Table 9-1 - Ichthyoplankton Survey Stations, Samples Collected and Status of Processing

Survey Date	Number of Samples	Gear	Status of Sample Processing
July 27-28, 2005	36	Plankton Net	All Rep 1 samples sorted and identified. Specimens analyzed for RNA/DNA.
August 18-19, 2005	36	Plankton Net	All Rep 1 samples sorted and identified.
August 25-26, 2005	36	Plankton Net	All Rep 1 samples sorted and identified. Specimens analyzed for RNA/DNA.
September 7-8, 2005	36	Plankton Net	All Rep 1 samples sorted and identified.
September 26-27, 2005	36	Plankton Net	All Rep 1 samples sorted and identified.
October 13-14, 2005	36	Plankton Net	All Rep 1 samples sorted and identified.
October 26-27, 2005	36	Plankton Net	All Rep 1 samples sorted and identified.
November 8-9, 2005	36	Plankton Net	All Rep 1 samples sorted and identified.
December 7-8, 2005	36	Plankton Net	All Rep 1 samples sorted and identified.
January 12-13, 2006	36	Plankton Net	All Rep 1 samples sorted and identified.
February 16-17 & 21, 2006	36	Plankton Net & Epibenthic Sled	All Rep 1 samples sorted and identified.
March 20-21 & 23, 2006	36	Plankton Net & Epibenthic Sled	All Rep 1 samples sorted and identified.
April 19-21 & 24, 2006	36	Plankton Net & Epibenthic Sled	All Rep 1 samples sorted and identified.
May 3-5, 2006	36	Plankton Net	All Rep 1 samples sorted and identified.
May 17-19, 2006	36	Plankton Net	All Rep 1 samples sorted and identified.
June 14-16, 2006	36	Plankton Net	All Rep 1 samples sorted and identified.
June 23 & 26-27, 2006	36	Plankton Net	All Rep 1 samples sorted and identified.
July 10-11, 2006	36	Plankton Net	All Rep 1 samples sorted and identified.

Table 9-2 - List of Common and Scientific Names of Ichthyoplankton Taxa Collected in Jamaica Bay Between July 2005 and July 2006

Scientific Name	Common Name	Life Stage
Ammodytes americanus	American Sandlance	Larvae
Anchoa hepsetus	Striped Anchovy	Eggs
Anchoa mitchilli	Bay Anchovy	Eggs, Larvae
Anguilla rostrata	American Eel	Larvae
Blenniidae	Blennies	Larvae
Brevoortia tyrannus	Atlantic Menhaden	Eggs, Larvae
Clupeidae	Herrings	Larvae
Enchelyopus cimbrius	Fourbeard Rockling	Eggs, Larvae
Etropus microstomus	Smallmouth Flounder	Eggs, Larvae
Gobiosoma bosc	Naked Goby	Eggs, Larvae
Etropus microstomus	Smallmouth Flounder	Eggs, Larvae
Gobiidae	Gobies	Larvae
Gobiosoma spp.	Gobies	Eggs, Larvae
Hippocampus erectus	Lined Seahorse	Larvae
Hypsoblennius hentzi	Feather Blenny	Larvae
Labridae	Wrasses	Eggs, Larvae
Menidia menidia	Atlantic Silverside	Larvae
Microgadus tomcod	Atlantic Tomcod	Larvae
Micropogonias undulatus	Atlantic Croaker	Larvae
Myoxocephalus aenaeus	Grubby Sculpin	Larvae
Paralichthys dentatus	Summer Flounder	Larvae
Peprilus triacanthus	Atlantic Butterfish	Larvae
Pholis gunnellus	Rock Gunnel	Larvae
Prionotus spp.	Searobins	Eggs, Larvae
Pseudopleuronectes americanus	Winter Flounder	Eggs, Larvae
Sciaenidae	Drums	Larvae
Scophthalmus aquosus	Windowpane	Eggs, Larvae
Sphoeroides maculates	Northern Puffer	Larvae
Stenotomus chrysops	Scup	Eggs
Syngnathus fuscus	Northern Pipefish	Larvae
Tautoga onitis	Blackfish	Eggs, Larvae
Tautogolabrus adspersus	Cunner	Eggs
Trinectes maculates	Hogchoker	Eggs

Table 9-3 - Average Density (number/100m^3) of Eggs Collected at Each Station with July 2005 through July 2006 Survey Dates Combined, Total Number of Organisms, Number of Taxa, Shannon's Diversity (*H'*) and Pielou's Index (*J'*)

AVERAGE NUMBER OF EGGS for YEAR 1: Jul 27, 2005 to Jul 10, 2006 for Y1 to Y12

	Average for the months Jul 27, 2005 to Jul 10, 2006														
EGGS	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	PER EVENT	TOTAL DENSITY	%of TOTAL
ANCHOA MITCHILLI	54.09	654.90	479.77	339.81	411.38	406.74	203.89	120.40	112.46	195.11	538.52	130.10	3647.17	65648.98	68.23
SCOPHTHALMUS AQUOSUS	67.62	38.21	104.85	35.35	87.84	80.18	26.27	5.55	2.33	24.96	44.16	31.78	549.09	9883.66	10.27
BREVOORTIA TYRANNUS	19.22	2.57	0.24	0.76	12.33	9.82	48.17	199.83	29.43	8.03	6.97	40.13	377.50	6795.09	7.06
PRIONOTUS SPP	77.31	15.32	50.28	15.45	31.08	41.60	10.90	0.41	0.20	5.95	25.12	25.75	299.38	5388.80	5.60
TAUTOGA ONITIS	34.45	12.71	49.09	18.36	39.94	28.15	10.21	2.31	1.33	5.87	25.50	15.10	243.03	4374.46	4.55
TAUTOGOLABRUS ADSPERSUS	26.99	8.43	17.90	5.35	10.47	17.10	14.35	1.06	0.22	5.76	36.81	7.07	151.51	2727.21	2.83
UNIDENTIFIED	4.05	4.04	7.75	2.79	4.68	2.56	0.43	0.17	1.63	0.79	5.96	7.46	42.31	761.59	0.79
STENOTOMUS CHRYSOPS	5.90	0.09	2.21	0.00	0.76	0.32	0.89	0.64	0.04	2.87	1.01	2.23	16.96	305.24	0.32
ETROPUS MICROSTOMUS	6.52	2.97	2.32	0.21	1.06	0.56	0.00	0.00	0.00	0.00	0.69	1.08	15.42	277.50	0.29
ANCHOA HEPSETUS	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.50	0.00	1.06	19.07	0.02
TRINECTES MACULATUS	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.97	17.40	0.02
LABRIDAE	0.14	0.03	0.00	0.08	0.09	0.03	0.00	0.00	0.00	0.00	0.04	0.00	0.42	7.47	0.01
PSEUDOPLEURONECTES AMERICANUS	0.00	0.20	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.37	6.66	0.01
ENCHELYOPUS CIMBRIUS	0.00	0.03	0.10	0.00	0.09	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.28	5.04	0.01
GOBIOSOMA BOSC	0.04	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.11	1.92	<0.01
TOTAL	296.34	739.49	714.55	418.16	600.22	587.73	315.14	330.37	147.64	249.35	685.88	260.68	5345.56	96220.09	100.00
NO. OF TAXA	11	12	11	9	12	13	9	8	8	8	13	9	15	15	
SHANNON'S INDEX	1.86957	0.53627	1.10214	0.74281	1.09027	1.07387	1.17043	0.81813	0.70729	0.86711	0.88388	1.54797			
PIELOU'S INDEX	0.77967	0.21581	0.45963	0.33807	0.43876	0.41867	0.53268	0.39344	0.34013	0.41699	0.3446	0.70451			

Table 9-4 - Average Density (number/100m^3) of Larvae Collected at Each Station with July 2005 through July 2006 Survey Dates Combined, Total Number of Organisms, Number of Taxa, Shannon's Diversity (*H'*) and Pielou's Index (*J'*)

AVERAGE NUMBER OF LARVAE for YEAR 1: Jul 27, 2005 to Jul 10, 2006 for Y1 to Y12

	Average for the months Jul 27, 2005 to Jul 10, 2006													
LARVAE	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	PER EVENT	TOTAL DENSITY
PARALICHTHYS DENTATUS	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.55
GOBIIDAE	13.99	12.56	36.93	11.04	54.52	163.89	15.91	12.17	12.58	25.04	30.79	21.26	410.69	7392.49
ANCHOA MITCHILLI	10.46	6.10	13.49	14.33	7.59	38.05	7.93	3.89	6.61	10.60	7.64	11.84	138.53	2493.57
SYNGNATHUS FUSCUS	3.52	2.37	4.93	2.03	1.96	4.20	0.60	0.40	0.55	1.08	3.09	1.05	25.78	463.97
PSEUDOPLEURONECTES AMERICANUS	3.05	1.88	0.84	4.26	1.15	1.76	0.36	0.76	1.35	0.62	1.57	1.43	19.03	342.57
UNIDENTIFIED	0.29	0.04	0.11	0.10	0.06	0.00	8.10	0.00	0.97	0.12	0.00	0.28	10.07	181.28
BREVOORTIA TYRANNUS	0.90	0.61	0.10	0.35	0.15	1.05	0.26	0.83	1.20	1.83	0.22	0.48	7.97	143.50
MENIDIA MENIDIA	0.25	2.59	0.00	1.50	0.07	0.06	0.06	0.00	0.00	0.00	0.11	0.17	4.82	86.77
MYOXOCEPHALUS AENAEUS	0.19	0.06	0.59	0.10	0.27	0.71	0.08	0.00	0.36	0.62	0.28	0.23	3.49	62.87
SCOPHTHALMUS AQUOSUS	0.16	0.38	0.20	0.35	0.12	0.36	0.11	0.14	0.34	0.28	0.04	0.22	2.70	48.52
LABRIDAE	0.00	0.00	2.60	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.65	47.69
MICROPOGONIAS UNDULATUS	0.50	0.00	0.08	0.09	0.04	0.10	0.25	0.09	0.00	0.20	0.16	0.62	2.14	38.52
HIPPOCAMPUS ERECTUS	0.38	0.37	0.60	0.19	0.09	0.04	0.00	0.00	0.00	0.06	0.08	0.04	1.85	33.28
AMMODYTES AMERICANUS	0.10	0.13	0.07	0.07	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.41	0.83	14.88
ETROPUS MICROSTOMUS	0.33	0.04	0.04	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.44	7.85
HYPSOBLENNIUS HENTZI	0.00	0.03	0.02	0.03	0.00	0.03	0.00	0.00	0.00	0.04	0.11	0.00	0.26	4.75
TAUTOGA ONITIS	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	2.51
CLUPEIDAE	0.00	0.04	0.07	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.14	2.47
PHOLIS GUNNELLUS	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.11	1.91
PEPRILUS TRIACANTHUS	0.00	0.00	0.04	0.00	0.04	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.10	1.87
PRIONOTUS SPP	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	1.69
ENCHELYOPUS CIMBRIUS	0.05	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	1.55
ANGUILLA ROSTRATA	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.98
MICROGADUS TOMCOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.71
SPHOEROIDES MACULATUS	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.63
BLENNIIDAE	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.56
TOTAL	34.25174	27.19459	60.88864	34.52946	66.1715	210.3947	33.68954	18.31	24.03609	40.49098	44.13226	38.0168	632.11	11377.91
NO. OF TAXA	15	14	20	15	13	15	11	8	9	11	12	12	26	26
SHANNON'S INDEX	1.599378	1.590155	1.223289	1.49794	0.672441	0.693437	1.281309	1.030654	1.361798	1.106828	0.992653	1.208775		
PIELOU'S INDEX	0.590601	0.602546	0.408344	0.553143	0.262165	0.256065	0.534347	0.49564	0.619781	0.461583	0.399473	0.486447		

Table 9-5 - Robust Line Fit Data for Larvae: Station Averages for Taxa, Density and Shannon's Index (*H'*)

Robust Line Fit: Table of Results for Larvae

Jamaica Bay Ichthyoplankton Study, Jul 2005 to Jul 2006

Test	Number of Organisms		Number of Taxa		Shannon's Index	
	Significance	p value	Significance	p value	Significance	p value
aveDO	NO		**YES**	$p < 0.01$	NO	
DO< 4.6	NO		**YES**	$p < 0.01$	NO	
ave NH3	**YES**	$p < 0.05$	NO		NO	
NH3 > 0.035	**YES**	$p < 0.01$	**YES**	$p < 0.05$	**YES**	$P < 0.01$

Community data is based on average numbers of organisms per 100 m^3

Table 9-6 - Robust Line Fit Data for Eggs: Station Averages for Taxa, Density and Shannon's Index (*H'*)

Robust Line Fit: Table of Results for Eggs

Jamaica Bay Ichthyoplankton Study, Jul 2005 to Jul 2006

Test	Number of Organisms		Number of Taxa		Shannon's Index	
	Significance	p value	Significance	p value	Significance	p value
aveDO	**YES**	$p < 0.02$	**YES**	$p < .05$	NO	
DO< 4.6	**YES**	$p < 0.02$	**YES**	$p < .05$	NO	
ave NH3	NO		NO		NO	
NH3 > 0.035	NO		NO		**YES**	$p < 0.10$

Community data is based on average numbers of organisms per 100 m^3

Table 9 - 7
Attainment Based on Ichthyoplankton/Larval Transport Model

	Attainment of DO WQS[1]		Larval Survival[2]	
	Grassy Bay	Bay-wide	Grassy Bay	Bay-wide
Baseline (Permit Conditions)	37.3	88.1	86.6	94.1
Recontour Grassy Bay (8 ft)	61.8	92.0	92.7	96.7
26th Ward (C12) + Jamaica (Level 2)	56.8	93.7	96.0	98.3
26th Ward (C12) + Jamaica (Level 2) + Recontour GB and NC	78.7	96.4	97.2	98.8
Level of Technology (LOT)	70.6	96.1	99.5	99.8

(1) bottom layer
(2) without tributaries

Table 9 - 8
Jamaica Bay
Bottom Dissolved Oxygen
Summer Conditions

Projection Endpoint	Area	Baseline	Cost Effective Treatment [1]	Grassy Bay & North Channel @ 8 ft with Cost Effective Treatment [1]
Average Attainment (%)[2] Class SB DO greater than 5.0 mg/L	Grassy Bay	32.4	47.8	70.5
	Bay-wide	85.5	90.2	92.9
Minimum DO[3] (mg/L)	Grassy Bay and Bay-wide	1.9	2.5	2.9

[1] Contract 12 Upgrade at 26th Ward WPCP, Level 2 BNR with Modified Flow Split; Partially Oxic at Jamaica WPCP
[2] Denotes criterion attainment based on average conditions throughout the indicated areas.
[3] Denotes average of the daily instantaneous minimum value through the indicated area.

Table 9 - 9
Jamaica Bay
Bottom Dissolved Oxygen
Annual Conditions

Projection Endpoint	Area	Baseline	Cost Effective[1] Treatment	Grassy Bay & North Channel @ 8 ft with Cost Effective Treatment [1]
Average Attainment (%)[2] Class SB DO greater than 5.0 mg/L	Grassy Bay	80.2	85.0	90.9
	Bay-wide	95.9	97.3	98.0
Minimum DO[3] (mg/L)	Grassy Bay and Bay-wide	1.9	2.5	2.9

[1] Contract 12 Upgrade at 26th Ward WPCP, Level 2 BNR with Modified Flow Split; Partially Oxic at Jamaica WPCP
[2] Denotes criterion attainment based on average conditions throughout the indicated areas.
[3] Denotes average of the daily instantaneous minimum value through the indicated area.

Table 9 - 10
Jamaica Bay
Bottom Dissolved Oxygen
Summer Conditions

Projection Endpoint	Area	Baseline	Baseline and Grassy Bay @ 4 ft	Baseline with LOT
Average Attainment (%)[1] Class SB DO = 5.0 mg/L	Grassy Bay	32.4	64.9	66.6
	Bay-wide	85.5	89.5	95.0
Average Attainment (%)[1] EPA Larval Growth Criteria	Grassy Bay	41.8	80.7	80.1
	Bay-wide	90.4	95.3	97.5
Minimum DO[2] (mg/L)	Grassy Bay and Bay-wide	1.9	3.2	3.6

(1) Denotes criterion attainment based on average conditions throughout the indicated areas.
(2) Denotes average of the daily instantaneous minimum values through the indicated area.

Table 9 - 11
Jamaica Bay
Bottom Dissolved Oxygen
Annual Conditions

Projection Endpoint	Area	Baseline	Baseline and Grassy Bay @ 4 ft	Baseline with LOT
Average Attainment (%)[1] Class SB DO = 5.0 mg/L	Grassy Bay	80.2	89.9	91.3
	Bay-wide	95.9	97.1	98.7
Average Attainment (%)[1] EPA Larval Survival Criteria	Grassy Bay	83.0	94.5	94.8
	Bay-wide	97.2	98.6	99.3
Minimum DO[2] (mg/L)	Grassy Bay and Bay-wide	1.9	3.2	3.6

[1] Denotes criterion attainment based on average conditions throughout the indicated areas.
[2] Denotes average of the daily instantaneous minimum values through the indicated area.

Table 9 - 12
Jamaica Bay
Bottom Dissolved Oxygen

Projection Endpoint	Area	Summer Conditions			Annual Conditions		
		Baseline	Grassy Bay @ 4 ft with Cost Effective Treatment (1)	Grassy Bay & North Channel @ 8 ft with Cost Effective Treatment (1)	Baseline	GrassyBay @ 4 ft with Cost Effective Treatment (1)	Grassy Bay & North Channel @ 8 ft with Cost Effective Treatment (1)
Average Attainment (%)(2) Class SB DO greater than 5.0 mg/L	Grassy Bay	32.4	82.3	70.5	80.2	95.1	90.9
	Bay-wide	85.5	94.5	92.9	95.9	98.5	98.0
Average Attainment (%)(2) EPA Larval Growth Criteria	Grassy Bay	41.8	98.1	81.8	83.0	99.3	94.3
	Bay-wide	90.4	98.9	96.9	97.2	99.7	99.0
Minimum DO(3) (mg/L)	Grassy Bay and Bay-wide	1.9	3.7	2.9	1.9	3.7	2.9

(1) Contract 12 Upgrade at 26th Ward WPCP, Level 2 BNR with Modified Flow Split; Partially Oxic at Jamaica WPCP
(2) Denotes criterion attainment based on average conditions throughout the indicated areas.
(3) Denotes average of the daily instantaneous minimum value through the indicated area.