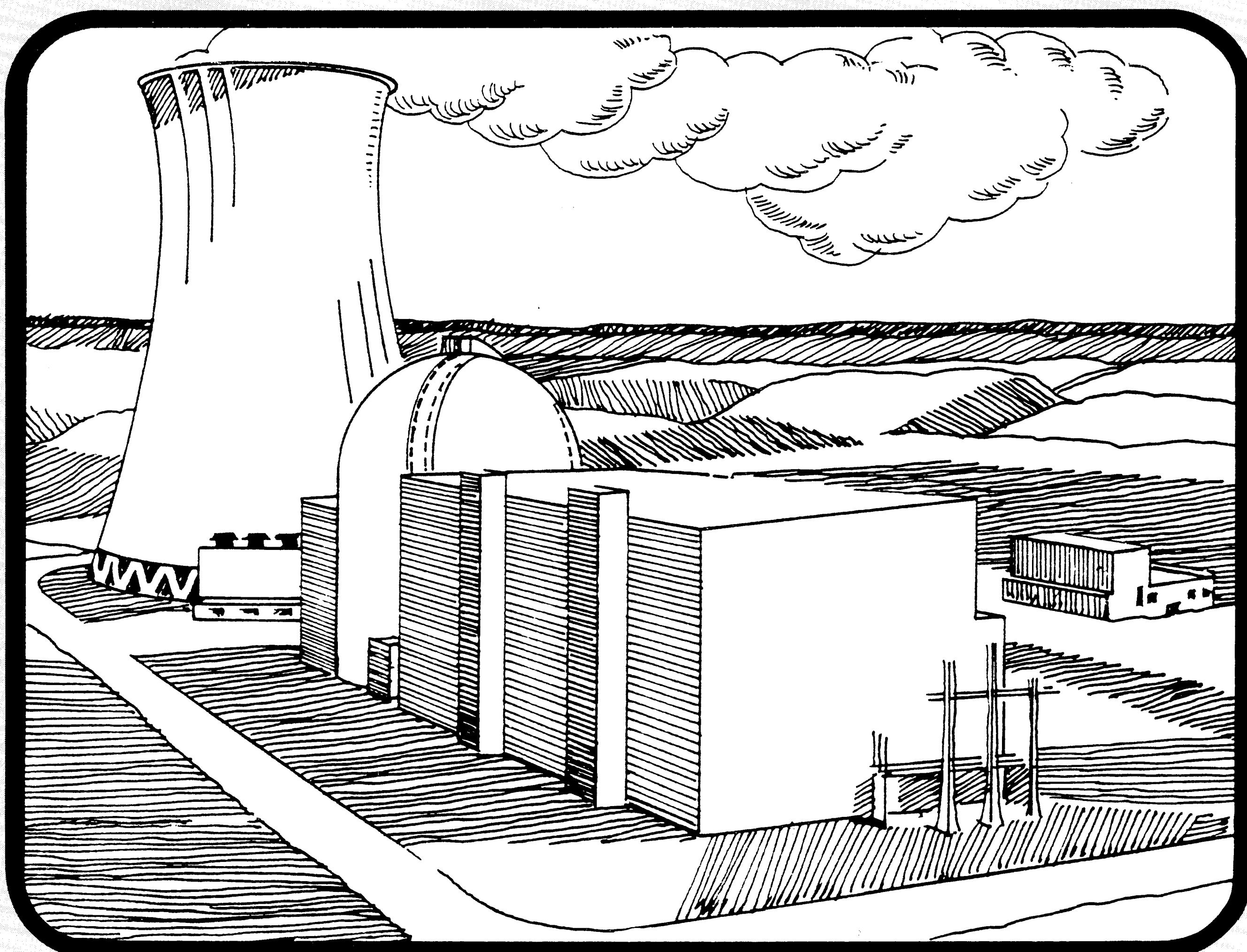
CALLAWAY PLANT

Evaluation of Cooling Water Intake Impacts on the Missouri River

Section 316b PL 92-500
NPDES Permit No.: MO-0098001



UNION ELECTRIC COMPANY

Environmental Services Department

St. Louis, Missouri

July, 1986

CALLAWAY PLANT

Evaluation of Cooling Water Intake Impacts

on the Missouri River

Section 316(b) PL 92-500

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Submitted to:

The Missouri Department of Natural Resources

Division of Environmental Quality

Prepared by:

UNION ELECTRIC COMPANY

Environmental Services Department

St. Louis, Missouri

July, 1986

Acknowledgements

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1.0 Introduction

1.1 Rationale and Legal Requirements

In order to satisfy the requirements of the Federal Clean Water Act (PL 92-500) and the Missouri Clean Water Law (Chapter 204 RSMo (Supp. 1973)), Union Electric must assess the potential impacts of its Callaway Plant intake facility on the Missouri River fish population. This assessment is required as part of the National Pollutant Discharge Elimination System (NPDES) permit issued by the Missouri Department of Natural Resources (DNR) on August 8, 1980 and reissued on November 22, 1985. This NPDES permit (MO-0098001) required Union Electric to submit a study program to monitor the effects of operation of the plant intake structure on the fish of the Missouri River. This study was designed to insure utilization of best available intake technology (BAT) to achieve minimum adverse environmental impact on the aquatic ecosystem, as specified in Section 316(b) of the Clean Water Act.

A Scope of Work for this study was submitted to the DNR on November 24, 1980 and was approved on December 10, 1980. The Scope of Work was modified in January, 1984, to take into consideration the results of two years of comprehensive aquatic study performed in the vicinity of the Callaway intake (Camp, Dresser & McKee 1981, 1982). The two year aquatic monitoring effort was carried out to satisfy the requirements of the U.S. Nuclear Regulatory Commission.

The Callaway 316(b) study was formulated based on inputs from the following sources:

- The requirements of Section E of the Callaway NPDES permit as issued by the Missouri DNR
- The Scope of Operational Fish Impingement and Entrainment Studies, Missouri River, Callaway Power Plant, which was reviewed and approved by the DNR
- A field audit of the Scope of Work conducted by the DNR in October, 1980, at the Callaway Plant
- The 1977 316(b) "Guidance Document" (U.S. EPA 1977)
- The 316(b) demonstration for Union Electric Company's Rush Island Power Plant (UE 1979b)

1.2 Previous Studies

The Missouri River in the vicinity of the Callaway intake has been extensively studied. These studies were done to assess the health of the aquatic environment prior to plant construction and to identify any impacts of construction. The baseline studies were performed by Dames and Moore, Inc. from 1973-1975. These studies were a comprehensive analysis of the terrestrial and aquatic environment near the Callaway Plant (Union Electric Co. 1974, 1975, 1976). A construction period water quality monitoring program was carried out by Ryckman, Edgerley, Tomlinson and Assoc. (RETA: now Envirodyne Engineers) from June 1976 through November 1979 (Union Electric Co., unpublished).

Preoperational studies were performed on the aquatic ecosystem near Callaway by Camp, Dresser and McKee, Inc. (CDM) from June 1980 through May 1982 (CDM 1981, 1982). Union Electric Company's

Environmental Services Department began sampling adult fish and ichthyoplankton in March of 1983 in order to supplement previously collected data and ensure continuity of previous studies with the present 316(b) demonstration. The results of the adult fish portion of this program will be presented as part of the ongoing in-house biomonitoring study.

Other reports dealing with the environmental impacts associated with the Callaway Plant include the Final Environmental Statement Related to the Operation of Callaway Plant, Unit No. 1 (U.S. Nuclear Regulatory Commission 1982); Final Environmental Statement Related to the Proposed Callaway Plant, Units 1 and 2 (U.S. Nuclear Regulatory Commission 1975); Site Selection Study - Phase I, Proposed Nuclear Power Plant (Union Electric Co. 1971); Site Selection Study - Phase II, Proposed Nuclear Power Plant (Union Electric Co. 1973); Callaway Plant, Environmental Report, Operating License Stage, Volumes I, II, and III (Union Electric Co. 1979a).

1.3 Study Elements

The Callaway 316(b) field studies conducted during 1984-1986 consisted of three major components: entrainment, impingement and field fisheries. The entrainment study estimated density, composition, and spatial and temporal distribution of fish larvae and eggs in the Missouri River adjacent to the Callaway Plant intake. These estimates were then combined along with hydrological data to estimate numbers and percentage of icthyoplankton entrained by the intake, both with actual flows and with record low flows during the period of larval fish occurrence. The impingement study involved counts and measurements of impinged fish. These counts were combined with intake operating data to estimate total numbers of fish impinged and identify any compositional or seasonal trends. The field fisheries survey involved sampling of adult fish populations adjacent to the intake to gain insight into the dynamics of these communities. These data were used to compliment and augment the entrainment and impingement studies and thus help demonstrate best available technology and minimal adverse environmental impact relative to intake design and operation.

1.3.1 Entrainment

The entrainment study included weekly samples for 26 consecutive weeks from April through September 1984. Three paired subsurface hauls were made in each of three zones in the Missouri River between mile 115.4 and 116. Intake withdrawal rates along with river discharge estimates were combined with icthyoplankton data to compute entrainment as a percentage of total river icthyoplankton transport.

1.3.2 Impingement

The impingement study consisted of weekly random-day collections of screen backwash water for an entire year (February 1985 through January 1986). Each collection was approximately 24 hours in length. Intake screens were operated in their normal manner during the collection period. Each collection yielded numbers and weight by species of fish impinged. The impingement counts were then combined with plant operating records to estimate total monthly and annual impingement rates.

1.3.3 Field Fisheries

The field fisheries study was designed to provide information on the composition and population dynamics of the fish population in the vicinity of the Callaway Plant for assessing the significance of potential entrainment and impingement impacts. The field fisheries study was conducted monthly for one year concurrent with impingement sampling.

1.4 Summary of Conclusions

The Draft Section 316(b) Guidance Manual defines low potential impact intakes as "those located in biologically unproductive areas having low flow or having historical data showing no effect or for which other considerations indicate low (adverse environmental) impact." The Callaway Plant intake structure is located in a biologically unproductive area and is a low flow intake since the plant withdraws only make-up water for a natural draft cooling tower system. The entrainment and impingement studies of the Callaway intake confirmed that it is located in biological umproductive area and has low adverse environmental impact. This conclusion is based on the following considerations.

The entrainment study sampled a total of 43,314 m^3 of river water during the study. The larval entrainment study indicated that endangered, threatened, and rare fish species are not being entrained by the Callaway intake. Those species of larvae collected during the entrainment study are common to the Missouri River which was confirmed by the field fisheries study. Mean percentage entrainment estimates peaked at less than 0.15% of larval transport using actual discharge estimates on sampling days. Worst case entrainment estimates using historical record low flows for April through September from 1929 through 1980 did not exceed 0.75% of the larvae being transported in the Missouri River. The entrainment of icthyoplankton by the Callaway intake structure should have minimal effects on the fish populations of the Missouri River.

Impingement sampling at the Callaway intake collected a total of 13 species of fish and sampled 1,933,932,000 gallons of river water. The projected total annual impingement was estimated at 2410 fish weighing 59.5 kilograms (131.2 pounds). Gizzard shad (92.7%) and freshwater drum (3.4%) accounted for 96.1% of individuals projected to be impinged annually. No other fish species were projected to be impinged in numbers greater than 18. Endangered, threatened, or rare fish species were not collected during the impingement study. The extremely low projected impingement rates can be attributed to the design, construction, capacity, and location of the Callaway intake structure. These low projected impingement rates for the Callaway intake structure reflect the use of the best technology available for minimizing impingement by a cooling water intake structure. The impingement study has shown that the impingement impact is not significant enough to adversely affect the fish populations of the Missouri River.

The field fisheries study found that the two dominant species in the electrofishing collections were gizzard shad and freshwater drum. These two species accounted for 96.1% of the total specimens projected to be impinged annually. The other species in impingement samples were less dominant in abundance which was consistent with their lower abundance found in the field fisheries study. Feeding, spawning, and nursery areas for fish are limited in the area of the intake structure. The low impingement rates indicate that the intake structure was located and designed to minimize impingement since the field fisheries study has shown that fish do reside in the area.

The low projected impingement rates and the small percentage of larvae being entrained can be attributed to the design, construction, capacity, and location of the Callaway intake structure. Losses are not of a sufficient magnitude to significantly affect the fish populations of the Missouri River. The Callaway intake structure reflects a "best technology available for minimizing adverse environmental impact" in compliance with Section 316(b) of the Federal Clean Water Act and the Missouri Clean Water Law.

1.5 Report Structure

This report deals first with the intake structure's location and operation specifics. A description of the Missouri River in the vicinity of the intake structure follows, including background information on hydrology, phytoplankton, zooplankton, macroinvertebrates, fish and wildlife.

The entrainment study is addressed next, followed by the impingement and the field fisheries sections. Each of these three sections describes its own particular objectives, materials and methods, results, and discussions. Collection data and analysis are presented in the appendices.

2.0 Plant Description and Operations

2.1 Location

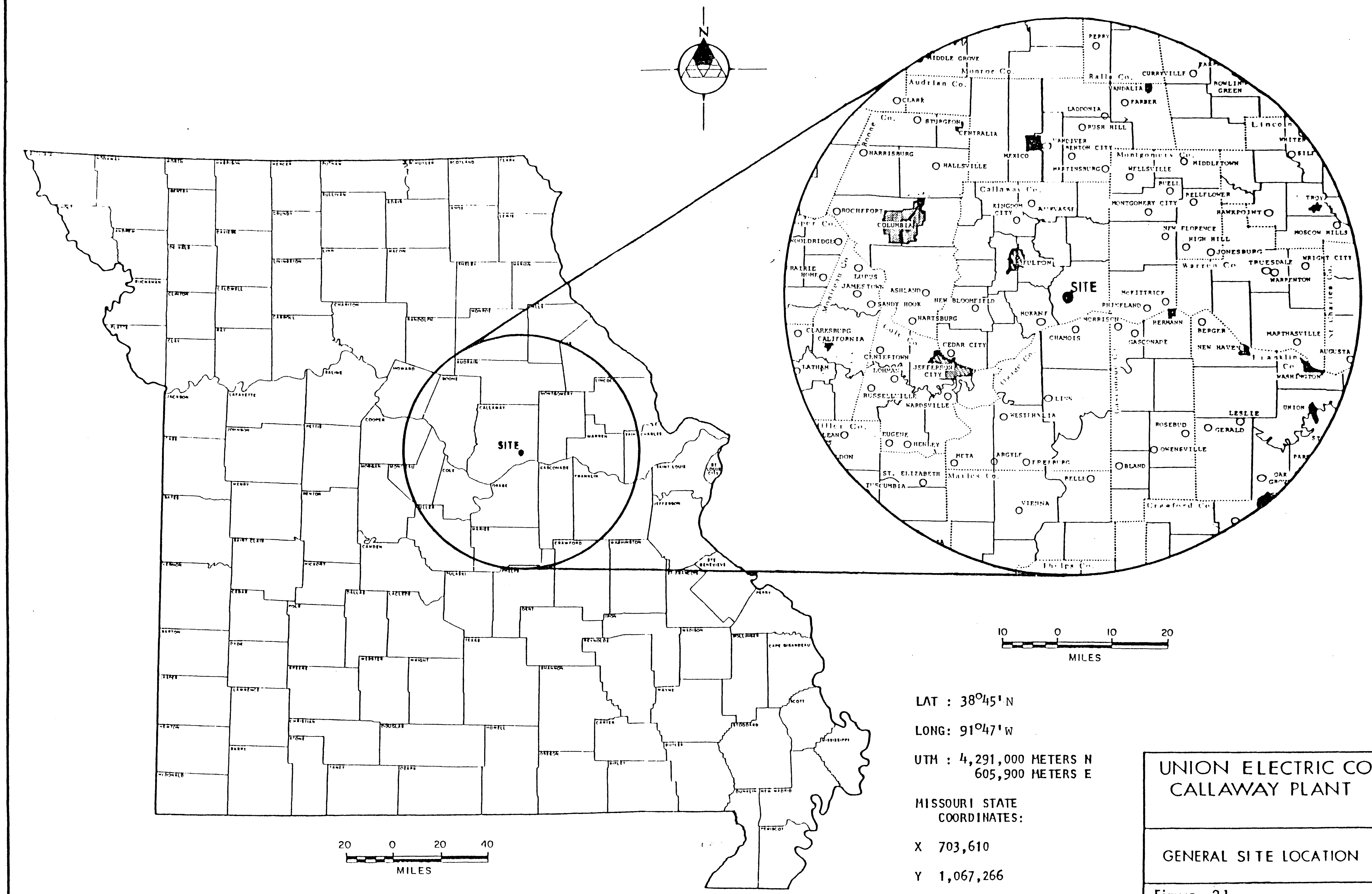
The Callaway Plant site is located approximately 10 miles southeast of Fulton, Missouri and approximately 80 miles west of the St. Louis metropolitan area as shown in Figure 2.1. The plant is located at latitude 38° 45' 42.3" N and longitude 91° 47' 52.4" W which is approximately 5 miles north of the Missouri River.

The intake is located on the north shore of the Missouri River at approximately river mile 115.4 at 38° 42'N latitude and 91° 44'W longitude.

2.2 Description

The Callaway Plant site and peripheral lands include about 7230 acres. The plant site and security areas encompass less than 450 acres with most of the remaining 6780 acres being managed for outdoor recreation by the Missouri Department of Conservation. There are approximately 5300 acres open to public use.

The Callaway Plant generation system consists of one pressurized water reactor, four steam generators, one steam turbine generator and a heat dissipation system. The heat dissipation system consists of one natural draft cooling tower; a three pump, bank-fit, make-up water intake; and a cooling tower blowdown discharge.



LAT : 38°45' N

LONG: 91°47' W

UTM : 4,291,000 METERS N
605,900 METERS E

MISSOURI STATE
COORDINATES:

X 703,610

Y 1,067,266

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CALLAWAY PLANT

GENERAL SITE LOCATION

Figure 2.1

2.3 Intake Structure Description and Operation

2.3.1 Intake Structure Description

The Callaway Plant water intake structure is located on the north bank of the Missouri River at river mile (RM) 115.4 (Figure 2.2), about 3500 feet upstream of the confluence of Logan Creek with the Missouri River. The intake structure is located within an opening of the Corps of Engineers' rock revetment and breakwater between RM 115.34 and 115.45. The upstream river bank is set back slightly from the riverside face of the intake structure and the rock revetment. The downstream river bank is set back from the rock revetments, which allows placement of a low velocity fish escape opening on the downstream side of the intake. To protect the intake structure from barges, pipe pile clusters are installed on the upstream side. The main channel of the Missouri River flows directly in front of the intake structure as the channel follows the north shore of the river at this point.

The intake structure is made of reinforced concrete and is composed of a pump room section and an electrical equipment room section (see Appendix A). Plan and section views of the intake are shown in Figures 2.3 and 2.4, respectively. The floor of the intake structure is at elevation 486 feet above mean sea level (MSL). The operating level of the intake is at elevation 541.5 feet MSL, 2.5 feet above the 200 year flood elevation.

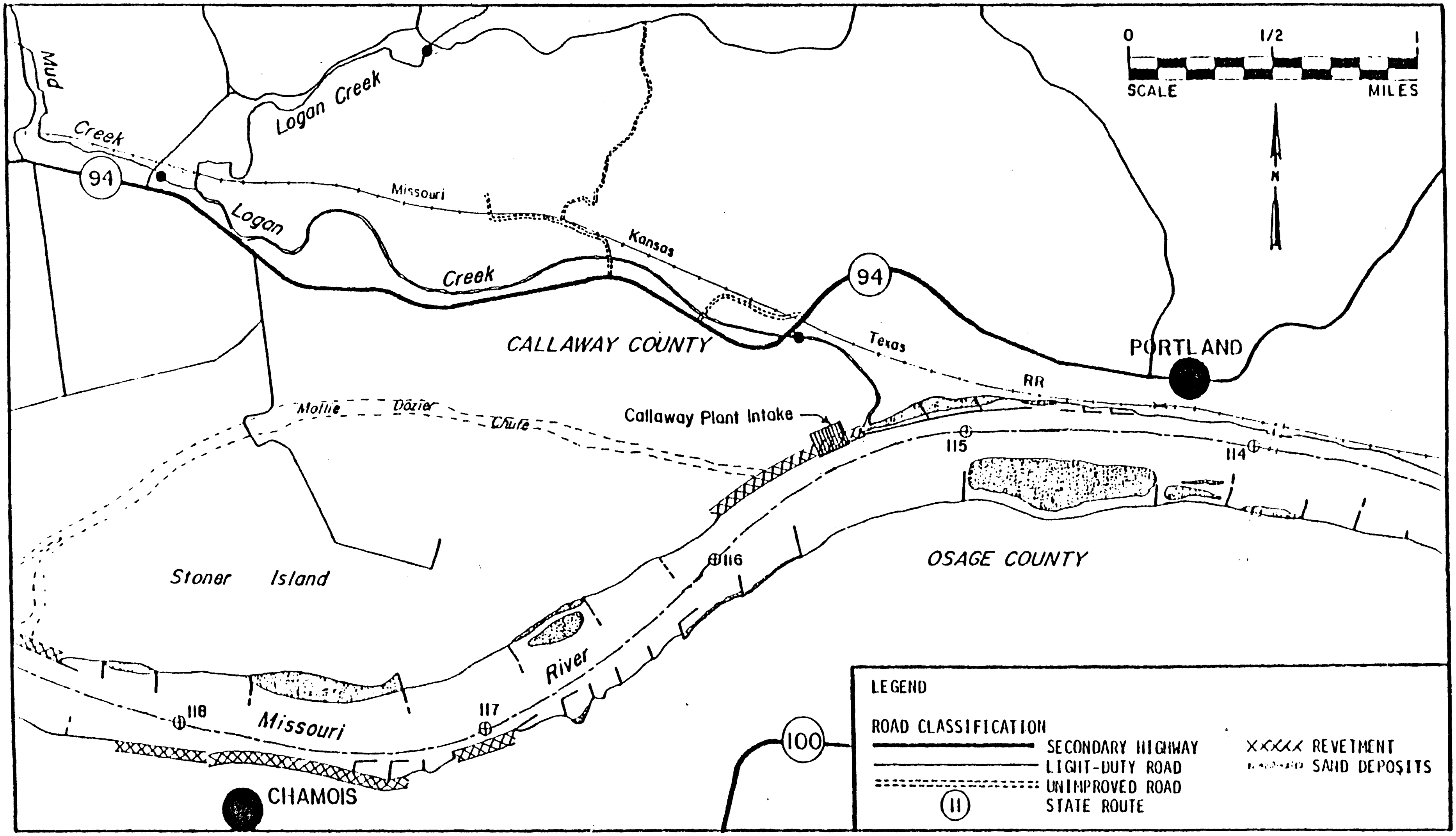
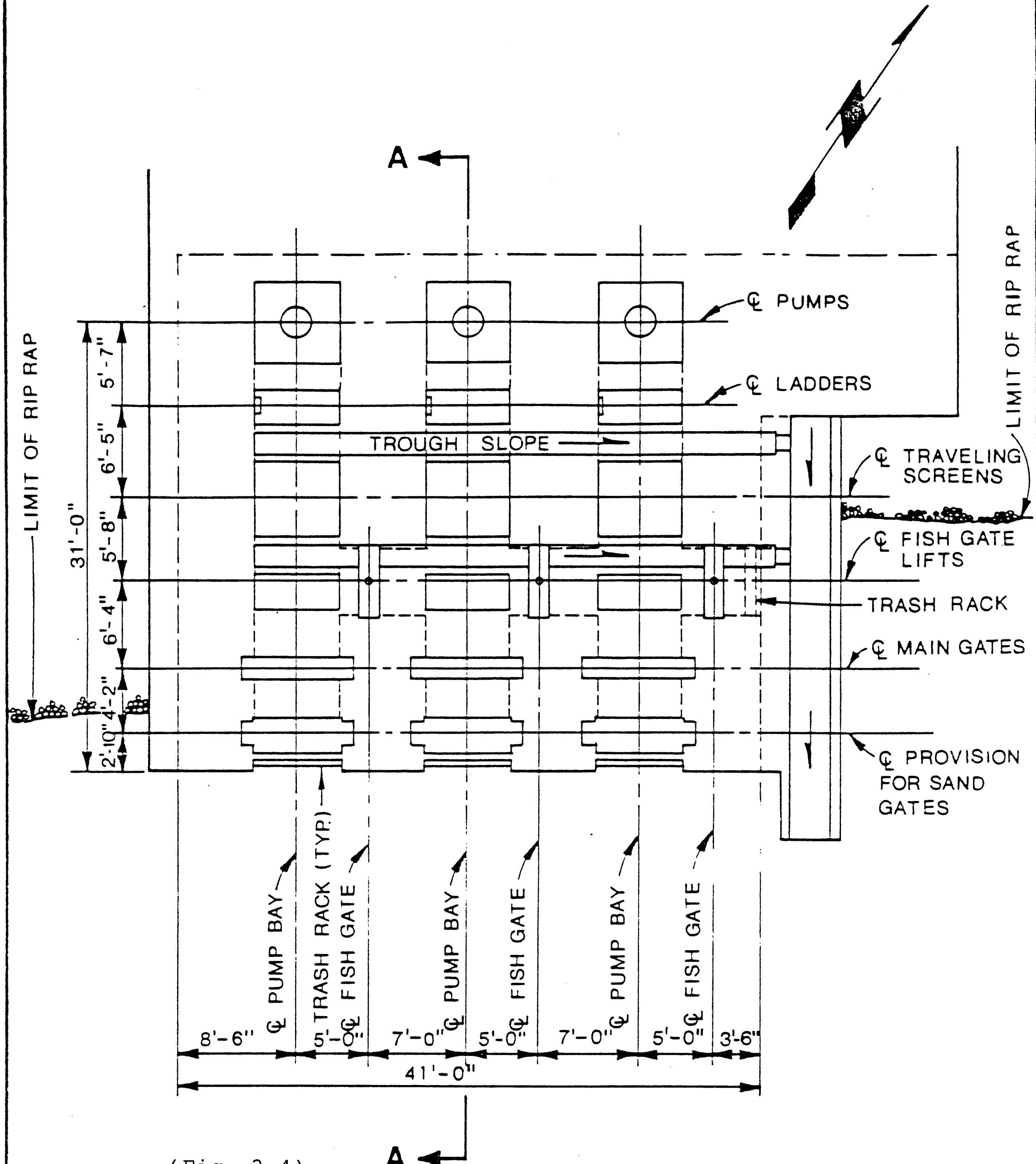


Figure 2.2 Location of the Callaway Plant Water Intake Structure.



(Fig. 2.4)

MISSOURI RIVER FLOW

RIVERSIDE PLAN

SCALE 1"= 10'

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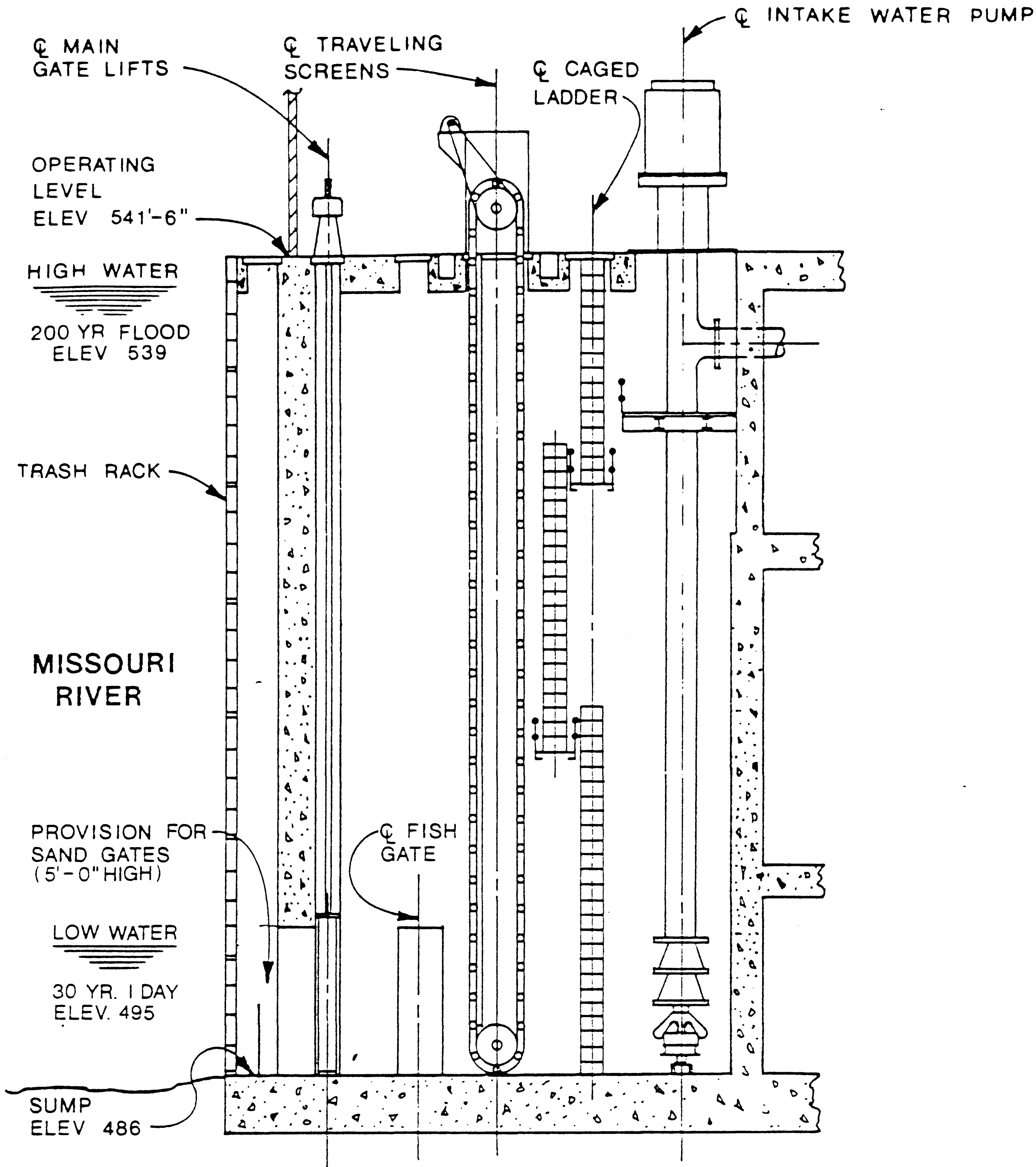
INTAKE STRUCTURE PLAN

Figure 2.3



SECTION A-A

SCALE 1"-10'

(Refer to Fig. 2.3)

ALL ELEV M.S.L.

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INTAKE STRUCTURE
SECTION

Figure 2.4

Features of the three-bay, three pump intake structure are shown in Figures 2.3 and 2.4. Incoming water initially passes through a set of vertical trash racks designed to stop large objects and debris from entering the intake structure. The trash racks are constructed of 0.5 inch bars placed 3 inches on center. Sand gates can be inserted between the trash racks and stop gates. The sand gates minimize intake bay silt deposition.

Intake stop gates are located between the sand gates and traveling screens. The stop gates provide intake bay isolation for maintenance purposes. With a stop gate closed, an intake bay can be dewatered by portable dewatering pumps. These gates include a Limitorque operator equipped with a manual handwheel. A fish escape stop is also used for dewatering. These gates operate identically to the intake stop gates.

A vertical traveling screen is located in each of the three pump bays. The traveling screens are a loop of screen panels that are driven over a pair of head sprockets and down through a boot. The screen panels are constructed of 0.5 inch square mesh screen wire.

The intake structure is constructed with fish escape openings in the side walls of the pump bays. These openings are directly in front of the traveling screens. The fish escape openings are 3 ft. wide and 10 ft. high, topping at 496 feet MSL (see Figure 2.4).

The intake structure houses three Ingersoll-Rand pumps that provide raw Missouri River water to the Callaway water treatment plant. Figure 2.5 shows a typical pump and motor on the main floor

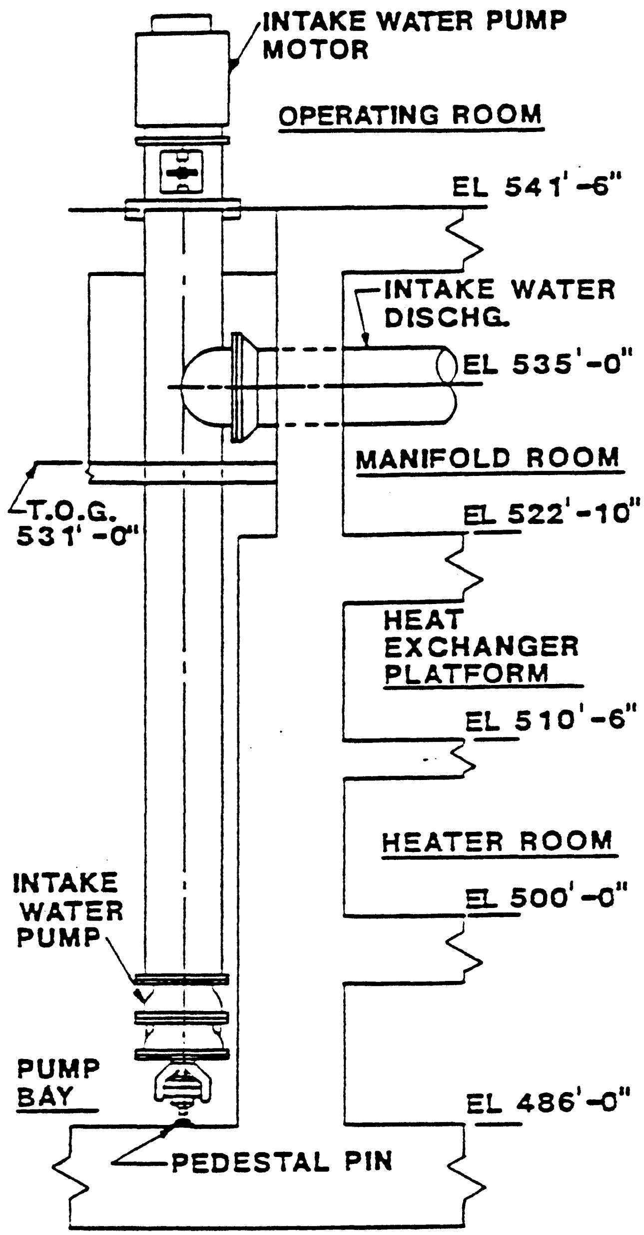


Figure 2.5 Callaway Plant Intake Structure Water Pump.

level. The common discharge manifold is one level down from the main floor. These pumps are vertical three-stage centrifugal pumps. The impellers are enclosed; the first stage impeller has double suction for thrust balance. Pump suction pressure is 32.5 psi and discharge pressure is 195 psi. The pump delivers about 14,000 gpm. The pump motor is 3-phase, 4160V and 60Hz. It develops 2050 Hp and operates at 1185 rpm. The suction head bearings and all other bearings are water lubricated. A mounting flange (part of support head) supports the pump vertically. The pump driver is mounted on the support head. The driver is coupled to the upper shaft by a rigid adjustable coupling. Stage casings contain the casing bearings which prevent unwanted radial pump shaft motion. Each casing encloses diffusor passages. These passages convert fluid velocity to pressure.

Two ten-inch free discharge valves control transient surge pressures of water being pumped from the Missouri River to the water treatment plant. Each valve is of the fixed-cone, discharge regulating type. The valves act as a continuously modulating by-pass to control the variables of system flow. Each valve can handle 100% of system regulation. Thus, the other valve remains on standby. The valves are designed to dissipate fluid energy rapidly.

Each discharge valve consists of a 45 degree cone attached to the main body cylinder by four independent ribs. Flow through the valve is regulated by means of a moveable sleeve mounted on the valve body. Sleeve movement varies the size of the annular port. Thus, flow through the valve is directly proportional to the stroke of the sleeve. Movement of the sleeve is controlled by two hydraulic oil cylinders. The cylinders are attached to the downstream end of the upper weldment. The weldment functions as a transition piece between the 14" header pipe and the 10" valve.

The kinetic energy of the water through the valve is rapidly dissipated by a drop pipe. Dissipation occurs due to friction and turbulence incurred by the drop pipe.

An electro-hydraulic control system maintains valve positions without drift and closes the valves on an all-pump trip signal or loss of power to the servo-controller.

The excess water from the free discharge valves is diverted to the free discharge box on the downtream side of intake structure. The excess water is discharged through a pipe in the bottom of the free discharge box back into the river. The amount of water discharged from the free discharge box is the amount of water which is not necessary to maintain system pressure.

The intake structure has two types of systems to provide freeze protection for the intake. Electric boilers warm stilling basin water and spray wash heaters warm screen wash water. Two Coates electric boilers provide shell side boiler heat exchanger water. The shell side water warms incoming stilling basin water, which flows to the intake pump bays for freeze protection. These boilers are designed for heating to 5000 KV, using a 3-Phase, 60 Hz power system at 4160 volts.

Two horizontal shell, tube-type heat exchangers provide a heat transfer interface between boiler and "stilling basin to pump" bay water.

Three in-line electric heaters warm screen wash water for freeze protection. One heater is provided for each traveling screen. These heaters are used when temperature requirements dictate. The heaters are 120V, single phase, 60 Hz and generate 200 KW of power.

2.3.2. Intake Operation

Two intake pumps will normally satisfy plant load requirements. During periods of outages only one pump will be operated to provide water for essential plant services.

The following equipment is operated automatically to allow sequencing circuits to place the equipment in the proper configuration upon intake pump starting and stopping:

- Stop gates and fish gates
- Intake pumps and respective hydraulic discharge valves
- Desilting valves
- Traveling screen wash valves
- Traveling screens operated in forward mode
- Lube water pumps

Trash handling procedures involve both river currents and mechanical systems. The larger trash or debris carried by the river, which accumulates on the coarse trash rack, is carried away by the river currents and changes in river elevation.

Traveling screens block debris and trash small enough to pass through the coarse trash rack and prevent it from entering the pump wells and consequently the pumps. Any debris larger than 1/2 inch square is collected on the traveling screens. Whenever accumulated debris on the screens produces a predetermined head differential across the screens, the screen wash systems operate automatically. The screen wash systems also are operated via an automatic periodic timer on an eight-hour cycle to prevent the boot shaft at the lower end of the screens from "mucking in". The screen systems shut off automatically after a preset minimum period of time.

The heaviest periods of operation for the traveling screen systems are in the fall and spring seasons. At these times debris in the river is at a maximum due to either shedding of leaves or rain and high water which wash out the backwater areas and streams along the Missouri River. During these periods the screens may operate continuously to prevent trash buildup.

A pump bay warming system and inline heating system provide traveling screen freeze protection and deicing of screen components. The warming system actually minimizes ice formation, while the in-line heaters loosen and knock ice already formed from the screens.

Operator judgment is required to determine whether one or two boilers should be placed in operation. However, formal system alignment is for two trains of water warming, each train consisting of one boiler, one heat exchanger, and one recirculation pump.

Heavy ice buildup on the traveling screens may result in considerable damage to screens and baskets. The in-line heaters are run automatically when freezing or subfreezing temperatures are predicted. The heaters energize when intake bay water temperature is 33°F.

Normal system alignment is each in-line heater serving each respective screen. However, by proper valving, any heater can supply any or all screens.

The Callaway intake structure has been designed for low intake velocities. The maximum intake-water velocity at the screens is estimated to be 0.6 ft/s at the 1-day 30-year low Missouri River flow of 5500 cfs (at 495 ft. MSL). Maximum velocity at the screens during the minimum river navigation flow of 35,000 cfs (at 501 ft. MSL) will be about 0.3 ft/s.

Each intake pump's stop and fish gates are normally open when the intake pump is operating. The gate positions are reversed when an intake pump is stopped. Intake pumps A and B include similar circuits. However, to open the B fish gate, stop gates B and C must be open; to open the A fish gate, stop gates A and B must be open. These configurations prevent fish from being trapped in the bays.

The purpose of the free discharge valves is to maintain system pressure at 195 psig. Each valve is capable of 100% system regulation; therefore, one valve is operated in automatic while the second valve remains on standby. The 195 psig setpoint is established with an instrument located near the annunciator panel. The valve control circuit compares setpoint with intake pump discharge header pressure and positions the free discharge valve as required to maintain this setpoint.

2.3.3 Intake Hydraulics and River Hydrology

The main channel of the Missouri River is adjacent to the north shoreline in the area of the Callaway intake. The intake structure is located along the river bank so that make-up water is drawn from the main channel perpendicular to the dominant flow field of the river. Flow fields in the main channel of the river are turbulent due to the volume of water flowing, the velocity of the current, and changes in the river bottom contours. The area in the river from which the make-up water is drawn may be defined as the "zone of influence" of the intake structure.

The physical presence of the intake structure, in addition to its water withdrawal, affects the natural flow field of the river. The area behind the intake structure has been built up, forcing the river to flow around the front of the intake structure. This slight narrowing of the river forces the water along the north shore to pass in front of the intake and has increased the river current velocity there. A slow eddy current is caused by the downstream corner of the intake. Aside from this small zone of influence, there are no changes in flow field resulting from intake structure configuration.

At any given time the zone of influence is determined by the quantity of water withdrawn and the river flow. It can also be affected by the combination of intake water pumps which are operating.

Due to these variables, the zone is not constant at all times and under all operating conditions. Since the intake withdrawal rate is small even during periods of low flow, the zone of influence is a small area near the bottom of the main channel of the river.

2.3.4 Entrainment and Impingement Considerations

The design and construction of the intake structure includes several features designed to minimize or reduce impingement and entrainment. To minimize impingement, the size of the intake portion of the structure has been increased beyond the required design in order to reduce the velocities of intake water through the screens. Also, to minimize entrainment and impingement, the intake has been located so it protrudes into in the main river channel, and water is withdrawn from areas located away from shallow and slower moving water where the largest populations of aquatic organisms would be expected to occur. Water withdrawal by the intake occurs from the depths of the main channel where few organisms inhabit. This gives buoyant or semibuoyant orgamisms a lesser chance of entrainment. In addition, the face of the intake has been aligned parallel to the river flow so that the water is withdrawn perpendicular to the river flow. Thus, river currents tend to sweep river organisms past the intake structure. Finally, the deicing system at the intake structure and its spray nozzles have been located so that icing can be controlled at the structure and any thermal attraction will be negligible. Thus, any heat dissipated at the intake structure will be mixed rapidly and reduced within the area of the intake structure. Also, a portion of the water pumped will be discharged immediately back to the river from the free discharge valves. This will immediately return some of the entrained organisms back into the river.

The portion of river flow withdrawn by the intake structure is an important consideration for both impingement and entrainment. The percent of river flow withdrawn by the plant is minimal, as shown by Table 2.1. This low volume withdrawal helps minimize the number organisms exposed to any adverse effects caused by the operation of the intake structure.

TABLE 2.1

Percent of Water Withdrawal[1] by the Callaway Plant Intake Structure during Minimum and Mean Missouri River Flows[2]

Month	Minimum Monthly River Flow (cfs)	Percent (%) of Plant Water Withdrawal of Minimum River Flow	Mean Monthly River Flow (cfs)	Percent (%) of Plant Water Withdrawal of Mean River Flow
January	4200	2.230	39730	0.236
February	9400	0.996	52820	0.177
March	16700	0.561	86870	0.108
April	23900	0.392	111700	0.083
May	25300	0.370	103900	0.090
June	27000	0.347	118900	0.079
July	20700	0.452	94050	0.100
August	14700	0.637	58180	0.161
September	15600	0.600	62090	0.151
October	14200	0.660	59480	0.157
November	12100	0.774	59810	0.157
December	6210	1.508	40530	0.231

1. Water withdrawal calculated conservatively by figuring three pumps operating with a total pumping rate of 42,000 gpm.

2. USGS records of Missouri River Flow Rate for Hermann, Missouri 1929 - 1980.

3.0 River and Site Characteristics

3.1 Physical and Hydrological

3.1.1 Introduction

The Missouri River in the vicinity of the Callaway intake is typical of the lower Missouri. High turbidities of up to 6980 Jackson Turbidity Units (JTU) have led to this river being referred to as the "Big Muddy". Strong currents, fluctuating water levels, and shifting, unstable substrates result in a low diversity of habitat types for aquatic organisms. Few permanent islands, backwaters and side channels remain in the area due to man's activities of the last 150 years. Quiet water areas are restricted to areas behind dikes at normal river flows.

The lower Missouri River has been radically altered over the last century and a half. Construction and maintenance of a 9 foot deep, 300 foot wide navigation channel has resulted in drastic reductions in water surface area and island, chute and backwater habitats. Snag removal, dredging, installation of revetment, pile dikes, and rock dikes, and flow regulation from main stream reservoirs have all contributed to these reductions. Since 1879, the 31 mile stretch between Hermann, Missouri and the Osage River has had a 41% reduction in water surface area and a 99% reduction in unconnected island surface area (Funk & Robinson 1974). Reduction of islands, sandbars and chutes is most notable in areas like the area across from Portland, Missouri (Funk & Robinson 1974).

Almost 1500 reservoirs occur in the Missouri River drainage above Sioux City, Iowa and they provide over 111 million acre feet of storage capacity. Flows are regulated from these dams to provide between 31,000 cubic feet per second (cfs) and 41,000 cfs at Kansas City, Missouri during the navigation season (Slizeski et al. 1982).

3.1.2 Hydrology

The Missouri River flows southeasterly from Three Forks, Montana for 2315 miles, draining about 529,000 square miles before joining the Mississippi River near St. Louis, Missouri. The nearest gauging stations to the Callaway intake are the U.S. Geological Survey stations at Hermann and Booneville, Missouri. At the Hermann station, 17 miles downstream of the intake, stream flow records have been kept since 1897. The average flow over an 86 year period (1897-1983) was 80,050 cfs. However, because of the channel alterations and flow regulation since 1952, flow records prior to 1952 may not be representative. Daily discharge means and ranges by month are presented in Figure 3.1. At Booneville, 82 miles upstream from the intake, stream flow records have been kept since 1925. Average flow for a 58 year period (1925-1983) was 59,260 cfs.

The Hermann gauge is closest to the Callaway intake. The only major tributary to the Missouri River between the site and Hermann is the Gasconade River (river mile 104.4). For these reasons, the Hermann data are presented as representative of flows and discharges at the Callaway intake. The stage discharge rating curve for Hermann is presented in Figure 3.2.

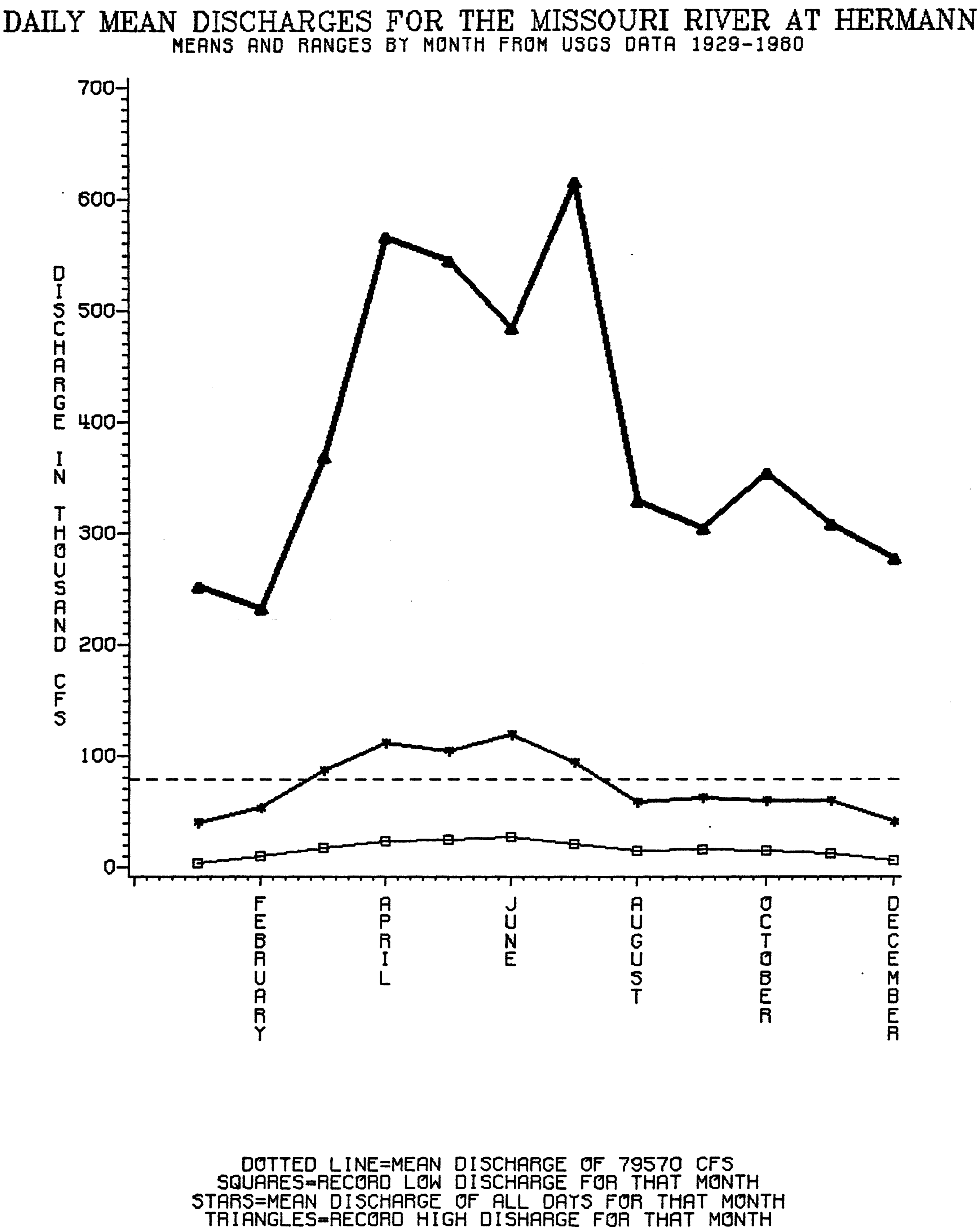


Figure 3.1 Daily Discharge Means and Ranges by Month, Hermann, Missouri.

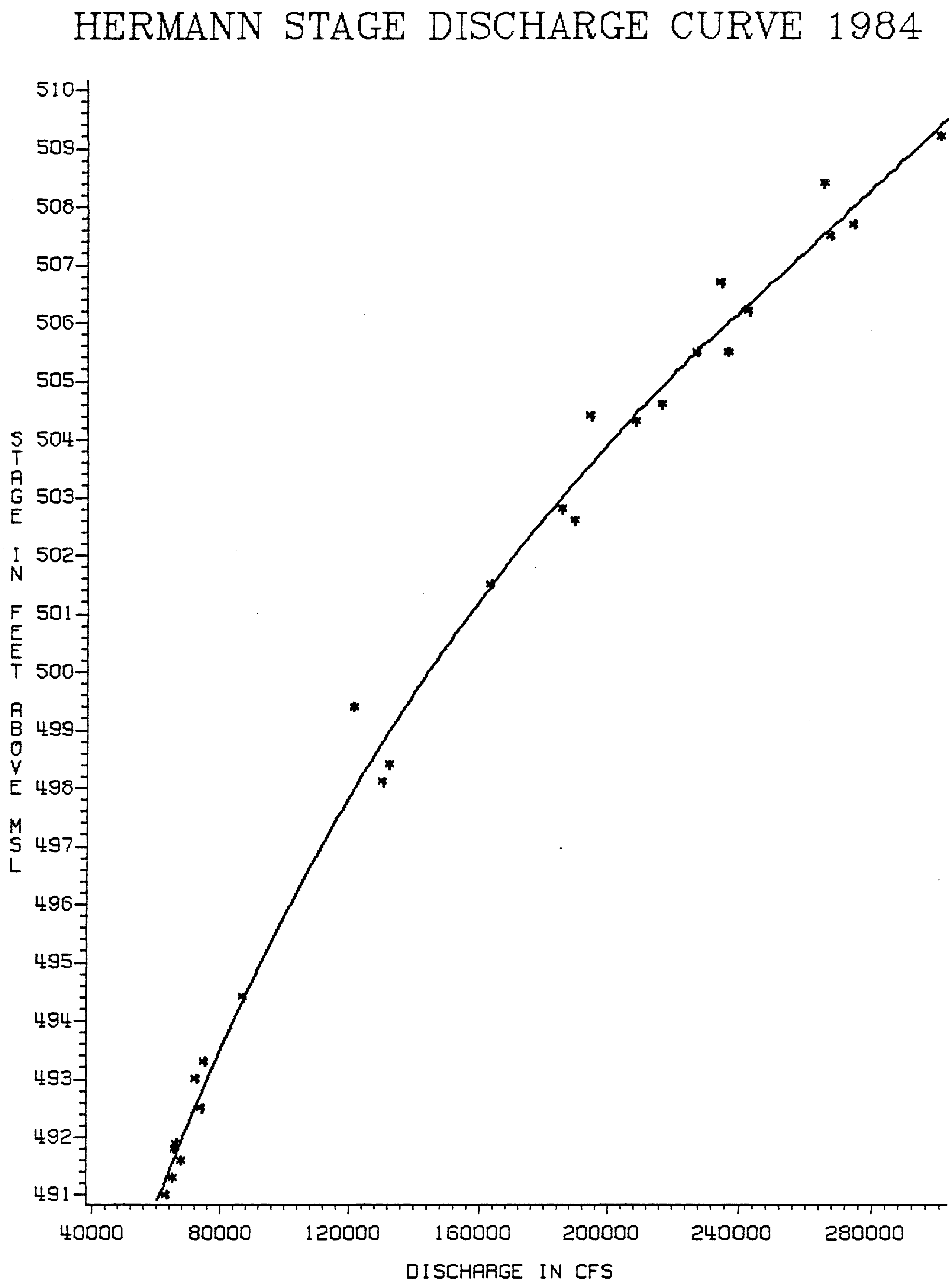


Figure 3.2 Stage Discharge Rating Curve for Missouri River, Hermann, Missouri.

Temperatures in the vicinity of the Callaway intake on days when icthyoplankton samples were collected are presented in Section 4.4.1.

3.1.3 Logan Creek

Logan Creek is a small tributary to the Missouri River which enters just downstream of the Callaway intake at river mile 114.9. It is intermittent during droughts and is essentially a backwater at high Missouri River elevations.

3.1.4 Other Major Tributaries

Upstream of the intake, the closest major tributary is the Osage River at river mile 130. Osage River flow is largely dependent on discharges from Bagnell Dam at Lake of the Ozarks. Osage River discharge ranges from 373 cfs to 216,000 cfs with an average of 9937 cfs for the period 1937-1983 measured at St. Thomas, Missouri.

Downstream of the intake, the closest major tributary is the Gasconade River. Flows at Jerome, Missouri range from 254 cfs to 136,000 cfs, with an average of 2485 cfs for the periods 1903-1905 and 1922-1983.

3.2 Water Quality

The Missouri River in the vicinity of the Callaway intake structure is a swiftly flowing, turbulent river with a high level of suspended sediment. The river experiences heavy silt loading from erosion and runoff during storms. The Missouri River has become less turbid since 1945, when the Rivers and Harbors Act authorized major navigation, bank stabilization and reservoir construction projects. However, the Missouri is still a highly turbid river characterized by periodic heavy silt loading, swift currents, shifting and unstable substrates, and greatly fluctuating water levels.

The water quality of the Missouri River near the Callaway intake is influenced by agricultural runoff, industrial and municipal discharges (CDM 1981, 1982). Fluctuations in the river's flow have been shown to influence the chemical constituents of the river. Increased river flows (volume) cause lower levels of dissolved solids, chloride, BOD and sulfate due to dilution (CDM 1981). High flows were found to be associated with higher levels of total suspended solids, turbidity, total metals, nitrate, ammonia nitrogen, COD, and coliform bacteria (CDM 1981).

Cold winter water temperatures were found to be associated with decreased levels of sulfate, phosphorus, nitrogen, suspended solids, and coliform bacteria (CDM 1981).

A summary of water quality monitoring data from the Missouri River near the Callaway Plant is given in Table 3.1.

All of the water quality parameters analyzed by CDM at the Callaway Plant were similar to the data reported for the Cooper Nuclear Plant (Missouri RM 532.5); most parameters were within the ranges reported for the Cooper Plant (Todd 1980, pp.36-40).

Table 3.1

Comparison of Baseline, Construction and Preoperational Water Quality Monitoring Data from the Missouri River near the Callaway Plant, 1973 through 1982. Vales are in mg/l Unless Otherwise Indicated.

Parameter	Baseline April 1973 - September 1975[b]			Construction June 1976 - March 1980[c]			Preoperational June 1980 - April 1982[d]		
	No.	Mean	Range	No.	Mean	Range	No.	Mean	Range
General Water Quality									
Alkalinity (as $CaCO_3$)	23	146.	105-168	139	158.	98-319	90	156.	90-214
BOD (5 day)	23	1.3	0.6-2.8	75	a	<1-15	90	a	<1-18
COD	23	43.	12-137	75	a	<5-188	90	a	<2-430
Hardness, Total	41	211.	160-246	159	214.	130-350	90	259.	156-515
Solids, Total Dissolved	53	378.	261-605	75	393.	56-600	90	481.	256-556
Solids, Total Suspended	53	424.	32-2,208	159	563.	13-3,240	90	668.	38-6,980
Coliforms, Total (#/100 mls)	53	a	310-41,000	70	18,561.	1-72,000	87	8,253.	130-92,000
Coliforms, Fecal (#/100 mls)	53	a	288-TNTC	75	a	1-7,800	90	1,403.	10-16,000
Turbidity	53	146.	16-600	159	334.	2-3,100	90	60.	5-280
Specific Conductance (umhos/cm)	53	493.	220-1,500	149	464.	180-700	90	634.	406-902
Dissolved Oxygen	53	7.6	5.3-13.0	149	8.6	4.3-12.2	90	9.9	4.8-14.9
Temperature (°C)	53	16.3	0.5-30.0	159	13.0	0.0-28.0	90	15.5	0.4-31.2
Chloride	53	21.	10-30	75	19.	1-28	90	25.	4-40.
Sulfate	53	120.	34-192	74	112.	19-195	90	172.	68-240
Calcium	23	56.0	36-74	159	64.4	10-107	90	63.4	36.0-96.0
Iron	53	9.9	0.1-66.0	75	8.3	0.02-45.9	90	8.7	0.2-76.0
Magnesium	23	16.6	10.0-19.0	159	20.8	1.9-37.4	90	22.9	14.0-40.0
Sodium	23	41.	18.-60.	75	44.8	6.2-86.0	90	63.2	31.0-86.0
Nutrients									
Nitrogen, Ammonia	23	0.15	0.04-0.33	75	a	<0.5-1.7	90	a	<0.2-0.7
Nitrogen, Nitrate	53	1.5	0.1-4.5	75	1.5	0.1-6.5	90	0.8	0.2-3.0
Nitrogen, Total Kjeldahl	23	1.8	0.1-4.9	75	a	<0.02-13.20	90	a	<0.3-6.3
Phosphorus, Dissolved ortho	53	a	<0.01-0.93	75	a	<0.01-0.84	90	0.23	0.05-1.4
Phosphorus, Total	53	0.4	0.05-1.40	NM	NM	NM	90	0.49	0.12-4.3
Trace Elements									
Arsenic	53	a	<0.005-0.014	75	a	<0.001-0.014	90	a	<0.005-0.3
Cadmium	53	a	<0.001-0.027	75	a	<0.001-0.016	90	a	<0.01-0.011
Chromium	53	a	<0.003-0.070	75	a	<0.01-0.07	90	a	<0.05-0.52
Copper	53	a	<0.001-0.08	75	a	<0.01-0.014	90	a	<0.05-0.13
Lead	53	a	0.005-0.14	75	a	<0.001-0.3	90	a	<0.005-0.26
Mercury	53	a	<0.0001-0.006	75	a	<0.00002-0.005	90	a	<0.005-0.048
Selenium	53	a	<0.005	75	a	0.0017-0.012	89	a	<0.005-0.007
Zinc	23	a	<0.002-0.12	75	a	0.005-0.188	90	a	<0.01-0.55

[a]Mean not calculated due to unknown values below detection limits.

[b]Union Electric Company (1974, 1975, 1976, undated).

[c]Miscellaneous correspondence 1976-1980

[d]CDM (1981).

NM - Not Measured

TNTC - Too numerous to count

3.3 River Ecology

This section discusses the historical data concerning primary productivity, zooplankton, habitat formers, macroinvertebrates, fish and other wildlife.

3.3.1 Primary Productivity

Phytoplankton are microscopic, photosynthetic algae that are capable of rapid reproduction. It is their ability to transform radiant solar energy into protoplasm that places the phytoplankton and periphyton (the attached algal form) at the bottom of the food chain.

Phytoplankton of the lower Missouri River characteristically occur in low densities and are dominated numerically by diatoms (Berner 1951; Damann 1951; Williams 1966; Stern and Stern 1972; Union Electric Company 1974; University of Missouri-Rolla 1974). The paucity of phytoplankton in the Missouri River is caused by excessive turbidity, high current velocity, and the lack of adjoining lentic (lake-like) waters (Berner 1951). The harsh conditions of the Missouri River are illustrated by their effects on plankton populations entering from tributary rivers. Damann (1951) reports that plankters entering the Missouri River from tributaries did not multiply. A reduction in tributary phytoplankton populations after entering the Missouri River was also noted by Ballentine, et al. (1970). Berner (1951) had earlier suggested that, in the absence of backwater areas, plankton production was autogenic, with little contribution from tributaries. Ballentine, et al. (1970) supported the suggestions of others that the Missouri River phytoplankton community originates in lentic waters.

Growth of rooted aquatic macrophytes and periphyton is limited in the Missouri River because of high turbidity, shifting substrates, and water level fluctuations. For this reason, phytoplankton populations contribute most of the primary production in the lower Missouri River. Algae are generally considered to be the base (primary producers) of aquatic food web, although in many rivers (such as the Missouri), allochthonous organic matter may be the main energy source.

Centric diatoms were the most abundant phytoplankters in the Missouri River near the Callaway Plant (Camp, Dresser and McKee, Inc. (CDM) 1981, pp. 2-9). Stephanodiscus astrea, Microsphina potamos and Cyclotella atomus were the three most abundant and persistent centric species collected from the Missouri River (CDM 1981, pp. 2-9). All three are eutrophic species commonly found in turbid, lotic systems (Lowe 1974, pp. 86, 188 and 296; Taylor, et al. 1980, p. 27). Two pennate diatoms, Fragilaria capucina and F. crotonensis, were the dominant species in May 1981 when river flow and turbidity were at maximum observed levels (CDM 1981, pp. 2-9). Both of these species are associated with eutrophic water and F. capucina, the most abundant species, is a tychoplanktonic diatom that was probably flushed out of tributaries by the increased volume of flow (Lowe 1974, pp. 135 and 139).

The colonial green algae, Dictyosophaerium pulchellum, was prevalent during the late summer and early fall (CDM 1981, pp. 2-9) in the Missouri River near the Callaway Plant. Species of the flagellated chrysophyte, Ochromonas, were most abundant during January and February (CDM 1981, pp. 2-9). The phytoplankton community of the Missouri River is generally tolerant of eutrophic conditions and heavy organic loading with occasional exceptions derived from relatively unpolluted tributary sources (CDM 1981, pp. 2-9).

The phytoplankton species collected during the Camp, Dresser & McKee study in the Missouri River near the Callaway Plant (CDM 1981, pp. 2-9) were similar to those reported in previous studies (Union Electric Company 1974, Table 2.3.2-1; Table 2-1).

Analysis of variance and Student-Neuman-Keuls multiple range tests were run on density, evenness and total phytoplankton abundance as well as the densities of selected major algae groups and taxa (CDM 1981, pp. 2-11). The results of these statistical comparisons support the hypothesis that the phytoplankton of the Missouri River near the Callaway Plant were not spatially patchy, but rather were reasonably homogeneous (CDM 1981, pp. 2-11).

3.3.2 Zooplankton

Zooplankton are microscopic animals that obtain their nutrition by consuming other zooplankton, primary producers (phytoplankton and bacteria) and detritus. Like phytoplankton, zooplankton are important food items for larger aquatic organisms such as larval fish. Because of the flowing water environment, many zooplankton found in rivers are primarily littoral or epibenthic rather than truly planktonic. Typical riverine zooplankton organisms include protozoans, rotifiers, cladocerans and copepods (Hynes 1970, p. 99).

The zooplankton community of the Missouri River near the Callaway Plant was comprised of 68 taxa, which included 38 Rotifera, 18 Cladocera, 16 Copepoda and one Tardigrada (CDM 1981, pp. 3-6). Rotifers constitued 84.5 percent of the total zooplankton density while cladocerans, copepods, and tardigrads represented 2.4, 13.1 and less than 0.1 percent, respectively. The only zooplankters which represented 5 percent or more of the annual mean total zooplankton density were the rotifers Brachionus angularis, B. calyciflorus, B. quadridentatus, and Keratella sp. Copepod nauplii also comprised 7.7 percent of the total composite. This type of zooplankton community was to be expected since rotifers commonly dominate in large rivers (Berner 1951, p. 6; Hynes 1970, p. 99; and University of Missouri-Rolla 1974, p. 463) and Brachionus and Keratella are among the truly planktonic rotifer taxa which nearly always dominate large river zooplankton (Williams 1966, p. 88; Hynes 1970, p. 99).

Mean total zooplankton density for all locations for all sampling dates was 14 organisms/liter, which is low for a large midwestern river. This was not unusual since the paucity of zooplankton in the Missouri River has been well documented (Berner 1951, p. 4; Hynes 1970, p. 98; University of Missouri-Rolla 1974, p. 560; and Repsys 1979, p. 58). Monthly mean zooplankton density was variable but was generally highest from late spring through summer and lowest in winter. The seasonal distribution of the five dominant taxa followed a similar pattern, which indicated that most pulses in total zooplankton densities were related to a pulse in one or more of the dominant taxa. This seasonal distribution of zooplankton in the Missouri River was typical for large midwestern rivers. Zooplankton populations in the Mississippi, Ohio and Illinois Rivers were found to be minimal in winter and increased in abundance from spring through summer (University of Missouri-Rolla 1974, p. 467 and pp. 504-508).

The results of the Camp, Dresser McKee study (CDM 1981) were very similar to previous zooplankton studies conducted on the Missouri River near the Callaway Plant (Union Electric Company 1974, pp. 21-23; 1975, pp. 18 and 19; and 1976, pp. 33-36). In each of the previous studies rotifers dominated the zooplankton community, and maximum densities (50-70 organisms/liter) usually occurred in late summer when flow and turbidity were low and diatom abundance was high. Minimum densities occurred in winter months and were usually less than 10 organisms/liter.

3.3.3 Habitat Formers

Habitat formers are plants or animals characterized by a relatively sessile life state which function as 1) a living or formerly living substrate for the attachment of epibiota; 2) a food source for shellfish, invertebrates and fish; and 3) sites for spawning, nursery, and cover for shellfish, invertebrates and fish.

Organisms that may qualify as habitat formers are attached algae, freshwater sponges, freshwater hydra, bryozoans and rooted vegetation. In the opinion of the University of Missouri-Rolla (University of Missouri-Rolla 1974, p. 553), there is no true periphyton in the lower Missouri River during flood years. They found that structure rocks and pilings showed no growth, because of frequent abrupt water level fluctuations, scouring, covering of structure surfaces by transported sediments, and low levels of light penetration. They surmised that their periphyton measurements were for potential periphyton growth under optimum conditions which occur rarely, if at all, in the lower Missouri River (University of Missouri-Rolla 1974, pp. 553-554).

Rooted aquatic vegetation is usually found in slow moving or standing waters. Past studies (Union Electric Company 1974, p. 24, CDM 1981, p. 7-7) stated that no vascular hydrophytes were observed in the Missouri River near the Callaway site. Berner (1947) also reported a complete absence of rooted aquatic plants in the channels, chutes, and backwaters of the Missouri River. He attributed their absence to turbidity, water level fluctuations, and the instability of the fine river substrates.

3.3.4 Macroinvertebrates

Macroinvertebrates (benthos) are the group of aquatic organisms that inhabit bottom sediments and consist of the larval stages of many types of aquatic insects, worms (oligochaetes), clams (pelecypods), snails (gastropods) and a variety of other invertebrate animals. Many benthic organisms are predators on other aquatic macroinvertebrates as well as fish larvae, while others utilize detritus, algae or other material. They serve as an important source of food for many types of fish.

One hundred benthic macroinvertebrate taxa distributed among 72 genera and 32 families were identified from 144 Ponar grab samples collected at four locations in the Missouri River near the Callaway Plant (CDM 1981, pp. 4-7). Oligochaeta and Chironomidae comprised the majority of the benthos and were represented by 20 and 33 taxa, respectively. Oligochaeta was composed of 9 species of Naididae and 11 species of Tubificidae. Other aquatic insects comprised 23 genera within 21 families. Turbellaria represented a significant portion of the benthos at two locations. Other miscellaneous taxa collected were isopods, amphipods, sphaerid clams, and the asiatic clam (Corbicula manilensis).

There are few published accounts of the Missouri River benthos in the immediate vicinity of the Callaway Plant and, until the study by Berner (1951), there had been no published or unpublished data concerning the benthic organisms of the Missouri River (University of Missouri-Rolla 1974, p. 477). Berner collected Petersen dredge samples from the lower Missouri River at 11 sites from the river mouth to the Iowa state line between April and November 1945. Only 750 benthic organisms were found in a total of 130 samples for an estimated density of approximately 29 organisms/m^2. In decreasing order of abundance, chironomids represented 35%, oligochaetes 20%, and Trichoptera 16%. The extremely low productivity (estimated as 0.4 pounds of benthos per acre) of the sampled habitats were attributed to high turbidity caused by high current velocity, shifting substrates, siltation, fluctuating water levels, and the absence of aquatic vegetation (Berner 1951, p. 10).

The University of Missouri-Rolla conducted a baseline study of the Missouri River in 1973 (University of Missouri-Rolla, 1974). Five locations (from RM 132.5 near Bonnot's Mill to RM 101.4 near Gasconade) were established near the present site of the Callaway Plant. The mean number of benthic organisms reported from these locations was 173 individuals/m^2. These samples were composed of Oligochaeta (87%), Ephemeroptera (6%), Chironomidae (4%) and Trichoptera (1%). The study ascribed the paucity of benthos to channelization, high turbidity, swift currents and shifting substrates (University of Missouri-Rolla, 1974, pp 554, 560).

Recent studies of the Missouri River adjacent to the Callaway Plant have reached similar conclusions regarding the benthos of the Missouri River, exclusive of dike and revetment habitats (Union Electric Company 1974, 1975, 1976). Mean densities ranged from 486 to 1,320 organisms/m^2 and mean biomass values ranged from 827 to 2,483 mg/m^2. In each investigation, Oligochaeta (mostly Tubificidae) represented more than 75 percent of the total benthos. Chironomidae were the second most abundant taxa, followed by Ephemeroptera and Trichoptera. Channelization, floods, swift currents, high turbidity and shifting substrates were found to be the major factors contributing to low species diversities, abundance, and biomass (Union Electric Company 1974, p. 28; 1975 p 34; and 1976, p 88).

A total of 127 taxa were identified in the drifting macroinvertebrate samples collected from June 1980 through May 1981 from the Missouri near the Callaway Plant (CDM 1981, p. 423). The number of taxa per location ranged from a low of 85 to a high of 103. Mean spatial densities ranged from 97 organisms/100m^3 to 156 organisms/100m^3. Hydropsyche orris was the most abundant species collected at each location. Mean annual densities of this organism ranged from 18 to 38 individuals/100m^3.

Of the 127 drifting macroinvertebrate taxa collected, 88 were aquatic insects. Chironomidae was the most diverse family of aquatic insects present, comprising 35 taxa. Mayflies were the second most diverse group of insects, representing 14 taxa distributed among 7 families. A third diverse group of organisms were the Polychaeta. Thirteen species of naiad worms, 7 species of tubificid worms, and 1 unidentified species of enchaetraeid worm were collected. The highest number of taxa (57) was collected in March, and the lowest number of taxa (26) was found in July.

There is very little data available concerning the macroinvertebrate drift assemblage of the lower Missouri River (CDM 1981, pp. 4-39). Berner (1951) calculated that about 64 million drifting organisms, weighing about 200 kilograms, passed under the Boonville, Missouri River bridge in a 24 hour period in 1946 (Berner 1951, p. 8). Of 381 drifting organisms collected in the lower Missouri River between May and November 1945, Chironomidae comprised 48%, Plecoptera 9%, Ephemeroptera 12% and Trichoptera 12% (Berner 1951, p. 8). An intensive drift survey conducted near Fort Calhoun

Station (RM 646) from 1973 through 1977 found Hydropsychidae (37%) Chironomidae (24%) and Ephemeroptera (14%) the most abundant groups (Carter 1977, p.158).

Union Electric Company (1975) collected drift samples near the Callaway Plant in June and September 1974. Species composition in drift samples varied greatly from that observed in grab samples collected during the same investigation. The most abundant organisms collected were _Stenonema_ sp., _Hexagenia_ sp., _Chaoborus_ sp. and _Polypedilum_ sp. All of these organisms, except _Hexagenia_ sp., were common or abundant in similar seasonal samples. However, drift densities (about 5 organisms/100m^3) were one-tenth of the minimum drift density of 50 organisms/100m^3 found in the CDM (1981) investigation.

3.3.5 Fish

The abundance and diversity of fish in the Callaway Plant area of the Missouri River are determined by the physical habitats present, water quality, and the populations of organisms in other portions of the food web. Many larval fish species feed on plankton as fry, but feed on aquatic insects or other fish as adults. Adult fish may act as primary consumers by feeding on phytoplankton; secondary consumers by feeding on zooplankton or benthic organisms; or tertiary consumers by feeding strictly on other species of fish.

Funk and Robinson (1974) did an extensive literature review and found that 63 species of fish have been collected from the Missouri River. They did not include species that were collected only in the mouth of tributary streams and were believed to be more characteristic of the tributary than the main river. They summarized their literature study by stating that the fish population of the river has become dominated by a few species adapted to survival in the swift, turbid stream and that diversity of the population has declined as habitat has become less varied and diverse. Spectacularly large specimens of lake sturgeon and paddlefish have not been taken for many years. The lake sturgeon has virtually disappeared, the paddlefish has declined drastically and the blue catfish now makes up only a small part of the total population. Crappie, sunfish, black bass and saugers, which once made up a considerable portion of the population, now are seldom taken. The exotic carp increased dramatically soon after introduction, apparently at the expense of the native buffaloes and carpsuckers, and has remained dominant. The flathead catfish may be declining in the river at present; the channel catfish is the only major species besides the carp which seems to be increasing in abundance. These changes have paralleled the physical changes in the river and, while proof of a cause and effect relationship is lacking, the circumstantial evidence of a direct relationship between decreased diversity in the habitat and decreased diversity in the fish population is very strong.

A study of the fish populations in the Missouri River near the Callaway Plant was conducted from June 1980 through May 1981 by Camp, Dresser & McKee (1981). A total of 2950 fish comprising 43 taxa was collected in the Missouri River by all sampling methods during this study. Electroshocking in the Missouri River was by far the most effective sampling method for both total numbers and diversity. Fifty seven percent of the total catch (1670 fish) and 32 species were collected by this method. Catch-per-effort ranged from a low of 0.09 fish/minute in August to a high of 3.39 fish/minute during May. Average catch-per-effort for the year was 0.95 fish/minute. Although catch-per-effort was generally low, the rates are typical of the lower Missouri River. In 1979, catch-per-effort at Cooper Nuclear Station (RM 532.5) averaged approximately 0.6 fish/minute (King 1980, p. 110). During previous studies for the Callaway Plant, high water greatly hampered electroshocking effectiveness and the method was discontinued (Union Electric Company 1975, p. 24).

Seining accounted for a total of 603 fish comprising 15 taxa, many of which were not readily collected by other sampling methods (CDM 1981, pp. 5-9). Two species, the emerald shiner (Notropis atherinoides) and the red shiner (N. lutrensis), comprised 72 percent of the specimens from seine collections. Gill netting accounted for 13 percent of the total catch (387 fish), comprising 18 species. This gear type was almost singly selective for one species, the shovelnose sturgeon (Scaphirhynchus platorynchus). Trap netting was the least effective technique employed during the Camp, Dresser & McKee study (1981). Less than 10 percent of the total catch (290 fish) was taken by this method. Trap nets captured 23 species but appeared to be most selective for catfish species and freshwater drum (Aplodinotus grunniens).

Ten fish species were collected during the Camp, Dresser & McKee study (1981) which were not reported from previous river collections near the Callaway Plant (Union Electric Company 1976, pp. 73-76). The most notable of these were the rainbow smelt (*Osmerus mordax*), an exotic species, and the sicklefin chub (*Hybopsis meeki*), presently listed as rare in Missouri (Nordstrom, *et al*. 1977; p. 28). Other uncommon species collected were blue sucker (*Cycleptus elongatus*), stonecat (*Noturus flavus*) and walleye (*Stizostedion vitreum*). Although species composition has differed from previous studies near the Callaway Plant, major components of the river's fish community have remained similar (CDM 1981, pp. 5-21). Differences in species composition generally did not include species associated with big river systems but were primarily limited to species in other faunal classifications. Despite rigorous sampling efforts in the Missouri River near Callaway, fish population densities were very low, primarily due to the harsh environment of the lower river caused by high turbidity, strong currents and the paucity of spawning and/or preferred backwater areas (CDM 1981, pp. 5-41).

3.3.6 Wildlife

Resident vertebrate wildlife populations in the vicinity of the Callaway intake area are limited since much of the adjacent lands are used for agricultural row crops and the river is channelized. The forest margins along the river banks, backwaters behind dikes, sandbars, forested islands and pastures are the major areas for resident vertebrate wildlife. Beaver, turkey, raccoon, rabbit and small duck populations (mallards, wood ducks, etc.) have been observed near the Callaway intake. During low river elevations Canada geese have used the large sandbar downstream of the intake on the south side of the river. Fall and spring bird migrants have been observed in the vicinity of the intake. Resting areas for these migrating birds include dike fields during normal or low water elevations, backwater areas formed in fields and lowlands during and after flooding, or old side channels of the river. The immediate vicinity of intake and discharge does not contain vegetation or habitat which would attract or hold large numbers of migratory waterfowl or resident vertebrate wildlife.

4.0 Entrainment Study

4.1 Objectives

Objectives of the entrainment study were to document the density, composition and spatial and temporal distribution of icthyoplankton in the Missouri River in the vicinity of the Callaway Plant. These data were used to calculate estimates of actual- and worst-case entrainment by the plant.

Entrainment estimates are expressed as percent entrainment relative to icthyoplankton transport. Percent entrainment estimates help demonstrate that best available technology (BAT) was used to design the intake to minimize adverse environmental impact to the aquatic ecosystem.

4.2 Materials and Methods

4.2.1 Collection Site Locations and Descriptions

Three parallel zones which encompassed the entire width of the river between RM 116 and the intake (RM 115.4) (Figure 4.1) were sampled weekly from April 1, 1984 through September 23, 1984. All three zones shown in Figure 4.1 were bounded on the upstream (west) end by an imaginary line perpendicular to the shore at the 116 mile marker and on the downstream end by an imaginary line perpendicular to the shore at the downstream edge of the intake (RM 115.4). Zones were designated as B2, B1 and B3 because these were the designations used in preoperational studies (CDM 1981, 1982). Throughout the remainder

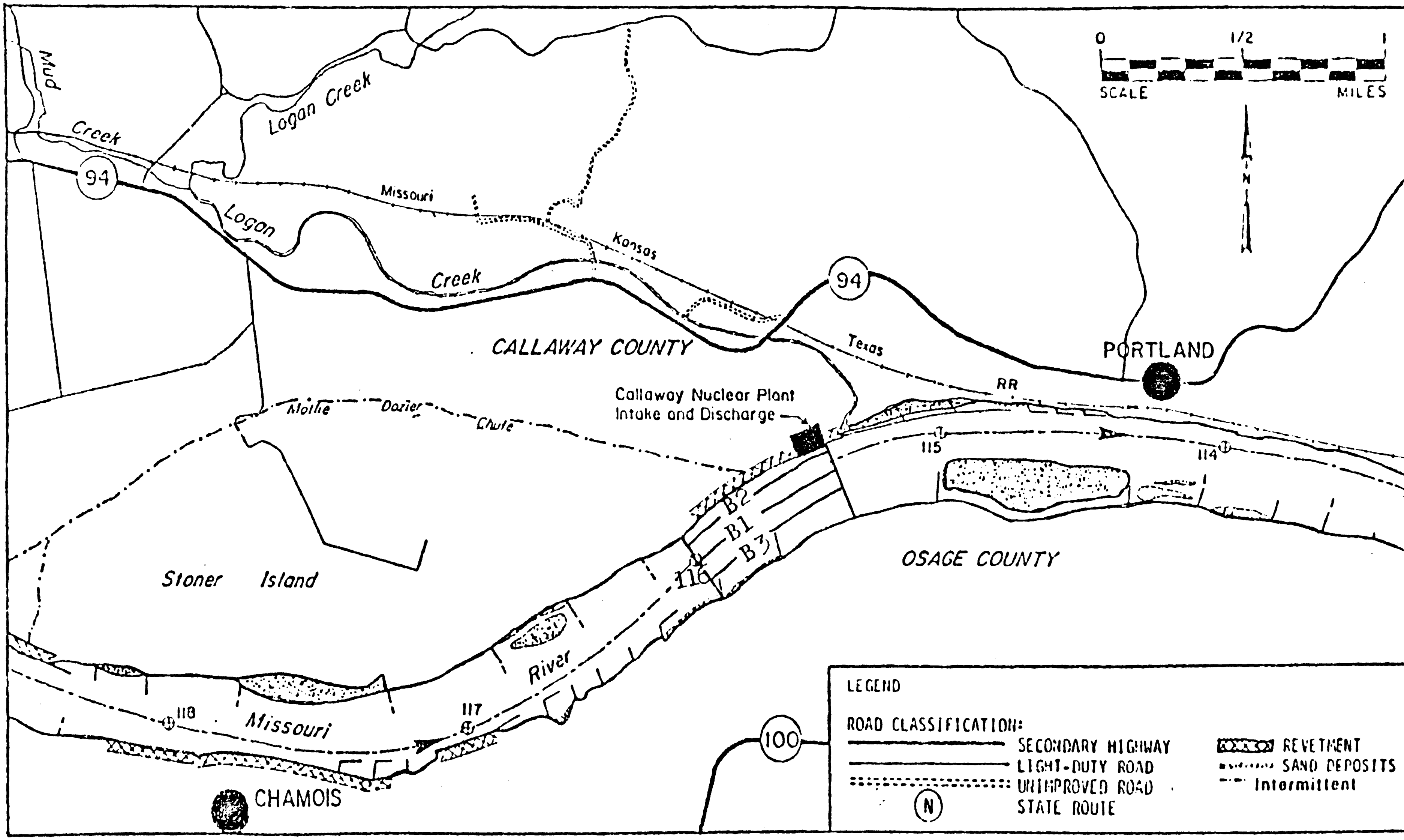


Figure 4.1 Icthyoplankton Sampling Zones in the Missouri River in the Vicinity of the Callaway Plant.

of the document these same zones will be referred to as north (B2), middle (B1) and south (B3) zones.

The north zone (B2 in Figure 4.1) is the zone closest to the intake and will be considered representative of the "zone of influence". Samples were collected along a path parallel to the bank and the face of the intake. The downstream portion of each haul put the boat as close to the face of the intake as possible without colliding (2-3 meters).

The middle zone (B1 in Figure 4.1) was the geometric center of the river on the sample day. The path for this haul was parallel and equidistant between the paths for the other two zones.

The south zone (B3 in Figure 4.1) was parallel to the south shore and just off the ends of the wing dikes under normal flows. During high flow conditions, such as those experienced often in 1984, this zone shifted south so that hauls were taken over the tops of the dikes.

The three zones were situated to divide the surface of the river into thirds on a sampling day and the south and middle zones shifted somewhat because of this. The north zone was consistently the same relative to the intake and north shore regardless of stage.

4.2.2 Sampling Methods

Paired 0.5 meter diameter conical nets with No. 0 "Nitex" mesh (0.570 micron openings) were mounted on frames to simultaneously sample on each side of a 18 foot boat. Each net was fitted inside with a calibrated model 2030 General Oceanics flowmeter. The starboard net had an identical flowmeter on the outside. Inside meters were used to calculate the volume of water sampled and readings were compared with the outside meter to check for net clogging or back-flushing.

Nets had a 27 in. deep cylindrical section of Nitex sewn in at the mouth to reduce back-flow. Nets were made by Ernest Case Company and cod end collection buckets were WILDCO 47-F64 1-liter plastic with 583 micron steel mesh screen.

Each of the two net hoops were welded to 10 foot long box steel arms with holes for pivot pins spaced at 6" intervals. Pivot pins held each net on the end of a midship box steel cross bar so that each net could be pivoted in and out of the water at the beginning and end of a collection (haul).

Nets were deployed and retrieved simultaneously on both sides of the boat and all meters were read between hauls. Hauls were made with the boat moving downstream, with the engine at about 1100 rpm, between the 116 mile marker and the downstream corner of the intake at river mile 115.4. Three consecutive hauls were made in each of the 3 zones on each sample day for a total of 18 discrete samples per day and 468 total samples during the 26 week sample period.

After each haul, nets were carefully rinsed from the outside of the net by swishing in the river and use of a pump with hose attached before being brought aboard. Net contents were rinsed with squirt bottles into a flat pan and then placed in a discretely labeled

16 oz. polethylene sample jar. Each jar was marked with a discrete sample (ID) number and a label was placed inside the jar. This label included ID number, plant, date, zone, side of boat (L or R), replicate number (in that zone for that day, 1-3), number of jars used for that sample, and the collector's name. Samples were preserved in the field with 10% formaldehyde.

Field data was recorded on data sheets which included the following information for each sample collected:

> ID, date, plant, zone, net number, side/replicate, flow meter ID number, start and finish flowmeter readings, number of jars used for the sample, start time, stop time, river stage, water temperature, outside flowmeter ID numbers and start and finish readings, and any remarks.

Samples were stained, rinsed and all visible icthyoplankton were separated from detritus at the laboratory in St. Louis. Rose Bengal was used to stain eggs and larvae and an illuminated magnifier was used to make them more easily visible.

Processing sheets were filled out in the lab for each sample and included the following: sample ID, number of jars, start date, completion date, initials of sorter, different taxon sorted and number of each, number of eggs, and general comments. Taxa that were distinctly different from a sample were sorted into separate petri dishes or jars, marked with the sample ID and designation (name or number) and preserved for further identification and measurement in a 75% alcohol, 20% water and 5% glycerine solution.

All larvae and eggs were identified to the lowest possible taxon and measured to the nearest 0.1 mm using a dissecting microscope fitted with an ocular micrometer and polarizing filters. Specimens were placed into the following life stages: egg, prolarva (yolk sac), larva (yolk absorbed but fin compliments incomplete), and juvenile (full compliment of fin arrays). All specimens were kept for future reference.

Specimens were identified with the aid of keys by May and Gasaway 1967; Taber 1969; Hogue, et al. 1976; and Auer 1982.

Bench processing sheets were filled out with the following information: ID, jar number, species code, life stage, size, sorter, identifier, confirmer, disposition of specimen, completion date, and remarks.

4.2.3 Entrainment Rate Calculations

Entrainment rates were calculated by the following method. The volume of water sampled on each haul in each net was calculated by converting flow meter counts to distance traveled and multiplying by the area of the net mouth opening.

Percent entrainment was calculated using a slight modification of the methods in Mathematical Methods to Evaluate Entrainment of Aquatic Organisms by Power Plants (U.S. Fish and Wildlife Service 1977) where:

$$\begin{array}{l} \text{\% mortality} \\ \text{(assuming 100\% =} \\ \text{mortality of} \\ \text{entrained} \\ \text{larvae)} \end{array} = \frac{\text{mean number of larvae entrained per unit time}}{\text{mean number of larvae drifting with the river per unit time}} \times 100$$

Let: Cz = mean concentration of larvae per m^3 for each zone (north, south and middle) calculated from all six samples in the respective zone for that date.

Cr = mean concentration of larvae per m^3 for the entire river cross section (average of all 18 samples for that date).

Cp = mean concentration of larvae in the intake water in m^3 (mean concentration in north zone on a date).

Qr = river flow (discharge) in m^3 per second for that date, calculated by using Hermann discharge for that day minus Gasconade discharge (USGS data) for that day.

Qp = mean flow through intake (m^3/sec) for that day, from operating data.

The mean number of larvae and eggs per second passing the intake is:

$$CrQr$$

The mean number being withdrawn is:

$$CpQp$$

The % entrainment rate (same as mortality rate assuming 100% mortality of entrained organisms) is:

$$\frac{Cp\ Qp}{Cr\ Qr} \times 100$$

Volume of water sampled for density calculations were measured using a General Oceanics flowmeter with a standard rotor.

$$\text{Distance in meters} = \frac{\text{difference in count x rotor constant (22,873)}}{999999}$$

Volume of water filtered in m^3 =

$$\frac{3.14 \times \text{net diameter in } m^2}{4} \times \text{distance travelled in meters}$$

$$\frac{\text{number of larvae and eggs in sample}}{\text{volume sampled in m}^3} = \text{larvae and egg density/m}^3$$

Worst-case entrainment calculations were based on a maximum intake withdrawal rate with three pumps running, icthyoplankton density in the zone of influence with a transport rate using average densities of all zones, and the record low river flow for the period of record during the time of icthyoplankton presence.

To calculate entrainment estimates, Gasconade River discharges at Jerome, Missouri were subtracted from Hermann discharges for that day. The stage discharge rating curve for Callaway based on these adjusted discharges and actual stage measurements at the intake are presented in Figure 4.2. The discharge estimates for Hermann and Callaway for the entrainment sampling period of 1984 are compared in Figure 4.3.

4.3 Results

The Callaway icthyoplankton sampling program was conducted weekly from April 2, 1984 through September 24, 1984. The sampling period included the entire period in which fish eggs and larvae were likely to exist. Eggs and larvae were first collected on May 1 and none were collected after September 10. Density values are expressed as number per 100 m^3. The mean quantity of water filtered on a given day was 1666 m^3 (range 1028 m^3 to 2155 m^3) with a total of 43314 m^3 sampled during the entire 26 weeks. Each of the 468 individual samples filtered a mean quantity of 92.6 m^3 with a range of 33 m^3 to 161 m^3.

Figure 4.2
CALLAWAY STAGE DISCHARGE CURVE 1984

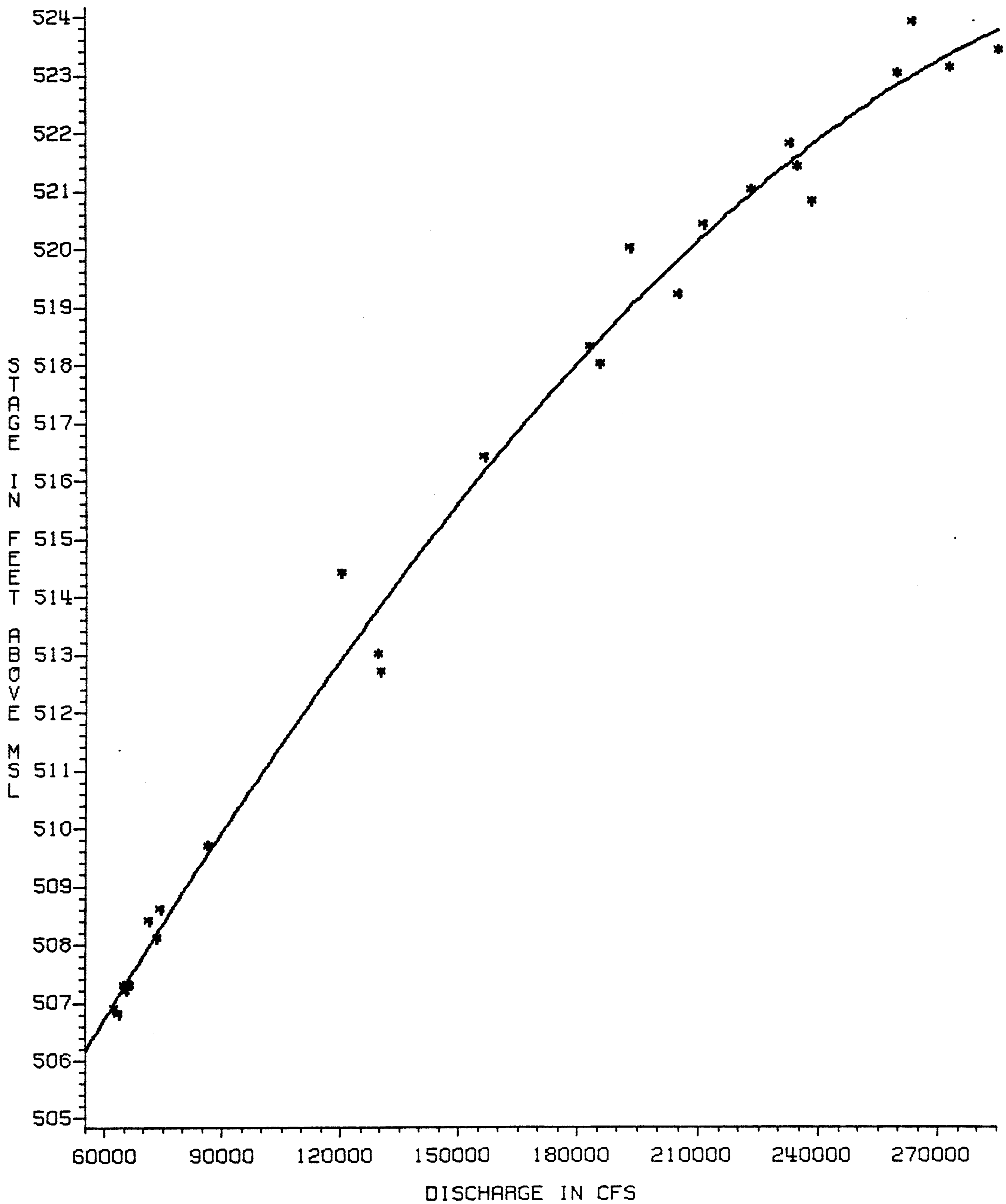
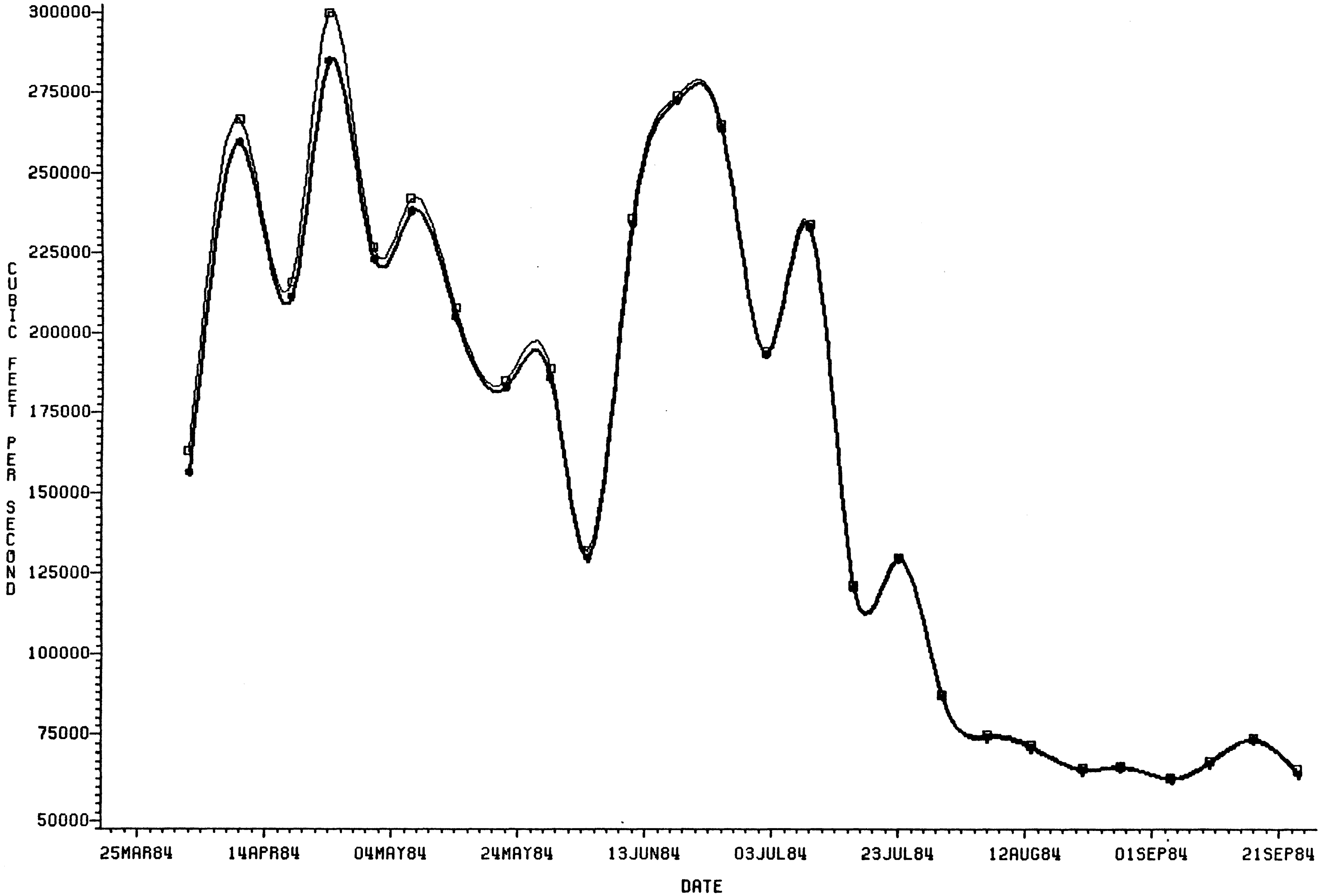


Figure 4.3 RIVER DISCHARGE COMPARISONS BETWEEN CALLAWAY AND HERMANN

FROM USGS DATA



SQUARES=HERMANN DISCHARGE (FROM USGS 1984)
STARS=CALLAWAY DISCHARGE-(HERMANN MINUS GASCONADE)

4.3.1 Species Composition Abundance and Densities

A total of 3541 fish and 195 eggs were sampled representing at least 26 taxa (Table 4.1). Four taxa comprised over 85% of the total taxa sampled. These predominant taxa were: freshwater drum (54.12%), gizzard shad (15.44%), carp (8.78%), and other minnows (6.69%). No specimens of rare, threatened, or endangered species listed for Missouri Waters (Missouri Department of Conservation 1977), or included on the U.S. Fish and Wildlife Service List of Endangered or Threatened Wildlife (U.S. Dept. of the Interior 1975) were found at the Callaway Plant. Because some specimens were identified only to the genus or family level or were unidentified, the possibility does exist that some rare species were included in the collection. The lack of rare fish (with the exception of the sicklefin chub) in adult fish samples in this study and previous studies in the same area makes the presence of rare eggs or larvae unlikely.

Number collected, mean density per 100 m^3 and percent frequency of occurrence in the 244 samples that contained icthyoplankton are shown in Table 4.2.

Total specimen frequencies for all taxon combined by date with zones compared are shown in Figure 4.4.

Mean density values by zone on each sampling date for all taxon combined and for the 5 most abundant taxon are presented in Figure 4.14 and Figures 4.6 through 4.10, respectively.

Table 4.1
Taxon Frequencies for Icthyoplankton Collections
Callaway May 1 - September 10, 1984

Common Name	Scientific Name	Number	Percent Of Total
Unidentified Egg	Unidentified Egg	55	1.47
Unidentified Yolk Sac Larva	Unidentified Prolarva	23	0.62
Unidentified Larva	Unidentified Larva	4	0.11
Unidentified Juvenile	Unidentified Juvenile	1	0.03
Damaged Larva	Damaged Larva	1	0.03
Paddlefish	Polyodon spathula	1	0.03
Shortnose Gar	Lepisosteus platostomus	1	0.03
Gizzard Shad	Dorosoma cepedianum	577	15.44
Goldeye	Hiodon alosoides	105	2.81
Goldeye or Mooneye	Hiodon species	1	0.03
Carp	Cyprinus carpio	328	8.78
Speckled Chub	Hybopsis aestivalis	1	0.03
Minnow Family	Cyprinidae	250	6.69
Buffalo Species	Ictiobus species	4	0.11
Sucker Family	Catostomidae	118	3.16
Sea Bass Family	Percichthyidea	5	0.13
Bluegill	Lepomis macrochirus	5	0.13
White Crappie	Pomoxis annularis	5	0.13
Spotted Bass	Micropterus punctulatus	1	0.03
Sunfish Species	Lepomis species	28	0.75
Crappie Species	Pomoxis species	28	0.75
Sunfish Family	Centrarchidae	27	0.72
Sauger	Stizostedion canadense	2	0.05
Perch Family	Percidae	3	0.08
Freshwater Drum	Aplodinotus grunniens	2022	54.12
Freshwater Drum Egg	Aplodinotus grunniens Egg	140	3.75
		3736	

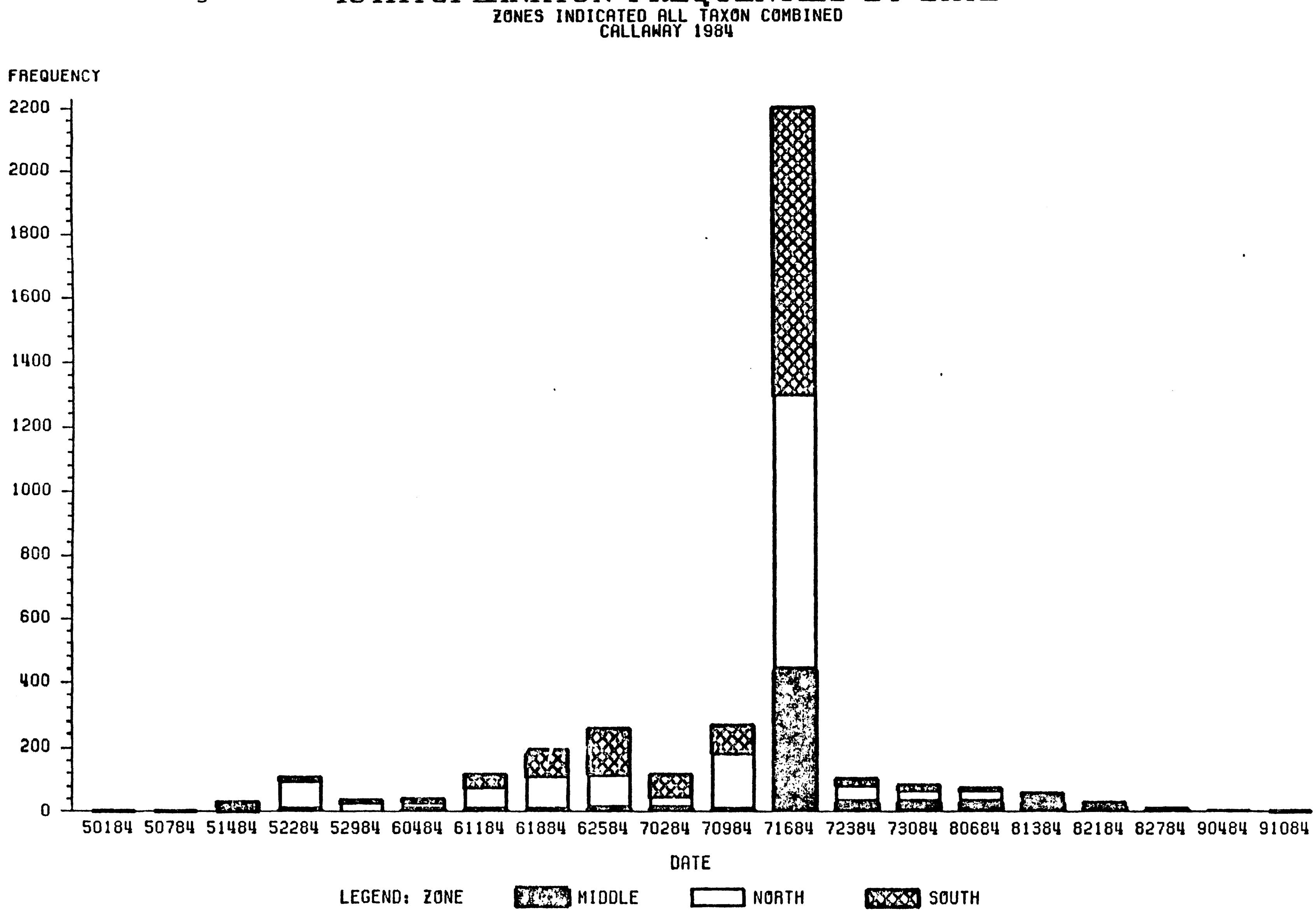
Table 4.2

Taxon Frequencies, Mean Densities and Percent Frequency of Occurrence

Callaway 1984

Taxon	Number	Mean Density Per 100 Cubic Meters	Percent Frequency of Occurrence
Freshwater Drum	2022	22.69	37
Gizzard Shad	577	5.43	46
Carp	328	4.56	32
Minnow Family	250	23.24	34
Freshwater Drum Egg	140	1.86	30
Sucker Family	118	1.95	29
Goldeye	105	5.38	9
Unidentified Egg	55	1.70	17
Sunfish Species	28	1.68	10
Crappie Species	28	2.22	9
Sunfish Family	27	1.05	2
Unidentified Yolk Sac Larva	23	1.14	1
Sea Bass Family	5	0.97	1
Bluegill	5	1.34	1
White Crappie	5	2.09	1
Unidentified Larva	4	1.75	1
Buffalo Species	4	1.10	<1
Perch Family	3	0.95	<1
Sauger	2	1.27	<1
Unidentified Juvenile	1	1.50	<1
Damaged Larva	1	0.87	<1
Paddlefish	1	0.90	<1
Shortnose Gar	1	1.77	<1
Goldeye or Mooneye	1	1.88	<1
Speckled Chub	1	0.72	<1
Spotted Bass	1	0.96	<1
Total	3736	70.97	--

Figure 4.4 ICTHYOPLANKTON FREQUENCIES BY DATE



The entire raw data base for the study is presented in Appendix B. Specimen frequencies by date with life stages indicated are presented in Figure 4.5.

A total of 2022 freshwater drum were collected with a mean density of 22.7/100 m^3 (Table 4.2) and a range of 0.6 to 157 per 100 m^3. Most of the drum sampled were juveniles (Figure 4.15) which would probably not be as susceptible to entrainment as larvae. For the purposes of estimates, all drum sampled were considered as "entrainable".

Drum first appeared in the samples on June 4 and were not sampled after August 27. Drum densities peaked in mid-July at an average density of 128/100 m^3. Drum appeared in 90 of the 244 samples that contained icthyoplankton for a percent occurrence of 37%. Drum densities compared between zones show the south zone and north zone (zone of influence) both having the highest mean densities on a date. Middle zone densities peaked at almost half of the other zone densities (Figure 4.6).

A total of 577 (Table 4.1) gizzard shad were collected with a mean density of 5.43/100 m^3 (Table 4.2) and a range of 0.6 to 24 per 100 m^3. Shad were collected in 113 of the 244 samples that contained icthyoplankton for a 45 percent occurrence.

Gizzard shad were collected from May 14 through August 6 (Figure 4.7). Mean zone densities peaked at 14/100 m^3 in the south zone during late June. There were lesser peaks in the north zone (zone of influence) during mid-June and late June as well as early

Figure 4.5 ICTHYOPLANKTON FREQUENCIES BY DATE

LIFESTAGE INDICATED-- ALL TAXON COMBINED
CALLAWAY 1984

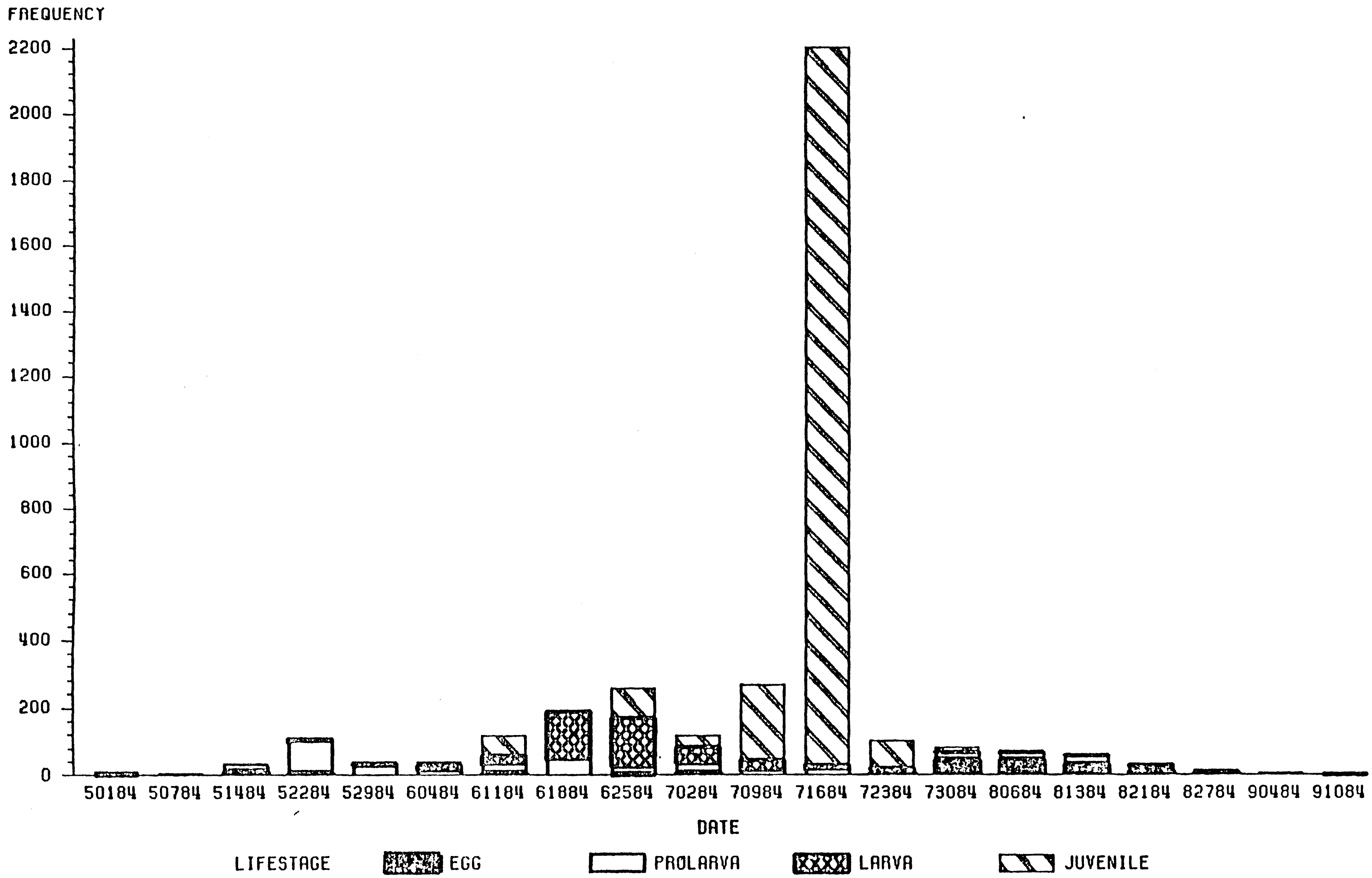


Figure 4.6 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED
FOR EACH DATE SAMPLED--BY DOMINANT TAXA
CALLAWAY 1984
FRESHWATER DRUM

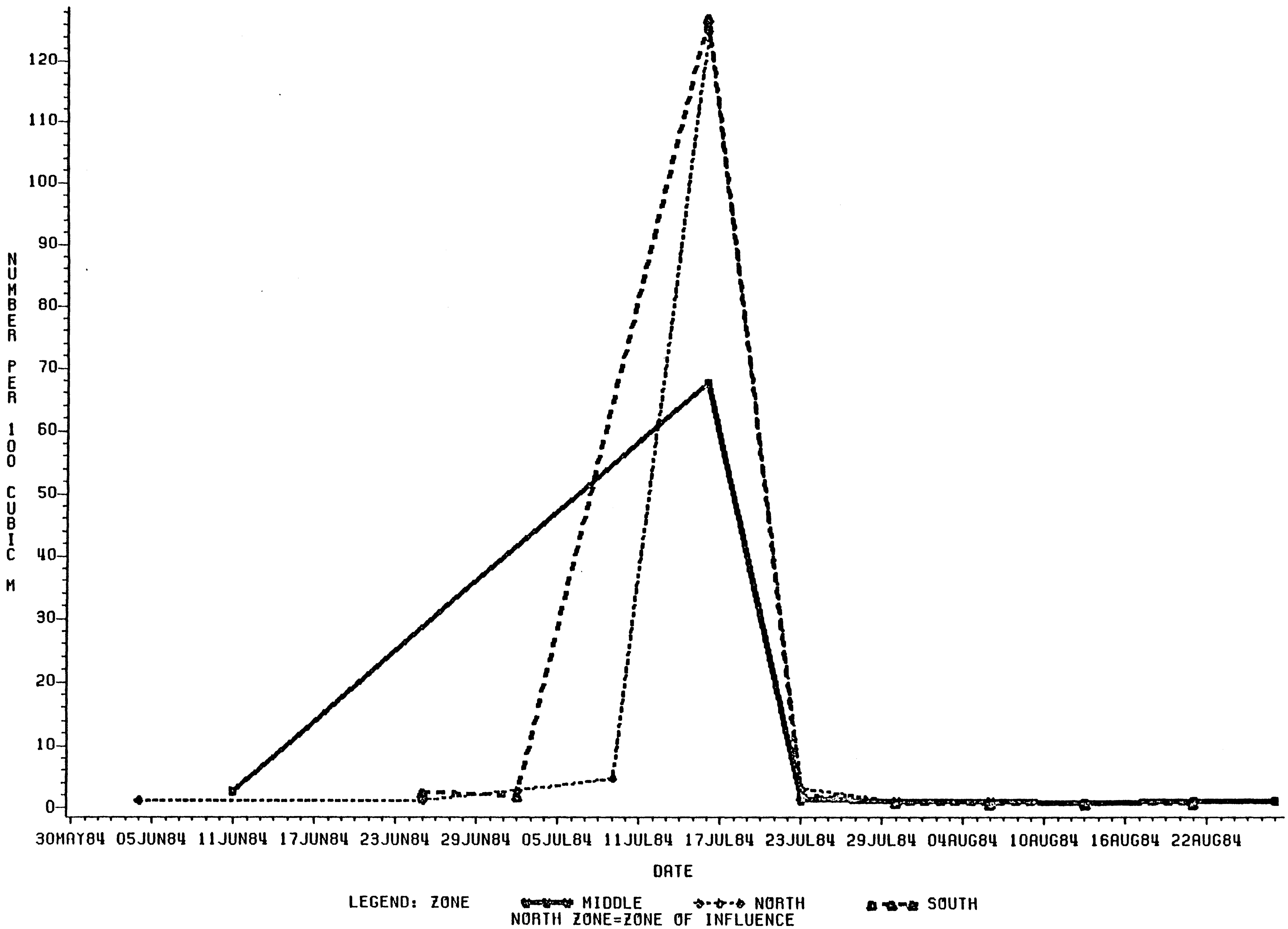
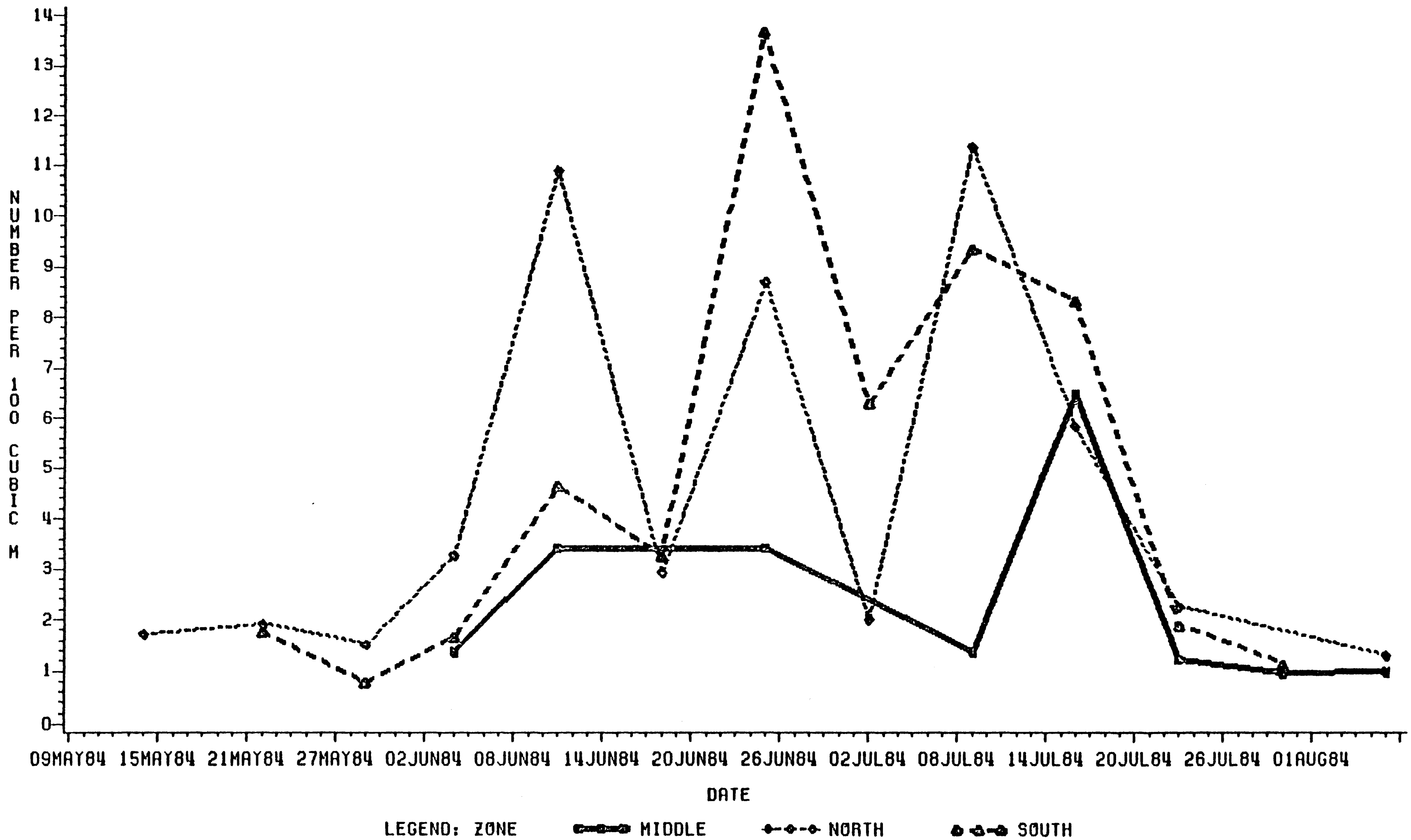


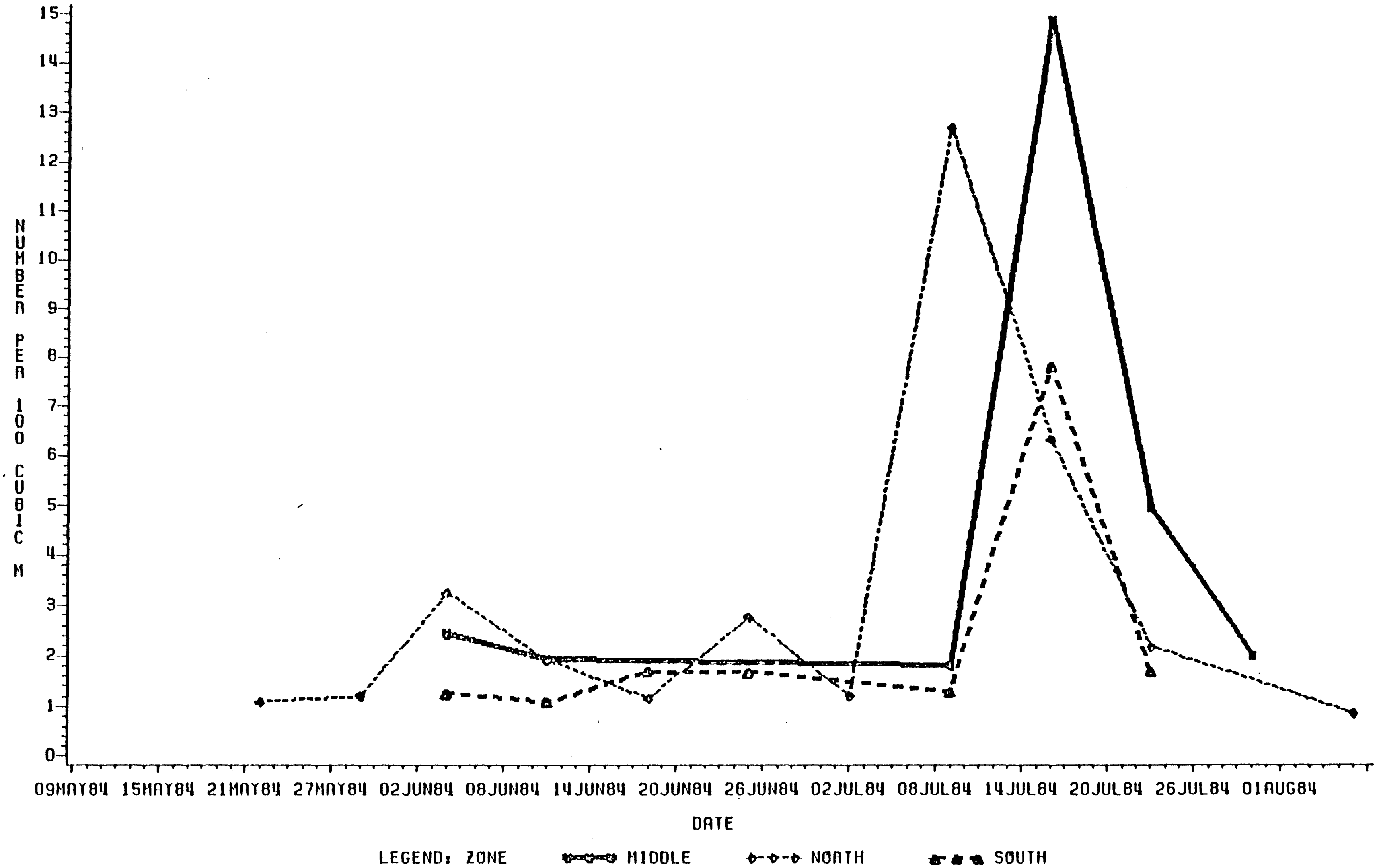
Figure 4.7 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED
FOR EACH DATE SAMPLED--BY DOMINANT TAXA
CALLAWAY 1984
GIZZARD SHAD



NORTH ZONE=ZONE OF INFLUENCE

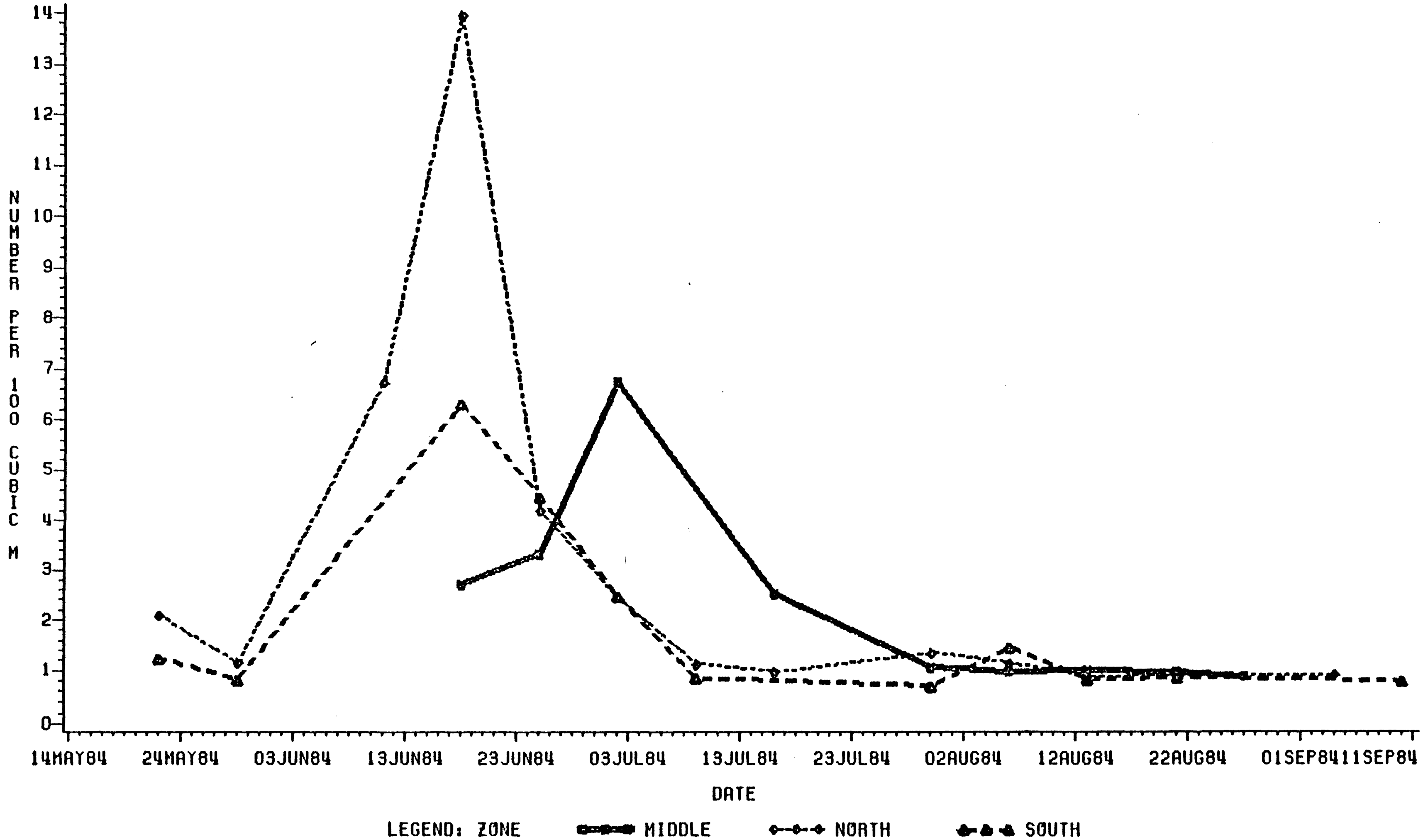
Figure 4.8 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED

FOR EACH DATE SAMPLED--BY DOMINANT TAXA
CALLAWAY 1984
CARP



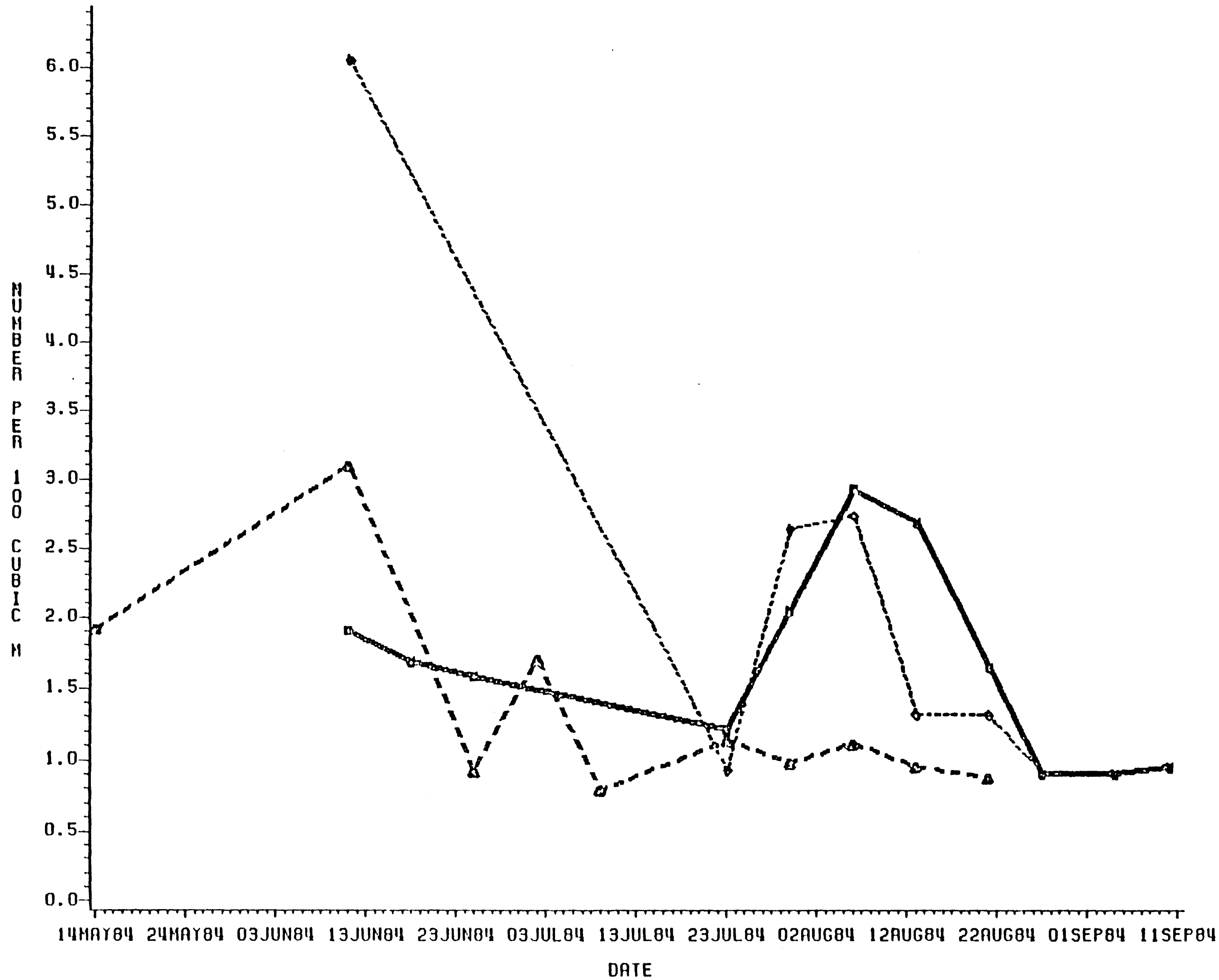
NORTH ZONE=ZONE OF INFLUENCE

Figure 4.9 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED
FOR EACH DATE SAMPLED--BY DOMINANT TAXA
CALLAWAY 1984
MINNOW FAMMILY



NORTH ZONE=ZONE OF INFLUENCE

Figure 4.10 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED
FOR EACH DATE SAMPLED--BY DOMINANT TAXA
CALLAWAY 1984
FRESHWATER DRUM EGG



LEGEND: ZONE MIDDLE NORTH SOUTH
NORTH ZONE=ZONE OF INFLUENCE

July. Middle zone densities were consistently lower with the only peak in mid-July (Figure 4.7).

Carp were the third most abundant taxon with a total of 328 and a mean density of 4.6/100 m^3 with a range of 0.7 to 25.7 per 100 m^3. Most of the fish identified as carp were juveniles since the minnow family is difficult to identify to species when the specimens are larvae. These juvenile carp were also considered "entrainable" even though some were probably capable of avoiding the intake. Carp were collected in 79 of the 244 samples when larvae or eggs were present for a 32% occurrence.

Carp were sampled from May 22 through August 6 and peaked during July (Figure 4.8).

Mean zone densities were highest during mid-July in the middle zone. An earlier but lower peak was seen in the first part of July in the north zone and a smaller peak in the south zone simultaneously with the middle zone peak (Figure 4.8).

Minnow species that were identified only to family made up 6.7 percent of the total taxon with a total of 250 specimens (Table 4.1). The mean density of minnow species (other than those identified as carp) was 1.9/100 m^3 with a sample range of 0.6 to 21 per 100 m^3. Unidentified minnow species were collected in 83 of the 244 samples that contained icthyoplankton for a 34% occurrence.

Unidentified minnows were collected from May 22 through September 10 with peaks during late to mid-June (Figure 4.9).

Inclusion of more than one species makes these peaks difficult to interpret.

Zone mean densities by date peaked in the north zone on June 8 at almost 14/100 m^3 with a lesser peak in the south zone at the same time of 6.4/100 m^3. The peak in the middle zone was later in early July and slightly higher than the south zone peak (Figure 4.9).

The fifth most abundant taxon was freshwater drum eggs with a total of 140 specimens (Table 4.1) and a mean density of 1.9/100 m^3 (Table 4.2) with a sample range of 0.6 to 6 per 100 m^3. Drum eggs were collected in 74 of the 244 samples that contained icthyoplankton for a 30% occurrence.

Drum eggs were collected from May 14 through September 10 and peaked in density during mid-June and again in mid-August (Figure 4.10).

Zone densities were highest in the north zone during mid-June and peaked again at a much lower density in mid-August (Figure 4.10).

Unidentified sucker species ranked sixth in abundance with a total of 118 specimens at a mean density of 1.9/100 m^3 and a sample range of 0.7 to 8 per 100 m^3. Catastomids are difficult to identify as adults due to errors in fact interpretation and omission in classification (Hubbs, 1930) and lack of interspecific differences in meristic features such as scale and fin ray counts (Robins and Rainey, 1956). Because larval fish identification relies on meristic differences, suckers were identified only to family in this study.

Literature exists to discern buffaloes from redhorses but there are contradictions.

Unidentified suckers were collected May 7 through September 4 and occurred in 72 of 244 samples for a 29% occurrence.

Zone mean densities peaked in the south zone during mid-July in the north zone in early July and in the middle zone in mid-August (Figure 4.11). Again, as with unidentified minnows, the probable combination of several species complicates and lengthens the density and occurrence plots.

Goldeye were the seventh most abundant taxon with a total of 105 (Table 4.1) specimens and a mean density of 5.3/100 m^3 (Table 4.2) with a sample range of 0.8 to 19 per 100 m^3. Goldeye were collected in only 22 of 244 ichtyoplankton containing samples for a 9% occurrence. Goldeye were collected from May 22 through June 4 or for only 3 weeks which accounts for the relatively high density (Figure 4.12). Goldeye mean density peaked in the north zone on May 22 at over 14/100 m^3 and were below 2/100 m^3 in the other two zones for the entire period of occurrence (Figure 4.12).

Unidentified eggs made up the eighth most abundant taxon with 55 specimens and a mean density of 1.7/100 m^3 with a sample range of 0.7 to 6 per 100 m^3. Unidentified eggs were collected in 41 samples that contained icthyoplankton for a 17% occurrence.

Figure 4.11 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED

FOR EACH DATE SAMPLED--BY DOMINANT TAXA
CALLAWAY 1984
SUCKER FAMILY

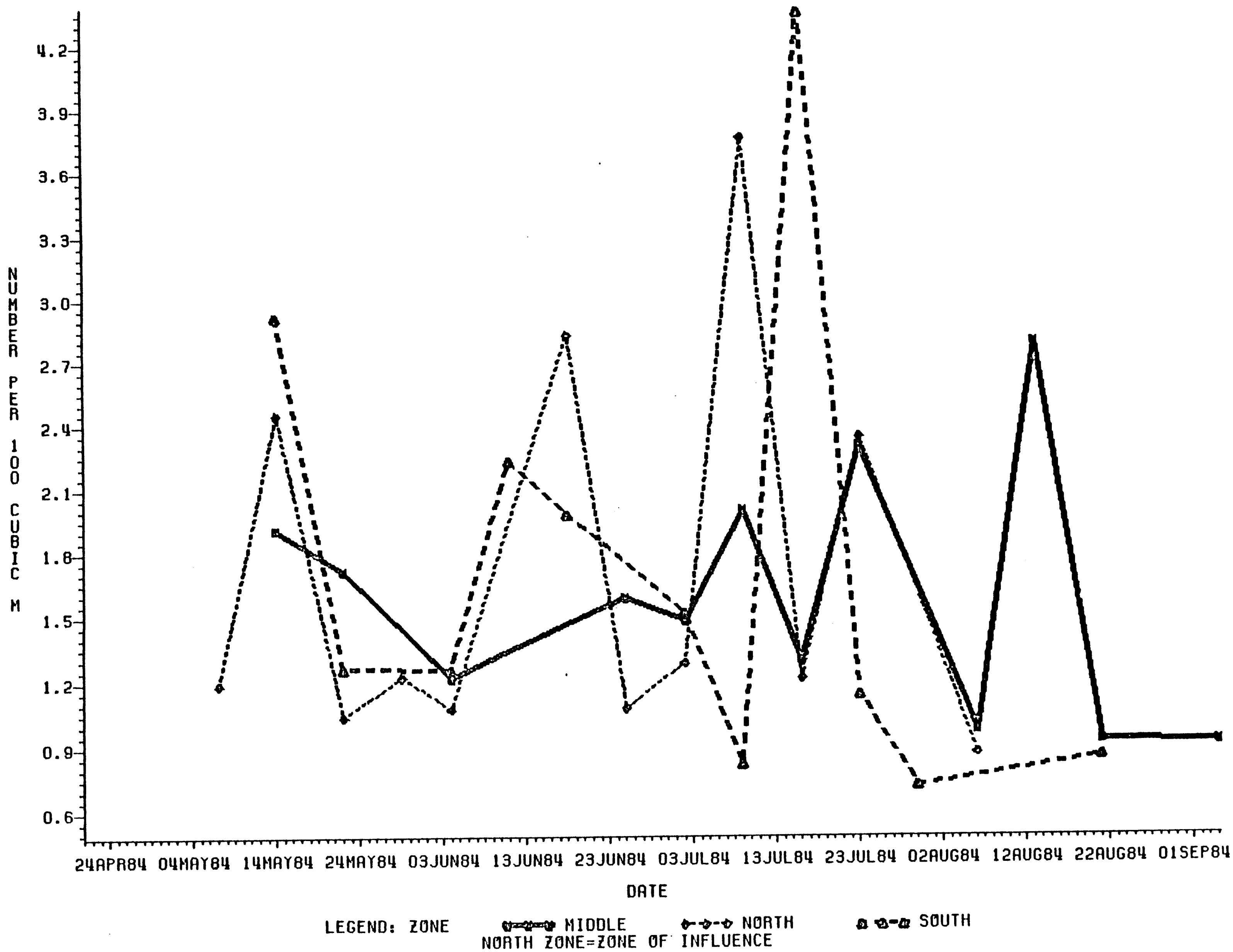
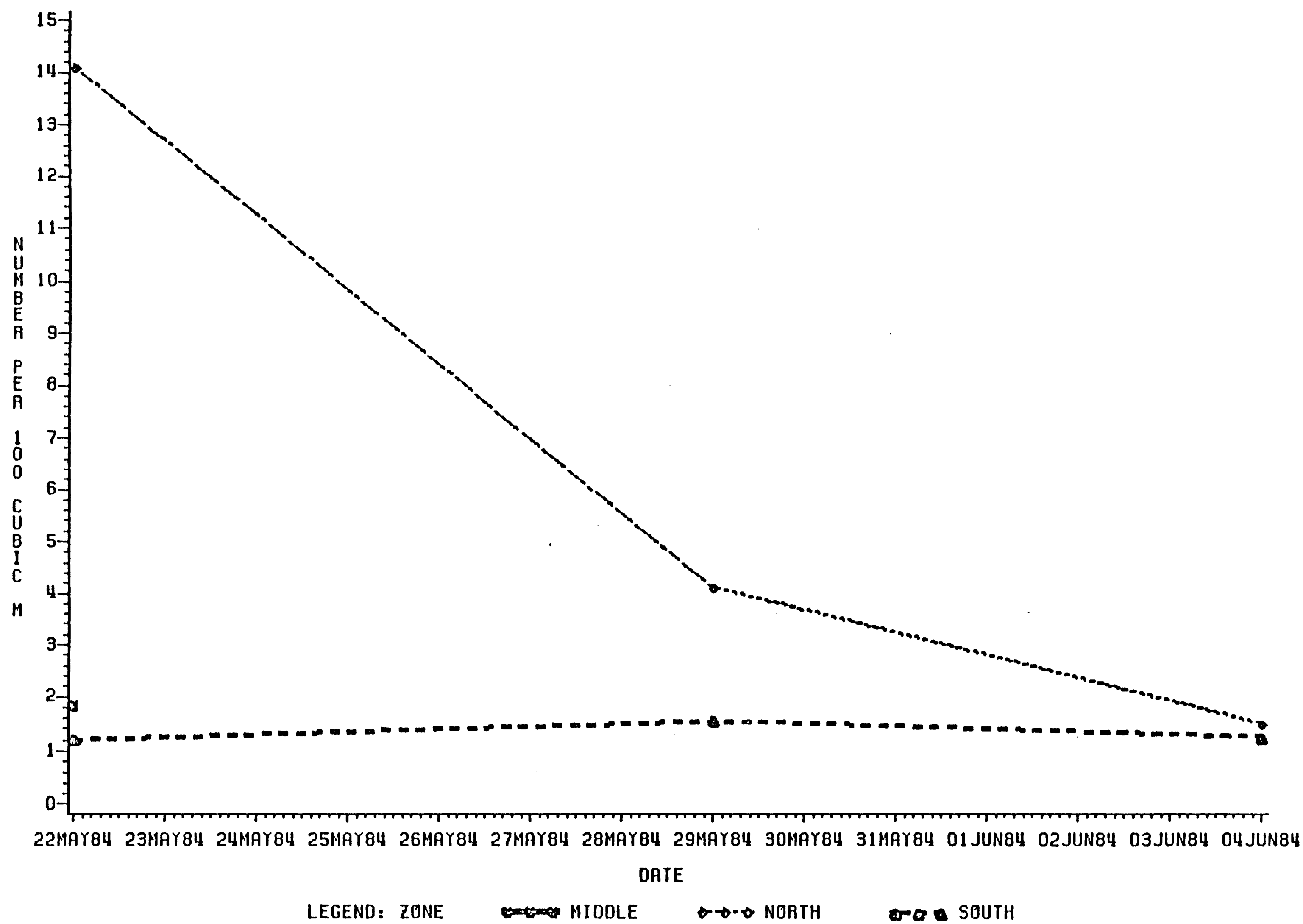


Figure 4.12 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED
FOR EACH DATE SAMPLED--BY DOMINANT TAXA
CALLAWAY 1984
GOLDEYE



NORTH ZONE=ZONE OF INFLUENCE

Unidentified eggs were collected from May 1 through September 4 with three major peaks (Figure 4.13). Mean zone densities were highest in the middle zone during late May but were collected more often and at greater densities in the other two zones. The south zone had the greatest average density over the entire sample period followed by the north zone (Figure 4.14).

The remaining 18 taxa made up the other 5% of the total taxon. These include unidentified prolarvae (23), larvae (4), and juveniles (1) (Table 4.1).

Mean zone densities of all taxa combined are presented in Figure 4.14. The peak of densities in mid-July is largely due to the many juvenile freshwater drum that were sampled.

4.3.2 Larva Length Distribution

Analysis of length distribution of major taxa provide an indication of spawning period and/or locality (Fig. 4.15-4.20). Length data for all taxon are presented in Appendix B.2. Mean lengths and ranges of all taxa are presented in Table 4.3.

4.3.3 Entrainment Results

Estimated mean entrainment rates are presented in several ways. The mean of rates calculated from each sample that contained icthyoplankton is presented by taxon and totaled in Table 4.4. This table also includes the means for density, entrainment, and percent entrainment of a transport rate. Taxon that were not collected in the zone of influence (north zone) did not have entrainment estimates

Figure 4.13 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED
FOR EACH DATE SAMPLED--BY DOMINANT TAXA
CALLAWAY 1984
UNIDENTIFIED EGG

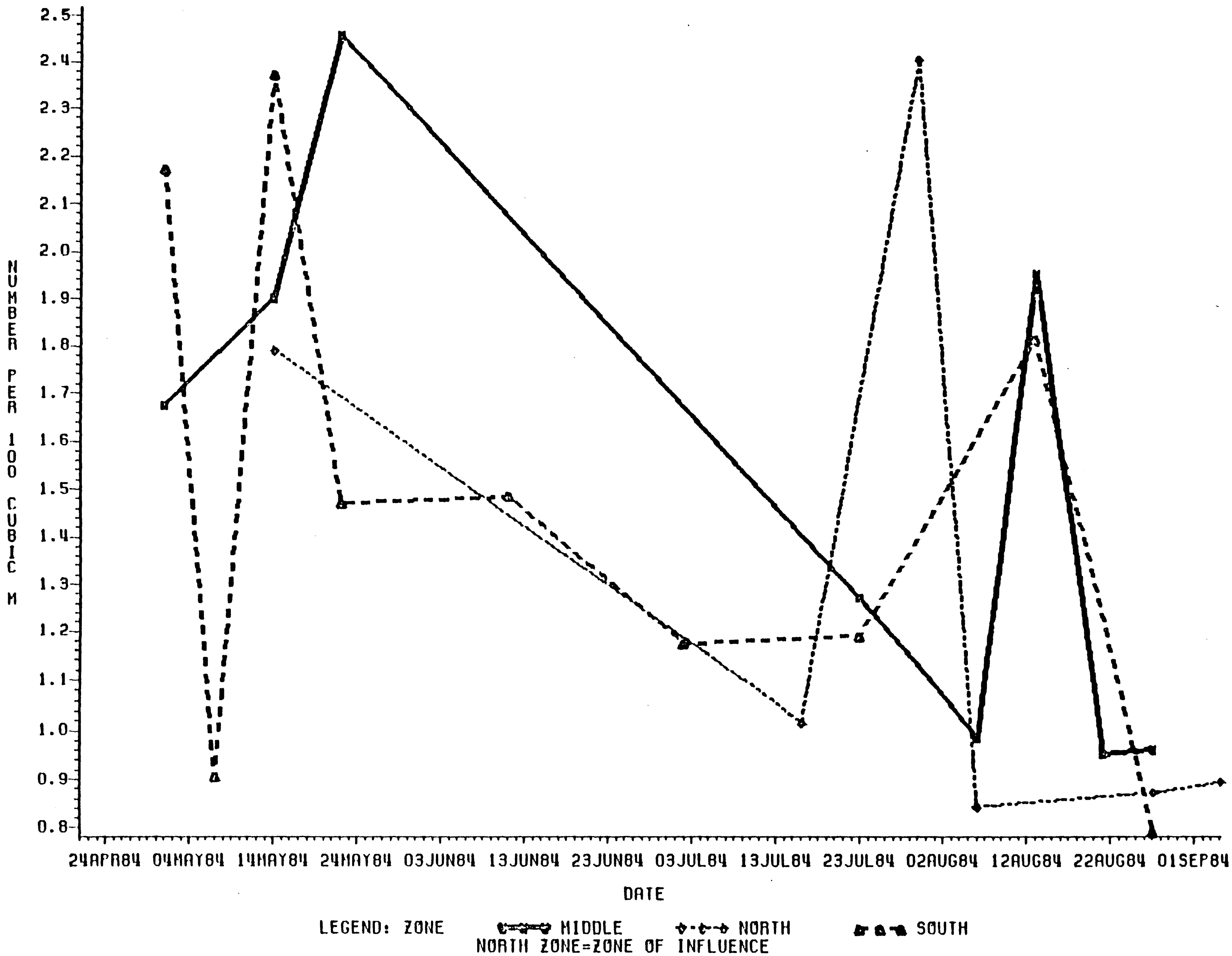
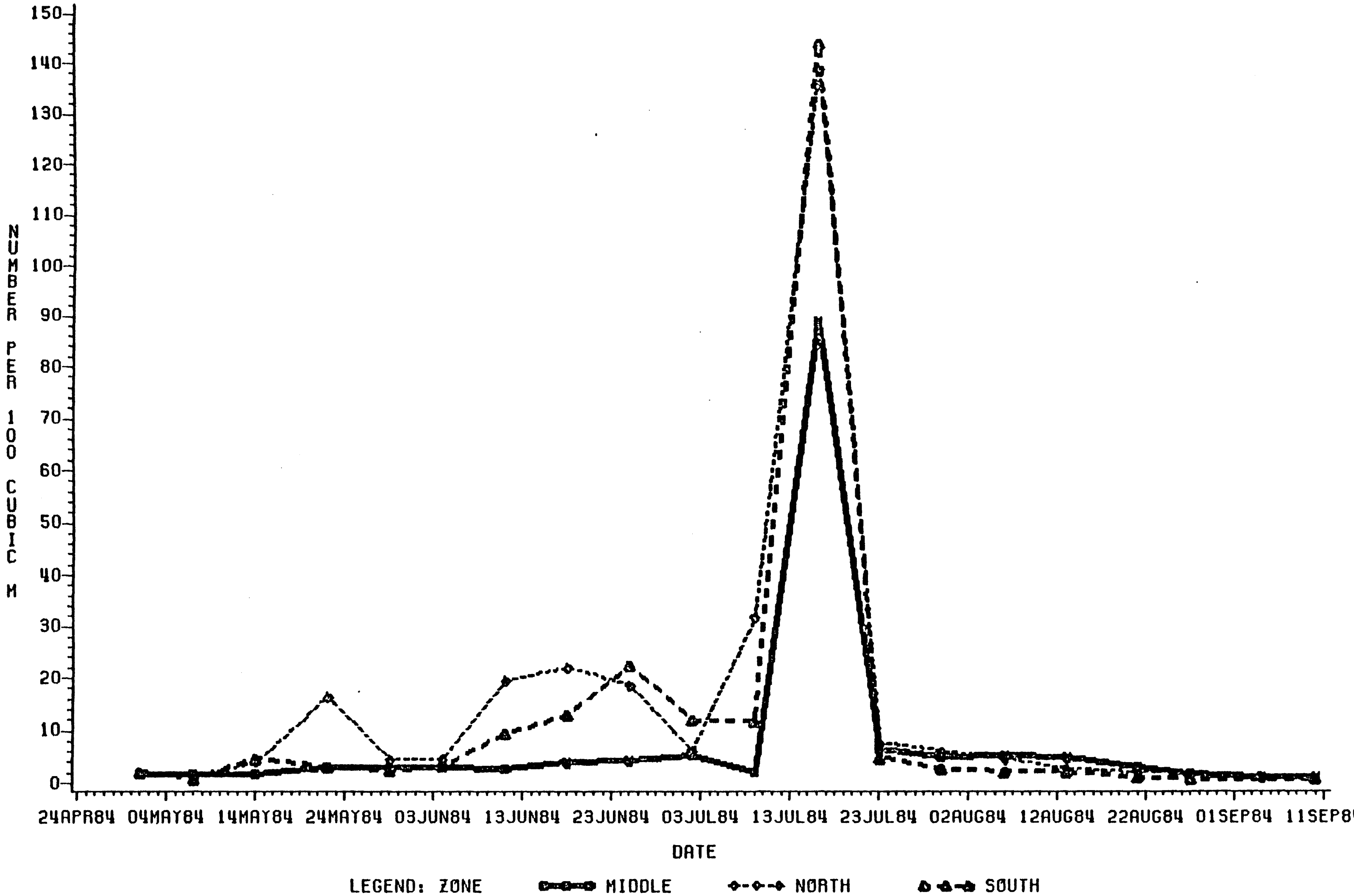


Figure 4.14 MEAN ZONE ICTHYOPLANKTON DENSITIES COMPARED
FOR EACH DATE SAMPLED--ALL TAXA
CALLAWAY 1984



NORTH=ZONE OF INFLUENCE

Figure 4.15 DOMINANT SPECIES LENGTH FREQUENCIES
WITH LIFESTAGES INDICATED
CALLAWAY 1984
TAXON=FRESHWATER DRUM

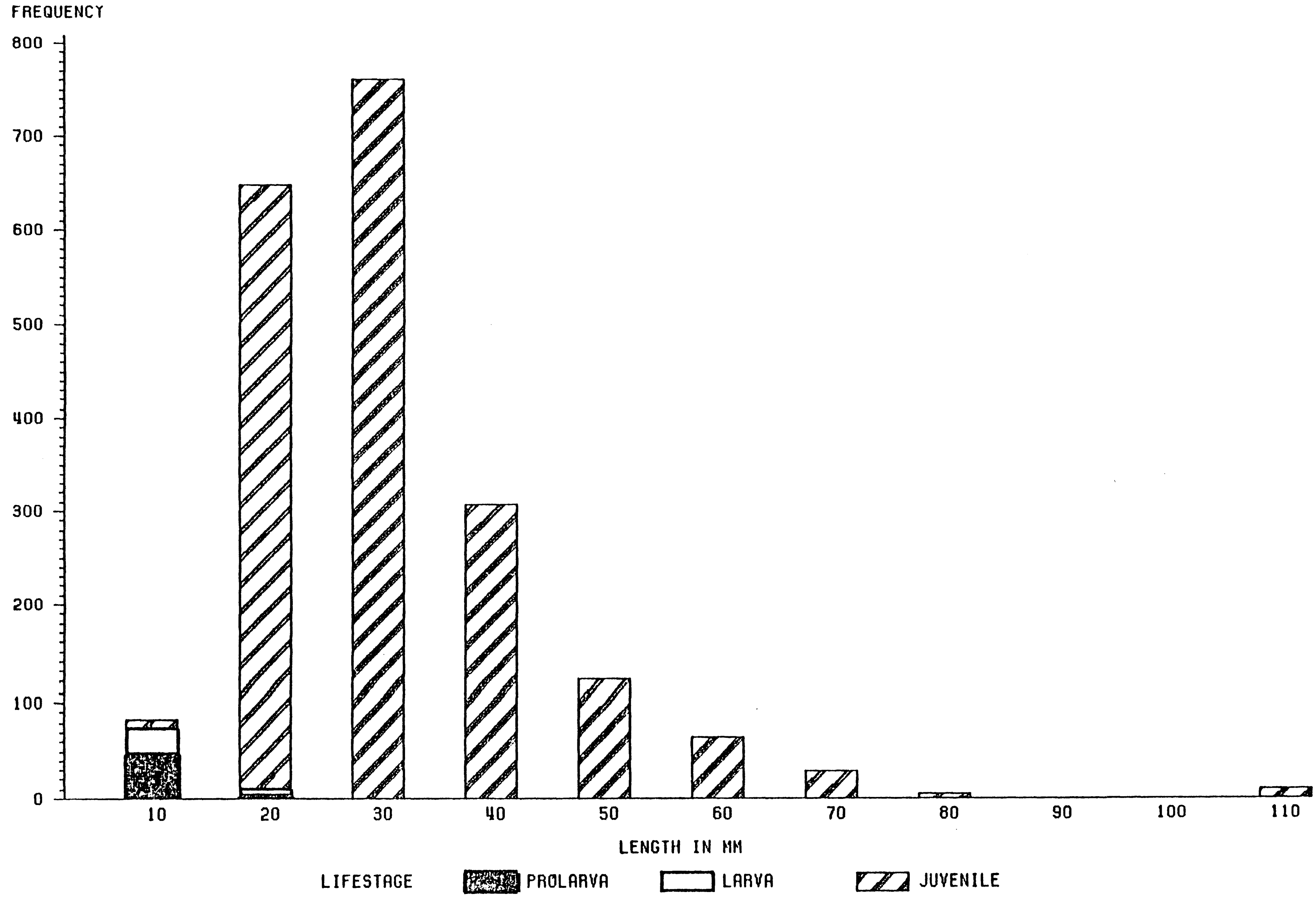


Figure 4.16 DOMINANT SPECIES LENGTH FREQUENCIES

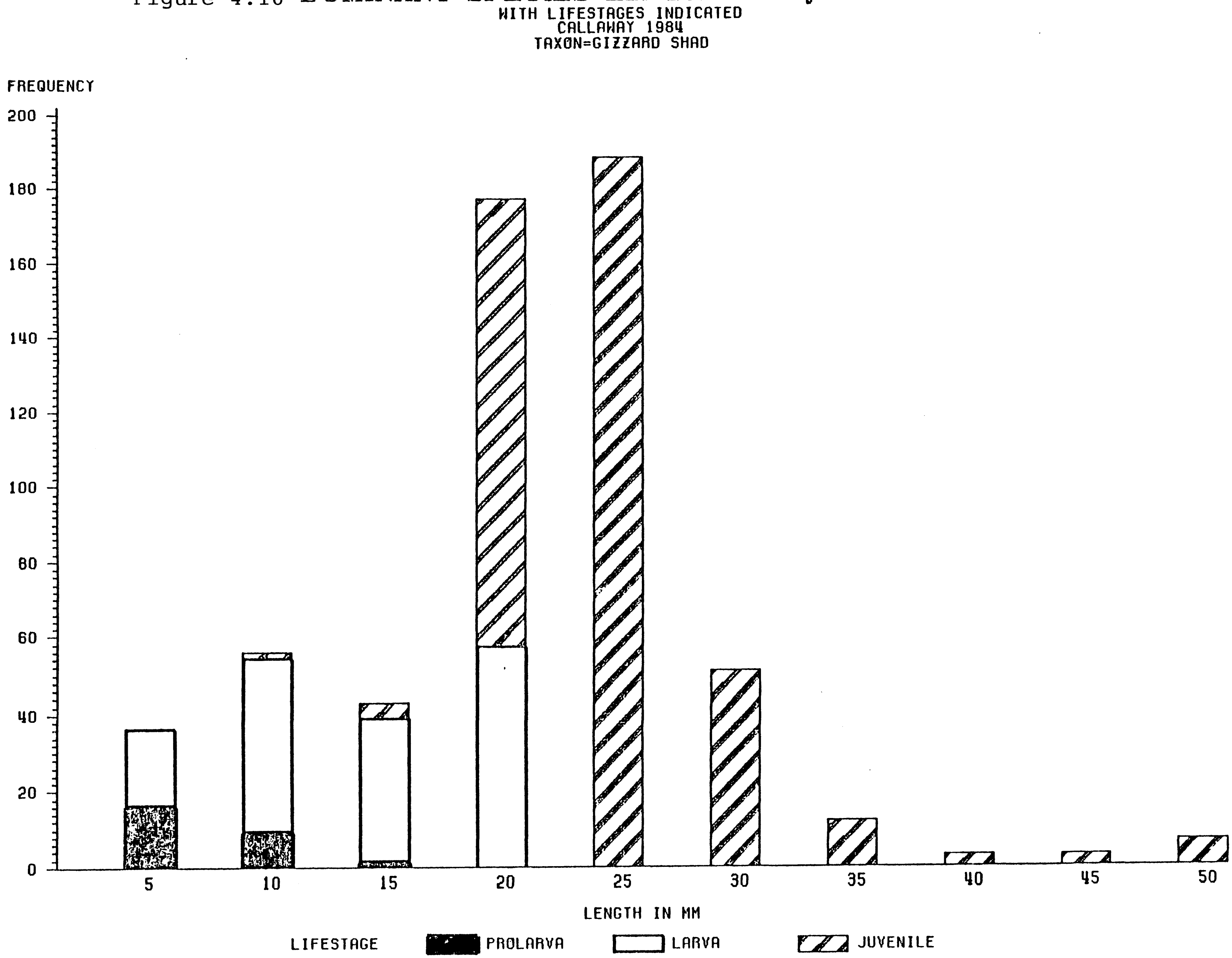


Figure 4.17 DOMINANT SPECIES LENGTH FREQUENCIES

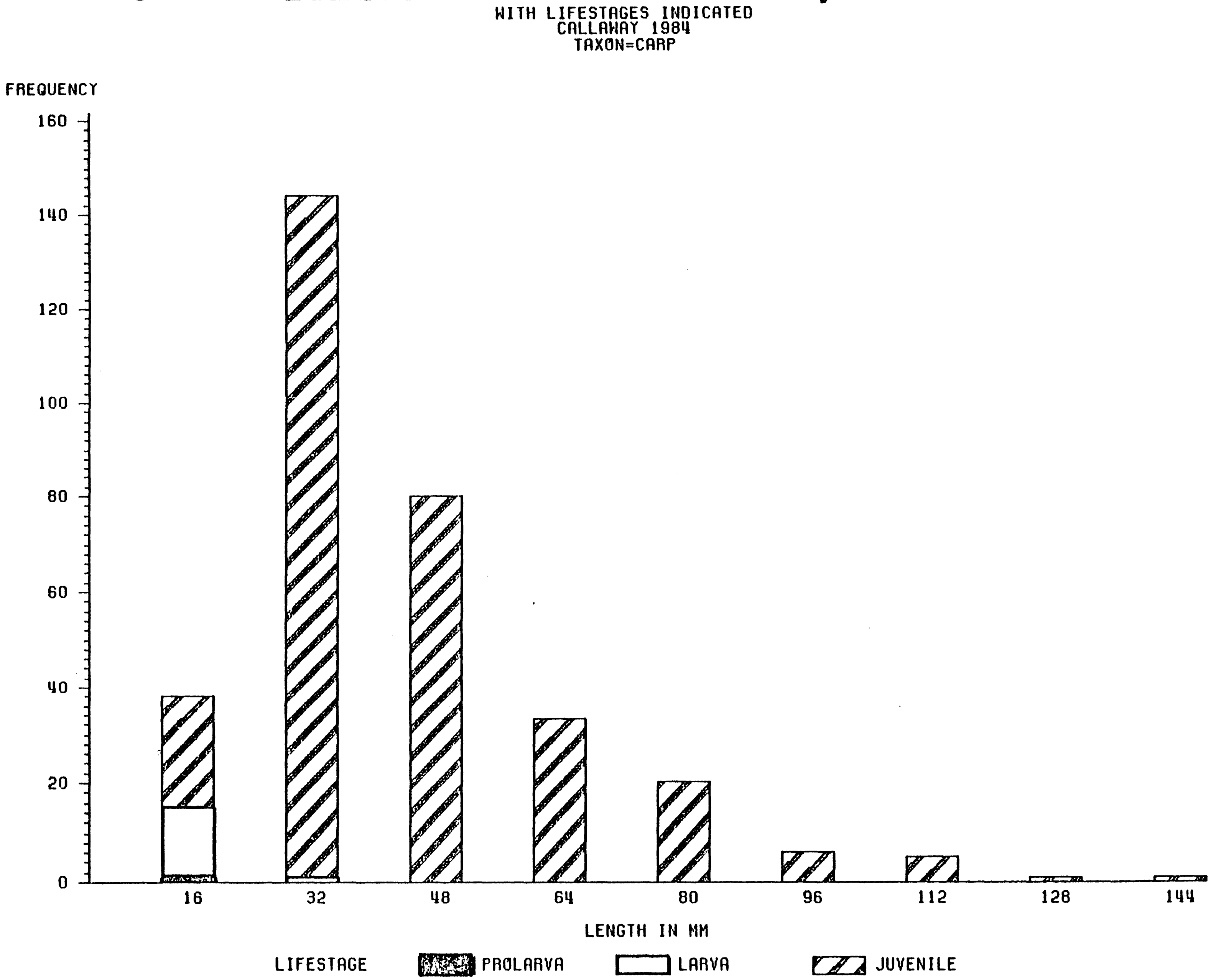


Figure 4.18 DOMINANT SPECIES LENGTH FREQUENCIES
WITH LIFESTAGES INDICATED
CALLAWAY 1984
TAXON=MINNOW FAMMILY

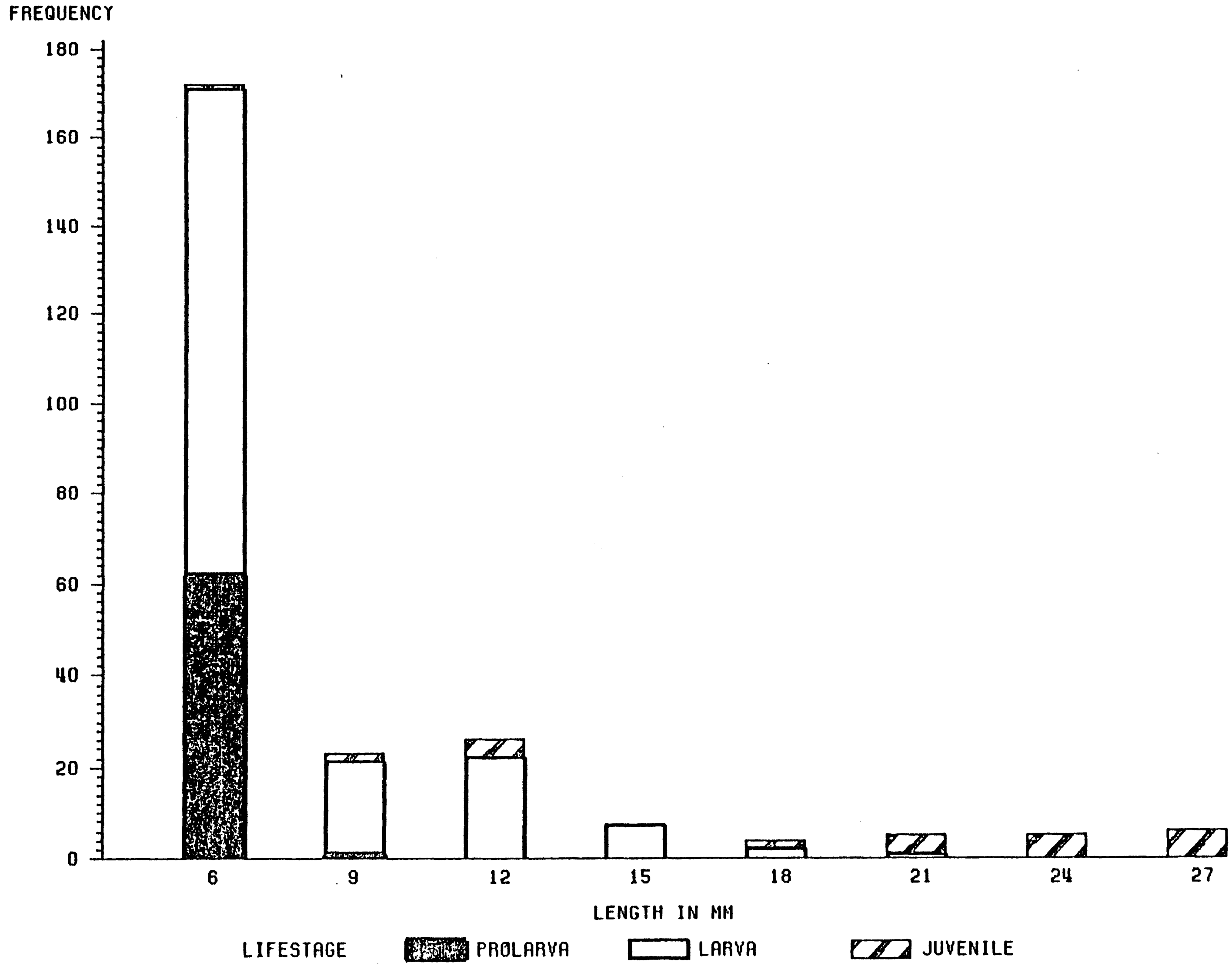


Figure 4.19 DOMINANT SPECIES LENGTH FREQUENCIES

WITH LIFESTAGES INDICATED
CALLAWAY 1984
TAXON=SUCKER FAMILY

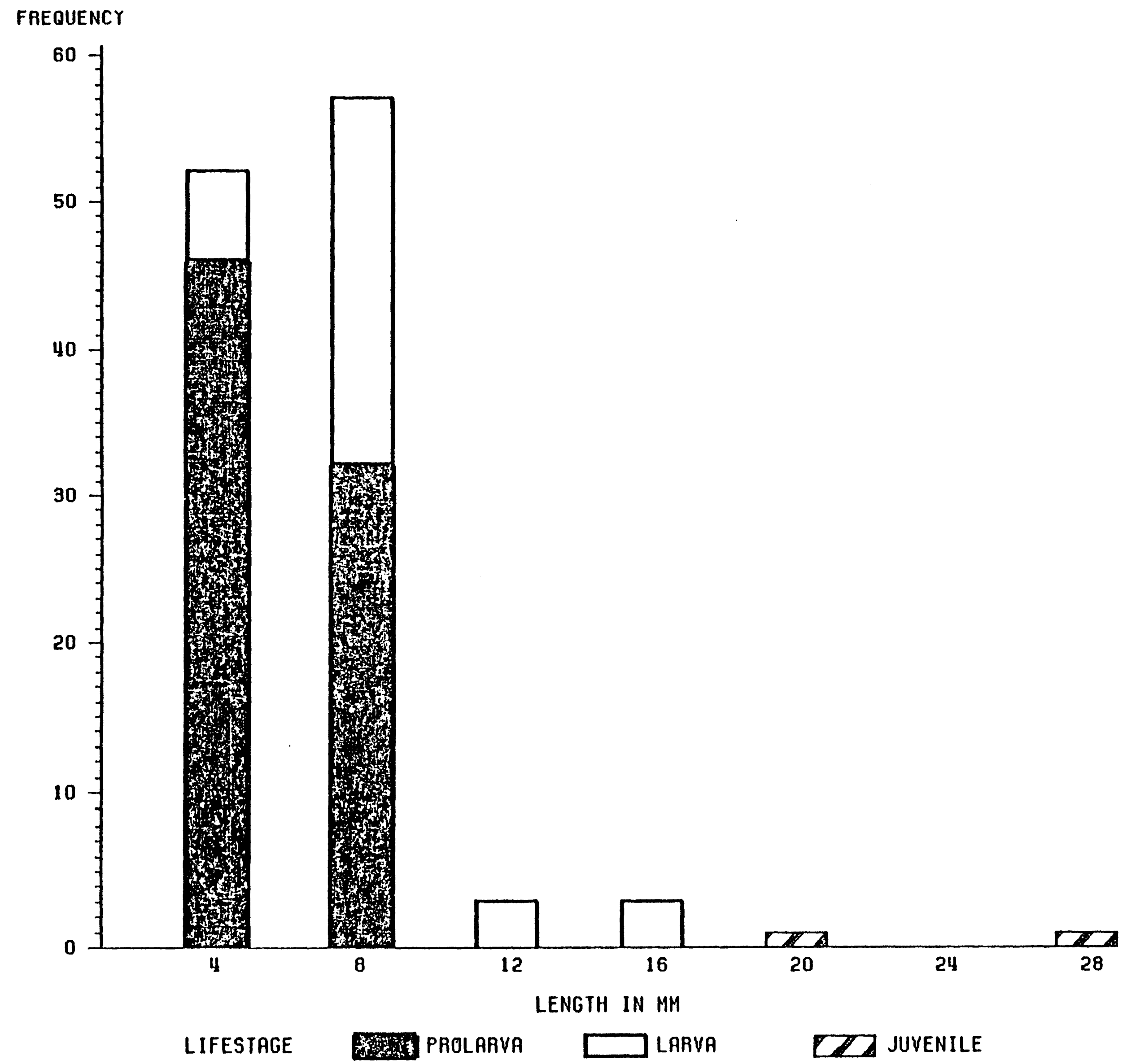


Figure 4.20 DOMINANT SPECIES LENGTH FREQUENCIES

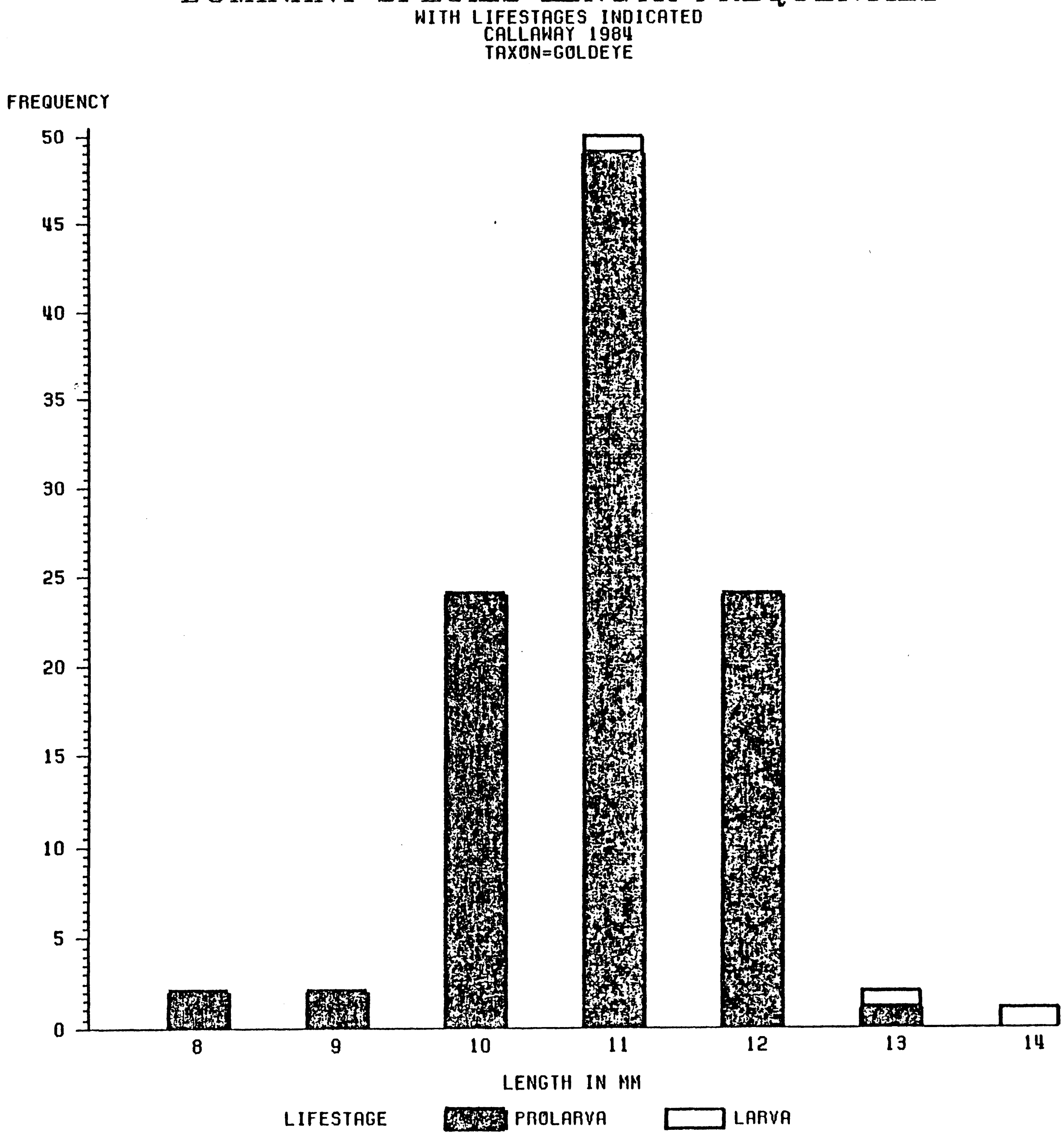


Table 4.3
Taxon Mean Lengths and Ranges
Callaway 1984

Taxon	Number	Mean Length Or Diameter In MM	Minimum Size	Maximum Size
Freshwater Drum	2022	30.13	2.6	114.0
Gizzard Shad	577	21.14	3.6	54.0
Carp	328	42.51	8.3	148.0
Minnow Family	250	8.71	4.1	30.0
Freshwater Drum Egg	140	1.50	1.3	2.5
Sucker Family	118	6.79	2.5	31.0
Goldeye	105	10.96	7.2	14.0
Unidentified Egg	55	2.30	1.0	8.0
Sunfish Species	28	8.90	3.7	22.0
Crappie Species	28	10.72	4.3	24.0
Sunfish Family	27	6.44	3.2	18.8
Unidentified Yolk Sac Larva	23	3.98	2.3	7.8
Sea Bass Family	5	19.82	7.5	32.0
Bluegill	5	21.08	11.4	32.0
White Crappie	5	23.00	17.0	29.0
Unidentified Larva	4	8.37	4.9	11.4
Buffalo Species	4	20.77	19.2	22.6
Perch Family	3	6.67	5.5	7.8
Sauger	2	6.40	6.0	6.8
Unidentified Juvenile	1	20.00	20.0	20.0
Damaged Larva	1	3.00	3.0	3.0
Paddlefish	1	7.60	7.6	7.6
Shortnose Car	1	48.00	48.0	48.0
Goldeye or Mooneye	1	10.50	10.5	10.5
Speckled Chub	1	46.00	46.0	46.0
Spotted Bass	1	61.00	61.0	61.0
	3736			

Table 4.4
Taxon Mean Densities - Entrainment - Percent Entrainment - Worst Case
(Worst Case = Actual Densities With Record Low Flow - 416.3 CMS
During April-September Period of Record)

Taxon	Number Sampled	Mean Density/100 Cubic M	Mean Entrainment Fish/Sec	Mean Percent Entrainment	Worst Case Percent Entrainment
Freshwater Drum	2022	22.69	0.65	0.08	0.46
Gizzard Shad	577	5.43	0.15	0.05	0.44
Carp	328	4.56	0.12	0.06	0.44
Minnow Family	250	3.24	0.10	0.05	0.49
Freshwater Drum Egg	140	1.86	0.06	0.10	0.49
Sucker Family	118	1.95	0.06	0.05	0.48
Goldeye	105	5.38	0.21	0.08	0.64
Unidentified Egg	55	1.70	0.04	0.06	0.42
Sunfish Species	28	1.68	0.06	0.05	0.53
Crappie Species	28	2.22	0.08	0.06	0.61
Sunfish Family	27	1.05	0.03	0.08	0.53
Unidentified Yolk Sac Larva	23	1.14	0.03	0.06	0.39
Sea Bass Family	5	0.97	0.03	0.05	0.47
Bluegill	5	1.34	0.04	0.09	0.48
White Crappie	5	2.09	.	.	.
Unidentified Larva	4	1.75	0.06	0.05	0.53
Buffalo Species	4	1.11	0.03	0.05	0.40
Perch Family	3	0.95	.	.	.
Sauger	2	1.27	.	.	.
Unidentified Juvenile	1	1.50	0.04	0.04	0.42
Damaged Larva	1	0.87	0.02	0.14	0.42
Paddlefish	1	0.90	.	.	.
Shortnose Gar	1	1.77	0.05	0.04	0.42
Goldeye or Mooneye	1	1.88	.	.	.
Speckled Chub	1	0.72	.	.	.
Spotted Bass	1	0.96	0.03	0.07	0.42
	3736				

calculated. Entrainment and percent entrainment for these six taxon would be similar to species adjacent to them in Table 4.4.

Mean entrainment rates for each taxon did not exceed 0.65 fish/second (Table 4.4). The range of species entrainment rates calculated from individual samples ranged from 0.021 to 4.03 fish/second (freshwater drum).

Mean transport rates for each taxon ranged from 34 fish/second to 786 fish/second. Individual sample ranges were from 13.5 fish/second to 5366 fish/second (freshwater drum).

Mean percent entrainment rates for each taxon ranged from a low of 0.04 percent to a high of 0.14 percent.

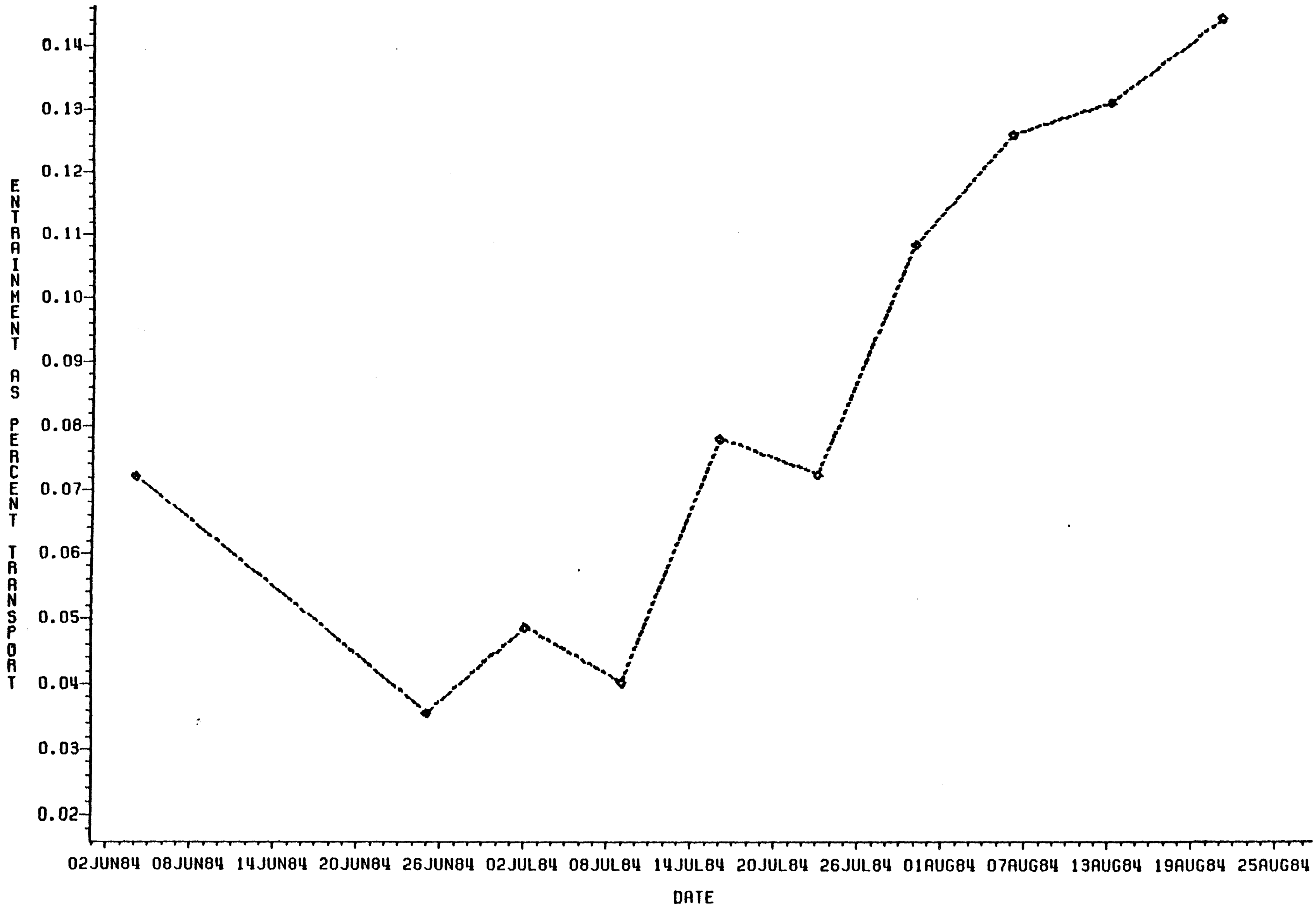
The individual taxon plots show the same pattern of low early summer percent entrainment with highest levels in late summer.

Mean percent entrainment for each of the 8 most abundant taxon by date are presented in Figure 4.21 through 4.28. Mean percent entrainment for each date with all taxon combined are presented in Figure 4.29.

Freshwater drum and minnow species show the greatest range of percent entrainment values with means by date (Figure 4.21 and 4.24) just as with the means of all samples (Table 4.4). Gizzard shad and carp show virtually identical patterns and ranges (Figure 4.22 and 4.23). Freshwater drum eggs showed a fairly steady increase thoroughout the season (Figure 4.25) while sucker species showed erratic ups and downs (Figure 4.26).

Figure 4.21 MEAN PERCENT ENTRAINMENT RATES--3 PUMPS RUNNING

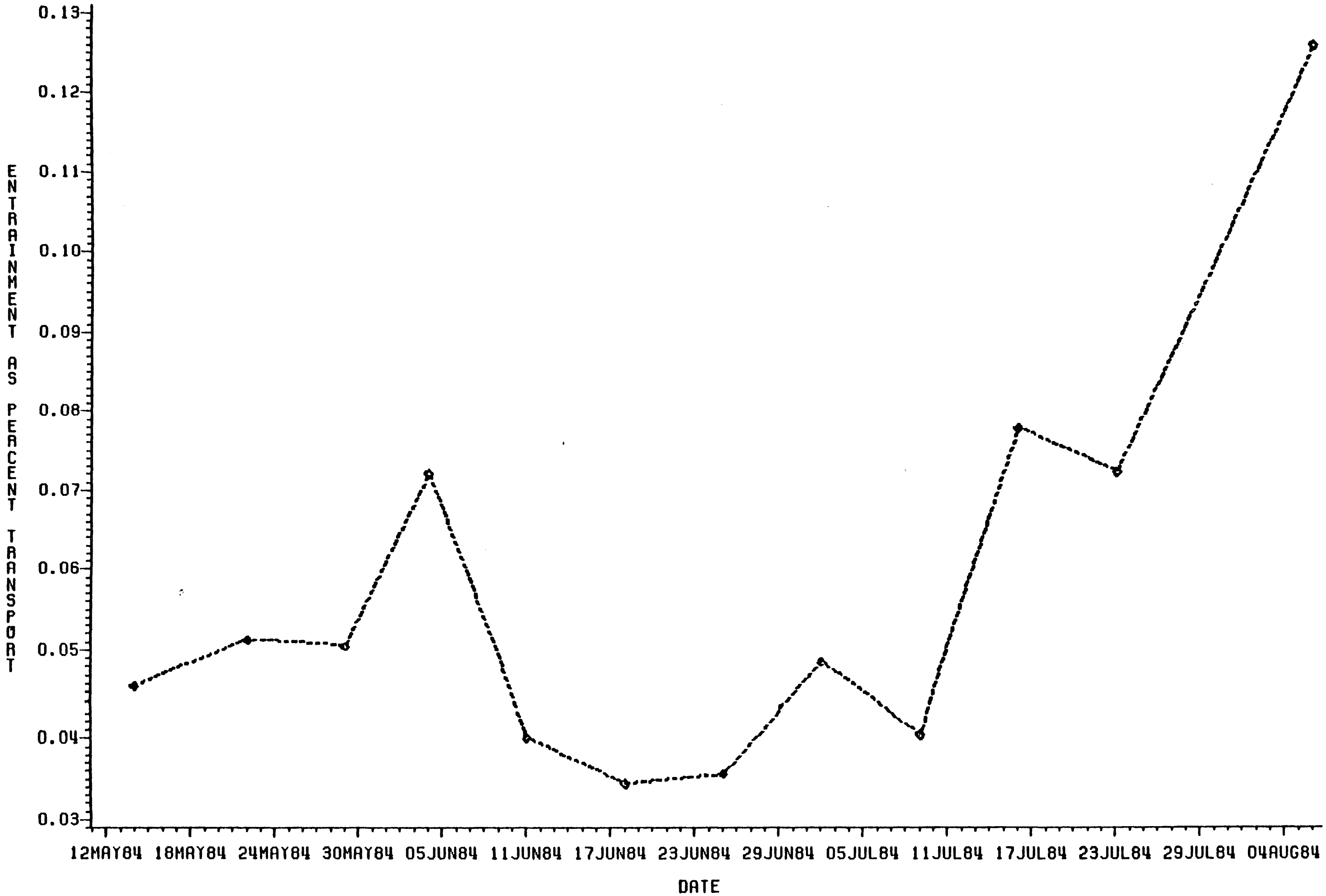
FOR EACH DATE SAMPLED--ABUNDANT TAXON--ACTUAL DISCHARGES
CALLAWAY 1984
SPECIES=FRESHWATER DRUM



PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

Figure 4.22 MEAN PERCENT ENTRAINMENT RATES--3 PUMPS RUNNING

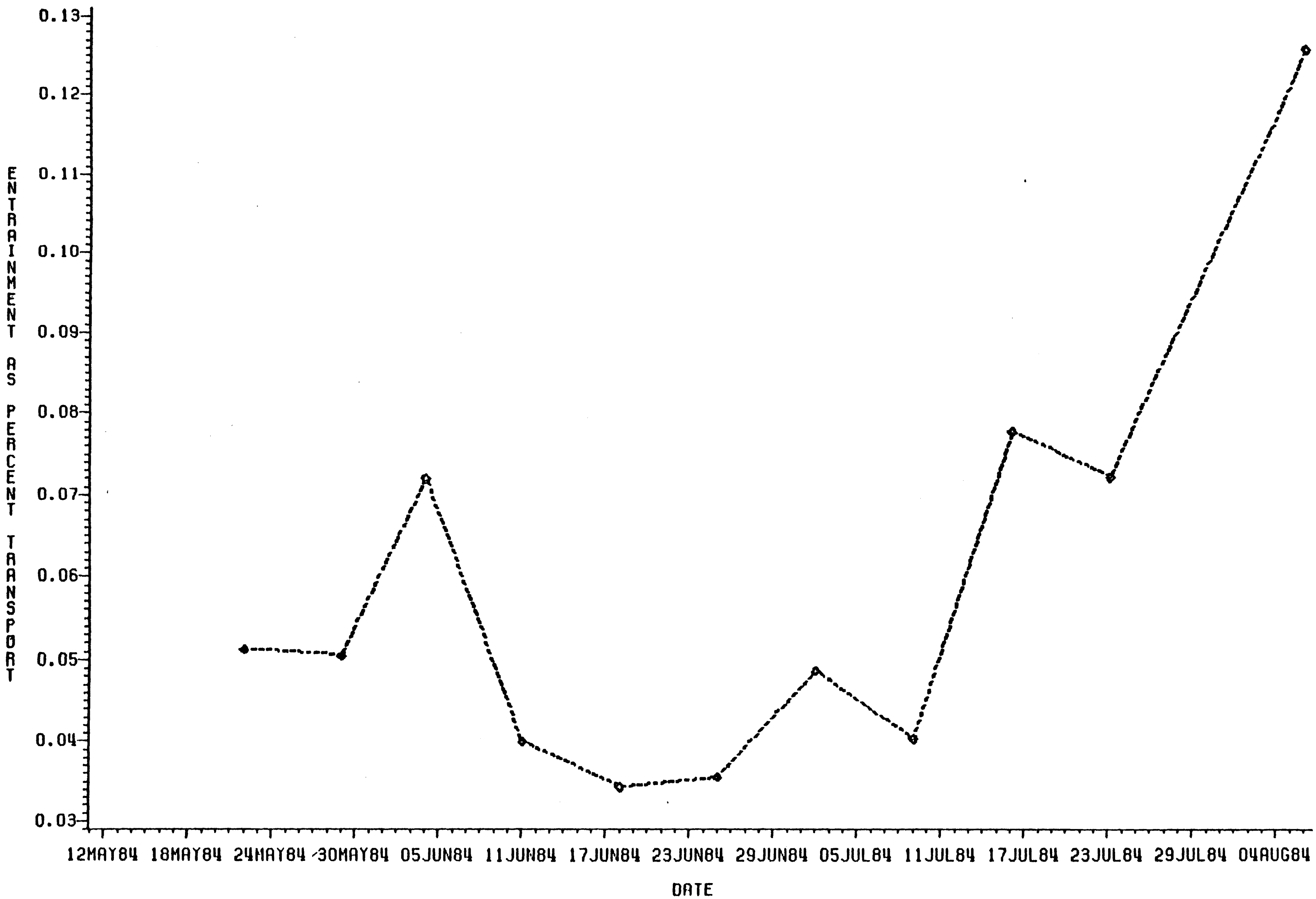
FOR EACH DATE SAMPLED--ABUNDANT TAXON--ACTUAL DISCHARGES
CALLAWAY 1984
SPECIES=GIZZARD SHAD



PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

Figure 4.23 MEAN PERCENT ENTRAINMENT RATES--3 PUMPS RUNNING

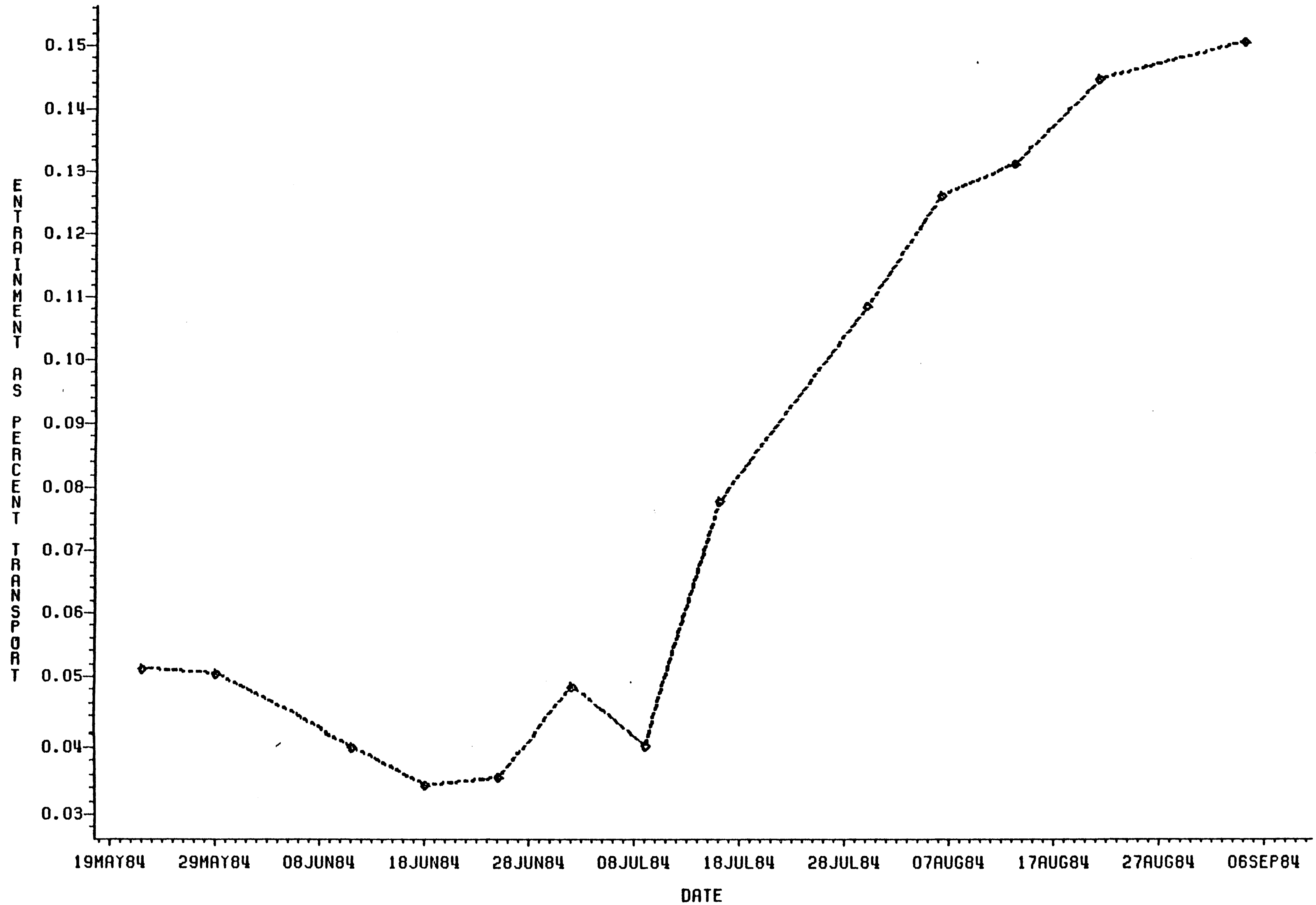
FOR EACH DATE SAMPLED--ABUNDANT TAXON--ACTUAL DISCHARGES
CALLAWAY 1984
SPECIES=CARP



PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

Figure 4.24 MEAN PERCENT ENTRAINMENT RATES--3 PUMPS RUNNING

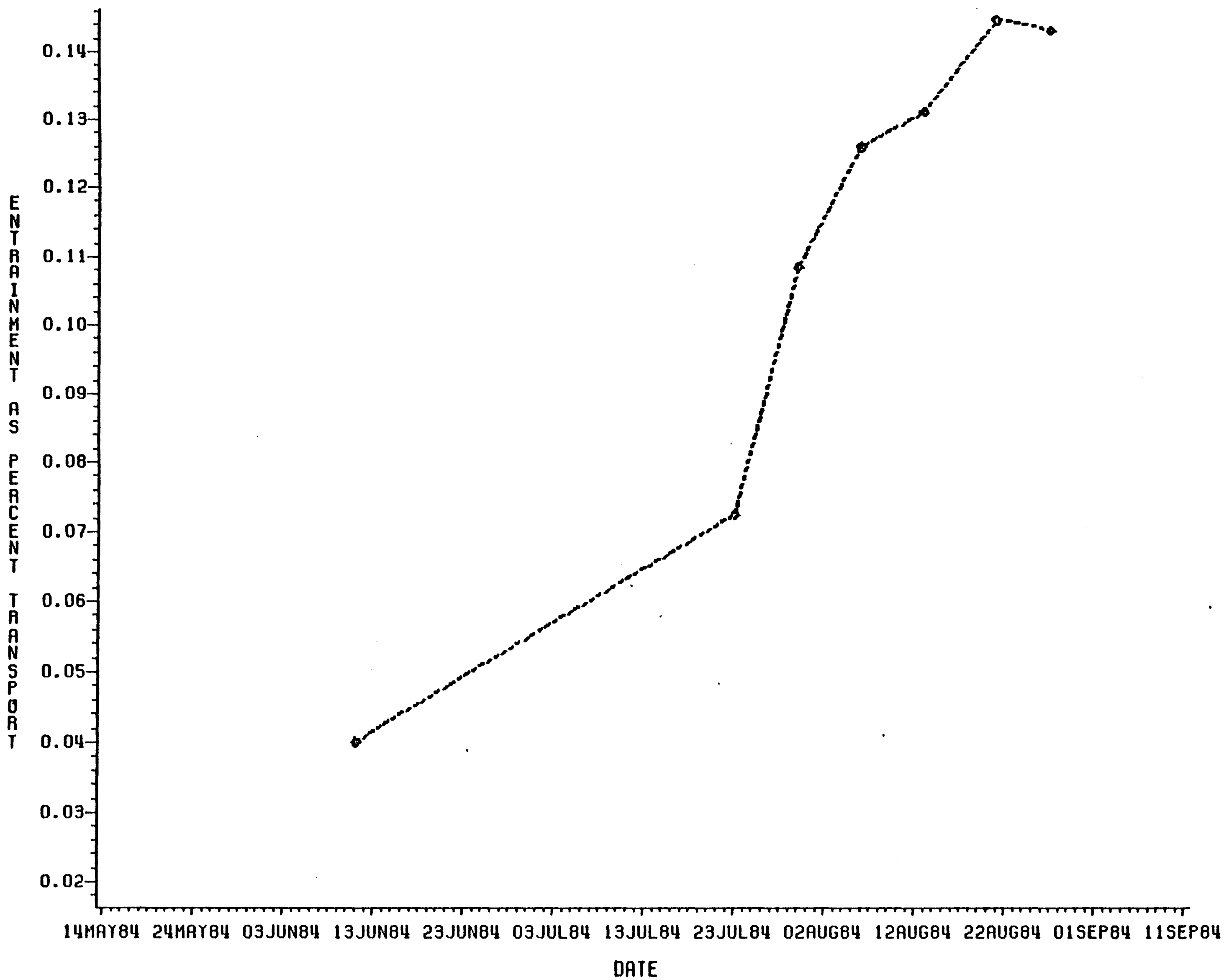
FOR EACH DATE SAMPLED--ABUNDANT TAXON--ACTUAL DISCHARGES
CALLAWAY 1984
SPECIES=MINNOW FAMMILY



PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

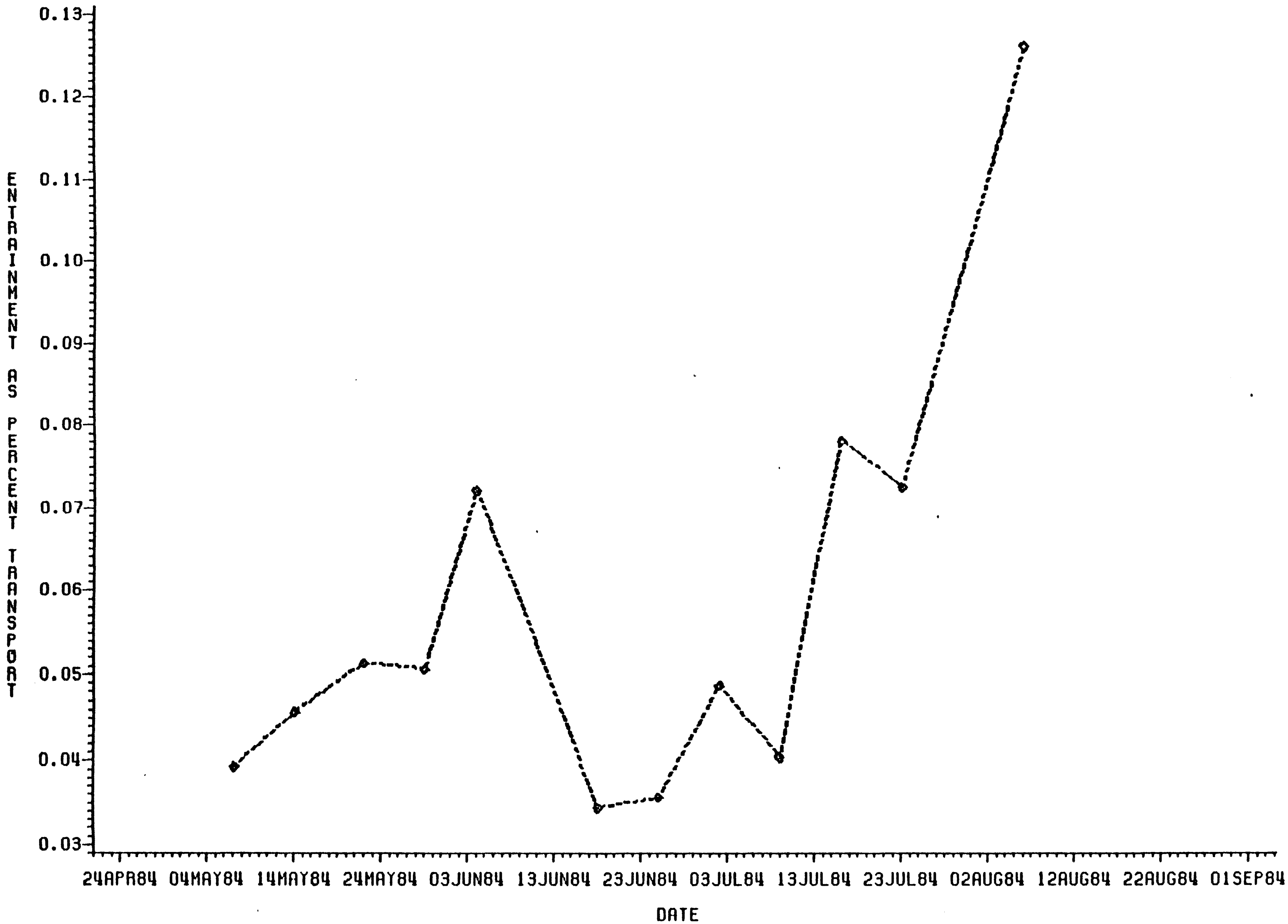
Figure 4.25 MEAN PERCENT ENTRAINMENT RATES--3 PUMPS RUNNING

FOR EACH DATE SAMPLED--ABUNDANT TAXON--ACTUAL DISCHARGES
CALLAWAY 1984
SPECIES=FRESHWATER DRUM EGG



PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

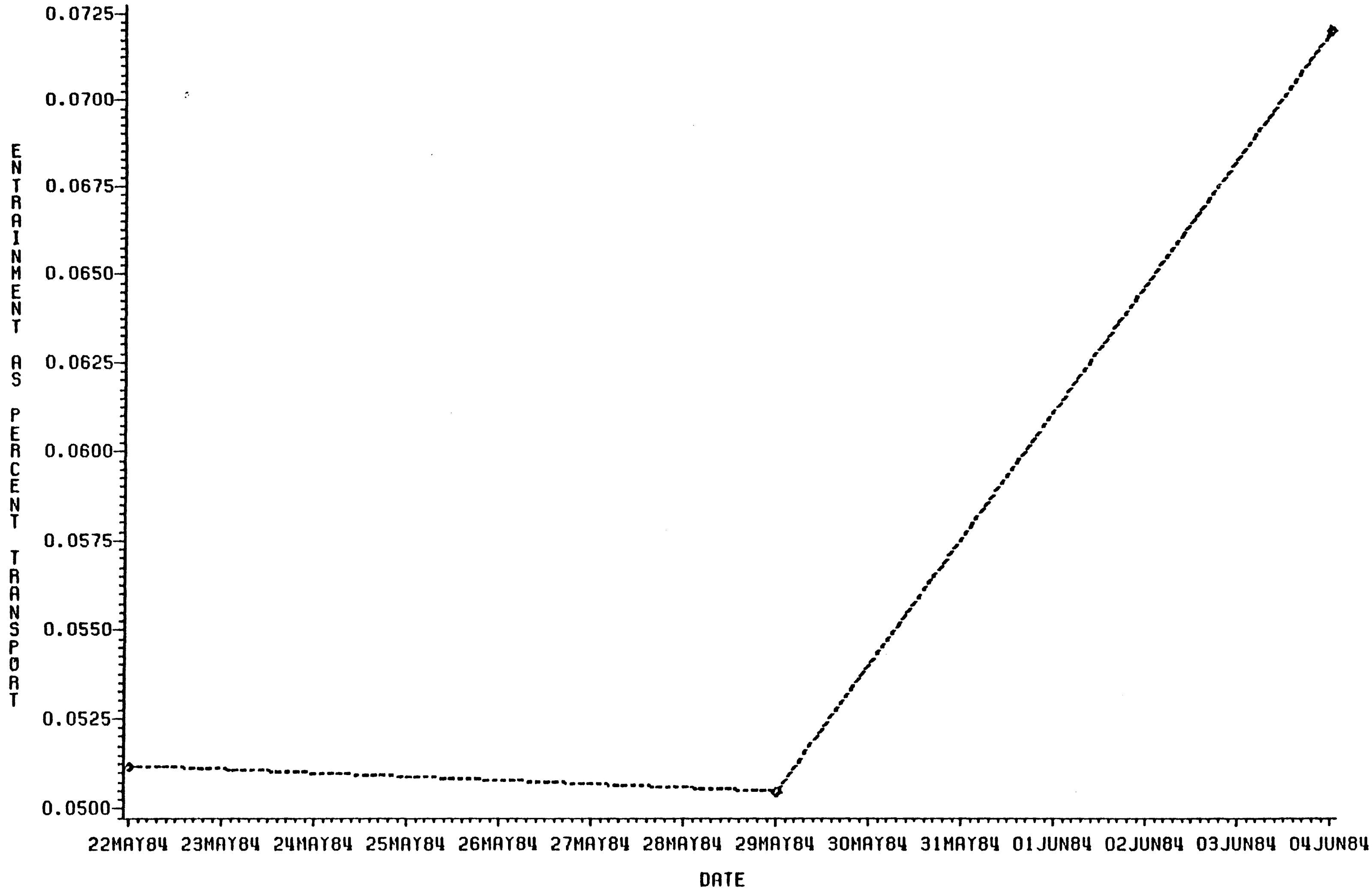
Figure 4.26 MEAN PERCENT ENTRAINMENT RATES--3 PUMPS RUNNING
FOR EACH DATE SAMPLED--ABUNDANT TAXON--ACTUAL DISCHARGES
CALLAWAY 1984
SPECIES=SUCKER FAMILY



PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

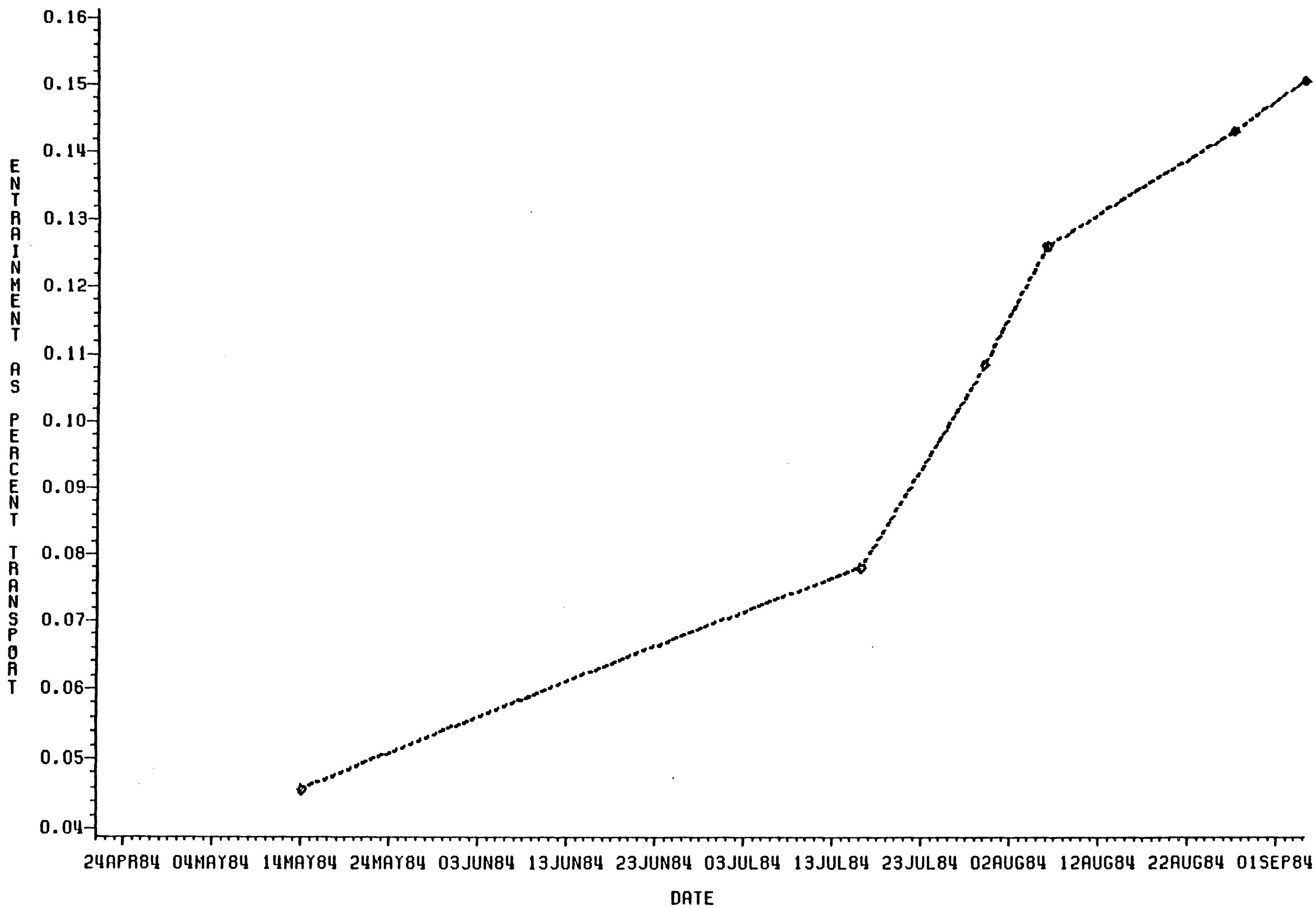
Figure 4.27 MEAN PERCENT ENTRAINMENT RATES--3 PUMPS RUNNING

FOR EACH DATE SAMPLED--ABUNDANT TAXON--ACTUAL DISCHARGES
CALLAWAY 1984
SPECIES=GOLDEYE



PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

Figure 4.28 MEAN PERCENT ENTRAINMENT RATES--3 PUMPS RUNNING
FOR EACH DATE SAMPLED--ABUNDANT TAXON--ACTUAL DISCHARGES
CALLAWAY 1984
SPECIES=UNIDENTIFIED EGG

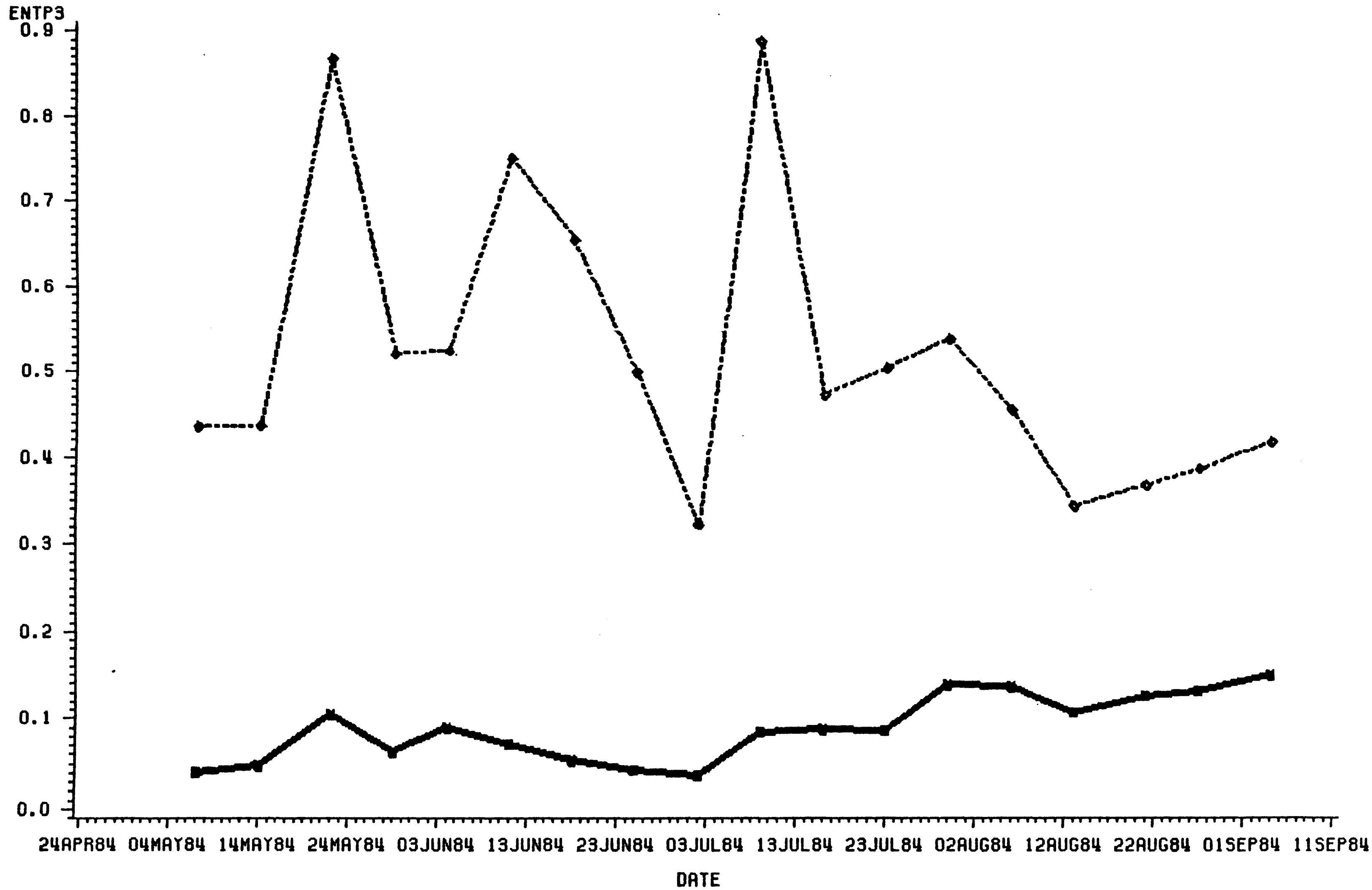


PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

Figure 4.29

ACTUAL AND WORST CASE MEAN PERCENT ENTRAINMENT RATES

FOR EACH DATE SAMPLED--ALL TAXON--CALLAWAY 1984
WORST CASE=PERIOD OF RECORD LOW FLOW APRIL-SEPTEMBER-416.5 CMS



SOLID LINE=ACTUAL--DASHED LINE=WORST CASE
PCT ENTRAINMENT=NORTH ZONE DENSITY X PLANT WITHDRAWL/TRANSPORT X 100

Goldeye showed the most limited range of percent entrainment rates of any of the top 8 taxon (Figure 4.27) while unidentified eggs showed a similar pattern to freshwater drum eggs (Figure 4.28).

When all taxon are combined to plot mean percent entrainment, the same increase through the season is shown with the greatest change during mid to late July (Figure 4.29).

4.4 Discussion

The Callaway intake shows best available technology to minimize adverse environmental impact in both design and operation. The entrainment estimates made in this study are, if anything, overstated because of the assumption that all icthyoplankton sampled in the north zone are entrained.

Estimates made are probably higher then they would actually be for the following reasons:

1. Estimates are based on three pumps operating. With the cancellation of Unit 2, all three pumps have not been used nor will they be used in the future. Actual entrainment would probably be two-thirds of the estimates.

2. The intake face is parallel to a consistently strong current with bar racks that work as louvres perpendicular to the current. This design serves to deflect passive larvae drifting into the screens just as it does to deflect debris.

3. The deep opening of the intake withdrawal reduces entrainment of buoyant larvae and eggs.

4. A large majority of the icthyoplankton sampled were juveniles (Figure. 4.5). Juveniles have a full fin compliment and are thus capable of deliberate swimming and avoiding the intake.

5. Some of the eggs and larvae that pass through the screens are probably returned to the river alive through the free discharge valve (see operational description, p. 2-10).

The icthyoplankton sampling program appears to have encompassed the entire period of icthyoplankton occurrence throughout the year since samples collected in April and late September contained no eggs or larvae.

Samples collected were representative of what was entrained. The average volume sampled on a day was over 23% of the total intake withdrawal rate during the 45 minutes of total sample time. With all three pumps running the intake would withdraw 7156 m^3 of water during a 45 minute period. The 18 samples collected on a date took approximately 45 minutes total with an average total volume of 1666 m^3 or 23% of the plant withdrawal.

4.4.1 Taxon Abundance and Densities

The relative abundance of principal taxa at Callaway agrees with previous studies done by CDM (1982) in the same area. Gizzard shad and freshwater drum dominated the 1981 samples collected by CDM

(Table 4.5) just as with this study. Other studies done on the middle Missouri by King (1977, 1980) and Harrow and Schlesinger (1981) found drum most abundant followed by catostomids and carp (King 1977, p. 47, and 1980, p. 121; Harrow and Schlesinger 1981, p. 298).

Peak densities of all larvae occurred during June and July in this study and in others on the Missouri (King 1977, p. 47, Harrow and Schlesinger 1981, p. 294, and CDM 1982, p. 102). There is some disagreement between the present study and that done by CDM during 1980-81 but the mandated monthly sampling program required by the Nuclear Regulatory Commission was probably inadequate to detect peaks of abundance.

The dominant taxa collected in this study are typical of the lower Missouri River (King 1980, p. 121; Harrow and Schlesinger 1981, p. 298) and generally paralleled adult fish populations in the immediate vicinity (See Section 6, this report). Low densities of taxon such as Morone sp., sunfish, crappie, sauger, paddlefish, etc. are attributed to these species neither being common in the Missouri River nor having larvae that are generally subject to drift.

Game species did not contribute appreciably to the assemblage even though some, such as juvenile and adult catfish were relatively common in the vicinity. The clumped schooling behavior of larval catfishes in backwater areas may have kept them from being part of the larval drift. Extremely low densities of catfish were collected by CDM (1982) at Callaway (0.1% of total) and also by Union Electric at Rush Island on the Mississippi River (1 fish, 0.1% of total) (Union

Table 4.5. Icthyoplankton taxa Collected from the Missouri River near the Callaway Nuclear Power Plant, June through September 1981.

Taxon: Scientific Name	Taxon: Common Name	Number	Percent of Total
Scaphirhynchus platorynchus	Shovelnose sturgeon	1	<0.1
Polyodon spathula	Paddlefish	1	<0.1
Lepisosteus sp.	Gars	4	<0.1
Dorosoma cepedianum	Gizzard shad	2528	33.3
Hiodon alosoides	Goldeye	216	2.8
Hoidon tergisus	Mooneye	11	0.1
Osmerus mordax	Rainbow smelt	1	<0.1
Cyprinidae	Minnows (other than carp)	994	13.1
Cyprinus carpio	Carp	335	4.4
Catostomidae	Suckers	9	0.1
Ictiobinae	Buffaloes/Carpsuckers	1194	15.7
Ictaluridae	Catfishes	6	<0.1
Ictalurus punctatus	Channel catfish	3	<0.1
Pylodictus olivaris	Flathead catfish	2	<0.1
Morone sp.	Temperate basses	21	0.3
Lepomis sp.	Sunfishes	80	1.1
Lepomis macrochirus	Bluegill	3	<0.1
Micropterus sp.	Black basses	1	<0.1
Pomoxis sp.	Crappies	41	0.5
Pomoxis annularis	White crappie	1	<0.1
Etheostomatinae	Darters	13	0.2
Aplodinotus grunniens	Freshwater drum - eggs	329	4.3
	- larvae	1667	21.9
	Unidentified* - eggs	105	1.4
	- larvae	30	0.4
TOTAL NUMBER		7596	

*Comprised primarily of unidentified eggs and damaged larvae.
(from Camp, Dresser, and McKee 1982)

Electric 1979b, p. 4-10). Freshwater drum peak densities peaked with carp densities as in the King, and Harrow and Schlesinger studies but the 1981 CDM study showed a peak that was largely gizzard shad.

When density of larvae were compared with water temperature (Figure 4.30) and discharge (Figure 4.3) no correlation (least squares) was found for either. The July peak in abundance of all taxa, particularly juvenile drum and carp, can probably be attributed to the rapid fall in discharge from a stage where the river was out of its banks. It is probable that these juveniles were occupying flooded habitat such as riparian vegetation and the sudden fall in river stage flushed them out into the river. It is likely that this was a behavioral response of juvenile fish that are capable of deliberate swimming as much as a physical displacement of them. Previous falls in discharge seen in Figure 4.3 did not result in the flush of fish probably because these juveniles were not present close enough upstream at that time to show up in samples.

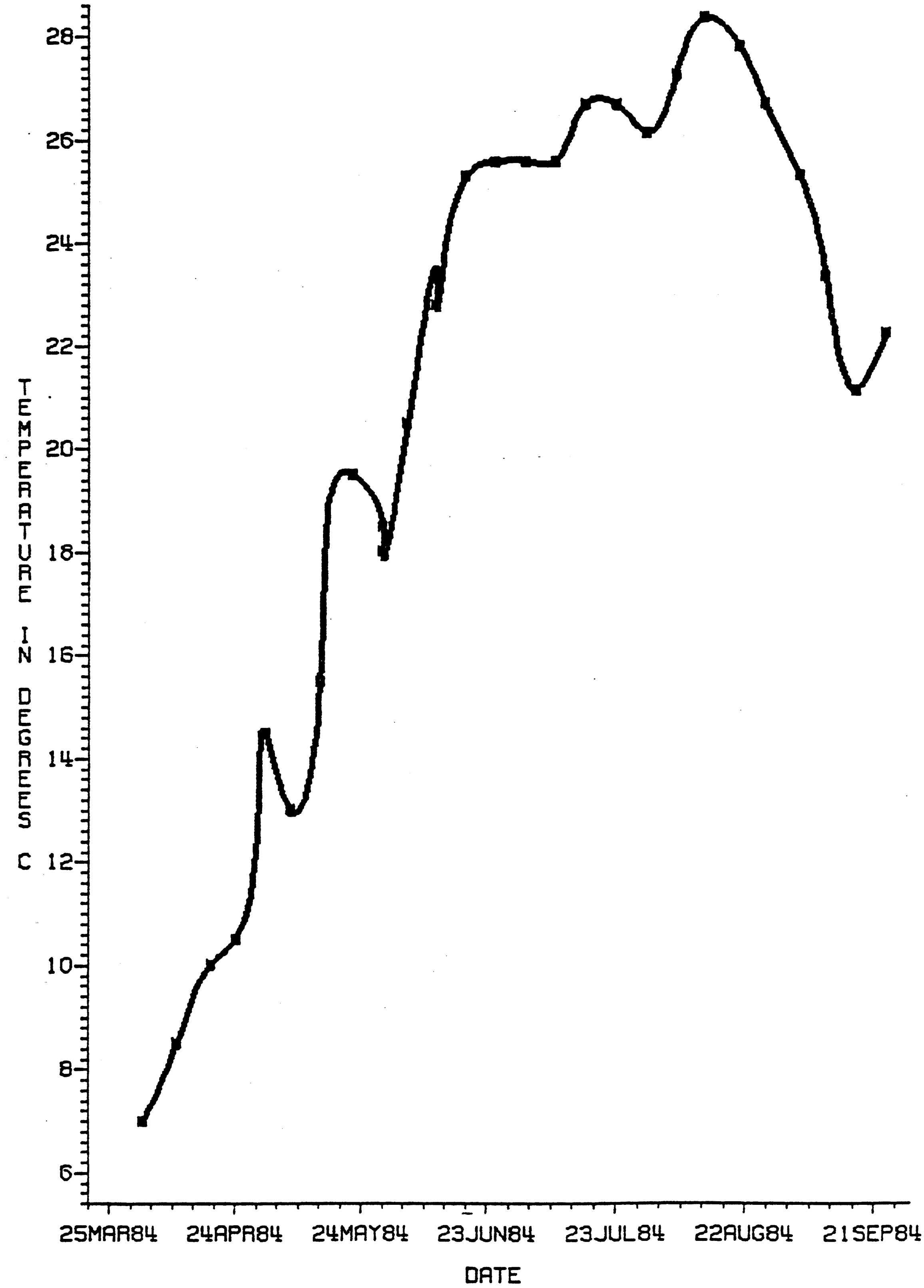
If juveniles are excluded, larvae peaked in mid to late June just as in the CDM study (1982, p. 101), the King study (1977, p. 47) and the study done by Harrow and Schlesinger (1981, p. 257). A June peak density was also seen in the Mississippi River in the vicinity of the Rush Island Plant.

Temporal distribution of larvae and eggs agrees fairly well with other studies with larvae appearing in May and peaking in June and July (King, 1977, CDM 1981, p. 47; Harrow and Schlesinger 1981, p. 257). Peaks in this study were related to freshwater drum just as

Figure 4.30

WATER TEMPERATURES FOR EACH SAMPLE DATE IN EACH ZONE

MISSOURI RIVER AT CALLAWAY APRIL-SEPTEMBER 1984



during the 1978 Union Electric study on the Mississippi River (1979b, p. 4-98). Spatial comparisons made in this study show, with the exception of carp (Figure 4.8) and unidentified eggs (Figure 4.13), the middle zone with the lowest overall densities (Figure 4.14). The north and south zones were generally equivalent in densities with the north zone being lighter on some dates during mid-May and mid-June (Figure 4.14). The north zone includes the channel where the swiftest and deepest water is found. Higher densities in this zone agree with the previous studies at Callaway (CDM 1982, p. 103). Harrow and Schlesinger (1981 p. 294) reported highest densities at maximum river depth. King found, however, that highest densities were along the filling bank in high flow years and along the cutting bank in low flow years (1980, p. 123). The north zone at Callaway is along the cutting bank, but 1984 would be considered a high flow year so there is disagreement between these two studies. The occasions when there were significant differences between mean zone densities in the north and south zones were only 4 of the 26 dates (Figure 4.14). These dates were May 22, June 11 and 16, and July 9, 1984 (Figure 4.14). The paired sample comparisons for the north zone show the close correlation in icthyoplankton densities (Figure 4.31-4.33) from one side of the boat to the other. In spite of slight differences in volumes sampled from one side to the other (4.34-4.36) the densities per 100 m^3 are very close for organisms that display a random patchy distribution like larval fish.

Figure 4.31 COMPARISON OF PAIRED SAMPLES BY ZONE AND REPLICATE

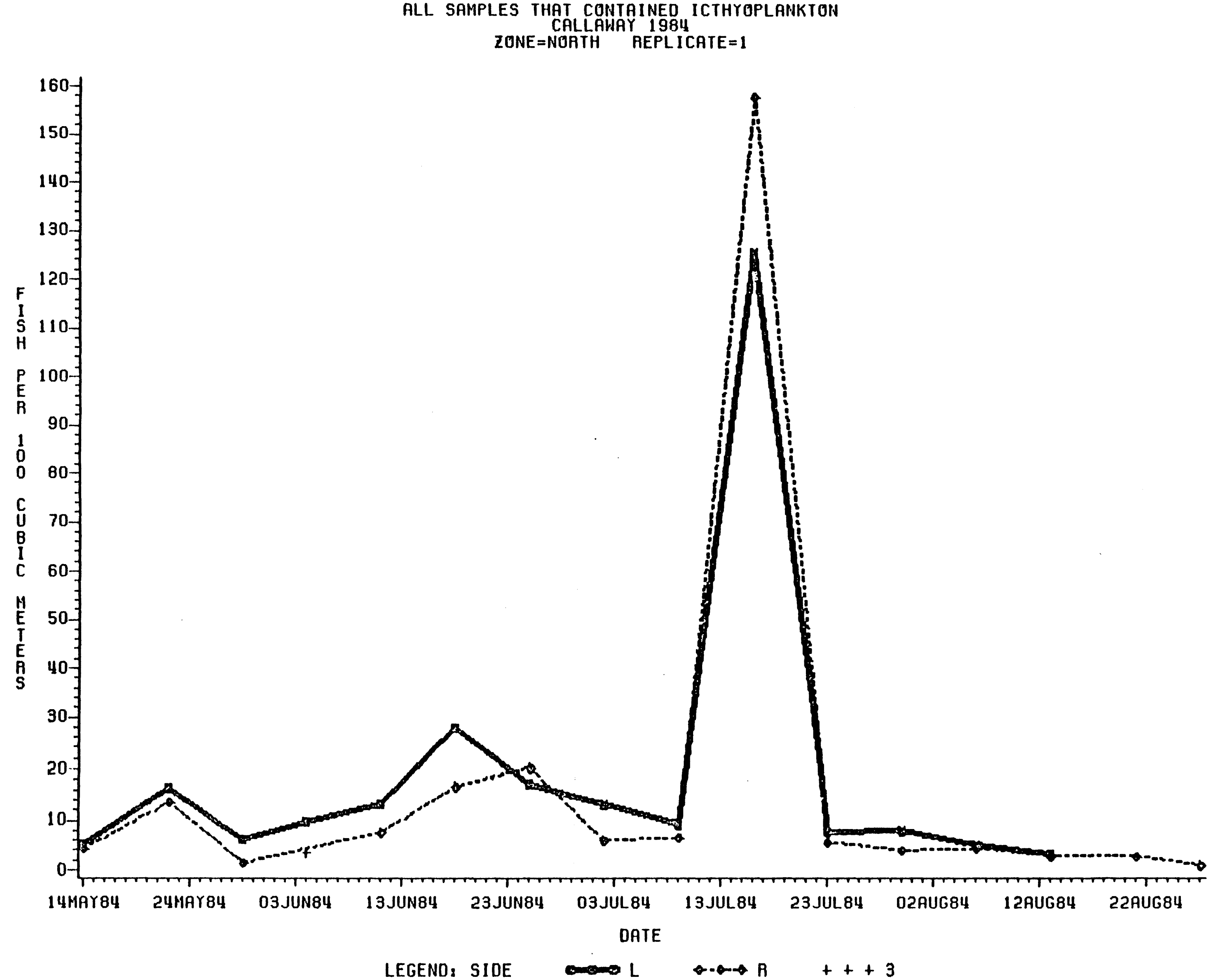


Figure 4.32 COMPARISON OF PAIRED SAMPLES BY ZONE AND REPLICATE

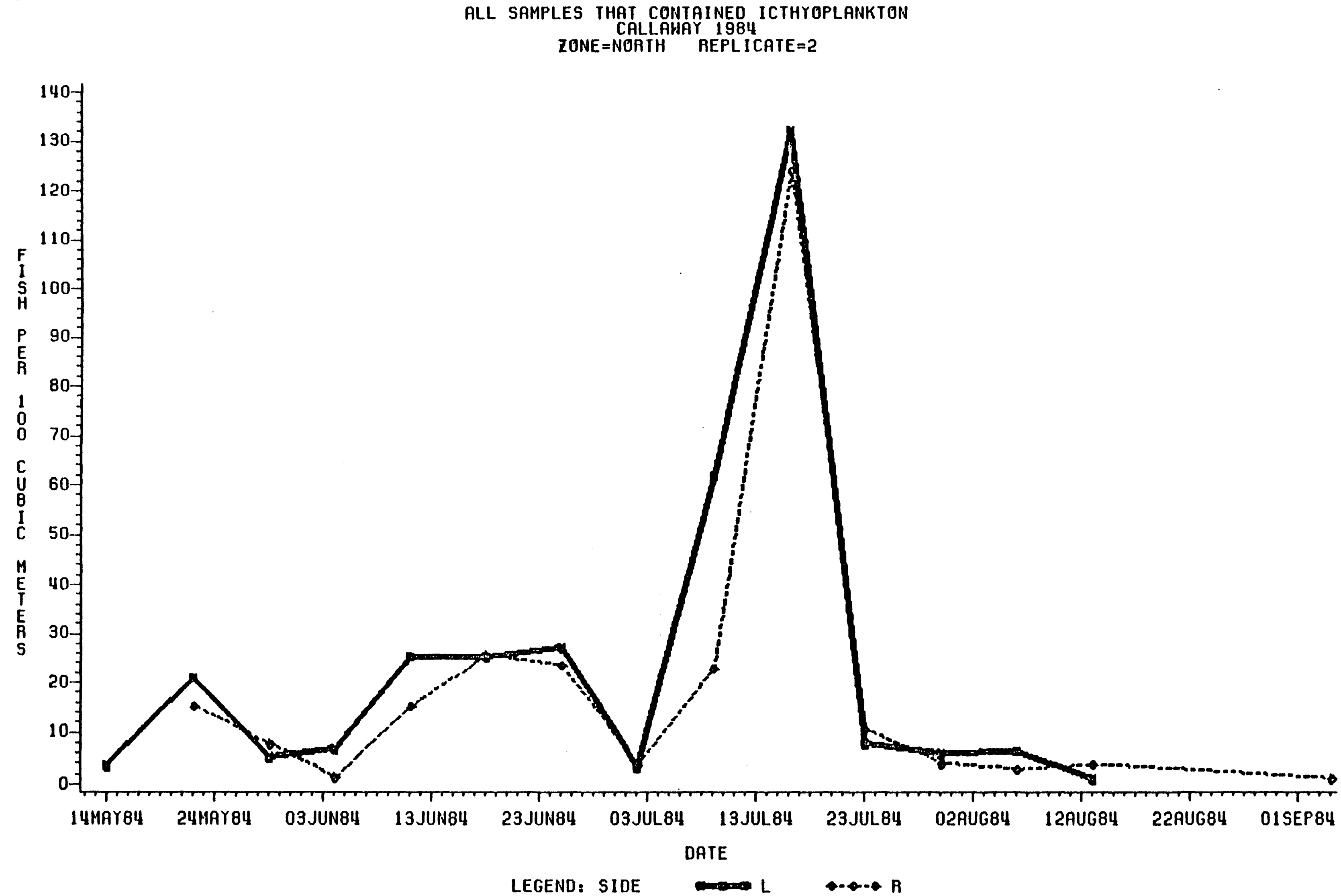
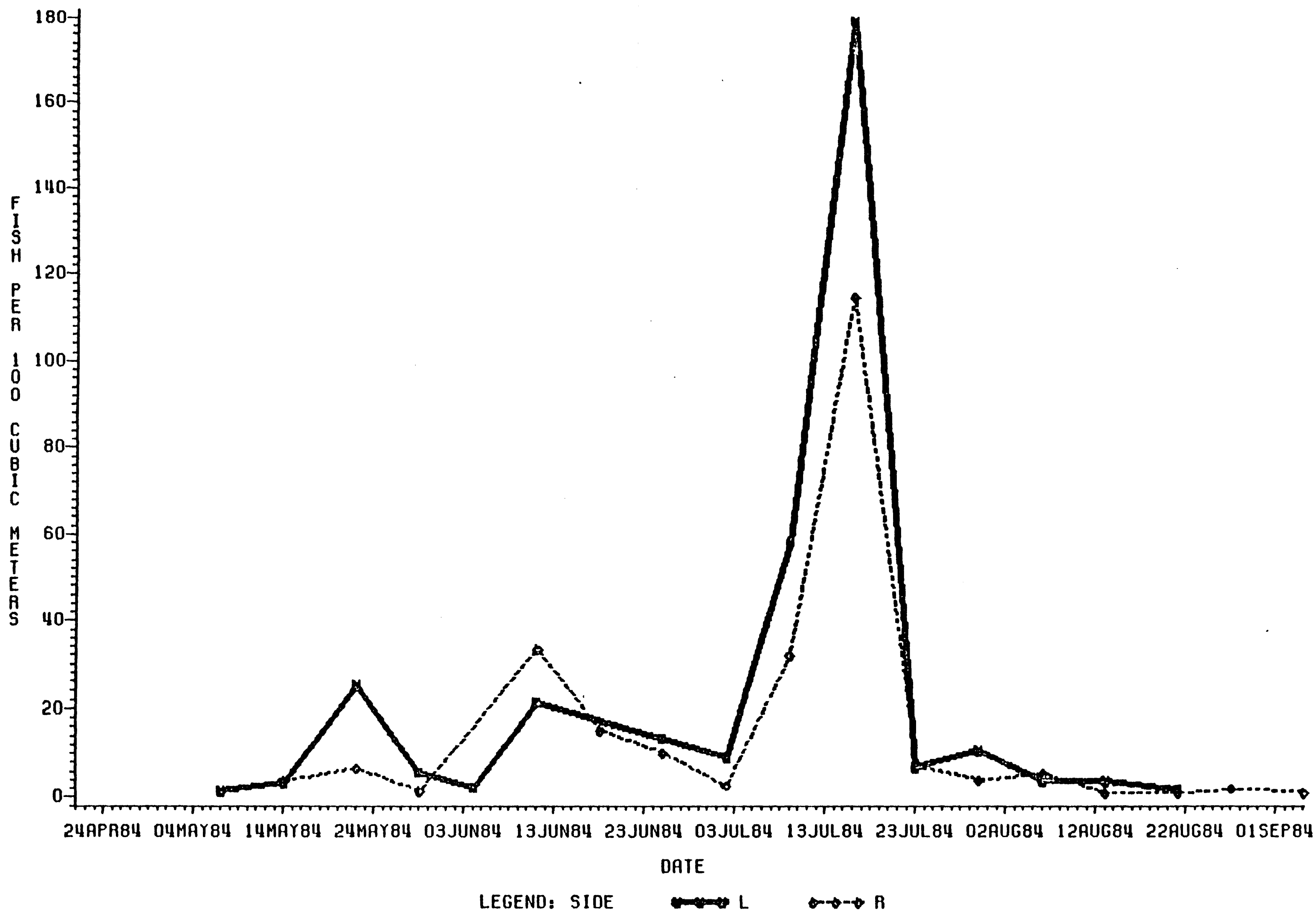


Figure 4.33 COMPARISON OF PAIRED SAMPLES BY ZONE AND REPLICATE

ALL SAMPLES THAT CONTAINED ICTHYOPLANKTON
CALLAWAY 1984
ZONE=NORTH REPLICATE=3



4-57

Figure 4.34 COMPARISON OF PAIRED SAMPLE VOLUMES BY ZONE AND REPLICATE

ALL SAMPLES THAT CONTAINED ICTHYOPLANKTON
CALLAWAY 1984
ZONE=NORTH REP=1

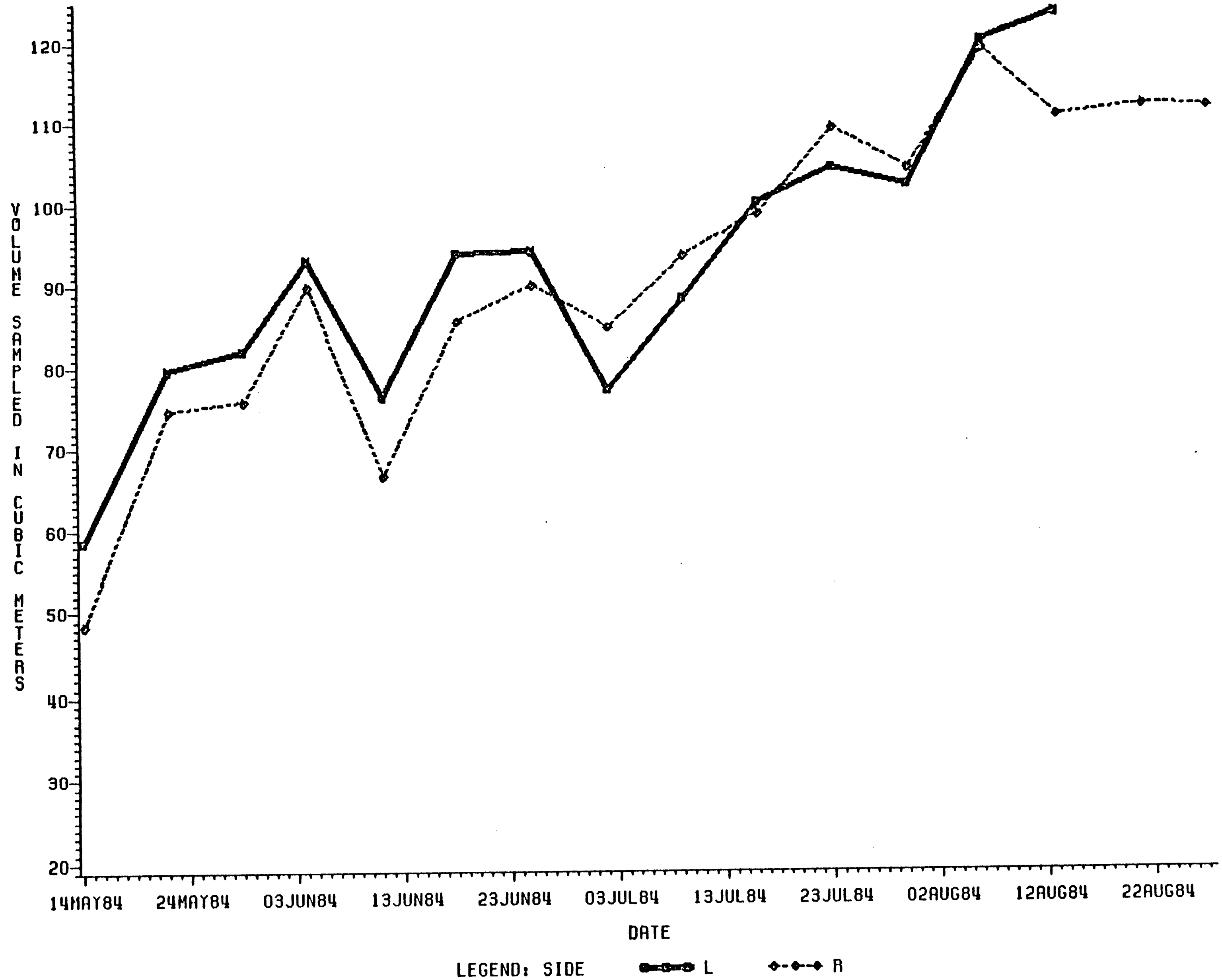


Figure 4.35 COMPARISON OF PAIRED SAMPLE VOLUMES BY ZONE AND REPLICATE

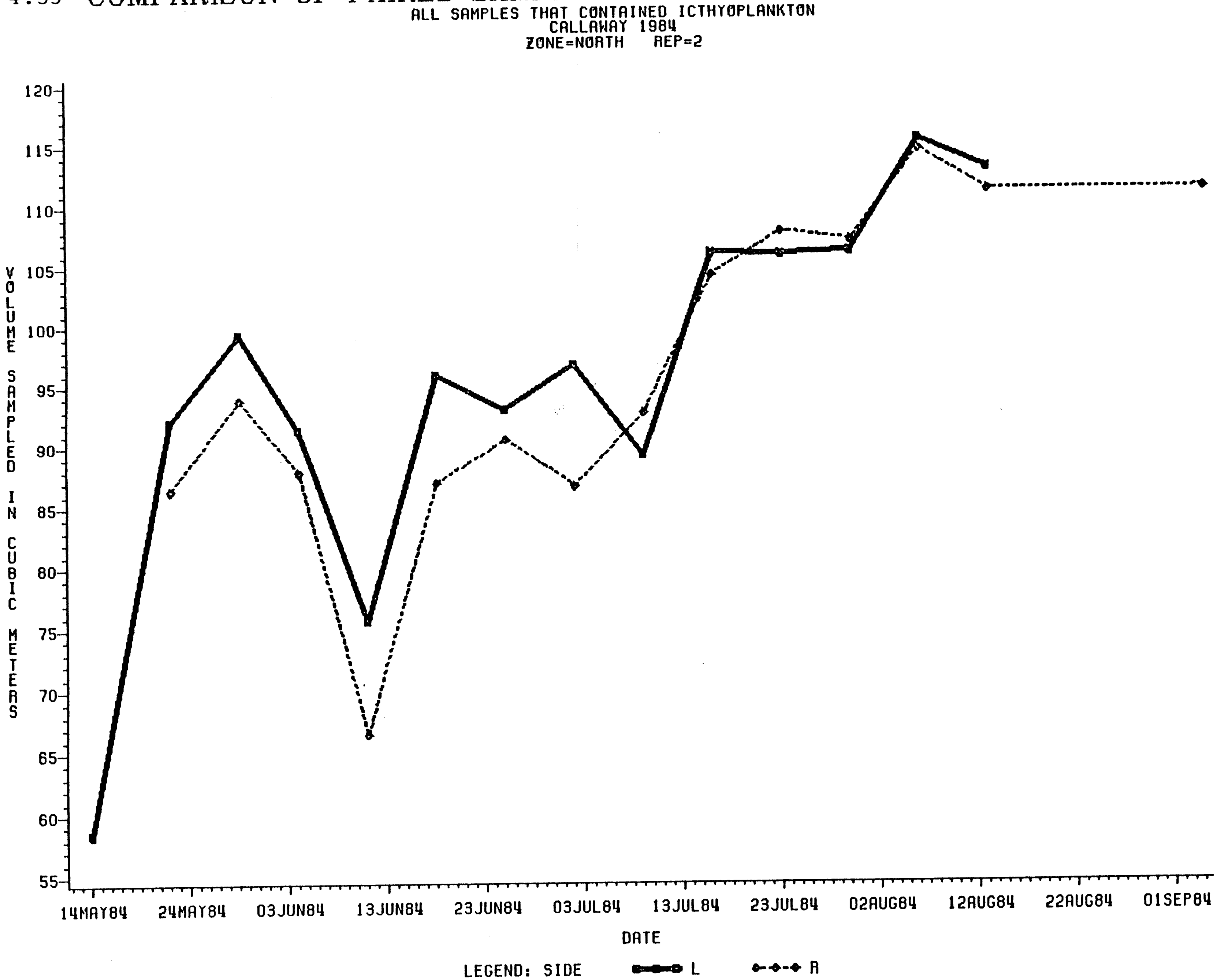
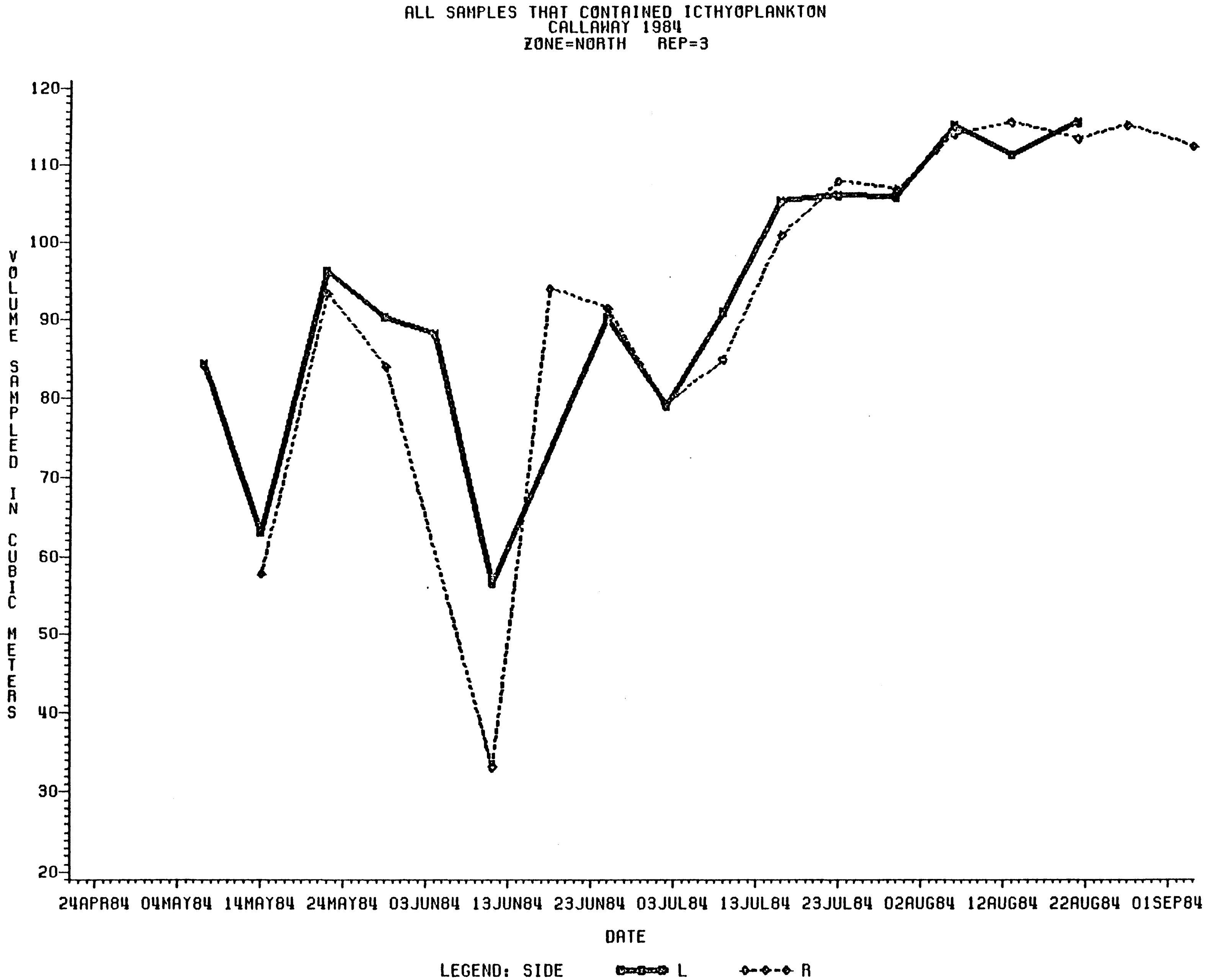


Figure 4.36 COMPARISON OF PAIRED SAMPLE VOLUMES BY ZONE AND REPLICATE



4.4.2 Length Distribution

The dearth of prolarvae that were sampled (Figure 4.5) indicate that no major spawning or nursery areas are immediately upstream of the intake.

The average hatching size of freshwater drum is 3.2mm (Swedberg and Walberg, 1970). This size was collected during the study, but not in very great numbers (Fig. 4.15). This indicates either that newly hatched drum are not susceptible to drift or that the drum larvae caught were hatched at some distance upstream. The latter is more likely due to the pelagic spawning habits of drum.

Gizzard shad hatching sizes range from 3.3 to 3.5mm (Auer 1982, p. 70), and some of these sizes were collected (Fig. 4.16). Just as with drum, the majority of the shad sampled were juveniles which indicates hatching upstream.

Carp hatching sizes range from 3.0 to 3.5mm (Auer 1982, p. 194), and none this small were sampled. Unidentified minnows were sampled as small as 4.1mm (Table 4.3), some of which may have been carp. The demersal adhesive eggs of carp are less likely to drift than are freshwater drum eggs.

Unidentified minnow species sampled were mostly larvae and prolarvae (Fig. 4.16). This is largely due to the fact that prolarvae and larvae are more difficult to identify than are juveniles, so unidentifiable specimens tended to be small.

Unidentified suckers collected ranged from 2.5 to 31.0mm in length. Hatching sizes for suckers range from 5 to 10mm (Auer 1982, p. 345). Many of the suckers collected were prolarvae (Fig. 4.19), which indicates spawning occurred closer upstream than for the previously discussed taxon. Many of these were probably river carpsuckers which are the most common catostomid adjacent to the plant.

Goldeye hatch at from 7.3 to 7.6mm (Battle and Sprules 1960) which includes sizes captured at Callaway. Most of those sampled were prolarvae (Fig. 4.20). The goldeye size and duration of occurrence in the samples indicated those that were sampled hatched nearby and then were either not present in larger sizes or not vulnerable to the sampling methods used.

All remaining taxon lengths are presented in Appendix B.2. Overall, the dearth of prolarvae indicates that there are no major spawning or nursery areas immediately upstream of the Callaway intake for the taxon collected.

4.4.3 Entrainment

The entrainment of icthyoplankton through the Callaway Plant will have minimal effects on the fish populations of the Missouri River. This conclusion is based on the low estimated percentage of larvae entrained of less than 0.2% of those being transported (Fig. 4.29). Worst case percent entrainment did not exceed 0.75% (Fig. 4.29).

Table 4.4 shows that those taxon sampled in the greatest numbers did not necessarily show the highest percent entrainment estimates. This can be attributed to several factors including a higher density for that taxon in the north zone on a sampling day than in the other two zones.

Those species that have missing values for entrainment estimates in Table 4.4 are those that were not sampled in the north zone (zone of influence) and were thus not included in calculation of the density that was entrained from that zone. These taxon were sampled in extremely low numbers in any of the zones (a maximum of 4), but would not be considered less entrainable than similar sizes of species that were sampled in the north zone.

The trend of increasing entrainment percentages from July through August is exaggerated on the expanded scales of the individual taxon figures (Fig. 4.21-4.28). The trend, however, is still present in the less sensitive scale of all the taxon combined percent entrainment figure (Fig. 4.29). This is due to increasing densities of specimens (particularly juveniles) late in the season and decreasing discharges. These two factors resulted in an increase in percentage entrainment estimates even though many of the fish sampled were juveniles (Fig. 4.4) and probably less susceptible to entrainment than eggs or larvae.

The worst case percentage entrainment estimates show a decreasing trend through the season (Fig. 4.29) probably because of decreasing densities and using a constant discharge for this calculation. The worst case discharge used in the calculations probably is indeed a worst case discharge as it is the record low flow for the months when fish eggs and larvae are present from 1929 through 1980.

4.4.4 Summary and Conclusions

The Callaway entrainment study sampling period encompassed the entire season of larvae and egg presence in the Missouri River during 1984. The most abundant taxon sampled were freshwater drum, gizzard shad, carp, minnow species, freshwater drum eggs, suckers, goldeye and unidentified eggs. No rare, threatened, or endangered species were identified.

Icthyoplankton were first collected on May 1, 1984, and were not collected after September 10, 1984. The north zone, the zone of influence, generally had the highest egg and larvae densities. The middle zone generally had the lowest densities, while the south zone was intermediate.

Mean percent entrainment rates for dominant taxon show the same increasing trend throughout the season due to the same factors previously mentioned (Fig. 4.21-4.28). Freshwater drum and freshwater drum eggs showed the widest ranges (Fig. 4.21 and 4.25) due to wide ranging densities.

Gizzard shad and carp showed almost identical patterns due to being sampled in almost identical densities simultaneously even though gizzard shad adults are more abundant near the intake (see Field

Fisheries section of this report) and they have a higher reproductive potential. The goldeye percentage entrainment pattern (Fig. 4.27) is very limited because goldeye were only collected on three occasions.

Mean percentage entrainment estimates peaked at less than 0.15% using actual discharge estimates on sampling days and did not exceed 0.75% using record low flows for April-September 1929-1980. The low percent entrainment estimates are the result of low percentage of water withdrawal by the plant and relatively low densities of icthyoplankton.

These low entrainment percentages indeed reflect that best available technology was used in intake design and operation. This best available technology results in minimum adverse impacts to the aquatic environment due to entrainment.

5.0 Impingement Study

5.1 Introduction

Impingement is the physical blocking of large organisms by a barrier, generally some type of screen system in a cooling water intake and involves the collision of an organism with a portion of the structure (U.S. EPA 1977, p. 18).

Fish are the primary organisms subject to impingement in the Missouri River. Gizzard shad (*Dorosoma cepedianum*) and freshwater drum (*Aplodinotus grunniens*) are the principal species of fish typically impinged at water intake structures on the Missouri River. This predominance in impingement collections may reflect these species' physiological condition, their overall abundance or, for shad, their susceptibility to impingement. Other species of fish usually make up a small percentage of the total number of fish impinged in the Missouri River (Equitable Environmental Health 1976).

Life stages of fish most susceptible to impingement are young-of-the-year fish and one year old fish. Adult fish are sometimes susceptible during spawning or migration runs, periods of weakened condition (post spawning periods, parasitic or bacterial infections) or periods of cold water temperatures.

Susceptibility of juvenile and adult fish depends on a number of factors including fish swimming ability; attraction or avoidance behavior; river currents, velocities and direction of flow relative to the intake structure; intake velocities, volume and alignment relative to the river; nearby habitats; and presence of various intake devices to reduce impingement. The impacts are highly site-specific. Therefore, adequate physical and biological data are needed to determine impingement effects.

This section examines potential effects on adult fish in the vicinity of the Callaway Plant caused by impingement by the intake structure.

5.2 Objectives

An impingement study was initiated to quantify the effects of the Callaway intake structure on the various species and life stages of fish during commercial operation of the Callaway Plant. The study involved monitoring of fish impingement on the intake screens and recording of pump flow rates to ascertain the impingement rate. This program extended from February 1985 through January 1986. It provided information on species composition, impingement rates, numbers and weights per species, and length-frequency distributions of impinged fish.

5.3 Materials and Methods

The 1985-86 impingement study employed methods and procedures recommended by U.S. EPA, Region VII. The Callaway impingement study plan was approved by the Missouri Department of Natural Resources.

5.3.1 Sample Collection

Impingement samples were collected from the screen wash by means of a collection basket system which was located on the downstream side of the intake structure. During sampling periods, manually operated gates in the screen wash troughs diverted the screen backwash flow into a pipe which emptied directly into a collection basket. The collection basket was constructed of 1/2" square screen mesh identical to that used on the plant's traveling screens. The basket therefore retained all material strained and washed from the screens.

Impingement samples were taken by diverting the screen wash flow to the collection basket for a twenty-four hour period. Sample collection was usually conducted from 8:00 a.m. to 8:00 a.m. During this period the screens were operated in their normal modes. The screens were washed before the 24-hour sampling period began and immediately before the sampling period ended. This assured that only fish impinged during the 24-hour tests were collected. Plant personnel maintained operating logs that recorded the number of intake water pumps in operation during each sampling period. Total plant withdrawal for each sampling period was developed from this operating data. At the end of the 24-hour collection period, diversion of the screen wash flow was stopped and the collection was processed. This procedure was repeated once each week on a random-day basis during the one year testing period.

5.3.2 Sample Processing and Analysis

Fish were separated from any trash or debris which collected in the impingement basket during sampling. The samples were processed in the field except during the winter season, when frozen samples were returned to the St. Louis laboratory for analysis.

Fish were sorted and identified to species. Those species occurring in large numbers were sorted into length ranges of 0-100 mm, 101-150 mm, and then in 50 mm increments thereafter. Fish were weighed and measured to the nearest gram and millimeter, respectively. When five or more fish of the same species were in the same length range, five were weighed and measured while the remainder were included only in the total count for the length range. Identifications were made with taxonomic keys published by Pflieger (1975) and Clay (1975). Identifications were made in the field except difficult to identify specimens, which were returned to the St. Louis laboratory for identification.

The scales used for weighing were Accuweigh, Universal Dial Scales, model M-800, 800 grams x 1 gram, and model M-1250, 12 kilograms x 50 grams. Fish were measured for total length on a 100 centimeter measuring board divided into millimeter increments. Scales and measuring boards were calibrated and calibration records were filed for quality assurance.

5.3.3 Sample Documentation

Lengths, weights, numbers and species of fish collected were recorded on field work sheets. Other data recorded on the work sheet were the date, the plant code, the code for each species, and any remarks concerning the condition of the fish (e.g. alive, scale loss, diseased).

Data recorded by plant personnel included the date, the times the collection period began and ended, river temperature at the intake, mode of screen operation, number of intake pumps operating, river elevation, discharge temperature, duration of operation of electric boilers for deicing, and water temperature rise caused by the electric deicing boilers.

5.3.4 Data Compilation and Computations

Automatic data processing was used to compile the sample data and to perform computations. The field work sheets were designed to facilitate direct computer coding of data. The coded data was verified for accuracy after coding. The verified data from each sample collection was then combined to form a complete impingement data set.

Computerized data compilations were prepared in various forms. For each impingement sample, the compilations included: the fish's common and scientific names, the total of each species collected and totals per 10 million gallons (MG) of intake water sampled, the total weight of each species and the total weights per 10 MG of intake water sampled. Compilations were also prepared for all species combined for each impingement sample. These included: the total number of fish collected and total per 10 MG of intake water sampled, the total weight of fish collected and the total weight per 10 MG of intake water sampled.

Compilations for all impingement collections combined were prepared detailing each species collected by common name, scientific name, total numbers, relative abundance, total weight, and relative weight. Also determined were the total number and weight of all species sampled during the study period.

The monthly average number and monthly average weight per 10 million gallons of intake water pumped were calculated for each species comprising at least 4% of the total collected, and also for all less dominant species combined. A monthly total number and a monthly total weight per 10 million gallons of intake pump water for all species combined were also calculated. Monthly length-frequency distributions were calculated for each species collected in total numbers of ten or more.

Monthly and annual estimates of the number, weight, relative abundance and the relative weight of impinged fish were calculated. These estimates were made two different ways. One set of estimates was based on total intake pump water flow and impingement totals for the month. This method estimated the annual impingement rate based on average monthly impingement rates. The second set was estimated based on daily impingement rates.

Data analysis required computations of various impingement rates and weights per unit flow. Impingement sample numbers and weights were grouped first by species and then by total numbers of fish collected. Each of these values were then divided by the intake pump water flow (in units of 10 million gallons) during the collection period. This yielded impingement rates (number/10 million gallons) and weights (g/10 million gallons) for individual samples both by species and for all species combined.

A similar procedure was followed to develop estimates of monthly and annual impingement rates and weights. In these computations the first step was to sum the numbers and weights of impinged fish sampled during a month. The monthly sums were then divided by the volume of intake pump water flow sampled during the month to yield a monthly average impingement rate (number/10 million gallons) and weight (g/10 million gallons). These monthly averages were then multiplied by the total monthly circulating water flow to derive the estimated monthly impingement rate and weight. These computations were done for each individual species and the total number of all fish impinged.

This process was repeated using the number of days sampled and the number of days in a month rather than the amount of intake pump flow sampled and total monthly intake pump water flow. Total estimated annual impingement rates and weights were obtained by summing monthly rates and weights in both cases.

5.4 Results

This section presents the impingement sample collection data and the estimates of monthly annual impingement rates and weights.

5.4.1 Sampling Results

Impingement sampling results are presented for each sampling period and on a monthly basis. Results are presented for water flow sampled, species composition, impingement rates, impingement weights, and length ranges of impinged fish.

5.4.1.1 Water Withdrawal

The amount and percentage of the water withdrawal flow sampled during the impingement collections is tabulated in Table 5.1 on a monthly and annual basis. The amount of water withdrawal sampled represents 14.13% of the total water withdrawn by the Callaway Plant during the study period.

5.4.1.2 Species Composition

Thirteen species of fish representing nine families and only 301 specimens were collected during the 51 sample collections, Table 5.2. Gizzard shad (275, 91.4%) and freshwater drum (12, 4.0%) accounted for 95.4% of the total specimens. Other species that were collected in numbers of greater than one were channel catfish (*Ictalurus punctatus*) (3, 1.0%) and blue catfish (*Ictalurus furcatus*) (2, 0.7%).

TABLE 5.1

Monthly Volumes of Total Water Withdrawal Versus Monthly Volumes Sampled for Impingement at the Callaway Power Plant, February 1985 through January 1986

Sampling Period	A. Total Water Withdrawal by Plant (gal)	B. Water Withdrawal Sampled for Impingement (gal)	B/A (%)
February, 1985	1,128,960,000	135,240,000	11.98%
March	1,249,920,000	122,976,000	9.84%
April	907,200,000	121,296,000	13.37%
May	1,249,920,000	203,280,000	16.26%
June	1,058,400,000	139,776,000	13.21%
July	1,249,920,000	205,968,000	16.48%
August	1,249,920,000	167,160,000	13.37%
September	1,209,600,000	161,280,000	13.33%
October	1,249,920,000	166,824,000	13.35%
November	756,000,000	101,976,000	13.49%
December	1,124,928,000	192,276,000	17.09%
January, 1986	1,249,920,000	215,880,000	17.27%
Total	13,684,608,000	1,933,932,000	14.13%

TABLE 5.2

Fish Species Sampled by Impingement at the Callaway Power Plant
February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total Wt. (G)	Relative Weight
Shovelnose Sturgeon	Scaphirhynchus platorynchus	1	0.3	61.0	0.7
Shortnose Gar	Lepisosteus platostomus	1	0.3	229.0	2.7
Gizzard Shad	Dorosoma cepedianum	275	91.4	2293.8	27.4
Goldeye	Hiodon alosoides	1	0.3	20.0	0.2
River Carpsucker	Carpiodes carpio	1	0.3	825.0	9.9
Smallmouth Buffalo	Ictiobus bubalus	1	0.3	3550.0	42.4
Blue Catfish	Ictalurus furcatus	2	0.7	283.0	3.4
Black Bullhead	Ictalurus melas	1	0.3	12.0	0.1
Channel Catfish	Ictalurus punctatus	3	1.0	10.0	0.1
Flathead Catfish	Pylodictis olivaris	1	0.3	2.0	LT 0.1
Green Sunfish	Lepomis cyanellus	1	0.3	4.0	LT 0.1
Walleye	Stizostedion vitreum	1	0.3	22.0	0.3
Freshwater Drum	Aplodinotus grunniens	12	4.0	1060.0	12.7
	Total	301		8371.8	

LT = Less Than

The total weight of all fish collected was 8372 grams. Smallmouth buffalo (Ictiobus bubalus) (42.4%), gizzard shad (27.4%), freshwater drum (12.7%), river carpsucker (Carpiodes carpio) (9.9%) accounted for 92.4% of the total weight. Shortnose gar (Lepisosteus platostomus) (2.7%) and blue catfish (3.4%) made up 6.1% of the total weight. The other seven species accounted for 1.5% of the total weight collected.

Threatened, endangered, or rare fish species were not collected during impingement sampling (U.S. Dept. of Interior 1975, Missouri Department of Conservation 1977).

The results of the individual sample collections are presented in Appendix C.1.

5.4.1.3 Impingement Rates

Impingement rates for individual samples are presented in Appendix C.1. Impingement rates during the study ranged from 0 fish per 10 million gallons (31 impingement tests) to 39.7 fish per 10 million gallons on February 15, 1985. Monthly rates varied from 0.0 fish per 10 million gallons during four months to 15.6 fish per 10 million gallons in February 1985, as summarized in Table 5.3. During the maximum impingement month, gizzard shad accounted for 15.5 of 15.6 fish per 10 million gallons. Gizzard shad was the dominant species impinged except during May and August when other species were impinged at the rate of 0.1 fish per 10 million gallons.

TABLE 5.3

Average Monthly Numbers and Weights per 10 Million Gallons of Circulating Water Screened at the Callaway Power Plant, February 1985 through January 1986

	No. Per 10,000,000 Gal.	Wt. (grams) Per 10,000,000 Gal.
February 1985		
Gizzard shad	15.5	115.9
Freshwater drum	0.0	0.0
Other species	0.1	0.3
Totals	15.6	116.2
March 1985		
Gizzard shad	1.0	5.8
Freshwater drum	0.2	2.5
Other species	0.1	1.8
Totals	1.3	10.1
April 1985		
Gizzard shad	2.4	10.3
Freshwater drum	0.0	0.0
Other species	0.1	292.7
Totals	2.5	303.0
May 1985		
Gizzard shad	0.0	0.0
Freshwater drum	0.0	0.0
Other species	0.1	0.7
Totals	0.1	0.7
June 1985		
Gizzard shad	0.0	0.0
Freshwater drum	0.0	0.0
Other species	0.0	0.0
Totals	0.0	0.0
July 1985		
Gizzard shad	0.0	0.0
Freshwater drum	0.0	0.0
Other species	0.0	0.0
Totals	0.0	0.0
August 1985		
Gizzard shad	0.0	0.0
Freshwater drum	0.0	0.0
Other species	0.1	0.1
Totals	0.1	0.1
September 1985		
Gizzard shad	0.0	0.0
Freshwater Drum	0.0	0.0
Other species	0.0	0.0
Totals	0.0	0.0
October 1985		
Gizzard shad	0.0	0.0
Freshwater drum	0.0	0.0
Other species	0.0	0.0
Totals	0.0	0.0
November 1985		
Gizzard shad	0.2	10.1
Freshwater drum	0.0	0.0
Other species	0.0	0.0
Totals	0.2	10.1
December 1985		
Gizzard shad	0.4	11.3
Freshwater drum	0.3	25.0
Other species	0.2	58.4
Totals	0.9	94.7
January 1986		
Gizzard shad	0.6	9.7
Freshwater drum	0.1	25.4
Other species	0.2	14.1
Totals	1.0	49.2
For the Year		
Gizzard shad	1.4	11.9
Freshwater drum	0.1	5.5
Other species	0.1	25.9
Totals	1.6	43.3

From the middle of May through the middle of November 1985 (28 impingement tests), there were no fish collected during the impingement tests except on August 30 when one flathead catfish was collected. Thus, the majority of impingement occurred from late fall through the spring.

5.4.1.4 Impingement Weights

Impingement weights for individual collections are presented in Appendix C.1. Impingement weights for individual collections ranged from 0 grams per 10 million gallons for 31 of the impingement tests to 882.4 grams per 10 million gallons on April 13, 1985. Monthly average impingement weights ranged from 0 grams per 10 million gallons during four months to 303.0 grams per 10 million gallons in April 1985 as summarized in Table 5.3.

April 1985 was the month of highest impingement by weight. This was caused by the collection of a smallmouth buffalo that weighed 3550 grams. This specimen appeared to have been dead greater than 24 hours, and therefore may have been dead prior to impingement.

Gizzard shad's highest impingement by weight was in February 1985 when 115.9 grams per 10 million gallons were impinged.

5.4.1.5 Length Ranges of Impinged Fish

Monthly length-frequency distributions were compiled for those fish species contributing more than 10 specimens to the impingement collections during the study. The percentage of fish in each length range was computed for each month. Length ranges were compiled for gizzard shad and freshwater drum and are presented in Appendix C.2.

The length-frequency distributions for gizzard shad indicated that 98% of the 275 specimens collected were less than 150 mm in length. This length corresponds approximately to age class one. Seven of the twelve freshwater drum were 150 mm or less which also corresponds approximately to age class one. All of the freshwater drum collected were less than 300 mm so they were approximately age four or less.

5.4.2 Projected Results

Monthly and annual projected impingement results are presented for total numbers of all species and for individual species. The projections based on the number of fish impinged per 10 million gallons resulted in higher impingement rates than the rates per day and are presented in Table 5.4. Estimates based on rates per day are included in Appendix C.3.

5.4.2.1 Projected Total Annual Impingement

The total annual impingement for all species of fish was projected to be 2410 fish per year with a total weight of 59,525 grams. This projection of total annual impingement is viewed as a conservative estimate of the annual impingement that would be expected during the life of the Callaway Plant. This is because the plant operated at a higher than expected capacity factor and normal river conditions occurred during the impingement study. The total annual

TABLE 5.4

Estimated Annual Impingement at the Callaway Power Plant Based Upon Total Water Withdrawal, February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total Wt. (G)	Relative Weight
Shovelnose Sturgeon	Scaphirhynchus platorynchus	5.9	0.2	356.9	0.6
Shortnose Gar	Lepisosteus platostomus	5.8	0.2	1326.0	2.2
Gizzard Shad	Dorosoma cepedianum	2234.6	92.7	17993.9	30.2
Goldeye	Hiodon alosoides	5.8	0.2	115.8	0.2
River Carpsucker	Carpiodes carpio	5.9	0.2	4827.0	8.1
Smallmouth Buffalo	Ictiobus bubalus	7.5	0.3	26545.4	44.6
Blue Catfish	Ictalurus furcatus	11.6	0.5	1653.0	2.8
Black Bullhead	Ictalurus melas	6.1	0.3	73.8	0.1
Channel Catfish	Ictalurus punctatus	17.7	0.7	58.6	*LT 0.1
Flathead Catfish	Pylodictis olivaris	7.5	0.3	15.0	LT 0.1
Green Sunfish	Lepomis cyanellus	8.3	0.3	33.4	LT 0.1
Walleye	Stizostedion vitreum	10.2	0.4	223.6	0.4
Freshwater Drum	Aplodinotus grunniens	83.0	3.4	6302.5	10.6
	Total	2409.9		59524.9	

*LT = Less Than

impingement projections are presented in Table 5.4 and the projected monthly totals are presented in Appendix C.4.

5.4.2.2 Projected Species Composition

The two species of fish that were predominant in the actual impingement data remained predominant in the impingement projections. Gizzard shad (2235, 92.7%) and freshwater drum (83, 3.4%) accounted for 96.1% of the individuals projected to be impinged annually. Only three other fish species were projected to be impinged in numbers of 10 or more. They were channel catfish (18, 0.7%), blue catfish (12, 0.5%), and walleye (10, 0.4%).

5.4.2.3 Projected Impingement Weights

Gizzard shad (17,994 g, 30.2%), smallmouth buffalo (26,545 g, 44.6%), and freshwater drum (6303 g, 10.6%) accounted for 85.4% of the projected total annual impingement weight of 59,525 grams. Shortnose gar (1326 g, 2.2%), river carpsucker (4827 g, 8.1%), and blue catfish (1653 g, 2.8%) accounted for 13.1% of the projected total annual weight of impinged fish. The seven other fish species accounted for only 1.5% or approximately 887 g of the projected total annual weight of impinged fish.

5.5 Discussion

This section will examine the significance of the Callaway intake impingement and the factors which influence impingement. The intake will impinge fish whenever there is water withdrawal. Whether this impingement causes adverse environmental impact must be evaluated in respect to the results of the impingement study conducted for the Callaway intake structure, and with those results compared to the fish populations of the Missouri River.

5.5.1 Significance of Impingement

The significance of the plant's impingement will be addressed through discussion of threatened and/or endangered species, predominant species, other species, size class of fish impinged and the field fisheries data. The magnitude of any adverse environmental impact from impingement by the Callaway Plant intake is difficult to quantitatively determine from the data. However, the significance of the impingement losses and the adverse environmental impact, if any, can be assessed from the relative magnitude.

5.5.1.1 Threatened or Endangered Fish

No fish of threatened or endangered status listed for Missouri waters (Mo. Dept. of Con. 1977) or included on the U.S. Fish and Wildlife Service List of Endangered or Threatened Wildlife (U.S. Dept. of Interior 1975) were collected during the impingement study at the Callaway Plant.

5.5.1.2 Predominant Species

The impingement samples and the projected estimates indicated the predominance of two fish species, gizzard shad and freshwater drum. Projected results showed that 2235 gizzard shad and 83 freshwater drum could be expected to be impinged annually by the Callaway Plant's intake structure. These species are numerically abundant in the Missouri River. Shad are an important forage species and their populations have demonstrated resiliency and impressive compensatory potential. Of the gizzard shad impinged, 98% were age class one or less. Young gizzard shad naturally suffer a high mortality rate according to Bodola (1966) who estimated that of 100,000 age I fishes, only 5,534 age II fishes and 435 age III survive. The annual impingement of freshwater drum was 83 specimens weighing 6,303 grams (13.9 pounds). All the freshwater drum impinged were less than 300 mm in length and 58% were age class one or less. These impingement rates of gizzard shad and freshwater drum by the Callaway intake are considered an insignificant adverse impact when taking into account the abundance of these species in the Missouri River, the age class of impinged fish, natural mortality and compensatory potential. Thus, there is no impact of consequence to the fish populations in the vicinity of the Callaway intake structure.

5.5.1.3 Other Species

Eleven other species of fish were impinged during the impingement tests, Table 5.2. None of these species are considered unique and all are common components of fish collections made from the Missouri River. The projected results showed that each of these species are estimated to be impinged at eighteen specimens or less per year. These eleven other fish species are not unique to the Missouri River, and therefore, hold no special significance by their presence at Callaway. It is thus unlikely that the annual impingement of 18 specimens or less of any species of fish that is not threatened or endangered would have a significant adverse environmental impact.

5.5.1.4 Age Class of Fish Impinged

The fish which were impinged showed in almost all cases that the majority of specimens were immature or age class one, Table 5.2, Appendix C.1, Appendix C.2. This fact is important in several respects. First, natural mortality and natural compensatory potential make these losses less significant. The second is that the older and more mature age classes are not being impinged. The field fisheries data have shown older age classes of fish to be present; therefore, some other mechanism such as intake design, location, capacity or construction must be the reason for their absence in impingement samples.

5.5.1.5 Field Fisheries Data

The field fisheries data from electrofishing illustrate the abundance of gizzard shad and freshwater drum in the vicinity of the Callaway Plant intake structure. Gizzard shad was the most abundant fish collected by electrofishing, making up 26.9% of the fish collected by this method. Freshwater drum ranked second in relative abundance making up 24.4% of the fish collected by electrofishing. Freshwater drum's relative abundance of 18.1% was the second highest abundance of the various species collected by seining. The seining and electrofishing data exemplify the predominance of the freshwater drum population, and the electrofishing data exemplify the predominance of the gizzard shad population in the Missouri River.

Feeding, spawning, and nursery areas for fish are limited in the area of the intake structure. Fish involvement with the intake basically entails fish migrating around the structure. The low impingement rates indicate that the intake structure was located and designed to minimize impingement since the field fisheries study has shown that fish do reside in the area.

5.5.2 Intake Design, Construction Capacity and Location

The extremely low projected annual impingement rates of 2,410 fish with a total weight of 59,525 grams (131.2 pounds) can be attributed to the design, construction, capacity and location of the Callaway Plant intake structure. The Callaway Plant was designed with a natural draft cooling tower system rather than with a once through cooling system. This minimizes water usage to make-up water to replenish the cooling system and thus has reduced water usage more than 90% as compared to a once through cooling system. This water usage reduction minimizes water withdrawal and consequently impingement. To further minimize impingement the intake was located so it protrudes into the river's main channel and withdraws water from the bottom of the swift main channel of the Missouri River where few fish can inhabit. The size of the intake portion of the structure was increased beyond the required design in order to reduce the velocities of intake water through the screens which also minimizes impingement. The maximum velocity at the screens during the minimum navigational flow of 35,000 cfs will be about 0.3 ft/s. This velocity will allow the majority of fish from becoming impinged unless they are lethargic, diseased, or in a stressed condition. Also, to lessen entrapment and minimize impingement, fish gates are located between the screenwells. This allows a fish that has entered the intake through the bar racks to exit the screenwells by way of the fish gates to avoid entrapment and possible impingement.

The Callaway intake has used many of the features recommended in the "Development Document for Best Technology Available for the Location, Design, Construction and Capacity of Cooling Water Intake Structures for Minimizing Adverse Environmental Impact" (U.S. EPA 1976). The low projected impingement rates for the Callaway intake reflect the use of the best technology available for the location, design, construction and capacity of a cooling water intake structure.

5.5.3 Summary and Conclusions

A total of 1,933,932,000 gallons or 14.13% of the total flow withdrawn by the Callaway intake from February 1985 through January 1986 was sampled for impingement impact. The sampling indicated a predominance of two species, gizzard shad (91.4%) and freshwater drum (4.0%). Thirteen species of fish representing nine families and 301 specimens weighing 8.4 kilograms were collected during the 51 impingement sample collections.

The sampling data and water withdrawal data were combined to project the total annual impingement rates (number per 10 million gallons of water withdrawn) and weights (grams per 10 million gallons of water withdrawn). The total annual impingement was estimated at 2410 fish weighing 59.5 kilograms (131.2 pounds). Gizzard shad (2235, 92.7%) and freshwater drum (83, 3.4%) accounted for 96.1% of the individuals projected to be impinged annually. No other species were projected to be impinged in numbers greater than 18.

The length ranges of the fish collected during the impingement sampling indicated a strong predominance of immature fish. The intake is not impinging mature adults in quantities large enough to produce a significant adverse impact. This is especially true for gizzard shad, where more than 98% of those individuals impinged were in age class one or below. The impingement of immature fish in relatively low numbers as predicted at Callaway may be offset by natural compensatory potential since immature fish are subject to large natural losses before reaching maturity.

Threatened, endangered, or rare fish species were not collected during the impingement study.

Impingement of gizzard shad and freshwater drum by the Callaway intake are considered an insignificant adverse impact when considering the abundance of these species in the Missouri River, the age class of impinged fish, natural mortality and compensatory potential. The other eleven species of fish were each impinged in very low numbers (18 specimens or less) and are species common to the Missouri River. It is thus highly unlikely that impingement of these fish would have a significant adverse environmental impact.

The field fisheries data shows the abundance of gizzard shad and freshwater drum in the vicinity of the Callaway Plant intake structure. Feeding, spawning, and nursery areas for fish are limited in the area of the intake structure. The low impingement rates indicate that the intake structure was located and designed to minimize impingement since the field fisheries study has shown that fish do reside in the area.

The extremely low projected annual impingement rates of 2410 fish with a total weight of 59.5 kilograms (131.2 pounds) can be attributed to the design, construction, capacity, and location of the Callaway intake structure. These low projected impingement rates for the Callaway intake structure reflect the use of the best technology available for minimizing impingement by a cooling water intake structure. The magnitude of the impact by the Callaway intake is difficult to accurately determine. However, the relative significance of the intake's impingement can be shown. The impingement study has shown that the impingement impact is not significant enough to adversely affect the fish populations of the Missouri River.

6.0 Field Fisheries Study

6.1 Objectives

The objectives of the field fisheries study were to provide information on the aquatic ecosystem of the Missouri River in the vicinity of the Callaway Plant intake. These data were used to help interpret data and support conclusions of the entrainment and impingement studies. Population dynamics (such as species composition and relative, spatial and temporal abundance) of adult and juvenile fish were compared with those same parameters for the larval, adult, and juvenile fish collected during entrainment and impingement studies.

6.2 Materials and Methods

Adult and juvenile fish were sampled monthly by electrofishing at five shoreline sites upstream, at, downstream, and across the river from the Callaway intake (Figure 6.1). Shoreline seining was conducted when and where possible within these sites to sample small adults and juveniles that are not as effectively collected by electrofishing.

6.2.1 Electrofishing Methods

Electrofishing was done with a 20 foot aluminum boat equipped with a gasoline powered 5000 watt generator. A Coffelt VVP-15 control box was used to rectify and control outputs. Alternating currents of 220 volts were adjusted for maximum amperage of up to 14 amps, depending on existing water conditions.

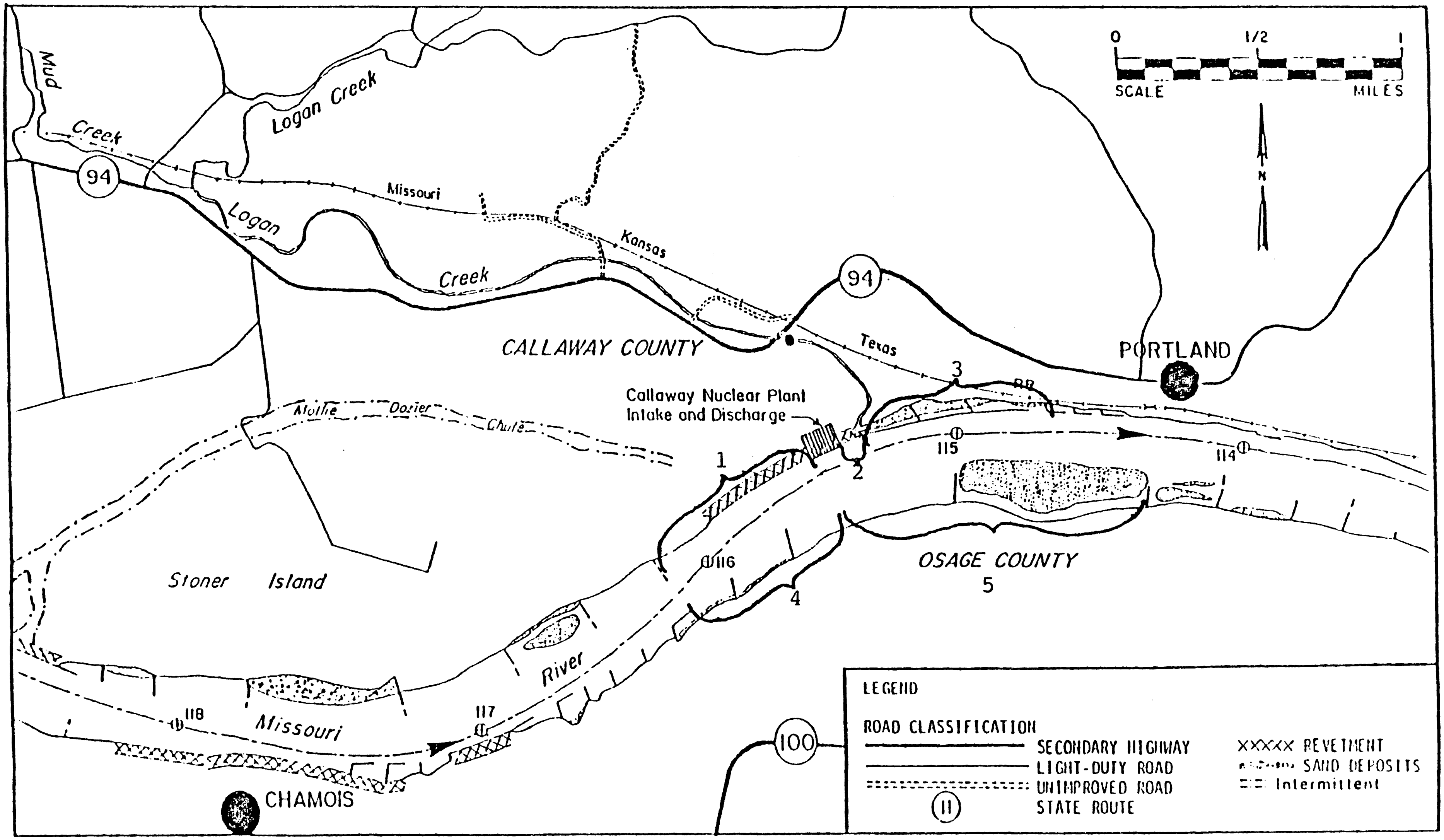


Figure 6.1 Field Fisheries Electrofishing Collection Sites, Missouri River.

All fish sampled were identified to species, weighed to the nearest gram and measured for total length to the nearest millimeter. Abundant species such as gizzard shad and freshwater drum were subsampled by grouping them into 50mm length groups and recording lengths and weights for 5 individuals within a group while the rest were counted. Identifications were made with the help of taxonomic keys by Clay (1975), Pflieger (1975), Smith (1979), and Trautman (1981). All fish collected on the south shore (sites 4 and 5) were released immediately after being weighed and measured. Those fish that were large enough were tagged with a Floy FD-68-BC anchor tag. Some fish collected on the north shore (sites 1, 2 and 3) were kept for radiological analysis as part of the Callaway radiological monitoring program mandated by the Nuclear Regulatory Commission. This program was often conducted concurrently with adult fish sampling carried out for this study. Specifications require collection of these samples from the north shore. Any fish from sites 1, 2 or 3 that were not needed for radiological analysis were released. Fish that were large enough were tagged with the same type of Floy tags as those on the south shore.

The fish tags are labeled with discrete numbers and information on where to return the tag when a tagged fish is caught by a commercial or sport fisherman. Information from tag returns and fish recaptured by UE personnel provides valuable information on growth, condition and movements of fish in big rivers. Union Electric has tagging programs instituted near several other power plants on the Osage, Mississippi and Missouri Rivers. Results and discussion of the

Callaway tagging program will not be included in this report. Data from tag returns and recaptures from all plants are still being analyzed.

All data were kept discrete as to collection, date and gear type. Water temperature and Missouri River discharge at Hermann were recorded for each collection day. A zone was considered to be sampled when one complete pass had been made down the shoreline and around any discernable offshore structure or habitat that could be effectively shocked (generally less than six feet deep). This offshore structure might include the tip of a wing dike, a notch in a dike, a sand bar or a ledge. Habitat shocked might include pilings, snags, drift piles, or submerged trees. Total shocking time within a zone was recorded so that catch-per-unit-effort (CPUE) calculations could be made.

6.2.2 Seining

Monthly shoreline seining was conducted in areas with suitable depths and firm substrates. A 30 foot by 6 foot, 1/4" mesh bag seine was used. Hauls were made downstream, keeping the net perpendicular to the bank. Distance moved down the bank was recorded. All fish collected during a seine haul were preserved with formalin and labeled for processing back at the lab. Distance seined, site location, depths, substrates and other pertinent parameters were recorded.

6.2.3 Collection Site Locations and Descriptions

Five collection sites were sampled during the field fisheries study. Figure 6.1 illustrates the collecting site locations. The collection sites' locations corresponded to some of the collection sites sampled during the Callaway preoperational studies (Camp, Dresser & McKee 1981, 1982). Collection sites 1, 2, and 3 were near shore sites located on the north shore of the Missouri River. Site 1 is located from dike 122.2 (River mile 116.2) downstream to the upstream side of the Callaway intake. The shoreline of site 1 is riprapped with a narrow band of mature trees (cottonwood, willow, silver maple) lining the bank area. Substrates at this site were usually riprap. The main channel of the river is located just off-shore from site 1. The water depth of site 1 drops off sharply from the narrow band of shallow water along the straight riprapped shoreline.

Site 2 is located from the downstream side of intake downstream to dike 121.58 and encompasses the immediate discharge area. A retaining wall for a barge unloading area and eddy currents are characteristic of this site which has a mud and fine sand substrate. The shoreline is steep and water depths of 15 feet or greater exist just off-shore.

Site 3 extends from the downstream side of dike 121.58 to dike 121.0. This site has dike fields which provide quiet water areas during low flows. When river elevations breach the dikes, flows become turbulent and swift. The bank area is lined with mature trees of willow and silver maple. Substrates are varied and include fine sand, silt, and mud. The collecting area for this site depends on river elevation. During low flows the riprapped portions of the dike fields must be sampled because access to inside the dike fields is limited by low water levels. Median flows allow access to the dike fields and large areas for collection. During above median flows only the shoreline is capable of being sampled.

Sites 4 and 5 were near shore sites located on the south shore of the Missouri River. Site 4 encompasses the area of three L-head dikes from dike 122.1 downstream to approximately river mile 115.4. The substrates at this site were sand, silt and mud. When river elevations are low, large areas of quiescent water is present. But when the dikes are breached, turbulent and swift flows exist. Water depths are variable within the dike fields. Deep water is present within the eddy portions of the dike fields, and shallow water exists along the banks and upstream side of the dikes. The banks are lined with trees with mature specimens on the high banks and new growth on the low banks. Site 5 begins directly across the river from the intake structure at the start of a tree line and ends at the upstream side of dike 121.2. Water depths are shallow because this site is a sand flat and extends into a chute behind an island. A small short dike is present just upstream of the chute. Vegetation on the banks is similar to what exists at site 4. Snags and stranded drift characterize the habitat of the chute. Water flow is swift and the substrates are sand, silt and mud.

6.3 Results

6.3.1 Species Composition

The collection by all fish sampling methodologies represented 2805 specimens comprising 14 families and 41 species. Table 6.1

Table 6.1
Fish Species Collected by Electrofishing at the Callaway Plant,
February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Icthyomyzon castaneus	28	1.5	663.0	0.1
Shovelnose Sturgeon	Scaphirhynchus platorynchus	1	*LT 0.1	638.0	0.1
Paddlefish	Polyodon spathula	1	LT 0.1	3200.0	0.6
Longnose Gar	Lepisosteus osseus	49	2.5	25059.0	5.0
Shortnose Gar	Lepisosteus platostomus	163	8.5	59156.0	11.8
American Eel	Anguilla rostrata	1	LT 0.1	480.0	LT 0.1
Gizzard Shad	Dorosoma cepedianum	518	26.9	75666.6	15.1
Goldeye	Hiodon alosoides	322	16.7	35855.0	7.2
Mooneye	Hiodon tergisus	4	0.2	366.0	LT 0.1
Carp	Cyprinus carpio	113	5.9	127834.0	25.5
Grass Carp	Ctenopharyngodon idella	1	LT 0.1	4850.0	1.0
Emerald Shiner	Notropis atherinoides	2	0.1	5.0	LT 0.1
River Carpsucker	Carpiodes carpio	85	4.4	38982.0	7.8
Quillback	Carpiodes cyprinus	1	LT 0.1	23.0	LT 0.1
Highfin Carpsucker	Carpiodes velifer	1	LT 0.1	1000.0	0.2
Smallmouth Buffalo	Ictiobus bubalus	11	0.6	7537.0	1.5
Bigmouth Buffalo	Ictiobus cyprinellus	8	0.4	11286.0	2.3
Golden Redhorse	Moxostoma erythrurum	4	0.2	767.0	0.2
Shorthead Redhorse	Moxostoma macrolepidotum	11	0.6	4576.0	0.9
Blue Catfish	Ictalurus furcatus	10	0.5	6051.0	1.2
Black Bullhead	Ictalurus melas	2	0.1	604.0	0.1
Yellow Bullhead	Ictalurus natalis	1	LT 0.1	136.0	LT 0.1
Channel Catfish	Ictalurus punctatus	19	1.0	10875.0	2.2
Flathead Catfish	Pylodictis olivaris	10	0.5	6191.0	1.2
White Bass	Morone chrysops	40	2.1	7777.0	1.6
Green Sunfish	Lepomis cyanellus	4	0.2	385.0	LT 0.1
Warmouth	Lepomis gulosus	2	0.1	366.0	LT 0.1
Bluegill	Lepomis macrochirus	16	0.8	1472.0	0.3
Largemouth Bass	Micropterus salmoides	3	0.2	2378.0	0.5
Spotted Bass	Micropterus punctulatus	1	LT 0.1	192.0	LT 0.1
White Crappie	Pomoxis annularis	14	0.7	3886.0	0.8
Black Crappie	Pomoxis nigromaculatus	4	0.2	416.0	LT 0.1
Sauger	Stizostedion canadense	5	0.3	1501.0	0.3
Freshwater Drum	Aplodinotus grunniens	469	24.4	60960.6	12.2
	TOTAL	1924		501134.2	

*LT = Less Than

presents the electrofishing results by species for all collection sites and all sampling dates. In the total of 1924 specimens, 14 families and 34 species were represented. As shown on Table 6.1, the dominant species from all electrofishing collections were gizzard shad (26.9% relative abundance), freshwater drum (24.4%), goldeye (16.7%), shortnose gar (8.5%), and carp (5.9%).

Tables 6.2 through 6.6 present the absolute and relative abundance by species of electrofishing results for each site over the entire study. The results presented in these tables are summarized in the following table which groups north and south shore sites.

Summary of Electrofishing
Results by Site

	Site				
	North Shore			South Shore	
	1	2	3	4	5
Families	12	10	11	10	12
Species	24	17	24	19	19
Specimens	681	231	356	299	357

The most specimens (681) were collected from site 1, also sites 1 and 3 had the highest number of species (24). The lowest number of specimens were collected from site 2 but this was caused by the limited collection area of this site.

Relative abundance of the dominant species for each site from electrofishing collections during the study is summarized in the table below.

Table 6.2
Fish Species Collected by Electrofishing at Site 1 during the Callaway Plant Study
February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Icthyomyzon castaneus	5	0.7	89.0	*LT 0.4
Longnose Gar	Lepisosteus osseus	11	1.6	2449.0	1.9
Shortnose Gar	Lepisosteus platostomus	56	8.2	20033.0	15.6
American Eel	Anguilla rostrata	1	0.1	480.0	0.4
Gizzard Shad	Dorosoma cepedianum	131	19.2	11025.8	8.6
Goldeye	Hiodon alosoides	121	17.8	11272.0	8.8
Mooneye	Hiodon tergisus	3	0.4	286.0	0.2
Carp	Cyprinus carpio	22	3.2	32819.0	25.5
River Carpsucker	Carpiodes carpio	9	1.3	5103.0	4.0
Highfin Carpsucker	Carpiodes velifer	1	0.1	1000.0	0.8
Smallmouth Buffalo	Ictiobus bubalus	1	0.1	718.0	0.6
Bigmouth Buffalo	Ictiobus cyprinellus	1	0.1	2375.0	1.8
Shorthead Redhorse	Moxostoma macrolepidotum	1	0.1	475.0	0.4
Blue Catfish	Ictalurus furcatus	3	0.4	819.0	0.6
Black Bullhead	Ictalurus melas	1	0.1	552.0	0.4
Channel Catfish	Ictalurus punctatus	7	1.0	1825.0	1.4
Flathead Catfish	Pylodictis olivaris	6	0.9	3340.0	2.6
White Bass	Morone chrysops	14	2.1	2051.0	1.6
Bluegill	Lepomis macrochirus	5	0.7	308.0	0.2
Largemouth Bass	Micropterus salmoides	2	0.3	1428.0	1.1
Spotted Bass	Micropterus punctulatus	1	0.1	192.0	0.1
White Crappie	Pomoxis annularis	3	0.4	1117.0	0.9
Sauger	Stizostedion canadense	3	0.4	1124.0	0.9
Freshwater Drum	Aplodinotus grunniens	273	40.1	27731.6	21.6
	Total	681		128612.4	

*LT = Less Than

Table 6.3
Fish Species Collected by Electrofishing at Site 2 during the Callaway Plant Study, February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Icthyomyzon castaneus	1	0.4	36.0	*LT 0.1
Longnose Gar	Lepisosteus osseus	6	2.6	3248.0	5.1
Shortnose Gar	Lepisosteus platostomus	30	13.0	10911.0	17.2
Gizzard Shad	Dorosoma cepedianum	55	23.8	3930.0	6.2
Goldeye	Hiodon alosoides	21	9.1	2757.0	4.4
Carp	Cyprinus carpio	35	15.2	28526.0	45.1
River Carpsucker	Carpiodes carpio	18	7.8	2951.0	4.7
Smallmouth Buffalo	Ictiobus bubalus	1	0.4	900.0	1.4
Bigmouth Buffalo	Ictiobus cyprinellus	1	0.4	1300.0	2.1
Golden Redhorse	Moxostoma erythrurum	2	0.9	545.0	0.9
Black Bullhead	Ictalurus melas	1	0.4	52.0	LT 0.1
White Bass	Morone chrysops	4	1.7	888.0	1.4
Green Sunfish	Lepomis cyanellus	1	0.4	47.0	LT 0.1
Bluegill	Lepomis macrochirus	2	0.9	186.0	0.3
Largemouth Bass	Micropterus salmoides	1	0.4	950.0	1.5
White Crappie	Pomoxis annularis	2	0.9	717.0	1.1
Freshwater Drum	Aplodinotus grunniens	50	21.6	5368.0	8.5
*LT = Less Than	TOTAL	231		63312.0	

Table 6.4
Fish Species Collected by Electrofishing at Site 3 during the Callaway Plant Study, February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Icthyomyzon castaneus	7	2.0	271.0	0.3
Longnose Gar	Lepisosteus osseus	12	3.4	3927.0	3.7
Shortnose Gar	Lepisosteus platostomus	34	9.6	9462.0	17.1
Gizzard Shad	Dorosoma cepedianum	101	28.4	18172.6	8.9
Goldeye	Hiodon alosoides	33	9.3	4369.0	4.1
Carp	Cyprinus carpio	31	8.7	25635.0	24.2
Emerald Shiner	Notropis atherinoides	1	0.3	1.0	*LT 0.1
River Carpsucker	Carpiodes carpio	27	7.6	13255.0	12.5
Quillback	Carpiodes cyprinus	1	0.3	23.0	LT 0.1
Smallmouth Buffalo	Ictiobus bubalus	6	1.7	1376.0	1.3
Bigmouth Buffalo	Ictiobus cyprinellus	6	1.7	7611.0	7.2
Golden Redhorse	Moxostoma erythrurum	2	0.6	222.0	0.2
Shorthead Redhorse	Moxostoma macrolepidotum	4	1.1	1508.0	1.4
Blue Catfish	Ictalurus furcatus	1	0.3	403.0	0.4
Yellow Bullhead	Ictalurus natalis	1	0.3	136.0	0.1
Channel Catfish	Ictalurus punctatus	6	1.7	4355.0	4.1
White Bass	Morone chrysops	9	2.5	1367.0	1.3
Green Sunfish	Lepomis cyanellus	2	0.6	224.0	0.2
Warmouth	Lepomis gulosus	2	0.6	366.0	0.3
Bluegill	Lepomis macrochirus	6	1.7	597.0	0.6
White Crappie	Pomoxis annularis	1	0.3	210.0	0.2
Black Crappie	Pomoxis nigromaculatus	3	0.8	230.0	0.2
Sauger	Stizostedion canadense	2	0.6	377.0	0.4
Freshwater Drum	Aplodinotus grunniens	58	16.3	11909.0	11.2
*LT = Less Than	TOTAL	356		106006.6	

Table 6.5
Fish Species Collected by Electrofishing at Site 4 during the Callaway Plant Study, February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Icthyomyzon castaneus	2	0.7	38.0	*LT 0.1
Longnose Gar	Lepisosteus osseus	11	3.7	9351.0	10.6
Shortnose Gar	Lepisosteus platostomus	29	9.7	13213.0	15.0
Gizzard Shad	Dorosoma cepedianum	104	34.8	16765.4	19.0
Goldeye	Hiodon alosoides	58	19.4	6374.0	7.2
Carp	Cyprinus carpio	11	3.7	11679.0	13.2
Emerald Shiner	Notropis atherinoides	1	0.3	4.0	*LT 0.1
River Carpsucker	Carpiodes carpio	15	5.0	12006.0	13.6
Smallmouth Buffalo	Ictiobus bubalus	1	0.3	518.0	0.6
Shorthead Redhorse	Moxostoma macrolepidotum	3	1.0	872.0	1.0
Blue Catfish	Ictalurus furcatus	4	1.3	3368.0	3.8
Channel Catfish	Ictalurus punctatus	4	1.3	2975.0	3.4
Flathead Catfish	Pylodictis olivaris	3	1.0	1051.0	1.2
White Bass	Morone chrysops	8	2.7	2338.0	2.7
Green Sunfish	Lepomis cyanellus	1	0.3	114.0	0.1
Bluegill	Lepomis macrochirus	3	1.0	381.0	0.4
White Crappie	Pomoxis annularis	5	1.7	1116.0	1.3
Black Crappie	Pomoxis nigromaculatus	1	0.3	186.0	0.2
Freshwater Drum	Aplodinotus grunniens	35	11.7	5817.0	6.6
*LT = Less Than	TOTAL	299		88166.4	

Table 6.6
Fish Species Collected by Electrofishing at Site 5 during the Callaway Plant Study,
February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Icthyomyzon castaneus	13	3.6	229.0	0.2
Shovelnose Sturgeon	Scaphirhynchus platorynchus	1	0.3	638.0	0.6
Paddlefish	Polyodon spathula	1	0.3	3200.0	2.8
Longnose Gar	Lepisosteus osseus	9	2.5	6084.0	5.3
Shortnose Gar	Lepisosteus platostomus	14	3.9	5537.0	4.8
Gizzard Shad	Dorosoma cepedianum	127	35.6	25772.8	22.4
Goldeye	Hiodon alosoides	89	24.9	11083.0	9.6
Mooneye	Hiodon tergisus	1	0.3	80.0	*LT 0.1
Carp	Cyprinus carpio	14	3.9	29175.0	25.4
Grass Carp	Ctenopharyngodon idella	1	0.3	4850.0	4.2
River Carpsucker	Carpiodes carpio	16	4.5	5667.0	4.9
Smallmouth Buffalo	Ictiobus bubalus	2	0.6	4025.0	3.5
Shorthead Redhorse	Moxostoma macrolepidotum	3	0.8	1721.0	1.5
Blue Catfish	Ictalurus furcatus	2	0.6	1461.0	1.3
Channel Catfish	Ictalurus punctatus	2	0.6	1720.0	1.5
Flathead Catfish	Pylodictis olivaris	1	0.3	1800.0	1.6
White Bass	Morone chrysops	5	1.4	1133.0	1.0
White Crappie	Pomoxis annularis	3	0.8	726.0	0.6
Freshwater Drum	Aplodinotus grunniens	53	14.8	10135.0	8.8
*LT = Less Than	TOTAL	357		115036.8	

Relative Abundance of Dominant Species
By Site from Electrofishing

	North Shore 1	North Shore 2	North Shore 3	South Shore 4	South Shore 5
Shortnose Gar	8.2	13.0	9.6	9.7	*
Gizzard Shad	19.2	23.8	28.4	34.8	35.6
Goldeye	17.8	9.1	9.3	19.4	24.9
Carp	*	15.2	8.7	*	*
River Carpsucker	*	7.8	7.6	5.0	*
Freshwater Drum	40.1	21.6	16.3	11.7	14.8

*Species was not a dominant component of collections.

Gizzard shad, goldeye, and freshwater drum were ubiquitous and were the dominant species collected at all sites. Gizzard shad and goldeye were more dominant on the south shore, whereas freshwater drum and shortnose gar were more dominant on the north shore. Carp was a dominant species at sites 2 and 3. River carpsucker exhibited that it was a dominant species at sites 2, 3, and 4.

Data on absolute and relative abundance from electrofishing collections for all sites monthly are presented in Appendix D.1 and for each site monthly in Appendix D.2.

Tables 6.7 through 6.10 show the seasonal species composition and abundance in collections from all electrofishing collection sites for the fall, winter, spring and summer. This seasonal data is summarized for the dominant species in Table 6.11. This table illustrates the seasonal variability in species composition by showing the seasonal relative abundance of dominant species. Gizzard shad, goldeye, and freshwater drum were dominant during all seasons. Shortnose gar and

Table 6.7
Fish Species Collected by Electrofishing during the Spring Season
At All Sites during the Callaway Plant Study, February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Icthyomyzon castaneus	13	1.4	205.0	0.1
Longnose Gar	Lepisosteus osseus	9	1.0	1996.0	1.4
Shortnose Gar	Lepisosteus platostomus	56	6.0	22095.0	15.0
Gizzard Shad	Dorosoma cepedianum	194	21.0	17390.8	11.8
Goldeye	Hiodon alosoides	202	21.8	19483.0	13.2
Mooneye	Hiodon tergisus	1	0.1	116.0	*LT 0.1
Carp	Cyprinus carpio	57	6.2	35272.0	23.9
Emerald Shiner	Notropis atherinoides	1	0.1	1.0	LT 0.1
River Carpsucker	Carpiodes carpio	28	3.0	4267.0	2.9
Quillback	Carpiodes cyprinus	1	0.1	23.0	LT 0.1
Smallmouth Buffalo	Ictiobus bubalus	6	0.6	1312.0	0.9
Bigmouth Buffalo	Ictiobus cyprinellus	4	0.4	2511.0	1.7
Shorthead Redhorse	Moxostoma macrolepidotum	2	0.2	629.0	0.4
Blue Catfish	Ictalurus furcatus	2	0.2	1461.0	1.0
Black Bullhead	Ictalurus melas	2	0.2	604.0	0.4
Yellow Bullhead	Ictalurus natalis	1	0.1	136.0	LT 0.1
Channel Catfish	Ictalurus punctatus	8	0.9	2146.0	1.5
Flathead Catfish	Pylodictis olivaris	1	0.1	437.0	0.3
White Bass	Morone chrysops	22	2.4	3311.0	2.2
Green Sunfish	Lepomis cyanellus	4	0.4	385.0	0.3
Warmouth	Lepomis gulosus	2	0.2	366.0	0.2
Bluegill	Lepomis macrochirus	12	1.3	1186.0	0.8
Largemouth Bass	Micropterus salmoides	3	0.3	2378.0	1.6
White Crappie	Pomoxis annularis	9	1.0	2667.0	1.8
Black Crappie	Pomoxis nigromaculatus	2	0.2	27.0	LT 0.1
Sauger	Stizostedion canadense	1	0.1	32.0	LT 0.1
Freshwater Drum	Aplodinotus grunniens	283	30.6	26862.6	18.2
*LT = Less Than	TOTAL	926		147299.4	

Table 6.8
Fish Species Collected by Electrofishing during the Summer Season
At All Sites during the Callaway Plant Study, February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Icthyomyzon castaneus	2	0.6	27.0	*LT 0.1
Shovelnose Sturgeon	Scaphirhynchus platorynchus	1	0.3	638.0	0.4
Longnose Gar	Lepisosteus osseus	21	6.5	9614.0	6.8
Shortnose Gar	Lepisosteus platostomus	89	27.5	30986.0	21.8
American Eel	Anguilla rostrata	1	0.3	480.0	0.3
Gizzard Shad	Dorosoma cepedianum	28	8.6	6142.0	4.3
Goldeye	Hiodon alosoides	50	15.4	7800.0	5.5
Carp	Cyprinus carpio	28	8.6	44671.0	31.5
River Carpsucker	Carpiodes carpio	21	6.5	16221.0	11.4
Smallmouth Buffalo	Ictiobus bubalus	1	0.3	750.0	0.5
Blue Catfish	Ictalurus furcatus	2	0.6	1466.0	1.0
Channel Catfish	Ictalurus punctatus	6	1.9	5021.0	3.5
Flathead Catfish	Pylodictis olivaris	7	2.2	5030.0	3.5
White Bass	Morone chrysops	9	2.8	2256.0	1.6
Bluegill	Lepomis macrochirus	4	1.2	286.0	0.2
Spotted Bass	Micropterus punctulatus	1	0.3	192.0	0.1
White Crappie	Pomoxis annularis	4	1.2	982.0	0.7
Black Crappie	Pomoxis nigromaculatus	1	0.3	186.0	0.1
Freshwater Drum	Aplodinotus grunniens	48	14.8	9080.0	6.4
	TOTAL	324		141828.0	

*LT = Less Than

Table 6.9
Fish Species Collected by Electrofishing during the Fall Season
At All Sites during the Callaway Plant Study, February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Chestnut Lamprey	Ichthyomyzon castaneus	13	2.3	431.0	0.2
Paddlefish	Polyodon spathula	1	0.2	3200.0	1.6
Longnose Gar	Lepisosteus osseus	19	3.4	13449.0	6.8
Shortnose Gar	Lepisosteus platostomus	18	3.2	6075.0	3.1
Gizzard Shad	Dorosoma cepedianum	242	43.1	49539.8	25.2
Goldeye	Hiodon alosoides	60	10.7	7866.0	4.0
Mooneye	Hiodon tergisus	2	0.4	218.0	0.1
Carp	Cyprinus carpio	26	4.6	44541.0	22.6
Grass Carp	Ctenopharyngodon idella	1	0.2	4850.0	2.5
River Carpsucker	Carpiodes carpio	34	6.1	17426.0	8.9
Smallmouth Buffalo	Ictiobus bubalus	4	0.7	5475.0	2.8
Bigmouth Buffalo	Ictiobus cyprinellus	4	0.7	8775.0	4.5
Golden Redhorse	Moxostoma erythrurum	4	0.7	767.0	0.4
Shorthead Redhorse	Moxostoma macrolepidotum	3	0.5	1500.0	0.8
Blue Catfish	Ictalurus furcatus	6	1.1	3124.0	1.6
Channel Catfish	Ictalurus punctatus	5	0.9	3708.0	1.9
Flathead Catfish	Pylodictis olivaris	1	0.2	300.0	0.2
White Bass	Morone chrysops	7	1.2	1476.0	0.7
White Crappie	Pomoxis annularis	1	0.2	237.0	0.1
Black Crappie	Pomoxis nigromaculatus	1	0.2	203.0	0.1
Sauger	Stizostedion canadense	4	0.7	1469.0	0.7
Freshwater Drum	Aplodinotus grunniens	105	18.7	22204.0	11.3
*LT = Less Than	TOTAL	561		196833.8	

Table 6.10
Fish Species Collected by Electrofishing during the Winter Season
At All Sites during the Callaway Plant Study, February 1985 through January 1986

Common Name	Scientific Name	Number	Relative Abundance	Total WT.(G)	Relative Weight
Gizzard Shad	Dorosoma cepedianum	54	47.8	2594.0	17.1
Goldeye	Hiodon alosoides	10	8.8	706.0	4.7
Mooneye	Hiodon tergisus	1	0.9	32.0	0.2
Carp	Cyprinus carpio	2	1.8	3350.0	22.1
Emerald Shiner	Notropis atherinoides	1	0.9	4.0	*LT 0.1
River Carpsucker	Carpiodes carpio	2	1.8	1068.0	7.0
Highfin Carpsucker	Carpiodes velifer	1	0.9	1000.0	6.6
Shorthead Redhorse	Moxostoma macrolepidotum	6	5.3	2447.0	16.1
Flathead Catfish	Pylodictis olivaris	1	0.9	424.0	2.8
White Bass	Morone chrysops	2	1.8	734.0	4.8
Freshwater Drum	Aplodinotus grunniens	33	29.2	2814.0	18.5
*LT = Less Than	TOTAL	113		15173.0	

Table 6.11
Relative Abundance of Dominant Species by Season from
Electrofishing Collections During the Callaway Plant Study, February 1985 through January 1986

Common Name	Scientific Name	All Sites Spring	Summer	Fall	Winter
Shortnose Gar	Lepisosteus platostomus	6.0%	27.5%	*	*
Gizzard Shad	Dorosoma cepedianum	21.0%	8.6%	43.1%	47.8%
Goldeye	Hiodon alosoides	21.8%	15.4%	10.7%	8.8%
Carp	Cyprinus carpio	6.2%	8.6%	*	*
Freshwater Drum	Aplodinotus grunniens	30.6%	14.8%	18.7%	29.2%
Longnose Gar	Lepisoteus osseus	*	6.5%	*	*
River Carpsucker	Carpiodes carpio	*	6.5%	6.1%	*
Shorthead Redhorse	Moxostoma macrolepidotum	*	*	*	5.3%

* Species was not a dominant component of collections.

carp were dominant species during the spring and summer seasons. Longnose gar was a dominant species in the summer and shorthead redhorse in the winter. In the summer and fall seasons, river carpsucker was a dominant species in the electrofishing collections.

Seasonal species composition for each electrofishing collection site are presented in Appendix D.3. Appendix D.4 provides data concerning each species collected in electrofishing collections for each site and all sites by showing the total number collected, mean total length, length range, mean weight, weight range, percent total biomass collected, and percent occurrence in the collections.

Seining collection data showing numbers and relative abundance for each species during the study are presented in Table 6.12. Seining produced chub, shiner and minnow species that were not present in the electrofishing collections, thus providing further documentation of the fish populations in the vicinity of the Callaway intake structure. Sampling by seining collected a total of 881 specimens representing 8 families and 17 species. The dominant species from the seining collections were channel catfish (63.5% relative abundance), freshwater drum (18.1%), and river carpsucker (9.1%). The specimens of these species were all young of the year and this shows the high fecundity and compensatory potential of these species.

Seining was scheduled to be conducted monthly but because of inclement weather and high river elevations, sampling was only accomplished on July 24, 1985. Electrofishing was not conducted in December 1985 because of adverse river conditions.

Table 6.12

Fish Species Collected by Seining at the Callaway Plant, February 1985 through January 1986

Common Name	Scientific Name	Number Site 1	Number Site 5	Total	Relative Abundance
Gizzard Shad	Dorosoma cepedianum	5	6	11	1.3
Goldeye	Hiodon alosoides	5	1	6	*LT 0.1
Silver Chub	Hybopsis storeriana	11	16	27	3.1
Speckled Chub	Hybopsis aestivalis	6		6	LT 0.1
Sicklefin Chub	Hybopsis meeki		2	2	LT 0.1
Flathead Chub	Hybopsis gracilis		2	2	LT 0.1
Bluntnose Minnow	Pimephales notatus	1	17	18	2.0
Suckermouth Minnow	Phenacobius mirabilis	1		1	LT 0.1
Emerald Shiner	Notropis atherinoides		2	2	LT 0.1
Sand Shiner	Notropis stramineus		2	2	LT 0.1
River Carpsucker	Carpiodes carpio		80	80	9.1
Channel Catfish	Ictalurus punctatus	127	432	559	63.5
Yellow Bullhead	Ictalurus natalis	1		1	LT 0.1
White Bass	Morone chrysops	1	2	3	LT 0.1
Spotted Bass	Micropterus punctulatus	1		1	LT 0.1
Bluegill	Lepomis macrochirus	1		1	LT 0.1
Freshwater Drum	Aplodinotus grunniens	50	109	159	18.1
Total		210	671	881	

*LT = Less Than

No fish of threatened or endangered status for Missouri waters (Mo. Dept. of Con. 1977), or included on the U.S. Fish and Wildlife Service List of Endangered and Threatened Wildlife (U.S. Dept. of Interior 1975) were collected during the study. Two sicklefin chubs (Hybopsis meeki) were collected by seining on the south shore during the study. The sicklefin chub is considered rare by the state of Missouri.

6.3.2 Pflieger Faunal Composition Analysis

Pflieger faunal composition analysis is a method of characterizing and analyzing the fish populations according to the habitat requirements of the various species. Faunal composition may be based on the number of species or the number of specimens within each faunal group. The Pflieger faunal composition percentages for all electrofishing collections monthly, seasonally and for the year by number of species and by number of specimens are presented in Tables 6.13 and 6.14, respectively. For all sites 50.0% of the species were wide ranging, 29.4% Big River, 5.9% Ozark and Prairie, and 2.9% each fell into Lowland, Ozark-Lowland and Ozark-Prairie faunal groups. The faunal composition percentage by number of specimens at all sites for the year were 52.7% Big River, 41.8% Wide Ranging, and 4.5% Prairie. All other faunal groups combined made up 1.1% of the specimens.

Appendix D.5 contains the Pflieger faunal composition percentages by the number of species and by the number of specimens for each electrofishing collection site by the month, season, and year.

Table 6.13
Pflieger Faunal Composition by Number of Species for All Electrofishing Collections
Monthly, Seasonally, and for the Year at the Callaway Plant, February 1985 through January 1986

	Ozark	Lowland	Prairie	Big River	Ozark Lowland	Ozark Prairie	Wide Ranging	Not Defined
February 1985	11.1	0.0	11.1	33.3	0.0	11.1	33.3	0.0
March 1985	0.0	0.0	5.6	33.3	0.0	5.6	55.6	0.0
April 1985	0.0	4.5	9.1	22.7	0.0	0.0	63.6	0.0
May 1985	0.0	0.0	9.1	18.2	0.0	0.0	72.7	0.0
June 1985	0.0	0.0	9.1	36.4	0.0	0.0	54.5	0.0
July 1985	0.0	0.0	6.3	37.5	6.3	0.0	50.0	0.0
August 1985	0.0	0.0	6.7	33.3	0.0	0.0	60.0	0.0
September 1985	0.0	0.0	7.1	35.7	0.0	0.0	57.1	0.0
October 1985	5.9	0.0	5.9	41.2	0.0	5.9	41.2	0.0
November 1985	0.0	0.0	9.1	27.3	0.0	9.1	54.5	0.0
January 1986	0.0	0.0	0.0	40.0	0.0	20.0	40.0	0.0
Spring Season	0.0	3.7	7.4	25.9	0.0	3.7	59.3	0.0
Summer Season	0.0	0.0	5.3	31.6	5.3	0.0	57.9	0.0
Fall Season	4.5	0.0	4.5	36.4	0.0	4.5	50.0	0.0
Winter Season	9.1	0.0	9.1	36.4	0.0	9.1	36.4	0.0
For The Year	5.9	2.9	5.9	29.4	2.9	2.9	50.0	0.0

Table 6.14
Pflieger Faunal Composition by Number of Specimens for All Electrofishing Collections
Monthly, Seasonally, and for the Year at the Callaway Plant, February 1985 through January 1986

	Ozark	Lowland	Prairie	Big River	Ozark Lowland	Ozark Prairie	Wide Ranging	Not Defined
February 1985	1.2	0.0	2.3	51.2	0.0	5.8	39.5	0.0
March 1985	0.0	0.0	4.2	80.1	0.0	0.4	15.2	0.0
April 1985	0.0	0.5	2.4	46.1	0.0	0.0	50.9	0.0
May 1985	0.0	0.0	1.0	32.0	0.0	0.0	67.0	0.0
June 1985	0.0	0.0	7.2	59.0	0.0	0.0	33.8	0.0
July 1985	0.0	0.0	5.6	62.2	1.1	0.0	31.1	0.0
August 1985	0.0	0.0	6.3	64.2	0.0	0.0	29.5	0.0
September 1985	0.0	0.0	8.5	46.0	0.0	0.0	45.5	0.0
October 1985	1.4	0.0	4.5	24.3	0.0	0.7	69.2	0.0
November 1985	0.0	0.0	4.4	62.2	0.0	2.2	31.1	0.0
January 1986	0.0	0.0	0.0	7.4	0.0	3.7	88.9	0.0
Spring Season	0.0	0.2	3.1	61.2	0.0	0.2	35.2	0.0
Summer Season	0.0	0.0	6.5	61.4	0.3	0.0	31.8	0.0
Fall Season	0.7	0.0	6.1	36.0	0.0	0.5	56.7	0.0
Winter Season	0.9	0.0	1.8	40.7	0.0	5.3	51.3	0.0
For The Year	0.3	0.1	4.5	52.7	*LT 0.1	0.6	41.8	0.0

*LT = less than

6.3.3 Length-Frequency Distribution

Length-frequency distributions for 18 different species of fish collected by electrofishing are given in Appendix D.6. These tables show the length-frequency distributions for each season and for the year for each species. The length-frequency distributions are in 50 millimeter (mm) increments for freshwater drum and gizzard shad, but are in 20 mm increments for other species.

These length-frequency distributions provide information on the size distributions of fish occurring at the collection sites in the vicinity of the Callaway intake structure during the study.

6.3.4 Catch-Per-Unit-Effort

Table 6.15 presents catch-per-unit-effort (CPUE) figures for the electrofishing collections. CPUE was calculated as a number of fish per standardized effort (fish per minute sampled) for each collection site and for all sites by month, season and the year. The CPUE ranged from 0.0 CPUE at site 1 and 2 in January 1986 to 6.0 CPUE at site 1 in April 1985. Site 4 CPUE of 0.96 was the lowest catch rate of the five sites during the study. Site 2 had the highest CPUE (2.41) during the study. The spring season CPUE of 2.27 was the highest seasonal average and the winter season CPUE of 0.51 was the lowest. The CPUE at all sites for the year was 1.36 fish per minute.

Table 6.15
Catch-Per-Unit-Effort for Electrofishing Collections Monthly, Seasonally, and for the Year By Site, and All Sites during the Callaway Plant Study, February 1985 through January 1986

	COLLECTION SITE					ALL SITES
	1	2	3	4	5	
February 1985	0.742	0.625	1.789	0.737	0.588	0.915
March 1985	4.880	4.200	0.867	2.750	4.300	3.485
April 1985	6.000	5.444	2.560	0.857	2.067	2.937
May 1985	0.800	5.000	0.257	0.233	0.094	0.662
June 1985	1.050	0.778	0.452	1.333	1.200	0.993
July 1985	1.208	2.143	0.700	0.567	0.267	0.744
August 1985	1.000	1.400	1.000	0.267	0.367	0.720
September 1985	1.800	1.444	2.605	0.767	0.839	1.566
October 1985	1.519	5.000	1.133	2.800	3.267	2.355
November 1985	0.143	0.600	0.633	0.125	0.400	0.349
January 1986	0.0	0.0	0.133	0.514	0.217	0.214
Spring Season	3.642	4.857	1.100	1.082	1.841	2.270
Summer Season	1.074	1.385	0.720	0.722	0.611	0.824
Fall Season	1.124	2.077	1.551	1.310	1.495	1.417
Winter Season	0.377	0.313	0.776	0.593	0.375	0.514
For The Year	1.816	2.406	1.079	0.955	1.178	1.358

6.3.5 Seasonal Trends

Table 6.11 showed seasonal changes in the relative abundance of dominant species. Seasonality may also be examined by consideration of the percentage of total catch for a species that occurred during each season. Table 6.16 presents this information for all species that were collected in numbers of five or more in electrofishing sampling. This table shows that seven of the eighteen species were present in all seasons. Seven other species were present during all seasons except the winter. Smallmouth buffalo and sauger were collected only in the spring and fall. Shorthead redhorse were not collected in the summer and 54.5% of the specimens were sampled in the winter. The majority of gizzard shad were collected in the spring (37.5%) and fall (46.7%). Goldeye and freshwater drum were collected in the highest numbers in the spring, when 62.7% and 60.3% of the specimens were collected, respectively. Seventy percent of the flathead catfish were collected in the summer. Spring (34.4%) and summer (54.6%) was when the majority of shortnose gar were collected, whereas longnose gar was collected in the highest numbers in the summer and fall. Smallmouth buffalo were mainly collected in the spring and fall. Carp and river carpsucker were collected in high numbers during all seasons except winter.

Table 6.16

Seasonal Distribution of Species* in Electrofishing Collections During the Callaway Study, February 1985 through January 1986

Common Name	Spring	Summer	Fall	Winter
Chestnut Lamprey	46.4%	7.1%	46.4%	0%
Longnose Gar	18.4%	42.9%	38.8%	0%
Shortnose Gar	34.4%	54.6%	11.0%	0%
Gizzard Shad	37.5%	5.4%	46.7%	10.4%
Goldeye	62.7%	15.5%	18.6%	3.1%
Carp	50.4%	24.8%	23.0%	1.8%
River Carpsucker	32.9%	24.7%	40.0%	2.4%
Smallmouth Buffalo	54.5%	9.1%	36.4%	0%
Bigmouth Buffalo	50.0%	0%	50.0%	0%
Shorthead Redhorse	18.2%	0%	27.3%	54.5%
Blue Catfish	20.0%	20.0	60.0%	0%
Channel Catfish	42.1%	31.6%	26.3%	0%
Flathead Catfish	10.0%	70.0%	10.0%	10.0%
White Bass	55.0%	22.5%	17.5%	5.0%
Bluegill	75.0%	25.0%	0%	0%
White Crappie	64.3%	28.6%	7.1%	0%
Sauger	20.0%	0%	80.0%	0%
Freshwater Drum	60.3%	10.2%	22.4%	7.0%

*Fish species collected in numbers of five or more in electrofishing collections.

6.3.6 Spatial Distributions

Table 6.17 summarizes the percentage occurrence, the spatial distribution, and the total numbers for each species in the electrofishing collections over the entire study. The three predominant species, gizzard shad, goldeye and freshwater drum exhibited the highest percentages of occurrence and were collected at all sites. Species that occurred at all sites but showed varying degrees of occurrence were chestnut lamprey, longnose gar, shortnose gar, carp, river carpsucker, smallmouth buffalo, white bass, and white crappie.

The bigmouth buffalo, shorthead redhorse, blue catfish, channel catfish, flathead catfish, green sunfish, and bluegill were species occurring at 50% or more of the electrofishing collection sites.

Habitat preferences were exhibited by certain species during the study. Shortnose gar, goldeye, mooneye, white bass, and freshwater drum showed a distinct preference for site 1. Fish species preferring site 3 were river carpsucker, smallmouth buffalo, and bigmouth buffalo. Carp, sauger, and golden redhorse exhibited a preference for sites on the north shore. Sixty percent of the flathead catfish were collected from site 1 and 30% were collected from site 4. Ninety-one percent of the shorthead redhorse were collected from sites 3, 4, and 5.

Table 6.17

Occurrence and Distribution of Species in Electrofishing Collections During the Callaway Study, February 1985 through January 1986

Common Name	Percent Occurrence Within Electrofishing Collections	Sites 1	2	3	4	5	Total
Chestnut Lamprey	22.6%	X	X	X	X	X	28
Shovelnose Sturgeon	1.9%					X	1
Paddlefish	1.9%					X	1
Longnose Gar	43.4%	X	X	X	X	X	49
Shortnose Gar	60.4%	X	X	X	X	X	163
American Eel	1.9%	X					1
Gizzard Shad	71.7%	X	X	X	X	X	518
Goldeye	75.5%	X	X	X	X	X	322
Mooneye	7.5%	X				X	4
Carp	60.4%	X	X	X	X	X	113
Grass Carp	1.9%					X	1
Emerald Shiner	3.8%			X	X		2
River Carpsucker	49.1%	X	X	X	X	X	85
Quillback	1.9%			X			1
Highfin Carpsucker	1.9%	X					1
Smallmouth Buffalo	15.1%	X	X	X	X	X	11
Bigmouth Buffalo	7.5%	X	X	X			8
Golden Redhorse	3.8%		X	X			4
Shorthead Redhorse	17.0%	X		X	X	X	11
Blue Catfish	13.2%	X		X	X	X	10
Black Bullhead	3.8%	X	X				2
Yellow Bullhead	1.9%			X			1
Channel Catfish	22.6%	X		X	X	X	19
Flathead Catfish	13.2%	X			X	X	10
White Bass	37.7%	X	X	X	X	X	40
Green Sunfish	5.7%		X	X	X		4
Warmouth	1.9%			X			2
Bluegill	17.0%	X	X	X	X		16
Largemouth Bass	5.7%	X	X				3
Spotted Bass	1.9%	X					1
White Crappie	22.6%	X	X	X	X	X	14
Black Crappie	5.7%			X	X		4
Sauger	5.7%	X		X			5
Freshwater Drum	81.1%	X	X	X	X	X	469

6.4 Discussion

6.4.1 Species Composition and Abundance

Threatened or endangered fish species (U.S. Dept. of Interior 1975; Missouri Dept. of Conservation 1977) were not collected during the field fisheries study or previous studies near the Callaway Plant (Union Electric Co. 1974, 1975, 1976; Camp, Dresser & McKee 1981, 1982). Sicklefin chub, a species considered rare by the state of Missouri (Missouri Dept. of Conservation 1977), were collected during the 1985-86 study and previous studies (Camp, Dresser & McKee 1981, 1982). The occurrence of the sicklefin chub within the study area was not unexpected relative to the habitat present within the study area. Pflieger (1971, p. 338) reported that the sicklefin chub occurs only in the Missouri River and lower Mississippi River in Missouri, preferring the main channel with substrates of sand and fine gravel. Its abundance increases toward the mouth of the Missouri River.

The only fish species collected during the 1985-86 study which had not been sampled during previous studies was the grass carp (*Ctenopharyngodon idella*). Pflieger (1975) states the grass carp is a native of eastern Asia that was brought into this country as early as 1963 and was introduced into open waters of Arkansas shortly thereafter. The grass carp is reported to be an inhabitant of large rivers. The larger streams of Missouri, particularly the Mississippi and Missouri, appear to provide suitable habitat (Pflieger 1975).

Relative abundance and species composition has varied during the Missouri River field fisheries investigations conducted for the

Callaway Plant. Species composition stayed relatively constant for the river as a whole, but has fluctuated according to sampling methodologies and collection sites. Relative abundance has varied among studies but not beyond what would be expected of fish populations in a dynamic riverine environment. Camp, Dresser & McKee (1981) in electrofishing collections found gizzard shad (69.8%), freshwater drum (5.2%), shortnose gar (5.0%), and river carpsucker (4.9%) to be the most abundant species in the river near the Callaway Plant. The following year Camp, Dresser & McKee (1982) in electrofishing collections found freshwater drum (36.5%), gizzard shad (35.5%), river carpsucker (6.6%), and goldeye (6.1%) to be the abundant species. The 1985-86 study found gizzard shad (26.9%), freshwater drum (24.4%), goldeye (16.7%), shortnose gar (8.5%), and carp (5.9%) to be the most abundant species. Gizzard shad and freshwater drum have remained the two predominant species collected during the last three field fisheries studies at Callaway. The differences in relative abundance between studies can be attributable to naturally fluctuating biotic and abiotic conditions.

There were 34 species collected by electrofishing during the 1985-86 study and in past studies 28 species (Camp, Dresser & McKee, 1982) and 31 species (Camp, Dresser & McKee 1981) were collected by this methodology. The species composition has remained stable in the Missouri River near the Callaway Plant. Differences in species numbers between studies is accountable by the occurrence of a few minor species being collected during certain studies.

Seining samples showed high fecundity and compensatory potential of certain species since 559 channel catfish, 159 freshwater drum, and 80 river carpsucker were collected on July 24, 1985. Seining samples provided information on the presence of minnow, shiner, and chub species, just as past studies have done (Camp, Dresser & McKee 1981, 1982).

6.4.2 Comparison by Pflieger Faunal Composition

Faunal compositions of the collections from fisheries studies conducted at the Callaway Plant were compared using Pflieger's classification system. The analysis was based on the number of species since analysis by number of specimens would skew the composition toward certain faunal groups because of the differences between studies.

Table 6.18 presents the Pflieger faunal composition by the number of species collected during the various studies. The earlier electrofishing studies to the present study conducted in the Missouri River near the Callaway Plant shows that faunal composition has been shifting from the big river faunal group to the wide ranging faunal group. One reason why this phenomenon may be happening is because of the Army Corps of Engineers dike notching program. Just recently the Corps implemented dike notching to create more diverse fish habitat by eliminating sediment build-up behind certain dike fields. Dike notching has created scour holes, flow behind dike fields during low to medium flows, and habitat diversity. This diversity has created niches where faunal groups other than the big river faunal group can

Table 6.18
Pflieger Faunal Composition by Number of Specimens Collected
During Field Fisheries Studies Conducted for the Callaway Plant

Study And Collection Method	Ozark	Lowland	Prairie	Big River	Ozark Lowland	Ozark Prairie	Wide Ranging	Not Defined
Camp, Dresser * McKee Study, 1980-1981, Electrofishing	0.0	0.0	12.9	41.9	3.2	3.2	38.7	3.2
Camp, Dresser * McKee Study, 1981-1982, Electrofishing	3.6	0.0	7.1	35.7	0.0	7.1	42.9	3.6
Union Electric Company Study, 1985-86, Electrofishing	5.9	2.9	5.9	29.4	2.9	2.9	50.0	0.0

inhabitat within the main portion of the Missouri River. This shift is beneficial since the big river faunal group is as abundant but has helped to restore diversity within a river system which has been greatly altered by past channelization and stabilization practices.

6.4.3 Impingement Composition and Abundance

Impingement samples included nine families and thirteen species, as shown in Table 5.2. Walleye (Stizostedion vitreum) was collected in the impingement studies but was not collected in the 1985-86 field fisheries study. This species has been collected in other studies conducted in the Missouri River near the Callaway Plant (Camp, Dreser & McKee 1981, 1982). Gizzard shad (91.4%) and freshwater drum (4.0%) together comprised 95.4% of the relative abundance from the impingement collections. Gizzard shad was the most abundant species in the electrofishing sampling, and freshwater drum was the second most abundant species. Also, freshwater drum was the second most abundant species in the seining collections.

Impingement sampling results indicated that 98% of impinged gizzard shad are one year old or less. The compensatory potential and natural mortality rates (Bodola 1966) of this species suggest that any effect on their populations from impingement would be insignificant.

Impingement primarily affects gizzard shad and freshwater drum, the two dominant species in the electrofishing collections. The field fisheries and impingement studies both confirm the predominance of gizzard shad and freshwater drum in the Missouri River. The other species in impingement samples were less dominant in abundance which was consistent with their lower abundance in the field fisheries study.

6.4.4 Intake Structure Location-Fish Involvement

The intake structure's location was selected so its effects on the fish populations would be minimal. The intake was located on a straight rip-rap bank that has the main river channel immediately offshore. Water withdrawal occurs from the depths of the main channel where fish inhabitation is minimal. The intake structure is located where spawning areas are limited and nursery areas are almost nonexistent. Fish involvement with the intake basically entails fish migrating around the structure. Major feeding areas do not exist in the area of the intake structure. The impingement study, which was conducted concurrently with the field fisheries study, projected that 2410 fish weighing 59.5 kilograms (131.2 pounds) would be impinged annually. This extremely low impingement rate lends further credence that the intake structure does not exist in major spawning, nursery, or feeding areas for fish (see sections 4.4.2 and 6.2.3).

From the middle of May through the middle of November 1985 (28 impingement tests), there were no fish collected during the impingement tests except on August 30 when one flathead catfish was collected. The majority of impingement by the intake structure occurred from late fall through the spring. The field fisheries data show that the highest concentration of fish (CPUE) occurs in the spring and fall around the area of the intake structure. This would account for the impingement that occurs in the fall and spring. The impingement of fish in the winter by the Callaway intake occurs primarily because of the stressed and lethargic condition of fish during periods of cold water temperature.

The construction of the intake structure created a small area downstream of the structure which is more conducive to fish inhabitation than the straight rip-rapped bank which existed before construction. This area is small and limited by the swift and deep main channel which is immediately off-shore.

6.5 Summary and Conclusions

The 1985-86 field fisheries study collected a total of 2805 specimens representing 14 families and 46 species by electrofishing and seining. The electrofishing portion of the study surveyed 34 fish species which is comparable to the 31 and 28 species surveyed in previous studies. In electrofishing collections gizzard shad (26.9%), freshwater drum (24.4%), goldeye (16.7%), shortnose gar (8.5%), and carp (5.9%) were the dominant species. Camp, Dresser & McKee (1981, 1982) also found gizzard shad and freshwater drum to be the two most dominant species in electrofishing collections. Seining sampling collected 881 specimens representing 8 families and 17 species which documented the presence of many species not readily collected by other sampling methodologies.

Threatened or endangered fish species were not collected during the 1985-86 field fisheries study. The sicklefin chub which is considered rare by the State of Missouri was collected by seining.

The grass carp was the only species collected which had not been collected during previous studies in the vicinity of the Callaway Plant.

Analysis of species composition by Pflieger faunal composition shows that the percentage of wide-ranging species is increasing and the percentage of big river species is decreasing from analysis of past and present studies conducted at Callaway. This phenomenon may be occurring because of dike notching by the Army Corps of Engineers. This has increased habitat diversity and possibly has increased fish diversity within the channelized Missouri River.

Impingement primarily affects gizzard shad and freshwater drum, the two dominant species in the electrofishing collections. The field fisheries and impingement both confirm the predominance of gizzard shad and freshwater drum in the Missouri River. The other species in impingement samples were less dominant in abundance which was consistent with their lower abundance in the field fisheries study.

Feeding, spawning, and nursery areas for fish are limited in the area of the intake structure. Fish involvement with the intake basically entails fish migrating around the structure. The low impingement rates indicate that the intake structure was located and designed to minimize impingement since the field fisheries study has shown that fish do reside in the area of intake.

7.0 References

Auer, N. A. (ed.). 1982. Identification of larval fishes of the Great Lakes basin with emphasis on the Lake Michigan drainage. Great Lakes Fishery Commission, Ann Arbor, Michigan 48105. Special Pub. 82-3:744 pp.

Ballentine, R. K., et al. 1970. Water quality of the Missouri River, Gavins Point Dam to Hermann, Missouri. Federal Water Quality Administration, Cincinati, Ohio.

Battle, J. I. and W. M. Sprules. 1960. A description of the semibuoyant eggs and early developmental stages of the goldeye *Hiodon alosoides* (Rafinesque). J. Fish. Res. Board Can. 17(2): 245-266.

Berner, L. M. 1947. A limnological survey of the Missouri River from its mouth to the Iowa state line during summer of 1945. Masters Thesis, University of Missouri.

Berner, L. M. 1951. Limnology of the lower Missouri River. Ecology 32:1-12.

Bodola, Anthony. 1966. Life history of the gizzard shad, *Dorosoma cepedianum* (Le Sueur), in Western Lake Erie. Fishery Bulletin. Vol. 65. No. 2. U.S. Fish and Wildlife Service. Washington, D.C. 391-425.

Camp, Dresser & McKee. 1981. Water quality and aquatic biological preoperational monitoring program for the Callaway Nuclear Plant.

First Annual Report, June 1980-May 1981. Unpublished report prepared for Union Electric Co., St. Louis, Missouri.

Camp, Dresser & McKee. 1982. Water quality and aquatic biological preoperational monitoring program for the Callaway Nuclear Plant. Second Annual Report, June 1981-May 1982. Unpublished Report prepared for Union Electric Co., St. Louis, Missouri.

Carter, S. R. 1977. Macroinvertebrate entrainment study at Fort Calhoun Station. In: Jensen, L.D., ed., Fourth National Workshop on Entrainment and Impingement. E.A. Communications, Melville, New York. Pages 155-169.

Clay, William M. 1975. The fishes of Kentucky. Kentucky Dept. of Fish and Wildlife Resources. Frankfort, Kentucky. 416 pp.

Damann, K. E. 1951. Missouri River Basin plankton study. Federal Security Agency, Public Health Service, Environmental Health Center, Cincinnati, Ohio.

Equitable Environmental Health, Inc. 1976. Labadie Power Plant entrainment and impingement effects on biological populations of the Missouri River. Submitted to Union Electric Co., St. Louis, Mo. 93 pp.

Funk, J. L. and J. W. Robinson. 1974. Changes in the channel of the lower Missouri River and effects on fish and wildlife. Missouri Dept. of Cons. Aquatic Series No. 11. 52 pp.

Harrow, L. G. and A. B. Schlesinger. 1981. Missouri River icthyoplankton dynamics. In: Jensen, L. D., ed., Issues

Associated with Impact Assessment - Fifth National Workshop on Entrainment and Impingement. E. A. Communications, Sparks, MD, Pages 289-307.

Hogue, J. J., Jr., R. Wallus and L. K. Kay. 1976. Preliminary guide to the identification of fishes in the Tennessee river. Tech. Note B19. Tennessee Valley Authority, Norris, TN. 66 pp.

Hubbs, C. L. 1930. Materials for a revision of the catostomid fishes of eastern North America. Misc. Publ. Mus. Zool. Univ. of Michigan, No. 20, 47 pp.

Hynes, H. B. N. 1970. The ecology of running waters. University of Toronto Press. 553 pp.

King, R. G. 1977. Entrainment of Missouri River fish larvae through Fort Calhoun Station. In: Jensen, L. D., ed., Fourth National Workshop on Entrainment and Impingement. E. A. Communications, Melville, NY. Pages 45-56.

King, R. G. 1980. Fish population and distribution study. Chapter 5. In: The evaluation of thermal effects in the Missouri River near Cooper Nuclear Station (Operational Phase). January - December 1979. Report to Nebraska Public Power District, Columbus, Nebraska, by Hazleton Environmental Services. Pages 92-119.

Lowe, R. L. 1974. Environmental requirements and pollution tolerance of freshwater diatoms. Prepared for National Environmental Research Center. EPA-670/4-74-005. 333 pp.

May, E. B. and C. R. Gasaway. 1967. A preliminary key to the identification of larval fishes of Oklahoma, with particular reference to Canton Reservoir, including a selected bibliography. Okla. Dept. Wildlf. Conserv. Fish. Res. Lab. Bull. No. 5. 42 pp.

Missouri Department of Conservation. 1977. Rare and endangered fauna of Missouri. Fish and Wildlife Research Center. Columbia, Mo. July 1977.

Nordstrom, G. R., W. L. Pflieger, K. C. Sadler and W. H. Lewis. 1977. Rare and endangered species of Missouri. Missouri Dept. of Conserv. and U. S. Dept. of Agri. Soil Conserv. Service. 129 pp.

Pflieger, W. 1971. A distributional study of Missouri fishes. Univ. Kansas Mus. Nat. Hist. Publ. 20(3): 225-570.

Pflieger, W. 1975. The fishes of Missouri. Missouri Dept. of Conservation. Jefferson City, Mo. 343 pp.

Repsys, A. J. 1979. Zooplankton. Chapter 4. In: The evaluation of thermal effects in the Missouri River near Cooper Nuclear Station (Operational phase), January-December 1978. Report to Nebraska Public Power District, Columbus, Nebraska, by Hazleton Environmental Sciences. p. 56-66.

Robins, C. R. and E. C. Raney. 1956. Studies of the Catostomid fishes of the genus *Moxostoma* with descriptions of two new species. Cornell Univ. Agri. Exp. Sta. Memoir No. 343, 6 pp.

Slizeski, Joseph J., John L. Andersen, and Wayne G. Dorough. 1982. Hydrologic setting, system operation, present and future stresses.

Chapter 2. In: Hesse, L. W., et. al., ed., The Middle Missouri River. The Missouri River Study Group, Norfolk, Nebraska. p. 15-37.

Smith, P. W. 1979. The fishes of Illinois. Univ. of Illinois Press, Urbana, Illinois. 314 pp.

Stern, D. H. and M. Stern. 1972. Aquatic biology. In: University of Missouri-Rolla, Missouri River Environmental Inventory, Rulo, Nebraska to mouth near St. Louis, Missouri. Vol. 1.

Swedberg, D. V. and C. H. Walberg. 1970. Spawning and early life history of the freshwater drum in Lewis and Clark Lake, Missouri River. Trans. Am. Fish. Soc. 99(3): 560-570.

Taber, C. A. 1969. The distribution and identification of larval fishes in the Buncombe Creek arm of Lake Texoma with observations on spawning habits and relative abundance. Ph.D. dissertation, Univ. Oklahoma, Norman.

Taylor, W. D., L. R. Williams, S. C. Hern, V. W. Lambou, F. A. Morris, M. K. Morris and C. L. Howard. 1980. Phytoplankton water-quality relationships in U.S. lakes. Part VIII: Algae associated with or responsible for water-quality problems. EPA 600/3-80-100. 317 pp.

Todd, R. D. 1980. Water evaluation. Chapter 2. In: The evaluation of thermal effects in the Missouri River near Cooper Nuclear Station (Operational phase), January-December 1979. Report to Nebraska Public Power District, Columbus, Nebraska, by Hazleton Environmental Sciences. p. 8-44.

Trautman, M. B. 1981. The fishes of Ohio. Ohio State Univ. Press with the Ohio Sea Grant Program Center for Lake Erie area research. 782 pp.

Union Electric Company. 1971. Site selection study - Phase I, proposed nuclear power plant. December 1971. Prepared by Dames and Moore, Inc.

Union Electric Company. 1973. Site selection study - Phase II, proposed nuclear power plant. Volumes I and II. February 1973. Prepared by Dames and Moore, Inc.

Union Electric Company. 1974. Callaway Plant Units 1 and 2, Environmental Baseline inventory. Prepared by Dames and Moore, Inc.

Union Electric Company. 1975. 1974 annual summary, Callaway Plant Units 1 and 2, preconstruction monitoring. Prepared by Dames and Moore, Inc.

Union Electric Company. 1976. Callaway Plant Units 1 and 2, preconstruction monitoring - two year summary 1974-1975. Unpublished report. Prepared by Dames and Moore, Inc.

Union Electric Company. 1979a. Callaway Plant, Environmental report, operating license stage. Volumes I, II, and III. St. Louis, MO.

Union Electric Company. 1979b. Rush Island Plant: Evaluation of cooling water intake impacts on the Mississippi River. St. Louis, MO.

University of Missouri-Rolla. 1974. A baseline study of the Missouri River: Rulo, Nebraska to mouth near St. Louis, Missouri. Vols. III, IV. A report to the Department of the Army, Kansas City District, Corps of Engineers.

U.S. Department of Interior. 1975. Endangered and threatened wildlife and plants. Fed. Register 40(188): p. 44411-44429.

U.S. Environmental Protection Agency. 1976. Development document for best technology available for the location, design, construction and capacity of cooling water intake structures for minimizing adverse environmental impact. April 1976. Effluent Guidelines Division, Office of Water and Hazardous Materials. Washington, D.C.

U. S. Environmental Protection Agency. 1977. Guidance for evaluating the adverse impact of cooling water intake structures on the aquatic environment: Section 316(b) P.L. 92-500. May 1977. Office of Water Enforcement, Permits Division, Industrial Permits Branch. Washington, D. C. 59 pp.

U. S. Fish & Wildlife Service. 1977. Mathematical methods to evaluate entrainment of aquatic organisms by power plants. Fish and Wildlife Service, U.S. Dept. of the Interior (Publication #FWS/OBS-76/20.3). Washington, D.C. 17 pp.

U.S. Geological Survey. Provisional and historical flow data from the Missouri River at Hermann, Missouri. Correspondence with Lloyd Waite, Rolla, Mo.

U.S. Nuclear Regulatory Commission. 1975. Final environmental statement, related to the proposed Callaway Plant, Units 1 and 2. March 1975. Docket Nos. STN 50-483 and STN 50-486. Office of Nuclear Reactor Regulation. Washington, D.C.

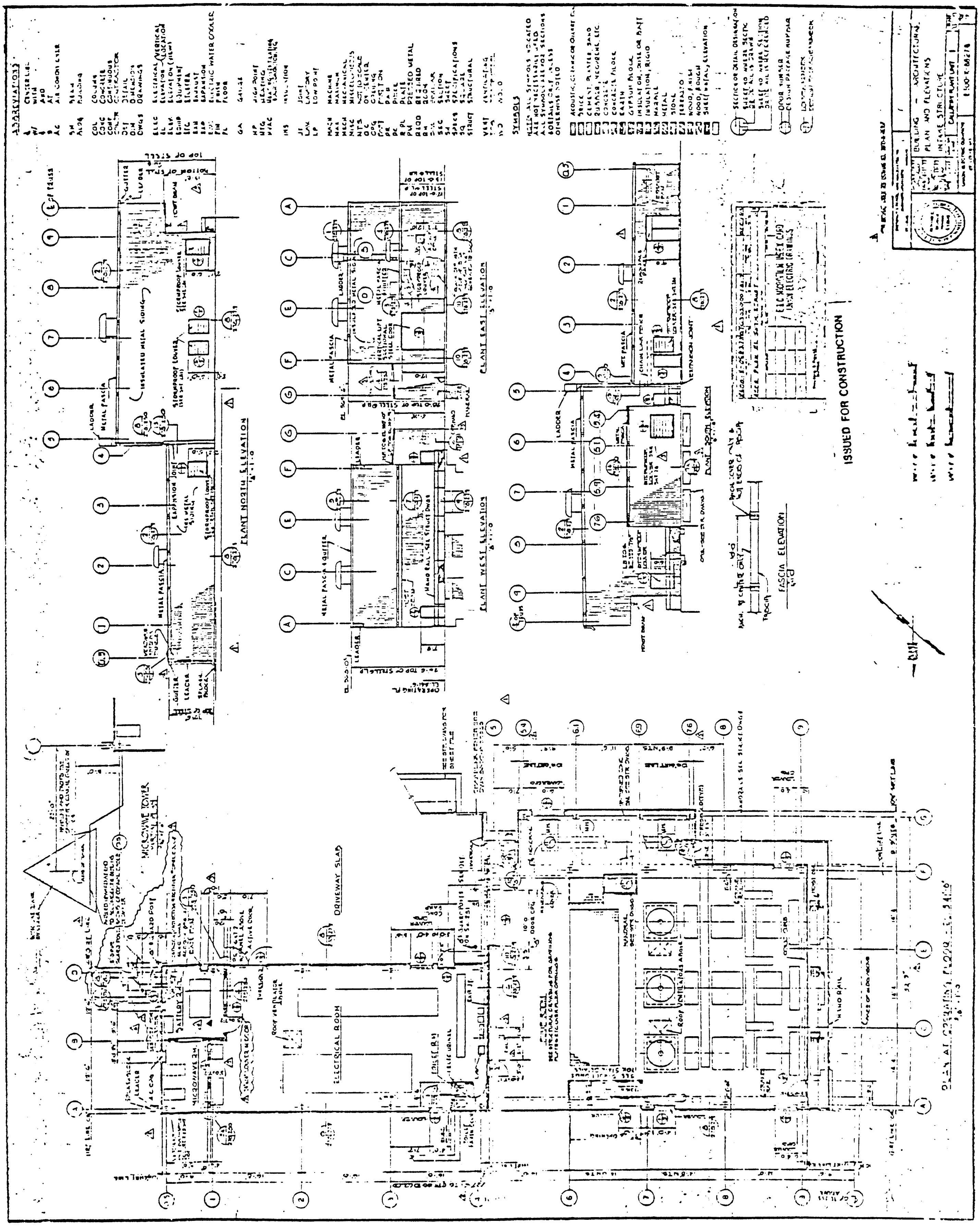
U.S. Nuclear Regulatory Commission. 1982. Final environmental statement, related to the operation of Callaway Plant, Unit No. 1. January 1982. Docket No. 50-483. Office of Nuclear Reactor Regulation. Washington, D.C.

Williams, L. G. 1966. Dominant planktonic rotifers of major waterways of the United States. Limnol. Oceanogr. 11(1):83-91.

Appendix A

Operational Information

Operational Information


ABBREVIATIONS
SYMBOLS
PLANT NORTH ELEVATION
PLANT WEST ELEVATION
PLANT EAST ELEVATION
PLANT SOUTH ELEVATION
FASCIA ELEVATION
ISSUED FOR CONSTRUCTION
MICROWAVE TOWER
DRIVEWAY SLAB
ELECTRICAL ROOM

Appendix B

Entrainment Data

Entrainment Data

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=02APR84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
1	NORTH	2	1	2	4	68.97	21.4	516.4	4429.53	7
2	NORTH	1	1	1	4	69.45	.	516.4	4429.53	7
3	NORTH	2	2	2	4	77.26	.	516.4	4429.53	7
4	NORTH	1	2	1	4	79.13	.	516.4	4429.53	7
5	NORTH	2	3	2	4	75.20	.	516.4	4429.53	7
6	NORTH	1	3	1	4	81.16	.	516.4	4429.53	7
7	MIDDLE	2	1	2	3	46.49	.	516.4	4429.53	7
8	MIDDLE	1	1	1	3	43.83	.	516.4	4429.53	7
9	MIDDLE	2	2	2	3	52.47	.	516.4	4429.53	7
10	MIDDLE	1	2	1	3	50.28	.	516.4	4429.53	7
11	MIDDLE	2	3	2	3	52.38	.	516.4	4429.53	7
12	MIDDLE	1	3	1	3	47.11	.	516.4	4429.53	7
13	SOUTH	2	1	2	3	78.38	.	516.4	4429.53	7
14	SOUTH	1	1	1	3	73.24	.	516.4	4429.53	7
15	SOUTH	2	2	2	3	66.90	.	516.4	4429.53	7
16	SOUTH	1	2	1	3	65.52	.	516.4	4429.53	7
17	SOUTH	2	3	2	4	90.83	.	516.4	4429.53	7
18	SOUTH	1	3	1	4	78.00	.	516.4	4429.53	7

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=10APR84

ID	ZONE	NET ID#	ZONE REPLI CATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
19	NORTH	2	.	2	3	71.27	28	523	7351.31	9
20	NORTH	1	1	1	3	73.03	.	523	7351.31	9
21	NORTH	2	2	2	3	101.04	.	523	7351.31	9
22	NORTH	1	2	1	3	103.31	.	523	7351.31	9
23	NORTH	2	3	2	3	102.29	.	523	7351.31	9
24	NORTH	1	3	1	3	100.91	.	523	7351.31	9
25	MIDDLE	2	1	2	3	67.55	.	523	7351.31	9
26	MIDDLE	1	1	1	3	64.31	.	523	7351.31	9
27	MIDDLE	2	2	2	3	66.86	.	523	7351.31	9
28	MIDDLE	1	2	1	3	64.87	.	523	7351.31	9
29	MIDDLE	2	3	2	3	63.55	.	523	7351.31	9
30	MIDDLE	1	3	1	3	62.16	.	523	7351.31	9
31	SOUTH	2	1	2	3	76.05	.	523	7351.31	9
32	SOUTH	1	1	1	3	75.81	.	523	7351.31	9
33	SOUTH	2	2	2	3	65.89	.	523	7351.31	9
34	SOUTH	1	2	1	3	67.98	.	523	7351.31	9
35	SOUTH	2	3	2	3	69.41	.	523	7351.31	9
36	SOUTH	1	3	1	3	67.28	.	523	7351.31	9

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

--------------------------------------- DATE=18APR84 ---------------------------------------

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
37	NORTH	2	1	2	3	95.88	25.4	520.4	5985.72	10
38	NORTH	1	1	1	3	100.53	.	520.4	5985.72	10
39	NORTH	2	2	2	3	104.48	.	520.4	5985.72	10
40	NORTH	1	2	1	3	105.46	.	520.4	5985.72	10
41	NORTH	2	3	2	3	94.94	.	520.4	5985.72	10
42	NORTH	1	3	1	3	102.68	.	520.4	5985.72	10
43	MIDDLE	2	1	2	3	56.54	.	520.4	5985.72	10
44	MIDDLE	1	1	1	3	54.75	.	520.4	5985.72	10
45	MIDDLE	2	2	2	3	62.74	.	520.4	5985.72	10
46	MIDDLE	1	2	1	3	59.21	.	520.4	5985.72	10
47	MIDDLE	2	3	2	3	60.76	.	520.4	5985.72	10
48	MIDDLE	1	3	1	3	58.26	.	520.4	5985.72	10
49	SOUTH	2	1	2	3	92.40	.	520.4	5985.72	10
50	SOUTH	1	1	1	3	89.77	.	520.4	5985.72	10
51	SOUTH	2	2	2	3	102.84	.	520.4	5985.72	10
52	SOUTH	1	2	1	3	91.56	.	520.4	5985.72	10
53	SOUTH	2	3	2	3	117.64	.	520.4	5985.72	10
54	SOUTH	1	3	1	3	107.09	.	520.4	5985.72	10

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=24APR84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
55	NORTH	2	1	2	4	78.44	28.4	523.4	8068.37	11
56	NORTH	1	1	1	4	82.63	.	523.4	8068.37	11
57	NORTH	2	2	2	4	80.34	.	523.4	8068.37	11
58	NORTH	1	2	1	4	85.66	.	523.4	8068.37	11
59	NORTH	2	3	2	4	81.36	.	523.4	8068.37	11
60	NORTH	1	3	1	4	93.41	.	523.4	8068.37	11
61	MIDDLE	2	1	2	3	66.17	.	523.4	8068.37	11
62	MIDDLE	1	1	1	3	62.67	.	523.4	8068.37	11
63	MIDDLE	2	2	2	3	69.48	.	523.4	8068.37	11
64	MIDDLE	1	2	1	3	65.76	.	523.4	8068.37	11
65	MIDDLE	2	3	2	3	66.93	.	523.4	8068.37	11
66	MIDDLE	1	3	1	3	63.22	.	523.4	8068.37	11
67	SOUTH	2	1	2	3	102.32	.	523.4	8068.37	11
68	SOUTH	1	1	1	3	95.78	.	523.4	8068.37	11
69	SOUTH	2	2	2	3	94.43	.	523.4	8068.37	11
70	SOUTH	1	2	1	3	82.82	.	523.4	8068.37	11
71	SOUTH	2	3	2	3	98.69	.	523.4	8068.37	11
72	SOUTH	1	3	1	3	94.18	.	523.4	8068.37	11

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

--- DATE=01MAY84 ---

ID	ZONE	NET ID#	ZONE REPLI CATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
73	NORTH	2	1	2	3	79.01	26	521	6315.08	15
74	NORTH	1	1	1	3	77.66	.	521	6315.08	15
75	NORTH	2	2	2	3	73.13	.	521	6315.08	15
76	NORTH	1	2	1	3	77.37	.	521	6315.08	15
77	NORTH	2	3	2	3	85.17	.	521	6315.08	15
78	NORTH	1	3	1	3	83.90	.	521	6315.08	15
79	MIDDLE	2	1	2	3	67.45	.	521	6315.08	15
80	MIDDLE	1	1	1	3	64.08	.	521	6315.08	15
81	MIDDLE	2	2	2	3	60.85	.	521	6315.08	15
82	MIDDLE	1	2	1	3	58.73	.	521	6315.08	15
83	MIDDLE	2	3	2	2	55.55	.	521	6315.08	15
84	MIDDLE	1	3	1	2	38.15	.	521	6315.08	15
85	SOUTH	2	1	2	3	69.61	.	521	6315.08	15
86	SOUTH	1	1	1	3	56.80	.	521	6315.08	15
87	SOUTH	2	2	2	4	78.38	.	521	6315.08	15
88	SOUTH	1	2	1	4	69.80	.	521	6315.08	15
89	SOUTH	2	3	2	4	92.07	.	521	6315.08	15
90	SOUTH	1	3	1	4	87.77	.	521	6315.08	15

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=07MAY84

ID	ZONE	NET ID#	ZONE REPLI CATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
91	NORTH	2	1	2	3	83.96	25.8	520.8	6743.28	13
92	NORTH	1	1	1	3	86.79	.	520.8	6743.28	13
93	NORTH	2	2	2	4	75.33	.	520.8	6743.28	13
94	NORTH	1	2	1	4	83.39	.	520.8	6743.28	13
95	NORTH	2	3	2	4	75.90	.	520.8	6743.28	13
96	NORTH	1	3	1	4	84.29	.	520.8	6743.28	13
97	MIDDLE	2	1	2	3	59.59	.	520.8	6743.28	13
98	MIDDLE	1	1	1	3	61.77	.	520.8	6743.28	13
99	MIDDLE	2	2	2	3	52.66	.	520.8	6743.28	13
100	MIDDLE	1	2	1	3	50.75	.	520.8	6743.28	13
101	MIDDLE	2	3	2	2	59.52	.	520.8	6743.28	13
102	MIDDLE	1	3	1	2	58.26	.	520.8	6743.28	13
103	SOUTH	2	1	2	3	116.37	.	520.8	6743.28	13
104	SOUTH	1	1	1	3	108.80	.	520.8	6743.28	13
105	SOUTH	2	2	2	4	105.96	.	520.8	6743.28	13
106	SOUTH	1	2	1	4	110.68	.	520.8	6743.28	13
107	SOUTH	2	3	2	4	110.42	.	520.8	6743.28	13
108	SOUTH	1	3	1	4	104.89	.	520.8	6743.28	13

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=14MAY84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
109	NORTH	2	1	2	4	48.33	24.2	519.2	5805.03	16
110	NORTH	1	1	1	4	58.49	.	519.2	5805.03	16
111	NORTH	2	2	2	3	37.39	.	519.2	5805.03	16
112	NORTH	1	2	1	3	58.45	.	519.2	5805.03	16
113	NORTH	2	3	2	4	57.72	.	519.2	5805.03	16
114	NORTH	1	3	1	4	63.12	.	519.2	5805.03	16
115	MIDDLE	2	1	2	3	52.64	.	519.2	5805.03	16
116	MIDDLE	1	1	1	3	99.00	.	519.2	5805.03	16
117	MIDDLE	2	2	2	3	55.95	.	519.2	5805.03	16
118	MIDDLE	1	2	1	3	54.04	.	519.2	5805.03	16
119	MIDDLE	2	3	2	3	52.40	.	519.2	5805.03	16
120	MIDDLE	1	3	1	3	54.00	.	519.2	5805.03	16
121	SOUTH	2	1	2	3	57.09	.	519.2	5805.03	16
122	SOUTH	1	1	1	3	53.21	.	519.2	5805.03	16
123	SOUTH	2	2	2	3	61.22	.	519.2	5805.03	16
124	SOUTH	1	2	1	3	59.17	.	519.2	5805.03	16
125	SOUTH	2	3	2	3	53.67	.	519.2	5805.03	16
126	SOUTH	1	3	1	3	52.31	.	519.2	5805.03	16

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=22MAY84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
127	NORTH	2	1	2	4	74.59	23.3	518.3	5180.86	20
128	NORTH	1	1	1	4	79.58	.	518.3	5180.86	20
129	NORTH	2	2	2	3	86.40	.	518.3	5180.86	20
130	NORTH	1	2	1	3	92.05	.	518.3	5180.86	20
131	NORTH	2	3	2	3	93.38	.	518.3	5180.86	20
132	NORTH	1	3	1	3	96.25	.	518.3	5180.86	20
133	MIDDLE	2	1	2	2	55.00	.	518.3	5180.86	20
134	MIDDLE	1	1	1	2	58.35	.	518.3	5180.86	20
135	MIDDLE	2	2	2	3	61.12	.	518.3	5180.86	20
136	MIDDLE	1	2	1	3	60.46	.	518.3	5180.86	20
137	MIDDLE	2	3	2	3	50.27	.	518.3	5180.86	20
138	MIDDLE	1	3	1	3	51.33	.	518.3	5180.86	20
139	SOUTH	2	1	2	3	81.00	.	518.3	5180.86	20
140	SOUTH	1	1	1	3	76.02	.	518.3	5180.86	20
141	SOUTH	2	2	2	3	83.90	.	518.3	5180.86	20
142	SOUTH	1	2	1	3	86.58	.	518.3	5180.86	20
143	SOUTH	2	3	2	3	69.21	.	518.3	5180.86	20
144	SOUTH	1	3	1	3	67.96	.	518.3	5180.86	20

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=29MAY84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
145	NORTH	2	1	2	3	75.76	23	518	5255.06	19
146	NORTH	1	1	1	3	81.92	.	518	5255.06	19
147	NORTH	2	2	2	3	93.81	.	518	5255.06	19
148	NORTH	1	2	1	3	99.30	.	518	5255.06	19
149	NORTH	2	3	2	4	84.06	.	518	5255.06	19
150	NORTH	1	3	1	4	90.31	.	518	5255.06	19
151	MIDDLE	2	1	2	3	61.14	.	518	5255.06	19
152	MIDDLE	1	1	1	3	63.15	.	518	5255.06	19
153	MIDDLE	2	2	2	3	45.36	.	518	5255.06	19
154	MIDDLE	1	2	1	3	48.44	.	518	5255.06	19
155	MIDDLE	2	3	2	2	48.21	.	518	5255.06	19
156	MIDDLE	1	3	1	2	49.51	.	518	5255.06	19
157	SOUTH	2	1	2	5	108.23	.	518	5255.06	18
158	SOUTH	1	1	1	5	103.62	.	518	5255.06	18
159	SOUTH	2	2	2	5	123.79	.	518	5255.06	18
160	SOUTH	1	2	1	5	127.30	.	518	5255.06	18
161	SOUTH	2	3	2	4	139.38	.	518	5255.06	18
162	SOUTH	1	3	1	4	139.46	.	518	5255.06	18

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=04JUN84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
163	NORTH	2	1	2	4	89.82	17.7	512.7	3680.75	21
164	NORTH	1	1	1	4	93.10	.	512.7	3680.75	21
165	NORTH	2	2	2	5	87.85	.	512.7	3680.75	21
166	NORTH	1	2	1	5	91.34	.	512.7	3680.75	21
167	NORTH	2	3	2	4	83.48	.	512.7	3680.75	21
168	NORTH	1	3	1	4	88.17	.	512.7	3680.75	21
169	MIDDLE	2	1	2	3	85.35	.	512.7	3680.75	21
170	MIDDLE	1	1	1	3	83.40	.	512.7	3680.75	21
171	MIDDLE	2	2	2	3	82.41	.	512.7	3680.75	21
172	MIDDLE	1	2	1	3	78.79	.	512.7	3680.75	21
173	MIDDLE	2	3	2	3	75.96	.	512.7	3680.75	21
174	MIDDLE	1	3	1	3	73.89	.	512.7	3680.75	21
175	SOUTH	2	1	2	3	81.01	.	512.7	3680.75	21
176	SOUTH	1	1	1	3	79.75	.	512.7	3680.75	21
177	SOUTH	2	2	2	3	79.91	.	512.7	3680.75	21
178	SOUTH	1	2	1	3	76.63	.	512.7	3680.75	21
179	SOUTH	2	3	2	4	83.33	.	512.7	3680.75	21
180	SOUTH	1	3	1	4	79.80	.	512.7	3680.75	21

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=11JUN84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
181	NORTH	2	1	2	3	66.58	26.4	521.4	6637.08	23
182	NORTH	1	1	1	3	76.32	.	521.4	6637.08	23
183	NORTH	2	2	2	3	66.47	.	521.4	6637.08	23
184	NORTH	1	2	1	3	75.61	.	521.4	6637.08	23
185	NORTH	2	3	2	4	33.05	.	521.4	6637.08	23
186	NORTH	1	3	1	4	56.54	.	521.4	6637.08	23
187	MIDDLE	2	1	2	3	38.86	.	521.4	6637.08	23
188	MIDDLE	1	1	1	3	39.22	.	521.4	6637.08	23
189	MIDDLE	2	2	2	4	52.64	.	521.4	6637.08	23
190	MIDDLE	1	2	1	4	52.32	.	521.4	6637.08	23
191	MIDDLE	2	3	2	3	60.05	.	521.4	6637.08	23
192	MIDDLE	1	3	1	3	59.26	.	521.4	6637.08	23
193	SOUTH	2	1	2	2	67.36	.	521.4	6637.08	23
194	SOUTH	1	1	1	2	59.17	.	521.4	6637.08	23
195	SOUTH	2	2	2	3	93.14	.	521.4	6637.08	23
196	SOUTH	1	2	1	3	89.57	.	521.4	6637.08	23
197	SOUTH	2	3	2	3	58.54	.	521.4	6637.08	23
198	SOUTH	1	3	1	3	57.00	.	521.4	6637.08	23

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=18JUN84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
199	NORTH	2	1	2	3	85.54	28.1	523.1	7717.2	25
200	NORTH	1	1	1	3	93.97	.	523.1	7717.2	25
201	NORTH	2	2	2	3	86.96	.	523.1	7717.2	25
202	NORTH	1	2	1	3	95.88	.	523.1	7717.2	25
203	NORTH	2	3	2	3	93.97	.	523.1	7717.2	25
204	NORTH	1	3	1	3	97.20	.	523.1	7717.2	25
205	MIDDLE	2	1	2	3	66.44	28.1	523.1	7717.2	25
206	MIDDLE	1	1	1	3	62.10	.	523.1	7717.2	25
207	MIDDLE	2	2	2	2	62.74	.	523.1	7717.2	25
208	MIDDLE	1	2	1	2	59.51	.	523.1	7717.2	25
209	MIDDLE	2	3	2	2	64.91	.	523.1	7717.2	25
210	MIDDLE	1	3	1	2	60.65	.	523.1	7717.2	25
211	SOUTH	2	1	2	4	114.91	.	523.1	7717.2	25
212	SOUTH	1	1	1	4	106.87	.	523.1	7717.2	25
213	SOUTH	2	2	2	4	110.99	.	523.1	7717.2	25
214	SOUTH	1	2	1	4	110.37	.	523.1	7717.2	25
215	SOUTH	2	3	2	4	119.73	.	523.1	7717.2	25
216	SOUTH	1	3	1	4	103.99	.	523.1	7717.2	25

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=25JUN84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
217	NORTH	2	1	2	3	90.04	28.9	523.9	7462.04	26
218	NORTH	1	1	1	3	94.22	.	523.9	7462.04	26
219	NORTH	2	2	2	4	90.48	.	523.9	7462.04	26
220	NORTH	1	2	1	4	93.01	.	523.9	7462.04	26
221	NORTH	2	3	2	3	91.44	.	523.9	7462.04	26
222	NORTH	1	3	1	3	90.23	.	523.9	7462.04	26
223	MIDDLE	2	1	2	3	61.42	.	523.9	7462.04	26
224	MIDDLE	1	1	1	3	56.51	.	523.9	7462.04	26
225	MIDDLE	2	2	2	3	59.38	.	523.9	7462.04	26
226	MIDDLE	1	2	1	3	54.96	.	523.9	7462.04	26
227	MIDDLE	2	3	2	2	63.18	.	523.9	7462.04	26
228	MIDDLE	1	3	1	2	60.69	.	523.9	7462.04	26
229	SOUTH	2	1	2	3	116.88	.	523.9	7462.04	26
230	SOUTH	1	1	1	3	106.91	.	523.9	7462.04	26
231	SOUTH	2	2	2	4	110.61	.	523.9	7462.04	26
232	SOUTH	1	2	1	4	100.32	.	523.9	7462.04	26
233	SOUTH	2	3	2	4	110.54	.	523.9	7462.04	26
234	SOUTH	1	3	1	4	106.56	.	523.9	7462.04	26

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=02JUL84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
235	NORTH	2	1	2	3	84.85	25	520	5468.11	26
236	NORTH	1	1	1	3	77.17	.	520	5468.11	26
237	NORTH	2	2	2	3	86.64	.	520	5468.11	26
238	NORTH	1	2	1	3	96.70	.	520	5468.11	26
239	NORTH	2	3	2	3	79.18	.	520	5468.11	26
240	NORTH	1	3	1	3	78.95	.	520	5468.11	26
241	MIDDLE	2	1	2	2	73.65	.	520	5468.11	26
242	MIDDLE	1	1	1	2	66.71	.	520	5468.11	26
243	MIDDLE	2	2	2	2	71.60	.	520	5468.11	26
244	MIDDLE	1	2	1	2	66.73	.	520	5468.11	26
245	MIDDLE	2	3	2	3	72.15	.	520	5468.11	26
246	MIDDLE	1	3	1	3	65.21	.	520	5468.11	26
247	SOUTH	2	1	2	4	121.76	.	520	5468.11	26
248	SOUTH	1	1	1	4	113.81	.	520	5468.11	26
249	SOUTH	2	2	2	3	96.06	.	520	5468.11	26
250	SOUTH	1	2	1	3	81.02	.	520	5468.11	26
251	SOUTH	2	3	2	3	87.07	.	520	5468.11	26
252	SOUTH	1	3	1	3	83.71	.	520	5468.11	26

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

-- DATE=09JUL84 --

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
253	NORTH	2	1	2	3	93.63	26.8	521.8	6594.6	26
254	NORTH	1	1	1	3	88.39	.	521.8	6594.6	26
255	NORTH	2	2	2	3	92.69	.	521.8	6594.6	26
256	NORTH	1	2	1	3	89.18	.	521.8	6594.6	26
257	NORTH	2	3	2	3	84.91	.	521.8	6594.6	26
258	NORTH	1	3	1	3	91.01	.	521.8	6594.6	26
259	MIDDLE	2	1	2	2	75.97	.	521.8	6594.6	26
260	MIDDLE	1	1	1	2	70.64	.	521.8	6594.6	26
261	MIDDLE	2	2	2	3	77.43	.	521.8	6594.6	26
262	MIDDLE	1	2	1	3	72.14	.	521.8	6594.6	26
263	MIDDLE	2	3	2	3	81.60	.	521.8	6594.6	26
264	MIDDLE	1	3	1	3	75.67	.	521.8	6594.6	26
265	SOUTH	2	1	2	4	134.59	.	521.8	6594.6	26
266	SOUTH	1	1	1	4	127.31	.	521.8	6594.6	26
267	SOUTH	2	2	2	4	121.82	.	521.8	6594.6	26
268	SOUTH	1	2	1	4	108.67	.	521.8	6594.6	26
269	SOUTH	2	3	2	3	112.25	.	521.8	6594.6	26
270	SOUTH	1	3	1	3	103.18	.	521.8	6594.6	26

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=16JUL84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
271	NORTH	2	1	2	3	98.84	19.4	514.4	3399.42	27
272	NORTH	1	1	1	3	100.28	.	514.4	3399.42	27
273	NORTH	2	2	2	3	104.19	.	514.4	3399.42	27
274	NORTH	1	2	1	3	106.07	.	514.4	3399.42	27
275	NORTH	2	3	2	3	100.89	.	514.4	3399.42	27
276	NORTH	1	3	1	3	105.33	.	514.4	3399.42	27
277	MIDDLE	2	1	2	3	84.99	.	514.4	3399.42	27
278	MIDDLE	1	1	1	3	72.06	.	514.4	3399.42	27
279	MIDDLE	2	2	2	3	84.42	.	514.4	3399.42	27
280	MIDDLE	1	2	1	3	86.91	.	514.4	3399.42	27
281	MIDDLE	2	3	2	3	83.60	.	514.4	3399.42	27
282	MIDDLE	1	3	1	3	79.99	.	514.4	3399.42	27
283	SOUTH	2	1	2	3	83.31	.	514.4	3399.42	27
284	SOUTH	1	1	1	3	85.82	.	514.4	3399.42	27
285	SOUTH	2	2	2	4	138.03	.	514.4	3399.42	27
286	SOUTH	1	2	1	4	128.60	.	514.4	3399.42	27
287	SOUTH	2	3	2	3	91.66	.	514.4	3399.42	27
288	SOUTH	1	3	1	3	88.53	.	514.4	3399.42	27

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=23JUL84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
289	NORTH	2	1	2	4	109.28	18	513	3659.65	27
290	NORTH	1	1	1	4	104.40	.	513	3659.65	27
291	NORTH	2	2	2	3	107.77	.	513	3659.65	27
292	NORTH	1	2	1	3	105.89	.	513	3659.65	27
293	NORTH	2	3	2	3	107.87	.	513	3659.65	27
294	NORTH	1	3	1	3	106.00	.	513	3659.65	27
295	MIDDLE	2	1	2	3	87.24	.	513	3659.65	27
296	MIDDLE	1	1	1	3	78.79	.	513	3659.65	27
297	MIDDLE	2	2	2	3	86.88	.	513	3659.65	27
298	MIDDLE	1	2	1	3	81.73	.	513	3659.65	27
299	MIDDLE	2	3	2	3	86.36	.	513	3659.65	27
300	MIDDLE	1	3	1	3	82.50	.	513	3659.65	27
301	SOUTH	2	1	2	3	91.70	.	513	3659.65	27
302	SOUTH	1	1	1	3	87.74	.	513	3659.65	27
303	SOUTH	2	2	2	3	87.07	.	513	3659.65	27
304	SOUTH	1	2	1	3	84.14	.	513	3659.65	27
305	SOUTH	2	3	2	2	88.28	.	513	3659.65	27
306	SOUTH	1	3	1	2	82.06	.	513	3659.65	27

Appendix B.1(cont'd)

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=30JUL84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
307	NORTH	2	1	2	4	104.36	14.7	509.7	2442.12	26
308	NORTH	1	1	1	4	102.36	.	509.7	2442.12	26
309	NORTH	2	2	2	3	107.09	.	509.7	2442.12	26
310	NORTH	1	2	1	3	106.14	.	509.7	2442.12	26
311	NORTH	2	3	2	4	106.85	.	509.7	2442.12	26
312	NORTH	1	3	1	4	105.81	.	509.7	2442.12	26
313	MIDDLE	2	1	2	3	94.70	.	509.7	2442.12	26
314	MIDDLE	1	1	1	3	93.28	.	509.7	2442.12	26
315	MIDDLE	2	2	2	3	102.22	.	509.7	2442.12	26
316	MIDDLE	1	2	1	3	95.91	.	509.7	2442.12	26
317	MIDDLE	2	3	2	3	105.23	.	509.7	2442.12	26
318	MIDDLE	1	3	1	3	96.65	.	509.7	2442.12	26
319	SOUTH	2	1	2	4	133.95	.	509.7	2442.12	26
320	SOUTH	1	1	1	4	120.43	.	509.7	2442.12	26
321	SOUTH	2	2	2	5	161.09	.	509.7	2442.12	26
322	SOUTH	1	2	1	5	139.61	.	509.7	2442.12	26
323	SOUTH	2	3	2	4	153.32	.	509.7	2442.12	26
324	SOUTH	1	3	1	4	135.99	.	509.7	2442.12	26

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=06AUG84

ID	ZONE	NET ID#	ZONE REPLI CATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
325	NORTH	2	1	2	3	119.02	13.6	508.6	2101.63	27
326	NORTH	1	1	1	3	120.03	.	508.6	2101.63	27
327	NORTH	2	2	2	4	114.48	.	508.6	2101.63	27
328	NORTH	1	2	1	4	115.39	.	508.6	2101.63	27
329	NORTH	2	3	2	4	113.82	.	508.6	2101.63	27
330	NORTH	1	3	1	4	114.96	.	508.6	2101.63	27
331	MIDDLE	2	1	2	4	101.02	.	508.6	2101.63	27
332	MIDDLE	1	1	1	4	100.28	.	508.6	2101.63	27
333	MIDDLE	2	2	2	4	102.79	.	508.6	2101.63	27
334	MIDDLE	1	2	1	4	100.08	.	508.6	2101.63	27
335	MIDDLE	2	3	2	3	105.09	.	508.6	2101.63	27
336	MIDDLE	1	3	1	3	102.68	.	508.6	2101.63	27
337	SOUTH	2	1	2	5	152.10	.	508.6	2101.63	27
338	SOUTH	1	1	1	5	129.12	.	508.6	2101.63	27
339	SOUTH	2	2	2	5	148.34	.	508.6	2101.63	27
340	SOUTH	1	2	1	5	131.85	.	508.6	2101.63	27
341	SOUTH	2	3	2	4	142.64	.	508.6	2101.63	27
342	SOUTH	1	3	1	4	120.16	.	508.6	2101.63	27

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=13AUG84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
343	NORTH	2	1	2	3	110.69	13.4	508.4	2019.98	28
344	NORTH	1	1	1	3	123.35	.	508.4	2019.98	28
345	NORTH	2	2	2	4	111.13	.	508.4	2019.98	28
346	NORTH	1	2	1	4	112.92	.	508.4	2019.98	28
347	NORTH	2	3	2	4	115.39	.	508.4	2019.98	28
348	NORTH	1	3	1	4	111.25	.	508.4	2019.98	28
349	MIDDLE	2	1	2	3	103.25	.	508.4	2019.98	28
350	MIDDLE	1	1	1	3	102.00	.	508.4	2019.98	28
351	MIDDLE	2	2	2	3	107.49	.	508.4	2019.98	28
352	MIDDLE	1	2	1	3	100.59	.	508.4	2019.98	28
353	MIDDLE	2	3	2	4	104.90	.	508.4	2019.98	28
354	MIDDLE	1	3	1	4	98.74	.	508.4	2019.98	28
355	SOUTH	2	1	2	4	128.98	.	508.4	2019.98	28
356	SOUTH	1	1	1	4	116.80	.	508.4	2019.98	28
357	SOUTH	2	2	2	4	125.93	.	508.4	2019.98	28
358	SOUTH	1	2	1	4	110.23	.	508.4	2019.98	28
359	SOUTH	2	3	2	4	117.37	.	508.4	2019.98	28
360	SOUTH	1	3	1	4	105.38	.	508.4	2019.98	28

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=21AUG84

ID	ZONE	NET ID#	ZONE REPLI CATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
361	NORTH	2	1	2	3	111.95	12.2	507.3	1833.3	28
362	NORTH	1	1	1	3	113.55	.	507.3	1833.3	28
363	NORTH	2	2	2	4	113.55	.	507.3	1833.3	28
364	NORTH	1	2	1	4	115.14	.	507.3	1833.3	28
365	NORTH	2	3	2	4	113.27	.	507.3	1833.3	28
366	NORTH	1	3	1	4	115.39	.	507.3	1833.3	28
367	MIDDLE	2	1	2	4	105.49	.	507.3	1833.3	28
368	MIDDLE	1	1	1	4	103.62	.	507.3	1833.3	28
369	MIDDLE	2	2	2	3	106.01	.	507.3	1833.3	28
370	MIDDLE	1	2	1	3	108.16	.	507.3	1833.3	28
371	MIDDLE	2	3	2	3	109.68	.	507.3	1833.3	28
372	MIDDLE	1	3	1	3	108.62	.	507.3	1833.3	28
373	SOUTH	2	1	2	4	119.26	.	507.3	1833.3	28
374	SOUTH	1	1	1	4	112.50	.	507.3	1833.3	28
375	SOUTH	2	2	2	4	135.86	.	507.3	1833.3	28
376	SOUTH	1	2	1	4	117.31	.	507.3	1833.3	28
377	SOUTH	2	3	2	4	124.17	.	507.3	1833.3	28
378	SOUTH	1	3	1	4	114.51	.	507.3	1833.3	28

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=27AUG84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
379	NORTH	2	1	2	3	111.66	12.3	507.2	1853.29	27
380	NORTH	1	1	1	3	125.62	.	507.2	1853.29	27
381	NORTH	2	2	2	3	116.09	.	507.2	1853.29	27
382	NORTH	1	2	1	3	113.47	.	507.2	1853.29	27
383	NORTH	2	3	2	4	115.02	.	507.2	1853.29	27
384	NORTH	1	3	1	4	113.86	.	507.2	1853.29	27
385	MIDDLE	2	1	2	4	111.52	.	507.2	1853.29	27
386	MIDDLE	1	1	1	4	104.56	.	507.2	1853.29	27
387	MIDDLE	2	2	2	3	110.45	.	507.2	1853.29	27
388	MIDDLE	1	2	1	3	109.05	.	507.2	1853.29	27
389	MIDDLE	2	3	2	3	116.01	.	507.2	1853.29	27
390	MIDDLE	1	3	1	3	115.24	.	507.2	1853.29	27
391	SOUTH	2	1	2	3	134.81	.	507.2	1853.29	27
392	SOUTH	1	1	1	3	126.30	.	507.2	1853.29	27
393	SOUTH	2	2	2	3	128.63	.	507.2	1853.29	27
394	SOUTH	1	2	1	3	119.68	.	507.2	1853.29	27
395	SOUTH	2	3	2	3	124.29	.	507.2	1853.29	27
396	SOUTH	1	3	1	3	116.29	.	507.2	1853.29	27

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=04SEP84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
397	NORTH	2	1	2	3	116.12	11.9	506.9	1761.25	25
398	NORTH	1	1	1	3	115.97	.	506.9	1761.25	25
399	NORTH	2	2	2	4	111.23	.	506.9	1761.25	25
400	NORTH	1	2	1	4	112.53	.	506.9	1761.25	25
401	NORTH	2	3	2	4	112.24	.	506.9	1761.25	25
402	NORTH	1	3	1	4	111.98	.	506.9	1761.25	25
403	MIDDLE	2	1	2	3	109.55	.	506.9	1761.25	25
404	MIDDLE	1	1	1	3	107.34	.	506.9	1761.25	25
405	MIDDLE	2	2	2	3	109.82	.	506.9	1761.25	25
406	MIDDLE	1	2	1	3	111.75	.	506.9	1761.25	25
407	MIDDLE	2	3	2	3	112.18	.	506.9	1761.25	25
408	MIDDLE	1	3	1	3	108.46	.	506.9	1761.25	25
409	SOUTH	2	1	2	4	124.58	.	506.9	1761.25	25
410	SOUTH	1	1	1	4	117.64	.	506.9	1761.25	25
411	SOUTH	2	2	2	4	130.67	.	506.9	1761.25	25
412	SOUTH	1	2	1	4	123.62	.	506.9	1761.25	25
413	SOUTH	2	3	2	3	138.62	.	506.9	1761.25	25
414	SOUTH	1	3	1	3	126.16	.	506.9	1761.25	25

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=10SEP84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
415	NORTH	2	1	2	3	112.42	12.2	507.3	1883	23
416	NORTH	1	1	1	3	110.84	.	507.3	1883	23
417	NORTH	2	2	2	4	116.02	.	507.3	1883	23
418	NORTH	1	2	1	4	116.67	.	507.3	1883	23
419	NORTH	2	3	2	4	114.48	.	507.3	1883	23
420	NORTH	0	3	1	4	117.81	.	507.3	1883	23
421	MIDDLE	2	1	2	4	112.79	.	507.3	1883	23
422	MIDDLE	0	1	1	4	108.47	.	507.3	1883	23
423	MIDDLE	2	2	2	3	105.14	.	507.3	1883	23
424	MIDDLE	0	2	1	3	105.69	.	507.3	1883	23
425	MIDDLE	2	3	2	3	105.48	.	507.3	1883	23
426	MIDDLE	0	3	1	3	105.81	.	507.3	1883	23
427	SOUTH	2	1	2	4	120.50	.	507.3	1883	23
428	SOUTH	0	1	1	4	112.71	.	507.3	1883	23
429	SOUTH	2	2	2	4	129.19	.	507.3	1883	23
430	SOUTH	0	2	1	4	117.68	.	507.3	1883	23
431	SOUTH	2	3	2	4	120.82	.	507.3	1883	23
432	SOUTH	0	3	1	4	115.27	.	507.3	1883	23

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=17SEP84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
433	NORTH	2	1	2	3	112.88	13.1	508.1	2077.67	21
434	NORTH	0	1	1	3	112.14	.	508.1	2077.67	21
435	NORTH	2	2	2	5	107.67	.	508.1	2077.67	21
436	NORTH	0	2	1	5	106.47	.	508.1	2077.67	21
437	NORTH	2	3	2	3	115.92	.	508.1	2077.67	21
438	NORTH	0	3	1	3	114.77	.	508.1	2077.67	21
439	MIDDLE	2	1	2	3	107.75	.	508.1	2077.67	21
440	MIDDLE	0	1	1	3	105.36	.	508.1	2077.67	21
441	MIDDLE	2	2	2	3	104.78	.	508.1	2077.67	21
442	MIDDLE	0	2	1	3	100.32	.	508.1	2077.67	21
443	MIDDLE	2	3	2	4	108.51	.	508.1	2077.67	21
444	MIDDLE	0	3	1	4	104.51	.	508.1	2077.67	21
445	SOUTH	2	1	2	3	126.52	.	508.1	2077.67	21
446	SOUTH	0	1	1	3	115.98	.	508.1	2077.67	21
447	SOUTH	2	2	2	4	118.39	.	508.1	2077.67	21
448	SOUTH	0	2	1	4	108.35	.	508.1	2077.67	21
449	SOUTH	2	3	2	4	128.53	.	508.1	2077.67	21
450	SOUTH	0	3	1	4	122.46	.	508.1	2077.67	21

CALLAWAY ICTHYOPLANKTON SAMPLING FIELD DATA
ALL SAMPLES APRIL-SEPTEMBER 1984

DATE=24SEP84

ID	ZONE	NET ID#	ZONE REPLICATE	FLOW METER ID#	SAMPLE TIME	VOLUME SAMPLED CUBIC M	STAGE AT PLANT	FEET ABOVE MSL	DISCHARGE M/SEC	WATER TEMP DEG C
451	NORTH	2	1	2	4	116.74	11.8	506.8	1801.15	22
452	NORTH	0	1	1	4	116.39	.	506.8	1801.15	22
453	NORTH	2	2	2	3	112.76	.	506.8	1801.15	22
454	NORTH	0	2	1	3	116.71	.	506.8	1801.15	22
455	NORTH	2	3	2	3	119.80	.	506.8	1801.15	22
456	NORTH	0	3	1	3	118.07	.	506.8	1801.15	22
457	MIDDLE	2	1	2	3	108.98	.	506.8	1801.15	22
458	MIDDLE	0	1	1	3	105.06	.	506.8	1801.15	22
459	MIDDLE	2	2	2	4	115.51	.	506.8	1801.15	22
460	MIDDLE	0	2	1	4	113.07	.	506.8	1801.15	22
461	MIDDLE	2	3	2	3	111.74	.	506.8	1801.15	22
462	MIDDLE	0	3	1	3	112.57	.	506.8	1801.15	22
463	SOUTH	2	1	2	3	135.86	.	506.8	1801.15	22
464	SOUTH	0	1	1	3	125.64	.	506.8	1801.15	22
465	SOUTH	2	2	2	3	141.22	.	506.8	1801.15	22
466	SOUTH	0	2	1	3	126.13	.	506.8	1801.15	22
467	SOUTH	2	3	2	3	131.52	.	506.8	1801.15	22
468	SOUTH	0	3	1	3	126.88	.	506.8	1801.15	22

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
1	NO FISH	0	.	BEN		40484
2	NO FISH	0	.	MAG		.
3	NO FISH	0	.	BEN		.
4	NO FISH	0	.	MAG		.
5	NO FISH	0	.	BEN		.
6	NO FISH	0	.	MAG		.
7	NO FISH	0	.	MAG		.
8	NO FISH	0	.	BEN		.
9	NO FISH	0	.	MAG		.
10	NO FISH	0	.	BEN		.
11	NO FISH	0	.	MAG		.
12	NO FISH	0	.	MAG		.
13	NO FISH	0	.	MAG		.
14	NO FISH	0	.	MAG		40584
15	NO FISH	0	.	MAG		.
16	NO FISH	0	.	MAG		.
17	NO FISH	0	.	MAG		.
17	NO FISH	0	.	MAG		.
18	NO FISH	0	.	MAG		.
19	NO FISH	0	.	BEN		41184
20	NO FISH	0	.	MAG.		.
21	NO FISH	0	.	MAG		41184
22	NO FISH	0	.	MAG		.
23	NO FISH	0	.	BEN		.
24	NO FISH	0	.	MAG		.
25	NO FISH	0	.	BEN		.
26	NO FISH	0	.	MAG		.
27	NO FISH	0	.	BEN		41284
28	NO FISH	0	.	MAG		.
29	NO FISH	0	.	BEN		.
30	NO FISH	0	.	MAG		.
31	NO FISH	0	.	BEN		.
31	NO FISH	0	.	BEN		.
32	NO FISH	0	.	MAG		.
32	NO FISH	0	.	MAG		.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
33	NO FISH	0	.	MAG		.
34	NO FISH	0	.	BEN		41384
34	NO FISH	0	.	BEN		.
35	NO FISH	0	.	MAG		.
35	NO FISH	0	.	MAG		.
36	NO FISH	0	.	MAG		.
36	NO FISH	0	.	BEN		.
37	NO FISH	0	.	BEN		41984
38	NO FISH	0	.	MAG		41984
39	NO FISH	0	.	BEN		.
40	NO FISH	0	.	MAG		.
41	NO FISH	0	.	BEN		41884
42	NO FISH	0	.	MAG		41984
43	NO FISH	0	.	MAG		.
44	NO FISH	0	.	BEN		.
45	NO FISH	0	.	BEN		.
46	NO FISH	0	.	BEN		.
47	NO FISH	0	.	MAG		.
48	NO FISH	0	.	MAG		.
49	NO FISH	0	.	BEN		42384
49	NO FISH	0	.	BEN		.
50	NO FISH	0	.	MAG		.
50	NO FISH	0	.	MAG		.
51	NO FISH	0	.	BEN		.
51	NO FISH	0	.	BEN		.
52	NO FISH	0	.	MAG		.
52	NO FISH	0	.	MAG		.
53	NO FISH	0	.	MAG		.
53	NO FISH	0	.	MAG		.
54	NO FISH	0	.	BEN		.
54	NO FISH	0	.	BEN		42384
55	NO FISH	0	.	MAG		42584
56	NO FISH	0	.	MAG		.
57	NO FISH	0	.	MAG		.
58	NO FISH	0	.	MAG		.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
59	NO FISH	0	.	MAG		.
60	NO FISH	0	.	MAG		.
61	NO FISH	0	.	BEN		42684
62	NO FISH	0	.	MAG		.
63	NO FISH	0	.	MAG		.
64	NO FISH	0	.	MAG		.
65	NO FISH	0	.	BEN		.
66	NO FISH	0	.	MAG		42784
67	NO FISH	0	.	BEN		42684
67	NO FISH	0	.	BEN		.
68	NO FISH	0	.	BEN		.
68	NO FISH	0	.	BEN		42784
69	NO FISH	0	.	MAG		.
69	NO FISH	0	.	MAG		.
70	NO FISH	0	.	BEN		.
70	NO FISH	0	.	BEN		.
71	NO FISH	0	.	BEN		.
71	NO FISH	0	.	BEN		42784
72	NO FISH	0	.	MAG		.
72	NO FISH	0	.	MAG		.
73	NO FISH	0	.	BEN		50284
74	NO FISH	0	.	MAG		.
75	NO FISH	0	.	BEN		.
76	NO FISH	0	.	BEN		.
77	NO FISH	0	.	MAG		.
78	NO FISH	0	.	MAG		.
79	NO FISH	0	.	MAG		.
80	NO FISH	0	.	BEN		.
81	UNIDENTIFIED EGG	EGG	1.9	MAG	TCS	50284
81	NO FISH	0	.	BEN	TCS	50384
82	UNIDENTIFIED EGG	EGG	2.3	BEN	TCS	.
82	NO FISH	0	.	BEN	TCS	50284
82	NO FISH	0	.	BEN	TCS	50384
83	NO FISH	0	.	BEN	TCS	50284
83	NO FISH	0	0.0	BEN	TCS	50284

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
84	NO FISH	0	.	MAG	TCS	50384
84	NO FISH	0	.	MAG	TCS	50384
85	NO FISH	0	.	BEN	TCS	.
85	NO FISH	0	.	BEN	TCS	.
86	NO FISH	0	.	MAG	TCS	.
86	NO FISH	0	.	MAG	TCS	.
87	NO FISH	0	.	MAG	TCS	.
87	NO FISH	0	.	MAG	TCS	.
88	NO FISH	0	.	BEN	TCS	.
88	NO FISH	0	.	BEN	TCS	.
89	UNIDENTIFIED EGG	EGG	2.5	BEN	TCS	.
89	UNIDENTIFIED EGG	EGG	2.2	BEN	TCS	50484
90	NO FISH	0	.	MAG	TCS	50484
90	NO FISH	0	0.0	MAG	TCS	50484
91	NO FISH	0	.	BEN	TCS	50884
92	NO FISH	0	.	BEN	TCS	.
93	NO FISH	0	.	BEN	TCS	.
94	NO FISH	0	.	BEN	TCS	.
95	NO FISH	0	.	BEN	TCS	.
96	SUCKER FAMILY	PROLARVA	6.1	MAG	TCS	50884
97	NO FISH	0	.	BEN	TCS	.
98	SAUGER	PROLARVA	6.8	MAG	TCS	.
99	NO FISH	0	0.0	BEN	TCS	50984
100	NO FISH	0	.	BEN	TCS	.
101	NO FISH	0	.	BEN	TCS	.
102	NO FISH	0	.	BEN	TCS	.
103	NO FISH	0	.	BEN	TCS	51084
104	SAUGER	PROLARVA	6.0	MAG	TCS	51084
105	NO FISH	0	0.0	BEN	TCS	51084
106	UNIDENTIFIED EGG	EGG	2.1	MAG	TCS	.
107	NO FISH	0	0.0	BEN	TCS	51084
108	NO FISH	0	.	BEN	TCS	.
109	UNIDENTIFIED EGG	EGG	3.0	MAG	TCS	51584
109	SUCKER FAMILY	PROLARVA	6.9	MAG	TCS	.
110	UNIDENTIFIED EGG	EGG	2.6	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
110	SUCKER FAMILY	PROLARVA	7.8	BEN	TCS	.
110	GIZZARD SHAD	PROLARVA	6.6	BEN	TCS	.
111	NO FISH	0	0.0	MAG	TCS	51584
112	SUCKER FAMILY	PROLARVA	7.4	BEN	TCS	.
112	SUCKER FAMILY	PROLARVA	7.5	BEN	TCS	.
113	SUCKER FAMILY	PROLARVA	7.2	BEN	TCS	.
113	SUCKER FAMILY	PROLARVA	7.4	BEN	TCS	.
113	NO FISH	0	.	MAG	JAW	51884
114	UNIDENTIFIED EGG	EGG	2.2	MAG	TCS	.
114	SUCKER FAMILY	PROLARVA	8.0	MAG	TCS	.
115	UNIDENTIFIED EGG	EGG	2.8	BEN	TCS	.
115	NO FISH	0	.	MAG	JAW	.
116	CRAPPIE SPECIES	PROLARVA	5.5	MAG	TCS	.
117	NO FISH	0	0.0	MAG	TCS	51684
118	NO FISH	0	.	BEN	TCS	51684
119	SUCKER FAMILY	PROLARVA	7.5	BEN	TCS	51684
119	NO FISH	0	.	MAG	JAW	.
120	NO FISH	0	0.0	BEN	TCS	51684
121	SUCKER FAMILY	PROLARVA	7.3	MAG	TCS	.
121	SUCKER FAMILY	PROLARVA	6.5	MAG	TCS	.
121	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	.	MAG	TCS	.
121	UNIDENTIFIED EGG	EGG	2.4	MAG	TCS	.
122	GOLDEYE OR MOONEYE	PROLARVA	10.5	BEN	TCS	.
122	SUCKER FAMILY	PROLARVA	7.0	BEN	TCS	.
122	UNIDENTIFIED EGG	EGG	3.0	BEN	TCS	.
123	UNIDENTIFIED EGG	EGG	3.1	BEN	TCS	.
123	UNIDENTIFIED EGG	EGG	3.0	BEN	TCS	.
124	NO FISH	0	.	BEN	TCS	.
124	UNIDENTIFIED EGG	EGG	2.8	BEN	TCS	.
124	SUCKER FAMILY	PROLARVA	7.6	BEN	TCS	.
124	SUCKER FAMILY	PROLARVA	7.8	BEN	TCS	.
125	UNIDENTIFIED EGG	EGG	2.2	BEN	TCS	.
125	UNIDENTIFIED EGG	PROLARVA	8.0	BEN	TCS	.
126	UNIDENTIFIED EGG	EGG	3.0	MAG	TCS	.
126	FRESHWATER DRUM EGG	EGG	1.5	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
127	GOLDEYE	PROLARVA	11.5	BEN	TCS	52384
127	GOLDEYE	PROLARVA	11.3	BEN	TCS	.
127	GOLDEYE	PROLARVA	11.3	BEN	TCS	.
127	GOLDEYE	PROLARVA	11.1	BEN	TCS	.
127	GOLDEYE	PROLARVA	11.0	BEN	TCS	.
127	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
127	GOLDEYE	PROLARVA	11.5	BEN	TCS	.
127	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
127	CRAPPIE SPECIES	PROLARVA	4.3	BEN	TCS	.
127	GIZZARD SHAD	LARVA	9.3	BEN	TCS	.
128	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
128	GOLDEYE	PROLARVA	10.8	BEN	TCS	.
128	GOLDEYE	PROLARVA	11.0	BEN	TCS	.
128	GOLDEYE	PROLARVA	10.6	BEN	TCS	.
128	GOLDEYE	PROLARVA	11.5	BEN	TCS	.
128	GOLDEYE	PROLARVA	12.0	BEN	TCS	.
128	GOLDEYE	PROLARVA	10.2	BEN	TCS	.
128	GOLDEYE	PROLARVA	10.3	BEN	TCS	.
128	GOLDEYE	PROLARVA	10.7	BEN	TCS	.
128	GOLDEYE	PROLARVA	10.4	BEN	TCS	.
128	GOLDEYE	PROLARVA	10.0	BEN	TCS	.
128	GOLDEYE	PROLARVA	10.3	BEN	TCS	.
128	GIZZARD SHAD	PROLARVA	10.3	BEN	TCS	.
129	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
129	GOLDEYE	PROLARVA	10.6	BEN	TCS	.
129	GOLDEYE	PROLARVA	11.2	BEN	TCS	.
129	GOLDEYE	PROLARVA	10.4	BEN	TCS	.
129	GOLDEYE	PROLARVA	11.2	BEN	TCS	.
129	GOLDEYE	PROLARVA	11.6	BEN	TCS	.
129	GOLDEYE	PROLARVA	11.0	BEN	TCS	.
129	GOLDEYE	PROLARVA	11.2	BEN	TCS	.
129	GOLDEYE	PROLARVA	11.0	BEN	TCS	.
129	GOLDEYE	PROLARVA	10.8	BEN	TCS	.
129	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
129	GOLDEYE	PROLARVA	12.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
129	GOLDEYE	PROLARVA	10.6	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.6	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.8	BEN	TCS	.
130	GOLDEYE	PROLARVA	10.4	BEN	TCS	.
130	GOLDEYE	PROLARVA	10.8	BEN	TCS	.
130	GOLDEYE	PROLARVA	12.2	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.2	BEN	TCS	.
130	GOLDEYE	PROLARVA	10.2	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.0	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.8	BEN	TCS	.
130	GOLDEYE	PROLARVA	9.6	BEN	TCS	.
130	GOLDEYE	PROLARVA	10.4	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.8	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
130	GOLDEYE	PROLARVA	10.6	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
130	GOLDEYE	PROLARVA	11.2	BEN	TCS	.
130	CARP	PROLARVA	8.3	BEN	TCS	.
130	GOLDEYE	LARVA	11.0	BEN	TCS	.
131	GOLDEYE	PROLARVA	10.3	BEN	TCS	.
131	GOLDEYE	PROLARVA	11.6	BEN	TCS	.
131	GOLDEYE	PROLARVA	10.6	BEN	TCS	.
131	GOLDEYE	PROLARVA	10.5	BEN	TCS	.
131	GOLDEYE	PROLARVA	11.2	BEN	TCS	.
131	CARP	LARVA	9.4	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.3	BEN	TCS	.
132	GOLDEYE	PROLARVA	11.7	BEN	TCS	.
132	GOLDEYE	PROLARVA	11.4	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.8	BEN	TCS	.
132	GOLDEYE	PROLARVA	11.8	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.6	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.7	BEN	TCS	.
132	GOLDEYE	PROLARVA	11.9	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.4	BEN	TCS	.

Appendix B.2 (cont'd)

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
132	GOLDEYE	PROLARVA	10.5	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.7	BEN	TCS	.
132	GOLDEYE	PROLARVA	11.2	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.3	BEN	TCS	.
132	GOLDEYE	PROLARVA	11.6	BEN	TCS	.
132	GOLDEYE	PROLARVA	11.5	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.2	BEN	TCS	.
132	GOLDEYE	PROLARVA	10.5	BEN	TCS	.
132	GOLDEYE	PROLARVA	11.0	BEN	TCS	.
132	MINNOW FAMMILY	LARVA	.	BEN	TCS	.
132	GIZZARD SHAD	LARVA	12.0	BEN	TCS	.
132	GIZZARD SHAD	PROLARVA	11.3	BEN	TCS	.
132	GIZZARD SHAD	PROLARVA	9.3	BEN	TCS	.
132	MINNOW FAMMILY	LARVA	11.5	BEN	TCS	.
132	SUCKER FAMILY	LARVA	7.5	BEN	TCS	.
133	UNIDENTIFIED EGG	EGG	2.0	MAG	TCS	52384
134	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	7.8	MAG	TCS	52484
134	SUCKER FAMILY	PROLARVA	4.9	MAG	TCS	.
135	NO FISH	0	0.0	BEN	TCS	52484
136	UNIDENTIFIED EGG	EGG	2.0	MAG	TCS	.
136	GOLDEYE	PROLARVA	11.3	MAG	TCS	.
137	GOLDEYE	PROLARVA	7.2	BEN	TCS	.
138	UNIDENTIFIED EGG	EGG	2.0	BEN	TCS	.
138	UNIDENTIFIED EGG	EGG	2.2	BEN	TCS	.
139	GOLDEYE	PROLARVA	11.6	BEN	TCS	.
139	MINNOW FAMMILY	PROLARVA	5.3	BEN	TCS	.
140	NO FISH	0	0.0	BEN	TCS	52484
141	GOLDEYE	PROLARVA	7.5	MAG	TCS	.
141	SUCKER FAMILY	PROLARVA	6.9	MAG	TCS	.
141	GIZZARD SHAD	LARVA	9.2	MAG	TCS	.
142	GOLDEYE	PROLARVA	10.0	MAG	TCS	52584
142	GIZZARD SHAD	LARVA	9.0	MAG	TCS	.
142	GIZZARD SHAD	PROLARVA	7.5	MAG	TCS	.
142	SUCKER FAMILY	PROLARVA	5.3	MAG	TCS	.
143	SUCKER FAMILY	PROLARVA	7.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
144	CRAPPIE SPECIES	PROLARVA	5.2	MAG	TCS	.
144	UNIDENTIFIED EGG	EGG	2.1	MAG	TCS	.
145	MINNOW FAMMILY	PROLARVA	6.2	BEN	TCS	53084
146	GOLDEYE	LARVA	12.8	JAW	TCS	.
146	GOLDEYE	PROLARVA	10.4	JAW	TCS	.
146	SUCKER FAMILY	LARVA	7.2	JAW	TCS	.
146	GIZZARD SHAD	PROLARVA	9.0	JAW	TCS	.
146	GIZZARD SHAD	PROLARVA	6.2	JAW	TCS	.
147	MINNOW FAMMILY	PROLARVA	7.3	BEN	TCS	.
147	GIZZARD SHAD	PROLARVA	8.2	BEN	TCS	.
147	GOLDEYE	PROLARVA	9.4	BEN	TCS	.
147	GOLDEYE	PROLARVA	10.5	BEN	TCS	.
147	GOLDEYE	PROLARVA	12.4	BEN	TCS	.
147	GOLDEYE	PROLARVA	10.8	BEN	TCS	.
147	GOLDEYE	PROLARVA	11.6	BEN	TCS	.
148	GOLDEYE	PROLARVA	10.0	JAW	TCS	.
148	GOLDEYE	PROLARVA	10.4	JAW	TCS	.
148	GOLDEYE	PROLARVA	10.9	JAW	TCS	.
148	GIZZARD SHAD	LARVA	8.6	JAW	TCS	.
148	MINNOW FAMMILY	PROLARVA	5.5	JAW	TCS	.
149	CARP	JUVENILE	14.4	BEN	TCS	.
150	GOLDEYE	PROLARVA	11.2	BEN	TCS	.
150	GOLDEYE	PROLARVA	11.3	BEN	TCS	.
150	GOLDEYE	PROLARVA	12.2	BEN	TCS	.
150	GOLDEYE	PROLARVA	12.0	BEN	TCS	.
150	GOLDEYE	PROLARVA	10.6	BEN	TCS	.
151	NO FISH	0	0.0	JAW	TCS	53084
152	NO FISH	0	.	JAW	TCS	.
153	NO FISH	0	.	BEN	TCS	.
154	NO FISH	0	.	BEN	TCS	.
155	NO FISH	0	.	BEN	TCS	.
156	NO FISH	0	.	BEN	TCS	.
157	SEA BASS FAMILY	LARVA	7.5	BEN	TCS	53184
157	MINNOW FAMMILY	PROLARVA	6.7	BEN	TCS	.
158	GOLDEYE	PROLARVA	11.6	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
159	GIZZARD SHAD	LARVA	7.3	BEN	TCS	.
159	GOLDEYE	PROLARVA	10.1	BEN	TCS	.
160	NO FISH	0	0.0	BEN	TCS	53184
161	GOLDEYE	PROLARVA	10.3	JAW	TCS	.
161	GOLDEYE	PROLARVA	12.2	JAW	TCS	.
161	GOLDEYE	PROLARVA	12.6	JAW	TCS	.
161	GOLDEYE	PROLARVA	11.4	JAW	TCS	.
161	GIZZARD SHAD	LARVA	14.6	JAW	TCS	.
161	MINNOW FAMMILY	LARVA	7.0	JAW	TCS	.
161	SPECKLED CHUB	JUVENILE	46.0	JAW	TCS	.
162	NO FISH	0	0.0	BEN	TCS	53184
163	GOLDEYE	PROLARVA	10.2	BEN	TCS	60584
163	GIZZARD SHAD	LARVA	11.8	BEN	TCS	.
163	GIZZARD SHAD	LARVA	15.4	BEN	TCS	.
164	GIZZARD SHAD	PROLARVA	7.3	MAG	TCS	60584
164	GIZZARD SHAD	PROLARVA	9.5	MAG	TCS	.
164	GIZZARD SHAD	PROLARVA	7.0	MAG	TCS	.
164	GIZZARD SHAD	PROLARVA	14.2	MAG	TCS	.
164	CARP	JUVENILE	56.5	MAG	TCS	.
164	CARP	JUVENILE	45.3	MAG	TCS	.
164	SUCKER FAMILY	LARVA	7.4	MAG	TCS	.
164	SUNFISH SPECIES	LARVA	9.7	MAG	TCS	.
164	CARP	JUVENILE	20.0	MAG	TCS	.
165	FRESHWATER DRUM	PROLARVA	10.0	JAW	TCS	.
166	GOLDEYE	PROLARVA	10.2	BEN	TCS	.
166	GIZZARD SHAD	LARVA	12.0	BEN	TCS	.
166	GIZZARD SHAD	PROLARVA	8.5	BEN	TCS	.
166	GIZZARD SHAD	LARVA	11.2	BEN	TCS	.
166	GOLDEYE	LARVA	14.0	BEN	TCS	.
166	CRAPPIE SPECIES	LARVA	5.2	BEN	TCS	.
167	NO FISH	0	0.0	JAW	TCS	60584
168	GOLDEYE	PROLARVA	10.4	MAG	TCS	.
168	SUNFISH SPECIES	LARVA	5.3	MAG	TCS	.
169	NO FISH	0	0.0	BEN	TCS	60584
170	NO FISH	0	0.0	MAG	TCS	60584

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
171	SUCKER FAMILY	PROLARVA	5.7	BEN	TCS	.
171	CRAPPIE SPECIES	LARVA	6.5	BEN	TCS	.
171	CARP	JUVENILE	49.0	BEN	TCS	60584
171	CARP	JUVENILE	54.0	BEN	TCS	.
172	SUNFISH SPECIES	LARVA	6.2	JAW	TCS	.
173	NO FISH	0	0.0	BEN	TCS	.
174	GIZZARD SHAD	LARVA	12.0	MAG	TCS	.
174	CRAPPIE SPECIES	LARVA	6.0	MAG	TCS	.
175	GIZZARD SHAD	LARVA	9.5	BEN	TCS	.
176	BUFFALO SPECIES	JUVENILE	22.6	JAW	TCS	60684
176	GIZZARD SHAD	LARVA	14.2	JAW	TCS	.
176	SUCKER FAMILY	PROLARVA	5.9	JAW	TCS	.
177	GOLDEYE	PROLARVA	8.7	BEN	TCS	.
177	CARP	JUVENILE	55.0	BEN	TCS	.
178	CRAPPIE SPECIES	LARVA	10.4	MAG	TCS	.
178	BUFFALO SPECIES	JUVENILE	22.0	MAG	TCS	.
179	NO FISH	0	0.0	BEN	TCS	60684
180	CARP	JUVENILE	37.0	JAW	TCS	.
180	GIZZARD SHAD	LARVA	10.6	JAW	TCS	.
180	PERCH FAMILY	PROLARVA	6.7	JAW	TCS	.
180	SUNFISH SPECIES	LARVA	6.1	JAW	TCS	.
180	GIZZARD SHAD	PROLARVA	10.6	JAW	TCS	.
181	CARP	JUVENILE	18.2	JAW	TCS	61284
181	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
181	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
181	CRAPPIE SPECIES	PROLARVA	5.9	JAW	TCS	.
181	UNIDENTIFIED JUVENILE	JUVENILE	20.0	JAW	TCS	.
182	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	.
182	GIZZARD SHAD	JUVENILE	26.0	BEN	TCS	.
182	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
182	CRAPPIE SPECIES	LARVA	14.6	BEN	TCS	.
182	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
182	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
182	GIZZARD SHAD	LARVA	15.0	BEN	TCS	.
182	GIZZARD SHAD	LARVA	13.0	BEN	TCS	.

Appendix B.2(cont'd)

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
182	GIZZARD SHAD	LARVA	9.2	BEN	TCS	.
182	GIZZARD SHAD	LARVA	14.4	BEN	TCS	.
183	GIZZARD SHAD	JUVENILE	26.0	MAG	TCS	.
183	GIZZARD SHAD	JUVENILE	33.0	MAG	TCS	.
183	GIZZARD SHAD	JUVENILE	24.0	MAG	TCS	.
183	GIZZARD SHAD	JUVENILE	22.0	MAG	TCS	.
183	GIZZARD SHAD	JUVENILE	25.0	MAG	TCS	.
183	GIZZARD SHAD	JUVENILE	23.0	MAG	TCS	.
183	CRAPPIE SPECIES	LARVA	13.6	MAG	TCS	61284
183	CARP	JUVENILE	23.0	MAG	TCS	.
183	GIZZARD SHAD	LARVA	17.0	MAG	TCS	.
183	CRAPPIE SPECIES	PROLARVA	5.7	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	25.0	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	29.0	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	26.0	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	32.0	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	28.0	MAG	TCS	.
184	CARP	JUVENILE	29.0	MAG	TCS	.
184	CARP	JUVENILE	28.0	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	20.2	MAG	TCS	.
184	MINNOW FAMMILY	LARVA	19.6	MAG	TCS	.
184	CRAPPIE SPECIES	LARVA	18.3	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	22.0	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	21.0	MAG	TCS	.
184	GIZZARD SHAD	JUVENILE	20.0	MAG	TCS	.
184	GIZZARD SHAD	LARVA	14.8	MAG	TCS	.
184	CRAPPIE SPECIES	JUVENILE	22.0	MAG	TCS	.
184	CRAPPIE SPECIES	PROLARVA	4.7	MAG	TCS	.
184	CRAPPIE SPECIES	PROLARVA	5.3	MAG	TCS	.
184	CRAPPIE SPECIES	PROLARVA	4.5	MAG	TCS	.
184	CRAPPIE SPECIES	PROLARVA	5.8	MAG	TCS	61284
185	GIZZARD SHAD	JUVENILE	29.0	BEN	TCS	.
185	GIZZARD SHAD	JUVENILE	27.0	BEN	TCS	.
185	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
185	CRAPPIE SPECIES	JUVENILE	22.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
185	CRAPPIE SPECIES	LARVA	17.0	BEN	TCS	61284
185	MINNOW FAMMILY	PROLARVA	5.9	BEN	TCS	61284
185	MINNOW FAMMILY	PROLARVA	6.5	BEN	TCS	.
185	MINNOW FAMMILY	PROLARVA	6.7	BEN	TCS	.
185	MINNOW FAMMILY	LARVA	13.0	BEN	TCS	.
185	FRESHWATER DRUM EGG	EGG	1.3	BEN	TCS	.
185	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
186	SHORTNOSE GAR	JUVENILE	48.0	JAW	TCS	61284
186	GIZZARD SHAD	JUVENILE	31.0	JAW	TCS	.
186	GIZZARD SHAD	JUVENILE	28.0	JAW	TCS	.
186	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
186	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
186	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
186	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
186	GIZZARD SHAD	LARVA	18.0	JAW	TCS	.
186	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
186	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
186	GIZZARD SHAD	LARVA	.	JAW	TCS	.
186	UNIDENTIFIED LARVA	LARVA	4.9	JAW	TCS	.
187	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	61284
187	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
188	FRESHWATER DRUM	PROLARVA	4.2	BEN	TCS	.
189	FRESHWATER DRUM EGG	EGG	1.3	JAW	TCS	61384
190	CARP	JUVENILE	47.0	BEN	TCS	61284
191	GIZZARD SHAD	JUVENILE	21.0	MAG	TCS	61384
192	NO FISH	0	0.0	BEN	TCS	61384
193	WHITE CRAPPIE	JUVENILE	29.0	JAW	TCS	.
193	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
193	WHITE CRAPPIE	LARVA	20.0	JAW	TCS	.
193	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
193	GIZZARD SHAD	LARVA	20.0	JAW	TCS	.
193	GIZZARD SHAD	LARVA	18.0	JAW	TCS	.
193	SUCKER FAMILY	PROLARVA	7.2	JAW	TCS	.
193	UNIDENTIFIED EGG	EGG	3.5	JAW	TCS	.
193	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.

Appendix B.2(cont'd)

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
193	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
194	GIZZARD SHAD	LARVA	18.0	MAG	TCS	61484
194	GIZZARD SHAD	LARVA	15.2	MAG	TCS	61384
194	GIZZARD SHAD	JUVENILE	26.0	MAG	TCS	.
194	SUCKER FAMILY	PROLARVA	4.9	MAG	TCS	.
194	SUCKER FAMILY	PROLARVA	4.1	MAG	TCS	.
195	CARP	JUVENILE	24.0	JAW	TCS	61484
195	GIZZARD SHAD	LARVA	8.2	JAW	TCS	61584
195	GIZZARD SHAD	LARVA	7.3	JAW	TCS	.
195	CRAPPIE SPECIES	PROLARVA	6.2	JAW	TCS	.
195	CRAPPIE SPECIES	LARVA	5.1	JAW	TCS	.
195	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	61484
195	WHITE CRAPPIE	JUVENILE	25.0	JAW	TCS	.
195	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
195	GIZZARD SHAD	LARVA	14.5	JAW	TCS	.
195	GIZZARD SHAD	LARVA	11.4	JAW	TCS	.
195	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	4.6	JAW	TCS	.
195	SUCKER FAMILY	PROLARVA	6.2	JAW	TCS	.
195	CRAPPIE SPECIES	PROLARVA	5.6	JAW	TCS	.
195	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
195	FRESHWATER DRUM EGG	EGG	1.3	JAW	TCS	.
195	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	61484
196	GIZZARD SHAD	JUVENILE	24.0	MAG	TCS	.
196	WHITE CRAPPIE	JUVENILE	24.0	MAG	TCS	.
196	WHITE CRAPPIE	LARVA	17.0	MAG	TCS	.
196	SUCKER FAMILY	LARVA	7.6	MAG	TCS	.
196	GIZZARD SHAD	LARVA	17.0	MAG	TCS	.
196	SUCKER FAMILY	PROLARVA	5.2	MAG	TCS	.
197	SUCKER FAMILY	PROLARVA	6.1	BEN	TCS	61484
198	SUCKER FAMILY	PROLARVA	4.8	BEN	TCS	.
198	GIZZARD SHAD	LARVA	16.2	BEN	TCS	.
198	SUCKER FAMILY	PROLARVA	5.0	BEN	TCS	.
198	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
199	CARP	LARVA	14.4	BEN	TCS	61984
199	SUCKER FAMILY	PROLARVA	7.2	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
199	GIZZARD SHAD	LARVA	7.8	BEN	TCS	.
199	GIZZARD SHAD	LARVA	7.0	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	6.4	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	7.2	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	5.0	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	5.9	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	6.9	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	8.0	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	5.8	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	6.7	BEN	TCS	.
199	MINNOW FAMMILY	LARVA	6.3	JAW	TCS	62884
199	GIZZARD SHAD	LARVA	8.4	JAW	TCS	.
200	CARP	JUVENILE	34.0	JAW	TCS	61984
200	MINNOW FAMMILY	LARVA	8.5	JAW	TCS	.
200	GIZZARD SHAD	LARVA	7.1	JAW	TCS	.
200	SUCKER FAMILY	PROLARVA	5.2	JAW	TCS	.
200	SUCKER FAMILY	LARVA	5.7	JAW	TCS	.
200	SUCKER FAMILY	LARVA	3.1	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	7.2	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	7.0	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	6.6	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	6.5	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	7.0	JAW	TCS	61984
200	MINNOW FAMMILY	LARVA	6.7	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	6.9	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	6.2	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	7.5	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	7.2	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	7.0	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	6.8	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	6.2	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	6.5	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	5.7	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	6.1	JAW	TCS	.
200	MINNOW FAMMILY	LARVA	5.4	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
200	MINNOW FAMMILY	LARVA	5.8	JAW	TCS	.
200	SUNFISH SPECIES	LARVA	4.8	JAW	TCS	.
200	MINNOW FAMMILY	PROLARVA	4.8	BEN	TCS	.
201	CARP	JUVENILE	34.0	BEN	TCS	61984
201	GIZZARD SHAD	LARVA	18.8	BEN	TCS	.
201	GIZZARD SHAD	LARVA	5.8	BEN	TCS	.
201	GIZZARD SHAD	LARVA	6.8	BEN	TCS	.
201	GIZZARD SHAD	LARVA	8.1	BEN	TCS	.
201	GIZZARD SHAD	LARVA	12.2	BEN	TCS	.
201	SUNFISH SPECIES	LARVA	4.2	BEN	TCS	.
201	SUNFISH SPECIES	LARVA	4.6	BEN	TCS	61984
201	MINNOW FAMMILY	LARVA	6.0	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	6.6	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	7.7	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	7.6	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	7.7	BEN	TCS	61984
201	MINNOW FAMMILY	LARVA	7.0	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	7.0	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	6.5	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	5.8	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	6.2	BEN	TCS	.
201	MINNOW FAMMILY	LARVA	6.0	BEN	TCS	.
201	SUCKER FAMILY	LARVA	6.6	BEN	TCS	.
201	SUCKER FAMILY	LARVA	5.1	BEN	TCS	.
201	SUCKER FAMILY	LARVA	5.3	BEN	TCS	.
202	BUFFALO SPECIES	LARVA	19.3	JAW	TCS	.
202	GIZZARD SHAD	PROLARVA	6.0	JAW	TCS	.
202	SUCKER FAMILY	LARVA	5.7	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	5.2	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.5	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	7.5	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.2	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.1	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.0	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.2	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
202	MINNOW FAMMILY	LARVA	7.2	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.1	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.0	JAW	TCS	61984
202	MINNOW FAMMILY	LARVA	7.1	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	7.5	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.8	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	5.9	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.7	JAW	TCS	.
202	MINNOW FAMMILY	LARVA	6.9	JAW	TCS	.
202	SUNFISH SPECIES	LARVA	5.0	JAW	TCS	.
202	SUCKER FAMILY	P OLARVA	4.7	JAW	TCS	.
202	SUCKER FAMILY	PROLARVA	6.0	JAW	TCS	.
202	MINNOW FAMMILY	PROLARVA	4.5	BEN	TCS	.
202	MINNOW FAMMILY	LARVA	7.3	BEN	TCS	.
203	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	61984
203	GIZZARD SHAD	LARVA	7.2	BEN	TCS	.
203	GIZZARD SHAD	LARVA	6.9	BEN	TCS	.
203	MINNOW FAMMILY	LARVA	6.3	BEN	TCS	.
203	MINNOW FAMMILY	LARVA	7.7	BEN	TCS	.
203	MINNOW FAMMILY	LARVA	6.5	BEN	TCS	.
203	MINNOW FAMMILY	LARVA	8.0	BEN	TCS	.
203	MINNOW FAMMILY	LARVA	7.5	BEN	TCS	.
203	MINNOW FAMMILY	LARVA	7.1	BEN	TCS	.
203	SUCKER FAMILY	LARVA	7.3	BEN	TCS	.
203	SUNFISH SPECIES	LARVA	4.1	BEN	TCS	.
203	SUNFISH SPECIES	LARVA	4.3	BEN	TCS	.
203	SUCKER FAMILY	P OLARVA	4.7	BEN	TCS	61984
203	SUCKER FAMILY	PROLARVA	6.0	BEN	TCS	.
204	NO FISH	0	0.0	BEN	TCS	61384
205	NO FISH	0	.	BEN	TCS	.
206	NO FISH	0	.	BEN	TCS	.
207	NO FISH	0	.	BEN	TCS	.
208	MINNOW FAMMILY	LARVA	7.5	JAW	TCS	.
208	FRESHWATER DRUM EGG	EGG	1.4	JAW	TCS	.
209	MINNOW FAMMILY	LARVA	6.7	BEN	TCS	.

Appendix B.2(cont'd)

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
209	SUNFISH FAMILY	PROLARVA	3.5	BEN	TCS	.
209	MINNOW FAMMILY	LARVA	6.6	BEN	TCS	.
210	MINNOW FAMMILY	LARVA	7.3	BEN	TCS	.
210	MINNOW FAMMILY	LARVA	8.8	BEN	TCS	.
211	MINNOW FAMMILY	PROLARVA	8.2	MAG	TCS	62084
211	MINNOW FAMMILY	PROLARVA	7.0	MAG	TCS	.
211	MINNOW FAMMILY	PROLARVA	5.6	MAG	TCS	.
211	MINNOW FAMMILY	PROLARVA	6.1	MAG	TCS	.
211	MINNOW FAMMILY	PROLARVA	7.0	MAG	TCS	.
211	MINNOW FAMMILY	PROLARVA	6.2	MAG	TCS	.
211	MINNOW FAMMILY	PROLARVA	6.8	MAG	TCS	.
211	MINNOW FAMMILY	PROLARVA	5.9	MAG	TCS	.
211	MINNOW FAMMILY	PROLARVA	6.0	MAG	TCS	.
211	SUNFISH FAMILY	LARVA	4.5	MAG	TCS	.
211	GIZZARD SHAD	LARVA	8.4	MAG	TCS	.
211	SUCKER FAMILY	PROLARVA	6.5	MAG	TCS	.
211	GIZZARD SHAD	PROLARVA	5.2	MAG	TCS	.
211	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	3.5	MAG	TCS	62084
211	GIZZARD SHAD	PROLARVA	5.8	BEN	TCS	.
211	GIZZARD SHAD	PROLARVA	4.2	BEN	TCS	.
212	GIZZARD SHAD	LARVA	13.0	JAW	TCS	.
212	MINNOW FAMMILY	LARVA	7.9	JAW	TCS	.
212	SUCKER FAMILY	PROLARVA	5.3	JAW	TCS	.
212	MINNOW FAMMILY	LARVA	6.7	JAW	TCS	.
212	MINNOW FAMMILY	LARVA	7.0	JAW	TCS	.
212	MINNOW FAMMILY	LARVA	6.1	JAW	TCS	.
212	GIZZARD SHAD	LARVA	7.5	JAW	TCS	.
213	SUNFISH FAMILY	PROLARVA	4.2	BEN	TCS	.
213	MINNOW FAMMILY	LARVA	8.2	BEN	TCS	.
213	MINNOW FAMMILY	LARVA	7.2	BEN	TCS	.
213	MINNOW FAMMILY	LARVA	6.4	BEN	TCS	.
213	MINNOW FAMMILY	LARVA	6.6	BEN	TCS	.
213	MINNOW FAMMILY	LARVA	7.0	BEN	TCS	.
213	MINNOW FAMMILY	LARVA	5.6	BEN	TCS	.
213	SUNFISH SPECIES	LARVA	5.1	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
213	MINNOW FAMMILY	LARVA	6.2	BEN	TCS	.
213	MINNOW FAMMILY	LARVA	6.2	BEN	TCS	.
213	UNIDENTIFIED LARVA	LARVA	6.2	BEN	TCS	.
213	GIZZARD SHAD	LARVA	8.2	BEN	TCS	.
213	GIZZARD SHAD	LARVA	9.5	BEN	TCS	.
214	SUCKER FAMILY	PROLARVA	7.2	JAW	TCS	.
214	MINNOW FAMMILY	PROLARVA	5.6	JAW	TCS	62084
214	MINNOW FAMMILY	PROLARVA	6.7	JAW	TCS	.
214	GIZZARD SHAD	LARVA	7.7	JAW	TCS	.
214	GIZZARD SHAD	LARVA	6.6	JAW	TCS	.
214	GIZZARD SHAD	LARVA	6.5	JAW	TCS	.
214	GIZZARD SHAD	LARVA	6.8	JAW	TCS	.
214	GIZZARD SHAD	LARVA	7.1	JAW	TCS	.
214	SUCKER FAMILY	PROLARVA	5.2	JAW	TCS	.
214	MINNOW FAMMILY	LARVA	6.2	JAW	TCS	.
214	MINNOW FAMMILY	LARVA	5.4	JAW	TCS	.
214	SUCKER FAMILY	PROLARVA	5.2	JAW	TCS	.
214	MINNOW FAMMILY	LARVA	6.0	JAW	TCS	.
214	MINNOW FAMMILY	LARVA	6.5	JAW	TCS	.
214	SUNFISH SPECIES	LARVA	5.7	JAW	TCS	.
215	MINNOW FAMMILY	LARVA	7.1	MAG	TCS	.
215	MINNOW FAMMILY	LARVA	6.5	MAG	TCS	.
215	MINNOW FAMMILY	LARVA	6.2	MAG	TCS	.
215	MINNOW FAMMILY	LARVA	6.8	MAG	TCS	.
215	GIZZARD SHAD	LARVA	8.1	MAG	TCS	.
215	GIZZARD SHAD	LARVA	7.2	MAG	TCS	.
215	GIZZARD SHAD	LARVA	8.2	MAG	TCS	.
215	GIZZARD SHAD	LARVA	6.9	MAG	TCS	.
215	CARP	JUVENILE	32.0	MAG	TCS	62084
215	CARP	JUVENILE	38.0	MAG	TCS	.
215	MINNOW FAMMILY	JUVENILE	7.0	MAG	TCS	.
215	MINNOW FAMMILY	JUVENILE	8.1	MAG	TCS	.
215	GIZZARD SHAD	LARVA	9.7	MAG	TCS	.
215	GIZZARD SHAD	LARVA	14.6	MAG	TCS	.
215	MINNOW FAMMILY	LARVA	6.3	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
215	SUCKER FAMILY	PROLARVA	5.2	MAG	TCS	.
215	SUNFISH SPECIES	LARVA	3.7	MAG	TCS	.
215	SUNFISH SPECIES	LARVA	4.6	MAG	TCS	.
215	SUCKER FAMILY	PROLARVA	5.3	MAG	TCS	.
215	SUCKER FAMILY	PROLARVA	7.1	MAG	TCS	.
216	GIZZARD SHAD	LARVA	10.2	BEN	TCS	.
216	SUCKER FAMILY	PROLARVA	7.4	BEN	TCS	.
216	SUCKER FAMILY	PROLARVA	5.7	BEN	TCS	.
216	MINNOW FAMMILY	LARVA	7.1	BEN	TCS	.
216	MINNOW FAMMILY	LARVA	7.0	BEN	TCS	.
216	GIZZARD SHAD	LARVA	7.7	BEN	TCS	.
216	GIZZARD SHAD	LARVA	4.6	BEN	TCS	.
216	SUNFISH FAMILY	LARVA	5.2	BEN	TCS	.
216	MINNOW FAMMILY	PROLARVA	6.3	BEN	TCS	.
216	MINNOW FAMMILY	PROLARVA	5.2	BEN	TCS	.
216	MINNOW FAMMILY	PROLARVA	6.7	BEN	TCS	62084
216	MINNOW FAMMILY	PROLARVA	6.9	BEN	TCS	.
216	MINNOW FAMMILY	PROLARVA	7.0	BEN	TCS	.
216	MINNOW FAMMILY	PROLARVA	6.6	BEN	TCS	.
216	SUCKER FAMILY	PROLARVA	7.0	BEN	TCS	.
217	CARP	JUVENILE	39.0	BEN	TCS	62684
217	CARP	JUVENILE	19.0	BEN	TCS	.
217	CARP	LARVA	14.8	BEN	TCS	.
217	CARP	LARVA	14.0	BEN	TCS	.
217	GIZZARD SHAD	LARVA	19.2	BEN	TCS	.
217	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
217	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
217	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
217	GIZZARD SHAD	LARVA	12.6	BEN	TCS	.
217	GIZZARD SHAD	LARVA	12.0	BEN	TCS	.
217	GIZZARD SHAD	LARVA	11.2	BEN	TCS	.
217	GIZZARD SHAD	LARVA	10.4	BEN	TCS	.
217	GIZZARD SHAD	LARVA	14.0	BEN	TCS	.
217	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
217	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
217	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
217	SUNFISH SPECIES	LARVA	6.8	BEN	TCS	.
217	MINNOW FAMMILY	LARVA	7.1	BEN	TCS	62684
218	GIZZARD SHAD	JUVENILE	31.0	JAW	TCS	.
218	GIZZARD SHAD	JUVENILE	29.0	JAW	TCS	.
218	GIZZARD SHAD	JUVENILE	36.0	JAW	TCS	.
218	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
218	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
218	CARP	LARVA	16.4	JAW	TCS	.
218	CARP	LARVA	14.2	JAW	TCS	.
218	CARP	LARVA	13.4	JAW	TCS	.
218	GIZZARD SHAD	JUVENILE	20.1	JAW	TCS	.
218	GIZZARD SHAD	LARVA	19.0	JAW	TCS	.
218	GIZZARD SHAD	LARVA	6.9	JAW	TCS	.
218	GIZZARD SHAD	LARVA	6.5	JAW	TCS	.
218	MINNOW FAMMILY	LARVA	5.7	JAW	TCS	.
218	MINNOW FAMMILY	LARVA	6.7	JAW	TCS	.
218	GIZZARD SHAD	LARVA	7.2	JAW	TCS	.
218	SUNFISH SPECIES	LARVA	4.1	JAW	TCS	.
219	SUNFISH SPECIES	LARVA	22.0	BEN	TCS	.
219	SUNFISH SPECIES	LARVA	22.0	BEN	TCS	.
219	SUNFISH SPECIES	LARVA	21.0	BEN	TCS	.
219	SUNFISH SPECIES	LARVA	18.0	BEN	TCS	.
219	SUNFISH SPECIES	LARVA	21.0	BEN	TCS	.
219	SUNFISH SPECIES	LARVA	19.0	BEN	TCS	62684
219	SUNFISH SPECIES	LARVA	17.0	BEN	TCS	.
219	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
219	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
219	GIZZARD SHAD	LARVA	19.3	BEN	TCS	.
219	MINNOW FAMMILY	LARVA	7.3	BEN	TCS	.
219	SUNFISH SPECIES	LARVA	4.3	BEN	TCS	.
219	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	.	BEN	TCS	.
219	CARP	JUVENILE	38.0	BEN	TCS	.
219	CARP	JUVENILE	23.0	BEN	TCS	.
219	CARP	LARVA	16.4	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
219	MINNOW FAMMILY	LARVA	13.4	BEN	TCS	.
219	MINNOW FAMMILY	LARVA	11.8	BEN	TCS	.
219	MINNOW FAMMILY	LARVA	13.2	BEN	TCS	.
219	MINNOW FAMMILY	LARVA	9.0	BEN	TCS	.
219	MINNOW FAMMILY	LARVA	6.9	BEN	TCS	.
220	CARP	JUVENILE	52.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	29.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	29.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	32.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
220	MINNOW FAMMILY	LARVA	17.2	JAW	TCS	62684
220	MINNOW FAMMILY	LARVA	13.0	JAW	TCS	.
220	MINNOW FAMMILY	LARVA	16.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
220	GIZZARD SHAD	LARVA	19.0	JAW	TCS	.
220	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
220	GIZZARD SHAD	LARVA	19.0	JAW	TCS	.
220	GIZZARD SHAD	LARVA	19.0	JAW	TCS	.
220	MINNOW FAMMILY	LARVA	6.9	JAW	TCS	.
220	MINNOW FAMMILY	LARVA	7.1	JAW	TCS	.
220	MINNOW FAMMILY	LARVA	7.2	JAW	TCS	.
220	MINNOW FAMMILY	LARVA	6.1	JAW	TCS	.
220	SUCKER FAMILY	PROLARVA	5.1	JAW	TCS	.
220	GIZZARD SHAD	PROLARVA	6.2	JAW	TCS	.
220	GIZZARD SHAD	PROLARVA	6.5	JAW	TCS	.
220	SUNFISH SPECIES	PROLARVA	4.0	JAW	TCS	.
220	FRESHWATER DRUM	PROLARVA	5.1	JAW	TCS	.
221	CARP	JUVENILE	46.0	BEN	TCS	.
221	MINNOW FAMMILY	LARVA	13.6	BEN	TCS	.
221	MINNOW FAMMILY	LARVA	12.0	BEN	TCS	.
221	MINNOW FAMMILY	LARVA	10.0	BEN	TCS	62684
221	MINNOW FAMMILY	LARVA	13.2	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
221	FRESHWATER DRUM	LARVA	4.5	BEN	TCS	.
221	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
221	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
221	GIZZARD SHAD	LARVA	18.2	BEN	TCS	.
222	CARP	JUVENILE	35.0	MAG	TCS	.
222	CARP	JUVENILE	25.0	MAG	TCS	.
222	CARP	JUVENILE	30.0	MAG	TCS	.
222	GIZZARD SHAD	LARVA	15.4	MAG	TCS	.
222	GIZZARD SHAD	LARVA	13.2	MAG	TCS	.
222	GIZZARD SHAD	LARVA	12.0	MAG	TCS	.
222	GIZZARD SHAD	LARVA	18.0	MAG	TCS	.
222	MINNOW FAMMILY	LARVA	12.2	MAG	TCS	.
222	MINNOW FAMMILY	LARVA	11.0	MAG	TCS	.
222	MINNOW FAMMILY	LARVA	11.0	MAG	TCS	.
222	GIZZARD SHAD	JUVENILE	23.0	MAG	TCS	.
222	GIZZARD SHAD	JUVENILE	8.2	MAG	TCS	.
223	MINNOW FAMMILY	LARVA	15.6	BEN	TCS	.
223	MINNOW FAMMILY	LARVA	11.2	BEN	TCS	.
223	MINNOW FAMMILY	LARVA	6.3	BEN	TCS	.
224	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
225	MINNOW FAMMILY	LARVA	13.4	MAG	TCS	62684
225	GIZZARD SHAD	LARVA	5.7	MAG	TCS	.
225	GIZZARD SHAD	LARVA	7.4	MAG	TCS	.
225	GIZZARD SHAD	JUVENILE	20.2	MAG	TCS	.
225	MINNOW FAMMILY	LARVA	8.8	MAG	TCS	.
226	NO FISH	0	0.0	BEN	TCS	62684
227	SUCKER FAMILY	PROLARVA	5.6	JAW	TCS	.
227	FRESHWATER DRUM EGG	EGG	1.4	JAW	TCS	.
228	MINNOW FAMMILY	EGG	10.0	BEN	TCS	.
229	CARP	JUVENILE	38.0	MAG	TCS	.
229	CARP	JUVENILE	32.0	MAG	TCS	.
229	GIZZARD SHAD	JUVENILE	11.6	MAG	TCS	.
229	GIZZARD SHAD	JUVENILE	13.4	MAG	TCS	.
229	GIZZARD SHAD	JUVENILE	14.0	MAG	TCS	.
229	GIZZARD SHAD	JUVENILE	17.8	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
229	MINNOW FAMMILY	JUVENILE	11.8	MAG	TCS	.
229	MINNOW FAMMILY	JUVENILE	12.8	MAG	TCS	.
229	MINNOW FAMMILY	JUVENILE	11.2	MAG	TCS	.
229	MINNOW FAMMILY	JUVENILE	12.8	MAG	TCS	.
229	MINNOW FAMMILY	JUVENILE	10.0	MAG	TCS	.
229	GIZZARD SHAD	JUVENILE	22.0	MAG	TCS	.
229	GIZZARD SHAD	JUVENILE	21.0	MAG	TCS	.
229	GIZZARD SHAD	LARVA	19.0	MAG	TCS	.
229	GIZZARD SHAD	LARVA	20.0	MAG	TCS	62684
229	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	5.2	MAG	TCS	.
230	CARP	JUVENILE	45.0	BEN	TCS	.
230	CARP	JUVENILE	38.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	29.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	26.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
230	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
230	GIZZARD SHAD	LARVA	18.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
230	GIZZARD SHAD	LARVA	14.0	BEN	TCS	.
230	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
230	GIZZARD SHAD	LARVA	16.4	BEN	TCS	.
230	GIZZARD SHAD	LARVA	17.4	BEN	TCS	.
230	GIZZARD SHAD	LARVA	13.6	BEN	TCS	.
230	GIZZARD SHAD	LARVA	10.6	BEN	TCS	.
230	GIZZARD SHAD	LARVA	9.2	BEN	TCS	.
230	GIZZARD SHAD	LARVA	8.3	BEN	TCS	62684
230	SUNFISH SPECIES	LARVA	7.8	BEN	TCS	.
230	MINNOW FAMMILY	LARVA	12.8	BEN	TCS	.
230	MINNOW FAMMILY	LARVA	15.0	BEN	TCS	.
230	FRESHWATER DRUM	LARVA	4.7	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
230	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
231	CARP	JUVENILE	41.0	JAW	TCS	.
231	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
231	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
231	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
231	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
231	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
231	GIZZARD SHAD	LARVA	18.0	JAW	TCS	.
231	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
231	GIZZARD SHAD	LARVA	18.0	JAW	TCS	.
231	GIZZARD SHAD	LARVA	15.0	JAW	TCS	.
231	GIZZARD SHAD	LARVA	18.0	JAW	TCS	.
231	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
231	GIZZARD SHAD	LARVA	20.0	JAW	TCS	.
231	GIZZARD SHAD	LARVA	17.0	JAW	TCS	.
231	MINNOW FAMMILY	LARVA	13.2	JAW	TCS	62684
231	GIZZARD SHAD	LARVA	10.0	JAW	TCS	.
231	GIZZARD SHAD	LARVA	8.5	JAW	TCS	.
231	GIZZARD SHAD	LARVA	8.7	JAW	TCS	.
231	GIZZARD SHAD	LARVA	7.9	JAW	TCS	.
231	GIZZARD SHAD	LARVA	11.4	JAW	TCS	.
231	MINNOW FAMMILY	LARVA	6.7	JAW	TCS	.
231	MINNOW FAMMILY	LARVA	6.3	JAW	TCS	.
231	SUNFISH FAMILY	LARVA	4.6	JAW	TCS	.
231	GIZZARD SHAD	PROLARVA	4.7	JAW	TCS	.
231	PADDLEFISH	PROLARVA	7.6	JAW	TCS	.
232	CARP	JUVENILE	30.0	BEN	TCS	.
232	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
232	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
232	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	18.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	20.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	16.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	14.0	BEN	TCS	.
232	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.

Appendix B.2(cont'd)

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
232	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	17.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	18.0	BEN	TCS	62684
232	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	17.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	15.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	12.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	12.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	9.0	BEN	TCS	.
232	GIZZARD SHAD	LARVA	14.0	BEN	TCS	.
232	SUNFISH SPECIES	LARVA	4.7	BEN	TCS	.
232	MINNOW FAMMILY	LARVA	6.5	BEN	TCS	.
232	MINNOW FAMMILY	LARVA	5.2	BEN	TCS	.
232	MINNOW FAMMILY	LARVA	6.0	BEN	TCS	.
232	SUNFISH FAMILY	PROLARVA	4.1	BEN	TCS	.
232	MINNOW FAMMILY	LARVA	12.0	BEN	TCS	.
233	GIZZARD SHAD	PROLARVA	5.3	MAG	TCS	.
233	GIZZARD SHAD	LARVA	16.0	MAG	TCS	.
233	GIZZARD SHAD	LARVA	13.0	MAG	TCS	.
233	GIZZARD SHAD	LARVA	15.2	MAG	TCS	.
233	GIZZARD SHAD	LARVA	18.0	MAG	TCS	.
233	GIZZARD SHAD	JUVENILE	20.0	MAG	TCS	.
233	GIZZARD SHAD	LARVA	19.0	MAG	TCS	.
233	GIZZARD SHAD	JUVENILE	21.0	MAG	TCS	62684
233	GIZZARD SHAD	JUVENILE	20.0	MAG	TCS	.
233	GIZZARD SHAD	JUVENILE	24.0	MAG	TCS	.
233	GIZZARD SHAD	JUVENILE	23.0	MAG	TCS	.
233	GIZZARD SHAD	JUVENILE	21.0	MAG	TCS	.
233	MINNOW FAMMILY	LARVA	6.5	MAG	TCS	.
233	MINNOW FAMMILY	LARVA	7.3	MAG	TCS	.
233	MINNOW FAMMILY	LARVA	7.2	MAG	TCS	.
233	MINNOW FAMMILY	PROLARVA	5.6	MAG	TCS	.
233	FRESHWATER DRUM	PROLARVA	5.2	MAG	TCS	.
233	SUNFISH FAMILY	PROLARVA	3.9	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
233	FRESHWATER DRUM EGG	EGG	1.7	MAG	TCS	62784
234	CARP	JUVENILE	37.0	JAW	TCS	.
234	CARP	JUVENILE	35.0	JAW	TCS	.
234	CARP	JUVENILE	31.0	JAW	TCS	.
234	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
234	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
234	GIZZARD SHAD	LARVA	19.0	JAW	TCS	.
234	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
234	GIZZARD SHAD	LARVA	19.0	JAW	TCS	.
234	GIZZARD SHAD	LARVA	14.0	JAW	TCS	.
234	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
234	GIZZARD SHAD	LARVA	17.0	JAW	TCS	62784
234	GIZZARD SHAD	LARVA	19.0	JAW	TCS	.
234	FRESHWATER DRUM	LARVA	7.6	JAW	TCS	.
234	FRESHWATER DRUM	LARVA	8.2	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	8.8	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	12.2	JAW	TCS	.
234	SEA BASS FAMILY	LARVA	17.6	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	13.2	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	13.4	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	10.0	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	14.0	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	11.0	JAW	TCS	.
234	GIZZARD SHAD	PROLARVA	4.0	JAW	TCS	.
234	GIZZARD SHAD	PROLARVA	4.6	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	6.1	JAW	TCS	62784
234	MINNOW FAMMILY	LARVA	7.0	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	5.8	JAW	TCS	.
234	FRESHWATER DRUM	PROLARVA	4.2	JAW	TCS	.
234	MINNOW FAMMILY	LARVA	6.1	JAW	TCS	.
234	FRESHWATER DRUM	LARVA	7.0	JAW	TCS	.
234	FRESHWATER DRUM	LARVA	5.8	JAW	TCS	.
234	FRESHWATER DRUM	PROLARVA	4.2	JAW	TCS	.
235	CARP	JUVENILE	46.0	MAG	TCS	70384
235	GIZZARD SHAD	JUVENILE	23.6	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
235	GIZZARD SHAD	PROLARVA	7.0	MAG	TCS	.
235	MINNOW FAMMILY	PROLARVA	6.1	MAG	TCS	.
235	GIZZARD SHAD	PROLARVA	3.6	MAG	TCS	.
236	MINNOW FAMMILY	JUVENILE	22.0	JAW	TCS	.
236	FRESHWATER DRUM	LARVA	16.0	JAW	TCS	.
236	FRESHWATER DRUM	LARVA	15.0	JAW	TCS	.
236	UNIDENTIFIED LARVA	LARVA	11.0	JAW	TCS	.
236	UNIDENTIFIED LARVA	LARVA	11.4	JAW	TCS	.
236	MINNOW FAMMILY	LARVA	7.0	JAW	TCS	.
236	MINNOW FAMMILY	LARVA	6.5	JAW	TCS	.
236	MINNOW FAMMILY	LARVA	6.7	JAW	TCS	.
236	FRESHWATER DRUM	LARVA	4.3	JAW	TCS	.
236	SUCKER FAMILY	PROLARVA	4.5	JAW	TCS	.
237	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
237	FRESHWATER DRUM	LARVA	9.1	BEN	TCS	.
237	FRESHWATER DRUM	PROLARVA	3.8	BEN	TCS	.
238	MINNOW FAMMILY	JUVENILE	21.0	MAG	TCS	70584
238	FRESHWATER DRUM	LARVA	5.8	MAG	TCS	.
238	MINNOW FAMMILY	PROLARVA	6.2	MAG	TCS	.
239	MINNOW FAMMILY	JUVENILE	23.0	BEN	TCS	.
239	FRESHWATER DRUM	PROLARVA	4.0	BEN	TCS	.
240	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
240	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
240	SUCKER FAMILY	LARVA	9.0	JAW	TCS	.
240	FRESHWATER DRUM	PROLARVA	3.4	JAW	TCS	.
240	FRESHWATER DRUM	PROLARVA	3.9	JAW	TCS	.
240	FRESHWATER DRUM	PROLARVA	4.0	JAW	TCS	70584
240	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	2.4	JAW	TCS	.
241	NO FISH	0	0.0	BEN	TCS	70584
242	MINNOW FAMMILY	JUVENILE	30.0	MAG	TCS	.
242	MINNOW FAMMILY	JUVENILE	28.0	MAG	TCS	.
242	MINNOW FAMMILY	JUVENILE	29.0	MAG	TCS	.
242	MINNOW FAMMILY	LARVA	14.2	MAG	TCS	.
242	MINNOW FAMMILY	PROLARVA	6.0	MAG	TCS	.
242	MINNOW FAMMILY	PROLARVA	6.2	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
242	SUNFISH SPECIES	PROLARVA	4.1	MAG	TCS	.
243	SUCKER FAMILY	PROLARVA	4.0	JAW	TCS	.
244	MINNOW FAMMILY	JUVENILE	22.0	MAG	TCS	70684
244	MINNOW FAMMILY	PROLARVA	5.9	MAG	TCS	.
244	CRAPPIE SPECIES	LARVA	8.6	MAG	TCS	.
244	MINNOW FAMMILY	JUVENILE	17.4	MAG	TCS	.
244	SUCKER FAMILY	LARVA	7.2	MAG	TCS	.
245	NO FISH	0	0.0	BEN	TCS	70584
246	SUCKER FAMILY	LARVA	6.8	JAW	TCS	70584
247	MINNOW FAMMILY	JUVENILE	24.0	BEN	TCS	70684
247	MINNOW FAMMILY	JUVENILE	22.0	BEN	TCS	.
247	CRAPPIE SPECIES	JUVENILE	19.0	BEN	TCS	.
247	CRAPPIE SPECIES	JUVENILE	19.4	BEN	TCS	.
247	BUFFALO SPECIES	JUVENILE	19.2	BEN	TCS	.
247	MINNOW FAMMILY	LARVA	5.7	BEN	TCS	.
247	MINNOW FAMMILY	LARVA	6.2	BEN	TCS	70684
247	MINNOW FAMMILY	LARVA	6.5	BEN	TCS	.
247	SUCKER FAMILY	PROLARVA	7.5	BEN	TCS	.
247	SUNFISH FAMILY	PROLARVA	5.4	BEN	TCS	.
247	GIZZARD SHAD	LARVA	21.0	BEN	TCS	.
247	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
247	GIZZARD SHAD	LARVA	17.0	BEN	TCS	.
247	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
247	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
247	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
247	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
247	FRESHWATER DRUM	JUVENILE	28.0	BEN	TCS	.
247	FRESHWATER DRUM EGG	EGG	1.6	BEN	TCS	.
247	FRESHWATER DRUM EGG	EGG	1.7	BEN	TCS	.
248	CRAPPIE SPECIES	LARVA	13.4	MAG	TCS	.
248	CRAPPIE SPECIES	JUVENILE	24.0	MAG	TCS	.
248	SEA BASS FAMILY	LARVA	22.0	MAG	TCS	.
248	GIZZARD SHAD	LARVA	17.4	MAG	TCS	.
248	GIZZARD SHAD	LARVA	18.0	MAG	TCS	.
248	GIZZARD SHAD	JUVENILE	20.2	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
248	GIZZARD SHAD	LARVA	18.0	MAG	TCS	.
248	GIZZARD SHAD	LARVA	19.8	MAG	TCS	.
248	GIZZARD SHAD	LARVA	19.2	MAG	TCS	70684
248	FRESHWATER DRUM	LARVA	9.0	MAG	TCS	.
248	FRESHWATER DRUM	PROLARVA	4.3	MAG	TCS	.
248	FRESHWATER DRUM	PROLARVA	15.0	MAG	TCS	.
248	MINNOW FAMMILY	LARVA	6.0	MAG	TCS	.
248	FRESHWATER DRUM	LARVA	6.2	MAG	TCS	.
248	SUCKER FAMILY	PROLARVA	6.0	MAG	TCS	.
248	SUCKER FAMILY	PROLARVA	5.3	MAG	TCS	.
248	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	3.2	MAG	TCS	.
248	FRESHWATER DRUM EGG	EGG	1.6	MAG	TCS	.
248	FRESHWATER DRUM EGG	EGG	1.5	MAG	TCS	.
249	CRAPPIE SPECIES	LARVA	16.4	BEN	TCS	.
249	SEA BASS FAMILY	JUVENILE	20.0	BEN	TCS	.
249	FRESHWATER DRUM	JUVENILE	26.0	BEN	TCS	.
249	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	.
249	GIZZARD SHAD	LARVA	21.0	BEN	TCS	.
249	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	70684
249	GIZZARD SHAD	JUVENILE	19.2	BEN	TCS	.
249	GIZZARD SHAD	JUVENILE	17.6	BEN	TCS	.
249	GIZZARD SHAD	JUVENILE	19.1	BEN	TCS	.
249	GIZZARD SHAD	JUVENILE	20.2	BEN	TCS	.
249	GIZZARD SHAD	JUVENILE	16.6	BEN	TCS	.
250	GIZZARD SHAD	LARVA	18.8	MAG	TCS	70684
250	GIZZARD SHAD	LARVA	18.6	MAG	TCS	.
250	GIZZARD SHAD	LARVA	18.3	MAG	TCS	.
250	GIZZARD SHAD	LARVA	19.2	MAG	TCS	.
250	GIZZARD SHAD	LARVA	20.3	MAG	TCS	.
250	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	2.9	MAG	TCS	.
250	MINNOW FAMMILY	PROLARVA	5.8	MAG	TCS	.
251	SUCKER FAMILY	LARVA	9.0	MAG	TCS	.
251	SUCKER FAMILY	LARVA	.	MAG	TCS	.
251	UNIDENTIFIED EGG	EGG	1.0	MAG	TCS	.
252	MINNOW FAMMILY	LARVA	19.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTIFIER INITIALS	DATE SORTED
252	MINNOW FAMMILY	JUVENILE	24.0	BEN	TCS	.
252	SUCKER FAMILY	LARVA	12.6	BEN	TCS	.
252	FRESHWATER DRUM	LARVA	18.2	BEN	TCS	.
252	MINNOW FAMMILY	LARVA	6.8	BEN	TCS	.
252	FRESHWATER DRUM	LARVA	6.5	BEN	TCS	.
252	GIZZARD SHAD	JUVENILE	26.0	BEN	TCS	.
252	GIZZARD SHAD	LARVA	19.0	BEN	TCS	.
252	GIZZARD SHAD	LARVA	19.0	BEN	TCS	70684
252	GIZZARD SHAD	LARVA	18.0	BEN	TCS	.
252	GIZZARD SHAD	LARVA	18.3	BEN	TCS	.
252	UNIDENTIFIED EGG	EGG	2.7	BEN	TCS	.
253	CARP	JUVENILE	26.0	BEN	TCS	71084
253	CARP	LARVA	17.0	BEN	TCS	.
253	MINNOW FAMMILY	LARVA	16.0	BEN	TCS	.
253	GIZZARD SHAD	JUVENILE	29.0	BEN	TCS	.
253	FRESHWATER DRUM	LARVA	19.0	BEN	TCS	.
253	SUCKER FAMILY	LARVA	6.7	BEN	TCS	.
254	CARP	JUVENILE	26.0	JAW	TCS	.
254	MINNOW FAMMILY	JUVENILE	29.0	JAW	TCS	.
254	GIZZARD SHAD	JUVENILE	32.0	JAW	TCS	.
254	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
254	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
254	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
254	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
254	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
255	CARP	JUVENILE	42.0	BEN	TCS	71084
255	CARP	JUVENILE	30.0	BEN	TCS	.
255	CARP	JUVENILE	28.0	BEN	TCS	.
255	CARP	JUVENILE	32.0	BEN	TCS	.
255	CARP	JUVENILE	27.0	BEN	TCS	71084
255	CARP	JUVENILE	31.0	BEN	TCS	.
255	CARP	LARVA	24.0	BEN	TCS	.
255	CARP	JUVENILE	21.0	BEN	TCS	.
255	CARP	LARVA	23.0	BEN	TCS	.
255	CARP	LARVA	21.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
255	SEA BASS FAMILY	JUVENILE	32.0	BEN	TCS	.
255	FRESHWATER DRUM	JUVENILE	19.4	BEN	TCS	.
255	GIZZARD SHAD	JUVENILE	29.0	BEN	TCS	.
255	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
255	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
255	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
255	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
255	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
255	SUCKER FAMILY	LARVA	6.5	BEN	TCS	.
255	SUCKER FAMILY	LARVA	7.7	BEN	TCS	.
255	SUCKER FAMILY	LARVA	12.4	BEN	TCS	.
256	SUCKER FAMILY	LARVA	8.1	JAW	TCS	71084
256	SUCKER FAMILY	PROLARVA	5.7	JAW	TCS	.
256	SUCKER FAMILY	LARVA	5.8	JAW	TCS	.
256	SUCKER FAMILY	LARVA	6.9	JAW	TCS	.
256	SUCKER FAMILY	LARVA	7.0	JAW	TCS	.
256	SUCKER FAMILY	LARVA	6.2	JAW	TCS	71084
256	SUCKER FAMILY	LARVA	8.5	JAW	TCS	.
256	GIZZARD SHAD	LARVA	10.2	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	31.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	29.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
256	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
256	GIZZARD SHAD	LARVA	19.0	JAW	TCS	.
256	GIZZARD SHAD	LARVA	17.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
256	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
256	FRESHWATER DRUM	JUVENILE	20.0	JAW	TCS	.
256	FRESHWATER DRUM	JUVENILE	21.0	JAW	TCS	.
256	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	71084
256	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
256	FRESHWATER DRUM	JUVENILE	15.0	JAW	TCS	.
256	FRESHWATER DRUM	JUVENILE	20.0	JAW	TCS	.
256	FRESHWATER DRUM	JUVENILE	14.4	JAW	TCS	.
256	CARP	JUVENILE	39.0	JAW	TCS	.
256	CARP	JUVENILE	31.0	JAW	TCS	.
256	CARP	JUVENILE	34.0	JAW	TCS	.
256	CARP	JUVENILE	30.0	JAW	TCS	.
256	CARP	JUVENILE	27.0	JAW	TCS	.
256	CARP	JUVENILE	29.0	JAW	TCS	.
256	CARP	JUVENILE	25.0	JAW	TCS	.
256	CARP	JUVENILE	24.0	JAW	TCS	.
256	CARP	JUVENILE	25.0	JAW	TCS	.
256	CARP	JUVENILE	24.0	JAW	TCS	.
256	CARP	JUVENILE	21.0	JAW	TCS	.
256	CARP	LARVA	19.0	JAW	TCS	.
256	CARP	JUVENILE	22.0	JAW	TCS	.
256	CARP	LARVA	18.0	JAW	TCS	.
256	CARP	JUVENILE	41.0	JAW	TCS	.
256	CARP	JUVENILE	37.0	JAW	TCS	.
256	CARP	JUVENILE	30.0	JAW	TCS	.
256	CARP	JUVENILE	31.0	JAW	TCS	71084
256	CARP	JUVENILE	32.0	JAW	TCS	.
256	CARP	JUVENILE	33.0	JAW	TCS	.
256	CARP	JUVENILE	30.0	JAW	TCS	.
256	CARP	JUVENILE	24.0	JAW	TCS	.
256	CARP	JUVENILE	23.0	JAW	TCS	.
257	SUCKER FAMILY	PROLARVA	5.1	BEN	TCS	.
257	GIZZARD SHAD	JUVENILE	29.0	BEN	TCS	.
257	GIZZARD SHAD	JUVENILE	31.0	BEN	TCS	.
257	GIZZARD SHAD	JUVENILE	27.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
257	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
257	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	.
257	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
257	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
257	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
257	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
257	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
257	FRESHWATER DRUM	JUVENILE	26.0	BEN	TCS	.
257	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
257	CARP	JUVENILE	33.0	BEN	TCS	.
257	CARP	JUVENILE	29.0	BEN	TCS	.
257	CARP	JUVENILE	26.0	BEN	TCS	.
257	CARP	JUVENILE	29.0	BEN	TCS	71084
257	CARP	JUVENILE	29.0	BEN	TCS	.
257	CARP	JUVENILE	26.0	BEN	TCS	.
257	CARP	JUVENILE	27.0	BEN	TCS	.
257	CARP	JUVENILE	23.0	BEN	TCS	.
257	CARP	JUVENILE	22.0	BEN	TCS	.
257	CARP	JUVENILE	24.0	BEN	TCS	.
257	CARP	JUVENILE	27.0	BEN	TCS	.
257	CARP	JUVENILE	23.0	BEN	TCS	.
257	CARP	JUVENILE	21.0	BEN	TCS	.
257	CARP	JUVENILE	25.0	BEN	TCS	.
258	SUCKER FAMILY	LARVA	6.7	BEN	TCS	.
258	SUCKER FAMILY	LARVA	6.0	BEN	TCS	.
258	SUCKER FAMILY	LARVA	6.2	BEN	TCS	.
258	SUCKER FAMILY	LARVA	6.7	BEN	TCS	.
258	SUCKER FAMILY	LARVA	6.6	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	28.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	26.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	27.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	27.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	28.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	71084

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
258	GIZZARD SHAD	JUVENILE	27.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	19.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	19.0	BEN	TCS	.
258	GIZZARD SHAD	JUVENILE	17.0	BEN	TCS	.
258	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
258	FRESHWATER DRUM	JUVENILE	26.0	BEN	TCS	.
258	FRESHWATER DRUM	JUVENILE	24.0	BEN	TCS	.
258	FRESHWATER DRUM	JUVENILE	24.0	BEN	TCS	.
258	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
258	FRESHWATER DRUM	LARVA	14.2	BEN	TCS	.
258	FRESHWATER DRUM	LARVA	16.0	BEN	TCS	71084
258	FRESHWATER DRUM	LARVA	15.0	BEN	TCS	.
258	CARP	JUVENILE	47.0	BEN	TCS	.
258	CARP	JUVENILE	40.0	BEN	TCS	.
258	CARP	JUVENILE	41.0	BEN	TCS	.
258	CARP	JUVENILE	40.0	BEN	TCS	.
258	CARP	JUVENILE	29.0	BEN	TCS	.
258	CARP	JUVENILE	27.0	BEN	TCS	.
258	CARP	JUVENILE	30.0	BEN	TCS	.
258	CARP	JUVENILE	27.0	BEN	TCS	.
258	CARP	JUVENILE	24.0	BEN	TCS	.
258	CARP	JUVENILE	24.0	BEN	TCS	.
258	CARP	JUVENILE	25.0	BEN	TCS	.
258	CARP	JUVENILE	25.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
258	CARP	JUVENILE	27.0	BEN	TCS	.
258	CARP	JUVENILE	21.0	BEN	TCS	.
258	CARP	JUVENILE	25.0	BEN	TCS	.
258	CARP	JUVENILE	23.0	BEN	TCS	.
258	CARP	JUVENILE	22.0	BEN	TCS	.
258	CARP	JUVENILE	21.0	BEN	TCS	.
259	CARP	JUVENILE	62.0	JAW	TCS	.
260	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	71184
261	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	71184
262	CARP	JUVENILE	28.0	JAW	TCS	.
262	SUCKER FAMILY	LARVA	17.0	JAW	TCS	.
262	SUCKER FAMILY	LARVA	13.2	JAW	TCS	.
263	SUCKER FAMILY	LARVA	17.6	BEN	TCS	.
264	CARP	JUVENILE	33.0	BEN	TCS	.
264	CARP	JUVENILE	22.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	27.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	26.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
265	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
265	CARP	JUVENILE	26.0	BEN	TCS	.
265	PERCH FAMILY	PROLARVA	5.5	BEN	TCS	.
265	MINNOW FAMMILY	PROLARVA	5.6	BEN	TCS	.
266	GIZZARD SHAD	JUVENILE	28.0	JAW	TCS	71284
266	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
266	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
266	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
266	CARP	JUVENILE	36.0	JAW	TCS	.
266	CARP	JUVENILE	39.0	JAW	TCS	.
266	CARP	JUVENILE	27.0	JAW	TCS	.
266	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	5.1	JAW	TCS	.
266	FRESHWATER DRUM EGG	EGG	1.6	JAW	TCS	.
267	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	71284
267	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	71284
267	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	26.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	24.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	19.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	21.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	19.0	BEN	TCS	.
267	GIZZARD SHAD	JUVENILE	18.0	BEN	TCS	.
267	CARP	JUVENILE	22.0	BEN	TCS	.
267	SUCKER FAMILY	PROLARVA	6.5	BEN	TCS	.
267	MINNOW FAMMILY	PROLARVA	6.1	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
268	GIZZARD SHAD	JUVENILE	28.0	JAW	TCS	71284
268	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	71284
268	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
268	GIZZARD SHAD	JUVENILE	20.0	JAW	TCS	.
268	CARP	JUVENILE	54.0	JAW	TCS	.
268	MINNOW FAMMILY	PROLARVA	5.6	JAW	TCS	.
269	GIZZARD SHAD	JUVENILE	23.0	MAG	TCS	71284
269	GIZZARD SHAD	JUVENILE	22.0	MAG	TCS	.
269	GIZZARD SHAD	JUVENILE	27.0	MAG	TCS	.
269	CARP	JUVENILE	34.0	MAG	TCS	.
269	CARP	JUVENILE	24.0	MAG	TCS	.
270	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
270	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
270	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
270	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
270	GIZZARD SHAD	JUVENILE	19.0	JAW	TCS	.
270	GIZZARD SHAD	JUVENILE	21.0	JAW	TCS	.
270	GIZZARD SHAD	LARVA	11.8	JAW	TCS	71284
270	CARP	JUVENILE	25.0	JAW	TCS	.
270	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	3.5	JAW	TCS	.
271	CARP	JUVENILE	38.0	JAW	TCS	71784
271	CARP	JUVENILE	28.0	JAW	TCS	.
271	CARP	JUVENILE	106.0	JAW	TCS	.
271	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
271	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
271	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
271	GIZZARD SHAD	JUVENILE	28	JAW	TCS	.
271	GIZZARD SHAD	JUVENILE	24	JAW	TCS	.
271	GIZZARD SHAD	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	45	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	64	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	42	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	71784.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
271	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	45	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	47	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
271	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	LARVA	13	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
271	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	14	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
271	FRESHWATER DRUM	JUVENILE	20.0	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	24.0	JAW	TCS	.
271	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
271	BLUEGILL	LARVA	11.4	JAW	TCS	.
271	BLUEGILL	JUVENILE	21.0	JAW	TCS	.
271	UNIDENTIFIED EGG	EGG	2.6	JAW	TCS	.
272	FRESHWATER DRUM	JUVENILE	60.0	BEN	TCS	71784
272	FRESHWATER DRUM	JUVENILE	16.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	28.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	33.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	36.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	32.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	21.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	21.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	24.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	24.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	19.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
272	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	18	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	14	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	17	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	18	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	18	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	60	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	29	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
272	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	33.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	36.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	32.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	52.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	60.0	BEN	TCS	.
272	FRESHWATER DRUM	LARVA	11.6	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	36.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	48.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	32.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	60.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	17.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	58.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	39.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	35.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
272	FRESHWATER DRUM	JUVENILE	18.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	19.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	67.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	57.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	53.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	39.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	43.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	40.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	37.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	35.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	33.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	33.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	63.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	16.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	39.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	49.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	50.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	38.0	BEN	TCS	.
272	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
272	CARP	JUVENILE	37.0	BEN	TCS	.
272	CARP	JUVENILE	56.0	BEN	TCS	.
272	CARP	JUVENILE	32.0	BEN	TCS	.
272	CARP	JUVENILE	52.0	BEN	TCS	.
272	GIZZARD SHAD	JUVENILE	22.0	BEN	TCS	.
272	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
272	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
272	GIZZARD SHAD	JUVENILE	25.0	BEN	TCS	.
272	GIZZARD SHAD	JUVENILE	23.0	BEN	TCS	.
272	GIZZARD SHAD	JUVENILE	34.0	BEN	TCS	.
272	SUCKER FAMILY	PROLARVA	5.6	BEN	TCS	.
273	FRESHWATER DRUM	JUVENILE	60.0	JAW	TCS	71784
273	FRESHWATER DRUM	LARVA	11.6	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	36.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	48.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	60	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	58	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	67	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	57	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	53	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
273	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	63	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	49	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	50	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	38	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	114	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	65	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	48	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTIFIER INITIALS	DATE SORTED
273	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	68	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	71	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	58	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	59	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	54	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	52	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	55	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	47	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	45	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
273	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	40.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
273	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
273	CARP	JUVENILE	72.0	JAW	TCS	.
273	CARP	JUVENILE	34.0	JAW	TCS	.
273	CARP	JUVENILE	30.0	JAW	TCS	.
273	CARP	JUVENILE	43.0	JAW	TCS	.
273	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
273	GIZZARD SHAD	JUVENILE	28.0	JAW	TCS	.
273	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
273	GIZZARD SHAD	JUVENILE	29.0	JAW	TCS	.
273	SUCKER FAMILY	PROLARVA	4.5	JAW	TCS	.
274	FRESHWATER DRUM	JUVENILE	60.0	MAG	TCS	71784
274	FRESHWATER DRUM	JUVENILE	17.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	58.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	30.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	34.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	39.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	34.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	35.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	22.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	29.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	18.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	19.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	40.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31.0	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	27.0	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
274	FRESHWATER DRUM	JUVENILE	27	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	23	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	25	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	23	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	28	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	26	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	24	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	40	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	16	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	26	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	30	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	18	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	37	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	30	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	25	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	39	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	84	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	42	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	38	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	42	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	41	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	42	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	36	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	39	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	18	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	35	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	21	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	30	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	19	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	23	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTIFIER INITIALS	DATE SORTED
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	19	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	21	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	42	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	17	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	33	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	22	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	23	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	36	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	30	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	28	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	27	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	19	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	21	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	42	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	15	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	17	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	17	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	19	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	25	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	30	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	27	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	35	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	21	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	41	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	51	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	46	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	40	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	40	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	42	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	25	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
274	FRESHWATER DRUM	JUVENILE	50	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	40	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	34	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	35	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	53	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	15	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	16	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	15	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	27	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	25	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	22	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	26	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	33	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	52	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	41	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	25	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	53	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	42	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	35	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	29	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	42	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	16	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	38	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	26	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	27	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	30	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	16	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	16	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	24	MAG	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
274	FRESHWATER DRUM	JUVENILE	36	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	14	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	16	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	27	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	31	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	32	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	22	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	26	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	29	MAG	TCS	.
274	FRESHWATER DRUM	JUVENILE	23	MAG	TCS	.
274	CARP	JUVENILE	105	MAG	TCS	.
274	CARP	JUVENILE	38	MAG	TCS	.
274	CARP	JUVENILE	38	MAG	TCS	.
274	CARP	JUVENILE	34	MAG	TCS	.
274	GIZZARD SHAD	JUVENILE	23	MAG	TCS	.
274	GIZZARD SHAD	JUVENILE	27	MAG	TCS	.
274	GIZZARD SHAD	JUVENILE	31	MAG	TCS	.
274	GIZZARD SHAD	JUVENILE	38	MAG	TCS	.
274	GIZZARD SHAD	JUVENILE	52	MAG	TCS	.
274	GIZZARD SHAD	JUVENILE	22	MAG	TCS	.
275	CARP	JUVENILE	67	JAW	TCS	71884
275	CARP	JUVENILE	57	JAW	TCS	.
275	CARP	JUVENILE	53	JAW	TCS	.
275	CARP	JUVENILE	39	JAW	TCS	.
275	CARP	JUVENILE	43	JAW	TCS	.
275	CARP	JUVENILE	40	JAW	TCS	.
275	CARP	JUVENILE	37	JAW	TCS	.
275	CARP	JUVENILE	35	JAW	TCS	.
275	CARP	JUVENILE	33	JAW	TCS	.
275	CARP	JUVENILE	33	JAW	TCS	.
275	CARP	JUVENILE	29	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	63	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
275	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	67	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	57	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	53	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	63	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	49	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	50	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	38	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
275	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	14	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
275	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	20.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	24.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	60.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	16.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	29.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	36.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	52.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
275	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
275	BLUEGILL	JUVENILE	32.0	JAW	TCS	.
275	GIZZARD SHAD	JUVENILE	28.0	JAW	TCS	.
275	GIZZARD SHAD	JUVENILE	31.0	JAW	TCS	.
275	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
275	SUCKER FAMILY	PROLARVA	4.5	JAW	TCS	.
276	CARP	JUVENILE	114.0	JAW	TCS	.
276	CARP	JUVENILE	65.0	JAW	TCS	.
276	CARP	JUVENILE	48.0	JAW	TCS	.
276	CARP	JUVENILE	41.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
276	CARP	JUVENILE	43	JAW	TCS	.
276	CARP	JUVENILE	34	JAW	TCS	.
276	CARP	JUVENILE	36	JAW	TCS	.
276	CARP	JUVENILE	37	JAW	TCS	.
276	CARP	JUVENILE	33	JAW	TCS	.
276	CARP	JUVENILE	40	JAW	TCS	.
276	CARP	JUVENILE	27	JAW	TCS	.
276	CARP	JUVENILE	32	JAW	TCS	.
276	CARP	JUVENILE	23	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	67	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	57	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	53	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	63	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	49	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	50	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	38	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
276	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	114	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	65	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	48	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
276	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	68	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	71	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	58	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	59	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	54	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	52	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	55	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	47	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	45	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
276	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	84	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	42	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	38	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	42	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	42	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
276	FRESHWATER DRUM	JUVENILE	42	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	42	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	15	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	51	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
276	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
276	GIZZARD SHAD	LARVA	19	JAW	TCS	.
276	GIZZARD SHAD	LARVA	20	JAW	TCS	.
276	GIZZARD SHAD	JUVENILE	26	JAW	TCS	.
276	GIZZARD SHAD	JUVENILE	25	JAW	TCS	.
276	GIZZARD SHAD	JUVENILE	27	JAW	TCS	.
276	GIZZARD SHAD	JUVENILE	21	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTIFIER INITIALS	DATE SORTED
276	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
276	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
276	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
276	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
276	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
276	MINNOW FAMMILY	PROLARVA	6.1	JAW	TCS	.
276	SUCKER FAMILY	PROLARVA	7.3	JAW	TCS	.
276	SUNFISH FAMILY	JUVENILE	18.8	JAW	TCS	.
276	SUNFISH FAMILY	JUVENILE	13.4	JAW	TCS	.
276	SUCKER FAMILY	PROLARVA	4.4	JAW	TCS	.
277	CARP	JUVENILE	69.0	JAW	TCS	71884
277	CARP	JUVENILE	76.0	JAW	TCS	.
277	CARP	JUVENILE	68.0	JAW	TCS	.
277	CARP	JUVENILE	71.0	JAW	TCS	.
277	CARP	JUVENILE	58.0	JAW	TCS	.
277	CARP	JUVENILE	59.0	JAW	TCS	.
277	CARP	JUVENILE	54.0	JAW	TCS	.
277	CARP	JUVENILE	52.0	JAW	TCS	.
277	CARP	JUVENILE	55.0	JAW	TCS	.
277	CARP	JUVENILE	47.0	JAW	TCS	.
277	CARP	JUVENILE	39.0	JAW	TCS	.
277	CARP	JUVENILE	41.0	JAW	TCS	.
277	CARP	JUVENILE	46.0	JAW	TCS	.
277	CARP	JUVENILE	39.0	JAW	TCS	.
277	CARP	JUVENILE	37.0	JAW	TCS	.
277	CARP	JUVENILE	37.0	JAW	TCS	.
277	CARP	JUVENILE	33.0	JAW	TCS	.
277	CARP	JUVENILE	34.0	JAW	TCS	.
277	CARP	JUVENILE	33.0	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	45.0	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.

Appendix B.2(cont'd)

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
277	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
277	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
277	GIZZARD SHAD	JUVENILE	34	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	71884
278	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	67	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	57	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	53	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	35	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	63	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
278	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	49	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	50	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	38	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	114	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	65	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	48	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
278	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
278	CARP	JUVENILE	60	JAW	TCS	.
278	CARP	JUVENILE	54	JAW	TCS	.
278	CARP	JUVENILE	55	JAW	TCS	.
278	CARP	JUVENILE	48	JAW	TCS	.
278	CARP	JUVENILE	50	JAW	TCS	.
278	CARP	JUVENILE	38	JAW	TCS	.
278	CARP	JUVENILE	42	JAW	TCS	.
278	CARP	JUVENILE	36	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
278	CARP	JUVENILE	39.0	JAW	TCS	.
278	CARP	JUVENILE	32.0	JAW	TCS	.
278	CARP	JUVENILE	23.0	JAW	TCS	.
278	CARP	JUVENILE	22.0	JAW	TCS	.
278	CARP	JUVENILE	27.0	JAW	TCS	.
278	SUCKER FAMILY	PROLARVA	3.9	JAW	TCS	.
279	CARP	JUVENILE	120.0	JAW	TCS	72084
279	CARP	JUVENILE	94.0	JAW	TCS	.
279	CARP	JUVENILE	84.0	JAW	TCS	.
279	CARP	JUVENILE	42.0	JAW	TCS	.
279	CARP	JUVENILE	38.0	JAW	TCS	.
279	CARP	JUVENILE	42.0	JAW	TCS	.
279	CARP	JUVENILE	41.0	JAW	TCS	.
279	CARP	JUVENILE	42.0	JAW	TCS	.
279	CARP	JUVENILE	36.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	39.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	35.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	21.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	36.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	52.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
279	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	60.0	JAW	TCS	.
279	FRESHWATER DRUM	LARVA	11.6	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	36.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	48.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	29.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
279	FRESHWATER DRUM	JUVENILE	21.0	JAW	TCS	.
279	GIZZARD SHAD	JUVENILE	30.0	JAW	TCS	.
279	GIZZARD SHAD	JUVENILE	28.0	JAW	TCS	.
279	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
279	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
279	BLUEGILL	JUVENILE	26.0	JAW	TCS	.
280	CARP	JUVENILE	47.0	MAG	TCS	72084
280	FRESHWATER DRUM	JUVENILE	42.0	MAG	TCS	.
280	FRESHWATER DRUM	JUVENILE	17.0	MAG	TCS	.
280	FRESHWATER DRUM	JUVENILE	32.0	MAG	TCS	.
280	FRESHWATER DRUM	JUVENILE	33.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	36.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	28.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	19.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	31.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	50.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
280	FRESHWATER DRUM	JUVENILE	40	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	34	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	35	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	53	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	15	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	15	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	52	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	41	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	53	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	35	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	29	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	38	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	36	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	14	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
280	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
280	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
280	GIZZARD SHAD	JUVENILE	23	BEN	TCS	.
280	GIZZARD SHAD	JUVENILE	25	BEN	TCS	.
280	GIZZARD SHAD	JUVENILE	25	BEN	TCS	.
280	GIZZARD SHAD	JUVENILE	25	BEN	TCS	.
280	GIZZARD SHAD	JUVENILE	26	BEN	TCS	.
280	GIZZARD SHAD	JUVENILE	27	BEN	TCS	.
280	GIZZARD SHAD	JUVENILE	23	BEN	TCS	.
280	CARP	JUVENILE	85	BEN	TCS	.
280	CARP	JUVENILE	87	BEN	TCS	.
280	CARP	JUVENILE	86	BEN	TCS	.
280	CARP	JUVENILE	72	BEN	TCS	.
280	CARP	JUVENILE	51	BEN	TCS	.
280	CARP	JUVENILE	46	BEN	TCS	.
280	CARP	JUVENILE	40	BEN	TCS	.
280	CARP	JUVENILE	40	BEN	TCS	.
280	CARP	JUVENILE	42	BEN	TCS	.
280	CARP	JUVENILE	31	BEN	TCS	.
280	CARP	JUVENILE	25	BEN	TCS	.
281	CARP	JUVENILE	72	WJE	TCS	72084
281	CARP	JUVENILE	66	WJE	TCS	.
281	CARP	JUVENILE	68	WJE	TCS	.
281	CARP	JUVENILE	61	WJE	TCS	.
281	CARP	JUVENILE	52	WJE	TCS	.
281	CARP	JUVENILE	53	WJE	TCS	.
281	CARP	JUVENILE	54	WJE	TCS	.
281	CARP	JUVENILE	53	WJE	TCS	.
281	CARP	JUVENILE	47	WJE	TCS	.
281	CARP	JUVENILE	31	WJE	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
281	CARP	JUVENILE	28	WJE	TCS	.
281	CARP	JUVENILE	27	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	42	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	15	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	32	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	26	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	30	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	18	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	37	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	30	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	31	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	25	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	32	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	39	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	84	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	42	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	38	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	42	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	41	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	42	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	36	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	39	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	18	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	35	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	21	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	30	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	19	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	32	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	23	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	31	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	19	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	32	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	21	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	17	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	22	WJE	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
281	FRESHWATER DRUM	JUVENILE	26.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	29.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	23.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	25.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	22.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	27.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	23.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	25.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	24.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	25.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	49.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	16.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	34.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	33.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	30.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	31.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	30.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	23.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	25.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	42.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	37.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	16.4	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	17.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	19.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	32.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	25.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	30.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	27.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	35.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	21.0	WJE	TCS	.
281	FRESHWATER DRUM	JUVENILE	41.0	WJE	TCS	.
281	GIZZARD SHAD	JUVENILE	21.0	WJE	TCS	.
281	GIZZARD SHAD	JUVENILE	25.0	WJE	TCS	.
281	GIZZARD SHAD	JUVENILE	23.0	WJE	TCS	.
281	GIZZARD SHAD	JUVENILE	21.0	WJE	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
281	GIZZARD SHAD	JUVENILE	29.0	WJE	TCS	.
281	SUCKER FAMILY	PROLARVA	4.4	WJE	TCS	.
282	CARP	JUVENILE	75.0	JAW	TCS	72484.
282	CARP	JUVENILE	63.0	JAW	TCS	.
282	CARP	JUVENILE	54.0	JAW	TCS	.
282	CARP	JUVENILE	50.0	JAW	TCS	.
282	CARP	JUVENILE	40.0	JAW	TCS	.
282	CARP	JUVENILE	34.0	JAW	TCS	.
282	CARP	JUVENILE	35.0	JAW	TCS	.
282	CARP	JUVENILE	31.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	53.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	15.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	16.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	15.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	26.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	35.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	29.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	67.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	57.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	53.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	39.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	43.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	40.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	37.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	35.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
282	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	63	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	49	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	50	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	38	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	114	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	65	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	48	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
282	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	68	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	71	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	58	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	59	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	54	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	52	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	55	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	47	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	45	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
282	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	40.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	52.0	JAW	TCS	.
282	FRESHWATER DRUM	JUVENILE	41.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
282	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
282	MINNOW FAMMILY	JUVENILE	23.0	JAW	TCS	.
282	MINNOW FAMMILY	JUVENILE	19.0	JAW	TCS	.
282	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	3.7	JAW	TCS	.
283	CARP	JUVENILE	77.0	BEN	TCS	72484
283	CARP	JUVENILE	70.0	BEN	TCS	.
283	CARP	JUVENILE	73.0	BEN	TCS	.
283	CARP	JUVENILE	71.0	BEN	TCS	.
283	CARP	JUVENILE	56.0	BEN	TCS	.
283	CARP	JUVENILE	53.0	BEN	TCS	.
283	CARP	JUVENILE	42.0	BEN	TCS	.
283	CARP	JUVENILE	31.0	BEN	TCS	.
283	CARP	JUVENILE	35.0	BEN	TCS	.
283	CARP	JUVENILE	29.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
283	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	38	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	18	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	18	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	60	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	29	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	36	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	52	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	34	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
283	FRESHWATER DRUM	JUVENILE	60.0	BEN	TCS	.
283	FRESHWATER DRUM	LARVA	11.6	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	36.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	48.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	32.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	60.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	17.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	58.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	39.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	35.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	18.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	19.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	67.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	57.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	53.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	39.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	43.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	40.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	37.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	35.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	33.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	33.0	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
283	FRESHWATER DRUM	JUVENILE	63	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	39	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	49	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	50	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	38	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	17	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	114	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	65	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	48	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	41	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	43	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	34	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	36	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	37	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	40	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	46	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	43	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	17	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
283	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
283	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
283	GIZZARD SHAD	JUVENILE	26	BEN	TCS	.
283	GIZZARD SHAD	JUVENILE	26	BEN	TCS	.
283	GIZZARD SHAD	JUVENILE	27	BEN	TCS	.
283	GIZZARD SHAD	JUVENILE	23	BEN	TCS	.
283	GIZZARD SHAD	JUVENILE	26	BEN	TCS	.
284	CARP	JUVENILE	58	JAW	TCS	72584
284	CARP	JUVENILE	73	JAW	TCS	.
284	CARP	JUVENILE	50	JAW	TCS	.
284	CARP	JUVENILE	42	JAW	TCS	.
284	CARP	JUVENILE	36	JAW	TCS	.
284	CARP	JUVENILE	40	JAW	TCS	.
284	CARP	JUVENILE	42	JAW	TCS	.
284	CARP	JUVENILE	35	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	14	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	31	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
284	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	14	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	18	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	19	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	60	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
284	FRESHWATER DRUM	JUVENILE	52.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	60.0	JAW	TCS	.
284	FRESHWATER DRUM	LARVA	11.6	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	36.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	48.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	29.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	60.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	17.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	58.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	39.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	35.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	29.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	67.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	57.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	53.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	39.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	43.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	40.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
284	FRESHWATER DRUM	JUVENILE	37.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	35.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	29.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	63.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	16.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	39.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	49.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	50.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	38.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	17.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	114.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	65.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	48.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	41.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	43.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	36.0	JAW	TCS	.
284	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
284	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
284	GIZZARD SHAD	JUVENILE	30.0	JAW	TCS	.
284	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
284	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
284	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
284	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
284	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
284	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
284	BLUEGILL	JUVENILE	15.0	JAW	TCS	.
284	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	4.1	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
285	CARP	JUVENILE	48	BEN	TCS	72584
285	CARP	JUVENILE	40	BEN	TCS	.
285	CARP	JUVENILE	38	BEN	TCS	.
285	CARP	JUVENILE	34	BEN	TCS	.
285	CARP	JUVENILE	33	BEN	TCS	.
285	CARP	JUVENILE	35	BEN	TCS	.
285	CARP	JUVENILE	25	BEN	TCS	.
285	CARP	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	49	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	34	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	18	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	60	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	29	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
285	FRESHWATER DRUM	JUVENILE	36.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	52.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	25.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	60.0	BEN	TCS	.
285	FRESHWATER DRUM	LARVA	11.6	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	36.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	48.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	60.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	17.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	58.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	39.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	35.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	29.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	18.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	19.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	67.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	57.0	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	53.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
285	FRESHWATER DRUM	JUVENILE	39	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	43	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	40	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	37	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	35	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	29	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	63	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	39	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	49	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	50	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	38	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	17	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	114	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	65	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	48	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	41	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	43	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	34	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	36	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	37	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	40	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	46	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
285	FRESHWATER DRUM	JUVENILE	43	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	17	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	20	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	68	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	71	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	58	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	59	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	54	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	52	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	55	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	47	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	39	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	41	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	46	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	39	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	37	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	37	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
285	FRESHWATER DRUM	JUVENILE	34	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	45	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	34	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	40	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	24	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	40	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	16	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	26	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	18	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	37	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	25	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	39	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	84	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	38	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
285	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	41	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	36	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	39	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	18	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	35	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	31	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	17	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	32	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	33	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	22	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	23	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	36	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	30	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	28	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	19	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	21	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	15	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	42	BEN	TCS	.
285	FRESHWATER DRUM	JUVENILE	27	MAG	JAW	.
285	FRESHWATER DRUM	JUVENILE	19	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	30	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	28	MAG	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
285	GIZZARD SHAD	JUVENILE	25.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	28.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	27.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	27.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	28.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	23.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	28.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	24.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	26.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	23.0	MAG	JAW	.
285	GIZZARD SHAD	JUVENILE	31.0	MAG	JAW	.
286	GIZZARD SHAD	LARVA	20.1	BEN	JAW	72584
286	GIZZARD SHAD	JUVENILE	33.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	32.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	30.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	26.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	24.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	27.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	25.0	BEN	JAW	72584
286	GIZZARD SHAD	JUVENILE	26.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	25.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	23.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	23.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	22.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	24.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	25.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	25.0	BEN	JAW	.
286	GIZZARD SHAD	JUVENILE	25.0	BEN	JAW	.
286	GIZZARD SHAD	LARVA	20.0	BEN	JAW	.
286	CARP	JUVENILE	148.0	BEN	JAW	.
286	CARP	JUVENILE	91.0	BEN	JAW	.
286	CARP	JUVENILE	73.0	BEN	JAW	.
286	CARP	JUVENILE	44.0	BEN	JAW	.
286	CARP	JUVENILE	42.0	BEN	JAW	.
286	CARP	JUVENILE	27.0	BEN	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
286	CARP	LARVA	19.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	45.0	BEN	JAW	.
286	FRESHWATER DRUM	LARVA	13.6	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	18.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	27.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	32.0	BEN	JAW	72584
286	FRESHWATER DRUM	JUVENILE	28.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	29.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	26.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	32.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	30.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	23.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	28.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	18.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	32.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	19.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	33.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	23.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	20.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	22.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	34.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	30.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	17.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	21.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	20.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	29.0	BEN	JAW	72584
286	FRESHWATER DRUM	JUVENILE	32.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	31.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	28.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	37.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	35.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	25.0	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24.0	BEN	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
286	FRESHWATER DRUM	JUVENILE	25	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	21	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	27	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	18	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	28	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	34	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	30	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	38	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	20	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	27	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	31	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	39	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	41	BEN	JAW	72584
286	FRESHWATER DRUM	JUVENILE	23	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	29	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	21	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	21	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	29	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	45	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	42	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	30	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	33	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	36	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	19	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	47	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	18	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	34	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	BEN	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
286	FRESHWATER DRUM	JUVENILE	31	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	37	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	28	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	47	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	45	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	19	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	36	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	30	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	28	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	13	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	29	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	27	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	29	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	20	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	21	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	BEN	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
286	FRESHWATER DRUM	JUVENILE	24	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	31	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	29	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	BEN	JAW	.
286	FRESHWATER DRUM	JUVENILE	34	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	20	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	33	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	28	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	18	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	16	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	31	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	42	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	37	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	31	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	21	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	20	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	35	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	37	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	28	JAW	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
286	FRESHWATER DRUM	JUVENILE	31	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	29	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	20	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	21	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	17	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	38	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	42	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	41	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	33	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	28	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	34	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	19	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	21	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	23	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	36	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	19	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	45	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	47	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	31	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	37	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	42	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	31	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	JAW	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
286	FRESHWATER DRUM	JUVENILE	16	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	18	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	28	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	33	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	20	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	34	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	30	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	27	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	45	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	42	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	28	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	29	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	24	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	26	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	27	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	22	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	39	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	42	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	33	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	20	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	25	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	30	JAW	JAW	.
286	FRESHWATER DRUM	JUVENILE	32	JAW	JAW	.
287	CARP	JUVENILE	57	JAW	TCS	.
287	CARP	JUVENILE	64	JAW	TCS	.
287	CARP	JUVENILE	47	JAW	TCS	.
287	CARP	JUVENILE	28	JAW	TCS	.
287	CARP	JUVENILE	57	JAW	TCS	.
287	CARP	JUVENILE	37	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
287	CARP	JUVENILE	35.0	JAW	TCS	.
287	CARP	JUVENILE	32.0	JAW	TCS	.
287	GIZZARD SHAD	JUVENILE	23.0	JAW	TCS	.
287	GIZZARD SHAD	JUVENILE	32.0	JAW	TCS	.
287	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
287	SUCKER FAMILY	PROLARVA	4.4	JAW	TCS	.
287	SUCKER FAMILY	PROLARVA	4.7	JAW	TCS	.
287	SUCKER FAMILY	PROLARVA	3.4	JAW	TCS	.
287	SUCKER FAMILY	PROLARVA	2.5	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	43.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	15.6	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	24.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	21.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	26.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	20.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	24.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
287	FRESHWATER DRUM	JUVENILE	60	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	29	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	52	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	114	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	65	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	48	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	36	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	40	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	16	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	43	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
287	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	30.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	21.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	17.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	59.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	54.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	52.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	55.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	47.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	39.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	41.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	46.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	39.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	37.0	JAW	TCS	.
287	FRESHWATER DRUM	JUVENILE	37.0	JAW	TCS	.
288	CARP	JUVENILE	100.0	JAW	TCS	.
288	CARP	JUVENILE	39.0	JAW	TCS	.
288	CARP	JUVENILE	27.0	JAW	TCS	.
288	CARP	JUVENILE	28.0	JAW	TCS	.
288	CARP	JUVENILE	29.0	JAW	TCS	.
288	GIZZARD SHAD	JUVENILE	27.0	JAW	TCS	.
288	GIZZARD SHAD	JUVENILE	28.0	JAW	TCS	.
288	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
288	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
288	GIZZARD SHAD	JUVENILE	24.0	JAW	TCS	.
288	GIZZARD SHAD	JUVENILE	22.0	JAW	TCS	.
288	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	35.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	17.4	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
288	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	54.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	52.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	55.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	47.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	39.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	41.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	46.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	37.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	16.4	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	114.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	65.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	48.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	41.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	43.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	36.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	37.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	40.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	46.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	16.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	43.0	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
288	FRESHWATER DRUM	JUVENILE	28	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	30	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	32	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	17	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	22	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	20	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	21	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	24	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	26	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	23	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	25	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	68	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	71	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	58	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	59	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	54	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	52	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	55	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	47	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	41	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	46	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	39	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	37	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	33	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	34	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
288	FRESHWATER DRUM	JUVENILE	33.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	45.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	32.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	34.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	40.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	31.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	21.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	23.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	18.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	24.0	JAW	TCS	.
288	FRESHWATER DRUM	JUVENILE	27.0	JAW	TCS	.
289	GIZZARD SHAD	JUVENILE	28.0	BEN	TCS	72684
289	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
289	FRESHWATER DRUM	JUVENILE	17.0	BEN	TCS	.
289	SUCKER FAMILY	PROLARVA	5.1	BEN	TCS	.
289	GIZZARD SHAD	JUVENILE	20.0	BEN	TCS	.
289	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
290	CARP	JUVENILE	37.0	BEN	TCS	72684
290	FRESHWATER DRUM	JUVENILE	18.0	BEN	TCS	.
290	FRESHWATER DRUM	JUVENILE	17.0	BEN	TCS	.
290	FRESHWATER DRUM	JUVENILE	15.0	BEN	TCS	.
290	FRESHWATER DRUM	JUVENILE	22.0	BEN	TCS	.
290	FRESHWATER DRUM	JUVENILE	37.0	BEN	TCS	.
290	GIZZARD SHAD	JUVENILE	33.0	BEN	TCS	.

Appendix B.2(cont'd)

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
290	SPOTTED BASS	JUVENILE	61.0	BEN	TCS	.
291	CARP	JUVENILE	118.0	BEN	TCS	72684
291	CARP	JUVENILE	29.0	BEN	TCS	.
291	CARP	JUVENILE	52.0	BEN	TCS	.
291	GIZZARD SHAD	JUVENILE	51.0	BEN	TCS	.
291	GIZZARD SHAD	JUVENILE	43.0	BEN	TCS	.
291	GIZZARD SHAD	JUVENILE	36.0	BEN	TCS	.
291	GIZZARD SHAD	JUVENILE	34.0	BEN	TCS	.
291	FRESHWATER DRUM	LARVA	12.0	BEN	TCS	.
291	FRESHWATER DRUM	JUVENILE	27.0	BEN	TCS	.
291	SUNFISH FAMILY	JUVENILE	16.4	BEN	TCS	.
291	FRESHWATER DRUM EGG	EGG	1.4	BEN	TCS	.
292	GIZZARD SHAD	JUVENILE	53.0	BEN	TCS	72684
292	GIZZARD SHAD	JUVENILE	48.0	BEN	TCS	.
292	GIZZARD SHAD	JUVENILE	27.0	BEN	TCS	.
292	GIZZARD SHAD	JUVENILE	32.0	BEN	TCS	.
292	FRESHWATER DRUM	LARVA	14.0	BEN	TCS	.
292	FRESHWATER DRUM	LARVA	16.0	BEN	TCS	.
292	FRESHWATER DRUM	JUVENILE	23.0	BEN	TCS	.
292	FRESHWATER DRUM	JUVENILE	38.0	BEN	TCS	.
293	FRESHWATER DRUM	JUVENILE	28.0	BEN	TCS	72784
293	FRESHWATER DRUM	JUVENILE	24.0	BEN	TCS	.
293	FRESHWATER DRUM	LARVA	15.0	BEN	TCS	.
293	FRESHWATER DRUM	JUVENILE	17.0	BEN	TCS	.
293	CARP	JUVENILE	39.0	BEN	TCS	.
293	CARP	JUVENILE	27.0	BEN	TCS	.
293	CARP	JUVENILE	28.0	BEN	TCS	.
294	FRESHWATER DRUM	JUVENILE	58.0	JAW	TCS	.
294	FRESHWATER DRUM	JUVENILE	25.0	JAW	TCS	.
294	GIZZARD SHAD	JUVENILE	54.0	JAW	TCS	.
294	SUCKER FAMILY	LARVA	17.0	JAW	TCS	.
294	SUCKER FAMILY	P OLARVA	4.1	JAW	TCS	.
294	SUCKER FAMILY	PROLARVA	5.6	JAW	TCS	72784
294	SUCKER FAMILY	PROLARVA	5.5	JAW	TCS	.
295	CARP	JUVENILE	79.0	JAW	TCS	73184

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
295	CARP	JUVENILE	88.0	JAW	TCS	.
295	CARP	JUVENILE	76.0	JAW	TCS	.
295	CARP	JUVENILE	53.0	BEN	TCS	.
295	CARP	JUVENILE	50.0	BEN	TCS	.
295	CARP	JUVENILE	41.0	BEN	TCS	.
295	FRESHWATER DRUM	JUVENILE	17.0	BEN	TCS	.
295	FRESHWATER DRUM EGG	EGG	1.6	BEN	TCS	.
296	FRESHWATER DRUM	JUVENILE	28.0	JAW	TCS	.
296	GIZZARD SHAD	JUVENILE	25.0	JAW	TCS	.
296	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	4.3	JAW	TCS	.
296	UNIDENTIFIED EGG	EGG	3.0	JAW	TCS	.
296	FRESHWATER DRUM EGG	EGG	1.6	JAW	TCS	.
297	SUCKER FAMILY	JUVENILE	31.0	BEN	TCS	.
297	CARP	JUVENILE	58.0	BEN	TCS	.
297	CARP	JUVENILE	58.0	BEN	TCS	.
297	CARP	JUVENILE	50.0	BEN	TCS	.
297	GIZZARD SHAD	JUVENILE	48.0	BEN	TCS	.
297	SUCKER FAMILY	PROLARVA	4.7	BEN	TCS	.
298	FRESHWATER DRUM	JUVENILE	48.0	JAW	TCS	.
298	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	7.8	JAW	TCS	73184
299	CARP	JUVENILE	88.0	BEN	TCS	80184
299	CARP	JUVENILE	57.0	BEN	TCS	.
299	CARP	JUVENILE	54.0	BEN	TCS	.
299	CARP	JUVENILE	45.0	BEN	TCS	.
299	CARP	JUVENILE	37.0	BEN	TCS	.
299	FRESHWATER DRUM	JUVENILE	34.0	BEN	TCS	.
300	CARP	JUVENILE	72.0	JAW	TCS	.
300	CARP	JUVENILE	45.0	JAW	TCS	.
300	CARP	JUVENILE	27.0	JAW	TCS	.
300	GIZZARD SHAD	JUVENILE	26.0	JAW	TCS	.
300	FRESHWATER DRUM	JUVENILE	15.0	JAW	TCS	.
301	CARP	JUVENILE	57.0	BEN	TCS	.
301	CARP	JUVENILE	82.0	BEN	TCS	.
301	CARP	JUVENILE	48.0	BEN	TCS	.
301	GIZZARD SHAD	JUVENILE	47.0	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
301	FRESHWATER DRUM	JUVENILE	28.0	BEN	TCS	.
302	CARP	JUVENILE	77.0	BEN	TCS	.
302	GIZZARD SHAD	JUVENILE	28.0	BEN	TCS	.
302	GIZZARD SHAD	JUVENILE	36.0	BEN	TCS	.
302	FRESHWATER DRUM	JUVENILE	15.0	BEN	TCS	.
302	FRESHWATER DRUM	JUVENILE	20.0	BEN	TCS	.
302	SUCKER FAMILY	PROLARVA	4.8	BEN	TCS	80184
303	CARP	JUVENILE	94.0	JAW	TCS	.
303	GIZZARD SHAD	JUVENILE	54.0	JAW	TCS	.
303	GIZZARD SHAD	JUVENILE	32.0	JAW	TCS	.
303	FRESHWATER DRUM	JUVENILE	22.0	JAW	TCS	.
303	FRESHWATER DRUM	JUVENILE	12.0	JAW	TCS	.
304	FRESHWATER DRUM	JUVENILE	15.0	BEN	TCS	80284
304	UNIDENTIFIED EGG	EGG	3.0	BEN	TCS	.
304	SUNFISH FAMILY	PROLARVA	3.9	BEN	TCS	.
305	FRESHWATER DRUM	JUVENILE	17.0	JAW	TCS	.
305	FRESHWATER DRUM	JUVENILE	19.0	JAW	TCS	.
305	FRESHWATER DRUM	JUVENILE	16.0	JAW	TCS	.
305	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
306	CARP	JUVENILE	73.0	JAW	TCS	.
306	FRESHWATER DRUM	LARVA	14.0	JAW	TCS	.
307	MINNOW FAMMILY	PROLARVA	5.7	BEN	TCS	.
307	FRESHWATER DRUM EGG	EGG	1.3	BEN	TCS	.
307	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
307	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
308	MINNOW FAMMILY	JUVENILE	26.0	JAW	TCS	.
308	SUNFISH FAMILY	LARVA	12.6	JAW	TCS	.
308	UNIDENTIFIED EGG	EGG	2.6	JAW	TCS	.
308	UNIDENTIFIED EGG	EGG	1.6	JAW	TCS	80284
308	UNIDENTIFIED EGG	EGG	1.7	JAW	TCS	.
308	UNIDENTIFIED EGG	EGG	1.4	JAW	TCS	.
308	UNIDENTIFIED EGG	EGG	1.5	JAW	TCS	.
308	UNIDENTIFIED EGG	EGG	1.6	JAW	TCS	.
309	FRESHWATER DRUM	PROLARVA	4.6	BEN	TCS	.
309	UNIDENTIFIED EGG	EGG	2.6	BEN	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
309	FRESHWATER DRUM EGG	EGG	1.6	BEN	TCS	.
309	FRESHWATER DRUM EGG	EGG	1.4	BEN	TCS	.
310	MINNOW FAMMILY	PROLARVA	6.5	JAW	TCS	.
310	FRESHWATER DRUM	PROLARVA	4.6	JAW	TCS	.
310	UNIDENTIFIED EGG	EGG	2.7	JAW	TCS	.
310	FRESHWATER DRUM EGG	EGG	1.3	JAW	TCS	.
310	FRESHWATER DRUM EGG	EGG	1.7	JAW	TCS	.
310	UNIDENTIFIED EGG	EGG	1.2	JAW	TCS	.
311	MINNOW FAMMILY	PROLARVA	5.0	BEN	TCS	.
311	FRESHWATER DRUM	PROLARVA	4.5	BEN	TCS	.
311	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
311	FRESHWATER DRUM EGG	EGG	1.4	BEN	TCS	.
312	MINNOW FAMMILY	PROLARVA	7.0	JAW	TCS	80384
312	MINNOW FAMMILY	PROLARVA	6.8	JAW	TCS	.
312	SUNFISH FAMILY	PROLARVA	4.7	JAW	TCS	.
312	SUNFISH FAMILY	PROLARVA	4.5	JAW	TCS	80384
312	MINNOW FAMMILY	PROLARVA	4.8	JAW	TCS	.
312	UNIDENTIFIED EGG	EGG	2.8	JAW	TCS	.
312	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
312	FRESHWATER DRUM EGG	EGG	1.6	JAW	TCS	.
312	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
312	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
312	FRESHWATER DRUM EGG	EGG	1.6	JAW	TCS	.
313	CARP	JUVENILE	58.0	JAW	TCS	.
313	CARP	JUVENILE	46.0	JAW	TCS	.
313	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
313	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
313	FRESHWATER DRUM EGG	EGG	1.4	JAW	TCS	.
314	CARP	JUVENILE	45.0	JAW	TCS	.
314	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	.	JAW	TCS	.
314	FRESHWATER DRUM EGG	EGG	1.3	JAW	TCS	.
315	CARP	JUVENILE	73.0	JAW	TCS	.
315	CARP	JUVENILE	46.0	JAW	TCS	.
315	FRESHWATER DRUM	PROLARVA	4.1	JAW	TCS	.
315	FRESHWATER DRUM EGG	EGG	1.3	JAW	TCS	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
316	CARP	JUVENILE	71.0	JAW	TCS	80784
316	MINNOW FAMMILY	JUVENILE	26.0	JAW	TCS	.
316	FRESHWATER DRUM EGG	EGG	1.7	JAW	TCS	80784
316	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
316	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
317	CARP	JUVENILE	69.0	BEN	TCS	.
317	CARP	JUVENILE	61.0	BEN	TCS	.
317	CARP	JUVENILE	59.0	BEN	TCS	.
317	CARP	JUVENILE	52.0	BEN	TCS	.
317	CARP	JUVENILE	47.0	BEN	TCS	.
317	GIZZARD SHAD	JUVENILE	45.0	BEN	TCS	.
317	FRESHWATER DRUM EGG	EGG	1.6	BEN	TCS	.
317	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
318	CARP	JUVENILE	58.0	JAW	TCS	.
318	FRESHWATER DRUM	PROLARVA	4.5	JAW	TCS	.
318	FRESHWATER DRUM EGG	EGG	1.6	JAW	TCS	.
318	FRESHWATER DRUM EGG	EGG	1.6	JAW	TCS	.
319	NO FISH	0	0.0	BEN	TCS	.
320	GIZZARD SHAD	JUVENILE	32.0	JAW	TCS	.
320	GIZZARD SHAD	JUVENILE	29.0	JAW	TCS	.
320	SUNFISH FAMILY	LARVA	7.3	JAW	TCS	.
320	FRESHWATER DRUM EGG	EGG	1.5	JAW	TCS	.
321	GIZZARD SHAD	JUVENILE	34.0	BEN	TCS	80884
321	MINNOW FAMMILY	PROLARVA	6.5	BEN	TCS	.
321	FRESHWATER DRUM	PROLARVA	4.8	BEN	TCS	80884
321	FRESHWATER DRUM EGG	EGG	1.6	BEN	TCS	.
322	SUCKER FAMILY	PROLARVA	4.0	JAW	TCS	.
322	FRESHWATER DRUM	PROLARVA	4.1	JAW	TCS	.
322	FRESHWATER DRUM	PROLARVA	4.3	JAW	TCS	.
322	FRESHWATER DRUM EGG	EGG	1.4	JAW	TCS	.
323	FRESHWATER DRUM	PROLARVA	4.6	BEN	TCS	.
323	FRESHWATER DRUM EGG	EGG	1.4	BEN	TCS	.
323	FRESHWATER DRUM EGG	EGG	1.3	BEN	TCS	.
323	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
324	MINNOW FAMMILY	PROLARVA	7.1	MAG	TCS	80684

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
324	FRESHWATER DRUM	PROLARVA	4.6	MAG	TCS	.
324	FRESHWATER DRUM EGG	EGG	1.5	MAG	TCS	.
325	MINNOW FAMMILY	JUVENILE	23.0	BEN	TCS	80884
325	FRESHWATER DRUM	PROLARVA	5.0	BEN	TCS	.
325	UNIDENTIFIED EGG	EGG	2.8	BEN	TCS	.
325	FRESHWATER DRUM EGG	EGG	1.6	BEN	TCS	.
325	FRESHWATER DRUM EGG	EGG	1.5	BEN	TCS	.
326	GIZZARD SHAD	JUVENILE	41.0	BEN	JAW	.
326	CARP	JUVENILE	110.0	BEN	JAW	.
326	MINNOW FAMMILY	LARVA	6.3	BEN	JAW	.
326	MINNOW FAMMILY	PROLARVA	4.5	BEN	JAW	.
326	FRESHWATER DRUM EGG	EGG	1.6	BEN	JAW	80884
326	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
327	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
327	FRESHWATER DRUM EGG	EGG	1.4	JAW	JAW	.
327	FRESHWATER DRUM EGG	EGG	1.6	JAW	JAW	.
328	SUCKER FAMILY	PROLARVA	6.1	BEN	JAW	.
328	FRESHWATER DRUM EGG	EGG	1.6	BEN	JAW	.
328	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
328	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
328	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
328	FRESHWATER DRUM EGG	EGG	1.7	BEN	JAW	.
328	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
329	FRESHWATER DRUM	PROLARVA	5.1	JAW	JAW	.
329	FRESHWATER DRUM EGG	EGG	1.5	JAW	JAW	.
329	FRESHWATER DRUM EGG	EGG	1.6	JAW	JAW	.
329	FRESHWATER DRUM EGG	EGG	1.5	JAW	JAW	.
329	FRESHWATER DRUM EGG	EGG	1.4	JAW	JAW	.
329	FRESHWATER DRUM EGG	EGG	1.7	JAW	JAW	.
330	GIZZARD SHAD	JUVENILE	38.0	BEN	JAW	.
330	GIZZARD SHAD	JUVENILE	29.0	BEN	JAW	.
330	MINNOW FAMMILY	PROLARVA	5.1	BEN	JAW	.
330	FRESHWATER DRUM EGG	EGG	1.6	BEN	JAW	.
331	GIZZARD SHAD	JUVENILE	34.0	BEN	JAW	.
331	FRESHWATER DRUM	PROLARVA	4.2	BEN	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
331	FRESHWATER DRUM EGG	EGG	1.6	BEN	JAW	80884
331	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
331	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
331	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
332	UNIDENTIFIED EGG	EGG	2.7	JAW	JAW	.
332	FRESHWATER DRUM EGG	EGG	1.5	JAW	JAW	.
332	FRESHWATER DRUM EGG	EGG	1.6	JAW	JAW	.
333	FRESHWATER DRUM	PROLARVA	4.5	JAW	JAW	.
333	MINNOW FAMMILY	PROLARVA	6.1	JAW	JAW	.
333	SUCKER FAMILY	PROLARVA	5.0	JAW	JAW	.
333	FRESHWATER DRUM EGG	EGG	1.5	JAW	JAW	.
333	FRESHWATER DRUM EGG	EGG	1.6	JAW	JAW	.
333	FRESHWATER DRUM EGG	EGG	1.7	JAW	JAW	.
333	FRESHWATER DRUM EGG	EGG	1.5	JAW	JAW	.
333	UNIDENTIFIED EGG	EGG	2.5	JAW	JAW	.
334	FRESHWATER DRUM	PROLARVA	4.6	BEN	JAW	.
334	FRESHWATER DRUM EGG	EGG	1.6	BEN	JAW	.
335	GIZZARD SHAD	JUVENILE	34.0	BEN	JAW	.
335	MINNOW FAMMILY	PROLARVA	6.8	BEN	JAW	.
335	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
335	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
336	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	4.3	JAW	JAW	.
336	FRESHWATER DRUM	PROLARVA	4.1	JAW	JAW	.
336	UNIDENTIFIED EGG	EGG	2.8	JAW	JAW	.
336	FRESHWATER DRUM EGG	EGG	1.5	JAW	JAW	80884
336	FRESHWATER DRUM EGG	EGG	1.5	JAW	JAW	.
336	FRESHWATER DRUM EGG	EGG	1.7	JAW	JAW	.
336	FRESHWATER DRUM EGG	EGG	1.6	JAW	JAW	.
336	FRESHWATER DRUM EGG	EGG	1.4	JAW	JAW	.
337	FRESHWATER DRUM EGG	EGG	1.6	BEN	JAW	.
338	MINNOW FAMMILY	LARVA	5.7	BEN	JAW	.
338	FRESHWATER DRUM EGG	EGG	1.7	BEN	JAW	.
338	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
339	NO FISH	0	.	BEN	JAW	.
340	NO FISH	0	.	JAW	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
341	MINNOW FAMMILY	PROLARVA	6.8	BEN	JAW	.
341	MINNOW FAMMILY	LARVA	11.2	BEN	JAW	.
341	FRESHWATER DRUM	PROLARVA	4.2	BEN	JAW	.
341	MINNOW FAMMILY	PROLARVA	4.6	BEN	JAW	.
341	FRESHWATER DRUM EGG	EGG	1.7	BEN	JAW	.
341	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
342	FRESHWATER DRUM	PROLARVA	4.5	JAW	JAW	.
342	FRESHWATER DRUM EGG	EGG	1.6	JAW	JAW	.
343	FRESHWATER DRUM	PROLARVA	4.2	MAG	JAW	81784
343	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	3.5	MAG	JAW	.
343	FRESHWATER DRUM EGG	EGG	1.4	MAG	JAW	.
344	MINNOW FAMMILY	PROLARVA	4.9	BEN	JAW	.
344	FRESHWATER DRUM	PROLARVA	4.6	BEN	JAW	.
344	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
344	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
345	MINNOW FAMMILY	PROLARVA	5.7	MAG	JAW	.
345	SUNFISH FAMILY	LARVA	7.1	MAG	JAW	.
345	FRESHWATER DRUM EGG	EGG	1.7	MAG	JAW	.
345	FRESHWATER DRUM EGG	EGG	1.5	MAG	JAW	.
346	FRESHWATER DRUM EGG	EGG	1.5	MAG	JAW	.
347	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
348	MINNOW FAMMILY	PROLARVA	5.6	BEN	JAW	82084
348	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	2.4	BEN	JAW	.
348	FRESHWATER DRUM EGG	EGG	1.3	BEN	JAW	.
348	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
349	FRESHWATER DRUM	PROLARVA	4.5	G.B	JAW	82084
349	FRESHWATER DRUM EGG	EGG	1.5	G.B	JAW	.
349	FRESHWATER DRUM EGG	EGG	1.3	G.B	JAW	.
349	FRESHWATER DRUM EGG	EGG	1.4	G.B	JAW	.
349	FRESHWATER DRUM EGG	EGG	1.5	G.B	JAW	.
350	MINNOW FAMMILY	PROLARVA	5.3	BEN	JAW	.
350	UNIDENTIFIED EGG	EGG	2.8	BEN	JAW	.
350	FRESHWATER DRUM EGG	EGG	1.3	BEN	JAW	.
350	UNIDENTIFIED EGG	EGG	1.1	BEN	JAW	.
350	UNIDENTIFIED EGG	EGG	1.0	BEN	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
350	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
350	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
351	SUCKER FAMILY	PROLARVA	4.7	G.B	JAW	.
351	SUCKER FAMILY	PROLARVA	5.7	G.B	JAW	.
351	SUCKER FAMILY	PROLARVA	4.9	G.B	JAW	.
351	FRESHWATER DRUM	PROLARVA	4.5	G.B	JAW	.
351	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	2.7	G.B	JAW	.
351	FRESHWATER DRUM EGG	EGG	1.7	G.B	JAW	.
351	FRESHWATER DRUM EGG	EGG	1.5	G.B	JAW	.
351	FRESHWATER DRUM EGG	EGG	1.3	G.B	JAW	.
352	FRESHWATER DRUM EGG	EGG	1.6	BEN	JAW	.
353	SUNFISH FAMILY	LARVA	5.2	BEN	JAW	.
353	FRESHWATER DRUM	PROLARVA	4.5	BEN	JAW	.
353	UNIDENTIFIED EGG	EGG	2.2	BEN	JAW	.
353	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
353	UNIDENTIFIED EGG	EGG	1.1	BEN	JAW	.
353	FRESHWATER DRUM EGG	EGG	1.3	BEN	JAW	.
353	FRESHWATER DRUM EGG	EGG	1.3	BEN	JAW	.
354	UNIDENTIFIED EGG	EGG	2.5	G.B	JAW	82084
355	MINNOW FAMMILY	PROLARVA	6.3	G.B	JAW	.
355	FRESHWATER DRUM	PROLARVA	4.0	G.B	JAW	.
355	SUNFISH FAMILY	PROLARVA	5.1	G.B	JAW	.
356	MINNOW FAMMILY	PROLARVA	4.6	G.B	JAW	.
356	SUNFISH FAMILY	PROLARVA	5.1	G.B	JAW	.
357	SUNFISH FAMILY	PROLARVA	5.2	G.B	JAW	.
358	SUNFISH FAMILY	PROLARVA	5.1	G.B	JAW	.
358	UNIDENTIFIED EGG	EGG	1.2	G.B	JAW	.
358	UNIDENTIFIED EGG	EGG	1.2	G.B	JAW	.
359	SUNFISH FAMILY	PROLARVA	4.9	G.B	JAW	.
359	FRESHWATER DRUM	PROLARVA	3.6	G.B	JAW	.
360	SUNFISH FAMILY	PROLARVA	5.1	G.B	JAW	.
360	SUNFISH FAMILY	LARVA	6.9	G.B	JAW	.
360	FRESHWATER DRUM EGG	EGG	1.5	G.B	JAW	.
361	FRESHWATER DRUM	LARVA	4.1	BEN	JAW	82284
361	MINNOW FAMMILY	PROLARVA	5.6	BEN	JAW	82284

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
361	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
362	NO FISH	0	0.0	BEN	JAW	.
363	NO FISH	0	0.0	BEN	JAW	.
364	NO FISH	0	0.0	BEN	JAW	.
365	MINNOW FAMMILY	PROLARVA	4.5	BEN	JAW	.
366	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
366	FRESHWATER DRUM EGG	EGG	1.6	BEN	JAW	.
367	FRESHWATER DRUM	LARVA	4.3	BEN	JAW	.
367	FRESHWATER DRUM EGG	EGG	1.3	BEN	JAW	.
367	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
367	UNIDENTIFIED EGG	EGG	1.2	BEN	JAW	.
368	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	2.3	G.B	JAW	.
368	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	2.9	G.B	JAW	.
368	FRESHWATER DRUM	PROLARVA	3.8	G.B	JAW	.
368	FRESHWATER DRUM	PROLARVA	4.2	G.B	JAW	.
368	MINNOW FAMMILY	LARVA	6.8	G.B	JAW	.
368	FRESHWATER DRUM EGG	EGG	1.5	G.B	JAW	.
368	FRESHWATER DRUM EGG	EGG	1.7	G.B	JAW	.
369	FRESHWATER DRUM	PROLARVA	4.7	BEN	JAW	.
370	SUCKER FAMILY	LARVA	6.0	BEN	JAW	.
370	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
371	FRESHWATER DRUM	PROLARVA	4.3	G.B	JAW	82284
372	FRESHWATER DRUM	PROLARVA	3.6	BEN	JAW	82384
372	UNIDENTIFIED YOLK SAC LARVA	PROLARVA	3.4	BEN	JAW	.
372	FRESHWATER DRUM EGG	EGG	1.3	BEN	JAW	.
372	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
373	FRESHWATER DRUM EGG	EGG	1.3	BEN	JAW	.
374	FRESHWATER DRUM EGG	EGG	1.5	BEN	JAW	.
375	FRESHWATER DRUM	LARVA	5.0	G.B	JAW	.
376	MINNOW FAMMILY	LARVA	12.4	BEN	JAW	.
376	SUCKER FAMILY	LARVA	6.0	BEN	JAW	.
377	NO FISH	0	0.0	BEN	JAW	.
378	FRESHWATER DRUM EGG	EGG	1.4	BEN	JAW	.
379	FRESHWATER DRUM EGG	EGG	1.4	G.B	JAW	.
380	NO FISH	0	0.0	BEN	JAW	82884

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
381	NO FISH	0	0.0	BEN	JAW	.
382	NO FISH	0	0.0	BEN	JAW	.
383	DAMAGED LARVA	PROLARVA	3.0	BEN	JAW	.
383	UNIDENTIFIED EGG	EGG	1.2	BEN	JAW	.
384	NO FISH	0	0.0	G.B	JAW	.
385	FRESHWATER DRUM	PROLARVA	4.5	BEN	JAW	.
385	FRESHWATER DRUM	PROLARVA	2.6	BEN	JAW	.
385	FRESHWATER DRUM EGG	EGG	1.3	BEN	JAW	.
386	UNIDENTIFIED EGG	EGG	1.2	G.B	JAW	.
387	FRESHWATER DRUM	PROLARVA	3.7	BEN	JAW	.
388	NO FISH	0	0.0	MAG	JAW	.
389	FRESHWATER DRUM	PROLARVA	4.1	MAG	JAW	.
389	SUNFISH FAMILY	PROLARVA	3.2	MAG	JAW	.
390	SUNFISH FAMILY	PROLARVA	3.9	BEN	JAW	.
390	MINNOW FAMMILY	PROLARVA	4.1	BEN	JAW	.
391	NO FISH	0	0.0	BEN	JAW	.
392	UNIDENTIFIED EGG	EGG	1.2	G.B	JAW	.
393	NO FISH	0	0.0	BEN	JAW	.
394	NO FISH	0	0.0	G.B	JAW	.
395	NO FISH	0	.	BEN	JAW	.
396	NO FISH	0	0.0	BEN	JAW	82884
397	NO FISH	0	.	G.B	JAW	90584
398	NO FISH	0	.	G.B	JAW	.
399	MINNOW FAMMILY	PROLARVA	6.0	G.B	JAW	.
400	NO FISH	0	0.0	G.B	JAW	.
401	UNIDENTIFIED EGG	EGG	2.8	G.B	JAW	90684
402	NO FISH	0	0.0	G.B	JAW	.
403	SUCKER FAMILY	JUVENILE	18.0	G.B	JAW	.
404	NO FISH	0	0.0	G.B	JAW	.
405	NO FISH	0	.	G.B	JAW	.
406	FRESHWATER DRUM EGG	EGG	1.7	G.B	JAW	.
407	NO FISH	0	0.0	BEN	JAW	90684
408	NO FISH	0	.	G.B	JAW	.
409	NO FISH	0	.	BEN	JAW	.
410	NO FISH	0	.	BEN	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
411	NO FISH	0	.	BEN	JAW	.
412	NO FISH	0	.	BEN	JAW	.
413	NO FISH	0	.	BEN	JAW	.
414	NO FISH	0	.	BEN	JAW	.
415	NO FISH	0	.	G.B	JAW	91184
416	NO FISH	0	.	BEN	JAW	.
417	NO FISH	0	.	BEN	JAW	.
418	NO FISH	0	.	G.B	JAW	.
419	NO FISH	0	.	G.B	JAW	.
420	NO FISH	0	.	BEN	JAW	.
421	NO FISH	0	.	BEN	JAW	.
422	NO FISH	0	.	G.B	JAW	.
423	NO FISH	0	.	BEN	JAW	.
424	NO FISH	0	.	G.B	JAW	.
425	NO FISH	0	.	G.B	JAW	.
426	FRESHWATER DRUM EGG	EGG	2.5	G.B	JAW	91484
426	NO FISH	0	.	G.B	JAW	.
427	NO FISH	0	.	BEN	JAW	.
428	NO FISH	0	.	BEN	JAW	.
429	MINNOW FAMMILY	PROLARVA	5.5	BEN	JAW	91184
429	NO FISH	0	.	BEN	JAW	.
430	NO FISH	0	.	G.B	JAW	.
431	NO FISH	0	.	G.B	JAW	.
432	PERCH FAMILY	LARVA	7.8	BEN	JAW	.
433	NO FISH	0	0.0	G.B	JAW	91884
434	NO FISH	0	.	G.B	JAW	101584
435	NO FISH	0	.	G.B	JAW	.
436	NO FISH	0	.	BEN	JAW	91884
437	NO FISH	0	.	G.B	JAW	101584
438	NO FISH	0	.	G.B	JAW	101584
439	NO FISH	0	.	G.B	JAW	91884
440	NO FISH	0	.	BEN	JAW	91684
441	NO FISH	0	.	BEN	JAW	91884
442	NO FISH	0	.	G.B	JAW	.
443	NO FISH	0	.	G.B	JAW	.

CALLAWAY ICTHYOPLANKTON BENCH DATA
ALL SAMPLES 1984

CID	TAXON	LIFESTAGE	LENGTH IN MM	SORTER INITIALS	IDENTFIER INITIALS	DATE SORTED
444	NO FISH	0	.	BEN	JAW	.
445	NO FISH	0	.	G.B	JAW	.
446	NO FISH	0	.	BEN	JAW	91984
447	NO FISH	0	.	BEN	JAW	.
448	NO FISH	0	.	BEN	JAW	.
449	NO FISH	0	.	BEN	JAW	.
450	NO FISH	0	.	BEN	JAW	.
451	NO FISH	0	.	BEN	JAW	92584
452	NO FISH	0	.	BEN	JAW	.
453	NO FISH	0	.	BEN	JAW	.
454	NO FISH	0	.	BEN	JAW	.
455	NO FISH	0	.	BEN	JAW	.
456	NO FISH	0	.	BEN	JAW	.
457	NO FISH	0	.	BEN	JAW	.
458	NO FISH	0	0	G.B	JAW	.
459	NO FISH	0	.	BEN	JAW	.
460	NO FISH	0	.	G.B	JAW	92584
461	NO FISH	0	.	BEN	JAW	.
462	NO FISH	0	.	BEN	JAW	.
463	NO FISH	0	.	BEN	JAW	.
464	NO FISH	0	.	G.B	JAW	.
465	NO FISH	0	.	BEN	JAW	.
466	NO FISH	0	.	G.B	JAW	.
467	NO FISH	0	.	G.B	JAW	.
468	NO FISH	0	.	G.B	JAW	.

Appendix C

Impingement Data

Impingement Data

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0207850098 SITE NO. 0 DATE 2/ 7/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 9.1 FEET INTAKE TEMP. 33.0F DISCHARGE TEMP. 50.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 13776000. GALLONS TIME INCLUDED IN SAMPLE 8.2 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	17	12.3	66- 180	179.0	129.9
	TOTAL	17	12.3		179.0	129.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0215850098 SITE NO. 0 DATE 2/15/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 10.0 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 48.9F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	160	39.7	86- 134	1224.0	303.6
	TOTAL	160	39.7		1224.0	303.6

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0219850098 SITE NO. 0 DATE 2/19/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 8.5 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 54.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	33	8.2	70- 105	165.0	40.9
GREEN SUNFISH	LEPOMIS CYANELLUS	1	0.2	70	4.0	1.0
	TOTAL	34	8.4		169.0	41.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0227850098 SITE NO. 0 DATE 2/27/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 32.5 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 32.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40824000. GALLONS TIME INCLUDED IN SAMPLE 24.3 HRS.

MODE OF SCREEN OPERATION AUTOMATIC, MANUAL

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0308850098 SITE NO. 0 DATE 3/ 8/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 27.8 FEET INTAKE TEMP. 37.0F DISCHARGE TEMP. 55.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 41664000. GALLONS TIME INCLUDED IN SAMPLE 24.8 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0312850098 SITE NO. 0 DATE 3/12/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 20.0 FEET INTAKE TEMP. 38.5F DISCHARGE TEMP. 59.3F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40656000. GALLONS TIME INCLUDED IN SAMPLE 24.2 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	1	0.2	125	16.0	3.9
WALLEYE	STIZOSTEDION VITREUM	1	0.2	142	22.0	5.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	10	2.5	70- 88	58.0	14.3
	TOTAL	12	3.0		96.0	23.6

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0327850098 SITE NO. 0 DATE 3/27/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 17.3 FEET INTAKE TEMP. 45.0F DISCHARGE TEMP. 51.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40656000. GALLONS TIME INCLUDED IN SAMPLE 24.2 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	0.5	82- 95	13.0	3.2
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	0.5	91- 95	15.0	3.7
	TOTAL	4	1.0		28.0	6.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0403850098 SITE NO. 0 DATE 4/ 3/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 0.0 FEET INTAKE TEMP. 0.0F DISCHARGE TEMP. 0.0F

ELECTRIC BOILER FOR DEICING WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 0. GALLONS TIME INCLUDED IN SAMPLE 0.0 HRS.

MODE OF SCREEN OPERATION

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

PLANT NON-OPERATIONAL, NO INTAKE PUMPS OPERATING

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0413850098   SITE NO. 0   DATE 4/13/85   COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 17.2 FEET   INTAKE TEMP. 46.3F   DISCHARGE TEMP. 54.1F

ELECTRIC BOILER FOR DEICING OFF   WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS   TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G) PER 10000000 GAL.
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	0.2	555	3550.0	880.5
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	0.5	80- 85	8.0	2.0
	TOTAL	3	0.7		3558.0	882.4

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0421850098 SITE NO. 0 DATE 4/21/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 15.5 FEET INTAKE TEMP. 58.0F DISCHARGE TEMP. 72.3F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40656000. GALLONS TIME INCLUDED IN SAMPLE 24.2 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	20	4.9	78- 10(	88.8	21.8
	TOTAL	20	4.9		88.8	21.8

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0424850098 SITE NO. 0 DATE 4/24/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 15.0 FEET INTAKE TEMP. 61.9F DISCHARGE TEMP. 76.2F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	7	1.7	65- 92	28.0	6.9
	TOTAL	7	1.7		28.0	6.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0501850098 SITE NO. 0 DATE 5/ 1/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 17.0 FEET INTAKE TEMP. 59.3F DISCHARGE TEMP. 72.3F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION -AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	0.2	75	2.0	0.5
BLACK BULLHEAD	ICTALURUS MELAS	1	0.2	96	12.0	3.0
	TOTAL	2	0.5		14.0	3.5

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0511850098 SITE NO. 0 DATE 5/11/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 15.6 FEET INTAKE TEMP. 63.2F DISCHARGE TEMP. 69.7F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 41664000. GALLONS TIME INCLUDED IN SAMPLE 24.8 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G) PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0517850098 SITE NO. 0 DATE 5/17/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 19.0 FEET INTAKE TEMP. 63.2F DISCHARGE TEMP. 77.5F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL (MM)	TOTAL WT. (G)	WT. (G) PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0521850098 SITE NO. 0 DATE 5/21/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 16.5 FEET INTAKE TEMP. 63.2F DISCHARGE TEMP. 77.5F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40656000. GALLONS TIME INCLUDED IN SAMPLE 24.2 HRS.

MODE OF SCREEN OPERATION AUTOMATIC, MANUAL

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0529850098 SITE NO. 0 DATE 5/29/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 13.0 FEET INTAKE TEMP. 62.6F DISCHARGE TEMP. 77.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0605850098 SITE NO. 0 DATE 6/ 5/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 18.5 FEET INTAKE TEMP. 68.4F DISCHARGE TEMP. 78.8F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 20160000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

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Appendix C.a (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0611850098 SITE NO. 0 DATE 6/11/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 19.8 FEET INTAKE TEMP. 67.1F DISCHARGE TEMP. 80.1F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40656000. GALLONS TIME INCLUDED IN SAMPLE 24.2 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0624850098   SITE NO. 0   DATE 6/24/85   COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 17.9 FEET   INTAKE TEMP. 70.0F   DISCHARGE TEMP. 80.4F

ELECTRIC BOILER FOR DEICING   OFF   WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING   0.0

VOLUME OF WATER SCREENED   38640000. GALLONS   TIME INCLUDED IN SAMPLE   23.0 HRS.

MODE OF SCREEN OPERATION   AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0629850098 SITE NO. 0 DATE 6/29/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 17.5 FEET INTAKE TEMP. 71.0F DISCHARGE TEMP. 81.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0701850098 SITE NO. 0 DATE 7/ 1/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 16.2 FEET INTAKE TEMP. 73.6F DISCHARGE TEMP. 76.2F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40824000. GALLONS TIME INCLUDED IN SAMPLE 24.3 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

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Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0713850098 SITE NO. 0 DATE 7/13/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 12.0 FEET INTAKE TEMP. 77.5F DISCHARGE TEMP. 81.4F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0718850098 SITE NO. 0 DATE 7/18/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 10.0 FEET INTAKE TEMP. 77.5F DISCHARGE TEMP. 82.7F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 42840000. GALLONS TIME INCLUDED IN SAMPLE 25.5 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0729850098 SITE NO. 0 DATE 7/29/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 10.8 FEET INTAKE TEMP. 77.2F DISCHARGE TEMP. 85.3F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0731850098 SITE NO. 0 DATE 7/31/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 10.3 FEET INTAKE TEMP. 76.8F DISCHARGE TEMP. 82.7F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 41664000. GALLONS TIME INCLUDED IN SAMPLE 24.8 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0810850098 SITE NO. 0 DATE 8/10/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 11.8 FEET INTAKE TEMP. 79.0F DISCHARGE TEMP. 84.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G) PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0814850098 SITE NO. 0 DATE 8/14/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 14.0 FEET INTAKE TEMP. 79.0F DISCHARGE TEMP. 85.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE FFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 45360000. GALLONS TIME INCLUDED IN SAMPLE 27.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC, MANUAL

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0820850098 SITE NO. 0 DATE 8/20/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 13.0 FEET INTAKE TEMP. 78.8F DISCHARGE TEMP. 82.7F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0830850098 SITE NO. 0 DATE 8/30/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 15.3 FEET INTAKE TEMP. 78.2F DISCHARGE TEMP. 83.2F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 41160000. GALLONS TIME INCLUDED IN SAMPLE 24.5 HRS.

MODE OF SCREEN OPERATION AUTOMATIC, MANUAL

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	0.2	64	2.0	0.5
	TOTAL	1	0.2		2.0	0.5

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0904850098 SITE NO. 0 DATE 9/ 4/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 12.0 FEET INTAKE TEMP. 80.0F DISCHARGE TEMP. 81.4F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION MANUAL, CONTINUOUS

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0913850098 SITE NO. 0 DATE 9/13/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 9.5 FEET INTAKE TEMP. 81.4F DISCHARGE TEMP. 77.5F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40488000. GALLONS TIME INCLUDED IN SAMPLE 24.1 HRS.

MODE OF SCREEN OPERATION MANUAL, CONTINUOUS

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

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Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0924850098 SITE NO. 0 DATE 9/24/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 11.5 FEET INTAKE TEMP. 72.3F DISCHARGE TEMP. 71.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 39984000. GALLONS TIME INCLUDED IN SAMPLE 23.8 HRS.

MODE OF SCREEN OPERATION CONTINUOUS

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0930850098 SITE NO. 0 DATE 9/30/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 14.0 FEET INTAKE TEMP. 63.2F DISCHARGE TEMP. 67.1F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40488000. GALLONS TIME INCLUDED IN SAMPLE 24.1 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1005850098   SITE NO. 0   DATE 10/ 5/85   COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 18.7 FEET   INTAKE TEMP. 58.0F   DISCHARGE TEMP. 71.0F

ELECTRIC BOILER FOR DEICING OFF   WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS   TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1009850098 SITE NO. 0 DATE 10/ 9/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 15.0 FEET INTAKE TEMP. 58.0F DISCHARGE TEMP. 65.8F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 42000000. GALLONS TIME INCLUDED IN SAMPLE 25.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1019850098 SITE NO. 0 DATE 10/19/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 22.0 FEET INTAKE TEMP. 52.8F DISCHARGE TEMP. 76.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 43680000. GALLONS TIME INCLUDED IN SAMPLE 26.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1025850098 SITE NO. 0 DATE 10/25/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 19.0 FEET INTAKE TEMP. 55.4F DISCHARGE TEMP. 75.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40824000. GALLONS TIME INCLUDED IN SAMPLE 24.3 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1102850098 SITE NO. 0 DATE 11/ 2/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 16.0 FEET INTAKE TEMP. 51.5F DISCHARGE TEMP. 66.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40488000. GALLONS TIME INCLUDED IN SAMPLE 24.1 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1106850098 SITE NO. 0 DATE 11/ 6/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 13.0 FEET INTAKE TEMP. 48.3F DISCHARGE TEMP. 68.0F

ELECTRIC BOILER FOR DEICING OOFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 20160000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1113850098 SITE NO. 0 DATE 11/13/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 11.4 FEET INTAKE TEMP. 46.0F DISCHARGE TEMP. 77.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 20328000. GALLONS TIME INCLUDED IN SAMPLE 24.2 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1122850098 SITE NO. 0 DATE 11/22/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 29.8 FEET INTAKE TEMP. 43.7F DISCHARGE TEMP. 58.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 21000000. GALLONS TIME INCLUDED IN SAMPLE 25.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	1.0	98- 231	103.0	49.0
	TOTAL	2	1.0		103.0	49.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1201850098   SITE NO. 0   DATE 12/ 1/85   COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 18.3 FEET   INTAKE TEMP. 33.3F   DISCHARGE TEMP. 51.0F

ELECTRIC BOILER FOR DEICING OFF   WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 50736000. GALLONS   TIME INCLUDED IN SAMPLE 30.2 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
RIVER CARPSUCKER	CARPIODES CARPIO	1	0.2	380	825.0	162.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	4	0.8	60- 247	171.0	33.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	1	0.2	118	19.0	3.7
	TOTAL	6	1.2		1015.0	200.1

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1206850098 SITE NO. 0 DATE 12/ 6/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 16.0 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 54.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
NO FISH COLLECTED						

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1211850098 SITE NO. 0 DATE 12/11/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 17.5 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 60.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 19740000. GALLONS TIME INCLUDED IN SAMPLE 23.5 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	1	0.5	169	61.0	30.9
BLUE CATFISH	ICTALURUS FURCATUS	1	0.5	300	236.0	119.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	3	1.5	105- 114	37.0	18.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	1.0	85- 107	19.0	9.6
	TOTAL	7	3.5		353.0	178.8

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1218850098 SITE NO. 0 DATE 12/18/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 16.0 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 48.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 41160000. GALLONS TIME INCLUDED IN SAMPLE 24.5 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	0.2	104	9.0	2.2
	TOTAL	1	0.2		9.0	2.2

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 1227850098 SITE NO. 0 DATE 12/27/85 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 13.0 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 61.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	3	0.7	218- 276	443.0	109.9
	TOTAL	3	0.7		443.0	109.9

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0102860098 SITE NO. 0 DATE 1/ 2/86 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 15.0 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 64.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 41160000. GALLONS TIME INCLUDED IN SAMPLE 24.5 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	1	0.2	453	229.0	55.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	4	1.0	70- 92	26.0	6.3
CHANNEL CATFISH	ICTALURUS PUNCTATUS	2	0.5	62- 76	8.0	1.9
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	0.5	69- 231	108.0	26.2
	TOTAL	9	2.2		371.0	90.1

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0110860098   SITE NO. 0   DATE 1/10/86   COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 11.0 FEET   INTAKE TEMP. 32.0F   DISCHARGE TEMP. 57.0F

ELECTRIC BOILER FOR DEICING OFF   WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 45360000. GALLONS   TIME INCLUDED IN SAMPLE 27.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM	4	0.9	102- 221	110.0	24.3
	TOTAL	4	0.9		110.0	24.3

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0114860098 SITE NO. 0 DATE 1/14/86 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 9.6 FEET INTAKE TEMP. 32.0F DISCHARGE TEMP. 58.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 42000000. GALLONS TIME INCLUDED IN SAMPLE 25.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
BLUE CATFISH	ICTALURUS FURCATUS	1	0.2	140	47.0	11.2
GOLDEYE	HIODON ALOSOIDES	1	0.2	182	20.0	4.8
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	1	0.2	172	440.0	104.8
GIZZARD SHAD	DOROSOMA CEPEDIANUM	4	1.0	96- 133	50.0	11.9
	TOTAL	7	1.7		557.0	132.6

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0126860098 SITE NO. 0 DATE 1/26/86 COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 10.8 FEET INTAKE TEMP. 34.6F DISCHARGE TEMP. 56.0F

ELECTRIC BOILER FOR DEICING OFF WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 40320000. GALLONS TIME INCLUDED IN SAMPLE 24.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME	ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.

NO FISH COLLECTED

Appendix C.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

COLLECTION NUMBER 0130860098   SITE NO. 0   DATE 1/30/86   COLLECTION METHOD-- IMPINGEMENT

RIVER STAGE 9.5 FEET   INTAKE TEMP. 33.0F   DISCHARGE TEMP. 56.0F

ELECTRIC BOILER FOR DEICING OFF   WATER TEMP. RISE EFFECT OF ELECTRIC BOILER FOR DEICING 0.0

VOLUME OF WATER SCREENED 47040000. GALLONS   TIME INCLUDED IN SAMPLE 28.0 HRS.

MODE OF SCREEN OPERATION AUTOMATIC

COMMON NAME	SCIENTIFIC NAME		ACTUAL NO.	NO. PER 10000000 GAL.	RANGE TL(MM)	TOTAL WT.(G)	WT.(G)PER 10000000 GAL.
GIZZARD SHAD	DOROSOMA CEPEDIANUM		2	0.4	97- 125	24.0	5.1
		TOTAL	2	0.4		24.0	5.1

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

PERCENT OF EACH LENGTH RANGE COLLECTED OFF TRAVELING SCREENS 2/85 THRU 1/86

GIZZARD SHAD DOROSOMA CEPEDIANUM

RANGE TOTAL LENGTH (MM)	2/85	3/85	4/85	5/85	6/85	7/85	8/85	9/85	10/85	11/85	12/85	1/86
0-100	89.5	100.0	96.6	0.0	0.0	0.0	0.0	0.0	0.0	50.0	37.5	50.0
101-150	10.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	42.9
151-200	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
201-250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	12.5	7.1
ACTUAL NUMBER	210	12	29	0	0	0	0	0	0	2	8	14

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

PERCENT OF EACH LENGTH RANGE COLLECTED OFF TRAVELING SCREENS 2/85 THRU 1/86

FRESHWATER DRUM APLODINOTUS GRUNNIENS

RANGE TOTAL LENGTH (MM)	2/85	3/85	4/85	5/85	6/85	7/85	8/85	9/85	10/85	11/85	12/85	1/86
0-100	0.0	66.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	33.3
101-150	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0
151-200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3
201-250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	33.3
251-300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	0.0
ACTUAL NUMBER	0	3	0	0	0	0	0	0	0	0	6	3

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

FEBRUARY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1470.0	99.5	10976.0	99.7
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	7.0	0.5	28.0	0.3
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	1477.0		11004.0	

Appendix C.3

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

MARCH 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	124.0	75.0	733.7	57.3
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	10.3	6.3	227.3	17.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	31.0	18.8	320.3	25.0
	TOTALS	165.3		1281.3	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

APRIL 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	290.0	96.7	1248.0	3.4
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	10.0	3.3	35500.0	96.6
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	300.0		36748.0	

Appendix C.3 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

MAY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	6.2	50.0	74.4	85.7
CHANNEL CATFISH	ICTALURUS PUNCTATUS	6.2	50.0	12.4	14.3
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	12.4		86.8	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

JUNE 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	0.0		0.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

JULY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	0.0		0.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

AUGUST 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	7.8	100.0	15.5	100.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	7.8		15.5	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

SEPTEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	0.0		0.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

OCTOBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	0.0		0.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

NOVEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	15.0	100.0	772.5	100.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	15.0		772.5	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

DECEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	6.2	5.9	378.2	3.4
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	49.6	47.1	1345.4	11.9
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	6.2	5.9	5115.0	45.3
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	6.2	5.9	1463.2	13.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	37.2	35.3	2982.2	26.4
	TOTALS	105.4		11284.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

JANUARY 1986

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6.2	4.5	1419.8	21.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	86.8	63.6	1302.0	19.8
GOLDEYE	HIODON ALOSOIDES	6.2	4.5	124.0	1.9
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	6.2	4.5	291.4	4.4
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	12.4	9.1	49.6	0.8
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	18.6	13.6	3397.6	51.6
	TOTALS	136.4		6584.4	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON NO. DAYS IN MONTH

TOTAL FOR YEAR

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	6.2	0.3	378.2	0.6
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6.2	0.3	1419.8	2.1
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2035.4	91.7	16377.6	24.2
GOLDEYE	HIODON ALOSOIDES	6.2	0.3	124.0	0.2
RIVER CARPSUCKER	CARPIODES CARPIO	6.2	0.3	5115.0	7.5
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	10.0	0.5	35500.0	52.4
BLUE CATFISH	ICTALURUS FURCATUS	12.4	0.6	1754.6	2.6
BLACK BULLHEAD	ICTALURUS MELAS	6.2	0.3	74.4	0.1
CHANNEL CATFISH	ICTALURUS PUNCTATUS	18.6	0.8	62.0	LT 0.1
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	7.8	0.3	15.5	LT 0.1
GREEN SUNFISH	LEPOMIS CYANELLUS	7.0	0.3	28.0	LT 0.1
WALLEYE	STIZOSTEDION VITREUM	10.3	0.5	227.3	0.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	86.8	3.9	6700.1	9.9
	TOTALS	2219.3		67776.5	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

FEBRUARY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1753.1	99.5	13089.9	99.7
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	8.3	0.5	33.4	0.3
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	1761.5		13123.2	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

MARCH 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	122.0	75.0	721.7	57.3
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	10.2	6.3	223.6	17.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	30.5	18.8	315.1	25.0
	TOTALS	162.6		1260.4	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

APRIL 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	216.8	96.7	933.2	3.4
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	7.5	3.3	26545.4	96.6
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	224.3		27478.6	

Appendix C.4 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

MAY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	6.1	50.0	73.8	85.7
CHANNEL CATFISH	ICTALURUS PUNCTATUS	6.1	50.0	12.3	14.3
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	12.3		86.1	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

JUNE 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	0.0		0.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

JULY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	0.0		0.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

AUGUST 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	7.5	100.0	15.0	100.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	7.5		15.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

SEPTEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	0.0		0.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

OCTOBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	0.0	0.0	0.0	0.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	0.0		0.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

NOVEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	14.8	100.0	763.6	100.0
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	0.0	0.0	0.0	0.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	0.0	0.0	0.0	0.0
	TOTALS	14.8		763.6	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

DECEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	5.9	5.9	356.9	3.4
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	0.0	0.0	0.0	0.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	46.8	47.1	1269.7	11.9
GOLDEYE	HIODON ALOSOIDES	0.0	0.0	0.0	0.0
RIVER CARPSUCKER	CARPIODES CARPIO	5.9	5.9	4827.0	45.3
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	5.9	5.9	1380.8	13.0
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	0.0	0.0	0.0	0.0
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	35.1	35.3	2814.3	26.4
	TOTALS	99.5		10648.8	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MISSOURI

ESTIMATED MONTHLY NUMBERS & WEIGHTS AND RELATIVE(%) ABUNDANCE AND WEIGHTS 2/85 THRU 1/86

BASED UPON TOTAL WATER WITHDRAWAL IN MONTH

JANUARY 1986

COMMON NAME	SCIENTIFIC NAME	NUMBERS	RELATIVE ABUNDANCE	WTS.(G)	RELATIVE WTS.
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	0.0	0.0	0.0	0.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	5.8	4.5	1326.0	21.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	81.1	63.6	1216.0	19.8
GOLDEYE	HIODON ALOSOIDES	5.8	4.5	115.8	1.9
RIVER CARPSUCKER	CARPIODES CARPIO	0.0	0.0	0.0	0.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	0.0	0.0	0.0	0.0
BLUE CATFISH	ICTALURUS FURCATUS	5.8	4.5	272.1	4.4
BLACK BULLHEAD	ICTALURUS MELAS	0.0	0.0	0.0	0.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	11.6	9.1	46.3	0.8
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	0.0	0.0	0.0	0.0
GREEN SUNFISH	LEPOMIS CYANELLUS	0.0	0.0	0.0	0.0
WALLEYE	STIZOSTEDION VITREUM	0.0	0.0	0.0	0.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	17.4	13.6	3173.1	51.6
	TOTALS	127.4		6149.2	

Appendix C.4 (Cont'd)

Appendix D

Field Fisheries Data

Field Fisheries Data

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES FEBRUARY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	31	36.0	2194.0	15.9
GOLDEYE	HIODON ALOSOIDES	9	10.5	586.0	4.3
MOONEYE	HIODON TERGISUS	1	1.2	32.0	0.2
CARP	CYPRINUS CARPIO	2	2.3	3350.0	24.3
RIVER CARPSUCKER	CARPIODES CARPIO	2	2.3	1068.0	7.8
HIGHFIN CARPSUCKER	CARPIODES VELIFER	1	1.2	1000.0	7.3
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	5	5.8	1999.0	14.5
WHITE BASS	MORONE CHRYSOPS	2	2.3	734.0	5.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	33	38.4	2814.0	20.4
	TOTAL	86		13777.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES MARCH 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	8	1.8	97.0	0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	2	0.4	532.0	0.8
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	13	2.9	4066.0	6.1
GIZZARD SHAD	DOROSOMA CEPEDIANUM	36	7.9	9065.0	13.7
GOLDEYE	HIODON ALOSOIDES	120	26.5	10144.0	15.3
CARP	CYPRINUS CARPIO	11	2.4	13126.0	19.8
RIVER CARPSUCKER	CARPIODES CARPIO	19	4.2	2418.0	3.7
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	2	0.4	1236.0	1.9
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	2	0.4	629.0	1.0
BLUE CATFISH	ICTALURUS FURCATUS	2	0.4	1461.0	2.2
BLACK BULLHEAD	ICTALURUS MELAS	1	0.2	52.0	LT 0.1
YELLOW BULLHEAD	ICTALURUS NATALIS	1	0.2	136.0	0.2
CHANNEL CATFISH	ICTALURUS PUNCTATUS	4	0.9	1653.0	2.5
WHITE BASS	MORONE CHRYSOPS	13	2.9	2797.0	4.2
BLUEGILL	LEPOMIS MACROCHIRUS	2	0.4	82.0	0.1
WHITE CRAPPIE	POMOXIS ANNULARIS	2	0.4	678.0	1.0
SAUGER	STIZOSTEDION CANADENSE	1	0.2	32.0	LT 0.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	214	47.2	17965.6	27.2
	TOTAL	453		66109.6	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES APRIL 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	4	1.1	100.0	0.2
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	0.8	497.0	0.8
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	24	6.4	10117.0	16.3
GIZZARD SHAD	DOROSOMA CEPEDIANUM	115	30.8	7112.8	11.5
GOLDEYE	HIODON ALOSOIDES	82	22.0	9339.0	15.0
MOONEYE	HIODON TERGISUS	1	0.3	116.0	0.2
CARP	CYPRINUS CARPIO	32	8.6	18225.0	29.3
EMERALD SHINER	NOTROPIS ATHERINOIDES	1	0.3	1.0	LT 0.1
RIVER CARPSUCKER	CARPIODES CARPIO	8	2.1	798.0	1.3
QUILLBACK	CARPIODES CYPRINUS	1	0.3	23.0	LT 0.1
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	4	1.1	76.0	0.1
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	4	1.1	2511.0	4.0
BLACK BULLHEAD	ICTALURUS MELAS	1	0.3	552.0	0.9
CHANNEL CATFISH	ICTALURUS PUNCTATUS	4	1.1	493.0	0.8
WHITE BASS	MORONE CHRYSOPS	9	2.4	514.0	0.8
GREEN SUNFISH	LEPOMIS CYANELLUS	4	1.1	385.0	0.6
WARMOUTH	LEPOMIS GULOSUS	2	0.5	366.0	0.6
BLUEGILL	LEPOMIS MACROCHIRUS	9	2.4	966.0	1.6
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	2	0.5	1667.0	2.7
WHITE CRAPPIE	POMOXIS ANNULARIS	5	1.3	1336.0	2.2
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	2	0.5	27.0	LT 0.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	56	15.0	6875.0	11.1
	TOTAL	373		62096.8	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES MAY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	1.0	8.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	4	4.0	967.0	5.1
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	19	19.0	7912.0	41.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	43	43.0	1213.0	6.4
CARP	CYPRINUS CARPIO	14	14.0	3921.0	20.6
RIVER CARPSUCKER	CARPIODES CARPIO	1	1.0	1051.0	5.5
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	1.0	437.0	2.3
BLUEGILL	LEPOMIS MACROCHIRUS	1	1.0	138.0	0.7
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	1	1.0	711.0	3.7
WHITE CRAPPIE	POMOXIS ANNULARIS	2	2.0	653.0	3.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	13	13.0	2022.0	10.6
	TOTAL	100		19033.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES JUNE 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	0.7	13.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	10	7.2	2443.0	4.6
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	44	31.7	14583.0	27.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	24	17.3	5034.0	9.4
GOLDEYE	HIODON ALOSOIDES	22	15.8	4453.0	8.4
CARP	CYPRINUS CARPIO	9	6.5	11871.0	22.3
RIVER CARPSUCKER	CARPIODES CARPIO	10	7.2	8933.0	16.8
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	0.7	1050.0	2.0
WHITE BASS	MORONE CHRYSOPS	3	2.2	1170.0	2.2
WHITE CRAPPIE	POMOXIS ANNULARIS	2	1.4	474.0	0.9
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	13	9.4	3277.0	6.1
	TOTAL	139		53301.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES JULY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	1	1.1	638.0	1.9
LONGNOSE GAR	LEPISOSTEUS OSSEUS	4	4.4	1981.0	5.8
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	27	30.0	7728.0	22.5
GIZZARD SHAD	DOROSOMA CEPEDIANUM	3	3.3	898.0	2.6
GOLDEYE	HIODON ALOSOIDES	9	10.0	599.0	1.7
CARP	CYPRINUS CARPIO	6	6.7	9545.0	27.8
RIVER CARPSUCKER	CARPIODES CARPIO	5	5.6	2877.0	8.4
BLUE CATFISH	ICTALURUS FURCATUS	1	1.1	316.0	0.9
CHANNEL CATFISH	ICTALURUS PUNCTATUS	4	4.4	3493.0	10.2
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	5	5.6	2728.0	7.9
WHITE BASS	MORONE CHRYSOPS	5	5.6	924.0	2.7
BLUEGILL	LEPOMIS MACROCHIRUS	4	4.4	286.0	0.8
WHITE CRAPPIE	POMOXIS ANNULARIS	1	1.1	298.0	0.9
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	1	1.1	186.0	0.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	13	14.4	1704.0	5.0
SPOTTED BASS	MICROPTERUS PUNCTULATUS	1	1.1	192.0	0.6
	TOTAL	90		34393.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES AUGUST 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	1.1	14.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	7	7.4	5190.0	9.6
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	18	18.9	8675.0	16.0
AMERICAN EEL	ANGUILLA ROSTRATA	1	1.1	480.0	0.9
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	1.1	210.0	0.4
GOLDEYE	HIODON ALOSOIDES	19	20.0	2748.0	5.1
CARP	CYPRINUS CARPIO	13	13.7	23255.0	43.0
RIVER CARPSUCKER	CARPIODES CARPIO	6	6.3	4411.0	8.1
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	1.1	750.0	1.4
BLUE CATFISH	ICTALURUS FURCATUS	1	1.1	1150.0	2.1
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	1.1	478.0	0.9
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	2	2.1	2302.0	4.3
WHITE BASS	MORONE CHRYSOPS	1	1.1	162.0	0.3
WHITE CRAPPIE	POMOXIS ANNULARIS	1	1.1	210.0	0.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	22	23.2	4099.0	7.6
	TOTAL	95		54134.0	

Appendix D.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES SEPTEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	5	2.2	118.0	0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	13	5.8	7360.0	8.5
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	8	3.6	3025.0	3.5
GIZZARD SHAD	DOROSOMA CEPEDIANUM	60	26.8	14241.6	16.4
GOLDEYE	HIODON ALOSOIDES	22	9.8	2458.0	2.8
CARP	CYPRINUS CARPIO	16	7.1	23814.0	27.4
RIVER CARPSUCKER	CARPIODES CARPIO	19	8.5	7675.0	8.8
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	3	1.3	7475.0	8.6
BLUE CATFISH	ICTALURUS FURCATUS	2	0.9	523.0	0.6
CHANNEL CATFISH	ICTALURUS PUNCTATUS	3	1.3	2542.0	2.9
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	0.4	300.0	0.3
WHITE BASS	MORONE CHRYSOPS	4	1.8	1091.0	1.3
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	1	0.4	203.0	0.2
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	67	29.9	16023.0	18.4
	TOTAL	224		86848.6	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES OCTOBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	5	1.7	180.0	0.2
LONGNOSE GAR	LEPISOSTEUS OSSEUS	6	2.1	6089.0	6.7
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	10	3.4	3050.0	3.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	177	60.6	33843.2	37.4
GOLDEYE	HIODON ALOSOIDES	22	7.5	2639.0	2.9
CARP	CYPRINUS CARPIO	8	2.7	15677.0	17.3
GRASS CARP	CTENOPHARYNGODON IDELLA	1	0.3	4850.0	5.4
RIVER CARPSUCKER	CARPIODES CARPIO	13	4.5	8681.0	9.6
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	3	1.0	2875.0	3.2
GOLDEN REDHORSE	MOXOSTOMA ERYTHRURUM	4	1.4	767.0	0.8
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	2	0.7	1198.0	1.3
BLUE CATFISH	ICTALURUS FURCATUS	4	1.4	2601.0	2.9
CHANNEL CATFISH	ICTALURUS PUNCTATUS	2	0.7	1166.0	1.3
WHITE BASS	MORONE CHRYSOPS	3	1.0	385.0	0.4
WHITE CRAPPIE	POMOXIS ANNULARIS	1	0.3	237.0	0.3
SAUGER	STIZOSTEDION CANADENSE	4	1.4	1469.0	1.6
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	27	9.2	4765.0	5.3
	TOTAL	292		90412.2	

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Appendix D.1 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES NOVEMBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	3	6.7	133.0	0.7
PADDLEFISH	POLYODON SPATHULA	1	2.2	3200.0	16.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	5	11.1	1455.0	7.5
GOLDEYE	HIODON ALOSOIDES	16	35.6	2769.0	14.2
MOONEYE	HIODON TERGISUS	2	4.4	218.0	1.1
CARP	CYPRINUS CARPIO	2	4.4	5050.0	25.9
RIVER CARPSUCKER	CARPIODES CARPIO	2	4.4	1070.0	5.5
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	2.2	2600.0	13.3
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	1	2.2	1300.0	6.7
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	2.2	302.0	1.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	11	24.4	1416.0	7.3
	TOTAL	45		19513.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

ALL SITES JANUARY 1986 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	23	85.2	400.0	28.7
GOLDEYE	HIODON ALOSOIDES	1	3.7	120.0	8.6
EMERALD SHINER	NOTROPIS ATHERINOIDES	1	3.7	4.0	0.3
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	3.7	448.0	32.1
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	3.7	424.0	30.4
	TOTAL	27		1396.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 FEBRUARY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	8.7	88.0	1.7
MOONEYE	HIODON TERGISUS	1	4.3	32.0	0.6
CARP	CYPRINUS CARPIO	1	4.3	1625.0	31.5
HIGHFIN CARPSUCKER	CARPIODES VELIFER	1	4.3	1000.0	19.4
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	4.3	475.0	9.2
WHITE BASS	MORONE CHRYSOPS	1	4.3	346.0	6.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	16	69.6	1596.0	30.9
	TOTAL	23		5162.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 MARCH 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	0.4	70.0	0.3
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	11	4.5	3108.0	11.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	16	6.6	3900.0	14.3
GOLDEYE	HIODON ALOSOIDES	40	16.4	3718.0	13.6
CARP	CYPRINUS CARPIO	2	0.8	2454.0	9.0
RIVER CARPSUCKER	CARPIODES CARPIO	3	1.2	800.0	2.9
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	0.4	718.0	2.6
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	0.4	648.0	2.4
WHITE BASS	MORONE CHRYSOPS	6	2.5	1068.0	3.9
BLUEGILL	LEPOMIS MACROCHIRUS	2	0.8	82.0	0.3
WHITE CRAPPIE	POMOXIS ANNULARIS	1	0.4	386.0	1.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	160	65.6	10353.6	37.9
	TOTAL	244		27305.6	

Appendix D.2 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 APRIL 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	0.6	322.0	1.1
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	8	4.8	4760.0	16.9
GIZZARD SHAD	DOROSOMA CEPEDIANUM	87	51.8	4444.8	15.8
GOLDEYE	HIODON ALOSOIDES	32	19.0	2536.0	9.0
MOONEYE	HIODON TERGISUS	1	0.6	116.0	0.4
CARP	CYPRINUS CARPIO	5	3.0	8972.0	31.8
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	1	0.6	2375.0	8.4
BLACK BULLHEAD	ICTALURUS MELAS	1	0.6	552.0	2.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	4	2.4	493.0	1.7
WHITE BASS	MORONE CHRYSOPS	5	3.0	374.0	1.3
BLUEGILL	LEPOMIS MACROCHIRUS	2	1.2	88.0	0.3
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	1	0.6	717.0	2.5
WHITE CRAPPIE	POMOXIS ANNULARIS	1	0.6	314.0	1.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	19	11.3	2120.0	7.5
	TOTAL	168		28183.8	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 MAY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	2.8	8.0	0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	8.3	837.0	11.1
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	16.7	1872.0	24.8
GIZZARD SHAD	DOROSOMA CEPEDIANUM	17	47.2	963.0	12.7
CARP	CYPRINUS CARPIO	2	5.6	2284.0	30.2
BLUEGILL	LEPOMIS MACROCHIRUS	1	2.8	138.0	1.8
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	1	2.8	711.0	9.4
WHITE CRAPPIE	POMOXIS ANNULARIS	1	2.8	417.0	5.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	4	11.1	330.0	4.4
	TOTAL	36		7560.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 JUNE 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	6	14.3	1220.0	11.2
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	19	45.2	5947.0	54.6
GOLDEYE	HIODON ALOSOIDES	12	28.6	2847.0	26.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	5	11.9	884.0	8.1
	TOTAL	42		10898.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 JULY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	3	10.3	734.0	6.3
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	6.9	640.0	5.5
GOLDEYE	HIODON ALOSOIDES	5	17.2	142.0	1.2
CARP	CYPRINUS CARPIO	4	13.8	5612.0	48.5
RIVER CARPSUCKER	CARPIODES CARPIO	3	10.3	2152.0	18.6
BLUE CATFISH	ICTALURUS FURCATUS	1	3.4	316.0	2.7
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	3.4	568.0	4.9
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	3	10.3	738.0	6.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	6	20.7	484.0	4.2
SPOTTED BASS	MICROPTERUS PUNCTULATUS	1	3.4	192.0	1.7
	TOTAL	29		11578.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 AUGUST 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	3.3	14.0	0.2
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	2	6.7	711.0	8.7
AMERICAN EEL	ANGUILLA ROSTRATA	1	3.3	480.0	5.9
GOLDEYE	HIODON ALOSOIDES	9	30.0	528.0	6.5
CARP	CYPRINUS CARPIO	1	3.3	1600.0	19.6
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	2	6.7	2302.0	28.2
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	14	46.7	2518.0	30.9
	TOTAL	30		8153.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 SEPTEMBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	3	4.8	67.0	0.3
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	1	1.6	800.0	3.8
GOLDEYE	HIODON ALOSOIDES	9	14.3	620.0	2.9
CARP	CYPRINUS CARPIO	6	9.5	9895.0	46.9
RIVER CARPSUCKER	CARPIODES CARPIO	2	3.2	1800.0	8.5
BLUE CATFISH	ICTALURUS FURCATUS	1	1.6	120.0	0.6
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	1.6	300.0	1.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	40	63.5	7496.0	35.5
	TOTAL	63		21098.0	

Appendix D.2 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 OCTOBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	14.6	2101.0	26.5
GIZZARD SHAD	DOROSOMA CEPEDIANUM	6	14.6	700.0	8.8
GOLDEYE	HIODON ALOSOIDES	11	26.8	557.0	7.0
CARP	CYPRINUS CARPIO	1	2.4	377.0	4.8
RIVER CARPSUCKER	CARPIODES CARPIO	1	2.4	351.0	4.4
BLUE CATFISH	ICTALURUS FURCATUS	1	2.4	383.0	4.8
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	2.4	116.0	1.5
WHITE BASS	MORONE CHRYSOPS	2	4.9	263.0	3.3
SAUGER	STIZOSTEDION CANADENSE	3	7.3	1124.0	14.2
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	9	22.0	1950.0	24.6
	TOTAL	41		7922.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 NOVEMBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	20.0	290.0	38.6
GOLDEYE	HIODON ALOSOIDES	3	60.0	324.0	43.1
MOONEYE	HIODON TERGISUS	1	20.0	138.0	18.4
	TOTAL	5		752.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 FEBRUARY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	20.0	10.0	0.9
GOLDEYE	HIODON ALOSOIDES	2	40.0	92.0	7.9
RIVER CARPSUCKER	CARPIODES CARPIO	2	40.0	1068.0	91.3
	TOTAL	5		1170.0	

Appendix D.2 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 MARCH 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	3	7.1	448.0	10.8
GOLDEYE	HIODON ALOSOIDES	9	21.4	824.0	19.9
CARP	CYPRINUS CARPIO	3	7.1	230.0	5.6
RIVER CARPSUCKER	CARPIODES CARPIO	9	21.4	800.0	19.3
BLACK BULLHEAD	ICTALURUS MELAS	1	2.4	52.0	1.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	17	40.5	1788.0	43.2
	TOTAL	42		4142.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 APRIL 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	12	24.5	1593.0	17.4
GOLDEYE	HIODON ALOSOIDES	4	8.2	1030.0	11.1
CARP	CYPRINUS CARPIO	11	22.4	3033.0	32.7
RIVER CARPSUCKER	CARPIODES CARPIO	6	12.2	738.0	8.0
WHITE BASS	MORONE CHRYSOPS	1	2.0	49.0	0.5
GREEN SUNFISH	LEPOMIS CYANELLUS	1	2.0	47.0	0.5
BLUEGILL	LEPOMIS MACROCHIRUS	1	2.0	152.0	1.6
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	1	2.0	950.0	10.3
WHITE CRAPPIE	POMOXIS ANNULARIS	1	2.0	481.0	5.2
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	11	22.4	1189.0	12.8
	TOTAL	49		9262.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 MAY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	13.3	2810.0	53.1
GIZZARD SHAD	DOROSOMA CEPEDIANUM	22	48.9	210.0	4.0
CARP	CYPRINUS CARPIO	11	24.4	1588.0	30.0
WHITE CRAPPIE	POMOXIS ANNULARIS	1	2.2	236.0	4.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	5	11.1	445.0	8.4
	TOTAL	45		5289.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 JUNE 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	85.7	1860.0	93.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	1	14.3	130.0	6.5
	TOTAL	7		1990.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 JULY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	2	13.3	858.0	26.3
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	11	73.3	2344.0	71.7
BLUEGILL	LEPOMIS MACROCHIRUS	1	6.7	34.0	1.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	1	6.7	32.0	1.0
	TOTAL	15		3268.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 AUGUST 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	5	35.7	3515.0	19.3
CARP	CYPRINUS CARPIO	6	42.9	14250.0	78.3
WHITE BASS	MORONE CHRYSOPS	1	7.1	162.0	0.9
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	14.3	263.0	1.4
	TOTAL	14		18190.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 SEPTEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	23.1	2195.0	31.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	15.4	80.0	1.1
GOLDEYE	HIODON ALOSOIDES	2	15.4	351.0	5.0
CARP	CYPRINUS CARPIO	2	15.4	3675.0	51.9
WHITE BASS	MORONE CHRYSOPS	2	15.4	677.0	9.6
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	15.4	107.0	1.5
	TOTAL	13		7085.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 OCTOBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	2.9	36.0	0.3
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	2.9	195.0	1.8
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	2	5.7	382.0	3.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	14	40.0	1369.0	12.4
GOLDEYE	HIODON ALOSOIDES	3	8.6	330.0	3.0
CARP	CYPRINUS CARPIO	2	5.7	5750.0	51.9
RIVER CARPSUCKER	CARPIODES CARPIO	1	2.9	345.0	3.1
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	2.9	900.0	8.1
GOLDEN REDHORSE	MOXOSTOMA ERYTHRURUM	2	5.7	545.0	4.9
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	8	22.9	1231.0	11.1
	TOTAL	35		11083.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 NOVEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	16.7	220.0	12.0
GOLDEYE	HIODON ALOSOIDES	1	16.7	130.0	7.1
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	1	16.7	1300.0	70.9
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	3	50.0	183.0	10.0
	TOTAL	6		1833.0	

Appendix D.2 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 FEBRUARY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	19	55.9	1068.0	57.5
GOLDEYE	HIODON ALOSOIDES	7	20.6	494.0	26.6
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	8	23.5	294.0	15.8
	TOTAL	34		1856.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 MARCH 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	6	23.1	1896.0	42.4
GOLDEYE	HIODON ALOSOIDES	4	15.4	240.0	5.3
CARP	CYPRINUS CARPIO	2	7.7	192.0	4.3
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	3.8	278.0	6.2
YELLOW BULLHEAD	ICTALURUS NATALIS	1	3.8	136.0	3.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	2	7.7	952.0	21.2
WHITE BASS	MORONE CHRYSOPS	1	3.8	138.0	3.1
SAUGER	STIZOSTEDION CANADENSE	1	3.8	32.0	0.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	8	30.8	634.0	14.1
	TOTAL	26		4498.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 APRIL 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	2	3.1	175.0	2.8
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	11	17.2	1981.0	31.8
GIZZARD SHAD	DOROSOMA CEPEDIANUM	6	9.4	250.0	4.0
GOLDEYE	HIODON ALOSOIDES	5	7.8	369.0	5.9
CARP	CYPRINUS CARPIO	13	20.3	745.0	12.0
EMERALD SHINER	NOTROPIS ATHERINOIDES	1	1.6	1.0	LT 0.1
RIVER CARPSUCKER	CARPIODES CARPIO	1	1.6	39.0	0.6
QUILLBACK	CARPIODES CYPRINUS	1	1.6	23.0	0.4
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	4	6.3	76.0	1.2
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	3	4.7	136.0	2.2
WHITE BASS	MORONE CHRYSOPS	2	3.1	43.0	0.7
GREEN SUNFISH	LEPOMIS CYANELLUS	2	3.1	224.0	3.6
WARMOUTH	LEPOMIS GULOSUS	2	3.1	366.0	5.9
BLUEGILL	LEPOMIS MACROCHIRUS	4	6.3	427.0	6.9
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	2	3.1	27.0	0.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	5	7.8	1341.0	21.5
	TOTAL	64		6223.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 MAY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	11.1	130.0	10.7
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	2	22.2	362.0	29.7
GIZZARD SHAD	DOROSOMA CEPEDIANUM	4	44.4	40.0	3.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	22.2	686.0	56.3
	TOTAL	9		1218.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 JUNE 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	7.1	244.0	5.5
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	5	35.7	1710.0	38.9
GOLDEYE	HIODON ALOSOIDES	3	21.4	966.0	21.9
RIVER CARPSUCKER	CARPIODES CARPIO	1	7.1	782.0	17.8
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	4	28.6	699.0	15.9
	TOTAL	14		4401.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 JULY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	28.6	2098.0	29.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	4.8	258.0	3.6
GOLDEYE	HIODON ALOSOIDES	2	9.5	326.0	4.6
RIVER CARPSUCKER	CARPIODES CARPIO	1	4.8	108.0	1.5
CHANNEL CATFISH	ICTALURUS PUNCTATUS	3	14.3	2925.0	41.1
WHITE BASS	MORONE CHRYSOPS	4	19.0	864.0	12.1
BLUEGILL	LEPOMIS MACROCHIRUS	2	9.5	170.0	2.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	9.5	376.0	5.3
	TOTAL	21		7125.0	

Appendix D.2 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 AUGUST 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	2	6.3	333.0	2.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	18.8	2148.0	13.1
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	3.1	210.0	1.3
GOLDEYE	HIODON ALOSOIDES	4	12.5	611.0	3.7
CARP	CYPRINUS CARPIO	5	15.6	5955.0	36.4
RIVER CARPSUCKER	CARPIODES CARPIO	6	18.8	4411.0	27.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	3.1	750.0	4.6
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	3.1	478.0	2.9
WHITE CRAPPIE	POMOXIS ANNULARIS	1	3.1	210.0	1.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	5	15.6	1250.0	7.6
	TOTAL	32		16356.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 SEPTEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	1.0	26.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	6	6.1	3045.0	7.5
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	4	4.0	1163.0	2.9
GIZZARD SHAD	DOROSOMA CEPEDIANUM	57	57.6	13701.6	33.8
GOLDEYE	HIODON ALOSOIDES	1	1.0	77.0	0.2
CARP	CYPRINUS CARPIO	5	5.1	7543.0	18.6
RIVER CARPSUCKER	CARPIODES CARPIO	9	9.1	1865.0	4.6
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	3	3.0	7475.0	18.4
BLUE CATFISH	ICTALURUS FURCATUS	1	1.0	403.0	1.0
WHITE BASS	MORONE CHRYSOPS	1	1.0	200.0	0.5
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	1	1.0	203.0	0.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	10	10.1	4829.0	11.9
	TOTAL	99		40530.6	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3   OCTOBER 1985   PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	3	8.8	112.0	0.7
GIZZARD SHAD	DOROSOMA CEPEDIANUM	4	11.8	695.0	4.6
GOLDEYE	HIODON ALOSOIDES	3	8.8	560.0	3.7
CARP	CYPRINUS CARPIO	4	11.8	6150.0	40.9
RIVER CARPSUCKER	CARPIODES CARPIO	7	20.6	4980.0	33.1
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	2.9	550.0	3.7
GOLDEN REDHORSE	MOXOSTOMA ERYTHRURUM	2	5.9	222.0	1.5
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	2.9	480.0	3.2
WHITE BASS	MORONE CHRYSOPS	1	2.9	122.0	0.8
SAUGER	STIZOSTEDION CANADENSE	1	2.9	345.0	2.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	7	20.6	832.0	5.5
	TOTAL	34		15048.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 NOVEMBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	3	15.8	133.0	1.6
GOLDEYE	HIODON ALOSOIDES	4	21.1	726.0	8.8
CARP	CYPRINUS CARPIO	2	10.5	5050.0	61.2
RIVER CARPSUCKER	CARPIODES CARPIO	2	10.5	1070.0	13.0
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	5.3	302.0	3.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	7	36.8	968.0	11.7
	TOTAL	19		8249.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 JANUARY 1986

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	3	75.0	54.0	10.8
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	25.0	448.0	89.2
	TOTAL	4		502.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 FEBRUARY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	4	28.6	232.0	11.1
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	3	21.4	872.0	41.6
WHITE BASS	MORONE CHRYSOPS	1	7.1	388.0	18.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	6	42.9	606.0	28.9
	TOTAL	14		2098.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 MARCH 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	1.8	462.0	5.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	4	7.3	1079.0	13.2
GOLDEYE	HIODON ALOSOIDES	32	58.2	2910.0	35.5
RIVER CARPSUCKER	CARPIODES CARPIO	1	1.8	54.0	0.7
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	1.8	518.0	6.3
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	1.8	53.0	0.6
WHITE BASS	MORONE CHRYSOPS	3	5.5	925.0	11.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	12	21.8	2202.0	26.8
	TOTAL	55		8203.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 APRIL 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	3	10.0	2950.0	54.3
GIZZARD SHAD	DOROSOMA CEPEDIANUM	5	16.7	365.0	6.7
GOLDEYE	HIODON ALOSOIDES	12	40.0	1027.0	18.9
GREEN SUNFISH	LEPOMIS CYANELLUS	1	3.3	114.0	2.1
BLUEGILL	LEPOMIS MACROCHIRUS	2	6.7	299.0	5.5
WHITE CRAPPIE	POMOXIS ANNULARIS	2	6.7	405.0	7.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	5	16.7	270.0	5.0
	TOTAL	30		5430.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 MAY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	3	42.9	1611.0	60.6
CARP	CYPRINUS CARPIO	1	14.3	49.0	1.8
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	14.3	437.0	16.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	28.6	561.0	21.1
	TOTAL	7		2658.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 JUNE 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	2.5	13.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	2.5	100.0	0.4
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	10	25.0	3617.0	16.2
GIZZARD SHAD	DOROSOMA CEPEDIANUM	8	20.0	1471.0	6.6
GOLDEYE	HIODON ALOSOIDES	2	5.0	82.0	0.4
CARP	CYPRINUS CARPIO	6	15.0	7896.0	35.4
RIVER CARPSUCKER	CARPIODES CARPIO	7	17.5	6829.0	30.6
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	2.5	1050.0	4.7
WHITE BASS	MORONE CHRYSOPS	2	5.0	751.0	3.4
WHITE CRAPPIE	POMOXIS ANNULARIS	2	5.0	474.0	2.1
	TOTAL	40		22283.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 JULY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	5.9	1000.0	18.5
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	7	41.2	2552.0	46.4
GOLDEYE	HIODON ALOSOIDES	1	5.9	70.0	1.3
CARP	CYPRINUS CARPIO	1	5.9	483.0	8.8
RIVER CARPSUCKER	CARPIODES CARPIO	1	5.9	617.0	11.2
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	5.9	190.0	3.5
WHITE BASS	MORONE CHRYSOPS	1	5.9	60.0	1.1
BLUEGILL	LEPOMIS MACROCHIRUS	1	5.9	82.0	1.5
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	1	5.9	186.0	3.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	11.8	261.0	4.7
	TOTAL	17		5501.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 AUGUST 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	2	25.0	4365.0	49.7
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	2	25.0	1125.0	12.8
GOLDEYE	HIODON ALOSOIDES	2	25.0	690.0	7.9
CARP	CYPRINUS CARPIO	1	12.5	1450.0	16.5
BLUE CATFISH	ICTALURUS FURCATUS	1	12.5	1150.0	13.1
	TOTAL	8		8780.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 SEPTEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	4.3	25.0	0.5
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	13.0	1850.0	18.4
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	3	13.0	1062.0	10.5
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	4.3	460.0	4.6
GOLDEYE	HIODON ALOSOIDES	4	17.4	737.0	7.3
CARP	CYPRINUS CARPIO	2	8.7	1801.0	17.9
RIVER CARPSUCKER	CARPIODES CARPIO	3	13.0	2206.0	21.9
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	4.3	822.0	8.2
WHITE BASS	MORONE CHRYSOPS	1	4.3	214.0	2.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	4	17.4	900.0	8.9
	TOTAL	23		10077.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 OCTOBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	3.6	1574.0	7.3
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	1	1.2	296.0	1.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	66	78.6	12650.4	58.7
GOLDEYE	HIODON ALOSOIDES	3	3.6	488.0	2.3
RIVER CARPSUCKER	CARPIODES CARPIO	3	3.6	2300.0	10.7
BLUE CATFISH	ICTALURUS FURCATUS	3	3.6	2218.0	10.3
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	1.2	1050.0	4.9
WHITE CRAPPIE	POMOXIS ANNULARIS	1	1.2	237.0	1.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	3	3.6	752.0	3.5
	TOTAL	84		21565.4	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 NOVEMBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	33.3	240.0	31.8
GOLDEYE	HIODON ALOSOIDES	1	33.3	250.0	33.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	1	33.3	265.0	35.1
	TOTAL	3		755.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 JANUARY 1986 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	15	83.3	268.0	32.8
GOLDEYE	HIODON ALOSOIDES	1	5.6	120.0	14.7
EMERALD SHINER	NOTROPIS ATHERINOIDES	1	5.6	4.0	0.5
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	5.6	424.0	52.0
	TOTAL	18		816.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 FEBRUARY 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	5	50.0	796.0	22.8
CARP	CYPRINUS CARPIO	1	10.0	1725.0	49.4
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	10.0	652.0	18.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	3	30.0	318.0	9.1
	TOTAL	10		3491.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 MARCH 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	8	9.3	97.0	0.4
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	2	2.3	958.0	4.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	7	8.1	1742.0	7.9
GOLDEYE	HIODON ALOSOIDES	35	40.7	2452.0	11.1
CARP	CYPRINUS CARPIO	4	4.7	10250.0	46.5
RIVER CARPSUCKER	CARPIODES CARPIO	6	7.0	764.0	3.5
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	1.2	351.0	1.6
BLUE CATFISH	ICTALURUS FURCATUS	2	2.3	1461.0	6.6
WHITE BASS	MORONE CHRYSOPS	3	3.5	666.0	3.0
WHITE CRAPPIE	POMOXIS ANNULARIS	1	1.2	292.0	1.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	17	19.8	2988.0	13.6
	TOTAL	86		22021.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 APRIL 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	4	6.5	100.0	0.8
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	2	3.2	426.0	3.3
GIZZARD SHAD	DOROSOMA CEPEDIANUM	5	8.1	460.0	3.5
GOLDEYE	HIODON ALOSOIDES	29	46.8	4377.0	33.7
CARP	CYPRINUS CARPIO	3	4.8	5475.0	42.1
RIVER CARPSUCKER	CARPIODES CARPIO	1	1.6	21.0	0.2
WHITE BASS	MORONE CHRYSOPS	1	1.6	48.0	0.4
WHITE CRAPPIE	POMOXIS ANNULARIS	1	1.6	136.0	1.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	16	25.8	1955.0	15.0
	TOTAL	62		12998.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 MAY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	2	66.7	1257.0	54.5
RIVER CARPSUCKER	CARPIODES CARPIO	1	33.3	1051.0	45.5
	TOTAL	3		2308.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 JUNE 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	2	5.6	879.0	6.4
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	4	11.1	1449.0	10.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	16	44.4	3563.0	26.0
GOLDEYE	HIODON ALOSOIDES	5	13.9	558.0	4.1
CARP	CYPRINUS CARPIO	3	8.3	3975.0	29.0
RIVER CARPSUCKER	CARPIODES CARPIO	2	5.6	1322.0	9.6
WHITE BASS	MORONE CHRYSOPS	1	2.8	419.0	3.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	3	8.3	1564.0	11.4
	TOTAL	36		13729.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 JULY 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	1	12.5	638.0	9.2
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	12.5	123.0	1.8
GOLDEYE	HIODON ALOSOIDES	1	12.5	61.0	0.9
CARP	CYPRINUS CARPIO	1	12.5	3450.0	49.8
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	12.5	1800.0	26.0
WHITE CRAPPIE	POMOXIS ANNULARIS	1	12.5	298.0	4.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	25.0	551.0	8.0
	TOTAL	8		6921.0	

Appendix D.2 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 AUGUST 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	27.3	492.0	18.5
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	3	27.3	1176.0	44.3
GOLDEYE	HIODON ALOSOIDES	4	36.4	919.0	34.6
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	1	9.1	68.0	2.6
	TOTAL	11		2655.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 SEPTEMBER 1985 PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	3.8	270.0	3.4
GOLDEYE	HIODON ALOSOIDES	6	23.1	673.0	8.4
CARP	CYPRINUS CARPIO	1	3.8	900.0	11.2
RIVER CARPSUCKER	CARPIODES CARPIO	5	19.2	1804.0	22.4
CHANNEL CATFISH	ICTALURUS PUNCTATUS	2	7.7	1720.0	21.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	11	42.3	2691.0	33.4
	TOTAL	26		8058.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 OCTOBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	1.0	32.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	2	2.0	4320.0	12.4
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	1	1.0	271.0	0.8
GIZZARD SHAD	DOROSOMA CEPEDIANUM	87	88.8	18428.8	52.9
GOLDEYE	HIODON ALOSOIDES	2	2.0	704.0	2.0
CARP	CYPRINUS CARPIO	1	1.0	3400.0	9.8
GRASS CARP	CTENOPHARYNGODON IDELLA	1	1.0	4850.0	13.9
RIVER CARPSUCKER	CARPIODES CARPIO	1	1.0	705.0	2.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	1.0	1425.0	4.1
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	1.0	718.0	2.1
	TOTAL	98		34853.8	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 NOVEMBER 1985

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
PADDLEFISH	POLYODON SPATHULA	1	8.3	3200.0	40.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	16.7	705.0	8.9
GOLDEYE	HIODON ALOSOIDES	7	58.3	1339.0	16.9
MOONEYE	HIODON TERGISUS	1	8.3	80.0	1.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	8.3	2600.0	32.8
	TOTAL	12		7924.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 JANUARY 1986

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	5	100.0	78.0	00.0
	TOTAL	5		78.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 SPRING SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	0.2	8.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	5	1.1	1229.0	1.9
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	25	5.6	9740.0	15.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	120	26.8	9307.8	14.8
GOLDEYE	HIODON ALOSOIDES	72	16.1	6254.0	9.9
MOONEYE	HIODON TERGISUS	1	0.2	116.0	0.2
CARP	CYPRINUS CARPIO	9	2.0	13710.0	21.7
RIVER CARPSUCKER	CARPIODES CARPIO	3	0.7	800.0	1.3
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	0.2	718.0	1.1
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	1	0.2	2375.0	3.8
BLACK BULLHEAD	ICTALURUS MELAS	1	0.2	552.0	0.9
CHANNEL CATFISH	ICTALURUS PUNCTATUS	5	1.1	1141.0	1.8
WHITE BASS	MORONE CHRYSOPS	11	2.5	1442.0	2.3
BLUEGILL	LEPOMIS MACROCHIRUS	5	1.1	308.0	0.5
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	2	0.4	1428.0	2.3
WHITE CRAPPIE	POMOXIS ANNULARIS	3	0.7	1117.0	1.8
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	183	40.8	12803.6	20.3
	TOTAL	448		63049.4	

SURVFY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 SUMMER SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	1.0	14.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	6	5.9	1220.0	4.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	24	23.8	7392.0	24.1
AMERICAN EEL	ANGUILLA ROSTRATA	1	1.0	480.0	1.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	2.0	640.0	2.1
GOLDEYE	HIODON ALOSOIDES	26	25.7	3517.0	11.5
CARP	CYPRINUS CARPIO	5	5.0	7212.0	23.5
RIVER CARPSUCKER	CARPIODES CARPIO	3	3.0	2152.0	7.0
BLUE CATFISH	ICTALURUS FURCATUS	1	1.0	316.0	1.0
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	1.0	568.0	1.9
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	5	5.0	3040.0	9.9
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	25	24.8	3886.0	12.7
SPOTTED BASS	MICROPTERUS PUNCTULATUS	1	1.0	192.0	0.6
	TOTAL	101		30629.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 FALL SEASON PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	3	2.8	67.0	0.2
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	7	6.4	2901.0	9.7
GIZZARD SHAD	DOROSOMA CEPEDIANUM	7	6.4	990.0	3.3
GOLDEYE	HIODON ALOSOIDES	23	21.1	1501.0	5.0
MOONEYE	HIODON TERGISUS	1	0.9	138.0	0.5
CARP	CYPRINUS CARPIO	7	6.4	10272.0	34.5
RIVER CARPSUCKER	CARPIODES CARPIO	3	2.8	2151.0	7.2
BLUE CATFISH	ICTALURUS FURCATUS	2	1.8	503.0	1.7
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	0.9	116.0	0.4
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	0.9	300.0	1.0
WHITE BASS	MORONE CHRYSOPS	2	1.8	263.0	0.9
SAUGER	STIZOSTEDION CANADENSE	3	2.8	1124.0	3.8
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	49	45.0	9446.0	31.7
	TOTAL	109		29772.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 1 WINTER SEASON PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	8.7	88.0	1.7
MOONEYE	HIODON TERGISUS	1	4.3	32.0	0.6
CARP	CYPRINUS CARPIO	1	4.3	1625.0	31.5
HIGHFIN CARPSUCKER	CARPIODES VELIFER	1	4.3	1000.0	19.4
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	4.3	475.0	9.2
WHITE BASS	MORONE CHRYSOPS	1	4.3	346.0	6.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	16	69.6	1596.0	30.9
	TOTAL	23		5162.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 SPRING SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	4.4	2810.0	15.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	37	27.2	2251.0	12.0
GOLDEYE	HIODON ALOSOIDES	13	9.6	1854.0	9.9
CARP	CYPRINUS CARPIO	25	18.4	4851.0	26.0
RIVER CARPSUCKER	CARPIODES CARPIO	15	11.0	1538.0	8.2
BLACK BULLHEAD	ICTALURUS MELAS	1	0.7	52.0	0.3
WHITE BASS	MORONE CHRYSOPS	1	0.7	49.0	0.3
GREEN SUNFISH	LEPOMIS CYANELLUS	1	0.7	47.0	0.3
BLUEGILL	LEPOMIS MACROCHIRUS	1	0.7	152.0	0.8
LARGEMOUTH BASS	MICROPTERUS SALMOIDES	1	0.7	950.0	5.1
WHITE CRAPPIE	POMOXIS ANNULARIS	2	1.5	717.0	3.8
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	33	24.3	3422.0	18.3
	TOTAL	136		18693.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 SUMMER SEASON PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	2	5.6	858.0	3.7
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	22	61.1	7719.0	32.9
CARP	CYPRINUS CARPIO	6	16.7	14250.0	60.8
WHITE BASS	MORONE CHRYSOPS	1	2.8	162.0	0.7
BLUEGILL	LEPOMIS MACROCHIRUS	1	2.8	34.0	0.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	4	11.1	425.0	1.8
	TOTAL	36		23448.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 FALL SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	1.9	36.0	0.5
LONGNOSE GAR	LEPISOSTEUS OSSEUS	4	7.4	2390.0	11.9
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	2	3.7	382.0	1.9
GIZZARD SHAD	DOROSOMA CEPEDIANUM	17	31.5	1669.0	8.3
GOLDEYE	HIODON ALOSOIDES	6	11.1	811.0	4.1
CARP	CYPRINUS CARPIO	4	7.4	9425.0	47.1
RIVER CARPSUCKER	CARPIODES CARPIO	1	1.9	345.0	1.7
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	1.9	900.0	4.5
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	1	1.9	1300.0	6.5
GOLDEN REDHORSE	MOXOSTOMA ERYTHRURUM	2	3.7	545.0	2.7
WHITE BASS	MORONE CHRYSOPS	2	3.7	677.0	3.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	13	24.1	1521.0	7.6
	TOTAL	54		20001.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 2 WINTER SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	1	20.0	10.0	0.9
GOLDEYE	HIODON ALOSOIDES	2	40.0	92.0	7.9
RIVER CARPSUCKER	CARPIODES CARPIO	2	40.0	1068.0	91.3
	TOTAL	5		1170.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 SPRING SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	3.0	305.0	2.6
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	13	13.1	2343.0	19.6
GIZZARD SHAD	DOROSOMA CEPEDIANUM	16	16.2	2186.0	18.3
GOLDEYE	HIODON ALOSOIDES	9	9.1	609.0	5.1
CARP	CYPRINUS CARPIO	15	15.2	937.0	7.8
EMERALD SHINER	NOTROPIS ATHERINOIDES	1	1.0	1.0	LT 0.1
RIVER CARPSUCKER	CARPIODES CARPIO	1	1.0	39.0	0.3
QUILLBACK	CARPIODES CYPRINUS	1	1.0	23.0	0.2
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	4	4.0	76.0	0.6
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	3	3.0	136.0	1.1
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	1.0	278.0	2.3
YELLOW BULLHEAD	ICTALURUS NATALIS	1	1.0	136.0	1.1
CHANNEL CATFISH	ICTALURUS PUNCTATUS	2	2.0	952.0	8.0
WHITE BASS	MORONE CHRYSOPS	3	3.0	181.0	1.5
GREEN SUNFISH	LEPOMIS CYANELLUS	2	2.0	224.0	1.9
WARMOUTH	LEPOMIS GULOSUS	2	2.0	366.0	3.1
BLUEGILL	LEPOMIS MACROCHIRUS	4	4.0	427.0	3.6
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	2	2.0	27.0	0.2
SAUGER	STIZOSTEDION CANADENSE	1	1.0	32.0	0.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	15	15.2	2661.0	22.3
	TOTAL	99		11939.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 SUMMER SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	4.5	577.0	2.1
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	17	25.4	5956.0	21.4
GIZZARD SHAD	DOROSOMA CEPEDIANUM	2	3.0	468.0	1.7
GOLDEYE	HIODON ALOSOIDES	9	13.4	1903.0	6.8
CARP	CYPRINUS CARPIO	5	7.5	5955.0	21.4
RIVER CARPSUCKER	CARPIODES CARPIO	8	11.9	5301.0	19.0
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	1.5	750.0	2.7
CHANNEL CATFISH	ICTALURUS PUNCTATUS	4	6.0	3403.0	12.2
WHITE BASS	MORONE CHRYSOPS	4	6.0	864.0	3.1
BLUEGILL	LEPOMIS MACROCHIRUS	2	3.0	170.0	0.6
WHITE CRAPPIE	POMOXIS ANNULARIS	1	1.5	210.0	0.8
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	11	16.4	2325.0	8.3
	TOTAL	67		27882.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 FALL SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	7	4.6	271.0	0.4
LONGNOSE GAR	LEPISOSTEUS OSSEUS	6	3.9	3045.0	4.8
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	4	2.6	1163.0	1.8
GIZZARD SHAD	DOROSOMA CEPEDIANUM	61	40.1	14396.6	22.6
GOLDEYE	HIODON ALOSOIDES	8	5.3	1363.0	2.1
CARP	CYPRINUS CARPIO	11	7.2	18743.0	29.4
RIVER CARPSUCKER	CARPIODES CARPIO	18	11.8	7915.0	12.4
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	0.7	550.0	0.9
BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	3	2.0	7475.0	11.7
GOLDEN REDHORSE	MOXOSTOMA ERYTHRURUM	2	1.3	222.0	0.3
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	2	1.3	782.0	1.2
BLUE CATFISH	ICTALURUS FURCATUS	1	0.7	403.0	0.6
WHITE BASS	MORONE CHRYSOPS	2	1.3	322.0	0.5
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	1	0.7	203.0	0.3
SAUGER	STIZOSTEDION CANADENSE	1	0.7	345.0	0.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	24	15.8	6629.0	10.4
	TOTAL	152		63827.6	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 3 WINTER SEASON PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	22	57.9	1122.0	47.6
GOLDEYE	HIODON ALOSOIDES	7	18.4	494.0	20.9
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	2.6	448.0	19.0
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	8	21.1	294.0	12.5
	TOTAL	38		2358.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 SPRING SEASON PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
LONGNOSE GAR	LEPISOSTEUS OSSEUS	1	1.1	462.0	2.8
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	6.5	4561.0	28.0
GIZZARD SHAD	DOROSOMA CEPEDIANUM	9	9.8	1444.0	8.9
GOLDEYE	HIODON ALOSOIDES	44	47.8	3937.0	24.2
CARP	CYPRINUS CARPIO	1	1.1	49.0	0.3
RIVER CARPSUCKER	CARPIODES CARPIO	1	1.1	54.0	0.3
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	1	1.1	518.0	3.2
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	1.1	53.0	0.3
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	1.1	437.0	2.7
WHITE BASS	MORONE CHRYSOPS	3	3.3	925.0	5.7
GREEN SUNFISH	LEPOMIS CYANELLUS	1	1.1	114.0	0.7
BLUEGILL	LEPOMIS MACROCHIRUS	2	2.2	299.0	1.8
WHITE CRAPPIE	POMOXIS ANNULARIS	2	2.2	405.0	2.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	19	20.7	3033.0	18.6
	TOTAL	92		16291.0	

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Appendix D.3 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 SUMMER SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	1.5	13.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	4	6.2	5465.0	14.9
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	19	29.2	7294.0	19.9
GIZZARD SHAD	DOROSOMA CEPEDIANUM	8	12.3	1471.0	4.0
GOLDEYE	HIODON ALOSOIDES	5	7.7	842.0	2.3
CARP	CYPRINUS CARPIO	8	12.3	9829.0	26.9
RIVER CARPSUCKER	CARPIODES CARPIO	8	12.3	7446.0	20.4
BLUE CATFISH	ICTALURUS FURCATUS	1	1.5	1150.0	3.1
CHANNEL CATFISH	ICTALURUS PUNCTATUS	1	1.5	1050.0	2.9
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	1.5	190.0	0.5
WHITE BASS	MORONE CHRYSOPS	3	4.6	811.0	2.2
BLUEGILL	LEPOMIS MACROCHIRUS	1	1.5	82.0	0.2
WHITE CRAPPIE	POMOXIS ANNULARIS	2	3.1	474.0	1.3
BLACK CRAPPIE	POMOXIS NIGROMACULATUS	1	1.5	186.0	0.5
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	2	3.1	261.0	0.7
	TOTAL	65		36564.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 FALL SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	0.9	25.0	LT 0.1
LONGNOSE GAR	LEPISOSTEUS OSSEUS	6	5.5	3424.0	10.6
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	4	3.6	1358.0	4.2
GIZZARD SHAD	DOROSOMA CEPEDIANUM	68	61.8	13350.4	41.2
GOLDEYE	HIODON ALOSOIDES	8	7.3	1475.0	4.6
CARP	CYPRINUS CARPIO	2	1.8	1801.0	5.6
RIVER CARPSUCKER	CARPIODES CARPIO	6	5.5	4506.0	13.9
BLUE CATFISH	ICTALURUS FURCATUS	3	2.7	2218.0	6.8
CHANNEL CATFISH	ICTALURUS PUNCTATUS	2	1.8	1872.0	5.8
WHITE BASS	MORONE CHRYSOPS	1	0.9	214.0	0.7
WHITE CRAPPIE	POMOXIS ANNULARIS	1	0.9	237.0	0.7
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	8	7.3	1917.0	5.9
	TOTAL	110		32397.4	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 4 WINTER SEASON

PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	19	59.4	500.0	17.5
GOLDEYE	HIODON ALOSOIDES	1	3.1	120.0	4.1
EMERALD SHINER	NOTROPIS ATHERINOIDES	1	3.1	4.0	0.1
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	3	9.4	872.0	29.9
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	3.1	424.0	14.6
WHITE BASS	MORONE CHRYSOPS	1	3.1	388.0	13.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	6	18.8	606.0	20.8
	TOTAL	32		2914.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 SPRING SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	12	7.9	197.0	0.5
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	6	4.0	2641.0	7.1
GIZZARD SHAD	DOROSOMA CEPEDIANUM	12	7.9	2202.0	5.9
GOLDEYE	HIODON ALOSOIDES	64	42.4	6829.0	18.3
CARP	CYPRINUS CARPIO	7	4.6	15725.0	42.1
RIVER CARPSUCKER	CARPIODES CARPIO	8	5.3	1836.0	4.9
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	0.7	351.0	0.9
BLUE CATFISH	ICTALURUS FURCATUS	2	1.3	1461.0	3.9
WHITE BASS	MORONE CHRYSOPS	4	2.6	714.0	1.9
WHITE CRAPPIE	POMOXIS ANNULARIS	2	1.3	428.0	1.1
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	33	21.9	4943.0	13.2
	TOTAL	151		37327.0	

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Appendix D.3 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 SUMMER SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
SHOVELNOSE STURGEON	SCAPHIRHYNCHUS PLATORYNCHUS	1	1.8	638.0	2.7
LONGNOSE GAR	LEPISOSTEUS OSSEUS	6	10.9	1494.0	6.4
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	7	12.7	2625.0	11.3
GIZZARD SHAD	DOROSOMA CEPEDIANUM	16	29.1	3563.0	15.3
GOLDEYE	HIODON ALOSOIDES	10	18.2	1538.0	6.6
CARP	CYPRINUS CARPIO	4	7.3	7425.0	31.9
RIVER CARPSUCKER	CARPIODES CARPIO	2	3.6	1322.0	5.7
FLATHEAD CATFISH	PYLODICTIS OLIVARIS	1	1.8	1800.0	7.7
WHITE BASS	MORONE CHRYSOPS	1	1.8	419.0	1.8
WHITE CRAPPIE	POMOXIS ANNULARIS	1	1.8	298.0	1.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	6	10.9	2183.0	9.4
	TOTAL	55		23305.0	

Appendix D.3 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 FALL SEASON PAGE 1

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
CHESTNUT LAMPREY	ICHTHYOMYZON CASTANEUS	1	0.7	32.0	LT 0.1
PADDLEFISH	POLYODON SPATHULA	1	0.7	3200.0	6.3
LONGNOSE GAR	LEPISOSTEUS OSSEUS	3	2.2	4590.0	9.0
SHORTNOSE GAR	LEPISOSTEUS PLATOSTOMUS	1	0.7	271.0	0.5
GIZZARD SHAD	DOROSOMA CEPEDIANUM	89	65.4	19133.8	37.6
GOLDEYE	HIODON ALOSOIDES	15	11.0	2716.0	5.3
MOONEYE	HIODON TERGISUS	1	0.7	80.0	0.2
CARP	CYPRINUS CARPIO	2	1.5	4300.0	8.5
GRASS CARP	CTENOPHARYNGODON IDELLA	1	0.7	4850.0	9.5
RIVER CARPSUCKER	CARPIODES CARPIO	6	4.4	2509.0	4.9
SMALLMOUTH BUFFALO	ICTIOBUS BUBALUS	2	1.5	4025.0	7.9
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	0.7	718.0	1.4
CHANNEL CATFISH	ICTALURUS PUNCTATUS	2	1.5	1720.0	3.4
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	11	8.1	2691.0	5.3
	TOTAL	136		50835.8	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

RELATIVE(%) ABUNDANCE AND WEIGHTS -- FROM 2/21/85 TO 1/13/86

ELECTROFISHING

SITE NO. 5 WINTER SEASON

COMMON NAME	SCIENTIFIC NAME	NUMBER	RELATIVE ABUNDANCE	TOTAL WT(G)	RELATIVE WEIGHT
GIZZARD SHAD	DOROSOMA CEPEDIANUM	10	66.7	874.0	24.5
CARP	CYPRINUS CARPIO	1	6.7	1725.0	48.3
SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	1	6.7	652.0	18.3
FRESHWATER DRUM	APLODINOTUS GRUNNIENS	3	20.0	318.0	8.9
	TOTAL	15		3569.0	

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- CHESTNUT LAMPREY
ICHTHYOMYZON CASTANEUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	5	208.	175 TO 243	17.8	8.0 TO 27.0	LT 0.1	40.0
SITE 2	1	242.	242 TO 242	36.0	36.0 TO 36.0	LT 0.1	10.0
SITE 3	7	261.	210 TO 311	38.7	26.0 TO 60.0	0.3	27.3
SITE 4	2	191.	170 TO 211	19.0	13.0 TO 25.0	LT 0.1	18.2
SITE 5	13	190.	141 TO 308	17.6	5.0 TO 80.0	0.2	27.3
ALL SITES	28	213.	141 TO 311	23.7	5.0 TO 80.0	0.1	22.6

SPECIES -- SHOVELNOSE STURGEON
SCAPHIRHYNCHUS PLATORYNCHUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	NONE						
SITE 3	NONE						
SITE 4	NONE						
SITE 5	1	671.	671 TO 671	638.0	638.0 TO 638.0	0.6	9.1
ALL SITES	1	671.	671 TO 671	638.0	638.0 TO 638.0	0.1	1.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- PADDLEFISH
POLYODON SPATHULA

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	NONE						
SITE 3	NONE						
SITE 4	NONE						
SITE 5	1	142.	142 TO 142	3200.0	3200.0 TO 3200.0	2.8	9.1
ALL SITES	1	142.	142 TO 142	3200.0	3200.0 TO 3200.0	0.6	1.9

SPECIES -- LONGNOSE GAR
LEPISOSTEUS OSSEUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	11	478.	336 TO 594	222.6	65.0 TO 390.0	1.9	40.0
SITE 2	6	633.	450 TO 795	541.3	195.0 TO 1050.0	5.1	30.0
SITE 3	12	502.	346 TO 814	327.3	66.0 TO 1300.0	3.7	45.5
SITE 4	11	638.	394 TO 1130	850.1	100.0 TO 4250.0	10.6	54.5
SITE 5	9	582.	404 TO 1101	676.0	122.0 TO 4000.0	5.3	45.5
ALL SITES	49	558.	336 TO 1130	511.4	65.0 TO 4250.0	5.0	43.4

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- SHORTNOSE GAR
LEPISOSTEUS PLATOSTOMUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	56	463.	331 TO 781	357.7	110.0 TO 1900.0	15.6	80.0
SITE 2	30	471.	347 TO 674	363.7	106.0 TO 1300.0	17.2	50.0
SITE 3	34	444.	321 TO 606	278.3	104.0 TO 700.0	8.9	54.5
SITE 4	29	505.	339 TO 704	455.6	98.0 TO 1100.0	15.0	63.6
SITE 5	14	496.	363 TO 600	395.5	130.0 TO 771.0	4.8	54.5
ALL SITES	163	471.	321 TO 781	362.9	98.0 TO 1900.0	11.8	60.4

SPECIES -- AMERICAN EEL
ANGUILLA ROSTRATA

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	1	240.	240 TO 240	480.0	480.0 TO 480.0	0.4	10.0
SITE 2	NONE						
SITE 3	NONE						
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	1	240.	240 TO 240	480.0	480.0 TO 480.0	LT 0.1	1.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- GIZZARD SHAD
DOROSOMA CEPEDIANUM

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	131	160.	73 TO 368	84.2	3.0 TO 510.0	8.6	70.0
SITE 2	55	162.	72 TO 335	71.5	4.0 TO 305.0	6.2	70.0
SITE 3	101	240.	80 TO 364	179.9	4.0 TO 455.0	17.1	81.8
SITE 4	104	239.	87 TO 373	161.2	4.0 TO 515.0	19.0	72.7
SITE 5	127	261.	88 TO 380	202.9	6.0 TO 500.0	22.4	63.6
ALL SITES	518	216.	72 TO 380	146.1	3.0 TO 515.0	15.1	71.7

SPECIES -- GOLDEYE
HIODON ALOSOIDES

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	121	207.	75 TO 409	93.2	4.0 TO 610.0	8.8	80.0
SITE 2	21	231.	165 TO 394	131.3	38.0 TO 518.0	4.4	60.0
SITE 3	33	236.	140 TO 393	132.4	22.0 TO 430.0	4.1	81.8
SITE 4	58	217.	129 TO 374	109.9	21.0 TO 445.0	7.2	81.8
SITE 5	89	226.	112 TO 416	124.5	15.0 TO 532.0	9.6	72.7
ALL SITES	322	219.	75 TO 416	111.4	4.0 TO 610.0	7.2	75.5

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- MOONEYE
HIODON TERGISUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	3	218.	152 TO 262	95.3	32.0 TO 138.0	0.2	30.0
SITE 2	NONE						
SITE 3	NONE						
SITE 4	NONE						
SITE 5	1	205.	205 TO 205	80.0	80.0 TO 80.0	LT 0.1	9.1
ALL SITES	4	215.	152 TO 262	91.5	32.0 TO 138.0	LT 0.1	7.5

SPECIES -- CARP
CYPRINUS CARPIO

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	22	456.	121 TO 6[illegible]7	1491.8	22.0 TO 3200.0	25.5	80.0
SITE 2	35	301.	129 TO 686	815.0	28.0 TO 3900.0	45.1	60.0
SITE 3	31	319.	139 TO 636	826.9	39.0 TO 3400.0	24.2	54.5
SITE 4	11	397.	149 TO 589	1061.7	49.0 TO 2650.0	13.2	45.5
SITE 5	14	528.	356 TO 615	2083.9	550.0 TO 3450.0	25.4	63.6
ALL SITES	113	373.	121 TO 686	1131.3	22.0 TO 3900.0	25.5	60.4

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- GRASS CARP
CTENOPHARYNGODON IDELLA

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	NONE						
SITE 3	NONE						
SITE 4	NONE						
SITE 5	1	750.	750 TO 750	4850.0	4850.0 TO 4850.0	4.2	9.1
ALL SITES	1	750.	750 TO 750	4850.0	4850.0 TO 4850.0	1.0	1.9

SPECIES -- EMERALD SHINER
NOTROPIS ATHERINOIDES

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	NONE						
SITE 3	1	74.	74 TO 74	1.0	1.0 TO 1.0	LT 0.1	9.1
SITE 4	1	80.	80 TO 80	4.0	4.0 TO 4.0	LT 0.1	9.1
SITE 5	NONE						
ALL SITES	2	77.	74 TO 80	2.5	1.0 TO 4.0	LT 0.1	3.8

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- RIVER CARPSUCKER
CARPIODES CARPIO

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	9	330.	190 TO 421	567.0	78.0 TO 1000.0	4.0	40.0
SITE 2	18	216.	74 TO 358	163.9	4.0 TO 608.0	4.7	40.0
SITE 3	27	305.	146 TO 461	490.9	39.0 TO 1400.0	12.5	63.6
SITE 4	15	385.	168 TO 475	800.4	54.0 TO 1200.0	13.6	45.5
SITE 5	16	264.	114 TO 449	354.2	17.0 TO 1200.0	4.9	54.5
ALL SITES	85	295.	74 TO 475	458.6	4.0 TO 1400.0	7.8	49.1

SPECIES -- QUILLBACK
CARPIODES CYPRINUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	NONE						
SITE 3	1	125.	125 TO 125	23.0	23.0 TO 23.0	LT 0.1	9.1
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	1	125.	125 TO 125	23.0	23.0 TO 23.0	LT 0.1	1.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- HIGHFIN CARPSUCKER
CARPIODES VELIFER

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	1	432.	432 TO 432	1000.0	1000.0 TO 1000.0	0.8	10.0
SITE 2	NONE						
SITE 3	NONE						
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	1	432.	432 TO 432	1000.0	1000.0 TO 1000.0	0.2	1.9

SPECIES -- SMALLMOUTH BUFFALO
ICTIOBUS BUBALUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	1	365.	365 TO 365	718.0	718.0 TO 718.0	0.6	10.0
SITE 2	1	382.	382 TO 382	900.0	900.0 TO 900.0	1.4	10.0
SITE 3	6	197.	108 TO 379	229.3	15.0 TO 750.0	1.3	27.3
SITE 4	1	344.	344 TO 344	518.0	518.0 TO 518.0	0.6	9.1
SITE 5	2	498.	450 TO 545	2012.5	1425.0 TO 2600.0	3.5	18.2
ALL SITES	11	297.	108 TO 545	685.2	15.0 TO 2600.0	1.5	15.1

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- BIGMOUTH BUFFALO
ICTIOBUS CYPRINELLUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	1	542.	542 TO 542	2375.0	2375.0 TO 2375.0	1.8	10.0
SITE 2	1	442.	442 TO 442	1300.0	1300.0 TO 1300.0	2.1	10.0
SITE 3	6	339.	116 TO 603	1268.5	19.0 TO 3550.0	7.2	18.2
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	8	377.	116 TO 603	1410.8	19.0 TO 3550.0	2.3	7.5

SPECIES -- GOLDEN REDHORSE
MOXOSTOMA ERYTHRURUM

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	2	283.	219 TO 346	272.5	120.0 TO 425.0	0.9	10.0
SITE 3	2	203.	190 TO 215	111.0	92.0 TO 130.0	0.2	9.1
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	4	243.	190 TO 346	191.8	92.0 TO 425.0	0.2	3.8

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- SHORTHEAD REDHORSE
MOXOSTOMA MACROLEPIDOTUM

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	1	373.	373 TO 373	475.0	475.0 TO 475.0	0.4	10.0
SITE 2	NONE						
SITE 3	4	333.	310 TO 356	377.0	278.0 TO 480.0	1.4	36.4
SITE 4	3	299.	272 TO 318	290.7	232.0 TO 342.0	1.0	9.1
SITE 5	3	375.	320 TO 425	573.7	351.0 TO 718.0	1.5	27.3
ALL SITES	11	339.	272 TO 425	416.0	232.0 TO 718.0	0.9	17.0

SPECIES -- BLUE CATFISH
ICTALURUS FURCATUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	3	319.	2[illegible]2 TO 355	273.0	120.0 TO 383.0	0.6	30.0
SITE 2	NONE						
SITE 3	1	382.	382 TO 382	403.0	403.0 TO 403.0	0.4	9.1
SITE 4	4	440.	331 TO 538	842.0	268.0 TO 1150.0	3.8	18.2
SITE 5	2	397.	298 TO 495	730.5	261.0 TO 1200.0	1.3	9.1
ALL SITES	10	389.	262 TO 538	605.1	120.0 TO 1200.0	1.2	13.2

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- BLACK BULLHEAD
ICTALURUS MELAS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	1	319.	319 TO 319	552.0	552.0 TO 552.0	0.4	10.0
SITE 2	1	160.	160 TO 160	52.0	52.0 TO 52.0	LT 0.1	10.0
SITE 3	NONE						
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	2	240.	160 TO 319	302.0	52.0 TO 552.0	0.1	3.8

SPECIES -- YELLOW BULLHEAD
ICTALURUS NATALIS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	NONE						
SITE 3	1	224.	224 TO 224	136.0	136.0 TO 136.0	0.1	9.1
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	1	224.	224 TO 224	136.0	136.0 TO 136.0	LT 0.1	1.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- CHANNEL CATFISH
ICTALURUS PUNCTATUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	7	280.	1[illegible]4 TO 416	260.7	45.0 TO 648.0	1.4	40.0
SITE 2	NONE						
SITE 3	6	416.	242 TO 492	725.8	132.0 TO 1100.0	4.1	27.3
SITE 4	4	400.	184 TO 476	743.8	53.0 TO 1050.0	3.4	36.4
SITE 5	2	427.	295 TO 559	860.0	170.0 TO 1550.0	1.5	9.1
ALL SITES	19	364.	174 TO 559	572.4	45.0 TO 1550.0	2.2	22.6

SPECIES -- FLATHEAD CATFISH
PYLODICTIS OLIVARIS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	6	352.	282 TO 565	556.7	198.0 TO 2000.0	2.6	30.0
SITE 2	NONE						
SITE 3	NONE						
SITE 4	3	329.	275 TO 357	350.3	190.0 TO 437.0	1.2	27.3
SITE 5	1	580.	580 TO 580	1800.0	1800.0 TO 1800.0	1.6	9.1
ALL SITES	10	368.	275 TO 580	619.1	190.0 TO 2000.0	1.2	13.2

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- WHITE BASS
MORONE CHRYSOPS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	14	220.	118 TO 300	146.5	19.0 TO 346.0	1.6	40.0
SITE 2	4	266.	166 TO 331	222.0	49.0 TO 398.0	1.4	30.0
SITE 3	9	229.	122 TO 316	151.9	20.0 TO 328.0	1.3	45.5
SITE 4	8	270.	123 TO 341	292.3	26.0 TO 534.0	2.7	45.5
SITE 5	5	250.	162 TO 324	226.6	48.0 TO 419.0	1.0	27.3
ALL SITES	40	241.	118 TO 341	194.4	19.0 TO 534.0	1.6	37.7

SPECIES -- GREEN SUNFISH
LEPOMIS CYANELLUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	1	135.	135 TO 135	47.0	47.0 TO 47.0	LT 0.1	10.0
SITE 3	2	174.	170 TO 178	112.0	101.0 TO 123.0	0.2	9.1
SITE 4	1	181.	181 TO 181	114.0	114.0 TO 114.0	0.1	9.1
SITE 5	NONE						
ALL SITES	4	166.	135 TO 181	96.3	47.0 TO 123.0	LT 0.1	5.7

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- WARMOUTH
LEPOMIS GULOSUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	NONE						
SITE 3	2	195.	182 TO 207	183.0	157.0 TO 209.0	0.3	9.1
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	2	195.	182 TO 207	183.0	157.0 TO 209.0	LT 0.1	1.9

SPECIES -- BLUEGILL
LEPOMIS MACROCHIRUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	5	135.	85 TO 180	61.6	13.0 TO 138.0	0.2	30.0
SITE 2	2	163.	135 TO 191	93.0	34.0 TO 152.0	0.3	20.0
SITE 3	6	152.	92 TO 204	99.5	13.0 TO 198.0	0.6	18.2
SITE 4	3	170.	144 TO 200	127.0	82.0 TO 199.0	0.4	18.2
SITE 5	NONE						
ALL SITES	16	152.	85 TO 204	92.0	13.0 TO 199.0	0.3	17.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- LARGEMOUTH BASS
MICROPTERUS SALMOIDES

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	2	355.	351 TO 358	714.0	711.0 TO 717.0	1.1	20.0
SITE 2	1	385.	385 TO 385	950.0	950.0 TO 950.0	1.5	10.0
SITE 3	NONE						
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	3	365.	351 TO 385	792.7	711.0 TO 950.0	0.5	5.7

SPECIES -- WHITE CRAPPIE
POMOXIS ANNULARIS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	3	283.	272 TO 294	372.3	314.0 TO 417.0	0.9	30.0
SITE 2	2	287.	256 TO 317	358.5	236.0 TO 481.0	1.1	20.0
SITE 3	1	246.	246 TO 246	210.0	210.0 TO 210.0	0.2	9.1
SITE 4	5	253.	231 TO 279	223.2	162.0 TO 305.0	1.3	27.3
SITE 5	3	257.	220 TO 282	242.0	136.0 TO 298.0	0.6	27.3
ALL SITES	14	265.	220 TO 317	277.6	136.0 TO 481.0	0.8	22.6

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- BLACK CRAPPIE
POMOXIS NIGROMACULATUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	NONE						
SITE 2	NONE						
SITE 3	3	145.	88 TO 245	76.7	11.0 TO 203.0	0.2	18.2
SITE 4	1	234.	234 TO 234	186.0	186.0 TO 186.0	0.2	9.1
SITE 5	NONE						
ALL SITES	4	167.	88 TO 245	104.0	11.0 TO 203.0	LT 0.1	5.7

SPECIES -- SAUGER
STIZOSTEDION CANADENSE

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	3	348.	270 TO 480	374.7	148.0 TO 800.0	0.9	10.0
SITE 2	NONE						
SITE 3	2	261.	168 TO 354	188.5	32.0 TO 345.0	0.4	18.2
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	5	313.	168 TO 480	300.2	32.0 TO 800.0	0.3	5.7

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

SPECIES -- FRESHWATER DRUM
APLODINOTUS GRUNNIENS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	273	185.	98 TO 425	101.6	6.0 TO 1150.0	21.6	90.0
SITE 2	50	201.	102 TO 356	107.4	11.0 TO 583.0	8.5	90.0
SITE 3	58	230.	86 TO 457	205.3	10.0 TO 1175.0	11.2	90.9
SITE 4	35	228.	120 TO 360	166.2	15.0 TO 579.0	6.6	72.7
SITE 5	53	222.	93 TO 409	191.2	8.0 TO 925.0	8.8	63.6
ALL SITES	469	199.	86 TO 457	130.0	6.0 TO 1175.0	12.2	81.1

SPECIES -- SPOTTED BASS
MICROPTERUS PUNCTULATUS

	TOTAL NUM.	MEAN TL (MM)	TL RANGE (MM)	MEAN WT. (G)	WT. RANGE (G)	% OF TOTAL BIOMASS	% OCCURRENCE
SITE 1	1	252.	252 TO 252	192.0	192.0 TO 192.0	0.1	10.0
SITE 2	NONE						
SITE 3	NONE						
SITE 4	NONE						
SITE 5	NONE						
ALL SITES	1	252.	252 TO 252	192.0	192.0 TO 192.0	LT 0.1	1.9

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIES

SITE NO. 1

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	14.3	0.0	0.0	28.6	0.0	14.3	42.9	0.0
MARCH 1985	0.0	0.0	8.3	33.3	0.0	0.0	58.3	0.0
APRIL 1985	0.0	0.0	0.0	28.6	0.0	0.0	71.4	0.0
MAY 1985	0.0	0.0	0.0	22.2	0.0	0.0	77.8	0.0
JUNE 1985	0.0	0.0	0.0	75.0	0.0	0.0	25.0	0.0
JULY 1985	0.0	0.0	10.0	40.0	10.0	0.0	40.0	0.0
AUGUST 1985	0.0	0.0	0.0	42.9	0.0	0.0	57.1	0.0
SEPTEMBER 1985	0.0	0.0	12.5	50.0	0.0	0.0	37.5	0.0
OCTOBER 1985	0.0	0.0	10.0	60.0	0.0	0.0	30.0	0.0
NOVEMBER 1985	0.0	0.0	0.0	33.3	0.0	0.0	66.7	0.0
SPRING SEASON	0.0	0.0	5.9	23.5	0.0	0.0	70.6	0.0
SUMMER SEASON	0.0	0.0	7.7	30.8	7.7	0.0	53.8	0.0
FALL SEASON	0.0	0.0	7.7	46.2	0.0	0.0	46.2	0.0
WINTER SEASON	14.3	0.0	0.0	28.6	0.0	14.3	42.9	0.0
FOR THE YEAR	4.2	0.0	4.2	25.0	4.2	4.2	58.3	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIMENS

SITE NO. 1

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	4.3	0.0	0.0	73.9	0.0	4.3	17.4	0.0
MARCH 1985	0.0	0.0	1.2	88.9	0.0	0.0	9.8	0.0
APRIL 1985	0.0	0.0	0.0	38.1	0.0	0.0	61.9	0.0
MAY 1985	0.0	0.0	0.0	27.8	0.0	0.0	72.2	0.0
JUNE 1985	0.0	0.0	0.0	85.7	0.0	0.0	14.3	0.0
JULY 1985	0.0	0.0	10.3	51.7	3.4	0.0	34.5	0.0
AUGUST 1985	0.0	0.0	0.0	83.3	0.0	0.0	16.7	0.0
SEPTEMBER 1985	0.0	0.0	3.2	81.0	0.0	0.0	15.9	0.0
OCTOBER 1985	0.0	0.0	2.4	78.0	0.0	0.0	19.5	0.0
NOVEMBER 1985	0.0	0.0	0.0	60.0	0.0	0.0	40.0	0.0
SPRING SEASON	0.0	0.0	0.7	65.0	0.0	0.0	34.4	0.0
SUMMER SEASON	0.0	0.0	3.0	75.2	1.0	0.0	20.8	0.0
FALL SEASON	0.0	0.0	2.8	78.9	0.0	0.0	18.3	0.0
WINTER SEASON	4.3	0.0	0.0	73.9	0.0	4.3	17.4	0.0
FOR THE YEAR	0.1	0.0	1.3	69.0	0.1	0.1	29.2	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIES

SITE NO. 2

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	0.0	0.0	33.3	33.3	0.0	0.0	33.3	0.0
MARCH 1985	0.0	0.0	16.7	33.3	0.0	0.0	50.0	0.0
APRIL 1985	0.0	0.0	10.0	30.0	0.0	0.0	60.0	0.0
MAY 1985	0.0	0.0	0.0	40.0	0.0	0.0	60.0	0.0
JUNE 1985	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
JULY 1985	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0
AUGUST 1985	0.0	0.0	0.0	75.0	0.0	0.0	25.0	0.0
SEPTEMBER 1985	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0
OCTOBER 1985	10.0	0.0	10.0	30.0	0.0	0.0	50.0	0.0
NOVEMBER 1985	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0
SPRING SEASON	0.0	0.0	8.3	33.3	0.0	0.0	58.3	0.0
SUMMER SEASON	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0
FALL SEASON	8.3	0.0	8.3	33.3	0.0	0.0	50.0	0.0
WINTER SEASON	0.0	0.0	33.3	33.3	0.0	0.0	33.3	0.0
FOR THE YEAR	5.9	0.0	5.9	23.5	0.0	0.0	64.7	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIMENS

SITE NO. 2

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	0.0	0.0	40.0	40.0	0.0	0.0	20.0	0.0
MARCH 1985	0.0	0.0	21.4	61.9	0.0	0.0	16.7	0.0
APRIL 1985	0.0	0.0	12.2	32.7	0.0	0.0	55.1	0.0
MAY 1985	0.0	0.0	0.0	24.4	0.0	0.0	75.6	0.0
JUNE 1985	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
JULY 1985	0.0	0.0	0.0	80.0	0.0	0.0	20.0	0.0
AUGUST 1985	0.0	0.0	0.0	57.1	0.0	0.0	42.9	0.0
SEPTEMBER 1985	0.0	0.0	0.0	46.2	0.0	0.0	53.8	0.0
OCTOBER 1985	5.7	0.0	2.9	37.1	0.0	0.0	54.3	0.0
NOVEMBER 1985	0.0	0.0	0.0	66.7	0.0	0.0	33.3	0.0
SPRING SEASON	0.0	0.0	11.0	39.0	0.0	0.0	50.0	0.0
SUMMER SEASON	0.0	0.0	0.0	75.0	0.0	0.0	25.0	0.0
FALL SEASON	3.7	0.0	1.9	42.6	0.0	0.0	51.9	0.0
WINTER SEASON	0.0	0.0	40.0	40.0	0.0	0.0	20.0	0.0
FOR THE YEAR	0.9	0.0	7.8	45.5	0.0	0.0	45.9	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIES

SITE NO. 3

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	0.0	0.0	0.0	66.7	0.0	0.0	33.3	0.0
MARCH 1985	0.0	0.0	0.0	44.4	0.0	11.1	44.4	0.0
APRIL 1985	0.0	6.3	12.5	31.3	0.0	0.0	50.0	0.0
MAY 1985	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0
JUNE 1985	0.0	0.0	20.0	60.0	0.0	0.0	20.0	0.0
JULY 1985	0.0	0.0	12.5	50.0	0.0	0.0	37.5	0.0
AUGUST 1985	0.0	0.0	10.0	30.0	0.0	0.0	60.0	0.0
SEPTEMBER 1985	0.0	0.0	8.3	41.7	0.0	0.0	50.0	0.0
OCTOBER 1985	9.1	0.0	9.1	36.4	0.0	9.1	36.4	0.0
NOVEMBER 1985	0.0	0.0	16.7	33.3	0.0	16.7	33.3	0.0
JANUARY 1986	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0
SPRING SEASON	0.0	5.0	10.0	30.0	0.0	5.0	50.0	0.0
SUMMER SEASON	0.0	0.0	8.3	33.3	0.0	0.0	58.3	0.0
FALL SEASON	6.3	0.0	6.3	37.5	0.0	6.3	43.8	0.0
WINTER SEASON	0.0	0.0	0.0	50.0	0.0	25.0	25.0	0.0
FOR THE YEAR	4.2	4.2	8.3	29.2	0.0	4.2	50.0	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIMENS

SITE NO. 3

		OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY	1985	0.0	0.0	0.0	44.1	0.0	0.0	55.9	0.0
MARCH	1985	0.0	0.0	0.0	53.8	0.0	3.8	42.3	0.0
APRIL	1985	0.0	3.1	3.1	37.5	0.0	0.0	56.3	0.0
MAY	1985	0.0	0.0	0.0	44.4	0.0	0.0	55.6	0.0
JUNE	1985	0.0	0.0	7.1	85.7	0.0	0.0	7.1	0.0
JULY	1985	0.0	0.0	4.8	66.7	0.0	0.0	28.6	0.0
AUGUST	1985	0.0	0.0	18.8	46.9	0.0	0.0	34.4	0.0
SEPTEMBER	1985	0.0	0.0	9.1	17.2	0.0	0.0	73.7	0.0
OCTOBER	1985	5.9	0.0	20.6	35.3	0.0	2.9	35.3	0.0
NOVEMBER	1985	0.0	0.0	10.5	57.9	0.0	5.3	26.3	0.0
JANUARY	1986	0.0	0.0	0.0	0.0	0.0	25.0	75.0	0.0
SPRING SEASON		0.0	2.0	2.0	42.4	0.0	1.0	52.5	0.0
SUMMER SEASON		0.0	0.0	11.9	61.2	0.0	0.0	26.9	0.0
FALL SEASON		1.3	0.0	11.8	26.3	0.0	1.3	59.2	0.0
WINTER SEASON		0.0	0.0	0.0	39.5	0.0	2.6	57.9	0.0
FOR THE YEAR		0.6	0.6	7.9	38.8	0.0	1.1	51.1	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIES

SITE NO. 4

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	0.0	0.0	0.0	50.0	0.0	25.0	25.0	0.0
MARCH 1985	0.0	0.0	12.5	37.5	0.0	0.0	50.0	0.0
APRIL 1985	0.0	0.0	0.0	42.9	0.0	0.0	57.1	0.0
MAY 1985	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0
JUNE 1985	0.0	0.0	10.0	30.0	0.0	0.0	60.0	0.0
JULY 1985	0.0	0.0	10.0	40.0	0.0	0.0	50.0	0.0
AUGUST 1985	0.0	0.0	0.0	60.0	0.0	0.0	40.0	0.0
SEPTEMBER 1985	0.0	0.0	10.0	40.0	0.0	0.0	50.0	0.0
OCTOBER 1985	0.0	0.0	11.1	44.4	0.0	0.0	44.4	0.0
NOVEMBER 1985	0.0	0.0	0.0	66.7	0.0	0.0	33.3	0.0
JANUARY 1986	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0
SPRING SEASON	0.0	0.0	7.1	28.6	0.0	0.0	64.3	0.0
SUMMER SEASON	0.0	0.0	6.7	33.3	0.0	0.0	60.0	0.0
FALL SEASON	0.0	0.0	8.3	41.7	0.0	0.0	50.0	0.0
WINTER SEASON	0.0	0.0	0.0	57.1	0.0	14.3	28.6	0.0
FOR THE YEAR	0.0	0.0	5.3	31.6	0.0	5.3	57.9	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIMENS

SITE NO. 4

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	0.0	0.0	0.0	50.0	0.0	21.4	28.6	0.0
MARCH 1985	0.0	0.0	1.8	85.5	0.0	0.0	12.7	0.0
APRIL 1985	0.0	0.0	0.0	66.7	0.0	0.0	33.3	0.0
MAY 1985	0.0	0.0	0.0	71.4	0.0	0.0	28.6	0.0
JUNE 1985	0.0	0.0	17.5	35.0	0.0	0.0	47.5	0.0
JULY 1985	0.0	0.0	5.9	64.7	0.0	0.0	29.4	0.0
AUGUST 1985	0.0	0.0	0.0	62.5	0.0	0.0	37.5	0.0
SEPTEMBER 1985	0.0	0.0	13.0	52.2	0.0	0.0	34.8	0.0
OCTOBER 1985	0.0	0.0	3.6	11.9	0.0	0.0	84.5	0.0
NOVEMBER 1985	0.0	0.0	0.0	66.7	0.0	0.0	33.3	0.0
JANUARY 1986	0.0	0.0	0.0	11.1	0.0	0.0	88.9	0.0
SPRING SEASON	0.0	0.0	1.1	78.3	0.0	0.0	20.7	0.0
SUMMER SEASON	0.0	0.0	12.3	46.2	0.0	0.0	41.5	0.0
FALL SEASON	0.0	0.0	5.5	21.8	0.0	0.0	72.7	0.0
WINTER SEASON	0.0	0.0	0.0	28.1	0.0	9.4	62.5	0.0
FOR THE YEAR	0.0	0.0	5.0	45.2	0.0	1.0	48.8	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIES

SITE NO. 5

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	0.0	0.0	0.0	25.0	0.0	25.0	50.0	0.0
MARCH 1985	0.0	0.0	9.1	45.5	0.0	9.1	36.4	0.0
APRIL 1985	0.0	0.0	11.1	44.4	0.0	0.0	44.4	0.0
MAY 1985	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0
JUNE 1985	0.0	0.0	12.5	50.0	0.0	0.0	37.5	0.0
JULY 1985	0.0	0.0	0.0	42.9	0.0	0.0	57.1	0.0
AUGUST 1985	0.0	0.0	0.0	75.0	0.0	0.0	25.0	0.0
SEPTEMBER 1985	0.0	0.0	16.7	33.3	0.0	0.0	50.0	0.0
OCTOBER 1985	0.0	0.0	10.0	30.0	0.0	10.0	50.0	0.0
NOVEMBER 1985	0.0	0.0	0.0	40.0	0.0	0.0	60.0	0.0
JANUARY 1986	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
SPRING SEASON	0.0	0.0	9.1	45.5	0.0	9.1	36.4	0.0
SUMMER SEASON	0.0	0.0	9.1	45.5	0.0	0.0	45.5	0.0
FALL SEASON	0.0	0.0	7.1	35.7	0.0	7.1	50.0	0.0
WINTER SEASON	0.0	0.0	0.0	25.0	0.0	25.0	50.0	0.0
FOR THE YEAR	0.0	0.0	5.3	42.1	0.0	5.3	47.4	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING FROM 2/21/85 TO 1/13/86

PFLIEGER FAUNAL COMPOSITION(%) -- NO. OF SPECIMENS

SITE NO. 5

	OZARK	LOWLAND	PRAIRIE	BIG RIVER	OZARK LOWLAND	OZARK PRAIRIE	WIDE RANGING	NOT DEFINED
FEBRUARY 1985	0.0	0.0	0.0	30.0	0.0	10.0	60.0	0.0
MARCH 1985	0.0	0.0	7.0	68.6	0.0	1.2	23.3	0.0
APRIL 1985	0.0	0.0	1.6	77.4	0.0	0.0	21.0	0.0
MAY 1985	0.0	0.0	33.3	66.7	0.0	0.0	0.0	0.0
JUNE 1985	0.0	0.0	5.6	36.1	0.0	0.0	58.3	0.0
JULY 1985	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0
AUGUST 1985	0.0	0.0	0.0	72.7	0.0	0.0	27.3	0.0
SEPTEMBER 1985	0.0	0.0	19.2	65.4	0.0	0.0	15.4	0.0
OCTOBER 1985	0.0	0.0	1.0	4.1	0.0	1.0	93.9	0.0
NOVEMBER 1985	0.0	0.0	0.0	66.7	0.0	0.0	33.3	0.0
JANUARY 1986	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
SPRING SEASON	0.0	0.0	5.3	72.2	0.0	0.7	21.9	0.0
SUMMER SEASON	0.0	0.0	3.6	45.5	0.0	0.0	50.9	0.0
FALL SEASON	0.0	0.0	4.4	21.3	0.0	0.7	73.5	0.0
WINTER SEASON	0.0	0.0	0.0	20.0	0.0	6.7	73.3	0.0
FOR THE YEAR	0.0	0.0	4.5	46.5	0.0	0.8	48.2	0.0

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- CHESTNUT LAMPREY PAGE 1

ICHTHYOMYZON CASTANEUS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
141- 160	6	0.17	0.12 TO 0.21						
161- 180	4	0.16	0.14 TO 0.20	1	0.26	0.26 TO 0.26			
181- 200							1	0.20	0.20 TO 0.20
201- 220				1	0.16	0.16 TO 0.16	2	0.28	0.27 TO 0.29
221- 240	1	0.20	0.20 TO 0.20				2	0.23	0.23 TO 0.23
241- 260	1	0.21	0.21 TO 0.21				4	0.20	0.18 TO 0.25
261- 280							2	0.19	0.18 TO 0.19
281- 300							1	0.24	0.24 TO 0.24
301- 320	1	0.27	0.27 TO 0.27				1	0.20	0.20 TO 0.20
TOTAL 141- 320	13	0.18	0.12 TO 0.27	2	0.21	0.16 TO 0.26	13	0.22	0.18 TO 0.29

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
141- 160				6	0.17	0.12 TO 0.21
161- 180				5	0.18	0.14 TO 0.26
181- 200				1	0.20	0.20 TO 0.20
201- 220				3	0.24	0.16 TO 0.29
221- 240				3	0.22	0.20 TO 0.23
241- 260				5	0.20	0.18 TO 0.25
261- 280				2	0.19	0.18 TO 0.19
281- 300				1	0.24	0.24 TO 0.24
301- 320				2	0.24	0.20 TO 0.27
TOTAL 141- 320				28	0.20	0.12 TO 0.29

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- LONGNOSE GAR
LEPISOSTEUS OSSEUS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
321- 340	1	0.18	0.18 TO 0.18	1	0.17	0.17 TO 0.17			
341- 360	1	0.16	0.16 TO 0.16						
381- 400	1	0.17	0.17 TO 0.17	1	0.16	0.16 TO 0.16			
401- 420	1	0.20	0.20 TO 0.20	3	0.19	0.16 TO 0.21	2	0.16	0.15 TO 0.17
421- 440	1	0.16	0.16 TO 0.16	3	0.16	0.16 TO 0.16	1	0.17	0.17 TO 0.17
441- 460				2	0.18	0.17 TO 0.19	3	0.19	0.18 TO 0.21
461- 480				1	0.17	0.17 TO 0.17			
501- 520				1	0.18	0.18 TO 0.18	1	0.18	0.18 TO 0.18
521- 540				2	0.17	0.16 TO 0.18			
541- 560	2	0.19	0.19 TO 0.20	1	0.18	0.18 TO 0.18			
561- 580							2	0.16	0.14 TO 0.17
581- 600	2	0.21	0.18 TO 0.23	1	0.19	0.19 TO 0.19			
601- 620				1	0.19	0.19 TO 0.19	2	0.19	0.18 TO 0.19
621- 640				1	0.18	0.18 TO 0.18			
661- 680				1	0.20	0.20 TO 0.20	1	0.19	0.19 TO 0.19
701- 720							1	0.20	0.20 TO 0.20
741- 760				1	0.24	0.24 TO 0.24	1	0.20	0.20 TO 0.20
781- 800							2	0.21	0.21 TO 0.21
801- 820							1	0.24	0.24 TO 0.24
881- 900							1	0.19	0.19 TO 0.19
1101-1120							1	0.30	0.30 TO 0.30
1121-1140				1	0.29	0.29 TO 0.29			
TOTAL 321-1140	9	0.19	0.16 TO 0.23	21	0.19	0.16 TO 0.29	19	0.19	0.14 TO 0.30

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- LONGNOSE GAR
LEPISOSTEUS OSSEUS

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
321- 340				2	0.18	0.17 TO 0.18
341- 360				1	0.16	0.16 TO 0.16
381- 400				2	0.17	0.16 TO 0.17
401- 420				6	0.18	0.15 TO 0.21
421- 440				5	0.16	0.16 TO 0.17
441- 460				5	0.19	0.17 TO 0.21
461- 480				1	0.17	0.17 TO 0.17
501- 520				2	0.18	0.18 TO 0.18
521- 540				2	0.17	0.16 TO 0.18
541- 560				3	0.19	0.18 TO 0.20
561- 580				2	0.16	0.14 TO 0.17
581- 600				3	0.20	0.18 TO 0.23
601- 620				3	0.19	0.18 TO 0.19
621- 640				1	0.18	0.18 TO 0.18
661- 680				2	0.20	0.19 TO 0.20
701- 720				1	0.20	0.20 TO 0.20
741- 760				2	0.22	0.20 TO 0.24
781- 800				2	0.21	0.21 TO 0.21
801- 820				1	0.24	0.24 TO 0.24
881- 900				1	0.19	0.19 TO 0.19
1101-1120				1	0.30	0.30 TO 0.30
1121-1140				1	0.29	0.29 TO 0.29
TOTAL 321-1140				49	0.19	0.14 TO 0.30

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- SHORTNOSE GAR
LEPISOSTEUS PLATOSTOMUS

PAGE 1

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
321- 340	5	0.29	0.25 TO 0.33	3	0.30	0.28 TO 0.32			
341- 360	2	0.31	0.31 TO 0.32	3	0.27	0.25 TO 0.30			
361- 380	10	0.30	0.27 TO 0.35	4	0.26	0.22 TO 0.28	1	0.33	0.33 TO 0.33
381- 400	5	0.31	0.27 TO 0.37	5	0.28	0.25 TO 0.31			
401- 420	3	0.34	0.30 TO 0.37	5	0.28	0.24 TO 0.33	1	0.28	0.28 TO 0.28
421- 440	3	0.32	0.31 TO 0.32	9	0.31	0.26 TO 0.41	2	0.28	0.26 TO 0.29
441- 460	3	0.32	0.32 TO 0.33	5	0.28	0.25 TO 0.31	2	0.34	0.26 TO 0.42
461- 480	3	0.32	0.31 TO 0.35	11	0.30	0.23 TO 0.39	4	0.29	0.27 TO 0.31
481- 500	3	0.34	0.29 TO 0.40	12	0.31	0.25 TO 0.36	3	0.26	0.26 TO 0.27
501- 520	4	0.36	0.32 TO 0.40	11	0.29	0.25 TO 0.34	1	0.29	0.29 TO 0.29
521- 540	2	0.34	0.32 TO 0.37	8	0.28	0.24 TO 0.31	2	0.28	0.26 TO 0.30
541- 560	5	0.34	0.30 TO 0.40	4	0.33	0.29 TO 0.39	1	0.33	0.33 TO 0.33
561- 580				3	0.33	0.29 TO 0.37			
581- 600	2	0.39	0.36 TO 0.42	1	0.27	0.27 TO 0.27			
601- 620	1	0.40	0.40 TO 0.40	2	0.25	0.18 TO 0.33	1	0.35	0.35 TO 0.35
621- 640	2	0.35	0.31 TO 0.39						
641- 660	1	0.38	0.38 TO 0.38	1	0.36	0.36 TO 0.36			
661- 680	1	0.37	0.37 TO 0.37	1	0.42	0.42 TO 0.42			
701- 720				1	0.32	0.32 TO 0.32			
781- 800	1	0.40	0.40 TO 0.40						
TOTAL 321- 800	56	0.33	0.25 TO 0.42	89	0.30	0.18 TO 0.42	18	0.30	0.26 TO 0.42

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- SHORTNOSE GAR
LEPISOSTEUS PLATOSTOMUS

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
321- 340				8	0.30	0.25 TO 0.33
341- 360				5	0.29	0.25 TO 0.32
361- 380				15	0.29	0.22 TO 0.35
381- 400				10	0.29	0.25 TO 0.37
401- 420				9	0.30	0.24 TO 0.37
421- 440				14	0.30	0.26 TO 0.41
441- 460				10	0.31	0.25 TO 0.42
461- 480				18	0.30	0.23 TO 0.39
481- 500				18	0.31	0.25 TO 0.40
501- 520				16	0.31	0.25 TO 0.40
521- 540				12	0.29	0.24 TO 0.37
541- 560				10	0.33	0.29 TO 0.40
561- 580				3	0.33	0.29 TO 0.37
581- 600				3	0.35	0.27 TO 0.42
601- 620				4	0.32	0.18 TO 0.40
621- 640				2	0.35	0.31 TO 0.39
641- 660				2	0.37	0.36 TO 0.38
661- 680				2	0.40	0.37 TO 0.42
701- 720				1	0.32	0.32 TO 0.32
781- 800				1	0.40	0.40 TO 0.40
TOTAL 321- 800				163	0.31	0.18 TO 0.42

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- GIZZARD SHAD
DOROSOMA CEPEDIANUM

	SPRING			SUMMER			FALL		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
0- 100	101	0.95	0.68 TO 2.14				6	0.86	0.59 TO 1.17
101- 150	10	0.88	0.64 TO 1.46				6	0.87	0.73 TO 1.14
151- 200	7	0.76	0.68 TO 0.81				19	0.90	0.70 TO 1.21
201- 250	19	0.81	0.54 TO 1.04	5	1.01	0.81 TO 1.58	74	0.94	0.77 TO 1.03
251- 300	33	0.90	0.76 TO 1.01	13	0.83	0.73 TO 0.93	63	0.98	0.85 TO 1.50
301- 350	20	0.91	0.81 TO 1.01	9	0.82	0.74 TO 0.90	63	1.00	0.82 TO 1.06
351- 400	4	1.00	0.89 TO 1.09	1	0.81	0.81 TO 0.81	11	0.97	0.81 TO 1.13
TOTAL 0- 400	194	0.91	0.54 TO 2.14	28	0.86	0.73 TO 1.58	242	0.96	0.59 TO 1.50

	WINTER			FOR YEAR		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
0- 100	8	1.37	0.42 TO 2.06	115	0.97	0.42 TO 2.14
101- 150	31	0.93	0.49 TO 1.58	47	0.91	0.49 TO 1.58
151- 200	5	0.93	0.62 TO 1.09	31	0.87	0.62 TO 1.21
201- 250	4	0.85	0.79 TO 0.92	102	0.92	0.54 TO 1.58
251- 300	5	0.91	0.73 TO 1.12	114	0.94	0.73 TO 1.50
301- 350				92	0.96	0.74 TO 1.06
351- 400	1	0.99	0.99 TO 0.99	17	0.97	0.81 TO 1.13
TOTAL 0- 400	54	0.99	0.42 TO 2.06	518	0.94	0.42 TO 2.14

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- GOLDEYE
HIODON ALOSOIDES

PAGE 1

	SPRING			SUMMER			FALL		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
61- 80				1	0.95	0.95 TO 0.95			
81- 100				2	0.71	0.70 TO 0.73			
101- 120				1	0.89	0.89 TO 0.89	4	0.91	0.58 TO 1.07
121- 140	2	0.99	0.98 TO 1.00				5	0.99	0.89 TO 1.13
141- 160	9	0.82	0.74 TO 0.89						
161- 180	30	0.82	0.54 TO 1.22	7	0.84	0.70 TO 1.11			
181- 200	100	0.82	0.63 TO 1.07	9	0.81	0.64 TO 0.99	8	0.71	0.54 TO 0.87
201- 220	10	0.84	0.79 TO 0.90	7	0.78	0.65 TO 0.88	6	0.74	0.62 TO 0.83
221- 240	4	0.82	0.79 TO 0.88	2	0.81	0.70 TO 0.91	9	0.73	0.61 TO 0.87
241- 260	1	0.76	0.76 TO 0.76	2	0.72	0.72 TO 0.73	3	0.72	0.70 TO 0.75
261- 280	8	0.76	0.72 TO 0.82	1	1.10	1.10 TO 1.10	7	0.76	0.65 TO 0.82
281- 300	15	0.81	0.72 TO 0.95	1	0.81	0.81 TO 0.81	6	0.83	0.65 TO 0.96
301- 320	8	0.87	0.77 TO 0.93	4	0.79	0.71 TO 0.86	4	0.80	0.70 TO 0.91
321- 340	8	0.89	0.78 TO 1.00	6	0.76	0.68 TO 0.80	4	0.79	0.75 TO 0.84
341- 360	4	0.92	0.81 TO 1.07	2	0.74	0.73 TO 0.75	4	0.81	0.78 TO 0.83
361- 380	2	1.05	0.98 TO 1.12	2	0.76	0.67 TO 0.85			
381- 400	1	0.85	0.85 TO 0.85	1	0.71	0.71 TO 0.71			
401- 420				2	0.80	0.71 TO 0.89			
TOTAL 61- 420	202	0.83	0.54 TO 1.22	50	0.80	0.64 TO 1.11	60	0.79	0.54 TO 1.13

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- GOLDEYE
HIODON ALOSOIDES

	WINTER			FOR YEAR		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
61- 80				1	0.95	0.95 TO 0.95
81- 100				2	0.71	0.70 TO 0.73
101- 120				5	0.91	0.58 TO 1.07
121- 140				7	0.99	0.89 TO 1.13
141- 160	2	1.04	0.94 TO 1.14	11	0.86	0.74 TO 1.14
161- 180	5	0.80	0.53 TO 0.90	42	0.82	0.53 TO 1.22
181- 200	1	0.86	0.86 TO 0.86	118	0.81	0.54 TO 1.07
201- 220				23	0.80	0.62 TO 0.90
221- 240				15	0.76	0.61 TO 0.91
241- 260	1	0.75	0.75 TO 0.75	7	0.73	0.70 TO 0.76
261- 280				16	0.78	0.65 TO 1.10
281- 300				22	0.81	0.65 TO 0.96
301- 320	1	0.86	0.86 TO 0.86	17	0.83	0.70 TO 0.93
321- 340				18	0.83	0.68 TO 1.00
341- 360				10	0.84	0.73 TO 1.07
361- 380				4	0.90	0.67 TO 1.12
381- 400				2	0.78	0.71 TO 0.85
401- 420				2	0.80	0.71 TO 0.89
TOTAL 61- 420	10	0.86	0.53 TO 1.14	322	0.82	0.53 TO 1.22

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- CARP
CYPRINUS CARPIO

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
121- 140	4	1.41	1.24 TO 1.60						
141- 160	15	1.39	1.21 TO 1.70						
161- 180	14	1.40	1.16 TO 1.68						
181- 200	5	1.39	1.27 TO 1.56						
201- 220	2	1.34	1.26 TO 1.41						
281- 300				1	1.41	1.41 TO 1.41	1	1.31	1.31 TO 1.31
301- 320				3	1.38	1.28 TO 1.59	2	1.23	1.21 TO 1.24
321- 340				2	1.27	1.24 TO 1.30	1	1.36	1.36 TO 1.36
341- 360				1	1.22	1.22 TO 1.22	1	1.36	1.36 TO 1.36
361- 380				1	1.34	1.34 TO 1.34			
381- 400	1	1.24	1.24 TO 1.24	1	1.23	1.23 TO 1.23	2	1.54	1.49 TO 1.59
421- 440	2	1.26	1.25 TO 1.27	1	1.30	1.30 TO 1.30	1	1.54	1.54 TO 1.54
441- 460							2	1.49	1.34 TO 1.63
461- 480				3	1.33	1.23 TO 1.39	2	1.34	1.33 TO 1.34
481- 500	5	1.28	1.14 TO 1.47	2	1.13	1.03 TO 1.23	2	1.20	1.04 TO 1.37
501- 520				3	1.38	1.16 TO 1.65	1	1.39	1.39 TO 1.39
521- 540	2	1.42	1.41 TO 1.44				4	1.34	1.24 TO 1.41
541- 560	2	1.53	1.45 TO 1.60	3	1.23	1.11 TO 1.32	2	1.43	1.42 TO 1.43
561- 580	2	1.43	1.21 TO 1.65						
581- 600	3	1.31	1.25 TO 1.41	3	1.23	1.01 TO 1.37			
601- 620				2	1.42	1.37 TO 1.48	3	1.53	1.34 TO 1.76
621- 640							1	1.32	1.32 TO 1.32
641- 660				1	1.11	1.11 TO 1.11			
661- 680							1	0.74	0.74 TO 0.74
681- 700				1	1.08	1.08 TO 1.08			
TOTAL 121- 700	57	1.38	1.14 TO 1.70	28	1.29	1.01 TO 1.65	26	1.36	0.74 TO 1.76

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- CARP
CYPRINUS CARPIO

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
121- 140				4	1.41	1.24 TO 1.60
141- 160				15	1.39	1.21 TO 1.70
161- 180				14	1.40	1.16 TO 1.68
181- 200				5	1.39	1.27 TO 1.56
201- 220				2	1.34	1.26 TO 1.41
281- 300				2	1.36	1.31 TO 1.41
301- 320				5	1.32	1.21 TO 1.59
321- 340				3	1.30	1.24 TO 1.36
341- 360				2	1.29	1.22 TO 1.36
361- 380				1	1.34	1.34 TO 1.34
381- 400				4	1.39	1.23 TO 1.59
421- 440				4	1.34	1.25 TO 1.54
441- 460				2	1.49	1.34 TO 1.63
461- 480				5	1.34	1.23 TO 1.39
481- 500				9	1.23	1.03 TO 1.47
501- 520	1	1.36	1.36 TO 1.36	5	1.38	1.16 TO 1.65
521- 540	1	1.11	1.11 TO 1.11	7	1.33	1.11 TO 1.44
541- 560				7	1.37	1.11 TO 1.60
561- 580				2	1.43	1.21 TO 1.65
581- 600				6	1.27	1.01 TO 1.41
601- 620				5	1.49	1.34 TO 1.76
621- 640				1	1.32	1.32 TO 1.32
641- 660				1	1.11	1.11 TO 1.11
661- 680				1	0.74	0.74 TO 0.74
681- 700				1	1.08	1.08 TO 1.08
TOTAL 121- 700	2	1.23	1.11 TO 1.36	113	1.35	0.74 TO 1.76

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- RIVER CARPSUCKER CARPIODES CARPIO

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
1- 80	1	0.99	0.99 TO 0.99						
101- 120	1	1.15	1.15 TO 1.15						
121- 140	2	1.16	1.08 TO 1.25						
141- 160	3	1.15	1.09 TO 1.25						
161- 180	5	1.16	1.14 TO 1.22				5	1.30	1.24 TO 1.37
181- 200	6	1.21	1.13 TO 1.30				1	1.16	1.16 TO 1.16
201- 220	4	1.18	1.12 TO 1.25	1	1.13	1.13 TO 1.13	2	1.28	1.14 TO 1.43
221- 240	1	1.36	1.36 TO 1.36				4	1.20	1.12 TO 1.30
241- 260	1	1.30	1.30 TO 1.30	1	1.21	1.21 TO 1.21	3	1.23	1.20 TO 1.25
261- 280				1	1.28	1.28 TO 1.28	1	1.14	1.14 TO 1.14
301- 320							3	1.22	1.19 TO 1.27
321- 340	1	0.99	0.99 TO 0.99						
341- 360	2	1.27	1.13 TO 1.40	1	1.46	1.46 TO 1.46			
361- 380				3	1.22	1.18 TO 1.24			
381- 400				2	1.32	1.20 TO 1.43	4	1.21	1.09 TO 1.32
401- 420				5	1.25	1.10 TO 1.41	2	1.26	1.09 TO 1.44
421- 440	1	1.41	1.41 TO 1.41	7	1.33	1.20 TO 1.47	5	1.17	0.98 TO 1.32
441- 460							2	1.36	1.33 TO 1.39
461- 480							2	1.27	1.12 TO 1.43
TOTAL 61- 480	28	1.19	0.99 TO 1.41	21	1.28	1.10 TO 1.47	34	1.23	0.98 TO 1.44

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- RIVER CARPSUCKER
CARPIODES CARPIO

	WINTER			FOR YEAR		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
61- 80				1	0.99	0.99 TO 0.99
101- 120				1	1.15	1.15 TO 1.15
121- 140				2	1.16	1.08 TO 1.25
141- 160				3	1.15	1.09 TO 1.25
161- 180				10	1.23	1.14 TO 1.37
181- 200				7	1.20	1.13 TO 1.30
201- 220				7	1.20	1.12 TO 1.43
221- 240				5	1.23	1.12 TO 1.36
241- 260				5	1.24	1.20 TO 1.30
261- 280				2	1.21	1.14 TO 1.28
301- 320				3	1.22	1.19 TO 1.27
321- 340	1	1.21	1.21 TO 1.21	2	1.10	0.99 TO 1.21
341- 360	1	1.33	1.33 TO 1.33	4	1.33	1.13 TO 1.46
361- 380				3	1.22	1.18 TO 1.24
381- 400				6	1.24	1.09 TO 1.43
401- 420				7	1.25	1.09 TO 1.44
421- 440				13	1.27	0.98 TO 1.47
441- 460				2	1.36	1.33 TO 1.39
461- 480				2	1.27	1.12 TO 1.43
TOTAL 61- 480	2	1.27	1.21 TO 1.33	85	1.23	0.98 TO 1.47

Appendix D.6 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- SMALLMOUTH BUFFALO
ICTIOBUS BUBALUS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
101- 120	3	1.19	1.06 TO 1.32						
121- 140	1	1.25	1.25 TO 1.25						
321- 340							1	1.41	1.41 TO 1.41
341- 360	1	1.27	1.27 TO 1.27						
361- 380	1	1.48	1.48 TO 1.48	1	1.38	1.38 TO 1.38			
381- 400							1	1.61	1.61 TO 1.61
441- 460							1	1.56	1.56 TO 1.56
541- 560							1	1.61	1.61 TO 1.61
TOTAL 101- 560	6	1.26	1.06 TO 1.48	1	1.38	1.38 TO 1.38	4	1.55	1.41 TO 1.61

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
101- 120				3	1.19	1.06 TO 1.32
121- 140				1	1.25	1.25 TO 1.25
321- 340				1	1.41	1.41 TO 1.41
341- 360				1	1.27	1.27 TO 1.27
361- 380				2	1.43	1.38 TO 1.48
381- 400				1	1.61	1.61 TO 1.61
441- 460				1	1.56	1.56 TO 1.56
541- 560				1	1.61	1.61 TO 1.61
TOTAL 101- 560				11	1.38	1.06 TO 1.61

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- BIGMOUTH BUFFALO PAGE 1
ICTIOBUS CYPRINELLUS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
101- 120	1	1.22	1.22 TO 1.22						
121- 140	1	1.24	1.24 TO 1.24						
161- 180	1	1.56	1.56 TO 1.56						
441- 460							1	1.51	1.51 TO 1.51
481- 500							1	1.40	1.40 TO 1.40
501- 520							1	1.70	1.70 TO 1.70
541- 560	1	1.49	1.49 TO 1.49						
601- 620							1	1.62	1.62 TO 1.62
TOTAL 101- 620	4	1.38	1.22 TO 1.56				4	1.56	1.40 TO 1.70

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
101- 120				1	1.22	1.22 TO 1.22
121- 140				1	1.24	1.24 TO 1.24
161- 180				1	1.56	1.56 TO 1.56
441- 460				1	1.51	1.51 TO 1.51
481- 500				1	1.40	1.40 TO 1.40
501- 520				1	1.70	1.70 TO 1.70
541- 560				1	1.49	1.49 TO 1.49
601- 620				1	1.62	1.62 TO 1.62
TOTAL 101- 620				8	1.47	1.22 TO 1.70

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- SHORTHEAD REDHORSE
MOXOSTOMA MACROLEPIDOTUM

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
261- 280									
301- 320	2	1.00	0.93 TO 1.07				1	0.92	0.92 TO 0.92
341- 360							1	1.06	1.06 TO 1.06
361- 380									
421- 440							1	0.94	0.94 TO 0.94
TOTAL 261- 440	2	1.00	0.93 TO 1.07				3	0.97	0.92 TO 1.06

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
261- 280	1	1.15	1.15 TO 1.15	1	1.15	1.15 TO 1.15
301- 320	2	1.05	1.04 TO 1.06	5	1.01	0.92 TO 1.07
341- 360	1	1.08	1.08 TO 1.08	2	1.07	1.06 TO 1.08
361- 380	2	1.06	0.92 TO 1.20	2	1.06	0.92 TO 1.20
421- 440				1	0.94	0.94 TO 0.94
TOTAL 261- 440	6	1.08	0.92 TO 1.20	11	1.03	0.92 TO 1.20

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- BLUE CATFISH
ICTALURUS FURCATUS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
261- 280							1	0.67	0.67 TO 0.67
281- 300	1	0.99	0.99 TO 0.99						
321- 340				1	0.80	0.80 TO 0.80	1	0.74	0.74 TO 0.74
341- 360							1	0.86	0.86 TO 0.86
381- 400							1	0.72	0.72 TO 0.72
421- 440							1	1.12	1.12 TO 1.12
441- 460							1	1.09	1.09 TO 1.09
481- 500	1	0.99	0.99 TO 0.99						
521- 540				1	0.74	0.74 TO 0.74			
TOTAL 261- 540	2	0.99	0.99 TO 0.99	2	0.77	0.74 TO 0.80	6	0.87	0.67 TO 1.12

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
261- 280				1	0.67	0.67 TO 0.67
281- 300				1	0.99	0.99 TO 0.99
321- 340				2	0.77	0.74 TO 0.80
341- 360				1	0.86	0.86 TO 0.86
381- 400				1	0.72	0.72 TO 0.72
421- 440				1	1.12	1.12 TO 1.12
441- 460				1	1.09	1.09 TO 1.09
481- 500				1	0.99	0.99 TO 0.99
521- 540				1	0.74	0.74 TO 0.74
TOTAL 261- 540				10	0.87	0.67 TO 1.12

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- CHANNEL CATFISH
ICTALURUS PUNCTATUS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
161- 180	1	0.85	0.85 TO 0.85						
181- 200	2	0.81	0.76 TO 0.85						
221- 240	1	0.76	0.76 TO 0.76						
241- 260	1	0.93	0.93 TO 0.93				1	0.78	0.78 TO 0.78
281- 300							1	0.66	0.66 TO 0.66
301- 320	1	0.99	0.99 TO 0.99						
381- 400	1	1.14	1.14 TO 1.14						
401- 420				2	0.76	0.72 TO 0.79			
421- 440	1	1.07	1.07 TO 1.07						
461- 480				3	0.92	0.88 TO 0.97	2	0.90	0.81 TO 0.99
481- 500				1	0.92	0.92 TO 0.92			
541- 560							1	0.89	0.89 TO 0.89
TOTAL 161- 560	8	0.92	0.76 TO 1.14	6	0.87	0.72 TO 0.97	5	0.83	0.66 TO 0.99

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- CHANNEL CATFISH PAGE 2
ICTALURUS PUNCTATUS

	WINTER			FOR YEAR		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
161- 180				1	0.85	0.85 TO 0.85
181- 200				2	0.81	0.76 TO 0.85
221- 240				1	0.76	0.76 TO 0.76
241- 260				2	0.86	0.78 TO 0.93
281- 300				1	0.66	0.66 TO 0.66
301- 320				1	0.99	0.99 TO 0.99
381- 400				1	1.14	1.14 TO 1.14
401- 420				2	0.76	0.72 TO 0.79
421- 440				1	1.07	1.07 TO 1.07
461- 480				5	0.91	0.81 TO 0.99
481- 500				1	0.92	0.92 TO 0.92
541- 560				1	0.89	0.89 TO 0.89
TOTAL 161- 560				19	0.88	0.66 TO 1.14

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- FLATHEAD CATFISH
PYLODICTIS OLIVARIS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
261- 280				1	0.91	0.91 TO 0.91			
281- 300				1	0.88	0.88 TO 0.88			
301- 320				2	0.89	0.88 TO 0.91			
321- 340				1	0.91	0.91 TO 0.91	1	0.88	0.88 TO 0.88
341- 360	1	0.99	0.99 TO 0.99						
561- 580				2	1.02	0.92 TO 1.11			
TOTAL 261- 580	1	0.99	0.99 TO 0.99	7	0.93	0.88 TO 1.11	1	0.88	0.88 TO 0.88

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
261- 280				1	0.91	0.91 TO 0.91
281- 300				1	0.88	0.88 TO 0.88
301- 320				2	0.89	0.88 TO 0.91
321- 340				2	0.90	0.88 TO 0.91
341- 360	1	0.93	0.93 TO 0.93	2	0.96	0.93 TO 0.99
561- 580				2	1.02	0.92 TO 1.11
TOTAL 261- 580	1	0.93	0.93 TO 0.93	10	0.93	0.88 TO 1.11

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- WHITE BASS — PAGE 1

MORONE CHRYSOPS

LENGTH RANGE (MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
101- 120	1	1.16	1.16 TO 1.16						
121- 140	4	1.14	1.03 TO 1.40						
141- 160	1	1.16	1.16 TO 1.16						
161- 180	2	1.10	1.07 TO 1.13	1	1.03	1.03 TO 1.03			
181- 200	3	1.21	0.98 TO 1.65						
221- 240	4	1.03	0.96 TO 1.13	2	1.11	1.08 TO 1.15	2	0.99	0.95 TO 1.03
241- 260	1	1.10	1.10 TO 1.10				1	1.00	1.00 TO 1.00
261- 280	1	1.18	1.18 TO 1.18	1	0.88	0.88 TO 0.88	1	0.95	0.95 TO 0.95
281- 300	3	1.33	1.21 TO 1.41	1	1.06	1.06 TO 1.06	1	0.93	0.93 TO 0.93
301- 320	1	1.32	1.32 TO 1.32	2	1.05	1.04 TO 1.06	1	1.01	1.01 TO 1.01
321- 340				2	1.28	1.23 TO 1.32	1	1.10	1.10 TO 1.10
341- 360	1	1.35	1.35 TO 1.35						
TOTAL 101- 360	22	1.17	0.96 TO 1.65	9	1.09	0.88 TO 1.32	7	1.00	0.93 TO 1.10

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- WHITE BASS
MORONE CHRYSOPS

PAGE 2

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
101- 120				1	1.16	1.16 TO 1.16
121- 140				4	1.14	1.03 TO 1.40
141- 160				1	1.16	1.16 TO 1.16
161- 180				3	1.08	1.03 TO 1.13
181- 200				3	1.21	0.98 TO 1.65
221- 240				8	1.04	0.95 TO 1.15
241- 260				2	1.05	1.00 TO 1.10
261- 280				3	1.00	0.88 TO 1.18
281- 300	1	1.28	1.28 TO 1.28	6	1.21	0.93 TO 1.41
301- 320	1	1.38	1.38 TO 1.38	5	1.16	1.01 TO 1.38
321- 340				3	1.22	1.10 TO 1.32
341- 360				1	1.35	1.35 TO 1.35
TOTAL 101- 360	2	1.33	1.28 TO 1.38	40	1.13	0.88 TO 1.65

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- BLUEGILL PAGE 1
LEPOMIS MACROCHIRUS

	SPRING			SUMMER			FALL		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
81- 100	2	1.89	1.67 TO 2.12						
101- 120	1	2.18	2.18 TO 2.18						
121- 140	2	2.00	1.99 TO 2.00	2	1.82	1.38 TO 2.26			
141- 160				1	2.75	2.75 TO 2.75			
161- 180	3	2.13	1.80 TO 2.37	1	2.53	2.53 TO 2.53			
181- 200	3	2.41	2.18 TO 2.57						
201- 220	1	2.33	2.33 TO 2.33						
TOTAL 81- 220	12	2.16	1.67 TO 2.57	4	2.23	1.38 TO 2.75			

	WINTER			FOR YEAR		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
81- 100				2	1.89	1.67 TO 2.12
101- 120				1	2.18	2.18 TO 2.18
121- 140				4	1.91	1.38 TO 2.26
141- 160				1	2.75	2.75 TO 2.75
161- 180				4	2.23	1.80 TO 2.53
181- 200				3	2.41	2.18 TO 2.57
201- 220				1	2.33	2.33 TO 2.33
TOTAL 81- 220				16	2.18	1.38 TO 2.75

Appendix D.6 (Cont'd)

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- WHITE CRAPPIE
POMOXIS ANNULARIS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
201- 220	1	1.28	1.28 TO 1.28						
221- 240	1	1.31	1.31 TO 1.31	1	1.30	1.30 TO 1.30			
241- 260	2	1.44	1.41 TO 1.48	1	1.41	1.41 TO 1.41			
261- 280	2	1.52	1.48 TO 1.56	1	1.40	1.40 TO 1.40	1	1.23	1.23 TO 1.23
281- 300	2	1.66	1.64 TO 1.69	1	1.33	1.33 TO 1.33			
301- 320	1	1.51	1.51 TO 1.51						
TOTAL 201- 320	9	1.48	1.28 TO 1.69	4	1.36	1.30 TO 1.41	1	1.23	1.23 TO 1.23

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
201- 220				1	1.28	1.28 TO 1.28
221- 240				2	1.31	1.30 TO 1.31
241- 260				3	1.43	1.41 TO 1.48
261- 280				4	1.42	1.23 TO 1.56
281- 300				3	1.55	1.33 TO 1.69
301- 320				1	1.51	1.51 TO 1.51
TOTAL 201- 320				14	1.43	1.23 TO 1.69

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- SAUGER
STIZOSTEDION CANADENSE

PAGE 1

	SPRING			SUMMER			FALL		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
161- 180	1	0.67	0.67 TO 0.67						
261- 280							1	0.75	0.75 TO 0.75
281- 300							1	0.69	0.69 TO 0.69
341- 360							1	0.78	0.78 TO 0.78
461- 480							1	0.72	0.72 TO 0.72
TOTAL 161- 480	1	0.67	0.67 TO 0.67				4	0.73	0.69 TO 0.78

	WINTER			FOR YEAR		
LENGTH RANGE(MM)	NO.	K(TL) MEAN	K(TL) RANGE	NO.	K(TL) MEAN	K(TL) RANGE
161- 180				1	0.67	0.67 TO 0.67
261- 280				1	0.75	0.75 TO 0.75
281- 300				1	0.69	0.69 TO 0.69
341- 360				1	0.78	0.78 TO 0.78
461- 480				1	0.72	0.72 TO 0.72
TOTAL 161- 480				5	0.72	0.67 TO 0.78

SURVEY ON MISSOURI RIVER AT CALLAWAY PLANT IN CALLAWAY COUNTY, MO.

ELECTROFISHING

LENGTH FREQUENCY DISTRIBUTIONS & PONDERAL INDICES K(TL) FROM 2/21/85 TO 1/13/86

SPECIES-- FRESHWATER DRUM PAGE 1
APLODINOTUS GRUNNIENS

LENGTH RANGE(MM)	SPRING NO.	SPRING K(TL) MEAN	SPRING K(TL) RANGE	SUMMER NO.	SUMMER K(TL) MEAN	SUMMER K(TL) RANGE	FALL NO.	FALL K(TL) MEAN	FALL K(TL) RANGE
0- 100	1	0.99	0.99 TO 0.99				2	1.43	1.28 TO 1.57
101- 150	148	0.65	0.50 TO 1.34	2	1.03	0.99 TO 1.07	1	0.96	0.96 TO 0.96
151- 200	32	1.10	0.84 TO 1.22	7	1.11	0.97 TO 1.22	22	1.04	0.63 TO 1.29
201- 250	65	1.07	0.91 TO 1.31	17	1.11	0.88 TO 1.34	22	1.11	0.92 TO 1.42
251- 300	15	1.13	0.86 TO 1.30	16	1.10	0.84 TO 1.22	42	1.10	0.91 TO 1.26
301- 350	13	1.22	1.07 TO 1.42	4	1.09	0.94 TO 1.26	10	1.11	0.86 TO 1.23
351- 400	7	1.28	1.13 TO 1.45	2	1.26	1.22 TO 1.30	3	1.16	1.09 TO 1.23
401- 450	2	1.43	1.35 TO 1.50				1	1.28	1.28 TO 1.28
451- 500							2	1.14	1.06 TO 1.23
TOTAL 0- 500	283	0.87	0.50 TO 1.50	48	1.11	0.84 TO 1.34	105	1.10	0.63 TO 1.57

LENGTH RANGE(MM)	WINTER NO.	WINTER K(TL) MEAN	WINTER K(TL) RANGE	FOR YEAR NO.	FOR YEAR K(TL) MEAN	FOR YEAR K(TL) RANGE
0- 100	4	1.57	0.99 TO 1.91	7	1.44	0.99 TO 1.91
101- 150	12	1.30	0.89 TO 1.85	163	0.70	0.50 TO 1.85
151- 200	2	1.06	1.04 TO 1.07	63	1.08	0.63 TO 1.29
201- 250	13	1.19	1.07 TO 1.81	117	1.09	0.88 TO 1.81
251- 300	2	1.22	1.13 TO 1.32	75	1.11	0.84 TO 1.32
301- 350				27	1.16	0.86 TO 1.42
351- 400				12	1.25	1.09 TO 1.45
401- 450				3	1.38	1.28 TO 1.50
451- 500				2	1.14	1.06 TO 1.23
TOTAL 0- 500	33	1.27	0.89 TO 1.91	469	0.97	0.50 TO 1.91

Appendix E

Quality Assurance Program

Quality Assurance Program

1.0 Introduction

A quality assurance (QA) program was conducted by Union Electric Company on Missouri River aquatic sampling programs in the vicinity of the Callaway Nuclear Power Plant. The purpose of this QA program was to assure that the operational entrainment and impingement studies conducted by Union Electric Company conformed to quality control and quality assurance procedures of environmental assessment.

2.0 Objectives

The Union Electric (UE) quality assurance (QA) program was based on the applicable Sections of the NRC "Quality Assurance Criteria for Nuclear Power Plants" (10 CFR50). Because of the rigid requirements of these QA criteria and procedures, UE was assured that the Callaway 316(b) demonstration would be conducted in a controlled manner which was acceptable to applicable regulatory agencies.

The specific objectives of the QA program were as follows:

- o To provide adequate confidence that the methods, techniques, and procedures used by UE personnel met the study objectives and produced scientifically sound data.

- o To provide assurance that methods, techniques, and procedures employed by UE personnel to collect, analyze, and report environmental data were properly documented.

- o To assure that UE personnel collected, analyzed and reported environmental data that complied with the scope of study, specific procedures and quality control requirements in the performance of their work.

Several procedures were used to guarantee that objectives of the QA program were fulfilled. These included:

- o Review and critique of scope of work
- o Observation and critique of field and laboratory techniques
- o Testing and calibration of measuring and test equipment
- o Training and testing of technicians' work that affected quality of data
- o Original document control
- o Review and critique of the final report

3.0 Materials and Methods

QA program activity areas were summarized within the following 10 categories extracted from 10 CFR 50.

- o Organization
- o Roles and Responsibilities

- Quality Assurance Program
- Scope of Work Control
- Document control
- Identification and control of materials, parts and components
- Control of measuring and test equipment
- Handling, storage and shipping
- Corrective Action

Each of these areas are described in detail as they pertain to the UE QA program in the following text.

3.1 Organization

The UE Environmental Services department manager had the ultimate responsibility for the quality of services performed by the department. The department manager appointed a quality assurance manager who assured the quality of the project being performed. The project was managed by a project leader and he was supported by project personnel. These roles and responsibilities are defined in the following text.

3.2 Roles and Responsibilities

Quality Assurance Manager

Appointed by the department manager, the quality assurance manager (QAM) was not routinely involved in the collection, analysis, interpretation, or reporting of the data for a particular project.

QA Manager responsibilities were:

- Reviewing the project scope of work.
- Reviewing project specifications.
- Being apprised of all activities affecting quality.

Project Leader

The Project Leader (PL) was the individual in charge of conducting the project. This included being in charge of both the field and laboratory work. In the event the PL was unable to be present on a field sampling event, he designated another trained and qualified individual to assume his QA and management responsibilities. The PL had the ultimate responsibility for analysis and reporting of results of that particular project or portion of a project.

The QA responsibilities of a PL included the following:

- Reviewing and helping develop the scope of work for that project.

- o Reviewing project specifications (procedures) to assure compliance with scope of work requirement.
- o Generating controlled documents such as collection and laboratory procedures, data sheets, equipment control and maintenance procedures and standard data forms.
- o Verifying the quality of field data by checking and initialing all field and laboratory data.
- o Revision and filing of project documents.
- o Assuring proper training and certification of project personnel (technicians) in the adherence to the QA program.
- o Including QA status as part of monthly activity reports.

Project Personnel

Project personnel were persons taking part in collection and analysis of samples. They were required to display demonstratable skills in operation of sampling equipment, in processing samples, conducting analysis of data and other quality affecting activities.

Project personnel responsibilities included:

- o Reviewing and following specification of project scope of work.
- o Familiarization with all equipment and procedures which affect quality.

- Notifying Project Leader and documenting with initials and date any variance from scope of work.
- Maintaining and calibrating sampling equipment.
- Initialing and dating any quality affecting procedure work sheet or data analysis that they perform.

3.3 Quality Assurance Program

The QA program was documented by procedures and specifications. All personnel involved with a project were responsible for conducting activities in compliance with these documents. These activities included project design and execution, training and control of materials and equipment, equipment calibration and maintenance, data analysis and report preparation.

Following thorough review of the scope of work, a project planning session was held in order to generate applicable measurement, sample collection and laboratory analysis methods. Suitable data forms were also generated to assure that all appropriate data were recorded. Prior to use, all controlled documents were reviewed and approved by the QA manager, and project leader.

All equipment used in measurements, sample collection and laboratory analyses was assembled, identified (to keep it discrete from similar equipment), maintained and calibrated prior to use. Only trained and certified personnel conducted sampling, analyzed samples and data and wrote reports. All personnel had a minimum educational standard as determined by their job title. Only those personnel that had been trained and certified in the use of certain field equipment were allowed to collect data with that equipment. Inexperienced personnel were accompanied in the field by a certified and trained person until the former had proved proficiency in the use of sampling equipment. Following initial training, laboratory personnel were tested, by the project leader or qualified scientist, on all aspects of their laboratory duties. Each person had to demonstrate the necessary working knowledge of the technical and theoretical aspects of his specialty and position. An individual was allowed to perform only those functions in which they had demonstrated competence. The Project Leader documented this activity in the Quality Assurance file.

3.4 Scope of Work Control

The Department Manager in charge, or a designated alternate, was responsible for appointing personnel to create the project scope of work. This scope includes relevant regulatory or design bases translated into appropriate work scopes. Any variance from the scope of work was noted and corrective action was taken to prevent the variance from recurring.

For each QA program the QA manager or his designee was responsible for the generation of project specifications and documented procedures and forms. Project data sheets were controlled documents and were handled in accordance with QA document control procedures. They were reviewed for technical adequacy and scope of work compliance and were then approved by the project leader.

3.5 Document Control

All documents prescribing activities affecting quality were controlled by the PL. This control assured that all documents had been reviewed and approved by the project leader for compliance with the project scope of work. In addition, the control assured that updated procedures were being used at the appropriate location. All documents were initialed and dated by the Project Leader, who also reviewed and authorized revisions to the documents. It was the responsibility of the Quality Assurance manager to ensure that a copy of each new or revised document reached the appropriate personnel. Original controlled documents are retained in quality assurance files.

Activities effecting quality were prescribed by documented specifications, routings and procedures which were appropriate to the activity being performed. Each project leader generated the specifications, routings or procedures pertaining to the quality-related activities for that project, including criteria for determining that those activities had been accomplished satisfactorily.

All documents released which prescribe activities affecting quality were:

- o Initialed and dated by the author of the document.
- o Reviewed for adequacy and approved for release by the Project Leader and appropriate project management personnel who initialed and dated the document.

Original controlled documents were retained in quality assurance files.

3.6 Identification of Materials and Components

Each in situ measurement or sample collected was uniquely identified by a collection number. This identification is retained from the point of collection through sample inventory, laboratory analysis, data analysis and report preparation. Data and voucher specimens are stored for a period of at least two years following completion of a program of study unless otherwise specified.

3.7 Equipment Control

Measuring and testing equipment was labeled with unique identification numbers. Documented specifications exist for each piece of equipment detailing its necessary capabilities and its accuracy within specified limits. Equipment was calibrated and maintained in accordance with documented procedures so that the standards detailed in its equipment specifications were met.

3.8 Handling, Storage and Shipping

Handling, storage and shipping procedures assured the appropriate environmental conditions and allowed for full data recovery. Each group that maintained materials and equipment affecting quality documented handling, storage, cleaning and preservation procedures.

3.9 Corrective Action

Corrective action that was required was documented. The Quality Assurance manager had the responsibility to make sure that corrective action had been implemented effectively and in a timely manner. If a variance in project design occured, the person noting the variance notified the Project Leader who, in turn, notified the QA manager to discuss the cause, possible effect on data and corrective action necessary to preclude variance recurrence. A standard Variance Form was completed, reviewed, approved and placed in quality assurance files.








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