THREE MILE ISLAND AQUATIC STUDY

Monthly Report for January 1981

by

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INTRODUCTION

The ecology of York Haven Pond near the Three Mile Island Nuclear Station (TMINS) has been under investigation since February 1974. Studies initiated in April 1974 include analysis of ambient water quality, ichthyoplankton (far-field), ichthyoplankton entrainment, macroinvertebrates, fish population dynamics, impingement of fishes, creel surveys, and thermal plume mapping.

This report discusses the progress of investigations conducted in January 1981.

COMPLIANCE WITH ENVIRONMENTAL TECHNICAL SPECIFICATIONS (ETS)

Objectives: To determine compliance with the nonradiological (aquatic) environmental monitoring programs specified in sections 3.1.1.a.(4), 3.1.2.a., 4.2, and 4.6.1 of the ETS and to insure that said programs are performed as detailed in the Generation Procedures Manual.

Progress: Ice cover on York Haven Pond throughout January prevented compliance with the following programs: macroinvertebrates, trapnet, seine, electrofishing, and ambient water quality (Table 1).

Creel surveys were conducted only at the York Haven Generating Station area; all other areas were inaccessible due to ice cover.

The impingement program was successfully completed at both Unit 1 and 2 (during all time periods) in January.

A program by program summary of the progress for January follows.

MACROINVERTEBRATES

Objective: To describe the diversity and distribution of the benthic macroinvertebrates occurring at the five benthos sampling stations near TMINS.

Progress: Ice cover prevented sampling throughout January (Table 1). Progress on the 1980 annual report i 'uded the entering of all data on the computer and the completion of running tables, analysis of variance computations, and a first draft of the methods section.

ICHTHYOPLANKTON

Objectives: (1) To determine the species composition, abundance, and distribution of ichthyoplankton in York Haven Pond; and (2) To investigate ichthyoplankton entrained at TMINS Unit 1 and 2 Intakes.

FAR-FIELD

Progress: Running tables were completed and typed and most figures were finished. The first draft of the results section of the 1980 annual report was completed.

ENTRAINMENT

Progress: Work on all figures was completed. Revisions were made to the section for the 1980 annual report and it was resubmitted to the project director.

TRAPNET

Objectives: (1) To determine the distribution and relative abundance of fishes in the Three Mile Island area vulnerable to trapnet; (2) To provide specimens for movements studies; (3) To monitor the occurrence of diseased fishes; (4) To provide specimens for radiation analysis; and (5) To determine reproductive status for fishes throughout the year.

Progress: Ice cover prevented sampling throughout January (Table 1). Most summary tables for the 1980 annual report were finished as were condition factors for the pumpkinseed, bluegill, and black crappie.

SEINE

Objectives: (1) To determine the species composition of fish upstream and downstream from the TMINS Discharge vulnerable to seine; (2) To determine the relative condition factor for important species; and (3) To determine the reproductive status for fishes throughout the year.

Progress: Ice cover prevented sampling throughout January (Table 1). All summary tables and condition factor tables for the spottail

shiner and spotfin shiner were completed. The first drafts of the methods and results sections of the 1980 annual report were finished.

IMPINGEMENT OF FISH

Objectives: (1) To determine the numbers and species impinged on the river water intake screens; (2) To determine day-night differences in impingement frequency; and (3) To determine the extent of mortality of impinged fish.

Progress: Impingement surveys were conducted on 6-7 and 21-22 January at the TMINS Unit 1 and 2 Intakes (Table 1). Unit 1 impinged 17 fish of 5 species weighing 37.2 g. Most fish were young and all but seven were dead (Tables 2 through 5). Fish biomass and numbers were highest during the 6-7 January survey. More fish were collected at 1200 h than during the other survey periods. The estimated impingement for Unit 1 for January was 264 fish weighing 576.6 g (1.3 lb).

Unit 2 impinged 6 fish of 5 species weighing 17.3 g (Tables 6 through 9). Most fish were juvenile and all but one were dead. Fish numbers were identical for both surveys; however, biomass was highest during the 21-22 January survey. The estimated impingement for January from Unit 2 was 93 fish weighing 268.2 g (0.6 lb).

The total estimated impingement at TMINS during January was 357 fish weighing 844.8 g (1.9 lb).

Work was initiated on the section for the 1980 annual report. Statistical analyses which were performed included Kendall's tau correlations, t-tests, and nonparametric binomial tests. First drafts of the introduction and methods sections were finished.

ELECTROFISHING

Objectives: (1) To provide specimens for radiation analysis and movements studies; and (2) To determine the relative abundance of fishes vulnerable to electrofishing in various parts of York Haven Pond.

Progress: Ice cover prevented sampling throughout January (Table 1). Rough tables for the 1980 annual report were completed and fish length and weight data were entered on the computer.

MOVEMENTS OF FISHES

Objective: To determine if fishes in waters receiving the TMINS effluent mix with fishes from other areas.

Progress: No fisherman recaptures were reported in January. Rough tables and all statistical analyses for the 1980 annual report were completed.

CREEL SURVEYS

Objectives: (1) To determine the extent and success of sport fishing; and (2) To determine information on angler residence and use of catch.

Progress: Surveys were conducted on 5, 10, 18, and 30 January (Table 1) only at the York Haven Generating Station; ice conditions prevented surveys in the General Reservoir, West Dam, and East Dam areas.

No anglers were interviewed in January (Table 10).

Summary tables and the first draft of the methods section for the 1980 annual report were completed.

AMBIENT WATER QUALITY

Objective: To determine concentrations of selected water quality parameters in ambient river areas and the TMINS effluent.

Progress: Ice cover prevented sampling throughout January (Table 1). Work was initiated on the section for the 1980 annual report.

Table 1

Sampling conducted in compliance with the Generation Procedures Manual in January 1981.

PROGRAM	Jan 1-10	Jan 11-17	Jan 18-24	Jan 25-31
Macroinvertebrates[1]				
Ichthyoplankton:				
Far-Field[2]				
Entrainment[2]				
Trapnet[1]				
Seine[1]				
Impingement of Fish	X		X	
Electrofishing[1]				
Movements of Fishes[1]				
Creel Surveys	X		X	X
Ambient Water Quality[1]				

1 Sampling not attempted due to ice cover.
2 Sampling scheduled to resume in April 1981.

Table 2

Numbers of fishes impinged at the Unit 1 Intake during a 24-h impingement survey on 6-7 January 1981.

Date	6		7		7			
Time	2000		0400		1200			
Volumetric Flow Rate (m^3/s)	1.21		1.21		1.21			
Number of River Water Pumps:								
Nuclear Service	2		2		2			
Secondary Service	1		1		1			
Decay Heat	0		0		0			
Intake Velocity (cm/s)	NA		NA		NA			
River Flow (m^3/s)	238.4		247.5		250.9			
Air Temp (C)	-2.5		0.0		1.0			
Water Temp (C)	0.5		0.5		0.5		Total	
Condition of Fish	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Spottail shiner	1	-	-	-	-	-	1	-
Channel catfish	-	1	-	-	1	-	1	1
Margined madtom	-	-	1	-	-	-	1	-
Pumpkinseed	1	2	-	-	1	-	2	2
Bluegill	-	-	1	-	-	1	1	1
Total	2	3	2	-	2	1	6	4

Table 3

Summary of lengths, weights, breeding condition, and numbers of fishes impinged at the Unit 1 Intake on 6-7 January 1981.

Species	Fork Length Range (5 mm groups)	Reproductive Status	Total Weight (g)	Total Number
Spottail shiner	56-60	1 Juvenile	2.3	1
Channel catfish	61-70	2 Young	5.4	2
Margined madtom	61-65	1 Juvenile	2.8	1
Pumpkinseed	36-45, 61-65	3 Young, 1 Juvenile	7.6	4
Bluegill	26-30, 51-55	1 Young, 1 Juvenile	2.6	2
Total			20.7	10

Table 4

Numbers of fishes impinged at the Unit 1 Intake during a 24-h impingement survey on 21-22 January 1981.

Date	21		22		22			
Time	2000		0400		1200			
Volumetric Flow Rate (m^3/s)	0.84		0.84		0.84			
Number of River Water Pumps:								
Nuclear Service	1		1		1			
Secondary Service	1		1		1			
Decay Heat	0		0		0			
Intake Velocity (cm/s)	NA		NA		NA			
River Flow (m^3/s)	161.7		187.0		196.5			
Air Temp (C)	-2.5		-7.0		3.0			
Water Temp (C)	1.0		0.0		1.5		Total	
Condition of Fish	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Spottail shiner	-	-	-	1	-	2	-	3
Pumpkinseed	1	-	-	-	-	3	1	3
Total	1	-	-	1	-	5	1	6

Table 5

Summary of lengths, weights, breeding condition, and numbers of fishes impinged at the Unit 1 Intake on 21-22 January 1981.

Species	Fork Length Range (5 mm groups)	Reproductive Status	Total Weight (g)	Total Number
Spottail shiner	46-60	2 Young, 1 Juvenile	3.7	3
Pumpkinseed	51-65	2 Young, 2 Juvenile	12.8	4
Total			16.5	7

Table 6

Numbers of fishes impinged at the Unit 2 Intake during a 24-h impingement survey on 6-7 January 1981.

Date	6		7		7			
Time	2000		0400		1200			
Volumetric Flow Rate (m^3/s)	1.58		1.58		1.58			
Number of River Water Pumps:								
Nuclear Service	1		1		1			
Secondary Service	1		1		1			
Intake Velocity (cm/s)	NA		NA		NA			
River Flow (m^3/s)	238.4		247.5		250.9			
Air Temp (C)	-2.5		-2.0		4.0			
Water Temp (C)	0.0		0.0		0.0		Total	
Condition of Fish	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Spottail shiner	-	-	-	1	-	-	-	1
Margined madtom	-	1	-	-	-	-	-	1
Tessellated darter	1	-	-	-	-	-	1	-
Total	1	1	-	1	-	-	1	2

Table 7

Summary of lengths, weights, breeding condition, and numbers of fishes impinged at the Unit 2 Intake on 6-7 January 1981.

Species	Fork Length Range (5 mm groups)	Reproductive Status	Total Weight (g)	Total Number
Spottail shiner	56-60	1 Juvenile	1.7	1
Margined madtom	91-95	1 Juvenile	5.4	1
Tessellated darter	46-50	1 Juvenile	1.0	1
Total			8.1	3

Table 8

Numbers of fishes impinged at the Unit 2 Intake during a 24-h impingement survey on 21-22 January 1981.

Date	21		22		22			
Time	2000		0400		1200			
Volumetric Flow Rate (m^3/s)	1.58		1.58		1.58			
Number of River Water Pumps:								
Nucelar Service	1		1		1			
Secondary Service	1		1		1			
Intake Velocity (cm/s)	NA		NA		NA			
River Flow (m^3/s)	161.7		187.0		196.5			
Air Temp (C)	-3.0		-7.0		4.0			
Water Temp (C)	0.5		0.0		1.5		Total	
Condition of Fish	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Spottail shiner	-	-	-	1	-	-	-	1
Channel catfish	-	-	-	1	-	-	-	1
Pumpkinseed	-	-	-	1	-	-	-	1
Total	-	-	-	3	-	-	-	3

Table 9

Summary of lengths, weights, breeding condition, and numbers of fishes impinged at the Unit 2 Intake on 21-22 January 1981.

Species	Fork Length Range (5 mm groups)	Reproductive Status	Total Weight (g)	Total Number
Spottail shiner	56-60	1 Juvenile	1.2	1
Channel catfish	81-85	1 Young	5.3	1
Pumpkinseed	51-55	1 Young	2.7	1
Total			9.2	3

Table 10

Creel survey data from the YRCS for each survey day in January 1981.

Day		5 Mon			10 Sat			18 Sun			30 Fri			
Weather		Clear			Partly Cloudy, Clear			Overcast			Clear			
River Stage (m)		1.06			1.07			1.04			1.02			
Air Temperature (C)		-4.5	-2.5	-4.0	-3.5	-1.0	-4.0	-1.0	0.0	-1.0	-2.0	2.5	2.0	
Water Temperature (C)		*	*	*	*	*	*	*	*	*	*	*	*	
Times:														
a) morning (0900-1300)		a			a			a			a			
b) afternoon (1301-1700)			b			b			b			b		
c) evening (1701-2100)				c			c			c			c	TOTAL
Total Per Time Period:														
	Anglers	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fish Caught	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fish Kept	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hours Fished	-	-	-	-	-	-	-	-	-	-	-	-	-
	Catch/Effort (h)	-	-	-	-	-	-	-	-	-	-	-	-	-
Day Totals:														
	Anglers		-			-			-			-		
	Fish Caught		-			-			-			-		
	Fish Kept		-			-			-			-		
	Hours Fished		-			-			-			-		
	Catch/Effort (h)		-			-			-			-		
Species		a	b	c	a	b	c	a	b	c	a	b	c	Total

* Ice present.