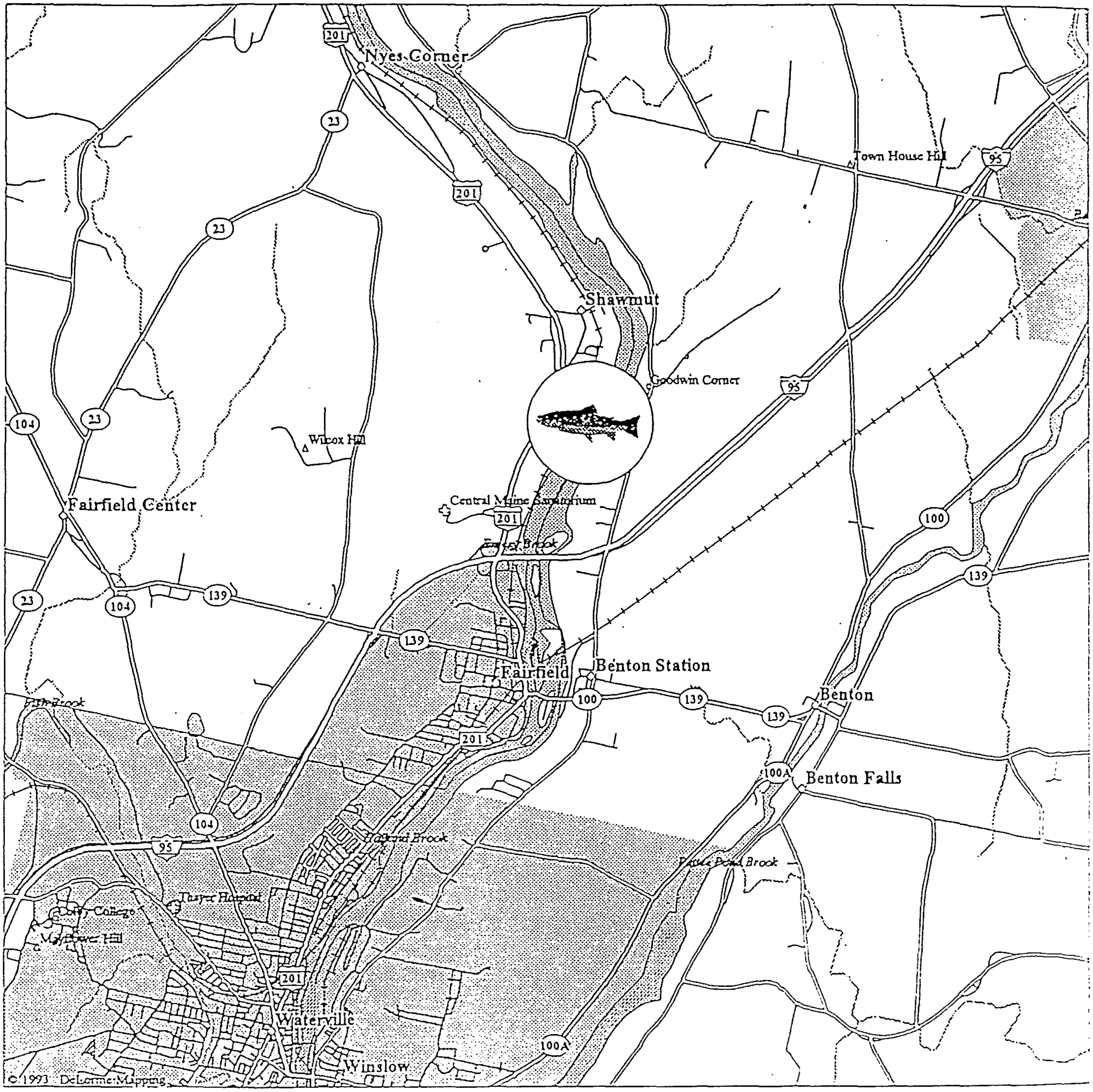
MDEP BL&WQ DEA

Kennebec River
Norridgewock

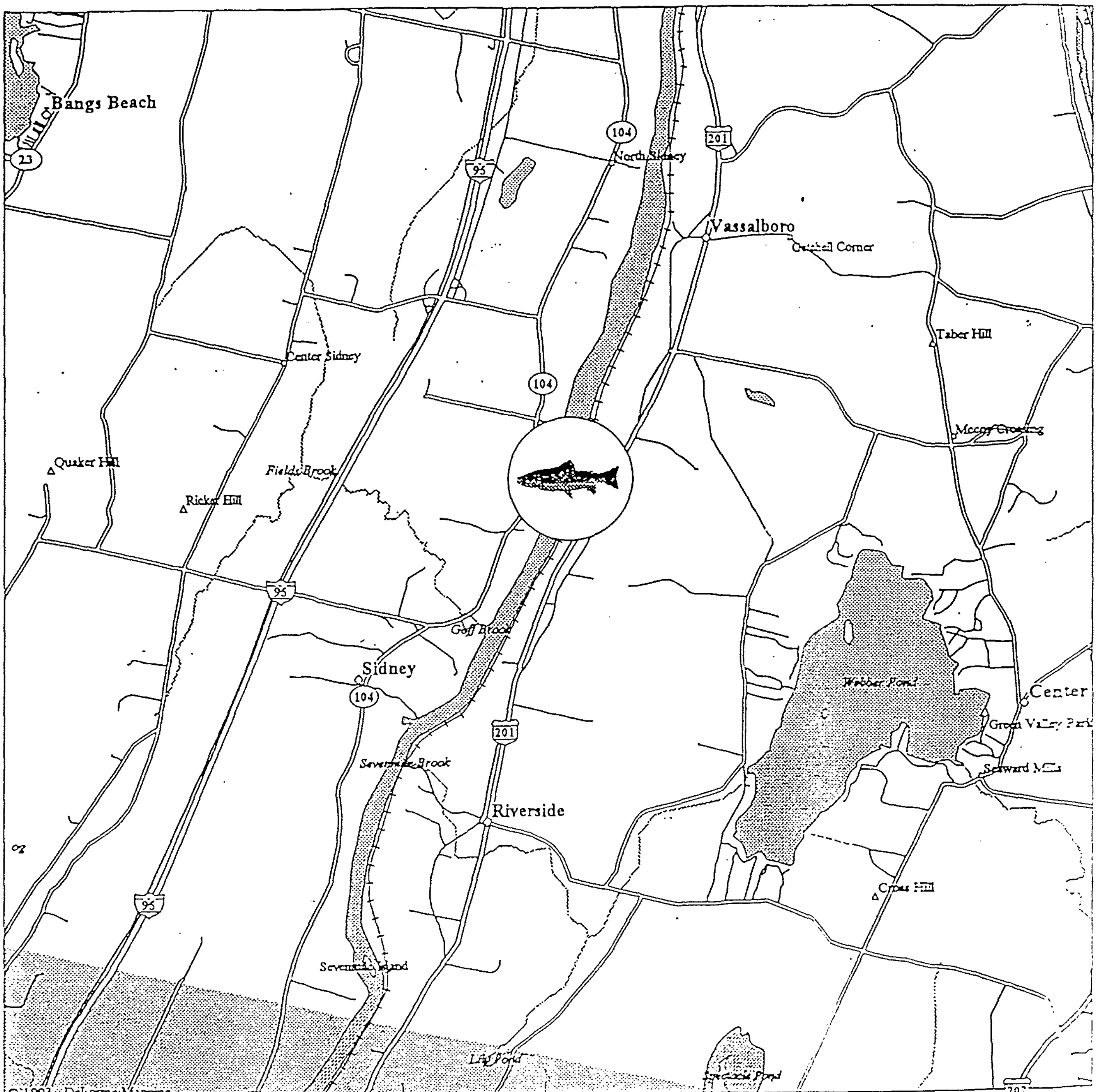
KNW



KFF KENNEBEC RIVER AT SHAWMUT, FAIRFIELD

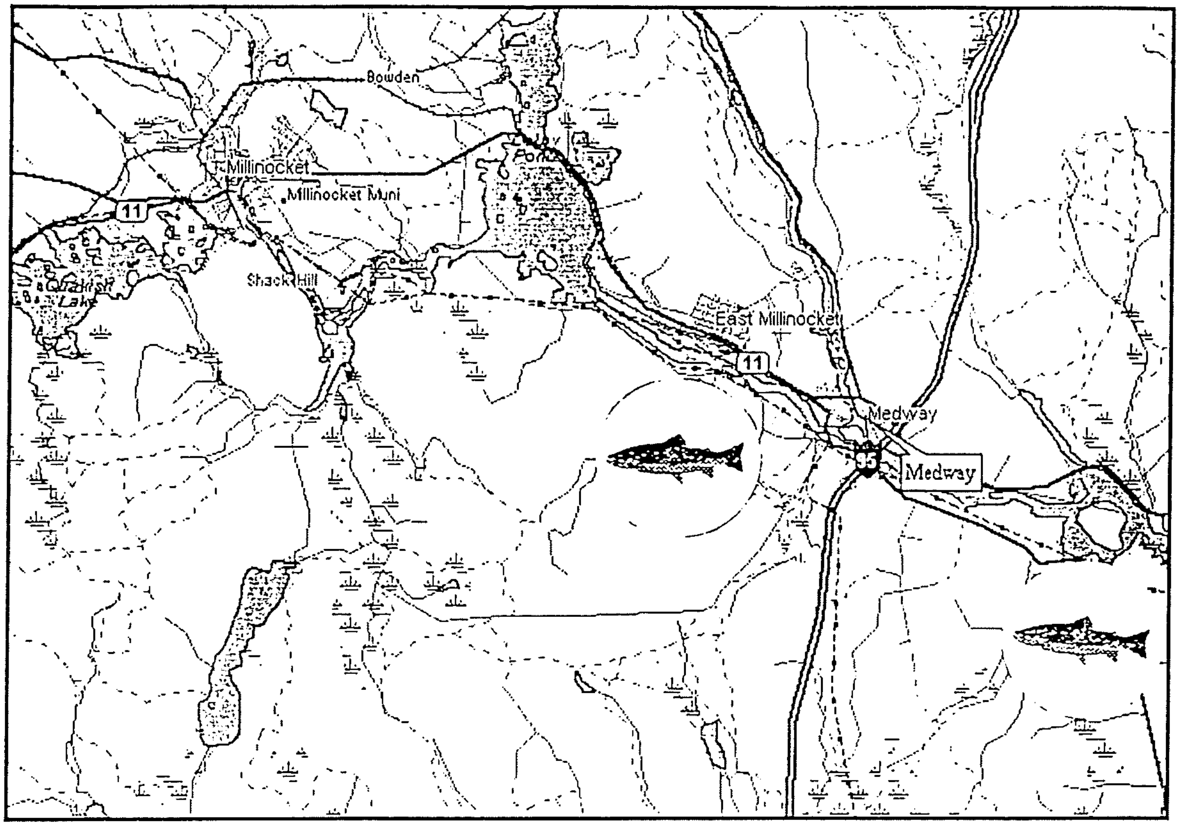


KSD KENNEBEC RIVER AT SIDNEY

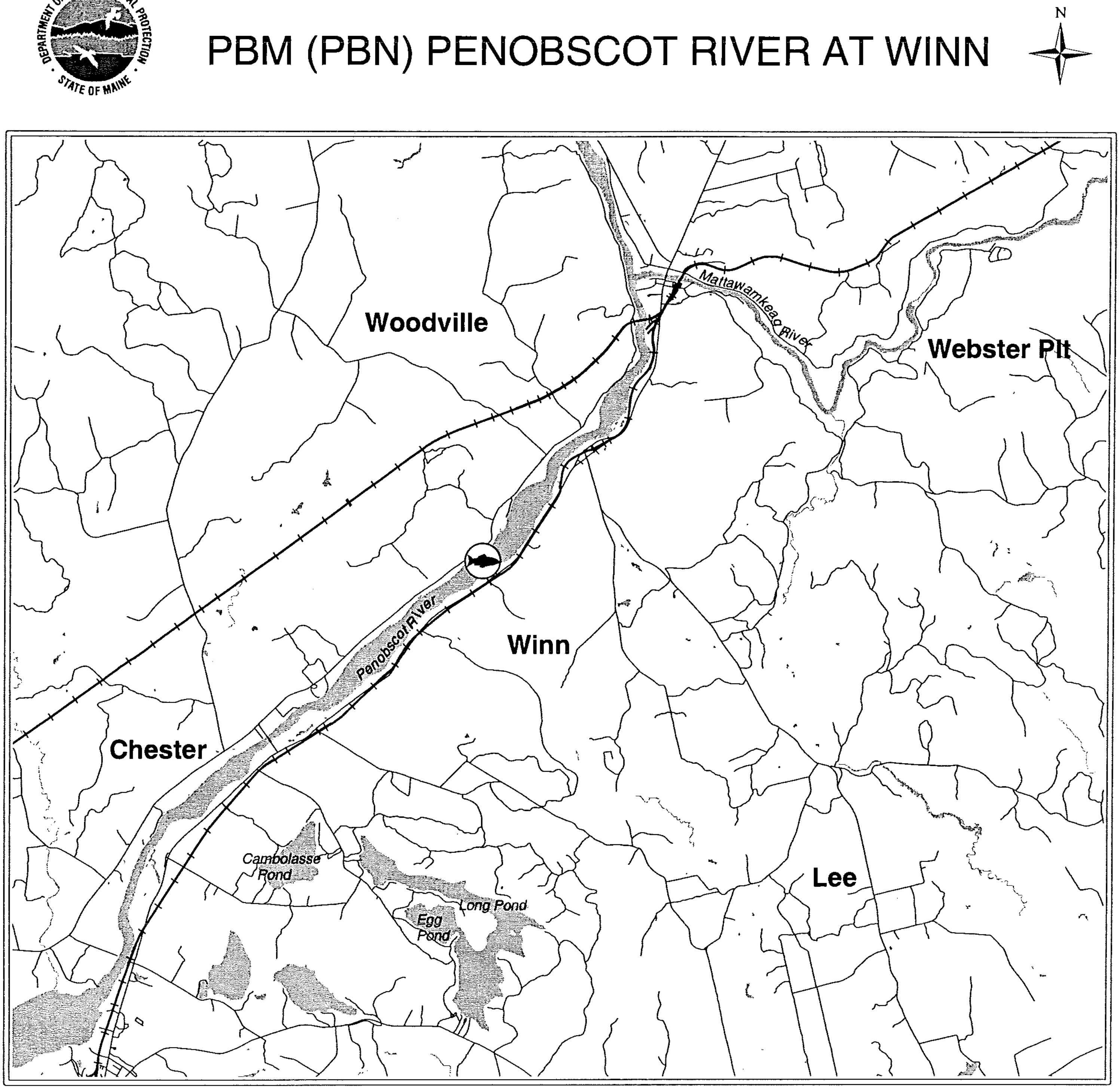


PBR Penobscot River E.Millinocket

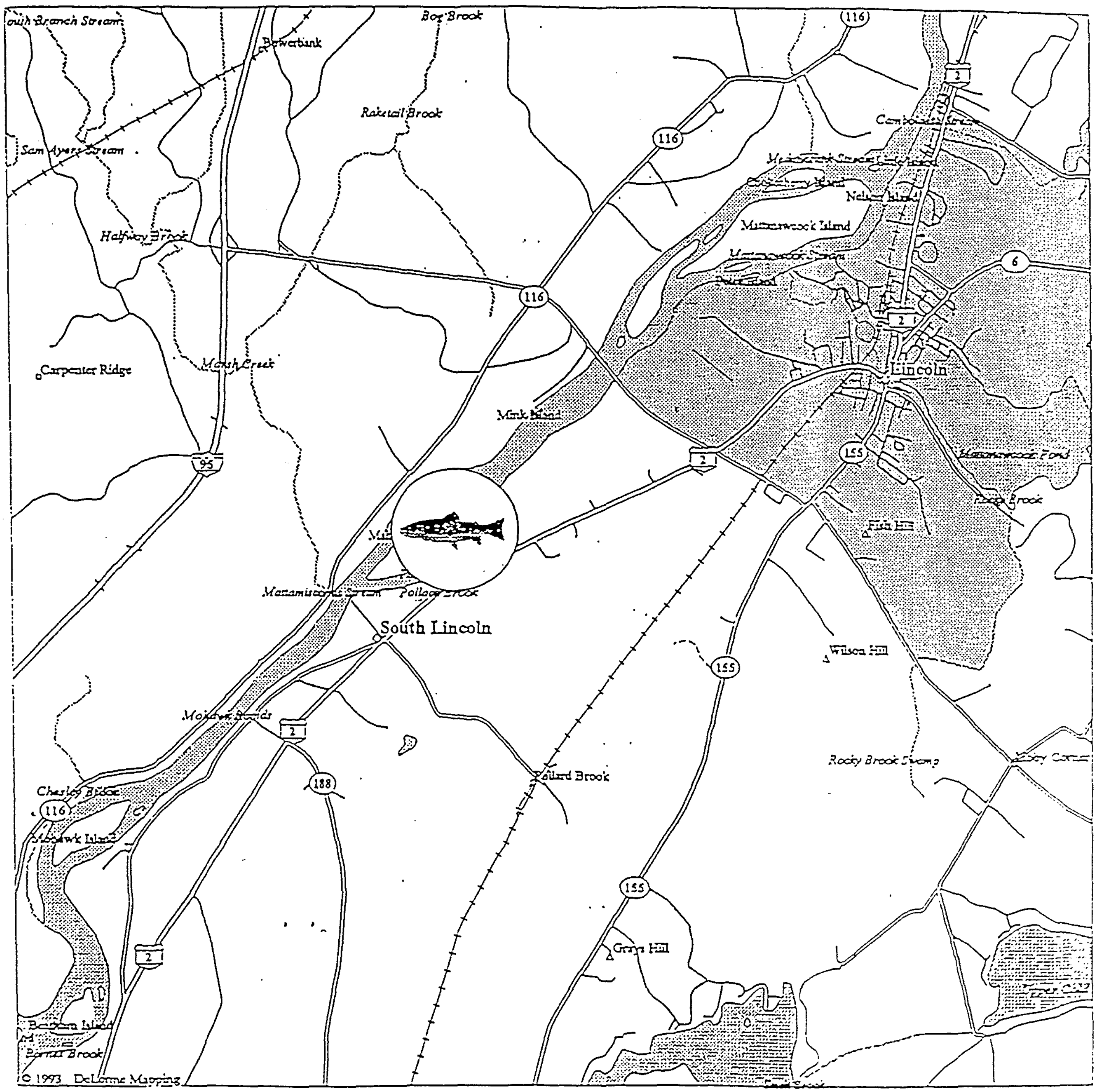
PBW Penobscot River Woodville



PBM (PBN) PENOBSCOT RIVER AT WINN

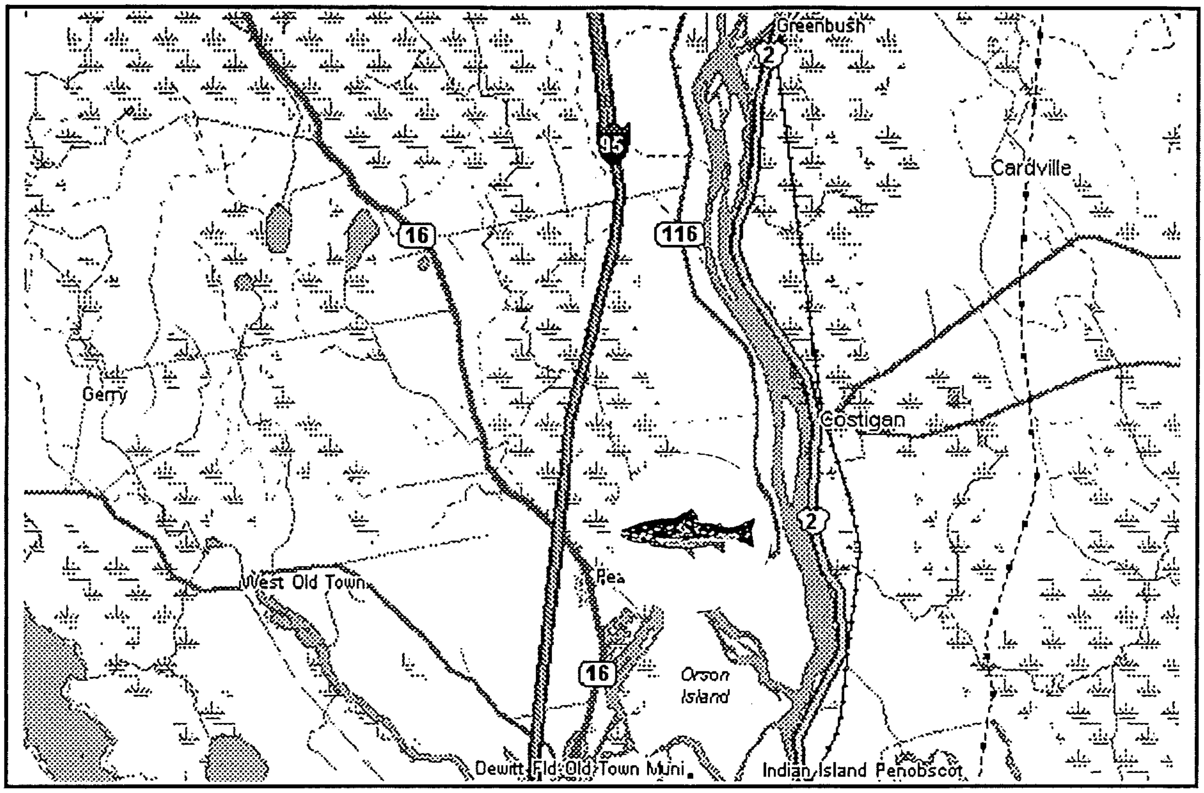


PBL PENOBSCOT RIVER AT SOUTH LINCOLN

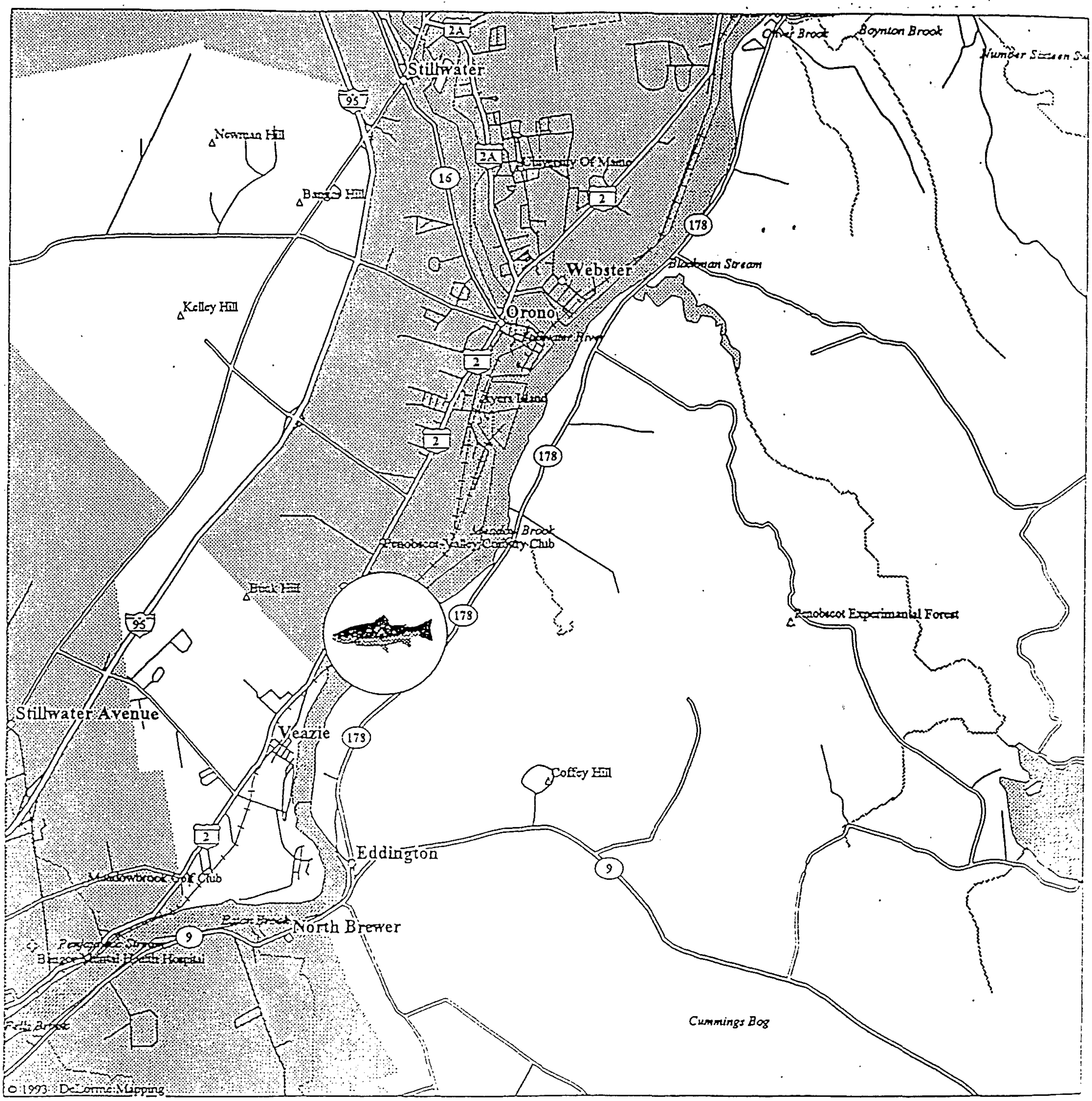


Penobscot River
Costigan

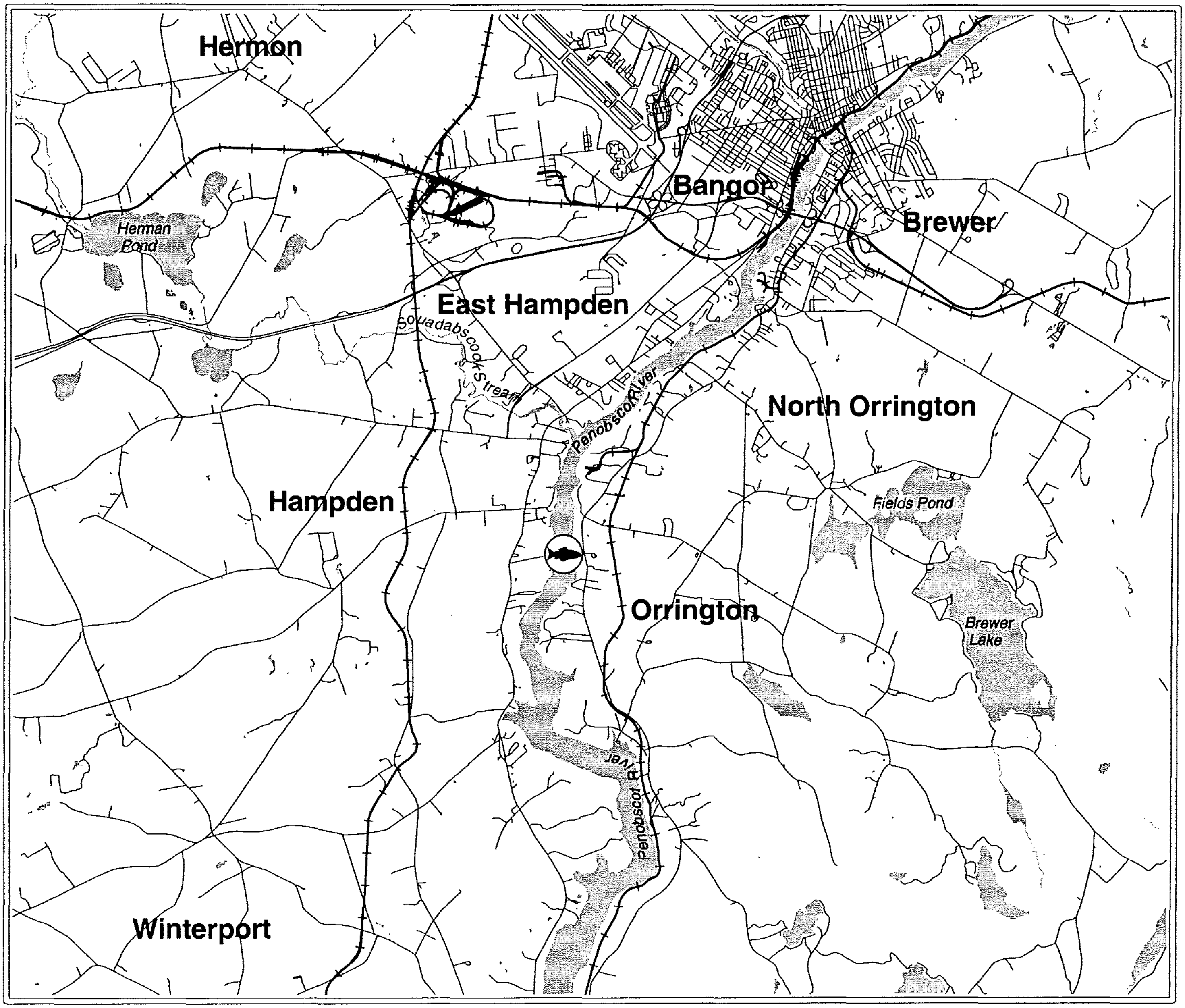
PBC



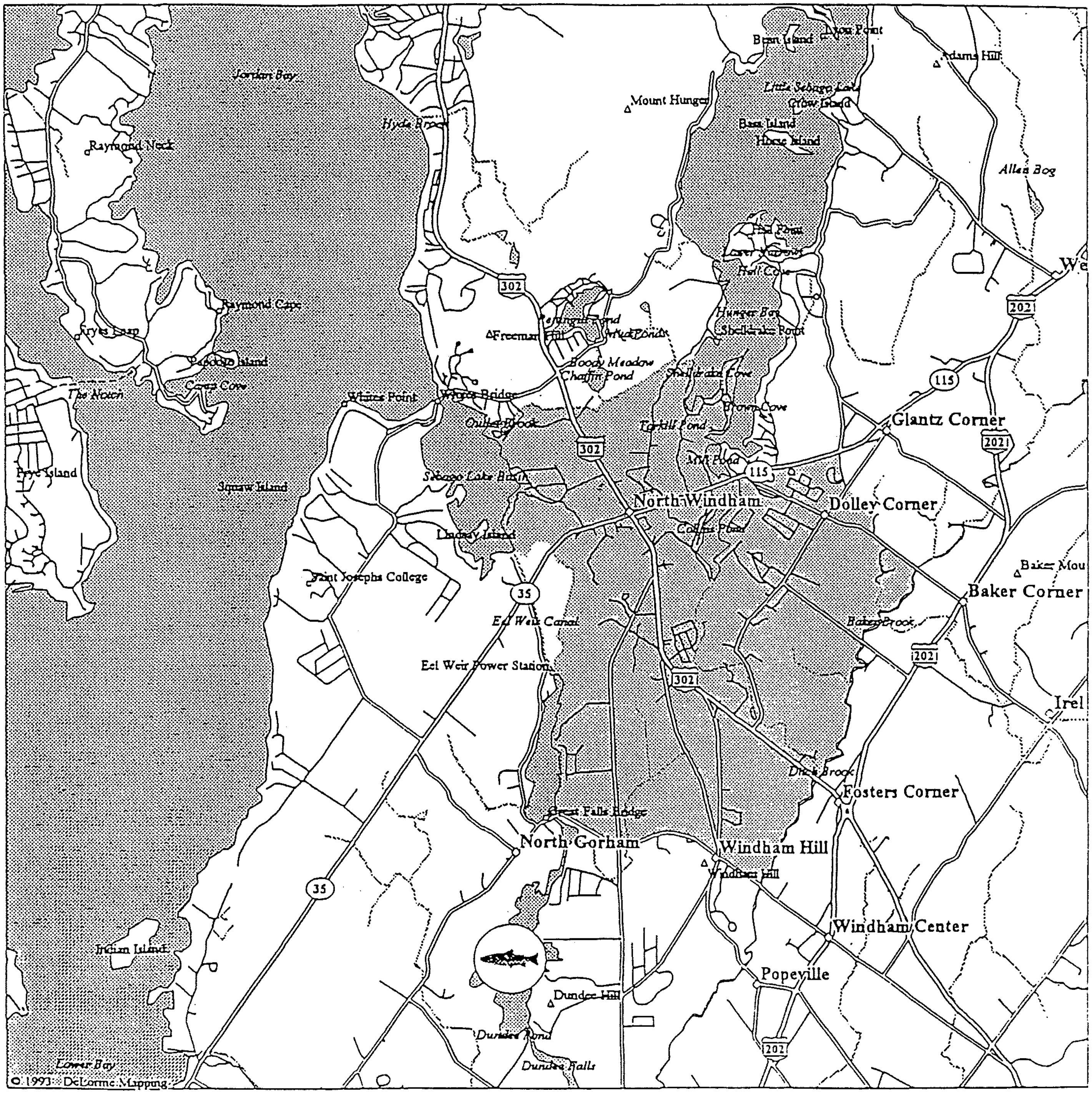
PBV PENOBSCOT RIVER AT VEAZIE



PBB PENOBSCOT RIVER AT ORRINGTON



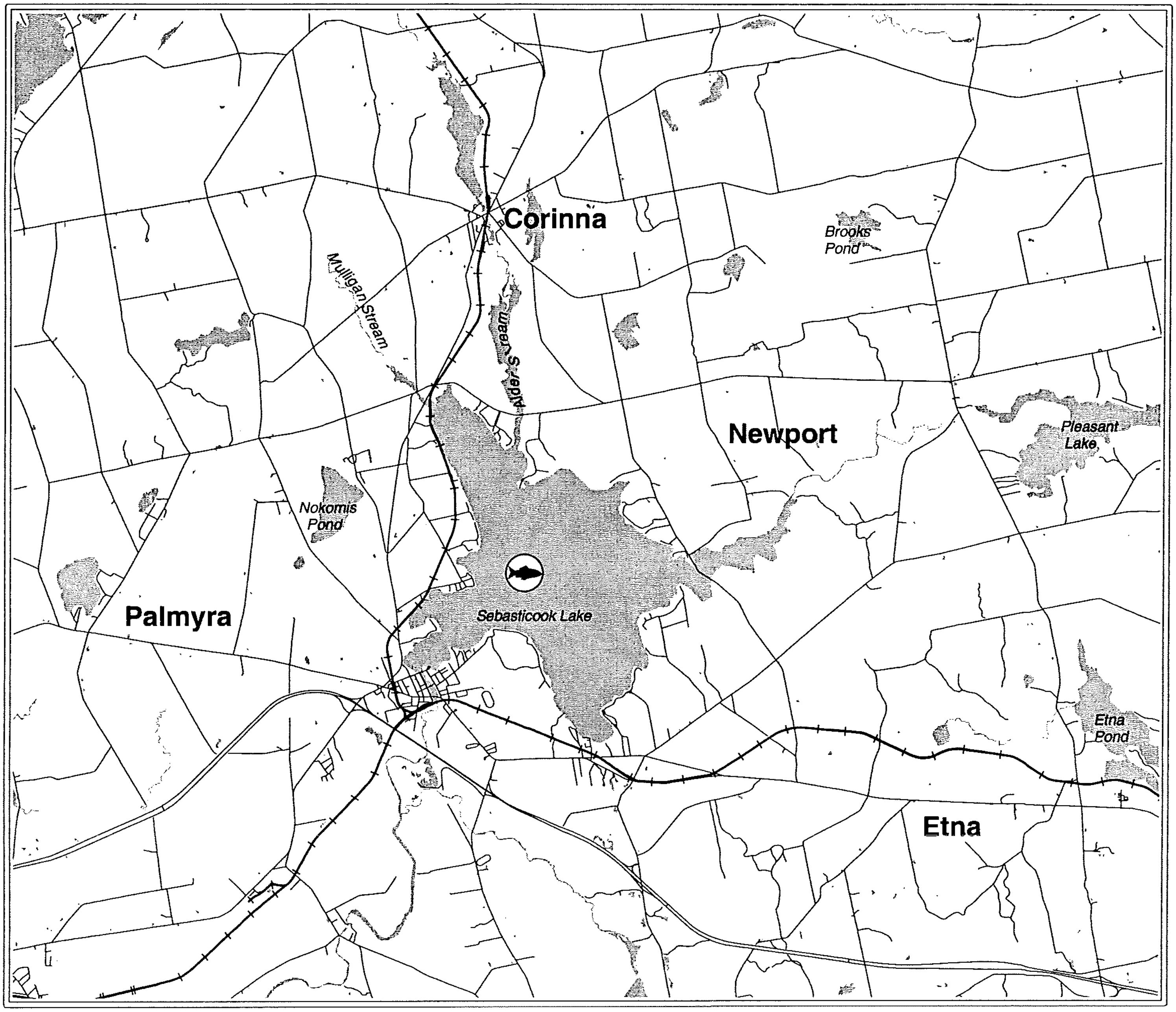
PWD PRESUMPSCOT RIVER AT WINDHAM



PWB PRESUMPSCOT RIVER AT WESTBROOK

SFS SALMON FALLS RIVER AT SOUTH BERWICK

SLN SEBASTICOOK LAKE AT NEWPORT



SWP W BR SEBASTICOOK RIVER AT PALMYRA

APPENDIX 7

LENGTHS AND WEIGHTS

IN 2000 FISH SAMPLES

APPENDIX 7. LENGTHS, WEIGHTS, AND IDs OF 2000 FISH SAMPLES

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
ANDROSCOGGIN RIVER					
Gilead					
AGL-RBT-1	05/17/2000	261	220		1
AGL-RBT-2	05/17/2000	322	320		1
AGL-RBT-3	05/18/2000	301	315		1
AGL-RBT-4	05/18/2000	286	245		1
AGL-RBT-5	05/18/2000	285	250		1
AGL-BNT-1	05/14/2000	398	660		1c5
AGL-BNT-2	05/17/2000	325	310		
AGL-BNT-3	05/17/2000	347	405		
AGL-BNT-4	05/17/2000	387	520		
AGL-BNT-5	05/18/2000	456	920		
Rumford-above					
ARP-SMB-1	07/12/2000	376	730		1
ARP-SMB-2	07/14/2000	358	660		1
ARP-SMB-3	07/20/2000	365	790		1
ARP-SMB-4	07/20/2000	391	1000		1
ARP-SMB-5	07/20/2000	363	680		1
ARP-SMB-6	07/20/2000	366	680		1
ARP-SMB-7	07/20/2000	300	450		1
ARP-SMB-8	07/20/2000	348	540		1
ARP-SMB-9	07/20/2000	377	900		1
ARP-SMB-10	07/20/2000	279	320		1
ARP-WHS-1	07/12/2000	430	880		2c5
ARP-WHS-2	07/12/2000	428	960		
ARP-WHS-3	07/13/2000	431	920		
ARP-WHS-4	07/13/2000	397	690		
ARP-WHS-5	07/13/2000	448	930		
ARP-WHS-6	07/13/2000	442	930		
ARP-WHS-7	07/13/2000	445	950		
ARP-WHS-8	07/13/2000	422	810		
ARP-WHS-9	07/14/2000	426	765		
ARP-WHS-10	07/14/2000	438	840		
Rumford					
ARF-SMB-1	07/24/2000	335	490		1
ARF-SMB-2	07/24/2000	332	545		1
ARF-SMB-3	07/24/2000	340	580		1
ARF-SMB-4	07/24/2000	362	660		1
ARF-SMB-5	07/24/2000	330	520		1
ARF-SMB-6	07/24/2000	345	540		1
ARF-SMB-7	07/24/2000	365	720		1
ARF-SMB-8	07/24/2000	356	650		1
ARF-SMB-9	07/24/2000	355	590		1
ARF-SMB-10	07/24/2000	357	640		1

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
ARF-WHS-1	07/25/2000	435	990		2c5
ARF-WHS-2	07/25/2000	419	920		
ARF-WHS-3	07/25/2000	445	1160		
ARF-WHS-4	07/25/2000	446	1140		
ARF-WHS-5	07/25/2000	416	990		
ARF-WHS-6	07/25/2000	430	1040		
ARF-WHS-7	07/25/2000	442	1110		
ARF-WHS-8	07/25/2000	421	1020		
ARF-WHS-9	07/25/2000	425	1020		
ARF-WHS-10	07/25/2000	425	860		
Riley					
ARY-SMB-1	07/25/2000	330	490		1
ARY-SMB-2	07/25/2000	330	540		1
ARY-SMB-3	07/25/2000	325	460		1
ARY-SMB-4	07/25/2000	305	395		1
ARY-SMB-5	07/25/2000	310	380		1
Livermore Falls Otis					
ALV-SMB-1	07/26/2000	335	480		1
ALV-SMB-2	07/26/2000	352	585		
ALV-SMB-3	07/26/2000	355	585		
ALV-SMB-4	07/26/2000	334	530		1
ALV-SMB-5	07/26/2000	339	560		1
ALV-SMB-6	07/26/2000	355	640		
ALV-SMB-7	07/26/2000	340	560		1
ALV-SMB-8	07/26/2000	342	500		
ALV-SMB-9	07/26/2000	335	500		1
ALV-SMB-10	07/26/2000	355	620		
ALV-WHS-1	07/26/2000	410	800		
ALV-WHS-2	07/26/2000	384	775		
ALV-WHS-3	07/26/2000	389	780		
ALV-WHS-4	07/26/2000	399	800		
ALV-WHS-5	07/26/2000	410	1040		
ALV-WHS-6	07/26/2000	395	800		
ALV-WHS-7	07/26/2000	397	715		
ALV-WHS-8	07/26/2000	390	720		
ALV-WHS-9	07/26/2000	395	880		
ALV-WHS-10	07/26/2000	410	885		
Livermore Falls below dam					
ALF-SMB-1	07/27/2000	350	700		
ALF-SMB-2	07/27/2000	336	560		
ALF-SMB-3	07/27/2000	355	715		
ALF-SMB-4	07/27/2000	330	540		
ALF-SMB-5	07/28/2000	347	690		
ALF-SMB-6	07/28/2000	340	620		
ALF-SMB-7	07/28/2000	350	640		

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
ALF-SMB-8	07/28/2000	340	620		
ALF-SMB-9	07/28/2000	342	640		
ALF-SMB-10	07/28/2000	350	640		
ALF-WHS-1	07/27/2000	380	650		
ALF-WHS-2	07/27/2000	406	790		
ALF-WHS-3	07/27/2000	390	620		
ALF-WHS-4	07/27/2000	407	720		
ALF-WHS-5	07/27/2000	402	760		
ALF-WHS-6	07/27/2000	387	750		
ALF-WHS-7	07/27/2000	380	670		
ALF-WHS-8	07/27/2000	390	640		
ALF-WHS-9	07/27/2000	397	800		
ALF-WHS-10	07/27/2000	403	920		
Androscoggin Lake					
ALW-SMB-1	07/17/2000	406	830		2c5
ALW-SMB-2	07/17/2000	290	315		
ALW-SMB-3	07/17/2000	358	560		
ALW-SMB-4	07/17/2000	350	515		
ALW-SMB-5	07/18/2000	327	440		
ALW-SMB-6	07/18/2000	329	470		
ALW-SMB-7	07/18/2000	425	840		
ALW-SMB-8	07/18/2000	345	625		
ALW-SMB-9	07/21/2000	320	420		
ALW-SMB-10	07/21/2000	322	405		
ALW-WHP-1	07/17/2000	305	380		2c5
ALW-WHP-2	07/17/2000	293	315		
ALW-WHP-3	07/17/2000	295	335		
ALW-WHP-4	07/17/2000	252	210		
ALW-WHP-5	07/17/2000	295	340		
ALW-WHP-6	07/17/2000	280	305		
ALW-WHP-7	07/17/2000	296	360		
ALW-WHP-8	07/17/2000	278	280		
ALW-WHP-9	07/17/2000	274	265		
ALW-WHP-10	07/17/2000	280	265		
ALW-WHS-1	07/17/2000	446	1040		2c5
ALW-WHS-2	07/17/2000	445	1000		
ALW-WHS-3	07/17/2000	445	1000		
ALW-WHS-4	07/17/2000	446	1060		
ALW-WHS-5	07/17/2000	436	900		
ALW-WHS-6	07/17/2000	447	1080		
ALW-WHS-7	07/17/2000	442	1060		
ALW-WHS-8	07/17/2000	442	1065		
ALW-WHS-9	07/17/2000	420	800		
ALW-WHS-10	07/17/2000	421	860		
Turner					

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
AGI-SMB-1	07/20/2000	311	410		1
AGI-SMB-2	07/20/2000	319	440		1
AGI-SMB-3	07/20/2000	315	380		1
AGI-SMB-4	07/20/2000	313	400		1
AGI-SMB-5	07/20/2000	314	400		1
Lisbon Falls					
ALS-SMB-1	07/28/2000	290	360		1
ALS-SMB-2	07/28/2000	312	460		1
ALS-SMB-3	07/28/2000	337	500		1
ALS-SMB-4	07/28/2000	323	475		1
ALS-SMB-5	08/05/2000	330			1
KENNEBEC RIVER					
Norridgewock					
KNW-BNT-01	06/01/2000	478	905		1
KNW-BNT-02	06/02/2000	412	700		1
KNW-BNT-03	06/02/2000	405	545		1
KNW-BNT-04	06/06/2000	251	170		
KNW-BNT-05	06/06/2000	373	460		1
KNW-BNT-10	08/22/2000	429	830		1
KNW-BNT-11	06/20/2000	441	840		
KNW-BNT-12	06/20/2000	346	390		
KNW-SMB-1		300	330		1
KNW-SMB-2		310	350		1
KNW-SMB-3		312	470		1
KNW-SMB-4		311	420		1
KNW-SMB-5		300	370		1
KNW-SMB-6		325	420		1
KNW-SMB-7		290	340		1
KNW-SMB-8		295	340		1
KNW-SMB-9		300	390		1
KNW-SMB-10		288	300		1
KNW-SMB-11		283	300		
KNW-SMB-12		335	460		
KNW-SSMB-20	08/30/2000	190	90		1
KNW-SSMB-21	08/30/2000	197	95		1
KNW-SSMB-22	09/11/2000	200	100		1
KNW-SSMB-23	09/11/2000	178	70		1
KNW-SSMB-24	09/11/2000	170	65		1
KNW-SSMB-25	09/11/2000	172	50		1
KNW-SSMB-26	09/11/2000	162	50		1
KNW-SSMB-27	09/11/2000	170	60		1
KNW-SSMB-28	09/11/2000	165	50		1
KNW-SSMB-29	09/11/2000	152	45		1
KNW-SSMB-30	09/11/2000	147	40		
KNW-SSMB-31	09/11/2000	155	50		

APPENDIX 7. LENGTHS, WEIGHTS, AND IDs OF 2000 FISH SAMPLES

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
KNW-WHS-1		425	920	5	10C5
KNW-WHS-2		430	1070	3	
KNW-WHS-3		425	910	7	
KNW-WHS-4		441	980	3	
KNW-WHS-5		421	870	4	
KNW-WHS-6		442	1000	4	
KNW-WHS-7		420	900	1	
KNW-WHS-8		436	1090	6	
KNW-WHS-9		444	1050	5	
KNW-WHS-10		440	1060	8	
KNW-WHS-11		416	750	8	
KNW-WHS-12		440	1010	9	
KNW-WHS-13		440	960	10	
KNW-WHS-14		425	1080	8	
KNW-WHS-15		440	1000	1	
KNW-WHS-16		430	920	4	
KNW-WHS-17		450	940	10	
KNW-WHS-18		440	910	2	
KNW-WHS-19		415	780	6	
KNW-WHS-20		432	1010	6	
KNW-WHS-21		445	1000	6	
KNW-WHS-22		430	1000	5	
KNW-WHS-23		428	930	2	
KNW-WHS-24		415	950	7	
KNW-WHS-25		406	860	2	
KNW-WHS-26		425	840	9	
KNW-WHS-27		419	920	9	
KNW-WHS-28		435	1020	5	
KNW-WHS-29		432	1080	7	
KNW-WHS-30		432	1000	8	
KNW-WHS-31		438	1070	7	
KNW-WHS-32		445	1100	7	
KNW-WHS-33		445	1060	8	
KNW-WHS-34		425	1020	10	
KNW-WHS-35		432	1010	9	
KNW-WHS-36		420	870	2	
KNW-WHS-37		420	900	3	
KNW-WHS-38		425	850	1	
KNW-WHS-39		425	800	6	
KNW-WHS-40		445	1090	9	
KNW-WHS-41		405	830	1	
KNW-WHS-42		432	940	10	
KNW-WHS-43		432	1000	1	
KNW-WHS-44		432	950	2	
KNW-WHS-45		413	910	4	
KNW-WHS-46		406	810	3	
KNW-WHS-47		419	1000	10	
KNW-WHS-48		432	1080	3	
KNW-WHS-49		413	940	5	

APPENDIX 7. LENGTHS, WEIGHTS, AND IDs OF 2000 FISH SAMPLES

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
KNW-WHS-50		432	970	4	
Fairfield					
KFF-BNT-01	07/29/2000	496	1500		1
KFF-BNT-02	09/18/2000	415	940		1
KFF-BNT-03		430	910		1
KFF-BNT-04		430	920		1
KFF-BNT-05		384	730		1
KFF-SMB-1	09/06/2000	300	400		1
KFF-SMB-2	09/06/2000	310	430		1
KFF-SMB-3	09/06/2000	325	420		1
KFF-SMB-4	09/06/2000	335	520		1
KFF-SMB-5	09/06/2000	309	400		1
KFF-SMB-6	09/06/2000	345	530		1
KFF-SMB-7	09/06/2000	295	390		1
KFF-SMB-8	09/06/2000	325	480		1
KFF-SMB-9	09/06/2000	310	430		1
KFF-SMB-10	09/08/2000	310	380		1
KFF-SMB-11	09/08/2000	303	370		
Small bass					
KFF-sSMB-1	09/06/2000	200	100		1
KFF-sSMB-2	09/06/2000	200	100		1
KFF-sSMB-3	09/06/2000	205	110		1
KFF-sSMB-4	09/06/2000	200	100		1
KFF-sSMB-5	09/06/2000	205	110		1
KFF-sSMB-6	09/06/2000	205	110		1
KFF-sSMB-7	09/06/2000	200	100		1
KFF-sSMB-8	09/06/2000	182	80		1
KFF-sSMB-9	09/06/2000	162	60		1
KFF-sSMB-10	09/06/2000	152	50		1
KFF-WHS-01	177	450	1180	10	10C5
KFF-WHS-03	179	440	1030	8	
KFF-WHS-05	181	425	1000	3	
KFF-WHS-06	182	440	1100	9	
KFF-WHS-07	183	425	1000	4	
KFF-WHS-08	184	415	900	5	
KFF-WHS-11	187	430	980	6	
KFF-WHS-13	189	415	1000	6	
KFF-WHS-14	190	430	1100	7	
KFF-WHS-15	191	444	1150	6	
KFF-WHS-16	192	430	1100	8	
KFF-WHS-17	193	412	980	4	
KFF-WHS-18	194	420	980	3	
KFF-WHS-21	197	445	1000	8	
KFF-WHS-25	201	410	1010	1	
KFF-WHS-26	202	434	1120	2	
KFF-WHS-27	203	440	1010	10	

APPENDIX 7. LENGTHS, WEIGHTS, AND IDs OF 2000 FISH SAMPLES

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
KFF-WHS-28	204	440	1040	1	
KFF-WHS-29	205	415	1010	7	
KFF-WHS-30	206	410	950	2	
KFF-WHS-31	207	420	1040	4	
KFF-WHS-32	208	420	1060	5	
KFF-WHS-33	209	420	1000	6	
KFF-WHS-34	210	410	900	3	
KFF-WHS-35	211	430	1000	9	
KFF-WHS-36	212	420	780	7	
KFF-WHS-37	213	438	1130	5	
KFF-WHS-38	214	440	1100	2	
KFF-WHS-39	215	415	900	8	
KFF-WHS-40	216	418	870	2	
KFF-WHS-41	217	436	1090	4	
KFF-WHS-42	218	444	1230	7	
KFF-WHS-43	219	435	1200	3	
KFF-WHS-44	220	438	1040	6	
KFF-WHS-45	221	420	960	8	
KFF-WHS-46	222	415	950	9	
KFF-WHS-47	223	424	1020	2	
KFF-WHS-48	224	415	920	10	
KFF-WHS-49	225	425	910	5	
KFF-WHS-50	226	430	1020	10	
KFF-WHS-51	227	445	1200	9	
KFF-WHS-52	228	440	1100	3	
KFF-WHS-53	229	416	930	1	
KFF-WHS-54	230	423	1000	1	
KFF-WHS-55	231	432	1100	1	
KFF-WHS-56	232	440	1170	4	
KFF-WHS-57	233	438	1010	7	
KFF-WHS-58	234	440	1140	5	
KFF-WHS-59	235	420	930	9	
KFF-WHS-60	236	420	960	10	
NOTE: FEMALE KFF-WHS TO BE STUDIED SEPARATELY					
KFF-WHS-02 **(F)**	**178**	450	1180	2c5 or 1c10	
KFF-WHS-04 **(F)**	**180**	435	1100		
KFF-WHS-09 **(F)**	**185**	445	1090		
KFF-WHS-10 **(F)**	**186**	445	1200		
KFF-WHS-12 **(F)**	**188**	430	830		
KFF-WHS-19 **(F)**	**195**	450	1200		
KFF-WHS-20 **(F)**	**196**	435	1100		
KFF-WHS-22 **(F)**	**198**	450	1180		
KFF-WHS-23 **(F)**	**199**	430	1180		
KFF-WHS-24 **(F)**	**200**	450	1080		
Winslow					
KWL-BNT-01	06/07/2000	364	450		1
KWL-BNT-02	06/07/2000	382	490		1
KWL-BNT-03	06/08/2000	423	685		1

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
KWL-BNT-04	06/08/2000	418	745		1
KWL-BNT-05	06/08/2000	370	490		1
Sidney					
KSD-SMB-1	09/06/2000	355	540		1
KSD-SMB-2	09/06/2000	305	380		1
KSD-SMB-3	09/06/2000	320	450		1
KSD-SMB-4	09/06/2000	325	430		1
KSD-SMB-5	09/06/2000	355	600		1
PENOBSCOT RIVER					
Woodville					
PBW-SMB-01	09/14/2000	443	825		
PBW-SMB-02	09/14/2000	358	575		1
PBW-SMB-03	09/19/2000	367	625		1
PBW-SMB-04	09/19/2000	404	825		
PBW-SMB-05	09/19/2000	394	775		
PBW-SMB-06	09/19/2000	390	750		1
PBW-SMB-07		373	675		1
PBW-SMB-08		350	525		
PBW-SMB-09	10/11/2000	367	600		1
PBW-SMB-10	10/11/2000	363	550		1
PBW-SMB-11	10/11/2000	353	550		
PBW-SMB-12	10/11/2000	370	525		1
PBW-SMB-13	10/11/2000	358	550		1
PBW-SMB-14	10/11/2000	346	500		1
PBW-SMB-15	10/12/2000	356	600		
PBW-SMB-16	10/13/2000	356	625		1
PBW-WHS-01	09/12/2000	475	1180		
PBW-WHS-02	09/14/2000	415	900		
PBW-WHS-03	09/14/2000	455	1100		1
PBW-WHS-04	09/14/2000	452	1100		1
PBW-WHS-05	09/14/2000	442	1000		
PBW-WHS-06	09/14/2000	433	1000		1
PBW-WHS-07	09/15/2000	439	975		
PBW-WHS-08	09/15/2000	440	950		
PBW-WHS-09	09/19/2000	435	875		1
PBW-WHS-10	09/19/2000	460	1100		1
PBW-WHS-11	09/19/2000	450	1000		1
PBW-WHS-12	09/19/2000	460	1025		1
PBW-WHS-13	09/19/2000	445	1025		
PBW-WHS-14	09/19/2000	465	1025		
PBW-WHS-15	09/19/2000	448	1000		1
PBW-WHS-16	09/19/2000	445	925		
PBW-WHS-17	09/19/2000	431	900		1
PBW-WHS-18	09/19/2000	414	900		
PBW-WHS-19	09/19/2000	444	1000		1
PBW-WHS-20	09/19/2000	437	1000		

APPENDIX 7. LENGTHS, WEIGHTS, AND IDs OF 2000 FISH SAMPLES

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
PBW-WHS-21	09/19/2000	407	775		
PBW-WHS-22	09/19/2000	477	1225		
PBW-WHS-23	09/19/2000	463	1000		
PBW-WHS-24	09/19/2000	454	1025		
PBW-WHS-25	09/19/2000	432	925		
PBW-WHS-26	09/19/2000	445	975		
PBW-WHS-27	09/19/2000	454	1125		
Mattawamkeag					
PBM-SMB1	10/17/2000	390	725		1
PBM-SMB2	10/18/2000	357	610		1
PBM-SMB3	10/18/2000	360	600		1
PBM-SMB4	10/19/2000	365	640		1
PBM-SMB5	10/19/2000	381	800		1
PBM-SMB6	10/19/2000	360	620		1
PBM-SMB7	10/20/2000	355	600		1
PBM-SMB8	10/20/2000	360	580		1
PBM-WHS-01	10/17/2000	450	1100		1
PBM-WHS-02	10/17/2000	432	900		1
PBM-WHS-03	10/17/2000	450	1000		1
PBM-WHS-04	10/17/2000	460	1025		1
PBM-WHS-05	10/17/2000	455	1050		1
PBM-WHS-06	10/17/2000	430	1000		1
PBM-WHS-07	10/17/2000	450	1150		1
PBM-WHS-08	10/17/2000	435	975		1
PBM-WHS-09	10/18/2000	475	1080		
PBM-WHS-10	10/18/2000	450	1120		1
PBM-WHS-11	10/19/2000	444	1000		1
Lincoln					
PBL-SMB-01	08/23/2000	373	725		1
PBL-SMB-10	09/07/2000	375	750		1
PBL-SMB-11	09/08/2000	386	750		1
PBL-SMB-12	09/08/2000	337	500		
PBL-SMB-02	08/23/2000	360	650		1
PBL-SMB-03	08/23/2000	372	700		1
PBL-SMB-04	08/23/2000	343	550		1
PBL-SMB-05	08/23/2000	374	725		1
PBL-SMB-06	08/23/2000	362	650		1
PBL-SMB-07	08/24/2000	377	750		1
PBL-SMB-08	09/06/2000	375	525		1
PBL-SMB-09	09/07/2000	448	625		
PBL-WHS-01	08/23/2000	459	1075		1
PBL-WHS-02	08/24/2000	441	1000		
PBL-WHS-03	08/24/2000	440	1075		
PBL-WHS-04	08/24/2000	450	1050		1
PBL-WHS-05	09/06/2000	421	950		

APPENDIX 7. LENGTHS, WEIGHTS, AND IDs OF 2000 FISH SAMPLES

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
PBL-WHS-06	09/06/2000	485	1250		
PBL-WHS-07	09/06/2000	444	1025		1
PBL-WHS-08	09/06/2000	439	950		1
PBL-WHS-09	09/06/2000	447	1150		
PBL-WHS-10	09/06/2000	422	950		
PBL-WHS-11	09/06/2000	460	1000		1
PBL-WHS-12	09/06/2000	340	475		
PBL-WHS-13	09/06/2000	430	950		1
PBL-WHS-14	09/06/2000	440	975		
PBL-WHS-15	09/06/2000	419	1000		
PBL-WHS-16	09/06/2000	452	1125		1
PBL-WHS-17	09/06/2000	372	625		
PBL-WHS-18	09/06/2000	326	425		
PBL-WHS-19	09/07/2000	430	900		1
PBL-WHS-20	09/07/2000	463	1125		
PBL-WHS-21	09/07/2000	447	1050		1
PBL-WHS-22	09/07/2000	448	1125		1
PBL-WHS-23	09/07/2000	445	1050		
PBL-WHS-24	09/07/2000	442	1100		
Costigan					
PBC-SMB-1	08/23/2000	440	1100		1
PBC-SMB-2	08/23/2000	415	825		1
PBC-SMB-3	09/06/2000	442	1225		1
PBC-SMB-4	09/06/2000	402	825		1
PBC-SMB-5	09/13/2000	385	850		1
PBC-WHS-01	08/23/2000	448	2000		2c5
PBC-WHS-02	08/23/2000	445	1100		
PBC-WHS-03	08/24/2000	441	1000		
PBC-WHS-04	08/24/2000	438	975	1	
PBC-WHS-05	08/24/2000	438	1000	2	
PBC-WHS-06	09/06/2000	479	1250	1	
PBC-WHS-07	09/06/2000	462	1150	2	
PBC-WHS-08	09/06/2000	442	900		
PBC-WHS-09	09/06/2000	469	1175	1	
PBC-WHS-10	09/06/2000	515	1500		
PBC-WHS-11	09/06/2000	475	1275	2	
PBC-WHS-12	09/06/2000	442	1050		
PBC-WHS-13	09/06/2000	490	1275	2	
PBC-WHS-14	09/06/2000	453	1275	1	
PBC-WHS-15	09/06/2000	440	1075		
PBC-WHS-16	09/06/2000	492	1425		
PBC-WHS-17	09/06/2000	431	950	1	
PBC-WHS-18	09/06/2000	505	1200		
PBC-WHS-19	09/07/2000	455	1000		
PBC-WHS-20	09/07/2000	442	1100		
PBC-WHS-21	09/07/2000	444	1000		
PBC-WHS-22	09/07/2000	433	925	2	

APPENDIX 7. LENGTHS, WEIGHTS, AND IDs OF 2000 FISH SAMPLES

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
Veazie					
PBV-SMB-1	09/28/2000	396	850		1
PBV-SMB-2	09/29/2000	410	1000		1
PBV-SMB-3	09/29/2000	386	760		1
PBV-SMB-4***	10/10/2000	380	700		
PBV-SMB-5	10/11/2000	406	820		1
PBV-SMB-6	10/11/2000	402	800		1
PBV-SMB-7	10/11/2000	360	630		
PBV-SMB-8	10/11/2000	356	600		
PBV-WHS-01	09/29/2000	415	965		2c5
PBV-WHS-02	10/10/2000	475	1475	2	
PBV-WHS-03	10/10/2000	475	1325	1	
PBV-WHS-04	10/10/2000	515	1650		
PBV-WHS-05	10/11/2000	453	1150	1	
PBV-WHS-06	10/11/2000	419	950		
PBV-WHS-07	10/11/2000	443	1120	2	
PBV-WHS-08	10/11/2000	460	1130	2	
PBV-WHS-09	10/11/2000	460	1125	1	
PBV-WHS-10	10/11/2000	480	1400	2	
PBV-WHS-11	10/11/2000	407	800		
PBV-WHS-12	10/11/2000	429	1000	1	
PBV-WHS-13	10/11/2000	505	1525		
PBV-WHS-14	10/11/2000	410	920		
PBV-WHS-15	10/11/2000	420	925		
PBV-WHS-16	10/11/2000	415	920		
PBV-WHS-17	10/11/2000	400	900		
PBV-WHS-18	10/11/2000	420	925	1	
PBV-WHS-19	10/11/2000	427	975	2	
Winterport					
PBB-EEL-01	07/19/2000	670	475	3	2c5
PBB-EEL-02	07/19/2000	660	500	2	
PBB-EEL-03	07/19/2000	610	350		
PBB-EEL-04	07/19/2000	670	460	4	
PBB-EEL-05	07/19/2000	630	405	3	
PBB-EEL-06	07/19/2000	615	420		
PBB-EEL-07	07/19/2000	670	575	1	
PBB-EEL-08	07/19/2000	630	460	4	
PBB-EEL-09	07/19/2000	595	380		
PBB-EEL-10	07/19/2000	650	420	4	
PBB-EEL-11	07/19/2000	655	445	1	
PBB-EEL-12	07/19/2000	615	415	1	
PBB-EEL-13	07/19/2000	710	540	3	
PBB-EEL-14	07/19/2000	640	405	1	
PBB-EEL-15	07/19/2000	750	815	4	
PBB-EEL-16	07/19/2000	625	480	2	
PBB-EEL-17	07/19/2000	700	575	2	
PBB-EEL-18	07/19/2000	550	295		

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
PBB-EEL-19	07/19/2000	670	420	2	
PBB-EEL-20	07/19/2000	670	490	3	
PBB-EEL-21	07/19/2000	595	420		
PBB-EEL-22	07/19/2000	690	630	1	
PBB-EEL-23	07/19/2000	590	290		
PBB-EEL-24	07/19/2000	640	450	2	
PBB-EEL-25	07/19/2000	470	175		
PBB-EEL-26	07/19/2000	680	510	4	
PBB-EEL-27	07/19/2000	645	450	3	
PRESUMPSCOT RIVER					
Windham					
PWD-SMB-1	06/22/2000	322	460		1
PWD-SMB-2	06/22/2000	295	310		1
PWD-SMB-3	06/22/2000	408	780		1
PWD-SMB-4	06/22/2000	450	1020		1
PWD-SMB-5	06/22/2000	425	925		1
Westbrook					
PWB-SMB-1	06/21/2000	250	160		1
PWB-SMB-2	06/21/2000	290	275		1
PWB-SMB-3	06/21/2000	201	260		1
PWB-SMB-4	06/21/2000	260	200		1
PWB-SMB-5	06/21/2000	263	200		1
SALMON FALLS RIVER					
S. Berwick					
SFS-SMB-1	09/13/2000	360	680		1
SFS-SMB-2	09/13/2000	265	220		1
SFS-SMB-3	09/13/2000	290	300		1
SFS-SMB-4	09/13/2000	260	260		
SFS-SMB-5	09/13/2000	265	230		1
SFS-SMB-6	09/13/2000	270	270		1
SEBASTICOOK RIVER					
W BR -Palmyra					
SWP-SMB-1	09/14/2000	392	830		2c5
SWP-SMB-2	09/14/2000	381	780		
SWP-SMB-3	09/28/2000	415	1000		
SWP-SMB-4	09/28/2000	400	990		
SWP-SMB-5	09/28/2000	422	970		
SWP-SMB-6	09/28/2000	382	730		
SWP-SMB-7	09/28/2000	382	700		
SWP-SMB-8	09/28/2000	374	700		
SWP-SMB-9	09/28/2000	284	310		
SWP-SMB-10	09/28/2000	287	320		
SEBASTICOOK LAKE					
SLN-SMB-1	09/12/2000	327	450		2C4
SLN-SMB-2	09/12/2000	425	1120		

APPENDIX 7. LENGTHS, WEIGHTS, AND IDs OF 2000 FISH SAMPLES

field ID	Date	Length mm	Weight gm.	Composite ID	D/F N
SLN-SMB-3	09/12/2000	397	800		
SLN-SMB-4	09/12/2000	369	630		
SLN-SMB-5	09/12/2000	393	810		
SLN-SMB-6	09/12/2000	403	1010		
SLN-SMB-7	09/12/2000	327	490		
SLN-SMB-8	09/12/2000	323	470		
SLN-WHP-1	09/12/2000	230	200		2C5
SLN-WHP-2	09/12/2000	242	230		
SLN-WHP-3	09/12/2000	248	240		
SLN-WHP-4	09/12/2000	241	220		
SLN-WHP-5	09/12/2000	233	210		
SLN-WHP-6	09/12/2000	267	310		
SLN-WHP-7	09/12/2000	230	230		
SLN-WHP-8	09/12/2000	226	200		
SLN-WHP-9	09/12/2000	248	240		
SLN-WHP-10	09/12/2000	249	240		

APPENDIX 8

SAMPLING SCHEDULE FOR THE 2000 DIOXIN MONITORING PROGRAM

Sampling schedule for the Dioxin Monitoring Program

May (early stations)

Androscoggin R at Lisbon Falls for brown trout
Kennebec R above Madison for brown trout
Kennebec R at Augusta for brown trout
Kennebec R at Fairfield for brown trout
E Br Sebasticook R at County Rd, Newport for bass/wh perch
W Br Sebasticook R at Rt 2 Palmyra for bass

JULY-AUGUST (all rivers in order, beginning at upstream stations)

Androscoggin R - July
Kennebec R - July
Penobscot R - August
Presumpscot R - August
Salmon Falls R - August
Sebasticook R (East and West Branches) - August

APPENDIX 9

TOXIC EQUIVALENCY FACTORS FOR PCDDS AND PCDFS

Appendix 9. Toxicity Equivalency Factors for PCDDs AND PCDFs (Van den Berg et al, 1998)

Congener	Toxic Equivalency Factor (TEF)		
	Humans/ Mammals	**Fish**	**Birds**
Dioxins			
2,3,7,8-TCDD	1	1	1
1,2,3,7,8-PeCDD	1	1	1
1,2,3,4,7,8-HxCDD	0.1	0.5	0.05
1,2,3,6,7,8-HxCDD	0.1	0.01	0.01
1,2,3,7,8,9-HxCDD	0.1	0.01	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.001	<0.001
OCDD	0.0001	<0.0001	0.0001
Furans			
2,3,7,8-TCDF	0.1	0.05	1
1,2,3,7,8-PeCDF	0.05	0.05	0.1
2,3,4,7,8-PeCDF	0.5	0.5	1
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1
2,3,4,6,7,8-HxCDF	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDF	0.01	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.01
OCDF	0.0001	<0.0001	0.0001
PCBs			
3,4,4',5-TCB (81)	0.0001	0.0005	0.1
3,3',4,4'-TCB (77)	0.0001	0.0001	0.05
3,3',4,4',5-PeCB (126)	0.1	0.005	0.1
3,3',4,4',5,5'-HxCB (169)	0.01	0.00005	0.001
2,3,3',4,4'-PeCB (105)	0.0001	<0.000005	0.0001
2,3,4,4',5-PeCB (114)	0.0005	<0.000005	0.0001
2,3',4,4',5-PeCB (118)	0.0001	<0.000005	0.00001
2',3,4,4',5-PeCB (123)	0.0001	<0.000005	0.00001
2,3,3',4,4',5-HxCB (156)	0.0005	<0.000005	0.0001
2,3,3',4,4',5'-HxCB (157)	0.0005	<0.000005	0.0001
2,3',4,4',5,5'-HxCB (167)	0.00001	<0.000005	0.00001
2,3,3',4,4',5,5'-HpCB (189)	0.0001	<0.000005	0.00001

APPENDIX 10

DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID	KNW-WHS-L-2		KNW-WHS-L-3		KNW-WHS-L-6	
WRI ID	99-460L	DL(ng/Kg)	99-461L	DL(ng/Kg)	99-464L	DL(ng/Kg)
1999						
2378-tcdf	1.05	2.8	<DL	2.9	1.21	1.7
12378-pecdf	<DL	6.3	<DL	6.6	<DL	3.8
23478-pecdf	<DL	6.3	<DL	6.6	<DL	3.8
123478-hxcdf	<DL	6.3	<DL	6.6	<DL	3.8
123678-hxcdf	<DL	6.3	<DL	6.6	<DL	3.8
234678-hxcdf	<DL	6.3	<DL	6.6	<DL	3.8
123789-hxcdf	<DL	6.3	<DL	6.6	<DL	3.8
1234678-hpcdf	10.2	12.5	15.1	13.2	9.15	7.6
1234789-hpcdf	<DL	12.5	<DL	13.2	<DL	7.6
ocdf	<DL	12.5	<DL	13.2	<DL	7.6
2378-tcdd	<DL	2.5	<DL	2.6	<DL	1.5
12378-pecdd	<DL	6.3	<DL	6.6	<DL	3.8
123478-hxcdd	<DL	6.3	<DL	6.6	<DL	3.8
123678-hxcdd	<DL	6.3	<DL	6.6	<DL	3.8
123789-hxcdd	<DL	6.3	<DL	6.6	<DL	3.8
1234678-hpcdd	5.39	12.5	8.32	13.2	6.88	7.6
ocdd	13.1	12.5	10.6	13.2	11.4	7.6
DTEo	0.2		0.23		0.28	
% Lipids	27.5		30.0		23.0	
Sample weight (g)	2.0		1.9		3.3	
Increased detection imits were mathematically derived from the method detection limits corrected for the smaller sample wei						
These are approximate values and should be used for guidance only.						
Values below the estimated detection limits are qualitative and are provided for information only.						

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID	KNW-WHS-L-7		KNW-WHS-L-8		KNW-WHS-L-10	
WRI ID	99-465L	DL(ng/Kg)	99-466L	DL(ng/Kg)	99-468L	DL(ng/Kg)
1999						
2378-tcdf	1.42	2.0	<DL	9.2	<DL	4.2
12378-pecdf	<DL	4.6	<DL	20.8	<DL	9.6
23478-pecdf	<DL	4.6	<DL	20.8	<DL	9.6
123478-hxcdf	<DL	4.6	<DL	20.8	<DL	9.6
123678-hxcdf	<DL	4.6	<DL	20.8	<DL	9.6
234678-hxcdf	<DL	4.6	<DL	20.8	<DL	9.6
123789-hxcdf	<DL	4.6	<DL	20.8	<DL	9.6
1234678-hpcdf	6.37	9.3	<DL	41.7	<DL	19.2
1234789-hpcdf	<DL	9.3	<DL	41.7	<DL	19.2
ocdf	<DL	9.3	<DL	41.7	<DL	19.2
2378-tcdd	<DL	1.9	<DL	8.3	<DL	3.8
12378-pecdd	<DL	4.6	<DL	20.8	<DL	9.6
123478-hxcdd	<DL	4.6	<DL	20.8	<DL	9.6
123678-hxcdd	<DL	4.6	<DL	20.8	<DL	9.6
123789-hxcdd	<DL	4.6	<DL	20.8	<DL	9.6
1234678-hpcdd	5.01	9.3	<DL	41.7	<DL	19.2
ocdd	4.26	9.3	<DL	41.7	<DL	19.2
DTEo	0.25		0		0	
% Lipids	29.7		25.9		28.8	
Sample weight (g)	2.7		0.6		1.3	
Increased detection imits wghts.						
These are approximate valu						
Values below the estimated						

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID	KNW-SMB-L-1		KNW-SMB-L-2		KNW-SMB-L-3	
WRI ID	99-475L	DL(ng/Kg)	99-476L	DL(ng/Kg)	99-477L	DL(ng/Kg)
1999						
2378-tcdf	<DL	3.2	<DL	2.9	0.96	2.1
12378-pecdf	<DL	7.4	<DL	6.6	<DL	4.8
23478-pecdf	<DL	7.4	<DL	6.6	<DL	4.8
123478-hxcdf	<DL	7.4	<DL	6.6	<DL	4.8
123678-hxcdf	<DL	7.4	<DL	6.6	<DL	4.8
234678-hxcdf	<DL	7.4	<DL	6.6	<DL	4.8
123789-hxcdf	<DL	7.4	<DL	6.6	<DL	4.8
1234678-hpcdf	<DL	14.7	<DL	13.2	3.61	9.6
1234789-hpcdf	<DL	14.7	<DL	13.2	<DL	9.6
ocdf	<DL	14.7	<DL	13.2	<DL	9.6
2378-tcdd	<DL	2.9	<DL	2.6	<DL	1.9
12378-pecdd	<DL	7.4	<DL	6.6	<DL	4.8
123478-hxcdd	<DL	7.4	<DL	6.6	<DL	4.8
123678-hxcdd	<DL	7.4	<DL	6.6	<DL	4.8
123789-hxcdd	<DL	7.4	<DL	6.6	<DL	4.8
1234678-hpcdd	<DL	14.7	4.89	13.2	7.22	9.6
ocdd	<DL	14.7	6.52	13.2	4.16	9.6
DTEo	0		0.05		0.19	
% Lipids	5.6		8.4		3.4	
Sample weight (g)	1.7		1.9		2.6	
Increased detection imits w(						
These are approximate valu						
Values below the estimated						

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID	KNW-SMB-L-4		KNW-SMB-L-5		KNW-SMB-L-6	
WRI ID	99-478L	DL(ng/Kg)	99-479L	DL(ng/Kg)	99-480L	DL(ng/Kg)
1999						
2378-tcdf	1.51	2.0	<DL	2.5	1.16	2.2
12378-pecdf	<DL	4.5	<DL	5.7	<DL	5.0
23478-pecdf	<DL	4.5	<DL	5.7	<DL	5.0
123478-hxcdf	<DL	4.5	<DL	5.7	<DL	5.0
123678-hxcdf	<DL	4.5	<DL	5.7	<DL	5.0
234678-hxcdf	<DL	4.5	<DL	5.7	<DL	5.0
123789-hxcdf	<DL	4.5	<DL	5.7	<DL	5.0
1234678-hpcdf	2.04	8.9	<DL	11.4	<DL	10.0
1234789-hpcdf	<DL	8.9	<DL	11.4	<DL	10.0
ocdf	<DL	8.9	<DL	11.4	<DL	10.0
2378-tcdd	<DL	1.8	<DL	2.3	<DL	2.0
12378-pecdd	<DL	4.5	<DL	5.7	<DL	5.0
123478-hxcdd	<DL	4.5	<DL	5.7	<DL	5.0
123678-hxcdd	<DL	4.5	<DL	5.7	<DL	5.0
123789-hxcdd	<DL	4.5	<DL	5.7	<DL	5.0
1234678-hpcdd	5.91	8.9	<DL	11.4	6.32	10.0
ocdd	7.36	8.9	8.69	11.4	4.41	10.0
DTEo	0.23		0		0.17	
% Lipids	3.7		3.4		3.3	
Sample weight (g)	2.8		2.2		2.5	
Increased detection imits w						
These are approximate valu						
Values below the estimated						

DEP ID	KNW-SMB-L-7		KNW-SMB-L-8		KNW-SMB-L-9	
WRI ID	99-481L	DL(ng/Kg)	99-482L	DL(ng/Kg)	99-483L	DL(ng/Kg)
1999						
2378-tcdf	0.87	2.0	<DL	2.5	1.65	1.9
12378-pecdf	<DL	4.6	<DL	5.7	<DL	4.3
23478-pecdf	<DL	4.6	<DL	5.7	<DL	4.3
123478-hxcdf	<DL	4.6	<DL	5.7	<DL	4.3
123678-hxcdf	<DL	4.6	<DL	5.7	<DL	4.3
234678-hxcdf	<DL	4.6	<DL	5.7	<DL	4.3
123789-hxcdf	<DL	4.6	<DL	5.7	<DL	4.3
1234678-hpcdf	4.21	9.3	<DL	11.4	6.74	8.6
1234789-hpcdf	<DL	9.3	<DL	11.4	<DL	8.6
ocdf	<DL	9.3	<DL	11.4	<DL	8.6
2378-tcdd	<DL	1.9	<DL	2.3	<DL	1.7
12378-pecdd	<DL	4.6	<DL	5.7	<DL	4.3
123478-hxcdd	<DL	4.6	<DL	5.7	<DL	4.3
123678-hxcdd	<DL	4.6	<DL	5.7	<DL	4.3
123789-hxcdd	<DL	4.6	<DL	5.7	<DL	4.3
1234678-hpcdd	4.26	9.3	<DL	11.4	9.63	8.6
ocdd	5.88	9.3	8.91	11.4	11.2	8.6
DTEo	0.17		0		0.32	
% Lipids	3.4		3.4		3.0	
Sample weight (g)	2.7		2.2		2.9	
Increased detection imits w						
These are approximate valu						
Values below the estimated						

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID	KNW-SMB-L-10		KFF-WHS-L-1		KFF-WHS-L-2	
WRI ID	99-484L	DL(ng/Kg)	99-485L	DL(ng/Kg)	99-486L	DL(ng/Kg)
1999						
2378-tcdf	<DL	3.4	12.9	2.4	20.6	0.5
12378-pecdf	<DL	7.8	<DL	5.4	<DL	1.1
23478-pecdf	<DL	7.8	<DL	5.4	1.52	1.1
123478-hxcdf	<DL	7.8	<DL	5.4	<DL	1.1
123678-hxcdf	<DL	7.8	1.63	5.4	2.61	1.1
234678-hxcdf	<DL	7.8	3.88	5.4	3.70	1.1
123789-hxcdf	<DL	7.8	1.06	5.4	<DL	1.1
1234678-hpcdf	<DL	15.6	3.09	10.9	1.95	2.2
1234789-hpcdf	<DL	15.6	<DL	10.9	<DL	2.2
ocdf	<DL	15.6	<DL	10.9	<DL	2.2
2378-tcdd	<DL	3.1	5.51	2.2	9.54	0.4
12378-pecdd	<DL	7.8	1.02	5.4	<DL	1.1
123478-hxcdd	<DL	7.8	<DL	5.4	<DL	1.1
123678-hxcdd	<DL	7.8	<DL	5.4	1.72	1.1
123789-hxcdd	<DL	7.8	<DL	5.4	<DL	1.1
1234678-hpcdd	<DL	15.6	5.22	10.9	4.63	2.2
ocdd	<DL	15.6	14.6	10.9	8.51	2.2
DTEo	0		8.56		13.2	
% Lipids	2.8		27.3		12.1	
Sample weight (g)	1.6		2.3		11.5	
Increased detection imits wı						
These are approximate valı						
Values below the estimated						

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID	KFF-WHS-L-3		KFF-WHS-L-4		KFF-WHS-L-5	
WRI ID	99-487L	DL(ng/Kg)	99-488L	DL(ng/Kg)	99-489L	DL(ng/Kg)
1999						
2378-tcdf	8.31	1.7	4.22	1.3	15.3	0.5
12378-pecdf	<DL	3.9	<DL	2.9	<DL	1.1
23478-pecdf	<DL	3.9	<DL	2.9	0.88	1.1
123478-hxcdf	<DL	3.9	<DL	2.9	<DL	1.1
123678-hxcdf	1.97	3.9	<DL	2.9	1.75	1.1
234678-hxcdf	2.42	3.9	1.75	2.9	2.81	1.1
123789-hxcdf	<DL	3.9	<DL	2.9	<DL	1.1
1234678-hpcdf	5.23	7.8	3.06	5.8	4.87	2.1
1234789-hpcdf	<DL	7.8	<DL	5.8	<DL	2.1
ocdf	<DL	7.8	<DL	5.8	<DL	2.1
2378-tcdd	7.61	1.6	4.71	1.2	11.6	0.4
12378-pecdd	<DL	3.9	<DL	2.9	0.95	1.1
123478-hxcdd	<DL	3.9	<DL	2.9	<DL	1.1
123678-hxcdd	3.05	3.9	2.24	2.9	1.49	1.1
123789-hxcdd	<DL	3.9	<DL	2.9	<DL	1.1
1234678-hpcdd	7.76	7.8	5.03	5.8	8.31	2.1
ocdd	4.91	7.8	3.66	5.8	6.29	2.1
DTEo	9.3		5.6		15.3	
% Lipids	46.6		17.0		15.5	
Sample weight (g)	3.2		4.3		11.8	
Increased detection imits w						
These are approximate valu						
Values below the estimated						

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID WRI ID	KFF-WHS-L-7 99-491L	DL(ng/Kg)	KFF-WHS-L-8 99-492L	DL(ng/Kg)	KFF-WHS-L-9 99-493L	DL(ng/Kg)
1999						
2378-tcdf	6.27	1.3	7.91	1.6	11.4	0.8
12378-pecdf	<DL	2.9	<DL	3.6	<DL	1.8
23478-pecdf	<DL	2.9	<DL	3.6	<DL	1.8
123478-hxcdf	<DL	2.9	<DL	3.6	<DL	1.8
123678-hxcdf	<DL	2.9	<DL	3.6	<DL	1.8
234678-hxcdf	1.84	2.9	3.62	3.6	1.15	1.8
123789-hxcdf	<DL	2.9	<DL	3.6	<DL	1.8
1234678-hpcdf	5.97	5.8	4.01	7.1	3.58	3.6
1234789-hpcdf	<DL	5.8	<DL	7.1	<DL	3.6
ocdf	<DL	5.8	<DL	7.1	<DL	3.6
2378-tcdd	3.79	1.2	5.73	1.4	8.41	0.7
12378-pecdd	<DL	2.9	<DL	3.6	<DL	1.8
123478-hxcdd	<DL	2.9	<DL	3.6	<DL	1.8
123678-hxcdd	4.61	2.9	2.94	3.6	0.95	1.8
123789-hxcdd	<DL	2.9	<DL	3.6	<DL	1.8
1234678-hpcdd	7.73	5.8	6.62	7.1	1.25	3.6
ocdd	9.58	5.8	8.19	7.1	3.36	3.6
DTEo	5.2		7.3		9.8	
% Lipids	42.2		29.9		10.8	
Sample weight (g)	4.3		3.5		7.0	
Increased detection imits w(						
These are approximate valu						
Values below the estimated						

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID WRI ID	KFF-WHS-L-10 99-494L	DL(ng/Kg)	KFF-SMB-L-1 99-510L	DL(ng/Kg)	KFF-SMB-L-2 99-511L	DL(ng/Kg)
1999						
2378-tcdf	4.21	1.8	3.22	2.0	4.91	1.9
12378-pecdf	<DL	4.0	<DL	4.5	<DL	4.3
23478-pecdf	<DL	4.0	<DL	4.5	<DL	4.3
123478-hxcdf	<DL	4.0	<DL	4.5	<DL	4.3
123678-hxcdf	<DL	4.0	<DL	4.5	<DL	4.3
234678-hxcdf	1.97	4.0	<DL	4.5	<DL	4.3
123789-hxcdf	<DL	4.0	<DL	4.5	<DL	4.3
1234678-hpcdf	<DL	8.1	3.16	8.9	5.74	8.6
1234789-hpcdf	<DL	8.1	<DL	8.9	<DL	8.6
ocdf	<DL	8.1	<DL	8.9	<DL	8.6
2378-tcdd	3.01	1.6	2.14	1.8	3.08	1.7
12378-pecdd	<DL	4.0	<DL	4.5	<DL	4.3
123478-hxcdd	<DL	4.0	<DL	4.5	<DL	4.3
123678-hxcdd	<DL	4.0	<DL	4.5	<DL	4.3
123789-hxcdd	<DL	4.0	<DL	4.5	<DL	4.3
1234678-hpcdd	2.85	8.1	4.06	8.9	5.22	8.6
ocdd	5.66	8.1	10.2	8.9	6.19	8.6
DTEo	3.7		2.5		3.7	
% Lipids	19.2		3.9		6.6	
Sample weight (g)	3.1		2.8		2.9	
Increased detection imits w						
These are approximate valu						
Values below the estimated						

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID	KFF-SMB-L-3		KFF-SMB-L-4		KFF-SMB-L-5	
WRI ID	99-512L	DL(ng/Kg)	99-513L	DL(ng/Kg)	99-514L	DL(ng/Kg)
1999						
2378-tcdf	2.75	2.8	<DL	3.2	1.96	1.6
12378-pecdf	<DL	6.3	<DL	7.4	<DL	3.6
23478-pecdf	<DL	6.3	<DL	7.4	<DL	3.6
123478-hxcdf	<DL	6.3	<DL	7.4	<DL	3.6
123678-hxcdf	<DL	6.3	<DL	7.4	<DL	3.6
234678-hxcdf	<DL	6.3	<DL	7.4	<DL	3.6
123789-hxcdf	<DL	6.3	<DL	7.4	<DL	3.6
1234678-hpcdf	10.4	12.5	<DL	14.7	8.33	7.1
1234789-hpcdf	<DL	12.5	<DL	14.7	<DL	7.1
ocdf	<DL	12.5	<DL	14.7	<DL	7.1
2378-tcdd	1.74	2.5	1.08	2.9	2.79	1.4
12378-pecdd	<DL	6.3	<DL	7.4	<DL	3.6
123478-hxcdd	<DL	6.3	<DL	7.4	<DL	3.6
123678-hxcdd	<DL	6.3	<DL	7.4	<DL	3.6
123789-hxcdd	<DL	6.3	<DL	7.4	<DL	3.6
1234678-hpcdd	8.43	12.5	<DL	14.7	3.07	7.1
ocdd	4.61	12.5	11.20	14.7	8.91	7.1
DTEo	2.2		1.1		3.1	
% Lipids	5.0		4.3		4.5	
Sample weight (g)	2.0		1.7		3.5	
Increased detection imits w(						
These are approximate valu						
Values below the estimated						

DEP ID	KFF-SMB-L-6		KFF-SMB-L-7		KFF-SMB-L-8	
WRI ID	99-515L	DL(ng/Kg)	99-516L	DL(ng/Kg)	99-517L	DL(ng/Kg)
1999						
2378-tcdf	1.75	1.8	4.83	2.8	2.61	1.9
12378-pecdf	<DL	4.0	<DL	6.3	<DL	4.3
23478-pecdf	<DL	4.0	<DL	6.3	<DL	4.3
123478-hxcdf	<DL	4.0	<DL	6.3	<DL	4.3
123678-hxcdf	<DL	4.0	<DL	6.3	<DL	4.3
234678-hxcdf	<DL	4.0	<DL	6.3	<DL	4.3
123789-hxcdf	<DL	4.0	<DL	6.3	<DL	4.3
1234678-hpcdf	4.26	8.1	6.41	12.5	5.30	8.6
1234789-hpcdf	<DL	8.1	<DL	12.5	<DL	8.6
ocdf	<DL	8.1	<DL	12.5	<DL	8.6
2378-tcdd	1.97	1.6	3.06	2.5	1.95	1.7
12378-pecdd	<DL	4.0	<DL	6.3	<DL	4.3
123478-hxcdd	<DL	4.0	<DL	6.3	<DL	4.3
123678-hxcdd	<DL	4.0	<DL	6.3	<DL	4.3
123789-hxcdd	<DL	4.0	<DL	6.3	<DL	4.3
1234678-hpcdd	6.31	8.1	10.2	12.5	8.51	8.6
ocdd	8.42	8.1	8.26	12.5	10.0	8.6
DTEo	2.3		3.7		2.4	
% Lipids	3.7		4.1		2.5	
Sample weight (g)	3.1		2.0		2.9	
Increased detection imits w(						
These are approximate valu						
Values below the estimated						

DEP ID WRI ID	KFF-SMB-L-9 99-518L	DL(ng/Kg)	KFF-SMB-L-10 99-519L	DL(ng/Kg)
1999				
2378-tcdf	5.19	1.8	2.25	2.0
12378-pecdf	<DL	4.2	<DL	4.5
23478-pecdf	<DL	4.2	<DL	4.5
123478-hxcdf	<DL	4.2	<DL	4.5
123678-hxcdf	<DL	4.2	<DL	4.5
234678-hxcdf	<DL	4.2	<DL	4.5
123789-hxcdf	<DL	4.2	<DL	4.5
1234678-hpcdf	3.67	8.3	6.95	8.9
1234789-hpcdf	<DL	8.3	<DL	8.9
ocdf	<DL	8.3	<DL	8.9
2378-tcdd	2.66	1.7	1.45	1.8
12378-pecdd	<DL	4.2	<DL	4.5
123478-hxcdd	<DL	4.2	<DL	4.5
123678-hxcdd	<DL	4.2	<DL	4.5
123789-hxcdd	<DL	4.2	<DL	4.5
1234678-hpcdd	6.58	8.3	4.83	8.9
ocdd	5.29	8.3	6.62	8.9
DTEo	3.3		1.8	
% Lipids	3.2		3.8	
Sample weight (g)	3.0		2.8	
Increased detection imits w				
These are approximate valu				
Values below the estimated				

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID SWAT ID	DL ng/kg	KNW-SMB- Liver 00-125-c1	KNW-SMB- Liver 00-238-c2	KNW-WHS- Liver 00-129-c1	KNW-WHS- Liver 00-146-c2	KNW-WHS- Liver 00-134-c3	KNW-WHS- Liver 00-139-c4	KNW-WHS- Liver 00-127-c5	KNW-WHS- Liver 00-130-c6	KNW-WHS- Liver 00-131-c7
2000										
2,3,7,8-TCDF	0.11	2.29	1.80	1.51	4.61	10.2	3.25	1.27	6.91	5.28
1,2,3,7,8-PeCDF	0.25	0.253	0.238	0.331	0.575	0.106	<DL	<DL	0.487	<DL
2,3,4,7,8-PeCDF	0.25	0.490	0.435	0.776	0.275	0.891	0.251	0.365	0.365	0.818
1,2,3,4,7,8-HxCDF	0.25	<DL	0.249	0.332	0.591	0.428	<DL	<DL	<DL	<DL
1,2,3,6,7,8-HxCDF	0.25	<DL	0.228	<DL	<DL	<DL	<DL	<DL	0.168	0.705
2,3,4,6,7,8-HxCDF	0.25	<DL	0.567	0.421	0.687	1.12	<DL	0.803	0.362	1.51
1,2,3,7,8,9-HxCDF	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1,2,3,4,6,7,8-HpCDF	0.50	0.806	0.792	<DL	<DL	0.842	<DL	<DL	<DL	1.78
1,2,3,4,7,8,9-HpCDF	0.50	<DL	0.340	<DL	0.516	1.26	<DL	<DL	0.426	<DL
OCDF	0.50	1.91	1.74	<DL	1.27	0.895	1.80	0.929	2.31	1.49
2,3,7,8-TCDD	0.10	0.465	0.253	<0.15	0.114	0.215	0.598	0.179	0.184	0.131
1,2,3,7,8-PeCDD	0.25	0.249	0.286	0.184	0.564	0.772	<DL	<DL	0.145	<DL
1,2,3,4,7,8-HxCDD	0.25	<DL	0.208	<DL	0.424	0.710	<DL	<DL	<DL	0.881
1,2,3,6,7,8-HxCDD	0.25	0.308	0.335	<DL	<DL	0.558	0.302	<DL	0.204	<DL
1,2,3,7,8,9-HxCDD	0.25	<DL	0.291	<DL	0.301	0.211	<DL	<DL	<DL	<DL
1,2,3,4,6,7,8-HpCDD	0.50	2.82	1.75	0.621	0.828	10.7	0.701	<DL	1.98	5.08
OCDD	0.50	4.07	17.5	5.27	2.66	16.3	2.21	1.05	6.17	11.6
DTEo		1.27	1.17	0.82	1.52	2.89	1.09	0.57	1.33	2.63
% lipids		23.68	27.7	33.46	31.74	28.06	27.16	23.73	31.92	17.3
sample wt, g wet wt.		15.8	15.4	36.5	33.9	32.1	31.5	30.8	30.5	30

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID SWAT ID	DL ng/kg	KNW-WHS-Liver 00-135-c8	KNW-WHS-Liver 00-133-c9	KNW-WHS-Liver 00-151-c10	KFF-SMB-Liver 00-250-c1	KFF-SMB-Liver 00-247-c2	KFF-WHS-Liver 00-184-c6	KFF-WHS-Liver 00-179-c8	KFF-WHS-Liver 00-193-c5	KFF-WHS-Liver 00-192-c9
2000										
2,3,7,8-TCDF	0.11	7.42	2.05	8.44	1.67	1.12	2.43	30.9	14.6	1.93
1,2,3,7,8-PeCDF	0.25	0.224	<DL	0.198	<DL	0.331	<DL	<DL	0.546	<DL
2,3,4,7,8-PeCDF	0.25	0.664	0.624	0.195	0.514	0.312	0.264	1.14	1.14	0.149
1,2,3,4,7,8-HxCDF	0.25	0.286	<DL	0.332	<DL	<DL	<DL	<DL	0.237	<DL
1,2,3,6,7,8-HxCDF	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.222	<DL
2,3,4,6,7,8-HxCDF	0.25	<DL	1.56	0.121	0.678	<DL	<DL	3.17	1.19	<DL
1,2,3,7,8,9-HxCDF	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1,2,3,4,6,7,8-HpCDF	0.50	0.235	0.549	0.509	1.02	0.743	0.450	<DL	<DL	0.125
1,2,3,4,7,8,9-HpCDF	0.50	0.519	0.661	<DL	<DL	<DL	<DL	<DL	<DL	<DL
OCDF	0.50	0.554	3.76	1.27	1.890	0.784	0.476	<DL	0.347	<DL
2,3,7,8-TCDD	0.10	0.665	0.347	0.168	0.512	0.447	0.582	<0.15	2.76	0.356
1,2,3,7,8-PeCDD	0.25	<DL	<DL	<DL	<DL	<DL	0.402	<DL	<DL	0.206
1,2,3,4,7,8-HxCDD	0.25	<DL	<DL	<DL	<DL	<DL	0.147	<DL	0.345	<DL
1,2,3,6,7,8-HxCDD	0.25	0.251	<DL	0.447	0.526	0.441	0.542	<DL	1.09	0.179
1,2,3,7,8,9-HxCDD	0.25	<DL	0.315	<DL	<DL	<DL	0.388	<DL	0.232	<DL
1,2,3,4,6,7,8-HpCDD	0.50	3.26	2.97	1.51	2.960	1.85	8.65	<DL	1.61	0.417
OCDD	0.50	8.61	4.65	19.1	1.015	3.630	15.7	11.7	2.79	1.32
DTEo		1.84	1.09	1.23	1.10	0.80	1.56	3.98	5.16	0.85
% lipids		28.47	27.78	23.22	20.03	25.02	18.98	28.03	30.04	25.56
sample wt, g wet wt.		30	29.3	29.1	28	26	45	41.9	46.1	42.4

APPENDIX 10. DIOXIN AND FURAN IN 1999 AND 2000 FISH LIVERS

DEP ID SWAT ID	DL ng/kg	KFF-WHS- Liver 00-189-c4	KFF-WHS- Liver 00-209-c3	KFF-WHS- Liver 00-213-c2	KFF-WHS- Liver 00-181-c10	KFF-WHS- Liver 00-188-c7	KFF-WHS- Liver 00-177-c1		female liver 00-180-C1
2000									
2,3,7,8-TCDF	0.11	1.83	10.6	22.6	14.3	6.32	8.91		4.74
1,2,3,7,8-PeCDF	0.25	0.543	0.846	6.41	<DL	0.417	<DL		<DL
2,3,4,7,8-PeCDF	0.25	1.36	1.16	1.07	1.45	1.27	0.998		0.741
1,2,3,4,7,8-HxCDF	0.25	0.584	0.462	4.98	1.66	0.447	1.06		2.12
1,2,3,6,7,8-HxCDF	0.25	0.773	0.531	5.07	0.598	0.338	0.941		0.471
2,3,4,6,7,8-HxCDF	0.25	<DL	<DL	1.13	<DL	<DL	0.444		<DL
1,2,3,7,8,9-HxCDF	0.25	<DL	<DL	<DL	<DL	<DL	<DL		<DL
1,2,3,4,6,7,8-HpCDF	0.50	0.908	<DL	1.99	<DL	<DL	<DL		0.412
1,2,3,4,7,8,9-HpCDF	0.50	0.955	0.427	6.43	<DL	1.61	0.657		<DL
OCDF	0.50	2.42	1.23	2.96	0.884	1.33	0.752		1.25
2,3,7,8-TCDD	0.10	0.357	0.782	2.50	0.665	1.42	0.886		0.569
1,2,3,7,8-PeCDD	0.25	0.632	1.53	<DL	<DL	0.359	0.847		<DL
1,2,3,4,7,8-HxCDD	0.25	0.996	0.698	3.94	0.445	0.561	1.02		0.395
1,2,3,6,7,8-HxCDD	0.25	0.862	1.54	8.21	0.672	4.21	0.695		1.75
1,2,3,7,8,9-HxCDD	0.25	0.610	1.38	<DL	<DL	<DL	0.542		0.250
1,2,3,4,6,7,8-HpCDD	0.50	2.02	0.704	3.41	5.15	3.35	1.62		2.61
OCDD	0.50	33.9	11.0	35.9	12.6	8.94	21.1		13.3
DTEo		2.30	4.47	8.08	3.21	3.67	3.62		1.94
% lipids		24.74	30.32	28.03	28.42				23.70
sample wt, g wet wt.		46.7	47.1	46.7	39.8	45.1	47.7		43.1

APPENDIX 11

DIOXIN AND FURAN IN CAGED FRESHWATER MUSSELS

APPENDIX 11. DIOXIN AND FURAN IN CAGED FRESHWATER MUSSELS

		KNW	KNW	KNW	KNW	KNW	KNW	KNW	KNW	KNW	KNW	KNW
DEP ID	DL	DF-UP-02	DF-UP-22	DF-UP-25	DF-UP-01	DF-UP-04	DF-UP-08	DF-UP-10	DF-UP-14	DF-UP-15	DF-UP-19	AVE
WRI ID	ng/kg				2260	2261	2262	2263	2264	2265	2266	
Compound												
2378-tcdf	0.11	0.52	0.31	0.62	0.47	0.33	0.19	0.36	1.15	0.28	1.06	0.53
12378-pecdf	0.25	0.36	0.54	<DL	0.21	<DL	<DL	0.31	0.61	0.25	0.42	
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.25	<DL	<DL	
123478-hxcdf	0.25	0.33	0.41	<DL	0.20	<DL	<DL	0.21	0.49	<DL	0.18	
123678-hxcdf	0.25	<DL	<DL	<DL	0.17	<DL	<DL	<DL	<DL	<DL	0.20	
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	
123789-hxcdf	0.25	1.02	0.75	0.41	0.26	0.51	0.37	0.17	0.63	0.28	0.49	
1234678-hpcdf	0.50	0.33	0.42	0.61	<DL	<DL	<DL	0.25	0.36	0.51	0.19	
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	
ocdf	0.50	<DL	1.05	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.10	<DL	<DL	<0.1
12378-pecdd	0.25	<DL	0.35	<DL	<DL	<DL	<DL	0.25	0.39	0.18	<DL	
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.51	<DL	0.35	
123678-hxcdd	0.25	0.51	<DL	0.36	<DL	0.26	0.41	<DL	0.48	0.18	0.21	
123789-hxcdd	0.25	0.15	0.22	0.34	<DL	<DL	<DL	<DL	0.41	<DL	0.26	
1234678-hpcdd	0.50	0.75	1.22	0.83	0.5	0.35	0.69	1.06	1.35	0.51	1.14	
ocdd	0.50	1.69	0.65	0.84	2.05	0.66	0.48	0.69	1.51	0.72	0.61	
DTEo		0.72	1.04	0.17	0.55	0.09	0.06	0.52	1.14	0.38	0.89	0.56
DTEd		1.14	1.39	0.97	0.78	0.94	0.91	0.92	1.52	0.90	1.06	1.06
% Lipids		0.52	0.63	0.57	0.49	0.59	0.48	0.53	0.87	0.58	0.67	0.59
Sample weight (g)		170	168.6	150.0	155	160	171	164	166	164.5	158	
lipid basis												
TCDF		100.0	49.2	108.8	95.9	56.4	39.5	67.9	131.8	48.6	158.3	89.3
DTEo		138.2	164.3	30.0	112.9	14.8	12.5	97.8	131.2	65.4	133.3	93.8

APPENDIX 11. DIOXIN AND FURAN IN CAGED FRESHWATER MUSSELS

DEP ID WRI ID	DL ng/kg	KFF DF-DN-06 1867	KFF DF-DN-13 1869	KFF DF-DN-17 1871	KFF DF-DN-09 2254	KFF DF-DN-11 2255	KFF DF-DN-18 2256	KFF DF-DN-20 2257	KFF DF-DN-21 2258	KFF DF-DN-24 2259	KFF AVE
Compound											
2378-tcdf	0.11	0.18	0.77	0.89	0.41	0.79	1.05	0.57	0.35	0.72	0.64
12378-pecdf	0.25	0.69	<DL	<DL	<DL	0.24	0.32	<DL	<DL	0.41	
23478-pecdf	0.25	<DL	<DL	0.44	<DL	0.37	0.61	<DL	0.18	<DL	
123478-hxcdf	0.25	<DL	<DL	0.64	<DL	<DL	0.52	<DL	0.29	<DL	
123678-hxcdf	0.25	<DL	<DL	0.77	<DL	0.52	0.41	<DL	0.25	<DL	
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	
123789-hxcdf	0.25	1.64	1.14	<DL	0.21	0.33	0.49	1.06	0.66	0.85	
1234678-hpcdf	0.50	0.57	<DL	0.24	0.61	0.25	<Dl	<DL	<DL	<DL	
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL	0.81	0.66	<DL	
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<0.1
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	
123478-hxcdd	0.25	<DL	<DL	0.43	0.25	0.33	<DL	<DL	<DL	0.52	
123678-hxcdd	0.25	0.67	<DL	<DL	0.55	<DL	<DL	<DL	0.46	0.62	
123789-hxcdd	0.25	0.25	0.37	0.18	0.29	0.25	<DL	0.25	0.41	0.18	
1234678-hpcdd	0.50	0.31	<DL	3.71	0.68	0.57	0.62	0.51	0.48	<DL	
ocdd	0.50	0.33	0.35	0.99	1.52	0.66	1.24	0.78	0.97	0.42	
DTEo		0.29	0.23	0.55	0.13	0.92	1.17	0.25	0.58	0.58	0.52
DTEd		0.90	0.86	0.99	0.93	1.21	1.39	1.05	0.99	1.18	1.06
% Lipids		0.67	0.61	0.48	0.47	0.59	0.64	0.66	0.67	0.53	0.59
Sample weight (g)		158	160	150	165	164	163	159	162	181	
lipid basis											
TCDF		26.7	126.1	184.0	86.7	132.8	165.1	86.2	52.2	135.4	107.4
DTEo		43.4	37.3	113.9	28.3	154.9	184.7	37.3	86.5	109.1	88.3

APPENDIX 11. DIOXIN AND FURAN IN CAGED FRESHWATER MUSSELS

		INITIAL TIME 0 SAMPLES					
DEP ID	DL	T0-1	T0-2	T0-3	T0-4	T0-5	Bllank
WRI ID	ng/kg						
Compound							
2378-tcdf	0.11	<DL	<DL	<DL	<DL	<DL	<DL
12378-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL
23478-pecdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL
234678-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdf	0.25	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL
1234789-hpcdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL
ocdf	0.50	<DL	<DL	<DL	<DL	<DL	<DL
2378-tcdd	0.10	<DL	<DL	<DL	<DL	<DL	<DL
12378-pecdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL
123478-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL
123678-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL
123789-hxcdd	0.25	<DL	<DL	<DL	<DL	<DL	<DL
1234678-hpcdd	0.50	<DL	<DL	<DL	<DL	<DL	<DL
ocdd	0.50	<DL	<DL	<DL	<DL	<DL	<DL
DTEo							
DTEd							
% Lipids		0.62	0.64	0.62	0.66	0.62	0.5433
Sample weight (g)		50.1	50.0	50.0	50.1	49.9	0.5406
lipid basis							
TCDF							
DTEo							

APPENDIX 12

DIOXIN AND FURAN IN FISH AND SHELLFISH 1984-1995

APPENDIX 12. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1984-1995 (pg/g)

WATER/STATION	SPECIES	TISSUE	NDS/NBS 1984-86 TCDD	MAINE 1988-1990 TCDD	MAINE 1988-1990 DTE	1991 TCDD	1991 DTE	1992 TCDD	1992 DTE
ANDROSCOGGIN LAKE									
Wayne	bn trout	f							
	bass	f							
	sucker	w							
ANDROSCOGGIN R									
Gilead	rb trout								
	bn trout								
	bass								
	sucker	w	1.8f/6.5w						
Rumford	bass	f				1.4	2.3-2.8	0.6	1.0-1.2
	sucker	w						3.0	7.4-8.0
Riley	bass								
	sucker	w	<2.1f/13w						
Jay	bass	f		17.6	24.0-29.1			1.2	1.9-2.3
	sucker	w						5.4	12.9-13.9
Livermore Falls	bass	f				2.4	3.1-3.3	1.1	1.4-1.5
	sucker	w						3.8	7.4-8.0
N Turner	sucker	w	6.2f/30w						
Auburn-GIP	bass	f	3.7f/24w					1.7	2.6-2.8
	lm bass	f						1.1	1.6-1.8
	sucker	w	8.3f/29w					5.6	14.3-15.4
	bullhead	w	7.8f/29.6w						
Lisbon Falls	bn trout	f		5.3	6.5-6.9				
	bass	f		4.5	5.5-5.8			0.7	1.0
	sucker	w	5.1f/12w					3.4	8.1-8.7
Brunswick	sucker	w	19.0						
	carp	f	11.0						
BEARCE LAKE									
Baring	pickerel	f	<0.1						
BRAVE BOAT HARBOR									
Kittery	lobster	m							
	lobster	t							
BROOKLYN	lobster	m							
	lobster	t							
COREA	lobster	t							
JONES CREEK									
Scarborough	clam	m						<0.1	0.02-0.3

APPENDIX 12. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1984-1995 (pg/g)

WATER/STATION	SPECIES	TISSUE	NDS/NBS 1984-86 TCDD	MAINE 1988-1990 TCDD	MAINE 1988-1990 DTE	1991 TCDD	1991 DTE	1992 TCDD	1992 DTE
KENNEBEC R									
Madison	bn trout	f							
	bass	f						<0.1	0.02-0.1
	sucker	w						0.1	0.3
Norridgewock	bass								
	sucker								
Fairfield	trout	f		6.2	6.9-8.0			1.4	1.6-1.8
	bass	f				1.4	1.6-1.7	0.6	0.6-0.7
	sucker	w	6.4	10.3	16.8-18.1			2.0	3.1-3.3
Sidney	bass	f	20.3w			1.0	1.4-2.4	0.4	0.6-1.0
	sucker	w	1.2f/11.4w					2.7	4.4-4.8
Augusta	bn trout	f		2.2	2.9-4.9			1.9	2.5-4.3
	bass	f						0.4	0.6-1.0
	sucker	w		5.0	7.3-8.4			1.5	2.6-2.8
Hallowell	smelt	c						0.2	0.5-0.8
Richmond	eel	f							
Phippsburg	clam	m						0.3	0.6-0.9
	lobster	m							
	lobster	t							
MESSALONSKEE LAKE									
Belgrade	bass					<0.09	0.04-0.3		
NARRAGUAGUS R									
Cherryfield	fallfish	w	<1.0						
NORTH POND									
Chesterfield	sucker	w	0.4						
	pickerel	f	<0.1						
PENOBSCOT R									
E Br Grindstone	bass	f		<0.1	0.09-0.2				
	sucker	w		<0.4	0.02-0.6				
E Millinocket	bass	f		<0.2	0.4-0.8				
	sucker	w		0.7	3.6-4.2				
Woodville	bass								
	sucker								
N Lincoln	bass	f		<0.4	0.2-0.8				
	sucker	w		<0.5-20.8	2.0-41.6				
S Lincoln	bass	f	5.0	1.7	2.3-2.7	0.9	1.2-1.3	0.7	1.0-1.2
	sucker	w		37.0	66.4-67.2			3.3	6.8
Passadumkeag	bass	f		1.8	2.9				
	sucker	w		2.8	7.6-7.7				
Milford	bass	f		0.9	1.4-1.7			0.3	0.4-0.5
	sucker	w		9.7	19.9-20.1			2.2	4.6
Veazie	bass	f	4.6w	1.9	2.4-2.6	1.2	1.5-1.7	0.4	0.6
	sucker	w	2.6f/7.6w	5.9	9.8-9.9	2.5	4.9-5.0	2.2	4.8-4.9
Bangor	eel	f							
Bucksport	clam	m						0.1	0.8-0.9
Stockton Springs	lobster	m							
	lobster	t							

APPENDIX 12. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1984-1995 (pg/g)

			NDS/NBS 1984-86	MAINE 1988-1990		1991		1992	
WATER/STATION	SPECIES	TISSUE	TCDD	TCDD	DTE	TCDD	DTE	TCDD	DTE
OWLS HEAD	mussel	m	<0.8						
PISCATAQUIS R									
Sangerville	bass	f				<0.2	0.03-0.3		
	bn trout	f				<0.4	0.03-0.4		
	sucker	w				0.26	0.6-0.7		
Howland	bass	f		<0.2	0.02-0.6				
PRESUMPSCOT R									
Windham	bass	f							
	sucker	w							
Westbrook	bass	f		1.8	2.4-4.5	0.2	0.2-0.4	0.1	0.2-0.4
	pickerel	f		<2.6	0.06-5.9				
	w perch	f		1.2	2.5-3.1	0.4	0.9-1.0		
	sucker	w	5.2	5.1	8.2-9.6	0.6	1.6-1.7	0.3	0.8-0.9
Falmouth	clam	m						<0.1	0.2-0.4
Portland	lobster	m							
	lobster	t							
ST CROIX R									
Woodland	bass	f							
	sucker								
Baring	bass			0.3	0.5-1.0	<0.1	0.04-0.3		
	sucker	w	<0.7	0.6	1.0-1.1				
Robbinston	lobster	t							
ST JOHN R									
Frenchville	sucker	w							
Madawaska	y perch	f		<0.5	0.08-0.8				
	bk trout	f							
	sucker	w							
SACO R									
Dayton	sucker	w	<0.3						
SACO BAY									
Scarborough	lobster	m							
	lobster	t							
SALMON FALLS R									
Acton	lm bass								
	sucker								
S Berwick	bass	f		0.4	0.5-0.6				
	lm bass								
	pickerel	f		0.2	0.3				
	sucker	w		1.5	2.1-2.2			2.4	3.4-3.6

APPENDIX 12. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1984-1995 (pg/g)

			NDS/NBS	MAINE					
			1984-86	1988- 1990		19 91		19 92	
WATER/STATION	SPECIES	TISSUE	TCDD	TCDD	DTE	TCDD	DTE	TCDD	DTE
SANDY P									
	bass	f	<1.0						
SEBAGO L									
Naples	bass	w	<0.6						
SEBASTICOOK R									
E Br Corinna	lm bass								
	bass								
	sucker								
Newport	bass	f						0.1	0.3-0.4
	lm bass	f	<0.2					<0.2	0.2-0.4
	w perch	f		1.0	1.6-2.1				
W Br Harmony	bass								
	sucker								
W Br Palmyra	bass	f		1.2	1.4-1.8			0.4	0.5-0.6
	pickerel	f	<0.1					0.2	0.2
	sucker	w	1.6	3.3	4.3-4.6			1.1	1.4-1.6
WEBBER POND									
Vassalboro	bass	f				<0.08	0.04-0.4		

f=fillet
m=meat
t=tomalley
w=whole

DTE= dioxin toxic equivalents using WHO 98 toxic equivalency factors (TEF).
Range shown at nd=0 and nd=mdl, ie DTEo-DTEd

APPENDIX 12. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1984-1995 (pg/g)

WATER/STATION	SPECIES	TISSUE	1993 TCDD	1993 DTE	1994 TCDD	1994 DTE	1995 TCDD	1995 DTE
ANDROSCOGGIN LAKE								
Wayne	bn trout	f						
	bass	f						
	sucker	w						
ANDROSCOGGIN R								
Gilead	rb trout						1.2	2.4-2.9
	bn trout							
	bass						0.9	3.8-4.1
	sucker	w					1.7	6.1-6.7
Rumford	bass	f	2.9	4.5-5.4	3.8	5.7-6.2	2.2	3.5-4.1
	sucker	w	5.8	13.6-14.6	4.0	11.4-11.9		
Riley	bass							
	sucker	w						
Jay	bass	f	1.4	1.8-2.2	1.6	2.2-2.8		
	sucker	w	4.5	10.9-11.8	4.7	11.5-12.3	2.3	6.9-7.6
Livermore Falls	bass	f	1.4	1.6-1.8	1.4	1.6-2.3	0.5	0.8-1.3
	sucker	w	3.6	6.8-7.3	2.2	4.8-5.3		
N Turner	sucker	w						
Auburn-GIP	bass	f	1.2	1.8-1.9	1.3	2.0-2.7		
	lm bass	f						
	sucker	w	3.7	9.0-9.8	1.6	4.4-5.4	1.4	3.8-5.0
	bullhead	w	2.1	3.0-3.3	1.3	2.3-2.8		
Lisbon Falls	bn trout	f						
	bass	f	1.2	1.7-1.8	0.6	0.8-1.7	0.9	1.4-2.4
	sucker	w	2.7	6.1-6.6	2.4	5.8-6.2		
Brunswick	sucker	w						
	carp	f						
BEARCE LAKE								
Baring	pickerel	f						
BRAVE BOAT HARBOR								
Kittery	lobster	m			<0.1	<0.1-1.2		
	lobster	t			1.3	9.7-11.5	1.6	6.7-9.9
BROOKLYN	lobster	m					0.8	4.9-8.2
	lobster	t						
COREA	lobster	t						
JONES CREEK								
Scarborough	clam	m						

APPENDIX 12. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1984-1995 (pg/g)

			1993		1994		1995	
WATER/STATION	SPECIES	TISSUE	TCDD	DTE	TCDD	DTE	TCDD	DTE
KENNEBEC R								
Madison	bn trout	f					<0.1	0.1-0.7
	bass	f						
	sucker	w					0.1	0.3-1.0
Norridgewock	bass							
	sucker							
Fairfield	trout	f	1.4	1.6-1.9	2.2	2.5-3.8	1.6	1.7-2.5
	bass	f	1.5	1.7-2.0	0.9	1.1-1.8		
	sucker	w	1.6	2.2-2.6	2.2	2.9-3.8		
Sidney	bass	f	0.6	0.8-1.4	0.3	0.4-1.3		
	sucker	w	1.5	2.5-2.7	2.3	3.0-4.0	1.2	1.7-2.5
Augusta	bn trout	f					1.0	1.3-3.5
	bass	f	0.6	0.9-1.5	1.0	1.3-3.7		
	sucker	w	1.9	3.3-3.6	2.3	4.0-5.8		
Hallowell	smelt	c						
Richmond	eel	f	0.6	0.8-1.4				
Phippsburg	clam	m						
	lobster	m	0.2	0.3-1.2	<0.1	<0.1-1.6		
	lobster	t	7.9	27.5-27.6	6.5	23.4-26.6	4.6	13.5-17.1
MESSALONSKEE LAKE								
Belgrade	bass							
NARRAGUAGUS R								
Cherryfield	fallfish	w						
NORTH POND								
Chesterfield	sucker	w						
	pickerel	f						
PENOBSCOT R								
E Br Grindstone	bass	f					<0.1	0.1-0.7
	sucker	w					<0.1	0.1-0.6
E Millinocket	bass	f						
	sucker	w						
Woodville	bass							
	sucker							
N Lincoln	bass	f						
	sucker	w						
S Lincoln	bass	f	1.2	1.6-1.8	0.4	0.4-1.7	0.5	0.7-1.3
	sucker	w	1.7	3.5-3.6	2.2	5.8-6.1		
Passadumkeag	bass	f						
	sucker	w						
Milford	bass	f						
	sucker	w						
Veazie	bass	f	0.6	0.8-1.0	0.2	0.2-1.3	0.3	0.4-1.9
	sucker	w	1.1	2.7-3.0	0.6	1.6-2.8	0.5	1.4-2.5
Bangor	eel	f	1.0	1.1-1.2				
Bucksport	clam	m						
Stockton Springs	lobster	m	0.1	0.3-1.1	<0.1	0.1-1.0		
	lobster	t	4.0	28.0	2.3	18.1-27.9	1.3	7.2-14.6

APPENDIX 12. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1984-1995 (pg/g)

			1993		1994		1995	
WATER/STATION	SPECIES	TISSUE	TCDD	DTE	TCDD	DTE	TCDD	DTE
OWLS HEAD	mussel	m						
PISCATAQUIS R								
Sangerville	bass	f						
	bn trout	f						
	sucker	w						
Howland	bass	f						
PRESUMPSCOT R								
Windham	bass	f	<0.1	<0.1-0.3	<0.1	<0.1-1.1		
	sucker	w	0.3	0.7-0.8	0.2	1.4-2.4	0.3	2.4-7.7
Westbrook	bass	f	<0.2	0.1-0.5	0.2	0.3-1.2		
	pickerel	f						
	w perch	f						
	sucker	w	1.1	1.8-2.3	0.9	2.1-3.7	0.8	1.6-2.6
Falmouth	clam	m						
Portland	lobster	m	<0.1	0.1-0.8	<0.1	0.2-1.0		
	lobster	t	3.4	18.5-18.7	2.5	17.2-21.3	2.2	9.5-12.8
ST CROIX R								
Woodland	bass	f						
	sucker							
Baring	bass							
	sucker	w						
Robbinston	lobster	t						
ST JOHN R								
Frenchville	sucker	w			0.1	0.2-1.0		
Madawaska	y perch	f						
	bk trout	f			<0.3	<0.1-2.3		
	sucker	w			<0.1	0.2-0.8		
SACO R								
Dayton	sucker	w						
SACO BAY								
Scarborough	lobster	m	<0.1	0.1-0.8	<0.1	<0.1-0.8		
	lobster	t	2.0	11.3-14.6	1.3	9.7-12.0		
SALMON FALLS R								
Acton	lm bass						<0.1	<0.1-0.7
	sucker							
S Berwick	bass	f	0.2	0.2-0.9	0.5	0.7-3.3	0.4	0.4-4.0
	lm bass							
	pickerel	f						
	sucker	w	1.9	3.6-3.8	2.1	4.7-6.1		

APPENDIX 12. DIOXIN AND FURAN CONCENTRATIONS IN MAINE FISH AND SHELLFISH 1984-1995 (pg/g)

			19 93		19 94		19 95	
WATER/STATION	SPECIES	TISSUE	TCDD	DTE	TCDD	DTE	TCDD	DTE
SANDY P								
	bass	f						
SEBAGO L								
Naples	bass	w						
SEBASTICOOK R								
E Br Corinna	lm bass						0.1	0.2-1.1
	bass							
	sucker							
Newport	bass	f						
	lm bass	f					0.3	1.1-2.0
	w perch	f						
W Br Harmony	bass						<0.1	0.1-0.8
	sucker							
W Br Palmyra	bass	f	0.9	1.2-1.6	0.4	0.4-1.3	0.8	1.7-2.2
	pickerel	f						
	sucker	w	1.0	2.6-2.7	1.2	4.0-4.3		
WEBBER POND								
Vassalboro	bass	f						

f=fillet
m=meat
t=tomalley
w=whole

DTE= dioxin toxic equivalents using
Range shown at nd=0 and nd=mdl, ie D'