

153

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RGE REPORT NO. B-07-115

ROCHESTER GAS AND ELECTRIC CORPORATION

1980 Fish Impingement Data Report

Russell Power Station

Data Collected and Report Prepared by  
Rochester Gas & Electric Corporation  
Nancy J. Edwards  
September 1981

REVISED 2/85

TABLES 13 + 19

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## TABLE OF CONTENTS

|                             | <u>Page</u> |
|-----------------------------|-------------|
| List of Tables              | iii         |
| List of Figures             | iv          |
| I. Introduction             | 1           |
| II. Materials and Methods   |             |
| A. Study Site               | 2           |
| B. Detailed Studies         | 2           |
| C. Daily Biomass Collection | 4           |
| III. Results                | 5           |

LIST OF TABLES

| <u>Table No.</u> |  | <u>Page</u> |
|------------------|--|-------------|
| 1                | 1980 Russell Station Impingement Study,<br>List of Fish Species Collected. | 9           |
| 2 through 47     | 1980 Russell Station Impingement Tables                                    | 10-55       |
| 48 through 59    | 1980 Daily Biomass Collection Tables                                       | 56-67       |

LIST OF FIGURES

| <u>Figure</u> |   | <u>Page</u> |
|---------------|---|-------------|
| 1             | Russell Station Site Location   | 6           |
| 2             | Russell Station Intake Structure  | 7           |
| 3             | Russell Station, Plan View of Screenhouse,<br>Forebay and Traveling Water Screens | 8           |

## I. INTRODUCTION

As part of Rochester Gas and Electric Corporation's Environmental Monitoring Program, impingement studies were conducted at RG&E's Russell Power Station in order to gather information regarding which fish species are impinged, and the environmental conditions associated with such impingement. This report describes the methods used in obtaining and analyzing these fish, as well as the basic results of the 1980 impingement studies at Russell Power Station.

## II. MATERIALS AND METHODS

### A. Study Site

Rochester Gas and Electric Corporation's Russell Power Station is located on Lake Ontario's southern shore, northwest of the City of Rochester, New York (Fig. 1) and approximately 2.4 km (1.5 mi.) west of the mouth of the Genesee River. The plant intake system is shown in Figure 2 and Figure 3, which depict the intake structure and the screenhouse facilities, respectively. This system consists of an 18.5M x 7.9M (61 ft. x 26 ft.) intake structure located offshore 1144M (3774 ft.) in about 9.1M (30 ft.) of water (lake elevation = 246 ft.). The intake velocity is about 0.8 fps through the trash bars on the structure. With a velocity of 7.0 fps the water moves shoreward through the intake tunnel entering the forebay of the screenhouse, where it is passed through four vertically traveling screens. The screens are operated sequentially, each being on for 15-20 minutes, with approximately 20 minutes separating the end of one screen wash and the start of the next. This washwater, carrying all collected screened material, travels down a trough and is collected in a sluiceway basket (Figure 3). It is from this point that impingement samples are removed.

### B. Detailed Studies

Most of the detailed impingement studies during 1980 were conducted for two consecutive 24-hour periods every week. Sample periods began at 0900 the first day and ended at

0900 the following day. All fish washed off the vertical traveling screens were collected in a wire mesh basket made to fit in the sluiceway to filter all screen washwater (Figure 3). This basket was lifted and the contents removed at the end of the 24-hour sampling period. The date listed on the data tables indicates the day sampling was initiated.

Collected fish were separated, normally identified to species, counted, and measured for length and weight. In cases where large numbers of a species were collected, all individuals were counted and a subsample of approximately 20 specimens were individually measured for length and weight. A batch weight of the remainder of that sample was then taken in order to get a total and average weight for that species. Within each species the fish collected were further divided into adults and juveniles, when this destination was readily apparent.

During the year, identification of all species collected was done according to Scott and Crossman (1973). Verification of species in question were performed by independent, qualified fisheries personnel. Along with each sampling, records of plant circulating cooling water flow, intake temperature, discharge temperature, air temperature, wind speed and direction, and general weather conditions were kept and have been presented with each sample date in the data table.

C. Daily Biomass Collection

The Daily Biomass Collection is a more qualitative 24-hour "impingement" sample taken each day (Tables 48 through 59). The sluiceway basket is emptied each morning and a total weight of everything collected is taken. Based on a macroscopic observation of the sample, the percentage of trash vs. fish is estimated. Trash in this instance represents all items excepting fish (e.g. rocks, seaweed, debris, crayfish, etc.). Using these percentages, one can then calculate from the total biomass collected the approximate kilograms of fish present. These daily biomass collections were begun in February 1978 and are an ongoing part of the impingement program at Russell Power Station. Although definitely not an exacting, quantitative sample, nor a detailed assessment of daily impingement, these collections were instituted in an attempt to provide some information concerning impingement on non-study days. Such information is expected to be useful in determining representativeness of scheduled sampling and environmental effects, among other concerns.

### III. RESULTS

During 1980 a total of 85 24-hour detailed sampling periods were conducted (Tables 2 through 47). Overall, a total of 17 species were identified; in addition, one other group was identified to the family level (Table 1). Daily biomass collections were taken on 223 days out of the 281 remaining days of the year (Tables 48 through 59). Combined detailed sampling and daily biomass collections represent impingement sampling conducted for 84% of the days in 1980.

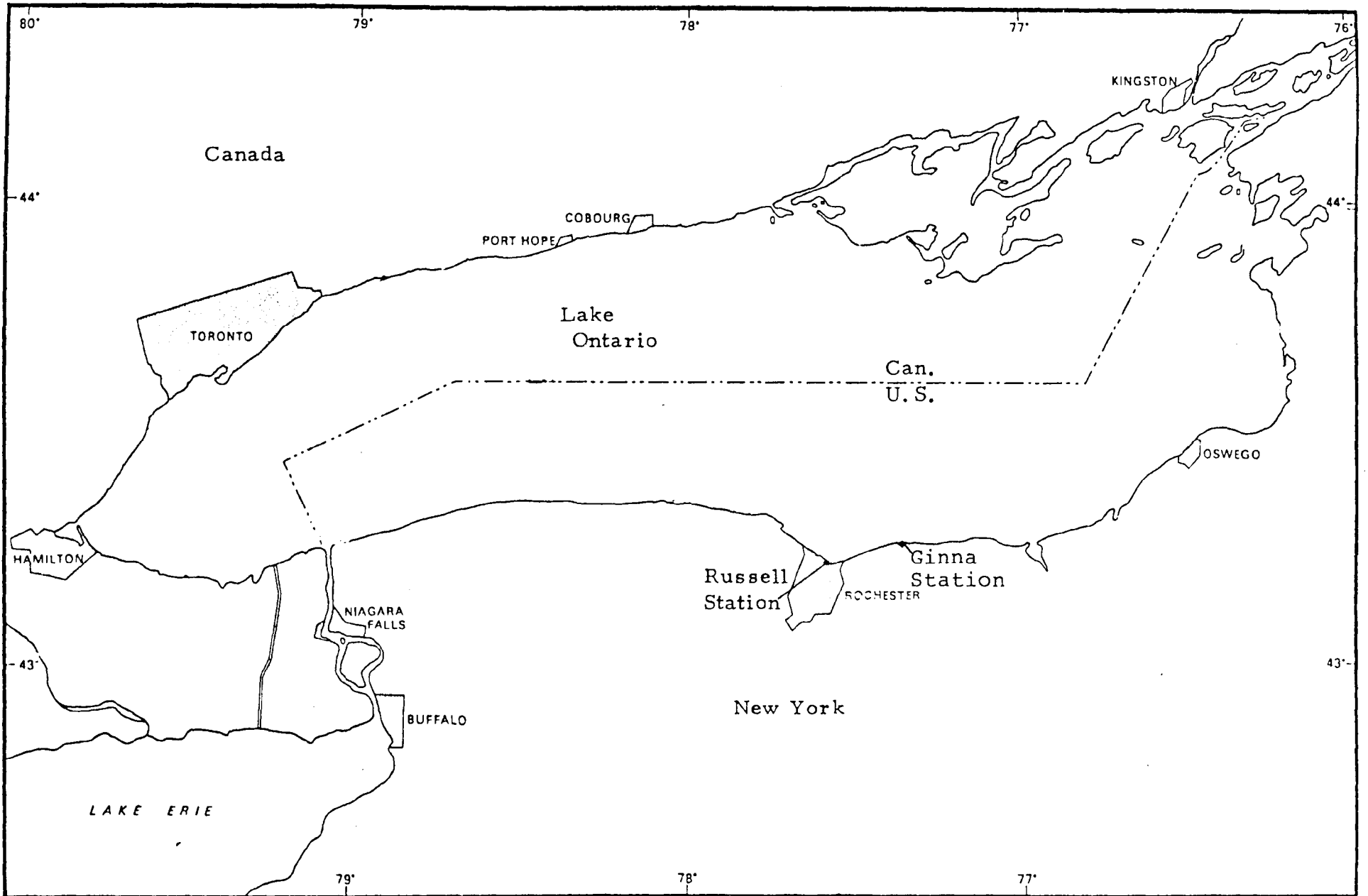


FIGURE 1  
RUSSELL STATION  
SITE LOCATION



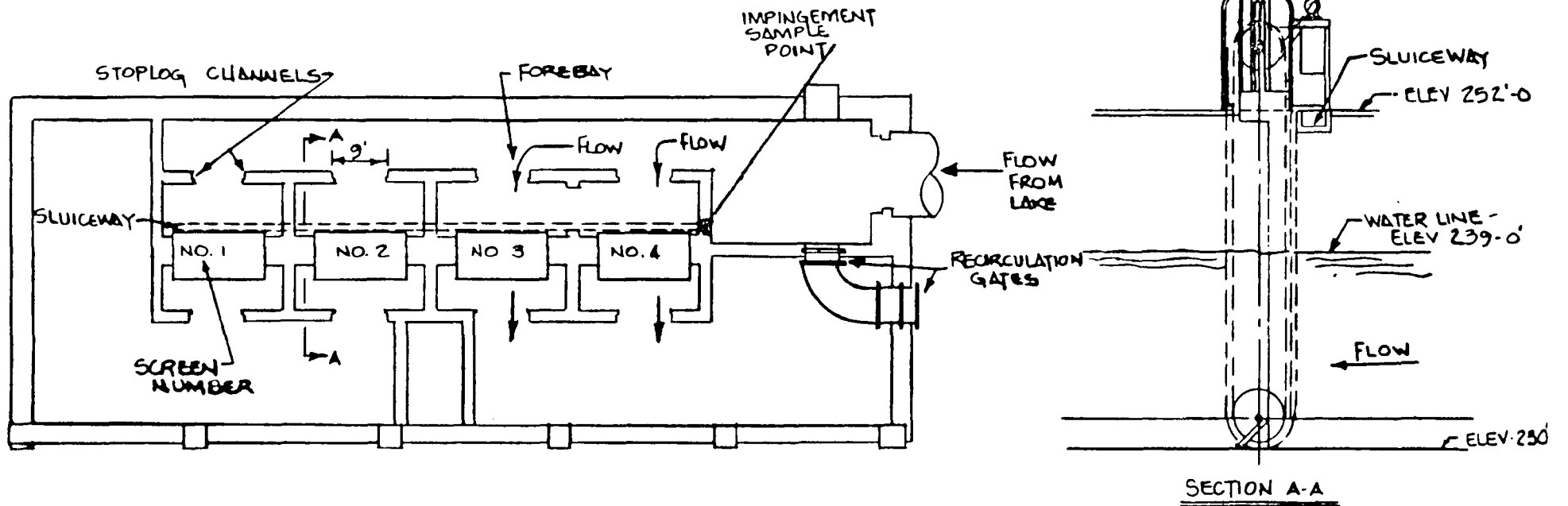


FIGURE 3  
RUSSELL STATION

PLAN VIEW OF SCREENHOUSE  
FOREBAY & TRAVELLING WATER SCREEN

TABLE 1  
 1980 RUSSELL STATION IMPINGEMENT STUDY  
 LIST OF FISH SPECIES COLLECTED

|                | <u>Scientific Name</u>  | <u>Common Name</u>                                    |
|----------------|---|---|
| Clupeidae      | <u>Alosa pseudoharengus</u><br><u>Dorosoma cepedianum</u>   | Alewife<br>Gizzard Shad                               |
| Osmeridae      | <u>Osmerus mordax</u>   | Rainbow Smelt   |
| Cyprinidae     | <u>Carassius auratus</u><br><u>Cyprinus carpio</u><br><u>Notropis atherinoides</u><br><u>Notropis hudsonius</u> | Goldfish<br>Carp<br>Emerald Shiner<br>Spottail Shiner |
| Catostomidae   | <u>Catostomus commersoni</u>  | White Sucker  |
| Percopsidae    | <u>Percopsis omiscomaycus</u>   | Trout-Perch   |
| Percichthyidae | <u>Morone americana</u><br><u>Morone chrysops</u>   | White Perch<br>White Bass                             |
| Centrarchidae  | Unidentified Centrarchidae<br><u>Ambloplites rupestris</u><br><u>Micropterus dolomieu</u>                       | Rock Bass<br>Smallmouth Bass                          |
| Percidae       | <u>Perca flavescens</u><br><u>Etheostoma nigrum</u>   | Yellow Perch<br>Johnny Darter                         |
| Sciaenidae     | <u>Aplodinotus grunniens</u>  | Freshwater Drum                                       |
| Cottidae       | <u>Cottus bairdi</u>  | Mottled Sculpin                                       |









TABLE 6

Russell Power Station  
1980 Impingement Program

Date: 3/4/80                                  Wind Speed (knots): 7.39  
 Plant Flow (MGD): 138.24                      Wind Direction: SW  
 Discharge Temp (°C): 14.44                      Air Temp (°C): -1.67  
 Intake Temp (°C): 2.78

| <u>Species</u>       | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Rainbow Smelt Juv.   | 1                    | 10.0                        | 7.0                         | 0.007                               |
| Rainbow Smelt        | 3                    | 13.2                        | 16.3                        | 0.022                               |
| Spottail Shiner Juv. | 1                    | 7.0                         | 4.0                         | 0.007                               |
| Spottail Shiner      | 3                    | 11.4                        | 16.0                        | 0.022                               |
| White Sucker         | 2                    | 28.5                        | 247.0                       | 0.014                               |
| White Bass           | 1                    | 21.0                        | 146.0                       | 0.007                               |
| <hr/>                |                      |                             |                             |                                     |
| Total                | 11                   |                             | 748.0*                      | 0.080                               |

\*\*\*\*\*

Date: 3/5/80                                  Wind Speed (knots): 7.39  
 Plant Flow (MGD): 138.24                      Wind Direction: W  
 Discharge Temp (°C): 15.00                      Air Temp (°C): 1.67  
 Intake Temp (°C): 2.78

| <u>Species</u>     | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|--------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife            | 1                    | 17.0                        | 44.0                        | 0.007                               |
| Rainbow Smelt Juv. | 1                    | 6.3                         | 0.5                         | 0.007                               |
| Rainbow Smelt      | 24                   | 15.2                        | 23.1**                      | 0.174                               |
| Spottail Shiner    | 2                    | 10.6                        | 11.0                        | 0.014                               |
| White Perch Juv.   | 1                    | 9.6                         | 11.0                        | 0.007                               |
| White Perch        | 2                    | 15.8                        | 55.0                        | 0.014                               |
| Mottled Sculpin    | 1                    | 7.6                         | 7.0                         | 0.007                               |
| <hr/>              |                      |                             |                             |                                     |
| Total              | 32                   |                             | 750.0*                      | 0.231                               |

\* Total weight of all impinged organisms.

\*\* Average weight based on subsample of 20 only.

TABLE 7

Russell Power Station  
1980 Impingement Program

Date: 3/20/80  
Plant Flow (MGD): 120.74  
Discharge Temp (°C): 12.78  
Intake Temp (°C): 3.33  
Wind Speed (knots): 7.48  
Wind Direction: S  
Air Temp (°C): 11.11

| <u>Species</u>       | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Rainbow Smelt        | 35                   | 16.2                        | 29.9**                      | 0.290                               |
| Spottail Shiner Juv. | 4                    | 9.6                         | 5.8                         | 0.033                               |
| Spottail Shiner      | 7                    | 11.0                        | 10.9                        | 0.058                               |
| White Perch Juv.     | 5                    | 8.7                         | 8.1                         | 0.041                               |
| White Perch          | 13                   | 18.9                        | 132.8                       | 0.108                               |
| Rock Bass            | 1                    | 15.0                        | 78.0                        | 0.008                               |
| Total                | 65                   |                             | 2991.0*                     | 0.538                               |

\* Total weight of all impinged organisms.

\*\* Average weight based on subsample of 20 only.

TABLE 8

Russell Power Station  
1980 Impingement Program

|                            |                          |
|----------------------------|--------------------------|
| Date: 3/31/80              | Wind Speed (knots): 9.65 |
| Plant Flow (MGD): 154.37   | Wind Direction: SE       |
| Discharge Temp (°C): 15.00 | Air Temp (°C): 5.00      |
| Intake Temp (°C): 4.44     |                          |

| <u>Species</u>       | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.         | 1                    | 8.0                         | 4.0                         | 0.006                               |
| Rainbow Smelt        | 17                   | 14.6                        | 21.4                        | 0.110                               |
| Spottail Shiner Juv. | 3                    | 9.2                         | 6.7                         | 0.019                               |
| Spottail Shiner      | 9                    | 11.5                        | 12.1                        | 0.058                               |
| White Perch Juv.     | 10                   | 9.7                         | 11.9                        | 0.065                               |
| White Perch          | 39                   | 14.4                        | 49.7                        | 0.253                               |
| Rock Bass            | 1                    | 17.5                        | 110.0                       | 0.006                               |
| Yellow Perch         | 1                    | 22.0                        | 98.0                        | 0.006                               |
| Mottled Sculpin      | 1                    | 6.8                         | 4.0                         | 0.006                               |
|                      |                      |                             |                             |                                     |
| Total                | 82                   |                             | 2766.1*                     | 0.531                               |

\* Total weight of all impinged organisms.

TABLE 9

Russell Power Station  
1980 Impingement Program

|                            |                          |
|----------------------------|--------------------------|
| Date: 4/2/80               | Wind Speed (knots): 8.52 |
| Plant Flow (MGD): 154.37   | Wind Direction: W        |
| Discharge Temp (°C): 15.56 | Air Temp (°C): 8.33      |
| Intake Temp (°C): 3.89     |                          |

| <u>Species</u>  | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|-----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Rainbow Smelt   | 2                    | 17.0                        | 32.0                        | 0.013                               |
| Spottail Shiner | 3                    | 11.3                        | 13.0                        | 0.019                               |
| Emerald Shiner  | 2                    | 12.5                        | 22.0                        | 0.013                               |
|                 |                      |                             |                             |                                     |
| Total           | 7                    |                             | 147.0*                      | 0.045                               |

\* Total weight of all impinged organisms.





TABLE 12

Russell Power Station  
1980 Impingement Program

Date: 4/24/80  
 Plant Flow (MGD): 157.90  
 Discharge Temp (°C): 17.78  
 Intake Temp (°C): 7.22  
 Wind Speed (knots): 8.87  
 Wind Direction: NE  
 Air Temp (°C): 6.67

| <u>Species</u>       | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.         | 2                    | 9.4                         | 6.0                         | 0.013                               |
| Alewife              | 17                   | 17.3                        | 34.8                        | 0.108                               |
| Rainbow Smelt Juv.   | 3                    | 8.9                         | 3.0                         | 0.019                               |
| Rainbow Smelt        | 33                   | 14.9                        | 19.2**                      | 0.209                               |
| Spottail Shiner Juv. | 2                    | 9.8                         | 8.0                         | 0.013                               |
| White Sucker         | 2                    | 29.0                        | 261.0                       | 0.013                               |
| Mottled Sculpin      | 1                    | 7.0                         | 2.0                         | 0.006                               |
| Johnny Darter        | 1                    | 8.0                         | 6.0                         | 0.006                               |
| <b>Total</b>         | <b>61</b>            |                             | <b>1792.0*</b>              | <b>0.386</b>                        |

\* Total weight of all impinged organisms.

\*\* Average weight based on subsample of 20 only.

TABLE 13

Russell Power Station  
1980 Impingement Program

Date: 4/27/80 Wind Speed (knots): 8.61  
Plant Flow (MGD): 125.93 Wind Direction: E  
Discharge Temp (°C): 15.00 Air Temp (°C): 9.44  
Intake Temp (°C): 6.67

| <u>Species</u>       | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/l X 10<sup>6</sup> gal.</u> |
|----------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.         | 2                    | 8.1                         | 10.0                        | 0.016                               |
| Alewife              | 7                    | 16.9                        | 31.3                        | 0.056                               |
| Rainbow Smelt Juv.   | 1                    | 8.3                         | 3.0                         | 0.008                               |
| Rainbow Smelt        | 35                   | 14.8                        | 19.5**                      | 0.278                               |
| Emerald Shiner Juv.  | 1                    | 6.8                         | 4.0                         | 0.008                               |
| Emerald Shiner       | 4                    | 11.3                        | 14.8                        | 0.032                               |
| Spottail Shiner Juv. | 1                    | 10.0                        | 10.0                        | 0.008                               |
| White Sucker         | 1                    | 24.4                        | 140.0                       | 0.008                               |
| White Bass           | 1                    | 16.8                        | 61.0                        | 0.008                               |
| Rock Bass            | 3                    | 44.0                        | 99.3                        | 0.024                               |
| Yellow Perch         | 1                    | 14.4                        | 28.0                        | 0.008                               |
| Mottled Sculpin      | 4                    | 9.7                         | 12.5                        | 0.032                               |
| Johnny Darter        | 2                    | 7.8                         | 4.5                         | 0.016                               |
| Crayfish             | 50                   | ---                         | 4.4                         | 0.397                               |

Total 113 12704.0\* 0.897

Revised  
2/85

\*\*\*\*\*

Date: 4/28/80 Wind Speed (knots): 9.91  
Plant Flow (MGD): 157.90 Wind Direction: NE  
Discharge Temp (°C): 19.44 Air Temp (°C): 9.44  
Intake Temp (°C): 8.33

| <u>Species</u> | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/l X 10<sup>6</sup> gal.</u> |
|----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife        | 1                    | 19.0                        | 37.0                        | 0.006                               |
| Rainbow Smelt  | 1                    | 17.5                        | 29.0                        | 0.006                               |
| White Bass     | 1                    | 18.5                        | 80.0                        | 0.006                               |
| Rock Bass      | 1                    | 16.0                        | 78.0                        | 0.006                               |

Total 4 224.0\*\* 0.025

\*\*\*\*\*

Date: 4/29/80 Wind Speed (knots): 8.78  
Plant Flow (MGD): 157.90 Wind Direction: E  
Discharge Temp (°C): 17.78 Air Temp (°C): 10.56  
Intake Temp (°C): 7.78

| <u>Species</u>     | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/l X 10<sup>6</sup> gal.</u> |
|--------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.       | 1                    | 8.3                         | 6.0                         | 0.006                               |
| Alewife            | 5                    | 14.5                        | 24.4                        | 0.032                               |
| Rainbow Smelt Juv. | 1                    | 7.5                         | 4.0                         | 0.006                               |
| Rainbow Smelt      | 3                    | 15.0                        | 27.7                        | 0.019                               |
| Emerald Shiner     | 2                    | 11.1                        | 18.5                        | 0.013                               |
| White Sucker       | 1                    | 28.0                        | 235.0                       | 0.006                               |
| Rock Bass          | 1                    | 25.6                        | 324.0                       | 0.006                               |

Total 14 811.0\* 0.089

\* Total weight of all impinged organisms.  
\*\* Average weight based on subsample of 20 only.

TABLE 14

Russell Power Station  
1980 Impingement Program

|                            |                          |
|----------------------------|--------------------------|
| Date: 5/6/80               | Wind Speed (knots): 8.61 |
| Plant Flow (MGD): 157.90   | Wind Direction: W        |
| Discharge Temp (°C): 18.33 | Air Temp (°C): 14.44     |
| Intake Temp (°C): 8.89     |                          |

| <u>Species</u>     | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|--------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife            | 15                   | 15.1                        | 24.3                        | 0.095                               |
| Rainbow Smelt Juv. | 2                    | 9.2                         | 4.5                         | 0.013                               |
| Rainbow Smelt      | 46                   | 16.0                        | 21.0**                      | 0.291                               |
| Mottled Sculpin    | 5                    | 6.7                         | 2.4                         | 0.032                               |
| Crayfish           | 2                    | ---                         | 2.5                         | 0.013                               |
|                    |                      |                             |                             |                                     |
| Total              | 70                   |                             | 1356.5*                     | 0.443                               |

\* Total weight of all impinged organisms.

\*\* Average weight based on subsample of 20 only.

TABLE 15

Russell Power Station  
1980 Impingement Program

|                            |                           |
|----------------------------|---------------------------|
| Date: 5/8/80               | Wind Speed (knots): 10.00 |
| Plant Flow (MGD): 157.90   | Wind Direction: SW        |
| Discharge Temp (°C): 21.67 | Air Temp (°C): 7.78       |
| Intake Temp (°C): 10.00    |                           |

| <u>Species</u> | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife        | 7                    | 17.1                        | 33.3                        | 0.044                               |
| Rainbow Smelt  | 22                   | 14.4                        | 15.9                        | 0.139                               |
| White Sucker   | 1                    | 29.0                        | 262.0                       | 0.006                               |
| Yellow Perch   | 1                    | 21.6                        | 120.0                       | 0.006                               |
| Crayfish       | 1                    | ---                         | 12.0                        | 0.006                               |
|                |                      |                             |                             |                                     |
| Total          | 32                   |                             | 976.0*                      | 0.203                               |

\* Total weight of all impinged organisms.









TABLE 20

Russell Power Station  
1980 Impingement Program

Date: 6/13/80                      Wind Speed (knots): 5.74  
 Plant Flow (MGD): 118.22              Wind Direction: SW  
 Discharge Temp (°C): 19.44              Air Temp (°C): 18.89  
 Intake Temp (°C): 12.22

| <u>Species</u>     | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|--------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.       | 4                    | 9.3                         | 1.9                         | 0.034                               |
| Alewife            | 40                   | 16.1                        | 23.9**                      | 0.338                               |
| Rainbow Smelt Juv. | 3                    | 7.8                         | 0.7                         | 0.025                               |
| Rainbow Smelt      | 14                   | 13.1                        | 10.4                        | 0.118                               |
| Spottail Shiner    | 1                    | 11.0                        | 11.0                        | 0.008                               |
| Crayfish           | 2                    | ---                         | 4.0                         | 0.017                               |
| <b>Total</b>       | <b>64</b>            |                             | <b>1130.3*</b>              | <b>0.541</b>                        |

\*\*\*\*\*  
 Date: 6/14/80                      Wind Speed (knots): 6.35  
 Plant Flow (MGD): 76.75              Wind Direction: W  
 Discharge Temp (°C): 18.33              Air Temp (°C): 21.67  
 Intake Temp (°C): 12.22

| <u>Species</u>     | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|--------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.       | 15                   | 8.9                         | 2.3                         | 0.195                               |
| Alewife            | 56                   | 16.8                        | 28.9**                      | 0.730                               |
| Rainbow Smelt Juv. | 4                    | 8.8                         | 2.0                         | 0.052                               |
| Rainbow Smelt      | 31                   | 14.0                        | 13.5                        | 0.404                               |
| Yellow Perch       | 1                    | 21.5                        | 123.0                       | 0.013                               |
| <b>Total</b>       | <b>107</b>           |                             | <b>2377.0*</b>              | <b>1.394</b>                        |

\* Total weight of all impinged organisms.

\*\* Average weight based on subsample of 20 only.









TABLE 25

Russell Power Station  
1980 Impingement Program

Date: 7/16/80                                      Wind Speed (knots): 8.52  
 Plant Flow (MGD): 142.01                        Wind Direction: SW  
 Discharge Temp (°C): 31.11                    Air Temp (°C): 27.22  
 Intake Temp (°C): 20.56

| <u>Species</u> | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.   | 2                    | 9.8                         | 4.0                         | 0.014                               |
| Alewife        | 16                   | 16.6                        | 29.7                        | 0.113                               |
| White Sucker   | 2                    | 50.0                        | 925.0                       | 0.014                               |
| Rock Bass      | 6                    | 21.0                        | 201.2                       | 0.042                               |
| Crayfish       | 2                    | ---                         | 0.5                         | 0.014                               |
| <hr/>          |                      |                             |                             |                                     |
| Total          | 28                   |                             | 3541.0*                     | 0.197                               |

\*\*\*\*\*  
 Date: 7/17/80                                      Wind Speed (knots): 8.35  
 Plant Flow (MGD): 116.42                        Wind Direction: SW  
 Discharge Temp (°C): 31.11                    Air Temp (°C): 25.00  
 Intake Temp (°C): 21.11

| <u>Species</u> | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.   | 3                    | 6.9                         | 4.3                         | 0.026                               |
| Alewife        | 72                   | 16.5                        | 30.2**                      | 0.618                               |
| Rock Bass      | 1                    | 22.0                        | 215.0                       | 0.009                               |
| Crayfish       | 2                    | ---                         | 0.8                         | 0.017                               |
| <hr/>          |                      |                             |                             |                                     |
| Total          | 78                   |                             | 2404.0*                     | 0.670                               |

\* Total weight of all impinged organisms.

\*\* Average weight based on subsample of 20 only.

TABLE 26

Russell Power Station  
1980 Impingement Program

Date: 7/23/80                      Wind Speed (knots): 8.35  
 Plant Flow (MGD): 155.88              Wind Direction: W  
 Discharge Temp (°C): 36.11            Air Temp (°C): 22.78  
 Intake Temp (°C): 23.89

| <u>Species</u>       | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.         | 1                    | 10.0                        | 9.0                         | 0.006                               |
| Alewife              | 8                    | 16.3                        | 30.5                        | 0.051                               |
| Spottail Shiner Juv. | 1                    | 10.0                        | 7.0                         | 0.006                               |
| Spottail Shiner      | 1                    | 12.5                        | 17.0                        | 0.006                               |
| <b>Total</b>         | <b>11</b>            |                             | <b>277.0*</b>               | <b>0.071</b>                        |

\*\*\*\*\*

Date: 7/24/80                      Wind Speed (knots): 5.22  
 Plant Flow (MGD): 155.88              Wind Direction: NW  
 Discharge Temp (°C): 35.56            Air Temp (°C): 21.11  
 Intake Temp (°C): 23.89

| <u>Species</u> | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife        | 6                    | 13.4                        | 29.0                        | 0.038                               |
| Rock Bass      | 1                    | 20.5                        | 180.0                       | 0.006                               |
| <b>Total</b>   | <b>7</b>             |                             | <b>354.0*</b>               | <b>0.045</b>                        |

\* Total weight of all impinged organisms.







TABLE 30

Russell Power Station  
1980 Impingement Program

Date: 8/24/80  
 Plant Flow (MGD): 155.88  
 Discharge Temp (°C): 26.11  
 Intake Temp (°C): 16.11  
 Wind Speed (knots): 4.35  
 Wind Direction: N  
 Air Temp (°C): 22.22

| <u>Species</u>     | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|--------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife            | 4                    | 17.8                        | 24.3                        | 0.026                               |
| Rainbow Smelt Juv. | 4                    | 9.0                         | 3.3                         | 0.026                               |
| Rainbow Smelt      | 8                    | 14.7                        | 16.3                        | 0.051                               |
| White Bass         | 1                    | 15.8                        | 54.0                        | 0.006                               |
| Rock Bass          | 19                   | 18.8                        | 150.7                       | 0.122                               |
| Yellow Perch       | 38                   | 19.8                        | 114.5**                     | 0.244                               |
| Mottled Sculpin    | 1                    | 6.0                         | 2.0                         | 0.006                               |
| Crayfish           | 16                   | ---                         | 57.0                        | 0.103                               |
| <br>               |                      |                             |                             |                                     |
| Total              | 91                   |                             | 8423.0*                     | 0.584                               |

\* Total weight of all impinged organisms.

\*\* Average weight based on subsample of 20 only.



TABLE 32

Russell Power Station  
1980 Impingement Program

Date: 9/3/80                                      Wind Speed (knots): 5.48  
 Plant Flow (MGD): 131.81                      Wind Direction: NW  
 Discharge Temp (°C): 27.22                  Air Temp (°C): 20.56  
 Intake Temp (°C): 20.56

| <u>Species</u> | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| White Sucker   | 1                    | 28.6                        | 462.0                       | 0.008                               |
| Rock Bass      | 2                    | 19.1                        | 151.5                       | 0.015                               |
| <b>Total</b>   | <b>3</b>             |                             | <b>765.0*</b>               | <b>0.023</b>                        |

\*\*\*\*\*

Date: 9/4/80                                      Wind Speed (knots): 5.22  
 Plant Flow (MGD): 126.00                      Wind Direction: S  
 Discharge Temp (°C): 29.44                  Air Temp (°C): 21.67  
 Intake Temp (°C): 21.11

| <u>Species</u> | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| White Sucker   | 1                    | 41.0                        | 404.0                       | 0.008                               |
| Yellow Perch   | 3                    | 22.8                        | 152.7                       | 0.024                               |
| Crayfish       | 1                    | ---                         | 4.0                         | 0.008                               |
| <b>Total</b>   | <b>5</b>             |                             | <b>866.0*</b>               | <b>0.040</b>                        |

\* Total weight of all impinged organisms.





TABLE 35

Russell Power Station  
1980 Impingement Program

Date: 9/24/80                                      Wind Speed (knots): 6.61  
 Plant Flow (MGD): 126.00                      Wind Direction: N  
 Discharge Temp (°C): 22.22                    Air Temp (°C): 13.89  
 Intake Temp (°C): 16.67

| <u>Species</u>     | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|--------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Rainbow Smelt Juv. | 2                    | 8.5                         | 3.0                         | 0.016                               |
| White Sucker       | 1                    | 32.0                        | 510.0                       | 0.008                               |
| Rock Bass          | 3                    | 13.5                        | 59.3                        | 0.024                               |
| Yellow Perch       | 2                    | 23.3                        | 168.0                       | 0.016                               |
| Mottled Sculpin    | 1                    | 7.0                         | 4.0                         | 0.008                               |
| Crayfish           | 4                    | ---                         | 6.0                         | 0.032                               |
| <b>Total</b>       | <b>13</b>            |                             | <b>1058.0*</b>              | <b>0.103</b>                        |

\*\*\*\*\*  
 Date: 9/25/80                                      Wind Speed (knots): 4.00  
 Plant Flow (MGD): 126.00                      Wind Direction: W  
 Discharge Temp (°C): 25.00                    Air Temp (°C): 15.56  
 Intake Temp (°C): 16.11

| <u>Species</u>  | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|-----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Alewife Juv.    | 1                    | 7.0                         | 2.0                         | 0.008                               |
| Alewife         | 1                    | 18.0                        | 16.0                        | 0.008                               |
| Rainbow Smelt   | 1                    | 16.5                        | 22.0                        | 0.008                               |
| Spottail Shiner | 1                    | 11.7                        | 12.0                        | 0.008                               |
| Rock Bass       | 3                    | 19.5                        | 152.0                       | 0.024                               |
| Yellow Perch    | 4                    | 17.8                        | 72.8                        | 0.032                               |
| Johnny Darter   | 1                    | 7.5                         | 6.0                         | 0.008                               |
| Mottled Sculpin | 1                    | 7.5                         | 4.0                         | 0.008                               |
| Crayfish        | 6                    | ---                         | 5.2                         | 0.048                               |
| <b>Total</b>    | <b>19</b>            |                             | <b>840.0*</b>               | <b>0.151</b>                        |

\* Total weight of all impinged organisms.



TABLE 37

Russell Power Station  
1980 Impingement Program

Date: 10/15/80                                  Wind Speed (knots): 4.52  
 Plant Flow (MGD): 126.00                      Wind Direction: SE  
 Discharge Temp (°C): 22.78                  Air Temp (°C): 8.33  
 Intake Temp (°C): 12.22

| <u>Species</u> | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Rainbow Smelt  | 3                    | 17.9                        | 26.3                        | 0.024                               |
| Rock Bass      | 3                    | 15.3                        | 99.3                        | 0.024                               |
| Yellow Perch   | 17                   | 22.8                        | 182.6                       | 0.135                               |
| <hr/>          |                      |                             |                             |                                     |
| Total          | 23                   |                             | 3481.0*                     | 0.183                               |

\*\*\*\*\*

Date: 10/16/80                                  Wind Speed (knots): 10.56  
 Plant Flow (MGD): 121.46                      Wind Direction: SE  
 Discharge Temp (°C): 23.33                  Air Temp (°C): 4.00  
 Intake Temp (°C): 12.22

| <u>Species</u>    | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|-------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Gizzard Shad Juv. | 1                    | 7.3                         | 6.0                         | 0.008                               |
| Spottail Shiner   | 1                    | 11.5                        | 18.0                        | 0.008                               |
| Rock Bass         | 2                    | 17.3                        | 111.0                       | 0.016                               |
| Yellow Perch      | 3                    | 21.3                        | 158.7                       | 0.025                               |
| <hr/>             |                      |                             |                             |                                     |
| Total             | 7                    |                             | 722.0*                      | 0.058                               |

\* Total weight of all impinged organisms.





TABLE 40

Russell Power Station  
1980 Impingement Program

Date: 10/29/80                                      Wind Speed (knots): 8.61  
 Plant Flow (MGD): 121.46                        Wind Direction: W  
 Discharge Temp (°C): 19.44                    Air Temp (°C): 5.00  
 Intake Temp (°C): 8.89

| <u>Species</u>       | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Rainbow Smelt        | 2                    | 16.5                        | 27.0                        | 0.016                               |
| Spottail Shiner Juv. | 1                    | 9.8                         | 10.0                        | 0.008                               |
| Spottail Shiner      | 1                    | 15.6                        | 23.0                        | 0.008                               |
| White Perch Juv.     | 19                   | 9.3                         | 8.9                         | 0.156                               |
| White Perch          | 7                    | 10.8                        | 14.4                        | 0.058                               |
| Rock Bass            | 1                    | 19.5                        | 162.0                       | 0.008                               |
| Yellow Perch         | 5                    | 21.9                        | 126.0                       | 0.041                               |
| <hr/>                |                      |                             |                             |                                     |
| Total                | 36                   |                             | 1150.0*                     | 0.296                               |

\*\*\*\*\*

Date: 10/30/80                                      Wind Speed (knots): 7.13  
 Plant Flow (MGD): 112.54                        Wind Direction: SW  
 Discharge Temp (°C): 19.44                    Air Temp (°C): 7.22  
 Intake Temp (°C): 8.89

| <u>Species</u>   | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Spottail Shiner  | 1                    | 13.0                        | 25.0                        | 0.009                               |
| White Perch Juv. | 9                    | 9.2                         | 11.7                        | 0.080                               |
| White Perch      | 6                    | 12.4                        | 39.7                        | 0.053                               |
| Trout Perch      | 1                    | 9.8                         | 11.0                        | 0.009                               |
| Johnny Darter    | 1                    | 8.5                         | 12.0                        | 0.009                               |
| Yellow Perch     | 2                    | 18.6                        | 73.5                        | 0.018                               |
| Mottled Sculpin  | 1                    | 6.0                         | 5.0                         | 0.009                               |
| <hr/>            |                      |                             |                             |                                     |
| Total            | 21                   |                             | 543.0*                      | 0.187                               |

\* Total weight of all impinged organisms.



TABLE 42

Russell Power Station  
1980 Impingement Program

Date: 11/12/80                                      Wind Speed (knots): 12.61  
 Plant Flow (MGD): 152.93                              Wind Direction: NW  
 Discharge Temp (°C): 20.00                              Air Temp (°C): 2.22  
 Intake Temp (°C): 6.67

| <u>Species</u>       | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|----------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Gizzard Shad Juv.    | 2                    | 8.9                         | 7.0                         | 0.013                               |
| Gizzard Shad         | 1                    | 10.2                        | 10.0                        | 0.007                               |
| Rainbow Smelt Juv.   | 2                    | 7.9                         | 2.3                         | 0.013                               |
| Rainbow Smelt        | 6                    | 13.5                        | 13.2                        | 0.039                               |
| Spottail Shiner Juv. | 2                    | 9.2                         | 7.5                         | 0.013                               |
| Spottail Shiner      | 4                    | 11.0                        | 13.0                        | 0.026                               |
| White Perch          | 3                    | 20.1                        | 150.0                       | 0.020                               |
| White Bass Juv.      | 10                   | 9.3                         | 7.0                         | 0.065                               |
| White Bass           | 30                   | 12.7                        | 21.1                        | 0.196                               |
| Rock Bass            | 13                   | 18.1                        | 131.7                       | 0.085                               |
| Yellow Perch         | 1                    | 21.0                        | 120.0                       | 0.007                               |
| Crayfish             | 4                    | ---                         | 4.3                         | 0.026                               |
| <hr/>                |                      |                             |                             |                                     |
| Total                | 78                   |                             | 3178.0*                     | 0.510                               |

\*\*\*\*\*

Date: 11/13/80                                      Wind Speed (knots): 5.91  
 Plant Flow (MGD): 152.93                              Wind Direction: S  
 Discharge Temp (°C): 18.33                              Air Temp (°C): 6.67  
 Intake Temp (°C): 7.22

| <u>Species</u>     | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|--------------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Rainbow Smelt Juv. | 1                    | 5.5                         | 1.0                         | 0.007                               |
| Rainbow Smelt      | 3                    | 13.8                        | 14.3                        | 0.020                               |
| White Perch        | 1                    | 21.6                        | 175.0                       | 0.007                               |
| White Bass Juv.    | 8                    | 9.6                         | 9.8                         | 0.052                               |
| White Bass         | 7                    | 11.3                        | 15.4                        | 0.046                               |
| Rock Bass          | 1                    | 20.8                        | 166.0                       | 0.007                               |
| <hr/>              |                      |                             |                             |                                     |
| Total              | 21                   |                             | 571.0*                      | 0.137                               |

Total weight of all impinged organisms.



TABLE 44

Russell Power Station  
1980 Impingement Program

Date: 11/25/80                      Wind Speed (knots): 12.78  
 Plant Flow (MGD): 152.71            Wind Direction: NW  
 Discharge Temp (°C): 17.78        Air Temp (°C): 1.11  
 Intake Temp (°C): 6.11

| <u>Species</u>  | <u>Total Numbers</u> | <u>Avg. Length<br/>(cm)</u> | <u>Avg. Weight<br/>(gm)</u> | <u>Fish/1 X 10<sup>6</sup> gal.</u> |
|-----------------|----------------------|-----------------------------|-----------------------------|-------------------------------------|
| Rainbow Smelt   | 2                    | 15.8                        | 16.0                        | 0.013                               |
| Spottail Shiner | 1                    | 10.8                        | 8.0                         | 0.006                               |
| White Bass Juv. | 2                    | 8.5                         | 5.0                         | 0.013                               |
| White Perch     | 2                    | 16.3                        | 63.5                        | 0.013                               |
| Yellow Perch    | 7                    | 21.1                        | 127.4                       | 0.046                               |
| Smallmouth Bass | 1                    | 25.5                        | 244.0                       | 0.006                               |
| <br>            | <hr/>                |                             | <hr/>                       | <hr/>                               |
| Total           | 15                   |                             | 1317.0*                     | 0.098                               |

\* Total weight of all impinged organisms.







TABLE 48  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 JANUARY

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 5.39               | W              | 2.78                   | 135.60           | -        | No Sample      |
| 2    | 7.65               | W              | 3.89                   | 135.60           | 0.80     | detailed study |
| 3    | 9.22               | N              | 3.33                   | 135.60           | 2.23     | detailed study |
| 4    | 5.91               | NE             | 2.78                   | 135.60           | -        | No Sample      |
| 5    | 10.00              | NE             | 2.22                   | 135.60           | 28.03*   | 5% trash       |
| 6    | 6.35               | S              | 2.78                   | 112.40           |          |                |
| 7    | 18.52              | SW             | 2.22                   | 116.10           |          |                |
| 8    | 13.04              | W              | 1.11                   | 99.90            | 2.25     | 10% trash      |
| 9    | 12.78              | W              | 1.11                   | 99.90            | 1.10     | detailed study |
| 10   | 7.48               | SE             | 0.56                   | 99.90            | 2.63     | detailed study |
| 11   | 17.13              | SW             | 1.11                   | 87.60            | 3.06     |                |
| 12   | 22.00              | SW             | 0.56                   | 90.70            | 0.89     | 90% trash      |
| 13   | 11.39              | S              | 0.56                   | 83.70            | 2.00     | 20% trash      |
| 14   | 6.87               | S              | 1.11                   | 83.70            | 0.91     |                |
| 15   | 7.65               | N              | 1.11                   | 83.70            | 1.02     | 10% trash      |
| 16   | 6.78               | E              | 1.11                   | 108.40           | 3.41     |                |
| 17   | 8.35               | SE             | 1.67                   | 114.20           | 0.79     |                |
| 18   | 9.91               | W              | 2.22                   | 123.40           | 4.09     |                |
| 19   | 12.61              | W              | 1.67                   | 108.40           | 2.00     | 20% trash      |
| 20   | 14.17              | NW             | 1.11                   | 108.40           | -        | No Sample      |
| 21   | 11.22              | W              | 1.11                   | 108.40           | 2.72     |                |
| 22   | 10.52              | SW             | 1.11                   | 108.40           | 4.18     | 20% trash      |
| 23   | 15.22              | SW             | 0.56                   | 108.40           | 2.95     |                |
| 24   | 13.48              | W              | 0.56                   | 80.70            | 3.17     | detailed study |
| 25   | 6.78               | W              | 0.00                   | 108.40           | 3.37     | detailed study |
| 26   | 13.39              | W              | 0.00                   | 88.70            | -        | No Sample      |
| 27   | 5.74               | W              | 0.00                   | 106.90           | -        | No Sample      |
| 28   | 12.61              | W              | 1.11                   | 140.80           | 4.49     | 10% trash      |
| 29   | 11.13              | W              | 1.11                   | 114.50           | 3.27     | 20% trash      |
| 30   | 10.78              | W              | 1.67                   | 117.60           | 2.54     | 20% trash      |
| 31   | 11.13              | NW             | 1.67                   | 138.90           | 2.86     | 10% trash      |

Total Biomass = 84.76 Kg.

\* Kg. Fish and % trash represent three days (5, 6, & 7) combined.

TABLE 49  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 FEBRUARY

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 13.91              | NW             | 2.22                   | 138.89           | 2.72     |                |
| 2    | 15.22              | W              | 2.22                   | 138.89           | 4.45*    | 30% trash*     |
| 3    | 13.74              | W              | 1.67                   | 138.89           |          |                |
| 4    | 10.00              | NW             | 2.22                   | 138.89           | 0.41     | 60% trash      |
| 5    | 8.35               | W              | 1.67                   | 140.65           | 0.91     |                |
| 6    | 6.61               | NE             | 1.67                   | 140.26           | 0.91     |                |
| 7    | 7.65               | NW             | 1.67                   | 140.26           | 1.18     | detailed study |
| 8    | 8.52               | W              | 1.67                   | 140.26           | 0.88     | detailed study |
| 9    | 7.22               | NW             | 1.67                   | 140.26           | -        | No Sample      |
| 10   | 7.91               | NW             | 1.67                   | 140.26           | 0.11     |                |
| 11   | 8.17               | W              | 1.67                   | 138.34           | 0.68     |                |
| 12   | 14.26              | SW             | 2.78                   | 139.54           | 0.68     |                |
| 13   | 11.04              | SW             | 2.22                   | 139.54           | 0.68     |                |
| 14   | 11.65              | W              | 2.22                   | 139.54           | 0.91     |                |
| 15   | 5.48               | E              | 1.67                   | 143.96           | 0.79     |                |
| 16   | 9.91               | W              | 2.22                   | 138.24           |          |                |
| 17   | 13.22              | SW             | 2.22                   | 137.43           | 6.33**   | 10% trash**    |
| 18   | 12.52              | W              | 2.22                   | 137.16           |          |                |
| 19   | 8.87               | SW             | 2.22                   | 137.16           | 0.68     |                |
| 20   | 5.22               | S              | 2.78                   | 137.16           | 0.11     |                |
| 21   | 9.39               | NE             | 1.67                   | 137.16           | -        | No Sample      |
| 22   | 13.04              | SW             | 2.78                   | 137.16           | -        | No Sample      |
| 23   | 7.13               | SW             | 2.78                   | 137.16           | 0.91     |                |
| 24   | 13.22              | SW             | 2.78                   | 137.16           | 1.36     |                |
| 25   | 9.13               | NE             | 3.33                   | 137.16           | 1.02     |                |
| 26   | 12.26              | NE             | 2.78                   | 137.16           | 5.90     |                |
| 27   | 14.00              | W              | 2.78                   | 137.16           | 4.77     |                |
| 28   | 11.91              | W              | 2.78                   | 137.16           | 0.79     |                |
| 29   | 15.39              | W              | 2.22                   | 137.16           | 0.36     | 20% trash      |

Total Biomass = 37.55 Kg.

\* Kg. Fish and % trash represent two days (2 & 3) combined.

\*\* Kg. Fish and % trash represent three days (16, 17 & 18) combined.

TABLE 50  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 MARCH

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 10.26              | NW             | 2.22                   | 138.24           | 2.95     |                |
| 2    | 7.39               | W              | 2.78                   | 138.24           | 0.57     |                |
| 3    | 9.48               | SW             | 2.22                   | 138.24           | 0.45     |                |
| 4    | 7.39               | SW             | 2.78                   | 138.24           | 0.75     | detailed study |
| 5    | 7.39               | W              | 2.78                   | 138.24           | 0.75     | detailed study |
| 6    | 9.74               | W              | 2.78                   | 138.24           | -        | No Sample      |
| 7    | 4.00               | E              | 2.78                   | 138.24           | 1.14     |                |
| 8    | 8.78               | NE             | 2.78                   | 138.24           | -        | No Sample      |
| 9    | 11.04              | SW             | 2.78                   | 138.24           | 1.02     |                |
| 10   | 10.61              | W              | 2.78                   | 138.24           | 0.11     |                |
| 11   | 19.48              | W              | 2.78                   | 138.24           | 0.11     |                |
| 12   | 12.00              | NW             | 1.67                   | 147.80           | 0.45     |                |
| 13   | 14.17              | SE             | 0.56                   | 152.35           | 2.84     |                |
| 14   | 13.39              | NW             | 0.56                   | 152.35           | 3.86     |                |
| 15   | 15.74              | NW             | 0.56                   | 152.35           | 2.04*    |                |
| 16   | 7.48               | E              | 0.56                   | 152.35           |          |                |
| 17   | 10.52              | W              | 1.11                   | 152.35           | 10.44    |                |
| 18   | 18.00              | W              | 1.67                   | 142.72           | 1.59     |                |
| 19   | 8.87               | W              | 2.22                   | 134.57           | 2.95     |                |
| 20   | 7.48               | S              | 3.33                   | 120.74           | 2.99     | detailed study |
| 21   | 12.61              | W              | 3.89                   | 113.80           | -        | No Sample      |
| 22   | 16.87              | W              | 3.89                   | 113.83           | 1.36     |                |
| 23   | 7.74               | W              | 3.33                   | 113.83           | -        | No Sample      |
| 24   | 7.22               | SE             | 3.89                   | 113.54           | 3.86     |                |
| 25   | 11.13              | W              | 3.33                   | 113.18           | 1.36     |                |
| 26   | 8.52               | W              | 3.89                   | 153.53           | 11.80    |                |
| 27   | 3.91               | E              | 4.44                   | 154.37           | 0.79     |                |
| 28   | 5.04               | N              | 3.89                   | 154.37           | 0.11     |                |
| 29   | 9.04               | NE             | 4.44                   | 154.37           | -        | No Sample      |
| 30   | 10.78              | NE             | 4.44                   | 154.37           | -        | No Sample      |
| 31   | 9.65               | SE             | 4.44                   | 154.37           | 2.77     | detailed study |

Total Biomass = 57.04 Kg.

\* Kg. Fish and % trash represent two days (15 & 16) combined.

TABLE 51  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 APRIL

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 2.26               | NE             | 5.00                   | 154.37           | 11.12    |                |
| 2    | 8.52               | W              | 3.89                   | 154.37           | 0.15     | detailed study |
| 3    | 8.26               | NE             | 5.56                   | 154.37           | -        | No Sample      |
| 4    | 16.52              | SW             | 5.56                   | 154.37           | 0.91     |                |
| 5    | 16.61              | W              | 5.56                   | 113.73           | 3.18     |                |
| 6    | 7.04               | NE             | 4.44                   | 138.67           | -        | No Sample      |
| 7    | 12.17              | S              | 6.67                   | 151.05           | 9.31     |                |
| 8    | 14.78              | S              | 7.78                   | 156.25           | 14.75    |                |
| 9    | 10.61              | SE             | 6.67                   | 155.30           | 6.79     | detailed study |
| 10   | 10.87              | SW             | 6.11                   | 155.30           | 2.44     | detailed study |
| 11   | 9.91               | W              | 6.67                   | 157.18           | 6.06*    | 10% trash*     |
| 12   | 10.35              | SW             | 6.67                   | 157.18           |          |                |
| 13   | 12.00              | SW             | 4.44                   | 131.29           |          |                |
| 14   | 10.87              | SW             | 8.33                   | 155.30           | 5.20     | detailed study |
| 15   | 13.04              | SW             | 7.78                   | 155.30           | 13.24    | detailed study |
| 16   | 14.87              | W              | 7.22                   | 155.30           | 2.36     | detailed study |
| 17   | 8.17               | W              | 6.67                   | 155.30           | 26.39    | 15% trash      |
| 18   | 9.13               | N              | 6.11                   | 147.98           | 8.40     |                |
| 19   | 6.52               | W              | 5.00                   | 128.40           | -        | No Sample      |
| 20   | 9.65               | W              | 7.22                   | 156.53           | 5.45     |                |
| 21   | 9.21               | W              | 7.78                   | 156.53           | 3.63     |                |
| 22   | 7.04               | NE             | 6.11                   | 145.63           | 0.34     |                |
| 23   | 8.87               | NE             | 6.67                   | 160.69           | 1.02     |                |
| 24   | 8.87               | NE             | 7.22                   | 157.90           | 1.79     | detailed study |
| 25   | 9.39               | W              | 8.33                   | 157.90           | -        | No Sample      |
| 26   | 5.65               | NE             | 7.22                   | 138.89           | -        | No Sample      |
| 27   | 8.61               | E              | 6.67                   | 125.93           | 1.27     | detailed study |
| 28   | 9.91               | NE             | 8.33                   | 157.90           | 0.22     | detailed study |
| 29   | 8.78               | E              | 7.78                   | 157.90           | 0.81     | detailed study |
| 30   | 4.52               | N              | 6.67                   | 157.90           | -        | No Sample      |

Total Biomass = 124.81 Kg.

\* Kg. Fish and % trash represents three days (11, 12 & 13) combined.

TABLE 52  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 MAY

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 6.35               | N              | 7.22                   | 157.90           | 0.91     |                |
| 2    | 6.52               | N              | 8.33                   | 157.90           | 1.14     |                |
| 3    | 10.52              | W              | 8.89                   | 157.90           | 0.34     |                |
| 4    | 10.17              | SW             | 8.89                   | 157.90           | 0.68     |                |
| 5    | 13.39              | W              | 8.89                   | 157.90           | -        | No Sample      |
| 6    | 8.61               | W              | 8.89                   | 157.90           | 1.36     | detailed study |
| 7    | 13.22              | SW             | 10.00                  | 157.90           | 1.14     |                |
| 8    | 10.00              | SW             | 10.00                  | 157.90           | 0.98     | detailed study |
| 9    | 12.35              | W              | 9.44                   | 157.90           | -        | No Sample      |
| 10   | 7.65               | W              | 9.44                   | 157.90           | -        | No Sample      |
| 11   | 12.78              | SW             | 8.89                   | 158.11           | -        | No Sample      |
| 12   | 6.00               | N              | 9.44                   | 157.90           | 0.30     | detailed study |
| 13   | 6.00               | N              | 10.00                  | 116.42           | 0.65     | detailed study |
| 14   | 8.26               | SW             | 10.56                  | 157.90           | -        | No Sample      |
| 15   | 9.65               | NW             | 10.56                  | 155.88           | 2.50     |                |
| 16   | 3.39               | NW             | 10.56                  | 155.88           | 2.95     |                |
| 17   | 8.26               | S              | 11.67                  | 155.88           | 3.52     |                |
| 18   | 11.13              | S              | 10.00                  | 155.88           | 2.16     |                |
| 19   | 5.91               | W              | 10.00                  | 155.88           | 2.72     |                |
| 20   | 6.26               | N              | 10.56                  | 155.88           | 2.38     |                |
| 21   | 5.13               | S              | 8.89                   | 143.21           | 1.14     | detailed study |
| 22   | 9.13               | SW             | 12.22                  | 154.69           | 1.89     | detailed study |
| 23   | 5.39               | W              | 12.22                  | 157.18           | 2.16     |                |
| 24   | 4.26               | N              | 12.78                  | 157.18           | 2.95     |                |
| 25   | 9.74               | NE             | 12.78                  | 157.18           | 0.68     |                |
| 26   | 11.65              | NW             | 13.89                  | 157.18           | 1.59     |                |
| 27   | 9.21               | NW             | 13.33                  | 157.18           | 2.27     |                |
| 28   | 4.87               | N              | 15.56                  | 157.18           | 1.92     | detailed study |
| 29   | 7.39               | E              | 12.22                  | 157.18           | 2.27     |                |
| 30   | 9.39               | SW             | 10.00                  | 144.45           | 2.16     |                |
| 31   | 12.17              | SW             | 10.00                  | 151.60           | 1.12     | 10% trash      |

Total Biomass = 43.88 Kg.

TABLE 53  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 JUNE

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 9.91               | NE             | 11.11                  | 155.88           | 1.82     | 50% trash      |
| 2    | 7.65               | W              | 12.22                  | 155.88           | 0.04     |                |
| 3    | 6.87               | NW             | 12.78                  | 155.88           | 1.82     |                |
| 4    | 12.00              | NW             | 13.33                  | 155.88           | 1.00     | detailed study |
| 5    | 6.00               | NW             | 11.67                  | 105.28           | 1.75     | detailed study |
| 6    | 8.00               | S              | 11.67                  | 118.22           | -        | No Sample      |
| 7    | 7.65               | W              | 11.11                  | 118.22           | -        | No Sample      |
| 8    | 15.39              | W              | 11.67                  | 118.22           | -        | No Sample      |
| 9    | 8.78               | NW             | 11.67                  | 118.22           | 1.45     | 80% trash      |
| 10   | 9.65               | NW             | 12.22                  | 118.22           | -        | No Sample      |
| 11   | 7.13               | W              | 12.22                  | 118.22           | 3.27     | 10% trash      |
| 12   | 5.65               | S              | 12.78                  | 118.22           | -        | No Sample      |
| 13   | 5.74               | SW             | 12.22                  | 118.22           | 1.13     | detailed study |
| 14   | 6.35               | W              | 12.22                  | 76.75            | 2.38     | detailed study |
| 15   | 10.35              | N              | 12.78                  | 118.22           | 3.86     | 50% trash      |
| 16   | 8.17               | NW             | 13.89                  | 118.22           | 1.94     | detailed study |
| 17   | 7.04               | NE             | 14.44                  | 118.22           | 6.38     | detailed study |
| 18   | 7.13               | N              | 14.44                  | 118.22           | 5.97     | detailed study |
| 19   | 7.65               | W              | 13.89                  | 118.22           | 7.49     |                |
| 20   | 14.78              | W              | 11.11                  | 118.22           | 5.45     |                |
| 21   | 8.35               | W              | 12.22                  | 118.22           | -        | No Sample      |
| 22   | 6.52               | N              | 12.22                  | 118.22           | -        | No Sample      |
| 23   | 5.48               | SW             | 12.22                  | 118.22           | 25.88    |                |
| 24   | 4.78               | N              | 12.78                  | 118.22           | 4.99     |                |
| 25   | 5.22               | N              | 14.44                  | 118.22           | 3.07     | detailed study |
| 26   | 8.78               | W              | 15.00                  | 118.22           | 2.06     | detailed study |
| 27   | 5.47               | N              | 16.67                  | 118.22           | -        | No Sample      |
| 28   | 8.17               | E              | 15.00                  | 118.22           | -        | No Sample      |
| 29   | 6.35               | NW             | 11.67                  | 118.22           | 7.72     |                |
| 30   | 11.04              | NW             | 12.78                  | 118.22           | 1.36     |                |

Total Biomass = 90.83 Kg.

TABLE 54  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 JULY

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 7.48               | SW             | 14.44                  | 118.22           | 3.13     | detailed study |
| 2    | 7.48               | NW             | 15.56                  | 134.64           | 4.07     | detailed study |
| 3    | 5.13               | NW             | 16.67                  | 155.59           | -        | No Sample      |
| 4    | 6.17               | SW             | 17.22                  | 156.01           | 4.54     |                |
| 5    | 9.65               | W              | 16.67                  | 158.11           | 10.22*   | 50% trash*     |
| 6    | 10.52              | N              | 17.22                  | 157.90           |          |                |
| 7    | 6.17               | SW             | 18.33                  | 157.90           |          |                |
| 8    | 10.00              | W              | 18.33                  | 157.90           | 4.05     | detailed study |
| 9    | 5.74               | NE             | 19.44                  | 157.22           | 2.65     | detailed study |
| 10   | 4.52               | NW             | 20.00                  | 155.88           | 2.29     | detailed study |
| 11   | 10.26              | W              | 21.11                  | 155.88           | 2.72     |                |
| 12   | 9.13               | NW             | 20.56                  | 155.88           | 2.27     |                |
| 13   | 5.91               | N              | 20.56                  | 155.88           | 0.00     |                |
| 14   | 3.13               | W              | 20.56                  | 155.88           | 2.09     | 20% trash      |
| 15   | 10.00              | SW             | 21.11                  | 155.88           | 4.09     |                |
| 16   | 8.52               | SW             | 20.56                  | 142.01           | 3.54     | detailed study |
| 17   | 8.35               | SW             | 21.11                  | 116.42           | 2.40     | detailed study |
| 18   | 5.13               | NE             | 21.67                  | 160.49           | 2.72     |                |
| 19   | 7.22               | S              | 21.11                  | 123.40           | -        | No Sample      |
| 20   | 6.52               | W              | 22.78                  | 155.88           | 3.41     |                |
| 21   | 9.22               | NW             | 23.89                  | 155.88           | 2.04     |                |
| 22   | 5.74               | SW             | 23.89                  | 155.88           | 2.50     |                |
| 23   | 8.35               | W              | 23.89                  | 155.88           | 0.28     | detailed study |
| 24   | 5.74               | NW             | 23.89                  | 155.88           | 0.35     | detailed study |
| 25   | 7.91               | W              | 23.33                  | 155.88           | 0.68     |                |
| 26   | 5.91               | N              | 23.89                  | 155.88           | 0.91     |                |
| 27   | 5.65               | N              | 23.33                  | 155.88           | -        | No Sample      |
| 28   | 8.52               | SE             | 18.89                  | 155.88           | 1.48     |                |
| 29   | 6.35               | NW             | 17.22                  | 155.88           | 3.18     |                |
| 30   | 7.04               | W              | 22.22                  | 155.88           | 0.79     |                |
| 31   | 5.48               | SW             | 22.78                  | 155.88           | 1.59     |                |

Total Biomass = 67.99 Kg.

\* Kg. Fish and % trash represents three days (5, 6 & 7) combined.

TABLE 55  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 AUGUST

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 9.65               | W              | 22.22                  | 155.88           | 1.14     |                |
| 2    | 8.35               | SW             | 23.33                  | 155.88           | 0.91     |                |
| 3    | 6.61               | SW             | 23.89                  | 155.88           | 0.00     |                |
| 4    | 5.48               | NE             | 24.44                  | 155.88           | 0.57     |                |
| 5    | 8.78               | SW             | 23.89                  | 155.88           | 0.34     |                |
| 6    | 10.61              | SW             | 22.22                  | 147.67           | 0.34     |                |
| 7    | 7.22               | SW             | 23.89                  | 155.88           | 3.54     | 40% trash      |
| 8    | 10.52              | W              | 25.56                  | 155.88           | 2.94     | detailed study |
| 9    | 10.17              | NW             | 25.56                  | 155.88           | 0.97     | detailed study |
| 10   | 6.35               | NE             | 25.00                  | 155.88           | -        | No Sample      |
| 11   | 3.74               | E              | 23.89                  | 155.88           | 0.00     |                |
| 12   | 10.78              | SW             | 21.11                  | 155.88           | 0.79     |                |
| 13   | 6.78               | N              | 23.89                  | 155.88           | 3.93     | detailed study |
| 14   | 8.52               | SW             | 22.78                  | 139.79           | 0.05     | detailed study |
| 15   | 9.64               | NW             | 22.78                  | 115.70           | 0.11     |                |
| 16   | 8.78               | W              | 23.33                  | 146.18           | -        | No Sample      |
| 17   | 4.87               | E              | 22.78                  | 139.25           | -        | No Sample      |
| 18   | 7.13               | SW             | 22.78                  | 141.55           | 0.23     |                |
| 19   | 6.35               | NW             | 22.78                  | 159.19           | 1.36     |                |
| 20   | 5.91               | NE             | 23.89                  | 155.74           | 2.64     | detailed study |
| 21   | 8.17               | SE             | 14.44                  | 155.74           | -        | No Sample      |
| 22   | 4.87               | SE             | 8.33                   | 155.88           | -        | No Sample      |
| 23   | 4.87               | NW             | 8.89                   | 155.88           | 0.91     |                |
| 24   | 4.35               | N              | 16.11                  | 155.88           | 8.42     | detailed study |
| 25   | 4.35               | NE             | 13.89                  | 155.88           | 8.17     |                |
| 26   | 5.48               | W              | 18.89                  | 155.88           | 0.11     |                |
| 27   | 8.61               | W              | 22.78                  | 155.30           | 0.13     | detailed study |
| 28   | 5.39               | NE             | 22.78                  | 155.23           | 0.12     | detailed study |
| 29   | 4.00               | NE             | 17.22                  | 155.23           | -        | No Sample      |
| 30   | 6.78               | SW             | 15.00                  | 136.32           | 3.06     |                |
| 31   | 8.52               | SW             | 15.56                  | 138.67           | 0.68     |                |

Total Biomass = 137.49 Kg.

TABLE 56  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 SEPTEMBER

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 9.04               | NW             | 18.89                  | 138.67           | 0.68     |                |
| 2    | 9.13               | W              | 21.11                  | 138.67           | 1.36     |                |
| 3    | 5.48               | NW             | 20.56                  | 131.81           | 0.77     | detailed study |
| 4    | 5.22               | S              | 21.11                  | 126.00           | 0.87     | detailed study |
| 5    | 9.22               | W              | 21.11                  | 126.00           | -        | No Sample      |
| 6    | 8.26               | NW             | 21.67                  | 126.00           | -        | No Sample      |
| 7    | 7.65               | NW             | 21.67                  | 126.00           | -        | No Sample      |
| 8    | 5.13               | N              | 22.22                  | 126.00           | 0.45     |                |
| 9    | 8.35               | SW             | 21.67                  | 125.21           | 0.34     |                |
| 10   | 11.13              | W              | 21.11                  | 126.00           | 0.49     | detailed study |
| 11   | 13.04              | W              | 20.56                  | 76.75            | 0.19     | detailed study |
| 12   | 7.91               | E              | 20.00                  | 76.75            | 0.23     |                |
| 13   | 6.87               | SW             | 20.56                  | 76.75            | 0.00     |                |
| 14   | 10.35              | N              | 20.00                  | 126.00           | 3.18*    | 30% trash*     |
| 15   | 7.48               | N              | 20.00                  | 126.00           |          |                |
| 16   | 6.26               | S              | 18.89                  | 126.00           | 3.18     |                |
| 17   | 11.22              | NW             | 10.00                  | 124.20           | 23.63    | detailed study |
| 18   | 5.39               | N              | 16.67                  | 124.20           | 1.78     | detailed study |
| 19   | 6.00               | W              | 15.56                  | 126.00           | 2.04     |                |
| 20   | 7.74               | SW             | 15.00                  | 126.00           | 0.45     |                |
| 21   | 8.52               | SW             | 15.56                  | 126.00           | 1.14     |                |
| 22   | 8.26               | NW             | 16.11                  | 126.00           | -        | No Sample      |
| 23   | 11.13              | NW             | 16.67                  | 126.00           | -        | No Sample      |
| 24   | 6.61               | N              | 16.67                  | 126.00           | 1.06     | detailed study |
| 25   | 4.00               | W              | 16.11                  | 126.00           | 0.84     | detailed study |
| 26   | 14.26              | W              | 15.56                  | 126.00           | 1.02     |                |
| 27   | 9.00               | SW             | 15.56                  | 126.00           | 3.41     |                |
| 28   | 6.17               | N              | 15.56                  | 126.00           | 0.23     |                |
| 29   | 3.39               | S              | 15.56                  | 126.00           | 0.91     |                |
| 30   | 6.87               | SW             | 16.11                  | 126.00           | 1.14     |                |

Total Biomass = 49.39 Kg.

\* Kg. Fish and % trash represent two days (14 & 15) combined.

TABLE 57  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 OCTOBER

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 8.60               | S              | 16.11                  | 126.00           | 0.57     |                |
| 2    | 8.00               | W              | 15.56                  | 126.00           | -        | No Sample      |
| 3    | 5.22               | W              | 15.56                  | 126.00           | -        | No Sample      |
| 4    | 11.48              | SW             | 15.56                  | 126.00           | -        | No Sample      |
| 5    | 6.52               | SW             | 15.56                  | 126.00           | -        | No Sample      |
| 6    | 5.74               | W              | 15.00                  | 126.00           | 4.65     |                |
| 7    | 6.17               | S              | 14.44                  | 126.00           | 1.93     |                |
| 8    | 13.04              | SW             | 14.44                  | 126.00           | 2.55     | detailed study |
| 9    | 6.52               | NE             | 13.89                  | 126.00           | 1.43     | detailed study |
| 10   | 4.52               | S              | 13.89                  | 126.00           | 1.93     |                |
| 11   | 11.65              | W              | 13.89                  | 126.00           | 1.36     |                |
| 12   | 12.17              | W              | 13.33                  | 126.00           | 2.27     |                |
| 13   | 11.65              | NW             | 12.78                  | 126.00           | 2.04     |                |
| 14   | 8.17               | W              | 12.22                  | 126.00           | 0.36     | 60% trash      |
| 15   | 4.52               | SE             | 12.22                  | 126.00           | 3.48     | detailed study |
| 16   | 4.00               | SE             | 12.22                  | 121.46           | 0.72     | detailed study |
| 17   | 8.26               | S              | 12.78                  | 121.46           | 0.91     |                |
| 18   | 13.22              | SW             | 13.33                  | 121.46           | 2.27     |                |
| 19   | 8.35               | W              | 13.33                  | 121.46           | -        | No Sample      |
| 20   | 8.00               | W              | 13.33                  | 121.46           | 2.72     |                |
| 21   | 9.13               | NW             | 12.78                  | 121.46           | 1.48     |                |
| 22   | 7.04               | NW             | 12.22                  | 121.46           | 1.75     | detailed study |
| 23   | 5.65               | N              | 11.67                  | 121.46           | 1.20     | detailed study |
| 24   | 8.61               | S              | 11.67                  | 121.46           | 1.36     |                |
| 25   | 11.74              | W              | 11.67                  | 121.46           | 1.36     |                |
| 26   | 21.48              | W              | 10.56                  | 121.46           | -        | No Sample      |
| 27   | 11.48              | W              | 10.56                  | 121.46           | 7.64     | detailed study |
| 28   | 8.26               | W              | 9.44                   | 121.46           | 10.44    |                |
| 29   | 8.61               | W              | 8.89                   | 121.46           | 1.15     | detailed study |
| 30   | 7.13               | SW             | 8.89                   | 112.54           | 0.54     | detailed study |
| 31   | 16.87              | W              | 8.33                   | 153.07           | 2.95     |                |

Total Biomass = 59.06 Kg.

TABLE 58  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 NOVEMBER

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 13.74              | W              | 8.89                   | 153.07           | 0.00     |                |
| 2    | 6.00               | W              | 8.33                   | 153.07           | 3.40     | 30% trash      |
| 3    | 10.00              | S              | 8.89                   | 152.93           | 4.09     |                |
| 4    | 14.78              | SW             | 8.89                   | 152.93           | 1.14     |                |
| 5    | 11.22              | NW             | 8.89                   | 152.93           | 0.27     | detailed study |
| 6    | 11.39              | SW             | 8.33                   | 152.93           | 0.31     | detailed study |
| 7    | 8.61               | SW             | 8.33                   | 152.93           | 0.91     |                |
| 8    | 8.78               | N              | 8.89                   | 152.93           | 4.99*    | 10% trash*     |
| 9    | 11.65              | SW             | 8.33                   | 152.93           |          |                |
| 10   | 19.39              | W              | 8.33                   | 152.93           |          |                |
| 11   | 17.22              | NW             | 7.22                   | 152.93           | 2.95     |                |
| 12   | 12.61              | NW             | 6.67                   | 152.93           | 3.18     | detailed study |
| 13   | 5.91               | S              | 7.22                   | 152.93           | 0.57     | detailed study |
| 14   | 7.22               | NW             | 6.67                   | 152.93           | 0.68     |                |
| 15   | 6.26               | N              | 6.67                   | 152.93           | 0.68     |                |
| 16   | 7.22               | N              | 7.22                   | 155.09           | 0.00     |                |
| 17   | 5.74               | E              | 7.22                   | 158.84           | 2.61     |                |
| 18   | 10.17              | N              | 7.22                   | 156.53           | -        | No Sample      |
| 19   | 7.74               | W              | 6.11                   | 152.71           | 0.08     | detailed study |
| 20   | 6.87               | S              | 6.67                   | 152.71           | 0.47     | detailed study |
| 21   | 10.17              | W              | 6.11                   | 152.71           | -        | No Sample      |
| 22   | 11.22              | SW             | 6.11                   | 152.71           | 0.57     | 79% trash      |
| 23   | 6.26               | SW             | 5.56                   | 152.71           | 0.79     |                |
| 24   | 4.52               | NW             | 6.11                   | 152.71           | 0.02     |                |
| 25   | 12.78              | NW             | 6.11                   | 152.71           | 1.32     | detailed study |
| 26   | 5.91               | W              | 6.11                   | 152.71           | 1.36     |                |
| 27   | 7.04               | SE             | 5.56                   | 152.71           | 1.70     |                |
| 28   | 7.65               | SW             | 5.56                   | 152.71           | 0.57     |                |
| 29   | 11.91              | W              | 6.67                   | 152.71           | 1.36     |                |
| 30   | 12.87              | SW             | 6.11                   | 152.71           | 0.00     |                |

Total Biomass = 36.00 Kg.

\* Kg. Fish and % trash represent three days (8, 9, & 10) combined.

TABLE 59  
 RUSSELL POWER STATION  
 1980 IMPINGEMENT PROGRAM  
 DAILY BIOMASS COLLECTIONS  
 DECEMBER

| Date | Wind Speed (Knots) | Wind Direction | Water Temperature (°C) | Plant Flow (MGD) | KG. Fish | Comments       |
|------|--------------------|----------------|------------------------|------------------|----------|----------------|
| 1    | 6.26               | W              | 5.56                   | 152.71           | 0.45     |                |
| 2    | 10.61              | SW             | 6.11                   | 152.71           | 0.45     |                |
| 3    | 17.65              | SW             | 5.00                   | 152.71           | 1.59     |                |
| 4    | 5.65               | NW             | 4.44                   | 152.71           | -        | No Sample      |
| 5    | 3.39               | N              | 3.89                   | 135.78           | -        | No Sample      |
| 6    | 3.74               | SE             | 3.89                   | 125.93           | 0.23     |                |
| 7    | 3.74               | W              | 4.44                   | 125.93           | 1.19     | detailed study |
| 8    | 10.87              | NW             | -                      | 125.93           | 1.46     | detailed study |
| 9    | 7.39               | NW             | 4.44                   | 125.93           | 1.59     |                |
| 10   | 12.26              | NW             | 5.00                   | 125.93           | 0.37     | detailed study |
| 11   | 9.91               | NW             | 3.89                   | 125.93           | 0.61     | detailed study |
| 12   | 9.22               | W              | 3.33                   | 125.93           | 2.50     |                |
| 13   | 12.17              | NW             | 3.33                   | 125.93           | 0.62     | 50% trash      |
| 14   | 16.52              | W              | 2.78                   | 125.93           | 0.68     | 60% trash      |
| 15   | 7.91               | S              | 2.78                   | 125.93           | 1.36     |                |
| 16   | 7.74               | N              | 1.67                   | 128.33           | 2.04     |                |
| 17   | 7.65               | S              | 1.11                   | 109.36           | 2.04     |                |
| 18   | 13.04              | SW             | 1.11                   | 109.36           | 1.59     |                |
| 19   | 12.00              | NW             | 0.56                   | 109.36           | 1.36     |                |
| 20   | 11.74              | W              | 1.11                   | 109.36           | 5.81     | 20% trash      |
| 21   | 13.22              | SW             | 1.11                   | 97.43            | 1.48     |                |
| 22   | 8.00               | S              | 2.22                   | 135.80           | 1.35     | detailed study |
| 23   | 8.35               | SW             | 2.78                   | 115.78           | 0.61     | detailed study |
| 24   | 12.17              | NW             | 2.78                   | 115.78           | 0.68     |                |
| 25   | 10.87              | W              | 2.78                   | 115.78           | 5.68*    |                |
| 26   | 9.22               | S              | 2.22                   | 115.78           |          |                |
| 27   | 6.26               | SE             | 2.78                   | 115.78           |          |                |
| 28   | 3.74               | SW             | 2.78                   | 115.78           |          |                |
| 29   | 4.35               | N              | 2.78                   | 115.78           |          |                |
| 30   | 10.17              | N              | 2.22                   | 115.78           | 0.91     |                |
| 31   | 4.52               | SE             | 1.67                   | 115.78           | 0.11     |                |

Total Biomass = 36.76 Kg.

\* Kg. Fish and % trash represent five days (25, 26, 27, 28 & 29) combined.