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General Motors Powertrain Site
Massena, New York

Results of 2008 Fish Collection Activities to Evaluate Fish Consumption Advisory in Remediated Cove, St. Lawrence River

December 12, 2008

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General Motors Powertrain Site
Massena, New York

Prepared for:
General Motors Powertrain Site

Prepared by:
ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.449.0017

Our Ref.:
B0050095

Date:
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1. Scope of Work

This report describes the fish collection activities that were conducted in June 2008 to re-evaluate the fish consumption advisory for the remediated cove area in the St. Lawrence River adjacent to the General Motors Powertrain Site (GM) in Massena, New York. The collection activities were performed consistent with the scope of work (SOW) letter dated March 28, 2008 and subsequent United States Environmental Protection Agency (USEPA) – Region II comments dated May 30, 2008. Included in this report are brief sections that cover the SOW background, current fish consumption advisories for the cove and nearby areas, fish collection activities and methods, analytical results, and conclusions.

The initial findings show that 2008 fish PCB levels in the remediated cove are somewhat consistent with those observed in 1988 by the New York State Department of Environmental Conservation (NYSDEC) and are generally higher than those observed in the surrounding areas. Any change determination on the fish consumption advisory for the cove will be made by the New York State Department of Health (NYSDOH), in consultation with the NYSDEC.

1.1 Scope of Work Background

The final SOW dated March 28, 2008 was revised to be consistent with the NYSDEC's August 9, 2007 document entitled "Outline for Assessment of PCBs (polychlorinated biphenyls) in Fish for General Motors Company, Massena, NY," which was prepared in response to the original SOW drafted by ARCADIS BBL on July 20, 2007. Implementation of the SOW also addressed comments from USEPA dated May 30, 2008 and additional comments from the NYSDEC.

In accordance with the SOW, GM proposed to collect post-remediation fish fillet PCB data to evaluate the consumption advisory in the cove. The advisory was established by NYSDEC and NYSDOH in 1990 based on fish fillet samples collected in 1988 by NYSDEC (NYSDEC 1990; NYSDOH 1990). Since that time, both the embayment and cove areas adjacent to the GM facility in the St. Lawrence River have been remediated (1995 and 2004-2005, respectively). PCB-containing sediments were removed to an average cleanup level of 3 milligrams/kilogram (mg/kg) PCBs in the embayment and less than 0.1 mg/kg PCBs in the cove.

Additionally, sediment remediation activities have been performed at two other PCB-containing sediment Superfund sites located in proximity to the cove. These include the Grasse River site, which is an upstream tributary to the St. Lawrence River, and the former Reynolds Metals Company (RMC) Site located upstream of the cove on the St. Lawrence River. Specifically, work on the Grasse River aimed at reducing PCB levels in the system includes completion of source control activities in 2001, as well as a number of pilot studies, including a Non-Time-Critical Removal Action in 1995, a Capping Pilot Study in 2001, a Remedial Options Pilot Study in 2005, and an Activated Carbon Pilot in 2006. Work conducted at the RMC site includes dredging and capping activities performed in 2001. Remedial work at both of these sites is to be completed in the future.

1.2 Fish Consumption Advisory

Currently, the fish consumption advisory for the cove recommends that no fish species be eaten from the "Bay at St. Lawrence/Franklin Co. line" (i.e., the cove) due to PCBs (NYSDOH, 2008). The cove has also been defined as the "embayment at the mouth of the unnamed tributary" (NYSDEC, 1990). The fish consumption advisory in the cove of "do not eat any fish" is more restrictive than the advisory for the rest of the St. Lawrence River (defined as "Whole River" in NYSDOH, 2008) which is due to PCBs, mirex, and dioxin. The advisory for the rest of the river, which includes the remediated embayment area adjacent to the GM facility, is listed below.

- Eat no more than "one meal (one-half pound) per week" of fish from the state's fresh-waters that are not listed in the specific advisories below (e.g., yellow perch, smallmouth bass, walleye, northern pike, rock bass, brown bullhead, etc.).

- No more than "one meal per month" is recommended for Chinook salmon, rainbow trout, white perch, white sucker, smaller lake trout, smaller brown trout, and coho salmon over 25 inches.

- An "eat none" advisory is recommended for carp, channel catfish, lake trout over 25", and brown trout over 20 inches.

- For all water bodies in New York State with a consumption advisory, including the St. Lawrence River and the cove, no fish are recommended to be eaten by women of childbearing age, infants, and children under the age of 15.

The above information is published by the NYSDOH in “Chemicals in Sportfish and Game: 2008-2009 Health Advisories” (www.health.state.ny.us/environmental/outdoors/fish/fish.htm).

The 1988 PCB data on which the cove fish consumption advisory is based were reported in “Chemical Contaminants in Fish from the St. Lawrence River Drainage on Lands of the Mohawk Nation at Akwesasne and Near the General Motors Corporation/Central Foundry Division Massena, New York Plant” (NYSDEC, 1990). The 1988 fish data for the cove and other St. Lawrence River locations sampled by the NYSDEC are summarized in Tables 1 through 3 of this document. Table 1 presents the number of fish samples collected; Table 2 presents the length measurements (mean and range) of fish; and Table 3 presents the mean total PCB results. Figure 1 shows the 1988 St. Lawrence River fish sampling locations.

According to NYSDOH (2008), fish consumption advisories are based primarily on information gathered by the NYSDEC on fish contaminant levels. The NYSDOH reviews the contaminant data annually to determine if an advisory should be issued or revised (NYSDOH, 2008). This is generally done by comparing the data to federal marketplace standards, but also considers other factors such as potential human exposures and health risks, and location and number and type of samples (NYSDOH, 2008). The specific procedures (i.e., data evaluations, statistical methods) used by the NYSDOH to establish fish consumption advisories are unpublished.

2. Fish Tissue Sample Collection

Fish tissue sampling was performed using boat electrofishing equipment on June 10 to 12, 2008 at three locations: the GM cove, the GM embayment area, and above Robert Moses Dam (Figures 1 and 2). The location above the dam was considered representative of background conditions. An attempt was made to collect similar fish species of similar size and sample number as those collected in 1988 by the NYSDEC (Tables 1 and 2), as well as to meet minimum size limits set by the NYSDEC (2008) in the Freshwater Fishing Regulations Guide at www.dec.ny.gov/outdoor/7917.html (i.e., fish that anglers could take legally and would be expected to consume). An attempt was also made to collect similar fish species across locations for spatial comparisons. The fish species observed during collection activities are presented in Table 4.

In total, five individual samples each of brown bullhead, rock bass, smallmouth bass, white sucker, and yellow perch were collected from each of the three sampling locations in 2008 (Table 1). Northern pike were also collected, but only three samples each of northern pike were collected at the embayment area and above the dam due to limited availability; five samples were collected from the cove. Pumpkinseeds were initially collected from the cove, however, no adult pumpkinseeds were observed in the embayment area or above the dam, and smallmouth bass were collected as a substitute species instead. In all, 30 fish samples were collected from the cove in 2008 (NYSDEC collected 30), and 28 fish samples each were collected from the embayment area and above the dam (NYSDEC collected 28 samples above the dam, but did not sample the embayment area.) (Table 1). Fish collected from the cove were similar in size to those collected by the NYSDEC in 1988, but were somewhat larger in 2008 from the embayment area and above the dam (Table 2).

Fish from all locations were collected primarily from shoreline habitats with submerged aquatic vegetation (SAV), woody debris, and/or rocky substrates. Fish from the cove were taken from the back of the cove near the unnamed tributary working out towards the mouth (Figure 2). Fish from the embayment area were taken from the remediated cap and western portion of the embayment (to increase distance away from the cove), but were also taken from the eastern shoreline of the embayment as needed (Figure 2). Fish collected from above the dam were taken from the northeast shore of Barnhart Island (smallmouth bass), and from the shore of the eastern most island that forms the Long Sault Island group where habitat conditions were better (all other fish samples) (Figure 1). Details on the specific areas within each location where fish were sampled are contained in the field notes in Attachment 1.

Sample collection and handling procedures generally followed the guidelines presented in Appendix 1 “General New York State Collection and Handling Procedures” (NYSDEC, 2007). Upon completion of sampling in a given area, fish were transferred from the boat live-well to plastic bags and placed on ice in a cooler. Fish were then field processed, wrapped in food-grade plastic bags and frozen within 24 hours of collection. Field processing tasks included sample ID designation, length and weight measurements, presence of physical anomalies, sample photographs, and removal of bony structures (scales or spines) for potential age analysis. Field notes on the sampling activities and field processing are included in Attachment 1 and Table 5.

In total, 86 whole fish samples were submitted frozen on ice to Pace Analytical, Inc. in Green Bay, Wisconsin where they were processed as individual fillets (i.e., one fish per sample) using a standard New York State fillet (i.e., skin-off for catfish/bullheads; skin-on scales-off for other fish). Chain-of-custody forms and custody seals were completed and submitted with the sample shipment (Attachment 2). Fillet samples were analyzed for PCB Aroclors and percent lipids using USEPA Method 8082. Data quality was evaluated using quality assurance criteria found in “USEPA Contract Laboratory Program National Functional Guidelines for Organic Review” (USEPA, 1999). The data validation report for the PCB Aroclor and percent lipid analyses are provided in Attachment 3, which indicate the data may be used without qualification.

2.1 Fish Tissue Data Results

Table 5 presents the 2008 total PCB (Aroclors summed) and percent lipid data for the individual fillet samples; Table 6 presents the analytical data summary statistics. Overall mean (one-half the reporting limit was used for non-detects in the calculation of arithmetic means) PCB concentrations (and range) in fish in 2008 by sample location are:

- Above Robert Moses Dam – 0.054 mg/kg (<0.019 to 0.23 mg/kg; n=28)
- GM Embayment – 1.5 mg/kg (<0.047 to 10.0 mg/kg; n=28)
- GM Cove – 2.9 mg/kg (0.022 to 14.4 mg/kg; n=30)

These concentrations are generally lower than those observed by the NYSDEC in 1988 for comparable locations (i.e., above the dam and in the GM cove; the GM embayment area was not sampled in 1988). Overall mean (weighted arithmetic average) fish PCB concentrations (and range) in 1988 were:

- Above Robert Moses Dam – 0.26 mg/kg (<0.15 to 2.2 mg/kg; n=28)

- GM Cove – 5.1 mg/kg (<0.15 to 20.6 mg/kg; n=30)

Table 3 and Figure 3 present species-specific comparisons of the 1988 NYSDEC and 2008 GM fish data. In the cove, mean PCB concentrations in brown bullhead, white sucker and yellow perch were generally lower in 2008 than in 1988 (1.97 vs. 20.6 mg/kg for brown bullhead, 4.66 vs. 6.39 mg/kg for white sucker, and 0.31 vs. 3.41 mg/kg for yellow perch, respectively). However, mean PCB concentrations in northern pike and rock bass from the cove in 2008 were generally higher than in 1988 (4.9 vs. 2.73 mg/kg for northern pike, and 3.56 vs.1.04 mg/kg for rock bass, respectively). Although smallmouth bass were not collected from the cove in 1988, concentrations in these fish from 2008 were generally higher than those observed in bass collected from other areas in the St. Lawrence River by the NYSDEC (Raquette Point, Cornwall Island, St. Regis, and Snye Marsh; Figure 3).

For the GM embayment area, mean PCB concentrations in brown bullhead, rock bass, smallmouth bass and white sucker were generally higher in 2008 than those observed by the NYSDEC in 1988 in these species from the surrounding area (Raquette Point, Cornwall Island, St. Regis, and Snye Marsh; Table 3 and Figure 3). Northern pike and yellow perch from the GM embayment area in 2008 had similar PCB concentrations to those observed in the same fish species collected by the NYSDEC in 1988 from the surrounding area. PCB concentrations in fish collected from above Robert Moses Dam in 2008 were generally similar or lower than the 1988 data.

3. Conclusions

Based on the 2008 fish tissue data collected from the cove, PCB concentrations in fish have decreased over the past 20 years in brown bullhead, white suckers, and yellow perch (lower trophic level species), but increased slightly in rock bass and northern pike (higher trophic level species). However, with the exception of yellow perch, the data show that PCB levels in fish in the cove are generally higher than those observed in historic data for the surrounding areas. Any final change determination in the consumption advisory for the cove should be made by the NYSDOH, in consultation with the NYSDEC.

4. References

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NYSDEC. 1990. Chemical Contaminants in Fish from the St. Lawrence River Drainage on Lands of the Mohawk Nation at Akwesasne and Near the General Motors Corporation/Central Foundry Division Massena, New York Plant. Technical Report 90-1 (BEP). April.

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Tables

TABLE 1
1988 NYSDEC AND 2008 GM NUMBER OF FISH SAMPLES ANALYZED FOR PCBS

RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

GENERAL MOTORS POWERTRAIN SITE
MASSENA, NEW YORK

	Waterbody	St. Lawrence River							
	Location	Upstream of Eisenhower Lock	Above Robert Moses Dam	GM Embayment	Unnamed Trib GM Foundry (GM Cove)	Bay West of Raquette Point	North Channel of Cornwall Island	Vicinity of St. Regis Village	Snye Marsh Area
		Number of Samples Analyzed for PCBs							
Fish Species	American eel				1			1	
	Brown bullhead		5 **(5)**	**(5)**	4 **(5)**	5	5		5
	Carp	3	2			1	4		5
	Channel catfish						1		
	Golden redhorse						1	2	
	Largemouth bass								3
	Muskellunge	1	1					2	
	Northern pike	2	4 **(3)**	**(3)**	5 **(5)**	2	1	5	5
	Pumpkinseed	5			4		3	5	
	Rainbow trout					2			
	Rock bass		**(5)**	**(5)**	5 **(5)**		3		
	Smallmouth bass	5	6 **(5)**	**(5)**	**(5)**	5	5	5	4
	Walleye					6		1	3
	White sucker	5	5 **(5)**	**(5)**	4 **(5)**	4		2	
	Yellow perch	1	5 **(5)**	**(5)**	7 **(5)**	4	4	5	5

Notes:

1. 1988 NYSDEC data are in plain font; 2008 GM data are in bold font within parentheses.
2. Data for 1988 are from NYSDEC 1990. Chemical Contaminants in Fish from the St. Lawrence River Drainage on Lands of the Mohawk Nation at Akwesasne and Near the General Motors Corporation/Central Foundry Division Massena, New York Plant. Technical Report 90-1 (BEP). April.
3. GM data were collected by ARCADIS personnel at three locations (Above Robert Moses Dam, GM Cap, Unnamed Tributary Near GM Foundry) from June 10 to 12, 2008.
4. All samples were processed as NYSDEC standard fillets.
5. Locations are shown on Figures 1 and 2.

TABLE 2
1988 NYSDEC AND 2008 GM MEAN FISH LENGTH AND RANGE

RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

GENERAL MOTORS POWERTRAIN SITE
MASSENA, NEW YORK

	Waterbody	St. Lawrence River								NYSDEC Minimum Size Limit for Anglers
	Location	Upstream of Eisenhower Lock	Above Robert Moses Dam	GM Embayment	Unnamed Trib GM Foundry (GM Cove)	Bay West of Raquette Point	North Channel of Cornwall Island	Vicinity of St. Regis Village	Snye Marsh Area	
		Arithmetic Mean Fish Length and Range (mm)								inches (mm)
Fish Species	American eel				818 (--)			731 (--)		none
	Brown bullhead		251 (235-285)		257 (242-285)	266 (260-276)	249 (230-270)		320 (270-339)	any
			270 (234-322)	**280 (259-292)**	**259 (242-281)**					
	Carp	657 (527-814)	708 (682-734)			773 (--)	651 (575-720)		683 (650-735)	any
	Channel catfish						460 (--)			any
	Golden redhorse						740 (--)	484 (480-487)		any
	Largemouth bass								403 (349-434)	12 (305)
	Muskellunge	952 (--)	574 (--)					909 (830-988)		48 (1219)
	Northern pike	780 (550-1010)	670 (537-774)		587 (560-630)	772 (735-810)	520 (--)	637 (595-690)	719 (664-870)	22 (559)
			695 (690-705)	**671 (663-679)**	**581 (520-708)**					
	Pumpkinseed	194 (165-209)			186 (175-190)		190 (170-210)	162 (152-172)		any
	Rainbow trout					522 (496-548)				21 (533)
	Rock bass				221 (205-240)		238 (220-250)			any
			188 (181-197)	**203 (182-223)**	**202 (174-228)**					
	Smallmouth bass	367 (340-397)	296 (237-330)			285 (132-350)	298 (288-326)	300 (273-343)	340 (305-387)	12 (305)
			360 (300-401)	**365 (300-404)**	**340 (324-364)**					
	Walleye					533 (345-589)		608 (--)	557 (490-600)	18 (457)
	White sucker	379 (329-425)	450 (420-542)		454 (435-467)	508 (430-550)		376 (375-378)		any
			460 (393-494)	**441 (403-478)**	**433 (417-453)**					
	Yellow perch	262 (--)	145 (98-243)		253 (180-287)	274 (253-291)	242 (230-257)	250 (224-268)	257 (235-273)	any
			218 (187-262)	**184 (169-205)**	**214 (189-261)**					

Notes:

1. 1988 NYSDEC data are in plain font; 2008 GM data are in bold font below each applicable species.
2. Data are from NYSDEC 1990. Chemical Contaminants in Fish from the St. Lawrence River Drainage on Lands of the Mohawk Nation at Akwesasne and Near the General Motors Corporation/Central Foundry Division Massena, New York Plant. Technical Report 90-1 (BEP). April.
3. GM data were collected by ARCADIS personnel at three locations (Above Robert Moses Dam, GM Cap, Unnamed Tributary Near GM Foundry) from June 10 to 12, 2008.
4. All samples were processed as NYSDEC standard fillets.
5. Locations are shown on Figures 1 and 2.

TABLE 3
1988 NYSDEC AND 2008 GM MEAN TOTAL PCBS IN FISH FILLETS

RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

GENERAL MOTORS POWERTRAIN SITE
MASSENA, NEW YORK

	Waterbody	St. Lawrence River							
	Location	Upstream of Eisenhower Lock	Above Robert Moses Dam	GM Embayment	Unnamed Trib GM Foundry (GM Cove)	Bay West of Raquette Point	North Channel of Cornwall Island	Vicinity of St. Regis Village	Snye Marsh Area
		Arithmetic Mean Total PCBs (mg/kg)							
Fish Species	American eel				0.66			46.50	
	Brown bullhead		0.15 **(0.024)**	**(1.40)**	20.55 **(1.97)**	0.90	0.59		0.36
	Carp	4.74	2.19			4.62	8.74		10.01
	Channel catfish						1.54		
	Golden redhorse						2.82	0.31	
	Largemouth bass								<0.15
	Muskellunge	1.92	<0.15					<0.15	
	Northern pike	0.24	<0.15 **(0.040)**	**(0.70)**	2.73 **(4.90)**	1.75	0.20	<0.15	<0.15
	Pumpkinseed	0.22			<0.15		2.92	<0.15	
	Rainbow trout					0.90			
	Rock bass		**(0.031)**	**(1.52)**	1.04 **(3.56)**		<0.15		
	Smallmouth bass	0.21	0.17 **(0.18)**	**(2.82)**	**(2.01)**	1.53	0.16	0.58	0.80
	Walleye					0.55		2.42	0.88
	White sucker	<0.15	<0.15 **(0.035)**	**(2.16)**	6.39 **(4.66)**	0.43		<0.15	
	Yellow perch	1.28	<0.15 **(0.012)**	**(0.11)**	3.41 **(0.31)**	0.08	<0.15	0.37	<0.15

mg/kg = milligrams per kilogram wet weight

Notes:

1. 1988 NYSDEC data are in plain font; 2008 GM data are in bold font within parentheses.
2. Data are from NYSDEC 1990. Chemical Contaminants in Fish from the St. Lawrence River Drainage on Lands of the Mohawk Nation at Akwesasne and Near the General Motors Corporation/Central Foundry Division Massena, New York Plant. Technical Report 90-1 (BEP). April.
3. GM data were collected by ARCADIS personnel at three locations (Above Robert Moses Dam, GM Cap, Unnamed Tributary Near GM Foundry) from June 10 to 12, 2008.
4. Mean PCB concentrations for 2008 fillet results were calculated using half the detection limit for sample results found to be non-detect.
5. All samples were processed as NYSDEC standard fillets.
6. Locations are shown on Figures 1 and 2.

TABLE 4
2008 FISH SPECIES OBSERVED DURING SAMPLING

RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH ONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVE

GENERAL MOTORS POWERTRAIN SITE
MASSENA, NEW YORK

	Waterbody	St. Lawrence River		
	Location	Above Robert Moses Dam	GM Embayment	GM Cove
		Number/Estimate of Observed Individuals		
Fish Species	American eel		2	<10
	Banded killifish	>10		
	Bluegill			2
	Bluntnose minnow	>25		>10
	Brown bullhead	>10*	2	>50
	Common carp	>50		1*
	Cutlips minnow	1		
	Emerald shiner			<10
	Fallfish	>10	2	>25
	Fathead minnow			>10
	Freshwater drum		2	
	Golden shiner			>10
	Logperch		>25	>10
	Muskellunge			1
	Northern pike		<10	
	Pumpkinseed	1*		>25
	Rainbow smelt	1	<10	
	Rock bass	>25*	>25*	>25
	Round goby	>10	>50	>50
	Silver lamprey	3	1	
	Silver redhorse		4	<10
	Smallmouth bass	>25	9	>25
	Spottail shiner	>25	>25	>100
	Spotted gar	1		
	Tesselated darter			1
	Walleye		2	3*
	White sucker	>50	<10*	>50
	Yellow perch	>25*	>25*	>50*
	Total No. of Species	16	16	21

* = mostly small fish

Notes:

1. Abundance observations were made by ARCADIS personnel from June 10 to 12, 2008 during fish sampling. Qualitative estimates were defined as follows: few is <10, some is >10, several is >25, and many is >50, and in some exceptions is >100.
2. Locations are shown on Figures 1 and 2.

TABLE 5
2008 GM FISH SAMPLES ANALYZED FOR PCBS

RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

GENERAL MOTORS POWERTRAIN SITE
MASSENA, NEW YORK

Waterbody	St. Lawrence River							
Location / Fish Species	Sample ID	Date Collected	# Individuals	Length (mm)	Weight (g)	Notes	Lipids (%)	Total PCBs (mg/kg)
Above Robert Moses Dam								
Brown bullhead	DAM-BB-061208-DB-001	6/12/2008	1	297	303	a, b	2.00	0.022 J
Brown bullhead	DAM-BB-061208-DB-002	6/12/2008	1	257	245	--	1.30	0.019 U
Brown bullhead	DAM-BB-061208-DB-003	6/12/2008	1	322	542	--	3.10	0.0672
Brown bullhead	DAM-BB-061208-DB-004	6/12/2008	1	234	208	--	0.70	0.019 U
Brown bullhead	DAM-BB-061208-DB-005	6/12/2008	1	242	195	--	0.79	0.019 U
Northern pike	DAM-NP-061208-DB-001	6/12/2008	1	690	2119	a	0.53	0.019 U
Northern pike	DAM-NP-061208-DB-002	6/12/2008	1	690	1726	a	0.40	0.0997
Northern pike	DAM-NP-061208-DB-003	6/12/2008	1	705	2352	d	0.56	0.019 U
Rock bass	DAM-RB-061208-DB-001	6/12/2008	1	185	176	--	1.40	0.0254 J
Rock bass	DAM-RB-061208-DB-002	6/12/2008	1	193	170	e	1.30	0.0229 J
Rock bass	DAM-RB-061208-DB-003	6/12/2008	1	185	164	e	0.95	0.0273 J
Rock bass	DAM-RB-061208-DB-004	6/12/2008	1	197	192	--	1.70	0.0536
Rock bass	DAM-RB-061208-DB-005	6/12/2008	1	181	168	--	1.10	0.0239 J
Smallmouth bass	DAM-SB-061108-DB-001	6/11/2008	1	381	1157	--	2.00	0.186
Smallmouth bass	DAM-SB-061108-DB-002	6/11/2008	1	358	918	--	1.80	0.125
Smallmouth bass	DAM-SB-061108-DB-003	6/11/2008	1	300	471	--	2.20	0.145
Smallmouth bass	DAM-SB-061108-DB-004	6/11/2008	1	360	876	f	2.80	0.201
Smallmouth bass	DAM-SB-061108-DB-005	6/11/2008	1	401	1100	--	2.80	0.226
White sucker	DAM-WS-061208-DB-001	6/12/2008	1	393	838	--	2.00	0.019 U
White sucker	DAM-WS-061208-DB-002	6/12/2008	1	476	1152	f	1.20	0.0678
White sucker	DAM-WS-061208-DB-003	6/12/2008	1	451	1162	a	1.30	0.019 U
White sucker	DAM-WS-061208-DB-004	6/12/2008	1	494	1828	a	2.20	0.0800
White sucker	DAM-WS-061208-DB-005	6/12/2008	1	485	1472	--	1.10	0.019 U
Yellow perch	DAM-YP-061208-DB-001	6/12/2008	1	241	191	--	0.96	0.019 U
Yellow perch	DAM-YP-061208-DB-002	6/12/2008	1	262	233	--	1.10	0.0219 J
Yellow perch	DAM-YP-061208-DB-003	6/12/2008	1	205	105	--	0.48	0.019 U
Yellow perch	DAM-YP-061208-DB-004	6/12/2008	1	187	89	--	0.77	0.0208 U
Yellow perch	DAM-YP-061208-DB-005	6/12/2008	1	195	105	--	0.88	0.019 U
						Mean	1.41	0.054
						Minimum	0.40	0.019 U
						Maximum	3.10	0.226
GM Embayment								
Brown bullhead	CAP-BB-061108-DB-001	6/11/2008	1	291	402	--	0.70	0.304
Brown bullhead	CAP-BB-061108-DB-002	6/11/2008	1	259	241	--	1.20	2.41
Brown bullhead	CAP-BB-061108-DB-003	6/11/2008	1	273	299	--	0.91	0.204
Brown bullhead	CAP-BB-061108-DB-004	6/11/2008	1	283	358	--	0.68	2.58
Brown bullhead	CAP-BB-061108-DB-005	6/11/2008	1	292	345	a, b, f	0.78	1.52
Northern pike	CAP-NP-061108-DB-001	6/11/2008	1	663	1603	d	0.32	0.223
Northern pike	CAP-NP-061108-DB-002	6/11/2008	1	672	2485	--	0.30	0.982
Northern pike	CAP-NP-061108-DB-003	6/11/2008	1	679	1991	d	0.38	0.897
Rock bass	CAP-RB-061108-DB-001	6/11/2008	1	182	140	--	0.64	1.47
Rock bass	CAP-RB-061108-DB-002	6/11/2008	1	197	171	g	0.91	1.35
Rock bass	CAP-RB-061108-DB-003	6/11/2008	1	223	279	--	0.74	1.01
Rock bass	CAP-RB-061108-DB-004	6/11/2008	1	188	141	--	0.62	1.38
Rock bass	CAP-RB-061108-DB-005	6/11/2008	1	223	303	--	0.83	2.38
Smallmouth bass	CAP-SB-061108-DB-001	6/11/2008	1	404	1104	--	3.00	1.63
Smallmouth bass	CAP-SB-061108-DB-002	6/11/2008	1	389	852	a	1.30	10.0
Smallmouth bass	CAP-SB-061108-DB-003	6/11/2008	1	390	1012	--	1.20	2.04
Smallmouth bass	CAP-SB-061108-DB-004	6/11/2008	1	341	616	d	1.30	0.190
Smallmouth bass	CAP-SB-061108-DB-005	6/11/2008	1	300	465	--	1.70	0.214
White sucker	CAP-WS-061108-DB-001	6/11/2008	1	461	1302	a	1.50	6.10
White sucker	CAP-WS-061108-DB-002	6/11/2008	1	403	1104	--	1.60	0.329
White sucker	CAP-WS-061108-DB-003	6/11/2008	1	406	919	a	1.10	0.842
White sucker	CAP-WS-061108-DB-004	6/11/2008	1	456	1271	--	1.70	1.66
White sucker	CAP-WS-061108-DB-005	6/11/2008	1	478	1517	a	1.30	1.85
Yellow perch	CAP-YP-061108-DB-001	6/11/2008	1	194	81	--	0.34	0.202
Yellow perch	CAP-YP-061108-DB-002	6/11/2008	1	172	45	--	0.27	0.121
Yellow perch	CAP-YP-061108-DB-003	6/11/2008	1	205	99	--	0.32	0.100
Yellow perch	CAP-YP-061108-DB-004	6/11/2008	1	169	57	--	0.54	0.0469 U
Yellow perch	CAP-YP-061108-DB-005	6/11/2008	1	180	64	--	0.54	0.0786 J
						Mean	0.95	1.50
						Minimum	0.27	0.0469 U
						Maximum	3.00	10.0

TABLE 5
2008 GM FISH SAMPLES ANALYZED FOR PCBS

RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

GENERAL MOTORS POWERTRAIN SITE
MASSENA, NEW YORK

Waterbody	St. Lawrence River							
Location / Fish Species	Sample ID	Date Collected	# Individuals	Length (mm)	Weight (g)	Notes	Lipids (%)	Total PCBs (mg/kg)
GM Cove								
Brown bullhead	COV-BB-061008-DB-001	6/10/2008	1	281	405	g	0.98	2.51
Brown bullhead	COV-BB-061008-DB-002	6/10/2008	1	261	277	b	0.84	1.43
Brown bullhead	COV-BB-061008-DB-003	6/10/2008	1	242	222	c	1.60	4.93
Brown bullhead	COV-BB-061008-DB-004	6/10/2008	1	264	310	--	1.20	0.0221 J
Brown bullhead	COV-BB-061008-DB-005	6/10/2008	1	248	233	--	0.98	0.978
Northern pike	COV-NP-061008-DB-001	6/10/2008	1	708	2445	d	0.54	2.28
Northern pike	COV-NP-061008-DB-002	6/10/2008	1	581	1295	d	0.74	6.23
Northern pike	COV-NP-061108-DB-003	6/11/2008	1	520	939	a	0.43	6.23
Northern pike	COV-NP-061108-DB-004	6/11/2008	1	574	1050	a	0.55	4.72
Northern pike	COV-NP-061108-DB-005	6/11/2008	1	523	790	g	0.34	5.05
Rock bass	COV-RB-061008-DB-001	6/10/2008	1	222	288	g	1.00	0.544
Rock bass	COV-RB-061008-DB-002	6/10/2008	1	228	289	--	0.54	7.34
Rock bass	COV-RB-061008-DB-003	6/10/2008	1	189	169	--	0.72	3.63
Rock bass	COV-RB-061108-DB-004	6/11/2008	1	198	196	--	0.74	0.747
Rock bass	COV-RB-061108-DB-005	6/11/2008	1	174	129	--	1.00	5.54
Smallmouth bass	COV-SB-061008-DB-001	6/10/2008	1	364	753	--	1.50	3.02
Smallmouth bass	COV-SB-061008-DB-002	6/10/2008	1	324	526	--	1.90	0.189
Smallmouth bass	COV-SB-061008-DB-003	6/10/2008	1	353	690	--	1.10	5.50
Smallmouth bass	COV-SB-061008-DB-004	6/10/2008	1	333	557	--	1.60	0.659
Smallmouth bass	COV-SB-061008-DB-005	6/10/2008	1	325	606	--	2.70	0.697
White sucker	COV-WS-061008-DB-001	6/10/2008	1	437	1053	c	0.76	14.4
White sucker	COV-WS-061008-DB-002	6/10/2008	1	432	1036	--	1.10	6.45
White sucker	COV-WS-061008-DB-003	6/10/2008	1	417	1045	--	2.20	1.36
White sucker	COV-WS-061108-DB-004	6/11/2008	1	453	1167	a	1.00	0.338
White sucker	COV-WS-061108-DB-005	6/11/2008	1	424	1037	--	0.92	0.753
Yellow perch	COV-YP-061008-DB-001	6/10/2008	1	197	92	--	0.68	0.196
Yellow perch	COV-YP-061008-DB-002	6/10/2008	1	189	70	--	0.44	0.402
Yellow perch	COV-YP-061108-DB-003	6/11/2008	1	202	91	--	0.61	0.733
Yellow perch	COV-YP-061108-DB-004	6/11/2008	1	220	119	--	0.43	0.140
Yellow perch	COV-YP-061108-DB-005	6/11/2008	1	261	198	--	0.50	0.0797
						Mean	0.99	2.90
						Minimum	0.34	0.0221 J
						Maximum	2.70	14.4

mm = millimeters
g = grams
mg/kg = milligrams per kilogram wet weight
J = estimated concentration
U = not detected; associated sample method detection limit provided.

Notes:

1. GM data were collected by ARCADIS personnel at three locations (Above Robert Moses Dam, GM Cap, Unnamed Tributary Near GM Foundry) from June 10 to 12, 2008. Samples were field processed within 24 hours and hard frozen prior to shipment to the laboratory.
2. All samples were processed as NYSDEC standard fillets.
3. Locations are shown on Figures 1 and 2.

Fish Anomalies

a) Sore/lesion
b) Missing barbel/s
c) Deformity
d) Hook scar
e) Cloudy eye
f) Eroded fin/s
g) Cut/puncture

TABLE 6
2008 GM FISH ANALYTICAL RESULT SUMMARY STATISTICS

RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

GENERAL MOTORS POWERTRAIN SITE
MASSENA, NEW YORK

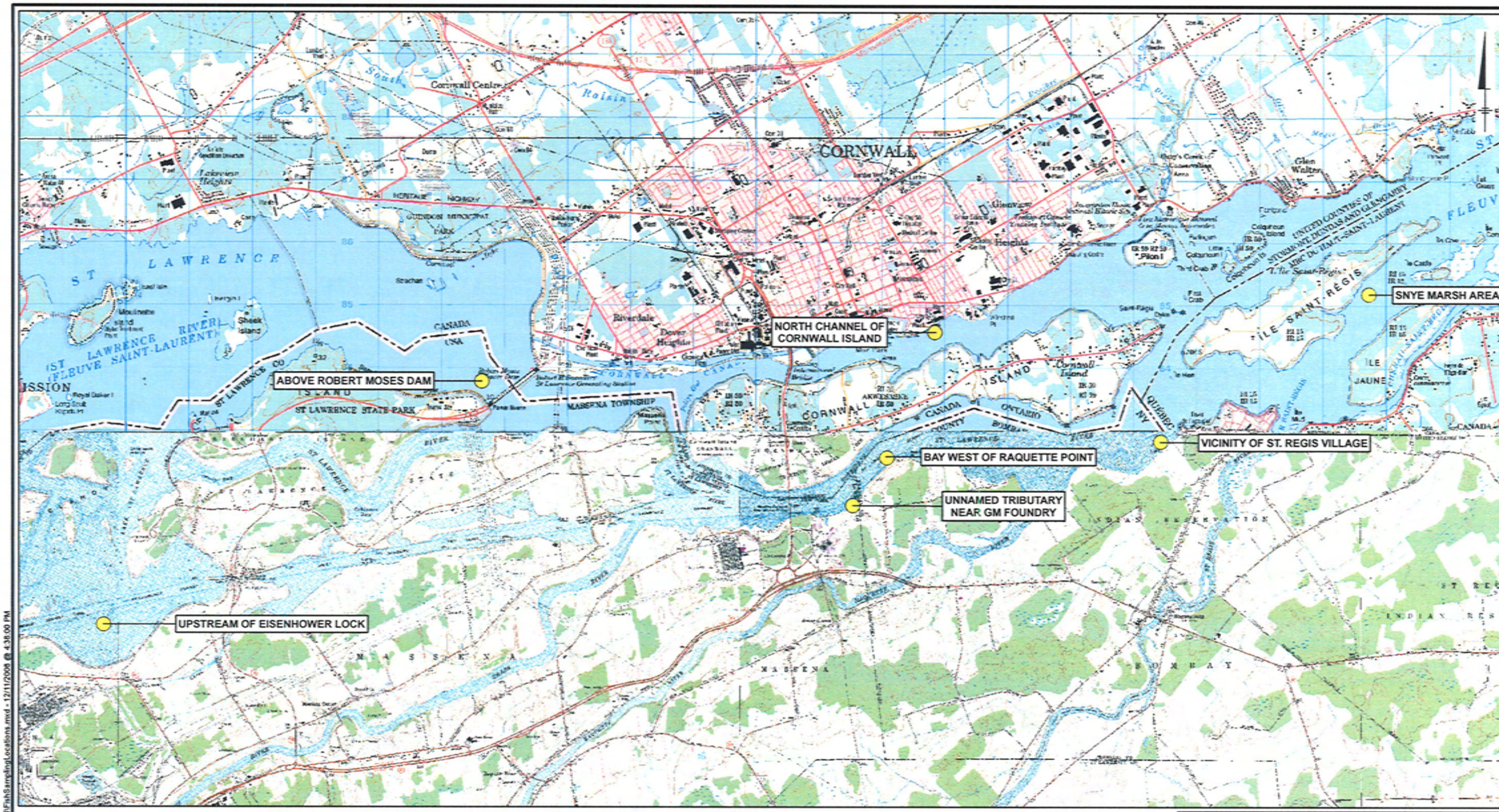
		Waterbody	St. Lawrence River							
Location	Analysis	Fish Species	Samples	Mean	Minimum	Maximum	Median	Variance	Standard Deviation	Coefficient Variation
Above Robert Moses Dam	PCBs (mg/kg)	Brown bullhead	5	0.0235	0.0095	0.0672	0.0095	6.25E-04	0.025	1.062
		Northern pike	3	0.0396	0.0095	0.0997	0.0095	0.00271	0.0521	1.316
		Rock bass	5	0.0306	0.0229	0.0536	0.0254	1.68E-04	0.013	0.423
		Smallmouth bass	5	0.177	0.125	0.226	0.186	0.0017	0.0412	0.233
		White sucker	5	0.0353	0.0095	0.08	0.0095	0.00126	0.0355	1.008
		Yellow perch	5	0.0122	0.0095	0.0219	0.0095	2.98E-05	0.00546	0.449
	Lipids (%)	Brown bullhead	5	1.578	0.7	3.1	1.3	9.91E-01	0.995	0.631
		Northern pike	3	0.497	0.4	0.56	0.53	7.23E-03	0.085	0.171
		Rock bass	5	1.29	0.95	1.7	1.3	8.30E-02	0.288	0.223
		Smallmouth bass	5	2.32	1.8	2.8	2.2	2.12E-01	0.46	0.198
		White sucker	5	1.56	1.1	2.2	1.3	2.53E-01	0.503	0.322
		Yellow perch	5	0.838	0.48	1.1	0.88	5.45E-02	0.233	0.279
	Lipid-Normalized PCBs (mg/kg-lipid)	Brown bullhead	5	1.32	0.7	2.2	1.2	3.07E-01	0.554	0.42
		Northern pike	3	9.467	1.7	24.9	1.8	1.79E+02	13.37	1.412
		Rock bass	5	2.38	1.8	3.2	2.2	4.12E-01	0.642	0.27
		Smallmouth bass	5	7.62	6.6	9.3	7.2	1.20E+00	1.094	0.144
		White sucker	5	2.28	0.5	5.7	0.9	5.25E+00	2.292	1.005
		Yellow perch	5	1.5	1	2	1.4	2.30E-01	0.48	0.32
GM Embayment	PCBs (mg/kg)	Brown bullhead	5	1.404	0.204	2.58	1.52	1.265	1.125	0.801
		Northern pike	3	0.701	0.223	0.982	0.897	0.173	0.416	0.594
		Rock bass	5	1.518	1.01	2.38	1.38	0.263	0.513	0.338
		Smallmouth bass	5	2.815	0.19	10	1.63	16.82	4.101	1.457
		White sucker	5	2.156	0.329	6.1	1.66	5.24	2.289	1.062
		Yellow perch	5	0.105	0.0235	0.202	0.1	0.00426	0.0653	0.621
	Lipids (%)	Brown bullhead	5	0.854	0.68	1.2	0.78	0.0456	0.213	0.25
		Northern pike	3	0.333	0.3	0.38	0.32	0.00173	0.0416	0.125
		Rock bass	5	0.748	0.62	0.91	0.74	0.0153	0.124	0.165
		Smallmouth bass	5	1.7	1.2	3	1.3	0.565	0.752	0.442
		White sucker	5	1.44	1.1	1.7	1.5	0.058	0.241	0.167
		Yellow perch	5	0.402	0.27	0.54	0.34	0.0165	0.129	0.32
	Lipid-Normalized PCBs (mg/kg-lipid)	Brown bullhead	5	168	22	379	195	20820	144.3	0.859
		Northern pike	3	211	70	327	236	16981	130.3	0.618
		Rock bass	5	204.8	136	287	223	3921	62.62	0.306
		Smallmouth bass	5	204.2	13	769	54	103771	322.1	1.578
		White sucker	5	149	21	407	98	22696	150.7	1.011
		Yellow perch	5	30.8	4	59	31	491.2	22.16	0.72
GM Cove	PCBs (mg/kg)	Brown bullhead	5	1.974	0.0221	4.93	1.43	3.531	1.879	0.952
		Northern pike	5	4.902	2.28	6.23	5.05	2.614	1.617	0.33
		Rock bass	5	3.56	0.544	7.34	3.63	8.806	2.967	0.834
		Smallmouth bass	5	2.013	0.189	5.5	0.697	5.016	2.24	1.113
		White sucker	5	4.66	0.338	14.4	1.36	35.73	5.977	1.283
		Yellow perch	5	0.31	0.0797	0.733	0.196	0.0706	0.266	0.857
	Lipids (%)	Brown bullhead	5	1.12	0.84	1.6	0.98	0.0886	0.298	0.266
		Northern pike	5	0.52	0.34	0.74	0.54	0.0226	0.15	0.289
		Rock bass	5	0.8	0.54	1	0.74	0.0394	0.198	0.248
		Smallmouth bass	5	1.76	1.1	2.7	1.6	0.358	0.598	0.34
		White sucker	5	1.196	0.76	2.2	1	0.33	0.575	0.481
		Yellow perch	5	0.532	0.43	0.68	0.5	0.012	0.109	0.206
	Lipid-Normalized PCBs (mg/kg-lipid)	Brown bullhead	5	167.2	2	308	170	14881	122	0.73
		Northern pike	5	1011	422	1485	858	203853	451.5	0.446
		Rock bass	5	514.4	54	1359	504	274473	523.9	1.018
		Smallmouth bass	5	155.6	10	500	41	42950	207.2	1.332
		White sucker	5	531.8	34	1895	82	633022	795.6	1.496
		Yellow perch	5	57.8	16	120	33	2041	45.17	0.782

mg/kg = milligrams per kilogram wet weight

Notes:

1. GM data were collected by ARCADIS personnel at three locations (Above Robert Moses Dam, GM Cap, Unnamed Tributary Near GM Foundry) from June 10 to 12, 2008.
2. Mean PCB concentrations for 2008 fillet results were calculated using half the detection limit for sample results found to be non-detect.
3. All samples were processed as NYSDEC standard fillets.
4. Locations are shown on Figures 1 and 2.

Figures



NOTES:

1. CANADA QUAD MAPS DOWNLOADED FROM GEOGRATIS AT http://www.geogratis.ca/
2. NEW YORK STATE QUAD MAPS DOWNLOADED FROM LIBRE MAP PROJECT AT http://libremap.org/

0 5,000 10,000 Feet

GRAPHIC SCALE

GENERAL MOTORS POWERTRAIN SITE, MASSENA, NEW YORK

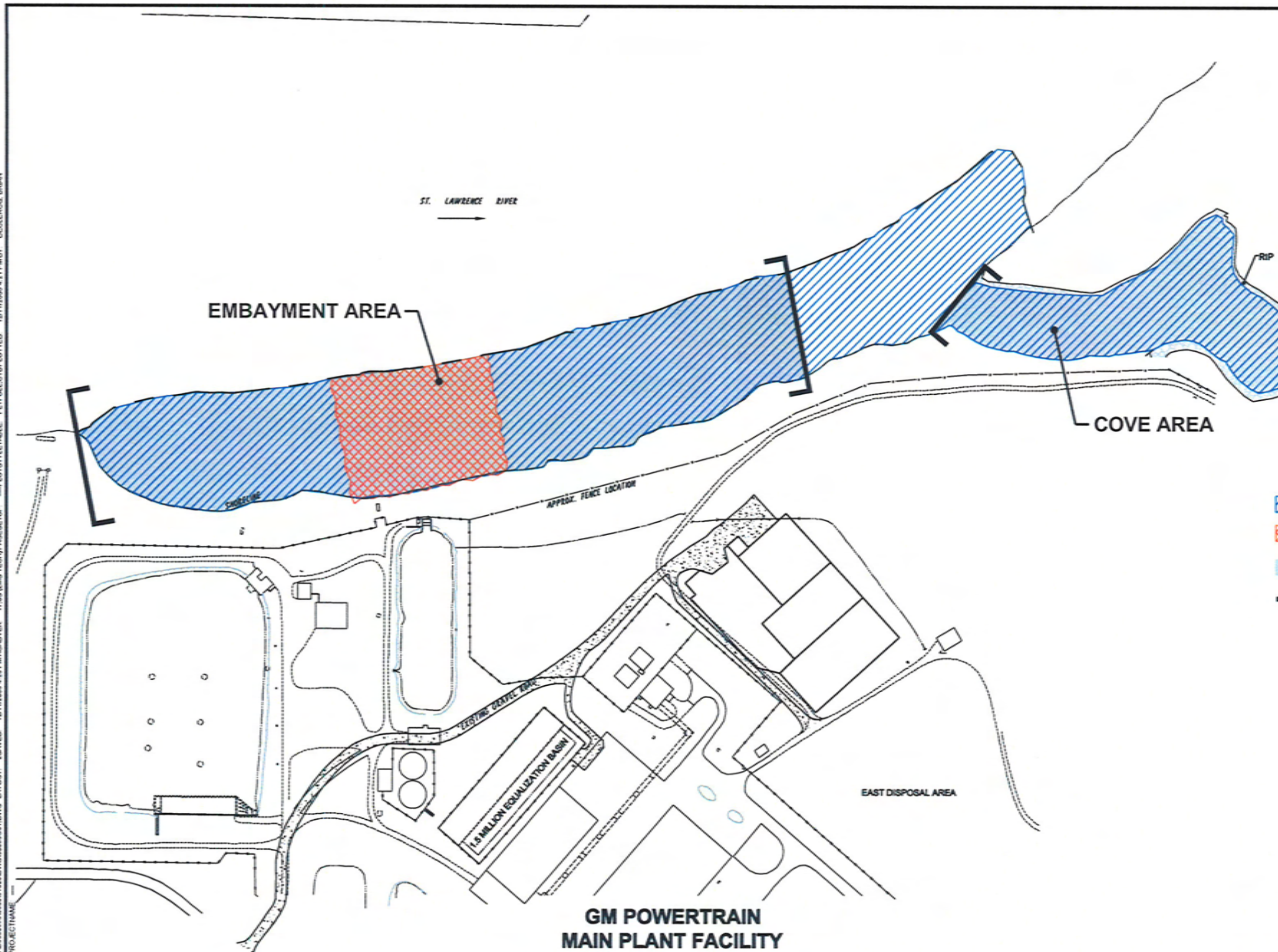
RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

HISTORIC ST. LAWRENCE RIVER FISH SAMPLING LOCATIONS

ARCADIS

FIGURE 1

CITY: SYR DIV/GROUP: AT DB: AMB KEW
GENERAL MOTORS (B0005096.0000.51020)
G:\GeneralMotors\Massena\Basemapping\mxd\FishSamplingLocations.mxd - 12/11/2008 @ 4:38:00 PM



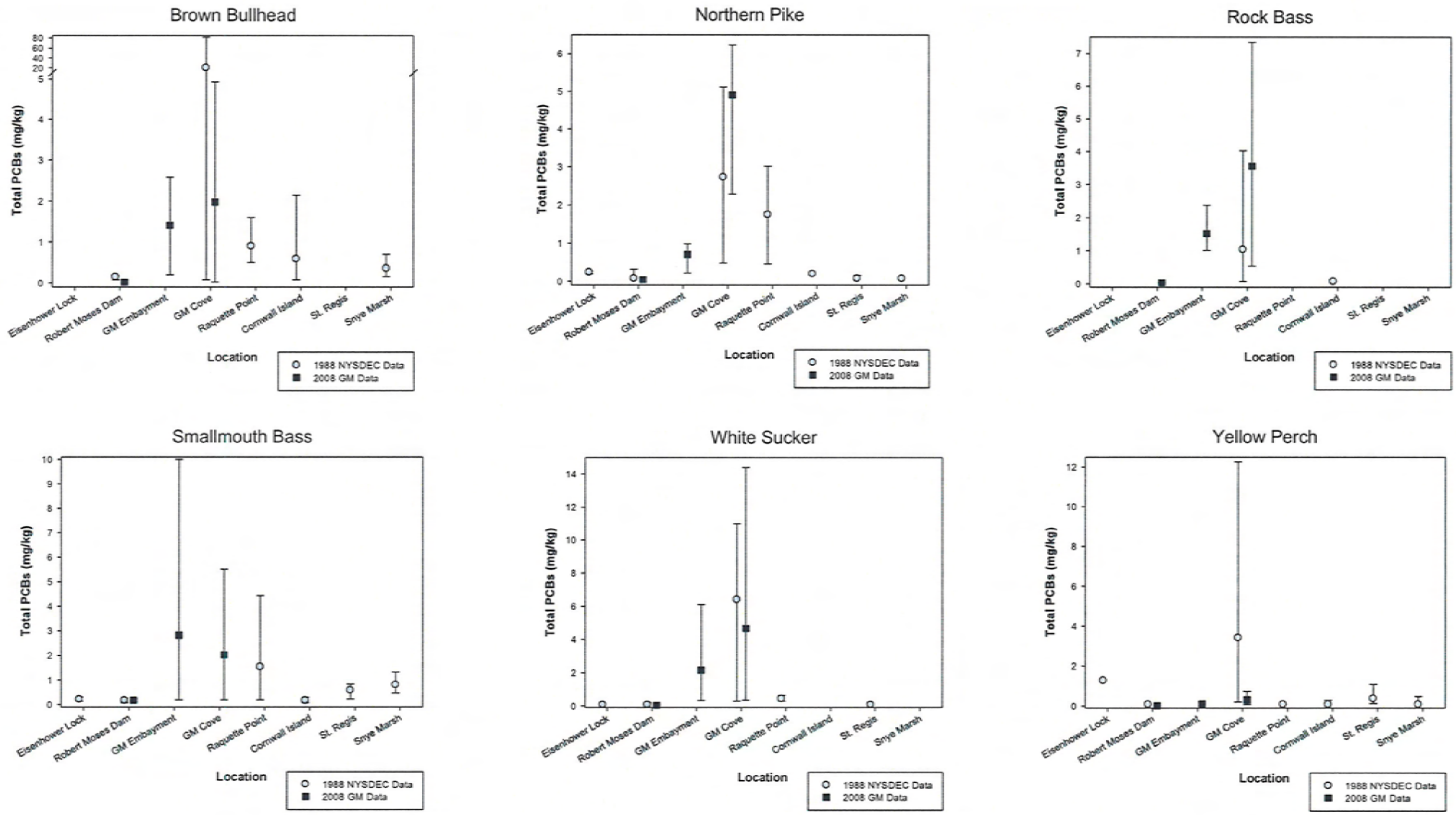
GENERAL MOTORS POWERTRAIN SITE, MASSENA, NEW YORK

RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

ST. LAWRENCE RIVER FISH SAMPLING LOCATIONS IN THE VICINITY OF GM

ARCADIS

FIGURE **2**



NOTE:

1. ARITHMETIC MEANS AND MINIMUM AND MAXIMUM CONCENTRATIONS ARE SHOWN.

GENERAL MOTORS POWERTRAIN SITE, MASSENA, NEW YORK
RESULTS OF 2008 FISH COLLECTION ACTIVITIES TO EVALUATE FISH CONSUMPTION ADVISORY IN REMEDIATED COVE, ST. LAWRENCE RIVER

1988 NYSDEC AND 2008 GM MEAN TOTAL PCBs IN FISH FILLETS

ARCADIS

FIGURE 3

Appendices

Appendix A

Field Notes

2008 GM, Massena, NY Fish Sampling – Fish Consumption Advisory Evaluation

6/10/08

Crew: DJB, MHF, DEC
Oversight: None
Weather: Overcast, 80's F

4:45pm – 5:30pm Sample Prep

Met Richard Boelter of Arcadis at Loram's Marina and discuss sampling plan. Launch 16ft Smith Boat 7.5 GPP electrofishing boat.

5:30pm – 8:00pm Fish Sampling – Cove

Crew boat electrofishes in the cove, beginning in the back of the cove by the unnamed tributary, and eventually working towards the mouth. Many fish were observed, including adults. Water clarity was moderately turbid. Fish habitat was primarily moderate to dense tall stands of aquatic vegetation with rocks occurring along the shoreline.

Most fish were collected from the middle to the back of the cove where more intensive sampling occurred. Fish collected included brown bullhead, N. Pike, pumpkinseed, rock bass, smallmouth bass, white sucker, and yellow perch.

Fish observed:

6/10
- white sucker – many
- silver redhorse – few
- falthfish – several
- bluntnose minnow – some
- yellow perch – many small, few large
- fathead minnow – some
- spottail shiner – many
- rockbass – several
- pumpkinseed – several
- round goby – many
- tesselated darter – 1
- golden shiner – some
- log perch – some

6/10
- smallmouth bass – several
- brown bullhead – many
- American eel – few

6/11
- muskellunge – 1
- bluegill – 2
- carp – 1 small
- walleye – 3 small
- ~~silver~~ shiner – few emerald

6/11/08

Crew: DJB, MHF, DEC
Oversight: None
Weather: Mostly sunny, 80's F

4:30 am - 6:00 am **Fish Sampling - Cove**

Crew boat electrofishes in the cove, completing several passes again like yesterday. Additional N. pike, pumpkinseed, rock bass, white sucker, and yellow perch are collected. Like yesterday, fish are individually bagged and placed on ice in preparation for sample processing and to be hard frozen in a chest freezer within 24 hours of collection

Additional fish observed (see species list on 6/10/08)

6:00 am - 8:00 am **Fish Sampling - GM Embayment**

Crew boat electrofishes over the cap, and then extends the sampling to the western portion and eastern portion of the embayment area adjacent to the cap. Vegetation has just begun to sprout in the entire embayment area and provides little cover for large fish; Rocks are currently the predominant fish habitat. Few fish were observed. Some brown bullhead, rock bass, smallmouth bass, and walleye collected from cap and adjacent areas in embayment. Water clear.

Fish observed:

6/11 day
- silver lamprey - 1
- freshwater drum - 2
- smallmouth bass - 9
- rockbass - several small
- brown bullhead - 2
- fallfish - 2
- walleye - 2
- silver redhorse - 4
- gobies - many
- logperch - several

6/11 day
- american eel - 2
- white sucker - few small
- no minnows, sunfish, pike

6/11 night
- yellow perch - several, mostly small
- smelt - few
- N. pike - few
- spottail shiner - several

9:00am – 12 NOON **Fish Sampling – Upstream Robert Moser Dam**

Crew boat electrofished the northeast shoreline of Barnhart Island to within approximately 1,500 ft of the dam. Rocks are the predominant fish habitat; very little aquatic vegetation has either sprouted or is present at this area. Few fish of game were observed. Small fish were present primarily in the 1 or 2 small stands of willows along the shore. Water was clear. Some carp, smallmouth bass, brown bullhead, and y. perch collected. Fish observed:

6/11
- carp – many
- fallfish – some
- banded killifish – some
- cutlips minnow – 1
- smallmouth bass – ~~few~~ several 6/11+12
- blintnose minnow – several
- spottail shiner – several

6/11
- silver ~~sea~~ lamprey – 3
- yellow perch – ~~X~~ several, mostly small 6/11+12
- brown bullhead – ~~few~~ some, mostly small 6/11+12
- rock bass – ~~5 some~~ several small 6/11+12
- round goby – some
- white sucker – ~~1 small~~ many 6/11+12

6/12
- spotted gar – 1
- smelt – 1
- pumpkinseed – 1 small

1:00pm – 4:30pm **Sample Processing**

Location	Species	Date Collected	Sample ID	# Indiv.	Length (cm)	Weight (g)	Notes
Cove	smallmouth bass	6/10/08	CoV-SB-061008-DB-001	1	36.4	753	NM
	1		-002	1	32.4	526	NM
	1		-003	1	35.3	690	NM
	1		-004	1	33.3	557	NM
	1		-005	1	32.5	606	NM
	brown bullhead	6/10/08	CoV-BB-061008-DB-001	1	28.1	405	2
	1		-002	1	26.1	277	3
	1		-003	1	24.2	222	4
	1		-004	1	26.4	310	NM
	1		-005	1	24.8	233	NM
	Northern Pike	6/10/08	CoV-NP-061008-DB-001	1	70.8	2445	5
	1		-002	1	58.1	1295	5
	8	6/11/08	CoV-NP-061108-DB-003	1	52.0	939	6
	9		-004	1	57.4	1050	6
	9		-005	1	52.3	790	7

6 = lesions, 7 = cut on side, 8 = mouth of cove, 9 = back half of cove

NM = no marks/anomalies, 1 = all collected at back of cove, 2 = puncture wound on L. side

3 = eroded inner L. chin barbel, 4 = deformed ~~adipose~~ fin, 5 = hook scar ~~on R. mandible~~

Location	Species	Date Collected	Sample ID	# Indiv.	length (cm)	weight (g)	Notes
Cove	Yellow perch[1]	6/10/08	COV-YP-061008-DB-001	1	19.7	92	NM
	1		-002		18.9	70	NM
	1	6/11/08	COV-YP-061108-DB-003		20.2	91	NM
	1		-004		22.0	119	NM
	1		-005		26.1	198	NM
	Pumpkinseed[2]	6/10/08	COV-PS-061008-DB-001	1	14.6	72	NM
	2	6/11/08	COV-PS-061108-DB-002		14.0	71	NM
	2		-003		13.7	73	NM
	2		-004		13.8	66	NM
	2		-005		13.4	54	NM
	White sucker[1]	6/10/08	COV-WS-061008-DB-001	1	43.7	1053	3
	1		-002		43.2	1036	NM
	1		-003		41.7	1045	NM
	1	6/11/08	COV-WS-061108-DB-004		45.3	1167	5
	4		-005		42.4	1037	NM
	Rock bass[2]	6/10/08	COV-RB-061008-DB-001	1	22.2	288	6
	1		002		22.8	289	NM
	1		003		18.9	169	NM
	4	6/11/08	COV-RB-061108-DB-004		19.8	196	NM
	4		-005		17.4	129	NM

chest freezer temperature = 5° F ; scales or spines taken for potential age analysis

8:00pm - 2:00am Fish Sampling - GM Embayment

Crew boat electrofished the entire embayment area. Many more adult fish were present during night fishing than day fishing. From the shoreline to up to 10 ft of water, we collected additional brown bullhead, rock bass, and smallmouth bass, and added some N. pike, white sucker, and yellow perch. Walleye were released. No pumpkinseed observed.

Additional fish observed (see list on previous page)

1 = back half of cove, NM = no marks, 2 = back of cove, 3 = deformed depressions on side
4 = mouth of cove, 5 = lesion, 6 = healed cut on side
COV = cove, DB = Dave Buys as required by GM Encore sample ID protocol

6/12/08

Crew: DJB, MHF, DEC
Oversight: None
Weather: Mostly sunny, ~~80's~~ ~70's F

6:00am - 9:15am Sample Processing - chest freezer temperature 5° F

Location	Species	Date Collected	Sample ID	# Indiv	length (cm)	weight (g)	Notes
GM cap	Rockbass	6/11/08 (am)	Cap-RB-061108-DB-001	1	18.2	140	ds NM
			-002		19.7	171	ds, 1
		6/11/08 (pm)	-003		22.3	279	cap NM
			-004		18.8	141	cap NM
			-005		22.3	303	cap NM
	Smallmouth bass	6/11/08 (am)	Cap-SB-061108-DB-001	1	40.4	1164	cap NM
			-002		38.9	852	ds ~~NM~~ 2
		6/11/08 (pm)	-003		39.0	1012	ds NM
			-004		34.1	616	ds 3
			-005		30.0	465	cap NM
	Yellow perch	6/11/08 (pm)	Cap-YP-061108-DB-001	1	19.4	81	cap NM
			-002		17.2	45	~~cap~~ cap NM
			-003		20.5	99	us NM
			-004		16.9	57	us NM
			-005		18.0	64	us NM
	Brown bullhead	6/11/08 (pm)	Cap-BB-061108-DB-001	1	29.1	402	us NM
			-002		25.9	241	us NM
			-003		27.3	299	us NM
			-004		28.3	358	us NM
			-005		29.2	345	us 4,5,6
	White sucker	6/11/08 (pm)	Cap-WS-061108-DB-001	1	46.1	1302	cap 5
			-002		40.3	1109	cap NM
			-003		40.6	919	us 7
			-004		45.6	1271	us NM
			-005		47.8	1517	us 7
	Northern pike	6/11/08 (pm)	Cap-NP-061108-DB-001	1	66.3	1603	ds 3
			-002		67.2	2485	cap NM
			-003		67.9	1991	~~ds~~ us 3

ds = downstream cap, cap = on cap, us = upstream cap, NM = no marks/anomalies
am = in the morning (~ 0700 hrs); pm = in the evening (~ 2330 hrs)
1 = laceration, 2 = inflamed anus, 3 = hooks scar, 4 = eroded fins, 5 = lesion, 6 = missing R. nose barbel, 7 = red sores (not open)

Location[2]	Species	Date Collected	Sample ID	# Indiv	length (cm)	Weight (g)	Notes
Upstream RMS dam	Smallmouth bass	6/11/08	Dam-SB-061108-DB-001	1	38.1	1157	NM
			-002		35.8	918	NM
			-003		30.0	471	NM
			-004		36.0	876	1
			-005		40.1	1100	NM

11:00pm – 3:30pm **Fish Sampling – Upstream RMS Dam**

Crew boat electrofished again the northeast side of Barnhart Island to within 1500 ft of the dam again. Very few fish observed again during daylight hours, and little aquatic vegetation was present, although, some dense, tall stands were found away from the shoreline in deeper water (7-10 ft.). Water was clear. No new fish species observed. No fish collected.

7:00pm – 3:00am **Fish Sampling – Upstream RMS Dam**

Crew conducts recon of area and decides to extend sampling area to the island just southwest of Barnhart Island due to somewhat better habitat (i.e. natural shoreline vs. riprap near the dam). Both northeast of Barnhart Island and the island southwest of it (just portions of the eastern shoreline) were sampled using boat electrofishing at night, and many more adult fish were observed. Species collected included yellow perch, brown bullhead, rock bass, white sucker, and northern pike. No large pumpkinseed observed.

Additional fish species added to 6/11/08 list.

Fish placed in chest freezer

RMS = Robert Moses Sandees, NM = no marks/anomalies, 1 = eroded fin/s
2 = collected from northeast shore of Barnhart Island

6/13/08

Crew: DJB, MHF, DEC
Oversight: None
Weather: Mostly sunny, 70's F

9:30am – 1:00pm Sample Processing

Location[2]	Species	Date Collected	Sample ID	# Indiv	Length (cm)	Weight (g)	Notes
Upstream RMS Dam	Rockbass	6/12/08	Dam-RB-061208-DB-001	1	18.5	176	NM
			-002		19.3	170	6
			-003		18.5	164	6
			-004		19.7	192	NM
			-005		18.1	168	NM
	Yellow perch	6/12/08	Dam-YP-061208-DB-001	1	24.1	191	NM
			-002		26.2	233	NM
			-003		20.5	105	NM
			-004		18.7	89	NM
			-005		19.5	105	NM
	Brown bullhead	6/12/08	Dam-BB-061208-DB-001	1	29.7	303	3,4
			-002		25.7	245	NM
			-003		32.2	542	NM
			-004		23.4	208	NM
			-005		24.2	195	NM
	White Sucker	6/12/08	Dam-WS-061208-DB-001	1	39.3	838	NM
			-002		42.6	1152	5
			-003		45.1	1162	3
			-004		49.4	1828	3
			-005		48.5	1472	NM
	Northern Pike	6/12/08	Dam-NP-061208-DB-001	1	69.0	2119	7
			-002		69.0	1726	7
			-003		70.5	2352	8

Chest freezer temperature = 7° F

RMS = Robert Moses Sanders, 1 = ~~northeast shoreline Barnhart Island~~ south of island just west of Barnhart Island, 2 = east shoreline, NM = nematodes/anomalies, 3 = open sores
4 = missing lnose and chin barbel, 5 = eroded fins, 6 = cloudy eye, 7 = lesion, 8 = hookscar

Appendix B

Chain of Custody Forms

GM REALM ENCORE

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

PAGE 1 OF 3

ID # № 02607

SSOW Ref. Code: R0001011

Required Client Information:

Company: ARCADIS	Report To: Dave Buys
Address: 6723 Towpath Rd Syracuse, NY 13214	Copy To: Richard Boelter
	Invoice To: Richard Boelter
	P.O.:
Phone: 315-446-9120	Project Name: GM Fish Sampling
Fax: 315-449-0017	Project Number: 30045.51020
E-mail: dave.buys@arcadis-us.com	

Laboratory: Pace Analytical	
Laboratory Location: Green Bay, WI	
Laboratory Contact: Ted Naltenayer	
Requested Due Date: standard	TAT:
QA/QC Requirements: see CRA SSOW and NYSDEC protocol.	

Valid Matrix Codes: WG Groundwater; WB Borehole Water; WS Surface Water; SO Soil; SE Sediment; See Back for Additional Codes

Analysis and Method

	Sample Identification:	Matrix Code	Date Collected	Time Collected	# Containers	Preservative: Unpreserved	HCl	H2SO4	HNO3	NaOH	Other: frozen/ice	PCB Aroclors	% Lipids	Remarks/Lab ID
1.	COV-SB-061008-DB-001	TA	6/10/08	1900	1						X	X	X	fillet fish following
2.	-002													NYSDEC standard
3.	-003													fillet protocol (see
4.	-004													attached). Analyze
5.	-005													fillets for PCB
6.	COV-BB-061008-DB-001		6/10/08	1900										Aroclors and %lipids
7.	-002													following CRA
8.	-003													SSOW and NYSDEC
9.	-004													protocol. Weigh fillets
10.	-005													
11.	COV-NP-061008-DB-001		6/10/08	1900										* hold fish in frozen
12.	-002													storage until further
13.	COV-NP-061108-DB-003		6/11/08	0500										notice before
14.	-004													processing
15.	-005													
	TOTAL NUMBER OF CONTAINERS				15									

SHIPMENT METHOD	NO. OF COOLERS	RELINQUISHED BY / AFFILIATION	DATE	TIME	RECEIVED BY / AFFILIATION	DATE	TIME
Fed Ex priority	2	Dave Buys	6/12/08	1330			
AIRBILL NO. 8616 3602 9560		ARCADIS					

Sample Condition

Temp in °C	
Received on Ice	Y / N
Sealed Cooler	Y / N
Samples Intact	Y / N

Additional Comments:

Sampler Name: Dave Buys

Sampler Signature: Date: 6/12/08

Distribution: WHITE - Fully Executed Copy YELLOW - Receiving Laboratory Copy PINK - Sampler Copy

REV. 0 (6-04)

GM REALM ENCORE

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

PAGE 2 OF 3

ID # № 02608

SSOW Ref. Code: RØØ1Ø11

Required Client Information: See page 1

Company:	Report To:	
Address:	Copy To:	
	Invoice To:	
	P.O.:	
Phone:	Project Name:	
Fax:	Project Number:	
E-mail:		

Laboratory:	See page 1
Laboratory Location:	
Laboratory Contact:	
Requested Due Date:	TAT:
QA/QC Requirements:	

Valid Matrix Codes: WG Groundwater; WB Borehole Water; WS Surface Water; SO Soil; SE Sediment; See Back for Additional Codes

Analysis and Method

	Sample Identification:	Matrix Code	Date Collected	Time Collected	# Containers	Preservative: Unpreserved	HCl	H2SO4	HNO3	NaOH	Other: Na2S2O3/ice	PCB Aroclors	2o lipids	Remarks/Lab ID
1.	CoV-YP-061908-DB-001	TA	6/10/08	1900	1						X	X	X	see remarks on page 1
2.	↓ ↓ ↓ ↓ -002	↓	↓	↓	↓						↓	↓	↓	
3.	CoV-YP-061108-DB-003		6/11/08	0500										
4.	↓ ↓ ↓ ↓ -004		↓	↓										
5.	↓ ↓ ↓ ↓ -005		↓	↓										
6.	CoV-PS-061008-DB-001		6/10/08	1400										
7.	CoV-PS-061108-DB-002		6/11/08	0500										
8.	↓ ↓ ↓ ↓ -003		↓	↓										
9.	↓ ↓ ↓ ↓ -004		↓	↓										
10.	↓ ↓ ↓ ↓ -005		↓	↓										
11.	CoV-WS-061008-DB-001		6/10/08	1900										
12.	↓ ↓ ↓ ↓ -002		↓	↓										
13.	↓ ↓ ↓ ↓ -003		↓	↓										
14.	CoV-WS-061108-DB-004		6/11/08	0500										
15.	↓ ↓ ↓ ↓ -005	↓	↓	↓	↓						↓	↓	↓	
	TOTAL NUMBER OF CONTAINERS				15									

SHIPMENT METHOD	NO. OF COOLERS	RELINQUISHED BY / AFFILIATION	DATE	TIME	RECEIVED BY / AFFILIATION	DATE	TIME
See page 1		Dave Buys	6/12/08	1330			
AIRBILL NO.		ARCADIS					

Sample Condition

Temp in °C	
Received on Ice	Y / N
Sealed Cooler	Y / N
Samples Intact	Y / N

Additional Comments:

Sampler Name: Dave Buys

Sampler Signature: Date: 6/12/08

Distribution: WHITE - Fully Executed Copy YELLOW - Receiving Laboratory Copy PINK - Sampler Copy

REV: 0 (6/04)

GM REALM

ENCORE

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

ID # № 02609

SSOW Ref. Code: RØØ1Ø11

Required Client Information: See page 1

Company:	↓	Report To:	↓
Address:		Copy To:	
		Invoice To:	
		P.O.:	
Phone:		Project Name:	
Fax:		Project Number:	↓
E-mail:	↓		

Laboratory:	See page 1		
Laboratory Location:			
Laboratory Contact:			
Requested Due Date:		TAT:	
QA/QC Requirements:	↓		

Valid Matrix Codes: WG Groundwater, WB Borehole Water, WS Surface Water, SO Soil, SE Sediment. See Back for Additional Codes

	Sample Identification	Matrix Code	Date Collected	Time Collected	# Containers	Preservative: Unpreserved	HCl	H2SO4	HNO3	NaOH	Other: frozen/ice	Analysis and Method: PCB Aroclor	% lipids	Remarks/Lab ID
1.	COV-RB-061008-DB-001	TA	6/10/08	1900	1						X	X	X	See remarks on page 1
2.	-002	↓			↓						↓	↓	↓	
3.	↓ ↓ ↓ ↓ -003		↓	↓										
4.	COV-RB-061108-DB-004		6/11/08	0500										
5.	↓ ↓ ↓ ↓ -005	↓	↓	↓	↓						↓	↓	↓	
6.														
7.														
8.														
9.														
10.														
11.														
12.														
13.														
14.														
15.														
	TOTAL NUMBER OF CONTAINERS				5									

SHIPMENT METHOD	NO. OF COOLERS	RELINQUISHED BY / AFFILIATION	DATE	TIME	RECEIVED BY / AFFILIATION	DATE	TIME
See page 1		Dave Buys ARCADIS	6/12/08	1330			
AIRBILL NO.		(signature)					

Sample Condition

Temp in °C	
Received on Ice	Y / N
Sealed Cooler	Y / N
Samples Intact	Y / N

Additional Comments:

Sampler Name: Dave Buys

Sampler Signature: (signature) Date: 6/12/06

Distribution: WHITE - Fully Executed Copy YELLOW - Receiving Laboratory Copy PINK - Sampler Copy

REV. 040904

GM REALM ENCORE

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

PAGE 1 OF ~~2~~ 4

ID # № 02610

SSOW Ref. Code: R001011

Required Client Information:

Company: ARCADIS	Report To: Dave Buys
Address: 6723 Towpath Rd	Copy To: Richard Boelter
Syracuse, NY 13214	Invoice To: Richard Boelter
	P.O.:
Phone: 315-446-9120	Project Name: GM Fish Sampling
Fax: 315-449-0017	Project Number: 50095.51020
E-mail: dave.buys@arcadis-us.com	

Laboratory: Pace Analytical	
Laboratory Location: Green Bay, WI	
Laboratory Contact: Tod Noltemeyer	
Requested Due Date: standard	TAT:
QA/QC Requirements: see CRA SSOW and NYSDEC protocol.	

Valid Matrix Codes: WG Groundwater, WB Borehole Water, WS Surface Water, SO Soil, SE Sediment, See Back for Additional Codes

Preservative / Analysis and Method

#	Sample Identification	Matrix Code	Date Collected	Time Collected	# Containers	Unpreserved	HCl	H2SO4	HNO3	NaOH	Other: frozen/ice	PCB Aroclors	% lipids	Remarks/Lab ID
1.	Cap-RB-061108-DB-001	TA	6/11/08	0700	1						X	X	X	fillet fish following
2.	-002	↓	↓	↓	↓						↓	↓	↓	NYSDEC standard
3.	~~Cap-RB~~ -003			2330										fillet protocol (see
4.	-004													previous attachment)
5.	-005			↓										Analyze fillets for PCB
6.	Cap-SB-061108-DB-001			0700										Aroclors and % lipids
7.	-002			↓										following CRA SSOW
8.	-003			2330										and NYSDEC protocol
9.	-004													(previously attached)
10.	-005			↓										Weigh fillets.
11.	Cap-YP-061108-DB-001			2330										
12.	-002													* hold fish in freezer
13.	-003													until further notice
14.	-004													before processing
15.	-005	↓	↓	↓	↓						↓	↓	↓	

TOTAL NUMBER OF CONTAINERS: 15

SHIPMENT METHOD	NO. OF COOLERS	RELINQUISHED BY / AFFILIATION	DATE	TIME	RECEIVED BY / AFFILIATION	DATE	TIME
Fed Ex priority	4	Dave Buys [signature] ARCADIS	6/13/08	1330			
AIRBILL NO. 8623 9487 9898							

Sample Condition

Temp in °C	
Received on Ice	Y / N
Sealed Cooler	Y / N
Samples Intact	Y / N

Additional Comments:

Sampler Name: Dave Buys

Sampler Signature: [signature] Date: 6/13/08

Distribution: WHITE - Fully Executed Copy YELLOW - Receiving Laboratory Copy PINK - Sampler Copy

REV. 01/6/04

CHAIN-OF-CUSTODY / Analytical Request Document

GM REALM ENCORE

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PAGE 2 OF ~~X~~ 4

ID # № 02611

SSOW Ref. Code: R001 011

Required Client Information: See page 1

Company:	↓	Report To:	↓
Address:		Copy To:	
		Invoice To:	
		P.O.:	
Phone:		Project Name:	
Fax:		Project Number:	↓
E-mail:	↓		

Laboratory: See page 1	
Laboratory Location: ↓	
Laboratory Contact:	
Requested Due Date:	TAT:
QA/QC Requirements: ↓	

Valid Matrix Codes: WG Groundwater, WB Borehole Water, WS Surface Water, SO Soil, SE Sediment. See Back for Additional Codes

	Sample Identification	Matrix Code	Date Collected	Time Collected	# Containers	Unpreserved	HCl	H2SO4	HNO3	NaOH	Other: frozen/ice	PCB Aroclors	% lipids	Remarks/Lab ID
1.	Cap-BB-061108-DB-001	TA	6/11/08	2330	1						X	X	X	See remarks on page 1
2.	-002	↓	↓	↓	↓						↓	↓	↓	
3.	-003													
4.	-004													
5.	-005													
6.	Cap-WS-061108-DB-001													
7.	-002													
8.	-003													
9.	-004													
10.	-005													
11.	Cap-NP-061108-DB-001													
12.	-002													
13.	-003	↓	↓	↓	↓						↓	↓	↓	
14.														
15.														

TOTAL NUMBER OF CONTAINERS: 13

SHIPMENT METHOD	NO. OF COOLERS	RELINQUISHED BY / AFFILIATION	DATE	TIME	RECEIVED BY / AFFILIATION	DATE	TIME
See page 1		Dave Buys [signature] ARCADIS	6/13/08	1330			
AIRBILL NO.							

Sample Condition

Temp in °C	
Received on Ice	Y / N
Sealed Cooler	Y / N
Samples Intact	Y / N

Additional Comments:

Sampler Name: Dave Buys

Sampler Signature: [signature] Date: 6/13/08

Distribution: WHITE - Fully Executed Copy YELLOW - Receiving Laboratory Copy PINK - Sampler Copy

REV. 0 (6/04)

GM REALM ENCORE

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

PAGE 3 OF 4

ID # № 02613

SSOW Ref. Code: RØØ1Ø11

Required Client Information: See page 1

Company:		Report To:	
Address:		Copy To:	
		Invoice To:	
		P.O.:	
Phone:		Project Name:	
Fax:		Project Number:	
E-mail:			

Laboratory: See page 1		
Laboratory Location:		
Laboratory Contact:		
Requested Due Date:	TAT:	
QA/QC Requirements:		

Analysis and Method

Preservative

Sample Identification:	Matrix Code	Date Collected	Time Collected	# Containers	Unpreserved	HCl	H2SO4	HNO3	NaOH	Other: Frozen/Ice	PCB Aroclors	% Solids	Remarks/Lab ID
1. DAM-SB-061108-DB-001	TA	6/11/08	1030	1						X	X	X	See remarks on page 1
2. -002													
3. -003													
4. -004													
5. -005													
6. DAM-RB-061208-DB-001		6/12/08	2300										
7. -002													
8. -003													
9. -004													
10. -005													
11. DAM-YP-061208-DB-001													
12. -002													
13. -003													
14. -004													
15. -005													
TOTAL NUMBER OF CONTAINERS				15									

Valid Matrix Codes:
WG Groundwater
WB Borehole Water
WS Surface Water
SO Soil
SE Sediment
See Back for Additional Codes

SHIPMENT METHOD	NO. OF COOLERS	RELINQUISHED BY / AFFILIATION	DATE	TIME	RECEIVED BY / AFFILIATION	DATE	TIME
See page 1		Dave Buys	6/13/08	1330			
AIRBILL NO.		ARCADIS					

Sample Condition

Temp in °C	
Received on Ice	Y / N
Sealed Cooler	Y / N
Samples Intact	Y / N

Additional Comments:

Sampler Name: Dave Buys

Sampler Signature: Date: 6/13/08

Distribution: WHITE - Fully Executed Copy YELLOW - Receiving Laboratory Copy PINK - Sampler Copy

REV. 0 (6/04)

GM REALM ENCORE

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

ID # № 02614

SSOW Ref. Code: R001011

Required Client Information: See page 1

Company:	↓	Report To:	↓
Address:		Copy To:	
		Invoice To:	
		P.O.:	
Phone:		Project Name:	
Fax:		Project Number:	
E-mail:			

Laboratory:	See page 1 ↓
Laboratory Location:	
Laboratory Contact:	
Requested Due Date:	TAT:
QA/QC Requirements:	

Valid Matrix Codes: WG Groundwater, WB Borehole Water, WS Surface Water, SO Soil, SE Sediment. See Back for Additional Codes

#	Sample Identification	Matrix Code	Date Collected	Time Collected	# Containers	Unpreserved	HCl	H2SO4	HNO3	NaOH	Other: Frozen/ice	PCB Aroclors	% Lipids										Remarks/Lab ID
1.	Dam-BB-061208-DB-001	TA	6/12/08	2300	1						X	X	X										See remarks on page 1
2.	↓ -002	↓	↓	↓	↓						↓	↓	↓										
3.	-003																						
4.	-004																						
5.	-005																						
6.	Dam-WS-061208-DB-001																						
7.	-002																						
8.	-003																						
9.	-004																						
10.	-005																						
11.	Dam-NP-061208-DB-001																						
12.	-002																						
13.	↓ -003	↓	↓	↓	↓						↓	↓	↓										
14.																							
15.	BATCH COMPLETE																						

TOTAL NUMBER OF CONTAINERS: 13

SHIPMENT METHOD	NO. OF COOLERS	RELINQUISHED BY / AFFILIATION	DATE	TIME	RECEIVED BY / AFFILIATION	DATE	TIME
See page 1		Dave Buys [signature] ARCADIS	6/13/08	1330			
AIRBILL NO.							

Sample Condition

Temp in °C	
Received on Ice	Y / N
Sealed Cooler	Y / N
Samples Intact	Y / N

Additional Comments:

Sampler Name: Dave Buys

Sampler Signature: [signature] Date: 6/13/08

Distribution: WHITE - Fully Executed Copy YELLOW - Receiving Laboratory Copy PINK - Sampler Copy

REV. 0(6/04)

ARCADIS

Appendix C

Data Validation Report

CONESTOGA-ROVERS & ASSOCIATES

2055 Niagara Falls Blvd., Suite #3
Niagara Falls, New York 14304
Telephone: (716) 297-6150 Fax: (716) 297-2265
www.CRAworld.com

MEMORANDUM

TO: Richard Boelter [Richard.Boelter@arcadis-us.com]

REF. NO.: 012650-001011

FROM: Kathleen Willy/bjw/23

DATE: September 12, 2008
REVISION: October 10, 2008

E-Mail and Hard Copy if Requested

RE: **Data Quality Assessment and Validation**
Biota Sampling, St. Lawrence River
Massena, NY
June 2008

The following details a quality assessment and validation of the analytical data resulting from the June 10-12, 2008 collection of fish samples from the Biota Sampling Event in the St. Lawrence River, in Massena, NY. The sample summary detailing sample identification, sample location, and analytical parameters is presented in Table 1. Sample analyses were completed at Pace Analytical Services, Inc., located in Green Bay, WI, in accordance with the methodologies presented in Table 2.

The quality control (QC) criteria used to assess the data were established by the methods and the Quality Assurance Project Plan (QAPP). Application of quality assurance criteria was consistent with the guidance document "USEPA Contract Laboratory Program National Functional Guidelines for Organic Review", United States Environmental Protection Agency (USEPA) 540/R-99/008, October 1999.

These guidelines are collectively referred to as "Guidelines" in this memorandum.

Sample Preservation and Holding Times

Sample holding time periods and preservation requirements are presented in the methods.

All samples were prepared and/or analyzed with the specified holding time periods. All samples were properly preserved and cooled to 4°C (±2°C) after collection.

Initial Calibration

To quantify compounds of interest, calibration of the gas chromatograph (GC) over a specific concentration range must be performed. Initially, six-point calibration curves are analyzed for Aroclors 1016 and1260. A single point calibration is performed for the remaining Aroclors of interest.

Linearity of the calibration curves are acceptable if percent relative standard deviation (%RSD) values are less than or equal to 20 percent or if the correlation coefficient is greater than 0.995. Retention time

windows are also calculated from the initial calibration analyses. These windows are then used to identify all compounds of interest in subsequent analyses.

Initial calibration standards were analyzed at the required frequencies. All retention time and linearity criteria were satisfied.

Continuing Calibration

To ensure that the calibration of the instrument is valid throughout the sample analysis period, continuing calibration standards are analyzed and evaluated on a regular basis. To evaluate the continued linearity of the calibration, percent difference (%D) values are calculated for Aroclors 1016 and1260 in all continuing standards and assessed against an acceptance criterion of 15 percent.

To ensure that compound retention times do not vary over the analysis period, all retention times must fall within the established retention time windows.

Continuing calibration standards were analyzed at the required frequency and all method criteria were met for analyte linearity.

Method Blank Samples

Method blank samples are prepared from a purified sample matrix and are processed concurrently with investigative samples to assess the presence and the magnitude of sample contamination introduced during sample analysis. Method blank samples are analyzed at a minimum frequency of one per analytical batch and target analytes should be non-detect.

All method blank samples were reported to be free from detectable levels of target analytes, indicating no additional laboratory-attributable contamination occurred.

Surrogate Compounds

Individual sample performance for organic analyses was monitored by assessing the results of surrogate compound percent recoveries. Surrogate percent recoveries are reviewed against the laboratory developed control limits provided in the analytical report.

The surrogate recovery acceptance criteria were met for all samples indicating acceptable analytical efficiency.

Laboratory Control Sample (LCS) Analysis

The LCS analysis serves as a monitor of the overall performance in all steps of the sample analysis and is analyzed with each sample batch. The LCS percent recoveries were evaluated against method and laboratory established control limits.

LCSs were extracted and analyzed in duplicate. The LCS recoveries were within the laboratory specified control limits for all analytes of interest demonstrating acceptable analytical accuracy. All duplicate recoveries were acceptable indicating good analytical precision.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To assess the long-term accuracy and precision of the analytical methods on various matrices, MS/MSD percent recoveries and relative percent difference (RPD) of the concentrations were determined. The organic MS/MSD percent recovery and RPD control limits are established by the laboratory.

Some MS/MSD recoveries and RPDs could not be assessed due to necessary dilutions performed on the sample extracts. All MS/MSD recoveries and RPDs were within acceptable laboratory limits where they could be assessed, demonstrating acceptable overall analytical accuracy and precision

Field Quality Assurance/Quality Control (QA/QC)

Due to the nature of the sampling event, no field QC was available.

Target Compound Quantitation

The reported quantitation results and detection limits were checked to ensure results reported were accurate. No discrepancies were found between the raw data and the sample results reported by the laboratory.

System Performance

System performance between various QC checks was evaluated to monitor for changes that may have caused the degradation of data quality. No technical problems or chromatographic anomalies were observed which would require qualification of the data.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision based on the provided information and may be used without qualification.

TABLE 1
SAMPLE COLLECTION AND ANALYSIS SUMMARY
BIOTA SAMPLING
ST. LAWRENCE RIVER
MASSENA, NEW YORK
JUNE 2008

				Analysis/Parameters	
Sample ID	*Location ID*	*Collection Date (mm/dd/yy)*	*Collection Time (hr:min)*	*PCB Aroclors (fish tissue)*	*Percent Lipids (fish tissue)*
COV-SB-061008-DB-001	Cove	06/10/08	19:00	X	X
COV-SB-061008-DB-002	Cove	06/10/08	19:00	X	X
COV-SB-061008-DB-003	Cove	06/10/08	19:00	X	X
COV-SB-061008-DB-004	Cove	06/10/08	19:00	X	X
COV-SB-061008-DB-005	Cove	06/10/08	19:00	X	X
COV-BB-061008-DB-001	Cove	06/10/08	19:00	X	X
COV-BB-061008-DB-002	Cove	06/10/08	19:00	X	X
COV-BB-061008-DB-003	Cove	06/10/08	19:00	X	X
COV-BB-061008-DB-004	Cove	06/10/08	19:00	X	X
COV-BB-061008-DB-005	Cove	06/10/08	19:00	X	X
COV-NP-061008-DB-001	Cove	06/10/08	19:00	X	X
COV-NP-061008-DB-002	Cove	06/10/08	19:00	X	X
COV-NP-061108-DB-003	Cove	06/11/08	5:00	X	X
COV-NP-061108-DB-004	Cove	06/11/08	5:00	X	X
COV-NP-061108-DB-005	Cove	06/11/08	5:00	X	X
COV-YP-061008-DB-001	Cove	06/10/08	19:00	X	X
COV-YP-061008-DB-002	Cove	06/10/08	19:00	X	X
COV-YP-061108-DB-003	Cove	06/11/08	5:00	X	X
COV-YP-061108-DB-004	Cove	06/11/08	5:00	X	X
COV-YP-061108-DB-005	Cove	06/11/08	5:00	X	X
COV-WS-061008-DB-001	Cove	06/10/08	19:00	X	X
COV-WS-061008-DB-002	Cove	06/10/08	19:00	X	X
COV-WS-061008-DB-003	Cove	06/10/08	19:00	X	X
COV-WS-061108-DB-004	Cove	06/11/08	5:00	X	X
COV-WS-061108-DB-005	Cove	06/11/08	5:00	X	X

TABLE 1
SAMPLE COLLECTION AND ANALYSIS SUMMARY
BIOTA SAMPLING
ST. LAWRENCE RIVER
MASSENA, NEW YORK
JUNE 2008

				Analysis/Parameters	
Sample ID	*Location ID*	*Collection Date (mm/dd/yy)*	*Collection Time (hr:min)*	*PCB Aroclors (fish tissue)*	*Percent Lipids (fish tissue)*
COV-RB-061008-DB-001	Cove	06/10/08	19:00	X	X
COV-RB-061008-DB-002	Cove	06/10/08	19:00	X	X
COV-RB-061008-DB-003	Cove	06/10/08	19:00	X	X
COV-RB-061108-DB-004	Cove	06/11/08	5:00	X	X
COV-RB-061108-DB-005	Cove	06/11/08	5:00	X	X
Cap-RB-061108-DB-001	Cap - Embayment	06/11/08	7:00	X	X
Cap-RB-061108-DB-002	Cap - Embayment	06/11/08	7:00	X	X
Cap-RB-061108-DB-003	Cap - Embayment	06/11/08	23:30	X	X
Cap-RB-061108-DB-004	Cap - Embayment	06/11/08	23:30	X	X
Cap-RB-061108-DB-005	Cap - Embayment	06/11/08	23:30	X	X
Cap-SB-061108-DB-001	Cap - Embayment	06/11/08	7:00	X	X
Cap-SB-061108-DB-002	Cap - Embayment	06/11/08	7:00	X	X
Cap-SB-061108-DB-003	Cap - Embayment	06/11/08	23:30	X	X
Cap-SB-061108-DB-004	Cap - Embayment	06/11/08	23:30	X	X
Cap-SB-061108-DB-005	Cap - Embayment	06/11/08	23:30	X	X
Cap-YP-061108-DB-001	Cap - Embayment	06/11/08	23:30	X	X
Cap-YP-061108-DB-002	Cap - Embayment	06/11/08	23:30	X	X
Cap-YP-061108-DB-003	Cap - Embayment	06/11/08	23:30	X	X
Cap-YP-061108-DB-004	Cap - Embayment	06/11/08	23:30	X	X
Cap-YP-061108-DB-005	Cap - Embayment	06/11/08	23:30	X	X
Cap-BB-061108-DB-001	Cap - Embayment	06/11/08	23:30	X	X
Cap-BB-061108-DB-002	Cap - Embayment	06/11/08	23:30	X	X
Cap-BB-061108-DB-003	Cap - Embayment	06/11/08	23:30	X	X
Cap-BB-061108-DB-004	Cap - Embayment	06/11/08	23:30	X	X
Cap-BB-061108-DB-005	Cap - Embayment	06/11/08	23:30	X	X

TABLE 1
SAMPLE COLLECTION AND ANALYSIS SUMMARY
BIOTA SAMPLING
ST. LAWRENCE RIVER
MASSENA, NEW YORK
JUNE 2008

				Analysis/Parameters	
Sample ID	*Location ID*	*Collection Date (mm/dd/yy)*	*Collection Time (hr:min)*	*PCB Aroclors (fish tissue)*	*Percent Lipids (fish tissue)*
Cap-WS-061108-DB-001	Cap - Embayment	06/11/08	23:30	X	X
Cap-WS-061108-DB-002	Cap - Embayment	06/11/08	23:30	X	X
Cap-WS-061108-DB-003	Cap - Embayment	06/11/08	23:30	X	X
Cap-WS-061108-DB-004	Cap - Embayment	06/11/08	23:30	X	X
Cap-WS-061108-DB-005	Cap - Embayment	06/11/08	23:30	X	X
Cap-NP-061108-DB-001	Cap - Embayment	06/11/08	23:30	X	X
Cap-NP-061108-DB-002	Cap - Embayment	06/11/08	23:30	X	X
Cap-NP-061108-DB-003	Cap - Embayment	06/11/08	23:30	X	X
Dam-SB-061108-DB-001	above Robert Moses Dam	06/11/08	10:30	X	X
Dam-SB-061108-DB-002	above Robert Moses Dam	06/11/08	10:30	X	X
Dam-SB-061108-DB-003	above Robert Moses Dam	06/11/08	10:30	X	X
Dam-SB-061108-DB-004	above Robert Moses Dam	06/11/08	10:30	X	X
Dam-SB-061108-DB-005	above Robert Moses Dam	06/11/08	10:30	X	X
Dam-RB-061208-DB-001	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-RB-061208-DB-002	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-RB-061208-DB-003	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-RB-061208-DB-004	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-RB-061208-DB-005	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-YP-061208-DB-001	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-YP-061208-DB-002	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-YP-061208-DB-003	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-YP-061208-DB-004	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-YP-061208-DB-005	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-BB-061208-DB-001	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-BB-061208-DB-002	above Robert Moses Dam	06/12/08	23:00	X	X

TABLE 1
SAMPLE COLLECTION AND ANALYSIS SUMMARY
BIOTA SAMPLING
ST. LAWRENCE RIVER
MASSENA, NEW YORK
JUNE 2008

				Analysis/Parameter:	
Sample ID	*Location ID*	*Collection Date (mm/dd/yy)*	*Collection Time (hr:min)*	*PCB Aroclors (fish tissue)*	*Percent Lipids (fish tissue)*
Dam-BB-061208-DB-003	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-BB-061208-DB-004	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-BB-061208-DB-005	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-WS-061208-DB-001	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-WS-061208-DB-002	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-WS-061208-DB-003	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-WS-061208-DB-004	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-WS-061208-DB-005	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-NP-061208-DB-001	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-NP-061208-DB-002	above Robert Moses Dam	06/12/08	23:00	X	X
Dam-NP-061208-DB-003	above Robert Moses Dam	06/12/08	23:00	X	X

Note:
PCB Polychlorinated Biphenyl.

TABLE 2

SUMMARY OF ANALYTICAL METHODS
BIOTA SAMPLING
ST. LAWRENCE RIVER
MASSENA, NEW YORK
JUNE 2008

Parameter	*Method*
PCBs	SW-846 8082[1]

Notes:

[1] "Test Methods for Solid Waste/Physical Chemical Methods", SW-846, 3rd Edition, September 1986 (with all subsequent revisions).

PCBs Polychlorinated Biphenyls.